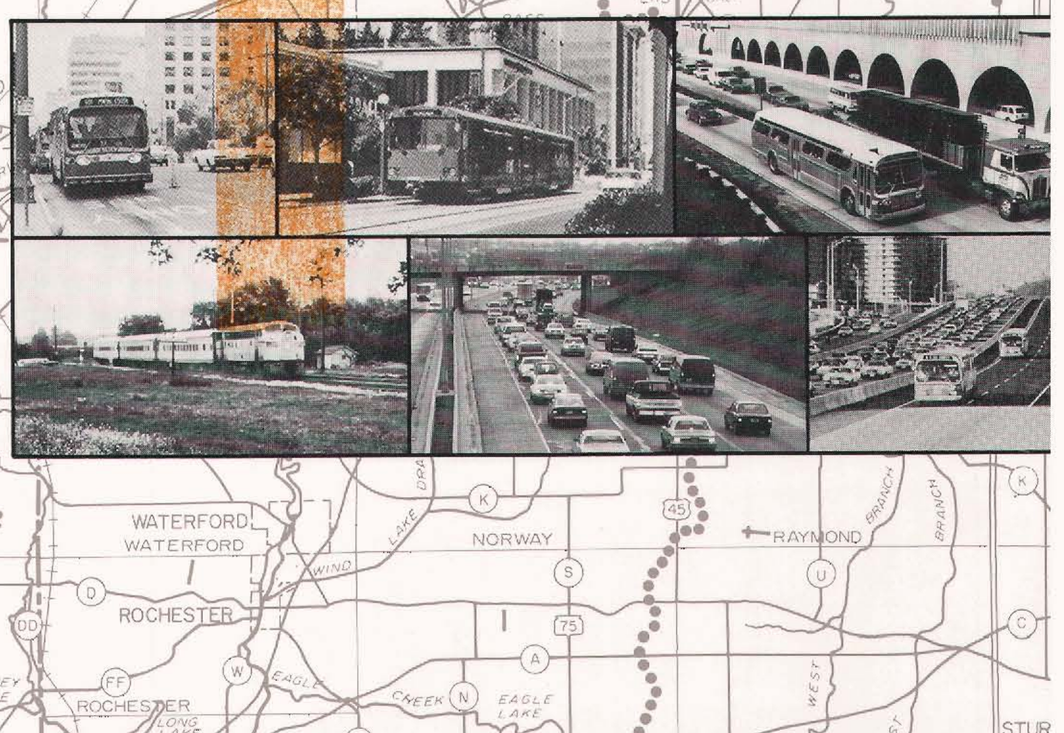
PLANNING REPORT NO. 41

# A REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2010



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PLANNING REPORT NUMBER 41

# A REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2010

Prepared by the

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December 1994

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December 7, 1994

## STATEMENT OF THE CHAIRMAN

The Commission has completed a third-generation regional transportation system plan for Southeastern Wisconsin, advancing the vision for transportation system development into the 21st century. The recommendations contained in the plan as herein documented were developed in the Commission's continuing regional land use-transportation planning effort, which since 1963 has provided the seven-county Region with sound transportation system plans. The Commission's transportation planning efforts have for almost 35 years provided a forum in which changing social and economic conditions, as well as new legal initiatives and regulations attendant to transportation system development, can be publicly evaluated and conscientiously reflected in recommended transportation system improvements for the Region.

In 1966, after careful evaluation and intensive public review of alternatives, the Commission adopted its first-generation regional land use and transportation system plans as guides to land use change and transportation facility development through the design year 1990. Those plans, with supporting data, analyses, forecasts, and objectives, were documented in SEWRPC Planning Report No. 7. In 1978, the Commission adopted its second-generation regional land use and transportation system plans, extending the design year to 2000. These plans were documented in SEWRPC Planning Report No. 25 and reaffirmed the basic concepts underlying the initial plans.

Planning for land use and transportation system development in Southeastern Wisconsin has remained fully integrated in this, the third cycle of transportation systems planning. About 24 months ago, the Commission adopted a third-generation regional land use plan, for the design year 2010. Like the previous plans, the new land use plan promotes a compact, centralized regional settlement pattern. New urban uses are recommended to be located only in areas covered by soils suitable for such use; in areas that may be efficiently served by basic urban services and facilities, including public sanitary sewer, public water supply, and mass transit; and in areas free of special hazards, such as erosion and flooding. The plan also seeks to preserve all primary environmental corridor lands and most prime agricultural lands in the Region. The new regional transportation system plan has been designed to serve the demand for travel generated under the adopted year 2010 regional land use plan and thereby helps to implement that plan.

Significant social and economic changes have occurred in the Region since the adoption of the second-generation transportation system plan. These changes have affected the demand for travel that the transportation system plan must serve and include: significant increases in employment levels and in female participation in the labor force, significant declines in average household size and in private automobile operating costs, an increase in private automobile ownership and use, and continued land development practices that foster urban sprawl and automobile dependency. The transportation effects of these changes have included, among others, increasing trip lengths and traffic congestion, and decreasing transit ridership. The new plan has been designed to moderate travel demand to the extent practicable in order to deal with these transportation effects of social and economic change in the Region.

Accordingly, the plan seeks to reverse the trends of declining transit ridership and accelerating peak-period automobile use and traffic congestion. The plan recommends specific land use planning and site-design measures to promote more efficient and cost-effective urban development that makes travel through a variety of transportation modes both safe and practical, the completion of the long-planned Milwaukee area freeway traffic management system, and traffic engineering measures and parking regulations to ensure that full and efficient use is made of existing facilities before consideration is given to arterial street and highway system expansion. The plan proposes to develop true regional rapid and express transit systems, providing for the eventual development of commuter-rail passenger service, light-rail facilities, and busway and high-occupancy vehicle facilities within the Region. The plan also provides for a significant increase in local transit service levels, with accompanying increases in paratransit service levels in conformance with the Federal Americans with Disabilities Act of 1990 (ADA), and for the continuation of local shared-ride taxi services in small urban areas of the Region. Recognizing that, despite an emphasis on transportation system management and public transit, most passengers and goods will continue to be moved on the regional highway system, the plan provides for the rehabilitation of key arterial facilities and the expansion of highway capacity in selected corridors to relieve traffic congestion and to provide for a spacing of arterial facilities that lends proper structure to planned urban development.

The recommendations for transportation system development contained in the new plan were arrived at through a process which, in keeping with past Commission transportation planning practices, permitted the consideration of a full array of measures to resolve anticipated transportation problems prior to proposing any expansion of the arterial street and highway system. The plan design process employed by the Commission was fully consistent with the Federal rules guiding the implementation of the Intermodal Surface Transportation Efficiency Act of 1991 and the Clean Air Act Amendments of 1990. The plan has been found to conform in its methodology, data, and recommendations with the intents and purposes of the State Implementation Plan for Air Quality, as is required by Federal law.

The aforementioned social and economic changes and Federal legislation combine to underscore the need to prepare a new regional transportation system plan. This need has been met. It is, therefore, hoped that government, business, industry, and interested citizen groups and individuals within the Region will take an active interest in the recommendations contained in the new design year 2010 regional transportation system plan. It is further hoped that, upon carefully reviewing the soundness and practicality of those recommendations, concerned units and agencies of government, business, industry, and interested citizens will support plan adoption and implementation.

Respectfully submitted,

David B. Falstad

David B. Falstad
Chairman

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# Chapter I

# INTRODUCTION

This report documents a third-generation regional transportation system plan for the Southeastern Wisconsin Region. The report presents the major findings and recommendations arrived at through a reappraisal of the second-generation regional transportation system plan.[1] That plan, adopted by the Commission in 1978, in turn revised and updated the initial transportation system plan for the Region, adopted in 1966.[2] The new plan presented herein reflects changing conditions within the Region since the adoption of the second-generation plan and extends the plan design year to 2010.

Some significant trends affecting the movement of people and goods have emerged since the completion of the second-generation regional transportation system plan. The Southeastern Wisconsin Region, as most urbanizing areas in the United States, has since 1978 witnessed declining public transit ridership, declining costs of private automobile operation, and the continuation of local land development practices that foster automobile dependency. Federal responses to the effects of these and other trends have included the passage of the Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991. The trends and both pieces of legislation require a public reexamination of the plans and policies guiding transportation system planning and development. The Commission's continuing regional land use-transportation study has long provided a framework within which changing conditions can be considered in the planning process.

The continuing land use-transportation study comprises an integral part of the broader mission and work program of the Regional Planning Commission. The Commission is charged by law with the function and duty of making and adopting a comprehensive plan for the physical development of the Region. The continuing land use-transportation study, as its name implies, is directed toward the preparation of two key elements of a long-range, areawide, comprehensive plan for the physical development of the Region: a land use plan and a transportation system plan. In 1992, the Commission adopted a third-generation regional land use plan, extending the design year to 2010. The land use plan provides the basis for the preparation of all other elements of the regional comprehensive plan and the new regional land use plan serves as the foundation for the completion of the companion third-generation regional transportation system plan.

This introductory chapter describes the need for regional planning and the status of the regional planning effort within Southeastern Wisconsin. This introduction to the Commission's broader regional planning program is intended to facilitate a better understanding of the transportation system plan reappraisal process and of its findings and recommendations as presented herein.

Although the plan presented in this report supersedes the previously adopted regional transportation system plans detailed in SEWRPC Planning Reports No. 7 and No. 25, the earlier plans and reports continue to have intrinsic value as important sources of historical data about the development of the land use pattern and transportation system within Southeastern Wisconsin.

## NEED FOR REGIONAL PLANNING

Regional, or areawide, planning has become increasingly accepted as a necessary governmental function in the large metropolitan areas

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[1]*SEWRPC Planning Report No. 25, A Regional Land Use-Transportation Plan for Southeastern Wisconsin—2000, Volume One, Inventory Findings, April 1975; and Volume Two, Alternative and Recommended Plans, May 1978.*

[2]*SEWRPC Planning Report No. 7, The Regional Land Use-Transportation Study, Volume One, Inventory Findings: 1963, May 1965; Volume Two, Forecasts and Alternative Plans: 1990, June 1966; and Volume Three, Recommended Regional Land Use-Transportation Plans: 1990, November 1966.*

of the United States. This acceptance is based, in part, on a growing awareness that problems of physical and economic development and of environmental deterioration transcend the geographic limits and fiscal capabilities of local units of government. It has also been recognized that sound resolution of areawide problems requires the cooperation of all units and agencies of government concerned and of private interests as well.

As used by the Commission, the term "region" means an area larger than a county but smaller than a state, united by economic interest and geography, and by common developmental and environmental problems. A regional basis is necessary to provide a meaningful technical approach to the proper planning and design of public works systems such as highway and transit, and sewerage and water supply, and of park and open space facilities. A regional basis is also essential to provide a sound approach to the resolution of such environmental problems as flooding, air and water pollution, natural resource base deterioration, and changing land use.

Private as well as public interests are vitally affected by areawide developmental and environmental problems and by proposed solutions to these problems; it appears neither desirable nor possible for any one level or agency of government to impose the decisions required to resolve these kinds of problems. Such decisions can better come from consensus among the public and private interests concerned, based on a common interest in the welfare of the entire Region. Regional planning is necessary to promote this consensus and the necessary cooperation among urban and rural; local, State and Federal; and public and private interests. In this light, regional planning is not a substitute for Federal, State, or local public planning or for private planning. Rather, regional planning is a vital supplement to such planning.

The Wisconsin regional planning enabling act declares that regional planning commissions are to be entirely advisory in nature. More specifically, Section 66.945(8)(a) of the Wisconsin Statutes provides that the "... functions of the regional planning commission shall be solely advisory to ..." the governments and governmental officials which comprise and serve the geographic region in question. In a 1977 case,[3] the Wisconsin Supreme Court, in addressing the powers of regional planning commissions in Wisconsin, stated "... their functions are merely advisory ..." Similarly, in a 1979 case,[4] the Wisconsin Supreme Court stated that "The Dane County Planning Commission is merely an advisory body. Its determinations are recommendations only."

The advisory nature of regional planning commissions is at times called into question when such commissions take on planning responsibilities under special designations provided under Federal law. Under Section 208 of the Federal Clean Water Act, for example, certain regional planning commissions, including the Southeastern Wisconsin Regional Planning Commission, have been designated by the Governor as an areawide water quality management planning agency for a given geographical area. In carrying out the planning responsibilities attendant to that designation, the regional planning commissions prepare and adopt water quality management plans which are intended to be considered and subsequently approved by the Wisconsin Department of Natural Resources as the regulatory agency of the State. Under Federal and State law, those plans, once they are adopted by the Federal and State agencies concerned, can take on great significance in terms of Federal and State regulatory decision making and, hence, are frequently viewed as more than advisory plans. In those situations, however, it is the approval of the plans by the State regulatory agency concerned, and not by the regional planning commission, which transforms the plan from an advisory document to one having regulatory significance. Moreover, recent court cases in Wisconsin[5] have made it

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[3]*Tanck v. Dane County Regional Planning Commission, 81 Wis. 2d 76, 85, 260 N.W. 2d 18 (1977).*

[4]*Kegonsa Joint Sanitary District v. City of Stoughton, 87 Wis. 2d 131, 154, 274 N.W. 2d 598 (1979).*

[5]*Doerr v. Racine County, Case No. 92-0034, Court of Appeal; decided December 9, 1992; ordered unpublished, January 26, 1993; Dane County Regional Planning Commission v. Wisconsin Department of Natural Resources, Case No. 91-CV-2990, Circuit Court, Dane County.*

very clear that in performing their responsibilities under the Section 208 gubernatorial designation, regional planning commissions remain advisory in nature, transmitting, through plans, recommendations pertaining to water quality to the Federal and State regulatory agencies. It is those agencies which are empowered to accept, modify, or reject the planning commission recommendations. Anyone aggrieved by an action of the regulatory agency which is undertaken in reliance upon a plan recommendation must pursue legal recourse against the regulatory agency and not the advisory planning body.

Another special designation often assigned to regional planning commissions is that of the Metropolitan Planning Organization (MPO) under Federal transportation legislation. That designation is similarly gubernatorial in nature and involves preparing and adopting transportation plans and improvement programs to meet Federal requirements. Under Federal law, the MPO designation means that the regional planning commission provides a "forum for cooperative transportation decision making." While the metropolitan transportation plan is required to be adopted only by the MPO, clearly that plan is intended under Federal law to be a consensus plan that has come about through a cooperative transportation planning process. By Federal law, the plan is to be provided to the Governor. Moreover, by Federal law, the State transportation plan must incorporate and be consistent with the metropolitan transportation plan. Taking into account the policy-making functions of the Governor and the Wisconsin Department of Transportation in terms of transportation decision making in the State, the metropolitan transportation plan adopted by the Commission as the MPO for Southeastern Wisconsin is, as a practical matter, advisory to the Governor and the Department and, indeed, given Federal requirements, may be expected to be significantly shaped through the cooperative transportation decision-making process operated by the MPO by the policy directives of the Governor reflected through the Department.

A review of the Federal legislation and rules attendant to transportation improvement programming also indicates an advisory role by the Commission as the MPO. While the Commission must initially approve a multi-year transportation program, that program must then be approved by the Governor. In practice, the Governor delegates his responsibility for such approval to the Secretary of the Wisconsin Department of Transportation. As a practical matter, then, the Commission's recommendations as the MPO regarding programming are advisory to the Governor and the Department of Transportation.

Given the foregoing, then, the regional planning program in Southeastern Wisconsin emphasizes the promotion of close cooperation among the various governmental agencies concerned with land use development and with the development and operation of supporting public works facilities. The Commission believes that the highest form of areawide planning combines accurate data and competent technical work with the active participation of knowledgeable and concerned public officials and private citizens in the formulation of plans that address clearly identified problems. Such planning is intended to lead not only to a more efficient regional development pattern, but also to a more desirable environment in which to live and work.

## THE REGIONAL PLANNING COMMISSION

The Southeastern Wisconsin Regional Planning Commission was established in 1960 under Section 66.945 of the Wisconsin Statutes as the official areawide planning agency for the highly urbanized southeastern region of the State. The Commission was created to provide basic information and planning services necessary to solve problems which transcend the corporate boundaries and fiscal capabilities of the local units of government comprising the Region. The financial support for the Commission's work programs is provided by county tax levies apportioned on the basis of equalized valuation. These basic funds are supplemented by State and Federal aid.

### Basic Functions

The Commission conceives regional planning as having three basic functions. The first involves the collection, analysis, and dissemination of basic planning and engineering data on a uniform, areawide basis in order that better development decisions can be made in both the public and private sectors. The Commission believes that the establishment and utilization of such data can in and of itself contribute to better development decision making within the Region. The second function involves the preparation of a framework of long-range areawide plans for the physical development of the Region. This function is mandated by State enabling legislation. While the scope and content of these plans can extend to all phases of regional development, the Commission believes that emphasis should be place on the preparation of plans for land use and supporting transportation, utility, and community facilities. The third function involves the provision of a center for the coordination of day-to-day planning and plan implementation activities of all of the units and levels of government operating within the Region. Through this function, the Commission seeks to integrate regional and local plans and planning efforts and thereby to promote regional plan implementation.

Organization

The Commission consists of 21 members, who serve without pay, three from each of the seven member counties. One Commissioner from each county is appointed by the county board and is an elected county board supervisor. The remaining two from each county are appointed by the Governor, one from a list prepared by the county board, one on the Governor's own motion. The organizational structure of the Commission and its relationship to the constituent units and agencies of government comprising or operating within the Region is shown in Figure 1.

The full Commission meets at least four times a year and is responsible for establishing overall policy, adopting the annual budget, and adopting regional plan elements. The Commission has four standing committees: Executive, Administrative, Planning and Research, and Intergovernmental and Public Relations. The Executive Committee meets monthly to oversee the work effort of the Commission and is empowered to act for the Commission in all matters except the adoption of the budget and the adoption of the regional plan elements. The Administrative Committee meets monthly to oversee the routine but essential housekeeping activities of the Commission. The Planning and Research Committee meets as necessary to review all of the technical work carried out by the Commission staff and its consultants. The Intergovernmental and Public Relations Committee serves as the Commission's principal arm in the communication process with the constituent county boards. The Committee meets as necessary to consider intergovernmental problems. The Commission is assisted in its work by 28 technical, citizen, and intergovernmental coordinating and advisory committees. These committees include both elected and appointed public officials and interested citizens with knowledge in the Commission work areas. The committees perform a significant function in both the formulation and the execution of the Commission work programs.

## THE REGION

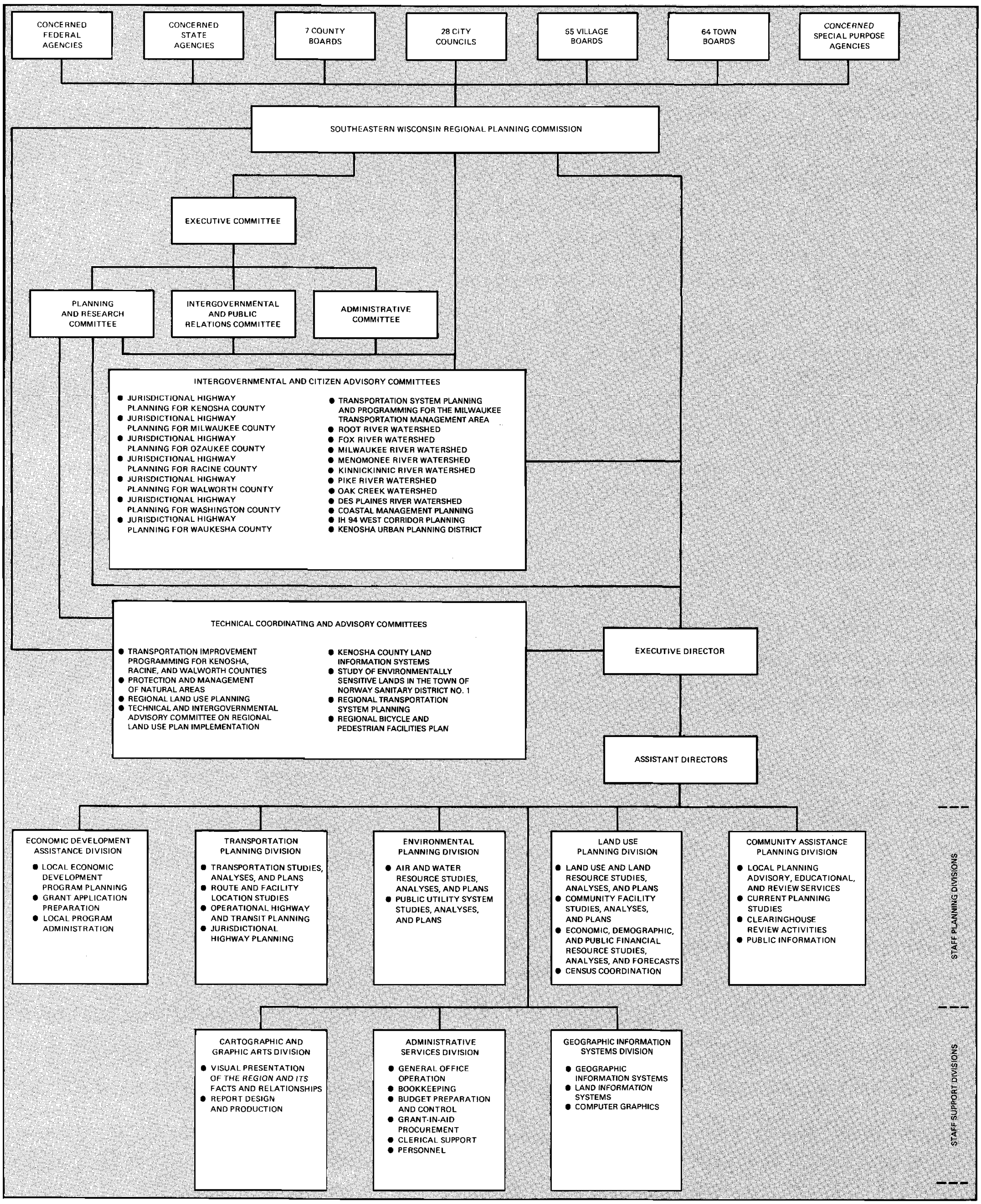
The Southeastern Wisconsin Region, as shown on Map 1, is comprised of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties. These seven counties have an area of about 2,689 square miles, or about 5 percent of the total land and inland water area of Wisconsin, and a total resident population of about 1.82 million people. About 37 percent of the population of the State lives within these seven counties, which contain three of the 13 metropolitan statistical areas wholly or partially located in Wisconsin. The Region contains about 41 percent of the tangible wealth of the State, as measured by equalized property valuation, and represents the greatest wealth-producing area of the State, providing about 39 percent of all employment in the State. The Region contains 154 general purpose local units of government, and encompasses all or parts of 11 major watersheds.

Geographically the Region is located in a relatively good position with regard to continued growth and development. It is bounded on the east by Lake Michigan, which provides an ample supply of fresh water for both domestic and industrial use and is an integral part of a major international transportation network. It is bounded on the south by the rapidly expanding northeastern Illinois metropolitan region and on the west and north by the fertile agricultural lands and desirable recreational areas of the rest of the State of Wisconsin. As shown on Map 2, many of the most important industrial areas and heaviest population concentrations in the Midwest lie within 250 miles of the Region; over 32 million people reside within this radius.

Map 1 shows the boundaries of both the urbanized areas and urban areas within the Region. Urbanized areas are delineated by the U. S. Bureau of the Census based on resident popula-

**Figure 1**

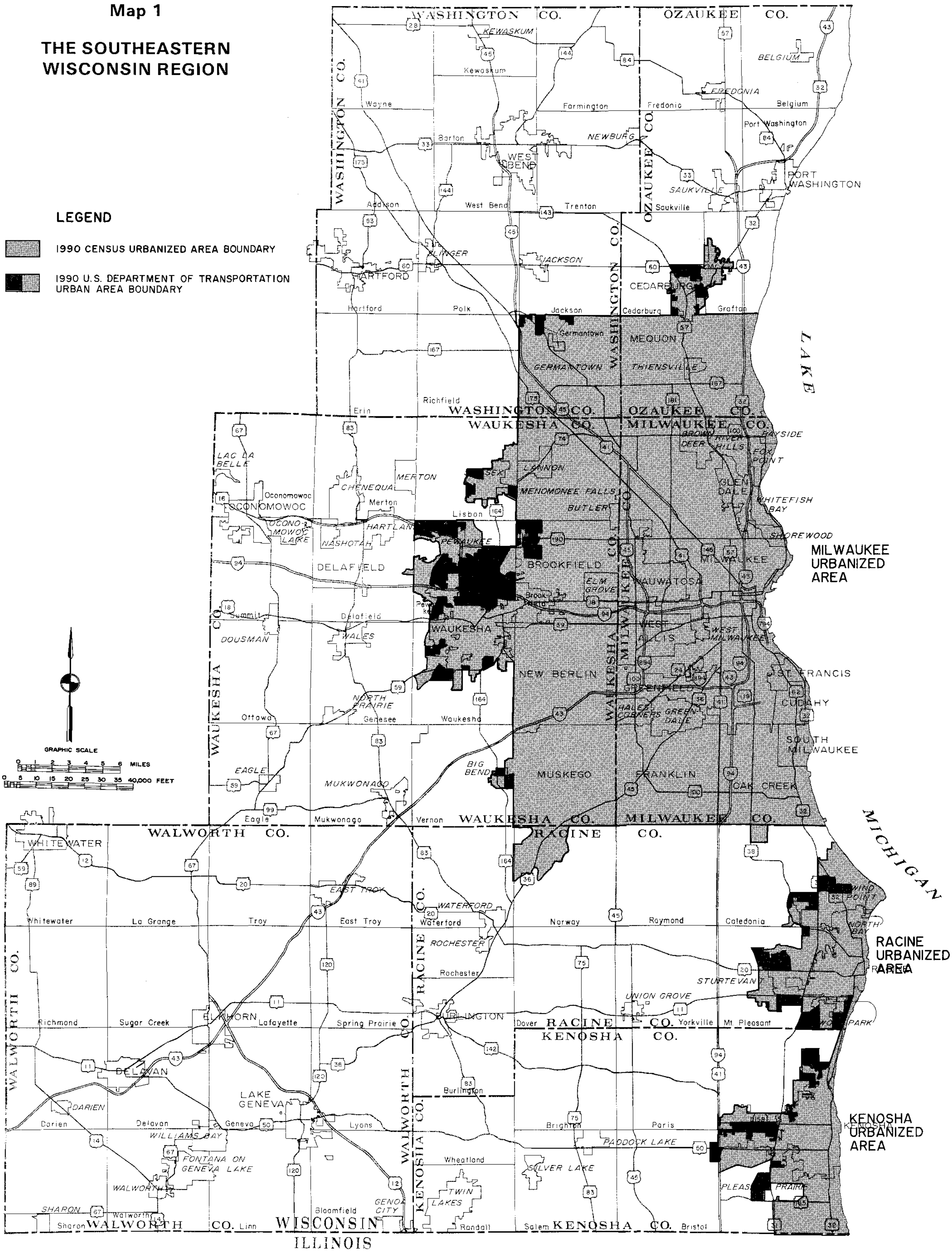
**SEWRPC ORGANIZATIONAL STRUCTURE**




*Source: SEWRPC.*

Map 1

THE SOUTHEASTERN WISCONSIN REGION

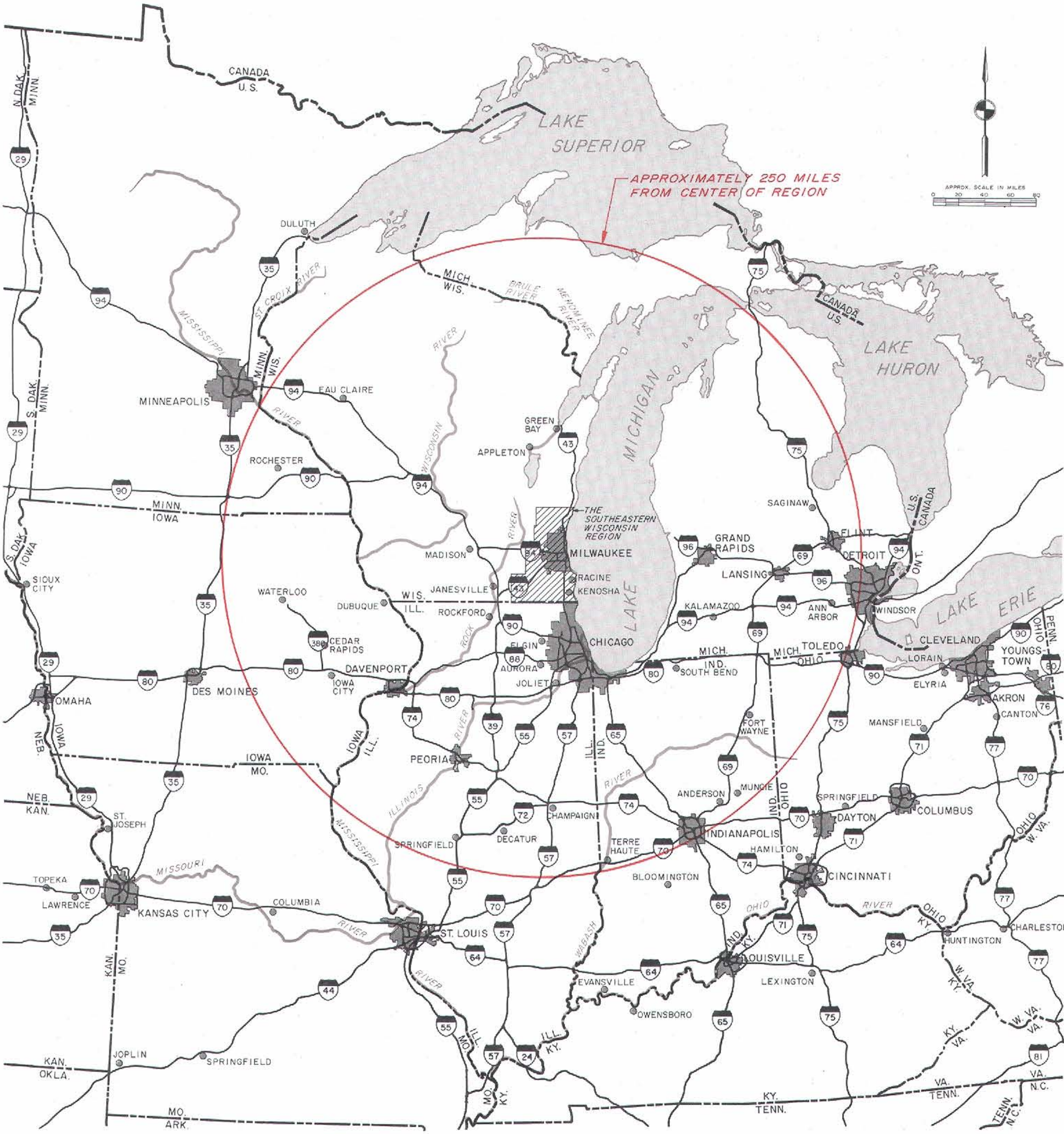



The Southeastern Wisconsin Region, consisting of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties, encompasses an area of about 2,689 square miles, or about 5 percent of the total area of the State. The Region has a resident population of about 1.82 million persons, or about 37 percent of the population of the State, and provides about 981,400 jobs, or about 39 percent of the total employment in the State. There are 154 general-purpose local units of government in the seven-county Region.

*Source: U. S. Bureau of the Census, U. S. Department of Transportation, and SEWRPC.*

## Map 2

### THE REGIONAL SETTING IN THE MIDWEST




Many of the most important industrial areas and the largest population and employment concentrations in the Midwest are located within 250 miles of the Southeastern Wisconsin Region. More than 32 million people, or more than one-seventh of the entire population of the United States, live within the 250-mile radius.

*Source: SEWRPC.*

tion and population density, and are intended to represent the more intensively developed urban cores of the metropolitan areas. Metropolitan areas as delineated by the U. S. Bureau of the Census consist of one or more counties containing one or more urbanized areas, and are intended to represent socio-economic entities centered on the urbanized areas concerned. There are three urbanized areas within the Region: Kenosha, Milwaukee, and Racine. By definition each has a resident population of over 50,000 and a population density of at least 1,000 persons per square mile. Urban areas are designated by the Regional Planning Commission pursuant to guidelines issued by the U. S. Department of Transportation for use in functionally classifying streets and highways; determining the eligibility of proposed transportation improvements for Federal funding; defining areas within which outdoor advertising is to be federally regulated; and to aid in the reporting of highway performance and related data. Urban areas are also intended to represent the more intensively developed urban cores of metropolitan areas; and all urbanized areas adjusted to incorporate logical transportation facility segments thereby avoiding the needless fragmentation of the functional systems concerned.

## COMMISSION WORK PROGRAMS TO DATE

Since its creation, the Regional Planning Commission has diligently pursued its three basic functions of areawide inventory, plan design, and promotion of plan implementation through intergovernmental cooperation and coordination, although the relative emphasis placed upon these functions has changed somewhat over time. Initially, major emphasis in the Commission's work program was on the inventory function, with increasing attention being placed over the years on the plan design and on the intergovernmental coordination functions.

### Inventory

With respect to the inventory function, the Commission's planning program, as conducted since 1961, has resulted in the creation of a data bank containing in a readily usable form the basic planning and engineering information required for sound, areawide planning. The data assembled in the regional data bank include, among others, definitive data on streamflows; floodlands; surface and groundwater quality; woodlands, wetlands, and wildlife habitat; sites having scenic, scientific, cultural, and recreational value; soils; existing and proposed land uses; travel habits and patterns; transportation system capacity and utilization; existing and proposed utility service areas; and the demographic and economic base and structure of the Region. The data base also includes an extensive topographic and cadastral base mapping and horizontal and vertical survey control file.

Data in the regional planning data bank have been assembled both through the collation of data collected by other agencies and through inventory efforts conducted by the Commission itself. Data collated from the efforts of other agencies include highway and transit facility capacity, use, and service levels; transportation terminal facility capacity; automobile and truck availability; and population and economic activity levels. The data inventoried by the Commission is assembled through inventory efforts ranging from aerial photography, large-scale topographic and cadastral base mapping, and control survey programs through extensive land use, woodland, wetland, wildlife habitat, potential park site, and public utility system inventories to massive surveys of travel characteristics, detailed operational soil surveys, and streamflow gauging and water quality monitoring efforts.

The regional planning data bank is supported by an extensive data conversion, filing, and retrieval capability which permits the basic data to be readily manipulated and tabulated by various geographic areas, ranging in size from the Region as a whole down through natural watersheds, counties, and minor civil divisions to planning analysis areas, census enumeration districts and tracts, traffic analysis zones, U. S. Public Land Survey sections and quarter-sections, and, for certain data, urban blocks and block faces. Of increasing importance in the regional planning data bank is the Commission's automated geographic information systems capability. Key regional map files, including land use inventory and soil survey maps, have been digitized, allowing for automated map reproduction and related data analysis functions. The Commission's planning data bank provides valuable points of departure for all Commission work efforts and is, moreover, available for use by the constituent agencies and units of government and by the private sector.

Plan Design

With respect to the plan design function, the Commission has placed great emphasis upon the development of a comprehensive plan for the physical development of the Region in the belief that such a plan is essential if land use development is to be properly coordinated with development of supporting transportation, utility, and community facility systems; if the development of each of these individual functional systems is to be coordinated with the development of each of the others; and if serious and costly developmental and environmental problems are to be avoided and a safer, more healthful and attractive, as well as more efficient, regional settlement pattern is to be achieved. Under the Commission's approach, the preparation, adoption, and use of the comprehensive plan are considered to be the primary objective of the planning process; all planning and plan implementation efforts are related to the comprehensive plan.

The comprehensive plan not only provides an official framework for coordinating and guiding growth and development within a multi-jurisdictional urbanizing region, but also provides a good conceptual basis for the application of systems engineering skills to the growing problems of such a region. The comprehensive regional plan also provides the essential framework for more detailed physical development planning at the county, community, and neighborhood levels.

Because the scope and complexity of areawide development problems prohibit the preparation of an entire comprehensive plan at one time, the Commission has determined to proceed with the preparation of individual plan elements which together comprise the required comprehensive plan. By the end of 1992, the adopted regional plan consisted of 24 individual plan elements.

Four of the elements of the regional comprehensive plan are land use-related: the regional land use plan, the regional housing plan, the regional library facilities and services plan, and the regional park and open space plan. Eight of the plan elements relate to transportation. These consist of the regional transportation plan, including highway and transit elements, the regional airport system plan, the transportation systems management plan, the elderly and handicapped transportation plan, and detailed transit development plans for the Kenosha, Racine, Waukesha, and West Bend urban areas.

Ten of the adopted plan elements fall within the broad functional area of environmental planning. These consist of the regional water quality management plan, the regional wastewater sludge management plan, the regional air quality attainment and maintenance plan, and comprehensive watershed development plans for the Root, Fox, Milwaukee, Menomonee, Kinnickinnic, and Pike River watersheds and for the Oak Creek watershed.

The final two plan elements consist of comprehensive community development plans for the Kenosha and Racine urbanized areas.

Certain of the aforementioned plan elements, namely, the regional transportation system plan, the regional airport system plan, and the regional water quality management plan, are second-generation plans. The regional land use plan, which serves as the basis for the preparation of all the other comprehensive plan elements, is a third-generation planning effort. Many of the plan elements described above have been refined and detailed through formal plan amendments.

Promotion of Plan Implementation

With respect to the promotion of plan implementation, the Commission carries on an active community assistance planning program, in which functional guidance and advice on planning problems are provided to local units of government. The Commission's assistance to local units of government often consists of interpreting regional planning studies in the light of local conditions, so that the findings and recommendations of these studies may be incorporated into local development plans and plan implementation programs. Six local planning guides have been prepared under this program to provide information helpful in the preparation of local plans and plan implementation ordinances. The subjects of these guides are land subdivision control, official mapping, zoning, organization of local planning agencies, floodland and shoreland development, and the use of soils data in development planning and control.

## CONTINUING REGIONAL LAND USE-TRANSPORTATION STUDY

The continuing regional land use-transportation study provides an organizing framework for the Commission to prepare the land use- and transportation-related elements of the regional comprehensive plan for Southeastern Wisconsin. This organizing framework is adaptable to changing conditions as study designs, which describe the major work elements to be completed under the continuing study, are periodically updated and revised. The periodic update and revision of the study designs is intended to ensure that changes in socio-economic conditions, in legal requirements, and in the state of the art of planning technology are brought to bear on the land use and transportation planning process.

Evolution of the Continuing Study

The land use-transportation study was initially undertaken in 1963 with the primary objective being the preparation of long-range land use and transportation system plans. That objective was fully met in 1966, when the Commission adopted and published the first regional land use plan and regional transportation system plan for Southeastern Wisconsin.

Federal laws enacted in the early 1960s underscored the importance of the Commission's emerging framework in guiding areawide land use and transportation planning. The 1962 Federal-Aid Highway Act required that, in order to be eligible for continued Federal aid for new highway construction, all urbanized areas in the United States had to have underway a continuing, comprehensive, areawide transportation planning process. The 1964 Federal Urban Mass Transportation Act established similar areawide planning prerequisites for Federal aid in support of transit system development. Therefore, even prior to the completion of the initial land use-transportation study, the Commission, its constituent local units of government, and the affected State and Federal agencies considered establishing a continuing land use and transportation planning effort in Southeastern Wisconsin.

The Commission published a Study Design in August 1967, describing the major work elements to be undertaken under such a continuing land use-transportation planning study. The continuing study was conducted in accordance with that design from January 1967 through December 1969. A second Study Design, updating the first, was prepared in December 1970 and revised in December 1971. The continuing land use-transportation study has been conducted in accordance with that design through December 1991. Major work elements completed under the continuing study include:

- The second-generation regional land use and transportation system plans for the design year 2000;
- Jurisdictional highway system plans for each of the seven counties comprising the Region;
- Detailed plans for integrating the stub ends of the Lake Freeway South, Lake Freeway North, Park Freeway East, Park Freeway West, Stadium Freeway South, and Stadium Freeway North into the surface arterial system;
- A rapid transit system plan for the greater Milwaukee area;
- Transportation systems management plans for the Kenosha, Milwaukee and Racine areas;
- Transit system development plans for the Kenosha, Racine, Waukesha and West Bend areas;
- Elderly and handicapped transportation plans for the entire Region, with particular emphasis on the Kenosha, Milwaukee, Racine, Waukesha, and West Bend areas;
- A freeway traffic management plan for the greater Milwaukee area; and
- The annual preparation of a transportation improvement program for the Kenosha, Milwaukee, and Racine urbanized areas.

With the adoption of the Federal Intermodal Surface Transportation Efficiency Act of 1991, a renewed importance was attached by the Federal government to the metropolitan transportation planning and programming process. This renewed emphasis was further strengthened by the requirements of the Federal Clean Air Act Amendments of 1990. It was, therefore, considered essential to prepare a new Study Design for the continuing land use-transportation planning effort in Southeastern Wisconsin. The third Study Design, updating the second, was prepared by the Commission in 1992. The reappraisal of the second-generation regional transportation system plan, presented herein, is the first major work element to be completed under the new study design. The new study design was reviewed and approved, on February 1, 1993, by the Commission's Technical Coordinating and Advisory Committee on Regional Transportation System Planning.

Objectives of the Continuing Land Use-Transportation Study

The objectives designed to guide the Commission, its constituent units of local government, and the concerned State and Federal agencies in the conduct of the continuing land use-transportation study are as follows:

1. To bring the policy provisions of the Federal Intermodal Surface Transportation Efficiency Act of 1991 to bear on systemwide transportation planning in the Region, to meet the planning and programming requirements of the Act so as to continue to qualify the constituent State and local units of government for Federal aids in partial support of the development of highway and transit facilities, and to assist in meeting the planning review requirements of Gubernatorial Order 29 which, in effect, continues the procedures established under Section 204 of the Federal Demonstration Cities and Metropolitan Development Act and the U. S. Bureau of the Budget Circular Memorandum A-95 issued pursuant to the Federal Intergovernmental Cooperation Act.

2. Continuously to update and revise data collected in, and forecasts prepared under, the initial regional land use-transportation study so that the full value of these data and forecasts can be realized and development decisions within the Region made intelligently on the basis of current, factual information.

3. Periodically to update and revise the plans prepared under the initial study effort in light of changing conditions within the Region.

4. To provide for the continued integration of the land use and transportation planning efforts within the Region with other elements of the comprehensive areawide planning effort.

5. To help the Wisconsin Department of Natural Resources meet the planning requirements attendant to the management of mobile sources of pollution as set forth in the Federal Clean Air Act Amendments of 1990.

6. Finally, and perhaps most importantly, to convert the plans prepared under the initial and continuing study efforts into action programs for plan implementation.

## PUBLIC PARTICIPATION

From the very origin of the Southeastern Wisconsin Regional Planning Commission, it was recognized that the regional community and its elected and appointed representatives in government service must be involved in the regional planning program. Indeed, the Commission membership itself consists of a combination of elected local governmental officials and citizen members. Thus, by intent, policy, and organizational structure, the Commission has tried to be responsive to its constituents.

In addition to providing public participation by conducting extensive public attitudinal and behavioral surveys, the Commission has developed an intricate plan formulation and review procedure specifically designed to gain the advice and consent of concerned elected officials and citizen leaders. This procedure focuses primarily on the use of advisory committees, informal public informational meetings, and formal public hearings.

Very early in its existence the Commission recognized that any comprehensive regional planning program covers such a broad spectrum of related governmental and private development programs and interests that no agency, whatever its function or authority, could "go it alone" in such a planning program. The basic Commission organizational structure, therefore, provides for the extensive use of advisory committees to promote the necessary intergovernmental and interagency coordination, to broaden the technical knowledge and experience at the disposal of the Commission, and to involve elected and appointed public officials and knowledgeable citizen leaders more actively in the regional planning effort.

Accordingly, the third regional transportation system planning program was carried out under the guidance of the Commission's Technical Coordinating and Advisory Committee on Regional Transportation System Planning. Membership on that Committee included representatives from the U. S. Department of Transportation, Federal Transit Administration and Federal Highway Administration; from the Wisconsin Departments of Transportation and Natural Resources; from the university community; from municipal and county planning, transportation, and public works departments; and from private utilities, transportation enterprises, and environmental groups. A complete membership list of the Technical Coordinating and Advisory Committee is provided on the inside cover of this report.

In addition to the Advisory Committee, public participation in the planning process was achieved through the publication of informational materials, including three issues of the Commission Newsletter, a transportation planning forum jointly sponsored by the Wisconsin Department of Transportation and the Commission, a regional planning conference for the purpose of presenting the final recommended transportation system plan and eliciting public comment regarding it, and a series of public informational meetings and public hearings. These public involvement activities and others were intended to provide an opportunity for the general public to become familiar with the plan reevaluation process and to allow individuals and groups to affect the decision-making process through comments and questions. The public involvement procedures for the third-generation regional planning process are documented in SEWRPC Memorandum Report No. 87, Public Involvement in the Transportation System Planning and Programming Processes: Year 2010 Regional Transportation System Plan. To assist in implementing the public involvement procedures, the Commission acquired the assistance of the University of Wisconsin Cooperative Extension Service.

## ORGANIZATIONAL STRUCTURE

As shown in Figure 2, the primary responsibility for the reevaluation of the present transportation plan and the preparation of a new regional transportation plan rested with the Commission's Transportation Planning Division. This division reports directly to the Executive Director of the Commission, who in turns reports to the Commission. The Transportation Planning Division was directly supported in its efforts by three service divisions of the Commission staff: Administrative Services, Cartographic and Graphic Arts, and Information Systems; and indirectly supported by the remaining functional planning divisions: Community Assistance Planning, Economic Development Planning, Environmental Planning, and Land Use Planning.

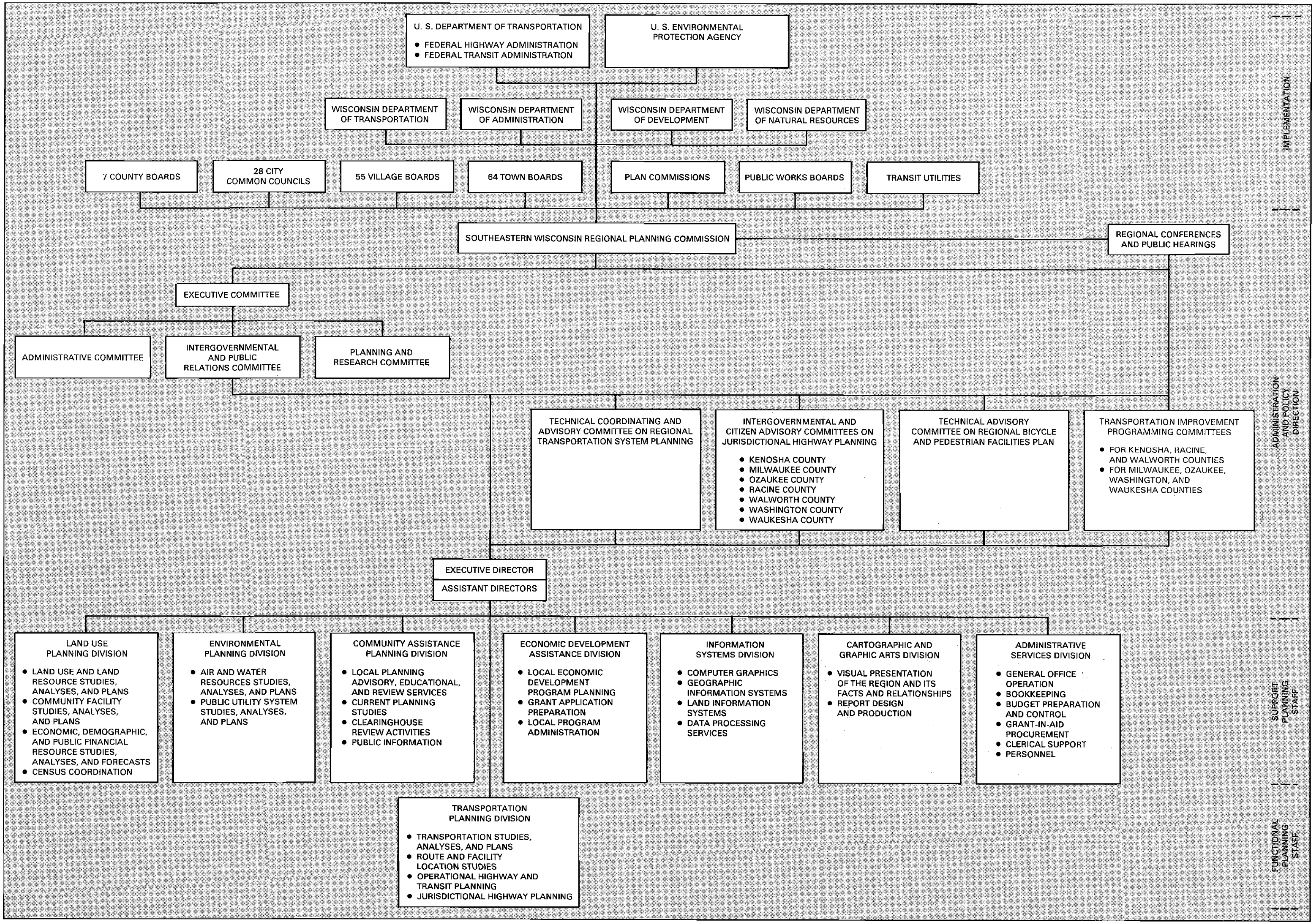
## SCHEME OF PRESENTATION

The major findings and recommendations of the third regional transportation planning program are documented in this report. Following this introductory chapter, Chapter II sets forth the basic principles underlying the regional transportation plan reevaluation and outlines the steps in the planning process. Chapter III presents an overview of the adopted year 2000 regional transportation system plan, together with a summary of the progress to date in the implementation of that plan. Chapters IV and V present new benchmark data and historic trend data essential to the transportation plan reappraisal process. Specifically, Chapter IV presents data pertinent to the supply and use of existing transportation facilities in the Region, while Chapter V presents findings from the third major inventory of travel habits and patterns, conducted by the Commission in 1991.

The remaining chapters are concerned with anticipated growth and change in the Region, presenting forecasts of travel demand as well as the process of developing, evaluating, and selecting the recommended regional transportation system plan. Chapter VI presents forecasts of anticipated regional growth and change and describes the adopted 2010 regional land use plan. Chapter VII describes the development and application of transportation planning models used by the Commission to forecast, simulate, and analyze changes in travel demand, and air quality impacts. Chapter VIII reviews the objectives adopted as part of the year 2000 regional transportation plan and sets forth a revised set of objectives and supporting principles and standards. Chapter IX presents alternative transportation system plans. Chapter X presents a comparison of alterative plans and an evaluation of these plans in light of the

**Figure 2**

**ORGANIZATIONAL STRUCTURE FOR THE REGIONAL TRANSPORTATION SYSTEM PLAN REAPPRAISAL**




*Source: SEWRPC.*

revised objectives and standards. Chapter XI presents the recommended design year 2010 regional transportation plan. Chapter XII describes the actions which should be taken by the various concerned units and agencies of government to facilitate implementation of the regional transportation plan. Finally, Chapter XIII summarizes the report, restating the major findings, conclusions, and recommendations of the reappraisal effort.

It should be noted that this report can only summarize briefly the volume of information assembled in the extensive data collection, analysis, and forecasting phases of the plan reevaluation effort. Although the reproduction of these data in conventional form is impossible due to their magnitude and complexity, data from the files are available to member units and agencies of government and to the general public, upon specific request.

This report, therefore, serves an additional purpose of indicating the type of data available from the Commission which may be of value in assisting Federal, State, and local units and agencies of government and private investors in making environmentally and socially sound decisions concerning community development and the provision of infrastructure within the Region.

This planning report is supplemented by certain other Commission publications. These include the SEWRPC technical reports and technical record series, which deal with certain phases of the work in greater depth and detail than is possible in this final report. These additional publications set forth the procedures and findings of the major work elements of the plan reevaluation, including the results and findings of the Commission's socio-economic inventories and forecasts.

# Chapter II

## BASIC PRINCIPLES AND CONCEPTS

A sound approach to the preparation of a regional transportation system plan requires careful consideration of the proper scope of the regional transportation system plan, the formulation of basic principles on which the planning process is based, and the clear identification of the major steps of the planning process itself.

This chapter describes the approach taken by the Commission in preparing the third-generation regional transportation system plan. Specifically, this chapter defines the terms "transportation system," and "transportation system development," thereby identifying the scope of the regional transportation system planning process; sets forth the basic principles on which the transportation system planning process is based; and describes the major steps of the planning process.

### SCOPE OF THE REGIONAL TRANSPORTATION SYSTEM PLAN

The "transportation system" is defined by the Commission as the functionally related surface transportation facilities and management measures that enable the intraregional and interregional movement of people and goods. The transportation system is considered down to, but not including, the level of the neighborhood and the major activity center. Transportation facilities, the physical components of the system, include arterial streets and highways,[1] transit facilities, bicycle and pedestrian facilities,[2] and all related terminal facilities considered on a regional scale. The transit facilities include all modes found in previous Commission planning reports to have potential application as cost-effective modes within the Region, including, more specifically, bus on busway, bus on reserved lanes, bus in mixed traffic on freeways and surface arterials, bus and other high-occupancy vehicles on high-occupancy vehicle lanes, and light and commuter rail. A previous Commission study found heavy rail to be inapplicable within the Region as a cost-effective mode. Transportation facilities such as interregional railway yards and terminals, airports, and seaports are considered in the transportation system planning process only as major trip generators which must be adequately served by arterial street and highway and transit facilities.

This definition of the transportation system emphasizes that this system for moving people and goods within and through the Region, is, like all systems, more than the sum of its physical elements. Transportation system management measures, which regulate the movement and attempt to control the demand on transportation facilities, are considered integral components of the transportation system. The rapid change in development conditions within the Region requires that flexibility be incorporated into system design. Transportation man-

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[1] *For the purpose of regional transportation planning in Southeastern Wisconsin, the following functionally classified highways are herein collectively defined as the "regional arterial highway system": urban principal arterials, urban minor arterials, rural principal arterials, rural minor arterials, and rural major collector streets and highways. This classification is consistent with the functional reclassification of arterial streets and highways required by the Federal Intermodal Surface Transportation Efficiency Act of 1991.*

[2] *Bicycle and pedestrian facilities have been included in the definition of "transportation system" since the adoption of the second-generation regional transportation system plan. The expansion of the definition underscores the need to incorporate these modes of transportation specifically into the general transportation system as compatible supplements and alternatives to the more capital- and energy-intensive modes of surface travel. The Commission is in the process of preparing a regional bicycle and pedestrian facilities plan as an additional transportation-related element of the regional comprehensive plan. That plan will be documented in a separate Commission report.*

agement measures promote such flexibility, enabling the system to respond better to changes in travel demand and to external forces which may affect the use and operation of the transportation system, such as changing motor fuel costs and constraints imposed by environmental protection requirements.

In the context of the regional transportation system plan, "transportation system development" refers to the process by which the system is purposely altered to realize its potential in achieving related objectives. This may mean that the system is modified to accommodate existing and future travel patterns better, or is modified to change travel patterns. Transportation system development refers to the physical expansion of the existing system, as well as to the physical and nonphysical strategies to make more meaningful use of existing facilities. Such nonphysical strategies may include freeway traffic management systems to better detect, confirm, and remove incidents; freeway and advisory information services to provide commuters with information about accidents and other disruptions of traffic flow; and freeway operational control measures, including the use of freeway on-ramp meters, to grant preferential access to high-occupancy vehicles.

Transportation system plans must be increasingly integrated into the larger urban complex to achieve broad regional development objectives, such as air quality improvement. Such integration is vital if the system is to capitalize on opportunities such as advances in telecommunications and to respond to socioeconomic changes such as smaller household sizes, greater female labor-force participation, and the growth of new major activity centers. If the transportation system is to be effectively fitted to changing travel demand, transportation policy makers must be cognizant of the changes that affect that demand.

Transportation system planning, therefore, must be carried out as an integral part of the comprehensive planning effort as described in Chapter I; transportation system plans must be based upon long-range, areawide land use plans. Only within the framework of such areawide land use plans can the planning, design, construction, and maintenance of the transportation system within an urbanizing region be purposefully directed.

Accordingly, the third-generation regional transportation system plan, as herein presented, is based upon the design year 2010 regional land use plan. That plan follows the precedent set in the initial regional land use plan for Southeastern Wisconsin by calling for a centralized development pattern directing urban development into areas that are environmentally and economically suitable for such development. The data, forecasts, analyses, objectives, alternatives considered, and the actual plan, designed and adopted, in the land use planning process indicate the structure of the transportation system development proposals contained herein.

An understanding of the term "land use" is, therefore, vital to an understanding of the principles underlying the transportation system planning process. Within the context of regional planning, the term "land use" is defined as the human activities which, grouped together, form the overall generalized pattern of urban and rural development considered at a regional scale. Particular emphasis is placed on those aspects of land use which either through their individual or aggregate effects interact strongly with the need for major utility, recreational, and transportation facilities. These include such large land-consuming uses as agriculture; regional parks and open space reserves; woodlands, wetlands and surface waters; residential uses; and commercial and industrial centers. These also include major concentrations of land use activities, such as regional shopping, office, and institutional centers and major transportation terminals. Regional land use plans spatially allocate the demand for these aspects of human activity to achieve regional development objectives.

## BASIC PRINCIPLES

The Commission views the planning process as cyclical in nature, alternating between areawide system planning and local project planning. With respect to transportation system planning, under this concept transportation-related proposals are initially advanced at the areawide, systems, level of planning and then an attempt is made to implement the proposals through local project planning. If, for whatever reasons, a particular facility construction or management proposal advanced at the areawide systems planning level cannot be implemented at the project level, that determination is taken into account in the next cycle of systems planning.

The specific planning process applied in the transportation plan reappraisal effort is based on seven basic principles. These are:

1. Transportation system planning must be regional in scope. Travel patterns develop over an entire urban region without regard to corporate limits. Thus, transportation planning cannot be accomplished successfully within the confines of a single municipality or even a single county if that municipality or county is a part of a larger urban complex. The regional surface transportation system, which is composed of arterial streets and highways, transit facilities and services, bicycle and pedestrian facilities, and related terminal facilities, as well as transportation system management measures, must form a single integrated system over the entire Region, a system which can adequately serve changing regional travel patterns.

2. Transportation system planning must be conducted concurrently with, and cannot be separated from, land use planning. The land use pattern determines the amount and spatial distribution of travel to be accommodated by the transportation system and the ability of various modes of transportation to serve travel demand cost-effectively. In turn, the transportation system is one of the most important determinants of the land use pattern, forming the basic framework for all urban development today. Although detailed land use patterns are primarily of local concern and properly subject to local planning and control, the aggregate effects of the spatial distribution of land use activities are regional in scope and interact strongly with the need for regional utility, recreation, and transportation facilities.

3. Highway and transit systems must be planned together. Each mode of transportation should be assigned that part of the total travel demand which it is best suited to carry. In order for the system to be most effective, arterial street and highway systems and related terminal facilities should function in a coordinated manner.

4. Transportation facilities and management measures must be planned as an integrated system. The capacities of each link in the system must be carefully fitted to traffic loads and the effects of each proposed facility and management measure on the remainder of the system must be quantitatively tested. Bicycle and pedestrian facilities must be integrated into the regional transportation system planning process.

5. Transportation system planning must recognize the existence of a limited natural resource base to which urban and rural development must be properly adjusted to ensure a pleasant and habitable environment. Land, water, and air resources are limited and subject to grave misuse through improper land use and transportation system development. Such misuse can lead to serious and costly environmental problems that may be difficult or impossible to correct.

6. Transportation system planning must recognize the role of transportation in the achievement of personal and community goals. Access to good transportation, including a choice of modes, facilitates the freedom to choose between a variety of places to live, work, shop, and recreate. The role of transportation in making accessible environmentally sound economic, cultural, and educational opportunities, thus in promoting sound social and economic development, must be recognized in the transportation system planning process.

7. Transportation systems planning must recognize the importance of properly relating the regional transportation system to the State and national systems. The planning for the interregional movement of people and goods, particularly by railway, pipeline, and waterway, is primarily the responsibility of the State and Federal levels of government. Decisions made at these levels of government affect the scale and timing of regional transportation system development and the availability of capital funds to implement regional transportation system improvements. Therefore, coordination in the planning process with the State and Federal levels of the government becomes essential to the attainment of a balanced, integrated, and workable regional transportation system.

## THE TRANSPORTATION SYSTEM PLANNING PROCESS

On the basis of the foregoing principles, the Regional Planning Commission employs a seven-step planning process by which the Region and its primary functional relationships can be accurately described both graphically and numerically; the complex movement of people and vehicles over highway and transit facilities simulated; and the effect of different courses of action with respect to regional transportation system development evaluated. The seven steps in the planning process are: 1) study design, 2) formulation of objectives and standards, 3) inventory, 4) analyses and forecast, 5) plan design, 6) plan test and evaluation, and 7) plan selection and adoption. Plan implementation, although a step beyond the foregoing planning process, is considered throughout the process so that realization of the plans may be fostered.

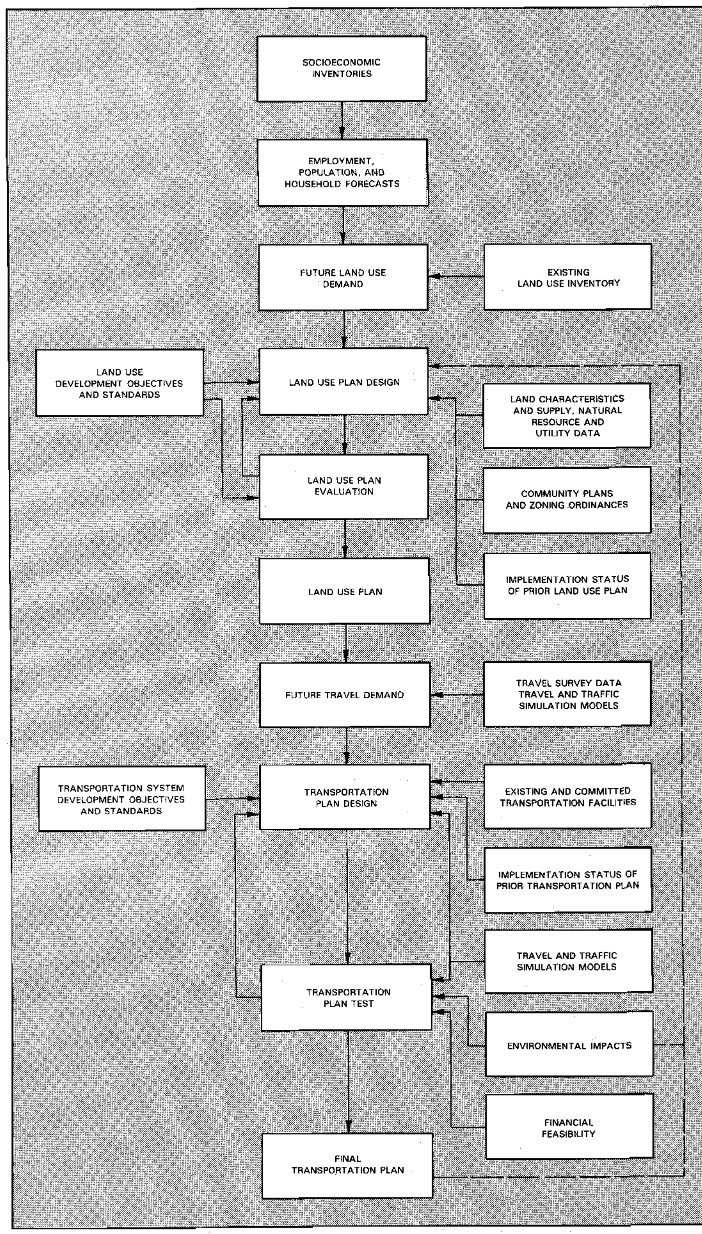
### Study Design

Every planning program must embrace a formal structure or study design so that the program can be carried out in a logical and consistent manner. This study design must: specify the content of the fact-gathering operations, define the geographic area for which data will be gathered and plans prepared, outline the manner in which the data collected are to be processed and analyzed, specify requirements for forecasts and for forecast accuracy, and define the nature of the plans to be prepared and the criteria for their evaluation and adoption. The study design for the third-generation regional planning program was set forth in general terms in Study Design for the Continuing Regional Land Use-Transportation Study, approved by the Commission's Technical Coordinating and Advisory Committee on Regional Transportation System Planning in February 1993.

In the approach to transportation system planning, as set forth in the various publications, the transportation system is designed to serve and support the planned land use pattern. The design and test of the transportation system plans, therefore, rest upon the basic concept that travel within a metropolitan area is an orderly and measurable occurrence directly related to land use. Based on this concept, techniques are used which make it possible to calculate future travel demand as a function of land use.

**Figure 3**

**LAND USE-TRANSPORTATION PLANNING PROCESS**




*Source: SEWRPC.*

By considering the future distribution of land use as the major factor in projecting travel patterns, integrated transportation systems can be designed to serve not only the existing travel patterns but also the entirely new travel patterns which evolve out of regional growth and change. Figure 3 illustrates the process followed in the formation of the third-generation regional transportation system plan and the relationship of that method to the third-generation regional land use plan.

Table 1

**TRANSPORTATION-SPECIFIC INVENTORIES CONDUCTED FOR USE IN THE THIRD-GENERATION REGIONAL TRANSPORTATION SYSTEM PLAN PREPARATION**

| Inventory of Transportation Facilities and Network Utilization | Inventory of Transportation Movement and Behavioral Factors Affecting Travel Habits and Patterns |
|---|---|
| Highway Facilities and Service Levels | Screenline Survey |
| Transit Facilities and Service Levels | Home Interview Survey |
| Transportation Terminal Facilities | Truck and Taxi Survey |
| Automobile Availability | External Surveys |
| Truck Availability | Mass Transit Survey |

*Source: SEWRPC.*

Formulation of Objectives and Standards

In its most basic sense, planning is a rational process for establishing and meeting objectives. The formulation of objectives is, therefore, an essential task to be undertaken before plans can be prepared. The objectives which are chosen guide the preparation of alternative plans and, when converted to standards, provide the criteria for evaluating and selecting from among the alternatives.

Since objectives provide the logical basis for the design of plans, formulation of sound objectives is a crucial step in the planning process. In order to be useful in plan design, the objectives must not only be stated clearly and be sound logically, but must also be related in a demonstrable way to alternative system development proposals. Only if the objectives are clearly relatable to system development and subject to objective test can a choice be made from among alternative plans in order to select that plan which best meets the agreed-upon objectives.

Inventory

Reliable basic planning and engineering data, collected on a uniform, areawide basis, are absolutely essential to the formulation of workable system development plans. Consequently, inventory becomes the first operational step in any planning process, growing out of the study design. The crucial nature of factual information in the planning process should be evident, since no intelligent forecasts can be made, or alternative courses of action selected, without knowledge of the current state of the system being planned.

The sound formation of a regional transportation system plan requires that factual data be developed on the existing and potential demand for transportation between various points inside the Region and outside the Region, on the relative demand for alternative modes of transportation, and on the major determinants of these demands, as well as on the existing and potential supply of transportation system capacity.

The transportation-specific inventories can be grouped under two headings: "Existing Transportation Facilities and Network Utilization," and "Existing Transportation Movement and Behavioral Factors Affecting Travel Habits and Patterns." The specific inventories under each of these major headings are shown in Table 1.

Because transportation system planning must be conducted concurrently with, and cannot be separated from, land use planning, the data derived from land use-related inventories is crucial. Accordingly, the sound formation of transportation system plans also requires that data be developed on the existing land use pattern, on the potential demand for each of the major land use categories, on the major determinants of these demands, and on existing local development objectives and constraints, as well on the underlying natural resource base and its ability to support land use development.

The major transportation and land use inventories considered together must encompass all the various factors which influence transportation system development. The data collected in the inventories must be pertinent to:

1. Describing existing conditions with respect to transportation system development and identifying existing problems and problem patterns with respect thereto;

2. Forecasting future transportation system needs in light of existing land use conditions and planned land use patterns;

3. Formulating alternative transportation system development plans to complement the adopted land use plan; and

4. Testing and evaluating alternative transportation system development plans.

Analyses and Forecast

Inventories provide factual information about the present situation, but analyses and forecasts are necessary to provide estimates of future needs for resources, land, and transportation. Analyses of the information provided by the inventories are required to provide an understanding of the existing situation, the future trends of change in that situation, and the factors influencing these trends. Particularly important among the analytical relationships established are those which link population and economic activity levels to the demand for land and transportation.

Future needs must be estimated from a sequence of interlocking forecasts founded in the results of the planning analyses. Economic activity and population forecasts set the general scale of future growth, which, in turn, is translated into future natural resources, land use, and travel demands. These future demands can then be scaled against the existing supply and plans formulated to meet deficiencies or to make more effective use of existing supply.

Plan Design

Plan design, or synthesis, is the process of fusing separate but related elements determined to be needed into the existing system to be planned. The most well-conceived objectives, the most sophisticated results of data collection and analyses, and the most accurate forecasts are of little value if they do not ultimately result in sound plans to meet system development objectives. The outputs of each of the three planning operations—formulation of objectives and standards, inventory, and forecast—become inputs to the problem of plan design.

Plan Test and Evaluation

If plans, formulated in the design stage of the planning process, are to prove practical and thereby capable of realization in terms of actual transportation system development, some measures must be applied to test alternative plans quantitatively in advance of their adoption and implementation. Traffic simulation models, developed and refined over the past three decades and applied in the planning process, make it possible to determine the existing and potential travel demand on any proposed transportation network. The complete sequence of simulation is applied in four stages.

1. Trip generation, in which the total number of future trips generated in each subarea of the Region is determined, using the relationships found to exist between land use and travel from analyses of inventory data.

2. Modal split, in which these future trips are divided into those using transit and those using personal vehicles, using a modal split model.

3. Trip distribution, in which the originating trips generated are allocated to destination zones; then interzonal travel desire lines are established for both transit and highway travel, using a trip distribution model.

4. Traffic assignment, in which the interzonal trips are then assigned to existing and proposed transit and highway facility networks, using a traffic assignment model.

Using the four-step simulation procedure, it is possible to test and verify the workability and efficiency of any transportation system development proposal. The last step in the procedure, traffic assignment, will reveal those areas where travel is anticipated to exceed, or to be within, the system capacity. The trip assignment procedure also provides the basis for determining which modifications to the system will ultimately result in a practical and efficient transportation system plan for which development costs can be calculated. Trip assignment also permits user benefits to be calculated for benefit-cost analyses. Finally, such assignment provides a more precise basis for the application of standards so that the degree to which each alternative transportation system plan meets the chosen objectives can be better determined.

The degree to which the alternative regional transportation system plans serve the adopted regional land use plan is also evaluated in the test and evaluation step. During the travel simulation procedure, described above, forecasts of travel are made on the basis of the adopted regional land use plan. Specifically, these travel forecasts are based on the levels and spatial distribution of the population, household, and economic activity envisioned in the land use plan. The evaluation of alternative transportation system proposals in light of the land use plan may suggest the need for changes in the land use plan, as shown by the feedback loop in Figure 3.

### Plan Selection and Adoption

The last step in the seven-step planning process is the selection and adoption of a final recommended plan from among the alternative plans considered. In this step, the alternative plan deemed most capable of meeting the stated objectives and standards is chosen for adoption by the Commission. The Commission has developed an extensive program to involve elected and appointed officials, citizen leaders, and the general public in plan selection and adoption. The public involvement program, as described in Chapter I, includes the use of advisory committees, public informational meetings, and formal public hearings. The program allows elected officials, technicians, and members of the general public concerned with regional development to participate in the selection and refinement of a final regional transportation system plan. After refinement, as warranted by the public review process, the plan is considered for adoption by the Regional Planning Commission. Upon adoption by the Commission, the plan is certified to concerned units and agencies of government for adoption and implementation.

## SUMMARY

This chapter has set forth the scope of the third-generation regional transportation system plan, the seven basic principles underlying the planning process, and the seven procedural steps followed by the Commission in that process. Though experience in preparing the first and second regional transportation system plans has proved the general scope, basic principles, and seven-step planning process to be essentially sound, certain modifications were made.

The definition of "transportation system" was expanded to underscore the multi-modal approach necessitated by sound planning and the integral role transportation management measures have come to play in transportation system operation. The regional transportation system is defined by the Commission as the functionally related surface transportation facilities, including arterial street and highway, mass transit, bicycle, and pedestrian facilities and system management measures that enable the intraregional and interregional movement of people and goods.

Basic principles one through five, as outlined in this chapter, were expounded in the initial and second-generation regional transportation planning efforts and modified only slightly, in keeping with the refined definition of the term "transportation system." Principle number six was added to the original five in recognition of the increasing importance of good transportation, including a choice among modes, to the achievement of personal and collective goals and thus to community development. Principle number seven was added to reflect the importance of functionally relating the regional transportation system to the State and national transportation systems and, consequently, the importance of coordinating planning endeavors among various levels of government.

The process applied in the earlier transportation planning efforts was again activated in the preparation of the year 2010 regional transportation system plan. That process, consisting of the seven steps of study design, formulation of objectives and standards, inventory, analyses and forecasts, plan design, plan test and evaluation, and plan selection, remains a coherent and rational approach to systemwide transportation planning.

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# Chapter III

## MONITORING AND IMPLEMENTATION ACTIVITIES RELATED TO THE ADOPTED YEAR 2000 REGIONAL TRANSPORTATION SYSTEM PLAN

### INTRODUCTION

The year 2000 regional transportation system plan has functioned as an important guide to transportation system development in the Region since its adoption by the Commission in 1978. It has been amended through planning executed at the local and subregional levels under the continuing land use-transportation study. This chapter describes the year 2000 regional transportation system plan as amended, provides an evaluation of the forecasts underlying the design of the plan, and describes the progress toward plan implementation. The information presented in this chapter provides an important basis for assessing the validity of the adopted plan and for identifying needed changes.

To the extent necessary for a proper evaluation of the regional transportation plan, this chapter provides some information on the changes in trip making and traffic congestion that have occurred within the Region from 1972 through 1991. More complete presentations of the changes in trip making and traffic congestion are provided in other chapters of this report. To the extent necessary for a proper evaluation of the status of regional transportation plan implementation, this chapter also presents some information on changes in urban development that have occurred within the Region from 1972 to 1991. For a more comprehensive review and analysis of such land use changes since 1970, and hence of the implementation of the year 2000 regional land use plan, the reader should refer to SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010. The reader may also wish to refer directly to SEWRPC Planning Report No. 25, in which the year 2000 regional land use plan is documented.

### PLAN ADOPTION

The Regional Planning Commission formally adopted the second-generation regional transportation system plan June 1, 1978. The plan, with supporting data, analyses, forecasts, and objectives, was fully documented in SEWRPC Planning Report No. 25. The Commission acted to adopt the plan pursuant to Section 66.945(9) and (10) of the Wisconsin Statutes. This plan was certified to concerned Federal and State agencies of government and to the constituent county and local units of government for consideration, adoption, and implementation.

The Commission's adoption of the plan was preceded by an extensive series of public informational meetings and public hearings held throughout the Region. The preliminary regional transportation system plan was the subject of four such hearings held by the Commission in the fall of 1977. Prior to those hearings, the Commission prepared and widely distributed the September-October 1977 issue of the SEWRPC Newsletter (Vol. 17, No. 5), which presented in summary form the preliminary plan recommendations. Extensive coverage of the plan was given by the public information media, including a major two-page feature story in the Thanksgiving Day issue of The Milwaukee Journal.

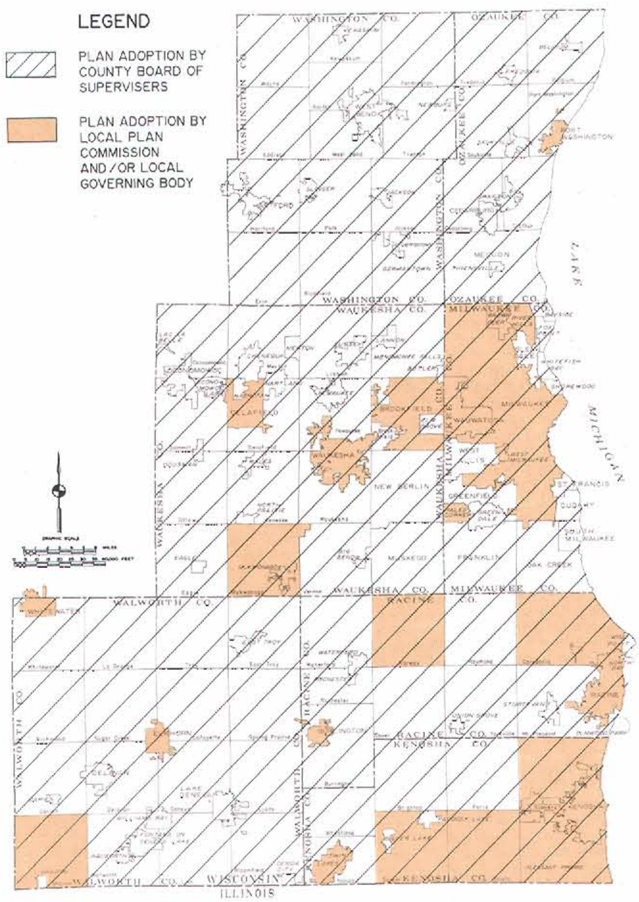
An essential action before the implementation of the regional transportation system plan is the adoption of the plan by the constituent units of local government and by the governmental agencies having plan implementation authority. As of January 1, 1993, the year 2000 regional transportation system plan had been adopted by all seven County Boards within the Region and the by local governing bodies of 11 cities, seven villages, and seven towns (see Map 3). The plan was also acknowledged by such government agencies as the U. S. Department of Transportation, Federal Highway Administration and Urban Mass Transit Administration (the latter now the Federal Transit Administration), and the Wisconsin Department of Transportation.

### PLAN AMENDMENTS

The second-generation regional transportation system plan, as a long-range development plan, was designed with an approximate 20-year planning horizon. This planning horizon was selected to reflect the economic life of transportation facilities proposed for construction during

Map 3

**ADOPTION OF THE YEAR 2000 REGIONAL TRANSPORTATION SYSTEM PLAN AND RELATED AMENDMENTS**




An essential action preceding the implementation of the regional transportation system plan is the adoption of the plan by the constituent units of local government and by the governmental agencies having plan implementation authority. As of January 1, 1993, the year 2000 regional transportation system plan had been adopted by all seven county boards within the Region and by the local governing bodies of eleven cities, seven villages, and seven towns. The plan was also formally acknowledged by the U. S. Department of Transportation, Federal Highway and Urban Mass Transit Administrations, the latter now the Federal Transit Administration, and the Wisconsin Department of Transportation.

*Source: SEWRPC.*

the initial stages of the plan. Since the adoption of the plan design year 2000 regional transportation system plan, the continuing regional land use-transportation study has provided the means for preparing county jurisdictional highway system plan amendments and integrating these county plan amendments into the regional transportation system plan, thereby also amending the regional plan.

In the operation of the subregional-to-systemwide planning cycles it became apparent that the design year of the regional plan was no longer a practical target for some of the jurisdictional highway system and corridor plans, particularly those prepared after 1985, since the economic life of the facilities included in such plans falls beyond the year 2000 design target. In and after 1985 it also became possible for the Commission to avail itself of more current land use and travel data. Consequently, the design year for the capital improvements proposed in the most recent jurisdictional highway plans for Walworth and Ozaukee Counties, proposed for the Burlington Bypass in Racine County, and for several major travel corridor plans was extended beyond the year 2000, to the year 2010.[1] These extensions of the design year were made by the Commission with the understanding that the planned improvements would be integrated into the third-generation regional transportation system plan during its preparation, provided such improvements advanced the objectives of the new regional plan.

In describing the arterial street and highway component of the adopted regional transportation system plan and in evaluating its implementation, it is therefore necessary to distinguish between the regional plan, essentially as adopted in 1978, and the regional plan as it stood amended through 1992, with some highway improvement proposals advanced to the

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[1] *See: Amendment to the Walworth County Jurisdictional Highway System Plan—2010, March 1992; Amendment to the Ozaukee County Jurisdictional Highway System Plan—2010, January 1993; Amendment to the Racine County Jurisdictional Highway System Plan—2000 (Recommendations for the proposed City of Burlington Bypass—2010), December 1990; SEWRPC Community Assistance Planning Report No. 200 A Land Use and Transportation System Development Plan for the IH 94 South Freeway Corridor, Kenosha, Milwaukee, and Racine Counties, January 1992; SEWRPC Community Assistance Planning Report No. 151 A Transportation System Plan for the Blue Mound Road (USH 18) Corridor, December 1987. Currently under preparation by the Commission is a land use and transportation system development plan for the IH 94 West Freeway Corridor.*

design year 2010. An evaluation of the implementation of the plan as it stood amended through 1992 would indicate unrealistic progress toward implementation, only a very few years having elapsed since the adoption of the latest concerned jurisdictional highway system and corridor plans, thus precluding meaningful opportunity for plan implementation. The needed implementation evaluation will therefore focus on the improvements set forth in the plan design year 2000 plan as adopted in 1978, while a description of the planned improvements will be provided as set forth under both conditions.

Plan Refinements

The Commission's continuing regional land use-transportation study has also provided the means for refining the adopted design year 2000 regional transportation system plan through the preparation and adoption of several significant plan elements (see Table 2). The description of these plan elements is intended to provide an appropriate context for understanding the true breadth of the year 2000 plan recommendations.

In 1980, pursuant to Federal regulations, the Commission adopted a transportation systems management plan element. That plan element is set forth in SEWRPC Community Assistance Planning Report No. 50, A Transportation Systems Management Plan for the Kenosha, Milwaukee, and Racine Urbanized Areas in Southeastern Wisconsin. The plan recommended the implementation of such management measures as a freeway traffic management system, improved transit services, a system of park-ride and park-pool lots, and the promotion of carpooling and vanpooling. In addition, this plan element called for specific studies for integrating the "stub ends" of uncompleted freeways into the arterial street and highway system, for the examination of the potential for work time rescheduling to reduce peak-period travel demands, for the examination of taxi fares and regulation, and for the examination of parking rate structures to discourage the use of single-occupancy motor vehicles for commuting within the Region.

On the basis of studies derived from the transportation system management plan recommendations, the second-generation regional transportation system plan was subsequently amended to provide specifically for the integration into the arterial street network of the "stub ends" of the Lake Freeway-South, the Lake Freeway-North, the Park Freeway-East, the Stadium Freeway-South, the Stadium Freeway-North, and the Park Freeway-West. These planned subregional projects were completed between 1981 and 1985, thereby refining the adopted regional transportation system plan.

The adopted year 2000 regional transportation system plan was further refined through the completion and adoption in 1982 of SEWRPC Planning Report No. 33, A Primary Transit System Plan for the Milwaukee Area. Specific recommendations concerning the provision of rapid transit service in the greater Milwaukee area were set forth in that document. The report explicitly recognized the potential for light rail and commuter rail transit services in certain major travel corridors.

In 1983, the Commission completed SEWRPC Planning Report No. 34, A Transportation System Plan for the Milwaukee Northwest Side/Ozaukee County Study Area. The plan identified both short-range and long-range highway and transit improvements which would be required for that portion of the Region in the absence of previously planned freeway improvements. Short-range plan recommendations included: the integration of the freeway "stub ends" at the Park Freeway-West and Stadium Freeway-North into the surface arterial system, the abatement of congestion and accident problems along 20 selected segments of the surface arterial street system, and the improvement of public transit. Long-range plan recommendations included: freeway improvements on IH 43 North, freeway traffic management improvements, surface arterial street extensions and widening projects, and major public transit improvements, including the provision of rapid transit service in the corridor either through express buses or light rail operating on exclusive transitways and reserved lanes.

In 1987, at the request of Milwaukee County, the Commission completed a major transit plan implementation study, an alternatives analysis, of the Milwaukee northwest travel corridor. That study was designed to address in detail whether the public transit service to be provided in the corridor, as recommended in the earlier plan amendment, should be provided through express bus or light rail transit. The results of this study are set forth in SEWRPC Community Assistance Planning Report No. 150, A Rapid Transit Facility Plan for the Milwaukee Northwest

Table 2

**THE EVOLVING REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN**

| Plan Element | Plan Document | Date of Adoption |
|---|---|---|
| Regional Transportation System Plan[a] | Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin: 2000, Volume One, Inventory Findings; Volume Two, Alternative and Recommended Plans | June 1, 1978 |
| Amendment—Lake Freeway South Corridor | Amendment to the Regional Transportation Plan—2000, Lake Freeway South Corridor | June 18, 1981 |
| Amendment—Milwaukee Area Primary Transit System | Planning Report No. 33, A Primary Transit System Plan for the Milwaukee Area | June 17, 1982 |
| Amendment—Racine County | Amendment to the Regional Transportation Plan—2000, Racine County | December 2, 1982 |
| Amendment—Waukesha County | Amendment to the Regional Transportation Plan—2000, Waukesha County | December 2, 1982 |
| Amendment—Milwaukee Northwest Side/Ozaukee County | Planning Report No. 34, A Transportation System Plan for the Milwaukee Northwest Side/Ozaukee County Study Area | September 8, 1983 |
| Amendment—Lake Freeway-North/ Park Freeway-East | Amendment to the Regional Transportation Plan—2000, Lake Freeway North/Park Freeway East | December 1, 1983 |
| Amendment—Stadium Freeway South Corridor | Amendment to the Regional Transportation Plan—2000, Stadium Freeway South Corridor | March 11, 1985 |
| Amendment—Waukesha County | Amendment to the Regional Transportation Plan—2000, Waukesha County | June 20, 1988 |
| Amendment—Washington County | Amendment to the Washington County Jurisdictional Highway System Plan—2000 | June 20, 1990 |
| Amendment—Racine County[b] | Amendment to the Racine County Jurisdictional Highway System Plan—2000 | December 5, 1990 |
| Amendment—Kenosha County | Amendment to the Regional Transportation Plan—2000, Kenosha County | December 5, 1990 |
| Amendment—Walworth County[c] | Amendment to the Walworth County Jurisdictional Highway System Plan—2010 | March 4, 1992 |
| Amendment-Ozaukee County[c] | Amendment to the Ozaukee County Jurisdictional Highway System Plan—2010 | January 18, 1993 |
| Amendment—IH 94 South Corridor[c] | Community Assistance Planning Report No. 200, A Land Use and Transportation System Development Plan for the IH 94 South Freeway Corridor, Kenosha, Milwaukee, and Racine Counties | January 15, 1992 |
| Racine Area Transit Development Plan | Community Assistance Planning Report No. 79, Racine Area Transit System Plan and Program: 1984-1988 | September 12, 1974 |
| Waukesha County Transit Plan | Community Assistance Planning Report No. 105, Waukesha County Transit Plan: 1988-1992 | --[d] |
| City of Waukesha Transit Development Plan | Community Assistance Planning Report No. 154, A Transit Development Plan for the City of Waukesha: 1988-1992 | June 20, 1990 |
| City of West Bend Transit Development Plan | Community Assistance Planning Report No. 189, A Transit Feasibility Study and Development Plan for the City of West Bend: 1992-1996 | March 4, 1992 |
| Kenosha Area Transit Development Plan[e] | Community Assistance Planning Report No. 183, Kenosha Transit System Development Plan: 1991-1995, City of Kenosha, Wisconsin | June 17, 1992 |
| Transportation Systems Management Plan | Community Assistance Planning Report No. 50, A Transportation Systems Management Plan for the Kenosha, Milwaukee, and Racine Urbanized Areas in Southeastern Wisconsin:1981 | December 4, 1980 |
| Amendment—Milwaukee Northwest Side/Ozaukee County | Planning Report No. 34, A Transportation System Plan for the Milwaukee Northwest Side/Ozaukee County Study Area | September 8, 1983 |
| Amendment—Milwaukee Area | Planning Report No. 39, A Freeway Traffic Management System Plan for the Milwaukee Area | December 5, 1988 |

Table 2 (continued)

| Plan Element | Plan Document | Date of Adoption |
|---|---|---|
| Elderly-Handicapped Transportation Plan[f] | Planning Report No. 31, A Regional Transportation Plan for the Transportation Handicapped in Southeastern Wisconsin: 1978-1982 | April 13, 1978 |
| Amendment—Racine Area | SEWRPC Resolution No. 78-17 | December 7, 1978 |
| Amendment—Milwaukee County | Memorandum Report No. 58, A Paratransit Service Plan for Disabled Persons—Milwaukee County Transit System | January 15, 1992 |
| Amendment—Kenosha Area | Memorandum Report No. 59, Paratransit Service Plan for Disabled Persons—City of Kenosha Transit System | January 15, 1992 |
| Amendment—Racine Area | Memorandum Report No. 60, Paratransit Service Plan for Disabled Persons—City of Racine Transit System | January 15, 1992 |
| Amendment—City of Waukesha | Memorandum Report No. 61, Paratransit Service Plan for Disabled Persons—City of Waukesha Transit System Utility | January 15, 1992 |
| Amendment—Waukesha County | Memorandum Report No. 62, Paratransit Service Plan for Disabled Persons—Waukesha County Transit System | January 15, 1992 |

[a]*The regional transportation plan is a second-generation plan. The initial regional transportation plan was adopted by the Commission on December 1, 1966, and documented in SEWRPC Planning Report No. 7, Land Use-Transportation Study, Volume Three, Recommended Regional Land Use and Transportation Plans—1990, and was subsequently amended by the adoption on June 4, 1970, of the Milwaukee County jurisdictional highway system plan documented in SEWRPC Planning Report No. 11, Jurisdictional Highway System Plan for Milwaukee County; the adoption on March 2, 1972, of the Milwaukee area transit plan set forth in the document entitled Milwaukee Area Transit Plan; the adoption on March 4, 1973, of the Walworth County jurisdictional highway system plan documented in SEWRPC Planning Report No. 15, Jurisdictional Highway System Plan for Walworth County; the adoption on March 7, 1974, of the Ozaukee County jurisdictional highway system plan documented in SEWRPC Planning Report No. 17, Jurisdictional Highway System Plan for Ozaukee County; the adoption on June 5, 1975, of the Waukesha County jurisdictional highway system plan documented in SEWRPC Planning Report No. 18, Jurisdictional Highway System Plan for Waukesha County; the adoption on September 11, 1975, of the Washington County jurisdictional highway system plan documented in SEWRPC Planning Report No. 23, Jurisdictional Highway System Plan for Washington County; the adoption on September 11, 1975, of the Kenosha County jurisdictional highway system plan documented in SEWRPC Planning Report No. 24, Jurisdictional Highway System Plan for Kenosha County; and the adoption on December 4, 1975, of the Racine County jurisdictional highway system plan documented in SEWRPC Planning Report No. 22, Jurisdictional Highway System Plan for Racine County.*

[b]*The design year for the proposed City of Burlington Bypass included in the Amendment to the Racine County Jurisdictional Highway System Plan—2000, adopted in December 1990, was advanced to the design year 2010 with the understanding that this arterial street and highway improvement would be integrated into the third-generation transportation system plan during the preparation of the plan.*

[c]*The design year of the proposed arterial street and highway system improvements was advanced to the design year 2010 with the understanding that such improvements would be integrated into the third-generation regional transportation system plan during the preparation of the plan.*

[d]*The Waukesha County Transit Plan: 1988-1992 was completed by the Commission staff in September 1988 but neither the Waukesha County Mass Transit Advisory Committee nor the Regional Planning Commission moved to adopt the plan.*

[e]*The Kenosha area transit development plan is a third-generation plan. The initial plan was adopted by the Commission on June 3, 1976, and documented in SEWRPC Community Assistance Planning Report No. 7, Kenosha Area Transit Development Plan: 1976-1980. The second-generation plan was adopted on March 11, 1985, and documented in SEWRPC Community Assistance Planning Report No. 101, Kenosha Area Transit System Plan and Program: 1984-1988.*

[f]*The 1992 amendments to the 1978 elderly-handicapped transportation plan supersede a series of earlier amendments to the 1978 plan. These earlier amendments are as follows: 1) an amendment adopted by the Commission on June 20, 1980, and documented in SEWRPC Community Assistance Planning Report No. 39, A Public Transit System Accessibility Plan, Volume Two, Milwaukee Urbanized Area/Milwaukee County; 2) three amendments adopted by the Commission on September 11, 1980, and documented in SEWRPC Community Assistance Planning Report No. 39, A Public Transit System Accessibility Plan, respectively, in Volume One, Kenosha Urbanized Area; Volume Three, Racine Urbanized Area; and Volume Four, Milwaukee Urbanized Area/Waukesha County; 3) an amendment adopted by the Commission on June 18, 1981, and documented in the Amendment to the Public Transit Accessibility Plan for the Milwaukee Urbanized Area/Waukesha County, City of Waukesha Transit System; 4) five amendments adopted by the Commission on December 7, 1987, and documented, respectively, in SEWRPC Memorandum Report No. 17, A Public Transit Program for Handicapped Persons—City of Waukesha Transit System Utility; SEWRPC Memorandum Report No. 21, A Public Transit Program for Handicapped Persons—Milwaukee County Transit System; SEWRPC Memorandum Report No. 22, A Public Transit Program for Handicapped Persons—Waukesha County Transit System; SEWRPC Memorandum Report No. 23, A Public Transit Program for Handicapped Persons—City of Kenosha Transit System; and SEWRPC Memorandum Report No. 24, A Public Transit Program for Handicapped Persons—City of Racine Transit System.*

*Source: SEWRPC.*

Table 3

TECHNICAL REPORTS PREPARED IN SUPPORT OF THE ADOPTED PLAN 2000 AS AMENDED

| Component Area | Report Document | Date Completed |
|---|---|---|
| Transportation System Management | Technical Report No. 20, Carpooling in the Metropolitan Milwaukee Area[a] | March 1977 |
| Public Transit | Technical Report No. 23, Transit Related Socioeconomic, Land Use, and Transportation Conditions and Trends in the Milwaukee Area | December 1980 |
| Public Transit | Technical Report No. 24, State-of-the-Art of Primary Transit System Technology | February 1981 |
| Transportation System Management | Technical Report No. 27, Milwaukee Area Work Time Rescheduling Study | August 1981 |
| Public Transit | Technical Report No. 26, Milwaukee Area Alternative Primary Transit System Plan Preparation, Test, and Evaluation | March 1982 |
| Transportation System Management | Technical Report No. 28, Evaluation of the Milwaukee Area Rideshare Program: 1979-1982 | May 1983 |

[a]*An evaluation of the effectiveness of the Metropolitan Milwaukee Area Carpooling Program in achieving its stated objectives conducted concurrently with the preparation of the year 2000 regional transportation system plan.*

*Source: SEWRPC.*

Corridor. On the basis of the study findings, the Milwaukee County Board and County Executive selected the express bus alternative as the preferred method of providing rapid transit service in the northwest travel corridor. Implementation of the selected alternative was then undertaken.

Within the framework of the second-generation regional transportation plan, more detailed short-range transit development plans have also been completed, adopted, and kept up to date for the Kenosha, Racine, and Waukesha urban areas. In addition, a new short-range transit development plan has recently been completed and adopted for the West Bend urban area.

Finally, the Commission also has completed and adopted a transportation plan for elderly and disabled persons. The original plan element, adopted in 1978, is updated periodically to maintain consistency with changing Federal laws and regulations. In 1992, the elderly and handicapped transportation plan, as it applies to the public transit service areas of the Region, was updated through the preparation and adoption of paratransit service plans. These service plans are intended to meet the requirements of the Federal Americans with Disabilities Act.

Plan-Related Technical Studies

The Commission also completed a series of studies since the adoption of the second-generation regional transportation system plan which are intended to provide information pertinent to the preparation of plans aimed at refining the adopted year 2000 plan. These studies, documented in SEWRPC Technical Reports, are listed in Table 3. The first such study, completed in December 1980, is documented in Technical Report No. 23, Transit-Related Socioeconomic, Land Use, and Transportation Conditions and Trends in the Milwaukee Area. That study and a companion study documented in Technical Report No. 24, State-of-the-Art of Primary Transit System Technology, combined to provide the information needed by the Commission in preparing the primary transit system plan for the Milwaukee Area. In August of 1981, the Commission completed Technical Report No. 27, Milwaukee Area Work Time Rescheduling Study. The study concerned found that the potential to reduce peak-period congestion was significant if a substantial proportion of work-related travel could be shifted from peak morning and afternoon travel hours. The study also found that the practicability of achieving the shift in work-related travel was questionable. Accordingly, the study recommended that no areawide work time rescheduling effort be undertaken at that time.

## PLAN DESCRIPTION: ADOPTED REGIONAL TRANSPORTATION SYSTEM PLAN

The adopted year 2000 regional transportation system plan consisted of three functionally related components: arterial streets and highways, including freeways; public transit facilities and services; and transportation system management measures.

Conceptually, the plan was designed to alleviate the need for expanded highway facilities by reducing automobile travel through expanded public transit and transportation system management measures. The management measures were designed to make more effective use of existing capacity before considering commitments to expanding arterial street and highway system capacity. Only the residual travel demand not captured by improved public transit and transportation system management measures would be addressed through arterial street and highway capacity improvements. The three components of the plan together would serve to alleviate existing and future traffic congestion on the arterial street and highway system, provide a more modally balanced and environmentally sound transportation system, and efficiently and effectively serve the land use pattern envisioned in the adopted regional land use plan. A description of the recommendations related to each system component follows.

### Arterial Street and Highway System

The arterial street and highway system consists of surface arterials and freeways. Surface arterials generally permit marginal access to abutting land uses, although such access may be limited, and generally have at-grade intersections with other arterial and nonarterial roadways. Freeways are high-capacity, high-speed, divided arterial facilities and have complete control of access, with access provided only at grade-separated interchanges.

The description of the arterial street and highway system component of the regional transportation system plan is intended to serve two purposes:

1. To identify the recommendations of the plan essentially as adopted in 1978, thereby providing the basis for later evaluating the implementation of the plan and

2. To present the most current plan recommendations coming out of recent county jurisdictional highway system plan amendments.

The arterial street and highway element of the adopted year 2000 regional transportation system plan recommended that the State, county, and local highway agencies jurisdictionally realign and functionally improve the arterial street and highway system in the Region. The planned functional and jurisdictional arterial street and highway system, as recommended in the adopted year 2000 plans,[2] is set forth in Table 4 and shown on Map 4. The adopted plan envisioned a regional arterial street and highway system totaling about 3,578 miles by the year 2000.

Jurisdictional Realignments: The jurisdictional realignment proposals were intended to achieve an equitable distribution of arterial street and highway development and maintenance costs among the various levels and agencies of government concerned. Criteria for recommending jurisdictional realignments were related to the

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[2]*See SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin: 2000, as well as the seven-county jurisdictional highway system plans set forth in SEWRPC Planning Reports No. 11, A Jurisdictional Highway System Plan for Milwaukee County; No. 15, A Jurisdictional Highway System Plan for Walworth County; No. 17, A Jurisdictional Highway System Plan for Ozaukee County; No. 18, A Jurisdictional Highway System Plan for Waukesha County; No. 22, A Jurisdictional Highway System Plan for Racine County; No. 23, A Jurisdictional Highway System Plan for Washington County; and No. 24, A Jurisdictional Highway System Plan for Kenosha County.*

Table 4

PLANNED DISTRIBUTION OF ARTERIAL STREET AND HIGHWAY MILEAGE IN THE REGION BY JURISDICTIONAL CLASSIFICATION: 2000[a]

| County | State | | County | | Local | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent |
| Kenosha . . . . . . | 112.2 | 31.6 | 198.5 | 56.0 | 44.0 | 12.4 | 354.7 | 100.0 |
| Milwaukee . . . . . | 247.0 | 32.0 | 195.0 | 25.3 | 329.0 | 42.7 | 771.0 | 100.0 |
| Ozaukee . . . . . . | 89.5 | 29.1 | 165.7 | 53.9 | 52.0 | 17.0 | 307.2 | 100.0 |
| Racine . . . . . . . | 178.8 | 41.5 | 173.2 | 40.2 | 79.0 | 18.3 | 431.0 | 100.0 |
| Walworth . . . . . | 224.2 | 46.4 | 244.3 | 50.6 | 14.7 | 3.0 | 483.2 | 100.0 |
| Washington . . . . | 158.6 | 33.4 | 239.7 | 50.5 | 76.1 | 16.1 | 474.4 | 100.0 |
| Waukesha . . . . . | 223.3 | 29.5 | 425.9 | 56.3 | 107.7 | 14.2 | 756.9 | 100.0 |
| Region | 1,233.6 | 34.5 | 1,642.3 | 45.9 | 702.5 | 19.6 | 3,578.4 | 100.0 |

[a]*Adopted Year 2000 Regional Transportation System Plan, as amended by the removal of the Stadium Freeway-South, Lake Freeway-North, Park Freeway-East, and by the substitution of the Lake Arterial for the Lake Freeway-South; and prior to its amendment by the following: Amendment to the Walworth County Jurisdictional Highway System Plan—2010, March 1992; Amendment to the Ozaukee County Jurisdictional Highway System Plan—2010, January 1993; Amendment to the Racine County Jurisdictional Highway System Plan—2000 (Recommendations for the proposed City of Burlington Bypass—2010), December 1990; SEWRPC Community Assistance Planning Report No. 200, A Land Use and Transportation System Development Plan for the IH 94 South Freeway Corridor, Kenosha, Milwaukee, and Racine Counties, January 1992; SEWRPC Community Assistance Planning Report No. 151, A Transportation System Plan for the Blue Mound Road (USH 18) Corridor, December 1987.*

*Source: SEWRPC.*

kinds of trips served by, and the operational characteristics of, the facilities. Applying such criteria, the plan recommended that State trunk highways serve the longest trips, access the most important land uses, and carry the highest traffic volumes. Concomitantly, the plan recommended that county trunk highways serve trips of intermediate length and carry intermediate traffic volumes, and that local trunk arterials serve the shortest trips, access locally-oriented land uses, and carry the lightest traffic volumes.

The jurisdictional realignment element of the plan recommended abolishing the "connecting street" concept[3] with respect to State trunk highways, thus providing for continuous State trunk highways, with attendant maintenance and traffic control responsibilities, through incorporated urban areas. Similarly, the plan recommended that county trunk highways penetrate incorporated communities and thereby provide continuous routes through those communities.

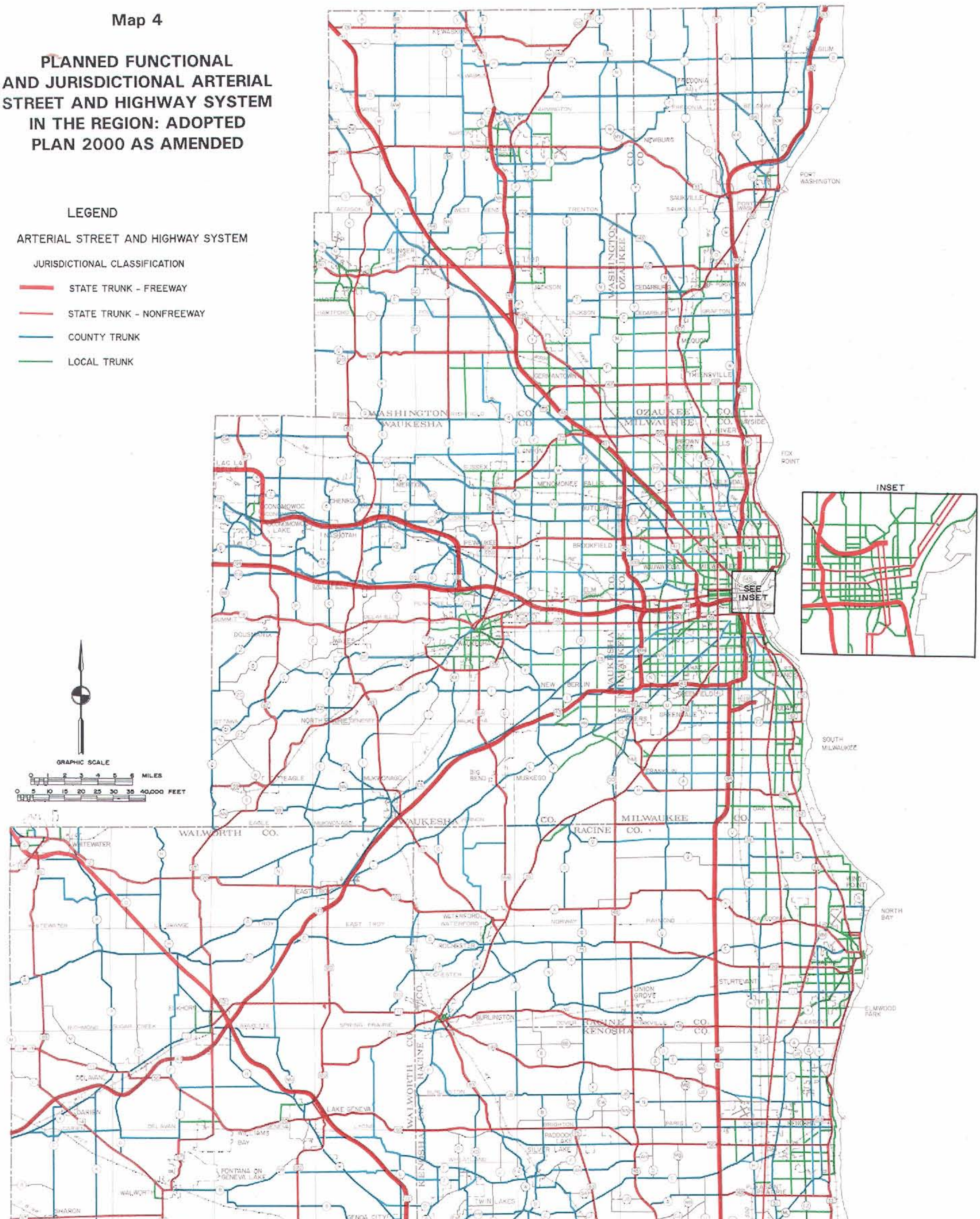
The recommended distribution of the arterial street and highway mileage among the three jurisdictional classifications is set forth in Table 4. Under the plan, State trunk highways would total 1,234 miles, or about 34 percent, of the planned regional arterial system. County trunk highways would total about 1,642 miles, or an additional 46 percent, of the regional system. Local arterial streets and highways would constitute the remaining 702 miles, or about 20 percent, of the regional system. This recommended distribution of arterial street and highway mileage would be achieved through the planned transfer of arterial miles between the jurisdictional classifications as set forth in Table 5. The adopted plan recommended the following with regard to jurisdictional realignments:

1. That approximately 123 miles be transferred to the State trunk system from the county trunk system and the local arterial system.

[3]*Connecting streets and highways are defined as the marked routes of State trunk highways over the municipal streets and highways where the municipality has the responsibility for maintenance and operation.*

## Map 4

### PLANNED FUNCTIONAL AND JURISDICTIONAL ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: ADOPTED PLAN 2000 AS AMENDED




The design year 2000 regional transportation system plan recommended that the State, county, and local highway agencies jurisdictionally realign and functionally improve the arterial streets and highways within the Region. The adopted plan envisioned a regional arterial street and highway system that would total about 3,574 miles by the year 2000.

*Source: SEWRPC.*

Table 5

PLANNED MILES OF JURISDICTIONAL REALIGNMENTS IN THE REGION BY COUNTY: 2000

| Type of Transfer | County | | | | | | | Region Total |
|---|---|---|---|---|---|---|---|---|
| | Kenosha | Milwaukee | Ozaukee | Racine | Walworth | Washington | Waukesha | |
| Transfers to State Trunk System | | | | | | | | |
| From County Trunk System | 6.5 | 11.0 | 4.3 | 28.2 | 19.0 | 8.0 | 18.9 | 95.9 |
| From Local System | 0.8 | 10.2 | 4.0 | 4.4 | 2.6 | 4.2 | 1.2 | 27.4 |
| Total | 7.3 | 21.2 | 8.3 | 32.6 | 21.6 | 12.2 | 20.1 | 123.3 |
| Transfers to County Trunk System | | | | | | | | |
| From State Trunk System | 34.7 | 54.7 | 86.4 | 36.7 | 30.3 | 46.9 | 53.4 | 343.1 |
| From Local System | 20.0 | 86.4 | 29.5 | 37.3 | 59.2 | 53.9 | 78.6 | 364.9 |
| Total | 54.7 | 141.1 | 115.9 | 74.0 | 89.5 | 100.8 | 132.0 | 708.0 |
| Transfers to Local Arterial System | | | | | | | | |
| From State Trunk System | 0.0 | 12.8 | 0.0 | 4.4 | 1.2 | 8.7 | 18.5 | 45.6 |
| From County Trunk System | 13.0 | 15.1 | 2.9 | 11.3 | 1.0 | 5.4 | 91.6 | 140.3 |
| Total | 13.0 | 27.9 | 2.9 | 15.7 | 2.2 | 14.1 | 110.1 | 185.9 |
| Transfers to Local Nonarterial System | | | | | | | | |
| From State Trunk System | 0.0 | 1.1 | 0.0 | 2.1 | 9.0 | 3.7 | 4.1 | 20.0 |
| From County Trunk System | 97.2 | 3.3 | 13.7 | 21.4 | 26.6 | 52.8 | 134.5 | 349.5 |
| Total | 97.2 | 4.4 | 13.7 | 23.5 | 35.6 | 56.5 | 138.6 | 369.5 |

*Source: SEWRPC.*

2. That approximately 708 miles be transferred to the county trunk system from the State trunk system and the local arterial system.

3. That approximately 186 miles be transferred to the local arterial system from the State trunk system and the county trunk system.

4. That approximately 370 miles be transferred to the local nonarterial system from the State trunk system and the county truck system.

Functional Improvements: The year 2000 adopted regional transportation system plan recommended three types of functional improvements to the arterial street and highway system: system preservation, consisting of the resurfacing and reconstruction necessary to properly maintain existing arterial roadways; system improvement, consisting of the widening of existing facilities to provide additional traffic capacity; and system expansion, consisting of the construction of new arterial facilities. The functional improvements as set forth in the adopted regional plan are summarized in Table 6 and shown on Map 5. As indicated in Table 6, about 2,941 miles, or 82 percent, of the total arterial street and highway system would require only preservation; about 401 miles, or about 11 percent, would require improvement; and about 236 miles, or about 7 percent would constitute new facilities. The most significant planned surface arterial and freeway improvements are listed below.

*Surface Arterial Improvements*: The major surface arterial improvements recommended under the plan included, among others, the following: in Kenosha County, the construction of the Lake Arterial from the Racine County line to the Wisconsin-Illinois state line, the improvement of STH 165 from its present four lane section to STH 32, and the improvement of STH 31 from CTH S to the Racine County line; in Milwaukee County, the construction of the Lake Arterial from Carferry Drive to the Racine County line and the improvement of Rawson Avenue from about S. 60th Street to USH 41; in Ozaukee County, the improvement of CTH N/ Wauwatosa Road from STH 167 to STH 60; in Racine County, the construction of the Lake Arterial from the Milwaukee County line to the Kenosha County line and the improvement of STH 36 from the City of Burlington to Waukesha County; in Walworth County, the construc-

Table 6

**PLANNED MILES OF FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY JURISDICTIONAL SYSTEM AND COUNTY: 2000[a]**

| County | Planned Miles of Functional Improvement | | | | | |
|---|---|---|---|---|---|---|
| | State Trunk Highways[b] | | | County Trunk Highways | | |
| | Preservation | Improvement | Expansion | Preservation | Improvement | Expansion |
| Kenosha | 58.6 | 36.9 | 16.7 | 165.0 | 26.0 | 7.5 |
| Milwaukee | 200.6 | 31.1 | 15.3 | 158.2 | 33.8 | 3.0 |
| Ozaukee | 49.2 | 21.4 | 18.9 | 163.7 | 2.0 | 0.0 |
| Racine | 125.6 | 36.8 | 16.4 | 149.5 | 16.0 | 7.7 |
| Walworth | 162.5 | 13.7 | 48.0 | 235.8 | 4.6 | 3.9 |
| Washington | 90.5 | 48.2 | 19.9 | 224.1 | 4.4 | 11.2 |
| Waukesha | 157.1 | 49.0 | 17.2 | 377.0 | 36.4 | 12.5 |
| Region | 844.1 | 237.1 | 152.4 | 1,473.3 | 123.2 | 45.8 |

| County | Planned Miles of Functional Improvement | | | | | | Total Planned Miles of Functional Improvement |
|---|---|---|---|---|---|---|---|
| | Local Arterials | | | Entire Arterial System | | | |
| | Preservation | Improvement | Expansion | Preservation | Improvement | Expansion | |
| Kenosha | 37.9 | 2.4 | 3.7 | 261.5 | 65.3 | 27.9 | 354.7 |
| Milwaukee | 300.5 | 23.5 | 5.0 | 659.3 | 88.4 | 23.3 | 771.0 |
| Ozaukee | 48.0 | 0.0 | 4.0 | 260.9 | 23.4 | 22.9 | 307.2 |
| Racine | 67.3 | 6.6 | 5.1 | 342.4 | 59.4 | 29.2 | 431.0 |
| Walworth | 5.0 | 0.4 | 9.3 | 403.3 | 18.7 | 61.2 | 483.2 |
| Washington | 66.5 | 0.3 | 9.3 | 381.1 | 52.9 | 40.4 | 474.4 |
| Waukesha | 98.8 | 7.2 | 1.7 | 632.9 | 92.6 | 31.4 | 756.9 |
| Region | 624.0 | 40.4 | 38.1 | 2,941.4 | 400.7 | 236.3 | 3,578.4 |

[a] *Adopted Year 2000 Regional Transportation System Plan, as amended by the removal of the Stadium Freeway-South, Lake Freeway-North, Park Freeway-East, and by the substitution of the Lake Arterial for the Lake Freeway-South; and prior to its amendment by the following: Amendment to the Walworth County Jurisdictional Highway System Plan—2010, March 1992; Amendment to the Ozaukee County Jurisdictional Highway System Plan—2010, January 1993; Amendment to the Racine County Jurisdictional Highway System Plan—2000 (Recommendations for the proposed City of Burlington Bypass—2010), December 1990; SEWRPC Community Assistance Planning Report No. 200, A Land Use and Transportation System Development Plan for the IH 94 South Freeway Corridor, Kenosha, Milwaukee, and Racine Counties, January 1992; SEWRPC Community Assistance Planning Report No. 151, A Transportation System Plan for the Blue Mound Road (USH 18) Corridor, December 1987.*

[b] *State trunk highways include both freeways and surface arterials.*

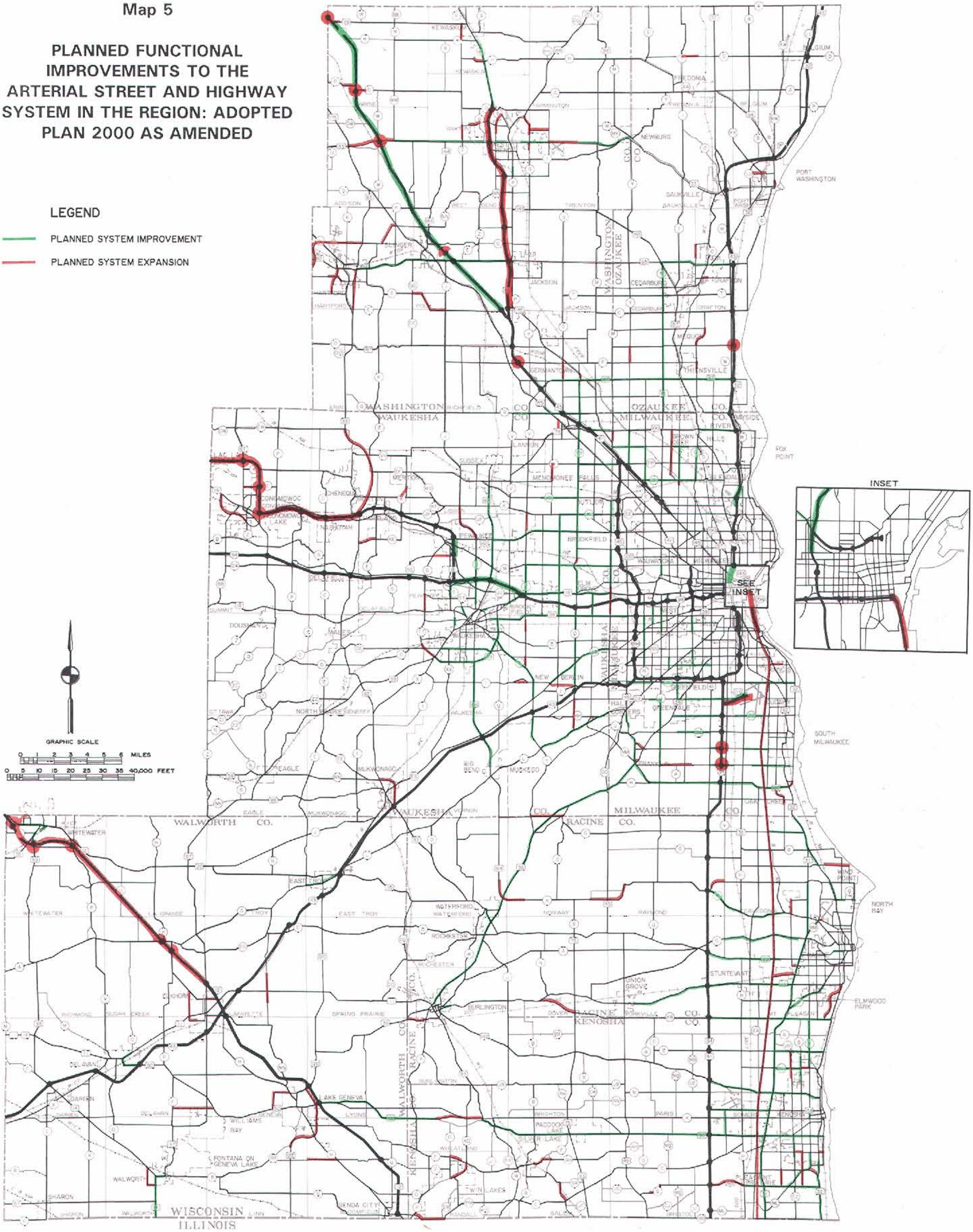
*Source: SEWRPC.*

tion of STH 120 bypass from CTH BB to STH 36; in Washington County, the improvement of USH 45 from the Village of Kewaskum to the City of West Bend and the improvement of STH 33 from USH 41 to the City of West Bend; in Waukesha County, the construction of the City of Waukesha Bypass from STH 59 to IH 94, the construction of the CTH SS extension from CTH G to CTH T, and the improvement of STH 59 from Milwaukee County to STH 164.

*Freeway Improvements*: The freeway improvements recommended under the adopted plan included the West Bend Freeway (USH 45); the conversion of USH 41 in Washington County from an expressway to a freeway; the completion of the STH 16 freeway to, and bypass around, the City of Oconomowoc; the extension of USH 12 northerly through Walworth County, with a bypass of the City of Whitewater and an eventual connection outside the Region with

**Map 5**

**PLANNED FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: ADOPTED PLAN 2000 AS AMENDED**




The design year 2000 regional transportation system plan recommended three types of functional improvements to arterial streets and highways within the Region: system preservation, system improvement, and system expansion. The plan called for the preservation of about 2,941 miles, or 82 percent, of the total planned system; for the improvement of about 401 miles, or 11 percent, of the planned system; and for the construction of 236 miles of additional arterial facilities.

*Source: SEWRPC.*

Table 7

PLANNED DISTRIBUTION OF ARTERIAL STREET AND HIGHWAY MILEAGE IN THE REGION BY JURISDICTIONAL CLASSIFICATION: 2010

| County | State | | County | | Local | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent |
| Kenosha . . . . . . | 114.9 | 32.5 | 195.0 | 55.2 | 43.1 | 12.3 | 353.0 | 100.0 |
| Milwaukee . . . . . | 247.0 | 32.0 | 195.0 | 25.3 | 329.0 | 42.7 | 771.0 | 100.0 |
| Ozaukee . . . . . . | 80.1 | 25.5 | 161.5 | 51.4 | 72.4 | 23.1 | 314.0 | 100.0 |
| Racine . . . . . . . | 156.6 | 35.7 | 177.6 | 40.5 | 104.1 | 23.8 | 438.3 | 100.0 |
| Walworth . . . . . | 223.0 | 46.0 | 239.8 | 49.5 | 22.1 | 4.5 | 484.9 | 100.0 |
| Washington . . . . | 158.6 | 33.4 | 239.7 | 50.5 | 76.1 | 16.1 | 474.4 | 100.0 |
| Waukesha . . . . . | 223.3 | 29.5 | 425.9 | 56.3 | 107.7 | 14.2 | 756.9 | 100.0 |
| Region | 1,203.7 | 33.5 | 1,634.5 | 45.5 | 754.5 | 21.0 | 3,592.5 | 100.0 |

*Source: SEWRPC.*

IH 90-94; and the widening of IH 43 from the Silver Spring interchange to Bender Road. New freeway interchanges recommended in the plan included: Highland Road on IH 43 in the City of Mequon and Drexel Avenue and Puetz Road on IH 94 in the City of Oak Creek.

The freeway improvements proposed are relatively modest compared to the improvements contained in the initial regional transportation system plan adopted in 1966. Approximately 141 miles of the once-proposed 436 mile regional freeway system were eliminated or converted to surface arterial facilities in the reappraisal of that initial transportation system plan or under amendments to the year 2000 plan. The adopted plan proposes to carry the traffic that the eliminated freeways would have carried on surface arterials and to reduce vehicular travel through both transportation system management measures and improved and expanded public transit service.

Arterial Street and Highway System—2010

As previously indicated, in the recent preparation of amendments to three county jurisdictional highway system plans, the Commission advanced the design year for highway facility improvements to 2010. The extension of the design year beyond 2000 was dictated by the needs of long-range planning. It is important to note, however, that the improvements proposed in the concerned county jurisdictional highway system plan amendments were consistent with the objectives and standards underlying the adopted year 2000 plan. That plan was the prevailing guide to regional transportation system development in Southeastern Wisconsin.

The planned functional and jurisdictional arterial street and highway system, as defined by the most recent amendments to the county jurisdictional highway system improvements, is set forth in Table 7. In its current form, the arterial street and highway component of the adopted plan envisions a regional arterial street and highway system totalling nearly 3,593 miles. The functional improvements currently proposed to be made to the arterial street and highway system are set forth in Table 8.

Public Transit

The adopted regional transportation system plan recommended improvements to, and expansion of, the urban fixed-route public transit system in the Region (see Table 9 and Map 6). The plan envisioned that by the year 2000 public transit service would consist of a fleet of 1,104 transit vehicles operating over 2,940 round-trip route miles. In 1972, the base year for the plan, the total public transit vehicle fleet consisted of 565 buses operating over 1,201 round-trip route miles.

With the planned service improvements, it was envisioned that the public transit share of total trips made within the Region could be increased from 4 percent in 1972 to about 6 percent in 2000.

Recommendations were provided in the plan for three levels of public transit facilities and services: rapid, express, and local.

## Table 8

### PLANNED MILES OF FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY JURISDICTIONAL SYSTEM AND COUNTY: 2010

| County | Planned Miles of Functional Improvement | | | | | |
|---|---|---|---|---|---|---|
| | State Trunk Highways[a] | | | County Trunk Highways | | |
| | Preservation | Improvement | Expansion | Preservation | Improvement | Expansion |
| Kenosha | 76.4 | 32.8 | 5.7 | 167.2 | 19.6 | 8.2 |
| Milwaukee | 200.6 | 31.1 | 15.3 | 158.2 | 33.8 | 3.0 |
| Ozaukee | 39.4 | 40.7 | 0.0 | 151.2 | 8.3 | 2.0 |
| Racine | 101.7 | 29.4 | 25.5 | 157.1 | 18.5 | 2.0 |
| Walworth | 157.9 | 39.1 | 26.0 | 233.1 | 4.2 | 2.5 |
| Washington | 103.6 | 48.2 | 6.8 | 225.0 | 3.9 | 10.8 |
| Waukesha | 157.1 | 49.0 | 17.2 | 377.0 | 36.4 | 12.5 |
| Region | 836.7 | 270.3 | 96.5 | 1,468.8 | 124.7 | 41.0 |

| County | Planned Miles of Functional Improvement | | | | | | Total Planned Miles of Functional Improvement |
|---|---|---|---|---|---|---|---|
| | Local Arterials | | | Entire Arterial System | | | |
| | Preservation | Improvement | Expansion | Preservation | Improvement | Expansion | |
| Kenosha | 37.9 | 2.4 | 2.8 | 281.5 | 54.8 | 16.7 | 353.0 |
| Milwaukee | 300.5 | 23.5 | 5.0 | 659.3 | 88.4 | 23.3 | 771.0 |
| Ozaukee | 66.6 | 0.5 | 5.3 | 257.2 | 49.5 | 7.3 | 314.0 |
| Racine | 93.8 | 2.7 | 7.6 | 352.6 | 50.6 | 35.1 | 438.3 |
| Walworth | 16.6 | 0.2 | 5.3 | 407.6 | 43.5 | 33.8 | 484.9 |
| Washington | 67.0 | 0.0 | 9.1 | 395.6 | 52.1 | 26.7 | 474.4 |
| Waukesha | 98.8 | 7.2 | 1.7 | 632.1 | 92.6 | 31.4 | 756.9 |
| Region | 681.2 | 36.5 | 36.8 | 2,985.9 | 431.5 | 174.3 | 3,592.5 |

[a]*State trunk highways include both freeways and surface arterials.*

*Source: SEWRPC.*

## Table 9

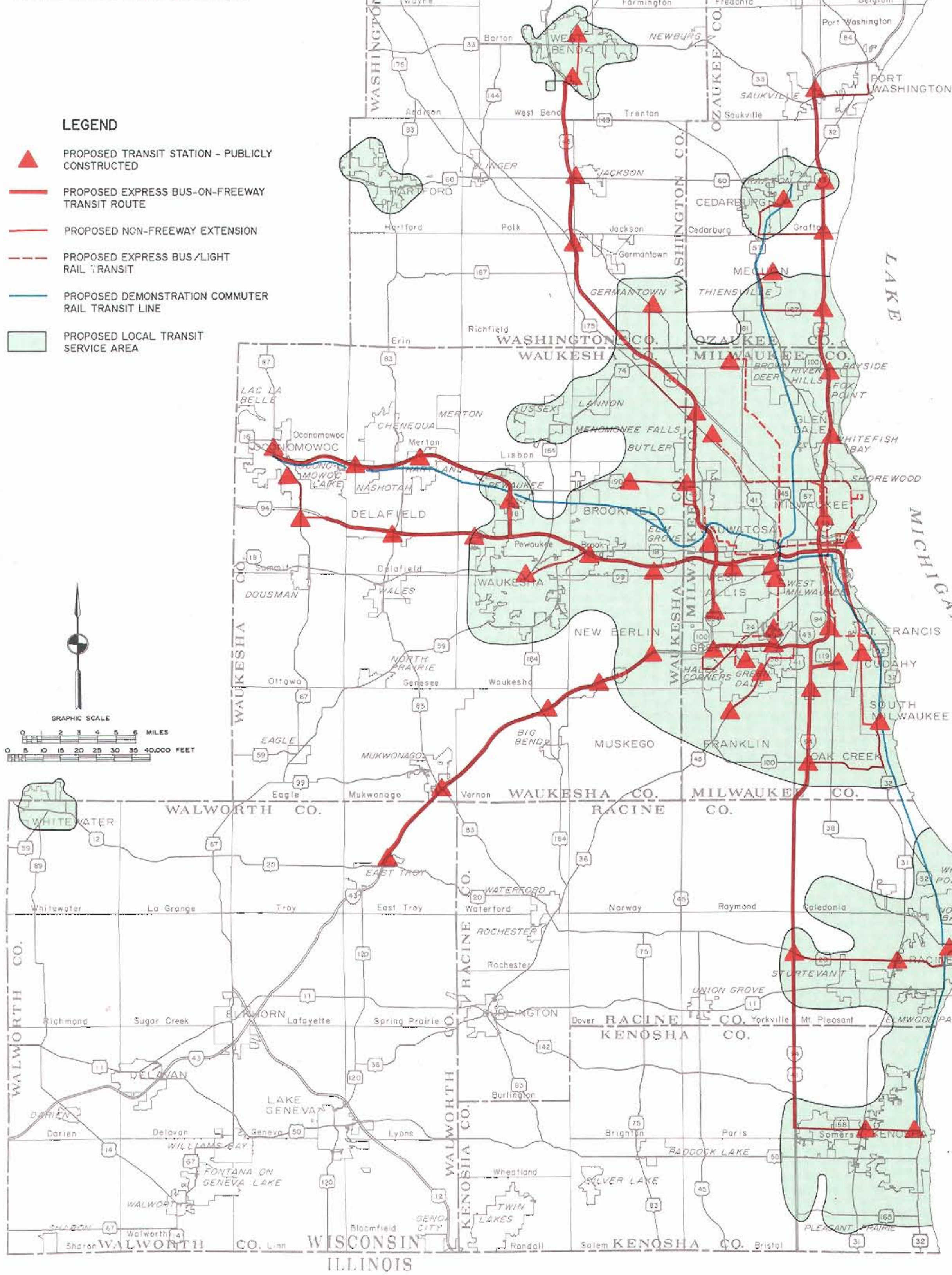
### OPERATING CHARACTERISTICS OF PUBLIC TRANSIT SERVICE IN THE REGION BY URBANIZED AREA: 1972 AND ADOPTED 2000 PLAN

| Transit Service Characteristic | Kenosha Urbanized Area | Milwaukee Urbanized Area | Racine Urbanized Area | Total Region |
|---|---|---|---|---|
| Existing 1972 | | | | |
| Round-Trip Route Miles | 59 | 1,061 | 81 | 1,201 |
| Peak-Period Vehicle Requirements | 12 | 442 | 10 | 464 |
| Total Fleet (including spares) | 18 | 533 | 14 | 565 |
| Adopted Year 2000 Plan | | | | |
| Round-Trip Route Miles | 147 | 2,641 | 153 | 2,941 |
| Peak-Period Vehicle Requirements | | | | |
| Buses | 42 | 872 | 38 | 952 |
| Light Rail | - - | 24 | - - | 24 |
| Commuter Rail | - - | 27 | - - | 27 |
| Subtotal | 42 | 923 | 38 | 1,003 |
| Total Fleet (including spares) | 46 | 1,016 | 42 | 1,104 |

*Source: SEWRPC.*

Map 6

**PLANNED PUBLIC TRANSIT SYSTEM IN THE REGION: ADOPTED PLAN 2000 AS AMENDED**




The year 2000 regional transportation system plan recommends a system of about 56 miles of rapid transit routes for motor bus and light rail operations. The plan recommends the development of three commuter rail lines on a demonstration basis including one line from downtown Milwaukee via the Cities of St. Francis, Cudahy, South Milwaukee, Oak Creek, Racine, and Kenosha into the Chicago area and the significant expansion into all seven counties, and improvement of, freeway flyer service. The year 2000 plan also recommends the extension of local transit service throughout the greater Milwaukee area and within the Kenosha, Racine, and Waukesha urbanized areas to serve existing and planned high- and medium-density urban development.

*Source: SEWRPC.*

- Rapid transit service is intended to facilitate relatively fast and convenient transportation along heavily traveled corridors and between major activity centers and high-density residential communities. Rapid transit service is characterized by relatively high average operating speeds and relatively low accessibility, with stops or station spacings located one-half mile or more apart. Rapid transit service can be provided by commuter rail and "heavy" rail trains operating over exclusive, grade-separated rights-of-way, or by buses operating over exclusive, grade-separated busways. Rapid transit service can also be provided by buses operating in mixed traffic on operationally controlled freeways and by "light" rail vehicles operating over exclusive, though not necessary fully grade-separated, rights-of-way.

- Express transit service can be provided by buses and "light" rail vehicles operating in mixed traffic or over reserved lanes of arterial streets and highways and in mixed traffic over freeways, with stops generally located less than 1,200 feet apart at intersecting transit routes, intersecting arterial streets, and major traffic generators. Express transit is intended to serve moderate-length trips. Express transit service provides a greater degree of accessibility at somewhat slower operating speeds than rapid transit, and may provide "feeder" service to the rapid transit system.

- Local transit service is characterized by a high degree of accessibility and low operating speeds. Local service can be provided by buses or "light" rail vehicles operating in mixed traffic over arterial and collector streets, with stops located no more than 1,200 feet apart. Such service can be provided by motor buses, electric trackless trolley buses, or "light" rail vehicles.

The public transit recommendations are shown in graphic summary form on Map 6 and are as follows:

Rapid Transit Service, "Light" Rail: With the demapping of the previously proposed Park Freeway West and Stadium Freeway North, the plan recommended that, subject to confirmation in a detailed corridor study meeting Federal requirements attendant to major transit investments, a high level of transit service in the Milwaukee northwest travel corridor be provided by bus or "light" rail that would extend from downtown Milwaukee to the Northridge Shopping Center. Within downtown Milwaukee, the service would operate over Wisconsin Avenue, which the plan recommended be converted to a transit mall between N. 10th Street and N. Prospect Avenue. This mall could serve both "light" rail vehicle and buses.

Rapid Transit Service, Bus on Freeways: The plan recommended that existing "freeway flyer" rapid transit and express bus service in the Milwaukee area be expanded and improved, with service extended to the south to the Racine and Kenosha areas, to the southwest to Mukwonago and East Troy, to the northwest to West Bend, and to the north to Port Washington. Throughout the Milwaukee urban area, the plan recommended that bus-on freeway service be expanded to become all-day service rather than peak-period only service. In all, the plan called for 24 bus-on freeway routes, totaling 1,057 round-trip route miles in length. The system would be served by 56 transit stations, 50 of which would have park-ride lots. Given a companion recommendation, discussed below, to institute a comprehensive freeway traffic management system, the plan envisioned that express bus service over freeways would provide truly rapid transit service providing a competitive alternative to the automobile. The plan also envisioned a high level of coordination between the rapid transit and express bus service and feeder and local bus services in order to provide access to major travel generators other than the Milwaukee central business district.

The plan also recognized that it might be desirable to institute "light" rail rapid transit service eventually in certain additional corridors within Milwaukee County in addition to the northwest corridor. Five additional "light" rail service corridors were identified: 1) downtown Milwaukee to the Mitchell Field/Cudahy area, 2) downtown Milwaukee to the Southridge Shopping Center area, 3) downtown Milwaukee to the Milwaukee County Institutions and Mayfair Shopping Center area, 4) downtown Milwaukee to the Timmerman Field area, and 5) downtown Milwaukee to the University of Wisconsin-Milwaukee/Shorewood area. The plan recommended that in-depth corridor studies be undertaken to examine the feasibility and desirability of "light" rail service in lieu of bus service within these corridors.

Rapid Transit Service, Commuter Rail: The plan recommended that commuter railway service be provided on a trial, or demonstration, basis. Three specific routes were identified in the plan as good candidates for such service: downtown Milwaukee to Grafton, over former Milwaukee Road trackage; downtown Milwaukee to Oconomowoc, also over former Milwaukee Road trackage; and downtown Milwaukee to Racine and Kenosha, primarily along the Chicago & North Western Transportation Company trackage. Of the three, the potential service to Racine and Kenosha was found to hold the most promise for a successful demonstration.

Express and Local Bus Service: The plan recommended that express and local bus service be provided throughout the Milwaukee urbanized area and in the Racine and Kenosha urbanized areas as well. Within the Milwaukee area, the plan identified certain express, or limited-stop, routes operating over arterial streets. The plan recommended that the public transit operators undertake detailed short-range transit planning that would identify the specific local service routes to be provided. In total, public transit service would be extended in such a way as to provide service to an aggregate of about 500 square miles, serving about 75 percent of the regional population.

Transportation System Management

The transportation system management element of the adopted year 2000 regional transportation system plan was aimed at reducing single-occupant vehicle use by providing incentives for the use of ridesharing and public transit and increasing the capacity of existing arterial streets at low capital cost with minimal disruption of traffic. The proposals related to transportation management are summarized below.

1. The expansion of freeway traffic management to improve freeway traffic flow by encouraging ridesharing and transit use, to reduce congestion due to accidents and disabled vehicles, to encourage motorists to make better route decisions through advisory information, and to control peaks in freeway demand. The proposed freeway traffic management system would reduce travel time, vehicle operating costs, and traffic incidents on the freeways.

   Elements of the proposed freeway traffic management system include: incident management to better detect, confirm, and remove incidents; advisory information to provide pertinent information to freeway users; and areawide freeway operational control through the use of centrally monitored and regulated freeway on-ramp meters. Systemwide freeway operational control would permit on-ramp metering rates to be determined by a centralized freeway flow monitoring system enabling freeway operation speeds to be maintained at 35 to 45 miles per hour. The proposed freeway operational control would provide high-occupancy vehicles exclusive bypass of on-ramp meters to encourage ridesharing and transit use.

2. The establishment of carpool parking lots in outlying parts of the Milwaukee metropolitan area as demand warranted. Six possible highway interchange locations were identified. In 1978, the year the plan was adopted, there were six such lots in the Region. The plan also recommended an aggressive program to promote carpooling in the Milwaukee area.

3. The conduct of studies to determine the extent to which existing automobile parking policies influence the choice of travel mode to downtown Milwaukee. The plan proposed reversing the current parking rate structure, which encourages long-term parking for work-related trip making. The plan also proposed providing preferential parking in facilities for high-occupancy vehicles to promote ridesharing.

4. The prohibition of curb parking, as necessary, on arterial streets during peak hours of travel to ensure that arterial street capacity was effectively used before commitments were made to improve arterial streets. Over all, the plan recommended that curb parking restrictions be eventually imposed on about 600 miles of arterial streets and highways, or about 17 percent of the total planned arterial street and highway system.

5. The use of traffic engineering and access management to ensure that available arterial street capacity was effectively utilized before commitments were made to improve surface arterials. Proposed measures included: traffic signalization, right- and left-turn lanes at intersections, and driveway and local street spacing.

## PLAN DESIGN: SOCIO-ECONOMIC FORECASTS

The adopted regional transportation system plan proceeded from the design of the year 2000 regional land use plan. In the design of the land use plan, forecasts of population, households, and employment were developed and used to determine the required scale of future urban development. The amount of urban land determined to be needed to accommodate forecast population and economic activity levels was then distributed to U. S. Public Land Survey quarter-sections[4] to achieve the planned centralized urban development pattern.

The same general forecasts employed in designing the regional land use plan, population, households, employment, and the distribution of urban development, as well the forecast of automobile availability, were used as inputs into the trip generation model[5] to determine the level of trip making the land use plan would foster within and between various subareas of the Region. The subareas, traffic analysis zones, are aggregations of the quarter-sections used in the design of the regional land use plan. The travel simulation procedure was used to forecast the levels of trip making likely to result from the planned land use pattern. In the design of the transportation system plan, an appropriate mix of transportation system development proposals necessary to accommodate the forecast travel patterns was then advanced.

Consequently, before examining the status of transportation system development since the adoption of the regional plan, it is necessary to evaluate the major socio-economic forecast variables used in the design of the plan. The conformance or departure of these forecast variables to or from actual conditions serves as an important qualifier in the evaluation of the continued validity of the adopted regional transportation system plan.

### Population and Economic Activity

The basic purpose for making a comparison between forecast and actual conditions with respect to the levels and distribution of population and economic activity is to determine the extent to which the scale of urban development in the Region approximates the scale envisioned. Should it be found that the actual levels of population, employment, and households, which determine the overall scale of urban development, greatly differ from the levels forecast, then the basic validity of the adopted land use and transportation system plans may be brought into question. The basic validity of the plans would be brought into question whether the observed differences in the determinants of the scale of development were significantly smaller or larger than forecast. For example, should the actual population size, number of jobs, and number of households in particular be found to significantly exceed the levels forecast, then it should be expected that the planned scale of urban development would be exceeded. This in turn could lead to severe traffic congestion and other problems related to insufficient arterial capacity and public transit service.

The Commission socio-economic forecasts are tempered by an envisioned modification of the market forces that have driven land use decentralization in the Region since the early part of the twentieth century. The Commission recognizes that the private search for, and public accommodation of, the highest returns on private land investment can result in a scattered and inefficient urban settlement pattern. Therefore, in the year 2000 regional land use plan, the Commission adjusted the forecast population and employment levels at the county level to design a land use plan with a more centralized distribution of population, employment, and related land use and transportation system development than an extrapolation of existing trends would indicate.

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[4]*A U. S. Public Land Survey quarter-section consists of a rectilinear area containing approximately 160 acres with all sides approximating one-half mile.*

[5]*See Chapter VII.*

For this reason the second-generation regional land use plan was termed a "controlled centralization" land use plan. Thus, there is a normative aspect to the Commission socio-economic forecasts, which at the county level seek to moderate the decentralization trends in the Region. The normative nature of the socioeconomic forecasts required that more resident population be allocated to Milwaukee County than would be the case if the observed decentralization trends were simply projected to continue.

The surveillance activities undertaken by the Commission with respect to population, households, and employment in the Region from 1970 through 1990 resulted in the basic findings set forth below:

Population: The population forecast had envisioned an increase in the regional population of about 286,300 persons, or an estimated 16 percent, from 1970 through 1990, as set forth in Table 10 and shown in Figure 4. By 1990, the actual population in the Region exhibited a slight increase of about 54,300 persons, or about 3 percent, over the 1970 base-year population. Thus, the actual 1990 regional population was lower than the 1990 forecast population by about 232,000 persons, or 11 percent. Evaluation of the factors that determine population levels, births, deaths, and migration, indicated that the variance between estimated and forecast levels resulted primarily from a rate of population outmigration in excess of the rate assumed in the population forecast. This excessive outmigration may be attributed in large part to the severe economic recession which occurred in the Region between 1979 and 1983.

At the county level, Kenosha, Ozaukee, Walworth, Washington, and Waukesha Counties all experienced population increases over the 20-year period. The population level in Racine County remained relatively stable during that time, showing an almost 3 percent increase, while the population of Milwaukee County decreased by 95,000 persons, or 9 percent. For each county, however, the actual 1990 population level was lower than the forecast level, the variance ranging from about 7 percent in Milwaukee County to nearly 24 percent in Ozaukee County.

While the overall regional population level by 1990 was less than forecast, the relative distribution of the population in the Region was remarkably close to the forecast distribution. For example, the proportion of the regional population residing in Milwaukee County, which was 60 percent in 1970, was forecast to decrease to 50 percent in 1990. Milwaukee County's proportion of the actual regional population in 1990 was 53 percent. In relatively fast-growing Waukesha County, where 13 percent of the regional population resided in 1970, monitoring revealed that the County housed 17 percent of the regional population in 1990. This may be compared with a forecast share for 1990 of 17 percent.

Households: The household forecast had envisioned an increase in the number of households in the Region of 131,300, or 24 percent, by 1990, as set forth in Table 11 and shown in Figure 5. By 1990, the actual number of households in the Region had increased over the 1970 base year by about 139,500, a 26 percent increase. Thus, on a regional scale, the 1990 household level exceeded that forecast by about 8,200, or 1 percent. The fact that the number of households increased as forecast, despite relatively stable population levels over the 20-year period, can be explained by the significant decrease in average household size, which was larger than forecast. Indeed, the actual number of persons per household, which stood at about 3.20 in 1970, had declined to about 2.68 by 1990. This can be compared to the 1990 forecast household size of about 3.06 persons per household.

At the county level, the monitoring indicated that each county in the Region experienced an increase in the number of households over the 20-year period. Actual household levels in 1990 were slightly higher than forecast in Racine, Walworth, and Waukesha Counties, and slightly lower than forecast in Kenosha, Ozaukee, and Washington Counties. The actual level of households in Milwaukee County deviated from the forecast level by less than one-half percent, indicating nearly complete conformance with the forecast. The variance in actual and forecast household levels was greatest in Waukesha County, almost 8 percent.

Review of the data in Table 11 indicated that the relative distribution of the number of households in the Region was remarkably close to the forecast distribution. Milwaukee County's share of all households in the Region, which stood at 63 percent in 1970, was forecast to decrease to

## Table 10

## ACTUAL AND FORECAST POPULATION LEVELS IN THE REGION BY COUNTY: 1970 AND 1990

| County | Existing 1970 | | Forecast 1990 | | | | Actual 1990 | | | | Difference between Actual and Forecast 1990 Population Levels | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Change 1970-1990 | | Total | | Change 1970-1990 | | Total | | | |
| | Total | Percent of Region | Number | Percent | Number | Percent of Region | Number | Percent | Number | Percent of Region | Number | Percent |
| Kenosha | 117,900 | 6.7 | 40,200 | 34.1 | 158,100 | 7.7 | 10,300 | 8.7 | 128,200 | 7.1 | -29,900 | -18.9 |
| Milwaukee | 1,054,300 | 60.1 | -27,800 | -2.6 | 1,026,500 | 50.3 | -95,000 | -9.0 | 959,300 | 53.0 | -67,200 | -6.5 |
| Ozaukee | 54,500 | 3.1 | 41,400 | 76.0 | 95,900 | 4.7 | 18,300 | 33.6 | 72,800 | 4.0 | -23,100 | -24.1 |
| Racine | 170,800 | 9.7 | 32,100 | 18.8 | 202,900 | 9.9 | 4,300 | 2.5 | 175,100 | 9.7 | -27,800 | -13.7 |
| Walworth | 63,500 | 3.6 | 23,400 | 36.7 | 86,900 | 4.3 | 11,500 | 18.1 | 75,000 | 4.1 | -11,900 | -13.7 |
| Washington | 63,800 | 3.6 | 53,100 | 83.2 | 116,900 | 5.7 | 31,500 | 49.4 | 95,300 | 5.3 | -21,600 | -18.5 |
| Waukesha | 231,300 | 13.2 | 123,900 | 53.6 | 355,200 | 17.4 | 73,400 | 31.7 | 304,700 | 16.8 | -50,500 | -14.2 |
| Region | 1,756,100 | 100.0 | 286,300 | 16.3 | 2,042,400 | 100.0 | 54,300 | 3.1 | 1,810,400 | 100.0 | -232,000 | -11.4 |

*Source: U. S. Bureau of the Census and SEWRPC.*

almost 56 percent by 1990. Monitoring data showed that the estimated proportion in 1990 was 55 percent. Similarly, Waukesha County's share of regional households stood at about 12 percent in 1970 and was forecast to increase to about 15 percent by 1990. Monitoring data revealed that the estimated level in 1990 was just under 16 percent.

Employment: The employment forecast had envisioned an increase by 1990 in the number of jobs in the Region of nearly 170,700, or 23 percent, as set forth in Table 12 and shown in Figure 6. By 1990, despite a severe economic recession within the Region, the estimated number of jobs in the Region had increased over the 1970 base year by about 236,600, a 31 percent increase. Thus, on a regional scale, the 1990 employment level exceeded that forecast by about 65,900 jobs, or 7 percent. Given a relatively stable regional population, the increase in regional employment reflects in part an increasing participation rate of the total population, particularly among women, in the labor force between 1970 and 1990. In fact, the female labor participation rate in the Region increased from 45 percent in 1970 to 64 percent by 1990.

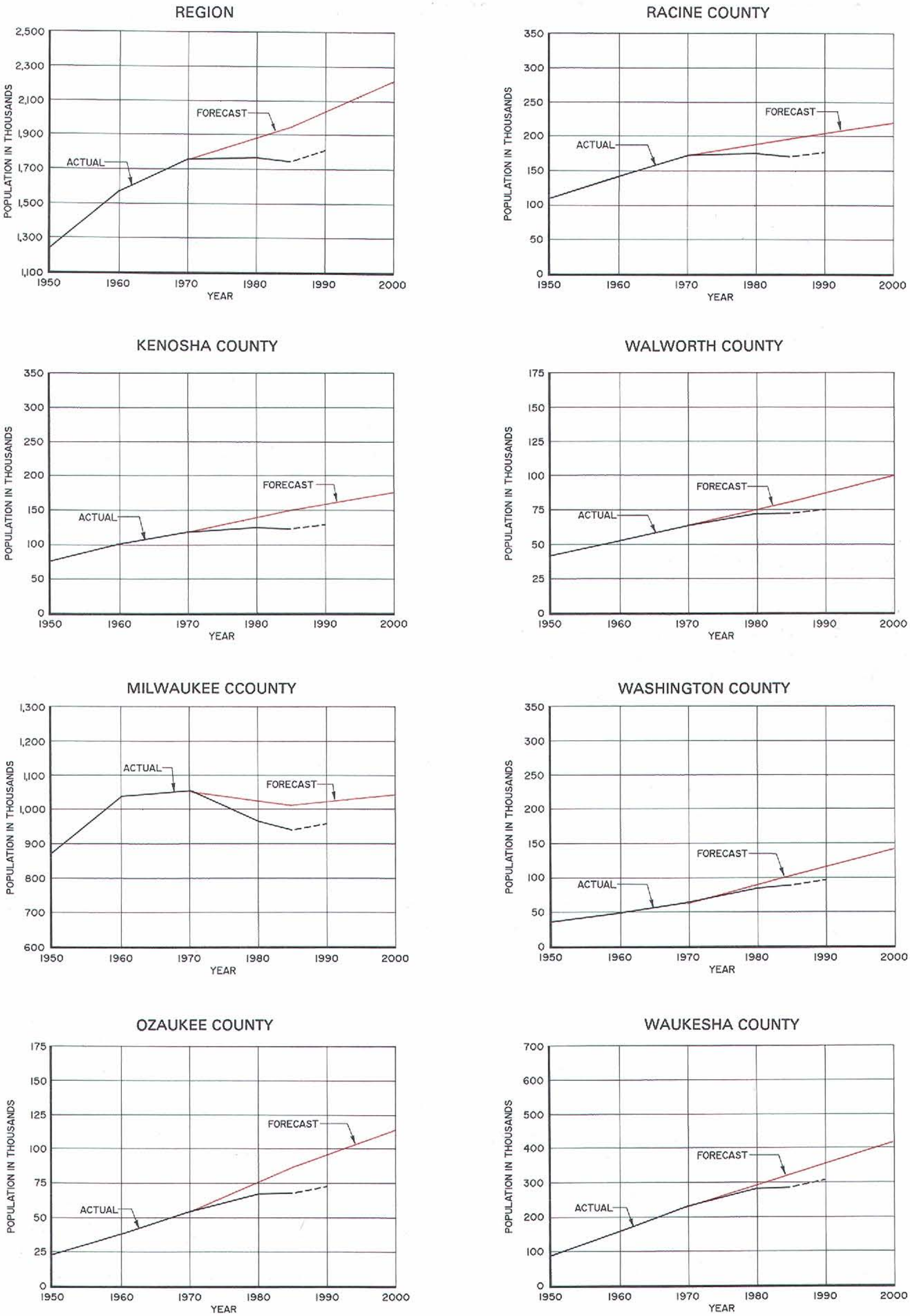
At the county level, the monitoring indicated that each county in the Region experienced an increase in total employment over the 20-year period. The largest relative increases occurred in Walworth, Ozaukee, Washington, and Waukesha Counties, marking a continuing decentralization of economic activity within the Region. Employment in Waukesha County more than doubled between 1970 and 1990, increasing by 125 percent. The increases in employment among the counties between 1970 and 1985 varied somewhat from that forecast. Employment levels increased substantially faster than forecast in Waukesha and Washington Counties and slightly faster than forecast in Milwaukee County, Ozaukee County, and Walworth County, where employment grew by 2, 3, and almost 5 percent, respectively. In Kenosha and Racine Counties, employment increased somewhat slower, about 6 and 3 percent less than forecast, respectively.

An indication that economic activity is becoming increasingly decentralized is the change in the distribution of regional employment among the counties. For example, Milwaukee County's share of the regional employment, which stood at 67 percent in 1970, was forecast to decrease to 61 percent by 1990. Monitoring data showed that the County's actual proportion had declined to 58 percent. By contrast, Waukesha County's share of regional employment, which stood at 10 percent in 1970, was forecast to increase to 14 percent by 1990. Monitoring data showed that the actual share in 1990 had reached 17 percent.

Automobile Availability: The automobile availability forecast had envisioned an increase in the number of automobiles in the Region of 242,700, or 38 percent, by 1990, as set forth in Table 13 and shown in Figure 7. By 1990, the number of automobiles available to residents in the Region had actually increased by 293,300, an increase of 46 percent, over the 1970 level. Thus, on a regional scale, the 1990 automobile availability level exceeded the forecast level by 50,600 automobiles, or about 6 percent. Several factors have contributed to this variance including an increase in the number of smaller size households and multiple ownership of automobiles by

Figure 4

**ACTUAL AND FORECAST REGIONAL AND COUNTY POPULATION: 1950-2000**




*Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.*

Table 11

ACTUAL AND FORECAST HOUSEHOLD LEVELS IN THE REGION BY COUNTY: 1970 AND 1990

| County | Existing 1970 | | Forecast 1990 | | | | Actual 1990 | | | | Difference between Actual and Forecast 1990 Household Levels | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Change 1970-1990 | | Total | | Change 1970-1990 | | Total | | | |
| | Total | Percent of Region | Number | Percent | Number | Percent of Region | Number | Percent | Number | Percent of Region | Number | Percent |
| Kenosha . . . . . | 35,500 | 6.6 | 14,100 | 39.7 | 49,600 | 7.4 | 11,500 | 32.4 | 47,000 | 7.0 | -2,600 | -5.2 |
| Milwaukee . . . | 338,600 | 63.1 | 33,000 | 9.7 | 371,600 | 55.6 | 34,400 | 10.2 | 373,000 | 55.2 | 1,400 | 0.4 |
| Ozaukee . . . . . | 14,800 | 2.8 | 12,300 | 83.1 | 27,100 | 4.1 | 10,900 | 73.6 | 25,700 | 3.8 | -1,400 | -5.2 |
| Racine . . . . . . | 49,800 | 9.3 | 11,700 | 23.5 | 61,500 | 9.2 | 13,900 | 27.9 | 63,700 | 9.4 | 2,200 | 3.6 |
| Walworth . . . . | 18,500 | 3.4 | 7,300 | 39.5 | 25,800 | 3.9 | 9,100 | 49.2 | 27,600 | 4.1 | 1,800 | 7.0 |
| Washington . . . | 17,400 | 3.2 | 16,200 | 93.1 | 33,600 | 5.0 | 15,600 | 89.7 | 33,000 | 4.9 | -600 | -1.8 |
| Waukesha . . . . | 61,900 | 11.5 | 36,700 | 59.3 | 98,600 | 14.8 | 44,100 | 71.2 | 106,000 | 15.7 | 7,400 | 7.5 |
| Region | 536,500 | 100.0 | 131,300 | 24.4 | 667,800 | 100.0 | 139,500 | 26.0 | 676,000 | 100.0 | 8,200 | 1.2 |

*Source: U. S. Bureau of the Census and SEWRPC.*

households. The increase in automobiles available is significant in light of the slower than forecast population growth experienced in the Region.

At the county level, the monitoring indicated that each county in the Region had experienced an increase in total automobiles available over the 20-year period. The largest relative increases occurred in Ozaukee and Washington Counties, the two counties experiencing the most rapid increases in resident population levels and number of households during the same time period. In both counties, the number of automobiles available more than doubled between 1970 and 1990. Though automobile availability increased substantially in Ozaukee and Washington Counties, it did not attain the levels forecast. Actual 1990 levels were below forecast levels by 11 and 10 percent, respectively. By contrast, monitoring indicated that in Milwaukee County automobile availability exceeded the level forecast by nearly 15 percent, the greatest variance between actual and forecast automobile availability levels among the counties in the Region.

While the level of automobiles available in the Region in 1990 was 6 percent greater than forecast, the relative distribution of automobiles among the counties was remarkably close to the forecast distribution. Indeed, the only real deviation between the actual and forecast proportion of automobiles occurred in Milwaukee County, about 7 percent.

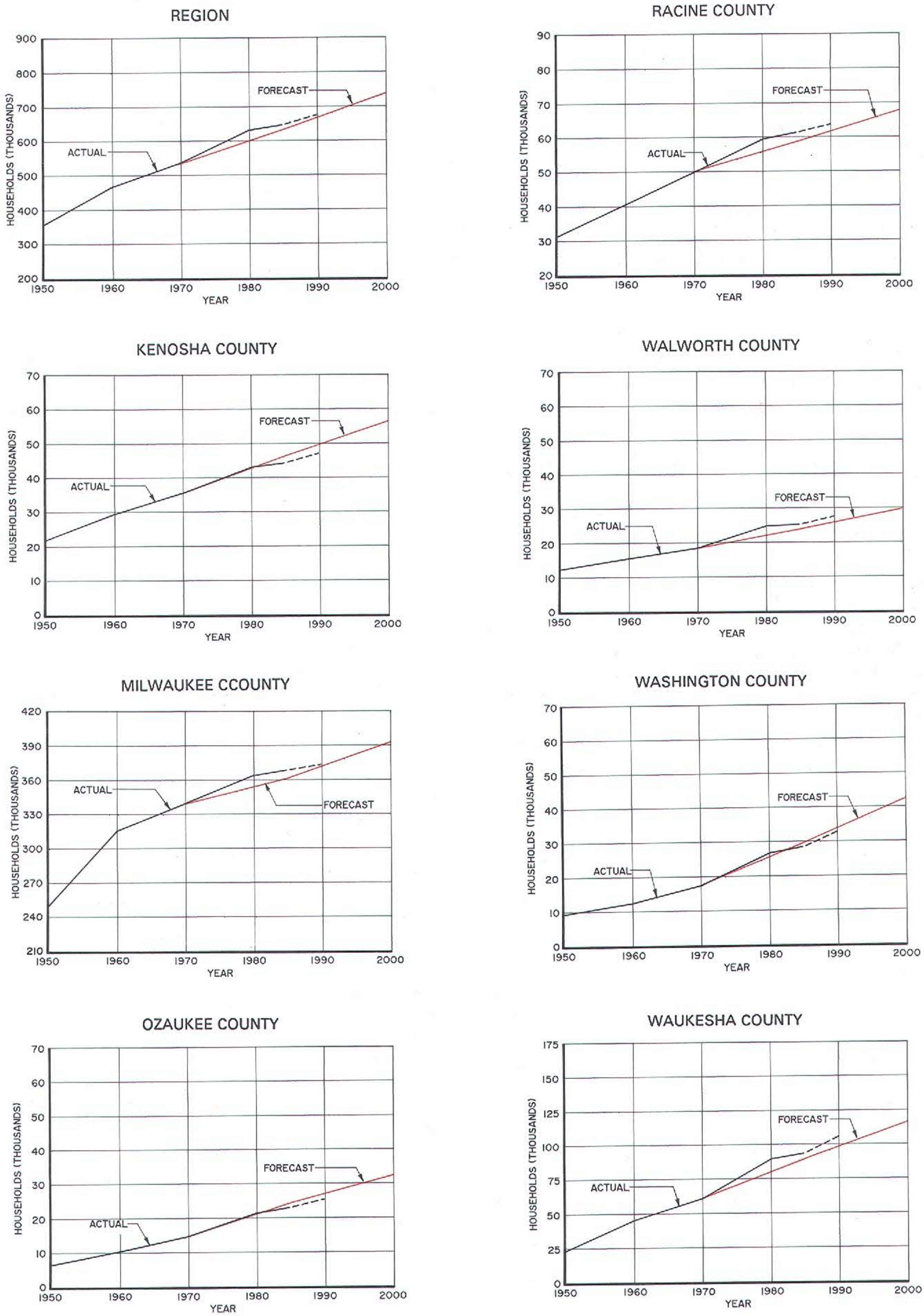
Truck Availability: The motor truck availability forecast had envisioned an increase in the number of trucks available to truck operators in the Region of about 56,300, or about 79 percent, by 1990 as set forth in Table 14 and shown in Figure 8. By 1990, the actual number of trucks available in the Region had increased by about 106,200, or by about 148 percent, over the 1970 base level. Thus, on a regional scale, the actual number of trucks in 1990 exceeded the forecast level by 49,930, or 39 percent. About 78 percent of all trucks in 1990, or 139,230, were classified as light trucks, having a net weight of less than 8,000 pounds. The remaining 22 percent, or 38,700, were classified as municipal or heavy trucks, having a net weight of greater than 8,000 pounds and two axles or more with dual wheels.

The difference in the actual and forecast level of trucks available in the Region may be attributed in part to the increasing use of light trucks as personal vehicles. The 1991 truck survey, conducted as part of the third major inventory of travel in the Region, indicated that light trucks used solely as personal vehicles accounted for 48 percent of all trucks in 1991 (see Figure 9). This may be compared to 23 percent in 1972, and to 9 percent in 1963. The increasing use of light trucks as personal vehicles has the same implications for transportation system planning as the increasing use of automobiles.

Indeed, the model used in the second-generation planning process to forecast automobile availability attempted to reflect the household decision process of owning a personal vehicle, regardless of its type, automobile or personal-use truck. In this regard, Table 15 sets forth an estimate of the actual and the forecast levels of personal vehicle availability. When personal-use trucks, whose number was estimated on the basis of the findings of the home interview survey conducted by the Commission in 1991, are added to the number of automobiles available in the Region in 1990, the resulting personal vehicle availability level slightly exceeds one million and is nearly 15 percent greater than the forecast level. Such consideration of personal-use trucks provides an estimate of personal vehicle

**Figure 5**

**ACTUAL AND FORECAST REGIONAL AND COUNTY HOUSEHOLDS: 1950-2000**




*Source: U. S. Bureau of the Census and SEWRPC.*

Table 12

ACTUAL AND FORECAST EMPLOYMENT LEVELS IN THE REGION BY COUNTY: 1970 AND 1990

| | Existing 1970 | | Forecast 1990 | | | | Actual 1990 | | | | Difference between Actual and Forecast 1990 Employment Levels | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Change 1970-1990 | | Total | | Change 1970-1990 | | Total | | | |
| County | Total | Percent of Region | Number | Percent | Number | Percent of Region | Number | Percent | Number | Percent of Region | Number | Percent |
| Kenosha . . . . . | 40,000 | 5.3 | 9,200 | 23.0 | 49,200 | 5.3 | 6,500 | 16.3 | 46,500 | 4.7 | -2,700 | -5.5 |
| Milwaukee . . . | 507,100 | 67.3 | 58,900 | 11.6 | 566,000 | 61.2 | 71,100 | 14.0 | 578,200 | 58.4 | 12,200 | 2.2 |
| Ozaukee . . . . . | 19,800 | 2.6 | 11,500 | 58.1 | 31,300 | 3.4 | 12,400 | 62.6 | 32,200 | 3.3 | 900 | 2.9 |
| Racine . . . . . . | 62,700 | 8.3 | 21,600 | 34.4 | 84,300 | 9.2 | 19,500 | 31.1 | 82,200 | 8.3 | -2,100 | -2.5 |
| Walworth . . . . | 24,500 | 3.3 | 11,000 | 45.0 | 35,500 | 3.8 | 12,600 | 51.4 | 37,100 | 3.7 | 1,600 | 4.5 |
| Washington . . . | 23,100 | 3.1 | 7,700 | 33.3 | 30,800 | 3.3 | 18,700 | 81.0 | 41,800 | 4.2 | 11,000 | 35.7 |
| Waukesha . . . . | 76,500 | 10.1 | 50,800 | 66.4 | 127,300 | 13.8 | 95,800 | 125.2 | 172,300 | 17.4 | 45,000 | 35.3 |
| Region | 753,700 | 100.0 | 170,700 | 22.6 | 924,400 | 100.0 | 236,600 | 31.4 | 990,300 | 100.0 | 65,900 | 7.1 |

*Source: U. S. Bureau of Economic Analysis; Wisconsin Department of Industry, Labor and Human Relations; and SEWRPC.*

availability that more closely reflects the magnitude of traffic on the arterial streets and highways of the Region, than does the level of automobile availability alone.

## PLAN DESIGN: LAND USE DISTRIBUTION

The foregoing evaluation of the forecasts made for the design of the transportation system plan indicates that while the population of the Region has not increased as forecast, the other determinants of the scale of urban development, households and employment, have increased substantially in accord with the forecasts and well within forecast accuracy tolerances. The close conformity between the actual and forecast number of households is particularly significant, since the household represents a basic consuming unit which generates much of the demand for urban land and transportation facilities and services.

The socio-economic forecasts are used in the plan design step of the planning process to determine the scale of future urban development and specifically the amount of rural land to be converted to urban land uses. Therefore, the conformity of the socio-economic forecasts to actual conditions should suggest conformity between the planned scale of urban development and the actual scale during the same period of time. Monitoring of land use data between 1970 and 1985 has, in fact, revealed such conformity, the actual scale of urban development within the Region exceeded the forecast scale by about 15 square miles, or by about 3 percent.

Pertinent to any transportation system plan reappraisal, however, is the distribution of the forecast land use development. As previously stated, the distribution of urban development is used as an input to the traffic models to forecast trip production and distribution. Thus, an evaluation of the pattern of urban development since the base year of the regional land use plan is pertinent to the transportation system plan reevaluation. The distribution of urban development stands as one of the factors potentially contributing to any variance in actual and forecast levels of trip production and distribution.

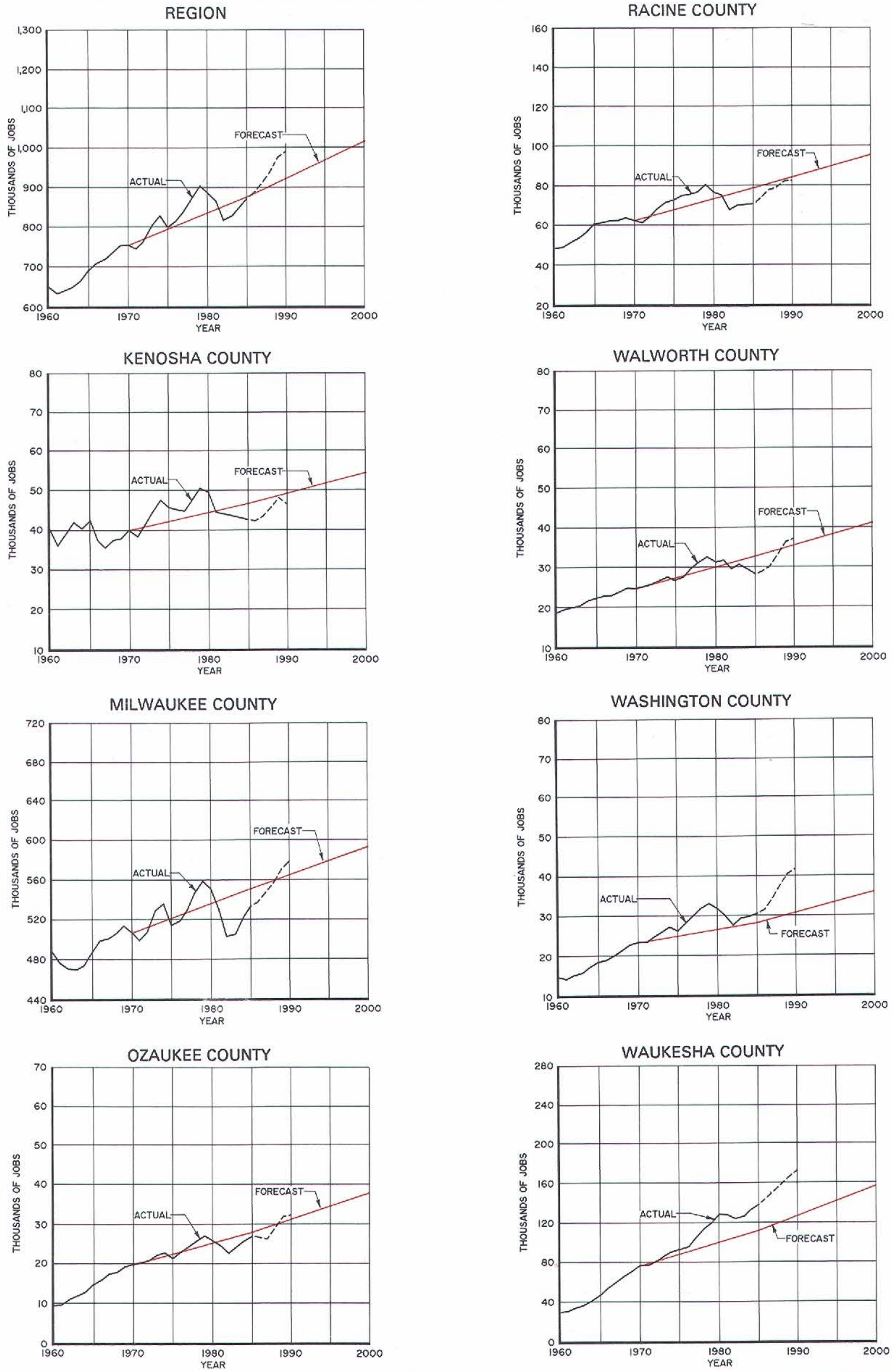
Accordingly, this section reports the results of the monitoring of residential land use development activity in the Region over the period 1970 through 1985 and over the period 1970 through 1990 with respect to major regional centers. The bulk of the information presented regarding residential urban development activity is based on the detailed land use inventory maintained by the Commission. The land use inventory is a precise accounting of land cover, identifying all land which has been developed for, and is actually in, urban use. Under the land use inventory, urban land use includes all residential, commercial, industrial, governmental, intensive recreational, and transportation development located within the Region.

### Conversion of Rural Land to Urban Development

As noted above, to accommodate forecast increases in population, households and employment by 1985, the regional land use plan envisioned that nearly 91 square miles of rural land would be converted to urban use. The adopted year 2000 regional land use plan is shown on Map 7. As shown in Table 16, actual rural land conversion during the 15-year period totaled about 105 square miles, almost 15 square miles, or about 3 percent, more than forecast.

Figure 6

ACTUAL AND FORECAST REGIONAL AND COUNTY EMPLOYMENT: 1950-2000




*Source: U. S. Bureau of Economic Analysis; Wisconsin Department of Industry, Labor and Human Relations; and SEWRPC.*

## Table 13

### ACTUAL AND FORECAST AUTOMOBILE AVAILABILITY IN THE REGION BY COUNTY: 1970 AND 1990

| County | Existing 1970 | | Forecast 1990 | | | | Actual 1990 | | | | Difference between Actual and Forecast 1990 Automobile Availability | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Change 1970-1990 | | Total | | Change 1970-1990 | | Total | | | |
| | Total | Percent of Region | Number | Percent | Number | Percent of Region | Number | Percent | Number | Percent of Region | Number | Percent |
| Kenosha . . . . . | 43,900 | 6.9 | 30,500 | 69.5 | 74,400 | 8.5 | 23,000 | 52.4 | 66,900 | 7.2 | -750 | -10.1 |
| Milwaukee . . . | 367,700 | 58.0 | 28,300 | 7.7 | 396,000 | 42.1 | 86,400 | 23.5 | 454,100 | 49.0 | -58,100 | 14.7 |
| Ozaukee . . . . . | 21,000 | 3.3 | 26,400 | 125.7 | 47,400 | 5.4 | 21,200 | 101.0 | 42,200 | 4.5 | -5,200 | -11.0 |
| Racine . . . . . . | 62,400 | 9.8 | 27,900 | 44.7 | 90,300 | 10.3 | 29,300 | 47.0 | 91,700 | 9.9 | -1,400 | 1.6 |
| Walworth . . . . | 24,700 | 4.0 | 17,200 | 69.6 | 41,900 | 4.8 | 18,000 | 72.9 | 42,700 | 4.6 | 800 | 1.9 |
| Washington . . . | 23,500 | 3.7 | 33,300 | 141.7 | 56,800 | 6.5 | 27,500 | 117.0 | 51,000 | 5.5 | -5,800 | -10.2 |
| Waukesha . . . . | 90,800 | 14.3 | 79,100 | 87.1 | 169,900 | 19.4 | 87,900 | 96.8 | 178,700 | 19.3 | 8,800 | 5.2 |
| Region | 634,000 | 100.0 | 242,700 | 38.3 | 876,700 | 100.0 | 293,300 | 46.3 | 927,300 | 100.0 | 50,000 | 5.8 |

*Source: U. S. Bureau of Economic Analysis; Wisconsin Department of Industry, Labor and Human Relations; and SEWRPC.*

## Table 14

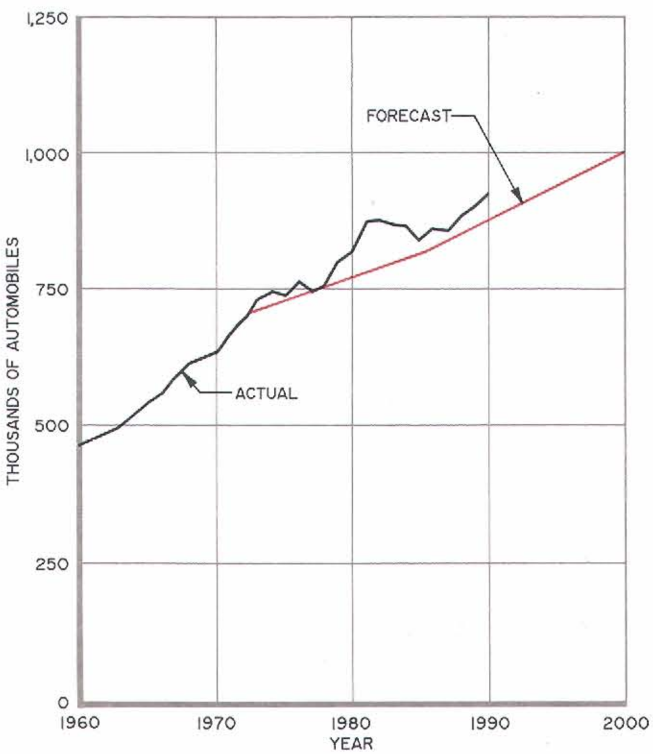
### ACTUAL AND FORECAST MOTOR TRUCK AVAILABILITY IN THE REGION: 1970 AND 1990

| Existing 1970 | Forecast 1990 | | | Actual 1990 | | | Difference between Actual and Forecast 1990 Truck Availability | |
|---|---|---|---|---|---|---|---|---|
| | Change 1970-1990 | | Total | Change 1970-1990 | | Total | | |
| | Number | Percent | Number | Number | Percent | Number | Number | Percent |
| 71,700 | 56,300 | 78.5 | 128,000 | 106,230 | 148.2 | 177,930 | 49,930 | 39.0 |

*Source: SEWRPC.*

### Figure 7

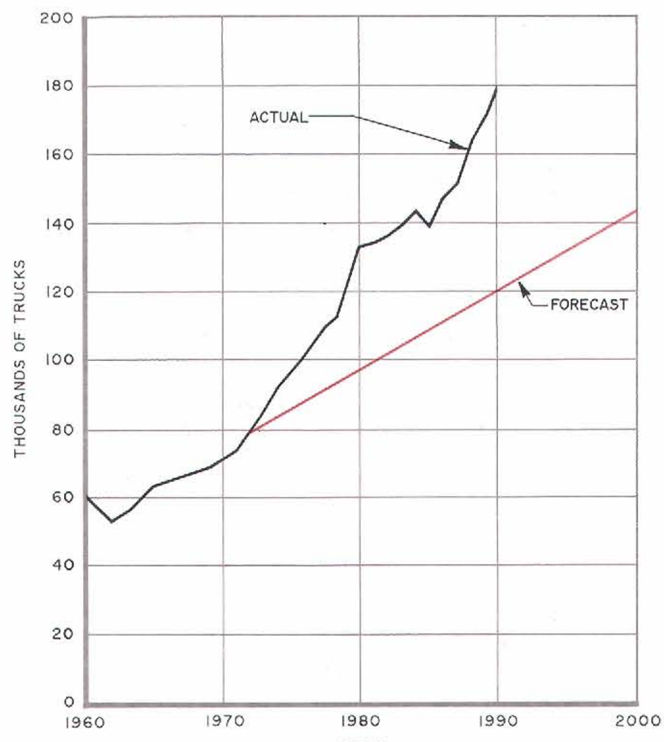
### ACTUAL AND FORECAST AUTOMOBILE AVAILABILITY IN THE REGION: 1960-1990




*Source: SEWRPC.*

### Figure 8

### ACTUAL AND FORECAST TRUCK AVAILABILITY IN THE REGION: 1960-1990




*Source: SEWRPC.*

Table 15

**ACTUAL AND FORECAST PERSONAL VEHICLE AVAILABILITY IN THE REGION: 1990**

| Type of Personal Vehicle | Forecast[a] | Actual | Difference between Actual and Forecast 1990 Personal Vehicle Availability | |
|---|---|---|---|---|
| | | | Number | Percent |
| Automobile . . . . . . . . . . . . . . | - - | 927,300 | - - | - - |
| Motor Truck . . . . . . . . . . . . . . | - - | 77,000[b] | - - | - - |
| Total | 876,700 | 1,004,300 | 127,600 | 14.6 |

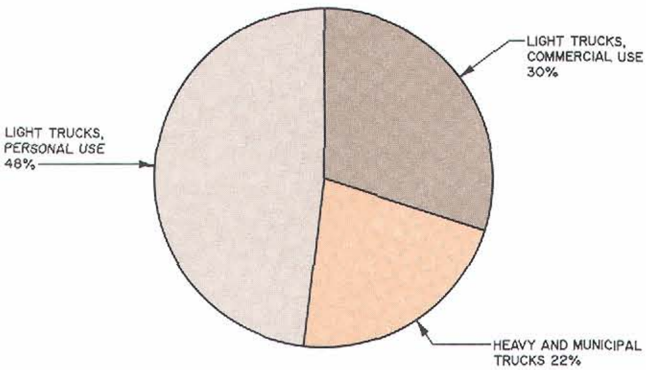
[a]*Documented elsewhere in this report as automobile availability. The model used to prepare this forecast attempted to reflect the decision of households to own a vehicle, regardless of its type, auto or truck.*

[b]*Commission estimate based upon 1991 Home Interview Survey assuming the personal use of automobiles between 1990 and 1991 increased at a rate equal to the rate of increase in the availability of light trucks in the Region (4.5 percent between 1990 and 1991).*

*Source: SEWRPC.*

*Figure 9*

**MOTOR TRUCKS IN THE REGION: 1991**




*Source: Wisconsin Department of Transportation and SEWRPC.*

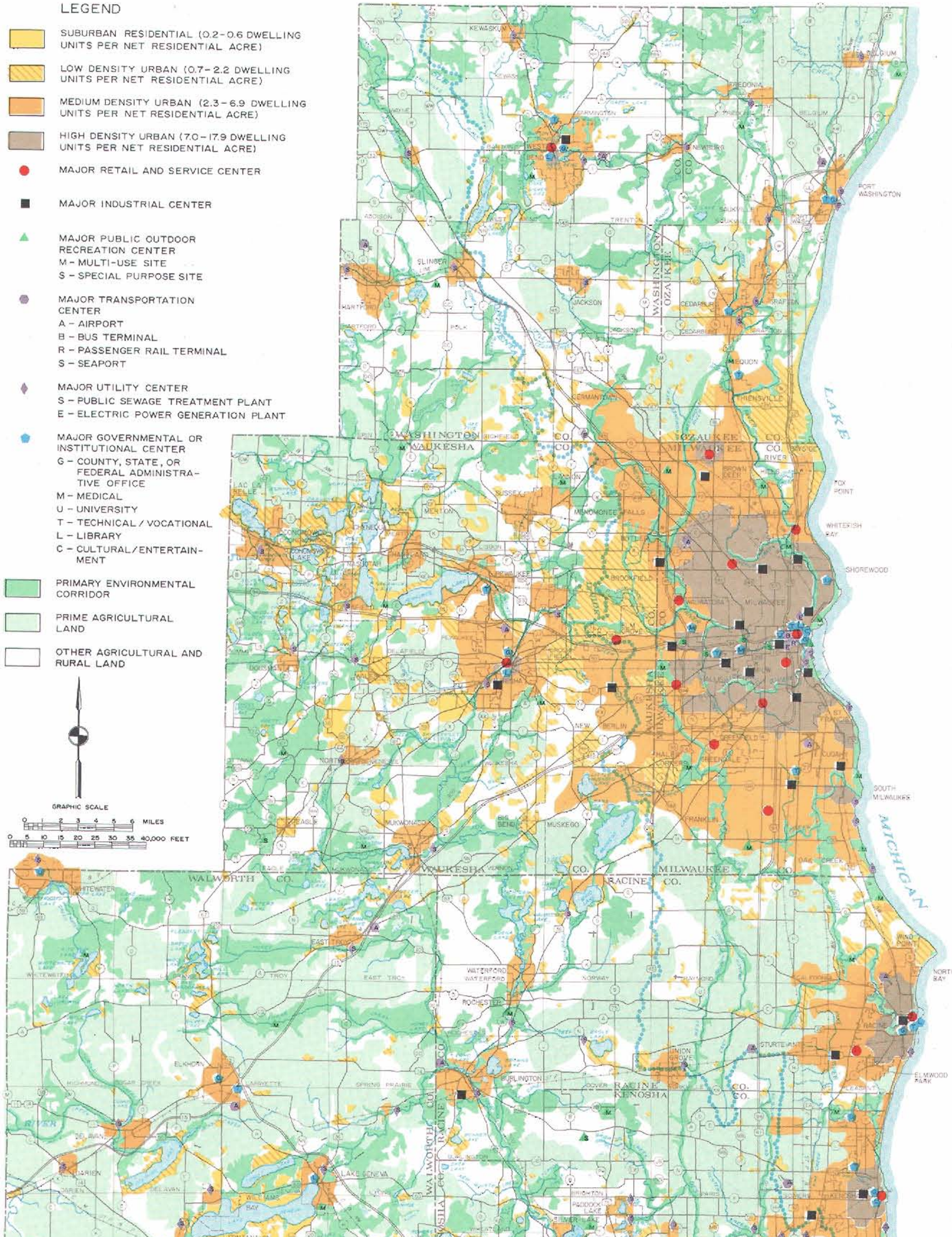
Table 16 also shows the planned and actual allocation of urban development among residential and nonresidential land uses between 1970 and 1985. Under the regional land use plan, about 58 square miles of land were planned to be converted from rural to urban residential use by 1985. Monitoring indicated, however, that the actual increase in residential land totaled 66 square miles, about seven square miles, or 12 percent, greater than the planned increase. Thus, by 1985, the actual amount of residential development in the Region totaled nearly 289 square miles, exceeding the planned amount by nearly 3 percent.

The distribution of that urban development among the residential land use categories is particularly important to the reevaluation of the adopted regional transportation system plan. The density and location of residential development to a large extent determines the potential effectiveness of vehicle trip reduction strategies as well as the viability of public transit service. Thus, the conversion of rural land to low-density residential development can preclude effective ridesharing programs and the cost effective provision of public transit service to areas so converted.

While the year 2000 regional land use plan recommended that new residential development occur primarily at medium densities, between 1970 and 1985 the Region experienced substantial residential development at low densities. In fact, low-density residential development accounted for almost 73 percent of the overall increase in residential land between 1970 and 1985. As shown in Table 16, the plan recommended that less than 12 square miles of land be converted to low-density residential use, defined as from 0.7 to 2.2 housing units per net residential acre. The monitoring showed, however, that 41 square miles were actually so converted. By contrast, the plan envisioned that by 1985 nearly 32 square miles of rural land would be converted to medium-density residential use, defined as from 2.3 to 6.9 housing units per net residential acre. Yet, less than 17 square miles were actually so converted. The conversion of rural land to low-density residential develop-

**Map 7**

**REGIONAL LAND USE PLAN FOR SOUTHEASTERN WISCONSIN: 2000**




The second-generation, year 2000, regional land use plan, like the first-generation, design year 1990, plan, sought to influence the operation of the urban land market within the Region in three important ways in order to achieve a more helpful and attractive, as well as more efficient, regional settlement pattern. First, the plan recommended that intensive urban development occur only in those areas of the Region which are covered by soils suitable for such development, which are not subject to such special hazards as flooding and shoreline erosion, and which can be readily served by essential municipal facilities and services. Second, the plan recommended the preservation in essentially natural open use of the remaining primary environmental corridors, those linear areas in the landscape encompassing the most important features of the natural resource space. Third, the plan recommended the retention in agricultural and related use of almost all of the remaining prime agricultural lands, the most productive farmlands and farm units in the Region.

*Source: SEWRPC.*

## Table 16

## URBAN LAND CONVERSION IN THE REGION: 1970-1985

| Urban Land Category | Actual 1970 | | Planned 1985 | | | | Actual 1985 | | | | Difference between Actual and Planned Urban Land Area | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Change 1970-1985 | | Total | | Change 1970-1985 | | Total | | | |
| | Square Miles | Percent of Total or Subtotal | Square Miles | Percent | Square Miles | Percent of Total or Subtotal | Square Miles | Percent | Square Miles | Percent of Total or Subtotal | Square Miles | Percent |
| Nonresidential[a] | 228.1 | 50.6 | 32.3 | 14.2 | 260.4 | 48.1 | 39.5 | 17.3 | 267.6 | 48.1 | 7.2 | 2.8 |
| Residential | | | | | | | | | | | | |
| High-Density[b] ........ | 42.1 | 18.9 | 0.9 | 2.1 | 43.0 | 15.3 | 1.3 | 3.1 | 43.4 | 15.0 | 0.4 | 0.9 |
| Medium-Density[c] ..... | 67.9 | 30.4 | 31.7 | 46.7 | 99.6 | 35.4 | 16.7 | 24.6 | 84.6 | 29.3 | -15.0 | -15.1 |
| Low-Density[d] ........ | 106.5 | 47.8 | 11.5 | 10.8 | 118.0 | 42.0 | 41.4 | 38.9 | 147.9 | 51.3 | 29.9 | 25.3 |
| Suburban-Density[e] .... | 6.5 | 2.9 | 14.1 | 216.9 | 20.6 | 7.3 | 6.1 | 93.8 | 12.6 | 4.4 | -8.0 | -38.8 |
| Subtotal | 223.0 | 49.4 | 58.2 | 26.1 | 281.2 | 51.9 | 65.5 | 29.4 | 288.5 | 51.9 | 7.3 | 2.6 |
| Total | 451.1 | 100.0 | 90.5 | 20.1 | 541.6 | 100.0 | 105.0 | 23.3 | 556.1 | 100.0 | 14.5 | 2.7 |

[a] *Includes those urban land use categories, other than residential, for which planned increments were identified under the year 2000 regional land use plan, namely: commercial; industrial; governmental and institutional; public recreational; and transportation, communication, and utilities. Private recreation lands and unused urban lands are not reflected in this table. Private recreation lands and unused urban land together encompassed 54.3 square miles in 1970 and 49.7 square miles in 1985.*

[b] *Defined as 7.0 to 17.9 housing units per net residential acre.*

[c] *Defined as 2.3 to 6.9 housing units per net residential acre.*

[d] *Defined as 0.7 to 2.2 housing units per net residential acre.*

[e] *Defined as 0.2 to 0.6 housing units per net residential acre.*

*Source: SEWRPC.*

## Table 17

## PLANNED AND ACTUAL PROPORTION OF NEW HOUSING UNITS BY RESIDENTIAL LAND USE CATEGORY: 1970-1985

| Residential Land Use Category | Planned 1985 Proportion (percent) | Actual 1985 Proportion (percent) | Difference |
|---|---|---|---|
| High-Density[a] .............. | 6.3 | 7.5 | 1.2 |
| Medium-Density[b] ........... | 76.4 | 64.1 | -12.3 |
| Low-Density[c] .............. | 9.6 | 26.9 | 17.3 |
| Suburban-Density[d] .......... | 7.7 | 1.5 | -6.2 |
| Total | 100.0 | 100.0 | - - |

[a] *Defined as 7.0 to 17.9 housing units per net residential acre.*

[b] *Defined as 2.3 to 6.9 housing units per net residential acre.*

[c] *Defined as 0.7 to 2.2 housing units per net residential acre.*

[d] *Defined as 0.2 to 0.6 housing units per net residential acre.*

*Source: SEWRPC.*

ment was most pronounced and had its greatest areal impact in Waukesha and Washington Counties.

Although a substantially greater amount of residential land was developed at low densities, the majority of housing units constructed during the 15-year period were accommodated at higher densities. As indicated in Table 17, over 70 percent of all housing units built between 1970 and 1985 were at medium or high residential densities. This is particularly significant to the evaluation of the continued viability of the regional transportation system plan because the concentration of occupied housing units enables the economic provision of public transit as well as the effective use of ridesharing strategies. Thus, if trip production in the Region increased

Table 18

ACTUAL AND PLANNED CHANGE IN THE NUMBER OF HOUSING UNITS IN THE REGION BY RESIDENTIAL LAND USE CATEGORY: 1970 AND 1985

| Residential Land Use Category | Existing 1970 | | Planned 1985 | | | | Actual 1985 | | | | Difference between Actual and Planned 1985 Housing Units | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Change 1970-1985 | | Total | | Change 1970-1985 | | Total | | | |
| | Number | Percent of Total | Number | Percent | Number | Percent of Total | Number | Percent | Number | Percent of Total | Number | Percent |
| High-Density[a] ......... | 319,930 | 59.6 | 6,070 | 1.9 | 326,000 | 51.6 | 8,080 | 2.5 | 328,010 | 51.0 | 2,010 | 0.6 |
| Medium-Density[b] ....... | 139,490 | 26.0 | 73,090 | 52.4 | 212,580 | 33.6 | 68,760 | 49.3 | 208,250 | 32.3 | -4,330 | -2.0 |
| Low-Density[c] ......... | 74,770 | 14.0 | 9,160 | 12.3 | 83,930 | 13.3 | 28,850 | 38.6 | 103,620 | 16.1 | 19,690 | 23.5 |
| Suburban-Density[d] ...... | 2,300 | 0.4 | 7,390 | 321.3 | 9,690 | 1.5 | 1,650 | 71.7 | 3,950 | 0.6 | -5,740 | -59.2 |
| Region | 536,490 | 100.0 | 95,710 | 17.8 | 632,200 | 100.0 | 107,340 | 20.0 | 643,830 | 100.0 | 11,630 | 1.8 |

*[a]Defined as 7.0 to 17.9 housing units per net residential acre.*

*[b]Defined as 2.3 to 6.9 housing units per net residential acre.*

*[c]Defined as 0.7 to 2.2 housing units per net residential acre.*

*[d]Defined as 0.2 to 0.6 housing units per net residential acre.*

*Source: SEWRPC.*

significantly faster than forecast despite the development of most new households at planned residential densities, other factors must be considered to explain high levels of trip making. Such explanations may include basic lifestyle changes as well as greater than anticipated low-density residential development. As shown in Table 17, the actual proportion of all new housing units accommodated at low density, 27 percent, exceeded the planned proportion by 17 percentage points. By contrast, the actual proportion of all new units accommodated at medium density, 64 percent, was 12 percent below the planned proportion.

Consistent with the findings stated above, the monitoring indicated that more new housing units were provided at low residential densities over the 15-year period than were planned. Table 18 shows that the land use plan recommended an increase in the number of housing units provided in the low-density category of 12 percent by 1985. By 1985, the actual number of housing units provided at low residential densities had increased by 32 percent. During the same 15-year period, a shortfall of 2 percent in the number of housing units provided in the medium-density category occurred. Table 18 also shows that nearly 2 percent more housing units were provided in the Region between 1970 and 1985 than had been planned.

The conversion of rural land to low-density residential development is a significant factor in evaluating the validity of the adopted plan. To understand the affect of low-density urban development on trip making within the Region more fully, the location of new urban development must be examined.

Location of Incremental Urban Development

A study of the location of urban development requires that an alternative method of land use analysis be used, an approach different from that used to provide the land use data presented above. Under this method, termed urban growth ring analysis, urban development is defined as those areas wherein houses and other buildings have been constructed in relatively compact groups or where a closely spaced network of minor streets has been constructed, thus indicating a concentration of residential, commercial, industrial, or some other urban uses. Urban growth ring analysis identifies the limits or boundaries of concentrations of urban growth and is thus useful in graphically representing the location of new urban development and determining changes in overall urban density in the Region.

Monitoring data with respect to the location of incremental urban growth indicated that nearly half of all urban development between 1970 and 1985 occurred in a diffused pattern, making travel in much of the newly developed areas almost totally automobile-dependent. Of the nearly 139 square miles of incremental urban development identified through the Commis-

Table 19

INCREMENTAL URBAN DEVELOPMENT IN THE REGION BY COUNTY: 1970-1985

| County | Extent of Urban Development 1970 (square miles) | Incremental Urban Development 1970-1985 (square miles) | | | | | Extent of Urban Development 1985 (square miles) |
|---|---|---|---|---|---|---|---|
| | | Located in Areas Recommended for Urban Development in the Regional Land Use Plan | | Located in Areas Not Recommended for Urban Development in the Regional Land Use Plan | | | |
| | | Amount | Percent of Total | Amount | Percent of Total | Total | |
| Kenosha ..... | 26.4 | 5.4 | 65.1 | 2.9 | 34.9 | 8.3 | 34.7 |
| Milwaukee ... | 149.8 | 17.2 | 99.4 | 0.1 | 0.6 | 17.3 | 167.1 |
| Ozaukee ..... | 19.0 | 6.5 | 60.7 | 4.2 | 39.3 | 10.7 | 29.7 |
| Racine ...... | 33.9 | 6.5 | 58.6 | 4.6 | 41.4 | 11.1 | 45.0 |
| Walworth .... | 22.1 | 3.6 | 33.6 | 7.1 | 66.4 | 10.7 | 32.8 |
| Washington ... | 14.1 | 5.8 | 25.8 | 16.7 | 74.2 | 22.5 | 36.6 |
| Waukesha .... | 72.3 | 27.4 | 47.0 | 30.9 | 53.0 | 58.3 | 130.6 |
| Region | 337.6 | 72.4 | 52.1 | 66.5 | 47.9 | 138.9 | 476.5 |

*Source: SEWRPC.*

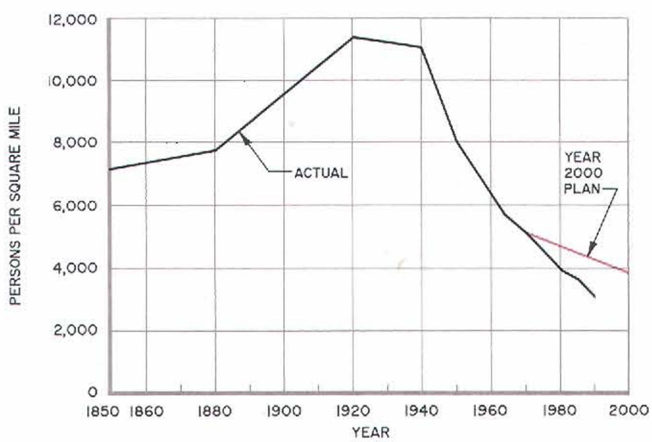
sion's growth ring analysis, approximately 66 square miles, or 48 percent, took place in a scattered fashion over much of Southeastern Wisconsin. The extent of this urban development, concentrated particularly in Waukesha and Washington Counties, is set forth in Table 19 and is shown in red on Map 8.

The remaining 72 square miles of incremental urban development, identified through the Commission's growth ring analysis, occurred within urban service areas as recommended in the regional land use plan. They are shown in green on Map 8. Such development can be readily and economically provided with essential public services such as sanitary sewer, water supply, and transit. In this regard, a supplemental analysis of the provision of sanitary sewer service to new housing units has revealed that, between 1970 and 1985, 79 percent of all new housing units constructed were within planned sanitary sewer service area, marking a significant achievement in the implementation of the year 2000 regional land use plan.

As already noted, the increase in the levels of households and employment exerted an urban land demand of the approximate magnitude envisioned in the plan, the scale of urban development varying only slightly from the forecast. Since population growth was insignificant between 1970 and 1985, the actual urban population density declined from about 5,100 persons per square mile to about 3,900 persons per square miles by 1985, as shown in Figure 10. Consequently, a substantial area of land was converted from rural to urban use over the 15-year period to serve essentially the same population level as existed within the Region in 1970.

Figure 10

ACTUAL AND PLANNED URBAN POPULATION DENSITY IN THE REGION: 1850-2000



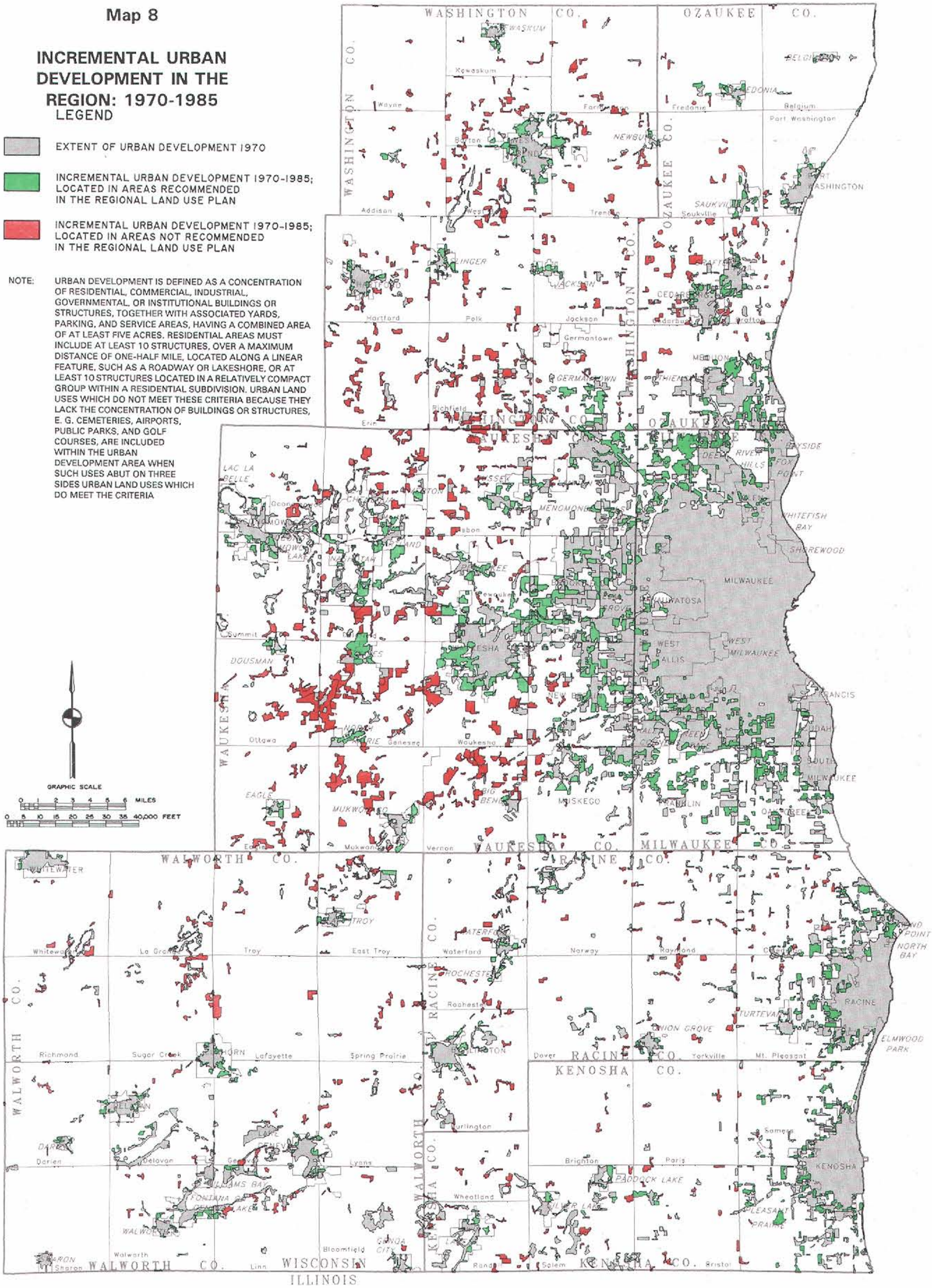

*Source: SEWRPC.*

<u>Major Regional Centers</u>

The regional land use plan included explicit recommendations concerning the location and size of three types of major regional centers of activity: industrial, commercial, and outdoor recreational. Major regional centers, especially in the case of industrial and commercial centers

## Map 8

### INCREMENTAL URBAN DEVELOPMENT IN THE REGION: 1970-1985




Monitoring the location of incremental urban growth indicated that nearly one-half of all urban development between 1970 and 1985, measured in square miles, occurred in a scattered pattern, making travel in many of the newly developed areas almost totally automobile dependent. Of the nearly 139 square miles of incremental urban development identified through the Commission's growth ring analysis, approximately 66 square miles, or 48 percent, took place in a scattered fashion over much of the Southeastern Wisconsin Region, particularly in Waukesha and Washington Counties.

*Source: SEWRPC.*

because of large employment concentrations, are significant trip generators. Consequently, the planned scale of transportation system development and rapid transit service in particular would be affected by large changes in employment at such centers and large shifts in employment among such centers. The proposed and actual development of major regional centers over the period 1972 through 1990 is described below.

Industrial Centers: Major industrial centers are defined in the adopted regional land use plan as concentrations of employment having at least 3,500 "industrial" jobs, with the term "industrial" encompassing the manufacturing, wholesaling, and construction sectors. While this definition is used for regional land use planning purposes, for regional transportation planning purposes the Commission also takes into account total jobs at each major industrial center. Therefore, the status of employment at each major center in terms of both industrial and total jobs is reported herein.

As shown in Table 20 and on Map 9, the regional land use plan envisioned that by the year 2000, 22 major industrial centers would be provided to serve the Region. Of the 22 major centers, 17 were in existence in 1972 and all but one met the threshold industrial employment criterion in both 1972 and 1990. Of the five planned new centers, three, Milwaukee-Granville, Oak Creek, and Waukesha, had been established and met the threshold industrial employment criterion by 1990. Of the remaining two planned centers, one, Burlington, was under development but did not yet meet the threshold industrial employment criterion; the other, Kenosha-West, had not yet been established.

The monitoring data indicated significant declines in the industrial and total employment levels at a number of the older industrial centers which were thriving in 1972, including Kenosha-East, Milwaukee-Glendale, Milwaukee-Menomonee Valley East, Milwaukee-Near North, and West Allis-East. Industrial employment at the West Allis-East center declined by 6,200 jobs, or 67 percent, between 1972 and 1990, causing West Allis-East to lose its major center designation.

The significant declines in industrial employment at the older centers noted above may be attributed to two factors: the overall loss of manufacturing jobs within the Region during the severe economic recession of 1979 to 1983 and, more significantly, the general restructuring of the national economy away from heavy manufacturing dependent on rail and seaport transportation facilities. During the economic recession of 1979 to 1983, the broad employment trend away from manufacturing was most pronounced; about 80,000 industrial jobs were lost within the Region.

The monitoring data also indicated a significantly higher than planned employment increase at one center and the emergence of two major unplanned centers. Employment at the Butler Center, located in the Villages of Butler and Menomonee Falls and the adjacent Cities of Brookfield, Milwaukee, and Wauwatosa, increased by 41 percent beyond the planned level. With about 21,000 industrial and about 29,000 total jobs in 1990, the Butler center represents the largest industrial employment center in the Region. The Waukesha-North center and the Pewaukee center were developed as major industrial centers by 1990 in areas that were not called for in the regional land use plan.

In addition, monitoring information indicates that four additional major industrial centers may emerge at sites previously unplanned. Three of these centers are under development, one each in the Cities of Franklin, West Bend, and Hartford.[6] A fourth potential industrial center, Pabst Farms along IH 94 in the Oconomowoc area of Waukesha County, has yet to receive the required local governmental approvals.

Commercial Centers: Major commercial centers are classified into two types: retail centers and office centers. A single center may be one or the other, or both, if both retail and office employment criteria are met. Major retail centers are defined as concentrations of employment having at least 2,000 jobs in the retail trade sector. Major office centers are defined as concentrations of employment having at least 3,500 jobs in the

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[6]*The industrial center at Hartford has been included as a planned major industrial center in the third-generation regional land use plan. See SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010, January 1992.*

## Table 20

### STATUS OF MAJOR INDUSTRIAL CENTERS IN THE REGION: 1990

| | Industrial Employment | | | | | Total Employment | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Estimated 1990 | | | | | Estimated 1990 | |
| Major Industrial Center[a] | Existing 1972 | Planned 2000 | Number | Percent Change from 1972 | Meets Criterion for Designation as a Major Center in 1990[a] | Existing 1972 | Planned 2000 | Number | Percent Change from 1972 |
| Existing in 1970 | | | | | | | | | |
| Kenosha-East | 11,600 | 11,600 | 4,800 | -59 | Yes | 14,600 | 15,300 | 7,100 | -51 |
| Cudahy-South Milwaukee | 7,300 | 8,400 | 5,100 | -30 | Yes | 9,800 | 11,800 | 8,900 | -9 |
| Milwaukee-Glendale | 17,800 | 18,200 | 8,500 | -52 | Yes | 22,700 | 23,700 | 13,700 | -40 |
| Milwaukee-Menomonee Valley East | 18,600 | 19,000 | 9,400 | -49 | Yes | 23,500 | 24,600 | 17,000 | -28 |
| Milwaukee-Menomonee Valley West | 5,300 | 5,400 | 6,400 | 21 | Yes | 8,200 | 8,600 | 9,500 | 16 |
| Milwaukee-Near North | 15,000 | 15,300 | 6,200 | -59 | Yes | 17,300 | 18,000 | 9,600 | -45 |
| Milwaukee-Near South | 12,600 | 12,900 | 9,900 | -21 | Yes | 14,700 | 15,500 | 12,300 | -16 |
| Milwaukee-North | 20,800 | 21,200 | 13,100 | -37 | Yes | 25,300 | 26,200 | 16,400 | -35 |
| Milwaukee-South | 4,100 | 4,200 | 4,500 | 10 | Yes | 5,400 | 5,600 | 6,100 | -13 |
| West Allis-East | 9,300 | 9,500 | 3,100 | -67 | No | 13,700 | 14,400 | 8,300 | -39 |
| West Allis-West | 3,600 | 3,700 | 5,700 | 58 | Yes | 7,800 | 8,200 | 10,800 | 38 |
| West Milwaukee | 15,400 | 15,700 | 6,300 | -59 | Yes | 18,800 | 19,500 | 8,700 | 54 |
| Mt. Pleasant | 3,500 | 9,400 | 4,700 | 34 | Yes | 3,500 | 9,600 | 4,800 | 37 |
| Racine | 12,500 | 12,800 | 9,700 | -22 | Yes | 15,500 | 16,600 | 11,900 | -23 |
| West Bend | 3,800 | 7,100 | 5,200 | 37 | Yes | 3,900 | 7,200 | 5,400 | 38 |
| Butler | 14,600 | 14,900 | 21,100 | 45 | Yes | 17,200 | 19,800 | 28,600 | 66 |
| New Berlin | 3,500 | 8,500 | 10,400 | 197 | Yes | 4,000 | 9,500 | 13,800 | 245 |
| Planned 2000 | | | | | | | | | |
| Kenosha-West | - - | 4,500 | 600 | - - | No | - - | 4,800 | 900 | - - |
| Milwaukee-Granville | 1,500 | 15,500 | 13,400 | 793 | Yes | 1,800 | 16,000 | 18,600 | 933 |
| Oak Creek | 800 | 8,800 | 9,300 | 1,063 | Yes | 1,100 | 9,200 | 11,500 | 945 |
| Burlington | 1,200 | 4,700 | 2,500 | 103 | No | 2,700 | 7,000 | 4,700 | 74 |
| Waukesha | 3,000 | 8,000 | 5,500 | 83 | Yes | 4,200 | 10,100 | 7,900 | 88 |
| Unplanned but Developed by 1990 | | | | | | | | | |
| Pewaukee | - - | - - | 6,200 | - - | Yes | - - | - - | 7,800 | - - |
| Waukesha-North | - - | - - | 4,900 | - - | Yes | - - | - - | 5,900 | - - |

[a] *The criterion selected as a basis for determining the status of major industrial centers is a minimum of 3,500 "industrial" jobs. The term "industrial" encompasses the manufacturing, wholesaling, and construction sectors as defined in the Standard Industrial Classification Manual of the U. S. Office of Management and Budget. The table above reports both industrial and total employment at the designated centers. For data collection and analysis purposes, each major center is defined as encompassing a select group of contiguous U. S. Public Land Survey one-quarter sections. For travel forecasting purposes each major center is defined by its location within one or more traffic analysis zones.*

*Source: SEWRPC.*

"office and service" sectors, sectors which encompass the finance, insurance, real estate, and service industries, except government service.[7]

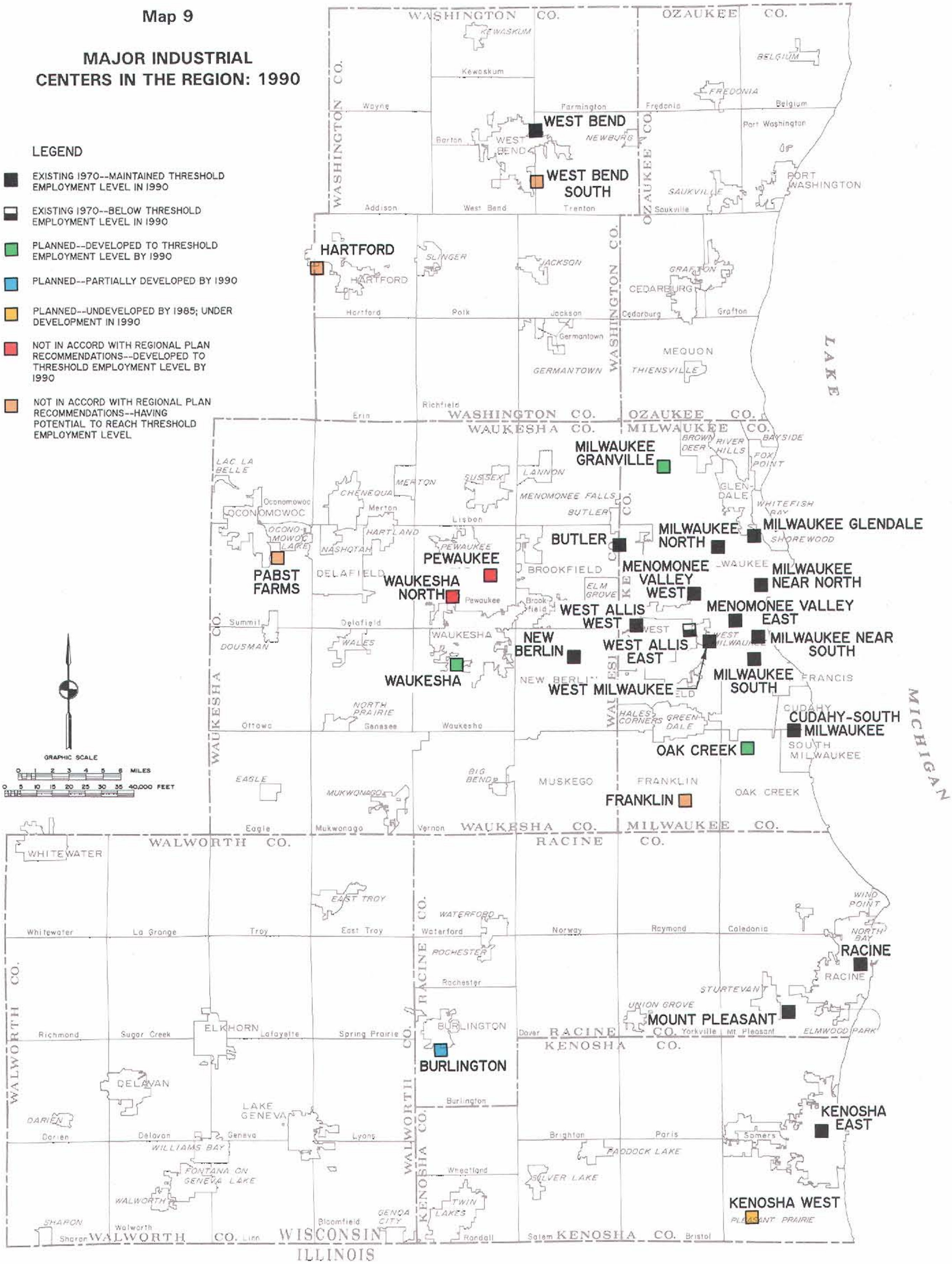
The status of the actual development of each of the 16 planned major commercial centers as of the year 1990 is summarized in Table 21 and on Map 10. By 1990, 12 of the 13 major commercial centers so designated in 1972 met one or both of the commercial center criteria. Mitchell Street, the exception, never met the office center employment criteria. Retail employment at this center fell below the 2,000 threshold level between 1972 and 1990.

Of the three planned new commercial centers, two, Northridge and Racine-West, had been established by 1990 and met the threshold employment levels for classification as major retail centers. In both cases, new shopping centers had been built as recommended in the plan. In the case of the third new commercial center, Oak Creek, a relatively minor development had been completed at the planned location, though employment at that center did not meet the levels needed for classification as either a major retail center or a major office center by 1990.

[7] *Special account is taken of jobs in the government and utility sectors only in the four older central business districts; those in Kenosha, Racine, Waukesha, and West Bend, in view of their unique historic character.*

## Map 9

### MAJOR INDUSTRIAL CENTERS IN THE REGION: 1990




The regional land use plan envisioned that by the year 2000, 22 major industrial centers would serve the Region. Of the 22 major centers, 17 were in existence in 1970, and all but one, the West Allis-East Center, met the threshold industrial employment criterion in both 1970 and 1990. Although these older industrial centers continue to meet threshold employment criteria, monitoring shows that employment levels at many of these centers have declined significantly since 1970. Of the five planned new centers, three, Milwaukee Granville, Oak Creek, and Waukesha, had been established and met the threshold industrial employment criterion by 1990. Two industrial centers, Pewaukee and Waukesha North, were developed to threshold employment levels by 1990 at variance with the adopted regional land use plan. Four additional unplanned industrial centers have the potential to reach the employment threshold by the year 2000.

Source: SEWRPC.

Table 21

STATUS OF MAJOR COMMERCIAL CENTERS IN THE REGION: 1990

| Major Commercial Center | Retail Trade Employment | | | | |
|---|---|---|---|---|---|
| | Existing 1972 | Planned 2000 | Estimated 1990 | | Meets Criterion for Designation as a Major Retail Center in 1990[a] |
| | | | Number | Percent Change from 1972 | |
| Existing in 1970 | | | | | |
| Kenosha CBD | N/A | N/A | N/A | N/A | N/A |
| Bay Shore | 2,300 | 2,300 | 2,400 | 4 | Yes |
| Capitol Court | 2,200 | 2,300 | 3,300 | 50 | Yes |
| Mayfair | 3,500 | 3,600 | 5,100 | 46 | Yes |
| Milwaukee CBD | 11,100 | 11,100 | 5,200 | -52 | Yes |
| Mitchell Street | 3,200 | 3,300 | 1,100 | -56 | No |
| Southgate-Point Loomis | 2,000 | 2,000 | 2,400 | 20 | Yes |
| Southridge | 2,600 | 2,600 | 3,700 | 42 | Yes |
| West Allis | 1,000 | 1,500 | 2,800 | 180 | Yes |
| Racine CBD | N/A | N/A | N/A | N/A | N/A |
| West Bend CBD | N/A | N/A | N/A | N/A | N/A |
| Brookfield-Blue Mound Road | 1,600 | 1,800 | 6,700 | 319 | Yes |
| Waukesha CBD | N/A | N/A | N/A | N/A | N/A |
| Planned 2000 | | | | | |
| Northridge | - - | 3,800 | 5,000 | - - | Yes |
| Oak Creek | - - | 2,900 | 300 | - - | No |
| Racine-West | - - | 3,300 | 3,500 | - - | Yes |

| Major Commercial Center | Office and Service Employment | | | | |
|---|---|---|---|---|---|
| | Existing 1972 | Planned 2000 | Estimated 1990 | | Meets Criterion for Designation as a Major Office Center in 1990[a] |
| | | | Number | Percent Change from 1972 | |
| Existing in 1970 | | | | | |
| Kenosha CBD | 3,000 | 3,300 | 3,700 | 23 | Yes |
| Bay Shore | N/A | N/A | N/A | N/A | N/A |
| Capitol Court | N/A | N/A | N/A | N/A | N/A |
| Mayfair | 3,100 | 5,100 | 7,200 | 119 | Yes |
| Milwaukee CBD | 54,900 | 55,000 | 65,900 | -7 | Yes |
| Mitchell Street | N/A | N/A | N/A | N/A | N/A |
| Southgate-Point Loomis | N/A | N/A | N/A | N/A | N/A |
| Southridge | N/A | N/A | N/A | N/A | N/A |
| West Allis | N/A | N/A | N/A | N/A | N/A |
| Racine CBD | 5,700 | 7,100 | 4,100 | -39 | Yes |
| West Bend CBD | 2,500 | 3,800 | 3,800 | 48 | Yes |
| Brookfield-Blue Mound Road | 300 | 4,300 | 13,600 | 1,967 | Yes |
| Waukesha CBD | 5,300 | 7,500 | 5,000 | -13 | Yes |
| Planned 2000 | | | | | |
| Northridge | N/A | N/A | N/A | N/A | N/A |
| Oak Creek | N/A | N/A | N/A | N/A | N/A |
| Racine-West | N/A | N/A | N/A | N/A | N/A |

Table 21 (continued)

| Major Commercial Center | Total Employment | | | | |
|---|---|---|---|---|---|
| | Existing 1972 | Planned 2000 | Estimated 1990 | | Estimated 1990 |
| | | | Number | Percent Change from 1972 | |
| Existing in 1970 | | | | | |
| Kenosha CBD | 4,500 | 4,800 | 4,600 | 2 | 4,600 |
| Bay Shore | 4,500 | 4,600 | 3,900 | -13 | 3,900 |
| Capitol Court | 3,300 | 3,400 | 3,900 | 18 | 3,900 |
| Mayfair | 8,100 | 10,200 | 13,600 | 68 | 13,600 |
| Milwaukee CBD | 88,900 | 91,000 | 91,400 | 28 | 91,400 |
| Mitchell Street | 5,500 | 5,800 | 4,100 | -25 | 4,100 |
| Southgate-Point Loomis | 2,600 | 2,700 | 3,700 | 42 | 3,700 |
| Southridge | 2,800 | 4,600 | 4,700 | 68 | 4,700 |
| West Allis | 1,700 | 2,300 | 6,300 | 271 | 6,300 |
| Racine CBD | 7,100 | 18,600 | 5,200 | -27 | 5,200 |
| West Bend CBD | 5,300 | 6,900 | 6,100 | 15 | 6,100 |
| Brookfield-Blue Mound Road | 2,200 | 6,400 | 24,900 | 1,032 | 24,900 |
| Waukesha CBD | 7,500 | 10,100 | 6,200 | -17 | 6,200 |
| Planned 2000 | | | | | |
| Northridge | - - | 4,600 | 6,500 | - - | 6,500 |
| Oak Creek | - - | 3,000 | 1,100 | - - | 1,100 |
| Racine-West | - - | 5,600 | 5,700 | - - | 5,700 |

NOTE: N/A indicates not applicable.

[a]*Major commercial centers have been classified into two types, retail centers and office centers. The criterion selected as a basis for determining the status of major retail centers is a minimum of 2,000 jobs in the "retail trade" sector as defined in the Standard Industrial Classification Manual of the U. S. Office of Management and Budget. The criterion selected as a basis for determining the status of major office centers, except as noted below, is a minimum of 3,500 "office and service" jobs. The term "office and service" encompasses the finance, insurance, and real estate sector and the services sector, excluding educational services, as defined in the Standard Industrial Classification Manual. The four older, smaller central business districts in the Region, the Kenosha CBD, Racine CBD, Waukesha CBD, and West Bend CBD, are identified as major office centers on the basis of the 3,500 minimum job level, taking into account government and utility sector jobs together with office and service jobs. The above table reports retail trade employment and total employment for retail centers and office and service employment and total employment for office centers. Some centers meet both the retail and office criteria. For data collection and analysis purposes, each major center is defined as encompassing a select group of contiguous U. S. Public Land Survey one-quarter sections. For travel forecasting purposes each center is defined by its location within one or more traffic analysis zones.*

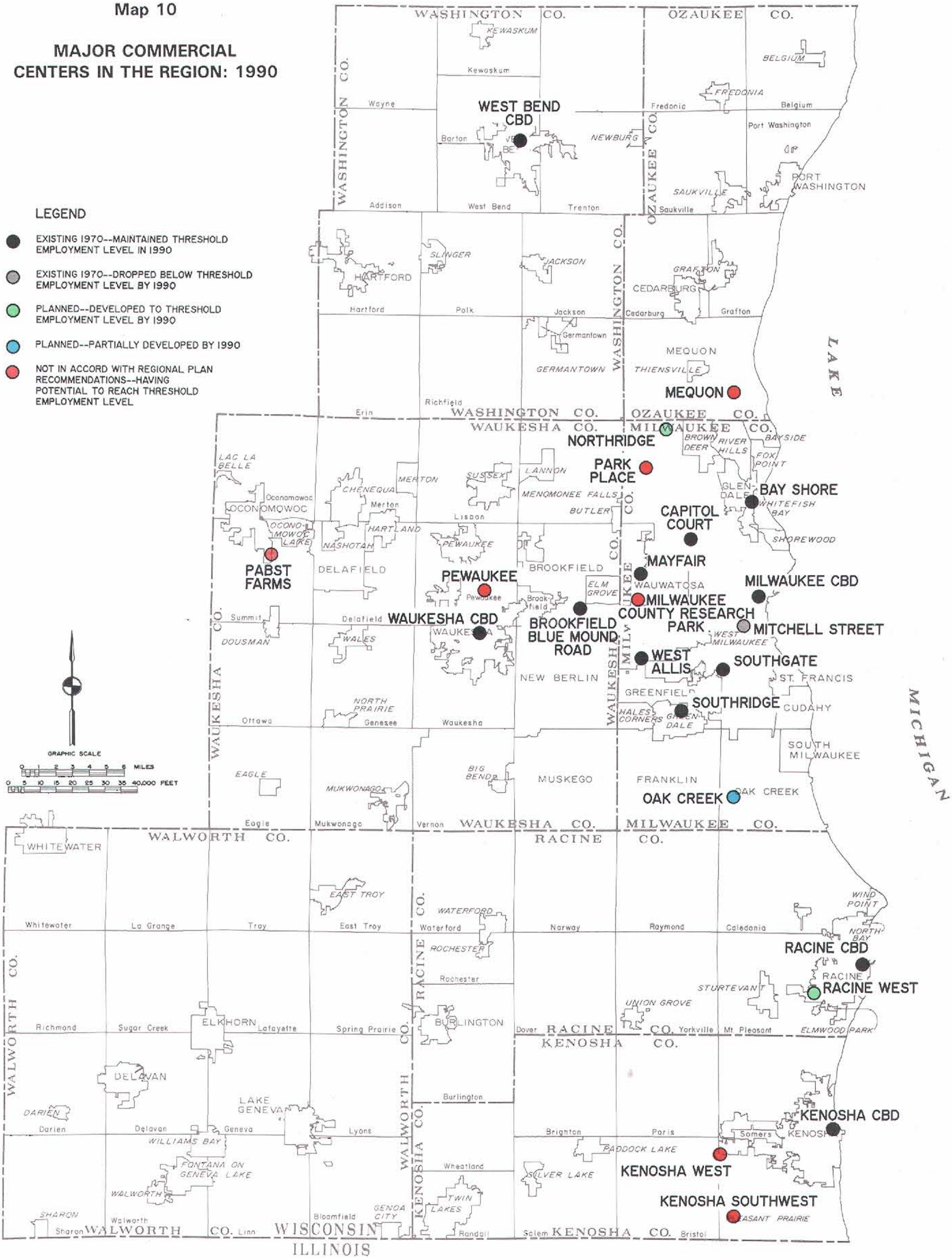
*Source: SEWRPC.*

Monitoring data indicated that for most centers the actual 1990 total commercial employment levels closely approximated levels planned for the year 2000. However, substantial deviation between actual and planned employment levels was recorded at four major commercial centers: Mayfair, with 3,400 more jobs than planned; West Allis, with 4,000 more jobs than planned; Brookfield-Blue Mound Road, with 18,500 more jobs than planned; and the Waukesha central business district, with 3,900 fewer jobs than planned.

Monitoring data also indicated that seven additional major commercial centers may emerge at sites not proposed in the year 2000 regional land use plan (see Map 10). At five of these sites, Mequon, Milwaukee-Park Place, Pewaukee,

Map 10

## MAJOR COMMERCIAL CENTERS IN THE REGION: 1990




The year 2000 regional land use plan envisioned that 16 major commercial centers would serve the Region. Major commercial centers are classified into two types: retail centers and office centers. By 1990, all the major commercial centers that existed in 1970, with the exception of the Mitchell Street Center in the City of Milwaukee, met both an office and retail center employment criteria. Two newly planned centers, Northridge and Racine West, had been established by 1990 and met the threshold employment levels for classification as major retail centers. Monitoring data also indicated that seven additional major commercial centers may emerge at locations not proposed in the year 2000 regional land use plan.

*Source: SEWRPC.*

Kenosha-West, and Kenosha-Southwest, development of commercial office and/or retail centers was under way by 1990. At the sixth site, Milwaukee County Research Park in Wauwatosa, development plans have been announced and the lands committed by Milwaukee County as the site of an office park.[8] At the seventh site, the Pabst Farms in the Oconomowoc area, development plans have recently been announced, but have not yet received required public approvals.

Outdoor Recreation Centers: Major public outdoor recreation centers, or regional parks, are defined in the adopted regional land use plan as multi-use outdoor recreation areas with a minimum site area of 250 acres. The regional land use plan recommended that 29 regional parks be provided to serve the Region by the year 2000 as shown in Table 22 and on Map 11. Of that total, 27 park sites were fully or partially acquired by 1970. At one of the two remaining sites, Cliffside in Racine County, additional acquisition was required to bring the site up to the threshold 250-acre size by 1990. Major park status was achieved at the other planned regional park, Monches in Waukesha County, when, in 1991, the County acquired an additional 90 acres.

Table 22 shows that two additional planned regional park sites, Sugar Creek in Walworth County and Paradise Valley in Washington County, had not been acquired by 1990. Finally, the monitoring indicated that an additional major park site, not included in the year 2000 regional land use plan, had been acquired by 1990. That site, Brookfield-Mitchell, approximated 260 acres in 1990, and was acquired and planned by the City of Brookfield for major park status.[9]

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[8] *The commercial centers at Mequon, Milwaukee-Park Place, Pewaukee, Kenosha West, and Milwaukee County Research Park have been included as planned major commercial centers in the third-generation regional land use plan. See SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010, January 1992.*

[9] *The Brookfield-Mitchell site has been included as a planned major outdoor recreation center in the third-generation regional land use plan. See SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010, January 1992.*

## PLAN IMPLEMENTATION

The foregoing description of urban development in the Region since 1970 is intended to assist in evaluating the travel forecasts made for the design of the adopted regional transportation system plan. The consistency between the forecast and actual travel levels to be described later must be viewed in light of the extent to which urban development occurred in a dispersed fashion contrary to land use plan recommendations. A sound evaluation of the travel forecasts also requires an evaluation of the state of implementation of the regional transportation system plan itself.

As previously indicated, the adopted regional transportation system plan contained recommendations in three component areas: arterial streets and highways, public transit, and transportation management measures. Substantial implementation progress remains to be made in each of the component areas. As indicated previously, the adopted year 2000 plan recommended that before extensive improvements were to be made to the arterial street and highway system, the public transit system was to be greatly improved and expanded and the recommended transportation management measures were to be implemented to make the most efficient use of existing arterial street and highway capacity. Implementation of the public transit recommendations has been poor; the transportation management system, despite actions taken by the Wisconsin Department of Transportation, remains essentially underdeveloped. The status of transportation system implementation is described below.

### Arterial Streets and Highways

The adopted plan called on the Federal, State, and constituent units of government both to realign jurisdictionally and functionally improve the arterial street and highway system.

Jurisdictional Realignment: The implementation status of the jurisdictional realignment element of the regional transportation plan by county is summarized in Table 23, and the changes made as of 1991 are shown on Map 12. Based on plan schedules, about one-half of the 1,387 miles planned for jurisdictional transfer should have been completed by 1990. A summary of the status of the planned realignments among each jurisdiction follows.

Table 22

STATUS OF MAJOR OUTDOOR RECREATION CENTERS IN THE REGION: 1990

| Major Regional Park | Site Area | | | Meets Site Area Criterion for Designation as a Major Park in 1990[a] |
|---|---|---|---|---|
| | Existing 1970 | Planned 2000 | Estimated 1990 | |
| Fully Acquired in 1970 | | | | |
| Brighton Dale | 360 | 360 | 360 | Yes |
| Petrifying Springs | 360 | 360 | 360 | Yes |
| Harrington Beach | 640 | 640 | 640 | Yes |
| Hawthorne Hills | 290 | 290 | 290 | Yes |
| Mee-Kwon | 240 | 240 | 240 | Yes |
| Ela | 240 | 240 | 240 | Yes |
| Johnson | 360 | 360 | 360 | Yes |
| Brown Deer | 370 | 370 | 370 | Yes |
| Dretzka | 330 | 330 | 330 | Yes |
| Greenfield | 300 | 300 | 300 | Yes |
| Lake Michigan-North | 420 | 420 | 420 | Yes |
| Lake Michigan-South | 840 | 840 | 840 | Yes |
| Lincoln | 310 | 310 | 310 | Yes |
| Oakwood | 280 | 280 | 280 | Yes |
| Whitnall | 640 | 640 | 640 | Yes |
| Whitewater Lake | 250 | 250 | 250 | Yes |
| Menomonee | 400 | 400 | 400 | Yes |
| Minooka | 300 | 300 | 300 | Yes |
| Mukwonago | 220 | 220 | 220 | Yes |
| Naga-Waukee | 420 | 420 | 420 | Yes |
| Ottawa Lake | 220 | 220 | 220 | Yes |
| Planned 2000, Partially Acquired in 1970 | | | | |
| Silver Lake | 260 | 360 | 260 | Yes |
| Bender | 310 | 440 | 310 | Yes |
| Cliffside | 220 | 540 | 220 | No |
| Big Foot Beach | 270 | 330 | 270 | Yes |
| Pike Lake | 680 | 740 | 680 | Yes |
| Monches[b] | 190 | 440 | 320 | Yes |
| Planned 2000, Not Acquired by 1985 | | | | |
| Sugar Creek | - - | 310 | - - | No |
| Paradise Valley | - - | 450 | - - | No |
| Unplanned, Acquired by 1985 | | | | |
| Brookfield-Mitchell | - - | - - | 533 | Yes |

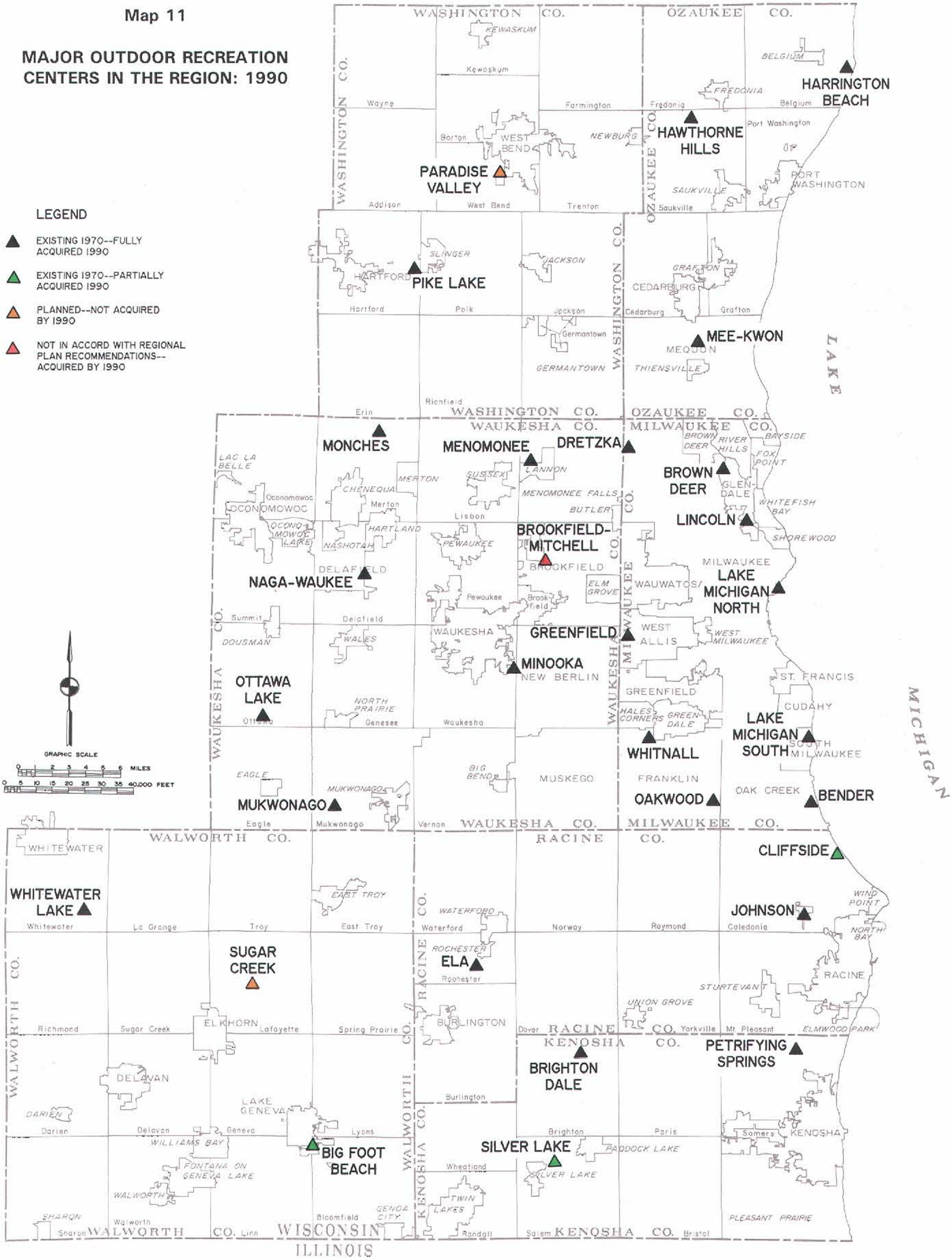
[a]*A major regional park is defined as a publicly owned site of at least 250 acres that provides opportunities for a variety of resource-oriented outdoor recreational activities, such as camping, beach swimming, and golf. In the plan implementation study, attention was focused on the status of public land acquisition to accommodate the proposed parks, recognizing that facility development at the proposed sites could proceed at a later date. It should be noted that the Ela, Mee-Kwon, Mukwonago, and Ottawa Lake sites abut existing parkway lands or lands recommended for parkway acquisition. The area of the site proper in conjunction with such associated existing or proposed parkway lands exceeds 250 acres.*

[b]*The Monches Regional Park met the criteria for designation as a "major regional park" in 1991 when Waukesha County acquired a 90-acre addition to the existing site.*

*Source: SEWRPC.*

Map 11

## MAJOR OUTDOOR RECREATION CENTERS IN THE REGION: 1990




The year 2000 regional land use plan envisioned a system of 29 regional parks providing opportunities for such recreational activities as camping, picnicking, and swimming. Of the 29 planned regional parks, 21 had been fully acquired by 1990 and five had been partially acquired by 1990. The remaining two planned recreational centers, Paradise Valley and Sugar Creek, had not been acquired by 1990.

Source: SEWRPC.

Table 23

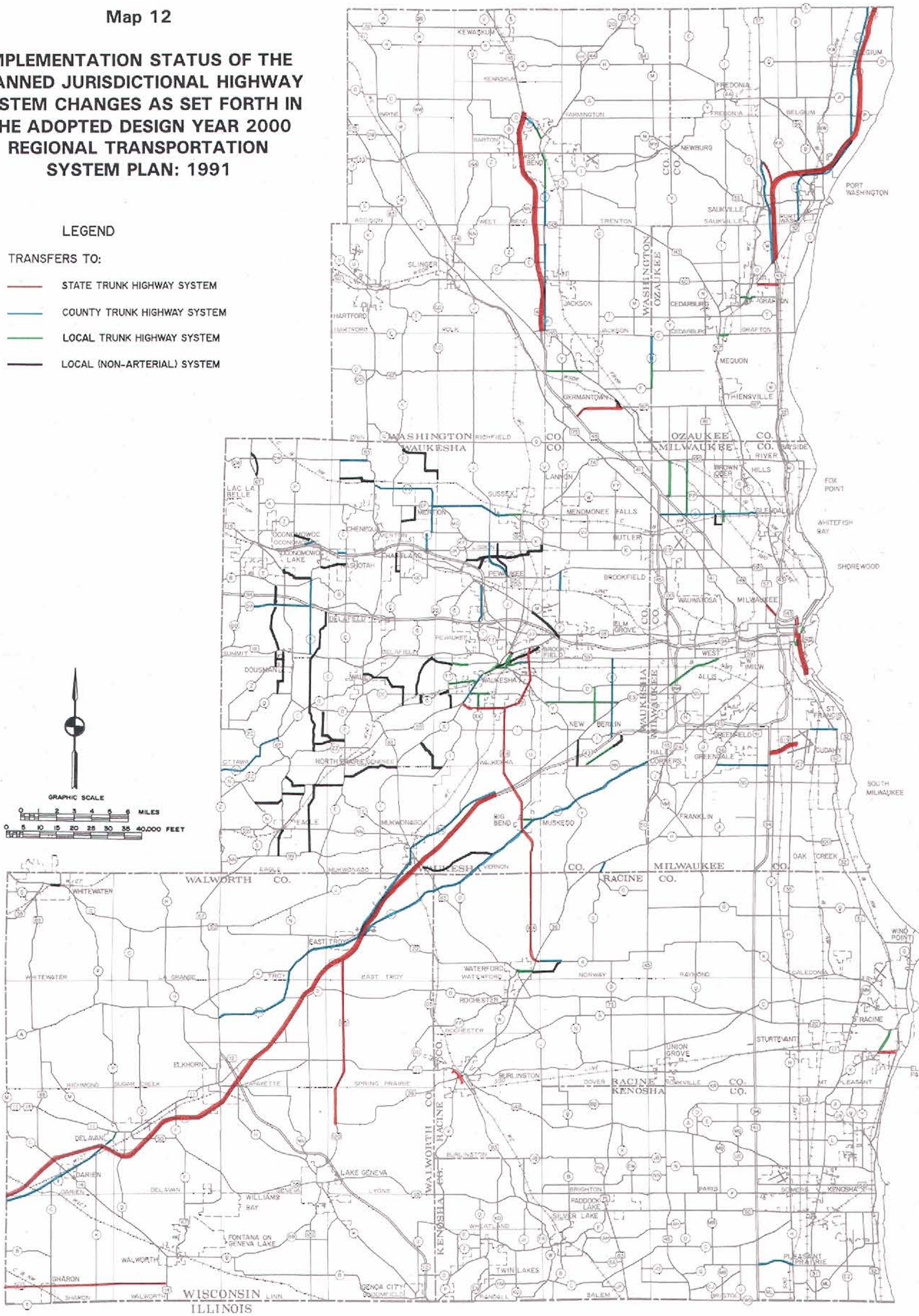
IMPLEMENTATION STATUS OF JURISDICTIONAL REALIGNMENTS RECOMMENDED IN THE ADOPTED YEAR 2000 REGIONAL TRANSPORTATION SYSTEM PLAN BY COUNTY: 1991

| Type of Transfer | Kenosha County | Milwaukee County | Ozaukee County | Racine County | Walworth County | Washington County | Waukesha County | Region Total |
|---|---|---|---|---|---|---|---|---|
| Transfers to State Trunk System | | | | | | | | |
| From County Trunk System | | | | | | | | |
| Planned (miles) | 6.5 | 11.0 | 4.3 | 28.2 | 19.0 | 8.0 | 18.9 | 95.9 |
| Completed (miles) | 0.0 | 0.0 | 1.6 | 5.6 | 18.3 | 0.0 | 16.1 | 41.6 |
| Percent Completed | 0.0 | 0.0 | 37.2 | 19.9 | 96.3 | 0.0 | 85.2 | 43.4 |
| From Local System | | | | | | | | |
| Planned (miles) | 0.8 | 10.2 | 4.0 | 4.4 | 2.6 | 4.2 | 1.2 | 27.4 |
| Completed (miles) | 0.0 | 1.9 | 0.0 | 1.3 | 0.1 | 2.7 | 0.3 | 6.3 |
| Percent Completed | 0.0 | 18.6 | 0.0 | 29.5 | 3.8 | 64.3 | 25.0 | 23.0 |
| Total | | | | | | | | |
| Planned (miles) | 7.3 | 22.2 | 8.3 | 32.6 | 21.6 | 12.2 | 20.1 | 123.3 |
| Completed (miles) | 0.0 | 1.9 | 1.6 | 6.9 | 18.4 | 2.7 | 16.4 | 47.9 |
| Percent Completed | 0.0 | 8.6 | 19.3 | 21.2 | 85.2 | 22.1 | 81.6 | 38.8 |
| Transfers to County Trunk System | | | | | | | | |
| From State Trunk System | | | | | | | | |
| Planned (miles) | 34.7 | 54.7 | 86.4 | 36.7 | 30.3 | 46.9 | 53.4 | 343.1 |
| Completed (miles) | 0.0 | 0.0 | 20.0 | 2.3 | 21.9 | 7.8 | 22.3 | 74.3 |
| Percent Completed | 0.0 | 0.0 | 23.1 | 5.7 | 72.3 | 16.6 | 41.8 | 21.7 |
| From Local System | | | | | | | | |
| Planned (miles) | 20.0 | 86.4 | 29.5 | 37.3 | 59.2 | 53.9 | 78.6 | 364.9 |
| Completed (miles) | 0.0 | 9.0 | 1.5 | 0.1 | 0.0 | 0.0 | 20.5 | 31.1 |
| Percent Completed | 0.0 | 10.4 | 5.1 | 0.3 | 0.0 | 0.0 | 26.1 | 8.5 |
| Total | | | | | | | | |
| Planned (miles) | 56.7 | 141.1 | 115.9 | 74.0 | 89.5 | 100.8 | 132.0 | 708.0 |
| Completed (miles) | 0.0 | 9.0 | 21.5 | 2.4 | 21.9 | 7.8 | 42.8 | 105.4 |
| Percent Completed | 0.0 | 6.4 | 18.6 | 3.2 | 24.5 | 7.7 | 32.4 | 14.9 |
| Transfers to Local Arterial System | | | | | | | | |
| From State Trunk System | | | | | | | | |
| Planned (miles) | 0.0 | 12.8 | 0.0 | 4.4 | 1.2 | 8.7 | 18.5 | 45.6 |
| Completed (miles) | 0.0 | 6.5 | 0.0 | 1.5 | 0.6 | 4.9 | 18.5 | 32.0 |
| Percent Completed | - - | 50.8 | - - | 10.0 | 50.0 | 56.3 | 100.0 | 56.9 |
| From County Trunk System | | | | | | | | |
| Planned (miles) | 13.0 | 15.1 | 2.9 | 11.3 | 1.0 | 5.4 | 91.6 | 140.3 |
| Completed (miles) | 0.0 | 3.2 | 2.1 | 2.5 | 0.0 | 0.0 | 88.6 | 96.4 |
| Percent Completed | 0.0 | 21.2 | 72.4 | 22.1 | 0.0 | 0.0 | 96.7 | 68.7 |
| Total | | | | | | | | |
| Planned (miles) | 13.0 | 27.9 | 2.9 | 15.7 | 2.2 | 14.1 | 110.1 | 185.9 |
| Completed (miles) | 0.0 | 9.7 | 2.1 | 4.0 | 0.6 | 4.9 | 107.1 | 128.4 |
| Percent Completed | 0.0 | 34.8 | 72.4 | 25.5 | 27.3 | 34.6 | 97.3 | 69.1 |
| Transfers to Local Nonarterial System | | | | | | | | |
| From State Trunk System | | | | | | | | |
| Planned (miles) | 0.0 | 1.1 | 0.0 | 2.1 | 9.0 | 3.7 | 4.1 | 20.0 |
| Completed (miles) | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.4 | 1.6 |
| Percent Completed | - - | 0.0 | - - | 0.0 | 6.7 | 16.2 | 9.8 | 8.0 |
| From County Trunk System | | | | | | | | |
| Planned (miles) | 97.2 | 3.3 | 13.7 | 21.4 | 26.6 | 52.8 | 134.5 | 349.5 |
| Completed (miles) | 0.0 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 78.5 | 81.0 |
| Percent Completed | 0.0 | 0.0 | 0.0 | 11.7 | 0.0 | 0.0 | 58.4 | 23.2 |
| Total | | | | | | | | |
| Planned (miles) | 97.2 | 4.4 | 13.7 | 23.5 | 35.6 | 56.5 | 138.6 | 369.5 |
| Completed (miles) | 0.0 | 0.0 | 0.0 | 2.5 | 0.6 | 0.6 | 78.9 | 82.6 |
| Percent Completed | 0.0 | 0.0 | 0.0 | 10.6 | 1.7 | 1.1 | 56.9 | 22.4 |

*Source: SEWRPC.*

Map 12

**IMPLEMENTATION STATUS OF THE PLANNED JURISDICTIONAL HIGHWAY SYSTEM CHANGES AS SET FORTH IN THE ADOPTED DESIGN YEAR 2000 REGIONAL TRANSPORTATION SYSTEM PLAN: 1991**




On the basis of the year 2000 regional transportation plan schedules, about one-half of planned jurisdictional transfers should have been completed by 1990. By 1990, nearly 48 arterial miles, or 39 percent of planned miles, had been transferred to the State trunk system; about 105 miles, or 15 percent of planned miles, had been transferred to the county trunk system; about 128 arterial miles, or 69 percent of planned miles, had been transferred to the local arterial system; and approximately 83 miles, or 22 percent of planned miles, had been transferred to the local nonarterial system from the State or county trunk systems.



*Source: SEWRPC.*

1. Of the approximately 123 miles to be transferred to the State trunk system from the county trunk system and the local arterial system nearly 48 miles, or 39 percent, have been completed.

2. Of the approximately 708 miles to be transferred to the county trunk system from the State trunk system and the local arterial system 105 miles, or 15 percent, have been completed.

3. Of the approximately 186 miles to be transferred to the local arterial system from the State trunk system and the county trunk system 128 miles, or 69 percent, have been completed.

4. Of the approximately 370 miles to be transferred to the local nonarterial system from the State trunk system and the county truck system nearly 83 miles, or 22 percent, have been completed.

Functional Improvements: Progress, as of 1991, toward implementing the functional improvements to the arterial street and highway system as recommended in the adopted year 2000 plan is summarized by jurisdictional system and by county in Table 24 and shown on Map 13.

As already noted, system preservation is defined in the adopted regional transportation system plan as the resurfacing and reconstruction, for the same capacity, necessary to maintain existing arterial street and highways. The regional plan envisioned that by the year 2000 system preservation work would be completed on about 2,941 miles of the arterial street and highway system. As of 1991, work on 706 miles, or nearly 24 percent of the miles planned for system preservation, had actually been completed. The greatest implementation of system preservation within the Region, in both relative terms and in absolute miles, has been accomplished on the State trunk highways. System preservation work on nearly 44 percent of the 844 miles of State trunk highways planned for such work had been completed by 1991. This progress can be compared with about 16 percent of the 1,473 miles of county trunk highways, and about 15 percent of the approximately 624 miles of local arterials planned for system preservation.

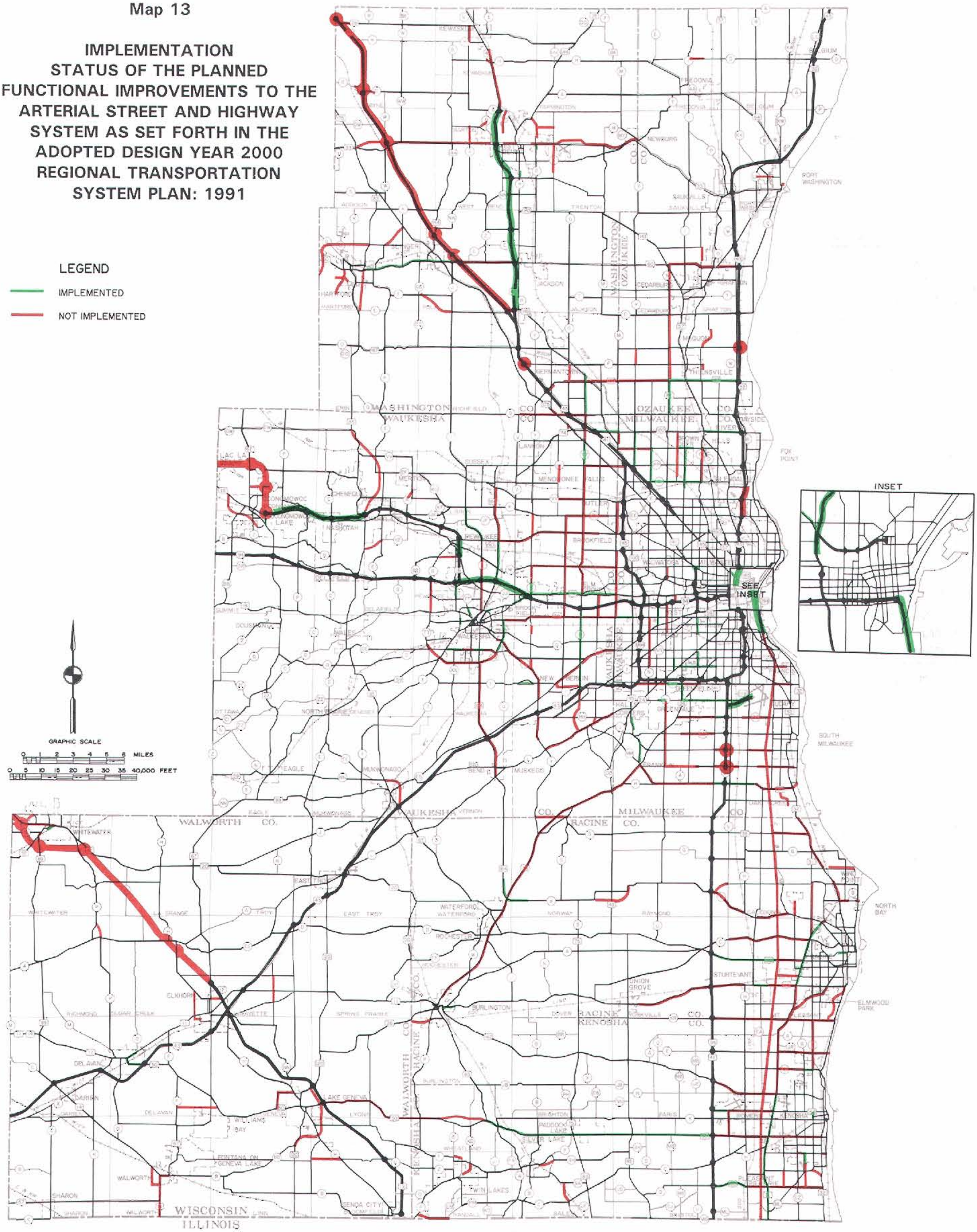
As already noted, system improvement is defined in the adopted regional transportation system plan as the widening of existing arterial streets and highways to provide additional traffic capacity. The plan envisioned that by the year 2000 system improvement work would have been completed on about 401 miles of the arterial streets and highways within the Region. As of 1991, work on 123 miles, or nearly 31 percent of the miles planned to be widened for added capacity, had been completed. Among the jurisdictional categories, the greatest relative implementation of system improvement occurred on local arterials as local governments, especially the City of Milwaukee, addressed the need to reconstruct arterial streets to improved rather than existing capacities. By 1991, system improvement work on about 52 percent of the planned local arterials had been completed while work on nearly 36 percent of the planned county trunk highways and about 25 percent of the planned State trunk highways had been completed.

As already noted, system expansion is defined in the adopted regional transportation system plan as the construction of new arterial streets and highways. The plan envisioned that by the year 2000, 236 miles of new roadway would have been added to the regional arterial street and highway system. As of 1991, construction of 69 miles, or 29 percent of the planned new miles, had been completed. The bulk of system expansion occurred at the State jurisdictional level. Indeed, nearly 93 percent of all new arterial mileage was jurisdictionally classified as State trunk highway. By 1991, 64 miles, or about 42 percent, of the planned State trunk additions were in place, compared with 6 percent of the planned county trunk miles and about 6 percent of the planned local arterial miles.

Of the 64 miles of new State highways constructed between 1978 and 1991, almost 13 miles consisted of the addition to USH 45, the West Bend freeway. Table 25 shows the implementation status of planned freeway expansions in the Region. Since the adoption of the second-generation regional transportation system plan, the planned West Bend freeway expansion, as well as the stub-end treatments of the Lake Freeway-North, the Park Freeway-East, the Stadium Freeway-North, the Park Freeway-West, and the Stadium Freeway-South, have all been completed. Construction of the Lake Arterial from the south end of the Daniel Hoan Memorial Bridge to E. Layton Avenue is currently under way.

Map 13

**IMPLEMENTATION STATUS OF THE PLANNED FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM AS SET FORTH IN THE ADOPTED DESIGN YEAR 2000 REGIONAL TRANSPORTATION SYSTEM PLAN: 1991**




The regional plan envisioned that by the year 2000 system preservation work would be completed on about 2,941 miles of the arterial street and highway system. As of 1990, work on 706 miles, or nearly 24 percent of the miles planned for system preservation, had been completed. The plan also envisioned that by the year 2000 system improvement work would have been completed on about 401 miles of the arterial street and highway system. As of 1990, work on 123 miles, or nearly 31 percent of the miles planned for system improvement, had been completed. Finally, the plan envisioned that by the year 2000 some 236 miles of new roadway would have been added to the regional arterial street and highway system. As of 1990, construction of 69 miles, or 29 percent, of the planned new miles had been completed. According to plan schedules, work on about one-half of the miles planned for system improvement and expansion should have been completed by 1990. However, systemwide monitoring has shown that work on only 29 percent of the miles planned for system improvement and system expansion had been completed, while work on only 25 percent of the miles planned for system preservation had been completed.



*Source: SEWRPC.*

Table 24

**IMPLEMENTATION STATUS OF PLANNED FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM AS SET FORTH IN THE DESIGN YEAR 2000 PLAN:[a] 1991**

| | System Preservation | | | | | |
|---|---|---|---|---|---|---|
| | State Trunk Highways[b] | | | County Trunk Highways | | |
| County | Planned Miles | Implemented Miles | Percent | Planned Miles | Implemented Miles | Percent |
| Kenosha | 58.6 | 13.0 | 22.2 | 165.0 | 36.5 | 22.1 |
| Milwaukee | 200.6 | 99.4 | 49.6 | 158.2 | 68.1 | 43.0 |
| Ozaukee | 49.2 | 32.1 | 65.2 | 163.7 | 29.2 | 17.8 |
| Racine | 125.6 | 37.8 | 30.2 | 149.5 | 30.5 | 20.4 |
| Walworth | 162.5 | 82.8 | 51.0 | 235.8 | 26.6 | 11.3 |
| Washington | 90.5 | 20.9 | 20.2 | 224.1 | 26.2 | 11.7 |
| Waukesha | 157.1 | 86.9 | 55.3 | 377.0 | 21.4 | 5.7 |
| Region | 844.1 | 372.9 | 44.2 | 1,473.3 | 238.4 | 16.2 |

| | System Preservation | | | | | |
|---|---|---|---|---|---|---|
| | Local Arterials | | | Total | | |
| County | Planned Miles | Implemented Miles | Percent | Planned Miles | Implemented Miles | Percent |
| Kenosha | 37.9 | 3.0 | 7.9 | 261.5 | 52.4 | 20.0 |
| Milwaukee | 300.5 | 67.6 | 22.5 | 659.3 | 235.1 | 35.7 |
| Ozaukee | 48.0 | 3.2 | 6.7 | 260.9 | 64.5 | 24.7 |
| Racine | 67.3 | 5.7 | 8.5 | 342.4 | 75.8 | 22.1 |
| Walworth | 5.0 | 0.6 | 12.0 | 403.3 | 110.0 | 27.3 |
| Washington | 66.5 | 5.4 | 8.1 | 381.1 | 52.4 | 13.7 |
| Waukesha | 98.8 | 7.3 | 7.4 | 632.9 | 115.6 | 18.3 |
| Region | 624.0 | 92.8 | 14.9 | 2,941.4 | 705.9 | 24.0 |

| | System Improvement | | | | | |
|---|---|---|---|---|---|---|
| | State Trunk Highways[b] | | | County Trunk Highways | | |
| County | Planned Miles | Implemented Miles | Percent | Planned Miles | Implemented Miles | Percent |
| Kenosha | 36.9 | 13.5 | 36.6 | 26.0 | 12.3 | 47.3 |
| Milwaukee | 31.1 | 9.3 | 29.9 | 33.8 | 10.1 | 29.9 |
| Ozaukee | 21.4 | 5.8 | 27.1 | 2.0 | 0.0 | 0.0 |
| Racine | 36.8 | 8.3 | 22.6 | 16.0 | 2.2 | 13.8 |
| Walworth | 13.7 | 1.3 | 9.5 | 4.6 | 0.3 | 6.5 |
| Washington | 48.2 | 0.0 | 0.0 | 4.4 | 0.5 | 11.4 |
| Waukesha | 49.0 | 19.9 | 40.6 | 36.4 | 18.7 | 51.4 |
| Region | 237.1 | 58.1 | 24.5 | 123.2 | 44.1 | 35.8 |

| | System Improvement | | | | | |
|---|---|---|---|---|---|---|
| | Local Arterials | | | Total | | |
| County | Planned Miles | Implemented Miles | Percent | Planned Miles | Implemented Miles | Percent |
| Kenosha | 2.4 | 1.5 | 62.5 | 65.3 | 27.3 | 41.8 |
| Milwaukee | 23.5 | 15.5 | 66.0 | 88.4 | 34.9 | 39.5 |
| Ozaukee | 0.0 | 0.0 | 0.0 | 23.4 | 5.8 | 24.8 |
| Racine | 6.6 | 0.9 | 13.6 | 59.4 | 11.4 | 19.2 |
| Walworth | 0.4 | 0.2 | 50.0 | 18.7 | 1.8 | 9.6 |
| Washington | 0.3 | 0.3 | 100.0 | 52.9 | 0.8 | 1.5 |
| Waukesha | 7.2 | 2.6 | 36.1 | 92.6 | 41.2 | 44.5 |
| Region | 40.4 | 21.0 | 52.0 | 400.7 | 123.2 | 30.7 |

Table 24 (continued)

| County | System Expansion | | | | | |
|---|---|---|---|---|---|---|
| | State Trunk Highways[b] | | | County Trunk Highways | | |
| | Planned Miles | Implemented Miles | Percent | Planned Miles | Implemented Miles | Percent |
| Kenosha . . . . . . . . . . . | 16.7 | 0.0 | 0.0 | 7.5 | 2.0 | 26.7 |
| Milwaukee . . . . . . . . . | 15.3 | 4.3 | 28.1 | 3.0 | 0.0 | 0.0 |
| Ozaukee . . . . . . . . . . . | 18.9 | 18.9 | 100.0 | 0.0 | 0.0 | 0.0 |
| Racine . . . . . . . . . . . . | 16.4 | 1.2 | 7.3 | 7.7 | 0.4 | 5.2 |
| Walworth . . . . . . . . . . | 48.0 | 26.7 | 55.6 | 3.9 | 0.0 | 0.0 |
| Washington . . . . . . . . . | 19.9 | 13.1 | 65.8 | 11.2 | 0.4 | 3.6 |
| Waukesha . . . . . . . . . . | 17.2 | 0.0 | 0.0 | 12.5 | 0.1 | 0.8 |
| Region | 152.4 | 64.2 | 42.1 | 45.8 | 2.9 | 6.3 |

| County | System Expansion | | | | | |
|---|---|---|---|---|---|---|
| | Local Arterials | | | Total | | |
| | Planned Miles | Implemented Miles | Percent | Planned Miles | Implemented Miles | Percent |
| Kenosha . . . . . . . . . . . | 3.7 | 0.0 | 0.0 | 27.9 | 2.0 | 7.2 |
| Milwaukee . . . . . . . . . | 5.0 | 1.4 | 28.0 | 23.3 | 5.7 | 24.5 |
| Ozaukee . . . . . . . . . . . | 4.0 | 0.7 | 17.5 | 22.9 | 19.6 | 85.6 |
| Racine . . . . . . . . . . . . | 5.1 | 0.0 | 0.0 | 29.2 | 1.6 | 5.5 |
| Walworth . . . . . . . . . . | 9.3 | 0.0 | 0.0 | 61.2 | 26.7 | 43.6 |
| Washington . . . . . . . . . | 9.3 | 0.2 | 2.2 | 40.4 | 13.7 | 33.9 |
| Waukesha . . . . . . . . . . | 1.7 | 0.0 | 0.0 | 31.4 | 0.1 | 0.3 |
| Region | 38.1 | 2.3 | 6.0 | 236.3 | 69.4 | 29.4 |

[a]*Adopted Year 2000 Regional Transportation System Plan, as amended by the removal of the Stadium Freeway-South, Lake Freeway-North, Park Freeway-East, and by the substitution of the Lake Arterial for the Lake Freeway-South; and prior to its amendment by the following: Amendment to the Walworth County Jurisdictional Highway System Plan—2010, March 1992; Amendment to the Ozaukee County Jurisdictional Highway System Plan—2010, January 1993; Amendment to the Racine County Jurisdictional Highway System Plan—2000 (Recommendations for the proposed City of Burlington Bypass—2010), December 1990; SEWRPC Community Assistance Planning Report No. 200, A Land Use and Transportation System Development Plan for the IH 94 South Freeway Corridor, Kenosha, Milwaukee, and Racine Counties, January 1992; SEWRPC Community Assistance Planning Report No. 151, A Transportation System Plan for the Blue Mound Road (USH 18) Corridor, December 1987.*

[b]*State trunk highways include both freeways and arterials.*

*Source: SEWRPC.*

Significant variation has occurred among the counties in the implementation of the planned functional improvements to the arterial street and highway system, as shown in Table 24. With respect to system preservation, the greatest degree of implementation occurred in Milwaukee County, where work on 235 miles, or about 36 percent, of the planned miles had been completed. The least degree of implementation of system preservation occurred in Washington County, where work on 52 miles, or 14 percent, of the planned miles had been completed. With regard to system improvement, the greatest implementation, in terms of miles completed, occurred in Waukesha County, where work on 41 miles was completed. In terms of percent completed, in Kenosha County, work on 42 percent of the planned 65 miles had been completed. The poorest record of implementation of system improvement occurred in Washington County, where work on less than one mile of the 53 planned miles had been completed. With respect to system expansion, the greatest degree of implementation, in terms of miles completed,

Table 25

**IMPLEMENTATION STATUS OF PLANNED FREEWAYS IN THE REGION: 1978-1991**

| Freeway Facility | Planned 1978 (miles) | Constructed 1991 (miles) |
|---|---|---|
| USH 12 . . . . . . . . . . . | 17.0 | 0.0 |
| STH 16 . . . . . . . . . . . | 5.4 | 0.0 |
| USH 41 . . . . . . . . . . . | 21.0 | 0.0 |
| USH 45-West Bend . . . | 12.7 | 12.7 |
| Total | 56.1 | 12.7 |

*Source: SEWRPC.*

Table 26

**SUMMARY IMPLEMENTATION STATUS OF TOTAL PLANNED FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM: 1991**

| County | Entire Arterial Street and Highway System | | |
|---|---|---|---|
| | | Implemented | |
| | Planned Miles | Miles | Percent |
| Kenosha . . . . . | 354.7 | 81.7 | 23.0 |
| Milwaukee . . . | 771.0 | 275.7 | 35.8 |
| Ozaukee . . . . . | 307.2 | 89.9 | 29.3 |
| Racine . . . . . . | 431.0 | 88.8 | 20.6 |
| Walworth . . . . | 483.2 | 138.5 | 28.7 |
| Washington . . . | 474.4 | 66.9 | 14.1 |
| Waukesha . . . . | 756.9 | 156.9 | 20.7 |
| Region | 3,578.4 | 898.4 | 25.1 |

*Source: SEWRPC.*

occurred in Walworth County, where about 27 miles were added to the arterial system. In terms of percent completed, in Ozaukee County nearly 86 percent of the 23 planned miles were added to the arterial system. The poorest implementation of system expansion occurred in Waukesha County, where less than one mile of the approximately 31 planned miles had been added to the arterial system as recommended in the adopted plan.

In summary, the pace of functionally improving the arterial street and highway system has fallen behind schedule. Indeed, on the basis of plan schedules, work on about one-half of the miles planned for system improvement and expansion should have been completed by 1990. However, systemwide monitoring indicated that work on only about 30 percent of the miles planned for system improvement and system expansion, those functional improvements designed to add capacity to the arterial street and highway system, had been completed. With respect to system preservation, work on only 24 percent of the planned miles had been completed by 1991. A summary of the implementation of the combined functional improvements occurring in each county, is shown in Table 26. By 1991, work on only one in four miles in the Region planned for functional improvement had been completed.

Public Transit

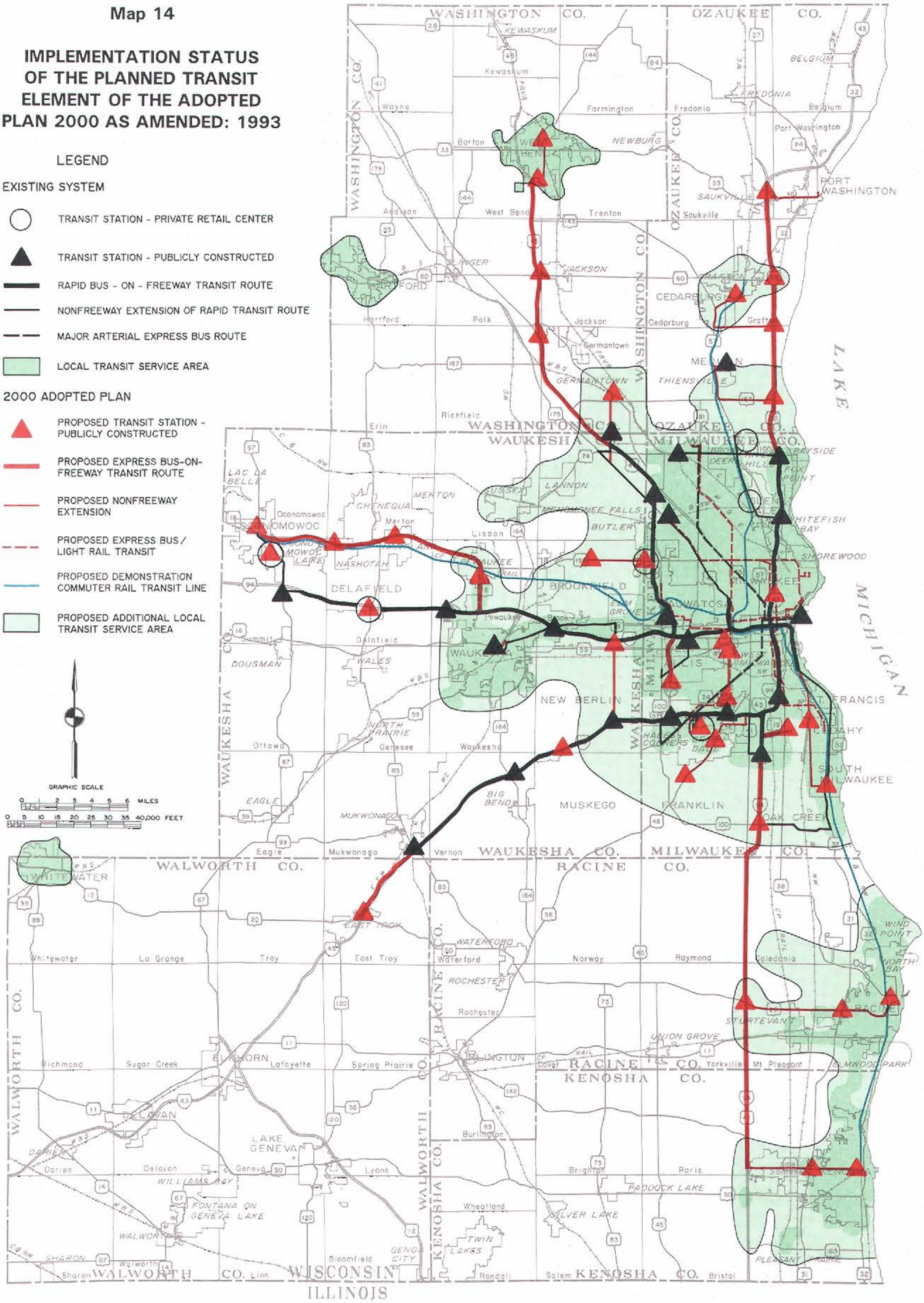
Overall, the adopted plan envisioned a significantly expanded and improved transit system. In particular, it was envisioned that the rapid transit element would serve a wide variety of trips and provide a competitive and attractive alternative to the automobile. By 1991, the number of vehicle-miles of transit service provided had not increased over the 1972 levels; and the average speed of a transit trip had remained about the same as in 1972. In part for these reasons, the increase in transit use envisioned in the plan has not been achieved. Indeed, transit use has declined from about 4 percent of all trip making in the Region in 1972 to 3 percent in 1991. The implementation status of the transit recommendations is shown in graphic summary form on Map 14 and is described below.

As already noted, the proposal to provide "light" rail rapid transit in the northwest corridor of Milwaukee County was evaluated in depth in the 1988 alternative analysis conducted by the Commission for Milwaukee County. This study resulted in a decision by the Milwaukee County Board and County Executive that a high level of transit service in this corridor be provided initially, not by "light" rail, but by express bus. Milwaukee County, with Federal financial assistance, implemented the express bus service, called "Metrolink," in 1992.

Although no action has been taken to implement the commuter rail recommendation contained in the adopted plan, significant steps have been taken to implement the express bus on freeway recommendations. Express bus service over freeways is currently provided by 15 routes operating over a total of about 519 round-trip route miles. Of the existing routes, 14 routes

Map 14

## IMPLEMENTATION STATUS OF THE PLANNED TRANSIT ELEMENT OF THE ADOPTED PLAN 2000 AS AMENDED: 1993




In total, the adopted plan recommended that public transit serve an aggregate area of 500 square miles and about 75 percent of the regional population. Significant steps have been taken to implement the freeway flyer rapid transit bus service. The plan recommended the operation of 24 freeway flyer routes and the provision of 56 public transit stations. Freeway flyer rapid transit is currently provided over 15 routes and serves 25 transit stations. In addition, since the adoption of the year 2000 plan, local public transit service has been extended within the Milwaukee, Racine, and Kenosha urbanized areas and shared-ride taxicab service has been provided in the urban areas of Whitewater, Hartford, and West Bend. Currently, public transit service is provided to an aggregate area of about 225 square miles and about 69 percent of the total resident population of the Region.

Source: SEWRPC.

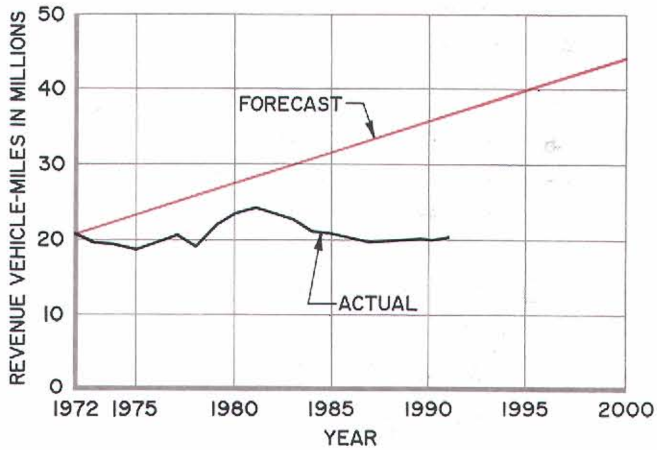
operating over a total of about 492 round-trip route miles have been implemented in accordance with plan recommendations. The remaining existing route has been implemented to provide special service for the University of Wisconsin-Milwaukee. All the express bus routes currently in operation, with the exception of one route in Milwaukee County, provide service only during weekday peak periods. The exception operates between the Northridge Shopping Center and the Milwaukee central business district over W. Brown Deer Road and IH 43 and provides service from about 5:30 a.m. until 7:00 p.m. each weekday.

The 15 existing routes serve 25 transit stations within Milwaukee and Waukesha Counties. A total of 19 of the stations served, including 17 with park-ride lots and two without parking lots, have been publicly constructed. Of these 19 publicly constructed transit stations, 16 have been located essentially as proposed by the express bus-on-freeway element of the plan. Two stations, Northridge and Timmerman Field, were envisioned under the adopted plan to be served ultimately by "light" rail transit, but are currently being served by an express bus route. The USH 41 and Pilgrim Road public transit station has been developed outside plan recommendations to meet current needs. The remaining six of the 25 existing stations served include four at privately owned retail establishments located close to where public facilities were proposed under the plan, three at private shopping center lots with parking and one at a retail store without parking. The remaining two stations served are in private shopping center lots at locations which do not correspond to any proposed station locations under the plan. In addition to the 19 public transit stations which are currently served by express bus service, two public transit stations which are not currently being served by any express bus routes have also been constructed at locations recommended under the plan, USH 45 and Good Hope Road and MATC in Mequon, and are currently being utilized as carpool parking facilities.

Since adoption of the system plan, local public transit service has continued to be provided and extended within the Milwaukee, Racine, and Kenosha urbanized areas. In addition, public transit in the form of shared-ride taxicab service has been provided in three smaller urban areas of the Region, Whitewater, Hartford, and West Bend. Public transit service is now provided to an aggregate of about 225 square miles, or about 8 percent of the total area of the Region, and to about 69 percent of the total resident population of the Region.

Figure 11

**ACTUAL AND FORECAST ANNUAL REVENUE VEHICLE-MILES OF PUBLIC TRANSIT SERVICE IN THE REGION: 1972-2000**




*Source: SEWRPC.*

An important quantitative measure of the degree of transit plan implementation is the level of vehicle-miles of transit service provided. The plan envisioned that by 1991 transit operators in the Region would together increase the number of vehicle-miles of service by about 77 percent, from about 20 million in 1972 to nearly 36 million vehicle-miles in 1991. As shown in Table 27 and Figure 11, the actual level of revenue vehicle-miles provided remained relatively stable. Thus, the actual 1991 level was below the planned level by about 43 percent. The provision of vehicle-miles of service peaked in 1981 at a level of about 24 million.

The plan also envisioned that by the year 2000 the public transit fleet would consist of over 1,100 vehicles operating over about 2,296 round-trip route miles. The operating characteristics of public transit service provided within each urbanized area in the Region are set forth in Table 28. In 1972, the base year for the adopted plan, the transit fleet consisted of a total of 565 buses operating over 1,201 round-trip route miles. As of 1991, the public transit fleet consisted of 662 buses operating over 2,066 round-

Table 27

ACTUAL AND FORECAST ANNUAL REVENUE VEHICLE-MILES OF PUBLIC TRANSIT SERVICE IN THE REGION BY URBANIZED AREA: 1972 AND 1991

| Urbanized Area | Existing 1972 (millions) | Forecast 1991 (millions) | | Actual 1991 (millions)[a] | | Difference between Actual and Forecast 1991 Annual Revenue Vehicle-Miles | |
|---|---|---|---|---|---|---|---|
| | | Change 1972-1991 | Total | Change 1972-1991 | Total | Number (millions) | Percent |
| Kenosha | 0.3 | 1.5 | 1.8 | 0.4 | 0.7 | -1.1 | -59.1 |
| Milwaukee | 19.4 | 12.8 | 32.2 | -1.1 | 18.3 | -13.9 | -43.2 |
| Racine | 0.5 | 1.4 | 1.8 | 0.8 | 1.3 | -0.6 | -31.1 |
| Region | 20.2 | 15.6 | 35.8 | 0.1 | 20.3 | -15.5 | -43.3 |

[a]*Excludes service on shared-ride taxicab systems outside the three urbanized areas within the Region.*

*Source: SEWRPC.*

Table 28

OPERATING CHARACTERISTICS OF PUBLIC FIXED-ROUTE TRANSIT SERVICE IN THE REGION BY URBANIZED AREA: 1972, 1991, AND YEAR 2000 ADOPTED PLAN

| Transit Service Characteristic | Kenosha Urbanized Area | | | Milwaukee Urbanized Area | | | Racine Urbanized Area | | | Total Region | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing 1972 | Existing 1991 | Planned 2000 | Existing 1972 | Existing 1991 | Planned 2000 | Existing 1972 | Existing 1991 | Planned 2000 | Existing 1972 | Existing 1991 | Planned 2000 |
| Round-Trip Route Miles | 59 | 171 | 147 | 1,061 | 1,954 | 2,641 | 81 | 171 | 153 | 1,201 | 2,296 | 2,941 |
| Peak-Period Vehicle Requirements | | | | | | | | | | | | |
| Buses | 12 | 28 | 42 | 442 | 471 | 872 | 10 | 31 | 38 | 464 | 530 | 952 |
| Light Rail | - - | - - | - - | - - | - - | 24 | - - | - - | - - | - - | - - | 24 |
| Commuter Rail | - - | - - | - - | - - | - - | 27 | - - | - - | - - | - - | - - | 27 |
| Subtotal | 12 | 28 | 42 | 442 | 471 | 923 | 10 | 31 | 38 | 464 | 530 | 1,003 |
| Total Fleet (including spares) | 18 | 35 | 46 | 533 | 585 | 1,016 | 14 | 42 | 42 | 565 | 662 | 1,104 |

*Source: SEWRPC.*

trip miles. As shown in Table 28, substantial progress has been made in the provision of round-trip route miles of service.

Transportation System Management

The recommended transportation system management element has been only modestly implemented since the plan was adopted and substantial implementation actions related to freeway traffic management remain to be accomplished. The recommended freeway traffic management system for the Milwaukee area is intended to furnish freeway users with information concerning traffic conditions with the potential of interrupting traffic flow and to provide for freeway operational control. Recommendations regarding the provision of such advisory information and incident management measures remain to be implemented.

The operational control element of the freeway management system is intended to regulate and monitor freeway access during peak-period travel hours and thereby reduce freeway traffic congestion, improve traffic flow, and facilitate the movement of transit and other high-occupancy vehicles. The Wisconsin Department of Transportation has recently begun the installation of additional freeway on-ramp metering equipment and the replacement of old on-ramp meter controllers with equipment utilizing microprocessor-based equipment. The upgraded equipment has the capability to store traffic-related data in support of systemwide freeway management. Currently 26 on-ramp meters are in place at various freeway access points in the Milwaukee area, 18 of which utilize this updated technology. However, the number and extent of the meters is currently insufficient to permit control of freeway conditions systemwide. The adopted plan also called for the exclusive bypass of such on-ramps meters for busses and other high-occupancy vehicles. Currently, buses are granted preferential access to the freeway system at four on-ramp locations and exclusive access at two locations.

With respect to carpool facilities and promotion, significant progress has been made in the provision of carpool parking facilities throughout the Region. However the envisioned utilization of the facilities, as discussed in Chapter IV, and of car and van pooling has not been achieved. The adopted year 2000 plan recommended the provision of off-street carpool parking facilities at key freeway interchanges as demand warranted. There were six such facilities in 1978 and in 1991 there were 18 (see Map 15). Three of 12 new lots are located at interchanges specifically suggested in the year 2000 plan: STH 60 and CTH P; USH 41 and CTH Y; and STH 16 and CTH C.

A continuing program of providing computer matching of commuters interested in carpooling is also in place. However, the recommended program to market carpooling aggressively to area commuters and employers and to encourage the provision of preferential parking to carpool participants has not operated since 1981.

With respect to the recommended parking measures, action has been taken only recently by the City of Milwaukee to study some of the recommendations, including a change in the parking rate structure to discourage long-term parking, and adjusting the supply of parking in downtown Milwaukee. From 1968 to 1988, contrary to plan recommendations, the parking supply in downtown Milwaukee increased by approximately 34 percent, from 35,300 spaces to 47,200 spaces, substantially faster than the increase in employment in downtown Milwaukee. The percentage of total travel to, from, and within downtown Milwaukee by public transit is estimated to have declined over that same 20-year period from approximately 25 percent to 15 percent.

## PLAN EVALUATION: FORECAST AND ACTUAL TRIP MAKING LEVELS

The surveillance activities undertaken by the Commission with respect to the travel forecasts used in the design of the adopted regional transportation system plan revealed the following.

### Internal Person Trips

The term "internal person trips" is defined by the Commission as the total number of trips made by any transportation mode within the Region on an average weekday. Internal person trips thus includes trips made as a passenger in a personal vehicle. The forecast is derived in the first step of the regional traffic simulation procedure, trip generation, through the quantification of relationships between land use and transportation. The forecast variables evaluated include population, households, employment, land use distribution, and automobile availability. These were used as inputs in this modeling procedure.

The forecast of internal person trips in the Region underlying the regional transportation plan had envisioned an increase in the number of internal person trips of about 20 percent by 1991 as shown in Table 29 and Figure 12. By 1991, the number of internal person trips had risen by about one million trips, or 23 percent, over the 1972 base level. Thus, at the regional level, the actual number of internal person trips exceeded the forecast level by about 155,000 trips, or by about 3 percent.

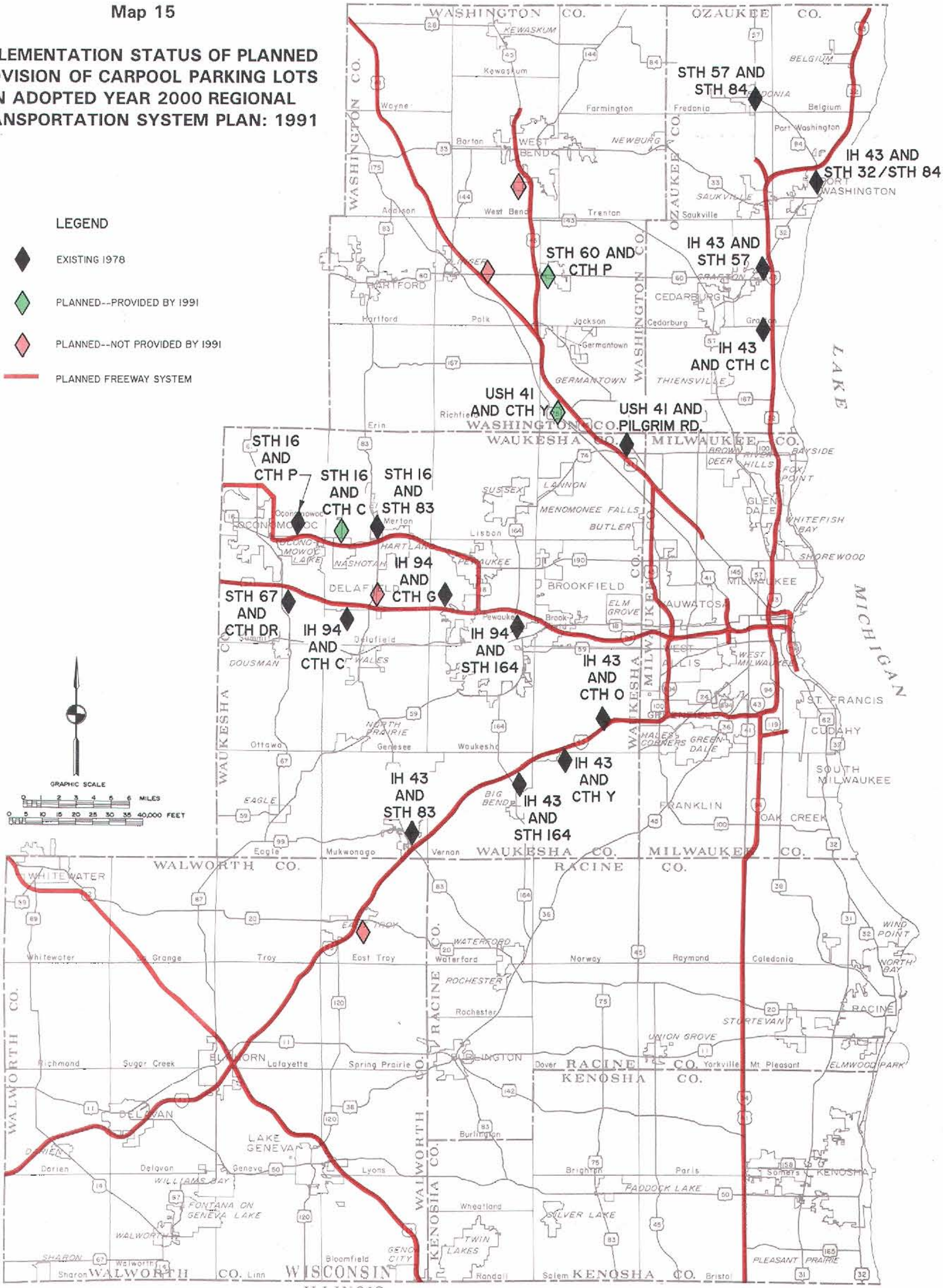
### Internal Vehicle Trips

The term "internal vehicle trips" is defined by the Commission as the total number of vehicle trips made on an average weekday within the Region. The forecast level is derived in the third step of the traffic simulation procedure, modal choice, in which the total number of person trips, forecast in the trip generation step, is divided among the travel modes. Variables affecting the forecast of internal vehicle trips include, in addition to those affecting internal person trips, in-vehicle travel time, out-of-vehicle travel times, and cost differences between the automobile and transit modes.

The forecast of internal vehicle trips underlying the regional transportation system plan had envisioned an increase of 596,700 trips, or about 21 percent, by 1991, as shown in Table 29 and Figure 13. By 1991, the actual level of internal

## Map 15

### IMPLEMENTATION STATUS OF PLANNED PROVISION OF CARPOOL PARKING LOTS IN ADOPTED YEAR 2000 REGIONAL TRANSPORTATION SYSTEM PLAN: 1991




Significant progress has been made in the provision of carpool parking facilities throughout the Region. The adopted year 2000 plan called for the provision of such parking lots at key freeway interchanges as demand for ride-sharing warranted and identified six specific locations. There were six carpool parking facilities in place when the plan was adopted in 1978; currently there are 18. Three of the 12 new lots are located at interchanges specially identified in the adopted plan: STH 60 and CTH P, USH 41 and CTH Y, and STH 16 and CTH C.

*Source: SEWRPC.*

Table 29

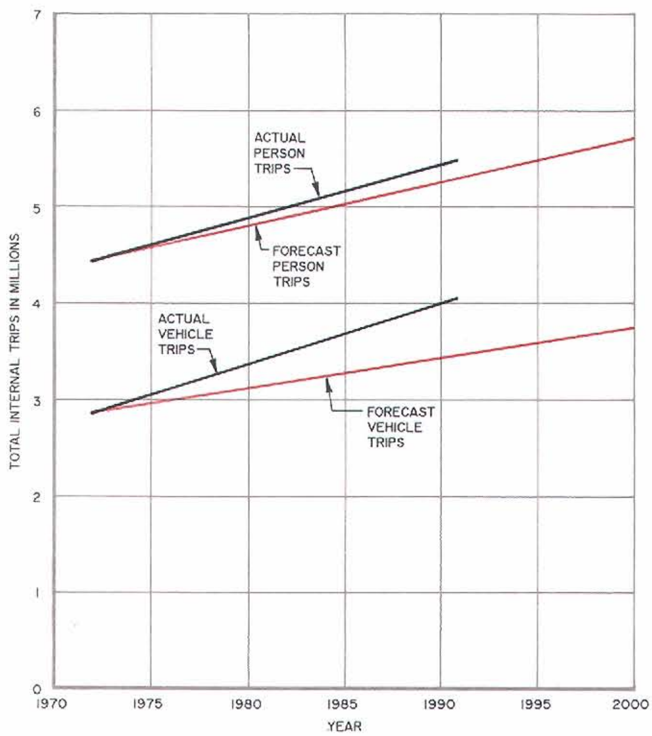
ACTUAL AND FORECAST INTERNAL PERSON TRIPS, VEHICLE TRIPS, AND VEHICLE MILES OF TRAVEL IN THE REGION: 1972 AND 1991

| Internal Trips | 1972 | Forecast 1991 Change 1972-1991 Number | Forecast 1991 Change 1972-1991 Percent | Forecast 1991 Total Number | Actual 1991 Change 1972-1991 Number | Actual 1991 Change 1972-1991 Percent | Actual 1991 Total Number | Difference between Actual and Forecast 1991 Internal Trips Number | Difference between Actual and Forecast 1991 Internal Trips Percent |
|---|---|---|---|---|---|---|---|---|---|
| Person Trips | 4,460,400 | 875,700 | 20 | 5,336,100 | 1,031,000 | 23 | 5,491,400 | 155,300 | 3 |
| Vehicle Trips | 2,884,700 | 596,700 | 21 | 3,481,400 | 1,176,100 | 40 | 4,060,800 | 579,400 | 17 |
| Vehicle Miles of Travel | 20,124,000 | 6,876,000 | 34 | 27,000,000 | 12,948,000 | 64 | 33,072,000 | 6,072,000 | 23 |

*Source: SEWRPC.*

Figure 12

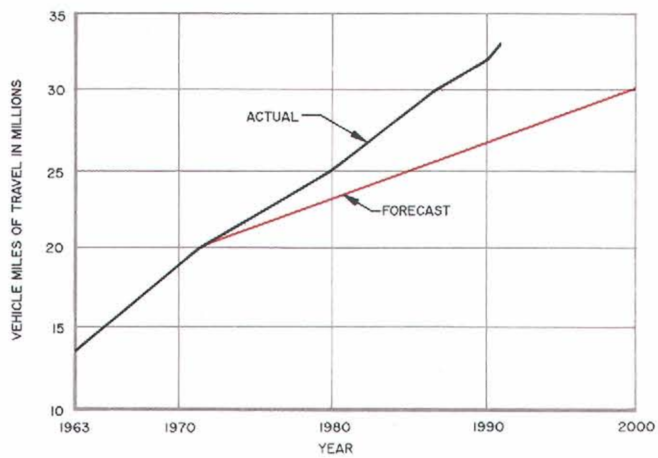
ACTUAL AND FORECAST AVERAGE WEEKDAY INTERNAL PERSON AND VEHICLE TRIPS IN THE REGION: 1972-2000




*Source: SEWRPC.*

Figure 13

ACTUAL AND FORECAST AVERAGE WEEKDAY VEHICLE MILES OF ARTERIAL TRAVEL IN THE REGION: 1963-2000




*Source: SEWRPC.*

vehicle trips had increased by 1.2 million, or about 40 percent, over the 1972 level. Therefore, at the regional level, the actual number of internal vehicle trips exceeded the forecast level by nearly 17 percent.

Vehicle Miles of Travel (VMT)

"Vehicle miles of travel" is an estimate of the total miles driven on the arterial streets and highways within the Region on an average weekday. The forecast of VMT is an output of the last step of the traffic simulation procedure, traffic assignment, in which total forecast vehicle trips are assigned to both existing and proposed arterial streets and highways and the resulting mileage calculated. Travel times between transportation analysis zones for both automobile and public transit travel directly affect the forecast of VMT.

The forecast of VMT underlying the regional transportation system plan had envisioned an increase of about 6.9 million vehicle miles by 1991, as shown in Table 29 and Figure 13. By 1991, the actual level of VMT had increased over the 1972 base-year level by 12.9 million or by

Table 30

ACTUAL AND FORECAST ANNUAL PUBLIC TRANSIT REVENUE PASSENGERS IN THE REGION BY URBANIZED AREA: 1972 AND 1991

| Urbanized Area | Existing 1972 | Forecast 1991 | | Actual 1991[a] | | Difference between Actual and Forecast 1991 Revenue Passengers | |
|---|---|---|---|---|---|---|---|
| | | Change 1972-1991 | Total | Change 1972-1991 | Total | Number | Percent |
| Kenosha . . . . . . | 503,200 | 4,096,800 | 4,600,000 | 624,800 | 1,128,000 | -3,472,000 | -75 |
| Milwaukee . . . . | 52,722,100 | 42,277,900 | 95,000,000 | -5,455,000 | 47,267,100 | -47,732,900 | -50 |
| Racine . . . . . . . | 525,700 | 4,574,300 | 5,100,000 | 1,302,100 | 1,827,800 | -3,272,200 | -64 |
| Region | 53,751,000 | 50,849,000 | 104,600,000 | -3,528,100 | 50,222,900 | -54,437,100 | -52 |

[a]*Excludes ridership on shared-ride taxicab services outside the three urbanized areas within the Region.*

*Source: SEWRPC.*

nearly 64 percent to a level of 33 million miles. Thus, the actual number of vehicle miles of travel in the Region exceeded the forecast level by five million miles, or nearly 22 percent.

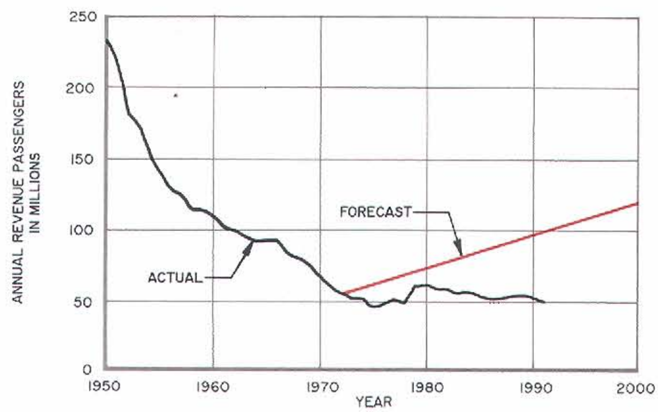
Public Transit Ridership

The forecast level of public transit ridership underlying the regional transportation system plan had envisioned an increase of nearly 51 million revenue passengers by 1991, as shown in Table 30 and Figure 14. By 1991, the actual level of transit ridership in the Region had fallen below the 1972 base-year level of 54 million revenue passengers by 3.5 million, or by about 7 percent. Thus, the actual level of public transit ridership in the Region was below the forecast level by about 54.4 million revenue passengers, or 52 percent.

At the urbanized area level, the Kenosha and Racine urbanized areas both experienced increases over the 1972 base-year ridership level. The 1991 ridership level in the Kenosha urbanized area was 600,000 passengers greater than the 1972 level of 500,000. Transit ridership in 1991 in the Racine urbanized area was similarly greater than in 1972, by over 1.3 million revenue passengers. The increase in transit ridership in the Kenosha and Racine urbanized areas was, however, not significant enough to offset the significant declines in ridership experienced in the Milwaukee urbanized area. In the Milwaukee urbanized area, transit ridership in 1991 was about 5.5 million revenue passengers below the 1972 level. In each of the three urbanized areas, 1991 ridership levels were far below forecast levels, as shown in Figure 15.

Figure 14

ACTUAL AND FORECAST PUBLIC TRANSIT RIDERSHIP IN THE REGION: 1950-2000




*Source: SEWRPC.*

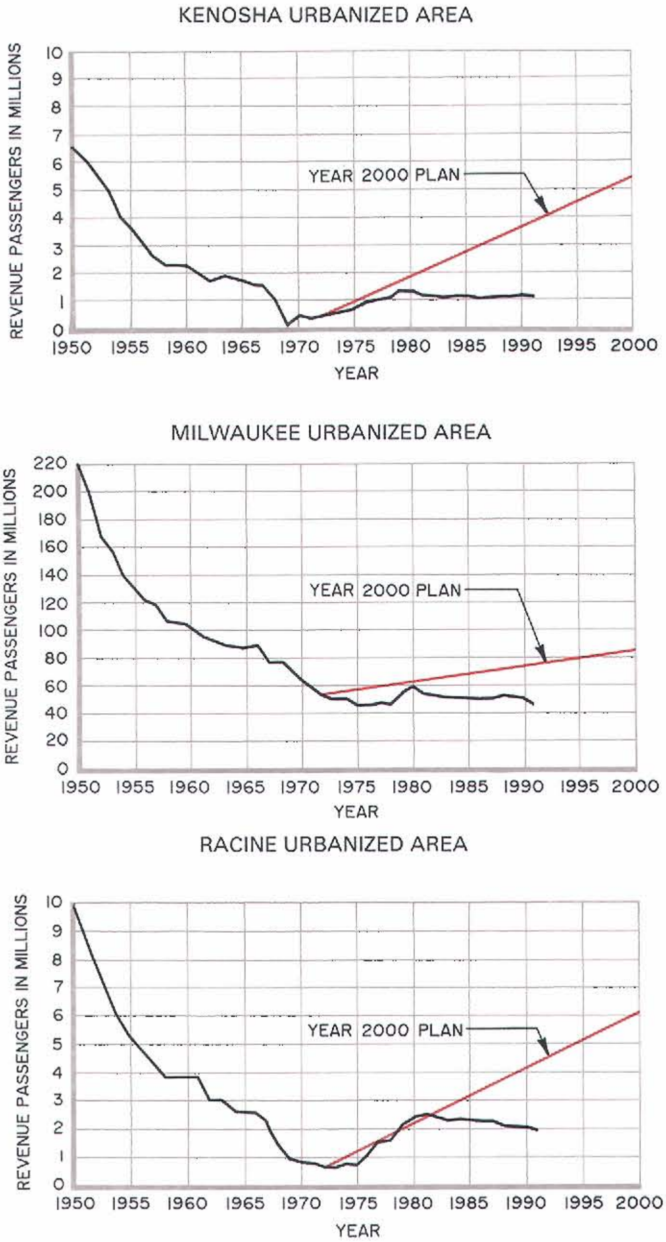
Ridership on the freeway flyer service totaled about 1.1 million revenue passengers in 1991, as shown in Figure 16, down from a peak ridership level in 1980 of about 1.98 million revenue passengers. The increase in freeway flyer ridership between 1977 and 1980, as shown in Figure 16, may be attributed in part to the increase in motor fuel prices during that period of time.

Evaluation of the Forecasts

The foregoing review of the travel forecasts underlying the year 2000 regional transportation system plan reveals that the actual levels of travel in the Region as indicated by internal vehicle trips, vehicle miles of travel, and public transit ridership had not conformed to the levels forecast. By 1991, internal vehicle trips and VMT

Figure 15

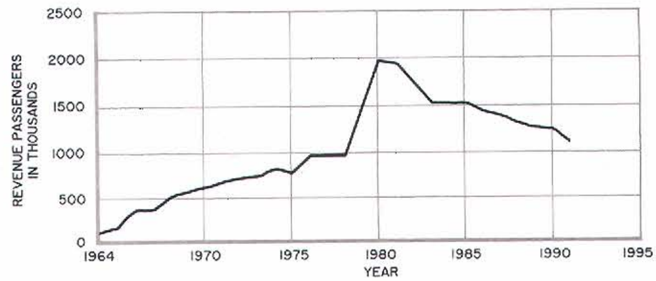
**PUBLIC TRANSIT RIDERSHIP IN THE REGION BY URBANIZED AREAS: 1950-2000**




*Source: SEWRPC.*

Figure 16

**MILWAUKEE URBANIZED AREA FREEWAY FLYER RIDERSHIP: 1964-1991**




*Source: SEWRPC.*

had increased to levels significantly higher than forecast, while public transit ridership decreased to a level far below the ridership forecast.

The actual level of internal person trips, however, varied only slightly from the forecast level, indicating that the increase in trip making in the Region between 1972 and 1991 was overwhelmingly the product of increases in personal vehicle use. Furthermore, the data indicate that the number of vehicle trips had increased faster than the number of person trips, indicating that single occupancy vehicle trips increasingly constituted a larger share of total trips in the Region. An indication of this trend is the decline in the vehicle occupancy rate between 1972 and 1991. The average vehicle occupancy rate for all trip purposes within the Region decreased by 11 percent: from 1.42 persons per automobile in 1972 to 1.26 by 1991. This trend toward increasing vehicle use is in part due to basic lifestyle changes in the Region, including declining household sizes and increasing labor participation rates among women.

Because vehicle trip making and VMT exceeded forecast levels and because implementation of planned transportation improvements lagged, higher than anticipated levels of traffic congestion have occurred. By 1991 the mileage of arterial streets and highways experiencing congestion had exceeded by 233 miles the level of 46 miles planned for the year 2000. Historical and current levels of traffic congestion in the Region are shown in Table 31 and on Map 16. Traffic congestion occurs when arterial facilities carry traffic volumes exceeding their design capacity. Traffic congestion typically occurs during the morning and evening peak-period travel hour, or in some cases, during the three-hour morning and evening peak-traffic periods.

At both the regional level and among the counties, except Kenosha County, the number of miles experiencing congestion had increased between 1972 and 1991 (see Table 31). The adopted plan envisioned that by the year 2000 a total of 46 miles, or just over 1 percent of the entire system, would experience traffic congestion on an average weekday. As of 1991, however, 279 miles, or nearly 9 percent of the entire arterial street and highway system mileage, experienced traffic congestion on an average weekday (see Map 16). Monitoring data reveals a similar variance in the planned and actual number of congested miles at the county level particularly in Milwaukee, Waukesha, and Racine Counties, as summarized in Table 31.

## SUMMARY AND CONCLUSIONS

The design year 2000 regional transportation system plan was adopted by the Regional Planning Commission in June 1978. It consisted of three components: an arterial street and highway, including freeway, component; a public transit component; and a transportation system management component. The transit and transportation system management components were designed to minimize the need to expand arterial street and highway facilities by reducing the demand for automobile travel and by increasing the efficiency and effectiveness of the arterial street and highway system.

The transportation system plan was based upon, and designed to serve, the design year 2000 regional land use plan, also adopted in 1978. The adopted land use plan recommended a centralized urban settlement pattern with new urban growth occurring in concentric rings outward from, and contiguous to, existing urban centers. The planned centralization would make the efficient provision of public transit possible, increase the efficacy of ridesharing strategies, lessen the need for costly arterial street and highway improvements, and prevent severe traffic congestion. In turn, implementation of the transportation system plan would assist in orderly and rational land use development by facilitating access, particularly multi-modal access, to major regional activity centers and residential communities within the Region.

The design of the regional transportation system plan was based on forecasts of population, households, employment, and on automobile and truck availability. While the resident population in the Region did not increase to the levels forecast, the other determinants of the general scale of urban development, the number of households and jobs, closely conformed to forecast levels. The close conformity between the actual and forecast number of households is especially significant since the number of households is a particularly important factor in the generation of travel demand. A summary of the evaluation of the forecasts is set forth below.

1. From 1970 to 1990, the population of the Region was forecast to increase by 16 percent, to over two million persons. By 1990, the regional population had increased to a level of 1.8 million persons, only about 3 percent over 1970 level. Consequently, the 1990 population was lower than forecast by about 232,000 persons, or about 11 percent.

2. From 1970 to 1990, the number of households within the Region was forecast to increase by about 24 percent, to about 667,800 households. By 1990, the number of households had increased to about 676,000, or about 26 percent, over the 1970 level. Consequently, the 1990 regional household level exceeded the forecast level by about 8,200 households, or about 1 percent.

3. From 1970 to 1990, the number of jobs within the Region was forecast to increase by about 23 percent, to about 921,400 jobs. By 1990, despite a severe economic recession from 1979 to 1983, regional employment had increased to a level of about 990,300 jobs, or by about 31 percent. Consequently, the 1990 regional employment level exceeded the forecast level by about 65,900 jobs, or about 7 percent.

4. From 1970 to 1990, the number of automobiles available within the Region was forecast to increase by about 38 percent, to about 876,700 automobiles. By 1990, the number of automobiles within the Region had increased to about 927,300, or by about 46 percent. Consequently, the 1990 regional automobile availability level exceeded the forecast level by about 50,000, or about 6 percent.

5. From 1970 to 1990, the number of trucks available in the Region was forecast to increase by about 79 percent, to about

Table 31

ARTERIAL STREET AND HIGHWAY SYSTEM TRAFFIC CONGESTION ON AN AVERAGE WEEKDAY IN THE REGION: HISTORICAL AND PLANNED SYSTEMS

| Facility Type | Arterial Facilities Carrying Average Weekday Traffic Volumes Exceeding Design Capacity and Experiencing Traffic Congestion | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Historical Systems | | | | | | Planned System 2000 | |
| | 1963 | | 1972 | | 1991 | | | |
| | Mileage | Percent of Total System | Mileage | Percent of Total System | Mileage | Percent of Total System | Mileage | Percent of Total System |
| Kenosha County | 13.5 | 4.8 | 22.0 | 7.9 | 15.1 | 4.8 | 3.2 | 0.9 |
| Milwaukee County | 116.3 | 14.7 | 61.0 | 8.3 | 121.9 | 15.7 | 31.6 | 4.1 |
| Ozaukee County | 8.3 | 3.1 | 5.5 | 2.2 | 13.3 | 4.6 | 1.9 | 0.6 |
| Racine County | 13.6 | 3.9 | 20.3 | 5.8 | 34.3 | 9.9 | 0.0 | 0.0 |
| Walworth County | 5.3 | 1.3 | 4.8 | 1.2 | 3.1 | 0.7 | 0.0 | 0.0 |
| Washington County | 0.0 | 0.0 | 9.1 | 2.7 | 19.5 | 4.9 | 0.0 | 0.0 |
| Waukesha County | 34.8 | 5.0 | 42.9 | 6.6 | 72.0 | 10.0 | 9.2 | 1.2 |
| Total | 191.8 | 6.0 | 165.6 | 5.3 | 279.2 | 8.5 | 45.9 | 1.3 |

*Source: SEWRPC.*

128,000. By 1990, the number of trucks had increased to about 177,900 trucks, about 148 percent over the 1970 level. Thus, the 1990 regional truck availability level exceeded the forecast level by about 49,900, or about 39 percent.

6. A more complete evaluation of the automobile availability forecast must consider the use of motor trucks as personal vehicles within the Region. The automobile availability forecast conducted for the second-generation plan attempted to estimate the future availability of personal vehicles in the Region regardless of their type, automobile or personal-use truck. In this regard, when the number of motor trucks estimated to be used as personal vehicles in 1990 is added to the number of automobiles in 1990, the resulting number of total personal vehicles exceeds the forecast by slightly more than one million, or by nearly 15 percent.

The design of the regional transportation system plan was also based on a forecast land use distribution within the Region, making an evaluation of urban development activity essential to transportation plan reappraisal. An evaluation of incremental urban development between 1970 and 1985 indicated that about 48 percent of all new residential development, or about 66 square miles, occurred in a highly diffused fashion throughout the Region; that nearly 15 square miles more land was converted from rural use to urban use than the plan recommended; that about 70 percent of all housing units were constructed at a medium or high residential density though the plan called for 83 percent; that 27 percent of all new housing units were constructed at a low residential density, though the plan recommended 10 percent; and that overall urban population density decreased from 5,100 persons per square mile in 1970 to 3,900 by 1985, though the plan envisioned a population density of 4,100 persons per square mile.

In addition, total employment at the older major industrial centers, generally concentrated within the Milwaukee, Racine and Kenosha urbanized areas, declined by 21 percent though the plan recommended that employment at such centers increase by about 13 percent. Two industrial centers, with a combined total of 13,700 jobs, were developed, contrary to plan recommendations. Currently, four additional centers dispersed throughout the Region have the potential to reach the 3,500 industrial employment level necessary for classification as major industrial centers.

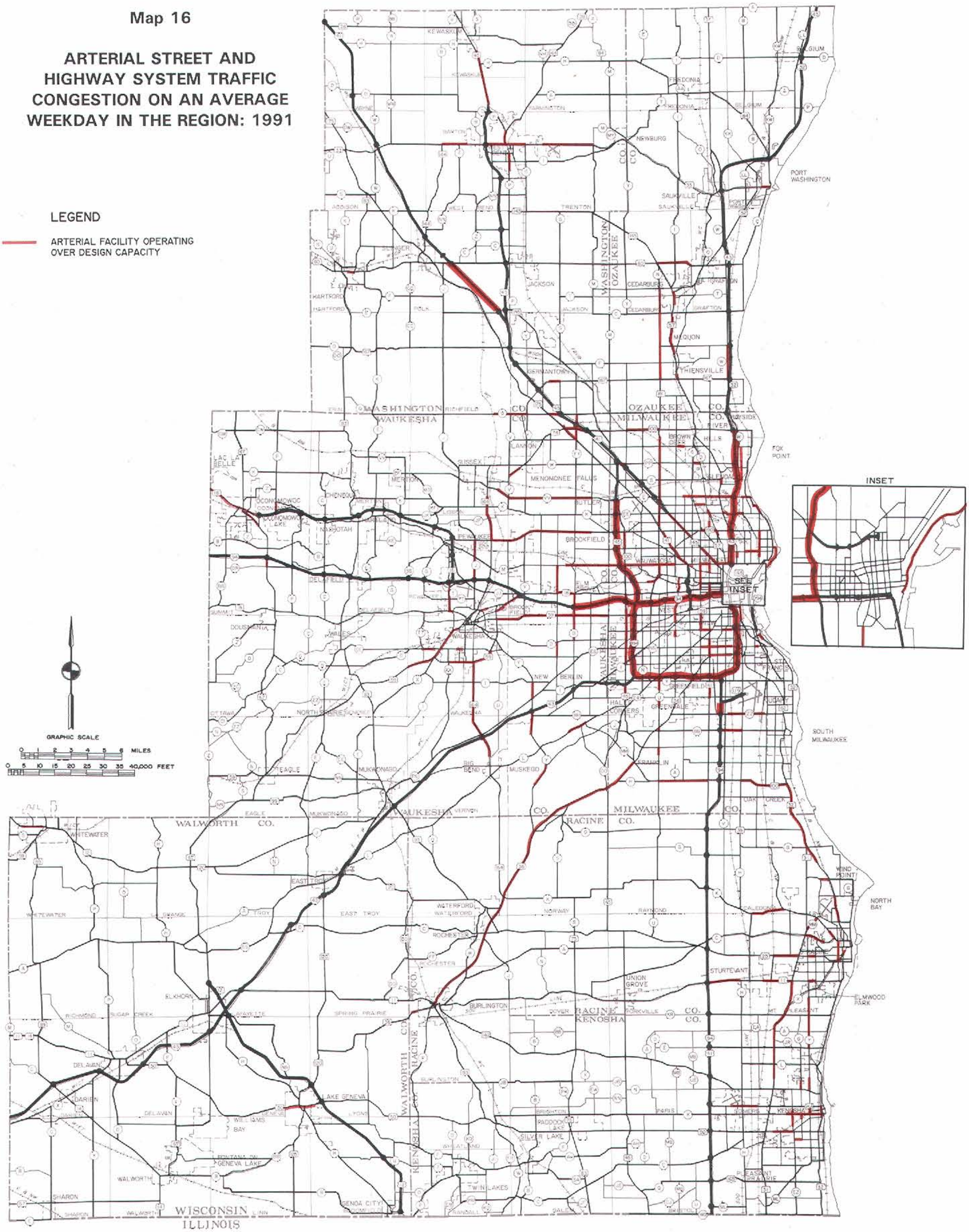
The progress of implementing the regional transportation system plan is set forth below.

## Map 16

### ARTERIAL STREET AND HIGHWAY SYSTEM TRAFFIC CONGESTION ON AN AVERAGE WEEKDAY IN THE REGION: 1991

LEGEND

ARTERIAL FACILITY OPERATING OVER DESIGN CAPACITY




The adopted plan envisioned that by the year 2000, 46 miles, or 1 percent of total arterial mileage within the Region, would operate over design capacity on an average weekday and thereby exhibit traffic congestion. As of 1991, however, because of significant increases in vehicle trip making and a failure to implement planned transportation improvements more fully, 279 miles, or nearly 9 percent of total arterial mileage, were operating over design capacity. Nearly 44 percent of this congested mileage, or 122 miles, was located within Milwaukee County.

*Source: SEWRPC.*

1. By 1990, about one-half of the mileage recommended in the plan for jurisdictional realignment and capacity improvement and expansion should have been implemented. As of 1991, however, only 26 percent of the 1,387 miles recommended for jurisdictional realignment had been appropriately transferred; work had been completed on only 31 percent of the 637 miles recommended for either system improvement or system expansion. The greatest progress in implementing the combined system improvement and expansion recommendations had occurred on the State trunk highway system at about 31 percent, followed by the local arterial system at about 30 percent, and the county trunk highway system at about 28 percent. Over all, work on only 24 percent of the miles planned for system preservation had been completed by 1991. All completed jurisdictional transfers and functional improvements were made as recommended in the adopted plan.

2. The adopted plan envisioned that by the year 2000 the public transit fleet would consist of about 1,000 transit vehicles, operating over 2,941 round-trip route miles. By 1991, the fleet consisted of 662 buses, operating over 2,296 round-trip miles. The plan envisioned that by 1991 approximately 36 million revenue vehicle-miles of service would be provided within the Region. In 1991, only 20.3 million revenue vehicle-miles were provided, less than a 1 percent increase over 1972.

3. The adopted plan aimed at reducing single-occupant automobile use by providing incentives for ridesharing and public transit use, thus minimizing the need for arterial capacity expansion. By 1990, the Wisconsin Department of Transportation had initiated implementation of the proposed freeway traffic management system by undertaking preliminary engineering. Significant progress had been made in the provision of carpool parking facilities throughout the Region. Some 18 carpool facilities, five more than planned, were in use by 1990. The utilization of the parking spaces at these facilities, discussed in Chapter IV, stood at 35 percent in 1991. The recommended program to market carpooling aggressively to area commuters and employers and to encourage the provision of preferential parking to carpool participants has not been operated within the Region since 1981. Action has been taken only recently by the City of Milwaukee to study parking related recommendations, including changing the parking rate structure to discourage long-term parking and adjusting the supply of parking in downtown Milwaukee.

Several factors have contributed to the lack of implementation of the regional transportation system plan. Inadequate funding, with respect to county and local arterial improvements, in particular, has been a substantial impediment to plan implementation. Federal funding for highway improvements has declined and no significant replacement State program funding has been forthcoming. The necessary reliance on the property tax to fund county and local arterial preservation and improvement projects has resulted in a lower than planned level of highway implementation.

Funding constraints have also been a significant factor in the poor implementation of the public transit component of the plan. Federal funding has declined and local funding is limited because of its reliance on the property tax base, already stressed by competing local programs. In consequence of declining Federal funding, State funding has been increased. It is apparent that without such State funding the level of public transit service in the Region would have been reduced even beyond the relatively low existing levels.

Other reasons for lack of public transit plan implementation include the escalation of transit unit costs; the declining costs of motor fuel and the attendant decline in public interest in transit, which tends to rise and fall with motor fuel prices; increasing transit fares; and the lack of land use plan implementation. With respect to land use plan implementation, particularly significant trends which have affected public transit plan implementation and which are at variance with the regional land use plan include: the decline in employment at central city commercial and industrial centers and the converse increase in employment at outlying centers, the decline of residential density in the central cities, and substantial new development at less than the recommended medium density.

The funding to improve the arterial street and highway system and to improve and expand the public transit system as planned has not been available. Moreover, the factors which would promote increased transit ridership and service, higher fuel prices, a more concentrated land use pattern, lower transit fares, have not unfolded as assumed.

The regional transportation system plan was designed to accommodate forecast increase in travel within the Region. Despite lower than forecast population growth, increases in vehicle trip making and vehicle miles of travel substantially exceeded levels forecast, while transit use stagnated. A summary of the forecasts of travel is set forth below.

1. From 1972 to 1991, the number of person trips within the Region was forecast to increase by about 20 percent, to about 5.3 million. By 1991, the number of internal person trips had actually increased by 23 percent, to about 5.5 million trips. Consequently, the actual level of internal person trips exceeded the forecast by about 155,000 trips, or 3 percent.

2. From 1972 to 1991, the number of vehicle trips within the Region was forecast to increase by about 21 percent, to about 3.5 million. By 1991, the number of internal vehicle trips had actually increased by 40 percent, to almost 4.1 million trips. Consequently, the 1991 level of internal vehicle trips exceeded the forecast by nearly 600,000 trips, or 17 percent.

3. From 1972 to 1991, vehicle miles of travel in the Region was forecast to increase by about 34 percent, to 27 million. By 1991, VMT had actually increased by about 64 percent, to a level of 33 million vehicle miles. Consequently, 1991 VMT in the Region exceeded the forecast by six million vehicle miles, or nearly 22 percent.

4. From 1972 to 1991, public transit ridership in the Region was forecast to increase by nearly 95 percent, to about 105 million revenue passengers. By 1991, transit ridership had fallen by 3.5 million, to a level of 50 million revenue passengers, about 7 percent below the 1972 level. Consequently, the 1991 level of public transit ridership was below the forecast level by 54.4 million, or 52 percent.

The dispersion of urban development contrary to the regional land use plan and poor implementation of the regional transportation system plan have contributed to cause higher than forecast vehicle trip production and vehicle miles of travel and consequently substantial traffic congestion and attendant problems on arterial streets and highways within the Region. Indeed, by 1988, 267 miles of the arterial street and highway system, 211 miles more than envisioned for the year 2000 in the adopted plan, experienced traffic congestion on an average weekday.

In the design of the year 2000 regional transportation system plan, a chosen set of transportation system development proposals was deemed sufficient to accommodate forecast trip making levels and to meet agreed-upon system development objectives. Because actual trip making levels have proven to be far in excess of those forecast, the regional transportation system plan, as it now stands, is no longer adequate to achieve the development objectives advanced under that plan.

The knowledge gained through the study of the adopted regional transportation system plan serves as an important point of departure for the preparation of the third-generation regional transportation system plan. The information contained in this chapter, combined with an understanding of the inventory data and the changes anticipated within the Region, will permit the reformulation of development objectives and standards to guide transportation system development to the year 2010.

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# Chapter IV

# INVENTORY OF TRANSPORTATION FACILITIES AND SERVICES

## INTRODUCTION

The regional transportation system forms the basic framework for both urban and rural development. It provides the accessibility necessary for development to occur and to remain vital and provides the mobility necessary for personal attainment of benefit from such development. The achievement of the basic social and economic objectives set forth in Chapter VIII hinges on a balanced, accessible, and efficient regional transportation system.

The transportation system is a major influence on the distribution of population and employment, and, therefore, a major influence on regional land use plan implementation. The transportation system can foster the achievement of objectives intrinsically related, not only to transportation, but also to other aspects of regional development as well, including urban development, environmental protection, and agricultural preservation. The ability to meet such broader objectives is related to both the supply and use of the transportation system.

The availability, location, and operation of transportation system facilities, services, and management measures also influence the path, mode, and frequency of travel. Such travel characteristics, in turn, influence the operation of the transportation system. Relationships between supply and utilization must therefore be understood. Such understanding necessitates comprehensive efforts to inventory the existing supply and the use of transportation facilities and services.

This chapter presents the findings of a definitive inventory of the supply of transportation system facilities and services, using 1991 as the base year. It focusses on the location, capacity, provision, and utilization of arterial street and highway facilities, public transit facilities and services, intermodal parking facilities, and the emerging freeway traffic management system of the Region. Such inventory data are necessary to formulate, calibrate, and validate traffic simulation models used in the plan test and evaluation phase of the regional transportation system planning process, as well as the sound design of alternative transportation system plans.

This chapter also describes the significant changes which have occurred in the supply and use of transportation facilities within the Region since 1972, the base year for the second-generation regional transportation system plan, and in some cases since 1963, the base year for the initial plan. A thorough examination of travel habits and patterns based on findings of the third major inventory of travel within the Region is set forth in Chapter V. Those findings and interpretations serve as the demand side of the transportation inventory equation. The focus in this chapter is on the supply side.

## CLASSIFICATION AND SUPPLY OF ARTERIAL STREETS AND HIGHWAYS

### Functional Classification

Functional classification is an important principle underlying sound regional transportation system planning. It defines the type and level of service which any particular street or highway should render and provides a means for defining direct and time-saving routes through the total street and highway system. Functional classification, therefore, is a prerequisite to the necessary simulation of existing and future travel patterns and thus to the design and evaluation of alternative regional transportation systems.

Individual streets and highways do not serve travel independently in any major way. Because most travel involves movement through a network of streets and highways, it becomes necessary to determine how this travel can be efficiently channelized within the total network. Functional classification defines the nature of this channelization. At least three functional classifications of streets and highways are recognized: land-access, collector, and arterial.

Only those facilities functionally classified as arterials are explicitly considered in the regional transportation system planning process. Knowledge of the location and function of land-access and collector streets and highways, however, is also essential to the design of an effective long-range regional transportation system plan. This is especially true of collector facilities, which are intended primarily to collect traffic from, and distribute traffic to, land-access streets, conveying such traffic to the arterial system. Knowledge of the supply and location of land-access and collector streets and highways is also vital to any comprehensive planning effort, since both types of facilities serve as a means of access to abutting property, provide important links in the urban stormwater drainage system, and provide the location for utilities serving urban and rural development.

Arterial streets and highways are intended to serve the through movement of fast or heavy traffic and to provide transportation service between two or more major subareas of the Region and between such subareas and areas outside of the Region. Arterials should form an integrated, areawide system, located and designed to carry imposed traffic loadings properly. Freeways, expressways, and certain parkways, as well as standard arterial streets and highways, have special design characteristics which qualify them for inclusion in the arterial system.[1]

The functional classification of the existing regional street and highway system was accomplished through a comparative evaluation of four major factors: 1) traffic: traffic volume and type, operating speeds, and average trip length, 2) physical characteristics: horizontal and vertical alignment, pavement width, and pavement type, 3) system integration: system continuity, facility spacing, and legal regulations, and 4) land use service: the areawide significance of the land use activities to be served.

Existing facilities proposed to be classified as arterials were mapped and copies of the preliminarily proposed arterial street and highway system were sent to concerned State, county, and local units of government for review and comment. After the Regional Planning Commission incorporated necessary changes and additions, the existing arterial street and highway system was reviewed and approved by the Technical Coordinating and Advisory Committee on Regional Transportation System Planning.

The amount of arterial mileage within the Region has generally increased over time, from 3,188 miles in 1963 to 3,274 miles in 1991 (see Table 32). It is interesting to note, however, that between 1963 and 1972 the amount of arterial mileage declined by 70 miles, or 2 percent, to 3,118 miles. This net decline may be attributed to the expansion of the freeway system in the mid- to-late 1960s, which replaced the arterial function of paralleling streets and highways. Despite the existence of the freeways and promoted by the substantial dispersion of urban development within the Region, the amount of arterial mileage increased by 156 miles, or about 5 percent, between 1972 and 1991 (see Table 33).

Of the 156-mile increase in arterial mileage between 1972 and 1991, only 70 miles represented new arterial construction; the remaining 86 miles were converted to arterial status to accommodate increased travel demand. About 64 percent of the mileage added to the Region's arterial system between 1972 and 1991, or 101 miles, was located within Waukesha and Washington Counties. As indicated in Chapter III, the most significant urban development at variance with the regional land use plan recommendations also occurred in these two counties.

The existing arterial system, shown on Map 17, represents about 29 percent of the Region's total street and highway system, which in 1991 consisted of about 11,200 miles (see Table 32). Over time arterial mileage has decreased as a percentage of total street and highway mileage. This decline is due in part to the construction of nonarterial streets and highways to accommo-

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[1]*A freeway is defined as a divided arterial highway with full control of access and with grade separations at all intersections. An expressway is defined as a divided arterial highway with full or partial control of access and with grade separations at some, but not necessarily all, intersections. A parkway is defined as an arterial highway provided for noncommercial traffic with full or partial control of access, usually located within a ribbon of park-like development. The term parkway as defined herein should not be confused with park roads or drives, which are not intended to serve as arterials. Standard arterial streets and highways may be defined as arterials with at-grade intersections. Standard arterials may or may not permit direct access to, and egress from, abutting property.*

## Table 32

### DISTRIBUTION OF TOTAL STREET AND HIGHWAY MILEAGE WITHIN THE REGION BY COUNTY: 1963, 1972, AND 1991

| County | 1963 | | | |
|---|---|---|---|---|
| | Arterial | Collector and Local/Land-Access | Total[a] | Arterial Mileage as a Percent of Total Mileage |
| Kenosha | 281.5 | 547.1 | 828.6 | 34.0 |
| Milwaukee | 791.5 | 1,642.6 | 2,434.1 | 32.5 |
| Ozaukee | 264.9 | 366.9 | 631.8 | 41.9 |
| Racine | 351.3 | 632.4 | 983.7 | 35.7 |
| Walworth | 399.7 | 824.2 | 1,223.9 | 32.7 |
| Washington | 402.3 | 688.0 | 1,090.3 | 36.9 |
| Waukesha | 697.0 | 1,054.0 | 1,751.0 | 39.8 |
| Total | 3,188.2 | 5,755.2 | 8,943.4 | 35.6 |

| County | 1972 | | | |
|---|---|---|---|---|
| | Arterial | Collector and Local/Land-Access | Total[a] | Arterial Mileage as a Percent of Total Mileage |
| Kenosha | 287.1 | 593.4 | 880.5 | 32.6 |
| Milwaukee | 795.7 | 1,851.7 | 2,647.4 | 30.1 |
| Ozaukee | 253.5 | 466.7 | 720.2 | 35.2 |
| Racine | 355.4 | 728.0 | 1,083.4 | 32.8 |
| Walworth | 412.0 | 846.9 | 1,308.9 | 31.5 |
| Washington | 344.8 | 821.1 | 1,165.9 | 29.6 |
| Waukesha | 670.2 | 1,342.5 | 2,012.7 | 33.3 |
| Total | 3,118.7 | 6,700.3 | 9,819.0 | 31.8 |

| County | 1991 | | | |
|---|---|---|---|---|
| | Arterial | Collector and Local/Land-Access | Total[a] | Arterial Mileage as a Percent of Total Mileage |
| Kenosha | 317.7 | 660.6 | 978.3 | 32.4 |
| Milwaukee | 775.4 | 2,131.6 | 2,907.0 | 26.7 |
| Ozaukee | 288.5 | 572.5 | 861.0 | 33.5 |
| Racine | 347.9 | 816.4 | 1,164.3 | 30.0 |
| Walworth | 429.2 | 996.4 | 1,425.6 | 30.1 |
| Washington | 399.2 | 924.4 | 1,323.6 | 30.2 |
| Waukesha | 716.3 | 1,824.6 | 2,540.9 | 28.2 |
| Total | 3,274.2 | 7,926.5 | 11,200.7 | 29.2 |

[a] *Total street and highway mileage does not include private streets and roads or roadways in public parks and on institutional lands.*

*Source: SEWRPC.*

date new urban development in previously undeveloped areas. In 1963 and 1972, arterial mileage accounted for about 36 percent and about 32 percent, respectively, of the total street and highway mileage within the Region.

The arterial street and highway system can be further functionally classified in terms of eligibility for Federal funding in support of highway improvements. To identify such facilities, the Wisconsin Department of Transportation (WisDOT) utilized a national functional highway classification scheme developed by the U. S. Department of Transportation (USDOT), Federal Highway Administration (FHWA). As required by the Federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the following categories were used in urban areas: "principal arterial, minor arterial, urban collector, and land-access;" and in rural areas: "principal arterial, minor arterial, major collector, minor collector, and land-access."

Arterial facilities classified under the Federal classification scheme as urban and rural principal arterials, urban and rural minor arterials, and rural major collectors were identified by the Commission in cooperation with concerned county and local units of government for inclusion in the 1991 existing regional arterial system. Table 34 shows the existing distribution of highway mileage among these classes. Those facilities classified as rural major collectors are included in the regional arterial system because they are vital to arterial system continuity. Indeed, as shown on Map 18, when rural major collectors transverse urban areas, they are classified under the Federal scheme as minor arterials.

Jurisdictional Classification

Streets and highways may be classified according to jurisdiction as well as function. Jurisdictional classification is important to plan implementation. It establishes which level of government, be it State, county, or local, has, or should have, responsibility for the design, construction, maintenance, and operation of each segment of the total street and highway system. Jurisdictional classification is intended to group into subsystems, in a logical fashion, all streets and highways under the jurisdiction of a given level of government.

Criteria for jurisdictionally classifying the streets and highways in the Region were developed by the Commission in cooperation with the Federal, State, and local units and agencies of government concerned under the individual county jurisdictional highway planning programs. The criteria relate to: 1) trip service: the average trip length on each segment during an average weekday, 2) land use service: the areawide significance of land use activities to be connected and served, and 3) facility operational characteristics attendant to system continuity: facility spacing, traffic volume, traffic mobility, and land access.

In applying the criteria it was determined that: 1) those facilities intended to provide a high level of traffic mobility, to serve trips of the longest length, to provide minimal land access, and to have regional or interregional continuity should

**Table 33**

**CHANGE IN ARTERIAL STREET AND HIGHWAY MILEAGE: 1972-1991 AND 1963-1991**

| County | Change 1972-1991 | | Change 1963-1991 | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| Kenosha | 30.6 | 10.7 | 36.2 | 12.9 |
| Milwaukee | -20.3 | -2.6 | -16.1 | -2.0 |
| Ozaukee | 35.0 | 13.8 | 23.6 | 8.9 |
| Racine | -7.5 | -2.1 | -3.4 | -1.0 |
| Walworth | 17.2 | 4.2 | 29.5 | 7.4 |
| Washington | 54.4 | 15.8 | -3.1 | -0.8 |
| Waukesha | 46.1 | 6.9 | 19.3 | 2.8 |
| Total | 155.5 | 5.0 | 86.0 | 2.7 |

*Source: SEWRPC.*

be classified as State trunk highways, 2) those facilities intended to provide an intermediate level of traffic mobility and land access and to have intercommunity continuity should be classified as county trunk arterials, and 3) those facilities intended to provide a low level of traffic mobility, a high degree of arterial land access, and to have intracommunity continuity should be classified as local arterial streets.

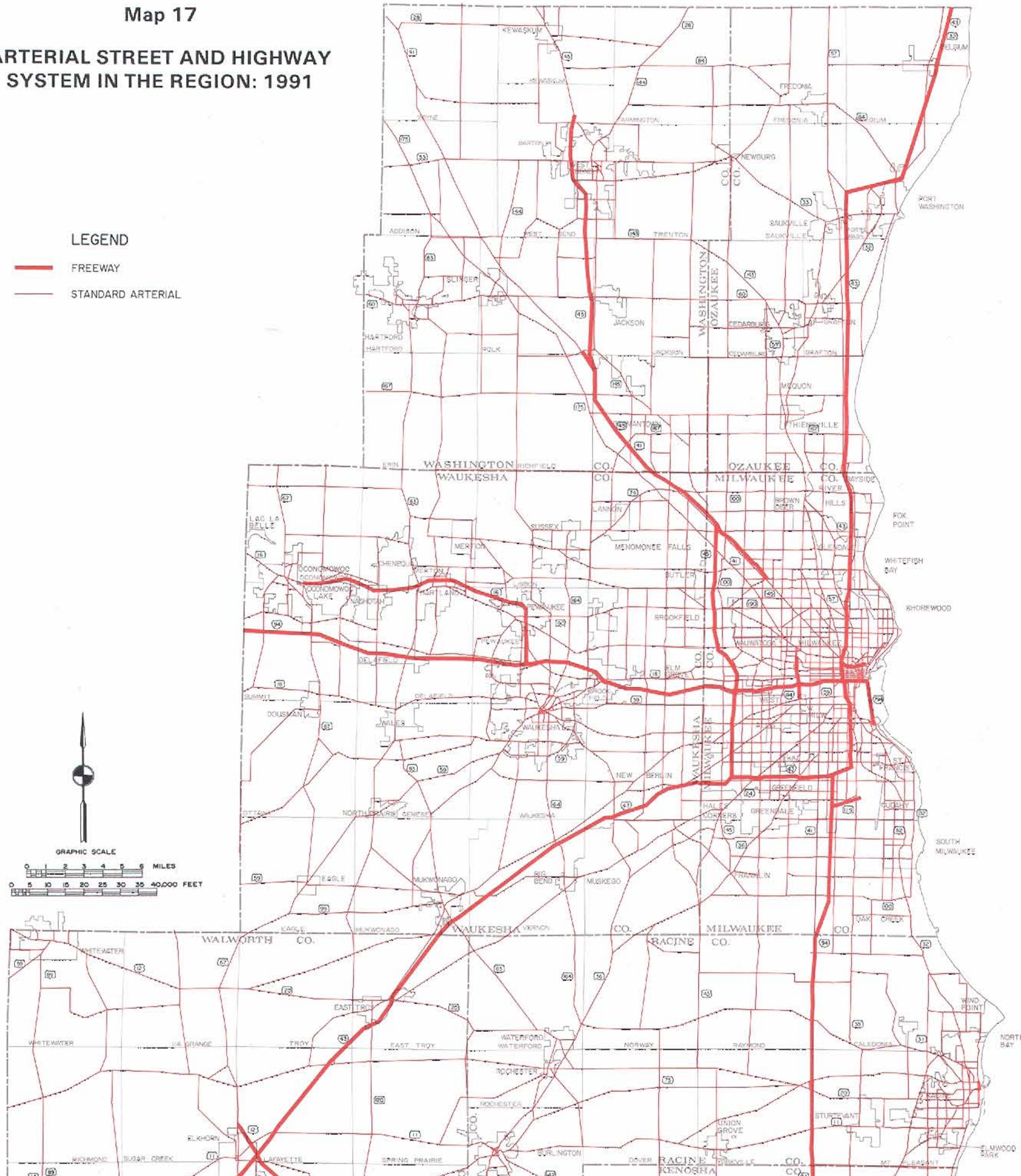
In practice, jurisdictional classification does not always relate fully to the functional criteria set forth above. The existing jurisdictional highway subsystems, as shown in Map 19, are the result of a long evolutionary process influenced by many complex political, administrative, financial, and engineering considerations and constraints.

Table 35 sets forth the existing distribution of arterial street and highway mileage among each jurisdictional subsystem within the Region and within each county of the Region. In 1991, about 1,261 miles, or nearly 39 percent of the total arterial system, were classified as State trunk highways, including State connecting streets; about 1,079 miles, or 33 percent, were classified as county trunk highways; the remaining 934 miles, or about 29 percent of the arterial system, were classified as local arterials.

Table 35 also compares the jurisdictionally classified mileage within each county in the Region. Milwaukee County had the most arterial State trunk highway and connecting street mileage. About 251 miles, or about 32 percent of arterial mileage within Milwaukee County, was classified as part of the State highway system.

## Map 17

### ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1991




Arterial streets and highways are intended to serve the through movement of traffic, providing transportation service between two or more subareas of a region, or through a region. The remainder of the street system consists of land access and collector streets whose principal function is to provide access to abutting property and to provide connections between land access and arterial streets, respectively. In 1991, the arterial street and highway system in the Southeastern Wisconsin Region consisted of 3,274 miles of facilities, including freeways, expressways, certain parkways, and standard surface streets and highways. This arterial system comprised 29 percent of the 11,200-mile total street and highway system in the Region.

*Source: SEWRPC.*

Table 34

DISTRIBUTION OF HIGHWAY MILEAGE BY FUNCTIONAL CLASSIFICATION AND BY COUNTY

| County | Urban | | Rural | | | Total |
|---|---|---|---|---|---|---|
| | Principal Arterials | Minor Arterials | Principal Arterials | Minor Arterials | Major Collector Streets and Highways | |
| Kenosha . . . . . . . | 45.5 | 71.6 | 35.9 | 35.5 | 129.2 | 317.7 |
| Milwaukee . . . . . . | 257.0 | 518.4 | - - | - - | - - | 775.4 |
| Ozaukee . . . . . . . | 38.1 | 111.4 | 39.3 | 9.7 | 90.0 | 288.5 |
| Racine . . . . . . . . | 63.4 | 71.0 | 61.9 | 47.8 | 103.8 | 347.9 |
| Walworth . . . . . . | 25.7 | 19.7 | 90.9 | 85.4 | 207.5 | 429.2 |
| Washington . . . . . | 35.8 | 64.0 | 53.2 | 60.3 | 185.9 | 399.2 |
| Waukesha . . . . . . | 176.4 | 242.2 | 35.0 | 89.6 | 173.1 | 716.3 |
| Region | 641.9 | 1,098.3 | 316.2 | 328.3 | 889.5 | 3,274.2 |

*Source: SEWRPC.*

Connecting streets are marked and signed routes of State trunk highways routed over streets and highways for which local municipalities have the responsibility for maintenance and operation. The City of Milwaukee, the convergence point of many arterial facilities, has significant connecting street maintenance and operational responsibilities. Indeed, about 53 percent of the total connecting street mileage within the Region is located within Milwaukee County.

In 1991, Waukesha County had the highest mileage of arterial county trunk highway within the Region. About 320 miles, or nearly 45 percent of the total arterial mileage within Waukesha County, was part of the county highway system. Milwaukee County, the most urbanized county in the Region, had the most mileage of local arterial trunk highway. About 442 miles, or 57 percent of the total arterial mileage within Milwaukee County, was part of the local highway system.

## UTILIZATION OF ARTERIAL STREETS AND HIGHWAYS

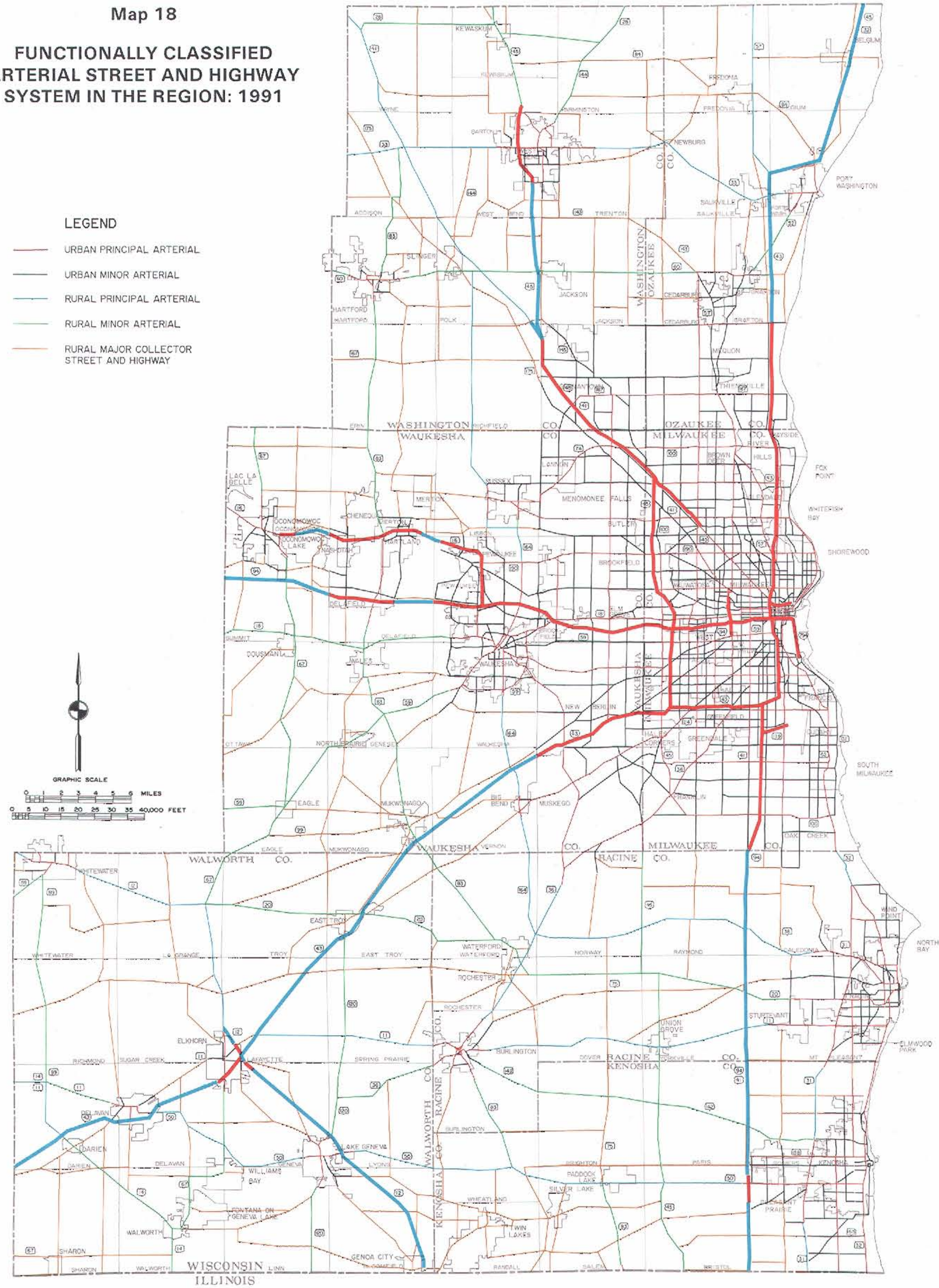
The regional arterial street and highway system was mapped and converted to network form for travel forecasting and system analyses purposes. This conversion was accomplished by assigning node numbers to all intersections and defining each segment between two nodes as a link in the system, as illustrated in Figure 17.

These forecasting and analyses necessitated significant inventory efforts. Data setting forth travel times on, and the length and capacity of, each link in the network have been maintained by the Commission since 1963 through extensive monitoring procedures. Data necessary to determine the traffic capacity of a link include, in addition to the length, average operating speed, pavement width, intersection approach gradient, type of facility, type of area through which the link passes, and the existence or nonexistence of intersection turning lanes. These data permitted the calculation of minimum travel-time paths through the network and the assignment of traffic to these minimum travel-time paths, duly considering capacity constraints. Such data and procedures enabled the accurate simulation of travel on the arterial street and highway system.

In order to provide a measure of the present utilization of the existing arterial street and highway system, the average weekday traffic volume was obtained for each link in the system. Programs to count traffic volume conducted by the Wisconsin Department of Transportation and by the County and City of Milwaukee on a regular basis provided much of the necessary current traffic volume data. In order to obtain complete data for the entire arterial network, however, these counts had to be supplemented by counts taken by other local municipalities and by the Commission itself. These programs, which included control and sampling counts for the arterial system as a whole, also included the

## Map 18

### FUNCTIONALLY CLASSIFIED ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1991

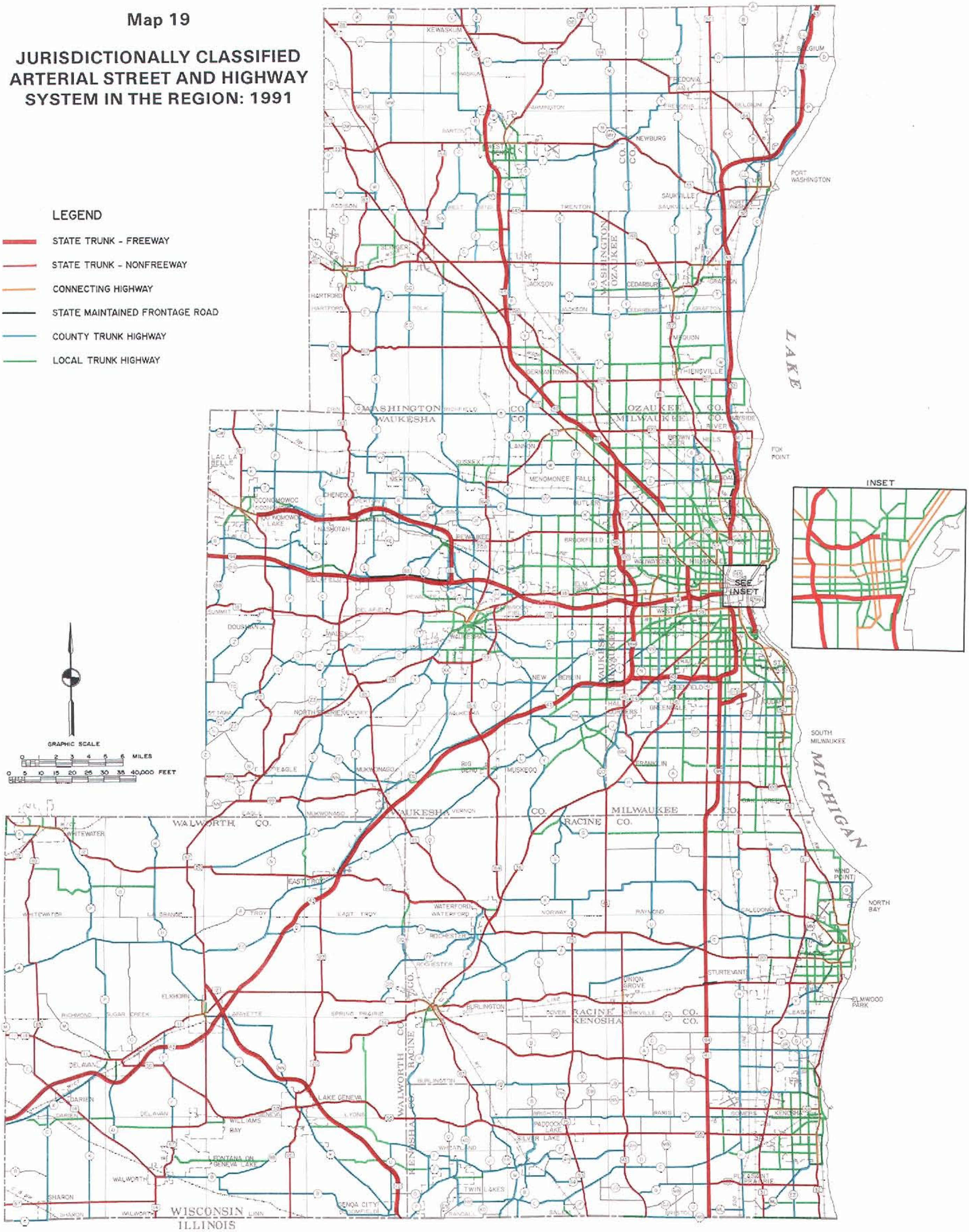



Under the Intermodal Surface Transportation Efficiency Act of 1991, existing streets and highways within the Region required functional classification according to a Federal classification scheme. Those streets and highways identified as existing arterials by the Commission in cooperation with concerned local units of government were further classified as follows under the Federal functional classification scheme: urban principal arterial, urban minor arterial, rural principal arterial, rural minor arterial, and rural major collector.

*Source: Wisconsin Department of Transportation and SEWRPC.*

## Map 19

### JURISDICTIONALLY CLASSIFIED ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1991




Jurisdictional classification determines which level of government, State, county, or local, has, or should have, the responsibility for the design, construction, operation, and maintenance of streets and highways. In 1991, about 1,261 arterial miles, or nearly 39 percent of the arterial street and highway system, were classified as State trunk highways; about 1,079 arterial miles, or 33 percent of the arterial system, were classified as county trunk highways; and about 934 arterial miles, or 29 percent of the arterial system, were classified as local streets or highways.

*Source: SEWRPC.*

Table 35

**EXISTING DISTRIBUTION OF ARTERIAL STREET AND HIGHWAY MILEAGE WITHIN THE REGION BY COUNTY AND JURISDICTIONAL CLASSIFICATION: 1991**

| County | State | | | County | | Local | | Total | |
|---|---|---|---|---|---|---|---|---|---|
| | Trunk Highways | Connecting Streets | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent |
| Kenosha . . . . . . | 106.1 | 12.7 | 37.4 | 139.9 | 44.0 | 59.0 | 18.6 | 317.7 | 100.0 |
| Milwaukee . . . . | 167.9 | 83.5 | 32.4 | 81.6 | 10.5 | 442.4 | 57.1 | 775.4 | 100.0 |
| Ozaukee . . . . . . | 90.4 | 10.3 | 34.9 | 96.9 | 33.6 | 90.9 | 31.5 | 288.5 | 100.0 |
| Racine . . . . . . . | 139.7 | 19.2 | 45.7 | 124.5 | 35.8 | 64.5 | 18.5 | 347.9 | 100.0 |
| Walworth . . . . . | 200.4 | 13.3 | 49.8 | 168.2 | 39.2 | 47.3 | 11.0 | 429.2 | 100.0 |
| Washington . . . . | 179.0 | 7.1 | 46.6 | 148.0 | 37.1 | 65.1 | 16.3 | 399.2 | 100.0 |
| Waukesha . . . . . | 218.4 | 12.9 | 32.3 | 320.0 | 44.7 | 165.0 | 23.0 | 716.3 | 100.0 |
| Region | 1,101.9 | 159.0 | 38.5 | 1,079.1 | 33.0 | 934.2 | 28.5 | 3,274.2 | 100.0 |

*Source: Wisconsin Department of Transportation and SEWRPC.*

cordon and screen-line counts necessary to evaluate the accuracy of the origin and destination surveys. The comprehensive nature of the traffic counting programs made it possible to estimate with a high degree of accuracy the average weekday and peak-hour traffic flows on all segments of the arterial network and to calculate total vehicle-miles of travel (VMT) on the arterial street and highway system.

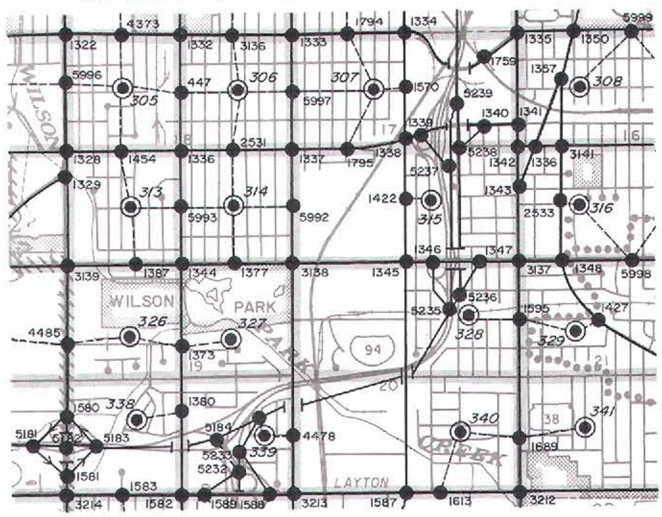
## System Utilization

The average weekday arterial traffic flows within the Region in 1991 are graphically displayed on Map 22. The highest traffic volumes were carried on the freeways and certain standard arterials within the Milwaukee urbanized area. East-west arterials that carried significant traffic volumes included, among others, W. Good Hope Road (STH 74 and STH 100) between IH 45 and IH 43, W. Silver Spring Drive between USH 41 and IH 43, W. Capitol Drive (USH 190) between the Milwaukee-Waukesha County line and IH 43, and W. Blue Mound Road (USH 18) from N. Mayfair Road to Barker Road. North-south arterials that carried significant volumes in 1991 included, among others, N. 76th Street from W. Brown Deer Road to W. Silver Spring Road, and Mayfair Road (USH 100) from W. Capitol Drive to USH 45. Two of these heavily used facilities, N. Mayfair Road and W. Blue Mound Road, parallel freeways: USH 45 and IH 94, respectively.

Major changes occurred in the utilization of the arterial street and highway system between 1963, 1972, and 1991, as a comparison of Maps 20, 21, and 22 indicates. These changes may be attributed in part to new urban development and in part to the redistribution of traffic as improvements were made in the arterial system itself. Between 1963 and 1972, for instance, the completion of

Figure 17

**EXAMPLE OF HIGHWAY NETWORK MAP**




LEGEND

310 ZONE CENTROID AND NUMBER

1454 LINK NODE AND NUMBER

FREEWAY/ARTERIAL LINK

DIRECTIONAL LINK

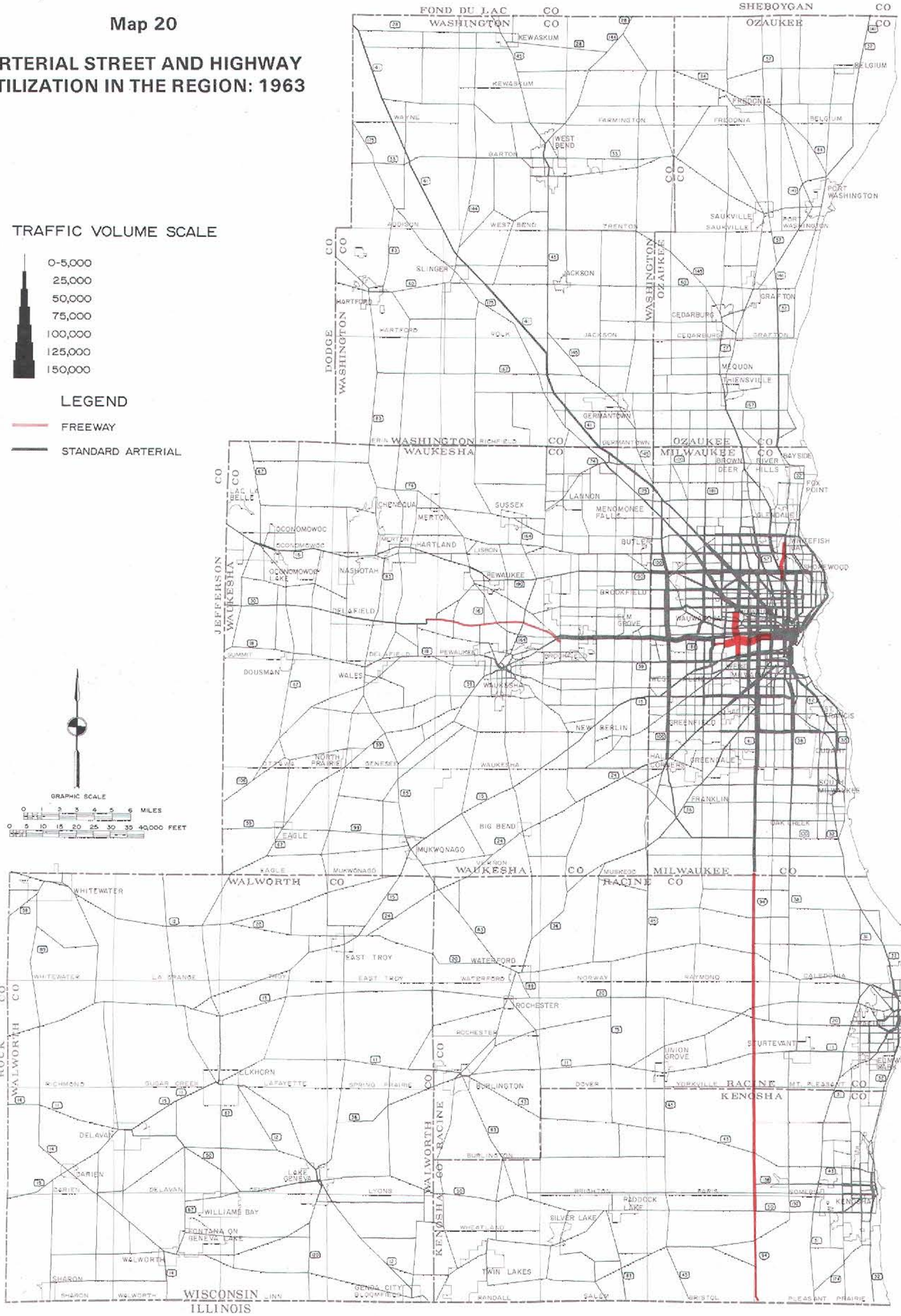
CENTROID CONNECTOR LINK

TRAFFIC ANALYSIS ZONE BOUNDARY

*Source: SEWRPC.*

## Map 20

### ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 1963

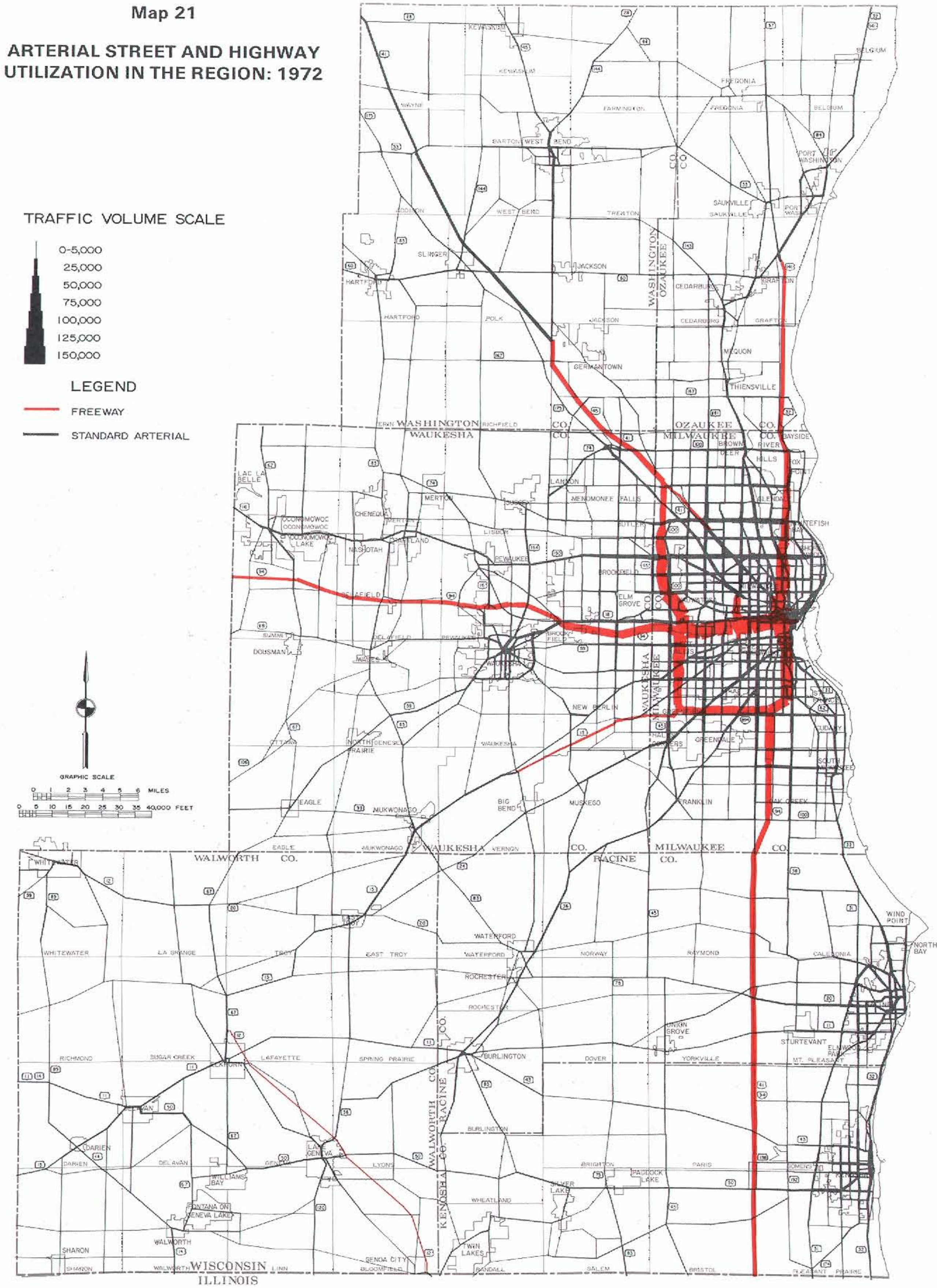



Average weekday traffic flows on the arterial street and highway system in the Region in 1963 are shown on the above map. This pattern of traffic flow is largely representative of pre-freeway conditions in the Region, since very few miles of urban freeway were open to traffic in 1963. In the Milwaukee metropolitan area, very heavy traffic volumes occurred on such standard surface arterials as W. Blue Mound Road, S. 27th Street, W. Capitol Drive, W. Fond du Lac Avenue, W. Appleton Avenue, W. Oklahoma Avenue, and STH 100, the former metropolitan bypass route.

*Source: SEWRPC.*

## Map 21

### ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 1972

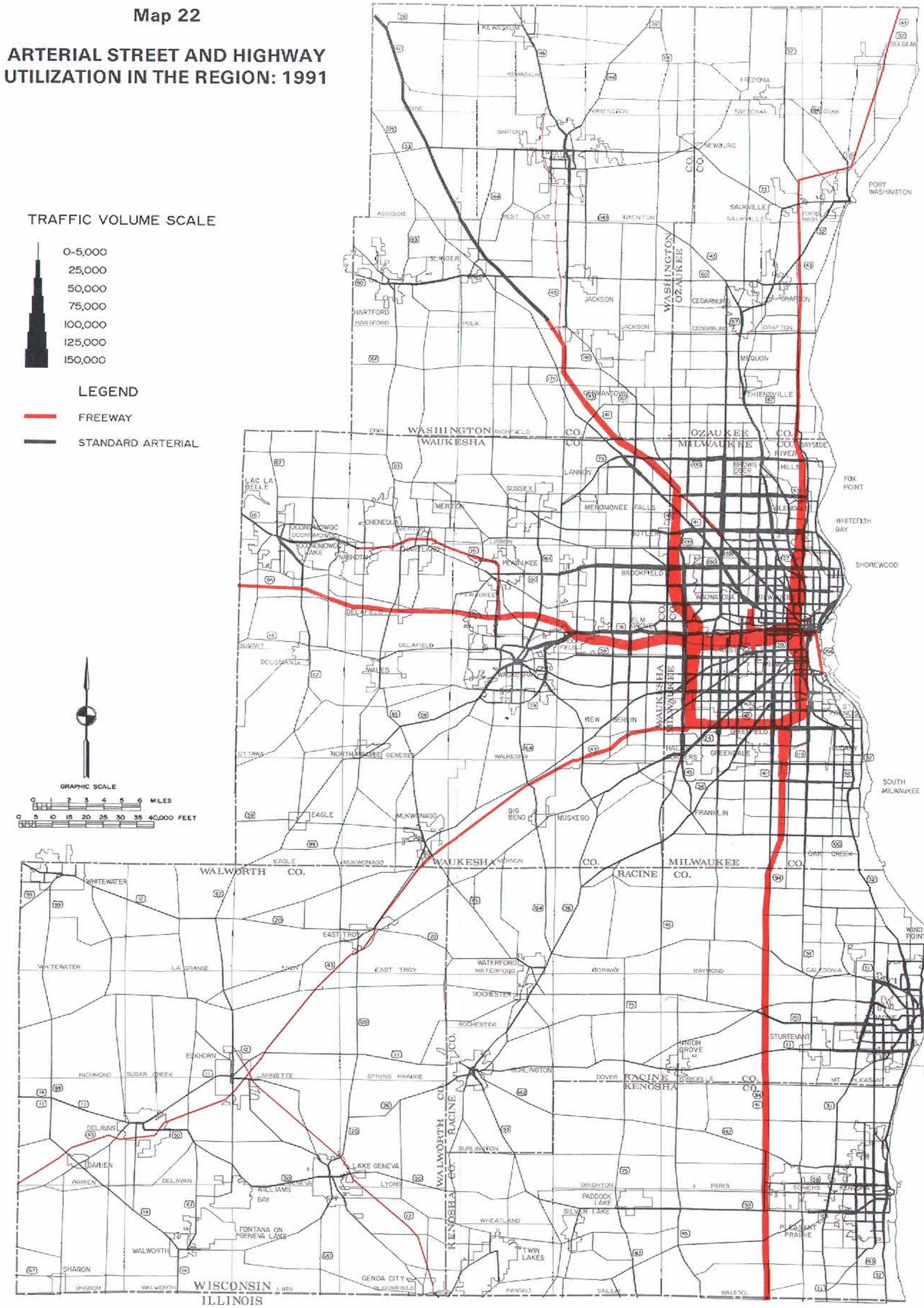



By 1972, the regional freeway system had been developed to the point where significant changes in the utilization of the arterial street and highway system had occurred. The freeways had become efficient and immensely popular carriers of travel, as indicated by the heavy volumes of freeway travel shown on the above map. Significant reductions in traffic flows of facilities in travel corridors served by newly constructed freeways had been effected, as shown by a comparison of 1963 and 1972 traffic volumes. Traffic flows were held at, or actually reduced below, 1963 levels on W. Blue Mound Road, S. 27th Street, W. Oklahoma Avenue, and STH 100. Where freeways were not built in accordance with adopted regional transportation plan recommendations, such as, for example, the Bay Freeway and Fond du Lac Freeway travel corridors, traffic volumes on the standard surface arterials increased significantly between 1963 and 1972.

*Source: SEWRPC.*

## Map 22

### ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 1991




The average weekday traffic flows on the regional arterial system in 1991 are shown on the above map. While little change has occurred in the geographic pattern of arterial use, traffic flows have increased significantly over time. Indeed, about 33 million vehicle-miles of travel were recorded on the arterial system in 1991, a 64 percent increase over the level recorded in 1972 and a 153 percent increase over the level recorded in 1963. In 1991, freeways, which comprised only 9 percent of total arterial mileage in the Region, carried about 39 percent of the total vehicle miles of travel.

*Source: SEWRPC.*

Table 36

ARTERIAL VEHICLE-MILES OF TRAVEL WITHIN THE REGION BY COUNTY: 1963, 1972, AND 1991

| County | 1963 | | 1972 | | 1991 | |
|---|---|---|---|---|---|---|
| | Vehicle-Miles of Travel (thousands) | Percent of Total | Vehicle-Miles of Travel (thousands) | Percent of Total | Vehicle-Miles of Travel (thousands) | Percent of Total |
| Kenosha | 938 | 7.2 | 1,428 | 7.1 | 2,500 | 7.6 |
| Milwaukee | 7,348 | 56.2 | 10,695 | 53.2 | 14,391 | 43.4 |
| Ozaukee | 484 | 3.7 | 850 | 4.2 | 1,942 | 5.9 |
| Racine | 1,125 | 8.6 | 1,813 | 9.0 | 2,966 | 9.0 |
| Walworth | 685 | 5.2 | 873 | 4.3 | 1,913 | 5.8 |
| Washington | 696 | 5.3 | 1,151 | 5.7 | 2,379 | 7.2 |
| Waukesha | 1,796 | 13.8 | 3,314 | 16.5 | 6,981 | 21.1 |
| Region | 13,072 | 100.0 | 20,124 | 100.0 | 33,072 | 100.0 |

| County | Change: 1972-1991 | | Change: 1963-1991 | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| Kenosha | 1,072 | 75.1 | 1,562 | 166.5 |
| Milwaukee | 3,696 | 34.6 | 7,043 | 95.8 |
| Ozaukee | 1,092 | 128.5 | 1,458 | 301.2 |
| Racine | 1,153 | 63.6 | 1,841 | 163.6 |
| Walworth | 1,040 | 119.1 | 1,228 | 179.3 |
| Washington | 1,228 | 106.7 | 1,683 | 241.8 |
| Waukesha | 3,667 | 110.7 | 5,185 | 288.7 |
| Region | 12,948 | 64.3 | 20,000 | 153.0 |

*Source: SEWRPC.*

important freeway segments resulted in significant reductions in traffic volumes on arterials paralleling the freeways and significant increases in traffic volumes on arterials connecting to freeway interchanges. Between 1972 and 1991, however, little change in the pattern of arterial utilization was evident. The magnitude of arterial street and highway use, however, increased significantly.

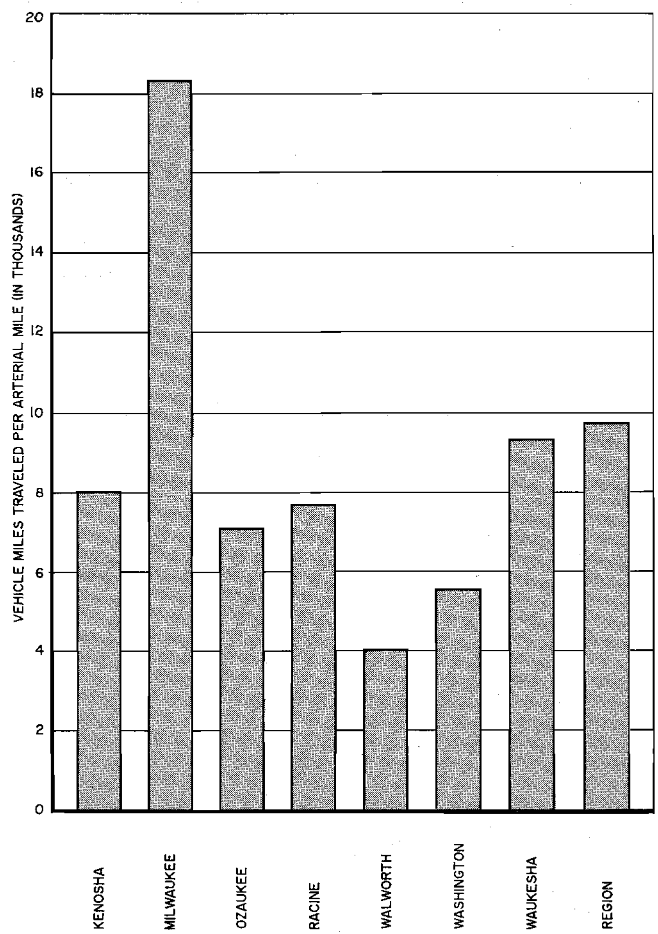
The magnitude of arterial use can be expressed in terms of total vehicle-miles of travel. On an average weekday in 1991, over 33 million VMT were recorded on the arterial street and highway system within the Region. As shown in Table 36, more vehicle-miles were traveled in Milwaukee County than in any other county of the Region. Milwaukee County alone accounted for 43 percent of the total VMT within the Region and exhibited the most intensive utilization of the existing arterial system, recording about 18,750 vehicle-miles of travel per mile of arterial street and highway (see Figure 18).

Table 36 also shows the change in arterial vehicle-miles of travel within each county and for the Region. Between 1972 and 1991, VMT within the Region increased by nearly 13 million vehicle-miles, or by about 64 percent. Between 1963 and 1991, VMT within the Region increased by about 20 million vehicle-miles, or by about 153 percent (see Figure 19).

It is important to note that, while the absolute increase in VMT between 1972 and 1991 within Milwaukee County is significant, nearly 3.7 million, the County's percentage increase in VMT between 1972 and 1991, about 35 percent, is significantly smaller than in the other counties. Further, the percentage increase in VMT in the urbanized counties of Kenosha, Milwaukee, and Racine was smaller than that in the four other counties of the Region. Indeed, vehicle miles traveled in Ozaukee, Walworth, Washington, and Waukesha Counties more than doubled between 1972 and 1991. This finding is indicative of the dispersion of urban development

Figure 18

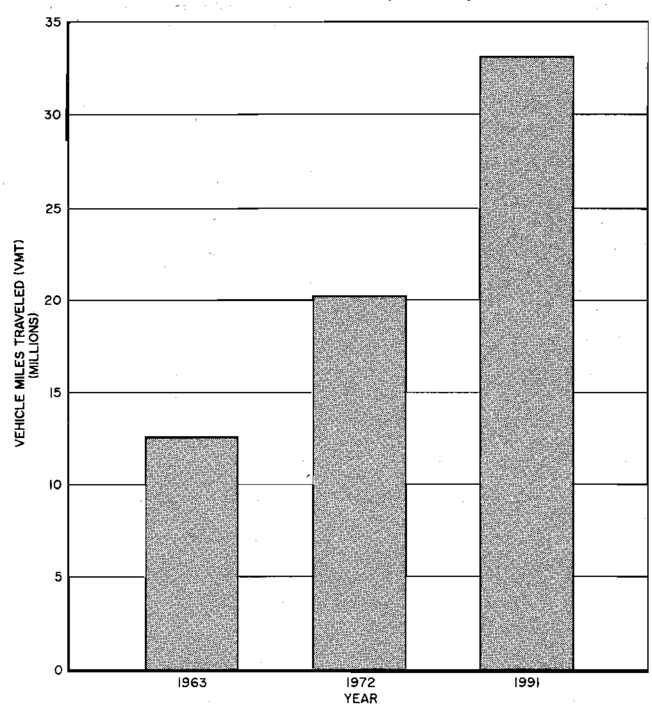
VEHICLE-MILES OF TRAVEL PER ARTERIAL MILE WITHIN THE REGION BY COUNTY: 1991




*Source: SEWRPC.*

Figure 19

ARTERIAL VEHICLE-MILES OF TRAVEL WITHIN THE REGION ON AN AVERAGE WEEKDAY: 1963, 1972, AND 1991




*Source: SEWRPC.*

throughout the Region and the consequent changes in vehicular travel patterns.

Table 37 shows vehicle-miles of travel on freeways and standard arterials, indicating an increasing utilization of freeways within the Region. In 1991, freeways, which constituted 295 miles, or about 9 percent of the total arterial system, carried about 35 percent of total arterial vehicle-miles of travel (see Figure 20), compared to 31 percent in 1972 and 11 percent in 1963. In 1991, freeways within the Region carried nearly 11.6 million vehicle-miles, 87 percent more than the approximately 6.2 million carried in 1972.

Relationship of System Use to Design Capacity

The volume-to-capacity (V/C) ratio exhibited by an arterial facility is a useful means of identifying and quantifying existing and probable future imbalances between street use and supply. The V/C ratio is defined as the relationship between the average daily weekday traffic utilizing a particular section of the arterial system and the design capacity of that section. This relationship, when determined and evaluated for the entire arterial system, is useful in identifying major travel corridors where additional capacity, travel demand management, and/or public transit investment may be needed.

Volume-to-capacity ratios were computed for each link of the arterial network for the base years of the first- and second-generation plans and again for 1991. The results are indicated on Maps 23 through 25. In order to facilitate their presentation and subsequent analysis, the V/C ratios were grouped into three categories: under design capacity, a V/C ratio of 0.90 or less; at design capacity, a V/C ratio of 0.91 to 1.10; and over design capacity, a V/C ratio of 1.11 or more. A description of operational conditions on urban standard arterials, rural arterials, and freeways is provided below.

- In general, urban standard arterials operating under design capacity will have average

Table 37

**ARTERIAL VEHICLE-MILES OF TRAVEL WITHIN THE REGION ON AN AVERAGE WEEKDAY BY COUNTY: 1963, 1972, AND 1991**

| County | 1963 | | | | | |
|---|---|---|---|---|---|---|
| | Freeway | | Standard Arterial | | Total | |
| | Vehicle-Miles of Travel (thousands) | Percent of Total | Vehicle-Miles of Travel (thousands) | Percent of Total | Vehicle-Miles of Travel (thousands) | Percent of Total |
| Kenosha | 204 | 21.7 | 734 | 78.3 | 938 | 100.0 |
| Milwaukee | 531 | 7.2 | 6,817 | 92.8 | 7,348 | 100.0 |
| Ozaukee | 20 | 9.1 | 464 | 95.9 | 484 | 100.0 |
| Racine | 203 | 18.0 | 922 | 82.0 | 1,125 | 100.0 |
| Walworth | - - | 0.0 | 685 | 100.0 | 685 | 100.0 |
| Washington | 345 | 49.6 | 351 | 50.4 | 696 | 100.0 |
| Waukesha | 159 | 8.7 | 1,637 | 91.1 | 1,796 | 100.0 |
| Total | 1,462 | 11.2 | 11,610 | 88.8 | 13,072 | 100.0 |

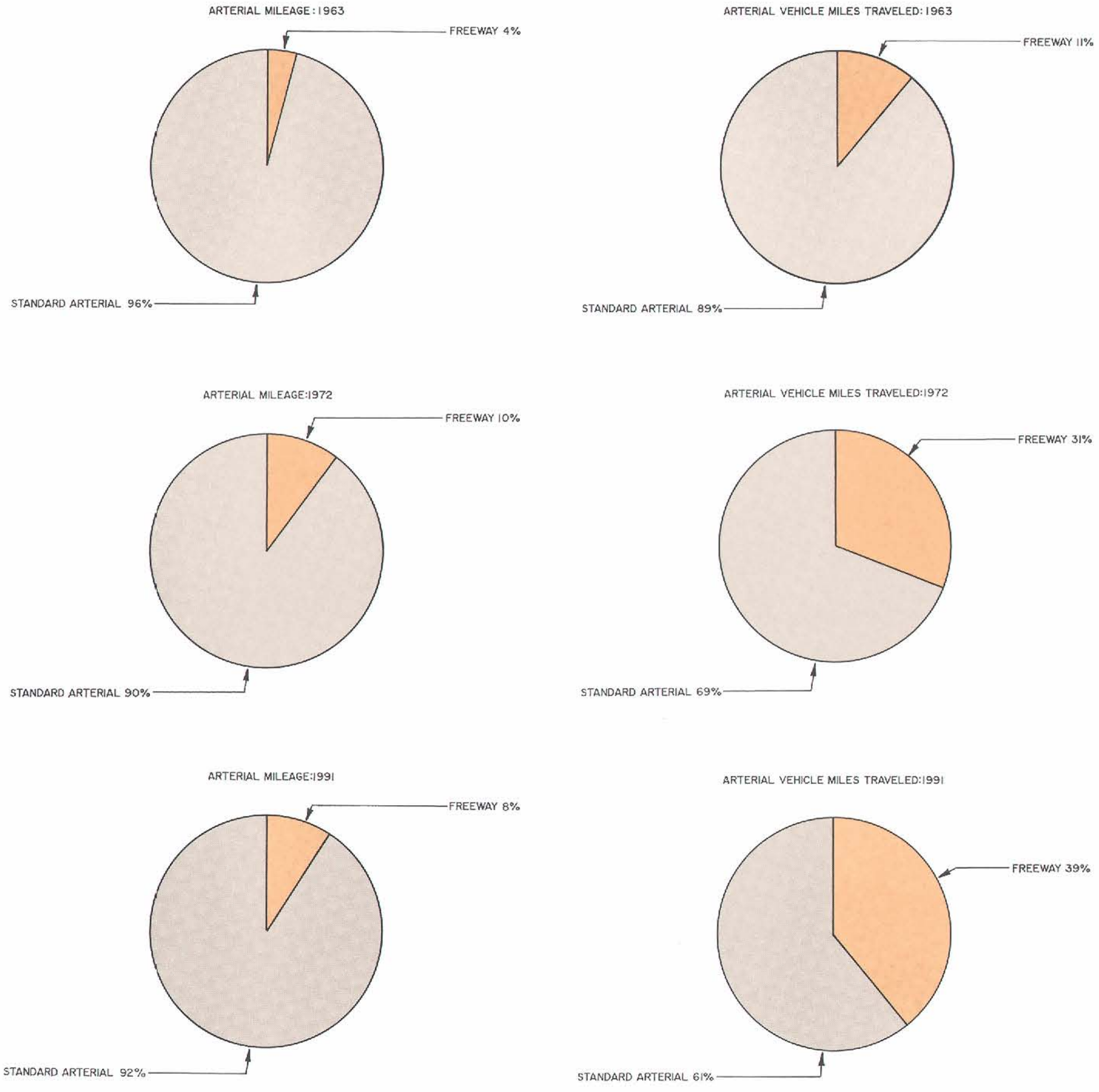
| County | 1972 | | | | | |
|---|---|---|---|---|---|---|
| | Freeway | | Standard Arterial | | Total | |
| | Vehicle-Miles of Travel (thousands) | Percent of Total | Vehicle-Miles of Travel (thousands) | Percent of Total | Vehicle-Miles of Travel (thousands) | Percent of Total |
| Kenosha | 382 | 26.8 | 1,046 | 73.2 | 1,428 | 100.0 |
| Milwaukee | 3,977 | 57.2 | 6,718 | 62.8 | 10,695 | 100.0 |
| Ozaukee | 223 | 26.2 | 627 | 73.8 | 850 | 100.0 |
| Racine | 415 | 12.9 | 1,398 | 77.1 | 1,813 | 100.0 |
| Walworth | 56 | 6.4 | 817 | 93.6 | 873 | 100.0 |
| Washington | 190 | 16.5 | 961 | 33.5 | 1,151 | 100.0 |
| Waukesha | 970 | 29.3 | 2,344 | 70.7 | 3,314 | 100.0 |
| Total | 6,213 | 30.9 | 13,911 | 69.1 | 20,124 | 100.0 |

| County | 1991 | | | | | |
|---|---|---|---|---|---|---|
| | Freeway | | Standard Arterial | | Total | |
| | Vehicle-Miles of Travel (thousands) | Percent of Total | Vehicle-Miles of Travel (thousands) | Percent of Total | Vehicle-Miles of Travel (thousands) | Percent of Total |
| Kenosha | 675 | 27.8 | 1,825 | 53.0 | 2,500 | 100.0 |
| Milwaukee | 5,945 | 41.3 | 8,446 | 58.7 | 14,391 | 100.0 |
| Ozaukee | 762 | 39.2 | 1,180 | 60.8 | 1,942 | 100.0 |
| Racine | 708 | 33.9 | 2,258 | 96.1 | 2,966 | 100.0 |
| Walworth | 540 | 28.2 | 1,373 | 71.8 | 1,913 | 100.0 |
| Washington | 546 | 23.0 | 1,833 | 77.0 | 2,379 | 100.0 |
| Waukesha | 2,421 | 34.7 | 4,560 | 65.3 | 6,981 | 100.0 |
| Total | 11,597 | 35.1 | 21,475 | 64.9 | 33,072 | 100.0 |

*Source: SEWRPC.*

**Figure 20**

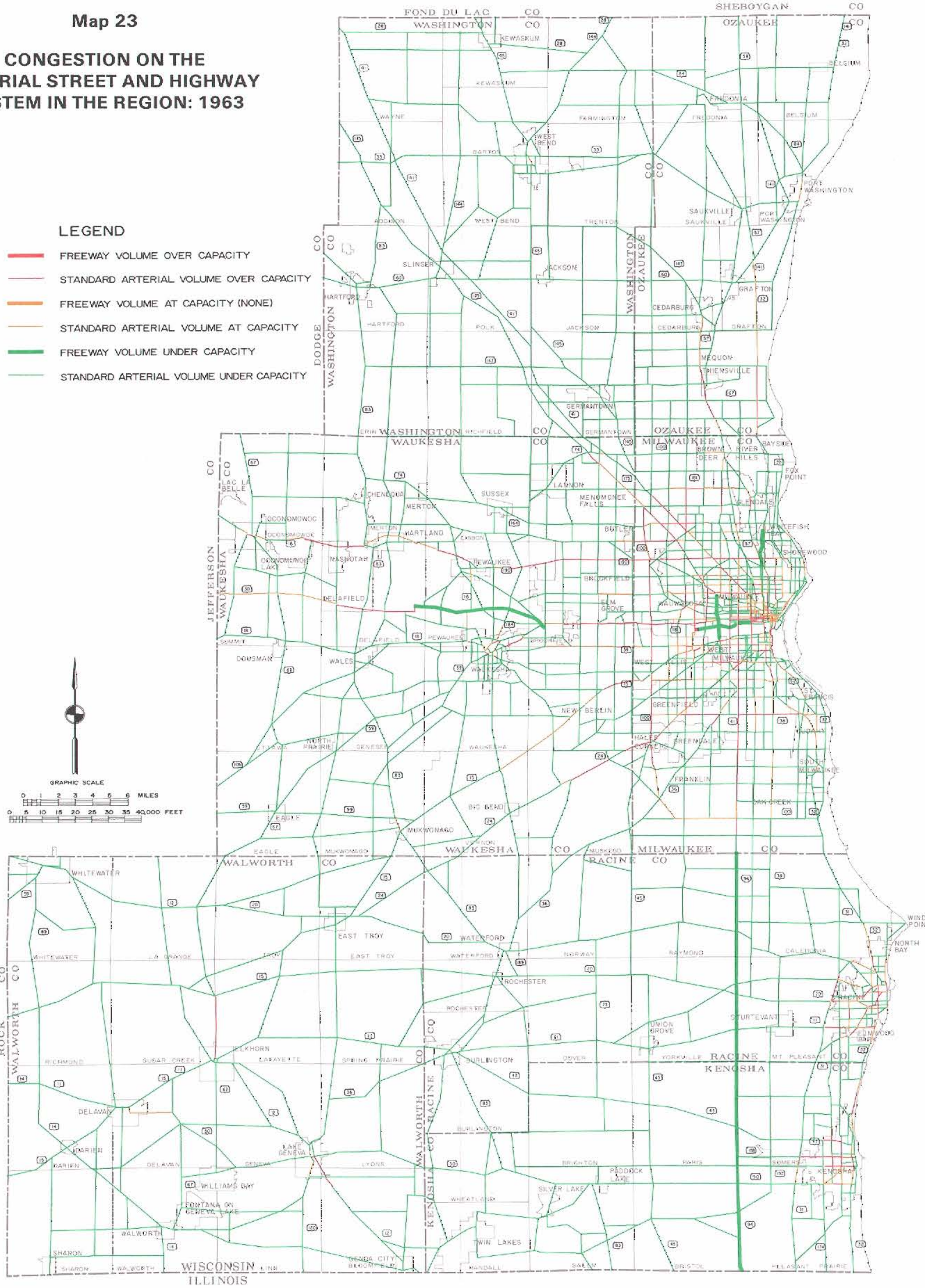
**RELATION OF FREEWAY MILEAGE AND VEHICLE-MILES OF TRAVEL TO TOTAL ARTERIAL MILEAGE AND VEHICLE-MILES OF TRAVEL: 1963, 1972, AND 1991**




*Source: SEWRPC.*

## Map 23

### CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1963



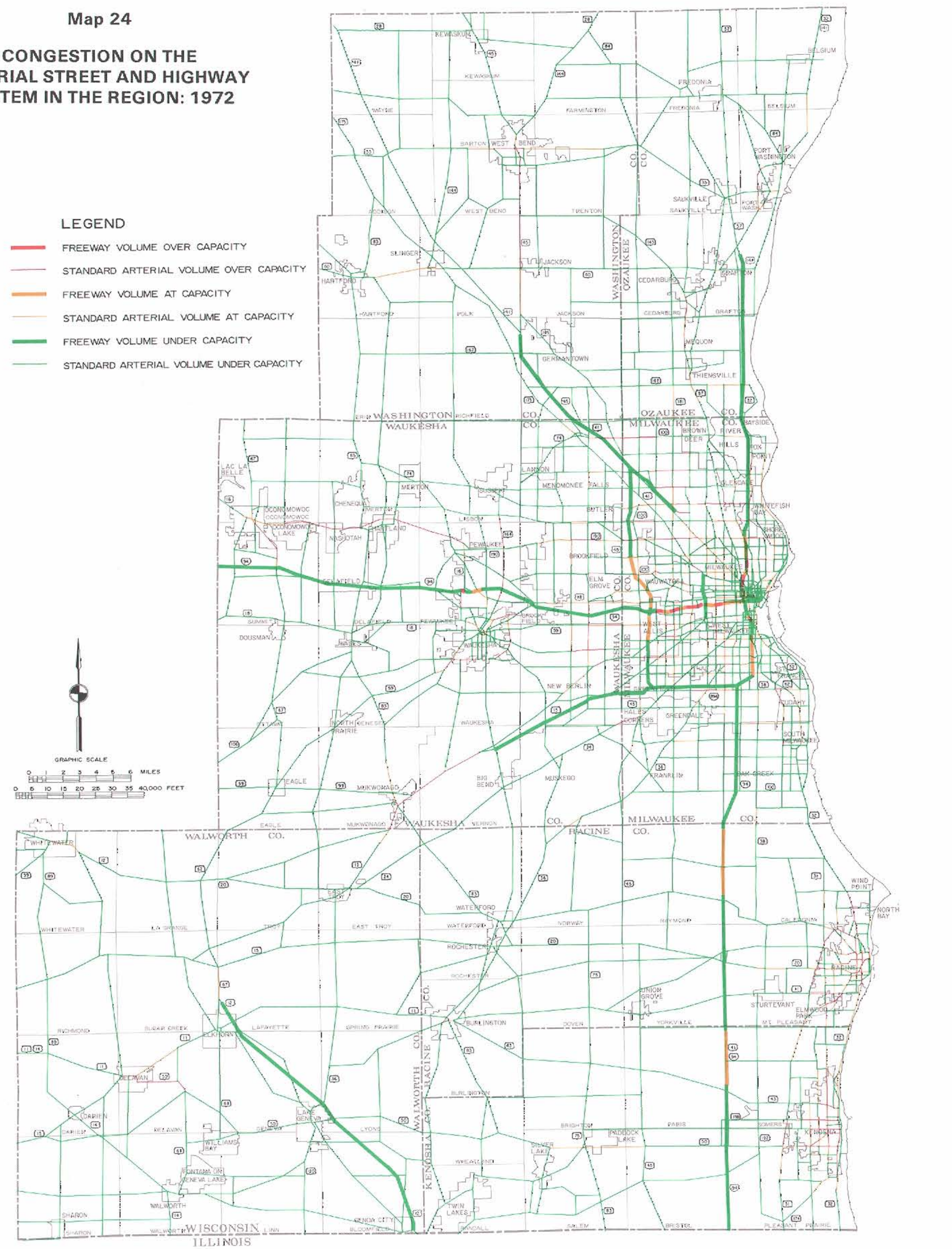

The map above reflects traffic flow patterns and conditions within the Region before urban freeway construction. About 6 percent of the arterial street and highway system in the Region, or about 192 miles, were operating over design capacity or under congested conditions in 1963. Another 4 percent, or about 140 miles, were operating at design capacity. The remaining 90 percent, or 2,857 miles, were operating freely below design capacity. Congestion was particularly severe in the three major urban centers of the Region. In Milwaukee County, about 25 percent of all arterial streets and highways, or about 202 miles, were operating at, or over, design capacity. This included such important surface arterials as W. National Avenue, S. 27th Street, W. Blue Mound Road, STH 100, W. Fond du Lac Avenue, W. Appleton Avenue, and N. Port Washington Road.

*Source: SEWRPC.*



## Map 24

### CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1972

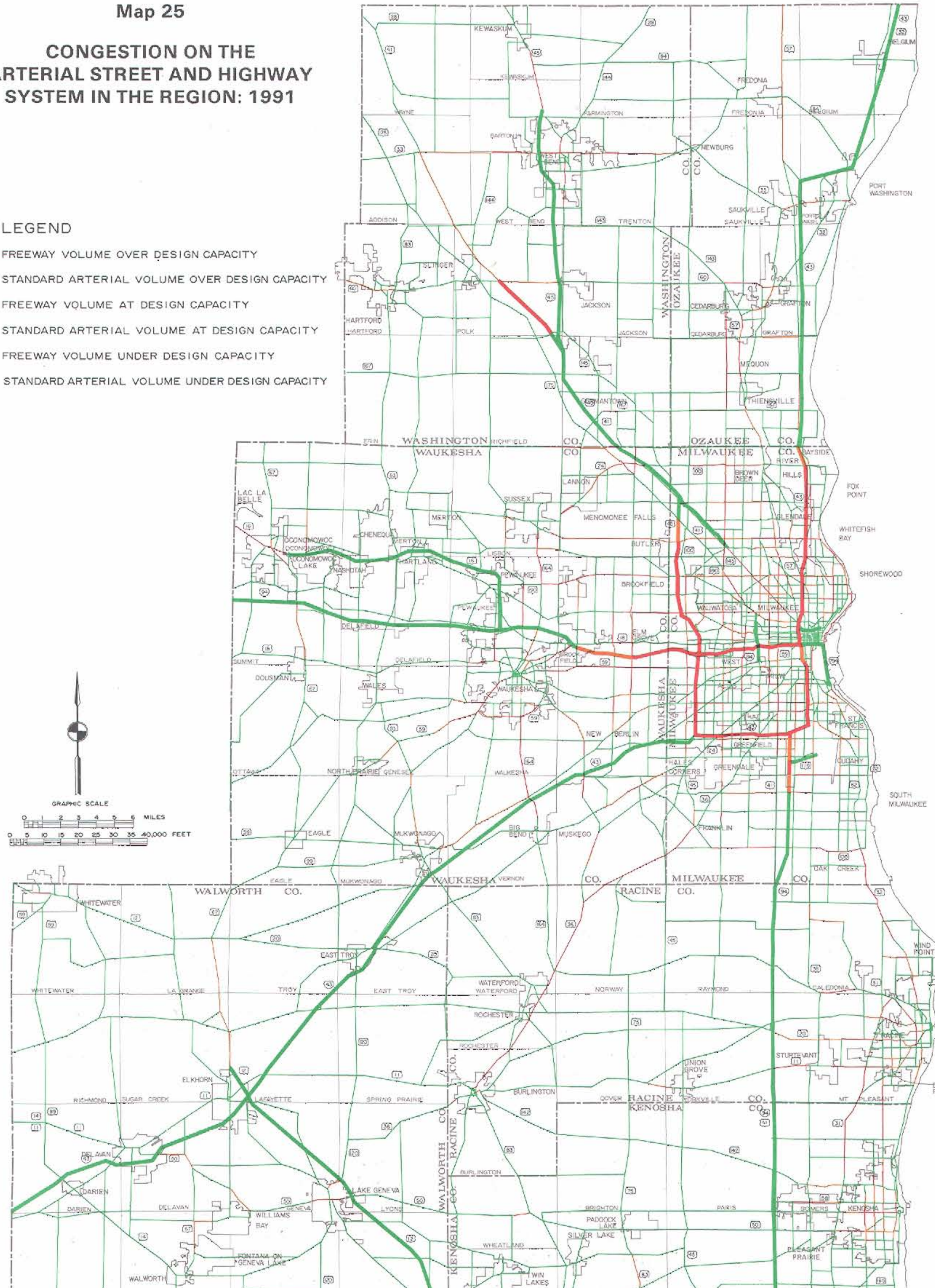



By 1972, the development of the regional freeway system had significantly altered traffic patterns and conditions within the Region. In the Milwaukee area, congestion on many important surface arterials, such as W. National Avenue, S. 27th Street, W. Blue Mound Road, STH 100, W. Fond du Lac Avenue, W. Appleton Avenue, and N. Port Washington Road, had been relieved by the construction of freeway facilities. The overwhelming majority of congested arterial mileage, 87 percent, was located in the Milwaukee, Racine, and Kenosha urbanized areas. In Milwaukee County about 17 percent of the arterial system was operating at or over design capacity, a significant reduction in traffic congestion due largely to the opening of freeway facilities. For the Region as a whole, arterial traffic congestion was held at about 1963 levels despite an 8 percent increase in population, a 40 percent increase in motor vehicle registrations, a 25 percent increase in trip generation, and a 54 percent increase in arterial vehicle-miles of travel. Without the regional freeway system, such increases in travel demand could not have been absorbed without increasing traffic congestion to intolerable levels.

*Source: SEWRPC.*

## Map 25

## CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1991

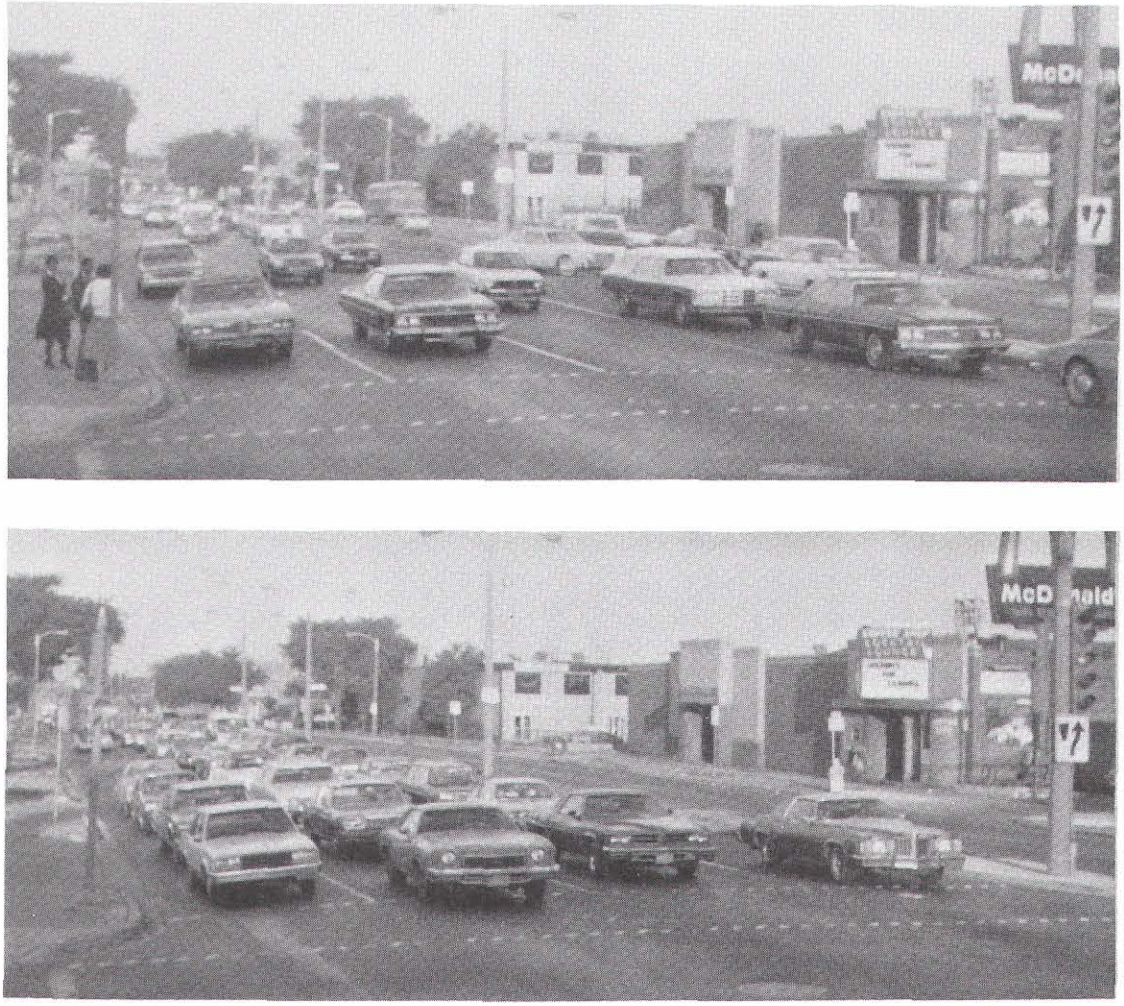



By 1991, the extra highway capacity provided by the expansion of the freeway system within Milwaukee County had largely been exceeded by significant peak-period traffic volumes and traffic congestion on paralleling surface arterial streets and highways, which had diminished upon freeway construction, returned. In 1991, about 279 arterial miles, or nearly 9 percent of the arterial street and highway system, were operating over design capacity; nearly 264 arterial miles, or 8 percent of the arterial system, were operating at design capacity. Within Milwaukee County, in the same year, nearly 30 percent of arterial mileage was operating at, or over, design capacity.

*Source: SEWRPC.*

Figure 21

TYPICAL URBAN ARTERIAL OPERATING AT, AND OVER, DESIGN CAPACITY DURING MORNING PEAK-TRAFFIC PERIOD



The above photographs of the eastbound approach to the intersection of W. Capitol Drive with N. 27th Street depict a typical arterial street "at" design capacity and "over" design capacity operating conditions during the morning peak travel period. The upper photograph, depicting "at" design capacity operation, indicates a steady flow of traffic with some attendant restrictions on a driver's opportunity to change from one traffic lane to another, slightly reduced vehicle operating speed, and short delays at some intersections. The lower photograph, depicting "over" design capacity operation, indicates a heavier flow of traffic, precluding a driver's opportunity to change from one traffic lane to another, substantially reduced vehicle operating speeds, and extended delays at intersections caused by backups of vehicles at the intersection.

*Source: SEWRPC.*

speeds of 25 to 40 miles per hour (mph) and average delays at signalized intersections of five to 15 seconds. Standard arterials operating at design capacity will have average speeds of about 20 to 30 mph and average delays at signalized intersections of about 25 seconds. Urban standard arterial streets operating over design capacity will have substantial delays at signalized intersections. During peak traffic periods, vehicles may have to wait through more than one red traffic signal. The average delay to each vehicle at signalized intersections will be at least 35 seconds and may approach 120 seconds. The average travel speed along such urban arterials will generally be less than 15 to 20 mph. In addition, the potential for accidents is increased on arterials carrying traffic volumes over design capacity. Figure 21 shows a typical urban arterial operating at design capacity and over design capacity during the morning peak traffic period.

- In general, rural arterials (with a 55-mph speed limit) operating under design capacity will have average speeds of 50 to 55 mph, with minimal restrictions on lane changing or passing. Rural arterials operating at design capacity will have average speeds of 45 to 50 mph, with some restrictions on lane changing or passing. Rural arterials operating over design capacity will have average speeds of 30 to 45 mph, with significant restrictions on lane changing on multi-lane facilities and on passing on two-lane facilities.

- In general, freeways (with 55-mph speed limit) operating under design capacity will have average speeds of 55 mph and no restrictions on lane changing. Freeways operating at design capacity will have speeds of 45 to 55 mph and some restrictions on lane changing. Freeways operating over design capacity will have average speeds of 30 to 45 mph and significant restrictions on lane changing. Stop-and-go traffic at speeds below 30 mph may occur behind freeway sections operating over design capacity.

Designations of levels of service are used to measure qualitatively the operational characteristics of a given link in the arterial network. Under this approach, there are six levels of service corresponding to letters "A" through "F," "A" describing free-flow, unrestricted traffic conditions and "F" describing a breakdown in traffic flow, the point past which conceptually it becomes impossible to operate an additional vehicle on the facility. The three ranges of V/C ratios, previously indicated, generally correspond to levels of service designations in the following manner: facilities operating under design capacity represent levels of service "A" or "B," facilities operating at design capacity represent level of service "C," facilities operating over design capacity represent levels of service "D," "E," or "F." Figure 22 shows freeway traffic conditions under each of the six levels of service.

As shown on Map 25, most of the arterial mileage operating at or over design capacity within the Region is located in, and adjacent to, intensely developed urban areas. Indeed, about 44 percent of the arterial mileage within the Region operating over design capacity in 1991 was located within Milwaukee County and nearly 16 percent of the total arterial mileage within Milwaukee County was operating over design capacity during an average weekday in 1991 (see Table 38). A comparison of Maps 23 through 25 also indicates that traffic congestion has increasingly occurred on arterials located within small urban areas. As shown on Map 25, arterial facilities operating at or over design capacity in 1991 were located within the Cities of Cedarburg, Lake Geneva, Oconomowoc, and West Bend and within the Villages of Grafton and Hartland.

Traffic congestion is closely tied to the supply and use of arterial highway capacity. Between 1963 and 1972, arterial mileage operating at or over design capacity decreased by about 14 miles, or 4 percent, to 166 miles. This decrease in traffic congestion was primarily due to the construction of the freeway system and the additional arterial capacity freeways provided. Between 1972 and 1991, however, arterial mileage operating at and over design capacity increased significantly, as shown in Figure 23. Indeed, the number of miles operating at or over design capacity increased by 71 percent, from about 318 in 1972 to 543 in 1991. Between 1963 and 1991, the number of arterial miles operating at or over design capacity increased by 212 miles, or about 64 percent.

## CLASSIFICATION, SUPPLY, AND UTILIZATION OF PUBLIC TRANSIT

If a balanced regional transportation system is to be designed, careful attention must be given to the existing public fixed-route transit facilities and services of areawide significance and to their potential use. Such facilities and services must be designed as integral parts of the regional transportation system. This section defines and classifies the various types of public transportation, identifies the urban fixed-route public transit system considered in the regional transportation system planning process and in the traffic simulation procedures, and describes the existing provision and utilization of public transit services within the Region.

### System Classification

Public transportation may be defined as the transportation of relatively large groups of people by publicly, quasi-publicly, or privately owned

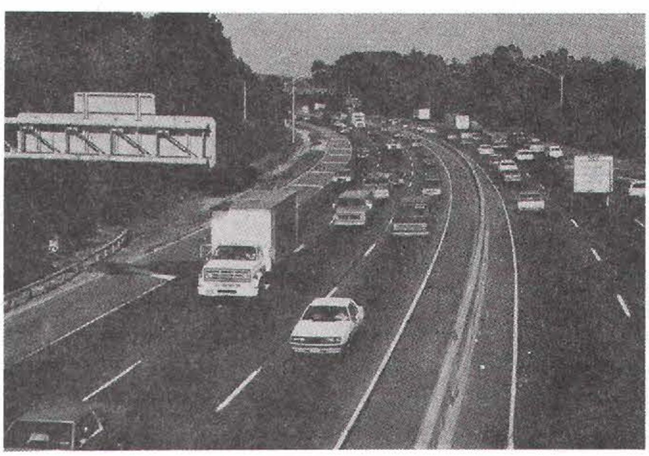
## Figure 22

### CONCEPTUAL LEVELS OF SERVICE ON THE FREEWAY SYSTEM

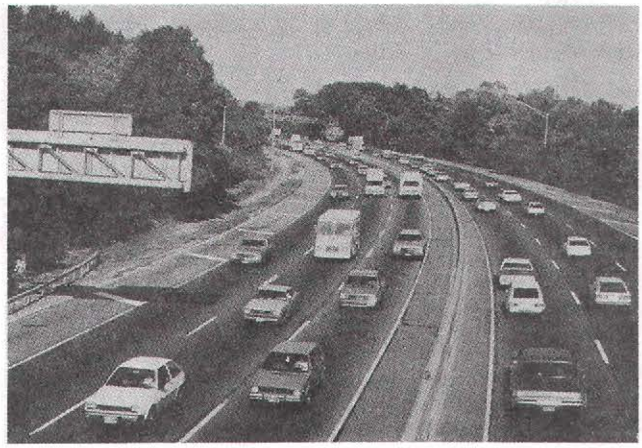
BASIC FREEWAY SEGMENTS

LEVEL-OF-SERVICE A

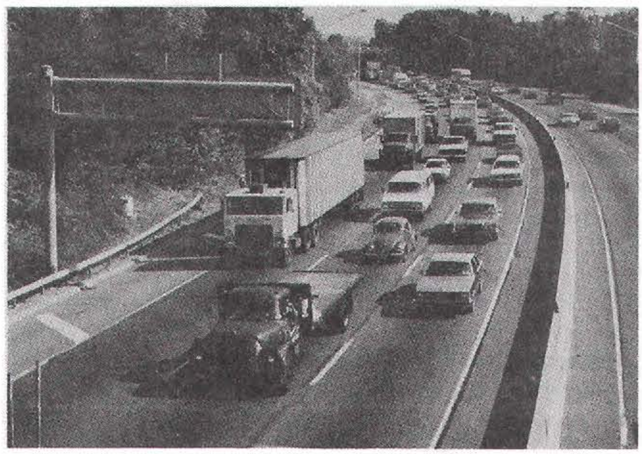
LEVEL-OF-SERVICE B



LEVEL-OF-SERVICE C



LEVEL-OF-SERVICE D



LEVEL-OF-SERVICE E

LEVEL-OF-SERVICE F

*Source: Transportation Research Board, National Research Council, Highway Capacity Manual, Washington D. C., 1985.*

Table 38

VOLUME-TO-CAPACITY RATIOS[a] FOR THE ARTERIAL STREET AND HIGHWAY SYSTEM WITHIN THE REGION BY COUNTY: 1963, 1972, AND 1991

| County | 1963 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Volume-to-Capacity Range 0.00-0.90 | | Volume-to-Capacity Range 0.91-1.10 | | Volume-to-Capacity Range Over 1.10 | | |
| | Mileage | Percent of Total | Mileage | Percent of Total | Mileage | Percent of Total | Total Mileage |
| Kenosha | 260.8 | 92.6 | 7.2 | 2.6 | 13.5 | 4.8 | 281.5 |
| Milwaukee | 589.8 | 74.5 | 85.4 | 10.8 | 116.3 | 14.7 | 791.5 |
| Ozaukee | 250.3 | 94.5 | 6.3 | 2.4 | 8.3 | 3.1 | 264.9 |
| Racine | 327.7 | 93.3 | 10.0 | 2.8 | 13.6 | 3.9 | 351.3 |
| Walworth | 390.5 | 97.7 | 3.9 | 1.0 | 5.3 | 1.3 | 399.7 |
| Washington | 401.8 | 99.9 | 0.5 | 0.1 | 0.0 | 0.0 | 402.3 |
| Waukesha | 635.6 | 91.2 | 26.6 | 3.8 | 34.8 | 5.0 | 697.0 |
| Region | 2,856.5 | 89.6 | 139.9 | 4.4 | 191.8 | 6.0 | 3,188.2 |

| County | 1972 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Volume-to-Capacity Range 0.00-0.90 | | Volume-to-Capacity Range 0.91-1.10 | | Volume-to-Capacity Range Over 1.10 | | |
| | Mileage | Percent of Total | Mileage | Percent of Total | Mileage | Percent of Total | Total Mileage |
| Kenosha | 250.4 | 87.2 | 14.7 | 5.1 | 22.0 | 7.7 | 287.1 |
| Milwaukee | 662.9 | 83.3 | 71.8 | 9.0 | 61.0 | 7.7 | 795.7 |
| Ozaukee | 237.9 | 93.8 | 10.1 | 4.0 | 5.5 | 2.2 | 253.5 |
| Racine | 316.0 | 88.9 | 19.1 | 5.4 | 20.3 | 5.7 | 355.4 |
| Walworth | 404.5 | 98.2 | 2.7 | 0.7 | 4.8 | 1.1 | 412.0 |
| Washington | 326.0 | 94.6 | 9.7 | 2.8 | 9.1 | 2.6 | 344.8 |
| Waukesha | 603.5 | 90.0 | 23.8 | 3.6 | 42.9 | 6.4 | 670.2 |
| Region | 2,801.2 | 89.8 | 151.9 | 4.9 | 165.6 | 5.3 | 3,118.7 |

| County | 1991 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Volume-to-Capacity Range 0.00-0.90 | | Volume-to-Capacity Range 0.91-1.10 | | Volume-to-Capacity Range Over 1.10 | | |
| | Mileage | Percent of Total | Mileage | Percent of Total | Mileage | Percent of Total | Total Mileage |
| Kenosha | 286.0 | 90.9 | 16.6 | 5.2 | 15.1 | 4.8 | 317.7 |
| Milwaukee | 543.2 | 70.1 | 110.3 | 14.2 | 121.9 | 15.7 | 775.4 |
| Ozaukee | 254.2 | 88.1 | 21.0 | 7.3 | 13.3 | 4.6 | 288.5 |
| Racine | 288.7 | 83.0 | 24.9 | 7.2 | 34.3 | 9.8 | 347.9 |
| Walworth | 411.1 | 95.8 | 15.0 | 3.5 | 3.1 | 0.7 | 429.2 |
| Washington | 356.5 | 89.5 | 23.2 | 5.8 | 19.5 | 4.9 | 399.2 |
| Waukesha | 591.3 | 82.5 | 53.0 | 7.4 | 72.0 | 10.1 | 716.3 |
| Region | 2,731.0 | 83.4 | 264.0 | 8.1 | 279.2 | 8.5 | 3,274.2 |

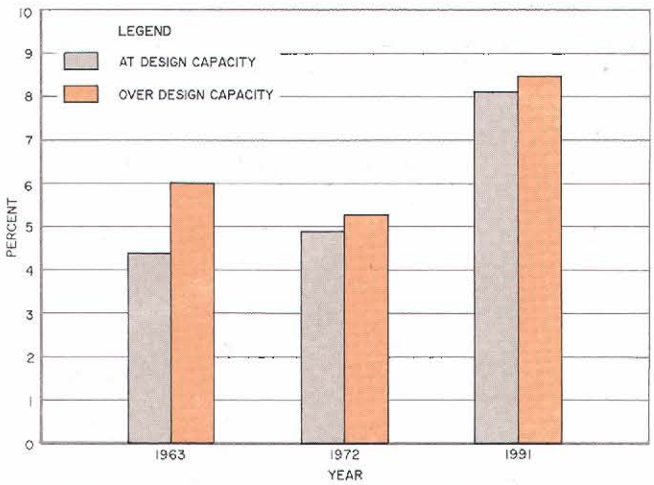
[a] *The significance of the volume-to-capacity ratio of the ranges used is:*

*0.00-0.90 - Under design capacity, fully adequate and safest operational level.*
*0.91-1.10 - At design capacity but still adequate.*
*Over 1.10 - Over design capacity, congested at times.*

*Source: SEWRPC.*

Figure 23

**PERCENTAGE OF TOTAL ARTERIAL MILEAGE OPERATING AT, AND OVER, DESIGN CAPACITY: 1963, 1972, 1991**




NOTE: AT DESIGN CAPACITY--VOLUME TO CAPACITY RATIO OF 0.91 TO 1.10
OVER DESIGN CAPACITY--VOLUME TO CAPACITY RATIO OVER 1.10

*Source: SEWRPC.*

vehicles routed between or along significant concentrations of related trip origins and destinations. Public transportation is most commonly provided in the Region by motor bus, commercial airplane, and railway passenger train.

As shown in Figure 24, public transportation may be divided into two subcategories: fixed-route and nonfixed-route. Fixed-route public transportation operates relatively large vehicles over predetermined routes on regular schedules and provides service to the general public or special subgroups. Nonfixed-route public transportation provides service to the general public or to special subgroups on a demand-responsive basis and includes paratransit service provided to disabled persons. Demand-responsive service is characterized by the flexible routing and scheduling of relatively small vehicles to provide shared-occupancy door-to-door transportation.

Operation of fixed-route public transportation can be simulated by mathematical models developed and maintained by the Commission. Fixed-route passenger transportation modes provided within the urban areas of the Region are therefore explicitly considered in the regional transportation system planning process. Operation of nonfixed-route public transportation, however, cannot be readily mathematically simulated and is only implicitly considered in the planning process. Nonfixed-route public transportation is given more definitive consideration by the Commission in subregional planning efforts, particularly in the preparation of transit system development programs for the urban areas of the Region.

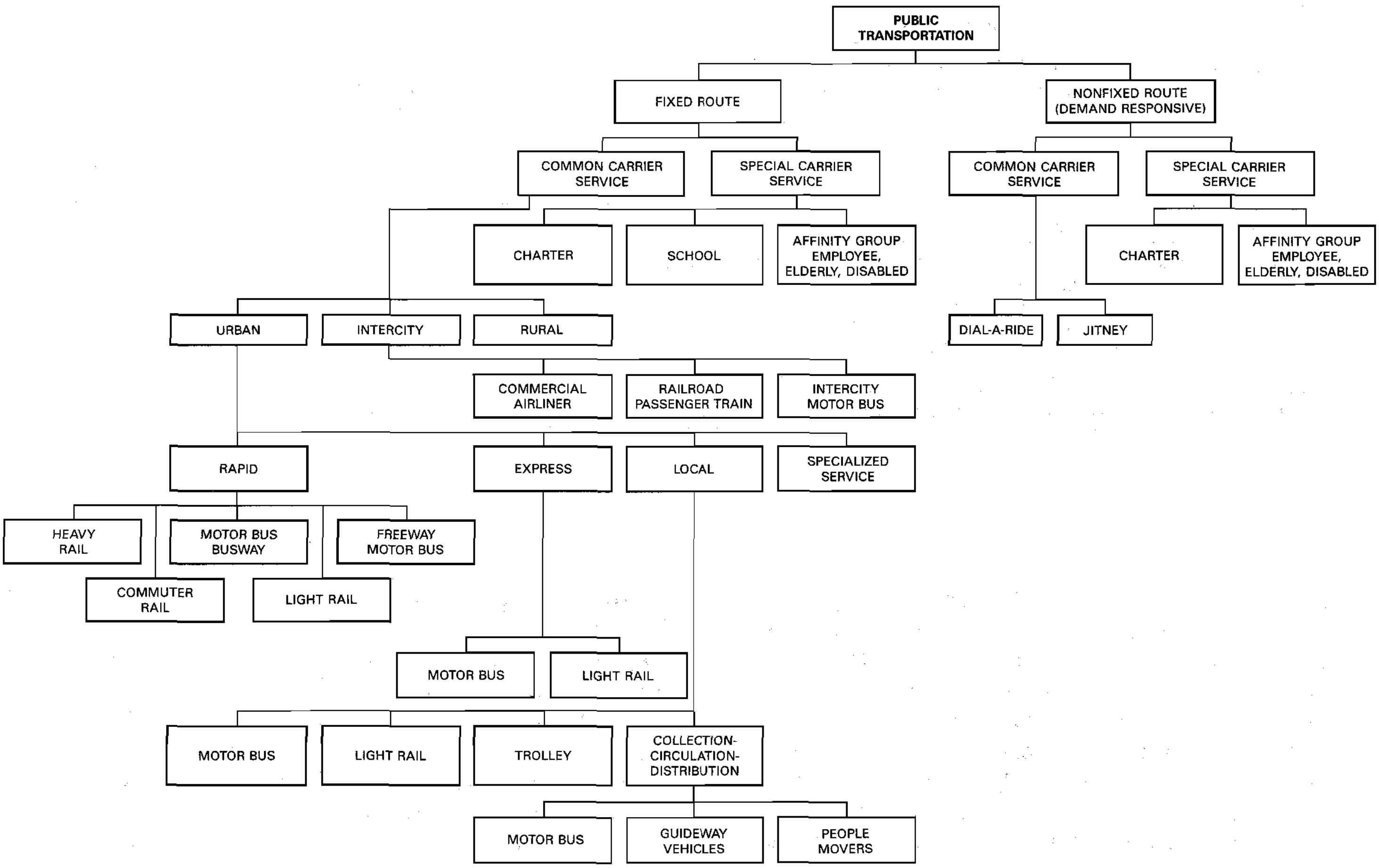
Fixed-route public transportation may be divided into common-carrier service and special-carrier service. Fixed-route common-carrier service is provided to the general public, while special-carrier service is provided to subgroups. Examples of fixed-route special-carrier public transportation include yellow school bus service operated by area school districts and the special U-Bus service operated by the University of Wisconsin-Milwaukee for its students and staff. Special-carrier service is considered only implicitly in the planning process.

As shown in Figure 24, fixed-route common-carrier service may be divided into three categories: interregional, urban, and rural. Interregional public transportation provides service across regional boundaries to meet external travel demand and includes commercial air travel, railway passenger service, and interregional bus service. Rural public transportation provides service in rural communities, making accessible economic and social opportunities otherwise not readily available in such areas to persons without access to a personal vehicle. Urban public transportation, commonly referred to as public transit, provides service within and between urban areas of the Region to meet internal travel demand. Public transit is essential in any metropolitan area to meet the travel needs of persons unable to use personalized transportation and to provide an alternative mode of travel for certain trips within and between urban areas.

Urban public transit is explicitly considered in the regional transportation planning process, while interregional and rural services are not. Interregional service is considered only to the extent that terminal and intermodal facilities, such as airports and bus and railway stations, comprise major trip generators affecting internal travel demand and patterns. Interregional commercial air travel is explicitly considered by the Commission under a separate comprehensive regional airport system planning program, while

Figure 24

**CLASSIFICATION OF EXISTING PUBLIC TRANSPORTATION**




*Source: SEWRPC.*

interregional passenger railway and motor bus service is considered by the Wisconsin Department of Transportation under a separate Statewide planning program.

Urban public transit may be divided into rapid, express, local, and paratransit levels of service. Rapid transit is intended to facilitate relatively fast and convenient transportation along heavily traveled corridors and between major activity centers and high- and medium-density residential communities within the Region. Rapid transit has relatively high average operating speeds and relatively low accessibility, with station spacings, if any, one-half mile or more apart. Rapid transit service can be provided by commuter rail and heavy rail operating over exclusive, grade-separated rights-of-way or by motor buses operating over exclusive, grade-separated busways. Rapid transit can also be provided by motor buses operating in mixed traffic on freeways and by light rail operating over exclusive, though not grade-separated, rights-of-way. All forms of rapid transit service are explicitly considered in the planning process. Table 39 presents the distinguishing characteristics of commuter, heavy, and light rail.

Express transit service is provided over arterial streets and highways with stops generally no less than 1,200 feet apart at intersecting transit routes, intersecting arterial streets, and major traffic generators. Express transit serves trips of moderate length and can be provided by motor bus or by light rail operating in mixed traffic on shared rights-of-way. Express transit service provides a greater degree of accessibility at somewhat slower operating speeds than rapid transit and may provide "feeder" service to the rapid transit system. Express transit service is also explicitly considered in the regional transportation system planning process.

Table 39

DISTINGUISHING CHARACTERISTICS OF COMMUTER, HEAVY, AND LIGHT RAIL

| Characteristic | Commuter Rail | Heavy Rail | Light Rail |
|---|---|---|---|
| Passenger Capacity | Seating capacity ranging from 88 to 157 passengers per car | From 180 to 250 passengers per car; seating capacity ranging from 44 to 62 passengers per car | From 75 to 80 passengers per car, or 155 to 180 passengers per two-car articulated unit; seating capacity ranging from 50 to 62 passengers per car, or 68 to 80 passengers per two-car articulated unit |
| Length of Trains | Typically three cars | Up to 10 cars | One to three cars |
| Passenger Loading | At grade-level or high-level platform | High-level platform | At grade-level or high-level platform |
| Power Supply | Electric-overhead wire or third rail; diesel-electric locomotives on self-propelled coaches | Electric-third rail | Electric-overhead wire |
| Right-of-Way | Usually fully grade-separated | Usually fully grade-separated | Usually not fully grade separated |

*Source: SEWRPC.*

Local transit service is characterized by a high degree of accessibility and low operating speeds. Local service is provided over arterial and collector streets with stops no more than 1,200 feet apart. Such service can be provided by motor bus, electric trolleybus, or light rail vehicles and is explicitly considered in the regional transportation system planning process. Local transit also provides a passenger collection-circulation-distribution function within major activity centers. The collection-circulation-distribution function of local transit service may include the use of motor buses, electric trolleybuses, vans, light rail vehicles, automated guideway vehicles, and other methods of moving people. This function of local transit service is explicitly considered by the Commission in the subregional transportation planning process, particularly in the preparation of transit system development programs for the Milwaukee, Kenosha, Racine, West Bend, and Waukesha urban areas.

Paratransit is operated within local transit service areas to meet the transportation needs of the elderly and of those persons who because of mental or physical disability are unable to avail themselves of conventional transit service. Such service is explicitly considered by the Commission in the preparation and annual update of paratransit service plans for each of the six urban public transit systems in the Region.

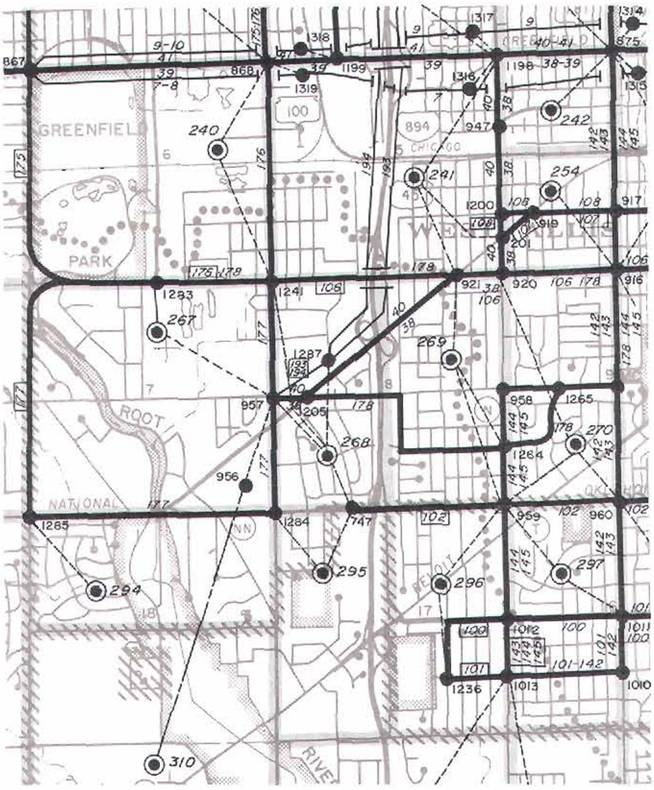
System Identification

The urban fixed-route, common-carrier, rapid, express, and local transit service provided in the Region, except the collection and distribution function of local transit, was the object of the inventory necessary to build the transit network used in travel forecasting and system analysis. In building the transit network, node numbers were assigned to all transfer and terminal points and each segment between two nodes was defined as a link.

The transit network, graphically represented in Figure 25, is more complex than the arterial street and highway network since links must be encoded to allow the special travel times associated with transit use to be simulated. Travel times involved in walking, waiting, boarding and exiting transit vehicles, and shuttling between auto and transit modes are accounted for by these special links. These data permit the identification and calculation of minimum travel time paths through the entire regional transit network and the assignment of traffic to these minimum time paths, thereby accurately simulating public transit travel within the Region. The public transit system considered in the construction of the transit network consists of six separate subsystems operated by two counties and three municipalities. The rapid, express, and local services provided by these six subsystems within the Region are described below.

## Figure 25

**EXAMPLE OF TRANSIT NETWORK**




LEGEND

310 ZONE CENTROID AND NUMBER

875 LINK NODE AND NUMBER

FREEWAY / EXPRESS TRANSIT LINK

LOCAL TRANSIT LINK

WALK / TRANSFER LINK

AUTO CONNECTOR LINK

177 TRANSIT LINE NUMBER

176 TRANSIT LINE TERMINUS

TRAFFIC ANALYSIS ZONE BOUNDARY

*Source: SEWRPC.*

Rapid Transit: Rapid transit service within the Region in 1991 consisted of 13 freeway flyer motor bus routes. Eleven routes were provided by Milwaukee County and operated by the Milwaukee County Transit System. Operation of the remaining two was initiated in 1981 by Waukesha County. The first route, between the Village of Menomonee Falls and the central business district (CBD) of Milwaukee, was operated for the County by the Milwaukee County Transit System. The other, between the City of Oconomowoc and the Milwaukee CBD was operated for the County by Wisconsin Coach Lines, Inc., a private transit operator (see Map 28).

In 1963, the base year of the initial regional transportation system plan, rapid transit within the Region consisted of commuter rail service operated by the Milwaukee Road between the City of Watertown, located approximately 10 miles west of the City of Oconomowoc but outside the Region, and the Milwaukee CBD (see Map 26). Freeway flyer service was initiated in 1964 by the Milwaukee and Suburban Transport Corporation between the City of Wauwatosa and the Milwaukee central business district. By 1972, seven routes were operated by the Milwaukee and Suburban Transport Corporation over freeways in the Milwaukee urban area, as shown on Map 27.

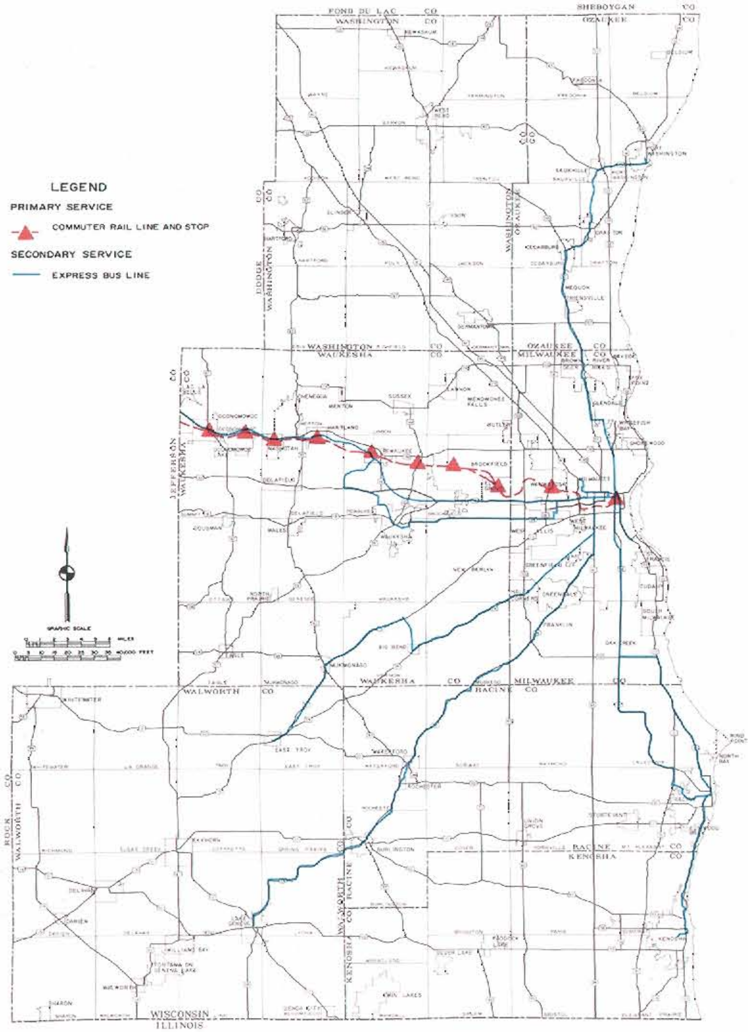
Express Transit: Express transit service provided within the Region in 1991 is also shown on Map 28. In 1991, express transit service consisted of a total of seven motor bus routes, including three routes in the Oconomowoc-Waukesha-Milwaukee travel corridor operated for Waukesha County by Wisconsin Coach Lines, Inc., three routes in Milwaukee County operated by the Milwaukee County Transit System, and one route between the Milwaukee CBD and the Cities of Racine and Kenosha sponsored since 1984 by the City of Racine and operated by Wisconsin Coach Lines, Inc. The most frequent commuter service in the Region in 1991, as in 1972, was provided by Wisconsin Coach Lines, Inc., in the Waukesha-Milwaukee travel corridor, with 18 eastbound trips and 17 westbound trips per weekday.

As shown on Map 26, express transit service in 1963 consisted of eight bus routes operated in several travel corridors by Greyhound Lines and Wisconsin Coach Lines, Inc., and two routes operated in the Milwaukee urban area by the Milwaukee and Suburban Transport Corporation. Express transit service remained largely unchanged during the 1963 through 1972 period; however, service between Waukesha and Oconomowoc and between Milwaukee and East Troy was abandoned. As shown on Map 27, in 1972 express service was operated over five routes by Wisconsin Coach Lines, Inc., and over two routes operated by the Milwaukee and Suburban Transport Corporation.

Local Transit: Fixed-route local transit service was provided in 1991 within the Kenosha, Milwaukee, and Racine urbanized areas. Local transit in the Kenosha urbanized area was provided by the City of Kenosha Transit Com-

## Map 26

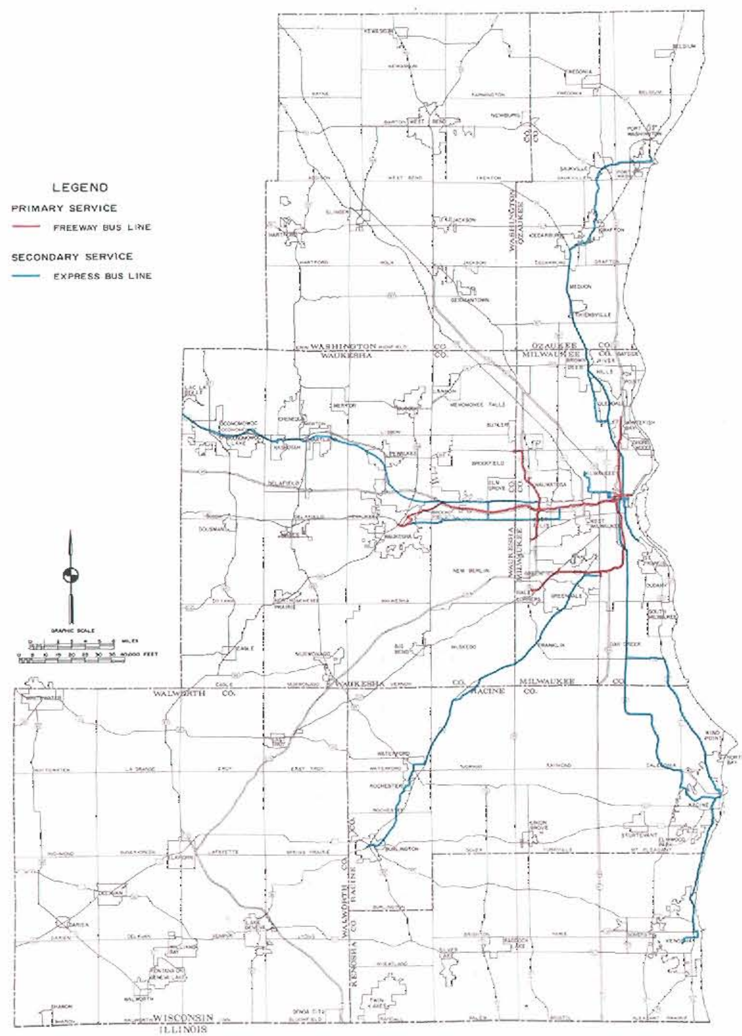
### RAPID AND EXPRESS FIXED-ROUTE PUBLIC TRANSIT IN THE REGION: 1963




*Source: SEWRPC.*

## Map 27

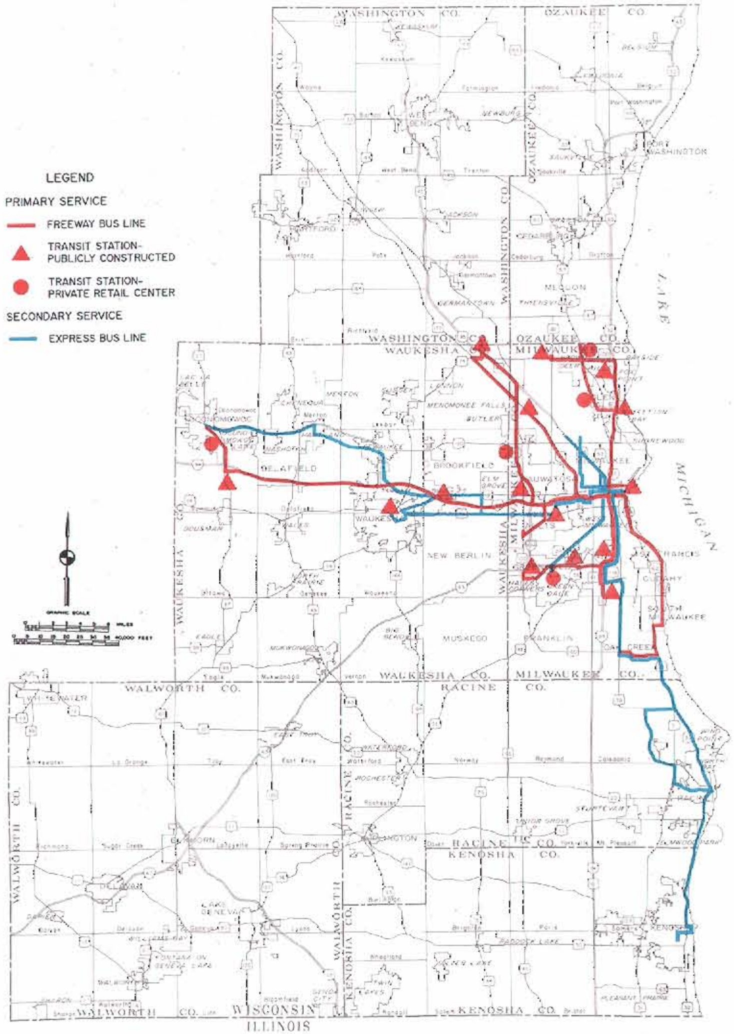
### RAPID AND EXPRESS FIXED-ROUTE PUBLIC TRANSIT IN THE REGION: 1972




*Source: SEWRPC.*

## Map 28

### RAPID AND EXPRESS FIXED-ROUTE PUBLIC TRANSIT IN THE REGION: 1991




*Source: SEWRPC.*

Maps 26, 27, and 28 show the rapid and express transit systems in the Region as these systems existed in 1963, 1972, and 1991. Rapid transit in 1963 consisted solely of commuter railway passenger train service operated by the Milwaukee Road between Watertown, just west of the Region, and the Milwaukee central business district. By 1972, such service had been abandoned and seven freeway flyer motor bus routes were operated within the Milwaukee area. By 1991, rapid transit service in the Region was provided in a fairly dense network of 13 freeway flyer routes, largely within Milwaukee County. While the geographic extent of rapid transit service increased over time, the extent of express transit service was reduced. Express transit in 1963 consisted of 10 bus routes operated within most of the major regional travel corridors oriented to central Milwaukee. By 1972, express service between Waukesha and Oconomowoc and between Milwaukee and East Troy had been dropped and express service between Lake Geneva and Milwaukee cut back to Burlington and Milwaukee. By 1991, seven express transit routes were operated in the Region, primarily in the Milwaukee urban area. Only two regional Milwaukee-oriented travel corridors were served, however: from Milwaukee west to Oconomowoc and south to Racine and Kenosha.

mission, which operated service over seven fixed routes, radial in design and emanating from downtown Kenosha, with direct, nontransfer service from the CBD to all portions of the City and its immediate environs, including the University of Wisconsin-Parkside (see Map 29). The Kenosha transit system also operated two special shuttle routes, which provided local transit service to major commercial, recreational, and employment centers which have developed outside the regular Kenosha local transit service area. In 1991, the system provided service from 6:00 a.m. to 6:00 p.m. every day except Sunday, with approximate 30- to 60-minute peak-period headways and 60-minute nonpeak-period headways. As shown on Map 29, peak-period headways exceeded the minimum frequency of service standard, 30 minutes, on two radial routes: one through the north side of the City and the other through the south side of the City.

Local transit service was provided in the Milwaukee urbanized area by the City of Waukesha Transit System Utility and the Milwaukee County Transit System. The fixed-route bus system operated by the City of Waukesha Transit System Utility, Waukesha METRO Transit, provided service over nine fixed radial routes. These nine routes began from downtown Waukesha and provided direct, nontransfer service from the CBD to all portions of the City and its immediate environs. As shown on Map 30, two of the routes served important traffic generators outside of the City: the Waukesha County Technical College in the Town of Pewaukee and the Goerke's Corners transit station in the Town of Brookfield. In 1991, the system provided service from 6:00 a.m. to 6:45 p.m. on weekdays and from 8:00 a.m to 6:00 p.m. on Saturdays at headways of approximately 30 to 60 minutes. Peak-period headways for Route No. 6, a radial route serving the southwest portion of the City of Waukesha, stood at 60 minutes.

As also shown on Map 30, the Milwaukee County Transit System provided local transit service in the Milwaukee urbanized area over 35 regular fixed routes: 15 radial routes emanating from downtown Milwaukee, 16 crosstown routes not serving downtown Milwaukee, and four feeder routes connecting to the crosstown and radial routes. In 1991, the system provided service seven days a week, typically from 5:00 a.m. to 1:00 a.m. Peak-period headways on most routes ranged from 10 to 20 minutes and nonpeak-period headways ranged from 15 to 30 minutes. Headways on three of the local transit routes operated by the Milwaukee County Transit System exceeded 30 minutes during weekday peak periods. Under contract with Waukesha County, the Milwaukee County Transit System also operated an extension of one local route from Milwaukee County to the Brookfield Square Shopping Center in Waukesha County.

Local public transit was provided in the Racine urbanized area by the City of Racine Belle Urban System, which operated service over 10 fixed routes. As shown on Map 31, eight of the 10 fixed routes were radial in design, emanating from the Racine CBD, and provided service to all portions of the City and to its immediate environs. The ninth route, a crosstown route, was routed to the west of downtown Racine. The tenth, a feeder route, served the Town of Caledonia and connected to two of the eight radial routes. In 1991, the system provided service from 5:30 a.m. to 7:00 p.m. on weekdays and from 7:00 a.m. to 6:00 p.m. on Saturdays. Peak-period headways approximated 20 to 45 minutes and nonpeak-period headways ranged from 30 to 45 minutes. Peak-period headways for the route serving the Town of Caledonia exceeded 30 minutes, as shown on Map 31.

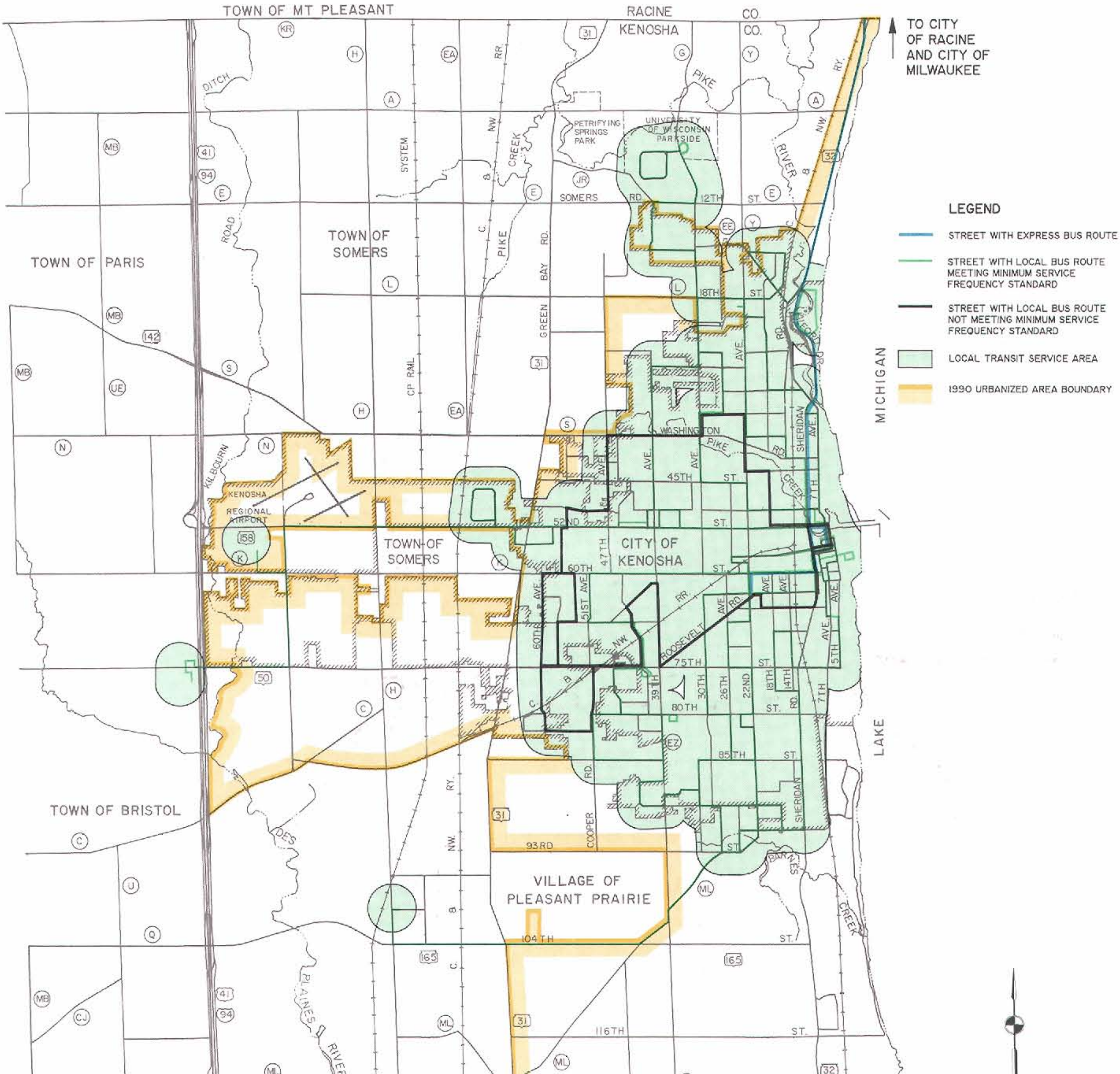
Land Area and Population Served by Local Public Transit

By definition, a local public transit service area encompasses the land and the population within one-quarter mile of a fixed local transit route. The location and extent of this area is a useful measure of the accessibility of local public transit service. The areal extent and resident population of the Kenosha, Milwaukee, and Racine local transit service areas and the number of round trip route miles operated within these areas is set forth in Table 40.

Between 1963 and 1991 the local transit service area within the Region increased significantly. Indeed, local transit operators extended transit routes into existing and newly developing areas at a rate of nearly 52 round-trip route miles per year. Over the span of 28 years, the number of round trip route miles increased from 856 in 1963 to 2,296 in 1991. As a result, over 47 additional square miles were brought within the boundaries of local transit service areas between 1963 and 1991.

## Map 29

### LOCAL FIXED-ROUTE PUBLIC TRANSIT SERVICE IN THE KENOSHA URBANIZED AREA: 1991

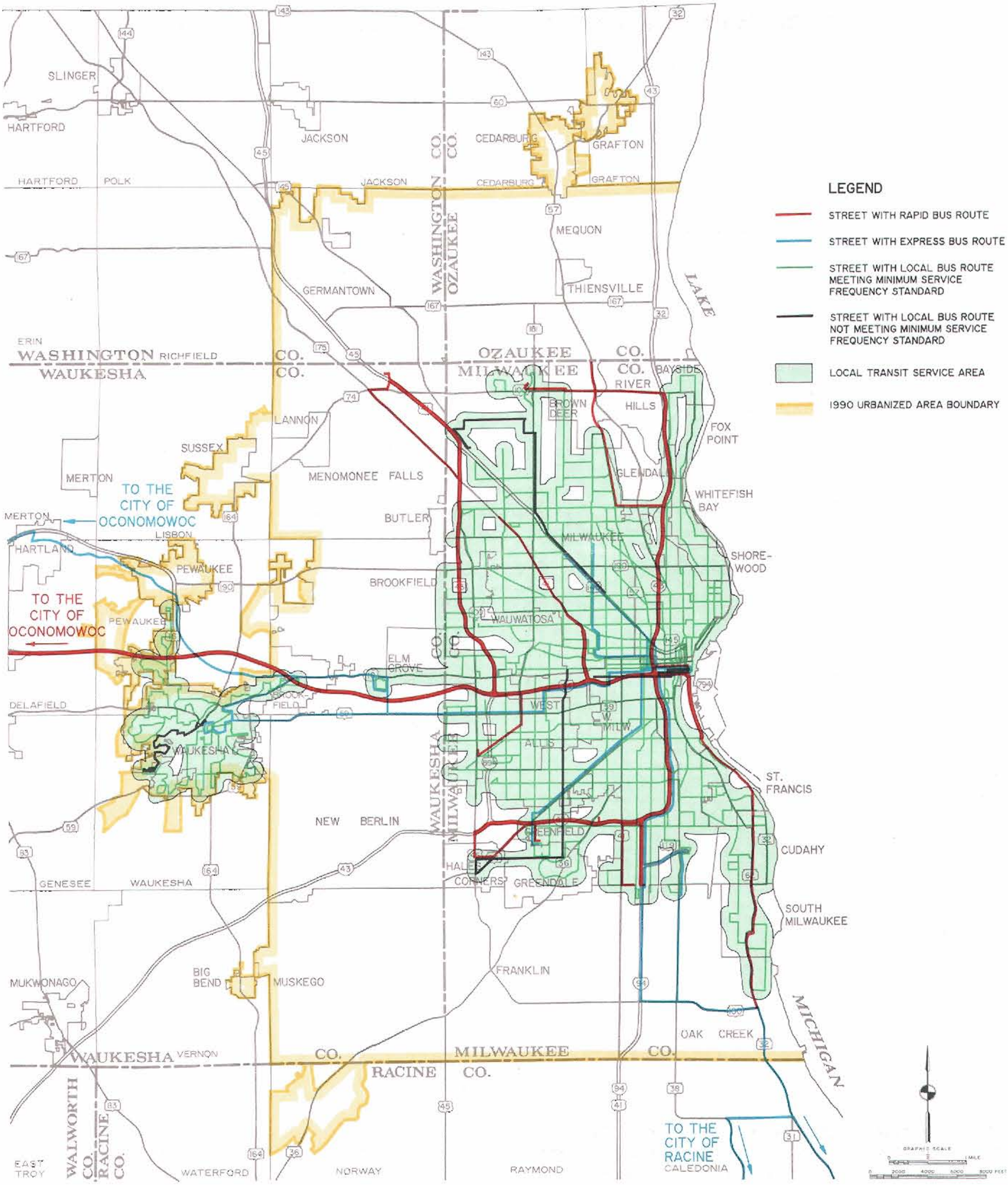



In 1991, local public transit service in the Kenosha urbanized area was provided by the City of Kenosha Transit Commission which operated seven fixed motor bus routes from downtown Kenosha to all portions of the City. Five of the seven routes met the SEWRPC minimally acceptable headway standard of 30 minutes during peak travel periods. In 1991, the Kenosha local transit service area comprised 21 square miles and encompassed a population of about 86,600.

*Source: SEWRPC.*

## Map 30

## LOCAL FIXED-ROUTE PUBLIC TRANSIT SERVICE IN THE MILWAUKEE URBANIZED AREA: 1991

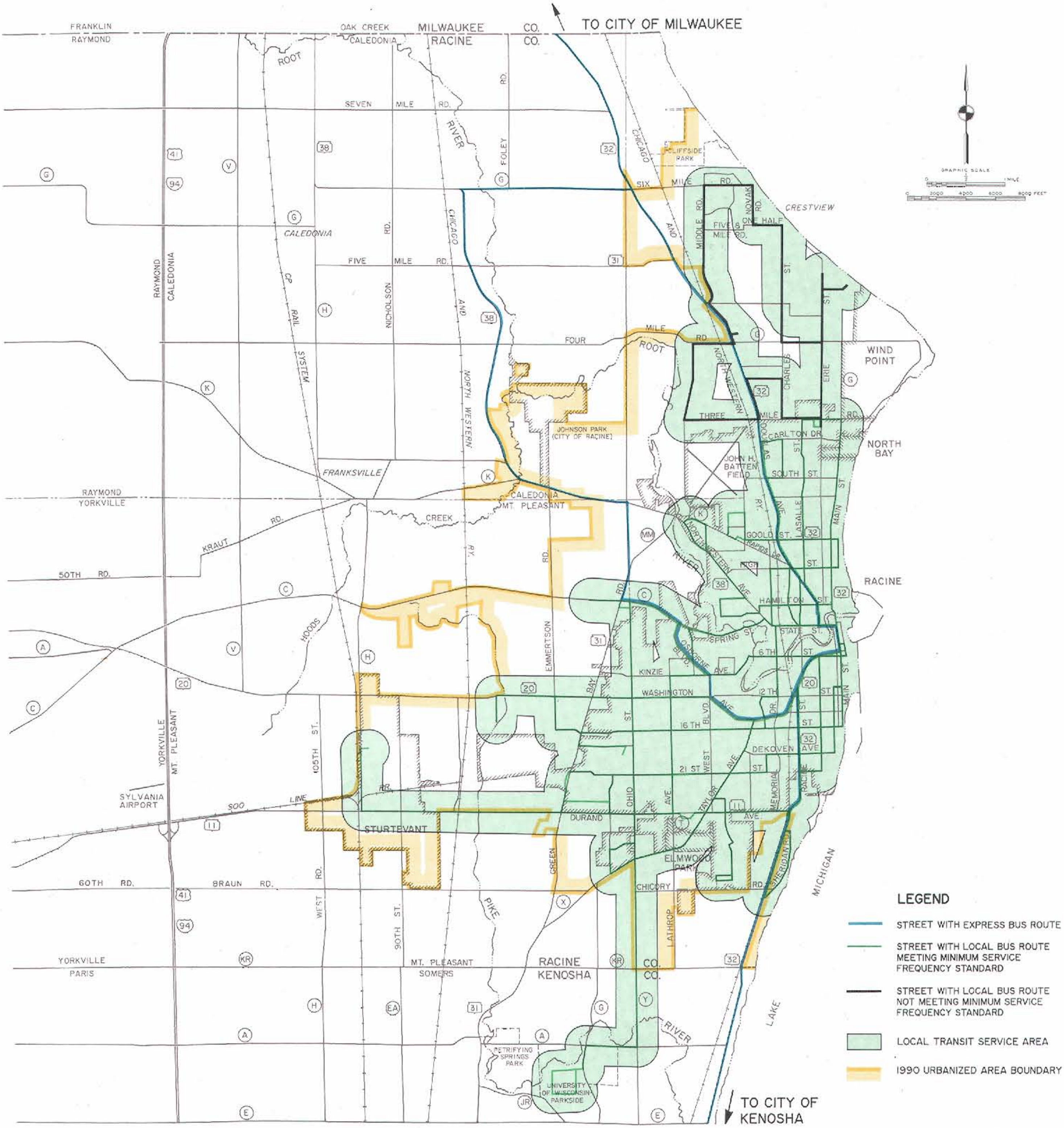



In 1991, local public transit service in the Milwaukee urbanized area was provided by the Milwaukee County Transit System (MCTS), which operated 35 fixed routes, and by the City of Waukesha Transit System Utility, which operated 10 fixed routes. Peak-period headways on all but three routes provided by MCTS and on all but one provided by the City of Waukesha met the SEWRPC minimally acceptable 30-minute standard. In 1991, the local transit service area in the Milwaukee urbanized area comprised 158 square miles and encompassed a population of about 935,400.

*Source: SEWRPC.*

## Map 31

**LOCAL FIXED-ROUTE PUBLIC TRANSIT SERVICE IN THE RACINE URBANIZED AREA: 1991**




In 1991, local public transit service in the Racine urbanized area was provided by the City of Racine Belle Urban System, which operated 10 fixed motor bus routes: eight radial routes, one crosstown route, and one feeder route. Peak-period headways on all but the feeder route, which served the Town of Caledonia and connected to the eight radial routes, met the SEWRPC minimally acceptable 30-minute standard. In 1991, the Racine local transit service area comprised 27 square miles and encompassed a population of about 114,600.

*Source: SEWRPC.*

Table 40

LOCAL FIXED-ROUTE TRANSIT AREAL EXTENT, POPULATION SERVED, AND ROUND-TRIP ROUTE MILES BY URBANIZED AREA: 1963, 1972, AND 1991

| Urbanized Area | Area (square miles) | | | Population | | | Round-Trip Route Miles | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1963 | 1972 | 1991 | 1963 | 1972 | 1991 | 1963 | 1972 | 1991 |
| Kenosha | 10.9 | 15.9 | 20.9 | 71,900 | 81,500 | 86,600 | 55 | 59 | 171 |
| Milwaukee | 136.9 | 147.5 | 158.0 | 1,025,800 | 1,026,000 | 935,400 | 716 | 1,061 | 1,954 |
| Racine | 11.7 | 14.0 | 27.4 | 95,600 | 97,100 | 114,600 | 76 | 81 | 171 |
| Total | 159.5 | 177.4 | 206.3 | 1,193,300 | 1,204,600 | 1,136,600 | 847 | 1,201 | 2,296 |

| Urbanized Area | Area (square miles) | | | | Population | | | | Round-Trip Route Miles | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Change 1963-1991 | | Change 1972-1991 | | Change 1963-1991 | | Change 1972-1991 | | Change 1963-1991 | | Change 1972-1991 | |
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kenosha | 10.0 | 91.7 | 5.0 | 31.4 | 14,700 | 20.4 | 5,100 | 6.3 | 116 | 210.9 | 112 | 189.8 |
| Milwaukee | 21.1 | 15.4 | 10.5 | 7.1 | -90,400 | -8.8 | -90,600 | -8.8 | 1,238 | 172.9 | 893 | 84.2 |
| Racine | 15.7 | 134.2 | 13.4 | 95.7 | 19,000 | 19.9 | 17,500 | 18.0 | 95 | 125.0 | 90 | 111.1 |
| Total | 46.8 | 29.3 | 28.9 | 16.3 | -56,700 | -4.8 | -68,000 | -5.6 | 1,449 | 171.1 | 1,095 | 91.2 |

*Source: SEWRPC.*

Regionwide, the expansion of the local transit service areas did not translate into an expansion in the number of people served by local transit. Indeed, as shown in Table 40, about 56,700 fewer potential transit users resided within one-quarter mile of a local transit route in 1991 than in 1963. This phenomenon is indicative of the dispersion of population away from older urban areas in the Region, where transit service has traditionally been provided.

The dominance of the Milwaukee urbanized area in the consideration of regionwide transit statistics is particularly evident when considering resident population within local transit service areas. While the population served by local transit within the Region decreased by nearly 5 percent between 1963 and 1991, the population served within the Kenosha and Racine urbanized areas actually increased by about 20 percent in both areas. Between 1963 and 1991, through the extension of transit service and incremental urban development within the Kenosha and Racine urbanized areas, an additional 33,700 persons were added to the local transit service areas. During the same period, however, the local transit service area population within the Milwaukee urbanized area declined by about 90,400 persons.

Table 41 shows the percentage of land area and percentage of population served by local transit in each of the urbanized areas in 1963, 1972, and 1991. Over the long term, between 1963 and 1991, the percentage of urbanized land area and population served has decreased. In 1963, 38 percent of the urbanized land area and 86 percent of the urbanized population in the Region was served by local transit. By 1991 these figures had decreased to about 35 percent and 79 percent, respectively.

Changes in transit service over time are evident in comparing the number of vehicle-miles provided and the number of route miles over which transit vehicles operated. Vehicle-miles may be defined as the total number of miles travelled by fixed-route transit vehicles. Thus, more frequent transit service will result in more vehicle-miles of service. Round-trip route miles may be defined as the total mileage of streets and highways over which transit vehicles operate on fixed routes. Therefore, if round trip route miles remain constant over time and vehicle-miles increase, transit service may be said to be improved, at least to be more frequent.

As previously indicated, between 1972 and 1991 each of the fixed-route local transit providers within the Region increased round-trip route miles in an attempt to serve broader areas. To maintain existing service levels, therefore, or to improve such levels, the same transit operators would have had to, at minimum, increase the

Table 41

AREA AND POPULATION SERVED BY LOCAL FIXED-ROUTE TRANSIT: 1963, 1972, AND 1991

| Urbanized Area | Urbanized Area (square miles) | | | Local Transit Service Area[a] (square miles) | | | Percent of Urbanized Area Served | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1963 | 1972 | 1991 | 1963 | 1972 | 1991 | 1963 | 1972 | 1991 |
| Kenosha . . . . . . | 13.3 | 17.5 | 41.1 | 10.9 | 15.9 | 20.9 | 82.0 | 90.9 | 50.8 |
| Milwaukee . . . . | 392.0 | 456.4 | 511.9 | 136.9 | 147.5 | 158.0 | 34.9 | 32.3 | 30.8 |
| Racine . . . . . . . | 14.5 | 28.1 | 38.8 | 11.9 | 14.0 | 27.4 | 82.1 | 50.0 | 70.6 |
| Total | 419.8 | 502.0 | 590.8 | 159.5 | 177.4 | 206.3 | 38.0 | 35.3 | 34.9 |

| Urbanized Area | Urbanized Area Population | | | Local Transit Service Area Population[b] | | | Percent of Population Served | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1963 | 1972 | 1991 | 1963 | 1972 | 1991 | 1963 | 1972 | 1991 |
| Kenosha . . . . . . | 73,400 | 86,500 | 94,300 | 71,900 | 81,500 | 86,600 | 91.8 | 94.2 | 91.8 |
| Milwaukee . . . . | 1,216,500 | 1,267,400 | 1,226,300 | 1,025,800 | 1,026,000 | 935,400 | 76.2 | 81.0 | 76.2 |
| Racine . . . . . . . | 95,900 | 115,200 | 121,800 | 95,600 | 97,100 | 114,600 | 94.1 | 84.3 | 94.1 |
| Total | 1,385,800 | 1,469,100 | 1,442,400 | 1,193,300 | 1,204,600 | 1,136,600 | 78.8 | 82.0 | 78.8 |

[a]*Area within one-quarter mile of a local bus route.*

[b]*Estimate based upon population data from the U. S. Census allocated to U. S. Public Land Survey quarter-sections by Commission staff.*

*Source: U. S. Bureau of the Census and SEWRPC.*

Table 42

AVERAGE DAILY FIXED-ROUTE TRANSIT VEHICLE-MILES PROVIDED WITHIN THE REGION BY URBANIZED AREA: 1963, 1972, AND 1991

| Urbanized Area | 1963 | 1972 | 1991 | Change: 1963-1991 | | Change: 1972-1991 | |
|---|---|---|---|---|---|---|---|
| | | | | Number | Percent | Number | Percent |
| Kenosha . . . . . . . . | 2,500 | 1,100 | 2,500 | 0 | 0.0 | 1,400 | 127.3 |
| Milwaukee . . . . . . . | 78,900 | 61,300 | 56,400 | -22,500 | -28.5 | -4,900 | -8.0 |
| Racine . . . . . . . . . | 3,500 | 1,600 | 4,400 | 900 | 25.7 | 2,800 | 175.0 |
| Total | 84,900 | 64,000 | 63,300 | -21,600 | -25.4 | -700 | -1.1 |

*Source: SEWRPC.*

provision of vehicle-miles. As shown in Table 42, this was the case in both the Kenosha and Racine local transit service areas. Within the Kenosha transit service area vehicle-miles increased from 1,100 in 1972 to 2,500 in 1991. Within the Racine transit service area vehicle-miles were increased from 1,600 in 1972 to 4,400 in 1991. By contrast, the provision of vehicle-miles within the Milwaukee urban area was reduced by about 8 percent, from 61,300 in 1972 to 56,400 in 1991, indicating an overall decline in local transit service. The magnitude of this reduction in the Milwaukee area was sufficient to reduce the regionwide total by about 1 percent.

Though the size and resident population of local service areas provides a measure of service provided, a more useful measure of the degree to which local transit serves a given area and its residents involves the application of plan design standards. If local transit is to provide a reasonable alternative to the personal vehicle and is to be integrated with express and rapid transit systems, it must meet certain minimum standards with respect to frequency of service. The

Table 43

LAND AREA AND POPULATION SERVED BY FIXED-ROUTE LOCAL TRANSIT MEETING SEWRPC MINIMUM SERVICE FREQUENCY STANDARDS[a] BY URBANIZED AREA: 1991

| Urbanized Area | Land Area | | | Population | | |
|---|---|---|---|---|---|---|
| | Area (square miles) | Area Served (square miles) | Percent of Urbanized Area Served | Population | Population Served | Percent of Urbanized Population Served |
| Kenosha ....... | 41.1 | 18.9 | 46 | 94,292 | 76,500 | 81 |
| Milwaukee ...... | 511.9 | 151.7 | 30 | 1,226,293 | 926,000 | 76 |
| Racine ........ | 38.8 | 22.5 | 58 | 121,788 | 101,100 | 83 |
| Total | 591.8 | 193.2 | 33 | 1,442,373 | 1,103,660 | 77 |

[a] *The SEWRPC standard for minimum frequency of service for local fixed-route public transit states that headways shall not exceed 30 minutes during peak periods, nor 60 minutes during nonpeak periods.*

*Source: U. S. Bureau of the Census and SEWRPC.*

frequency of service standard, adopted as part of design year 2000 regional transportation system plan, stated that local transit headways[2] shall not exceed 30 minutes during weekday peak periods nor exceed 60 minutes during nonpeak-periods. Areas to which transit is provided with headways exceeding this standard are not considered by the Commission to be served.

Comparing existing local transit service with service frequency standards permits delineation of the land area and population provided with adequate levels of transit. The land area and population of each urbanized area within one-quarter mile of a local transit route meeting the planning standard for frequency of service is set forth in Table 43. As shown in Table 43, 46 percent of the land area and 81 percent of the residential population of the Kenosha urbanized area was served by local transit in 1991, about 30 percent of the land area and 76 percent of the resident population of the Milwaukee urbanized area was served by local transit in 1991, and about 58 percent of the land area and 83 percent of the resident population of the Racine urbanized area was served by local transit in 1991. When the frequency of service standard is applied it becomes clear that the significantly expanded local transit service area in the Racine urbanized area, due to the provision of Route 10 in northern areas of the City of Racine, has not been accompanied by a frequency of service that could help attract new transit users to transit.

[2]*The term "headway" is defined as the time interval between any two successive transit vehicles providing service on the same route in the same direction.*

Transit Provision and Utilization

Capacity determinants are quite different for public transit systems from those for arterial street and highway systems. The capacity of a transit system depends on the type of facilities and vehicles, the passenger capacity of vehicles, and number of vehicles operating during a given period of time. Consequently, actual transit operating capacities can be readily increased or decreased by adding or subtracting from scheduled services. Transit system capacity is more flexible and less precisely quantifiable than the capacity of the arterial street and highway system.

Capacity is, therefore, less useful as a criterion for evaluating an existing transit system than it is for evaluating an existing arterial street and highway system. Service provided, in terms of seat-miles, is a more meaningful criterion for such an evaluation. This criterion is readily comparable to passenger miles, a measure of transit utilization both on an individual link and on a systemwide basis. The frequency of service provided, in terms of the number of units per hour or day on a given route, is a factor in the determination of seat-miles provided and is also an important measure in itself. Waiting time is

Table 44

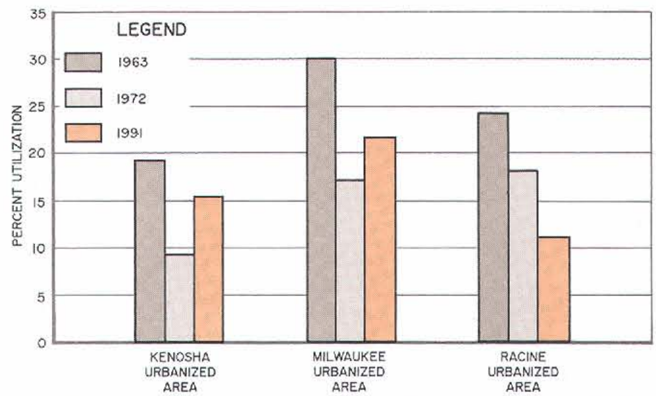
**UTILIZATION OF FIXED-ROUTE TRANSIT SERVICE ON AN AVERAGE WEEKDAY WITHIN THE REGION BY URBANIZED AREA: 1991**

| Urbanized Area | Transit Service Provided | | Transit Service Used | | Percent Utilization |
|---|---|---|---|---|---|
| | Seat-Miles | Percent of Total | Passenger Miles | Percent of Total | |
| Kenosha | 110,700 | 3.7 | 16,800 | 2.8 | 15.2 |
| Milwaukee | 2,692,300 | 90.5 | 573,200 | 94.1 | 21.3 |
| Racine | 172,000 | 5.8 | 19,100 | 3.1 | 11.1 |
| Total | 2,975,000 | 100.0 | 609,100 | 100.0 | 20.5 |

*Source: SEWRPC.*

Figure 26

**PERCENT UTILIZATION OF FIXED-ROUTE TRANSIT SERVICE ON AN AVERAGE WEEKDAY WITHIN THE REGION BY URBAN AREA: 1963, 1972, 1991**




NOTE: "PERCENT UTILIZATION" IS A MEASURE OF HOW WELL THE EXISTING SUPPLY OF PUBLIC TRANSIT SERVICE IS USED. THIS MEASURE IS DETERMINED BY DIVIDING THE NUMBER OF PASSENGER-MILES RECORDED WITHIN EACH URBANIZED AREA BY THE NUMBER OF SEAT-MILES PROVIDED WITHIN EACH URBANIZED AREA.

SEVERAL FACTORS HAVE CONTRIBUTED TO THE DECREASE IN PERCENT UTILIZATION WITHIN THE RACINE URBANIZED AREA BETWEEN 1972 AND 1991, INCLUDING A 10 SQUARE MILE EXPANSION OF THE LOCAL TRANSIT SERVICE AREA AND THE REQUIRED PROVISION OF ADDITIONAL SERVICE TO THAT AREA; AND THE SHIFT TO LARGER SEATING CAPACITY BUSES.

*Source: SEWRPC.*

a component of overall transit travel time. Both measures were utilized in the transit inventory presented herein.

Transit service provided in each of the urbanized areas within the Region, together with the utilization of this service, is summarized in Table 44. Over 90 percent of the seat-miles provided and 94 percent of the passenger miles recorded within the Region in 1991 were attributable to the operation of transit within the Milwaukee urbanized area. Consequently, the supply and use of transit within the Milwaukee urbanized area dominates any systemwide consideration of transit utilization.

Percent utilization is a measure of how well the existing supply of transit service is used. It is determined by dividing the number of passenger miles recorded within an area by the number of seat-miles provided within the area. In 1991, the Region overall achieved a daily percent utilization rate of about 21 percent, matching the percent utilization rate recorded in the Milwaukee urbanized area. The urbanized areas of Kenosha and Racine achieved a 15 percent and a 11 percent utilization rate, respectively.

As shown in Figure 26, between 1972 and 1991 the utilization of public transit within the Milwaukee and Kenosha urbanized areas increased from 17 to 21 percent, and from 9 to 15 percent, respectively. Conversely, the percent utilization of public transit in the Racine urbanized area decreased from 18 percent in 1972 to 11 percent in 1991. The decline evident in the Racine urbanized area is a consequence of several factors, including the 13-square-mile expansion of the local public transit service area between 1972 and 1991 and a required increase in route miles to serve that expanded area plus a change in the bus fleet which doubled the average vehicle capacity. In all three urbanized areas, the utilization of public transit is significantly below levels set in 1963; the comparable percent utilization rates by urbanized area were: Milwaukee, 30; Kenosha, 19; and Racine, 24.

In order to evaluate the regionwide percent utilization rates set forth in Table 44, the annual percent utilization of public transit in the

Table 45

RANKING OF SIMILAR URBANIZED AREAS BY ANNUAL PERCENT UTILIZATION OF PUBLIC TRANSIT SERVICE: 1990

| Urbanized Area | Population | Annual Seat-Miles (millions) | Annual Passenger Miles (millions) | Percent[a] Utilization |
|---|---|---|---|---|
| Cincinnati | 1,212,675 | 553.8 | 168.5 | 30.4 |
| Milwaukee | 1,226,293 | 805.4 | 177.1 | 22.0 |
| Fort Lauderdale/Hollywood/ Pompano Beach | 1,238,134 | 402.6 | 82.0 | 20.4 |
| Portland/Vancouver | 1,172,158 | 954.4 | 174.5 | 18.3 |
| Kansas City | 1,275,317 | 395.3 | 69.8 | 17.7 |
| Riverside/San Bernadino | 1,170,196 | 242.9 | 42.7 | 17.6 |
| Norfolk/Virginia Beach/ Newport News | 1,323,098 | 339.8 | 44.8 | 13.2 |

| Urbanized Area | Total Land Area (square miles) | Annual Seat-Miles (millions) | Annual Passenger Miles (millions) | Percent[a] Utilization |
|---|---|---|---|---|
| Baltimore | 593 | 976.4 | 319.5 | 32.7 |
| Cincinnati | 512 | 553.8 | 168.5 | 30.4 |
| Seattle | 588 | 1,311.0 | 397.2 | 30.3 |
| Milwaukee | 512 | 805.4 | 177.1 | 22.0 |
| Cleveland | 636 | 1,035.1 | 200.0 | 19.4 |
| Indianapolis | 469 | 258.7 | 49.6 | 19.2 |
| Jacksonville | 508 | 261.6 | 45.1 | 17.2 |

| Urbanized Area | Population Density (persons per square mile) | Annual Seat-Miles (millions) | Annual Passenger Miles (millions) | Percent[a] Utilization |
|---|---|---|---|---|
| Cincinnati | 2,369 | 553.8 | 168.5 | 30.4 |
| Memphis | 2,420 | 281.5 | 65.7 | 23.4 |
| Milwaukee | 2,395 | 805.4 | 177.1 | 22.0 |
| Albany/Schenectady/Troy | 2,436 | 261.0 | 56.4 | 21.6 |
| New Haven/Meriden | 2,402 | 154.2 | 29.4 | 19.1 |
| Wilmington | 2,392 | 106.3 | 17.9 | 16.9 |
| Fort Wayne | 2,389 | 62.5 | 4.7 | 7.6 |

[a] *Percentile utilization is derived by dividing annual passenger miles by annual seat-miles.*

*Source: U. S. Department of Transportation, Federal Transit Administration, Transit Profiles—Agencies in Urbanized Areas Exceeding 200,000 Population, Washington, D. C., 1991; and SEWRPC.*

Milwaukee urbanized area was compared to that of other urbanized areas in the United States of similar population size, land area size, and population density. As shown in Table 45, in terms of 1990 annual utilization of fixed-route motor bus transit, the Milwaukee urbanized area, with an annual utilization rate of 22 percent, ranked second highest among areas similar in population size; fourth highest among areas similar in total land area; and third highest among areas similar in population density. A cumulative ranking of all the 17 different urbanized areas listed in Table 45 indicates that in terms of providing annual seat-miles, the Milwaukee urbanized area ranked fifth highest, providing 805.4 million in 1990. In terms of annual passenger miles, the Milwaukee urbanized area ranked fourth highest, recording 177.1

million in 1990. The findings indicate that, compared to similar urbanized areas, the Milwaukee urbanized area provided a significantly high level of annual seat-miles and recorded a respectful level of transit use in terms of annual passenger miles.

Within the Region, a more detailed analysis of transit utilization was made anent the CBDs of the cities of Kenosha, Milwaukee, and Racine. The number of bus seats provided and passengers carried on each route entering and leaving the CBDs was summarized by direction of travel and hour of day. Results are displayed graphically in Figures 27 through 29 and presented, in aggregated form, in Table 46. It should be noted that these comparisons represent gross evaluations of service provided and utilized during selected times and do not reflect actual passenger loadings on individual routes. Consequently, the use of seats on certain routes entering or leaving the CBDs may be proportionately higher or lower than displayed.

The findings indicate that in 1991 a significantly higher ratio of service provided to service used existed on an average weekday in Kenosha and Racine than in Milwaukee. Indeed, as is shown in Table 46, in 1991 buses entering the CBDs of Kenosha and Racine provided, respectively, 4.8 and 4.1 seats per passenger carried, while in Milwaukee, inbound buses provided 2.3 seats for every inbound transit passenger. These findings indicate that public transit service is provided more efficiently to and from the Milwaukee CBD. Over all in 1991, there were approximately 2.5 seats available to every transit passenger entering or leaving the major central business districts within the Region.

Public Transit Ridership

Annual public transit ridership levels recorded in 1963, 1973, and 1991 within the Kenosha, Milwaukee, and Racine urbanized areas are set forth in Table 47. Public transit ridership within the Region has declined significantly over time. In 1963, over 94.5 million revenue passengers were carried on public transit within the three urbanized areas of the Region. In 1972, about 53.9 million revenue passengers were carried, about 43 percent fewer than in 1963. In 1991, about 50.2 million passengers were carried, 47 percent fewer than in 1963 and about 7 percent fewer than in 1972. It is interesting to note that the 1991 public transit ridership levels within the Kenosha and Racine urbanized areas were more than two and three times greater than the 1972 levels, respectively. The 1991 ridership level in the Milwaukee urbanized area, however, was nearly 11 percent lower than the 1972 level.

A similar pattern emerges when public transit rides per capita are considered. As shown in Table 48, rides per capita, that is, the number of annual revenue passengers per resident of the respective local transit service areas, increased significantly between 1972 and 1991 within the Kenosha and Racine urbanized areas and decreased slightly within the Milwaukee urbanized area. Though increases have occurred since 1972, rides per capita in each urbanized area are significantly below levels set in 1963.

The historical trends in transit ridership in the Kenosha, Milwaukee, and Racine urbanized areas are shown in Figure 30. Ridership within the Kenosha and Racine urbanized areas grew gradually from 1972 though 1980, leveled off, and declined slightly to current levels. Ridership within the Milwaukee urbanized area increased in the late 1970s until 1980 and has generally declined since then.

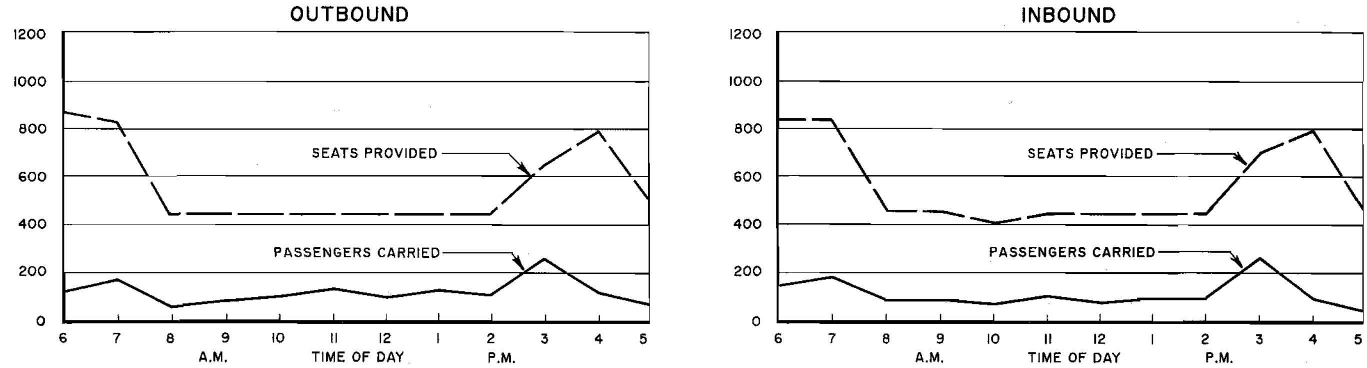
## SUPPLY AND USE OF INTERMODAL PARKING FACILITIES

Intermodal parking facilities are an important element of the regional transportation system since they affect transportation modal choice, and hence traffic congestion, within certain travel corridors. Parking supply and demand at public transit lots and at carpool lots is monitored annually by the Wisconsin Department of Transportation and the Commission. Such parking facilities, unlike those located within the CBDs and at other major activity centers, serve primarily as intermodal transfer points and are explicitly considered in the regional transportation system planning process.

The role of intermodal parking facilities in the attainment of transportation development objectives, especially as related to traffic congestion, air quality, and energy conservation, is critical. Commuters utilizing public transit lots shift from personal transportation modes to rapid or express transit while commuters utilizing carpool lots typically shift to some form of ridesharing. These modal changes alleviate traffic congestion and reduce air pollutant emissions and fuel consumption. An adequate supply of

## Figure 27

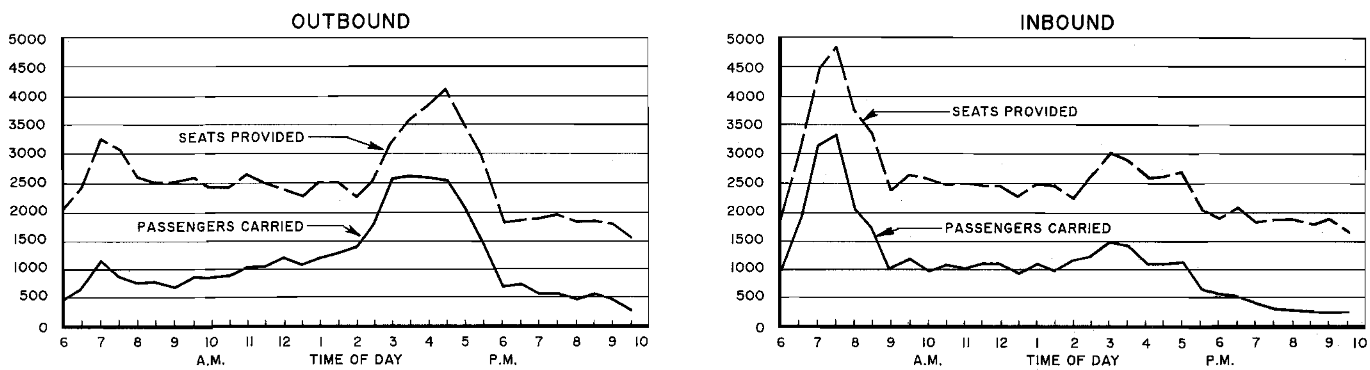
### WEEKDAY BUS SEATS PROVIDED AND PASSENGERS CARRIED TO AND FROM THE KENOSHA CENTRAL BUSINESS DISTRICT: 1991




*Source: SEWRPC.*

## Figure 28

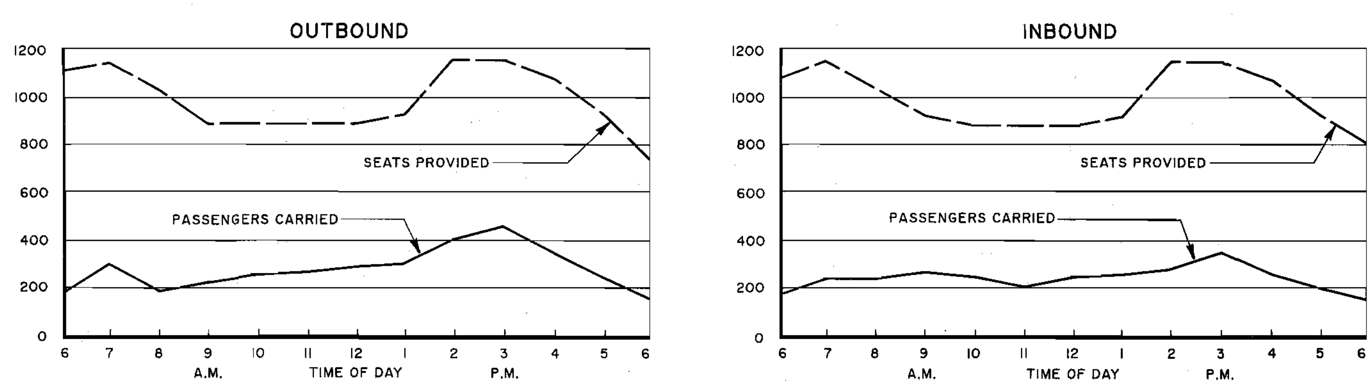
### WEEKDAY BUS SEATS PROVIDED AND PASSENGERS CARRIED TO AND FROM THE MILWAUKEE CENTRAL BUSINESS DISTRICT: 1991




*Source: Milwaukee County Transit System and SEWRPC.*

## Figure 29

### WEEKDAY BUS SEATS PROVIDED AND PASSENGERS CARRIED TO AND FROM THE RACINE CENTRAL BUSINESS DISTRICT: 1991




*Source: SEWRPC.*

## Table 46

### SEATS PROVIDED AND PASSENGERS CARRIED BY FIXED-ROUTE PUBLIC TRANSIT BY CENTRAL BUSINESS DISTRICT

| Central Business District | Inbound Trips | | | Outbound Trips | | |
|---|---|---|---|---|---|---|
| | Seats Provided | Passengers Carried | Ratio of Seats to Passengers | Seats Provided | Passengers Carried | Ratio of Seats to Passengers |
| Kenosha | 6,644 | 1,383 | 4.81 | 6,732 | 1,421 | 4.74 |
| Milwaukee | 81,800 | 35,837 | 2.28 | 81,652 | 35,972 | 2.27 |
| Racine | 12,880 | 3,168 | 4.07 | 12,800 | 3,550 | 3.60 |
| Total | 101,324 | 40,388 | 2.51 | 101,184 | 40,943 | 2.47 |

*Source: SEWRPC.*

## Table 47

### ANNUAL FIXED-ROUTE PUBLIC TRANSIT RIDERSHIP WITHIN THE REGION BY URBANIZED AREA: 1963, 1972, 1991

| Urbanized Area | Annual Revenue Passengers | | | Change: 1972-1991 | | Change: 1963-1991 | |
|---|---|---|---|---|---|---|---|
| | 1963 | 1972 | 1991 | Number | Percent | Number | Percent |
| Kenosha | 1,884,400 | 503,200 | 1,128,000 | 624,800 | 124.2 | -756,400 | -40.1 |
| Milwaukee | 89,761,600 | 52,875,400 | 47,267,100 | -5,608,300 | -10.6 | -42,494,500 | -47.3 |
| Racine | 2,902,000 | 525,700 | 1,827,800 | 1,302,100 | 247.7 | -1,074,200 | -37.0 |
| Total | 94,548,000 | 53,904,300 | 50,222,900 | -3,681,400 | -6.8 | -44,325,100 | -46.9 |

*Source: SEWRPC.*

## Table 48

### ANNUAL RIDES PER CAPITA ON FIXED-ROUTE PUBLIC TRANSIT SERVICE WITHIN THE REGION BY URBANIZED AREA: 1963, 1972, AND 1991

| Urbanized Area | Local Mass Transit Rides Per Capita | | | | |
|---|---|---|---|---|---|
| | 1963 | 1972 | 1991 | Percent Change 1963-1991 | Percent Change 1972-1991 |
| Kenosha | 26 | 6 | 13 | -50.3 | 111.0 |
| Milwaukee | 88 | 52 | 51 | -42.4 | -1.9 |
| Racine | 30 | 5 | 16 | -47.5 | 194.6 |
| Combined Urbanized Area Rides Per Capita | 79 | 45 | 44 | -44.4 | -1.3 |

*Source: SEWRPC.*

both types of facilities at appropriate locations supports the operation of the multi-modal transportation system within the Region.

Public Transit Parking

In 1991, freeway flyer service was provided to 18 parking lots, distributed about evenly among four major rapid transit corridors within the Region, as shown on Map 32. These intermodal facilities provided 3,740 parking spaces. An additional combined 335 parking spaces were provided at the Milwaukee Area Technical

College transit station in Mequon and at the W. Good Hope Road transit station, although transit service was not provided to these sites in 1991. Consequently, any parking use recorded during 1991 at these sites may be attributed to carpool participants.

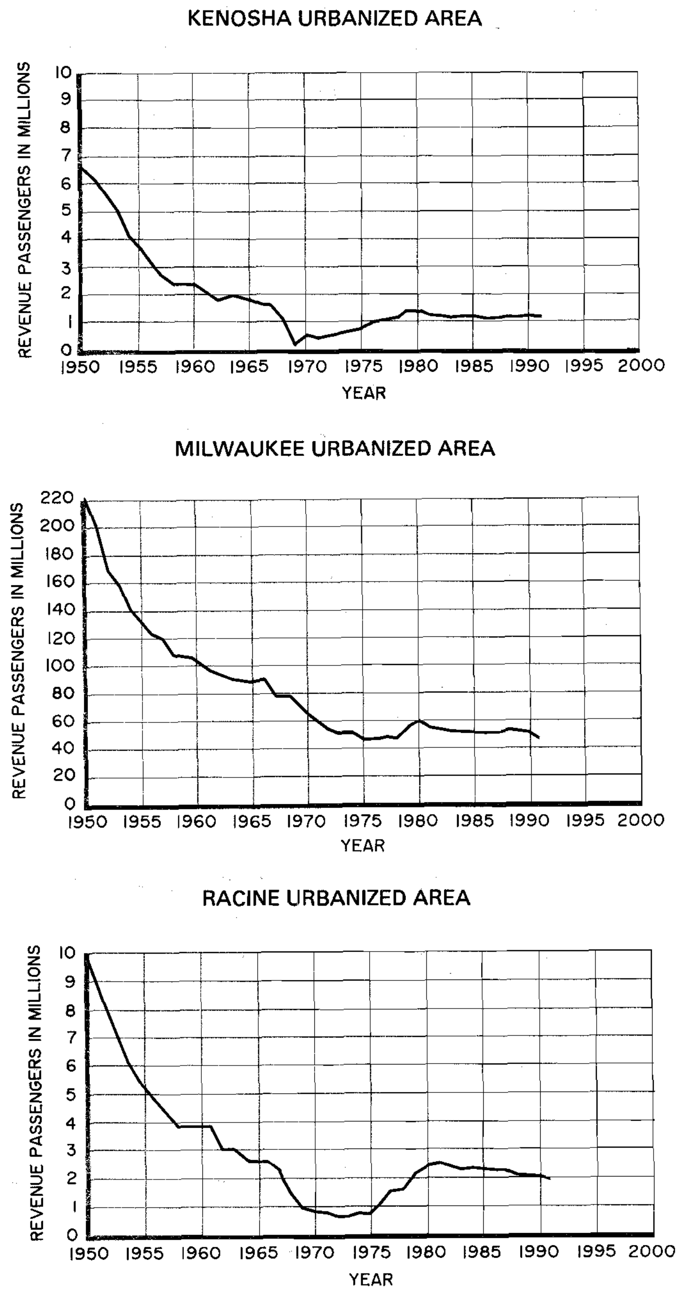
The utilization of parking at sites to which public transit service was provided in 1991 is set forth in Table 49 and is shown on Map 32. The greatest utilization of such parking occurred within the USH 41/45 rapid transit corridor, where about 58 percent of available parking spaces were used on an average weekday during the fourth quarter of 1991. The lowest utilization of freeway flyer parking occurred within the IH 43 North rapid transit corridor, where about 39 percent of available parking spaces were used on an average weekday during the fourth quarter of 1991.

The utilization of parking spaces at individual parking lots illustrated on Map 32 ranges from a high of 83 percent, at the Pilgrim Road public transit station in Menomonee Falls, to a low of 20 percent, at the Northridge public transit station in Milwaukee. In addition to the Pilgrim Road site, other parking lots with utilization rates greater than 60 percent, indicated on the accompanying map, are located at the following locations: Whitnall transit station, City of Hales Corners; State Fair Park, City of West Allis; and Phar-Mor shopping center, City of Brookfield.

As indicated in Table 49 public transit parking facilities within the Region are located at certain public transit stations and at certain shopping centers. On an average weekday during the fourth quarter of 1991, nearly 47 percent of the 3,125 parking spaces at public transit stations[3] and about 46 percent of the 725 spaces available at shopping center lots were used. The utilization of spaces at public transit stations peaked in 1981, when about 71 percent of the approximately 2,560 parking spaces were used (see

**Figure 30**

**HISTORIC PUBLIC TRANSIT RIDERSHIP IN URBANIZED AREAS WITHIN THE REGION**




*Source: SEWRPC.*

Figure 31). The utilization of spaces at shopping center lots peaked in 1980, when about 78 percent of the 1,095 spaces available were used.

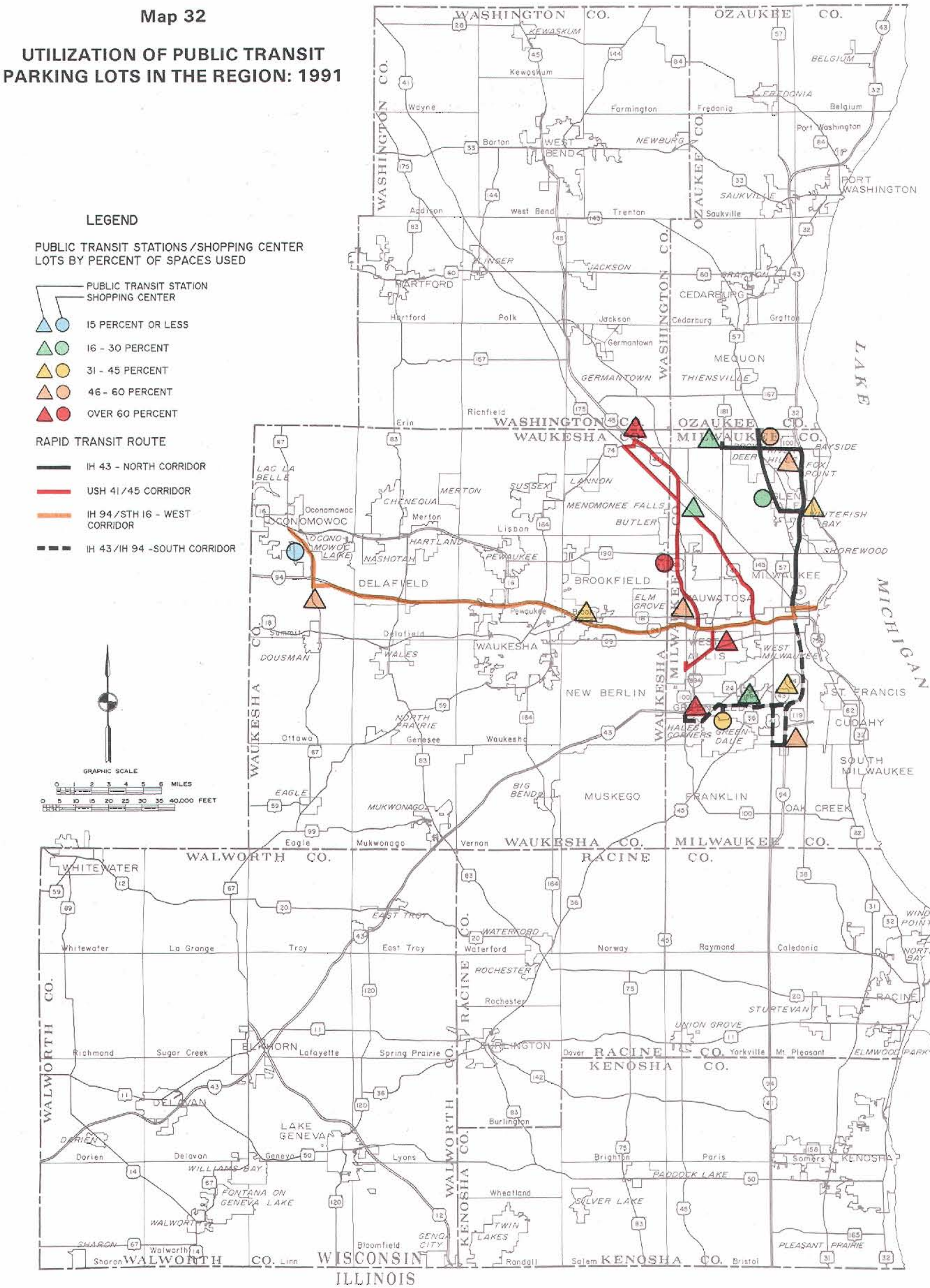
Carpool Parking

In 1991, there were 16 carpool parking facilities located at key freeway interchanges within the

[3]*The annual monitoring of the use of public transit parking at public transit stations indicated that on an average weekday during the entire year of 1991 about 46 percent of available spaces were used.*

## Map 32

## UTILIZATION OF PUBLIC TRANSIT PARKING LOTS IN THE REGION: 1991




In 1991, public transit service was provide to 18 parking lots distributed among major travel corridors emanating from the City of Milwaukee. Together, the parking lots provided 3,850 parking spaces, of which 47 percent were determined to be used on an average weekday during the fourth quarter of 1991. The highest utilization of public transit parking spaces was recorded at the Pilgrim Road transit station in Menomonee Falls, where 83 percent of the available spaces were used on an average weekday.

*Source: SEWRPC.*

Table 49

SUPPLY AND USE OF PARKING AT PUBLIC TRANSIT PARKING LOTS WITHIN THE REGION BY RAPID TRANSIT CORRIDOR: FOURTH QUARTER 1991

| Location[a] | Available Parking Spaces | Vehicles Parked (average weekday) | Percent of Spaces Used |
|---|---|---|---|
| IH 43-North Rapid Transit Corridor | | | |
| Northridge (Milwaukee) | 100 | 20 | 20.0 |
| Target Shopping Center (Brown Deer) | 125 | 75 | 60.0 |
| Brown Deer (River Hills) | 360 | 137 | 38.1 |
| Silver Mill Shopping Center (Milwaukee) | 100 | 23 | 23.0 |
| North Shore (Glendale) | 175 | 79 | 45.1 |
| Subtotal | 860 | 334 | 38.8 |
| Percent of Regionwide Total | 22.3 | 18.5 | - - |
| USH 41/45 Rapid Transit Corridor | | | |
| Pilgrim Road (Menomonee Falls) | 65 | 54 | 83.1 |
| Timmerman Field (Milwaukee) | 140 | 42 | 30.0 |
| Phar-Mor Shopping Center (Brookfield) | 200 | 138 | 69.0 |
| W. Watertown Plank Road (Wauwatosa) | 200 | 96 | 48.0 |
| State Fair Park (West Allis) | 200 | 137 | 68.5 |
| Subtotal | 805 | 467 | 58.0 |
| Percent of Regionwide Total | 20.9 | 25.8 | - - |
| IH 94/STH 16-West Rapid Transit Corridor | | | |
| Olympia Shopping Center (Oconomowoc) | 50 | 7[b] | 14.5[b] |
| STH 67 and IH 94 (Summit) | 80 | 46 | 57.5 |
| Goerke's Corners (Brookfield) | 250 | 107 | 42.8 |
| Subtotal | 380 | 160 | 42.1 |
| Percent of Regionwide Total | 9.9 | 8.9 | - - |
| IH 43-South Rapid Transit Corridor | | | |
| W. Loomis Road (Greenfield) | 415 | 96 | 23.1 |
| Southridge Shopping Center (Greendale) | 250 | 88 | 35.2 |
| Whitnall (Hales Corners) | 370 | 272 | 73.5 |
| Subtotal | 1,035 | 456 | 44.1 |
| Percent of Regionwide Total | 26.9 | 25.2 | - - |
| IH 94-South Rapid Transit Corridor | | | |
| W. College Avenue (Milwaukee) | 530 | 287 | 54.1 |
| W. Holt Avenue (Milwaukee) | 240 | 103 | 42.9 |
| Subtotal | 770 | 390 | 50.6 |
| Percent of Regionwide Total | 20.0 | 21.6 | - - |
| Regionwide Total | 3,850 | 1,807 | 46.9 |

NOTE: Public transit service was not provided during 1991 to the Milwaukee Area Technical College (Mequon) and the W. Good Hope Road public transit stations. In 1991, these public transit stations had a combined total of 335 parking spaces. In 1991, there were no freeway flyer parking lots located in the IH 794-South rapid transit corridor.

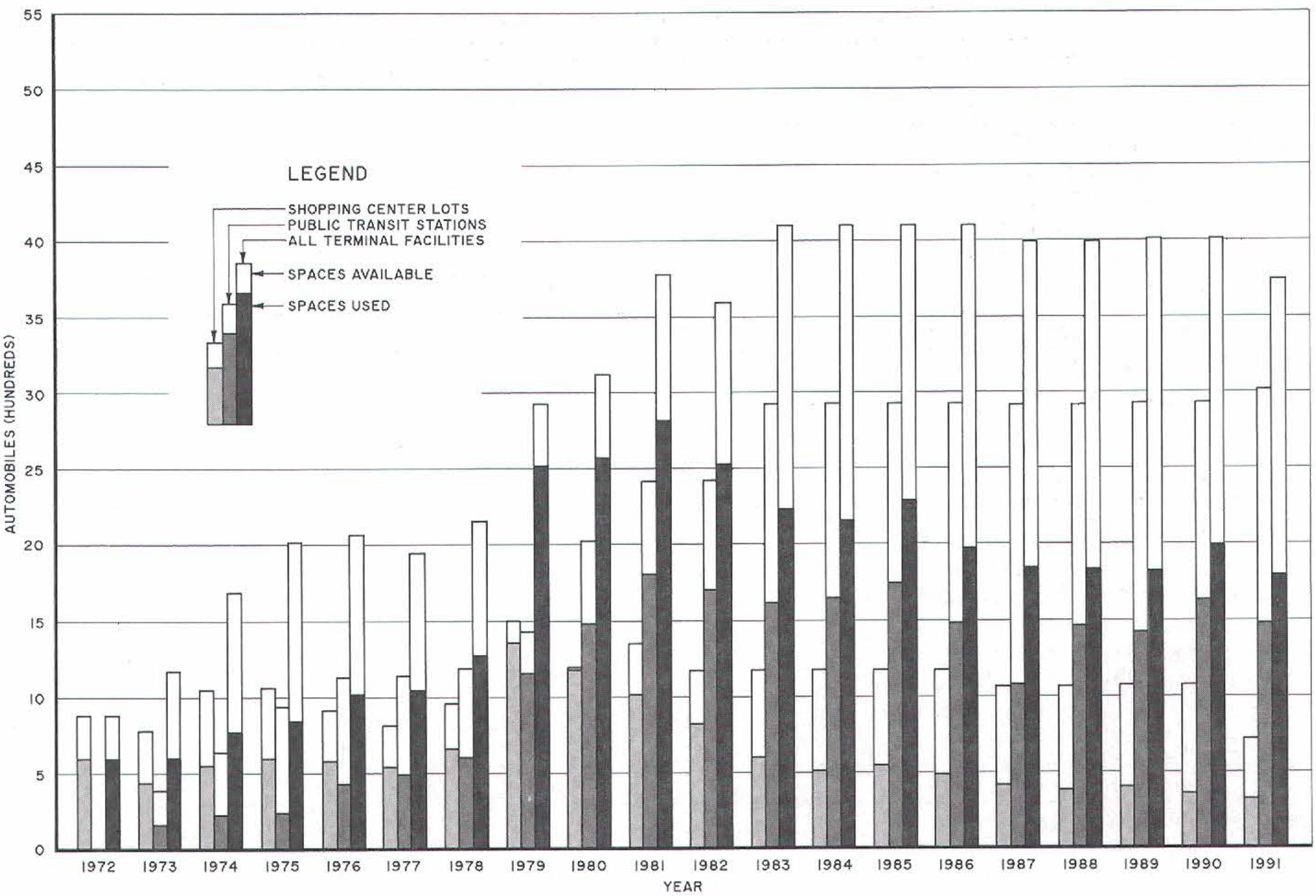
[a] *In 1991, freeway flyer parking facilities, those parking lots served by rapid transit in 1991, were located at public transit stations and at shopping center parking lots within the Region.*

[b] *Commission estimate.*

*Source: SEWRPC.*

Figure 31

PUBLIC TRANSIT PARKING LOT USE: 1972-1991




*Source: SEWRPC.*

Region containing 1,112 parking spaces.[4] Most of such parking, about 41 percent, was located within the IH 43-South travel corridor. About 29 percent of carpool parking was sited within the IH 94/STH 16-West travel corridor. The IH 43-North and USH 41/45 corridors combined to account for the remaining 30 percent of total carpool parking. No carpool parking facilities were located within the IH 94-South or the USH 12 travel corridors.

The utilization of the carpool parking within each travel corridor is set forth in Table 50 and shown on Map 33. The greatest utilization of carpool parking, about 46 percent, occurred within the IH 94/STH 16-West corridor. The lowest utilization of carpool parking, about 25 percent, occurred within the IH 43-South corridor. Regionwide, 32 percent of the 1,112 spaces available at carpool lots were used on an average weekday during the fourth quarter of 1991.[5]

The utilization of parking spaces at the individual carpool parking lots is also illustrated on

[4] *Three public transit lots in the Region, USH 41 and Pilgrim Road, IH 94 and STH 67, and IH 94 and USH 18, functioned in part as carpool parking lots. Because public transit service was provided to these locations, they are listed in Table 49).*

[5] *The annual monitoring of the use of carpool parking indicated that on an average weekday during the entire year of 1991 about 33 percent of available spaces were used.*

Table 50

SUPPLY AND USE OF PARKING AT CARPOOL PARKING LOTS WITHIN THE REGION BY TRAVEL CORRIDOR: FOURTH QUARTER 1991

| Location | Available Parking Spaces | Vehicles Parked (average weekday) | Percent of Spaces Used |
|---|---|---|---|
| IH 43-North Travel Corridor | | | |
| IH 43 and STH 32 and STH 84 (Port Washington) | 50 | 3 | 6.0 |
| IH 43 and STH 57 (Saukville) . . . . . . . . . . . . . . . | 100 | 14 | 14.0 |
| IH 43 and CTH C (Grafton) . . . . . . . . . . . . . . . . . | 50 | 34 | 68.0 |
| STH 57 and STH 84 (Fredonia) . . . . . . . . . . . . . . | 10 | 6 | 60.0 |
| Subtotal | 210 | 58 | 13.3 |
| Percent of Regionwide Total | 18.9 | 16.5 | - - |
| USH 41/45 Travel Corridor | | | |
| USH 41 and CTH Y (Germantown) . . . . . . . . . . . . | 100 | 20 | 20.0 |
| STH 60 and CTH P (Jackson) . . . . . . . . . . . . . . . | 30 | 13 | 43.3 |
| Subtotal | 130 | 33 | 25.4 |
| Percent of Regionwide Total | 11.7 | 9.4 | - - |
| IH 94/STH 16-West Travel Corridor | | | |
| STH 16 and CTH C (Nashotah) . . . . . . . . . . . . . . | 50 | 15 | 30.0 |
| STH 16 and STH 83 (Chenequa) . . . . . . . . . . . . . | 65 | 15 | 23.1 |
| STH 16 and CTH P (Oconomowoc) . . . . . . . . . . . | 45 | 19 | 42.2 |
| IH 94 and CTH CC (Delafield) . . . . . . . . . . . . . . . | 30 | 19 | 63.3 |
| IH 94 and CTH G (Pewaukee) . . . . . . . . . . . . . . . | 50 | 22 | 44.0 |
| IH 94 and STH 164 (Pewaukee) | 80 | 57 | 71.3 |
| Subtotal | 320 | 147 | 45.9 |
| Percent of Regionwide Total | 28.8 | 41.9 | - - |
| IH 43-South Travel Corridor | | | |
| IH 43 and STH 83 (Mukwonago) . . . . . . . . . . . . . | 95 | 42 | 44.2 |
| IH 43 and STH 164 (Big Bend) . . . . . . . . . . . . . . | 100 | 27 | 27.0 |
| IH 43 and CTH Y (New Berlin) . . . . . . . . . . . . . . . | 60 | 18 | 30.0 |
| IH 43 and CTH O (New Berlin) . . . . . . . . . . . . . . . | 197 | 27 | 13.7 |
| Subtotal | 452 | 114 | 25.2 |
| Percent of Regionwide Total | 40.6 | 32.5 | - - |
| Regionwide Total | 1,112 | 351 | 31.6 |

NOTE: In 1991, no carpool parking lots were located within the IH 794, IH 94 South, and USH 12 travel corridors.

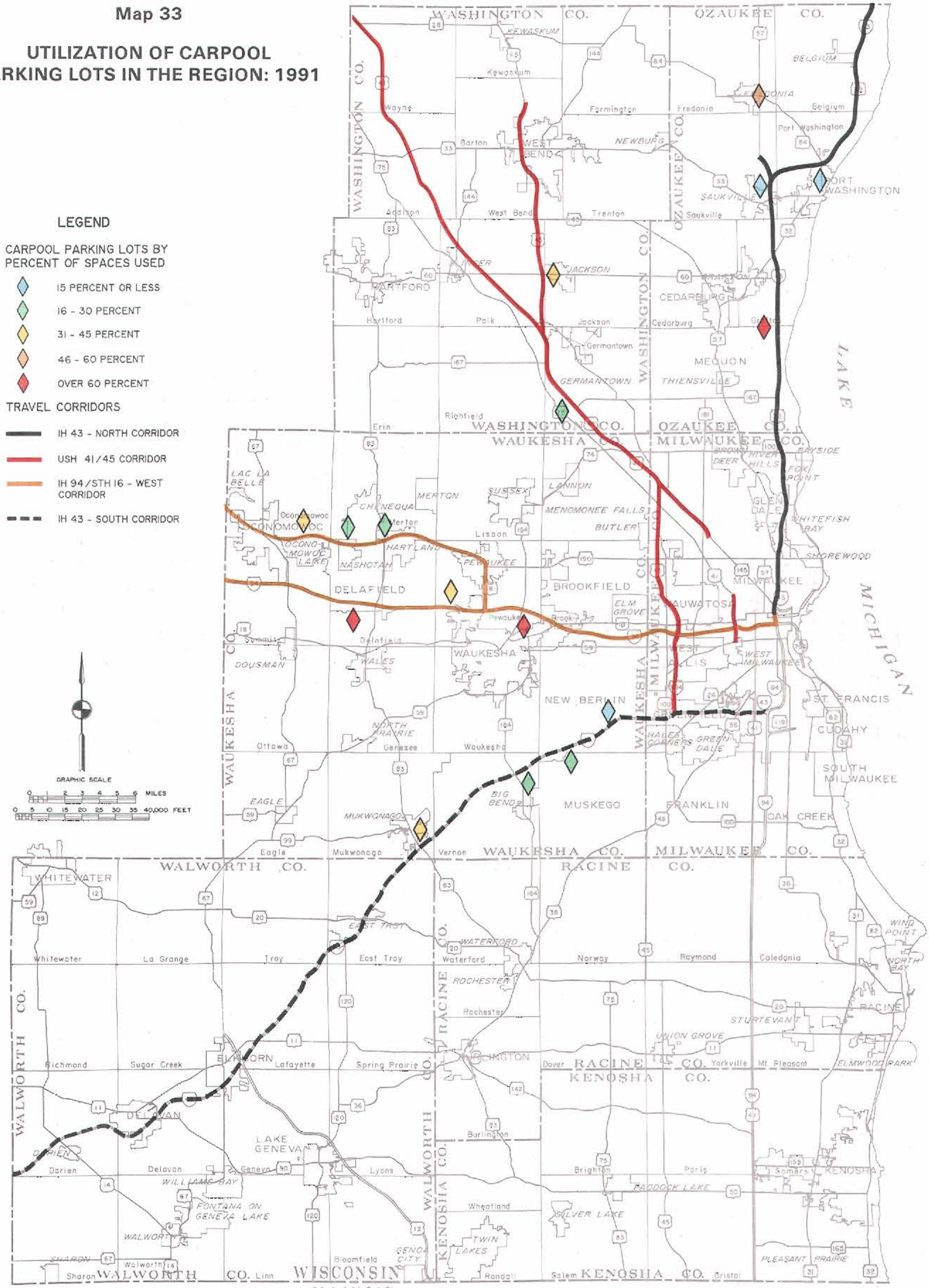
During an average weekday in the fourth quarter of 1991, 21 of the combined total 335 parking spaces available at Milwaukee Area Technical College (Mequon) and the W. Good Hope Road public transit stations were recorded as being used, presumably by carpool participants, since transit service was not provided to these sites during 1991.

*Source: SEWRPC.*

Map 33. It ranges from a high of 71 percent at the IH 94 and STH 164 site in Pewaukee to a low of 6 percent at the IH 43/STH 32 and STH 84 site in Port Washington. In addition to the IH 94 and STH 164 site, other lots with utilization rates greater than 60 percent, indicated on Map 33, are located at the following major interchanges: IH 43 and CTH C in Grafton and IH 94 and CTH CC in Delafield. In addition to the IH 43/STH 32 and STH 84 site, lots with utilization rates below 15 percent, indicated on the accompanying map, are located at the following major interchanges: IH 43 and STH 57 in Saukville and IH 43 and CTH 0 in New Berlin.

## Map 33

### UTILIZATION OF CARPOOL PARKING LOTS IN THE REGION: 1991

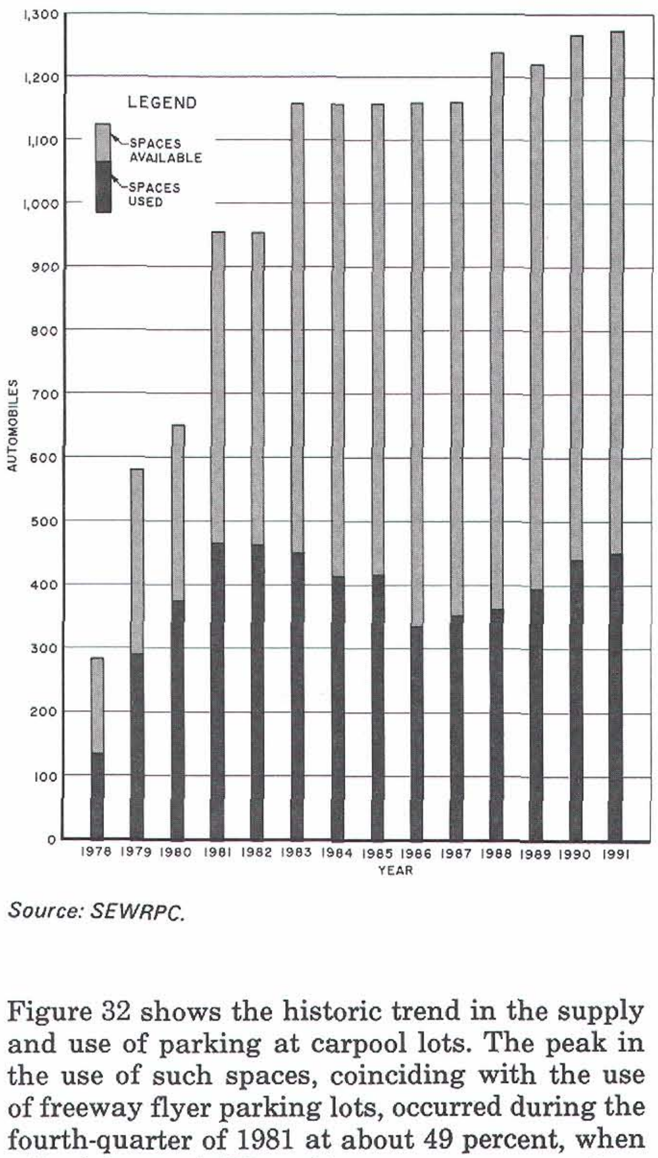



In 1991, there were 16 carpool parking lots distributed among major travel corridors emanating from the City of Milwaukee. Together, the parking lots provided 1,112 parking spaces, of which 32 percent were determined to be used on an average weekday during the fourth quarter of 1991. The highest utilization of carpool parking spaces was recorded at the IH 94 and STH 164 site in Pewaukee, where 71 percent of the available spaces were used on an average weekday.

*Source: SEWRPC.*

Figure 32

CARPOOL PARKING LOT USE: 1978-1991




*Source: SEWRPC.*

Figure 32 shows the historic trend in the supply and use of parking at carpool lots. The peak in the use of such spaces, coinciding with the use of freeway flyer parking lots, occurred during the fourth-quarter of 1981 at about 49 percent, when 468 of the total 957 parking spaces were used on an average weekday. The use of carpool parking lots declined between 1981 and 1986 and increased slightly each successive year to its present level.

## FREEWAY TRAFFIC MANAGEMENT SYSTEM

The existing freeway traffic management system is shown in graphic summary form on Map 34. In 1991, 21 freeway access points were equipped with on-ramp meters and corresponding traffic detectors in the Milwaukee area, 18 of which utilized microprocessor-based equipment. The metered on-ramps are located adjacent to freeway segments that experience the most severe traffic congestion during morning and evening weekday peak-traffic periods.

The principal objective of the freeway management system is to reduce the severity and duration of freeway traffic congestion. The on-ramp meters exercise control of freeway traffic volumes by restricting on-ramp traffic, thereby preventing groups of vehicles from attempting to merge into traffic simultaneously. The controller for each on-ramp meter can select one of three metering rates to accomplish the objective of smoothing traffic flow: one vehicle every six, nine, or 12 seconds, depending on the level of freeway congestion measured by the corresponding traffic detector at a location just "upstream" of the meter.

In 1991, preferential access was provided at four freeway access points and exclusive access was provided at two freeway access points to buses providing rapid and express transit service from the outlying park-and-ride lots and public transit stations to the Milwaukee CBD. Preferential access allows buses to bypass automobile traffic waiting at controlled ramps.

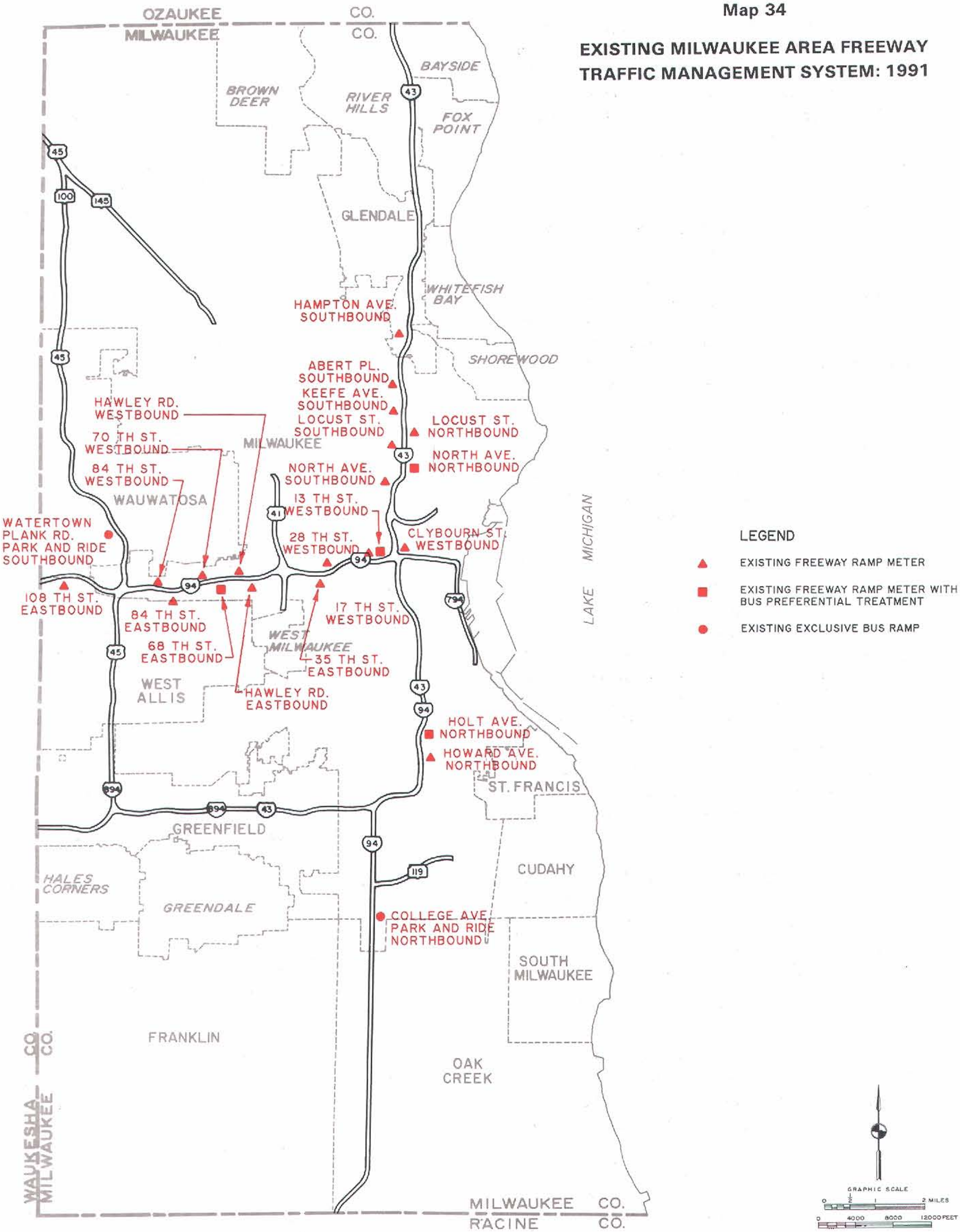
A comprehensive freeway management system for the Milwaukee area is not currently in place. The Commission recommended the development of such a system in 1988 with the publication of Planning Report No. 39, A Freeway Traffic Management System Plan for the Milwaukee Area. A comprehensive freeway management system would provide the means to monitor existing traffic flow rates systemwide and to regulate access to the freeway system based on current traffic conditions, that is, on a real-time basis. It would consist of a central traffic management center and include extensive incident management procedures, motorist advisory information and assistance services, and coordination of freeway controls with local street traffic controls. Preliminary engineering for the development of such a comprehensive freeway management system within the Milwaukee area is currently underway.

## SUMMARY

This chapter has summarized the existing supply and utilization of the regional transportation system, arterial streets and highways,

Map 34

**EXISTING MILWAUKEE AREA FREEWAY TRAFFIC MANAGEMENT SYSTEM: 1991**




Traffic entering the freeway system at a limited number of freeway on-ramps within the Milwaukee area freeway system is currently metered during the morning and evening peak periods. This map shows the locations of the 21 existing metered ramps, as well as the locations of the four existing ramp meters with bypasses for busses.

*Source: Wisconsin Department of Transportation and SEWRPC.*

fixed-route public transit, intermodal parking, and freeway traffic management. The chapter has also documented the changes that have occurred in the status and use of the system since 1972, the base year of the second-generation regional transportation system plan, and, in some cases, since 1963, the base year of the initial plan. A number of inventory findings with particular significance for transportation system development are evident. These include:

1. As of 1991 there were approximately 11,200 miles of street and highways of all types, local/land-access, collector, and arterial, open to traffic within the Region. Nearly 29 percent, or 3,274 miles of the total street and highway system functioned as arterials.

2. In 1991, approximately 33 million vehicle-mile of travel were found to occur on the arterial street and highway system on an average weekday within the Region. Most of this arterial utilization occurred within the intensely developed portions of the Region, particularly along the travel corridors emanating from the Milwaukee CBD through the Milwaukee urbanized area. The most intensive use of the arterial system, about 19,000 vehicle-miles of travel per arterial mile, occurred in Milwaukee County. Freeways within the Region, which constituted 295 miles or about 9 percent of the total arterial system, carried 35 percent of total arterial system vehicle-miles of travel on an average weekday in 1991.

3. In 1991, approximately 543 miles, or about 17 percent of the total arterial street and highway system, were operating at or over design capacity. About 43 percent of this mileage, or 232 miles, was within Milwaukee County.

4. In 1991, fixed-route public transit service in the form of local, express, and rapid transit was provided within the Kenosha, Milwaukee, and Racine urbanized areas. The operation of public transit within the Milwaukee urbanized area accounted for about 90 percent of the total seat-miles and about 94 percent of the total passenger miles recorded within the Region. The annual 1990 utilization of public transit in the Milwaukee urbanized area was recorded at 22 percent, indicating a slightly more effective provision of service than was provided in most urbanized areas of similar areal extent, population size, and population density within the United States. The 1991 daily percent utilization rates of public transit in the Kenosha, Milwaukee, and Racine urbanized areas were recorded at 15 percent, 21 percent, and 11 percent, respectively.

5. In 1991, nearly 33 percent of the urbanized land area and 77 percent of the urbanized area population was served by local public transit operating at or below 30-minute peak-period standard headways. In the Kenosha urbanized area 51 percent of the land area and 92 percent of the population was served by local transit. In the Milwaukee urbanized area 31 percent of the land area and 76 percent of the population was served by local public transit. In the Racine urbanized area 71 percent of the land area and 94 percent of the population was served by local transit.

6. Between 1972 and 1991, public transit ridership within the Region decreased by about 7 percent. This decline may be attributed to a 11 percent decrease in transit ridership within the Milwaukee urbanized area which was sufficient to offset concurrent ridership gains in the Kenosha and Racine urbanized areas. Between 1972 and 1991, public transit ridership within the Kenosha urbanized area more than doubled and ridership within the Racine urbanized area more than tripled.

7. On an average weekday during the fourth quarter of 1991, about 47 percent of the 3,850 parking spaces available to public transit patrons within the Region were used. Public transit parking lots were located at public transit stations and certain shopping centers along major rapid transit freeway corridors. In 1991, the use of such parking was found to be about 39 percent within the IH 43 North corridor, about 58 percent within the USH 41/45 corridor, about 42 percent within the IH 94/STH 16-West corridor, about 44 percent within IH 43 South corridor, and

about 51 percent within the IH 94-South corridor.

8. On an average weekday during the fourth quarter of 1991 about 32 percent of the 1,112 available parking spaces at carpool lots within the Region were used. In 1991, the use of available parking spaces at carpool lots was found to be about 13 percent within the IH 43-North corridor, about 25 percent within the USH 41/45 corridor, about 46 percent within the IH 94/STH 16-West corridor, and about 25 percent within the IH 43-South corridor. No carpool parking facilities were located within the IH 94 South, the IH 794, or the USH 12 freeway corridors.

9. In 1991, 21 freeway on-ramps within the Milwaukee area were equipped with metering devices to control freeway traffic volumes by monitoring and restricting on-ramp traffic flows. Preferential access to the freeway system was provided to buses at four freeway access points. Exclusive bypass of the meters was provided at two access points.

Significant changes have occurred in the provision and utilization of arterial street and highway and public transit facilities and services since 1963, the date of the Commission's first definitive travel related inventories. These changes are summarized in Table 51 and discussed below.

The total street and highway mileage within the Region increased between 1963 and 1991 by about 25 percent, from 8,943 miles to 11,199 miles. This increase may be attributed in part to the increase in urban development within the Region and the consequent construction of local/land-access and collector facilities to serve that development. From 1963 to 1985 the amount of land devoted to urban land uses increased by 37 percent, while resident population increased by 4 percent, the number of households increased by 34 percent, and employment increased by 35 percent.

The portion of total street and highway system mileage made up of arterial facilities has declined over time. In 1963, nearly 36 percent of total street and highway mileage was functionally classified as arterial; in 1972, about 32 percent; and in 1991, about 29 percent. Between 1963 and 1972 arterial system mileage decreased by 70 miles, or about 2 percent, from 3,188 miles to 3,118 miles. This decline was due, in part, to freeway construction and the consequent return of certain arterial facilities to collector and land-access status and function. In terms of absolute miles, arterial mileage increased between 1972 and 1991 as approximately 70 new miles were constructed and 84 miles took on arterial functions, carrying heavier traffic volumes and providing needed system continuity for the through movement of traffic.

The utilization of the arterial street and highway system has increased. In 1963, about 13 million arterial vehicle-miles of travel were recorded in the Region on an average weekday. Vehicle-miles of travel increased to about 20 million vehicle-miles by 1972 and to about 33 million vehicle-miles by 1991. Arterial VMT increased 64 percent between 1972 and 1991, and 153 percent between 1963 and 1991.

The significant increase in arterial utilization served to increase traffic congestion within the Region. In 1963, about 332 arterial miles, or about 10 percent of the system, was operating at or over design capacity. Arterial mileage operating at or over design capacity decreased between 1963 and 1972, to 318 miles, in response to freeway construction and the added highway capacity freeways provided. Between 1972 and 1991, however, arterial mileage operating at or over design capacity increased by 71 percent, or 225 miles. By 1991, 543 miles, or nearly 17 percent of total arterial mileage, were approaching, or already experiencing, congested traffic conditions.

Table 51 also indicates that significant changes have occurred in the provision and utilization of public transit within the Region. Between 1963 and 1991 the land area within the Region provided with local transit service increased significantly. Local transit operators extended transit routes into newly developing areas, providing additional round trip route miles at a rate of nearly 52 round trip route miles per year. Over the span of 28 years, the number of round trip route miles increased by about 168 percent, from 856 in 1963 to 2,296 in 1991. As a result, about 47 additional square miles were brought into the local transit service areas between 1963 and 1991.

## Table 51

### SUMMARY OF CHANGES IN THE PROVISION AND UTILIZATION OF ARTERIAL STREETS AND HIGHWAYS AND PUBLIC TRANSIT WITHIN THE REGION: 1963, 1972, AND 1991

| Measure of Provision and Utilization | 1963 | 1972 | 1991 | Change: 1972-1991 | | Change: 1963-1991 | |
|---|---|---|---|---|---|---|---|
| | | | | Number | Percent | Number | Percent |
| Arterial Streets and Highways | | | | | | | |
| Total Street and Highway Mileage[a] | 8,943.4 | 9,819.0 | 11,199.0 | 1,380 | 14.1 | 2,255.6 | 25.2 |
| Arterial Street and Highway Mileage | 3,188.2 | 3,118.7 | 3,274.2 | 155.5 | 5.0 | 86.0 | 2.7 |
| Arterial Mileage as a Percent of Total Mileage | 35.6 | 31.8 | 29.2 | -2.6 | - - | -6.4 | - - |
| Arterial Vehicle Miles of Travel | 13,072,000 | 20,124,000 | 33,072,000 | 12,948,000 | 64.3 | 20,000,000 | 153.0 |
| Arterial Mileage Operating at or over Design Capacity[b] | 332 | 318 | 543 | 225 | 70.8 | 211 | 63.6 |
| Public Transit[c] | | | | | | | |
| Total Local Transit Service Area (square miles) | 159.5 | 177.4 | 206.3 | 28.9 | 16.3 | 46.8 | 29.3 |
| Kenosha Urbanized Area | 10.9 | 15.9 | 20.9 | 5.0 | 31.4 | 10.0 | 91.7 |
| Milwaukee Urbanized Area | 136.9 | 147.5 | 158.0 | 10.5 | 7.1 | 21.1 | 15.4 |
| Racine Urbanized Area | 11.7 | 14.0 | 27.4 | 13.4 | 95.7 | 15.7 | 134.2 |
| Population Served by Local Transit | 1,193,300 | 1,204,600 | 1,136,600 | -68,000 | -5.6 | -56,700 | -4.8 |
| Kenosha Urbanized Area | 71,900 | 81,500 | 86,600 | 5,100 | 6.3 | 14,700 | 20.4 |
| Milwaukee Urbanized Area | 1,025,800 | 1,026,000 | 935,400 | -90,600 | -8.8 | -90,400 | -8.8 |
| Racine Urbanized Area | 95,600 | 47,100 | 114,600 | 17,500 | 18.0 | 19,000 | 19.9 |
| Total Round-Trip Route Miles | 847 | 1,201 | 2,296 | 1,095 | 91.2 | 1,449 | 171.1 |
| Kenosha Urbanized Area | 55 | 59 | 171 | 112 | 189.8 | 116 | 210.9 |
| Milwaukee Urbanized Area | 716 | 1,061 | 1,954 | 893 | 84.2 | 1,238 | 172.9 |
| Racine Urbanized Area | 76 | 81 | 171 | 90 | 111.1 | 95 | 125.0 |
| Total Transit Vehicle-Miles (average weekday) | 84,900 | 64,000 | 63,300 | -700 | -1.1 | -21,600 | -25.4 |
| Kenosha Urbanized Area | 2,500 | 1,100 | 2,500 | 1,400 | 127.3 | 0 | 0 |
| Milwaukee Urbanized Area | 78,900 | 61,300 | 56,400 | -4,900 | -8.0 | -22,500 | -28.5 |
| Racine Urbanized Area | 3,500 | 1,600 | 4,400 | 2,800 | 175.0 | 900 | 25.7 |
| Total Seat-Miles (average weekday) | 3,412,000 | 3,258,700 | 2,975,000 | -283,700 | -8.7 | -437,000 | -12.8 |
| Kenosha Urbanized Area | 80,800 | 43,200 | 110,700 | 67,500 | 156.3 | 29,900 | 37.0 |
| Milwaukee Urbanized Area | 3,201,300 | 3,186,000 | 2,692,300 | -493,700 | -15.5 | -509,000 | -15.9 |
| Racine Urbanized Area | 129,900 | 29,500 | 172,000 | 142,500 | 483.1 | 42,100 | 32.4 |
| Total Passenger Miles (average weekday) | 1,013,600 | 560,700 | 609,100 | 48,400 | 8.6 | 404,500 | -39.9 |
| Kenosha Urbanized Area | 15,100 | 3,900 | 16,800 | 12,900 | 330.8 | 1,700 | 11.3 |
| Milwaukee Urbanized Area | 966,700 | 551,500 | 573,200 | 21,700 | 3.9 | -393,500 | -68.6 |
| Racine Urbanized Area | 31,800 | 5,300 | 19,100 | 13,800 | 260.4 | -12,700 | -39.9 |
| Percent Utilization of Public Transit[d] | 29.7 | 17.2 | 20.5 | 3.3 | - - | -9.2 | - - |
| Kenosha Urbanized Area | 18.7 | 9.0 | 15.2 | 6.2 | - - | -3.5 | - - |
| Milwaukee Urbanized Area | 30.2 | 17.3 | 21.3 | 4.0 | - - | -8.9 | - - |
| Racine Urbanized Area | 24.4 | 18.0 | 11.1 | -6.9 | - - | -13.3 | - - |
| Annual Revenue Passengers | 94,548,000 | 53,904,300 | 50,222,900 | -3,681,400 | -6.8 | -44,325,100 | -46.9 |
| Kenosha Urbanized Area | 1,884,400 | 503,200 | 1,128,000 | 624,800 | 124.2 | -756,400 | -40.1 |
| Milwaukee Urbanized Area | 89,761,600 | 52,875,400 | 47,267,100 | -5,608,300 | -10.6 | -42,494,500 | -47.3 |
| Racine Urbanized Area | 2,902,000 | 525,700 | 1,827,800 | 1,302,100 | 247.7 | 1,074,100 | -37.0 |

[a] *Includes streets and highways functionally classified as arterials, collectors, and local/land-access streets.*

[b] *At design capacity:volume-to-design capacity ratio of 0.91-1.10; over design capacity: volume-to-design capacity ratio over 1.10.*

[c] *Includes only fixed-route transit service. Does not include the fixed-route transit service provided in the City of Port Washington, discontinued in 1966.*

[d] *Percent utilization, a measure of how well the supply of fixed-route transit service is used, is calculated by dividing the number of average weekday passenger-miles by the number of average weekday seat-miles.*

*Source: SEWRPC.*

Over all, however, the expansion of the local transit service areas did not result in an increase in the number of people served by local transit. In fact, on a regionwide level, in 1991, 56,700 fewer persons resided within one-quarter mile of a local transit route, the distance that would enable a resident to access the transit system conveniently by walking, than did in 1963. In providing service to smaller, less concentrated populations over greater route mileage, transit providers within the Milwaukee urbanized area combined to operate fewer vehicles less often. Transit vehicle-miles provided within the Milwaukee urbanized area decreased by nearly 29 percent between 1963 and 1991.

The dominance of the Milwaukee urbanized area in the consideration of regionwide transit statistics is particularly evident when considering resident population served by local transit. While the population served by local transit within the Region decreased by 5 percent between 1963 and 1991, the population served within the Kenosha and Racine urbanized areas actually increased by about 20 percent in both areas. Between 1963 and 1991, transit providers within the Kenosha and Racine urbanized areas combined to add an additional 33,700 potential transit riders to the local transit service areas and increased transit vehicle-miles provided by about 15 percent.[6] During the same period, the local transit service area population within the Milwaukee urbanized area declined by 90,400 persons, indicating the decentralization of urban development and resident population. These declines in the Milwaukee urbanized area were sufficient to offset the gains made in population served within the two smaller urbanized areas.

Public transit ridership has declined significantly within the Region, by nearly 47 percent between 1963 and 1991. Between 1972 and 1991, however, ridership within the Kenosha and Racine urbanized areas increased more than two-fold and three-fold, respectively, but did not attain levels set in 1963. Unlike the smaller urbanized areas, the ridership level in the Milwaukee area in 1991 was significantly below the level set in 1972, by 5.6 million.

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[6]*Between 1963 and 1991, the increased provision of transit vehicle-miles occurred only within the Racine urbanized area where a 26 percent increase occured. Within the Kenosha urbanized area, the provision of vehicle-miles was the same in both 1963 and 1991.*

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# Chapter V

# TRAVEL HABITS AND PATTERNS

## INTRODUCTION

One of the central concepts underlying the regional transportation study is that travel is an orderly, regular, and measurable occurrence, evidenced by recognizable travel patterns. Periodically, a complete and accurate inventory of existing travel is necessary to identify those patterns and disclose those aspects which demonstrate a high degree of repetitiveness. Such knowledge is a prerequisite to an understanding of probable future travel behavior and, therefore, to intelligent planning of future travel requirements. In this respect, the inventory of travel must provide a clear representation of total travel, while taking stock of, and describing in detail, each of its component parts.

Another fundamental concept underlying the regional transportation study is that land use and transportation are closely interrelated. A complete and accurate inventory of existing travel in the Region is, therefore, also necessary in order to determine the quantitative relationships existing between land use and travel, thereby providing a solid basis for the derivation of future travel demand from existing and proposed land use patterns.

Finally, an accurate inventory of travel is necessary to provide the basis for an understanding of the interactions between travel behavior and land use development. Such an understanding is essential to intelligent planning for future land use requirements.

This chapter describes the necessary travel inventories, the existing travel behavior within the Region, and the significant forces shaping regional travel habits and patterns, comparing the findings of the 1991 regional travel inventory with those of the 1972 and 1963 travel inventories. In addition to the major elements of the regional travel inventory described below, a set of special surveys was conducted as part of the inventory. These special surveys are also described in this chapter.

## THE 1991 REGIONAL INVENTORY OF TRAVEL: MAJOR ELEMENTS

Findings of the 1963 and 1972 regional inventories of travel were described in SEWRPC Planning Report No. 7, Volume One, The Land Use-Transportation Study: Inventory Findings: 1963, May 1965, and SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin: 2000, Volume One, Inventory Findings, April 1975, respectively. The 1991 regional inventory of travel,[1] although not as extensive as the 1972 inventory, was more extensive than the 1963 study both in the number and kinds of surveys conducted and also in the scope and detail of information collected. Like the 1963 inventory, the 1991 inventory included comprehensive origin-destination surveys of average weekday travel, including resident household, truck, taxi, and external cordon surveys. In addition, the 1991 inventory, like the 1972 inventory, included surveys of mass transit, intercity motor bus, and intercity railway average weekday travel. Not included in the 1991 inventory were special origin-destination surveys of weekend travel, surveys of mass transit nonusers, and surveys of major traffic generators included in the 1972 inventory.

The 1991 survey of resident households was based on a sample of 17,500 households, or approximately 2.6 percent of the estimated total of 676,100 households in the Region. The sample was selected from electric utility residential customer account address lists. This large-scale sample provides a rich set of data, permitting the description and analysis of resident household travel both by subarea and between subareas of the Region. Information obtained through personal interviews from each sampled household included detailed data concerning: specific household characteristics, including the number of household members, number of vehi-

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[1]*Although the most recent regional travel inventory was conducted from 1991 to 1993, this inventory has been designated the "1991" inventory for purposes of reference and of comparison to the 1963 and 1972 inventories. The special surveys described later in this chapter, however, are referred to by the years in which, respectively, they were conducted.*

cles available, structure type of residence, and household income range; specific data for each household member, such as relationship to head of household, age, license-to-drive status, sex, and employment status; and, for each trip made by persons over the age of five on the assigned travel day, the origin and destination of trip, trip purpose, time of day, mode of travel, blocks walked at origin of trip and destination of trip, and, for automobile drivers, the number of passengers in the vehicle, parking location, type of parking, duration of parking, and cost of parking.

In addition, 1,400 samples, representing approximately 3.6 percent of the 38,800 residents of the Region living in group quarters, such as Huber law jail facilities, shelters, nursing homes, motels, hotels, and rooming houses, and schools and other institutions, were surveyed. The sample was drawn from a list of such facilities compiled by the Commission using telephone directories and consultations with various agencies of government. Residents who were group-quartered but who were severely restricted in their ability to travel were not surveyed. This group included residents of mental hospitals, prisons, and invalid homes.

The five major mass transit systems operating in the Region in 1991 were also surveyed. Each of the five systems was sampled at rates designed to permit analysis of the characteristics of existing transit system ridership. For the Kenosha area transit system, 800 samples were obtained, representing a 35 percent rate of return and a 17 percent sample of its estimated 4,800 average weekday riders. For the Milwaukee area transit system, 8,700 samples were obtained, representing a 30 percent rate of return and a 4 percent sample of its estimated 232,700 average weekday riders. For the Racine area transit system, 1,600 samples were obtained, representing a 50 percent rate of return and a 17 percent sample of its estimated 9,200 average weekday riders. For the City of Waukesha transit system, 600 samples were obtained, representing a 40 percent rate of return and a 24 percent sample of its estimated 2,500 average weekday riders. For the Waukesha County transit system, 500 samples were obtained, representing a 68 percent rate of return and a 66 percent sample of its estimated 760 average weekday riders.

Information obtained through mail-back survey forms included detailed data concerning specific household characteristics, including the location of each tripmaker's home, the number of household members, number of vehicles available, and household income range; specific data regarding each tripmaker, such as age, sex, license-to-drive status, and race; and for each trip, the origin and destination of the trip, trip purpose, time of day, transfer information, mode of travel to the bus stop, fares, round-trip frequency, and length of time using transit.

The 1991 regional travel inventory also included a truck survey. The truck survey was intended to provide information regarding the movement of freight and the delivery of services by commercial trucks. Personal travel made using trucks was collected and reported in the resident household and group-quarters surveys. The survey of truck travel was based on a sample of 2,500 commercial trucks, or approximately 3 percent of the estimated 87,500 commercial trucks[2] registered in the Region. Information obtained through a mail survey for each sampled truck included detailed data concerning: the business or industry of the truck owner; the truck garaging location, carrier type, odometer reading at the beginning and end of the travel day, and vehicle type; and for each trip made using the truck on the assigned travel survey day, the origin and destination of the trip, trip purpose, and time of day.

The taxi survey conducted as a part of the 1991 travel inventory included travel by limousines and specialized carriers providing service to elderly and disabled tripmakers, as well as travel by taxicabs. About 400 samples were obtained, representing about 33 percent of the approximately 1,200 private personalized transportation vehicles estimated to be operated in the Region. Information obtained through the mail-back survey from each sampled vehicle included detailed data concerning: the business and industry of the vehicle owner; the vehicle garaging location, carrier type, odometer reading at the beginning and end of the travel day,

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[2]*For purposes of the truck survey, the number of trucks available within the Region for commercial use was determined to be 87,500. The truck survey findings indicated that there were, in addition, 80,600 trucks available in the Region used for personal travel.*

and vehicle type; and for each trip made on the assigned travel survey day, the origin and destination of the trip, trip purpose, and time of day.

In the external cordon survey, roadside interview stations were established on 44 major highways crossing the boundaries of the Region. At these stations, mail-back survey forms were distributed to 174,700 motorists between the hours of 6:00 a.m. and 6:00 p.m. in May 1992 and early June 1992. Approximately 47,100 usable survey forms were returned, representing more than 16 percent of the 288,700 regional boundary crossings by vehicles estimated to occur at the interview stations during an average weekday. Information obtained through the mail-back survey included: the vehicle used in making the trip, the garaging address of the vehicle, type of vehicle, and number of passengers carried; and, for trucks, the carrier type. For trips crossing the cordon line, data regarding the origin, destination, and purpose of each trip were also obtained.

As a part of the new regional inventory of travel, special origin-destination surveys were conducted in the spring of 1993 to provide information on persons entering, exiting, or traveling through the Region on motor buses and railway trains. In addition, a survey of enplaning passengers at General Mitchell International Airport was conducted in the fall of 1989. The survey of intercity motor bus travel was based on a sample of 1,000 riders or approximately 71 percent of the estimated 1,400 average weekday intercity motor bus riders. The survey of intercity railway passengers was based on a sample of 1,300 riders, or approximately 76 percent of the estimated 1,700 average weekday intercity railway passengers. Information obtained through these mail-back surveys included: specific household characteristics, such as location of residence, number of vehicles available in the household, and household income range; specific data regarding the tripmaker, such as occupation, age, and level of education; and data related to the trip, such as the origin, destination, and purpose of the trip; and, if part of a round trip, boarding location and frequency of the trip made. Surveyed riders were also asked to identify reasons for choosing their mode of travel and to state which alternative mode they would choose if the current service was not available.

The expanded data obtained in these surveys provided a complete representation of the total travel occurring within the Region on an average weekday in 1991. In each survey, careful attention was given to data collection scheduling to prevent any day-related bias in the information.

Accuracy Checks

Two distinct sets of accuracy checks were employed to determine the degree of accuracy and completeness of data obtained in the major travel surveys. In one set, data on socio-economic characteristics obtained from the major surveys were compared with data from the 1990 Federal Census and other independent sources. In the other set of accuracy checks, vehicle trip volumes derived from travel surveys were compared to vehicle trip volumes obtained by classification counts made at screenlines, cut lines, and cordon lines.[3] The level of vehicle-miles of travel derived from travel surveys was also compared to actual vehicle-miles of travel estimated from traffic counts.

Socio-Economic Accuracy Checks: Application of the socio-economic accuracy checks to the resident household survey indicated that the percentage distribution of households by household size as established by the survey was essentially the same as that identified by the 1990 Federal Census at a county as well as regional level. Table 52 sets forth a comparison of the distribution of households by household size within each county as measured by the 1990 Federal Census and as derived from the resident household

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[3]*A cut line is defined as an imaginary line extending through a selected portion of a geographic area for the purpose of comparing and analyzing data as estimated from traffic counts with data derived from travel surveys. A screenline is an imaginary line extending through a selected portion of a geographic area along natural or built barriers providing a limited number of crossing points established for the purpose of comparing and analyzing travel data as estimated from traffic counts with data derived from travel surveys. A cordon line is an imaginary line extending around a selected geographic area for the purpose of comparing and analyzing external travel data as estimated from traffic counts with such data as derived from travel surveys.*

## Table 52

### THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF THE DISTRIBUTION OF HOUSEHOLDS BY HOUSEHOLD SIZE AND COUNTY FROM 1990 FEDERAL CENSUS AND 1991 RESIDENT HOUSEHOLD SURVEY

| County | Household Size | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | One Person | | | Two Persons | | | Three Persons | | |
| | Number of Households | | | Number of Households | | | Number of Households | | |
| | 1990 Federal Census | Resident Household Survey | Percent Difference[a] | 1990 Federal Census | Resident Household Survey | Percent Difference[a] | 1990 Federal Census | Resident Household Survey | Percent Difference[a] |
| Kenosha . . . . . | 10,923 | 10,993 | 0.6 | 14,750 | 14,788 | 0.3 | 8,436 | 8,424 | -0.1 |
| Milwaukee . . . . | 109,528 | 109,569 | 0.0 | 116,694 | 116,863 | 0.1 | 60,421 | 60,265 | -0.3 |
| Ozaukee . . . . . | 4,374 | 4,361 | -0.3 | 8,627 | 8,651 | 0.3 | 4,877 | 4,854 | -0.5 |
| Racine . . . . . . | 14,049 | 14,043 | 0.0 | 20,016 | 19,927 | -0.4 | 11,563 | 11,531 | -0.3 |
| Walworth . . . . | 6,609 | 6,624 | 0.2 | 9,256 | 9,254 | 0.0 | 4,651 | 4,661 | 0.2 |
| Washington . . . | 5,657 | 5,643 | -0.2 | 10,405 | 10,418 | 0.1 | 6,037 | 6,040 | 0.0 |
| Waukesha . . . . | 17,619 | 17,497 | -0.7 | 34,360 | 34,598 | 0.7 | 20,084 | 20,009 | -0.4 |
| Region | 168,759 | 168,730 | 0.0 | 214,108 | 214,499 | 0.2 | 116,069 | 115,784 | -0.2 |

| County | Household Size | | | | | | Total Number of Households | |
|---|---|---|---|---|---|---|---|---|
| | Four Persons | | | Five or More Persons | | | | |
| | Number of Households | | | Number of Households | | | | |
| | 1990 Federal Census | Resident Household Survey | Percent Difference[a] | 1990 Federal Census | Resident Household Survey | Percent Difference[a] | 1990 Federal Census | Resident Household Survey |
| Kenosha . . . . . | 7,638 | 7,565 | -1.0 | 5,293 | 5,271 | -0.4 | 47,040 | 47,040 |
| Milwaukee . . . . | 49,004 | 48,960 | -0.1 | 37,401 | 37,390 | 0.0 | 373,048 | 373,048 |
| Ozaukee . . . . . | 4,826 | 4,849 | 0.5 | 3,003 | 2,992 | -0.4 | 25,707 | 25,707 |
| Racine . . . . . . | 10,852 | 10,944 | 0.8 | 7,256 | 7,291 | 0.5 | 63,736 | 63,736 |
| Walworth . . . . | 4,234 | 4,206 | -0.7 | 2,875 | 2,880 | 0.2 | 27,625 | 27,625 |
| Washington . . . | 6,575 | 6,596 | 0.3 | 4,333 | 4,310 | -0.5 | 33,007 | 33,007 |
| Waukesha . . . . | 21,200 | 21,169 | -0.1 | 12,727 | 12,717 | -0.1 | 105,990 | 105,990 |
| Region | 104,329 | 104,288 | 0.0 | 72,888 | 72,851 | -0.1 | 676,153 | 676,153 |

[a] *The percent difference is derived by dividing the result of subtracting the number of households reported in the 1990 Federal Census from the number of households reported in the resident household survey by the number of households in the 1990 Federal Census.*

*Source: U. S. Bureau of the Census and SEWRPC.*

survey. As Table 52 shows, the county-level survey data on household size are within 0.3 percent of corresponding 1990 Federal Census data in more than one-half of the applicable cases. The largest difference between county-level survey data and corresponding 1990 Federal Census data is in the case of four-person households in Kenosha County, in which case the difference is 1.0 percent. At the regional level, all differences between Census and survey data were 0.2 percent or less.

Table 53 sets forth comparisons of data on vehicle availability by county for 1991 as obtained, respectively, from 1990 Federal Census data and from the 1991 resident household survey. The comparison indicated that vehicle availability by county was accurately estimated by the survey, varying by 2.3 percent to 6.4 percent from Federal Census estimates. The total number of vehicles available in the Region, based on the 1991 residential household survey, was estimated to be about 1,142,500 vehicles, about 2.4 percent more than the 1,116,000 vehicles estimated to be available in 1991 using 1990 Federal Census data.

The distribution of annual household income as estimated by the travel survey was also compared with similar data estimated from the 1990 Census. Table 54 sets forth this comparison. At a regional level, the percentage of households in any given income range, based on the 1991 resident household survey, did not differ from the corresponding percentage of households based on 1990 Federal Census data by more than 3 percent.

## Table 53

### THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF THE NUMBER OF VEHICLES AVAILABLE BY COUNTY FROM THE 1990 FEDERAL CENSUS AND 1991 RESIDENT HOUSEHOLD SURVEY DATA

| County | 1991 Estimate Based on 1990 Federal Census | | 1991 Resident Household Survey | | | |
|---|---|---|---|---|---|---|
| | Number of Vehicles | Percent of Total | Number of Vehicles | Percent of Total | Difference in Number of Vehicles | Percent Difference |
| Kenosha | 83,700 | 7.5 | 88,800 | 7.8 | 5,100 | 6.1 |
| Milwaukee | 516,100 | 46.2 | 540,600 | 47.3 | 24,500 | 4.7 |
| Ozaukee | 53,300 | 4.8 | 52,100 | 4.6 | -1,200 | -2.3 |
| Racine | 113,400 | 10.2 | 120,700 | 10.6 | 7,300 | 6.4 |
| Walworth | 51,900 | 4.7 | 54,000 | 4.7 | 2,100 | 4.0 |
| Washington | 70,600 | 6.3 | 68,700 | 6.0 | -1,900 | -2.7 |
| Waukesha | 227,000 | 20.3 | 217,600 | 19.0 | -9,400 | -4.1 |
| Region | 1,116,000 | 100.0 | 1,142,500 | 100.0 | 26,500 | 2.4 |

*Source: U. S. Bureau of the Census and SEWRPC.*

## Table 54

### THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF THE DISTRIBUTION OF THE PERCENTAGE OF HOUSEHOLDS BY INCOME AND BY COUNTY FROM THE 1990 FEDERAL CENSUS AND 1991 RESIDENT HOUSEHOLD SURVEY DATA

| Household Income | Kenosha | | | Milwaukee | | | Ozaukee | | | Racine | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 Federal Census | Resident Household Survey | Difference in Percent | 1990 Federal Census | Resident Household Survey | Difference in Percent | 1990 Federal Census | Resident Household Survey | Difference in Percent | 1990 Federal Census | Resident Household Survey | Difference in Percent |
| Under $5,000 | 3.3 | 1.5 | -1.8 | 4.8 | 2.5 | -2.3 | 1.3 | 1.1 | -0.2 | 3.3 | 0.9 | -2.4 |
| $5,000 to 9,999 | 8.7 | 4.3 | -4.4 | 11.9 | 8.2 | -3.7 | 4.1 | 2.5 | -1.6 | 8.7 | 5.0 | -3.7 |
| 10,000 to 14,999 | 8.3 | 8.5 | 0.2 | 9.6 | 9.9 | 0.3 | 5.1 | 4.3 | -0.8 | 8.2 | 6.9 | -1.3 |
| 15,000 to 19,999 | 9.3 | 9.5 | 0.2 | 9.3 | 10.6 | 1.3 | 6.1 | 4.8 | -1.3 | 8.4 | 8.5 | 0.1 |
| 20,000 to 24,999 | 9.6 | 11.4 | 1.8 | 9.1 | 12.0 | 2.9 | 6.2 | 7.7 | 1.5 | 8.3 | 10.1 | 1.8 |
| 25,000 to 29,999 | 9.5 | 9.9 | 0.4 | 8.5 | 10.4 | 1.9 | 7.2 | 7.8 | 0.6 | 7.8 | 11.0 | 3.2 |
| 30,000 to 34,999 | 8.8 | 9.9 | 1.1 | 8.0 | 10.2 | 2.2 | 7.3 | 7.1 | -0.2 | 8.5 | 11.2 | 2.7 |
| 35,000 to 39,999 | 7.4 | 9.1 | 1.7 | 7.3 | 8.6 | 1.3 | 8.0 | 8.3 | 0.3 | 8.0 | 9.4 | 1.4 |
| 40,000 to 49,999 | 13.2 | 14.3 | 1.1 | 11.9 | 11.4 | -0.5 | 14.4 | 16.2 | 1.8 | 13.9 | 13.7 | -0.2 |
| 50,000 to 74,999 | 16.0 | 16.9 | 0.9 | 13.9 | 11.5 | -2.4 | 22.3 | 23.5 | 1.2 | 17.4 | 16.2 | -1.2 |
| 75,000 to 99,999 | 4.0 | 2.9 | -1.1 | 3.3 | 2.7 | -0.6 | 8.5 | 7.9 | -0.6 | 4.6 | 4.3 | -0.3 |
| 100,000 or Over | 1.9 | 1.8 | -0.1 | 2.4 | 2.0 | -0.4 | 9.5 | 8.8 | -0.7 | 2.9 | 2.8 | -0.1 |
| Total | 100.0 | 100.0 | 0.0 | 100.0 | 100.0 | 0.0 | 100.0 | 100.0 | 0.0 | 100.0 | 100.0 | 0.0 |

| Household Income | Walworth | | | Washington | | | Waukesha | | | The Region | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 Federal Census | Resident Household Survey | Difference in Percent | 1990 Federal Census | Resident Household Survey | Difference in Percent | 1990 Federal Census | Resident Household Survey | Difference in Percent | 1990 Federal Census | Resident Household Survey | Difference in Percent |
| Under $5,000 | 3.6 | 2.2 | -1.4 | 1.3 | 0.9 | -0.4 | 1.4 | 1.0 | -0.4 | 3.7 | 1.9 | -1.8 |
| $5,000 to 9,999 | 8.5 | 10.1 | 1.6 | 5.0 | 2.7 | -2.3 | 3.9 | 2.6 | -1.3 | 9.3 | 6.4 | -2.9 |
| 10,000 to 14,999 | 8.9 | 10.6 | 1.7 | 5.9 | 3.8 | -2.1 | 4.5 | 3.9 | -0.6 | 8.2 | 8.1 | -0.1 |
| 15,000 to 19,999 | 10.3 | 8.8 | -1.5 | 6.5 | 6.8 | 0.3 | 5.3 | 5.0 | -0.3 | 8.4 | 9.0 | 0.6 |
| 20,000 to 24,999 | 9.5 | 7.7 | -1.8 | 7.8 | 9.2 | 1.4 | 6.0 | 5.8 | -0.2 | 8.4 | 10.4 | 2.0 |
| 25,000 to 29,999 | 8.6 | 7.6 | -1.0 | 8.1 | 9.9 | 1.8 | 6.2 | 6.5 | 0.3 | 8.1 | 9.6 | 1.5 |
| 30,000 to 34,999 | 8.7 | 11.0 | 2.3 | 8.9 | 10.7 | 1.8 | 7.3 | 9.4 | 2.1 | 8.0 | 10.0 | 2.0 |
| 35,000 to 39,999 | 7.5 | 9.2 | 1.7 | 9.1 | 9.7 | 0.6 | 7.6 | 8.5 | 0.9 | 7.5 | 8.8 | 1.3 |
| 40,000 to 49,999 | 13.4 | 12.5 | -0.9 | 17.8 | 18.2 | 0.4 | 16.0 | 16.0 | 0.0 | 13.2 | 13.1 | -0.1 |
| 50,000 to 74,999 | 14.4 | 14.0 | -0.4 | 21.1 | 19.0 | -2.1 | 26.0 | 27.3 | 1.3 | 16.9 | 15.6 | -1.3 |
| 75,000 to 99,999 | 4.0 | 3.9 | -0.1 | 5.3 | 5.1 | -0.2 | 9.0 | 8.8 | -0.2 | 4.7 | 4.1 | -0.6 |
| 100,000 or Over | 2.5 | 2.5 | 0.0 | 3.1 | 3.9 | 0.8 | 6.8 | 5.1 | -1.7 | 3.4 | 2.9 | -0.5 |
| Total | 100.0 | 100.0 | 0.0 | 100.0 | 100.0 | 0.0 | 100.0 | 100.0 | 0.0 | 100.0 | 100.0 | 0.0 |

*Source: U. S. Bureau of Census and SEWRPC.*

Table 55

THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF SOUTHEASTERN WISCONSIN TRUCK REGISTRATIONS AND TRUCK AVAILABILITY AS DETERMINED BY THE 1991 TRUCK SURVEY

| Truck Classification | 1992 Truck Registrations | | 1991 Truck Survey Motor Trucks Available | | Difference in Number of Vehicles | Percent Difference |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent of Total | | |
| Light . . . . . . . . . | 135,600 | 76.6 | 129,700 | 77.2 | -5,900 | -4.4 |
| Medium . . . . . . . | 30,700 | 17.4 | 28,400 | 16.9 | -2,300 | -7.5 |
| Heavy . . . . . . . . | 3,400 | 1.9 | 3,100 | 1.8 | -300 | -8.8 |
| Municipal . . . . . | 7,200 | 4.1 | 6,900 | 4.1 | -300 | -4.2 |
| Total | 176,900 | 100.0 | 168,100 | 100.0 | -8,800 | -5.0 |

*Source: Wisconsin Department of Transportation and SEWRPC.*

Estimates of truck availability, including estimates by type, as determined by the 1991 travel survey, were compared with corresponding estimates as derived from 1992 Wisconsin Department of Transportation, Division of Motor Vehicles, registration records. This comparison indicates a high degree of accuracy for the truck data derived from the survey, both within the Region and within its counties. Table 55 sets forth this comparison with regard to the Region. As Table 55 shows, the 1991 survey findings indicated that survey estimates of motor truck availability represented about 95 percent of the total trucks registered. Previous surveys conducted by the Commission indicated that motor truck availability estimates approximated 94 percent of all trucks registered within the Region. The remaining 6 percent was not available because those trucks were removed from the State or were in salvage yards, used vehicle lots, or similar storage.

The results of the accuracy checks on the resident household survey socio-economic characteristic data indicate that the survey data demonstrate a high degree of accuracy and completeness. Upon completion of the accuracy checks on the expanded housing and socio-economic characteristic data as derived from the resident household and other travel surveys, the second set of checks was performed to ascertain the degree of accuracy of, and to determine the need for adjustment to the trip information obtained in, these surveys. For this analysis, expanded trip data from the resident household, external truck, and taxi travel surveys were combined.

Travel Accuracy Checks: To verify that travel into and out of the Region was adequately represented by the 1991 travel inventory, travel accuracy checks were first conducted at the external cordon of the Region. The findings shown in Table 56 indicated that the travel survey data did indeed accurately represent external travel and could be used without adjustment of external travel data as reported in the external cordon and resident household and truck surveys.

The next travel accuracy checks performed included the comparisons of the combined travel survey data with traffic counts of vehicle crossings at selected east-west screenlines and cut lines and estimates of actual vehicle-miles of travel. The principal check compared traffic count and classification data from all vehicle crossings of screenlines between 6 a.m. and 8 p.m. with vehicle trip volumes determined from the travel survey data to be crossing such screenlines. The three screenlines, which are shown on Map 35 and which paralleled natural or built barriers to minimize undetected crossings, bisected the Milwaukee, Racine, and Kenosha urbanized areas. In addition, the Milwaukee screenline, which roughly paralleled IH 94, extended across the Region from the Waukesha-Jefferson County line on the west to Lake Michigan on the east. The results of this comparison, shown in Table 57, indicate that the combined travel surveys underrepresented travel by about 14 percent on the Milwaukee screenline and by almost 20 percent on the Kenosha and Racine screenlines.

Table 56

**THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF ESTIMATED SOUTHEASTERN WISCONSIN CORDON LINE CROSSING: ESTIMATED AVERAGE WEEKDAY TRAFFIC VOLUMES FROM TRAFFIC COUNTS AND FROM TRAVEL SURVEYS**

| External Cordon Line Segment | Estimated Average Weekday Traffic Volumes from Traffic Counts | Estimated Average Weekday Traffic Volumes from Travel Survey Data | Difference in Volumes | Percent Difference |
|---|---|---|---|---|
| Northern Region Boundary . . . | 39,500 | 33,600 | -5,900 | -14.9 |
| Western Region Boundary . . . | 130,500 | 134,100 | 3,600 | 2.8 |
| Southern Region Boundary . . . | 129,300 | 131,500 | 2,200 | 1.7 |
| Total | 299,300 | 299,200 | -100 | 0.0 |

*Source: SEWRPC.*

Table 57

**THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF ESTIMATES OF AVERAGE WEEKDAY VEHICULAR TRAFFIC CROSSING THE KENOSHA, MILWAUKEE, AND RACINE SCREENLINES USING UNADJUSTED TRAVEL SURVEY DATA FROM TRAFFIC COUNTS AND TRAVEL SURVEY DATA**

| Screenline | Estimated Average Weekday Traffic Volumes from Traffic Counts | Estimated Average Weekday Traffic Volumes from Travel Survey Data | Difference in Volumes | Percent Difference |
|---|---|---|---|---|
| Kenosha . . . . . . . . . . . . . . | 211,400 | 169,600 | -41,800 | -19.8 |
| Milwaukee . . . . . . . . . . . . . | 819,200 | 701,200 | -118,000 | -14.4 |
| Racine . . . . . . . . . . . . . . . | 195,700 | 158,700 | -37,000 | -18.9 |

*Source: SEWRPC.*

The other major travel accuracy check compared estimated vehicle-miles of travel, as derived from survey trip data, assigned to the arterial street and highway network to actual traffic estimates derived from traffic volume counts for the Kenosha, Milwaukee, and Racine urbanized areas; for the remainder of the Region, which consists of rural and small urban areas; and for the Region as a whole.

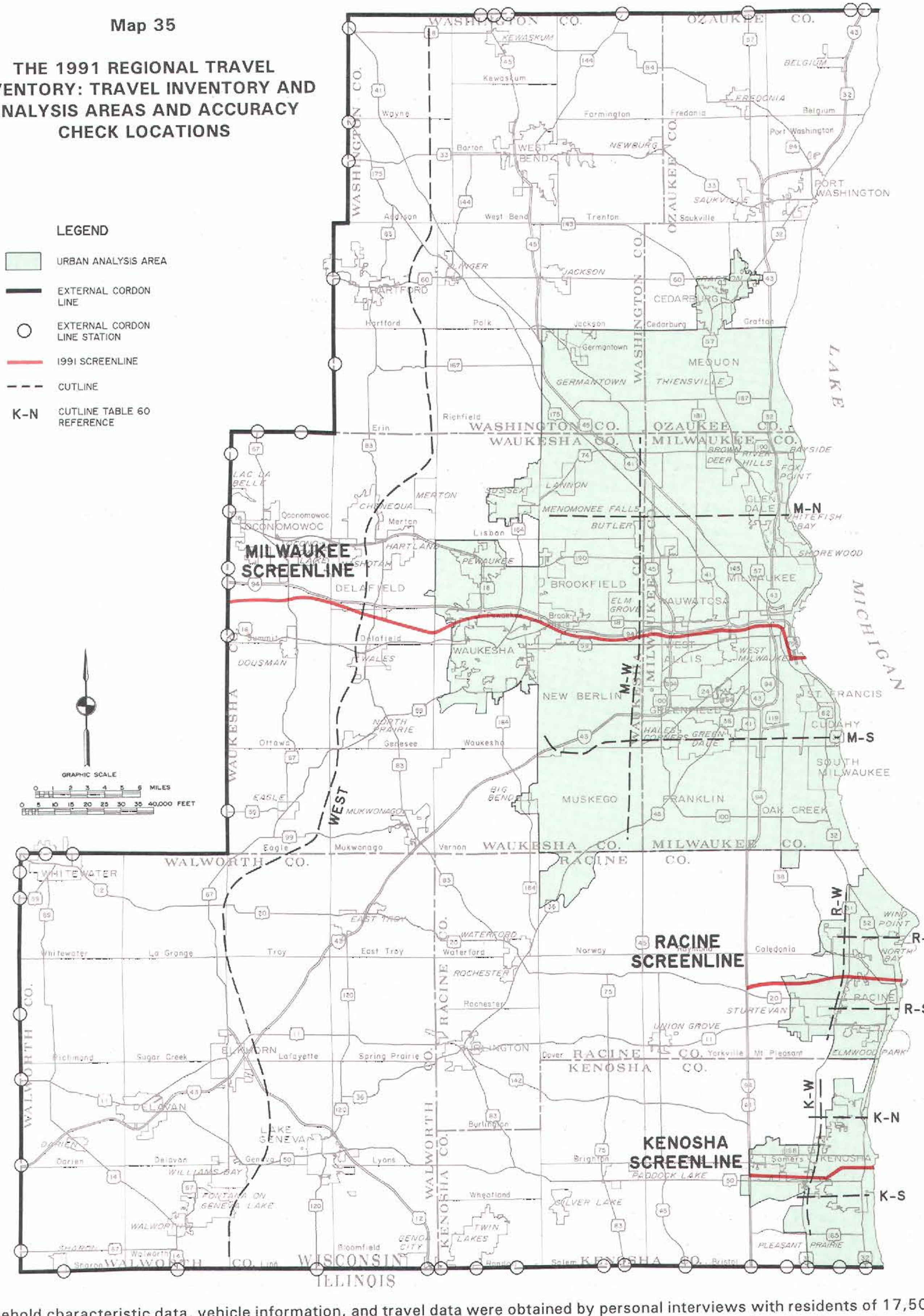
As shown in Table 58, estimates of vehicle-miles of travel derived from the assignment of the survey trip data were about 6 percent lower for the Region and about 7 percent lower for the Milwaukee urbanized area than the corresponding estimates of vehicle-miles of travel derived from traffic volume counts.

This underrepresentation of travel is similar to that observed in the 1963 and 1972 surveys and in travel origin and destination surveys conducted nationwide. The underrepresentation of travel occurs in the off-peak periods with respect to nonwork and nonschool travel, including trips made for shopping, personal business, social, and recreational purposes. The adjustment factors applied to the 1991 survey were similar to the factors applied to the 1963 and 1972 travel inventories in each of the urbanized areas to nonwork travel. Application of the adjustment factor to the 1991 travel data increased total internal vehicle trips by approximately 14 percent.

Following adjustment, survey data on estimated average weekday vehicular traffic crossing screenlines were compared with corresponding data derived from traffic counts. The results of the screenline accuracy checks on the adjusted travel data, as shown in Table 59, indicated that the simulated traffic volumes from the adjusted survey data represented 95 percent of the traffic volumes crossing the screenlines in Kenosha, 101 percent in Milwaukee, and 96 percent in Racine. As Table 60 shows, a comparison of survey-estimated average weekday traffic volumes crossing cut lines with comparable estimates derived from traffic counts indicated

Map 35

## THE 1991 REGIONAL TRAVEL INVENTORY: TRAVEL INVENTORY AND ANALYSIS AREAS AND ACCURACY CHECK LOCATIONS




Household characteristic data, vehicle information, and travel data were obtained by personal interviews with residents of 17,500 households and by mail-back survey forms from 12,200 mass transit users, 2,900 commercial-use truck and taxi operators, and 47,100 drivers of vehicles crossing regional boundaries. The above map shows the boundaries of the three urbanized areas selected for intensive survey data analysis, the location of the 44 roadside interview stations in the external cordon survey, and the screenlines and cut lines selected to check accuracy.

*Source: SEWRPC.*

## Table 58

### THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF ESTIMATE VEHICLE-MILES OF TRAVEL ON AN AVERAGE WEEKDAY IN SELECTED AREAS OF THE REGION USING UNADJUSTED TRAVEL SURVEY DATA

| Area | Estimated Average Weekday Vehicle-Miles of Travel from Traffic Counts | Estimated Average Weekday Vehicle-Miles of Travel from Travel Survey Data | Difference in Vehicle Miles | Percent Difference |
|---|---|---|---|---|
| Kenosha Urbanized Area ..... | 1,009,400 | 1,024,600 | 15,200 | 1.5 |
| Milwaukee Urbanized Area .... | 20,334,400 | 18,952,900 | -1,381,500 | -6.8 |
| Racine Urbanized Area ...... | 1,171,100 | 1,114,400 | -56,700 | -4.8 |
| Area of Region outside Urbanized Area ........... | 9,687,200 | 9,178,100 | -509,100 | -5.3 |
| Region | 32,202,100 | 30,270,000 | -1,932,100 | -6.0 |

Source: SEWRPC.

## Table 59

### THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF ESTIMATED AVERAGE WEEKDAY VEHICULAR TRAFFIC CROSSING THE KENOSHA, MILWAUKEE, AND RACINE SCREENLINES

| Screenline | Estimated Average Weekday Traffic Volumes from Traffic Counts | Estimated Average Weekday Traffic Volumes from Adjusted Travel Survey Data | Difference in Volumes | Percent Difference |
|---|---|---|---|---|
| Kenosha .............. | 211,400 | 201,700 | -9,700 | -4.6 |
| Milwaukee ............. | 819,200 | 826,500 | 7,300 | 0.9 |
| Racine ............... | 195,700 | 187,300 | -8,400 | -4.3 |

Source: SEWRPC.

## Table 60

### THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF ESTIMATED AVERAGE WEEKDAY TRAFFIC CROSSING THE KENOSHA, MILWAUKEE, AND RACINE CUT LINES

| Cut Line | Map 35 Reference | Estimated Average Weekday Traffic Volumes from Traffic Counts | Estimated Average Weekday Traffic Volumes from Adjusted Travel Survey Data | Difference in Volumes | Percent Difference |
|---|---|---|---|---|---|
| Kenosha | | | | | |
| North ........ | K-N | 57,100 | 56,200 | -900 | -1.6 |
| South ........ | K-S | 90,200 | 94,700 | 4,500 | 5.0 |
| West ......... | K-W | 67,500 | 71,100 | 3,600 | 5.3 |
| Milwaukee | | | | | |
| North ........ | M-N | 411,100 | 409,100 | -2,000 | -0.5 |
| South ........ | M-S | 351,000 | 345,200 | -5,800 | -1.7 |
| West ......... | M-W | 493,100 | 513,400 | 20,300 | 4.1 |
| Racine | | | | | |
| North ........ | R-N | 53,900 | 61,400 | 7,500 | 13.9 |
| South ........ | R-S | 114,000 | 113,500 | -500 | -0.4 |
| West ......... | R-W | 89,500 | 98,400 | 8,900 | 9.9 |
| Rural .......... | West | 215,100 | 212,500 | -2,600 | -1.2 |

Source: SEWRPC.

Table 61

THE 1991 REGIONAL TRAVEL INVENTORY: COMPARISON OF ESTIMATED VEHICLE-MILES OF TRAVEL ON AN AVERAGE WEEKDAY IN SELECTED AREAS OF THE REGION

| Area | Estimated Average Weekday Vehicle-Miles of Travel from Traffic Counts | Estimated Average Weekday Vehicle-Miles of Travel from Adjusted Travel Survey Data | Difference in Vehicle Miles | Percent Difference |
|---|---|---|---|---|
| Kenosha Urbanized Area . . . . . | 1,009,400 | 1,208,900 | 199,500 | 19.8 |
| Milwaukee Urbanized Area . . . . | 20,334,400 | 20,374,400 | 40,000 | 0.2 |
| Racine Urbanized Area . . . . . . | 1,171,100 | 1,225,200 | 54,100 | 4.6 |
| Area of Region outside Urbanized Area . . . . . . . . . . . | 9,687,200 | 10,733,300 | 1,046,100 | 10.8 |
| Region | 32,202,100 | 33,541,800 | 1,339,700 | 4.2 |

*Source: SEWRPC.*

that simulated traffic volumes in Kenosha represented between 98 percent and 105 percent of counted volumes; in Milwaukee, between 98 percent and 104 percent; in Racine, between 100 percent and 114 percent; and in the rural area, 99 percent. A check on vehicle-miles of travel, as shown in Table 61, derived from the adjusted travel data indicated that vehicular travel simulated from survey data in the Kenosha urbanized area represented 120 percent of the corresponding estimate derived from traffic counts; in the Milwaukee urbanized area, 100 percent; in the Racine urbanized area, 105 percent; and in the rural and small urban areas, 111 percent. For the entire Region, simulated vehicle-miles of travel from the adjusted travel survey represented 104 percent of total vehicle-miles of travel estimated from traffic counts.

## INVENTORY FINDINGS

### Quantity of Total Travel

An estimated 5.91 million person trips[4] were made within the Region on an average weekday in 1991, as shown on Table 62. This represents an increase of about 2.12 million person trips per weekday, or an increase of about 56 percent, since 1963 and an increase of 1.23 million person trips per weekday, or 26 percent, since 1972. Of these 5.91 million person trips, about 5.59 million, or 95 percent, were internal person trips. Internal trips have both trip origin and trip destination within the Region.

The 5.59 million internal person trips represent an increase of 2.0 million trips, or 55 percent, since 1963 and an increase of 1.1 million trips, or 24 percent, since 1972. The average number of internal person trips per capita on an average weekday increased from 2.2 in 1963 to 2.5 in 1972 and to 3.1 in 1991, while the average number of internal person trips per household on an average weekday increased from 7.3 in 1963 to 7.9 in 1972 and then decreased slightly to 7.8 in 1991.

In 1991, an estimated 4.89 million vehicle trips, consisting of automobile and truck trips, were made within the Region on an average weekday. This represents an increase of 2.33 million vehicle trips, or 91 percent, since 1963 and an increase of 1.48 million vehicle trips, or 43 percent, since 1972. Of the 4.89 million vehicle trips, about 4.62 million, or 94 percent, were internal vehicle trips. Internal vehicle trips thus increased by 2.15 million, or 87 percent, since 1963 and by 1.33 million, or 40 percent, since 1972. Vehicle trips made within the Region have increased faster than person trips, particularly since 1972, as a result of a decline in both

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[4] *A person trip is defined as a one-way journey between a point of origin and a point of destination by a person five years of age or older traveling as an automobile driver or as a passenger in an automobile, taxi, truck, motorcycle, school bus, or other mass transit carrier. To be considered, the trip must have been at least the equivalent of one full city block in length. A person trip also includes trips made by bicycle or walking when the trip purpose is work.*

Table 62

AVERAGE WEEKDAY PERSON AND VEHICLE TRIPS BY SURVEY TYPE: 1963, 1972, AND 1991

| Survey Type | Person Trips | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1963 | | 1972 | | 1991 | | Change: 1963-1991 | | Change: 1972-1991 | |
| | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent | Number | Percent |
| Home Interview | 3,603,000 | 94.9 | 4,504,900 | 96.2 | 5,594,300 | 94.6 | 1,991,300 | 55.3 | 1,089,400 | 24.2 |
| External Cordon | 191,700 | 5.1 | 176,900 | 3.8 | 317,400 | 5.4 | 125,700 | 65.6 | 140,500 | 79.4 |
| Total | 3,794,700 | 100.0 | 4,681,800 | 100.0 | 5,911,700 | 100.0 | 2,117,000 | 55.8 | 1,229,900 | 26.3 |

| Survey Type | Vehicle Trips | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1963 | | 1972 | | 1991 | | Change: 1963-1991 | | Change: 1972-1991 | |
| | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent | Number | Percent |
| Home Interview/ Truck and Taxi | 2,466,400 | 96.0 | 3,290,300 | 96.3 | 4,620,300 | 94.4 | 2,153,900 | 87.3 | 1,330,000 | 40.4 |
| External Cordon | 101,600 | 4.0 | 125,700 | 3.7 | 273,300 | 5.6 | 171,700 | 169.0 | 147,600 | 117.4 |
| Total | 2,568,000 | 100.0 | 3,416,000 | 100.0 | 4,893,600 | 100.0 | 2,325,600 | 90.6 | 1,477,600 | 43.3 |

*Source: SEWRPC.*

automobile occupancy and transit use. The percentage increase between 1963 and 1991 for vehicle trips was 91 percent, as compared with 56 percent for person trips. The percentage increase in vehicle trips between 1972 and 1991 was 43 percent, compared with 26 percent for person trips.

Table 62 also shows that an estimated 317,400 external person trips and 273,300 external vehicle trips were made in 1991. External trips have one end or both ends located outside of the Region. From 1963 to 1991, external travel increased by 125,700 person trips, or by about 66 percent; and by 171,700 vehicle trips, or by about 169 percent.

The increase in internal person trips is on par with increases in the number of households and jobs within the Region. As shown in Table 63 and Figure 33, between 1963 and 1991, internal person tripmaking increased by 55 percent, households increased by 46 percent, and employment increased by 56 percent. The increase in person trips, however, far exceeded the 9 percent increase in population during the same time period. These findings confirm that increases in households and employment were the major socio-economic factors behind increased tripmaking within the Region and that population increases had a negligible impact between 1963 and 1991. The significant increase in employment despite the small increase in population is indicative of the increased participation of women in the labor force. This increase in employment is also largely the cause of increased tripmaking in the Region.

Internal Person Travel

Internal Person Trip Production: A comparison of information shown on Maps 36, 37, and 38 indicates that average person trip production per household varied widely by subarea of the Region in 1963, 1972, and 1991. The lowest rates of household person trip production in each of those three years were in the central areas of the larger cities and in certain portions of the rural areas, where the average number of trips per household made on an average weekday was usually less than four. The highest rates were found in the suburban and rural urban-fringe areas, where the number of trips per household made on an average weekday was 12 or more. Average trip production per household between 1972 and 1991 increased particularly in many of the outlying areas of the Region as urban development occurred in these areas.

Table 63

COMPARISON OF HISTORIC REGIONAL INTERNAL PERSON TRIPS, HOUSEHOLDS, EMPLOYMENT, AND POPULATION: 1963, 1972, AND 1991

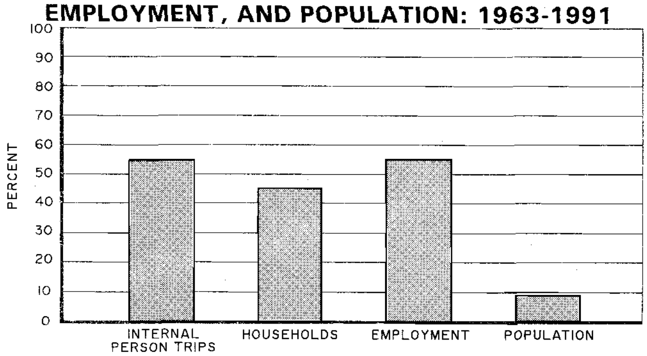
| Internal Person Trips | 1963 | 1972 | 1991 | Percent Change 1963-1991 | Percent Change 1972-1991 |
|---|---|---|---|---|---|
| Internal Person Trips | 3,603,300 | 4,504,900 | 5,594,300 | 55.3 | 24.2 |
| Households[a] | 491,400 | 567,700 | 714,900 | 45.5 | 25.9 |
| Employment (jobs) | 630,900 | 748,800 | 981,400 | 55.6 | 31.1 |
| Population | 1,654,000 | 1,810,700 | 1,798,300 | 8.7 | -0.7 |

*[a]Includes group-quartered population households: approximately 10,200 in 1963, 10,400 in 1972, and 38,800 in 1991.*

*Source: SEWRPC.*

Figure 33

PERCENTAGE CHANGE IN INTERNAL PERSON TRIPS, HOUSEHOLDS, EMPLOYMENT, AND POPULATION: 1963-1991




*Source: SEWRPC.*

Relationship of Vehicle Availability: A strong correlation exists between person trip production and the number of vehicles available to households. The 1991 survey findings indicated that about 1,142,500 vehicles were available in the Region. This represents an average of 1.60 vehicles per household, or about 620 vehicles per 1,000 residents. In 1963, 527,300 vehicles were available, an average of 1.07 vehicles per household and 319 vehicles per 1,000 residents. In 1972, 704,600 vehicles were available, an average of 1.24 vehicles per household and 389 vehicles per 1,000 residents (see Maps 39, 40, and 41). A comparison of Maps 40 and 41 shows that between 1972 and 1991 the number of vehicles available to households in rural and suburban areas increased significantly. By 1991, the vast majority of households in these areas each had two or more automobiles available.

Table 64 shows the relationship of vehicle availability to person trip production in the Region. Household person trip production increases sharply in relation to increased vehicle availability. It may also be noted that from 1963 to 1991, the percentage of households with two or more automobiles increased from 24 percent to 53 percent of all households, the percentage of households with zero automobiles declined from 18 percent to 13 percent of all households, and the percentage with one automobile declined from 58 percent to 34 percent of all households. This increase in household automobile availability contributed to the increase in person trips generated within the Region since 1963.

Relationship of Household Size: Person trip production within the Region is also related to the number of persons comprising the household. Table 65 indicates that in 1991 one-person households averaged about three weekday internal person trips per household, two-person households averaged about seven such trips per household, three-person households averaged about nine such trips per household, four-person households averaged about 12 such trips per household, and five-or-more-person households averaged about 15 such trips per household. The average number of such trips per household increased in each successively higher household size category in 1963, 1972, and 1991. The average trip generation rate for total households remained constant at about eight trips per household in both 1972 and 1991, however, the distribution of the number of households by household size changed markedly from 1972 to 1991. One-person households more than doubled in number, increasing from 98,700 in 1972 to

## Table 64

### AVERAGE WEEKDAY INTERNAL PERSON TRIPS PER HOUSEHOLD IN THE REGION BY AUTOMOBILE AVAILABILITY: 1963, 1972, AND 1991

| Autos Available | 1963 | | | | 1972 | | | | 1991 | | | | Person Trips per Household | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Households | | Person Trips | | Households | | Person Trips | | Households | | Person Trips | | | | |
| | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | 1963 | 1972 | 1991 |
| None | 90,700 | 18.4 | 193,900 | 5.4 | 95,600 | 16.8 | 182,500 | 4.1 | 90,700 | 12.7 | 192,700 | 3.4 | 2.1 | 1.9 | 2.1 |
| One | 284,600 | 57.9 | 2,107,800 | 58.5 | 279,200 | 49.2 | 1,964,900 | 43.6 | 243,500 | 34.1 | 1,328,600 | 23.8 | 7.4 | 7.0 | 5.5 |
| Two | 103,000 | 21.0 | 1,123,900 | 31.2 | 161,300 | 28.4 | 1,851,000 | 41.1 | 281,200 | 39.3 | 2,813,800 | 50.3 | 10.9 | 11.5 | 10.0 |
| Three or More | 13,100 | 2.7 | 177,400 | 4.9 | 31,600 | 5.6 | 506,500 | 11.2 | 99,500 | 13.9 | 1,259,200 | 22.5 | 13.5 | 16.0 | 12.7 |
| Total | 491,400 | 100.0 | 3,603,000 | 100.0 | 567,700 | 100.0 | 4,504,900 | 100.0 | 714,900 | 100.0 | 5,594,300 | 100.0 | 7.3 | 7.9 | 7.8 |

*Source: SEWRPC.*

## Table 65

### AVERAGE WEEKDAY INTERNAL PERSON TRIPS PER HOUSEHOLD IN THE REGION BY HOUSEHOLD SIZE: 1963, 1972, AND 1991

| Household Size | 1963 | | | | 1972 | | | | 1991 | | | | Person Trips per Household | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Households | | Person Trips | | Households | | Person Trips | | Households | | Person Trips | | | | |
| | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | 1963 | 1972 | 1991 |
| One | 60,000 | 12.2 | 114,600 | 3.2 | 98,700 | 17.4 | 234,800 | 5.2 | 206,500 | 28.9 | 622,100 | 11.1 | 1.9 | 2.4 | 3.0 |
| Two | 136,300 | 27.7 | 685,000 | 19.0 | 164,200 | 28.9 | 903,200 | 20.0 | 215,000 | 30.1 | 1,539,900 | 27.5 | 5.0 | 5.5 | 7.2 |
| Three | 87,800 | 17.9 | 668,400 | 18.6 | 92,400 | 16.3 | 762,100 | 16.9 | 116,100 | 16.2 | 1,081,400 | 19.3 | 7.6 | 8.2 | 9.3 |
| Four | 84,000 | 17.1 | 807,100 | 22.4 | 86,600 | 15.3 | 904,700 | 20.1 | 104,400 | 14.6 | 1,290,100 | 23.1 | 9.6 | 10.4 | 12.4 |
| Five or More | 123,300 | 25.1 | 1,327,900 | 36.8 | 125,800 | 22.2 | 1,700,100 | 37.7 | 72,900 | 10.2 | 1,060,800 | 19.0 | 10.8 | 13.5 | 14.6 |
| Total | 491,400 | 100.0 | 3,603,000 | 100.0 | 567,700 | 100.0 | 4,504,900 | 100.0 | 714,900 | 100.0 | 5,594,300 | 100.0 | 7.3 | 7.9 | 7.8 |

*Source: SEWRPC.*

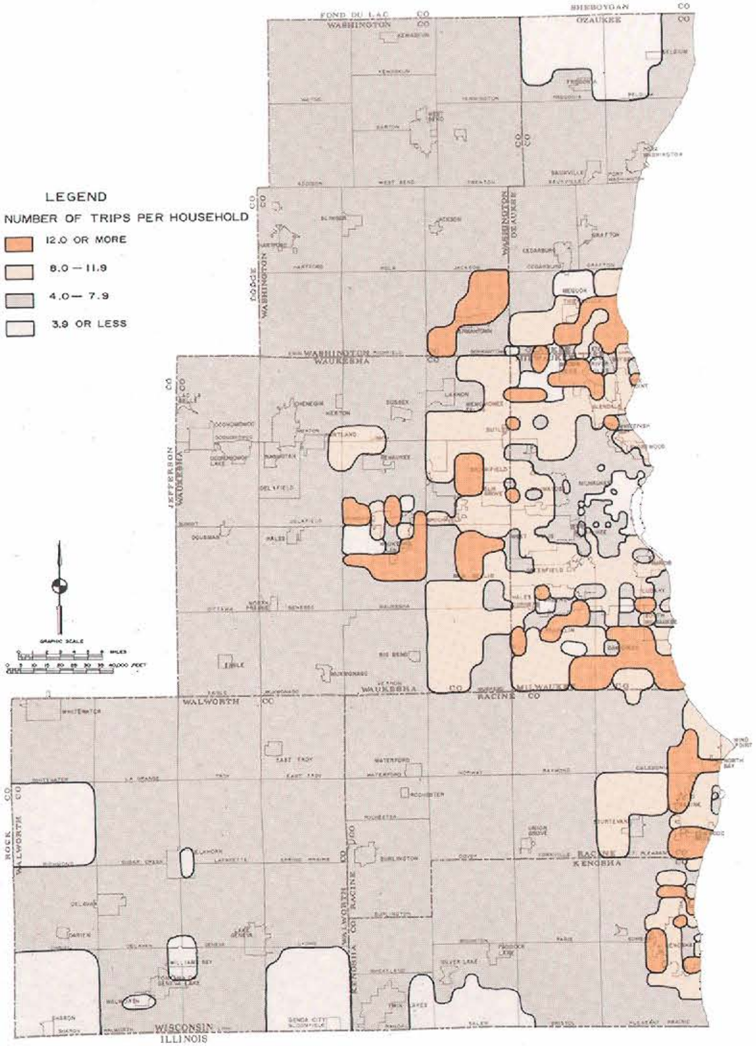
206,500 in 1991, while five-or-more-person households decreased from 125,800 to 72,900 during the same period. It may also be noted that the average number of trips per household in each household size category increased between 1963 and 1972 and between 1972 and 1991.

Relationship of Household Annual Income: A third factor strongly correlated with person trip production is annual household income. Table 66 shows the 1991 and 1972 inventory findings, based upon data collected for the entire seven-county Region, together with the 1963 findings, based upon data collected only in the three urbanized areas. Table 66 indicates that the average number of weekday internal person trips per household in each of the survey years generally increased in direct proportion to annual household income.

Mode of Internal Person Trips: Freedom to select a particular mode of travel is not always present. Many households, for example, are located in areas not served by mass transit, and thus are highly dependent on the use of an automobile. Other households do not have an automobile available, and thus are dependent almost entirely on mass transit. The survey findings indicate that auto-oriented travel on an average weekday accounted for about 88 percent of internal person trips in 1963 and about 92 percent of internal person trips in both 1972 and 1991. The 1991 data indicate that auto-oriented travel is increasingly becoming driver-only travel. In 1963 and 1972, auto passenger travel accounted for 27 percent of total internal person trips, but in 1991 accounted for only 19 percent of such trips. As Table 67 shows, driver-only trips increased from 2.9 million, or

## Map 36

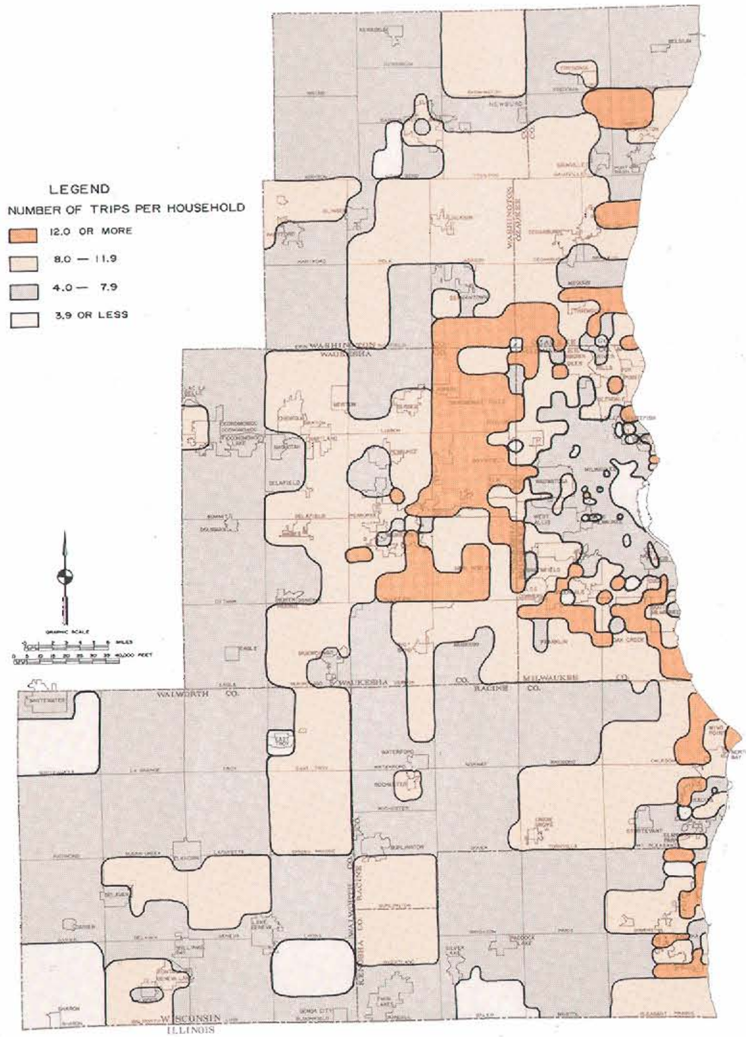
### AVERAGE WEEKDAY INTERNAL PERSON TRIPS PER HOUSEHOLD IN THE REGION: 1963




*Source: SEWRPC.*

## Map 37

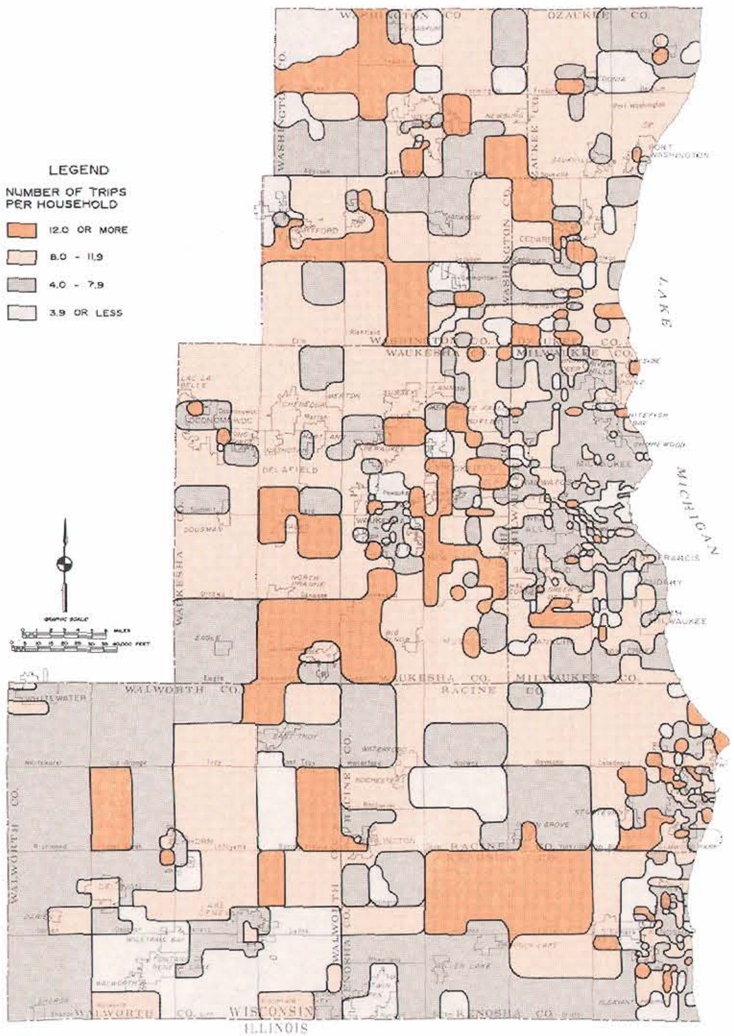
### AVERAGE WEEKDAY INTERNAL PERSON TRIPS PER HOUSEHOLD IN THE REGION: 1972




*Source: SEWRPC.*

## Map 38

### AVERAGE WEEKDAY INTERNAL PERSON TRIPS PER HOUSEHOLD IN THE REGION: 1991

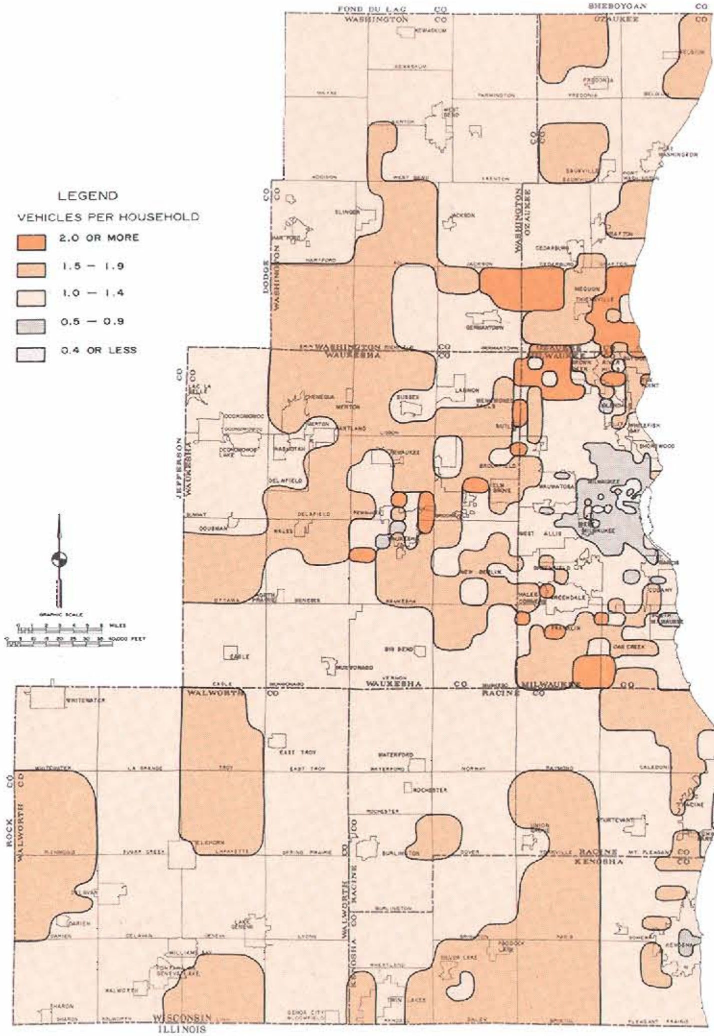



*Source: SEWRPC.*

Residents of Southeastern Wisconsin made about 5.91 million person trips within the Region on an average weekday in 1991, an increase of 2.12 million trips, or 56 percent, over the 1963 level; and of 1.23 million trips, or 26 percent, over the 1972 level. The average number of internal person trips per household increased from 7.3 in 1963 to 7.9 in 1972 and decreased only slightly to 7.8 by 1991. As shown on Maps 36, 37, and 38, areas with above-average tripmaking rates have increasingly comprised a larger share of the Region over time. The significant expansion of high tripmaking areas is most evident in western Waukesha County and in much of Washington County. Areas with tripmaking rates lower than the average are shown in 1963, 1972, and 1991 to be concentrated in the central parts of major cities and in scattered rural locations.

## Map 39

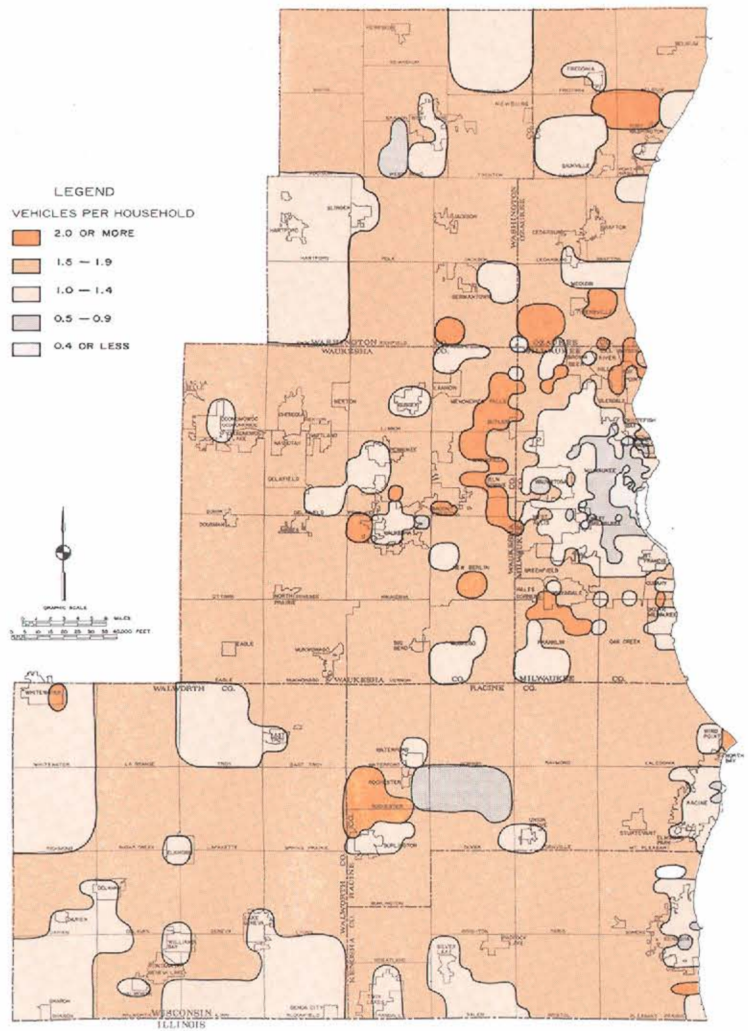
### VEHICLES AVAILABLE PER HOUSEHOLD IN THE REGION: 1963




*Source: SEWRPC.*

## Map 40

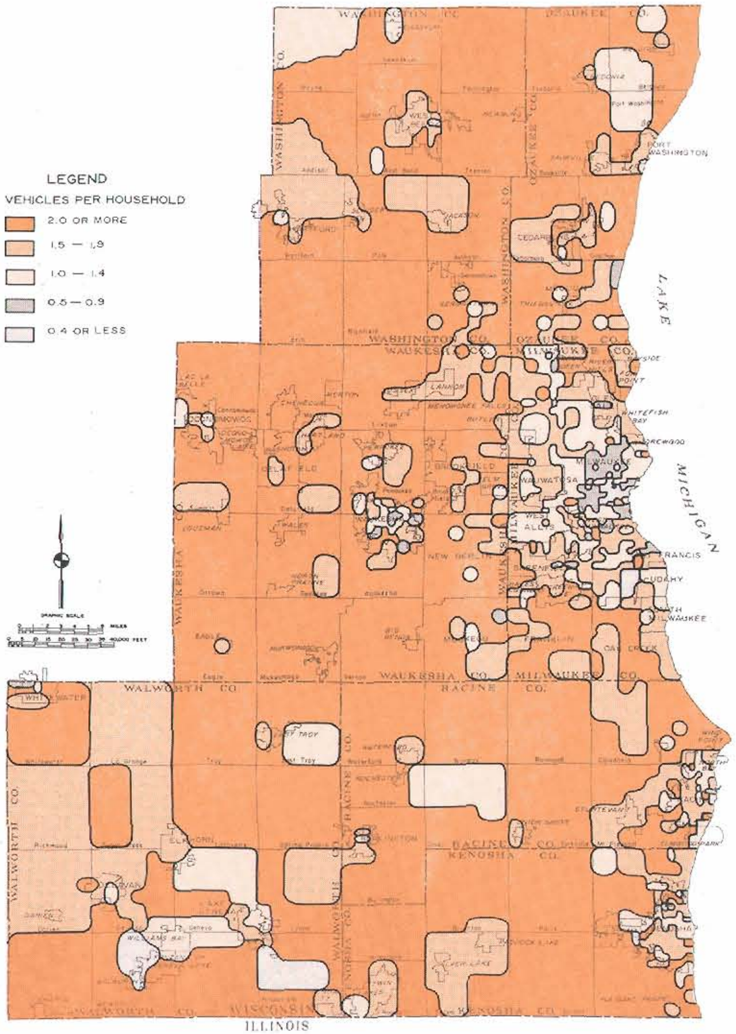
### VEHICLES AVAILABLE PER HOUSEHOLD IN THE REGION: 1972




*Source: SEWRPC.*

## Map 41

### VEHICLES AVAILABLE PER HOUSEHOLD IN THE REGION: 1991




*Source: SEWRPC.*

In 1963, there were 527,300 personal vehicles, or 1.07 available vehicles per household, in the Region. In 1972, there were 704,600 personal vehicles, or 1.24 available vehicles per household. In 1991, there were 1,142,500 personal vehicles available, or 1.60 vehicles per household. Survey data indicate that the number of zero- and one-vehicle households has decreased over time, while the number of households with two or more vehicles has increased significantly. As shown on Maps 39, 40, and 41, while in 1963 and 1972 areas with households with two or more vehicles were concentrated in the suburban Milwaukee area, by 1991 such areas comprised nearly the entire Region, excluding only scattered rural locations and the central portions of major cities.

Table 66

**AVERAGE WEEKDAY INTERNAL PERSON TRIPS PER HOUSEHOLD IN THE REGION BY INCOME GROUP: 1963, 1972, AND 1991**

| Income Range (1963 actual dollars) | 1963[a] | | | | |
|---|---|---|---|---|---|
| | Households[b] | | Person Trips | | Person Trips per Household |
| | Number | Percent of Total | Number | Percent of Total | |
| Under 2,000 | 45,400 | 12.0 | 94,600 | 3.2 | 2.1 |
| 2,000 to 3,999 | 46,100 | 12.1 | 194,200 | 6.5 | 4.2 |
| 4,000 to 5,999 | 92,400 | 24.3 | 649,200 | 21.8 | 7.0 |
| 6,000 to 7,999 | 94,800 | 25.0 | 865,600 | 29.1 | 9.1 |
| 8,000 to 9,999 | 52,400 | 13.8 | 569,300 | 19.2 | 10.9 |
| 10,000 to 11,999 | 24,700 | 6.5 | 291,300 | 9.8 | 11.8 |
| 12,000 to 13,999 | 9,300 | 2.4 | 115,500 | 3.9 | 12.4 |
| 14,000 to 15,999 | 5,000 | 1.3 | 61,500 | 2.1 | 12.3 |
| 16,000 or Over | 9,700 | 2.6 | 130,000 | 4.4 | 13.4 |
| Total | 379,800 | 100.0 | 2,971,200 | 100.0 | 7.8 |

| Income Range (1972 actual dollars) | 1972 | | | | |
|---|---|---|---|---|---|
| | Households[c] | | Person Trips | | Person Trips per Household |
| | Number | Percent of Total | Number | Percent of Total | |
| Under 2,000 | 14,700 | 3.8 | 37,600 | 1.1 | 2.6 |
| 2,000 to 3,999 | 36,900 | 9.5 | 107,700 | 3.2 | 2.9 |
| 4,000 to 5,999 | 31,000 | 7.9 | 163,000 | 4.8 | 5.3 |
| 6,000 to 7,999 | 36,100 | 9.3 | 221,400 | 6.5 | 6.1 |
| 8,000 to 9,999 | 53,700 | 13.8 | 428,200 | 12.5 | 8.0 |
| 10,000 to 11,999 | 63,500 | 16.3 | 615,000 | 18.0 | 9.7 |
| 12,000 to 14,999 | 69,000 | 17.7 | 772,300 | 22.6 | 11.2 |
| 15,000 to 24,999 | 66,900 | 17.2 | 824,200 | 24.1 | 12.3 |
| 25,000 to 49,999 | 15,300 | 3.9 | 214,600 | 6.3 | 14.0 |
| 50,000 or Over | 2,900 | 0.7 | 37,700 | 1.1 | 13.0 |
| Total | 390,000 | 100.0 | 3,421,700 | 100.0 | 8.8 |

| Income Range (1991 actual dollars) | 1991 | | | | |
|---|---|---|---|---|---|
| | Households[d] | | Person Trips | | Person Trips per Household |
| | Number | Percent of Total | Number | Percent of Total | |
| Under 5,000 | 27,900 | 4.9 | 63,400 | 1.4 | 2.3 |
| 5,000 to 9,999 | 40,900 | 7.1 | 140,100 | 3.1 | 3.4 |
| 10,000 to 14,999 | 45,700 | 8.0 | 215,200 | 4.8 | 4.7 |
| 15,000 to 19,999 | 49,800 | 8.7 | 292,200 | 6.5 | 5.9 |
| 20,000 to 24,999 | 57,400 | 10.0 | 375,400 | 8.3 | 6.5 |
| 25,000 to 29,999 | 53,100 | 9.3 | 403,700 | 8.9 | 7.6 |
| 30,000 to 34,999 | 55,500 | 9.7 | 467,100 | 10.3 | 8.4 |
| 35,000 to 39,999 | 48,100 | 8.4 | 434,600 | 9.6 | 9.0 |
| 40,000 to 49,999 | 71,700 | 12.5 | 723,200 | 16.0 | 10.1 |
| 50,000 to 74,999 | 85,500 | 14.9 | 955,800 | 21.1 | 11.2 |
| 75,000 to 99,999 | 22,600 | 3.9 | 274,900 | 6.1 | 12.2 |
| 100,000 or Over | 15,800 | 2.8 | 178,000 | 3.9 | 11.3 |
| Total | 574,000 | 100.0 | 4,523,600 | 100.0 | 7.9 |

[a] *Income data was collected only for the urbanized areas in 1963.*

[b] *Approximately 8 percent of total households did not provide household annual income data.*

[c] *Approximately 31 percent of total households did not provide household annual income data.*

[d] *Approximately 20 percent of total households did not provide household annual income data.*

*Source: SEWRPC.*

Table 67

DISTRIBUTION OF AVERAGE WEEKDAY INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1963, 1972, AND 1991

| Mode of Travel | Person Trips 1963 Number | 1963 Percent of Total | 1972 Number | 1972 Percent of Total | 1991 Number | 1991 Percent of Total | Change: 1963-1991 Number | Change: 1963-1991 Percent | Change: 1972-1991 Number | Change: 1972-1991 Percent |
|---|---|---|---|---|---|---|---|---|---|---|
| Auto Driver | 2,165,700 | 60.1 | 2,897,000 | 64.3 | 4,077,500 | 72.9 | 1,911,800 | 88.3 | 1,180,500 | 40.7 |
| Auto Passenger | 985,100 | 27.4 | 1,227,400 | 27.2 | 1,054,400 | 18.8 | 69,300 | 7.0 | -173,000 | -14.1 |
| Mass Transit | 323,900 | 9.0 | 186,200 | 4.1 | 178,000 | 3.2 | -145,900 | -45.0 | -8,200 | -4.4 |
| School Bus | 119,900 | 3.3 | 173,800 | 3.9 | 229,000 | 4.1 | 109,100 | 91.0 | 55,200 | 31.8 |
| Other[a] | 8,400 | 0.2 | 20,500 | 0.5 | 55,400 | 1.0 | 47,000 | 559.5 | 34,900 | 170.2 |
| Total | 3,603,000 | 100.0 | 4,504,900 | 100.0 | 5,594,300 | 100.0 | 1,991,300 | 55.3 | 1,089,400 | 24.2 |

[a]*Includes taxi, motorcycle, rail, and intercity bus in 1963 and 1972; walk and bicycle trips are also included in 1991.*

*Source: SEWRPC.*

70 percent of auto-oriented travel, in 1972 to nearly 4.1 million driver-only trips, or 79 percent of auto-oriented travel, in 1991, an increase of about 1.2 million driver-only trips, or 41 percent, since 1972.

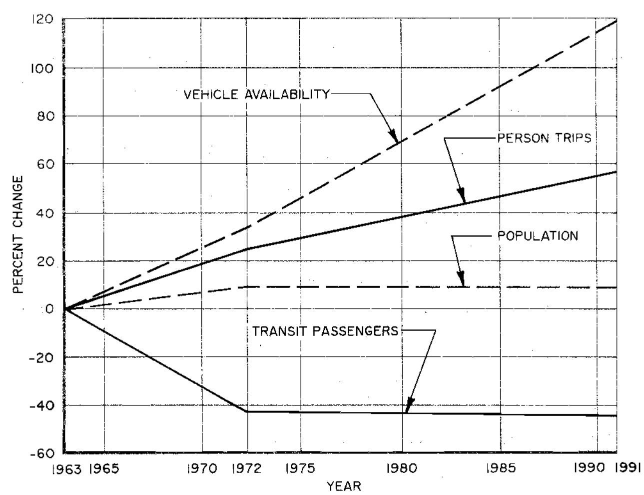
This decline in automobile passenger trips and increase in driver-only trips is reflected in the average vehicle occupancy rate for all trip purposes, which decreased from 1.45 persons in 1963 to 1.42 persons in 1972 and to 1.26 persons in 1991.

The substantial growth in household vehicle availability, particularly with respect to multiple-vehicle households, along with the decline in average household size, has contributed to the increase in driver-only travel and to the decline in automobile passenger travel, and the attendant decline in average automobile occupancy. The decline in automobile occupancy is particularly evident with regard to work trips. Average vehicle occupancy for work trips has declined from 1.21 persons in 1963 to 1.17 persons in 1972 and to 1.06 persons in 1991.

Mass transit passenger travel in the Region, in contrast to the increases in auto travel, decreased from about 324,000 revenue passenger trips per average weekday in 1963 to 186,000 in 1972, or by about 43 percent, and to 178,000 in 1991, or by about 4 percent from the 1972 levels. Mass transit travel, which constituted about 9 percent of total regional travel in 1963, declined to only 4 percent of total regional travel in 1972, and to only 3 percent in 1991. This decline in transit use occurred despite a

Figure 34

PERCENTAGE CHANGES IN VEHICLE AVAILABILITY, PERSON TRIPS, POPULATION, AND MASS TRANSIT REVENUE PASSENGERS IN THE REGION: 1963, 1972, AND 1991




*Source: SEWRPC.*

60 percent increase in total person tripmaking on an average weekday in the Region, as shown in Figure 34.

Person trips by school bus within the Region increased substantially, from about 120,000 in 1963 to about 174,000 in 1972, or by 45 percent, and to about 229,000 in 1991, or by 32 percent from the 1972 levels. School bus trips in 1991 constituted a larger volume of internal person trips than did general mass transit trips.

Table 68

AVERAGE TRIP LENGTHS AND TIMES FOR INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1963, 1972, AND 1991

| Trip Purpose | 1963 Trip Length | | 1972 Trip Length | | 1991 Trip Length | | Percent Change 1972-1991 | | Percent Change 1963-1991 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Minutes | Miles | Minutes | Miles | Minutes | Miles | Minutes | Miles | Minutes | Miles |
| Home-Based Work . . . . . . . | 18.5 | 6.1 | 16.1 | 7.5 | 16.9 | 9.1 | 5.0 | 21.3 | -8.6 | 49.2 |
| Home-Based Shopping . . . . | 9.7 | 3.3 | 9.6 | 4.0 | 9.1 | 4.3 | -5.2 | 7.5 | -6.2 | 30.3 |
| Home-Based Other . . . . . . . | 12.7 | 4.6 | 11.6 | 4.9 | 10.9 | 5.4 | -6.0 | 10.2 | -14.2 | 17.4 |
| Nonhome-Based . . . . . . . . . | 13.0 | 4.0 | 12.4 | 4.9 | 11.6 | 5.7 | -6.5 | 16.3 | -10.8 | 42.5 |
| Average | 13.5 | 4.5 | 12.4 | 5.3 | 12.1 | 6.1 | -2.4 | 15.1 | -10.4 | 35.5 |

*Source: SEWRPC.*

Trips to work by bicycle or walking totaled 23,600 in 1963, 32,400 in 1972, and 39,200 in 1991, representing an increase of 37 percent between 1963 and 1972 and an additional increase of 21 percent between 1972 and 1991.

Trip Length: As Table 68 shows, the average length in minutes of home-based work trips within the Region increased by 5 percent between 1972 and 1991. The average length in minutes of internal person trips for all other purposes decreased by about 6 percent during this same period. In terms of trip length measured in miles, home-based work trip lengths increased by about 21 percent; trips for other purposes increased by between 8 and 16 percent between 1972 and 1991. Between 1972 and 1991 the trip length average for all purposes as measured in travel time decreased by about 2 percent but as measured in distance increased by about 15 percent.

Between 1963 and 1991, work trip lengths measured in travel time decreased by about 9 percent and the average length in minutes of trips for all other purposes decreased by between 6 and 14 percent. In terms of trip length measured in miles, work trip lengths increased by about 49 percent. The average length in miles of internal person trips for other purposes increased by between 17 and 43 percent during this same time period. Between 1963 and 1991 the trip length average for all purposes as measured in travel time decreased by about 10 percent, but as measured in distance, it increased by nearly 36 percent.

Selected Characteristics of Users of Various Modes of Internal Person Travel: In 1963 and 1972, over 60 percent of the driver-only trips within the Region on an average weekday were made by males, while over 60 percent of automobile passenger and mass transit trips were made by females (see Table 69). However, in 1991, driver-only trips were made almost equally by males and females, and automobile passenger and mass transit trips showed an increase in the number of males and a corresponding decrease in the number of females. Table 69 also indicates that of all age groups in each of the survey years, persons from ages 35 to 44 generated the highest percentage of driver-only trips, children from ages five to 14 generated the highest percentage of auto and school bus passenger trips, and people from ages 15 to 19 generated the highest percentage of mass transit passenger trips. The percentage of trips made in 1991 by persons 65 years of age or older as either auto drivers or auto passengers more than doubled from the percentage distributions found on the 1963 and 1972 surveys, reflecting the increasing activity of this age group.

The 1991 data show that since the 1963 and 1972 surveys, the percentage of mass transit passenger trips made by persons 45 years of age or older decreased, while the percentage of such trips made by persons under the age of 45 increased. Table 69 also shows a younger median-age group making trips as mass transit passengers in each succeeding survey year: in 1963, the median age group was 35 to 44; in 1972, the median age group was 25 to 29; and in 1991, the median age group was 20 to 24 years of age.

Table 69

**PERCENTAGE DISTRIBUTION OF SELECTED CHARACTERISTICS OF TRIPMAKERS BY MODE OF TRAVEL IN THE REGION: 1963, 1972, AND 1991**

| Selected Characteristic | Year | Percent of Trips by Mode | | | |
|---|---|---|---|---|---|
| | | Auto Driver | Auto Passenger[a] | Transit Passenger | School Bus Passenger |
| Sex | | | | | |
| Male | 1963 | 69.9 | 31.9 | 36.8 | 49.0 |
| | 1972 | 60.7 | 31.7 | 34.2 | 50.3 |
| | 1991 | 50.4 | 35.6 | 41.2 | 51.3 |
| Female | 1963 | 30.1 | 68.1 | 63.2 | 51.0 |
| | 1972 | 39.3 | 68.3 | 65.8 | 49.7 |
| | 1991 | 49.6 | 64.4 | 58.8 | 48.7 |
| Total | 1963 | 100.0 | 100.0 | 100.0 | 100.0 |
| | 1972 | 100.0 | 100.0 | 100.0 | 100.0 |
| | 1991 | 100.0 | 100.0 | 100.0 | 100.0 |
| Age Group | | | | | |
| Five to 14 | 1963 | - - | 31.2 | 9.6 | 75.4 |
| | 1972 | - - | 30.3 | 12.2 | 77.4 |
| | 1991 | - - | 39.4 | 19.1 | 85.3 |
| 15 to 19 | 1963 | 3.9 | 11.2 | 19.2 | 23.7 |
| | 1972 | 6.3 | 15.7 | 22.1 | 21.5 |
| | 1991 | 3.0 | 9.5 | 20.5 | 13.9 |
| 20 to 24 | 1963 | 8.6 | 7.6 | 9.8 | - - |
| | 1972 | 11.8 | 10.3 | 11.7 | - - |
| | 1991 | 5.3 | 3.9 | 11.9 | - - |
| 25 to 29 | 1963 | 11.5 | 6.6 | 4.6 | - - |
| | 1972 | 12.5 | 7.0 | 5.0 | - - |
| | 1991 | 9.0 | 4.4 | 8.9 | - - |
| 30 to 34 | 1963 | 12.6 | 5.8 | 4.6 | - - |
| | 1972 | 11.1 | 5.0 | 3.9 | - - |
| | 1991 | 13.3 | 4.8 | 8.2 | - - |
| 35 to 44 | 1963 | 28.1 | 13.7 | 13.6 | - - |
| | 1972 | 21.9 | 8.0 | 9.2 | - - |
| | 1991 | 27.6 | 9.0 | 11.4 | - - |
| 45 to 54 | 1963 | 19.9 | 11.2 | 14.7 | - - |
| | 1972 | 19.4 | 9.7 | 12.0 | - - |
| | 1991 | 16.4 | 5.0 | 6.2 | - - |
| 55 to 64 | 1963 | 10.7 | 7.4 | 14.3 | - - |
| | 1972 | 10.8 | 7.5 | 13.1 | - - |
| | 1991 | 12.7 | 8.5 | 5.6 | - - |
| 65 and Older | 1963 | 4.7 | 5.3 | 9.6 | - - |
| | 1972 | 6.2 | 6.5 | 10.8 | - - |
| | 1991 | 12.7 | 15.5 | 8.2 | - - |
| Total | 1963 | 100.0 | 100.0 | 100.0 | 99.1[b] |
| | 1972 | 100.0 | 100.0 | 100.0 | 98.9 |
| | 1991 | 100.0 | 100.0 | 100.0 | 99.2 |

Table 69 (continued)

| Selected Characteristic | Year | Percent of Trips by Mode | | | |
|---|---|---|---|---|---|
| | | Auto Driver | Auto Passenger[a] | Transit Passenger | School Bus Passenger |
| Other | | | | | |
| Licensed Drivers | 1963 | 100.0 | 38.4 | 29.6 | 8.2 |
| | 1972 | 100.0 | 44.9 | 29.2 | 8.6 |
| | 1991 | 100.0 | 41.8 | 36.7 | 3.8 |
| Going to and from Work as Proportion of Total Purpose Travel for Each Mode | 1963 | 46.3 | 16.4 | 50.8 | - - |
| | 1972 | 42.0 | 15.4 | 42.5 | - - |
| | 1991 | 40.9 | 10.2 | 29.4 | 0.2 |
| Going to and from School as Proportion of Total Purpose Travel for Each Mode | 1963 | 1.2 | 10.2 | 21.1 | 99.6 |
| | 1972 | 2.4 | 10.2 | 28.9 | 99.2 |
| | 1991 | 2.9 | 19.3 | 41.0 | 99.5 |
| Trips In Six Peak Hours as Proportion of Total Weekday Travel for Each Mode | 1963 | 41.3 | 32.9 | 64.6 | 86.0 |
| | 1972 | 42.1 | 35.9 | 62.4 | 79.0 |
| | 1991 | 43.4 | 42.4 | 55.2 | 77.5 |
| Going to and from Milwaukee CBD as Proportion of Total Weekday Travel for Each Mode | 1963 | 6.0 | 4.4 | 31.2 | - - |
| | 1972 | 5.1 | 4.5 | 30.7 | - - |
| | 1991 | 6.8 | 5.1 | 28.4 | 3.3 |

[a]*Includes truck and taxi passengers.*

[b]*The remaining 0.9 percent in 1963, 1.1 percent in 1972, and 0.8 percent in 1991 are distributed throughout the other age groups.*

*Source: SEWRPC.*

As Table 69 also indicates, the number of auto passenger trips made by licensed drivers varied in each of the survey years, the number of licensed drivers using mass transit increased in 1991, and the number of such drivers using a school bus decreased. The number of work-based trips to total person trips continued to decrease slightly for auto drivers, decreasing by approximately one-third for both auto passenger and mass transit travel. While the number of school-based trips remained relatively constant in the auto driver category, substantial increases occurred in the auto passenger and mass transit passenger categories.

From 1963 to 1972 and from 1972 to 1991, the proportion of total person trips made in the six peak traffic hours of the day to total person trips increased for both auto drivers and auto passengers, while the proportions of such trips to total person trips for mass transit passengers and school bus passengers decreased. In 1991, peak-hour trips accounted for slightly more than 40 percent of total auto driver and auto passenger travel, 55 percent of mass transit trips, and nearly 78 percent of school bus passenger trips.

It is significant to note that while travel to and from the Milwaukee central business district (CBD) by mass transit declined from 36 percent of all trips made in the Milwaukee CBD in 1963 to 22 percent in 1972 and to 13 percent in 1991, the proportion of mass transit trips made to and from the Milwaukee CBD relative to all mass transit trips made throughout the Region remained relatively stable at about 30 percent between 1963 and 1991.

Mass Transit Trip Production: The total number of households making mass transit trips on an average weekday in the urbanized areas of the Region decreased from approximately 110,500 in 1963 to 73,200 in 1972 and to 62,500 in 1991. The relationships of mass transit trip production in

Table 70

AVERAGE WEEKDAY INTERNAL TRANSIT TRIPS PER TRANSIT TRIPMAKING HOUSEHOLD IN THE URBANIZING AREAS OF THE REGION BY AUTOMOBILE AVAILABILITY: 1963, 1972, AND 1991

| Automobiles Available per Household | 1963 | | | | |
|---|---|---|---|---|---|
| | Households | | Transit Trips | | Average Trips per Household |
| | Number | Percent of Total | Number | Percent of Total | |
| None | 39,300 | 35.6 | 127,100 | 39.8 | 3.2 |
| One | 56,200 | 50.8 | 153,000 | 47.8 | 2.7 |
| Two | 13,500 | 12.2 | 35,800 | 11.2 | 2.7 |
| Three or More | 1,500 | 1.4 | 3,900 | 1.2 | 2.6 |
| Total | 110,500 | 100.0 | 319,800 | 100.0 | 2.9 |

| Automobiles Available per Household | 1972 | | | | |
|---|---|---|---|---|---|
| | Households | | Transit Trips | | Average Trips per Household |
| | Number | Percent of Total | Number | Percent of Total | |
| None | 27,400 | 37.4 | 74,900 | 40.5 | 2.7 |
| One | 30,800 | 42.1 | 76,600 | 41.5 | 2.5 |
| Two | 12,300 | 16.8 | 28,300 | 15.3 | 2.3 |
| Three or More | 2,700 | 3.7 | 5,000 | 2.7 | 1.9 |
| Total | 73,200 | 100.0 | 184,800 | 100.0 | 2.5 |

| Automobiles Available per Household | 1991 | | | | |
|---|---|---|---|---|---|
| | Households | | Transit Trips | | Average Trips per Household |
| | Number | Percent of Total | Number | Percent of Total | |
| None | 23,100 | 36.9 | 80,300 | 45.1 | 3.5 |
| One | 17,500 | 28.0 | 46,600 | 26.2 | 2.7 |
| Two | 15,300 | 24.5 | 36,100 | 20.3 | 2.4 |
| Three or More | 6,600 | 10.6 | 15,000 | 8.4 | 2.3 |
| Total | 62,500 | 100.0 | 178,000 | 100.0 | 2.8 |

*Source: SEWRPC.*

the Region to automobile availability, household size, and income are set forth in Tables 70, 71, and 72, respectively.

As Table 70 shows, in each of the survey years the average number of transit trips per transit tripmaking household decreased as the number of automobiles owned by the household increased. Also, from 1963 to 1991, the number of zero- or one-automobile households making transit trips decreased, and the number of two-or-more-automobile households making transit trips increased. These decreases and increases are consistent with the decrease in total zero- or one- automobile households and the increase in total two-or-more-automobile households in the urbanizing areas in the Region.

As Table 71 shows, although the average number of transit trips per transit tripmaking household generally increased as household size increased, the average number of transit trips per person in these households generally decreased in relation to household size. The average number of transit trips per household and per person for transit tripmaking households of each household size have remained relatively constant over the past three decades.

Table 71

AVERAGE WEEKDAY INTERNAL TRANSIT TRIPS PER TRANSIT TRIPMAKING HOUSEHOLD IN THE URBANIZING AREAS OF THE REGION BY HOUSEHOLD SIZE: 1963, 1972, AND 1991

| Household Size (persons) | 1963 | | | | | |
|---|---|---|---|---|---|---|
| | Households | | Transit Trips | | Average Trips per Household | Average Trips per Person |
| | Number | Percent of Total | Number | Percent of Total | | |
| One | 13,800 | 12.5 | 34,700 | 10.9 | 2.5 | 2.5 |
| Two | 29,900 | 27.1 | 78,000 | 24.4 | 2.6 | 1.3 |
| Three | 21,900 | 19.8 | 64,100 | 20.0 | 2.9 | 1.0 |
| Four | 17,500 | 15.8 | 50,600 | 15.8 | 2.9 | 0.7 |
| Five or More | 27,400 | 24.8 | 92,400 | 28.9 | 3.4 | 0.7 |
| Total | 110,500 | 100.0 | 319,800 | 100.0 | 2.9 | 0.9 |

| Household Size (persons) | 1972 | | | | | |
|---|---|---|---|---|---|---|
| | Households | | Transit Trips | | Average Trips per Household | Average Trips per Person |
| | Number | Percent of Total | Number | Percent of Total | | |
| One | 12,800 | 17.6 | 27,800 | 15.0 | 2.2 | 2.2 |
| Two | 17,800 | 24.3 | 38,300 | 20.7 | 2.2 | 1.1 |
| Three | 11,600 | 15.8 | 27,100 | 14.7 | 2.3 | 0.8 |
| Four | 11,600 | 15.8 | 30,700 | 16.6 | 2.6 | 0.7 |
| Five or More | 19,400 | 26.5 | 60,900 | 33.0 | 3.1 | 0.6 |
| Total | 73,200 | 100.0 | 184,800 | 100.0 | 2.5 | 0.8 |

| Household Size (persons) | 1991 | | | | | |
|---|---|---|---|---|---|---|
| | Households | | Transit Trips | | Average Trips per Household | Average Trips per Person |
| | Number | Percent of Total | Number | Percent of Total | | |
| One | 12,600 | 20.2 | 32,400 | 18.2 | 2.6 | 2.6 |
| Two | 10,500 | 16.8 | 27,000 | 15.2 | 2.6 | 1.3 |
| Three | 12,900 | 20.6 | 34,200 | 19.2 | 2.7 | 0.9 |
| Four | 13,000 | 20.8 | 36,100 | 20.3 | 2.8 | 0.7 |
| Five or More | 13,500 | 21.6 | 48,300 | 27.1 | 3.6 | 0.7 |
| Total | 62,500 | 100.0 | 178,000 | 100.0 | 2.8 | 0.8 |

*Source: SEWRPC.*

Table 72 presents the distribution of households, transit trips, and average transit trips per household among six household annual-income ranges. The survey findings indicate that lower-income households constituted a larger share of all households with members using public transit in 1991 than in 1963 and 1972. Indeed, households earning under $14,000 per year, in 1991 dollars, comprised 32 percent of all transit-using households in 1991 as opposed to about 17 percent in 1963 and 15 percent in 1972. It follows, then, that transit trips made by members of lower-income households comprised a larger share of all transit trips made in 1991 than in 1963 and 1972. Indeed, members of households earning under $14,000 per year (1991 dollars) made 38 percent of all transit trips in 1991, as opposed to about 17 percent in 1963 and 15 percent in 1972. As a result, although the average number of transit trips made by all

Table 72

**AVERAGE WEEKDAY INTERNAL TRIPS PER TRANSIT TRIPMAKING HOUSEHOLD BY THE URBANIZING AREAS OF REGION BY INCOME GROUP: 1963, 1972, AND 1991**

| Annual Income Range (constant 1991 dollars) | 1963 Households Number[a] | Households Percent of Total | Transit Trips Number | Transit Trips Percent of Total | Average Trips per Household |
|---|---|---|---|---|---|
| Under 14,000 ....... | 16,600 | 16.8 | 47,700 | 16.7 | 2.9 |
| 14,000 to 27,899 .... | 31,400 | 31.8 | 91,600 | 32.2 | 2.9 |
| 27,900 to 41,899 .... | 31,600 | 32.0 | 91,200 | 32.0 | 2.9 |
| 41,900 to 55,899 .... | 13,800 | 14.0 | 38,900 | 13.7 | 2.8 |
| 55,900 to 76,799 .... | 3,900 | 4.0 | 11,000 | 3.9 | 2.8 |
| 76,800 or Over ...... | 1,400 | 1.4 | 4,300 | 1.5 | 3.1 |
| Total | 98,700 | 100.0 | 284,700 | 100.0 | 2.9 |

| Annual Income Range (constant 1991 dollars) | 1972 Households Number[a] | Households Percent of Total | Transit Trips Number | Transit Trips Percent of Total | Average Trips per Household |
|---|---|---|---|---|---|
| Under 14,000 ....... | 6,800 | 14.7 | 17,000 | 14.6 | 2.5 |
| 14,000 to 27,899 .... | 9,800 | 21.2 | 26,500 | 22.7 | 2.7 |
| 27,900 to 41,899 .... | 13,900 | 30.0 | 32,300 | 27.7 | 2.3 |
| 41,900 to 55,899 .... | 8,900 | 19.2 | 23,700 | 20.3 | 2.7 |
| 55,900 to 76,799 .... | 4,600 | 9.9 | 10,700 | 9.2 | 2.3 |
| 76,800 or Over ...... | 2,300 | 5.0 | 6,400 | 5.5 | 2.8 |
| Total | 46,300 | 100.0 | 116,600 | 100.0 | 2.5 |

| Annual Income Range (constant 1991 dollars) | 1991 Households Number[a] | Households Percent of Total | Transit Trips Number | Transit Trips Percent of Total | Average Trips per Household |
|---|---|---|---|---|---|
| Under 14,000 ....... | 16,900 | 31.9 | 57,400 | 37.6 | 3.4 |
| 14,000 to 27,899 .... | 14,600 | 27.5 | 44,400 | 29.1 | 3.0 |
| 27,900 to 41,899 .... | 9,700 | 18.3 | 23,700 | 15.5 | 2.4 |
| 41,900 to 55,899 .... | 5,500 | 10.4 | 13,900 | 9.1 | 2.5 |
| 55,900 to 76,799 .... | 5,100 | 9.6 | 10,400 | 6.8 | 2.0 |
| 76,800 or Over ...... | 1,200 | 2.3 | 2,800 | 1.9 | 2.3 |
| Total | 53,000 | 100.0 | 152,600 | 100.0 | 2.9 |

[a] *Approximately 11 percent of transit tripmaking households in 1963, 37 percent in 1972, and 15 percent in 1991 did not provide household annual income data.*

*Source: SEWRPC.*

households in the Region was recorded at 2.9 per weekday in both 1963 and 1991, lower-income households made more transit trips on an average day in 1991 than in 1963, and higher-income households made fewer transit trips on an average weekday in 1991 than in 1963. As shown in Table 72, transit trips made by persons from households earning incomes under $14,000 per year (1991 dollars) increased by 21 percent between 1963 and 1991. Conversely, transit trips

Table 73

DISTRIBUTION OF AVERAGE WEEKDAY INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE AT DESTINATION: 1963, 1972, AND 1991

| | Person Trips | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1963 | | 1972 | | 1991 | | Change: 1963-1991 | | Change: 1972-1991 | |
| Trip Purpose | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent | Number | Percent |
| Home-Based Work | 895,900 | 24.9 | 1,064,500 | 23.6 | 1,314,600 | 23.4 | 418,700 | 46.7 | 250,100 | 23.5 |
| Home-Based Shopping | 546,800 | 15.2 | 678,600 | 15.1 | 803,800 | 14.4 | 257,000 | 47.0 | 125,200 | 18.4 |
| Home-Based Other | 1,197,200 | 33.2 | 1,556,000 | 34.5 | 1,714,900 | 30.7 | 517,700 | 43.2 | 158,900 | 10.2 |
| Nonhome-Based | 649,600 | 18.0 | 787,400 | 17.5 | 1,133,900 | 20.3 | 484,300 | 74.6 | 346,500 | 44.0 |
| School | 313,500 | 8.7 | 418,400 | 9.3 | 627,100 | 11.2 | 313,600 | 100.0 | 208,700 | 49.9 |
| Total | 3,603,000 | 100.0 | 4,504,900 | 100.0 | 5,594,300 | 100.0 | 1,991,300 | 55.3 | 1,089,400 | 24.2 |

*Source: SEWRPC.*

made by persons from households earning $27,900 or more per year (1991 dollars) decreased by 65 percent during the same period of time.

These findings indicate that the decline in transit ridership between 1963 and 1991 occurred primarily among persons from more affluent households, leaving the use of mass transit increasingly dominated by persons from lower-income households. The reasons for this decline may include the movement of households from the traditional transit service areas in the densely urbanized parts of the Region, the significant increase in the number of persons living in poverty in those same areas, and cutbacks in transit service that promoted mode shifts among those able to own and operate a personal vehicle. The income characteristics of the existing users of public transit indicate that the significant percentage decreases in transit use which occurred between 1963 and 1991 may not be expected to continue into the future, since existing mass transit ridership is limited in its ability to make use of alternative modes of travel.

Purposes of Internal Trips: The activities of a household are usually centered around the home. It logically follows, therefore, that home-oriented travel may be expected to account for a large portion of total internal person travel on an average weekday. Trips which have either an origin or destination at home, which are known as "home-based" trips, were found to comprise about four-fifths of total average weekday internal person trips in each of the survey years. This indicates the importance of the home as a generator of trips. Thus, future facility requirements within the Region will be determined in large measure by the amount and location of future residential development.

The percentage distributions of the purposes of weekday internal person trips remained stable during the period from 1963 to 1991 (see Table 73). During this period, home-based work trips comprised between 23 and 25 percent of all such trips; home-based shopping trips, between 14 and 15 percent; home-based trips in other categories, between 31 and 35 percent; nonhome-based trips, between 18 and 20 percent; and school trips, between 9 and 11 percent. These percentage distributions remained stable over three decades despite substantial increases in the absolute numbers of trips in all categories. This stability demonstrates that some aspects of travel are indeed orderly and regular over time. In percentage terms, the largest increases in internal person trips between 1972 and 1991 were found in nonhome-based trips, which increased by 346,500, or 44 percent, and school trips, which increased by 208,700 trips, or 50 percent.

Average Auto Occupancy by Selected Trip Purpose: The overall average number of persons per auto, including the driver, remained relatively constant from 1963 to 1972, at 1.45 and 1.42, respectively. From 1972 to 1991, however, the overall occupancy rate decreased substantially, from 1.42 to 1.26 persons per auto. With the exception of school trips, only minor differences occurred within given trip purpose categories from 1963 to 1972. Average auto occupancy

Table 74

AVERAGE AUTOMOBILE OCCUPANCY OF AVERAGE WEEKDAY INTERNAL TRIPS IN THE REGION BY SELECTED TRIP PURPOSE: 1963, 1972, AND 1991

| Year | Average Auto Occupancy by Selected Trip Purpose (number of persons) | | | | | |
|---|---|---|---|---|---|---|
| | Home-Based Work | Home-Based Shopping | Home-Based Other | Nonhome Based | School | Total Travel |
| 1963 | 1.21 | 1.53 | 1.58 | 1.34 | 4.96 | 1.45 |
| 1972 | 1.17 | 1.47 | 1.54 | 1.38 | 2.83 | 1.42 |
| 1991 | 1.06 | 1.27 | 1.34 | 1.20 | 2.71 | 1.26 |

*Source: SEWRPC.*

decreased significantly in every trip purpose classification from 1972 to 1991. The most notable decrease was for home-based work trips which, in 1991, showed an auto occupancy rate of 1.06 persons per auto (see Table 74).

Relationship of Travel Mode and Trip Purpose: The distributions of internal person trips by trip purpose and by mode of travel, as shown in Figure 35, remained relatively unchanged between 1963, 1972, and 1991. Figure 35 sets forth the percentage distributions of internal person trips by trip purpose and by mode of travel. As Figure 35 shows:

- Of total driver-only trips, the percentage distributions of trip purposes are markedly similar in all three survey years despite the increases in total driver-only trips recorded in 1972 and 1991.

- Of total auto trips with passengers, the percentage distributions of home-based work trips and the percentage distribution of home-based shopping trips decreased in both 1972 and 1991. The largest increase occurred in home-based school trips in 1991, from 9 percent in 1963 and 1972 to 16 percent in 1991.

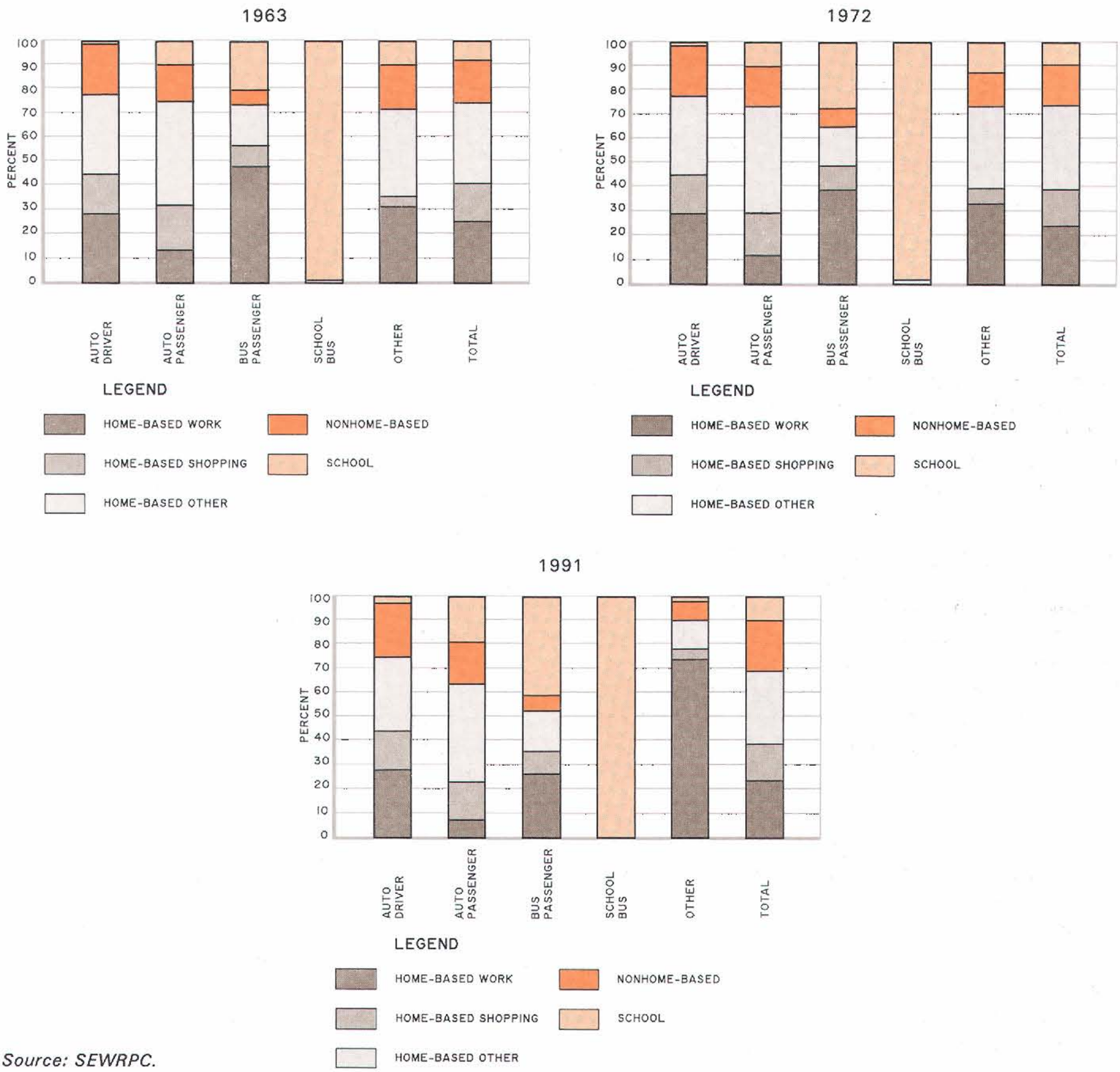
- Of total bus passenger trips, the percentage of home-based work trips decreased from 47 percent in 1963 to 38 percent in 1972 and to 26 percent in 1991. The largest increases occurred in school trips, from 20 percent in 1963 to 27 percent in 1972 and to 39 percent in 1991.

Hourly Patterns of Internal Person Travel: The hourly distributional patterns of internal person trips indicated that although total person trip volumes increased substantially on an average weekday from 1963 to 1972 and from 1972 to 1991, the regular ebb and flow of travel remained markedly similar both in the proportion of trips by trip purpose and in the proportion and times of peak periods (see Figures 36, 37, and 38). Approximately 32 percent of daily travel within the Region occurred in the two morning and two afternoon peak hours of the day in each survey year. Of these peak-hour movements, trips to and from work comprised 47 percent of the total in 1963, 44 percent in 1972, and 41 percent in 1991. These findings indicate that one of the primary transportation problems within the Region continues to be meeting the peak demand of the journeys to and from work.

Daily Patterns in Person Travel: The patterns shaped by the variations of daily volumes of total weekday internal person travel in each of the survey years are quite similar (see Figure 39). The patterns indicate that total internal person travel varied no more than 6 percent from the daily average for any weekday other than Friday. Total Friday person trip volumes were 14 percent above average in 1963, 9 percent above average in 1972, and 7 percent above average in 1991. Because driver-only trip volumes dominate person trip volumes, the patterns of those trips closely matched those of

## Figure 35

**PERCENTAGE DISTRIBUTION OF AVERAGE WEEKDAY INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE AND MODE OF TRAVEL: 1963, 1972, AND 1991**




*Source: SEWRPC.*

total person trips in each of the survey years. The patterns of mass transit trips were about the same in all three survey years, varying by no more than 8 percent from the weekday average in each of the three survey years.

The patterns of auto, truck, and taxi passenger trips had the largest variance from the weekday average in each of the survey years, with the travel on Friday rising to 25 percent above the average in both 1963 and in 1991 and to 19 percent above the average in 1972. The patterns of school bus passenger trips, although exhibiting differences by day of week in each of the survey years, varied by no more than 12 percent from the weekday average. Differences are probably random in nature, possibly occurring because of the randomness of such activities as scheduled field trips, teacher conferences, and other special school activities, as well as student absenteeism.

The reasons for daily variations in weekday internal person travel are indicated in Figure 40, which shows the daily variations by trip purpose. The large variations in tripmaking on Fridays in each of the survey years were largely caused by the significant increases in home-based shopping, nonhome-based, and home-based "other" trips. Home-based shopping trips were 38 percent, 19 percent, and 14 percent above the weekday average on Fridays in 1963, 1972, and 1991, respectively. Nonhome-based trips were 25 percent, 24 percent, and 16 percent above the weekday average on Fridays in 1963, 1972, and 1991, respectively. Home-based "other" trips were approximately 12 to 13 percent above the weekday average on Fridays in each of the survey years.

For home-based shopping and nonhome-based trips, the variance from the weekday average for Friday trips decreased from both 1963 to 1972 and from 1972 to 1991 (see Figure 40). The reasons for this decrease are unclear, but may be related to the changes in lifestyle which have accompanied the trend toward smaller households and increased rates of female participation in the labor force.

Vehicle Availability and Internal Vehicle Trip Production: In addition to the approximately 1,142,500 personal-use automobiles, trucks, and vans and the 45,000 motorcycles available to residents of the Region in 1991, there were about 87,500 commercial trucks and 900 limousines and specialized carriers available for use within the Region on an average weekday in 1991. Together, they constitute a total of 1,275,900 vehicles available in the Region on weekdays (see Table 75). From 1963 to 1972, total weekday vehicle availability in the Region increased from 586,300 vehicles to 803,300 vehicles, or by 37 percent; from 1972 to 1991, total weekday vehicle availability in the Region increased from 803,300 vehicles to 1,275,900 vehicles, or by 59 percent.

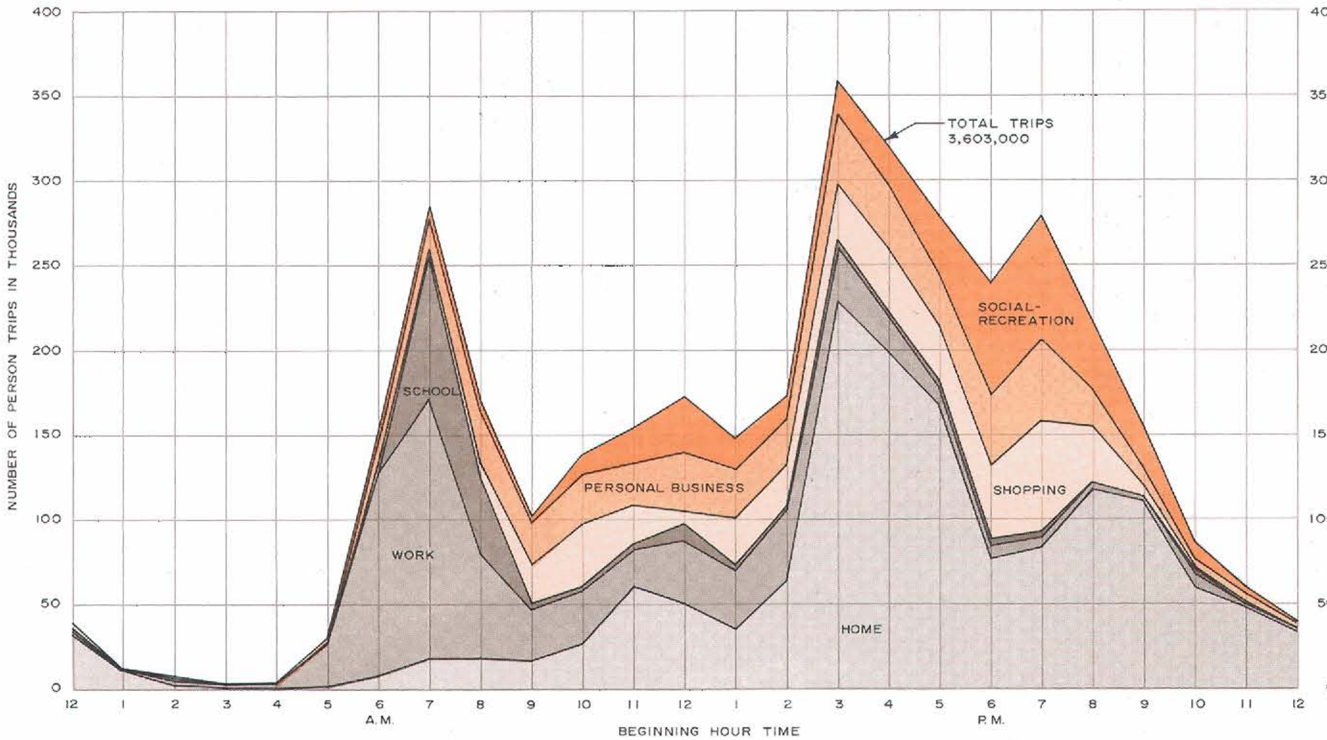
As Table 75 also indicates, on an average weekday in 1991, the 1,275,900 vehicles available within the Region made a total of 4,620,300 internal vehicle trips. This is an increase of 1,330,000 vehicle trips, or 40 percent, over the 1972 total of 3,290,300 internal vehicle trips. In turn, the 1972 total represents an increase of 823,900 vehicle trips, or 33 percent, over the 1963 total of 2,466,400 internal vehicle trips. These increases, which are substantially higher than the 25 percent increase in person trips from 1963 to 1972 and the 24 percent increase in person trips from 1972 to 1991, reflect the rapid 37 percent growth in vehicle availability from 1963 to 1972 and the 59 percent growth from 1972 to 1991. The increases in vehicle trips also reflect the decline in average vehicle occupancy per trip from 1.42 persons per vehicle in 1972 to 1.26 persons per vehicle in 1991.

Vehicles defined as being in personal use by resident households averaged 4.1 internal vehicle trips per vehicle on an average weekday and accounted for about 88 percent of total internal vehicle trips in 1963 and 1972. In 1991, they averaged 3.6 vehicle trips per weekday but still accounted for 88 percent of total internal vehicle trips. Commercial trucks accounted for 11 percent of total internal vehicle trips and had a trip rate of 5.9 trips per vehicle on an average weekday in 1991. In 1963 and 1972, by comparison, commercial trucks accounted for 12 percent and 11 percent, respectively, of total internal vehicle trips, and had a trip rate of 5.0 and 4.8 weekday trips per vehicle, respectively. In 1972, the 21,000 motorcycles available made 8,000 internal trips, a trip rate of 0.4 trip per vehicle. By 1991, the number of motorcycles had more than doubled to 45,000, but made only 6,300 trips, a trip rate of 0.1 trip per vehicle.

Internal Commercial Truck Trip Production by Truck Type: The number of trucks available within the Region increased from 58,500 in 1963 to 77,250 in 1972 and to 87,500 in 1991 (see Table 76). It should be noted that, because of the substantial increase in the use of light trucks as personal vehicles rather than as commercial vehicles, the 1991 definition of commercial trucks excludes trucks employed primarily for personal use. Such personal-use trucks were included with automobiles as personal-use vehicles. In 1963, personal-use trucks represented 5,100, or about 9 percent, of the total 58,500 trucks available; in 1972 they represented 18,100, or about 23 percent, of the total 77,250 trucks available. In 1991, personal-use trucks were estimated to total about 80,600 trucks, or about

## Figure 36

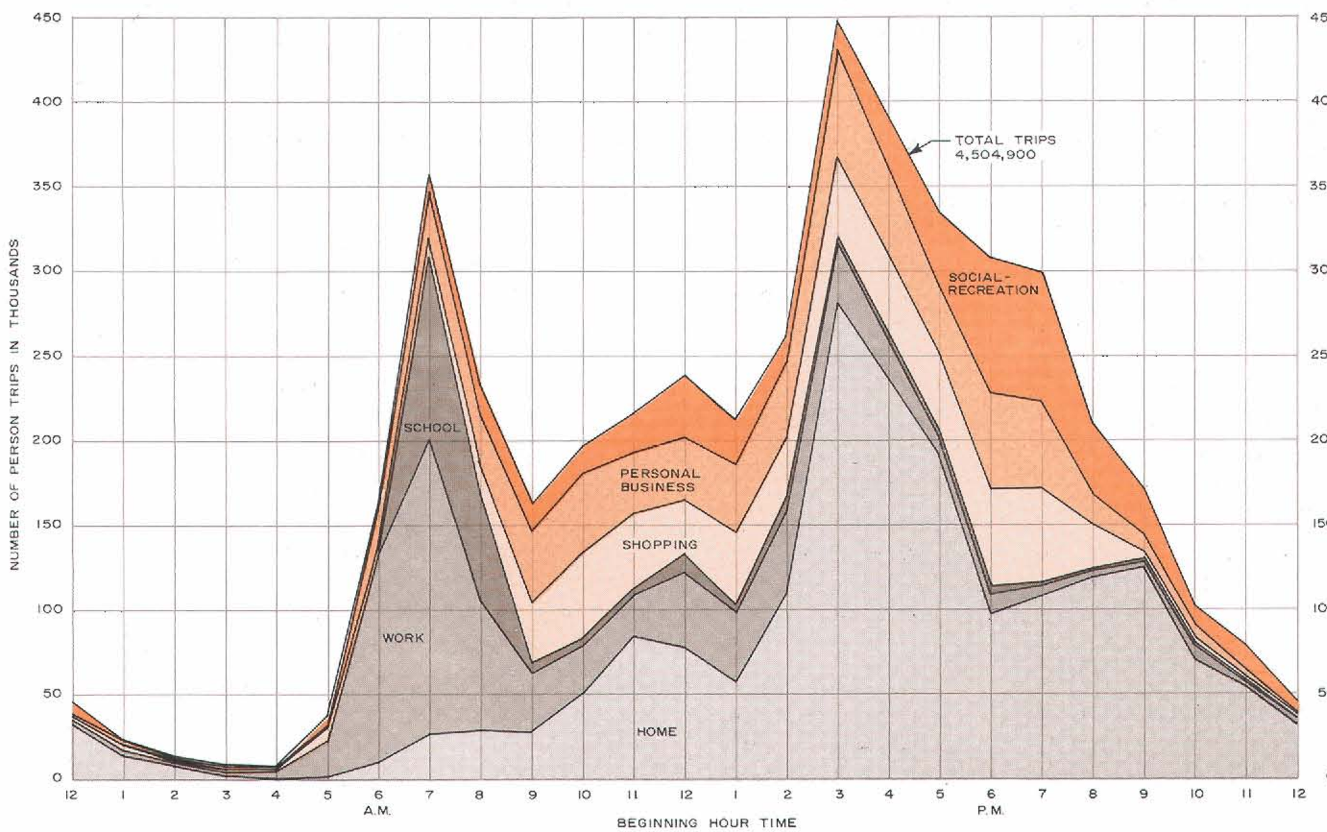
HOURLY VARIATION OF AVERAGE WEEKDAY INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE AT DESTINATION: 1963




*Source: SEWRPC.*

## Figure 37

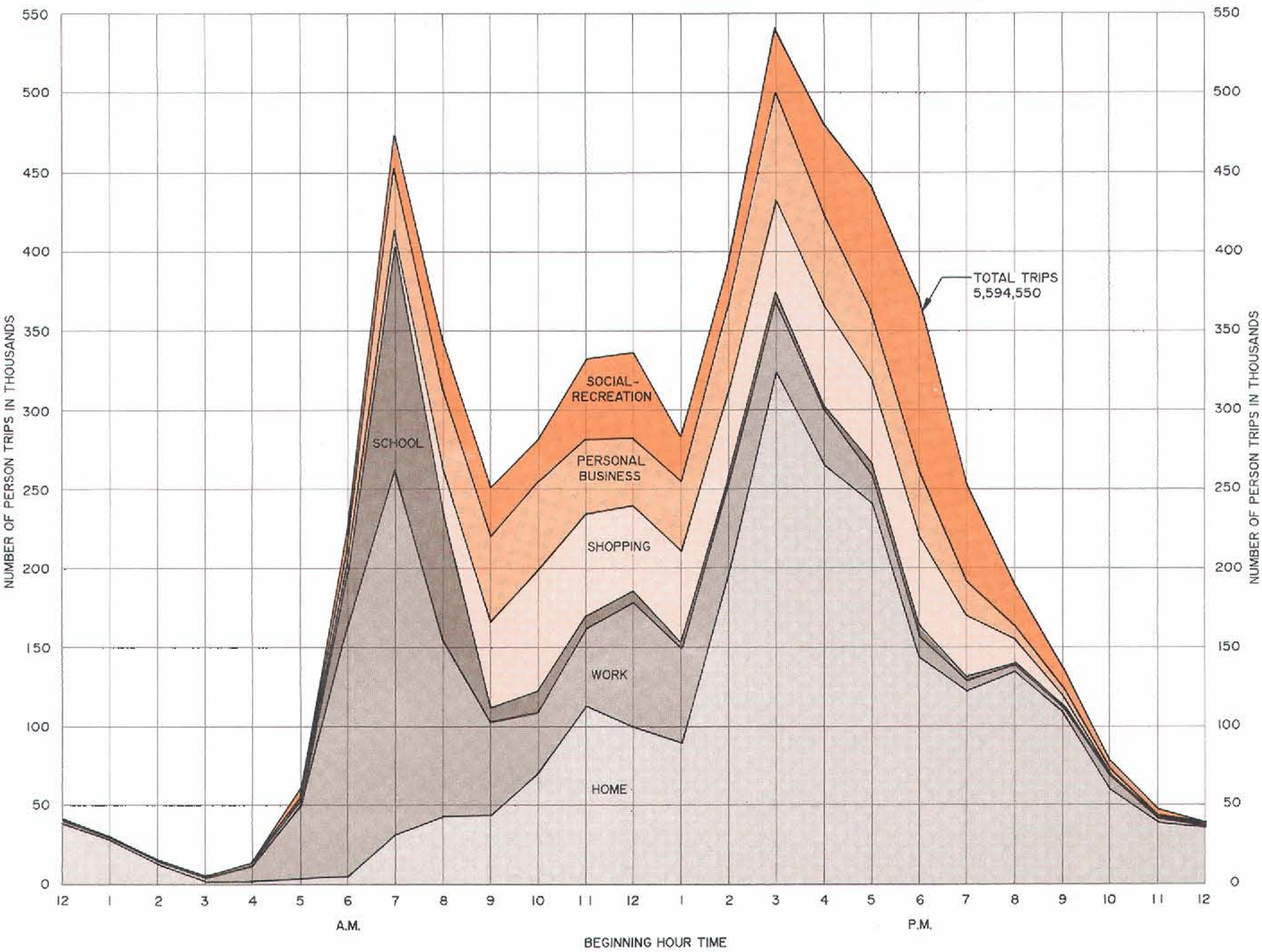
HOURLY VARIATION OF AVERAGE WEEKDAY INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE AT DESTINATION: 1972




*Source: SEWRPC.*

Figure 38

HOURLY VARIATION OF AVERAGE WEEKDAY INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE AT DESTINATION: 1991



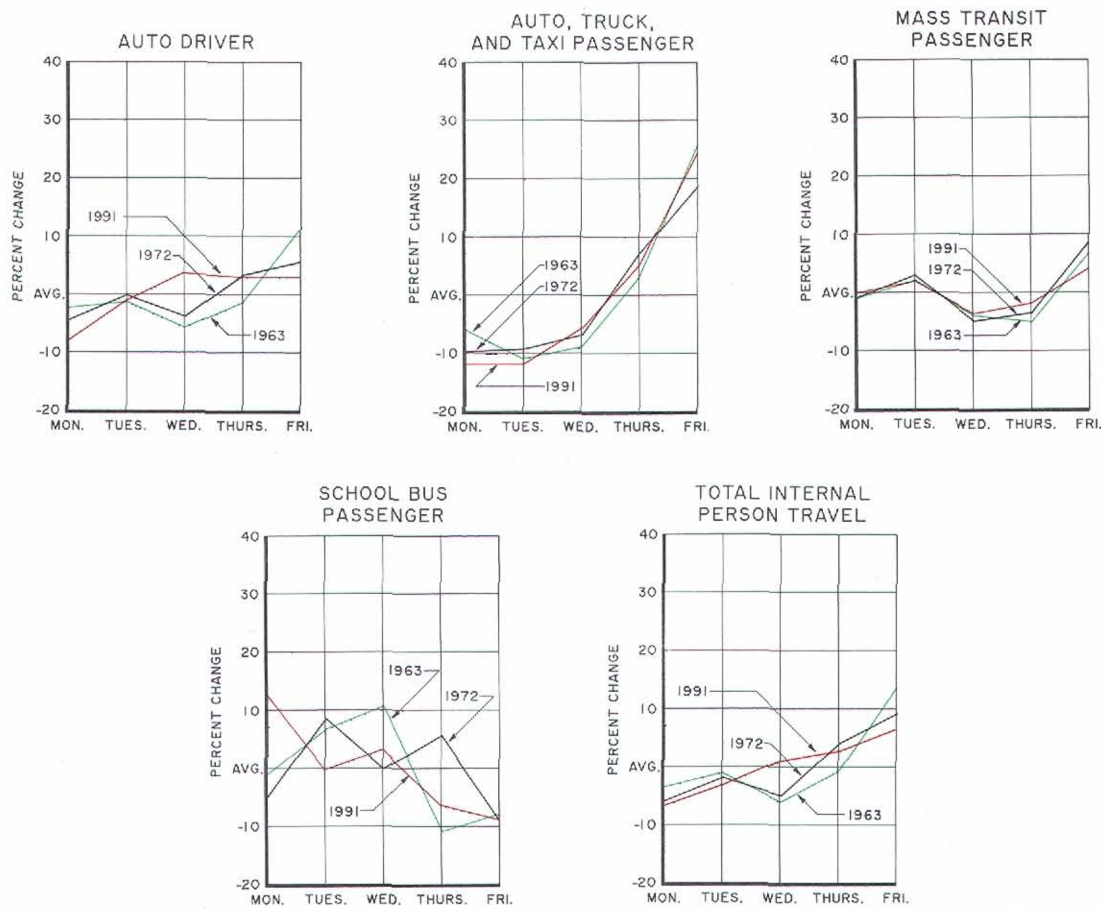

*Source: SEWRPC.*

48 percent of the total 168,100 trucks available. There was a slight decrease in the number of light trucks available for commercial use in 1991 as compared to 1972, from 51,000 light trucks in 1972 to 49,100 such trucks in 1991. This decrease was due to a change in the definition which excluded personal-use light trucks. Medium trucks in commercial use increased from 22,850 to 28,400 during the period from 1972 to 1991, an increase of 24 percent. The number of heavy trucks in commercial use decreased from 3,400 in 1972 to 3,100 in 1991, a decrease of 9 percent. In 1991, for the first time, municipal trucks were classified separately. The 6,900 municipal trucks recorded in 1991 accounted for 8 percent of all commercial trucks.

Together, these light, medium, heavy, and municipal trucks in commercial use made an estimated total of 520,100 trips on an average weekday in 1991, representing an increase of 149,100 trips, or 40 percent, from 1972 to 1991. Trip rates for medium and heavy trucks showed increases in both 1972 and 1991, indicating greater daily use of these trucks, since their total numbers did not increase at the same rate as

*Figure 39*

**DAILY VARIATION OF AVERAGE WEEKDAY INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1963, 1972, AND 1991**




*Source: SEWRPC.*

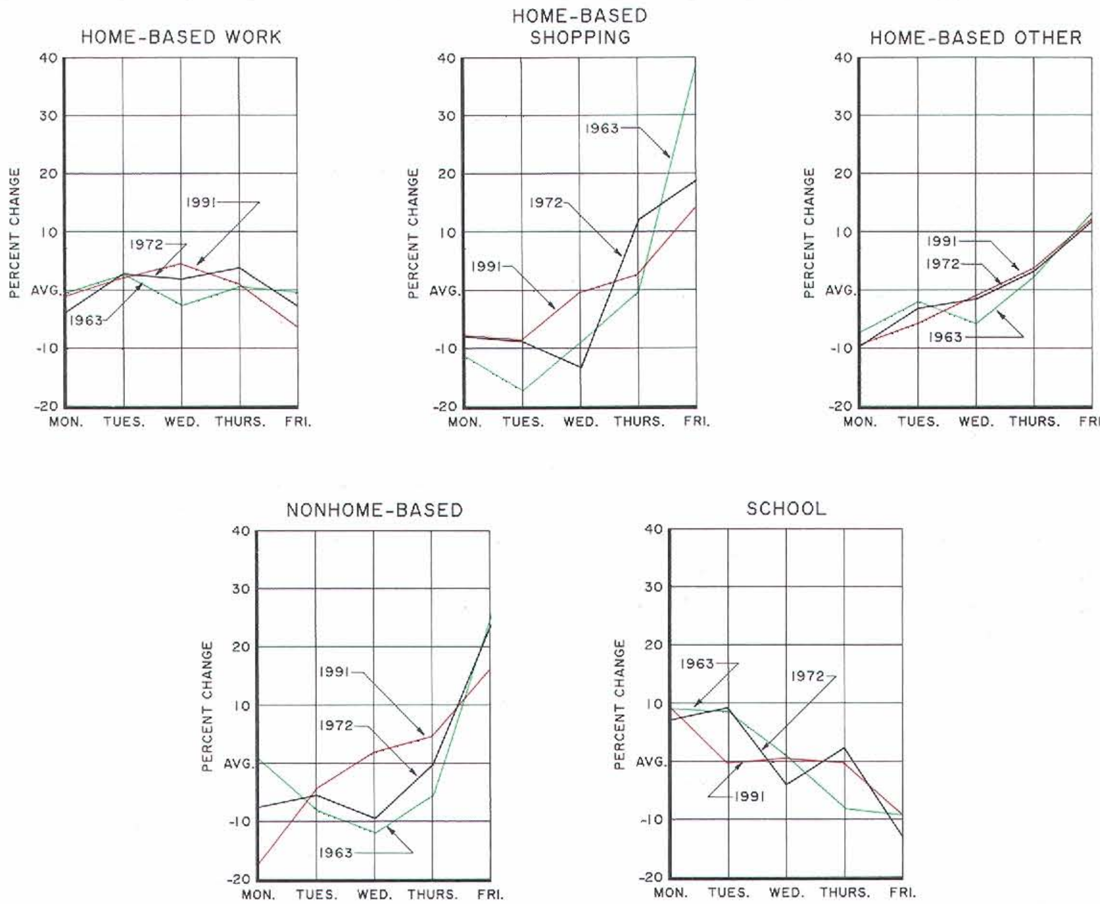
autos and trucks in personal use did during that period. The average number of trips per weekday for all trucks in commercial use was 5.0 trips per vehicle in 1963, 4.8 in 1972, and 5.9 in 1991 (see Table 76).

Characteristics of Internal Commercial Truck Use within the Region on an Average Weekday: The 1963, 1972, and 1991 inventories indicate that in the Region the average number of weekday trips per commercial truck has increased over time, along with the average distance traveled per trip. Table 77 shows that the average number of trips made per truck increased from about 5.0 in both 1963 and 1972 to 5.9 trips in 1991. The average miles traveled per truck trip increased from 4.9 miles per trip in 1963, to 7.3 miles per trip in 1972, and to 8.4 miles per trip in 1991, a 71 percent increase between 1963 and 1991 and a 15 percent increase between 1972 and 1991.

Hourly Distribution of Internal Vehicle Travel: The hourly distribution of commercial truck trips and trips by limousines and specialized carriers in 1991 indicates that most of such trips occurred during the business hours of the day. The peak hours for tripmaking were between 9:00 a.m. and 11:00 a.m. Trips made by light trucks were concentrated between 7:00 a.m. and 4:00 p.m., while trips made by medium and heavy trucks and municipal trucks were concentrated between 7:00 a.m. and 3:00 p.m. This decline in tripmaking by medium and heavy trucks after 3:00 p.m. in 1991 alleviates, to a degree, afternoon peak-period congestion. A decline in truck

Figure 40

**DAILY VARIATION OF AVERAGE WEEKDAY INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1963, 1972, AND 1991**




*Source: SEWRPC.*

tripmaking may be observed during the noon hour. The hourly distribution of truck and taxi tripmaking observed in 1991 is very similar to that observed in 1963 and 1972 (see Figures 41, 42, and 43).

Location of Travel

The amount of travel attracted to a given area is largely determined by the amount, type, and intensity of development in that area. Maps 42, 43, and 44 show the spatial distribution of internal person trip destinations within the Region on an average weekday for each of the survey years. The highest concentrations of internal person trip destinations on all three maps occur in the highly developed central business districts and major industrial and commercial areas of the larger urbanized areas of the Region. These concentrations include, among others, the Blue Mound Road corridor; the Milwaukee CBD; such major shopping centers as Brookfield Square, Northridge, Southridge, Regency Mall, and Mayfair; and the University of Wisconsin-Milwaukee campus. Significant increases in concentrations of person trip destinations in 1991, however, were found in many smaller communities, such as the Village of Jackson, City of Oconomowoc, Town of Richfield, Village of Union Grove, City of West Bend, and City of Whitewater, further demonstrating the decentralization of land use in Southeastern Wisconsin.

Maps 45, 46, and 47 show the spatial distribution of internal mass transit trip destinations within the Region on an average weekday for 1963,

### Table 75

### VEHICLE AVAILABILITY AND AVERAGE WEEKDAY INTERNAL VEHICLE TRIPS IN THE REGION BY VEHICLE TYPE: 1963, 1972, AND 1991

| Type of Vehicle | 1963 | | | | |
|---|---|---|---|---|---|
| | Vehicles | | Vehicle Trips | | Average Number of Trips |
| | Number | Percent of Total | Number | Percent of Total | |
| Personal Vehicle[a] | 527,300 | 89.9 | 2,166,000 | 87.8 | 4.1 |
| Commercial-Use Trucks[b] | 58,500 | 10.0 | 293,400 | 11.9 | 5.0 |
| Taxi/Limousine/Specialized Carrier | 500 | 0.1 | 7,000 | 0.3 | 14.0 |
| Motorcycle[c] | - - | - - | - - | - - | - - |
| Total | 586,300 | 100.0 | 2,466,400 | 100.0 | 4.2 |

| Type of Vehicle | 1972 | | | | |
|---|---|---|---|---|---|
| | Vehicles | | Vehicle Trips | | Average Number of Trips |
| | Number | Percent of Total | Number | Percent of Total | |
| Personal Vehicle[a] | 704,600 | 87.7 | 2,897,000 | 88.0 | 4.1 |
| Commercial-Use Trucks[b] | 77,250 | 9.6 | 371,000 | 11.4 | 4.8 |
| Taxi/Limousine/Specialized Carrier | 450 | 0.1 | 14,300 | 0.4 | 31.8 |
| Motorcycle[c] | 21,000 | 2.6 | 8,000 | 0.2 | 0.4 |
| Total | 803,300 | 100.0 | 3,290,300 | 100.0 | 4.1 |

| Type of Vehicle | 1991 | | | | |
|---|---|---|---|---|---|
| | Vehicles | | Vehicle Trips | | Average Number of Trips |
| | Number | Percent of Total | Number | Percent of Total | |
| Personal Vehicle[a] | 1,142,500 | 89.5 | 4,077,500 | 88.2 | 3.6 |
| Commercial-Use Trucks[b] | 87,500 | 6.9 | 520,100 | 11.3 | 5.9 |
| Taxi/Limousine/Specialized Carrier | 900 | 0.1 | 16,400 | 0.4 | 18.2 |
| Motorcycle[c] | 45,000 | 3.5 | 6,300 | 0.1 | 0.1 |
| Total | 1,275,900 | 100.0 | 4,620,300 | 100.0 | 3.6 |

[a] *For 1991, this category includes autos, personal-use trucks, and vans on home interview survey.*

[b] *By definition, this category, for 1963 and 1972, includes personal-use trucks as well as commercial-use trucks. In 1991, this category was defined to include only commercial-use trucks. In 1963 and 1972, personal-use trucks represented relatively modest proportions of total trucks: 5,100 of a total 58,500 trucks, or 9 percent, in 1963, and 18,100 of a total 77,250 trucks, or 23 percent, in 1972. In 1991, personal-use trucks represented 80,600 of a total 168,100 trucks, or 48 percent.*

[c] *In 1963, motorcycles were included with automobiles.*

*Source: SEWRPC.*

Table 76

COMMERCIAL-USE TRUCK AVAILABILITY AND AVERAGE WEEKDAY INTERNAL TRUCK TRIPS IN THE REGION BY TYPE: 1963, 1972, AND 1991

| Type of Truck[a] | Year | Trucks | | | Truck Trips | | | |
|---|---|---|---|---|---|---|---|---|
| | | Number | Percent of Total | Percent Change | Number | Percent of Total | Percent Change | Trips per Truck |
| Light | 1963 | 33,800 | 57.8 | - - | 169,500 | 57.8 | - - | 5.0 |
| | 1972 | 51,000 | 66.0 | 50.9 | 185,800 | 50.1 | 9.6 | 3.6 |
| | 1991 | 49,100 | 56.1 | -3.7 | 214,300 | 41.1 | 15.3 | 4.4 |
| Medium | 1963 | 20,500 | 35.0 | - - | 110,900 | 37.8 | - - | 5.4 |
| | 1972 | 22,850 | 29.6 | 11.5 | 173,500 | 46.8 | 56.4 | 7.6 |
| | 1991 | 28,400 | 32.5 | 24.3 | 259,700 | 49.8 | 49.7 | 9.1 |
| Heavy | 1963 | 4,200 | 7.2 | - - | 13,000 | 4.4 | - - | 3.1 |
| | 1972 | 3,400 | 4.4 | -19.0 | 11,700 | 3.1 | -10.0 | 3.4 |
| | 1991 | 3,100 | 3.5 | -8.8 | 17,500 | 3.6 | 49.6 | 5.6 |
| Municipal | 1991 | 6,900 | 7.9 | - - | 28,600 | 5.5 | - - | 4.1 |
| Total | 1963 | 58,500 | 100.0 | - - | 293,400 | 100.0 | - - | 5.0 |
| | 1972 | 77,250 | 100.0 | 32.1 | 371,000 | 100.0 | 26.4 | 4.8 |
| | 1991 | 87,500 | 100.0 | 13.3 | 520,100 | 100.0 | 40.2 | 5.9 |

[a]*A light truck is defined as one having a gross weight of 10,000 pounds or less for farm trucks and 8,000 pounds or less for all other trucks. A medium truck is defined as one having a gross weight greater than 10,000 pounds but no more than 50,000 pounds for farm trucks and greater than 8,000 pounds but no more than 50,000 pounds for all other trucks. A heavy truck is defined as one having a gross weight of more than 50,000 pounds. Municipal trucks have no weight limitations.*

*Source: SEWRPC.*

Table 77

SELECTED TRIPMAKING CHARACTERISTICS OF COMMERCIAL-USE TRUCKS GARAGED IN THE REGION: 1963, 1972, AND 1991

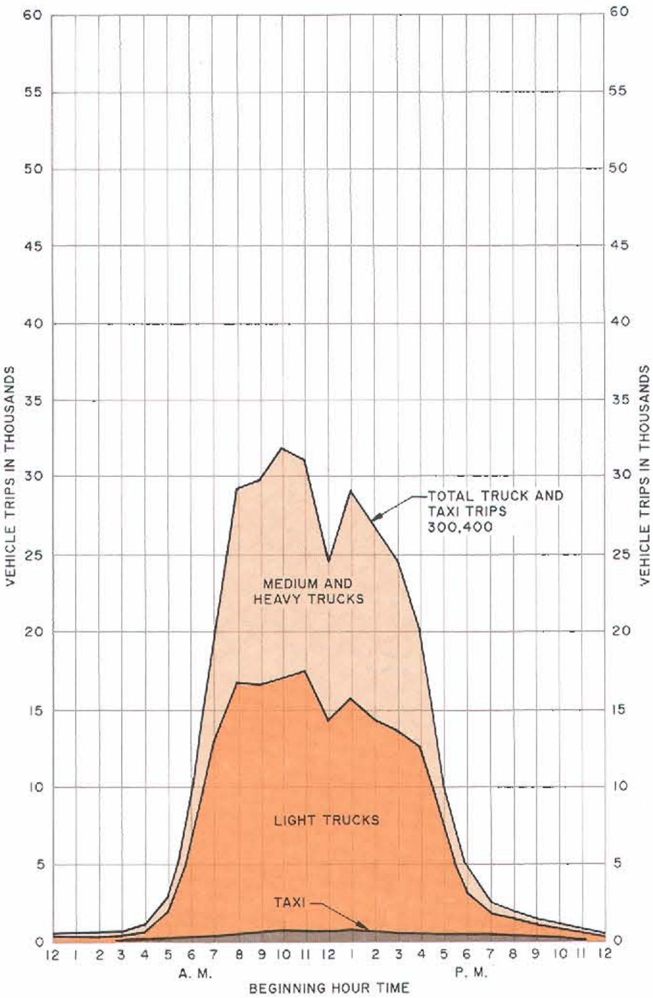
| Trip Characteristics | 1963 | 1972 | 1991 | Change: 1963-1991 | | Change: 1972-1991 | |
|---|---|---|---|---|---|---|---|
| | | | | Number | Percent | Number | Percent |
| Average Weekday Trips per Truck . . . . . . . . . . | 5.0 | 4.8 | 5.9 | 0.9 | 18.0 | 1.1 | 22.9 |
| Average Trip Length (miles) . . . . . . . . . . | 4.9 | 7.3 | 8.4 | 3.5 | 71.4 | 1.1 | 15.1 |

*Source: SEWRPC.*

1972, and 1991, respectively. These maps indicate that mass transit utilization has declined substantially from 1963 to 1972 and from 1972 to 1991. In 1991, mass transit trips were concentrated only in the Milwaukee CBD; at the University of Wisconsin-Milwaukee and Marquette University campuses; in an area bounded by S. 13th Street on the east, W. Greenfield Avenue on the south, S. 20th Street on the west and W. Pierce Street on the north; in an area bounded by N. Sherman Boulevard on the east, W. North Avenue on the south, N. 60th Street on the west, and W. Burleigh Street on the north; in an area bounded by N. 27th Street on the east, W. Hampton Avenue on the south, N. Sherman Boulevard on the west, and W. Silver Spring Drive on the north; and in an area bounded by N. 13th Street on the east, W. Burleigh Street on the south, N. 20th Street on the west, and W. Keefe Avenue on the north.

Figure 41

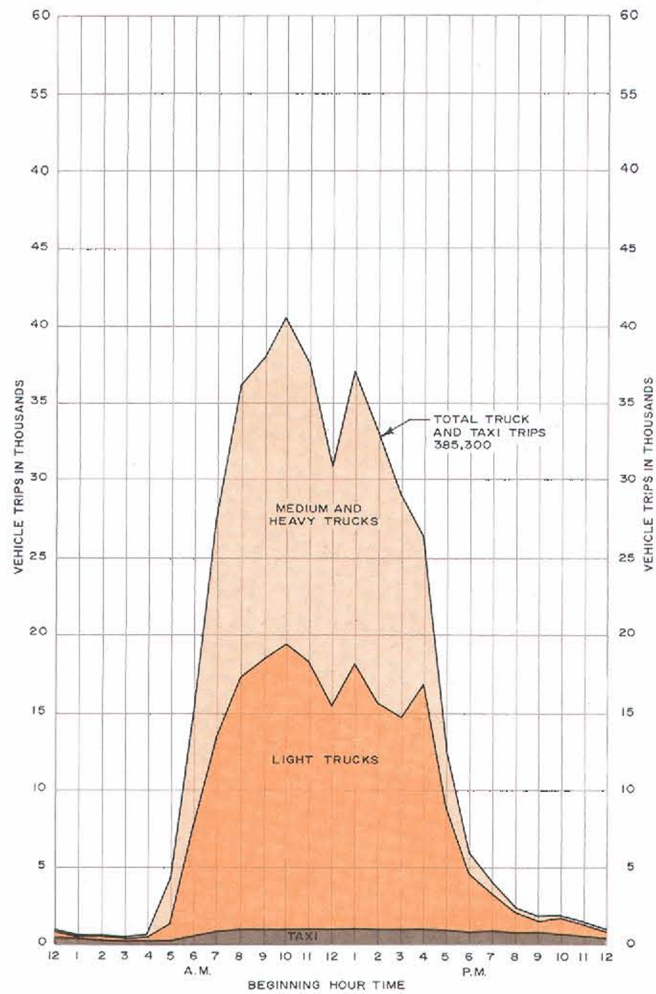
HOURLY VARIATION OF AVERAGE WEEKDAY INTERNAL TRUCK AND TAXI TRIPS IN THE REGION BY VEHICLE TYPE: 1963




*Source: SEWRPC.*

Figure 42

HOURLY VARIATION OF AVERAGE WEEKDAY INTERNAL TRUCK AND TAXI TRIPS IN THE REGION BY VEHICLE TYPE: 1972



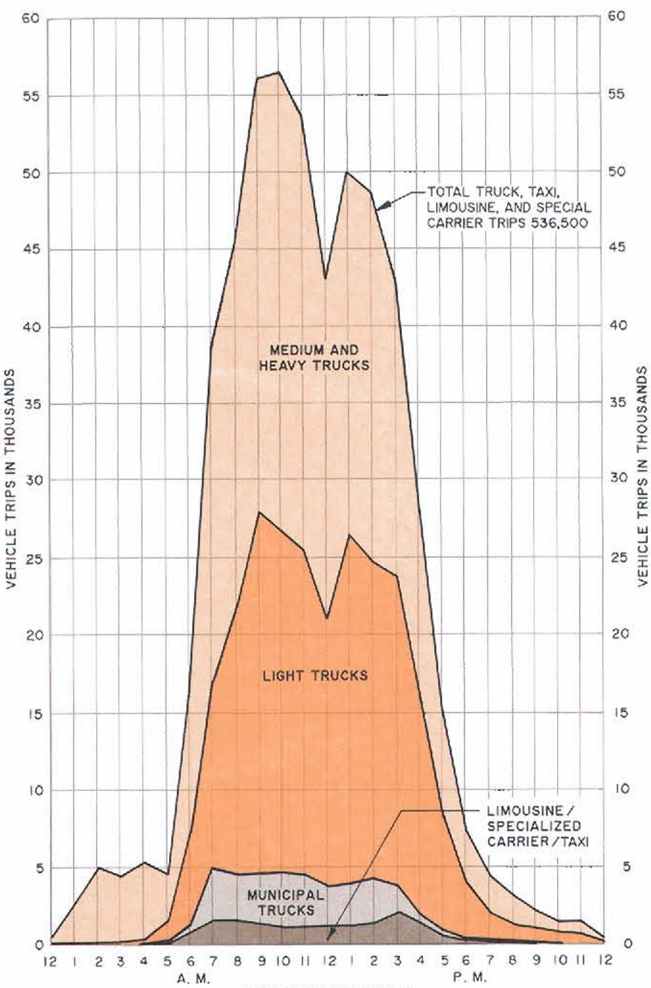

*Source: SEWRPC.*

Maps 48, 49, and 50, respectively, show the spatial distribution of internal truck trip destinations within the Region on an average weekday in 1963, when such destinations totaled 293,400; in 1972, when such destinations totaled 371,000; and in 1991, when such destinations totaled 520,100. The patterns shown on these maps indicate that internal truck trip destinations are most highly concentrated in the central areas of the larger urbanized areas of the Region and in major commercial and industrial areas within, and adjacent to, those larger urbanized areas. These maps also indicate that while substantial increases in the number of truck trip destinations occurred from 1963 to 1972 and to 1991 in many rural areas as well as in the highly developed industrial and commercial areas of the Cities of Milwaukee, Racine, and Kenosha, the number of truck trip destinations within the central areas of these cities remained relatively unchanged.

Maps 51, 52, and 53 show the garaging locations of commercial trucks for, respectively, 1963, 1972, and 1991. Truck garaging locations, although concentrated in the urbanized areas, are dispersed throughout the rural areas of the Region. A comparison of garaging locations with truck trip destinations indicates that both

Figure 43

HOURLY VARIATION OF AVERAGE WEEKDAY INTERNAL TRUCK AND TAXI TRIPS IN THE REGION BY VEHICLE TYPE: 1991




*Source: SEWRPC.*

the number of trucks and the number of trips has increased over time. However, the pattern of trips is concentrated in the more highly developed areas of the Region.

Maps 54, 55, and 56 show the person trip "desire lines" connecting the origins and destinations of external trips with the points of entry to, or exit from, the Region for each of the survey years. These maps also show the through movement of person travel as well as the internal-external travel interchanges. Comparisons of 1991 internal-external travel interchanges with internal-external travel in 1972 and 1963 show increased tripmaking from each of the points of entry or exit to more areas of the Region, reflecting the increase in tripmaking since 1972. Significantly, no large concentrations of trip destinations existed in any of the survey years in any single portion of the Milwaukee urbanized area. As in 1963 and 1972, the majority of through trips in 1991 followed north-south routes, the largest volumes utilizing a combination of IH 94 and either IH 43 or USH 41. Since the completion of IH 43, a greater number of 1991 north-south trips use IH 94 and IH 43 than in 1972, when a greater number of north-south trips used IH 94 and USH 41. Also, through trip points of origin and destination have increased in volume in 1991 from the southwest and the northwest.

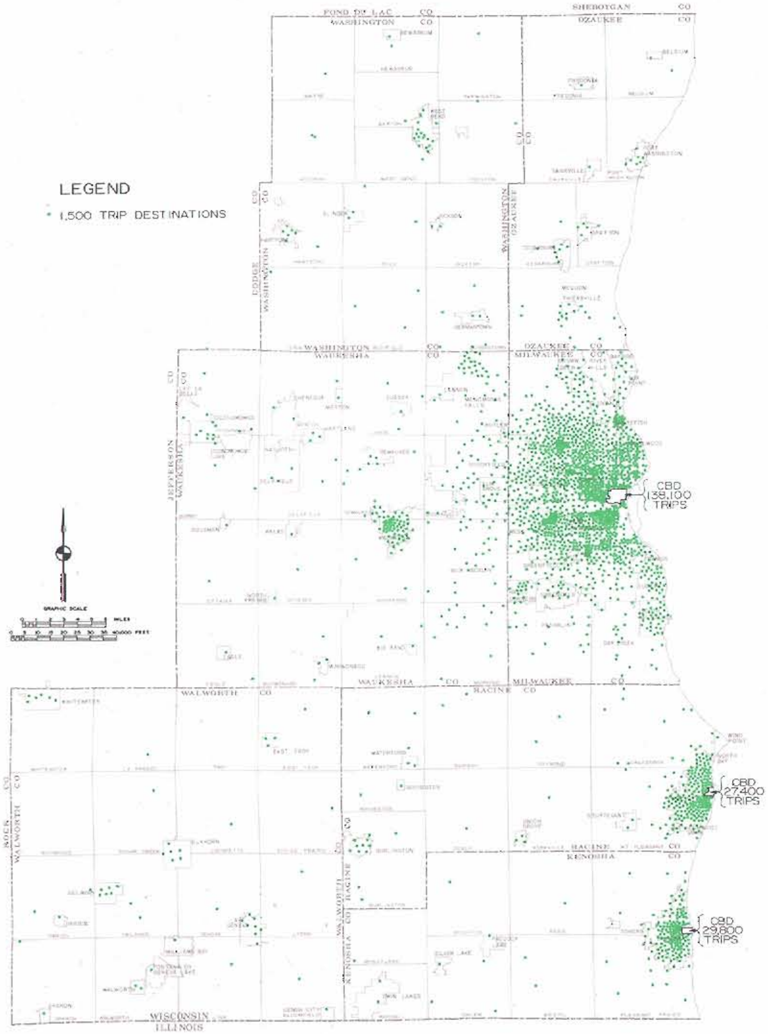
## Characteristics of Travel in Selected Major Central Business Districts

Historically, the highly developed central business districts of the larger cities of the Region have been regarded as the financial, commercial, and cultural centers of the urbanized areas in which they are located. As such they create considerable interest with respect to growth and change. Because the degree of activity within a central business district in terms of employment and tripmaking is often equated with the well-being of the entire urbanized area it serves, special emphasis is placed here upon the examination of the trends from 1963 to 1972 and from 1972 to 1991 in the central business districts of Milwaukee, Racine, and Kenosha. The boundaries of these districts are shown, respectively, on Maps 57, 58, and 59. Map 57 also graphically shows the core area of the Milwaukee CBD. Tables 78, 79, and 80 each summarize survey data for each survey year and for each central business district. Table 78 presents person trips by mode of travel, Table 79 presents vehicle trips by mode of travel, and Table 80 presents person trip destinations by trip purpose and mode of travel.

Comparisons of the 1963, 1972, and 1991 inventory findings set forth in Table 78 indicate that the total number of person trip destinations on an average weekday increased in the Milwaukee CBD and decreased in the Kenosha and Racine central business districts. In spite of the fact that tripmaking on an average weekday decreased by 9,300 person trips, or 17 percent, in the core of the Milwaukee CBD between 1972 and 1991, there was an increase of 13,300 person

## Map 42

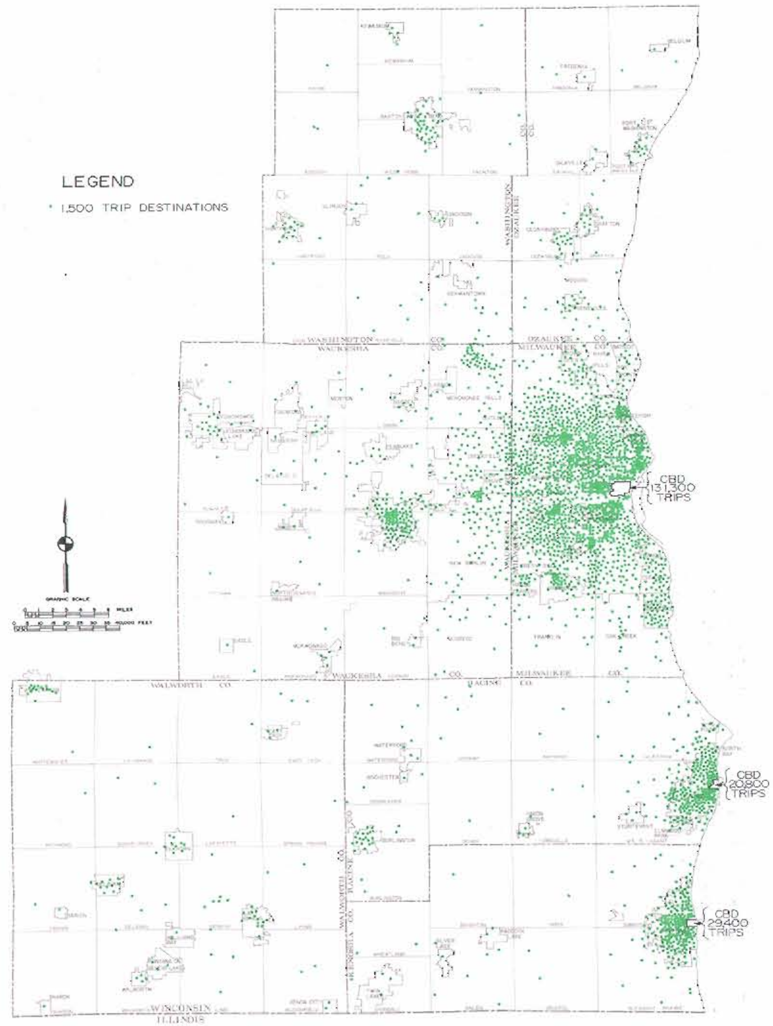
### AVERAGE WEEKDAY INTERNAL PERSON TRIP DESTINATIONS IN THE REGION: 1963




*Source: SEWRPC.*

## Map 43

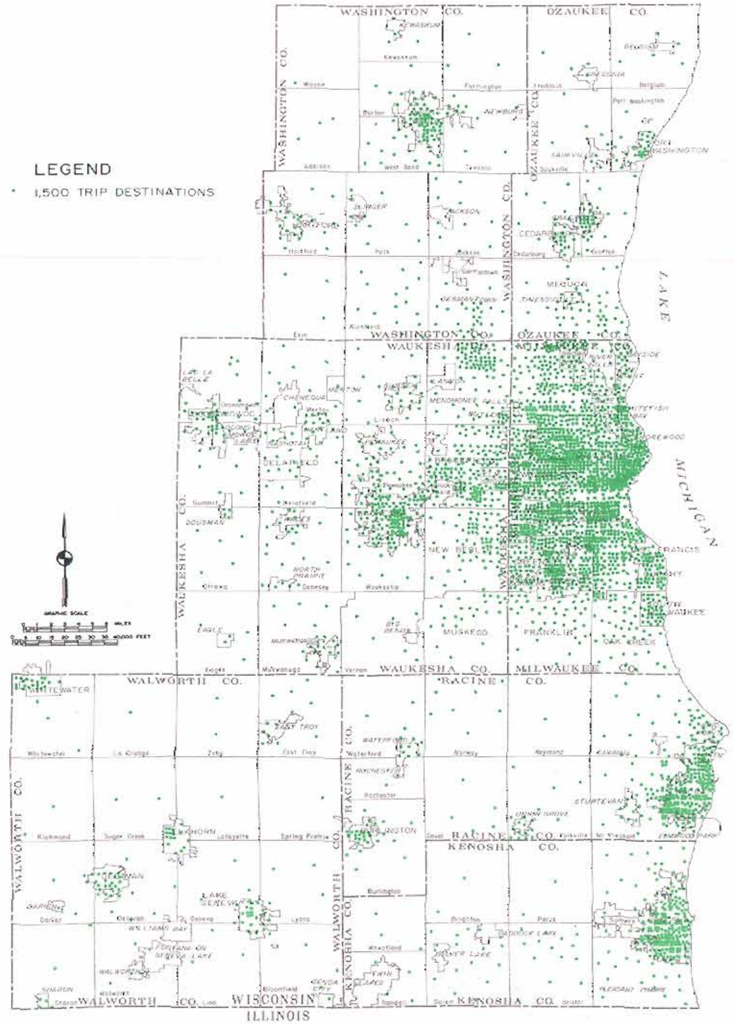
### AVERAGE WEEKDAY INTERNAL PERSON TRIP DESTINATIONS IN THE REGION: 1972




*Source: SEWRPC.*

## Map 44

### AVERAGE WEEKDAY INTERNAL PERSON TRIP DESTINATIONS IN THE REGION: 1991

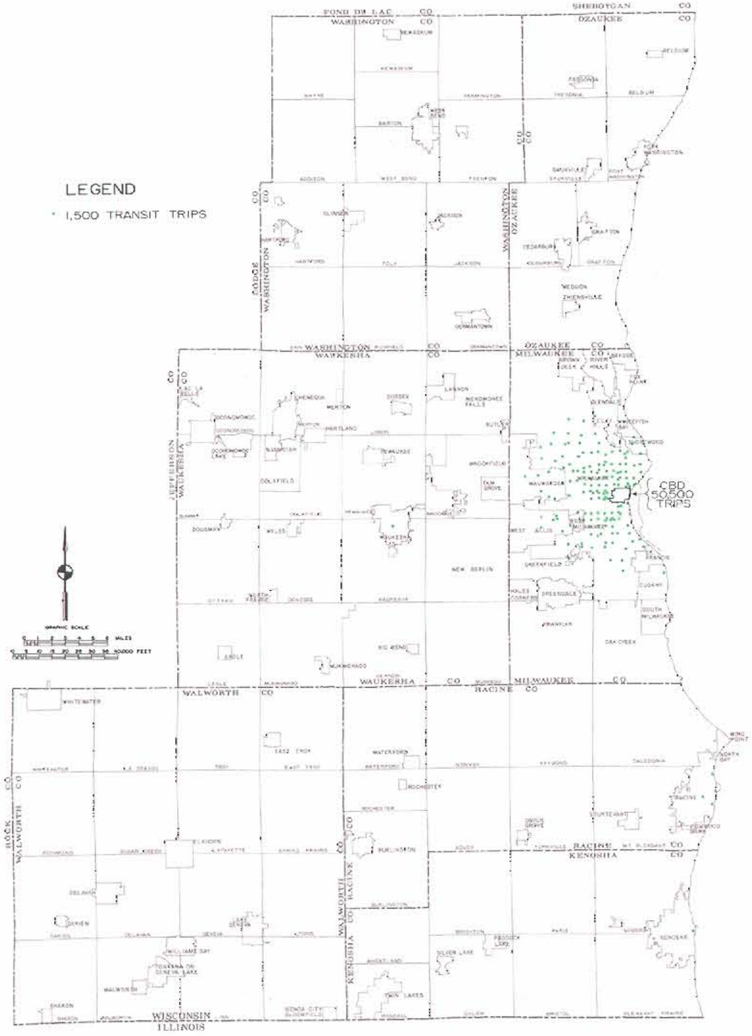



*Source: SEWRPC.*

The number of trips attracted to a given area of the Region is determined by the amount, kind, and intensity of land use development in that area. In all three survey years, the highest concentrations of person trip destinations were found in the highly developed urban areas of the Region. *The 1991 survey findings*, however, indicate both a larger dispersion of trip destinations throughout the Region and a more dense clustering of trip destinations in the smaller urban areas. The overall pattern produced by plotting the location of internal trip destinations closely resembles existing urban development patterns.

## Map 45

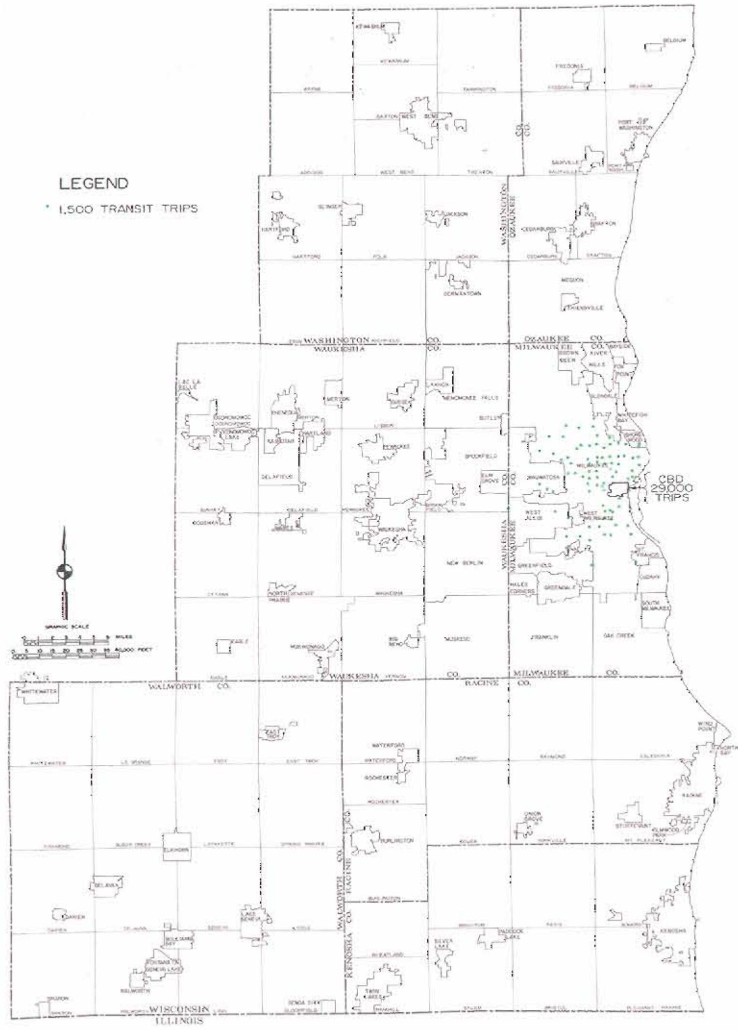
### AVERAGE WEEKDAY MASS TRANSIT TRIP DESTINATIONS IN THE REGION: 1963




Source: SEWRPC.

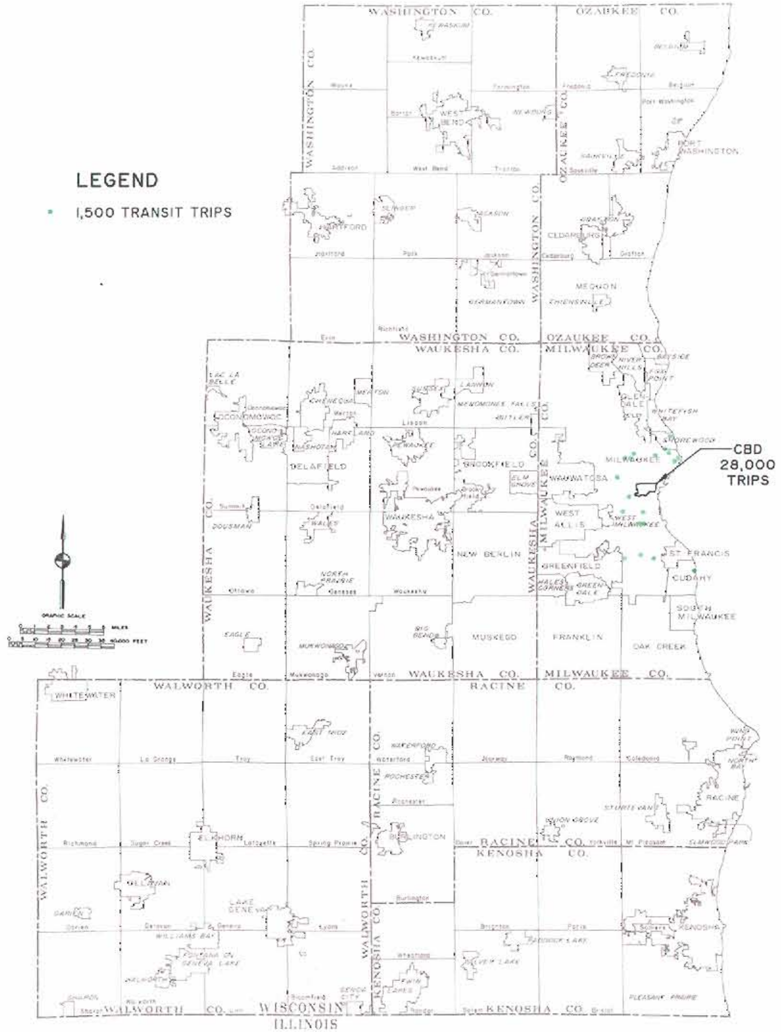
## Map 46

### AVERAGE WEEKDAY MASS TRANSIT TRIP DESTINATIONS IN THE REGION: 1972



## Map 47

### AVERAGE WEEKDAY MASS TRANSIT TRIP DESTINATIONS IN THE REGION: 1991

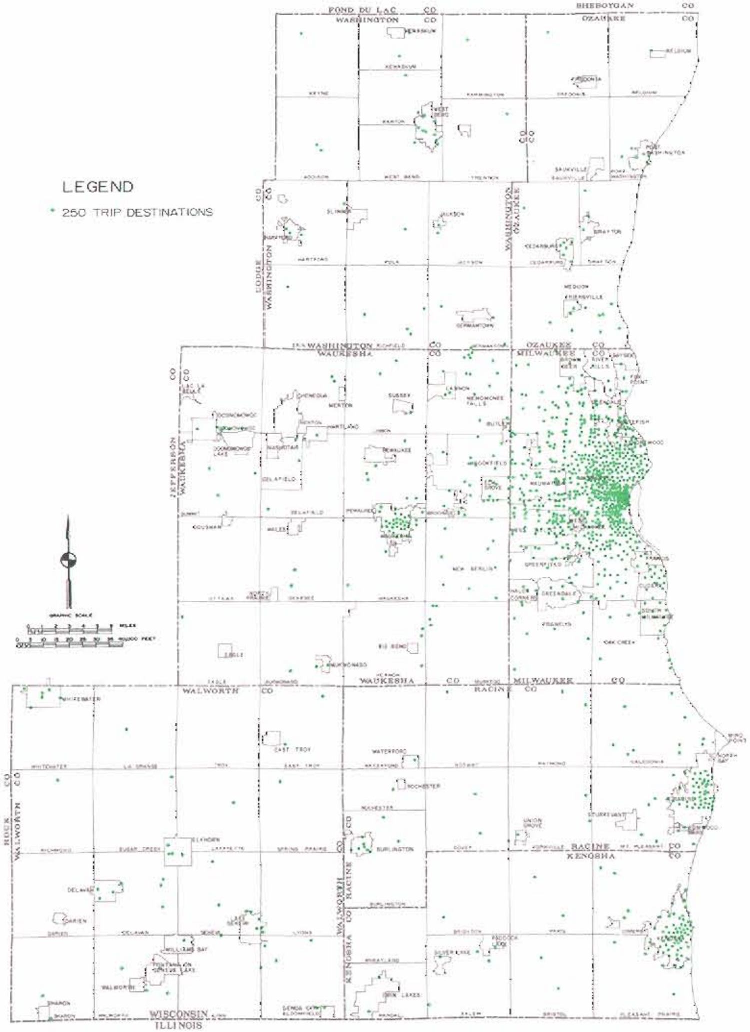



*Source: SEWRPC.*

Mass transit trip destinations within the Region on an average weekday decreased sharply, from about 323,900 in 1963 to 186,200 in 1972 and to 178,000 in 1991. By 1991, significant mass transit trip destinations were concentrated only in certain areas within the City of Milwaukee, including the central business district and the University of Wisconsin-Milwaukee and Marquette University campuses.

## Map 48

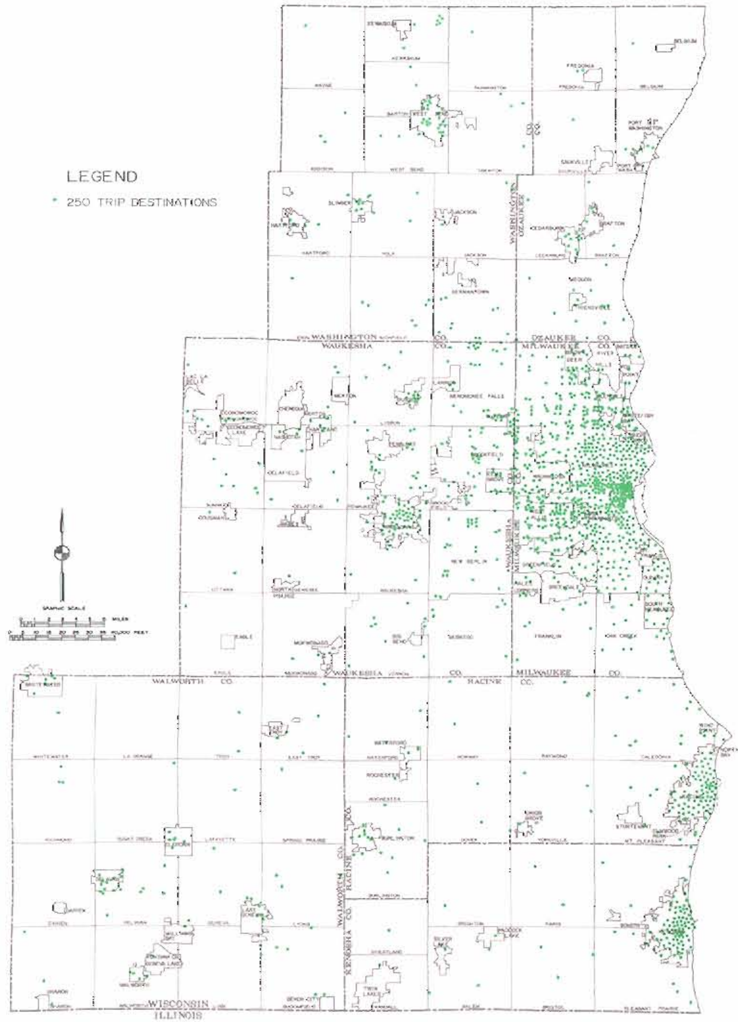
### AVERAGE WEEKDAY TRUCK TRIP DESTINATIONS IN THE REGION: 1963




*Source: SEWRPC.*

## Map 49

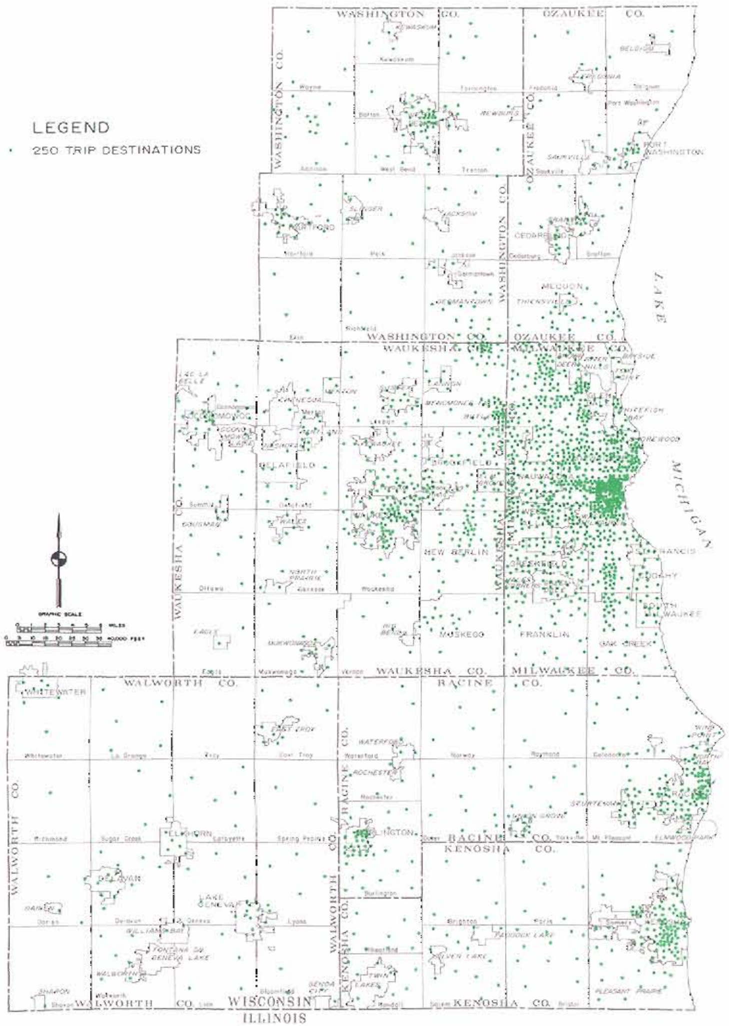
### AVERAGE WEEKDAY TRUCK TRIP DESTINATIONS IN THE REGION: 1972




*Source: SEWRPC.*

## Map 50

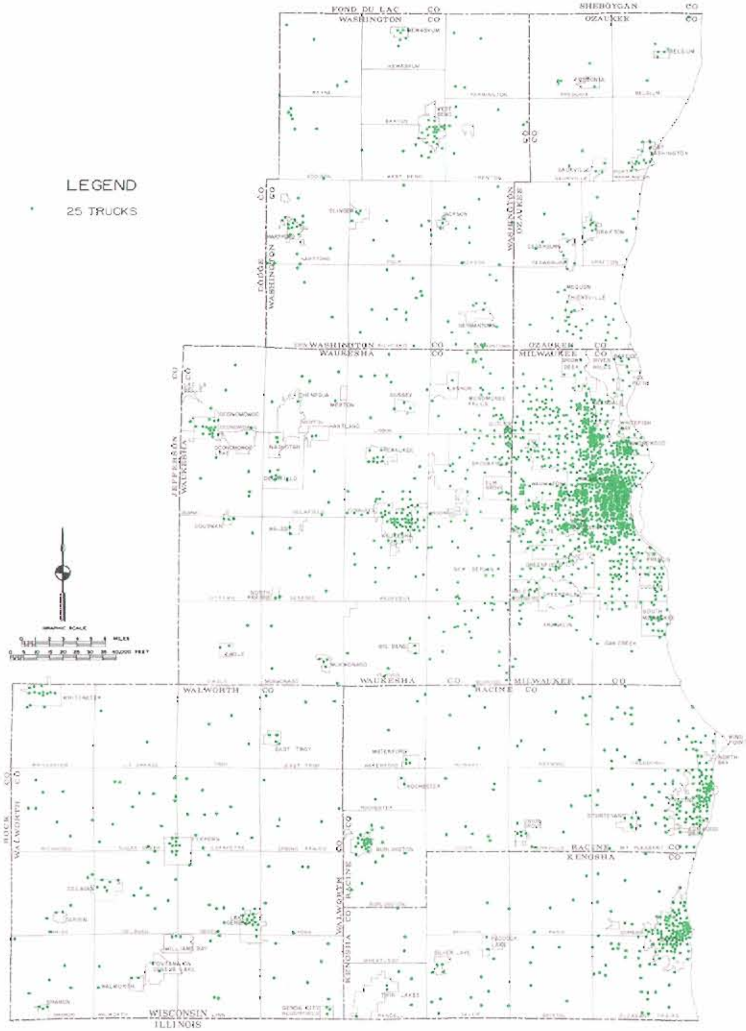
### AVERAGE WEEKDAY TRUCK TRIP DESTINATIONS IN THE REGION: 1991




The number of internal truck trip destinations within the Region on an average weekday increased from about 293,400 in 1963 to 371,000 in 1972 and to 520,100 in 1991. As shown on Maps 48, 49, and 50, while in all three survey years truck trip destinations were most highly concentrated in the central business districts of the Cities of Kenosha, Milwaukee, and Racine, a greater dispersion of truck trip destinations throughout the Region is evident in 1991.

## Map 51

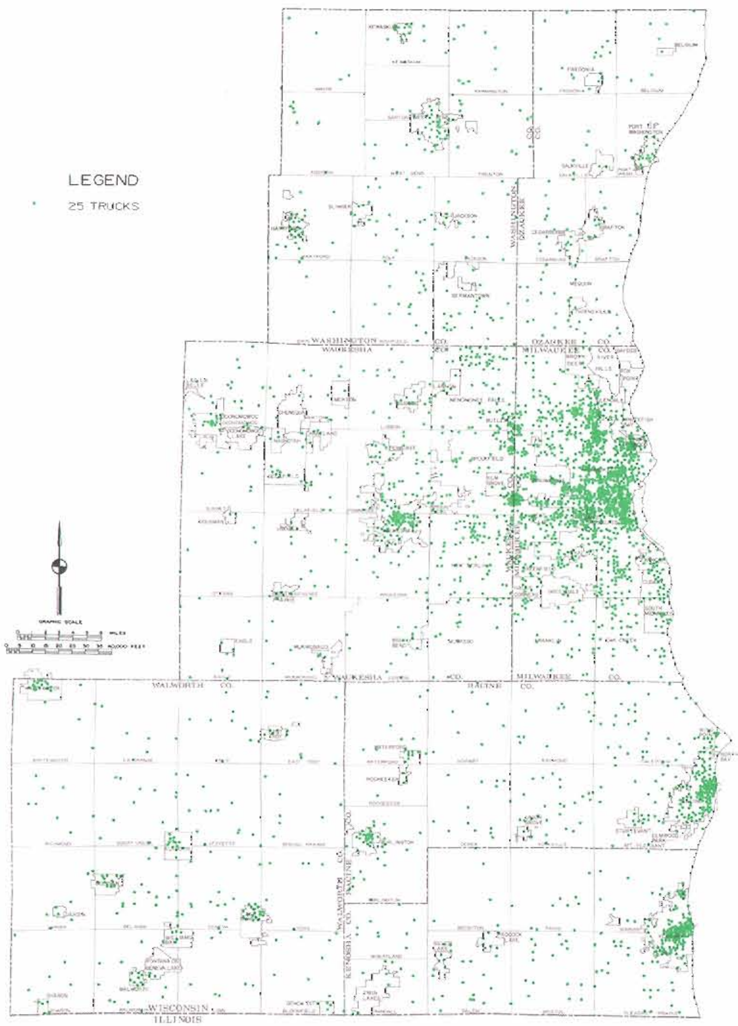
### TRUCK GARAGING LOCATIONS IN THE REGION: 1963




Source: SEWRPC.

## Map 52

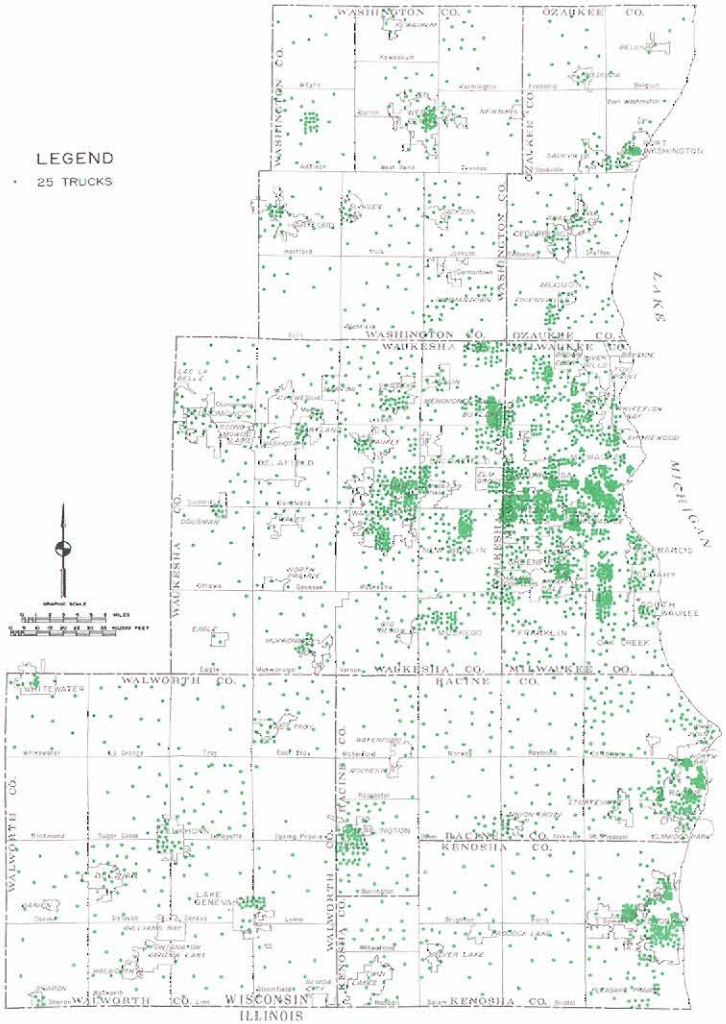
### TRUCK GARAGING LOCATIONS IN THE REGION: 1972




Source: SEWRPC.

## Map 53

## TRUCK GARAGING LOCATIONS IN THE REGION: 1991

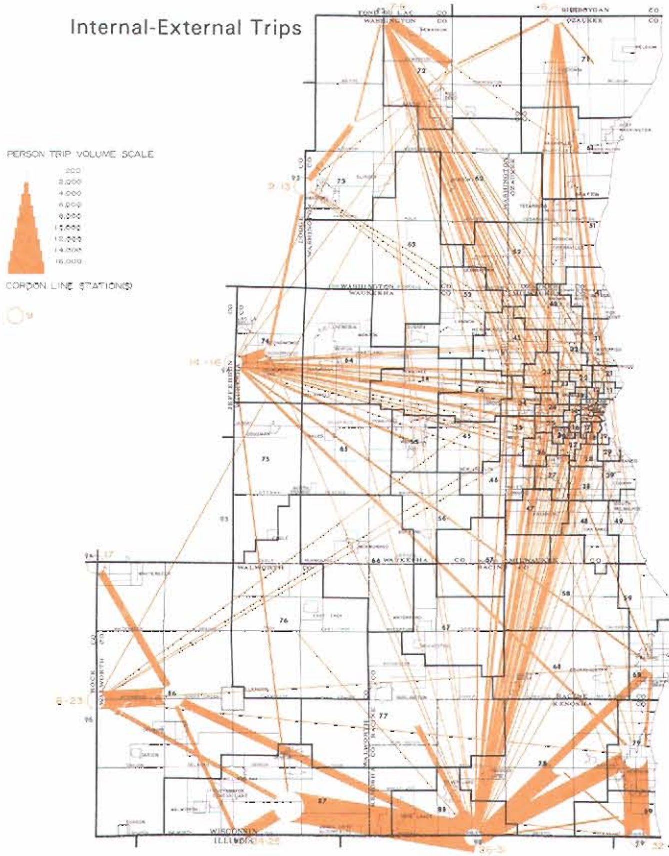


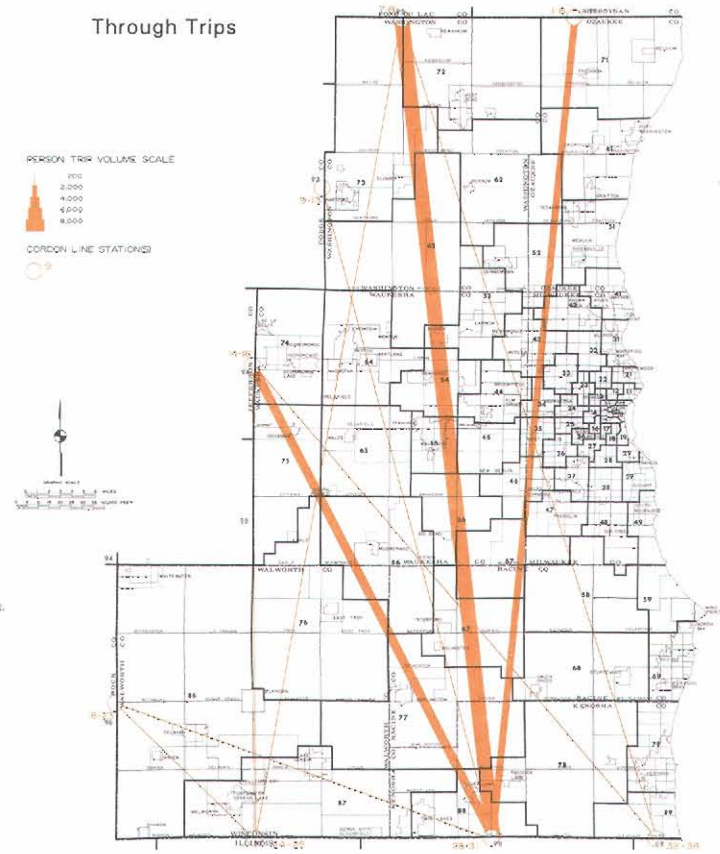

*Source: SEWRPC.*

Maps 51, 52, and 53 graphically show the spatial distribution of commercial-use truck garaging locations within the Region in 1963, 1972, and 1991. There were about 58,500 such trucks garaged within the Region in 1963, 77,300 in 1972, and 87,500 in 1991. Much of the increase in commercial-use truck garaging locations since 1963 has occurred in the smaller urban areas of the Region.

Map 54

AVERAGE WEEKDAY EXTERNAL TRIP DESIRE LINES IN THE REGION: 1963

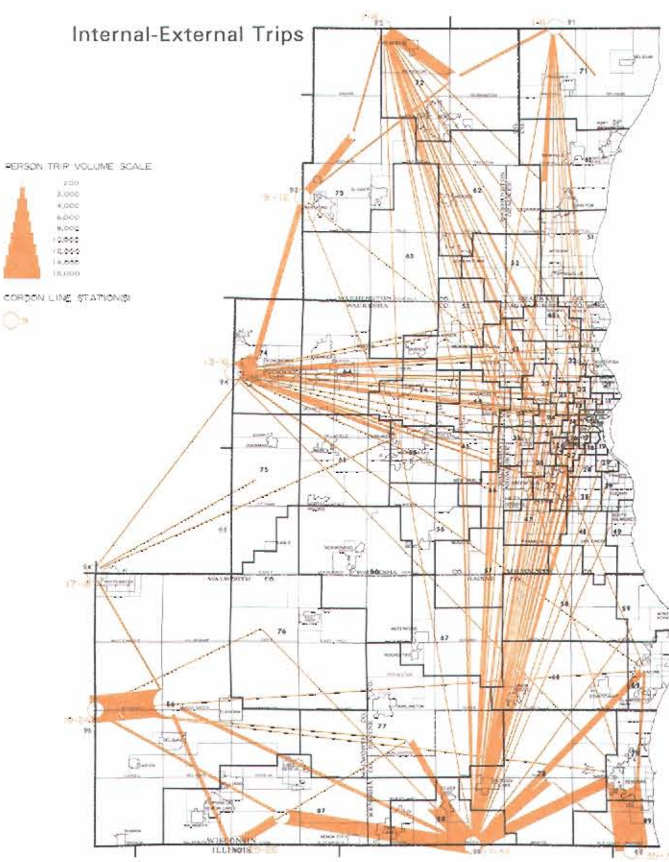


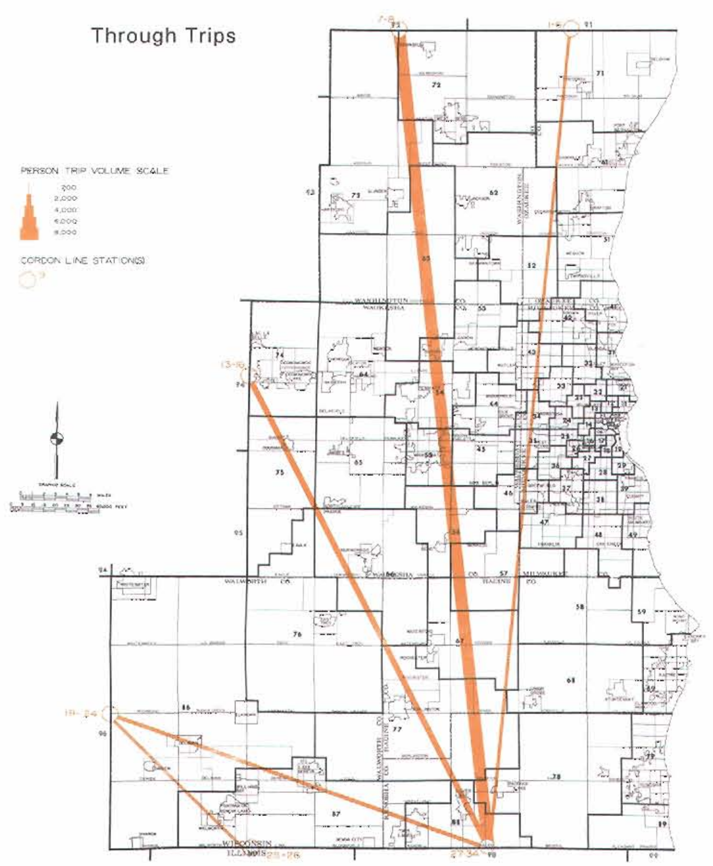




Source: SEWRPC.

Map 55

AVERAGE WEEKDAY EXTERNAL TRIP DESIRE LINES IN THE REGION: 1972

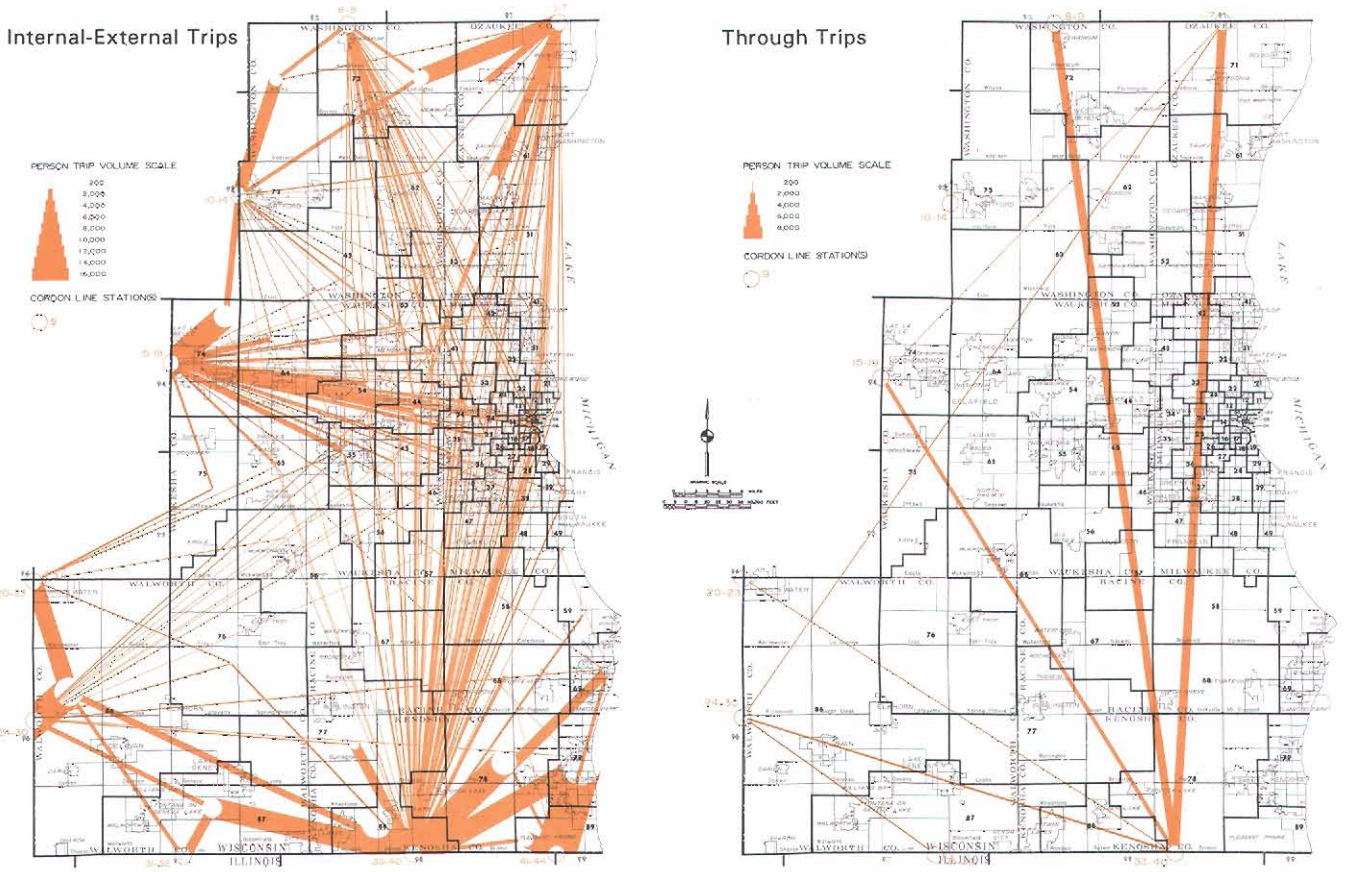



Source: SEWRPC.

Map 56

**AVERAGE WEEKDAY EXTERNAL TRIP DESIRE LINES IN THE REGION: 1991**




Maps 54, 55, and 56 show person-trip "desire lines" connecting the origins and destinations of external person trips with points of entry to and exit from the Region, as well as the movement of person trips directly through the Region. As indicated by the above maps, between 1972 and 1991, north-south through trips became more evenly distributed over the two primary routes serving such through traffic: IH 94-IH 43 and IH 94-USH 41. A factor affecting this change was the completion of IH 43 during the same time period.

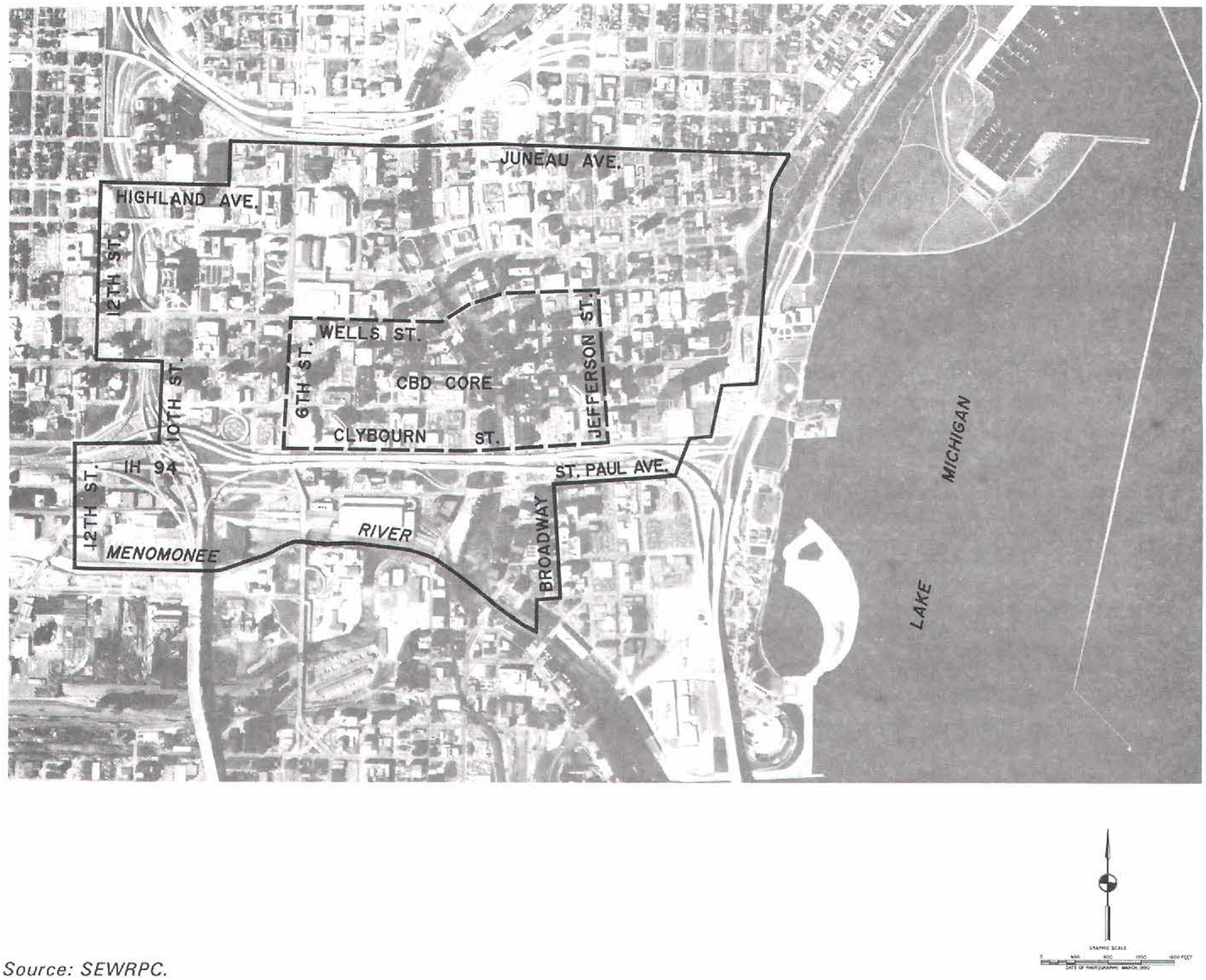
*Source: SEWRPC.*

trips, or 10 percent, in the total district over that time period. In the Kenosha CBD, total person trips decreased from 30,700 in 1963 to 29,800 in 1972, or by 3 percent, and to 13,000 in 1991, a decrease of 56 percent from 1972 to 1991. In the Racine CBD, total person trips decreased from 27,500 in 1963 to 20,900 in 1972, or by 24 percent, and to 18,700 in 1991, a decrease of nearly 11 percent from 1972 to 1991.

The Milwaukee CBD showed a decrease in total person trips for an average weekday from 1963 to 1972 of 6,200, or 4 percent, and then an increase from 1972 to 1991 of 13,300, or 10 percent. As a result, there were 7,100 more trips in 1991 than in 1963. Trips made by auto passengers increased from 22,400, or 16 percent of the total in 1963, to 28,300, or 21 percent of the total in 1972, and then declined to 19,800, or 13 percent of the total in 1991. Transit trips declined from 50,500, or 36 percent of the total, in 1963; to 29,000, or 22 percent of the total, in 1972; to 18,800, or 13 percent of the total, in 1991. During this same time period, person trips by auto drivers increased from 66,200, or 48 percent of the total in 1963, to 75,800, or 57 percent of the total in 1972, and to 103,200, or 70 percent of the total in 1991. Trips to and from the Milwaukee CBD were made mostly by automobiles: 84 percent in 1963, 86 percent in 1972 and 89 percent in 1991. The average auto occupancy of personal-use vehicles entering and leaving the Milwaukee CBD was 1.34 persons per vehicle in 1963; 1.37 in 1972; and 1.19 in 1991.

**Map 57**

**BOUNDARIES OF THE MILWAUKEE CENTRAL BUSINESS DISTRICT AND CORE AREA**



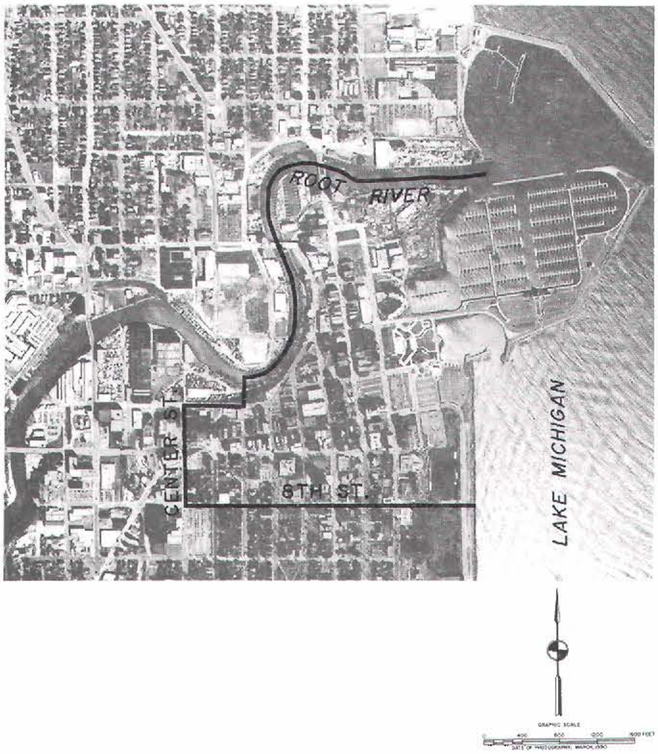

*Source: SEWRPC.*

Trips made by trucks in commercial use to and from the Milwaukee CBD declined from 11,800 in 1963 to 11,100 in 1972, and then increased to 12,400 in 1991 (see Table 79). Trips made by all other modes, including school bus, taxi, and motorcycle, totaled 900 in 1963, 700 in 1972, and 1,400 in 1991. In addition, there were an estimated 3,900 walking and bicycle trips in 1991, resulting in a total of 5,300 trips made by other modes (see Table 78).

Table 80 sets forth internal person trip destinations by destination trip purpose and mode of travel to the Milwaukee, Kenosha, and Racine central business districts for 1963, 1972, and 1991. In the Milwaukee CBD, trips to work accounted for one-half or more of the trips in each of the survey years, increasing by 16,600 trips, or 25 percent, from 1972 to 1991. Also increasing from 1972 to 1991 were person trips to social and recreational activities, which increased by 4,800 trips, or 39 percent; homebound trips, 3,300 trips, or 77 percent; and schoolbound trips, 1,900 trips, or 24 percent. Trips made for personal business purposes increased from 25,300 in 1963 to 29,000 in 1972, an increase of 3,700, or 15 percent; and then decreased to 20,000 in 1991, a decrease of 9,000,

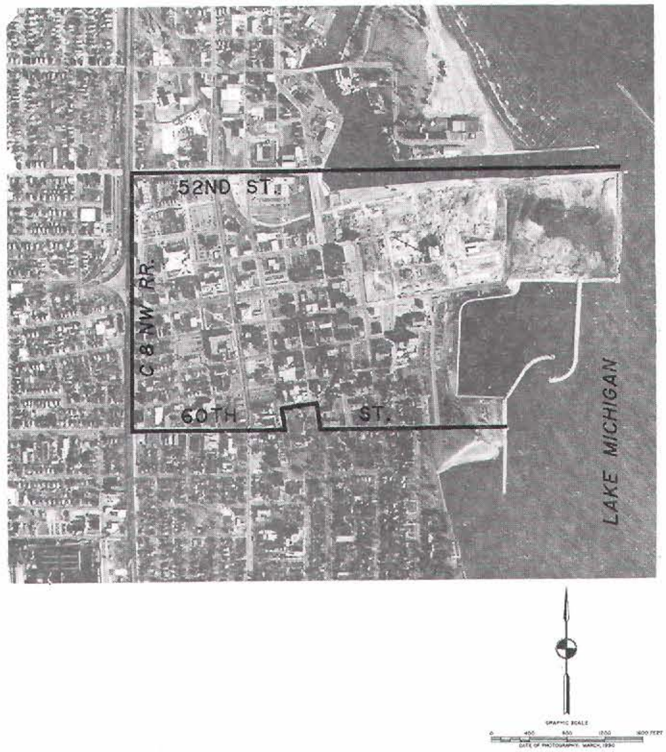
Map 58

BOUNDARIES OF THE RACINE CENTRAL BUSINESS DISTRICT




Map 59

BOUNDARIES OF THE KENOSHA CENTRAL BUSINESS DISTRICT




Maps 57, 58, and 59 show graphically the boundaries of the central business district of the Cities of Milwaukee, Racine, and Kenosha. Map 57 also shows the boundaries of the Milwaukee central business district core area.

*Source: SEWRPC.*

or 31 percent, between 1972 and 1991. Also decreasing were shopping trips, which decreased from 16,500 in 1963 to 12,400 in 1972, or by 25 percent; and to 7,500 in 1991, or by 40 percent from 1972 to 1991.

Tripmaking in the Kenosha CBD declined substantially from 29,800 person trips in 1972 to 13,000 person trips in 1991, a decline of 56 percent (see Table 78). This decline may be attributed to the effects of job reductions in the automotive industry that have occurred in Kenosha since 1972. In 1991, driver-only trips accounted for about 81 percent of total person trips; auto passenger trips accounted for about 16 percent; and all other modes, including transit, accounted for about 3 percent. Major declines in the number of trips by destination trip purpose from 1972 to 1991 are shown in Table 80 and include: work, from 5,700 trips to 4,900 trips, or 14 percent; shopping, from 5,500 trips to 1,000 trips, or 82 percent; personal business, from 11,600 trips to 3,200 trips, or 72 percent; social-recreational, from 2,700 trips to 1,800 trips, or 33 percent; and school, from 2,000 trips to 100 trips, or 95 percent. The decrease in school trips is due to the relocation of a high school during this time period.

In the Racine CBD, total person trips decreased from 27,500 in 1963 to 20,900 in 1972, a decrease of 24 percent; and to 18,700 in 1991, a further decrease of 11 percent (see Table 78). Vehicle trips decreased from 19,600 in 1963 to 15,900 in 1972, a decrease of 19 percent; and then increased to 16,400 in 1991, an increase of 3 percent from 1972 (see Table 79). In 1991, the primary mode choice of persons entering and

## Table 78

### AVERAGE WEEKDAY PERSON TRIP DESTINATIONS IN SELECTED CENTRAL BUSINESS DISTRICTS OF THE REGION BY MODE OF TRAVEL: 1963, 1972, AND 1991

| Type of Trip and Travel Mode | Year | Milwaukee CBD | | | Milwaukee CBD Core | | |
|---|---|---|---|---|---|---|---|
| | | Trips | Percent of Total | Percent Change | Trips | Percent of Total | Percent Change |
| Internal | | | | | | | |
| Auto Driver | 1963 | 65,100 | 46.5 | - - | 27,600 | 40.2 | - - |
| | 1972 | 74,300 | 55.5 | 14.1 | 27,500 | 48.9 | -0.4 |
| | 1991 | 101,000 | 68.7 | 35.9 | 31,000 | 66.1 | 12.7 |
| Auto Passenger | 1963 | 21,600 | 15.4 | - - | 10,700 | 15.6 | - - |
| | 1972 | 27,300 | 20.4 | 26.4 | 12,100 | 21.5 | 13.1 |
| | 1991 | 18,900 | 12.8 | -30.8 | 6,000 | 12.8 | -50.4 |
| Transit Passenger | 1963 | 50,500 | 36.1 | - - | 28,700 | 41.8 | - - |
| | 1972 | 29,000 | 21.7 | -42.6 | 15,500 | 27.6 | -46.0 |
| | 1991 | 18,800 | 12.8 | -35.2 | 7,400 | 15.8 | -52.3 |
| Other | 1963 | 900 | 0.6 | - - | 300 | 0.4 | - - |
| | 1972 | 700 | 0.5 | -22.2 | 100 | 0.2 | -66.7 |
| | 1991 | 5,300[a] | 3.6 | 657.1 | 1,400[b] | 3.0 | 1,300.0 |
| Subtotal | 1963 | 138,100 | 98.6 | - - | 67,300 | 98.1 | - - |
| | 1972 | 131,300 | 98.1 | -4.9 | 55,200 | 98.2 | -18.0 |
| | 1991 | 144,000 | 97.9 | 9.7 | 45,800 | 97.7 | -17.0 |
| External | | | | | | | |
| Auto Driver | 1963 | 1,100 | 0.8 | - - | 700 | 1.0 | - - |
| | 1972 | 1,500 | 1.1 | 36.4 | 600 | 1.1 | -14.3 |
| | 1991 | 2,200 | 1.5 | 46.7 | 800 | 1.7 | 33.3 |
| Auto Passenger | 1963 | 800 | 0.6 | - - | 600 | 0.9 | - - |
| | 1972 | 1,000 | 0.7 | 25.0 | 400 | 0.7 | -33.3 |
| | 1991 | 900 | 0.6 | -10.0 | 300 | 0.6 | -25.0 |
| Subtotal | 1963 | 1,900 | 1.4 | - - | 1,300 | 1.9 | - - |
| | 1972 | 2,500 | 1.9 | 31.6 | 1,000 | 1.8 | -23.1 |
| | 1991 | 3,100 | 2.1 | 24.0 | 1,100 | 2.3 | 10.0 |
| Total | 1963 | 140,000 | 100.0 | - - | 68,600 | 100.0 | - - |
| | 1972 | 133,800 | 100.0 | -4.4 | 56,200 | 100.0 | -18.1 |
| | 1991 | 147,100 | 100.0 | 9.9 | 46,900 | 100.0 | -16.5 |

| Type of Trip and Travel Mode | Year | Kenosha CBD | | | Racine CBD | | |
|---|---|---|---|---|---|---|---|
| | | Trips | Percent of Total | Percent Change | Trips | Percent of Total | Percent Change |
| Internal | | | | | | | |
| Auto Driver | 1963 | 19,200 | 62.5 | - - | 17,900 | 65.1 | - - |
| | 1972 | 19,600 | 65.8 | 2.1 | 14,500 | 69.4 | -19.0 |
| | 1991 | 9,700 | 74.6 | -50.5 | 14,800 | 79.1 | 2.1 |
| Auto Passenger | 1963 | 8,600 | 28.0 | - - | 7,400 | 26.9 | - - |
| | 1972 | 9,000 | 30.2 | 4.7 | 5,800 | 27.8 | -21.6 |
| | 1991 | 1,800 | 13.8 | -80.0 | 2,400 | 12.8 | -58.6 |
| Transit Passenger | 1963 | 1,800 | 5.9 | - - | 2,000 | 7.3 | - - |
| | 1972 | 400 | 1.3 | -77.8 | 300 | 1.4 | -85.0 |
| | 1991 | 200 | 1.5 | -50.0 | 400 | 2.1 | 33.3 |
| Other | 1963 | 200 | 0.7 | - - | 100 | 0.4 | - - |
| | 1972 | 400 | 1.3 | 100.0 | 200 | 1.0 | 100.0 |
| | 1991 | 200[c] | 1.5 | -50.0 | 600[d] | 3.2 | 200.0 |
| Subtotal | 1963 | 29,800 | 97.1 | - - | 27,400 | 99.6 | - - |
| | 1972 | 29,400 | 98.7 | -1.3 | 20,800 | 99.5 | -24.1 |
| | 1991 | 11,900 | 91.5 | -59.5 | 18,200 | 97.3 | -12.5 |
| External | | | | | | | |
| Auto Driver | 1963 | 500 | 1.6 | - - | 100 | 0.4 | - - |
| | 1972 | 300 | 1.0 | -40.0 | 100 | 0.5 | 0.0 |
| | 1991 | 800 | 6.2 | 166.7 | 300 | 1.6 | 200.0 |
| Auto Passenger | 1963 | 400 | 1.3 | - - | - -[e] | 0.0 | - - |
| | 1972 | 100 | 0.3 | -75.0 | - -[e] | 0.0 | - - |
| | 1991 | 300 | 2.3 | 200.0 | 200 | 1.1 | - - |
| Subtotal | 1963 | 900 | 2.9 | - - | 100 | 0.4 | - - |
| | 1972 | 400 | 1.3 | -55.6 | 100 | 0.5 | - - |
| | 1991 | 1,100 | 8.5 | 175.0 | 500 | 2.7 | 400.0 |
| Total | 1963 | 30,700 | 100.0 | - - | 27,500 | 100.0 | - - |
| | 1972 | 29,800 | 100.0 | -2.9 | 20,900 | 100.0 | -24.0 |
| | 1991 | 13,000 | 100.0 | -56.4 | 18,700 | 100.0 | -10.5 |

[a] *Includes 3,900 walking and bicycle trips.*

[b] *Includes 1,200 walking and bicycle trips.*

[c] *Includes 100 walking and bicycle trips.*

[d] *Includes 100 walking and bicycle trips.*

[e] *Trips by these modes are fewer than 50. All trips are rounded to the nearest hundred.*

*Source: SEWRPC.*

Table 79

**AVERAGE WEEKDAY VEHICLE TRIP DESTINATIONS IN SELECTED CENTRAL BUSINESS DISTRICTS OF THE REGION BY MODE OF TRAVEL: 1963, 1972, AND 1991**

| Type of Trip and Travel Mode | Year | Milwaukee CBD Trips | Milwaukee CBD Percent of Total | Milwaukee CBD Percent Change | Milwaukee CBD Core Trips | Milwaukee CBD Core Percent of Total | Milwaukee CBD Core Percent Change |
|---|---|---|---|---|---|---|---|
| Internal | | | | | | | |
| Auto | 1963 | 65,100 | 82.3 | - - | 27,600 | 84.4 | - - |
| | 1972 | 74,300 | 83.8 | 14.1 | 27,500 | 85.7 | -0.4 |
| | 1991 | 101,000 | 87.0 | 35.9 | 31,000 | 89.1 | 12.7 |
| Commercial-Use Truck | 1963 | 11,600 | 14.7 | - - | 3,700 | 11.3 | - - |
| | 1972 | 10,900 | 12.3 | -6.0 | 3,200 | 10.0 | -13.5 |
| | 1991 | 12,100 | 10.4 | 11.0 | 3,100 | 8.9 | -3.1 |
| Taxi | 1963 | 1,100 | 1.4 | - - | 700 | 2.2 | - - |
| | 1972 | 1,800 | 2.0 | 63.6 | 800 | 2.5 | 14.3 |
| | 1991 | 500 | 0.4 | -72.2 | 100 | 0.3 | -87.5 |
| Subtotal | 1963 | 77,800 | 98.4 | - - | 32,000 | 97.9 | - - |
| | 1972 | 87,000 | 98.1 | 11.8 | 31,500 | 98.1 | -1.6 |
| | 1991 | 113,600 | 97.8 | 30.6 | 34,200 | 98.3 | 8.6 |
| External | | | | | | | |
| Auto | 1963 | 1,100 | 1.4 | - - | 700 | 2.1 | - - |
| | 1972 | 1,500 | 1.7 | 36.4 | 600 | 1.9 | -14.3 |
| | 1991 | 2,200 | 1.9 | 46.7 | 800 | 2.3 | 33.3 |
| Commercial-Use Truck | 1963 | 200 | 0.2 | - - | - -[a] | 0.0 | - - |
| | 1972 | 200 | 0.2 | 0.0 | - -[a] | 0.0 | - - |
| | 1991 | 300 | 0.3 | 50.0 | 100 | 0.3 | - - |
| Subtotal | 1963 | 1,300 | 1.6 | - - | 700 | 2.1 | - - |
| | 1972 | 1,700 | 1.9 | 30.8 | 600 | 1.9 | -14.3 |
| | 1991 | 2,500 | 2.2 | 47.1 | 600 | 1.7 | 0.0 |
| Total | 1963 | 79,100 | 100.0 | - - | 32,700 | 100.0 | - - |
| | 1972 | 88,700 | 100.0 | 12.1 | 32,100 | 100.0 | -1.8 |
| | 1991 | 116,100 | 100.0 | 30.9 | 34,800 | 100.0 | 8.4 |

| Type of Trip and Travel Mode | Year | Kenosha CBD Trips | Kenosha CBD Percent of Total | Kenosha CBD Percent Change | Racine CBD Trips | Racine CBD Percent of Total | Racine CBD Percent Change |
|---|---|---|---|---|---|---|---|
| Internal | | | | | | | |
| Auto | 1963 | 19,200 | 91.4 | - - | 17,900 | 91.3 | - - |
| | 1972 | 19,600 | 91.1 | 2.1 | 14,500 | 91.2 | -19.0 |
| | 1991 | 9,700 | 82.2 | -50.5 | 14,800 | 90.2 | 2.1 |
| Commercial-Use Truck | 1963 | 1,200 | 5.7 | - - | 1,600 | 8.2 | - - |
| | 1972 | 1,500 | 7.0 | 25.0 | 1,300 | 8.2 | -18.8 |
| | 1991 | 1,200 | 10.2 | -20.0 | 1,500 | 9.1 | 15.4 |
| Taxi | 1963 | 100 | 0.5 | - - | - -[a] | 0.0 | - - |
| | 1972 | 100 | 0.5 | 0.0 | - -[a] | 0.0 | - - |
| | 1991 | - - | 0.0 | -100.0 | - -[a] | 0.0 | - - |
| Subtotal | 1963 | 20,500 | 97.6 | - - | 19,500 | 99.5 | - - |
| | 1972 | 21,200 | 98.6 | 3.4 | 15,800 | 99.4 | -19.0 |
| | 1991 | 10,900 | 92.4 | -48.6 | 16,300 | 99.4 | 3.2 |
| External | | | | | | | |
| Auto | 1963 | 500 | 2.4 | - - | 100 | 0.5 | - - |
| | 1972 | 300 | 1.4 | -40.0 | 100 | 0.6 | 0.0 |
| | 1991 | 800 | 6.8 | 166.7 | 300 | 1.8 | 200.0 |
| Commercial-Use Truck | 1963 | - - | 0.0 | - - | - -[a] | 0.0 | - - |
| | 1972 | - - | 0.0 | - - | - -[a] | 0.0 | - - |
| | 1991 | 100 | 0.8 | - - | - -[a] | 0.0 | - - |
| Subtotal | 1963 | 500 | 2.4 | - - | 100 | 0.5 | - - |
| | 1972 | 300 | 1.4 | -40.0 | 100 | 0.6 | 0.0 |
| | 1991 | 900 | 7.6 | 200.0 | 100 | 0.6 | 0.0 |
| Total | 1963 | 21,000 | 100.0 | - - | 19,600 | 100.0 | - - |
| | 1972 | 21,500 | 100.0 | 2.4 | 15,900 | 100.0 | -18.9 |
| | 1991 | 11,800 | 100.0 | -45.1 | 16,400 | 100.0 | 3.1 |

[a] *Trips by these modes are less than 50. All numbers are rounded to the nearest hundred.*

*Source: SEWRPC.*

## Table 80

### AVERAGE WEEKDAY INTERNAL PERSON TRIP DESTINATIONS IN SELECTED CENTRAL BUSINESS DISTRICTS OF THE REGION BY TRIP PURPOSE AND MODE OF TRAVEL: 1963, 1972, AND 1991

| Destination Trip Purpose | Year | Milwaukee CBD: Mode of Travel to Selected CBD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Auto Driver | | Auto Passenger | | Transit Passenger | | Other | | Total | |
| | | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total |
| Home | 1963 | 1,700 | 2.6 | 1,400 | 6.5 | 3,300 | 6.5 | 100 | 11.1 | 6,500 | 4.7 |
| | 1972 | 2,400 | 3.2 | 1,000 | 3.7 | 900 | 3.1 | --[a] | 0.0 | 4,300 | 3.3 |
| | 1991 | 3,800 | 3.8 | 1,100 | 5.8 | 1,400 | 7.4 | 1,300 | 24.6 | 7,600 | 5.3 |
| Work | 1963 | 36,000 | 55.3 | 7,600 | 35.2 | 26,500 | 52.5 | 100 | 11.1 | 70,200 | 50.8 |
| | 1972 | 40,000 | 53.9 | 10,800 | 39.6 | 14,500 | 50.0 | 200 | 28.6 | 65,500 | 49.9 |
| | 1991 | 63,900 | 63.3 | 6,600 | 34.9 | 8,900 | 47.3 | 2,700 | 51.0 | 82,100 | 57.0 |
| Shopping | 1963 | 4,900 | 7.5 | 2,900 | 13.4 | 8,700 | 17.2 | --[a] | 0.0 | 16,500 | 12.0 |
| | 1972 | 3,700 | 5.0 | 2,500 | 9.2 | 6,200 | 21.4 | --[a] | 0.0 | 12,400 | 9.4 |
| | 1991 | 4,300 | 4.3 | 1,200 | 6.3 | 2,000 | 10.6 | --[a] | 0.0 | 7,500 | 5.2 |
| Personal Business | 1963 | 13,800 | 21.2 | 4,800 | 22.2 | 6,400 | 12.7 | 300 | 33.4 | 25,300 | 18.3 |
| | 1972 | 18,100 | 24.4 | 7,600 | 27.8 | 3,200 | 11.0 | 100 | 14.3 | 29,000 | 22.1 |
| | 1991 | 13,400 | 13.3 | 3,400 | 18.0 | 2,800 | 14.9 | 400 | 7.5 | 20,000 | 13.9 |
| School | 1963 | 1,700 | 2.6 | 500 | 2.3 | 2,600 | 5.2 | 200 | 22.2 | 5,000 | 3.6 |
| | 1972 | 3,600 | 4.8 | 800 | 2.9 | 3,300 | 11.4 | 100 | 14.3 | 7,800 | 5.9 |
| | 1991 | 5,200 | 5.1 | 1,200 | 6.3 | 2,900 | 15.4 | 400 | 7.5 | 9,700 | 6.7 |
| Social and Recreational | 1963 | 7,000 | 10.8 | 4,400 | 20.4 | 3,000 | 5.9 | 200 | 22.2 | 14,600 | 10.6 |
| | 1972 | 6,500 | 8.7 | 4,600 | 16.8 | 900 | 3.1 | 300 | 42.8 | 12,300 | 9.4 |
| | 1991 | 10,400 | 10.2 | 5,400 | 28.7 | 800 | 4.4 | 500 | 9.4 | 17,100 | 11.9 |
| Total | 1963 | 65,100 | 100.0 | 21,600 | 100.0 | 50,500 | 100.0 | 900 | 100.0 | 138,100 | 100.0 |
| | 1972 | 74,300 | 100.0 | 27,300 | 100.0 | 29,000 | 100.0 | 700 | 100.0 | 131,300 | 100.0 |
| | 1991 | 101,000 | 100.0 | 18,900 | 100.0 | 18,800 | 100.0 | 5,300 | 100.0 | 144,000 | 100.0 |

| Destination Trip Purpose | Year | Kenosha CBD: Mode of Travel to Selected CBD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Auto Driver | | Auto Passenger | | Transit Passenger | | Other | | Total | |
| | | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total |
| Home | 1963 | 600 | 3.1 | 200 | 2.3 | 100 | 5.6 | --[a] | 0.0 | 900 | 3.0 |
| | 1972 | 1,100 | 5.6 | 700 | 7.8 | --[a] | 0.0 | 100 | 25.0 | 1,900 | 6.5 |
| | 1991 | 600 | 6.2 | 200 | 11.1 | --[a] | 0.0 | 100 | 50.0 | 900 | 7.6 |
| Work | 1963 | 6,200 | 32.3 | 1,100 | 12.8 | 300 | 16.6 | --[a] | 0.0 | 7,600 | 25.5 |
| | 1972 | 4,700 | 24.0 | 1,000 | 11.1 | --[a] | 0.0 | --[a] | 0.0 | 5,700 | 19.4 |
| | 1991 | 4,300 | 44.3 | 400 | 22.2 | 100 | 50.0 | 100 | 50.0 | 4,900 | 41.2 |
| Shopping | 1963 | 3,800 | 19.8 | 2,800 | 32.6 | 200 | 11.1 | --[a] | 0.0 | 6,800 | 22.8 |
| | 1972 | 3,800 | 19.3 | 1,600 | 17.8 | 100 | 25.0 | --[a] | 0.0 | 5,500 | 18.7 |
| | 1991 | 600 | 6.2 | 300 | 16.7 | 100 | 50.0 | 0 | 0.0 | 1,000 | 8.4 |
| Personal Business | 1963 | 6,800 | 35.4 | 2,000 | 23.2 | 400 | 22.2 | --[a] | 0.0 | 9,200 | 30.9 |
| | 1972 | 7,700 | 39.3 | 3,800 | 42.2 | 100 | 25.0 | --[a] | 0.0 | 11,600 | 39.4 |
| | 1991 | 2,800 | 28.9 | 400 | 22.2 | --[a] | 0.0 | --[a] | 0.0 | 3,200 | 26.9 |
| School | 1963 | 300 | 1.6 | 800 | 9.3 | 700 | 38.9 | 200 | 100.0 | 2,000 | 6.7 |
| | 1972 | 500 | 2.6 | 1,000 | 11.1 | 200 | 50.0 | 300 | 75.0 | 2,000 | 6.8 |
| | 1991 | 100 | 1.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 100 | 0.8 |
| Social and Recreational | 1963 | 1,500 | 7.8 | 1,700 | 19.8 | 100 | 5.6 | --[a] | 0.0 | 3,300 | 11.1 |
| | 1972 | 1,800 | 9.2 | 900 | 10.0 | --[a] | 0.0 | --[a] | 0.0 | 2,700 | 9.2 |
| | 1991 | 1,300 | 13.4 | 500 | 27.8 | 0 | 0.0 | 0 | 0.0 | 1,800 | 15.1 |
| Total | 1963 | 19,200 | 100.0 | 8,600 | 100.0 | 1,800 | 100.0 | 200 | 100.0 | 29,800 | 100.0 |
| | 1972 | 19,600 | 100.0 | 9,000 | 100.0 | 400 | 100.0 | 400 | 100.0 | 29,400 | 100.0 |
| | 1991 | 9,700 | 100.0 | 1,800 | 100.0 | 200 | 100.0 | 200 | 100.0 | 11,900 | 100.0 |

**Table 80 (continued)**

| Destination Trip Purpose | Year | Racine CBD: Mode of Travel to Selected CBD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Auto Driver | | Auto Passenger | | Transit Passenger | | Other | | Total | |
| | | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total | Trips | Percent of Total |
| Home | 1963 | 500 | 2.8 | 300 | 4.1 | 100 | 5.0 | --[a] | 0.0 | 900 | 3.3 |
| | 1972 | 600 | 4.1 | 300 | 5.2 | 50 | 16.7 | --[a] | 0.0 | 950 | 4.6 |
| | 1991 | 500 | 3.4 | 0 | 0.0 | 100 | 25.0 | 100 | 16.7 | 700 | 3.8 |
| Work | 1963 | 5,800 | 32.4 | 1,100 | 14.9 | 800 | 40.0 | --[a] | 0.0 | 7,700 | 28.1 |
| | 1972 | 4,900 | 33.8 | 1,200 | 20.7 | 50 | 16.7 | 50 | 25.0 | 6,200 | 29.8 |
| | 1991 | 6,600 | 44.6 | 400 | 16.7 | 0 | 0.0 | --[a] | 0.0 | 7,000 | 38.5 |
| Shopping | 1963 | 3,500 | 19.6 | 2,000 | 27.0 | 400 | 20.0 | --[a] | 0.0 | 5,900 | 21.5 |
| | 1972 | 2,600 | 0.0 | 1,100 | 19.0 | 100 | 33.3 | --[a] | 0.0 | 3,800 | 18.3 |
| | 1991 | 1,200 | 8.1 | 100 | 4.2 | 100 | 25.0 | --[a] | 0.0 | 1,400 | 7.7 |
| Personal Business | 1963 | 5,900 | 33.0 | 2,300 | 31.1 | 500 | 25.0 | 50 | 50.0 | 8,750 | 31.9 |
| | 1972 | 5,000 | 34.5 | 2,200 | 37.9 | 100 | 33.3 | 100 | 50.0 | 7,400 | 35.6 |
| | 1991 | 3,400 | 23.0 | 400 | 16.7 | 100 | 25.0 | 100 | 16.7 | 4,000 | 22.0 |
| School | 1963 | 200 | 0.0 | 100 | 1.3 | --[a] | 0.0 | --[a] | 0.0 | 300 | 1.1 |
| | 1972 | 400 | 2.8 | 100 | 1.7 | --[a] | 0.0 | 50 | 25.0 | 550 | 2.6 |
| | 1991 | 200 | 1.4 | 100 | 4.2 | --[a] | 0.0 | 300 | 50.0 | 600 | 3.3 |
| Social and Recreational | 1963 | 2,000 | 11.1 | 1,600 | 21.6 | 200 | 10.0 | 50 | 50.0 | 3,850 | 14.1 |
| | 1972 | 1,000 | 6.9 | 900 | 15.5 | --[a] | 0.0 | --[a] | 0.0 | 1,900 | 9.1 |
| | 1991 | 2,900 | 19.5 | 1,400 | 58.2 | 100 | 25.0 | 100 | 16.6 | 4,500 | 24.7 |
| Total | 1963 | 17,900 | 100.0 | 7,400 | 100.0 | 2,000 | 100.0 | 100 | 100.0 | 27,400 | 100.0 |
| | 1972 | 14,500 | 82.1 | 5,800 | 100.0 | 300 | 100.0 | 200 | 100.0 | 20,800 | 100.0 |
| | 1991 | 14,800 | 100.0 | 2,400 | 100.0 | 400 | 100.0 | 600 | 100.0 | 18,200 | 100.0 |

[a]*Trips by these vehicle types are fewer than 50.*

*Source: SEWRPC.*

leaving the central business district was as an auto driver. Driver-only trips accounted for 15,100, or 81 percent, of the total person trips. Auto passenger travel accounted for 2,600 trips, or about 14 percent. Trips by all other modes, including transit, accounted for 1,000 person trips, or about 5 percent (see Table 78). Work trips increased from 6,200 in 1972 to 7,000 in 1991, a 13 percent increase, and trips made for social and recreational purposes increased from 1,900 in 1972 to 4,500 in 1991, an increase of 137 percent. This latter increase may be attributable to the development of Festival Park on the Racine lakefront. Shopping trips decreased from 5,900 in 1963 to 3,800 in 1972, a decrease of 36 percent, and to 1,400 in 1991, a decrease of 63 percent since 1972. Personal business trips decreased from about 8,800 person trips in 1963 to 7,400 in 1972, a decrease of 16 percent, and to 4,000 person trips in 1991, a decrease of 46 percent since 1972 (see Table 80).

Major Commercial and Industrial Center Trip Attractors

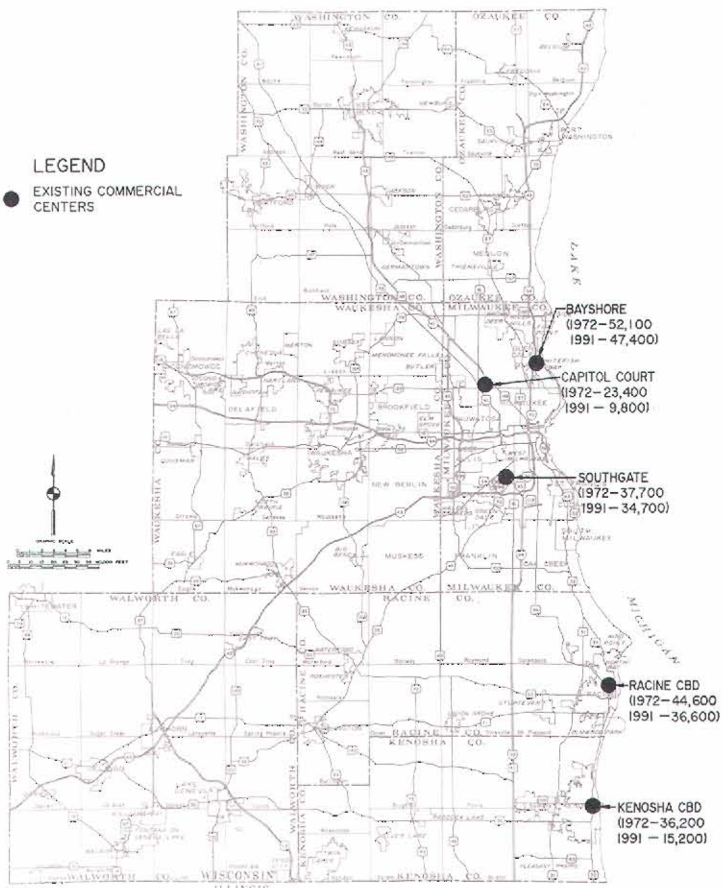
Travel to a number of major commercial and industrial centers located within the densely populated urban areas of Milwaukee, Racine, and Kenosha Counties has declined, while travel to major centers located in outlying urban areas has increased significantly (see Maps 60 and 61).[5] For instance, in 1972, the Kenosha and Racine CBD commercial centers attracted over seven times the number of trips attracted by the

[5]*The travel data presented refer to total travel attracted to the commercial and industrial centers on an average weekday, with the areal extent of the centers as defined in Appendix E of SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010, January 1992.*

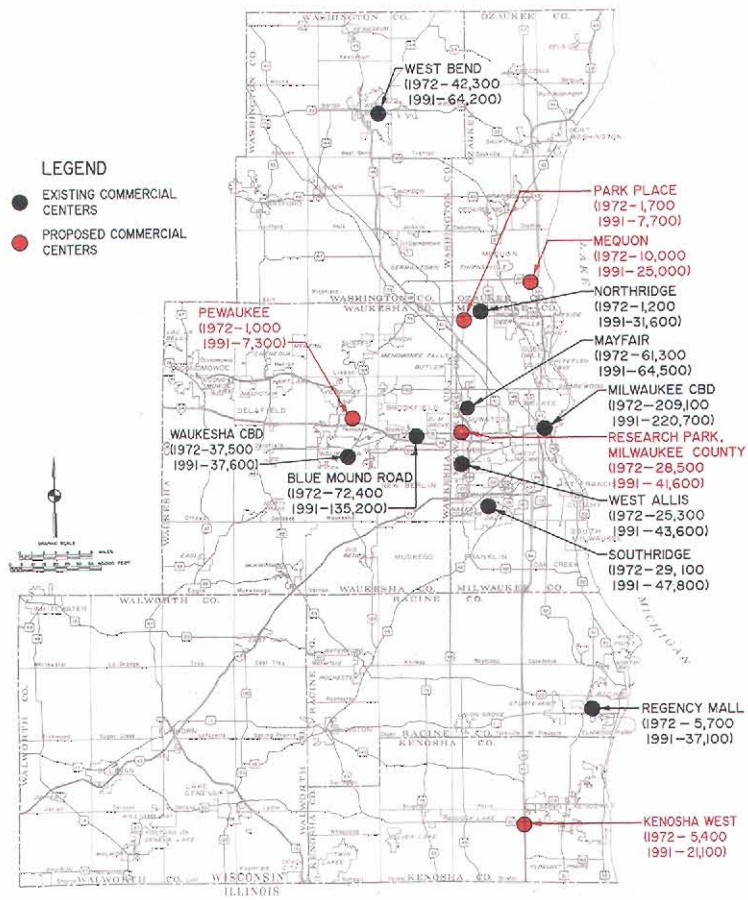
## Map 60

### CHANGE IN NUMBER OF TRIPS ATTRACTED TO MAJOR COMMERCIAL CENTERS IN THE REGION: 1972 AND 1991

COMMERCIAL CENTERS EXPERIENCING DECLINING TRIPMAKING




COMMERCIAL CENTERS EXPERIENCING INCREASING TRIPMAKING




As the above maps show, travel to some of the major commercial centers located in the densely populated urban areas of Milwaukee, Racine, and Kenosha Counties has declined, while travel to major centers in outlying urban areas has increased significantly. In 1972, for instance, the Kenosha and Racine CBD centers attracted over seven times the number of trips attracted by the outlying Kenosha West and Regency Mall areas. By 1991, however, the two outlying areas attracted 6,400 more trips than the former CBD locations. The Regency Mall, Kenosha West, Northridge, Park Place, Pewaukee, and Mequon commercial centers each attracted over 100 percent more trips in 1991 than in 1972.

*Source: SEWRPC.*

outlying Kenosha West and Regency Mall areas. By 1991, however, the two outlying areas combined to attract 6,400 more trips than the former CBD locations. The Regency Mall, Kenosha West, Northridge, Park Place, Pewaukee, and Mequon commercial centers and the Waukesha North, Pewaukee, Pleasant Prairie, and Granville industrial centers attracted over 100 percent more trips in 1991 than in 1972. The largest commercial center trip attractor is the Milwaukee CBD center, with 220,700 daily trips, followed by the Blue Mound Road center, with 135,200 daily trips. The largest industrial center trip attractor is the West Allis West center, with 97,100 daily trips, followed by the Cudahy/South Milwaukee center, with 87,400 daily trips.

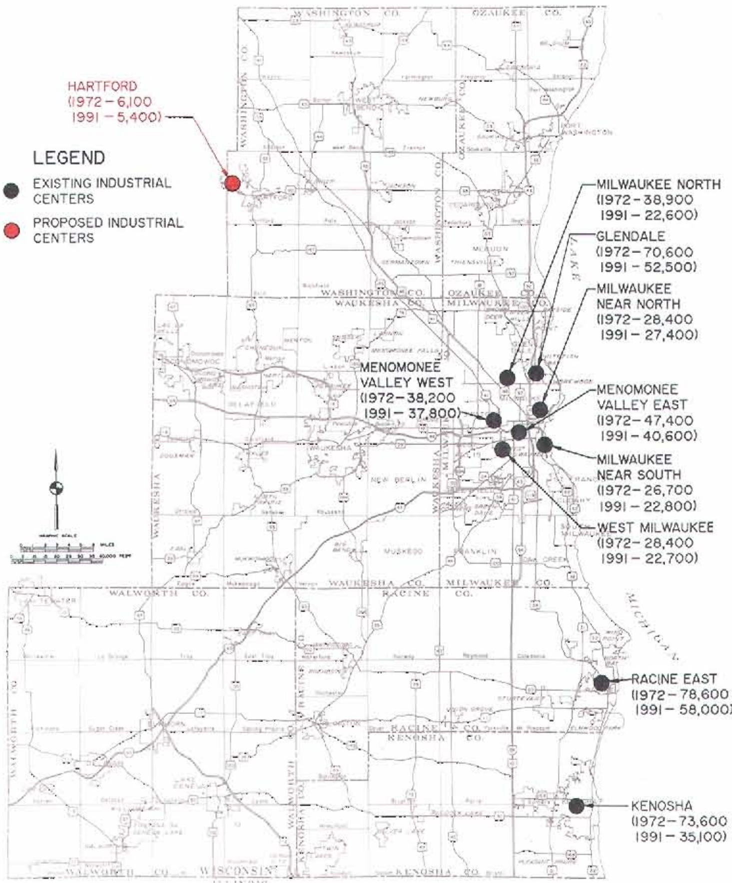
### Trip Patterns

County-to-County: Map 62 and Table 81 show the magnitude of intra- and inter-county travel within the Region, excluding school trips, on an average weekday in 1963, 1972, and 1991. Several

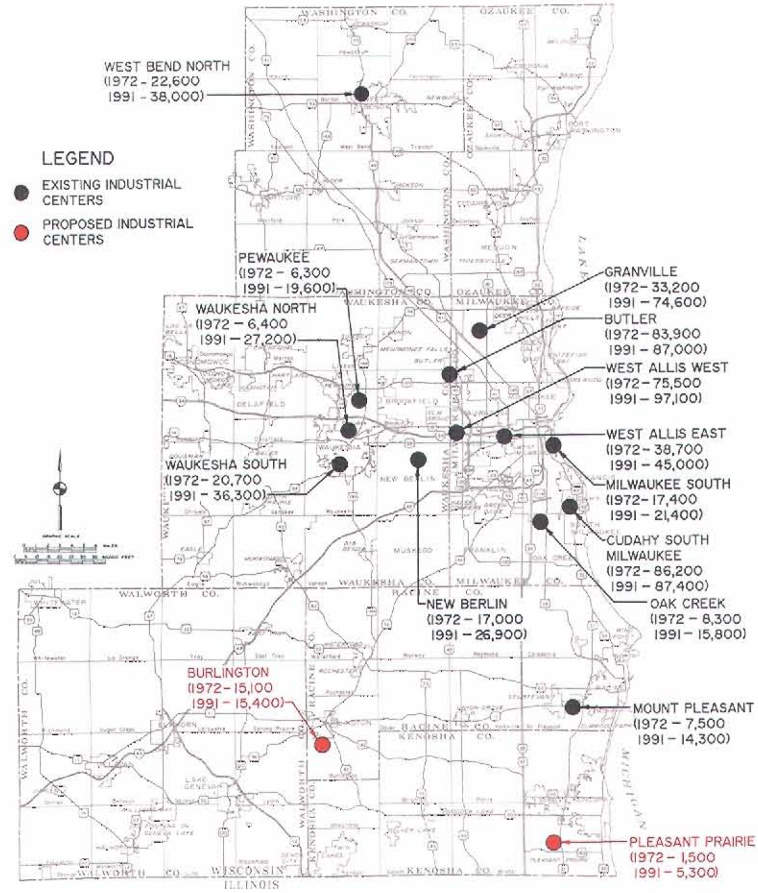
## Map 61

### CHANGE IN NUMBER OF TRIPS ATTRACTED TO MAJOR INDUSTRIAL CENTERS IN THE REGION: 1972 AND 1991

INDUSTRIAL CENTERS
EXPERIENCING DECLINING TRIPMAKING




INDUSTRIAL CENTERS
EXPERIENCING INCREASING TRIPMAKING




As the above maps show, travel to some of the major industrial centers located in the densely populated urban areas of Milwaukee, Racine, and Kenosha Counties has declined, while travel to major centers in outlying urban areas has increased significantly. The Waukesha North, Pewaukee, Pleasant Prairie, and Granville industrial centers each attracted over 100 percent more trips in 1991 than in 1972.

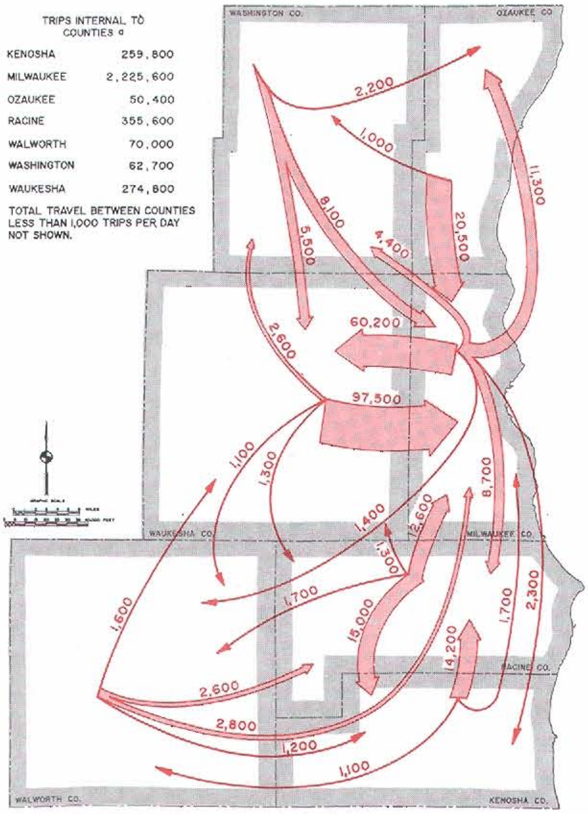
*Source: SEWRPC.*

important conclusions can be drawn from these data. First, travel internal to counties dominates total travel within the Region. However, there has been a small shift over time away from intra-county travel toward increased inter-county travel. In 1963, 91 percent of trips, excluding school trips, were intra-county, that is, they had both origin and destination within the same county, while 9 percent of trips were inter-county. In 1972, 87 percent of trips were intra-county, while 13 percent were inter-county. In 1991, 85 percent of the trips were intra-county, while 15 percent were inter-county. Second, the proportion of travel internal to the three urbanized counties, Kenosha, Milwaukee, and Racine, to total regional travel has decreased. As shown in Table 81, travel internal to the urbanized counties has decreased from 80 percent of all travel in 1963, to 70 percent in 1972, and to 60 percent in 1991. Third, the number of trips to and within Milwaukee County decreased from 65 percent of all trips in 1963 to 57 percent in 1972 and to

## Map 62

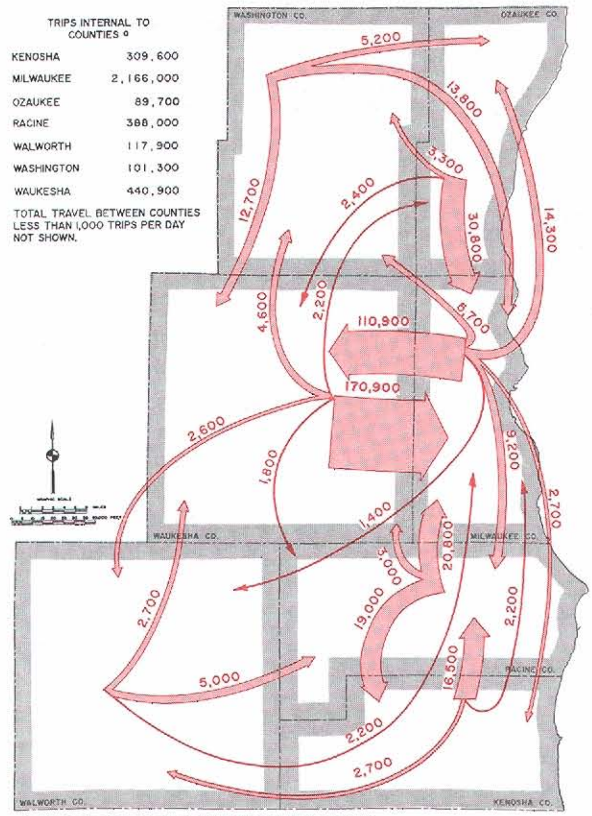
### AVERAGE WEEKDAY PERSON TRIPS BETWEEN COUNTIES IN THE REGION: 1963, 1972, AND 1991

1963



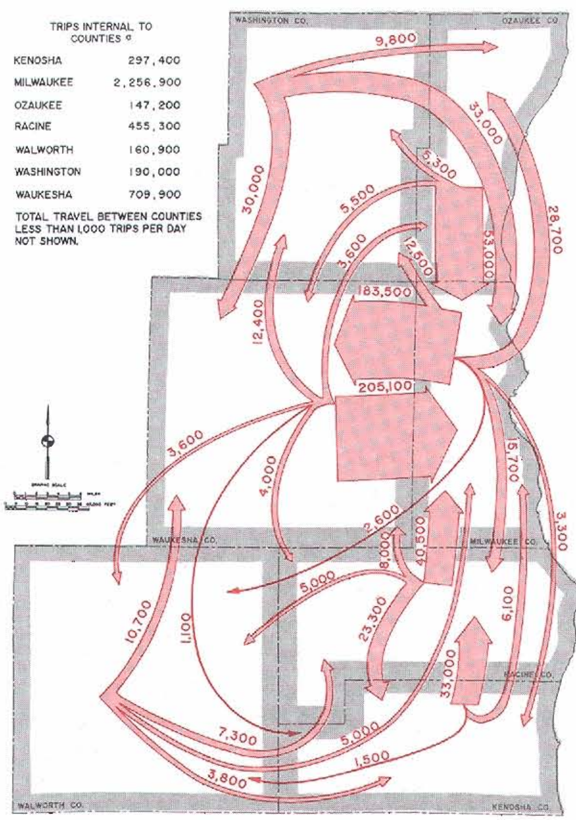

ª TRIPS ARE BASED ON THE RESIDENT HOUSEHOLD SURVEYS AND INCLUDE TRIPS FOR ALL PURPOSES EXCEPT SCHOOL.

1972




ª TRIPS ARE BASED ON THE RESIDENT HOUSEHOLD SURVEYS AND INCLUDE TRIPS FOR ALL PURPOSES EXCEPT SCHOOL.

1991




ª TRIPS ARE BASED ON THE RESIDENT HOUSEHOLD SURVEYS AND INCLUDE TRIPS FOR ALL PURPOSES EXCEPT SCHOOL.

The accompanying maps show the magnitude of inter-county travel, excluding school trips, made within the Region in 1963, 1972, and 1991. The changes that have occurred in the traditional suburb-to-central city commuting pattern is evident here. Travel to Milwaukee County from Waukesha County has increased by 20 percent between 1972 and 1991 and by 110 percent between 1963 and 1991, while travel in the reverse direction, to Waukesha County from Milwaukee County, has increased by 65 percent between 1972 and 1991 and 205 percent between 1963 and 1991.

A further indication of these changes in travel patterns is the fraction of total regional travel each county has generated over time. The number of trips made to and within Milwaukee County has decreased from 65 percent of all trips in 1963 to 57 percent in 1972 and to 52 percent in 1991. Meanwhile, the number of trips attracted to, and within, Waukesha County has increased from 10 percent of all trips in 1963 to 15 percent in 1972 and to 19 percent in 1991.

The proportion of travel generated in each of the other five counties of the Region has remained relatively stable. The number of trips made to, and within, Ozaukee, Walworth, and Washington Counties has remained near or below 5 percent of all trips in the Region. The number of trips attracted to, and made within, Kenosha and Racine Counties has remained at about 8 percent or less and 11 percent, respectively.

*Source: SEWRPC.*

Table 81

**AVERAGE WEEKDAY PERSON TRIPS, EXCLUDING SCHOOL TRIPS, BETWEEN, AND WITHIN, COUNTIES IN THE REGION: 1963, 1972, AND 1991**

| Production County | Attraction County: 1963 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Kenosha | Milwaukee | Ozaukee | Racine | Walworth | Washington | Waukesha | Total |
| Kenosha | 240,900 | 1,700 | 0 | 14,200 | 1,100 | 0 | 100 | 258,000 |
| Milwaukee | 2,300 | 2,054,900 | 11,300 | 8,700 | 1,400 | 4,400 | 60,200 | 2,143,200 |
| Ozaukee | 0 | 20,500 | 42,700 | 0 | 0 | 1,000 | 600 | 64,800 |
| Racine | 15,000 | 12,600 | 0 | 332,800 | 1,700 | 0 | 1,300 | 363,400 |
| Walworth | 1,200 | 2,800 | 0 | 2,600 | 58,300 | 200 | 1,600 | 66,700 |
| Washington | 300 | 8,100 | 2,200 | 0 | 200 | 51,700 | 5,500 | 68,000 |
| Waukesha | 300 | 97,500 | 900 | 1,300 | 1,100 | 2,600 | 221,700 | 325,400 |
| Total | 260,000 | 2,198,100 | 57,100 | 359,600 | 63,800 | 59,900 | 291,000 | 3,289,500 |

| Production County | Attraction County: 1972 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Kenosha | Milwaukee | Ozaukee | Racine | Walworth | Washington | Waukesha | Total |
| Kenosha | 309,600 | 2,300 | 100 | 16,500 | 2,700 | 0 | 100 | 331,300 |
| Milwaukee | 2,700 | 2,166,000 | 14,300 | 9,200 | 1,400 | 5,700 | 110,900 | 2,310,200 |
| Ozaukee | 0 | 30,800 | 89,700 | 100 | 0 | 3,300 | 2,400 | 126,300 |
| Racine | 18,900 | 20,800 | 0 | 388,100 | 3,100 | 100 | 2,900 | 433,900 |
| Walworth | 800 | 2,200 | 0 | 5,000 | 117,900 | 0 | 2,700 | 128,600 |
| Washington | 100 | 13,800 | 5,200 | 200 | 0 | 101,300 | 12,700 | 133,300 |
| Waukesha | 100 | 170,900 | 2,200 | 1,800 | 2,600 | 4,600 | 440,900 | 623,100 |
| Total | 332,200 | 2,406,800 | 111,500 | 420,900 | 127,700 | 115,000 | 572,600 | 4,086,700 |

| Production County | Attraction County: 1991 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Kenosha | Milwaukee | Ozaukee | Racine | Walworth | Washington | Waukesha | Total |
| Kenosha | 297,400 | 6,100 | 100 | 33,100 | 1,500 | 0 | 700 | 338,900 |
| Milwaukee | 3,300 | 2,256,900 | 28,800 | 15,700 | 2,600 | 12,500 | 183,500 | 2,503,300 |
| Ozaukee | 200 | 53,000 | 147,200 | 200 | 100 | 5,300 | 5,500 | 211,500 |
| Racine | 23,300 | 40,500 | 500 | 445,300 | 4,900 | 300 | 8,000 | 522,800 |
| Walworth | 3,800 | 5,000 | 100 | 7,300 | 160,900 | 0 | 10,700 | 187,800 |
| Washington | 100 | 33,000 | 9,800 | 300 | 100 | 190,000 | 30,000 | 263,300 |
| Waukesha | 1,100 | 205,100 | 3,600 | 3,900 | 3,600 | 12,400 | 709,900 | 939,600 |
| Total | 329,200 | 2,599,600 | 190,100 | 505,800 | 173,700 | 220,500 | 948,300 | 4,967,200 |

*Source: SEWRPC.*

50 percent in 1991. Fourth, the number of trips to and within Waukesha County has increased from 10 percent of all trips in 1963, to 15 percent in 1972, and to 19 percent in 1991.

Travel between Subareas

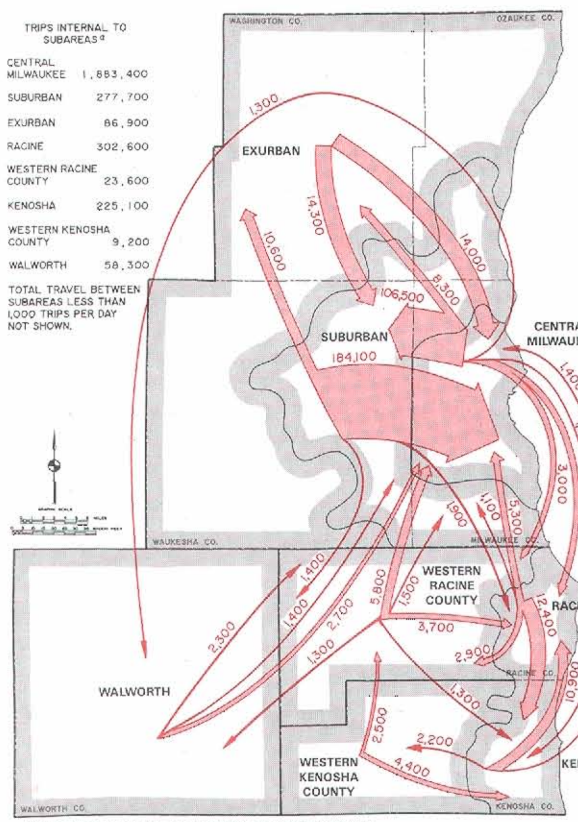
The growth in regional internal person travel has occurred primarily in the suburban and exurban areas of the Region. Suburban areas are defined as developed urban portions of the Region located adjacent to, and surrounding, the Cities of Milwaukee, Racine, and Kenosha; exurban areas are defined as outlying portions of Ozaukee, Racine, Walworth, Washington, and Waukesha Counties. Map 63 and Table 82 show the magnitude of tripmaking excluding trips made for the purpose for attending school between the Region's major subareas in 1963, 1972, and 1991.

While average weekday travel, excluding school trips, with both trip origin and destination within the central Milwaukee urban area remained relatively stable at between 1.8 million and 1.9 million person trips from 1963 to 1991, such travel within the suburban areas of the Region increased substantially, from 277,700 person trips in 1963 to 547,300 person trips in 1972 and to 922,000 person trips in 1991. Average weekday travel with both trip origin and destination within the exurban area increased from 86,900 person trips in 1963 to 172,100

## Map 63

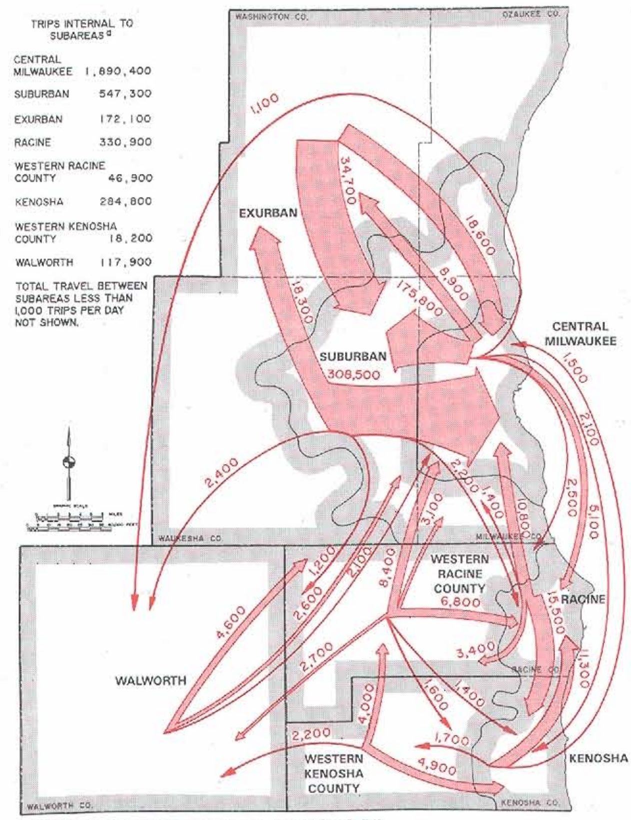
### AVERAGE WEEKDAY PERSON TRIPS BETWEEN SUBAREAS IN THE REGION: 1963, 1972, AND 1991

1963



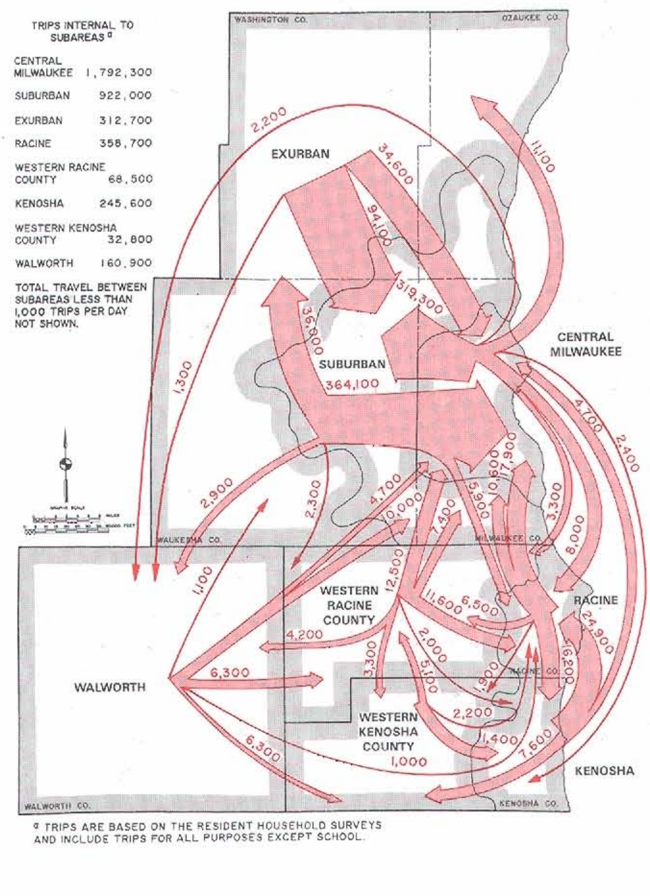

[a] TRIPS ARE BASED ON THE RESIDENT HOUSEHOLD SURVEYS AND INCLUDE TRIPS FOR ALL PURPOSES EXCEPT SCHOOL.

1972




[a] TRIPS ARE BASED ON THE RESIDENT HOUSEHOLD SURVEYS AND INCLUDE TRIPS FOR ALL PURPOSES EXCEPT SCHOOL.

1991




[a] TRIPS ARE BASED ON THE RESIDENT HOUSEHOLD SURVEYS AND INCLUDE TRIPS FOR ALL PURPOSES EXCEPT SCHOOL.

For the purpose of analyzing trends in Regional tripmaking, the Region may be divided into subareas corresponding generally to the intensity of existing urban development. The three accompanying maps show the magnitude of tripmaking between the major subareas of the Region in 1963, 1972, and 1991. The growth in regional tripmaking has occurred primarily within the suburban and exurban subareas. Indeed, since 1972, the base year of the currently adopted transportation plan, 95 percent of the increase of 880,000 within the Region were attracted or produced within the suburban and exurban areas. During the same period of time, two-thirds of both the regional household and employment growth occurred within those areas. These trends were clearly foreseen and commented upon in the Commission's first-generation regional transportation system plan, adopted in 1966.

*Source: SEWRPC.*

Table 82

AVERAGE WEEKDAY PERSON TRIPS, EXCLUDING SCHOOL TRIPS, BETWEEN, AND WITHIN, SUBAREAS IN THE REGION: 1963, 1972, AND 1991

| Production Zone | Attraction Zone: 1963 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Central Milwaukee | Suburban | Exurban | Racine and Environs | Western Racine County | Kenosha and Environs | Western Kenosha County | Walworth County | Total |
| Central Milwaukee | 1,883,400 | 106,500 | 8,300 | 3,700 | 3,000 | 1,800 | 400 | 1,300 | 2,008,400 |
| Suburban | 184,100 | 277,700 | 10,600 | 1,900 | 1,400 | 300 | 300 | 700 | 477,000 |
| Exurban | 14,000 | 14,300 | 86,900 | 100 | 100 | 100 | 0 | 600 | 116,100 |
| Racine and Environs | 5,300 | 1,100 | 100 | 302,600 | 2,900 | 12,400 | 300 | 400 | 325,100 |
| Western Racine County | 5,800 | 1,500 | 100 | 3,700 | 23,600 | 1,300 | 700 | 1,300 | 38,000 |
| Kenosha and Environs | 1,400 | 100 | 100 | 10,900 | 400 | 225,100 | 2,200 | 500 | 240,700 |
| Western Kenosha County | 300 | 0 | 0 | 400 | 2,500 | 4,400 | 9,200 | 600 | 17,400 |
| Walworth County | 2,700 | 1,400 | 600 | 300 | 2,300 | 600 | 600 | 58,300 | 66,800 |
| Total | 2,097,000 | 402,600 | 106,700 | 323,600 | 36,200 | 246,000 | 13,700 | 63,700 | 3,289,500 |

| Production Zone | Attraction Zone: 1972 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Central Milwaukee | Suburban | Exurban | Racine and Environs | Western Racine County | Kenosha and Environs | Western Kenosha County | Walworth County | Total |
| Central Milwaukee | 1,890,400 | 175,800 | 8,900 | 5,100 | 2,500 | 2,100 | 400 | 1,100 | 2,086,300 |
| Suburban | 308,500 | 547,300 | 18,300 | 2,200 | 1,200 | 200 | 100 | 2,400 | 880,200 |
| Exurban | 18,600 | 34,700 | 172,100 | 200 | 100 | 100 | 0 | 500 | 226,300 |
| Racine and Environs | 10,800 | 1,400 | 0 | 330,900 | 3,400 | 15,500 | 300 | 500 | 362,800 |
| Western Racine County | 8,400 | 3,100 | 200 | 6,800 | 46,900 | 1,400 | 1,600 | 2,700 | 71,100 |
| Kenosha and Environs | 1,500 | 200 | 0 | 11,300 | 600 | 284,800 | 1,700 | 500 | 300,600 |
| Western Kenosha County | 600 | 100 | 100 | 600 | 4,000 | 4,900 | 18,200 | 2,200 | 30,700 |
| Walworth County | 2,100 | 2,600 | 300 | 400 | 4,600 | 500 | 300 | 117,900 | 128,700 |
| Total | 2,240,900 | 765,200 | 199,900 | 357,500 | 63,300 | 309,500 | 22,600 | 127,800 | 4,086,700 |

| Production Zone | Attraction Zone: 1991 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Central Milwaukee | Suburban | Exurban | Racine and Environs | Western Racine County | Kenosha and Environs | Western Kenosha County | Walworth County | Total |
| Central Milwaukee | 1,792,300 | 319,300 | 11,100 | 8,100 | 3,300 | 2,400 | 300 | 2,200 | 2,139,000 |
| Suburban | 364,100 | 922,000 | 36,000 | 5,900 | 2,300 | 900 | 800 | 2,900 | 1,334,900 |
| Exurban | 34,600 | 94,100 | 312,700 | 300 | 200 | 100 | 100 | 1,300 | 443,400 |
| Racine and Environs | 17,900 | 10,600 | 700 | 358,700 | 6,500 | 16,200 | 1,900 | 700 | 413,200 |
| Western Racine County | 12,500 | 7,400 | 400 | 11,600 | 68,500 | 2,000 | 3,300 | 4,200 | 109,900 |
| Kenosha and Environs | 4,700 | 900 | 0 | 24,900 | 900 | 245,600 | 7,600 | 600 | 285,200 |
| Western Kenosha County | 800 | 600 | 0 | 2,200 | 5,100 | 11,400 | 32,800 | 900 | 53,800 |
| Walworth County | 4,700 | 10,000 | 1,100 | 1,000 | 6,300 | 900 | 2,900 | 160,900 | 187,800 |
| Total | 2,231,600 | 1,364,900 | 362,000 | 412,700 | 93,100 | 279,500 | 49,700 | 173,700 | 4,967,200 |

*Source: SEWRPC.*

person trips in 1972 and to 312,700 person trips in 1991. Between 1963 and 1991, the 644,300-trip increase in suburban travel represented about 38 percent of the total internal person trip growth of approximately 1.68 million, excluding school trips. The 225,800-trip increase in exurban travel represented about 13 percent of the growth in internal person travel, excluding school trips, within the Region. These changes were clearly foreseen and commented upon in the Commission's first-generation regional transportation system plan, completed in 1966. These findings are also consistent with the fact that nearly 66 percent of all growth in regional households and 68 percent of all growth in regional employment between 1963 and 1991 occurred in the suburban and exurban areas.

Average weekday travel from the Milwaukee central urban area to the suburban areas increased substantially as well, from 106,500 person trips in 1963 to 175,800 person trips in 1972 and to 319,300 person trips in 1991, or by about 200 percent between 1963 and 1991. This increase in reverse commuting represented about 13 percent of the growth in regional internal

Table 83

**AVERAGE WEEKDAY EXTERNAL PERSON AND VEHICLE TRIPS IN THE REGION BY DIRECTION: 1963, 1972, AND 1991**

| Direction | Year | Auto Driver[a] | | Auto Passenger[a] | | Auto Person Trips | | | Truck Driver | | Total Vehicle Trips | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Number | Percent Change | Number | Percent Change | Number | Percent Change | Percent of All Directions | Number | Percent Change | Number | Percent Change | Percent of all Directions |
| Inbound | 1963 | 39,700 | - - | 47,900 | - - | 87,600 | - - | 45.7 | 7,100 | - - | 46,800 | - - | 46.1 |
| | 1972 | 46,700 | 17.6 | 33,500 | -30.1 | 80,200 | -8.4 | 45.3 | 10,900 | 53.5 | 57,600 | 23.1 | 45.8 |
| | 1991 | 107,300 | 129.8 | 40,300 | 20.3 | 147,600 | 84.0 | 46.5 | 19,300 | 77.1 | 126,600 | 119.8 | 46.3 |
| Outbound | 1963 | 40,000 | - - | 48,100 | - - | 88,100 | - - | 46.0 | 7,200 | - - | 47,200 | - - | 46.4 |
| | 1972 | 47,500 | 18.8 | 35,900 | -25.4 | 83,400 | -5.3 | 47.2 | 10,700 | 48.6 | 58,200 | 23.3 | 46.3 |
| | 1991 | 111,900 | 135.6 | 41,800 | 16.4 | 153,700 | 84.3 | 48.4 | 19,800 | 85.0 | 131,700 | 126.3 | 48.2 |
| Through | 1963 | 5,900 | - - | 10,100 | - - | 16,000 | - - | 8.3 | 1,700 | - - | 7,600 | - - | 7.5 |
| | 1972 | 6,600 | 11.9 | 6,700 | -33.7 | 13,300 | -16.9 | 7.5 | 3,300 | 94.1 | 9,900 | 30.3 | 7.9 |
| | 1991 | 10,000 | 51.5 | 6,100 | -9.0 | 16,100 | 21.1 | 5.1 | 5,000 | 51.5 | 15,000 | 51.5 | 5.5 |
| All Directions | 1963 | 85,600 | - - | 106,100 | - - | 191,700 | - - | 100.0 | 16,000 | - - | 101,600 | - - | 100.0 |
| | 1972 | 100,800 | 17.8 | 76,100 | -28.3 | 176,900 | -7.7 | 100.0 | 24,900 | 55.6 | 125,700 | 23.7 | 100.0 |
| | 1991 | 229,200 | 127.4 | 88,200 | 15.9 | 317,400 | 79.4 | 100.0 | 44,100 | 77.1 | 273,300 | 117.4 | 100.0 |

[a]*Includes personal-use trucks.*

*Source: SEWRPC.*

person travel, excluding school trips, from 1963 to 1991. It is important to note that the growth in reverse commuting between 1963 and 1991 greatly exceeded the growth in the more traditional suburb-to-central city travel. During this time, travel from suburban areas to the Milwaukee central urban area increased by 98 percent, from 184,100 person trips in 1963 to 364,100 person trips in 1991.

External Trip Production

In addition to the 5.59 million internal person trips and 4.62 million internal vehicle trips made within the Region on an average weekday in 1991, there were 317,400 auto person trips and 273,300 total vehicle trips entering, leaving, or passing through the Region. In each of the survey years, as indicated in Table 83, the numbers of external auto person and vehicle trips entering the Region were very similar to the respective numbers of such trips leaving the Region, ranging from 45 to 48 percent in the case of external auto person trips and from 46 to 48 percent in the case of external vehicle trips. External vehicle trips which passed through the Region, which remained at about 8 percent of all external vehicle trips between 1963 and 1972, decreased to about 6 percent of total external vehicle trips in 1991.

Although the extent of external travel by direction was similar for each of the survey years, comparisons of the ratio of external vehicle travel to external person travel and the corresponding mode use indicate significant changes in external travel. The most significant change was a decline in vehicle occupancy. External person trips decreased from 191,700 in 1963 to 176,900 in 1972, a decrease of 8 percent. External auto person trips then increased from 176,900 in 1972 to 317,400 in 1991, an increase of 79 percent. External vehicle trips, however, increased from 101,600 in 1963 to 125,700 in 1972, or by 24 percent, and from 125,700 in 1972 to 273,300 in 1991, an increase of 117 percent. Increases from 1972 to 1991 by mode are: auto driver and personal-use truck trips, 128,400, or 127 percent; truck driver trips, 19,200, or 77 percent. Auto and personal-use truck passenger trips, which totaled 106,100 in 1963, declined to 76,100 in 1972, or by 28 percent, and increased to 88,200 in 1991, or by 16 percent between 1972 and 1991.

Of the total external person trips, which consist of auto and personal-use truck driver and auto and personal-use truck passenger trips, driver trips accounted for 45 percent in 1963, 57 percent in 1972, and 72 percent in 1991. Of the total

Table 84

**AVERAGE WEEKDAY EXTERNAL AUTOMOBILE AND PERSONAL-USE TRUCK DRIVER TRIPS AND VEHICLE OCCUPANCY IN THE REGION BY TRIP PURPOSE: 1963, 1972, AND 1991**

| | 1963 | | | | |
|---|---|---|---|---|---|
| | Auto Driver Trips | | Total Person Trips | | |
| Trip Purpose | Number | Percent of Total | Number | Percent of Total | Vehicle Occupancy |
| Home-Based Work ...... | 24,600 | 28.7 | 36,900 | 19.2 | 1.50 |
| Home-Based Shopping .... | 5,200 | 6.1 | 12,300 | 6.4 | 2.37 |
| Home-Based Other ...... | 45,000 | 52.6 | 121,600 | 63.5 | 2.70 |
| Nonhome-Based ........ | 9,400 | 11.0 | 18,200 | 9.5 | 1.94 |
| School .............. | 1,400 | 1.6 | 2,700 | 1.4 | 1.93 |
| Total | 85,600 | 100.0 | 191,700 | 100.0 | 2.24 |

| | 1972 | | | | |
|---|---|---|---|---|---|
| | Auto Driver Trips | | Total Person Trips | | |
| Trip Purpose | Number | Percent of Total | Number | Percent of Total | Vehicle Occupancy |
| Home-Based Work ...... | 36,700 | 36.4 | 49,400 | 27.9 | 1.35 |
| Home-Based Shopping .... | 7,200 | 7.1 | 15,100 | 8.5 | 2.10 |
| Home-Based Other ...... | 41,000 | 40.7 | 87,900 | 49.7 | 2.14 |
| Nonhome-Based ........ | 12,300 | 12.2 | 18,700 | 10.6 | 1.52 |
| School .............. | 3,600 | 3.6 | 5,800 | 3.3 | 1.61 |
| Total | 100,800 | 100.0 | 176,900 | 100.0 | 1.75 |

| | 1991 | | | | |
|---|---|---|---|---|---|
| | Auto Driver Trips[a] | | Total Person Trips[a] | | |
| Trip Purpose | Number | Percent of Total | Number | Percent of Total | Vehicle Occupancy |
| Home-Based Work ...... | 112,900 | 49.3 | 129,600 | 40.8 | 1.15 |
| Home-Based Shopping .... | 15,700 | 6.8 | 26,200 | 8.2 | 1.67 |
| Home-Based Other ...... | 59,800 | 26.1 | 106,300 | 33.5 | 1.78 |
| Nonhome-Based ........ | 33,200 | 14.5 | 44,300 | 14.0 | 1.33 |
| School .............. | 7,600 | 3.3 | 11,000 | 3.5 | 1.45 |
| Total | 229,200 | 100.0 | 317,400 | 100.0 | 1.38 |

[a]*Includes personal-use trucks.*

*Source: SEWRPC.*

external vehicle trips, auto and personal-use truck driver trips accounted for 84 percent in 1963, 80 percent in 1972, and 84 percent in 1991.

As indicated in Table 84, the vehicle occupancy rate for external travel declined from 1963 to 1972 and from 1972 to 1991 for each trip purpose. Although the 1972 survey showed a decline in total external person trips from 1963, the 1991 data show increases in total person trips for each trip purpose. Table 84 also shows the increase in home-based work trips which cross the boundaries of the Region, reflecting both residents of the Region commuting to jobs outside the Region and nonresidents of the Region commuting to jobs within the Region.

Table 85

DISTRIBUTION OF AVERAGE WEEKDAY EXTERNAL COMMERCIAL-USE TRUCK TRIPS IN THE REGION BY DESTINATION AND PURPOSE: 1963, 1972, AND 1991

| Trip Purpose | 1963 | | 1972 | | 1991 | | Percent Change 1963-1972 | Percent Change 1972-1991 |
|---|---|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent | | |
| Base of Operations . . . . . . . . . | 4,200 | 27.5 | 9,400 | 41.8 | 17,600 | 39.9 | 123.8 | 87.2 |
| Work-Connected Business . . . . | 700 | 4.6 | 3,200 | 14.2 | 9,700 | 22.0 | 357.1 | 203.1 |
| Pick-Up/Delivery of Goods . . . . | 10,100 | 66.0 | 9,800 | 43.6 | 15,300 | 34.7 | -3.0 | 56.1 |
| Customer Service . . . . . . . . . . | 300 | 2.0 | 100 | 0.4 | 1,500 | 3.4 | -66.7 | 1,400.0 |
| Total | 15,300 | 100.0 | 22,500 | 100.0 | 44,100 | 100.0 | 47.1 | 96.0 |

*Source: SEWRPC.*

The volume of external commercial truck trips, as shown in Table 85, increased from 15,300 trips per day in 1963 to 22,500 trips per day in 1972, an increase of 47 percent. From 1972 to 1991, such trips increased from 22,500 trips per day to 44,100 trips per day, an increase of 96 percent. Trips made for the purpose of picking up and/or delivering goods, which averaged approximately 10,100 trips per day in 1963 and 9,800 trips per day in 1972, increased to 15,300 trips per day in 1991, an increase of about 5,500 trips per day, or 56 percent, since 1972. Trips made for work-connected business purposes increased from 3,200 trips per day in 1972 to 9,700 in 1991, an increase of 6,500 trips, or 203 percent. Trips made to return to bases of operations increased from 9,400 trips per day in 1972 to 17,600 trips per day in 1991, an increase of 8,200 trips, or about 87 percent. The increases in work-connected business trips plus the increase in trips related to pickup and/or delivery of goods, combined with the increase between 1972 and 1991 in commercial truck trips for the purpose of customer service, are indicative of an economy that is expanding beyond the borders of the Southeastern Wisconsin Region.

## SPECIAL SURVEYS

In addition to the major elements of the regional travel inventory, a set of special surveys was conducted as part of this inventory. These special surveys included: a mass transit user survey, a personal opinion survey, and origin-destination surveys on intercity and interregional transportation services not recently surveyed.

### Mass Transit User Survey

The Commission conducted special surveys of mass transit passengers on the transit systems operated by the City of Kenosha Transit Commission, Milwaukee County Transit System, City of Racine Belle Urban System, City of Waukesha Transit System Utility—Waukesha Metro Transit, and Waukesha County. Transit passengers on the express transit route sponsored in 1991 by the City of Racine between the Cities of Milwaukee, Racine, and Kenosha were also surveyed. The principal purpose of these surveys was to obtain accurate descriptions of the socio-economic and travel characteristics of the ridership of the overall regional mass transit system.

In conducting this survey, a prepaid, preaddressed, mail-back questionnaire was distributed on a sample basis to riders on each mass transit system during the survey period. The number of questionnaires returned and the percentage of the average weekday ridership for each system was: on the Kenosha system, 800 questionnaires returned, or 17 percent of 4,800 average weekday riders, on the Milwaukee system, 8,700 questionnaires, or 4 percent of the 232,700 average weekday riders; on the Racine system, 1,600 questionnaires, or 17 percent of 9,200 average weekday riders; on the Waukesha system, 600 questionnaires, or 24 percent of 2,500 average weekday riders; on the Milwaukee-Racine-Kenosha system, 100 questionnaires, or 37 percent of 270 average weekday riders; and on the Waukesha-Milwaukee system, 400 questionnaires, or 82 percent of 490 average weekday riders.

To permit the sample data to be expanded to represent total weekday ridership on each of the six systems, the number of passengers boarding each bus was recorded and an expansion factor was then determined by dividing the number of

### Table 86

**PERCENTAGE DISTRIBUTION OF AVERAGE WEEKDAY BUS PASSENGER TRIPS IN THE REGION BY TRIP PURPOSE AND TRANSIT SYSTEM: 1972 AND 1991**

| | Transit System | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Milwaukee | | | Racine | | | Waukesha | | |
| Trip Purpose | 1972 | 1991 | Difference in Percent | 1972 | 1991 | Difference in Percent | 1972 | 1991 | Difference in Percent |
| Home-Based Work . . . . . . | 56.8 | 26.4 | -30.4 | 42.2 | 25.0 | -17.2 | 35.5 | 29.0 | -6.5 |
| Home-Based Shopping . . . | 6.5 | 9.6 | 3.1 | 11.2 | 8.6 | -2.6 | 10.3 | 5.7 | -4.6 |
| Home-Based Other . . . . . . | 12.5 | 17.3 | 4.8 | 19.9 | 23.3 | 3.4 | 13.1 | 10.0 | -3.1 |
| Nonhome-Based . . . . . . . . | 4.7 | 7.0 | 2.3 | 3.9 | 10.6 | 6.7 | 0.0 | 4.4 | 4.4 |
| School . . . . . . . . . . . . . . | 19.5 | 39.7 | 20.2 | 22.8 | 32.5 | 9.7 | 41.1 | 50.9 | 9.8 |
| Total | 100.0 | 100.0 | - - | 100.0 | 100.0 | - - | 100.0 | 100.0 | - - |

| | Transit System | | | | | | |
|---|---|---|---|---|---|---|---|
| | Kenosha | | | Milwaukee-Racine-Kenosha[a] | Waukesha-Milwaukee | | |
| Trip Purpose | 1972[b] | 1991 | Difference in Percent | 1991 | 1972 | 1991 | Difference in Percent |
| Home-Based Work . . . . . . | 26.5 | 16.4 | -10.1 | 53.8 | 72.0 | 71.2 | -0.8 |
| Home-Based Shopping . . . | 12.3 | 8.0 | -4.3 | 1.4 | 12.2 | 6.9 | -5.3 |
| Home-Based Other . . . . . . | 19.8 | 13.7 | -6.1 | 14.0 | 4.1 | 4.8 | 0.7 |
| Nonhome-Based . . . . . . . . | 3.7 | 5.1 | 1.4 | 9.1 | 4.6 | 5.4 | 0.8 |
| School . . . . . . . . . . . . . . | 37.7 | 56.8 | 19.1 | 21.7 | 7.1 | 11.7 | 4.6 |
| Total | 100.0 | 100.0 | - - | 100.0 | 100.0 | 100.0 | - - |

[a] *Service not provided in 1972.*

[b] *Excludes school "trippers," or bus runs designed to accommodate school-aged children.*

*Source: SEWRPC.*

boarding passengers by the number of completed questionnaires. An adjustment was made for passengers who transferred.

As Table 86 shows, home-based work and school trips constituted the major portion of bus passenger travel on each of the transit systems in 1972 and 1991. As a percentage of total trips, home-based work trips decreased on each system surveyed between 1972 and 1991. Taken together, home-based shopping and other nonwork and nonschool related home-based trips increased on the Milwaukee and Racine systems and decreased on the other systems during that time.

Table 87 presents the distribution of bus passenger travel on the 1972 and 1991 transit systems as reported in the surveys by sex, age, annual household income, and race. For comparison purposes, Table 88 presents 1972 and 1991 percentage distributions of bus passengers by income, using 1991 dollars. These tables indicate that:

- Female passengers made the majority of trips on all systems in both years. However, from 1972 to 1991, the proportion of male passengers increased on all systems existing in 1972, except the Waukesha-Milwaukee system.

- As in 1972, the largest portion of 1991 bus passenger trips consisted of passengers 16 through 24 years of age on the Milwaukee, Racine, and Kenosha systems. On the Waukesha system, the largest portion of bus passenger trips in 1972 was made by passengers 16 through 24 years of age. In 1991 the majority of passengers was one through 15 years of age. On the Waukesha-

## Table 87

## PERCENTAGE DISTRIBUTION OF AVERAGE WEEKDAY BUS PASSENGER TRAVEL IN THE REGION BY TRANSIT SYSTEM AND SELECTED CHARACTERISTICS OF TRANSIT USERS: 1972 AND 1991

| Selected Characteristics | Percent of Trips by Transit System: 1972 | | | | |
|---|---|---|---|---|---|
| | Milwaukee | Racine | Waukesha[a] | Kenosha[a] | Waukesha-Milwaukee |
| Sex | | | | | |
| Male | 27.7 | 20.1 | 7.7 | 29.1 | 38.2 |
| Female | 72.3 | 79.9 | 92.3 | 70.9 | 61.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Age | | | | | |
| One to 15 | 7.2 | 10.5 | 4.0 | 11.2 | - - |
| 16 to 24 | 31.8 | 29.8 | 43.0 | 35.7 | 20.6 |
| 25 to 34 | 12.4 | 8.9 | 2.9 | 4.9 | 11.2 |
| 35 to 44 | 10.4 | 6.9 | 10.0 | 3.4 | 17.4 |
| 45 to 54 | 15.9 | 15.7 | 18.1 | 13.4 | 19.2 |
| 55 to 64 | 15.0 | 14.6 | 11.7 | 11.3 | 24.1 |
| 65 or Older | 7.3 | 13.6 | 10.3 | 20.1 | 7.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Household Income (actual dollars) | | | | | |
| Under 4,000 | 20.3 | 26.8 | 7.6 | 25.4 | 6.6 |
| 4,000 to 7,999 | 29.7 | 27.9 | 21.0 | 28.6 | 18.3 |
| 8,000 to 11,999 | 26.9 | 23.3 | 42.3 | 19.9 | 26.8 |
| 12,000 to 14,999 | 12.3 | 11.0 | 12.9 | 14.6 | 19.9 |
| 15,000 to 19,999 | 7.0 | 7.3 | 15.2 | 6.3 | 21.6 |
| 20,000 to 24,999 | 2.4 | 2.2 | - - | 2.5 | 3.9 |
| 25,000 or Over | 1.4 | 1.5 | 1.0 | 2.7 | 2.9 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Race | | | | | |
| Black | 12.3 | 8.8 | - - | 2.4 | - - |
| White | 85.3 | 87.6 | 93.5 | 96.0 | 97.5 |
| Other | 2.4 | 3.6 | 6.5 | 1.6 | 2.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

| Selected Characteristics | Percent of Trips by Transit System: 1991 | | | | | |
|---|---|---|---|---|---|---|
| | Milwaukee | Racine | Waukesha | Kenosha | Waukesha-Milwaukee | Milwaukee-Racine-Kenosha[b] |
| Sex | | | | | | |
| Male | 38.1 | 38.2 | 43.3 | 39.3 | 37.3 | 46.9 |
| Female | 61.9 | 61.8 | 56.7 | 60.7 | 62.7 | 53.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Age | | | | | | |
| One to 15 | 4.9 | 15.4 | 32.4 | 25.4 | 3.0 | - - |
| 16 to 24 | 31.3 | 35.9 | 27.3 | 33.9 | 20.7 | 17.1 |
| 25 to 34 | 24.1 | 21.2 | 11.7 | 14.1 | 22.5 | 35.5 |
| 35 to 44 | 18.6 | 12.4 | 11.5 | 5.9 | 21.3 | 30.7 |
| 45 to 54 | 9.5 | 5.5 | 5.1 | 6.3 | 18.5 | 6.9 |
| 55 to 64 | 6.3 | 3.9 | 6.2 | 5.0 | 11.8 | 4.4 |
| 65 or Older | 5.3 | 5.7 | 5.8 | 9.4 | 2.2 | 5.4 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Household Income (actual dollars) | | | | | | |
| Under 5,000 | 10.7 | 22.2 | 15.7 | 15.7 | 2.6 | - - |
| 5,000 to 9,999 | 14.1 | 18.5 | 12.7 | 17.0 | 3.9 | 10.9 |
| 10,000 to 14,999 | 13.3 | 14.6 | 12.5 | 15.5 | 6.3 | 10.3 |
| 15,000 to 19,999 | 12.2 | 7.4 | 13.2 | 7.4 | 5.5 | 12.7 |
| 20,000 to 24,999 | 11.8 | 9.2 | 6.9 | 8.0 | 7.6 | 15.8 |
| 25,000 to 29,999 | 8.9 | 6.0 | 5.4 | 5.3 | 9.5 | 9.3 |
| 30,000 to 34,999 | 7.6 | 6.4 | 7.0 | 5.4 | 8.1 | 13.4 |
| 35,000 to 39,999 | 6.0 | 4.6 | 4.3 | 6.1 | 7.3 | 8.9 |
| 40,000 to 49,999 | 6.5 | 4.2 | 6.5 | 6.6 | 14.3 | 7.8 |
| 50,000 or Over | 8.9 | 6.9 | 15.8 | 13.0 | 34.9 | 10.9 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Race | | | | | | |
| Black | 30.6 | 39.9 | 4.5 | 13.7 | 4.2 | 18.8 |
| White | 63.3 | 49.7 | 84.1 | 77.5 | 90.3 | 68.8 |
| Other | 6.1 | 10.4 | 11.4 | 8.8 | 5.5 | 12.4 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[a]*Excludes school "trippers," or bus runs designed to accommodate school-aged children.*

[b]*Service not provided in 1972.*

*Source: SEWRPC.*

Table 88

**PERCENTAGE DISTRIBUTION OF AVERAGE WEEKDAY BUS PASSENGER TRAVEL IN THE REGION BY TRANSIT SYSTEM BY 1991 CONSTANT DOLLARS: 1972 AND 1991**

| Household Income (constant 1991 dollars) | Percent of Trips by Transit System | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Milwaukee | | Racine | | Waukesha | | Kenosha | | Milwaukee-Racine-Kenosha[a] | Waukesha-Milwaukee | |
| | 1972 | 1991 | 1972 | 1991 | 1972 | 1991 | 1972 | 1991 | 1991 | 1972 | 1991 |
| Under 14,000 | 20.3 | 35.4 | 26.8 | 52.4 | 7.6 | 38.2 | 25.4 | 45.0 | 18.8 | 6.6 | 11.6 |
| 14,000 to 27,899 | 29.7 | 32.0 | 27.9 | 23.2 | 21.0 | 25.9 | 28.6 | 21.7 | 36.8 | 18.3 | 20.2 |
| 27,900 to 41,899 | 26.9 | 18.5 | 23.3 | 14.2 | 42.3 | 14.9 | 19.9 | 15.2 | 27.5 | 26.8 | 21.8 |
| 41,900 to 52,299 | 12.3 | 5.7 | 11.0 | 3.7 | 12.9 | 6.0 | 14.6 | 5.7 | 6.9 | 20.9 | 13.3 |
| 52,300 or Over | 10.8 | 8.4 | 11.0 | 6.5 | 16.2 | 15.0 | 11.5 | 12.4 | 10.0 | 27.4 | 33.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[a]*Service not provided in 1972.*

*Source: SEWRPC.*

Milwaukee system, the largest portion of bus passenger trips in 1972 was made by passengers 55 through 64 years of age; in 1991 by passengers 25 through 34 years of age. No comparison was possible for the Milwaukee-Racine-Kenosha system, which did not provide service in 1972.

- The 1972 survey showed that approximately one-half of total bus passenger trips on the Milwaukee, Racine, Waukesha, and Kenosha systems was made by persons under 35 years of age. Generally, the median age of bus passengers in 1991 is lower. On the Kenosha and Racine systems, about one-half of the passenger trips in 1991 were made by persons under 25 years of age. On the Milwaukee system, the percentage of bus passenger trips made by persons under 35 years of age increased from 51 percent in 1972 to 60 percent in 1991. On the Waukesha-Milwaukee system, the percentage of bus passenger trips made by persons under 35 years of age increased from 32 percent in 1972 to 46 percent in 1991. On the Waukesha system, the percentage of bus passenger trips made by persons under 35 years of age rose from about 50 percent in 1972 to about 71 percent in 1991. Again, no comparison was possible for the Milwaukee-Racine-Kenosha system, which did not provide service in 1972.

- On all five systems existing in 1972, the proportion of black and other nonwhite passengers increased from 1972 to 1991.

- The average annual household income of bus passengers, in 1991 dollars, decreased from 1972 to 1991. As shown on Table 88, in 1972, the percentage of bus passenger trips made by persons with an annual household income of less than $27,900 in 1991 dollars ranged from 25 percent to 55 percent, while in 1991 this percentage ranged from 32 percent to 76 percent. Table 87 presents income ranges for mass transit passengers by transit system in actual dollars for the 1972 and 1991 survey years, respectively.

The total data obtained in this survey are judged to be representative of daily urban and suburban transit tripmaking and of transit tripmakers. The data can be used in comparing present routing with potential routes desired by transit users for consideration in the provision of improved transit service as an element of the short-range transit development of the regional modal split model for the simulation of future travel conditions, and in calibrating transit system networks preparatory to alternative system plan development.

Personal Opinion Survey

As part of the 1991 home interview survey, a special survey was conducted to obtain the opinions, preferences, and attitudes of heads of households or spouses regarding certain aspects of transportation and housing. The salient findings of this survey are provided in the following sections. Where possible, these find-

Table 89

THE 1991 PERSONAL OPINION SURVEY: PERCENTAGE DISTRIBUTION OF RESPONSES REGARDING PERCEIVED TRAFFIC CONGESTION IN THE REGION

| Personal Opinion Concerning Severity of Traffic Congestion | Percent |
|---|---|
| Not a Problem | 4.6 |
| A Minor Problem during Peak-Traffic Periods | 44.9 |
| A Severe Problem during Peak-Traffic Periods | 40.4 |
| A Severe Problem during Peak-Traffic Periods and during Other Parts of the Day | 8.8 |
| No Response | 1.3 |
| Total | 100.0 |

*Source: SEWRPC.*

Table 90

THE 1991 PERSONAL OPINION SURVEY: PERCENTAGE DISTRIBUTION OF RESPONSES REGARDING SEVERITY OF TRAFFIC CONGESTION DURING THE PAST 10 YEARS

| Personal Opinion Concerning Change in Level of Traffic Congestion | Percent |
|---|---|
| Has Become Substantially Worse in the Last 10 Years | 40.4 |
| Has Become Somewhat Worse in the Last 10 Years | 44.1 |
| Is About the Same as 10 Years Ago | 8.2 |
| Has Become Less of a Problem over the Last 10 Years | 2.5 |
| There Is No Traffic Congestion Problem | 2.7 |
| No Reponse | 2.1 |
| Total | 100.0 |

*Source: SEWRPC.*

ings are compared with the findings of a similar personal opinion survey conducted as part of the 1972 home interview survey.[6]

The personal opinion surveys conducted by the Commission directly questioned respondents about their attitude, not behavior, on certain travel- and housing-related issues. Preferences were expressed without regard to the practicality of satisfying those preferences in the face of economic and other realities. The 1991 survey reflects the attitudes of the more than 1,700 households responding to the survey.

Traffic Congestion Severity: Item A of the questionnaire asked each respondent to indicate his or her perception of the severity of traffic congestion in the Region. About 45 percent of the respondents indicated that traffic congestion was a minor problem during peak traffic periods, while 40 percent indicated that traffic congestion was a severe problem during peak traffic periods. An additional 9 percent of respondents indicated that traffic congestion was a severe problem not only during peak traffic periods but during other parts of the day (see Table 89).

Traffic Congestion Change in Last 10 Years: Item B of the questionnaire asked each respondent to indicate his or her perception of the change in traffic congestion over the last 10 years. Almost 85 percent of the respondents indicated that traffic congestion had become worse, 44 percent indicating that traffic congestion had become somewhat worse and 40 percent indicating that traffic congestion had become substantially worse. About 3 percent indicated that traffic congestion had moderated over the last 10 years, while 8 percent indicated that traffic congestion had remained unchanged (see Table 90).

Location of Worst Traffic Congestion: Item C of the questionnaire asked each respondent to identify in rank order the facilities in the Region exhibiting the worst traffic congestion problems. The percentage distributions of responding households are shown by facility type in Table 91. The facilities ranked worst by nearly 75 percent of the respondents were the Milwaukee County freeways. About 39 percent of the respondents ranked Milwaukee County streets the second worst.

[6]*For a more detailed presentation of the findings of the 1972 survey, see SEWRPC Technical Report No. 13, A Survey of Public Opinion in Southeastern Wisconsin—1972, September 1974.*

Table 91

THE 1991 PERSONAL OPINION SURVEY: PERCENTAGE DISTRIBUTION OF RESPONSES REGARDING SEVERITY OF TRAFFIC CONGESTION ON FREEWAYS AND STREETS IN MILWAUKEE COUNTY AND SURROUNDING COUNTIES

| Facilities | Responses (percent) | | | | | No Response | Total |
|---|---|---|---|---|---|---|---|
| | Worst | Second-Worst | Third-Worst | Fourth-Worst | Fifth-Worst | | |
| Milwaukee County Freeways | 74.6 | 10.8 | 2.9 | 2.3 | 0.3 | 9.1 | 100.0 |
| Surrounding County Freeways | 3.1 | 28.7 | 34.9 | 12.8 | 0.8 | 19.7 | 100.0 |
| Milwaukee County Streets | 10.4 | 39.4 | 24.5 | 5.9 | 0.7 | 19.1 | 100.0 |
| Surrounding County Streets | 3.4 | 5.5 | 13.3 | 53.2 | 1.3 | 23.3 | 100.0 |
| Other | 2.2 | 0.7 | 1.2 | 0.5 | 5.6 | 89.8 | 100.0 |

*Source: SEWRPC.*

Table 92

THE 1991 PERSONAL OPINION SURVEY: PERCENTAGE DISTRIBUTION OF RESPONSES REGARDING PERCEIVED EFFECTS OF TRAFFIC CONGESTION

| Effects | Responses (percent) | | | | | | No Response | Total |
|---|---|---|---|---|---|---|---|---|
| | Worst | Second-Worst | Third-Worst | Fourth-Worst | Fifth-Worst | Sixth-Worst | | |
| Fuel Consumption/Air Pollution | 31.9 | 15.1 | 11.4 | 12.8 | 17.0 | 0.6 | 11.2 | 100.0 |
| Increased Traffic Accidents | 20.7 | 22.1 | 15.5 | 16.4 | 12.8 | 0.4 | 12.1 | 100.0 |
| Increased Travel Time | 13.9 | 20.8 | 22.8 | 20.4 | 9.4 | 0.1 | 12.6 | 100.0 |
| Unreliable Travel Time | 11.3 | 16.4 | 20.8 | 18.0 | 18.9 | 0.6 | 14.0 | 100.0 |
| Irritation of Stop-and-Go Driving | 17.0 | 16.0 | 15.0 | 15.5 | 23.1 | 0.4 | 13.0 | 100.0 |
| Other | 1.3 | 0.4 | 0.3 | 0.1 | 0.2 | 3.2 | 94.5 | 100.0 |

*Source: SEWRPC.*

Worst Thing about Traffic Congestion: Item D of the questionnaire asked each respondent to identify in rank order the worst things about traffic congestion. About 32 percent of the respondents ranked increased motor fuel consumption and air pollutant emissions the worst. The second- through fifth-ranked responses to this question were not as clearly defined. Increased traffic accidents were ranked as second worst by 22 percent and worst by 21 percent. Increased travel time was ranked as third worst by 23 percent, second worst by 21 percent, and fourth worst by 20 percent. Unreliable travel time was ranked as third worst by 21 percent, fifth worst by 19 percent, and fourth worst by 18 percent. The irritation of stop-and-go driving was ranked as fifth worst by 23 percent and worst by 17 percent. Although 32 percent of the respondents indicated that increased fuel costs and air pollutant emissions were the worst impacts of traffic congestion, the various other factors were also ranked in varying degrees of importance (see Table 92).

Actions to Alleviate Traffic Congestion: Item E of the questionnaire asked each respondent to indicate agreement or disagreement with various potential actions that could be taken to alleviate traffic congestion. The actions and the percentage of respondents indicating support for each action were: increased use of carpooling and public transit, 81 percent; extension of bus

Table 93

THE 1991 PERSONAL OPINION SURVEY: PERCENTAGE DISTRIBUTION OF RESPONSES REGARDING SUPPORT FOR POSSIBLE ACTIONS TO ALLEVIATE TRAFFIC CONGESTION IN THE REGION

| Possible Actions | Yes | No | No Response | Total |
|---|---|---|---|---|
| Increase Use of Carpooling and Public Transit | 81.2 | 12.5 | 6.3 | 100.0 |
| Extend Bus Service to New Areas | 77.0 | 17.9 | 5.1 | 100.0 |
| Provide More Express and Freeway Flyer Bus Service | 72.6 | 20.6 | 6.8 | 100.0 |
| Provide Convenient Bike Lanes and Paths | 56.3 | 36.0 | 7.7 | 100.0 |
| Build Light Rail and Commuter Rail Transit | 54.4 | 38.3 | 7.3 | 100.0 |
| Increase Frequency of Bus Service | 54.0 | 39.5 | 6.5 | 100.0 |
| Reduce Bus Fare | 49.0 | 43.2 | 7.8 | 100.0 |
| Widen Existing and Build New Arterial Streets | 44.6 | 46.9 | 8.5 | 100.0 |
| Widen Existing Freeways | 42.9 | 49.5 | 7.6 | 100.0 |
| Build New Freeways | 25.5 | 66.5 | 8.0 | 100.0 |
| No Action Is Necessary | 9.7 | 49.5 | 40.8 | 100.0 |
| Increase the Cost of Operating an Automobile | 6.8 | 86.3 | 6.9 | 100.0 |
| Other | 6.0 | 1.6 | 92.4 | 100.0 |

*Source: SEWRPC.*

service to new areas, 77 percent; provision of more express and freeway flyer bus service, 73 percent; provision of convenient bike lanes and paths, 56 percent; building light-rail and commuter rail transit, 54 percent; and increasing frequency of bus service, 54 percent. The two actions respondents opposed the most included building of new freeways, 67 percent, and increasing the cost of operating an automobile, 86 percent (see Table 93).

Travel Reduction to Meet Federal Clean Air Act Requirements: Item F, Part 1, of the questionnaire asked the respondents to indicate agreement or disagreement with various actions that could be taken to reduce automobile travel, particularly work-related travel, to meet the requirements of the Federal Clean Air Act. The action approved most frequently, by 82 percent of the respondents, was to improve public transit to encourage more transit use, including provision of more available, faster, and more frequent bus transit. The action opposed most frequently, by 74 percent of the respondents, was the elimination of free employee parking to encourage more carpooling and transit use. All other specific actions were favored by a majority of the respondents, ranging from 55 to 62 percent (see Table 94).

Factors Needed to Influence Carpool and Transit Use: Item F, Part 2, of the questionnaire asked respondents to indicate agreement or disagreement with factors that would need to change before they would carpool or use transit if they currently drive alone to and from work. Of the six factors listed, as shown in Table 95, three were cited most frequently. Specifically, faster and more frequent public bus transit was cited by 60 percent; faster and more frequent public transit, including light-rail and commuter rail, by 50 percent; and carpool incentives, such as exclusive carpool freeway lanes and priority parking, by 50 percent. Only a small percentage, 16 and 14 percent, respectively, of respondents indicated that elimination of free workplace parking or substantially increased automobile costs would encourage them to consider alternatives to driving alone to work. Respondents may have reacted to these two proposed actions, not with respect to potential to change their travel

## Table 94

### THE 1991 PERSONAL OPINION SURVEY: PERCENTAGE DISTRIBUTION OF SUPPORT FOR POSSIBLE ACTIONS TO REDUCE AUTOMOBILE TRAVEL TO AND FROM WORK

| Possible Actions | Yes | No | No Response | Total |
|---|---|---|---|---|
| Improve Public Transit to Encourage More Transit Use, Including Provision of More Available, Faster, and More Frequent Bus Transit | 81.8 | 12.8 | 5.4 | 100.0 |
| Provide Incentives to Carpool and Transit Users, Such as Exclusive Carpool and Transit Lanes on Streets and Freeways | 62.4 | 29.7 | 7.9 | 100.0 |
| Encourage Employers to Provide Transit Subsidies to Promote More Transit Use | 61.6 | 29.6 | 8.8 | 100.0 |
| Improve Public Transit with Light Rail and Commuter Rail | 57.6 | 34.9 | 7.5 | 100.0 |
| Encourage Employers to Offer Four-Day or Three-Day Work Weeks | 56.9 | 35.3 | 7.8 | 100.0 |
| Provide Convenient Bike Lanes and Paths | 56.5 | 34.6 | 8.9 | 100.0 |
| Encourage Employers to Arrange Programs to Permit Employees to Work at Home | 54.9 | 36.4 | 8.7 | 100.0 |
| Eliminate Free Employee Parking to Encourage More Carpooling and Transit Use | 18.1 | 74.2 | 7.7 | 100.0 |
| Other | 3.8 | 1.1 | 95.1 | 100.0 |

*Source: SEWRPC.*

## Table 95

### THE 1991 PERSONAL OPINION SURVEY: PERCENTAGE DISTRIBUTION OF FACTORS CONSIDERED NECESSARY BEFORE CHOOSING TO CARPOOL OR USE TRANSIT RATHER THAN DRIVING ALONE

| Factors | Yes | No | No Response | Total |
|---|---|---|---|---|
| Faster and More Frequent Public Bus Transit | 60.1 | 25.0 | 14.9 | 100.0 |
| Faster and More Frequent Public Transit, Including Light Rail and Commuter Rail | 50.2 | 34.7 | 15.1 | 100.0 |
| Carpool Incentives, Such as Exclusive Carpool Freeway Lanes and Priority Parking | 50.1 | 33.1 | 16.8 | 100.0 |
| Convenient Bike Lanes and Paths | 40.0 | 41.6 | 18.4 | 100.0 |
| Elimination of Free Parking at Your Workplace with Possible Charges of $20 to $30 per Month | 16.0 | 67.4 | 16.6 | 100.0 |
| Substantial Increases in the Cost of Operating an Auto, Such as Increased Gasoline Prices | 14.4 | 70.5 | 15.1 | 100.0 |

*Source: SEWRPC.*

behavior, but, rather, with respect to their disapproval of such increases in the cost of operating an automobile.

Funding Sources for County and Local Arterials: Item G of the questionnaire asked respondents to indicate their choice for funding the cost of operating, maintaining, and improving county and local arterials. A 31 percent plurality favored a combination of sources, including a user fee of 6 cents per gallon of gasoline, a user fee of an additional $40 per vehicle annually, and an increase in the sales tax of 0.25 percent. Approximately 23 percent stated that the cost should continue to be covered by the property tax, at an estimated rate of $0.80 per $1,000 of assessed value (see Table 96).

Limitations Believed to Result from Lack of Public Transportation: Item H of the questionnaire asked respondents to indicate whether the lack of adequate public transportation between their homes and certain areas of the Region prevented or severely limited household members from accepting employment, reaching shopping and recreational areas of their choice, conducting necessary personal business, or visiting friends or relatives. This was the only transportation-related question that was similar to a 1972 personal opinion question. Both the 1972 and 1991 data are shown in Table 97. For all categories of possible limitation, the percentages of respondents indicating a belief that a lack of public transportation limited personal options were lower in 1991 than in 1972, indicating that fewer respondents believed that members of their households were limited in their activities due to a lack of public transportation. These decreases may be due in part to the increase in personal vehicles available to residents of the Region.

Special Origin-Destination Surveys on Intercity and Interregional Transportation Services

As part of the 1991 regional inventory of travel, special origin-destination surveys were conducted in the spring of 1993 on all intercity and interregional public passenger transportation services that operated regularly scheduled weekday service within the Region and that had not been recently surveyed. These transportation services included the Metra commuter rail service operated between Kenosha and Chicago and intercity motor coach services operated by four carriers: Badger Coaches, Inc., Greyhound Lines, Inc., Lamers Bus Lines, Inc., and United Limo, Inc. Amtrak intercity passenger train service was surveyed in the spring of 1991.[7] These survey data were combined with the highway travel surveys to provide a complete inventory of interregional surface travel by mode. In addition, a survey of enplaning passengers at General Mitchell International Airport, the sole scheduled-air-carrier airport serving Southeastern Wisconsin, was conducted in the fall of 1989.[8]

**Table 96**

**THE 1991 PERSONAL OPINION SURVEY: PERCENTAGE DISTRIBUTION OF RESPONSES REGARDING CHOICES FOR POSSIBLE FUNDING SOURCES FOR COUNTY AND LOCAL ARTERIALS**

| Funding Sources | Percent |
|---|---|
| A. Remain on the Property Tax (an estimated $0.80 per $1,000 of assessed value, or $56 per $70,000 house) | 22.5 |
| B. Be Funded Instead by a User Fee, Such as Increased Motor Fuel Taxes (an estimated $0.06 per gallon) | 14.5 |
| C. Be Funded Instead by a User Fee, Such as Increased Annual Vehicle Registration Fees (an estimated additional $40 per vehicle) | 8.8 |
| D. Be Funded Instead by Increased Sales Tax (an estimated additional 0.25 percent) | 9.1 |
| E. Some Combination of Sources B, C, and D | 31.1 |
| F. Other | 8.6 |
| G. No Response | 5.4 |
| Total | 100.0 |

*Source: SEWRPC.*

[7]*See SEWRPC Memorandum Report No. 57, Amtrak Milwaukee-Chicago Passenger Survey Findings: June 1991, January 1993.*

[8]*See SEWRPC Technical Report No. 32, General Mitchell International Airport Enplaning Passenger Survey Findings: 1989, August 1990.*

Table 97

PERCENTAGE DISTRIBUTION OF RESPONSES REGARDING ACTIVITIES BELIEVED TO BE LIMITED BY A LACK OF PUBLIC TRANSPORTATION: 1972 AND 1991

| Activities | 1972 | | | | 1991 | | | |
|---|---|---|---|---|---|---|---|---|
| | Yes | No | No Response | Total | Yes | No | No Response | Total |
| Accepting Employment | 11.3 | 78.1 | 10.6 | 100.0 | 9.7 | 84.5 | 5.8 | 100.0 |
| Reaching Recreational Areas | 12.0 | 76.6 | 11.4 | 100.0 | 8.4 | 84.8 | 6.8 | 100.0 |
| Reaching Shopping Areas of Your Choice | 15.8 | 73.7 | 10.5 | 100.0 | 12.2 | 82.4 | 5.4 | 100.0 |
| Conducting Necessary Personal Business | 8.3 | 80.2 | 11.5 | 100.0 | 7.1 | 86.8 | 6.1 | 100.0 |
| Making Social Visits to Friends or Relatives | 10.6 | 78.1 | 11.3 | 100.0 | 8.6 | 85.2 | 6.2 | 100.0 |

*Source: SEWRPC.*

In each of the surveys, each boarding and through passenger was asked to complete and return a questionnaire. The questions that were used typically requested and elicited delineations of such socio-economic characteristics of the passenger as age, occupation, home address, household annual income, and auto availability; and to characteristics of the trip being made, such as trip origin and destination, trip purpose, mode of travel used to reach the boarding location, and frequency with which the particular trip was made. Depending upon the survey, other information was also obtained, such as whether the trip was part of a round trip and why the tripmaker chose to make this trip on the travel mode concerned.

The only commuter railway service operated in the Region in 1993 was Metra's Chicago & North Western Railway North Line between Kenosha and Chicago, with intermediate stops in the north shore suburbs of northeastern Illinois. Metra is the commuter railway service division of the Regional Transportation Authority, which serves northeastern Illinois. Service on this particular commuter railway route was provided by the Chicago & North Western Transportation Company under contract with Metra. On weekdays in 1993, this service consisted of nine commuter trains in each direction between Kenosha and Chicago. In 1972, weekday commuter railway service in Southeastern Wisconsin consisted of 24 trains, including nine trains in each direction between Kenosha and Chicago, as in 1993; two trains in each direction between the City of Lake Geneva and Chicago; and one train in each direction between the Village of Walworth and Chicago.

In the spring of 1993, scheduled intercity motor coach services were provided by four carriers: Badger Coaches, Inc.; Greyhound Lines, Inc.; Lamers Bus Lines, Inc.; and United Limo, Inc. Service provided on weekdays by Badger Coaches included six runs in each direction between Madison, downtown Milwaukee, and General Mitchell International Airport. Service provided by Greyhound in Southeastern Wisconsin is centered in Milwaukee, which the carrier uses as a regional hub at which passengers may transfer between buses. In 1993, Greyhound operated a total of 39 weekday bus runs in both directions between Milwaukee and Chicago; Milwaukee and Green Bay, continuing on to Calumet, Michigan; Milwaukee and Appleton, continuing on to Stevens Point and Rhinelander; and Milwaukee and Madison, continuing on to Minneapolis-St. Paul. Some of these bus runs made only limited stops and some made local stops. Also, some of these runs operate through Milwaukee and some originate or terminate in Milwaukee. Service provided on weekdays by Lamers Bus Lines included one run in each direction between Milwaukee, Appleton, and Wausau. Service provided on weekdays by United Limo included nine runs in each direction between downtown Milwaukee, General Mitchell International Airport, and Chicago O'Hare International Airport. Together, the four intercity motor coach carriers operated a combined total of 71 bus runs, all of which were surveyed.

In 1972, there were six intercity motor coach carriers providing service through the operation of 144 weekday bus runs in the Region. Of these 144 weekday runs, 96 were operated by Greyhound to Chicago, to various locations in Wisconsin and Upper Michigan, and to cities as far away as Seattle; 12 runs were operated by Wisconsin Coach Lines, Inc., between Milwaukee and Fond du Lac, Watertown, and Rockford, Illinois; 12 runs were operated by Badger Coaches between Milwaukee and Madison; 12 runs were operated by Tri-State Coach Lines, Inc., between Milwaukee and Chicago's O'Hare International Airport; eight runs were operated by Wisconsin-Michigan Coach Lines, Inc., between Milwaukee and Green Bay, Sister Bay, and Marshfield; and four runs were operated by Peoria-Rockford Bus Company between Milwaukee, Rockford, and Dixon, Illinois.

In 1993, intercity railway passenger service in Southeastern Wisconsin was provided by Amtrak over CP Rail System trackage, formerly Chicago, Milwaukee, St. Paul & Pacific Railroad Company trackage, with stops within the Region at Milwaukee and Sturtevant. When the most recent survey by the Commission of this service was conducted in the spring of 1991, Amtrak operated five weekday trains in each direction between Milwaukee and Chicago and one weekday train in each direction between Chicago, Milwaukee, St. Paul-Minneapolis, and Seattle.

In 1972, by comparison, Amtrak operated three weekday trains in each direction between Milwaukee and Chicago, two weekday trains in each direction between Milwaukee, Chicago, and St. Louis, and two weekday trains in each direction between Chicago, Milwaukee, St. Paul-Minneapolis, and Seattle.

In 1972, cross-lake car ferry service on Lake Michigan was operated by the Chesapeake & Ohio Railway Company between Milwaukee and Ludington, Michigan. This service, which carried passengers, automobiles, and railway freight cars and scheduled two weekday departures from each port during the summer season, was discontinued in 1984.

Scheduled air-carrier service to and from Milwaukee County's General Mitchell International Airport was provided by 16 airline companies in the fall of 1989 when the most recent survey of air-carrier service was conducted by the Commission. These airline companies included: American Airlines, Comair, Continental Airlines, Delta Air Lines, Eastern Airlines, Enterprise Airlines, Express Airlines, Midway Airlines, Midway Commuter, Midwest Express Airlines, Mesaba Airlines, Northwest Airlines, Skyway Airlines, Trans World Airlines, United Airlines, and USAir. In 1989, these carriers provided a total of 364 scheduled nonstop weekday flights between Mitchell International and 33 other cities or metropolitan areas. Cities with 10 or more nonstop weekday flights to or from Milwaukee included: Chicago, Detroit, Grand Rapids, Atlanta, Cincinnati, New York, Minneapolis-St. Paul, Appleton, Cleveland, Indianapolis, St. Louis, Madison, Green Bay, Boston, Columbus, and Wausau. Many of these flights continued on to other cities.

By comparison, in 1971, when a previous enplaning passenger survey was undertaken by the Commission, there were six airline companies providing a total of 250 scheduled nonstop weekday flights between Milwaukee and 32 other cities or metropolitan areas. These airline companies included: Air Michigan, Eastern Airlines, North Central Airlines, Northwest Airlines, Ozark Airlines, and United Airlines. Cities with 10 or more nonstop weekday flights to or from Milwaukee included: Chicago, New York, Madison, Minneapolis-St. Paul, Detroit, and Oshkosh. Between the 1971 and 1989 enplaning passenger surveys, airline companies have made dramatic changes to their route structures, resulting in most of the scheduled service from Milwaukee being concentrated in major, heavily traveled markets and to cities that serve as system hubs for the airline companies.

Quantity of Interregional Passenger Travel: The 1991 survey findings indicated that on an average weekday, 3,088 passengers were being carried on interregional surface public transportation modes, including Amtrak intercity railway passenger trains, Metra commuter railway trains, and intercity motor coaches serving Southeastern Wisconsin. In addition, 12,614 passengers were being carried on an average weekday on scheduled air-carrier flights between Milwaukee and other cities. Accordingly, a total of 15,702 interregional passenger trips were being made in the Region on public transportation on an average weekday, as shown in Table 98. Also, as shown in Table 98, there were 317,400 interregional automobile person trips made on an average weekday, accounting for 95 percent of all interregional public transportation and automobile trips on an average week-

**Table 98**

**NUMBER OF INTERREGIONAL PASSENGER TRIPS ON INTERCITY MODES IN THE REGION: 1972 AND 1993**

| Mode | 1972 | | | 1993 | | |
|---|---|---|---|---|---|---|
| | Number | Percent without Auto | Percent with Auto | Number | Percent without Auto | Percent with Auto |
| Intercity Motor Bus . . . . . . . . . . | 1,297 | 14.3 | 0.7 | 1,341 | 8.5 | 0.4 |
| Metra Commuter Rail . . . . . . . . | 267 | 2.9 | 0.2 | 748 | 4.8 | 0.2 |
| Amtrak Intercity Rail . . . . . . . . . | 560 | 6.2 | 0.3 | 999[a] | 6.4 | 0.3 |
| Chesapeake & Ohio Cross-Lake Car Ferry . . . . . . . . | 749 | 8.2 | 0.4 | - - | - - | - - |
| Air Carriers . . . . . . . . . . . . . . . | 6,225[b] | 68.4 | 3.3 | 12,614[c] | 80.3 | 3.8 |
| Private Automobile | 176,900 | - - | 95.1 | 317,400 | - - | 95.3 |
| Total | 185,998 | 100.0 | 100.0 | 333,102 | 100.0 | 100.0 |

[a]*Survey taken in 1991.*

[b]*Survey taken in 1971.*

[c]*Survey taken in 1989.*

*Source: SEWRPC.*

day. Of the remaining interregional trips, 1,341 passengers were carried on the 71 intercity motor coach runs, an average of about 19 passengers per run; 748 passengers were carried on the 18 Metra commuter rail trains, an average of about 42 passengers per train; 999 passengers were carried on the 12 Amtrak intercity railway passenger trains, an average of about 83 passengers per train; and 12,614 passengers were carried on the 364 scheduled air-carrier flights, an average of about 35 passengers per flight. The numbers and percentages of passengers returning completed questionnaires in the surveys were: for intercity motor coach services, 883, or 66 percent; for Metra commuter rail trains, 426, or 57 percent; for Amtrak intercity rail trains, 878, or 88 percent; and for the scheduled air carriers, an average of 2,710 enplaning passengers per day over a five-day survey period. When this figure is doubled to account for both enplaning and deplaning passengers, it results in a projected total of 5,420, or 43 percent.

By comparison, it was estimated that on an average weekday in 1972, a total of 2,873 passengers were being carried on interregional surface transportation modes, including Amtrak intercity passenger trains, commuter railway trains, intercity motor coaches, and car ferries in Southeastern Wisconsin. Including the 6,225 passengers that were carried on scheduled air-carrier flights between Milwaukee and other cities, a total of 9,098 interregional passenger trips were made on public transportation in the Region on an average weekday in 1972. There were also 176,900 interregional automobile person trips, accounting for 95 percent of all interregional public transportation and automobile trips on an average weekday in 1972. Of the remaining interregional trips, 1,297 passengers were carried on intercity motor coach runs, 267 passengers were carried on commuter railway trains, 560 passengers were carried on Amtrak intercity railway passenger trains, 749 were carried on cross-lake car ferries; and 6,225 passengers were carried on scheduled air-carrier flights.

Round Trips: According to the most recent surveys, the proportion of interregional passenger trips made as a part of a round trip ranged from 60 percent on intercity motor coaches to 95 percent on scheduled air carriers, as shown on Table 99. This compares to the 1972 survey findings, where the percentages of passengers making round trips ranged from 84 percent on intercity motor coaches to 97 percent on commuter rail trains. Round trips by air cannot be determined from the 1971 air-carrier survey. It should be noted that although 35 percent of

Table 99

PERCENTAGE DISTRIBUTION OF ROUND TRIPS IN THE REGION ON AN AVERAGE WEEKDAY BY CARRIER TYPE: 1972, 1989, 1991, AND 1993

| | Carrier Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Amtrak | | Motor Bus | | Commuter Rail | | Air Carrier | |
| Making Round Trips | 1972 | 1991[a] | 1972 | 1993 | 1972 | 1993 | 1971[b] | 1989 |
| Yes . . . . . . . . . . . . | 91.6 | 65.3 | 84.2 | 59.6 | 96.9 | 87.7 | - - | 94.8 |
| No . . . . . . . . . . . . | 8.4 | 34.7 | 15.8 | 40.4 | 3.1 | 12.3 | - - | 5.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | - - | 100.0 |

[a]*Question in 1991 concerning whether the survey trip was part of a round trip asked whether the trip was part of round trip on day surveyed.*

[b]*Round-trip data were not collected during the 1971 survey.*

*Source: SEWRPC.*

Amtrak passengers in 1991 indicated that their trips were not part of any round trip, the question on the Amtrak survey specifically asked if the trip was part of a round trip being taken on the same day. It is believed that for many of these Amtrak passengers, the surveyed trip was indeed part of a round trip being completed on another day. In part, this is due to long-distance travelers who accounted for 16 percent of all passengers, or nearly one-half of the total Amtrak passengers, who indicated that the surveyed trip was a one-way trip in the Milwaukee-Chicago corridor.

Frequency of Trip: In response to a question about the frequency with which the trip was made, a high degree of repetitiveness was found only in commuter railway travel, in which 56 percent of the passengers indicated that the trip was usually made 20 or more times per month (see Table 100). Amtrak, air-carrier, and intercity motor coach passengers are generally infrequent travelers, as about 60 to 80 percent of such passengers indicated that they travel by their respective modes less than once per month. The frequency of travel among scheduled air-carrier passengers is shown in Table 101.

Trip Purpose by Carrier Type: The distribution of travel by trip purpose reflects some of the differences in the characteristics of travel by the four current public interregional modes, as shown in Tables 102 and 103. For example, there was a greater diversity of trip purposes for motor coach and Amtrak railway passengers than for commuter railway and scheduled air-carrier passengers in each of the survey years. The majority of motor coach passengers, 63 percent, made trips for reasons other than work, school, or shopping, while the majority of passengers using commuter railway service, 73 percent, made work-related trips. On Amtrak railway service, 41 percent of the trips were found to be work-related; on the scheduled air carriers, 54 percent of the trips were work-related.

Locations of Origins and Destinations: The geographic distribution of the trip origins and destinations of interregional passengers is presented in Table 104. In those cases where the passenger did not furnish an ultimate origin or destination, the boarding or deboarding location is used. The distribution of passenger trip origins and destinations, combined with trip purposes, emphasizes the nature of the carrier as either commuter-oriented or as a long-distance carrier. Not surprisingly, about 99 percent of commuter rail passenger trip interchanges are between the Southeastern Wisconsin Region and the counties of northeastern Illinois, predominantly between Kenosha County and Cook County. This pattern of travel is also found on the Amtrak railway service, where at least 85 percent of the trip interchanges are between the Southeastern Wisconsin Region and the counties of northeastern Illinois, predominantly

Table 100

**PERCENTAGE DISTRIBUTION OF FREQUENCY OF INTERREGIONAL TRIPMAKING BY SURFACE CARRIER TYPE: 1972, 1991, AND 1993**

| Frequency of Travel | Carrier Type | | | | | |
|---|---|---|---|---|---|---|
| | Amtrak | | Motor Bus | | Commuter Rail | |
| | 1972 | 1991 | 1972 | 1993 | 1972 | 1993 |
| Less than One Trip per Month | 65.5 | 59.0 | 59.9 | 66.8 | 9.5 | 19.4 |
| One to Four Trips per Month | 13.5 | 16.5 | 27.2 | 20.4 | 4.6 | 10.1 |
| Five to Nine Trips per Month | 10.0 | 6.5 | 9.3 | 6.6 | 6.6 | 4.2 |
| 10 to 19 Trips per Month | 2.7 | 4.6 | 2.4 | 3.7 | 12.5 | 10.5 |
| 20 or More Trips per Month | 8.3 | 13.4 | 1.2 | 2.5 | 66.8 | 55.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Source: SEWRPC.*

between Milwaukee County and Cook County. Among the intercity surface modes, only on motor coaches is there a wide geographic diversification of trip origins and destinations, reflecting the use of motor bus service by passengers as a provider of long-distance service for trip purposes other than work. Because the scheduled air-carrier surveys conducted at Mitchell International included only enplaning passengers and not deplaning passengers, the data show air-carrier trip origins being heavily concentrated within Southeastern Wisconsin and air-carrier trip destinations entirely outside the Region.

Mode of Travel before Boarding the Carrier: The modes of travel used to reach the train, motor bus, or airplane also emphasize the differences in travel characteristics among the various modes, as shown in Table 105. The most frequently used mode used to reach the boarding locations of all carriers in each of the survey years was the private auto, which accounted for 50 to 67 percent of the access modes used. By carrier type, the next most frequently used modes were: Amtrak, taxi, walking, or another train, which accounted for 17 percent, 16 percent, and 9 percent, respectively; intercity motor coaches, walking, local bus, taxi, or intercity motor coach, which accounted for 10 percent, 10 percent, 9 percent, and 8 percent, respectively; commuter rail, walking and taxi, which accounted for 28 percent and 8 percent, respectively; and air carriers, other aircraft and rental car, which accounted for 12 percent and 11 percent, respectively. All other modes accounted for less than 5 percent of travel to the boarding location for each carrier type.

Table 101

**AIR TRAVEL FREQUENCY OF ENPLANING PASSENGERS USING GENERAL MITCHELL INTERNATIONAL AIRPORT: 1989**

| Number of Departures Made Annually at Mitchell International | Percent |
|---|---|
| One or Fewer | 34.5 |
| Two to Six | 39.2 |
| Seven to 12 | 11.1 |
| 13 to 25 | 8.0 |
| 26 to 50 | 5.5 |
| More than 50 | 1.7 |
| Total | 100.0 |

*Source: SEWRPC.*

Selected Socio-Economic Characteristics: Selected socio-economic characteristics of interregional motor coach, railway train, and air passengers are shown in Table 106. Passengers using Amtrak had a median age of 38 and a median annual household income of $55,000. A majority classified their employment as either executive-

Table 102

**PERCENTAGE DISTRIBUTION OF AVERAGE WEEKDAY BUS AND RAIL PASSENGER TRIPS BY TRIP PURPOSE: 1972, 1991, AND 1993**

| | Carrier Type | | | | | |
|---|---|---|---|---|---|---|
| | Amtrak | | Motor Bus | | Commuter Rail | |
| Trip Purpose | 1972 | 1991 | 1972 | 1993 | 1972 | 1993 |
| Home-Based Work | 19.5 | 40.5 | 17.9 | 11.8 | 70.0 | 73.1 |
| Home-Based Shopping | 1.6 | 2.2 | 2.8 | 0.2 | 4.1 | 1.3 |
| Home-Based Other | 45.1 | 31.2 | 40.0 | 62.7 | 11.9 | 13.5 |
| Nonhome-Based | 28.6 | 24.5 | 23.4 | 15.6 | 9.6 | 7.4 |
| School | 5.2 | 1.6 | 15.9 | 9.7 | 4.4 | 4.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Source: SEWRPC.*

Table 103

**OVERALL TRAVEL PURPOSE OF ENPLANING PASSENGERS USING GENERAL MITCHELL INTERNATIONAL AIRPORT: 1871 AND 1989**

| | Percent of Passengers Citing Trip Purpose | |
|---|---|---|
| Trip Purpose | 1971 | 1989 |
| Work or Work-Related Business | 50.7 | 54.1 |
| Personal Business | 6.7 | 8.7 |
| School | 2.3 | 1.6 |
| Social/Recreational/Vacation | 38.5 | 32.4 |
| Other | 1.8 | 3.2 |
| Total | 100.0 | 100.0 |

*Source: SEWRPC.*

managerial or professional-technical and had an educational level of four years of college or better. Intercity motor coach passengers had a median age of 32 and a median annual household income of $22,000. Their principal occupations were reported to be student, craftsman-operator-laborer, professional-technical, or retired. The majority had a high school education or had attended some college. Passengers on commuter railway trains had a median age of 35 and a median annual household income of $46,000. The majority worked either in professional-technical, executive-managerial, or clerical-administrative support occupations and had at least four years of college. Air-carrier passengers had a median age of 41 and a median annual household income of $54,000 in 1989 dollars. No occupational or educational data were collected in the 1989 enplaning passenger survey. Data on automobile availability were not collected in the 1991 Amtrak survey or the 1989 enplaning passenger survey. However, 8 percent of passengers using commuter rail and 20 percent of passengers using motor coach came from households with no automobiles available.

## SUMMARY AND CONCLUSIONS

The Commission travel surveys conducted for 1963, 1972, and 1991 clearly demonstrate that travel is an orderly, regular, and measurable occurrence, evidenced by recognizable travel patterns. Recognition of those aspects and patterns of travel which demonstrate a high degree of repetitiveness is a prerequisite to foreseeing future travel behavior and, consequently, to sound transportation system planning. The Commission's comprehensive inventories of travel describe in detail each of the component parts of the total travel pattern of the Region. Knowledge of each of these parts is essential to an understanding of the total travel pattern within the Region, and, consequently, to the conceptual processes involved in establishing generalized norms of travel behavior.

This chapter has presented, in summary form, the basic findings of the 1991 Commission inventory of travel within the Region. In order to assess the changes occurring in travel habits

## Table 104

### PERCENTAGE DISTRIBUTION OF LOCATION OF TRIP ORIGINS AND DESTINATIONS FOR INTERREGIONAL RAIL, BUS, AND AIR PASSENGERS: 1989, 1991, AND 1993

| State and County | Carrier Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Amtrak: 1991 | | Motor Bus: 1993 | | Commuter Rail: 1993 | | Air Carrier: 1989 | |
| | Origins | Destinations | Origins | Destinations | Origins | Destinations | Origins | Destinations |
| Southeastern Wisconsin | | | | | | | | |
| Kenosha | 0.4 | 1.0 | 1.4 | 1.0 | 43.5 | 31.5 | 1.6 | - - |
| Milwaukee | 36.5 | 28.9 | 28.4 | 21.6 | 1.6 | 1.2 | 43.2 | - - |
| Ozaukee | 2.9 | 2.8 | 0.9 | 0.5 | 0.0 | 0.0 | 3.9 | - - |
| Racine | 4.0 | 3.0 | 1.6 | 2.3 | 10.2 | 9.2 | 4.6 | - - |
| Walworth | 0.1 | 0.3 | 0.0 | 0.1 | 0.3 | 0.8 | 1.9 | - - |
| Washington | 0.8 | 0.4 | 0.4 | 0.5 | 0.0 | 0.0 | 2.5 | - - |
| Waukesha | 8.5 | 8.2 | 2.5 | 2.7 | 0.3 | 0.3 | 16.7 | - - |
| Subtotal | 53.2 | 44.6 | 35.2 | 28.7 | 55.9 | 43.0 | 74.4 | - - |
| Other Wisconsin Counties | 3.5 | 4.1 | 19.2 | 26.8 | 0.0 | 0.0 | 14.9 | 5.1 |
| Northeastern Illinois Counties | 34.2 | 40.9 | 22.1 | 17.4 | 43.8 | 55.9 | 2.9 | 0.7 |
| Other Illinois Counties | 1.3 | 1.0 | 0.7 | 0.6 | 0.3 | 0.0 | - - | - - |
| All Other States and Countries | 7.8 | 9.4 | 22.8 | 26.5 | 0.0 | 1.1 | 7.8 | 94.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[a]*Responses are only from passengers enplaning at Milwaukee.*

[b]*Includes Cook, Du Page, Kane, Lake, McHenry, and Will Counties, Illinois.*

[c]*Includes the six northeastern Illinois counties plus the nine northwestern Illinois counties of Boone, Carroll, DeKalb, Jo Daviess, Lee, Ogle, Stephenson, Whiteside, and Winnebago.*

[d]*Includes all Illinois counties.*

*Source: SEWRPC.*

## Table 105

### PERCENTAGE DISTRIBUTION, BY CARRIER TYPE, OF MODE OF TRAVEL USED BY INTERREGIONAL PASSENGERS BEFORE BOARDING: 1971, 1972, 1989, 1989, AND 1993

| Mode of Travel | Carrier Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Amtrak | | Motor Bus | | Commuter Rail | | Air Carrier[a] | |
| | 1972 | 1991 | 1972 | 1993 | 1972 | 1993 | 1971 | 1989 |
| Private Auto | 62.3 | 50.2 | 45.5 | 57.9 | 74.7 | 57.9 | 57.0 | 67.2 |
| Rental Car | - -[b] | 0.7 | - -[b] | 0.4 | - -[b] | 0.4 | 9.3 | 10.9 |
| Taxi | 16.6 | 17.0 | 8.7 | 8.9 | 2.5 | 7.5 | 8.2 | 3.4 |
| Hotel Courtesy Car | - -[c] | 0.2 | - -[c] | 0.7 | - -[c] | 0.3 | 2.1 | 2.6 |
| Local City Bus | 8.1 | 4.1 | 22.5 | 9.7 | 1.9 | 4.0 | - -[d] | - -[d] |
| Intercity Bus | - -[e] | - - | - -[e] | 8.1 | - -[e] | 0.4 | 5.7[f] | 4.1[f] |
| Train | 6.7 | 9.4 | 2.2 | - - | - - | - - | - - | - - |
| "L" or Subway | - -[g] | 1.0 | - -[g] | 0.6 | - -[g] | 1.3 | - - | - - |
| Walking | 4.9 | 16.3 | 18.5 | 10.3 | 20.3 | 27.9 | - - | - - |
| Other | 1.4 | 1.1 | 2.6 | 3.4 | 0.6 | 0.3 | 17.7[h] | 11.8[h] |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[a]*Responses are only from passengers enplaning at Milwaukee.*

[b]*Included with "Private Auto" in 1972.*

[c]*Included with "Other" in 1972.*

[d]*Negligible, but included with "Intercity Bus."*

[e]*Included with "Local Bus" in 1972.*

[f]*Also includes airport limousines.*

[g]*Included with "Train" in 1972.*

[h]*Includes passengers arriving by other scheduled air carriers, air taxis, and private airplanes.*

*Source: SEWRPC.*

### Table 106

**PERCENTAGE DISTRIBUTION OF SELECTED SOCIO-ECONOMIC CHARACTERISTICS OF INTERREGIONAL RAIL, BUS, AND AIR PASSENGERS BY CARRIER TYPE: 1989, 1991, AND 1993**

| | Carrier Type | | | |
|---|---|---|---|---|
| | Amtrak | Motor Bus | Commuter Rail | Air Carrier |
| Selected Socio-Economic Characteristics | 1991 | 1993 | 1993 | 1989 |
| Age Group | | | | |
| 15 or Younger | 4.4 | 1.8 | 0.3 | 1.6 |
| 16 to 24 | 11.6 | 28.9 | 14.2 | 7.0 |
| 25 to 34 | 24.2 | 23.7 | 33.7 | 23.1 |
| 35 to 44 | 29.2 | 16.8 | 30.6 | 26.4 |
| 45 to 54 | 16.6 | 11.1 | 16.6 | 20.8 |
| 55 to 64 | 8.8 | 6.6 | 2.2 | 13.0 |
| 65 and Older | 5.2 | 11.1 | 2.4 | 8.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Occupation[a] | | | | |
| Executive/Managerial | 27.4 | 4.5 | 23.3 | - - |
| Clerical/Administrative Support | 6.1 | 7.5 | 13.5 | - - |
| Sales/Buyer | 10.3 | 2.7 | 4.8 | - - |
| Professional/Technical | 24.4 | 12.2 | 31.6 | - - |
| Craftsman/Operator/Laborer | 3.8 | 15.9 | 7.6 | - - |
| Self-Employed | 5.3 | 11.2 | 5.3 | - - |
| Teacher | 3.0 | 2.7 | 1.8 | - - |
| Homemaker | 3.4 | 8.5 | 2.6 | - - |
| Student | 9.6 | 23.3 | 8.7 | - - |
| Retired | 5.4 | 11.5 | 0.8 | - - |
| Other | 1.3 | - - | - - | - - |
| Total | 100.0 | 100.0 | 100.0 | - - |
| Education[a] | | | | |
| Some High School | 3.9 | 9.7 | 3.8 | - - |
| High School or GED | 8.9 | 28.2 | 14.7 | - - |
| Some College | 18.6 | 27.9 | 22.3 | - - |
| Associate/Technical Degree | 8.3 | 7.3 | 7.3 | - - |
| Bachelor's Degree | 34.7 | 13.9 | 32.9 | - - |
| Graduate Degree | 25.6 | 13.0 | 19.0 | - - |
| Total | 100.0 | 100.0 | 100.0 | - - |
| Annual Household Income (actual dollars) | | | | |
| Less than 10,000 | 5.6 | 23.2 | 6.4 | 3.1 |
| 10,000 to 19,999 | 6.2 | 23.9 | 7.4 | 5.4 |
| 20,000 to 29,999 | 11.6 | 16.0 | 10.7 | 10.3 |
| 30,000 to 39,999 | 10.8 | 13.1 | 18.1 | 12.8 |
| 40,000 to 49,999 | 11.4 | 9.5 | 13.2 | 14.1 |
| 50,000 to 74,999 | 22.6 | 8.1 | 26.9 | 26.3 |
| 75,000 to 99,999 | 11.7 | 3.6 | 12.9 | 12.0 |
| 100,000 or More | 20.1 | 2.6 | 4.4 | 16.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of Automobiles[a,b] | | | | |
| None | - - | 19.5 | 8.0 | - - |
| One | - - | 36.4 | 34.1 | - - |
| Two or More | - - | 44.1 | 57.9 | - - |
| Total | - - | 100.0 | 100.0 | - - |

[a] *This information was not collected in the 1989 enplaning passenger survey.*

[b] *This information was not collected in the 1991 Amtrak survey.*

*Source: SEWRPC.*

and patterns within the Region over time, comparisons have been made between the findings of the 1991 inventory with those of earlier Commission travel inventories of 1963 and 1972. The findings of the travel inventories which bear special significance for regional transportation system plan development include the following:

- On an average weekday in 1991, about 5.9 million person trips were made within the Region. This represents increases from 1972 of 1.2 million person trips, or 26 percent; and from 1963 of 2.1 million person trips, or 56 percent. The increases in regional tripmaking reflect the increases in the number of households within the Region of 26 percent from 1972 to 1991, and of 46 percent from 1963 to 1991, as well as the increases in employment of 31 percent from 1972 to 1991, and of 56 percent from 1963 to 1991. The increases in person trips in the Region were substantially greater than the changes in the resident population of the Region, a 1 percent decrease from 1972 to 1991 and a 9 percent increase from 1963 to 1991. Future levels of households and employment, rather than of resident population, should be considered key indicators of potential future travel growth.

- The number of internal person trips per resident household of the Region has remained remarkably stable, at 7.3 trips per household in 1963, 7.9 in 1972 and 7.8 in 1991. The level of average weekday internal person trips per capita, however, has increased significantly, from 2.2 trips per capita in 1963 to 2.5 in 1972 and to 3.1 in 1991. The stability in the household trip rate is remarkable, considering the substantial socio-economic and land use changes which have occurred within the Region over the last 30 years. These changes include an increase in automobile availability per household from 1.1 in 1963, to 1.2 in 1972, and to 1.6 in 1991; a decline in the cost of operating an automobile with respect to motor fuel, measured in 1991 dollars, from 12.7 cents per mile in 1963 to 9.4 cents per mile in 1972 and to 5.5 cents per mile in 1991; and a reduction in travel time between the various parts of the Region from 1963 to 1991 of between 6 percent and 14 percent. The stability in household trip production over the 30-year period of substantial socio-economic and land use changes in the Region indicates that continued stability in household trip production may be expected and that it may be unreasonable to expect that changes in land use patterns or site design, travel price, travel accessibility, or population lifestyles will materially affect the number of daily trips made per household within the Region.

- On an average weekday in 1991, nearly 4.9 million vehicle trips were made within the Region. This represents an increase of about 1.5 million vehicle trips, or 44 percent, from 1972 to 1991; and an increase of 2.3 million vehicle trips, or about 90 percent, from 1963 to 1991. The increase in vehicle trips from 1972 to 1991 is more substantial than the increase in person trips, specifically, an increase of 1.5 million vehicle trips and of 1.2 million person trips over the 19-year period. The principal factor contributing to the more rapid increase in vehicle trips is the decline in average vehicle occupancy observed in the surveys, from 1.42 persons per vehicle in 1972 to 1.26 persons per vehicle in 1991 with respect to all trips and, from 1.17 persons per vehicle in 1972 to 1.06 persons per vehicle in 1991 for work trips. Vehicle tripmaking should not increase significantly faster than person tripmaking in the future because vehicle occupancy can no longer experience declines of the magnitude exhibited historically.

- On an average weekday in 1991, 33 million vehicle-miles of travel occurred within the Region as a result of the 4.9 million vehicle trips. The historic increases in vehicle-miles of travel reported in Chapter IV of this report, from 20 million in 1972 to 33 million in 1991, or 65 percent, and from 13 million in 1963 to 33 million in 1991, or 154 percent, have been more rapid than the corresponding historic increases in total person tripmaking and vehicle tripmaking. The principal contributing factor to the more substantial increases in vehicle-miles of travel has been an increase in the average length of internal person trips from 5.3 miles in 1972 to 6.1 miles in 1991, an increase of about 18 percent; and from 4.5 miles in 1963 to 6.1 miles in 1991, an increase of about 35 percent. Thus, the 65 percent increase in highway traffic and attendant congestion in the Region from 1972 to 1991 has been the result only in part of demographic and economic growth and change and related person tripmaking. Only about 50 percent of the growth in highway traffic over roughly the past 20 years may be attributed to increased tripmaking as a result of demographic and economic growth and change. The remaining 50 percent may be attributed equally to the decline in vehicle occupancy and the increase in trip length.

- Nearly all, about 95 percent, of the person and vehicle trips made within the Region on an average weekday in each survey year were made by residents of the Region. Therefore, the location and capacity of future transportation facilities must accommodate, to the degree possible, the patterns of travel of regional residents.

- The number of personal vehicles, automobiles and personal-use light trucks available to residents of the Region increased from about 527,000 in 1963 to 705,000 in 1972, an increase of 178,000 autos, or 34 percent, and to 1,142,500 in 1991, an increase of 437,500, or 62 percent from 1972 to 1991. The percentage of total households in the Region having two or more personal vehicles available increased from 24 percent in 1963 to 34 in 1972 and to 53 percent in 1991, while the percentage of total households having no personal vehicle available decreased from 18 percent in 1963 to 17 percent in 1972, and to 13 percent in 1991. In addition, while automobile travel increased from about 88 percent of all internal person travel in the Region in 1963 to about 92 percent in both 1972 and 1991, mass transit travel decreased from 9 percent of total internal person travel in 1963 to 4 percent in 1972 and to 3 percent in 1991. These findings indicate that an even greater amount of total person travel than that observed in 1991 may be expected to be made by personal vehicle in future years, barring significant improvement in the regional transit system and changes in public attitudes toward the use of transit and public preferences relating to the type and location of housing.

- While substantial increases in tripmaking were found in all other travel modes on an average weekday, mass transit travel decreased sharply within the Region, from 324,000 trips in 1963, to 186,000 trips in 1972, and to 178,000 trips in 1991.

- In each of the three survey years, approximately 88 percent of total internal vehicle trips were made by automobile or taxi, and only about 11 to 12 percent were made by truck. The distribution of truck trips did not exhibit the same sharp concentrations in time of tripmaking as did automobile trips and did not coincide with the peak periods of automobile travel, either by hour of the day or day of the week. These findings indicate that, with respect to highway facilities, the transportation problem within the Region is primarily one of the movement of people rather than goods.

- Approximately 80 percent of total internal person trips within the Region on an average weekday in 1963, 1972, and 1991 consisted of trips made to or from places of residence. It is apparent, then, that future travel facility requirements within the Region will be determined largely by the amount and location of future residential development.

- Trips between home and work accounted for 25 percent of all internal person trips made within the Region on an average weekday in 1963, 24 percent in 1972, and 23 percent in 1991. The findings indicate that the location of future employment centers will be another important factor affecting travel demand within the Region. In 1991, school-related travel accounted for about 11 percent of all internal person trips within the Region; trips between home and shopping for about 15 percent; trips between home and other destinations for social, recreational, and personal business purposes for about 31 percent, and trips between nonhome origins and destinations for about 20 percent.

- The increase in tripmaking experienced within the Region over time has been a result of household and employment growth in the suburban and exurban portions of the Region, and of attendant tripmaking. Between 1963 and 1991, the 644,300-trip increase in suburban-area travel represented about 38 percent of the total internal person trip growth of approximately 1.68 million, excluding school trips. The 225,800-trip increase in exurban-area travel represented about 13 percent of the growth in travel, excluding school trips, within the Region. These changes were clearly foreseen and commented upon in the Commission's first-generation regional transportation system plan, completed in 1966. These findings are also consistent with the fact that nearly 66 percent of all growth in regional households and 68 percent of all growth in regional employment between 1963 and 1991 occurred in the suburban and exurban areas of the Region.

It is important to note that travel habits and patterns, such as those reported here, are the direct result of literally millions of individual personal decisions often made on a daily basis. Each individual exercises his or her choice regarding available transportation alternatives, utilizing a wide array of criteria, the relative importance assigned to the criteria being a matter of personal values. The criteria that an individual might utilize in making a transportation decision may include timeliness, trip purpose, cost, convenience, and perceived personal safety. Certain factors involved defy quantification, such as, among others, pleasure in driving, prestige, and family and personal activity levels. Individual choice is influenced significantly, and may be constrained, by the availability, convenience, and cost of alternatives. The latter may be determined, or at least influenced, by public policies.

The recognition that travel patterns and traffic volumes are a result of individual choice and of the factors considered in making these choices is critical to understanding the implications and practicality of any proposal to significantly change travel habits and patterns. In subsequent chapters of this report, transportation system alternatives which would require that the availability, convenience, and cost of alternative travel modes be substantially altered, are proposed and evaluated. To the extent practicable, the implications of these alternatives with respect to the modification of travel behavior will be evaluated by using Commission travel simulation models.

## Chapter VI

# ANTICIPATED REGIONAL GROWTH AND CHANGE, THE ADOPTED REGIONAL LAND USE PLAN, AND ALTERNATIVE FUTURES FOR SOUTHEASTERN WISCONSIN

## INTRODUCTION

Change is a basic characteristics of the modern world; urban growth, decay, and renewal are among the most important aspects of this change. No modern nation, state, or region can escape the effects of urban change; no part of daily life can avoid being influenced in some way by forces rooted in this complex process. Since change is inevitable, the question facing public officials and citizen leaders of a region, such as Southeastern Wisconsin, is not whether urban growth, decay, and renewal will occur, but how much may be expected to occur, when, and how well it will be shaped and guided in the public interest. Changes in population size, composition, and distribution; in employment levels and personal income; and in land use are all inevitable. In any planning effort, then, it is necessary to forecast changes in those factors which lie outside the scope of plan design, but which influence such design. This chapter presents the results of attempts to forecast both the magnitude and direction of anticipated changes in these factors and also the alternative land use plans designed to accommodate such changes.

Many methods have been developed for forecasting change in a region such as Southeastern Wisconsin. Some of these methods are quite simple, some are highly complex, but all are ultimately based upon historical experience and, in general, rely on a combination of mathematical formulation and professional judgment.

The principal difference between forecasting methods is generally reflected in the differing emphasis upon these two basic elements. At one extreme, a method may involve little or no mathematical formulation and may depend almost entirely upon the exercise of professional judgment. Because the variables entering into these forecasts are most often not clearly defined, even in the minds of their authors, such forecasts are generally not capable of reduction to a precise procedure which can be expressed mathematically. At the other extreme, a method may depend almost entirely upon mathematical formulation and require little or no exercise of professional judgment. Such forecasts, founded as they are on a precise procedure, may be readily replicated once the rules of the procedure are established. These procedural rules may be called forecasting models; if expressed in mathematical terms, they may be designated as mathematical forecasting models.[1]

It is important to understand that the forecasts based upon mathematical forecasting models are not necessarily more accurate than forecasts based largely upon experienced professional judgment. Forecasts based upon models, however, have two great advantages: they require that the underlying assumptions be explicitly stated and they permit the effects of differing underlying assumptions to be determined quantitatively.

It must also be recognized that no one can "predict" the future and that all forecasts, how ever made, involve uncertainty and, therefore, must always be used with great caution. Forecasts cannot take into account events which are unpredictable but may have a major effect upon future conditions. Such events include wars; epidemics; major social, political, and economic upheavals; and radical institutional changes. Moreover, both public and private decisions of a nature less radical than the foregoing can be made which may significantly affect the ultimate accuracy of any forecast. For these reasons, forecasting, like planning, must be a continuing process. As otherwise unforeseeable events

[1]*A model is a replica or representation of some other object or thing. Models are often used to simulate the operation of complex, real-world systems composed of a large number of interacting elements. A mathematical model uses a set of mathematical relationships (equations) to operate on a set of typical real data. The model is then used to simulate the operation of a real system, such as the flow of automobile traffic in a highway network.*

unfold, forecast results must be revised and, in turn, plans which are based on such forecasts must be reviewed and revised accordingly.

In more than three decades of long-range physical planning, the Commission has undertaken a number of studies of future population and economic activity. The traditional practice has been to prepare a number of projections of possible future population and economic activity levels, selecting from this range one set of forecast population and economic activity levels believed to be most likely to represent future conditions. The selected forecasts are then utilized in the development, test, and evaluation of alternative plans. This traditional approach was followed in the preparation of the first- and second-generation regional land use and transportation system plans.

The traditional approach to planning works well in periods of socio-economic stability, when historic trends can be anticipated to continue relatively unchanged over the plan design period. However, during periods of major change in social and economic conditions, when there is uncertainty as to whether historic trends will continue, an alternative to this traditional approach may be required. Surveillance activities carried out under the continuing regional planning program point to increasing uncertainty regarding future social and economic conditions in Southeastern Wisconsin. To deal with this uncertainty, the Commission has adopted an "alternative futures" approach to areawide, systems level planning.

The alternative futures approach to systems level planning has provided a broad basis for the design and evaluation of both land use plans and supporting systemwide facility plans such as the regional transportation system plan. It has involved the postulation of high-growth, low-growth, and intermediate-growth alternative future growth scenarios for the Region; the preparation of projections of population and employment for each scenario;[2] and the design of a recommended land use plan and alternative land use plans for each future growth scenario. Such alternative future plans have served to bracket conceptually the recommended land use plan and have permitted the evaluation of alternative transportation plans under various possible future land use conditions.

The first section of this chapter describes the high-growth, low-growth and intermediate-growth scenarios for Southeastern Wisconsin and sets forth the related projections of population, households, employment, and personal income. This section also presents estimated future land use requirements associated with the projected population and economic activity levels in the Region. The land use requirements associated with the intermediate-growth scenario served as the foundation for the design of the adopted 2010 land use plan.

The second section of this chapter describes the recommended regional land use plan, adopted by the Commission in September 1993. The plan is set forth in greater detail and its recommendations elaborated more fully in SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin: 2010. The adopted regional land use plan incorporates the basic concepts of the year 2000 land use plan and updates and extends that plan to a new design year. Like the year 2000 plan, the new plan recommends a relatively compact and centralized regional settlement pattern, with urban development occurring generally in concentric rings along the full periphery of, and outward from, existing urban centers. The overall scale and distribution of urban development distinguish the adopted plan from the alternative futures plans; the adopted plan may be termed an "intermediate-growth centralized land use plan."

The third section of this chapter summarizes the alternative land use plans considered, including a high-growth decentralized plan, a low-growth decentralized plan, an intermediate-growth decentralized plan, and a high-growth centralized plan.

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[2]*Information regarding the possible future population and economic activity levels in the Region through the year 2010 developed by the Commission using the alternative futures approach is presented in SEWRPC Technical Report No. 10 (2nd Edition), The Economy of Southeastern Wisconsin, 1984; and SEWRPC Technical Report No. 11 (2nd Edition), The Population of Southeastern Wisconsin, 1984.*

## ALTERNATIVE FUTURE GROWTH SCENARIOS

Under the alternative futures approach, three alternative future growth scenarios were postulated for Southeastern Wisconsin. The sets of conditions postulated for each "future" are intended to represent consistent, reasonable scenarios of future change in population and economic activity levels in the Region through the year 2010. Two scenarios, the "high-growth" scenario and the "low-growth" scenario, are intended to represent reasonable extremes, while the third scenario, the "intermediate-growth" scenario, is intended to represent a likely future. The general trends in resident population and economic activity levels envisioned under the respective scenarios are herein described.[3]

### Economic Growth Scenarios

Among the many uncertainties surrounding future economic conditions in the Region, two appeared to be particularly pertinent as the Commission attempted to prepare long-range economic forecasts. The first uncertainty pertains to the relative strength of the manufacturing sector, historically the dominant sector of the regional economy, but one which has experienced a major decline over the past two decades. The second uncertainty pertains to the long-term impacts of the recession of 1979 through 1983, a recession which lasted longer and was more severe within the Region than any recession since the Great Depression of the 1930s. Because that recession did not display a pattern typical of a normal business cycle, it could not be assumed that the ensuing recovery would be typical; thus the possibility of major structural changes in the regional economy could not be dismissed. The alternative economic growth scenarios described herein embody varying assumptions regarding the ability of the regional economy, particularly the manufacturing sector, to recover from the 1979 through 1983 recession and again compete effectively with other regions of the nation and the world.

The economic changes that may be expected under a high-growth scenario represent a return to the type of growth that has historically occurred in the regional economy. Under this scenario, there would be no long-term damage to the regional economy as a result of the 1979 through 1983 recession and the economic recovery of the Region would be strong after 1985, with long-term growth rates recovering to levels at, or slightly below, national averages. This growth would be expected to result from the identification and exploitation of strengths in the regional economy, such as labor availability, a good vocational-technical educational system, land availability, and a high-quality infrastructure of railway, highway, seaport, airport, and sewerage and water systems. In addition, the traditional manufacturing interests that historically comprised the foundation of the regional economy would be successful in reducing production costs and increasing productivity through the application of advanced technologies to traditional manufacturing processes, thereby improving their competitive position. The trade and service sectors would, under this scenario, continue to grow at rapid rates, as they have done over the past several decades.

Under the intermediate-growth scenario, the recovery of the regional economy from the 1979 through 1983 recession would be delayed and would be initially weaker than the national recovery as the heavy industrial and manufacturing concerns that dominate the regional economy continue to close unprofitable plants and limit operations in the streamlining efforts necessary for survival during poor economic conditions. Under this scenario, the changes occurring during this contraction of the manufacturing employment group would ultimately lead to a stronger, though initially smaller, regional manufacturing economy as more efficient factory operations allow employers to expand and modernize existing plants. Employment in retail and wholesale trade would increase as the economy recovers. Employment

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[3] *The "high-growth," "intermediate-growth," and "low-growth" scenarios as described in this chapter are equivalent to the "optimistic," "intermediate," and "pessimistic" regional growth scenarios, respectively, described in SEWRPC Technical Report No. 10 (2nd Edition), The Economy of Southeastern Wisconsin, 1984, and SEWRPC Technical Report No. 11 (2nd Edition), The Population of Southeastern Wisconsin, 1984.*

in the services sector would also increase, continuing recent trends seen at both the regional and national levels.

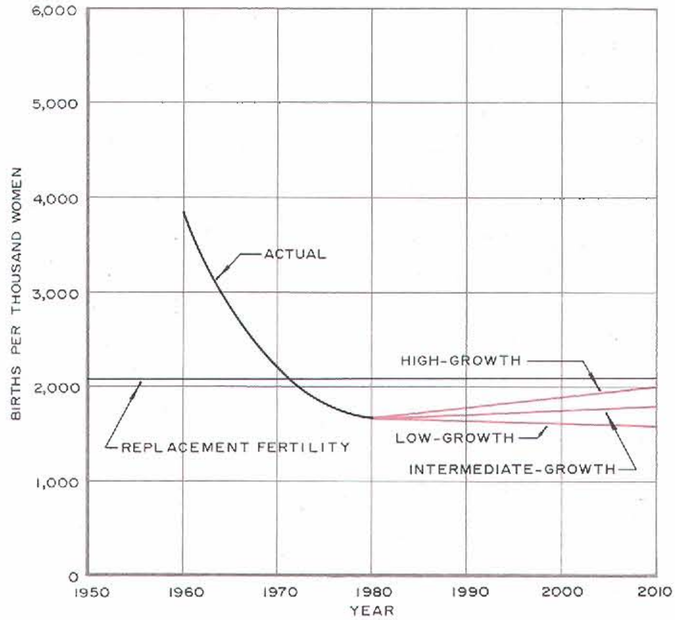
The economic conditions that may be expected under a low-growth scenario represent a departure from long-term trends under which the Region was able to maintain or to increase its relative share of national employment. Under the low-growth scenario, the recovery of the regional economy from the 1979 through 1983 recession would be a lengthy one, with regional employment remaining depressed. Over the long term, the Region would experience a continuation or even an acceleration of a trend first observed in the 1970s, when Southeastern Wisconsin began to experience a decline in its share of total national employment. This departure from historic trends is based on an assumed inability of area manufacturers to modernize their aging physical capital stock, resulting in declining productivity and continued erosion of product markets. Increased foreign competition in manufacturing industries and the continued migration of manufacturing employment to other regions of the United States would more than offset any employment gains that could be expected in such possible growth sectors as wholesale trade, retail trade, medical and other professional services, and finance, insurance, and real estate. Under this scenario, the lack of industrial expansion or rejuvenation could be expected to hold total employment levels in the Region at, or slightly below, the 1980 levels through the year 2010.

Population Growth Scenarios

The population of an area is constantly changing as a result of births, deaths, and the migration of persons into, or out of, the area. Area population projections may be prepared through explicit consideration of these components of population change. The process of developing alternative population growth scenarios for Southeastern Wisconsin involved a review of critical social and economic factors that could be expected to impact on mortality, fertility, and migration rates through the year 2010 and the establishment of a reasonable range of values for each component of population change. Each of the three population growth scenarios developed by the Commission reflects a combination of assumed fertility, mortality, and migration rates selected from the range of possible values. The

**Figure 44**

**HISTORICAL AND PROJECTED WHITE TOTAL FERTILITY RATE FOR THE REGION: 1960-2010**




*Source: U. S. Bureau of the Census and SEWRPC.*

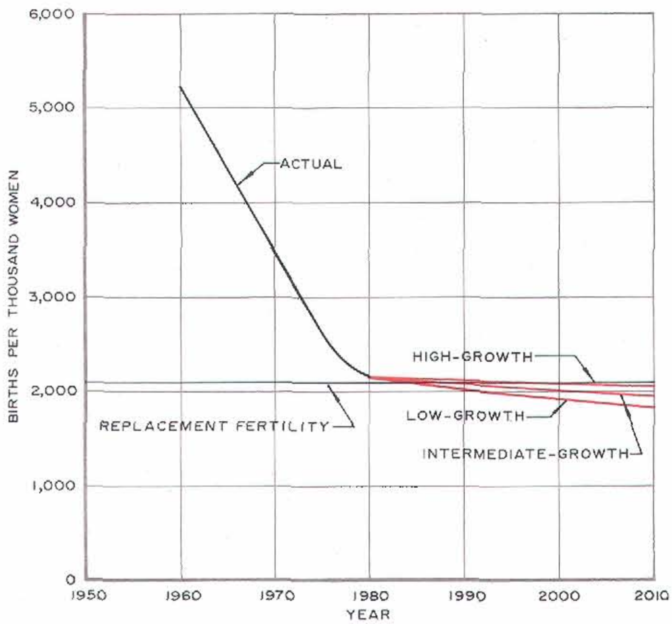
assumed combinations of fertility, mortality, and migration rates were ultimately used to project the probable size of the population of the Region under a range of possible future conditions.

Among the population growth scenarios, the highest fertility rates were assumed for the high-growth scenario and the lowest fertility rates for the low-growth scenario (see Figures 44 and 45). The overall range between the low and high fertility rates was relatively narrow, a joint product of changing societal preferences regarding family size, the increased availability of family planning, and the effectiveness of birth control. The narrow range only slightly diminishes the crucial nature of the assumed rates, however, because the differences in the rates are compounded over the course of several generations. With regard to the other determinant of natural increase in population, mortality rates, it should be noted that the same set of mortality rates was assumed for each population growth scenario.

The rates of migration assumed under the high-growth, intermediate-growth, and low-growth scenarios were logically linked to anticipated

Figure 45

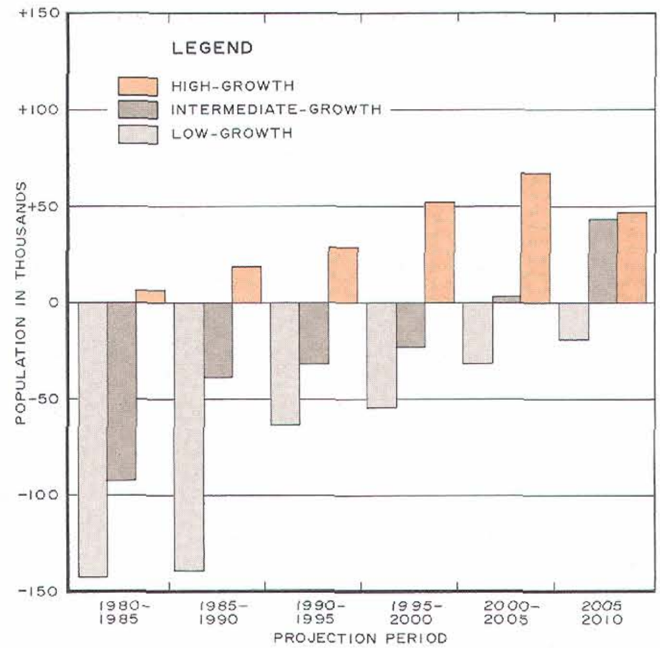
**HISTORICAL AND PROJECTED NONWHITE TOTAL FERTILITY RATE FOR THE REGION: 1960-2010**




*Source: U. S. Bureau of the Census and SEWRPC.*

Figure 46

**PROJECTED LEVELS OF NET MIGRATION FOR THE REGION UNDER HIGH-GROWTH, INTERMEDIATE-GROWTH, AND LOW-GROWTH FUTURE ECONOMIC CONDITIONS**




*Source: SEWRPC.*

economic conditions, taking into account the number of jobs, unemployment rates, rates of dual job holding, and labor force participation rates envisioned under the corresponding economic growth scenarios. Significant net in-migration of population was postulated under the high-growth scenario as a result of the assumed strong recovery from the 1979 through 1983 recession and the assumed ability of the regional economy to compete with other areas (see Figure 46). Under the intermediate-growth scenario, it was assumed that the net out-migration experienced in the Region during the 1970s would gradually diminish in response to gradually improving economic conditions and that net in-migration of population into the Region would begin after the year 2000. Under the low-growth scenario, it was assumed that significant out-migration of population would occur over the entire 1980 to 2010 projection period in response to a stagnating regional economy, with the highest rates of out-migration anticipated during the 1980s.

The varying assumptions regarding rates of natural increase and net migration described above lead to significantly different scenarios of population change in the Region. A substantial increase, 31 percent, in the regional population between 1980 and 2010 is envisioned under the high-growth scenario, while a relatively modest population increase, 6 percent, is envisioned under the intermediate-growth scenario. A decrease in the regional population of about 14 percent is envisioned under the low-growth scenario.

Accompanying changes in population size would be changes in the number, size, and type of households. Under each growth scenario, the number of households would increase and average household size would decrease, although rates of change in the number of households and average household size would vary considerably for the three scenarios. The high-growth scenario assumes that "traditional" patterns of household composition will exist between 1980 and 2010 and that households consisting of a husband, wife, and children will constitute the dominant type, although the average number of children in the households will be lower than in the past. Under this scenario, the average household size in the Region would decrease from about 2.8 in 1980 to about 2.6 in 2010. The intermediate-growth

Table 107

POPULATION LEVELS IN THE REGION BY COUNTY: ACTUAL 1980 AND 1990 AND PROJECTED 1990, 2000, AND 2010

| County | Population | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Actual 1980 | Actual 1990 | Projected | | | | Projected Change 1980-2010 | |
| | | | Scenario | 1990 | 2000 | 2010 | Number | Percent |
| Kenosha | 123,100 | 128,200 | High-growth | 135,700 | 152,900 | 166,800 | 43,700 | 35.5 |
| | | | Intermediate-growth | 117,300 | 118,000 | 123,300 | 200 | 0.2 |
| | | | Low-growth | 109,900 | 105,200 | 101,800 | -21,300 | -17.3 |
| Milwaukee | 965,000 | 959,300 | High-growth | 964,900 | 991,900 | 1,009,800 | 44,800 | 4.6 |
| | | | Intermediate-growth | 924,300 | 892,200 | 911,300 | -53,700 | -5.6 |
| | | | Low-growth | 861,700 | 831,800 | 818,100 | -146,900 | -15.2 |
| Ozaukee | 67,000 | 72,800 | High-growth | 84,000 | 106,200 | 139,000 | 72,000 | 107.5 |
| | | | Intermediate-growth | 69,700 | 75,000 | 81,900 | 14,900 | 22.2 |
| | | | Low-growth | 60,500 | 58,800 | 57,700 | -9,300 | -13.9 |
| Racine | 173,100 | 175,100 | High-growth | 188,400 | 206,000 | 224,700 | 51,600 | 29.8 |
| | | | Intermediate-growth | 165,200 | 166,000 | 171,800 | -1,300 | -0.8 |
| | | | Low-growth | 152,900 | 146,800 | 139,600 | -33,500 | -19.4 |
| Walworth | 71,500 | 75,000 | High-growth | 85,600 | 106,200 | 129,700 | 58,200 | 81.4 |
| | | | Intermediate-growth | 78,200 | 85,600 | 89,900 | 18,400 | 25.7 |
| | | | Low-growth | 66,900 | 65,000 | 63,700 | -7,800 | -10.9 |
| Washington | 84,900 | 95,300 | High-growth | 114,300 | 135,900 | 164,400 | 79,500 | 93.6 |
| | | | Intermediate-growth | 97,500 | 109,500 | 116,000 | 31,100 | 36.6 |
| | | | Low-growth | 78,000 | 75,800 | 74,400 | -10,500 | -12.4 |
| Waukesha | 280,200 | 304,700 | High-growth | 353,800 | 424,800 | 481,700 | 201,500 | 71.9 |
| | | | Intermediate-growth | 302,000 | 336,000 | 378,000 | 97,800 | 34.9 |
| | | | Low-growth | 267,700 | 264,400 | 261,800 | -18,400 | -6.6 |
| Region | 1,764,800 | 1,810,400 | High-growth | 1,926,700 | 2,123,900 | 2,316,100 | 551,300 | 31.2 |
| | | | Intermediate-growth | 1,754,200 | 1,782,300 | 1,872,200 | 107,400 | 6.1 |
| | | | Low-growth | 1,597,600 | 1,547,800 | 1,517,100 | -247,700 | -14.0 |

*Source: U. S. Bureau of the Census and SEWRPC.*

scenario assumes that traditional patterns of household composition will be less dominant and that single-parent families and single-person households will be more prevalent than under the high-growth scenario. The historic increase in single-parent and single-person households would, however, be moderate under this scenario. The average household size in the Region would decrease from about 2.8 in 1980 to about 2.4 in 2010. The low-growth scenario assumes that husband-wife households will continue to decrease as a proportion of total households and that single-parent and single-person households will increase as a proportion of total households, as they have done historically. Under this scenario, the average household size in the Region would decrease from about 2.8 in 1980 to about 2.1 in 2010.

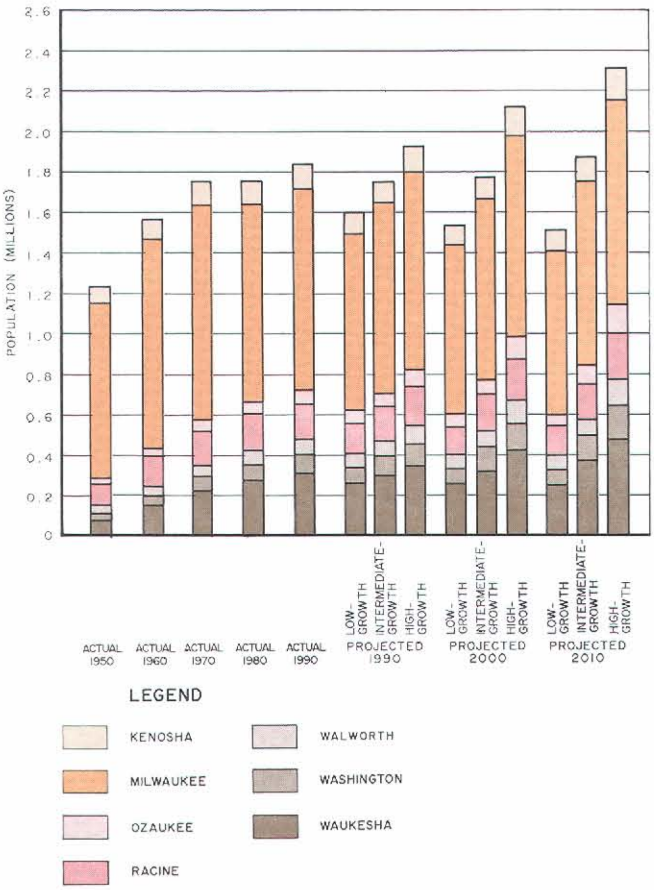
Population Projections

Commission population projections for the Region and the constituent counties under the three regional growth scenarios described above are set forth in Table 107. The projected distribution of the population among the counties in the Region under the three growth scenarios is also shown in Figure 47.

Under the high-growth scenario, the resident population of the Region would increase by about 551,300 persons, or 31 percent, from 1,764,800 persons in 1980 to 2,316,100 persons in 2010. Under this scenario, Waukesha County could be expected to gain about 201,500 persons, an increase of 72 percent over the 30-year projection period. The other six counties in the Region would experience smaller, but neverthe-

Figure 47

POPULATION LEVELS IN THE REGION BY COUNTY: ACTUAL AND PROJECTED: 1950-2010




*Source: U. S. Bureau of the Census and SEWRPC.*

less significant, population increases, ranging from about 43,700 persons in Kenosha County to about 79,500 persons in Washington County.

Under the intermediate-growth scenario, the regional population would be expected to increase by about 107,400 persons, or about 6 percent, to a level of 1,872,200 in the year 2010. Waukesha County would also experience the largest absolute population increase, 97,800 persons, under this scenario. Ozaukee, Walworth, and Washington Counties would gain 14,900, 18,400, and 31,100 persons, respectively. The population levels of Kenosha and Racine Counties would not change significantly. The population of Milwaukee County would decrease by about 53,700 persons over the 30-year projection period, decreasing from 965,000 persons in 1980 to just under 900,000 persons in the year 2000, then increasing to about 911,300 in the year 2010.

The low-growth scenario envisions a year 2010 population of 1,517,100, a decrease of 247,700 persons, or 14 percent, from the 1980 level. Each county in the Region would experience a population decrease under this scenario, ranging from about 7,800 persons in Walworth County to about 146,900 persons in Milwaukee County. The substantial loss of population in Milwaukee County would account for 59 percent of the overall loss projected for the Region under this scenario.

It should be noted that since 1980 the actual population level of the Region has most closely approximated the level anticipated under the intermediate-growth scenario (see Figure 48). Recently released 1990 U. S. Census data indicate that the resident population of the Region stood at 1,810,400 persons in 1990, 3 percent, or 56,200 persons, greater than the level of 1,754,200 anticipated under the intermediate-growth scenario. The 1990 resident population was about 212,800 persons, or 13 percent, greater than the level of 1,597,600 envisioned under the low-growth scenario, and about 116,300 persons, or 6 percent, less than the level of 1,926,700 projected under the high-growth scenario. Actual population levels are compared with projected population levels by county in Figure 48.

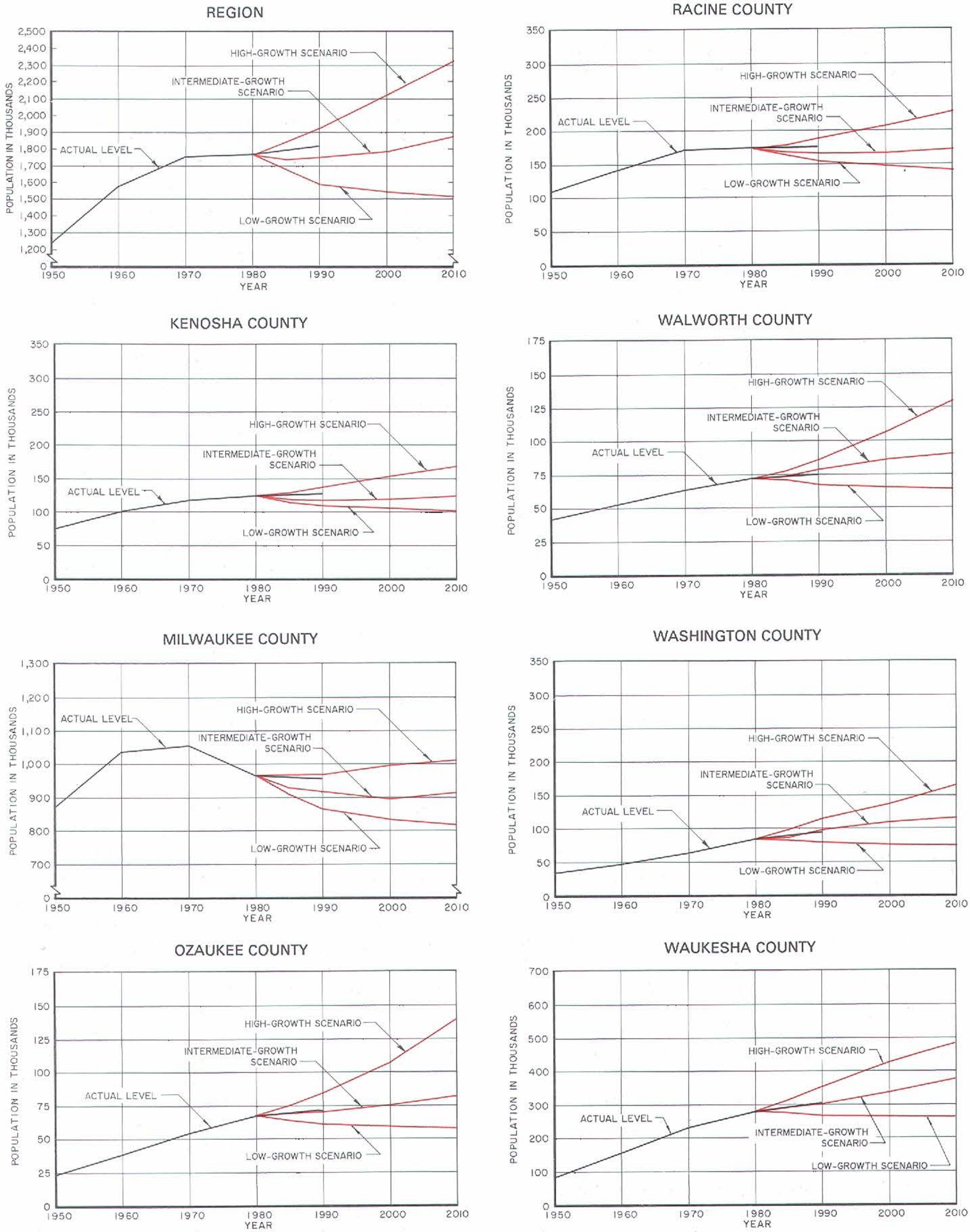
Household Projections

Changes in the number of households have important implications for long-range land use and transportation system planning. The household creates much of the demand for various land uses and such public facilities and services as arterial streets and highways and public transit service. The projections of the number of households in the Region under the high-growth, intermediate-growth, and low-growth scenarios are set forth in Table 108. The projected changes in the distribution of households among counties in the Region is shown in Figure 49. As will become apparent, the anticipated changes in the number of households do not necessarily parallel the anticipated changes in total population under the respective scenarios, a result of assumed changes in household types and related changes in household size, previously described.

As indicated in Table 108, under the high-growth scenario, the number of households in

Figure 48

ACTUAL AND ALTERNATIVE FUTURE REGIONAL AND COUNTY POPULATION LEVELS: 1950-2010




Source: Wisconsin Department of Administration, U. S. Bureau of the Census, and SEWRPC.

Table 108

HOUSEHOLDS IN THE REGION BY COUNTY: ACTUAL 1980 AND 1990 AND PROJECTED 1990, 2000, AND 2010

| County | Households | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Actual 1980 | Actual 1990 | Projected | | | | Projected Change 1980-2010 | |
| | | | Scenario | 1990 | 2000 | 2010 | Number | Percent |
| Kenosha | 43,100 | 47,000 | High-growth | 48,200 | 55,300 | 61,400 | 18,300 | 42.5 |
| | | | Intermediate-growth | 43,000 | 45,500 | 50,200 | 7,100 | 16.5 |
| | | | Low-growth | 41,600 | 43,500 | 46,300 | 3,200 | 7.4 |
| Milwaukee | 363,700 | 373,000 | High-growth | 369,300 | 384,200 | 397,100 | 33,400 | 9.2 |
| | | | Intermediate-growth | 365,900 | 370,000 | 398,900 | 35,200 | 9.7 |
| | | | Low-growth | 351,300 | 371,100 | 401,000 | 37,300 | 10.3 |
| Ozaukee | 21,800 | 25,700 | High-growth | 27,900 | 35,900 | 48,000 | 26,200 | 120.2 |
| | | | Intermediate-growth | 23,900 | 27,000 | 31,200 | 9,400 | 43.1 |
| | | | Low-growth | 21,400 | 22,700 | 24,600 | 2,800 | 12.8 |
| Racine | 59,400 | 63,700 | High-growth | 65,700 | 73,300 | 81,300 | 21,900 | 36.9 |
| | | | Intermediate-growth | 59,400 | 62,700 | 68,400 | 9,000 | 15.2 |
| | | | Low-growth | 56,700 | 59,600 | 62,200 | 2,800 | 4.7 |
| Walworth | 24,800 | 27,600 | High-growth | 30,600 | 38,800 | 48,400 | 23,600 | 95.2 |
| | | | Intermediate-growth | 28,900 | 33,400 | 36,900 | 12,100 | 48.8 |
| | | | Low-growth | 25,500 | 27,000 | 29,100 | 4,300 | 17.3 |
| Washington | 26,700 | 33,000 | High-growth | 36,700 | 44,400 | 54,800 | 28,100 | 105.2 |
| | | | Intermediate-growth | 32,200 | 38,300 | 42,800 | 16,100 | 60.3 |
| | | | Low-growth | 26,600 | 28,200 | 30,500 | 3,800 | 14.2 |
| Waukesha | 88,500 | 106,000 | High-growth | 114,500 | 139,800 | 161,700 | 73,200 | 82.7 |
| | | | Intermediate-growth | 100,600 | 118,000 | 140,200 | 51,700 | 58.4 |
| | | | Low-growth | 92,000 | 99,400 | 108,200 | 19,700 | 22.3 |
| Region | 628,000 | 676,100 | High-growth | 692,900 | 771,700 | 852,700 | 224,700 | 35.8 |
| | | | Intermediate-growth | 653,900 | 694,900 | 768,600 | 140,600 | 22.4 |
| | | | Low-growth | 615,100 | 651,500 | 701,900 | 73,900 | 11.8 |

*Source: U. S. Bureau of the Census and SEWRPC.*

the Region would increase by 224,700, or about 36 percent, from about 628,000 in 1980 to about 852,700 in 2010. The projected relative increase of 36 percent is slightly greater than the increase of about 31 percent in the total population projected under this scenario. As might be expected, Waukesha County, which has the largest projected absolute increase in total population, would have the largest absolute increase in households between 1980 and 2010, about 73,200. For the other six counties, the increases would range from about 18,300 in Kenosha to about 33,400 in Milwaukee.

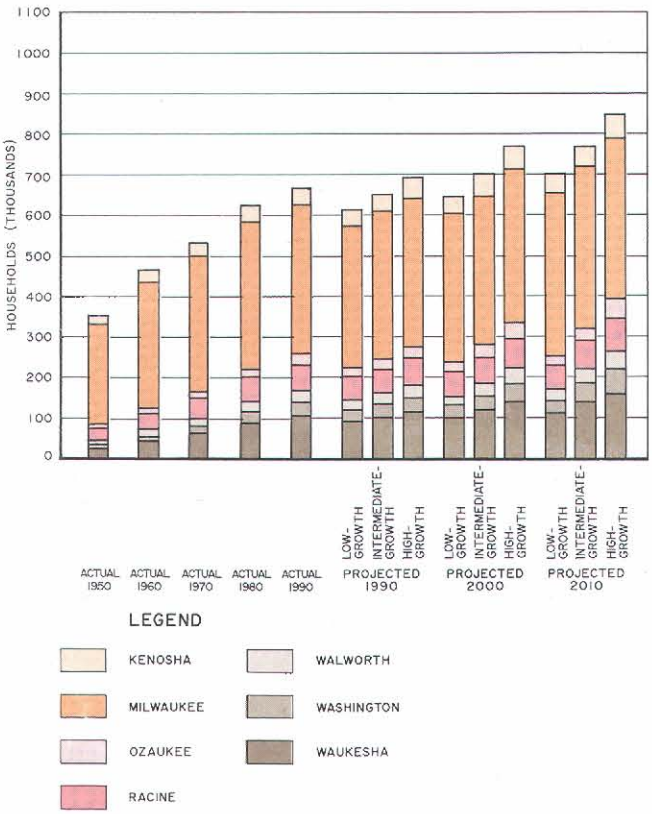
Under the intermediate-growth scenario, the number of households in the Region would increase by about 140,600, or 22 percent, to a level of about 768,600 in the year 2010. The projected 22 percent increase in households is significantly greater than the 6 percent increase in total population projected under this scenario. Among the seven counties, the increases in households would range from about 7,100 in Kenosha to about 51,700 in Waukesha.

Under the low-growth scenario, the number of households would increase by about 73,900, or about 12 percent, to about 701,900 in the year 2010. This is in contrast to a projected 14 percent decrease in the total regional population between 1980 and 2010. It is a result of the assumed increase in smaller households, particularly single-person and single-parent households. Under this scenario, the increase in households would be about 37,300 in Milwaukee County, about 19,700 in Waukesha County, and under 5,000 in Kenosha, Ozaukee, Racine, Walworth and Washington Counties.

As shown in Figure 49, the actual increase in the number of households in the Region since 1980 has been between the levels anticipated under

Figure 49

**HOUSEHOLD LEVELS IN THE REGION BY COUNTY: ACTUAL AND PROJECTED 1950-2010**




*Source: U. S. Bureau of the Census and SEWRPC.*

the high-growth and intermediate-growth scenarios. The number of households in the Region in 1990 was anticipated to be 692,900 under the high-growth scenario, 653,900 under the intermediate-growth scenario, and 615,100 under the low-growth scenario. Recently released data from the 1990 Federal Census of Population and Housing indicate that the number of households in the Region was 676,100 in 1990, about 16,800 households, or 2 percent, below the level envisioned under the high-growth scenario. Consequently, the actual number of households exceeded the levels anticipated under the intermediate-growth and low-growth scenarios by 22,200, or 3 percent, and by 61,000, or 10 percent, respectively. Actual household levels are compared with projected household levels by county in Figure 50.

Employment Projections

Commission employment projections for the Region under the three regional growth scenarios are presented in Table 109. The projected change in the distribution of employment among the counties in the Region is shown in Figure 51. Under the high-growth scenario, total employment in the Region would increase by 42 percent, or 367,400 jobs, from 884,200 in 1980 to 1,251,600 in 2010. Each of the seven counties would experience a significant employment increase, ranging from about 24,500 jobs in Ozaukee County to 103,900 jobs in Waukesha County.

Under the intermediate-growth scenario, employment growth would occur at a more moderate rate, about 19 percent, to about 1,051,300 jobs by the year 2010, an increase of about 167,100 jobs over 1980. Employment in Waukesha County would increase by about 68,900 jobs; the increases for the other six counties would range from about 9,700 jobs in Milwaukee County to about 29,000 jobs in Racine County.

Under the low-growth scenario, employment levels, which dropped significantly during the 1979 to 1983 depression, would stay depressed throughout the 1980s and would increase only gradually thereafter. By 2010, employment in the Region would reach 870,900, about 13,300 jobs less than the 1980 level. Milwaukee County would lose about 63,300 jobs between 1980 and 2010 under this scenario, while Waukesha County would gain about 37,000 jobs. Employment changes in the other five counties would be relatively minor.

Each of the regional growth scenarios envisions continued change in the structure of the regional economy. In particular, under each of the growth scenarios, the historic dominance of manufacturing employment in the Region would continue to decrease, while the relative share of employment in service industries would increase.[4] As indicated in Table 110, under the high-growth scenario, manufacturing employment would

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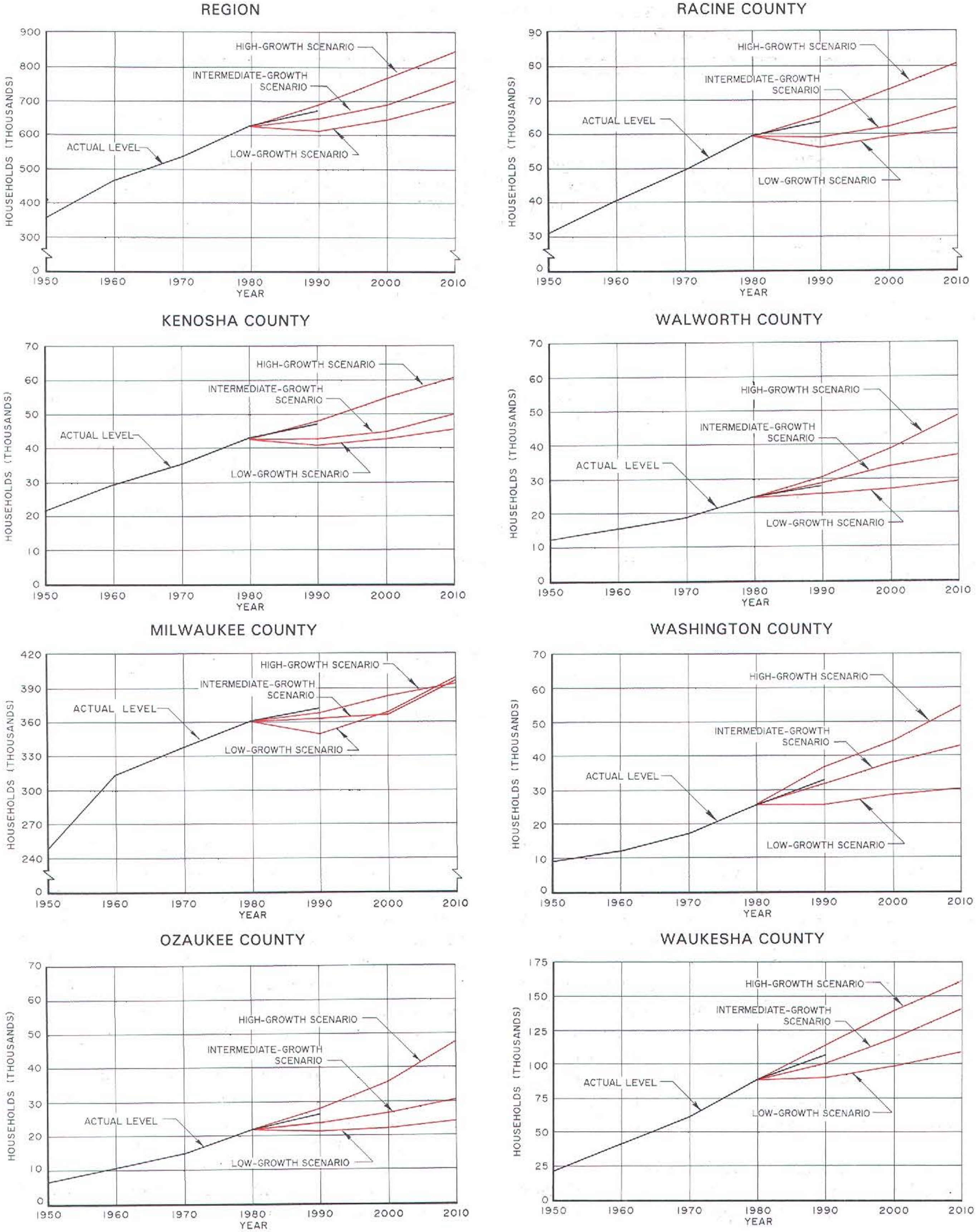
[4]*As presented in this chapter, manufacturing employment includes employment in manufacturing, construction, and wholesale trade. Service employment includes persons employed in services and finance, insurance, and real estate along with self-employed persons. Agricultural employment includes employment in agriculture, agricultural services, forestry, mining, and miscellaneous.*

Figure 50

ACTUAL AND ALTERNATIVE FUTURE REGIONAL AND COUNTY HOUSEHOLD LEVELS: 1950-2010




Source: U. S. Bureau of the Census and SEWRPC.

Table 109

EMPLOYMENT LEVELS IN THE REGION BY COUNTY: ACTUAL 1980 AND 1990 AND PROJECTED 1990, 2000, AND 2010

| County | Employment | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Actual 1980 | Actual 1990 | Projected | | | | Projected Change 1980-2010 | |
| | | | Scenario | 1990 | 2000 | 2010 | Number | Percent |
| Kenosha | 50,100 | 46,500 | High-growth | 56,300 | 65,600 | 75,100 | 25,000 | 49.9 |
| | | | Intermediate-growth | 50,200 | 54,200 | 61,000 | 10,900 | 21.8 |
| | | | Low-growth | 45,400 | 47,100 | 48,800 | -1,300 | -2.6 |
| Milwaukee | 542,300 | 578,200 | High-growth | 573,000 | 599,800 | 625,800 | 83,500 | 15.4 |
| | | | Intermediate-growth | 518,000 | 530,000 | 552,000 | 9,700 | 1.8 |
| | | | Low-growth | 484,300 | 481,800 | 479,000 | -63,300 | -11.7 |
| Ozaukee | 25,600 | 32,200 | High-growth | 31,600 | 40,000 | 50,100 | 24,500 | 95.7 |
| | | | Intermediate-growth | 26,400 | 31,400 | 36,800 | 11,200 | 43.8 |
| | | | Low-growth | 23,600 | 25,200 | 26,100 | 500 | 2.0 |
| Racine | 76,100 | 82,200 | High-growth | 94,800 | 114,400 | 137,700 | 61,600 | 80.9 |
| | | | Intermediate-growth | 81,900 | 91,400 | 105,100 | 29,000 | 38.1 |
| | | | Low-growth | 72,200 | 75,700 | 78,400 | 2,300 | 3.0 |
| Walworth | 31,100 | 37,100 | High-growth | 40,500 | 51,100 | 62,600 | 31,500 | 101.3 |
| | | | Intermediate-growth | 34,400 | 40,000 | 47,300 | 16,200 | 52.1 |
| | | | Low-growth | 30,000 | 32,000 | 34,800 | 3,700 | 11.9 |
| Washington | 31,400 | 41,800 | High-growth | 41,500 | 53,300 | 68,800 | 37,400 | 119.1 |
| | | | Intermediate-growth | 36,100 | 42,800 | 52,600 | 21,200 | 67.5 |
| | | | Low-growth | 31,600 | 35,300 | 39,200 | 7,800 | 24.8 |
| Waukesha | 127,600 | 172,300 | High-growth | 150,200 | 186,600 | 231,500 | 103,900 | 81.4 |
| | | | Intermediate-growth | 133,900 | 161,800 | 196,500 | 68,900 | 54.0 |
| | | | Low-growth | 124,200 | 143,800 | 164,600 | 37,000 | 29.0 |
| Region | 884,200 | 990,300 | High-growth | 987,900 | 1,110,800 | 1,251,600 | 367,400 | 41.6 |
| | | | Intermediate-growth | 880,900 | 951,600 | 1,051,300 | 167,100 | 18.9 |
| | | | Low-growth | 811,300 | 840,900 | 870,900 | -13,300 | -1.5 |

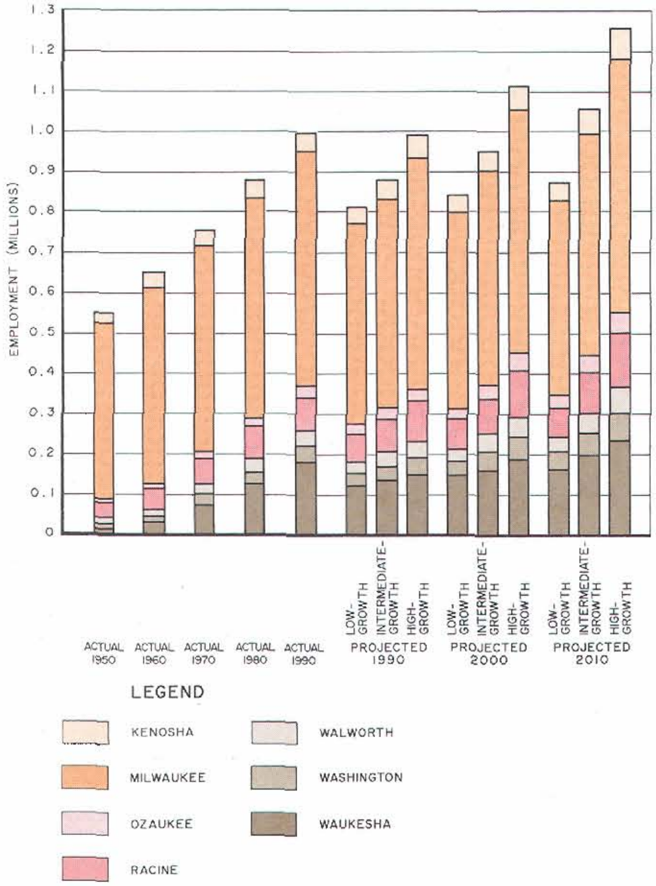
*Source: Wisconsin Department of Industry, Labor and Human Relations and SEWRPC.*

increase by 29 percent, compared to a projected increase of about 66 percent in service employment. Under the intermediate-growth scenario, manufacturing employment would increase by only 7 percent, compared to a service employment increase of about 37 percent. Under the low-growth scenario, manufacturing employment would decrease by about 13 percent, while service employment would increase by 12 percent. As a result, by the year 2010, the relative share of service employment would be nearly equal to that of manufacturing under each of the growth scenarios (see Table 111).

As shown in Figure 52, during the latter half of the 1980s, actual employment in the Region approached levels anticipated under the high-growth scenario. The employment level was anticipated to be 987,900 jobs in 1990 under the high-growth scenario, 880,900 jobs under the intermediate-growth scenario, and 811,300 jobs under the low-growth scenario. The actual 1990 level of 990,300 jobs is about 0.2 percent above the level anticipated under the high-growth scenario, about 12 percent above the level anticipated under the intermediate-growth scenario, and about 22 percent above the level anticipated under the low-growth scenario. Actual employment levels through 1990 are compared with those projected under the three regional growth scenarios for each of the seven counties in Figure 52. In reviewing these data, it is important to recognize that employment levels are subject to short-term fluctuation in response to

Figure 51

EMPLOYMENT LEVELS IN THE REGION BY COUNTY: ACTUAL AND PROJECTED: 1950-2010




Source: *Wisconsin Department of Industry, Labor and Human Relations and SEWRPC.*

business cycles, cycles which are apparent on the accompanying graphs. Long-term employment trends following the deep recession of 1979 through 1983 are not yet clearly defined.

Personal Income Projections

Changes in employment levels and in the types of jobs available may be expected to result in changes in personal income levels in the Region. Future income levels will have a direct bearing on the ability of the regional population to pursue personal preferences regarding housing types and location, recreation, and other lifestyle factors and, accordingly, may be expected to have a major impact on the evolving regional settlement pattern.

Projections of personal income levels under the three alternative regional growth scenarios are presented in this section. For each scenario, the primary income projections made were those of per capita income. Projections of aggregate personal income were made by multiplying the projected per capita income by the projected population. Projected mean household income was derived from projected aggregate income levels and the projected number of households. It should be noted that the historic and projected income data presented herein are all expressed in constant 1990 dollars.

Historic and projected personal income levels in the Region are set forth in Table 112. As the table indicates, per capita income in the Region measured in constant 1990 dollars increased steadily, from $7,702 in 1950 to $10,285 in 1960, to $12,896 in 1970, and to $15,240 in 1980.[5] As measured in constant dollars, the increase in per capita income was relatively stable during the 1950s, 1960s, and 1970s, showing average annual increases of $258, $261, and $234, respectively. The average annual percentage increase, however, decreased in each decade, from 2.9 percent per year during the 1950s to 2.3 percent during the 1960s and to 1.7 percent during the 1970s. More recently, personal income levels in the Region have been adversely affected by the deep economic recession of 1979 through 1983. As indicated in Table 112, in 1985, per capita income in the Region stood at $13,559, about $1,681, or 11 percent, below the 1980 level.

Under the high-growth scenario, it is envisioned that a strong recovery from the 1979 through 1983 recession would be accompanied by a significant increase in personal income levels. During the second half of the 1980s, per capita income in the Region would recover from the

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[5]*The source of personal income data presented in this report is the U. S. Census Bureau. While income levels are generally identified by the census year in which they are collected, 1950, 1960, 1970, and 1980, and 1990, it should be noted that the income figures collected in the census are for the year preceding the census, that is, 1949, 1959, 1969, 1979, and 1989, respectively. The 1985 income data presented herein are estimates developed by the Census Bureau for 1985.*

Table 110

**EMPLOYMENT LEVELS IN THE REGION BY MAJOR INDUSTRY GROUP: ACTUAL 1980 AND PROJECTED 2010**

| Major Industry Group | Employment: Actual 1980 | Actual 1990 | Projected: Scenario | Projected: 2010 | Projected Change 1980-2010: Number | Percent |
|---|---|---|---|---|---|---|
| Agriculture[a] | 15,300 | 12,100 | High-growth | 13,300 | -2,000 | -13.1 |
| | | | Intermediate-growth | 12,500 | -2,800 | -18.3 |
| | | | Low-growth | 12,200 | -3,100 | -20.3 |
| Manufacturing[b] | 331,100 | 310,500 | High-growth | 426,600 | 95,500 | 28.8 |
| | | | Intermediate-growth | 353,300 | 22,200 | 6.7 |
| | | | Low-growth | 288,800 | -42,300 | -12.8 |
| Retail Trade | 131,900 | 155,700 | High-growth | 190,200 | 58,300 | 44.2 |
| | | | Intermediate-growth | 162,800 | 30,900 | 23.4 |
| | | | Low-growth | 133,300 | 1,400 | 1.1 |
| Transportation, Communication, and Utility | 39,600 | 40,900 | High-growth | 50,900 | 11,300 | 28.5 |
| | | | Intermediate-growth | 42,800 | 3,200 | 8.1 |
| | | | Low-growth | 35,900 | -3,700 | -9.3 |
| Government and Education | 120,700 | 139,500 | High-growth | 163,500 | 42,800 | 35.5 |
| | | | Intermediate-growth | 143,800 | 23,100 | 19.1 |
| | | | Low-growth | 126,500 | 5,800 | 4.8 |
| Services[c] | 245,600 | 331,600 | High-growth | 407,100 | 161,500 | 65.8 |
| | | | Intermediate-growth | 336,100 | 90,500 | 36.8 |
| | | | Low-growth | 274,200 | 28,600 | 11.6 |
| Total | 884,200 | 990,300 | High-growth | 1,251,600 | 367,400 | 41.6 |
| | | | Intermediate-growth | 1,051,300 | 167,100 | 18.9 |
| | | | Low-growth | 870,900 | -13,300 | -1.5 |

[a]*Includes agriculture, agricultural services, forestry, mining and miscellaneous.*

[b]*Includes manufacturing, construction, and wholesale trade.*

[c]*Includes services; finance, insurance, and real estate; and self-employed.*

*Source: Wisconsin Department of Industry, Labor and Human Relations; U. S. Bureau of Economic Analysis; and SEWRPC.*

Table 111

**PERCENT DISTRIBUTION OF EMPLOYMENT BY MAJOR INDUSTRY GROUP IN THE REGION: ACTUAL 1980 AND PROJECTED 2010**

| Major Industry Group | Actual 1980 | Actual 1990 | Projected: 2010 High-Growth | Intermediate-Growth | Low-Growth |
|---|---|---|---|---|---|
| Agriculture[a] | 1.7 | 1.2 | 1.1 | 1.2 | 1.4 |
| Manufacturing[b] | 37.4 | 31.4 | 34.1 | 33.6 | 33.2 |
| Retail Trade | 14.9 | 15.7 | 15.2 | 15.5 | 15.3 |
| Transportation, Communication, and Utility | 4.5 | 4.1 | 4.1 | 4.1 | 4.1 |
| Government and Education | 13.7 | 14.1 | 13.0 | 13.7 | 14.5 |
| Services[c] | 27.8 | 33.5 | 32.5 | 31.9 | 31.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

[a]*Includes agriculture, agricultural services, forestry, mining, and miscellaneous.*

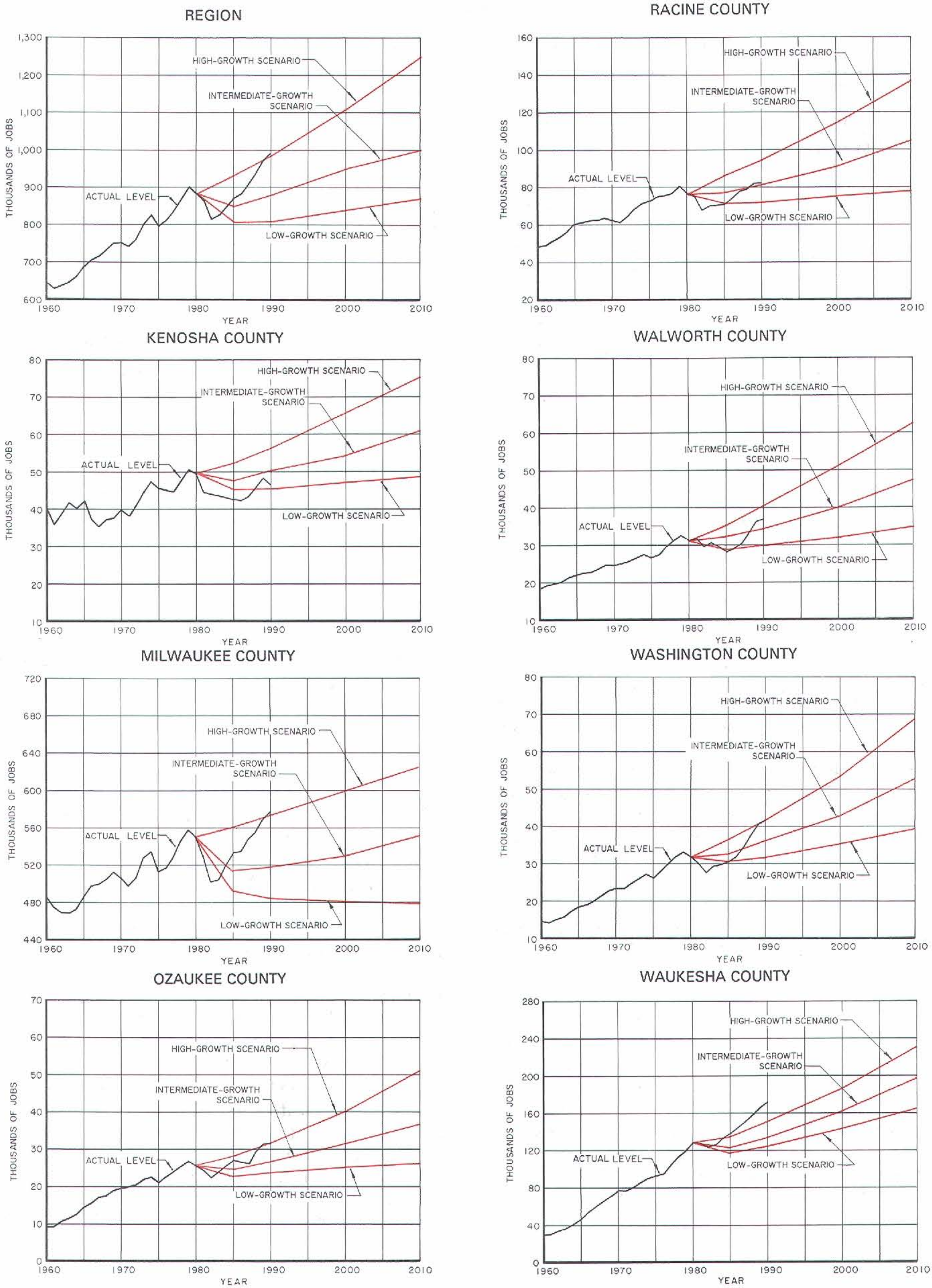
[b]*Includes manufacturing, construction, and wholesale trade.*

[c]*Includes services; finance, insurance, and real estate; and self-employed.*

*Source: Wisconsin Department of Industry, Labor and Human Relations; U. S. Bureau of Economic Analysis; and SEWRPC.*

Figure 52

**ACTUAL AND ALTERNATIVE FUTURE REGIONAL AND COUNTY EMPLOYMENT LEVELS: 1960-2010**




Source: *Wisconsin Department of Industry, Labor and Human Relations and SEWRPC.*

Table 112

ACTUAL AND PROJECTED PERSONAL INCOME LEVELS IN THE REGION: 1950-2010

| Income Category | Year | Per Capita Income | Mean Household Income |
|---|---|---|---|
| Actual Income | 1950 | $ 7,702 | $26,954 |
| | 1960 | 10,285 | 34,738 |
| | 1970 | 12,896 | 42,216 |
| | 1980 | 15,240 | 42,832 |
| | 1985 | 13,559 | 36,723 |
| | 1990 | 14,351 | 38,541 |
| Projected Income | | | |
| High-Growth Scenario | 1990 | $16,400 | $45,600 |
| | 2000 | 20,400 | 56,100 |
| | 2010 | 24,400 | 66,100 |
| Intermediate-Growth Scenario | 1990 | $15,200 | $40,900 |
| | 2000 | 16,900 | 43,400 |
| | 2010 | 18,600 | 45,300 |
| Low-Growth Scenario | 1990 | $13,600 | $35,200 |
| | 2000 | 14,300 | 33,900 |
| | 2010 | 15,000 | 32,400 |

NOTE: All income data are presented in constant 1990 dollars.

*Source: U. S. Bureau of the Census and SEWRPC.*

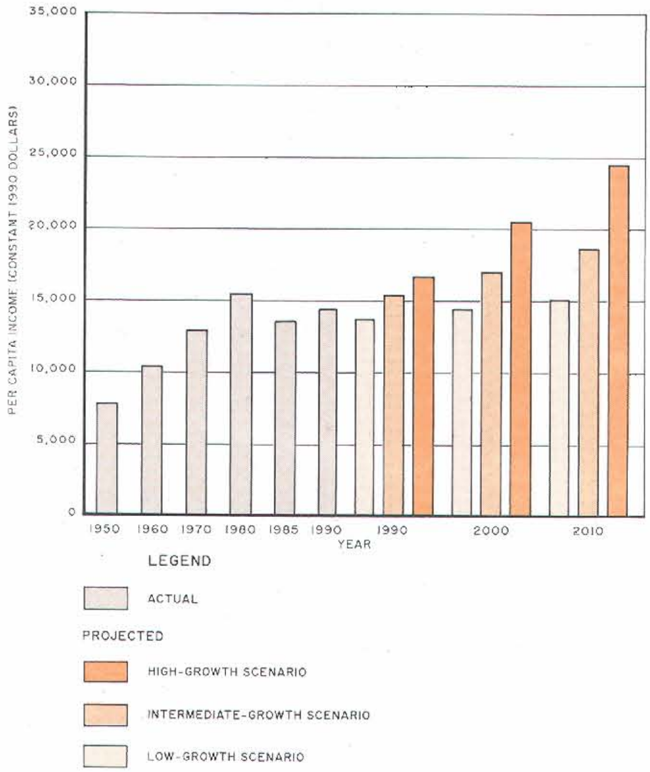
reduced levels of the recession and by 1990 would exceed the 1980 level (see Figure 53). Between 1990 and the year 2010, per capita income measured in constant 1990 dollars would increase at the relatively high rate of about 2 percent per year, approximately the same growth rate experienced in the Region between 1960 and 1980, a period generally characterized by favorable economic growth within the Region. Under this scenario, per capita income in the Region would rise to about $24,400 in the year 2010, an increase of about $9,160, or 60 percent, over 1980. The mean household income would rise by just over 54 percent, from about $42,800 in 1980 to about $66,100 in 2010 (see Figure 54).

The intermediate-growth scenario also anticipates a recovery in personal income levels during the latter half of the 1980s, although the recovery would be slower than under the high-growth scenario. Under the intermediate-growth scenario, it is envisioned that by 1990 per capita income would recover to the 1980 level. It is further envisioned that between 1990 and 2010, per capita income would increase by about 1 percent per year. This represents a continuation of the trend of declining relative increases in per capita income evident during the 1960s and 1970s. Even at the reduced rate of growth, however, per capita income would increase significantly over the long term. By the year 2010, per capita income would reach $18,600, about $3,400, or 22 percent, above the 1980 level. Mean household income would increase somewhat, to about $45,300, an increase of about $2,500, or 6 percent.

As previously noted, the low-growth scenario envisions a very slow recovery from the 1979 to 1983 recession. This scenario envisions only minimal long-term growth in total employment and a decrease in traditionally high-paying manufacturing jobs in the Region. These conditions may be expected to alter the long-term trend in personal income levels in the Region. Under this scenario, it is envisioned that per capita income would remain at depressed recessionary levels until 1990 and then, between 1990 and 2010, would increase slowly, at about half the average annual rate of increase anticipated under the intermediate-growth scenario, or about 0.5 percent. Under a low-growth scenario, then, per capita income would be expected to approxi-

Figure 53

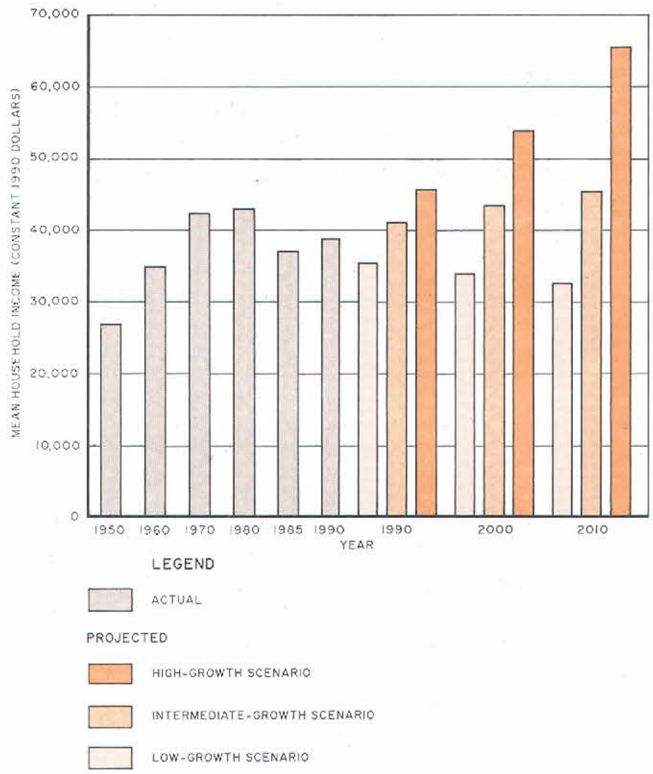
ACTUAL AND PROJECTED PERSONAL INCOME LEVELS IN THE REGION: 1950-2010




*Source: U. S. Bureau of the Census and SEWRPC.*

Figure 54

ACTUAL AND PROJECTED MEAN HOUSEHOLD INCOME IN THE REGION: 1950-2010




*Source: U. S. Bureau of the Census and SEWRPC.*

mate $15,000 in the year 2010, about the same as the 1980 level. Mean household income would approximate $32,400 in 2010, a decrease of about 24 percent from the 1980 level.

It is interesting to compare projections of personal income prepared by the Bureau of Economic Analysis of the U. S. Department of Commerce with the personal income levels anticipated under the respective regional growth scenarios. The most recent Bureau projections were prepared in 1985 and reflect economic data available through 1983.[6] Those projections envisioned a rapid recovery of personal income levels in the Region between 1983 and 1990. Over the long term, from 1990 through 2010, Bureau projections indicated that per capita income in the Region would increase at an average annual rate of 1.2 percent; the anticipated rate of increase is somewhat higher during the early part of this period and somewhat lower during the latter part. The projected increase of 1.2 percent per year between 1990 and 2010 is similar to that envisioned under the intermediate-growth scenario, substantially lower than the 2 percent envisioned under the high-growth scenario, and substantially higher than the 0.5 percent envisioned under the low-growth scenario.

## Land Use Demand Projections

Changes in the levels and distribution of population, households, and employment may be expected to generate additional demand for

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[6] *U. S. Bureau of Economic Analysis income projections for the Region are based on income projections for the Kenosha Metropolitan Statistical Area, which consists of Kenosha County; the Racine Metropolitan Statistical Area, which consists of Racine County; and the Milwaukee Metropolitan Statistical Area, which consists of Milwaukee, Ozaukee, Washington, and Waukesha Counties. Bureau projections are not available for Walworth County.*

urban land development in the Region. Projections of demand for the major categories of land use in the Region under the three regional growth scenarios are presented in Table 113. For the residential; governmental and institutional; recreational; and transportation, communication, and utility land use categories, the projected increases in land area between 1980 and 2010 are based upon the anticipated increases in the number of households under each scenario. For the industrial and commercial land use categories, the projected changes in land area are, for the most part, based upon the anticipated increases in related employment for each growth scenario (see footnotes in Table 113).

As indicated in Table 113, under the high-growth scenario, it is envisioned that land in urban use within the Region would increase by about 159,400 acres, or 42 percent, from about 378,100 acres in 1980 to 537,500 acres in the year 2010. As a result, urban land uses would encompass about 31 percent of the total area of the Region, compared to about 22 percent in 1980. Growth in the two largest urban land use categories, residential and transportation, communication, and utility, would combine to account for about 128,700 acres, or about 81 percent of the overall increase in urban lands envisioned under the high-growth scenario.

Under the intermediate-growth scenario, urban lands would increase by about 98,000 acres, or about 26 percent, to about 476,100 acres in the year 2010. Urban lands would then comprise nearly 28 percent of the total area of the Region. The combined increase of 80,500 acres in residential land and transportation, communication, and utility land would constitute about 82 percent of the overall increase in urban lands anticipated under the intermediate-growth scenario.

A very modest increase in urban lands of about 50,900 acres, or about 14 percent, is anticipated under the low-growth scenario. Urban lands would total 429,000 acres, or about 25 percent of the Region, in the year 2010. About 83 percent of the overall increase in urban lands would consist of residential and transportation, communication, and utility lands.

The development of the alternative regional growth scenarios was based upon explicit consideration of a number of the social and economic factors that may be expected to affect county and regional population and employment levels. These factors include birth, death, and migration rates; labor force participation rates; and the relative anticipated strengths of various sectors of the regional economy. To the extent practicable, assumptions regarding such factors were expressed quantitatively in the development of the growth scenarios. It should be recognized that there are many other factors which are not easily quantified and do not lend themselves to explicit consideration in the development of alternative growth scenarios and, particularly, in the projection of county population and employment levels. Among these factors are the quality of education, the levels and quality of public services, the quality of infrastructure systems, the quality of neighborhoods, relations between races and between socio-economic groups, and the incidence of crime. Trends in these factors may be expected to influence the degree of centralization or decentralization of population and employment within the Region. Thus, while these factors can be treated only implicitly in the development of the alternative future growth scenarios, they may have a significant bearing on future county population and employment levels.

## ADOPTED REGIONAL LAND USE PLAN

A concerted effort was made in previous regional land use planning efforts to explore and evaluate the full range of practical future land development patterns available to the Region. In the first regional land use planning effort, undertaken in 1963, four different land use plan designs were prepared and evaluated. In the second effort, undertaken in 1972, two additional alternative designs were explored. Both efforts indicated that a controlled existing trend plan, emphasizing a centralized settlement pattern, would provide the best guide to shaping urban development in the Region.

In view of the extensive work in preparing and evaluating alternative land use designs conducted under the first and second regional land use planning efforts and the conclusive nature of the findings, it was determined that additional design alternatives would not be explored. Rather, it was determined that the basic concepts of the adopted year 2000 regional land use plan would be advanced to a new design year and incorporated into the new land use plan.

## Table 113

## PROJECTED LAND USE DEMAND IN THE REGION: 1980-2010

| Land Use Category | Land Use | | | | | |
|---|---|---|---|---|---|---|
| | Actual 1980 | Actual 1985 | Projected: 2010 | | Projected Change 1980-2010 | |
| | | | Scenario | Acres | Acres | Percent |
| Urban | | | | | | |
| Residential[a] | 179,831 | 184,603 | High-growth | 268,250 | 88,419 | 49.2 |
| | | | Intermediate-growth | 235,157 | 55,326 | 30.8 |
| | | | Low-growth | 208,911 | 29,080 | 16.2 |
| Commercial[b] | 8,162 | 8,714 | High-growth | 11,459 | 3,297 | 40.4 |
| | | | Intermediate-growth | 9,983 | 1,821 | 22.3 |
| | | | Low-growth | 8,612 | 450 | 5.5 |
| Industrial[b] | 11,171 | 12,080 | High-growth | 20,859 | 9,688 | 86.7 |
| | | | Intermediate-growth | 15,728 | 4,557 | 40.8 |
| | | | Low-growth | 13,471 | 2,300 | 20.6 |
| Transportation, Communication, and Utilities[a] | 117,706 | 120,279 | High-growth | 157,950 | 40,244 | 34.2 |
| | | | Intermediate-growth | 142,887 | 25,181 | 21.4 |
| | | | Low-growth | 130,941 | 13,235 | 11.2 |
| Governmental and Institutional[a] | 17,033 | 17,240 | High-growth | 23,122 | 6,089 | 35.7 |
| | | | Intermediate-growth | 20,843 | 3,810 | 22.4 |
| | | | Low-growth | 19,036 | 2,003 | 11.8 |
| Recreational[a] | 24,309 | 25,564 | High-growth | 35,904 | 11,595 | 47.7 |
| | | | Intermediate-growth | 31,564 | 7,255 | 29.8 |
| | | | Low-growth | 28,122 | 3,813 | 15.7 |
| Unused Urban[c] | 19,935 | 19,215 | High-growth | 19,935 | 0 | 0.0 |
| | | | Intermediate-growth | 19,935 | 0 | 0.0 |
| | | | Low-growth | 19,935 | 0 | 0.0 |
| Total Urban Land | 378,147 | 387,695 | High-growth | 537,479 | 159,332 | 42.1 |
| | | | Intermediate-growth | 476,097 | 97,950 | 25.9 |
| | | | Low-growth | 429,028 | 50,881 | 13.5 |
| Agricultural and Other Open Land | 1,342,969 | 1,333,418 | High-growth | 1,183,637 | -159,332 | -11.9 |
| | | | Intermediate-growth | 1,245,019 | -97,950 | -7.3 |
| | | | Low-growth | 1,292,088 | -50,881 | -3.8 |
| Total | 1,721,116 | 1,721,113 | - - | 1,721,116 | - - | - - |

*[a]For the residential, governmental and institutional, recreational, and transportation, communication, and utility land use categories, the projected changes in land area between 1980 and 2010 under the three regional growth scenarios reflect the increases in the number of households anticipated under the respective growth scenarios. For each category, the projected increases in land area were obtained by multiplying the projected increase in households between 1980 and 2010 for each growth scenario by the historic ratio of the increase in land area to the increase in households within the Region for the period 1963 to 1980.*

*[b]For the industrial and commercial land use categories, the projected changes in land area are based upon anticipated increases in related employment under the respective growth scenarios and land area to employee ratios used by the Commission in systems level land use planning. The land area to employee ratios for the commercial and industrial use categories were re-evaluated under the current regional land use planning program and found to properly reflect current commercial and industrial development patterns. The projected increase in commercial land for all three scenarios was obtained by multiplying the projected increase in related employment between 1980 and 2010 by the land area to employee ratio for commercial land. For both the high-growth and intermediate-growth scenarios, the projected increase in industrial land was obtained by multiplying the projected increase in related employment between 1985 and 2010 by the land area to employee ratio for industrial land. The industrial land projection for these two scenarios was based upon the anticipated industrial employment increase from 1985 to 2010, rather than 1980 to 2010, in order to reflect the increase in industrial employment anticipated during the forecast period, following the industrial employment decline of the early 1980s. While virtually no change in industrial employment is anticipated under the low-growth scenario between 1985 and 2010, industrial land would be expected to increase somewhat as a result of continuing change in the distribution of industrial activity in the Region. Accordingly, a nominal increase in industrial land, equal to about one-half of the increase in industrial land projected under the intermediate-growth scenario, or 2,300 acres, was assumed for the low-growth scenario.*

*[c]The amount of unused urban land was assumed constant over the projection period.*

*Source: SEWRPC.*

The new plan would, thus, update and extend recommendations of the previously adopted plan. As shown in graphic summary on Map 64, the plan recommends the promotion of compact, centralized land use development in the Region, with development generally occurring in concentric rings along the periphery of, and outward from, existing urban centers.

Like the year 2000 plan, the adopted year 2010 plan seeks to influence the operation of the urban land market in several important ways in order to achieve a more healthful, attractive, and efficient settlement pattern. In this regard, the plan recommends that new urban development occur primarily in those areas of the Region which are covered by soils suitable for such development and in those areas which can be readily served by essential municipal facilities and services, including public sanitary sewerage, water supply, and public transit facilities and services. The plan recommends the preservation in essentially natural, open uses of the identified environmental corridors and the preservation in agricultural and related uses of most of the remaining prime agricultural lands in the Region. The adopted year 2010 land use plan takes into account changes in land use that have taken place in the Region since the adoption of the year 2000 plan; the findings and recommendations of other local, county, and regional planning efforts since completed; and forecasts of population and economic activity levels within the Region through the year 2010.

As a practical matter, the preparation of any specific land use plan must be based on a single set of population and employment projections. It was the collective judgment of the Advisory Committee guiding the preparation of the new plan that future population and employment levels within the Region would be most closely approximated by the intermediate-growth scenario. Accordingly, the Committee directed that the new land use plan be prepared to accommodate the population and employment forecasts attendant to the intermediate-growth scenario, subject, however, to two modifications:

1. The forecast regional design year 2010 population and employment levels were adjusted at the county level to achieve a more centralized distribution of population, employment, and related urban land use development within the Region. Adjustments included the allocation of more population to Milwaukee County than initially forecast, with corresponding reductions in the design year population levels for Ozaukee, Walworth, Washington, and Waukesha Counties. In Kenosha and Racine Counties the planned population distribution was centralized around the Kenosha and Racine urbanized areas. The distribution of employment within the Region was similarly centralized.

2. Design year population and employment levels were adjusted to reflect the implications of new benchmark population and employment data, particularly data from the 1990 U. S. Census of Population and Housing. Such data indicated that population and employment growth was exceeding that envisioned under the intermediate-growth scenario in certain areas of the Region. Adjustments were made to accommodate reasonable growth and development between 1990 and 2010 in areas of the Region which had grown more rapidly than expected by 1990 and where additional growth is likely to occur over the next two decades. The most noteworthy adjustments were increases in the design year population levels for Kenosha and Racine Counties.[7]

As a result of these two adjustments, the new regional land use plan was designed to accommodate a year 2010 resident population of about 1,911,000 persons, about 38,800 persons, or 2 percent, more than envisioned under the intermediate-growth forecast, and a total employment of about 1,095,000 jobs, about 43,700 jobs, or 4 percent, more than initially forecast.

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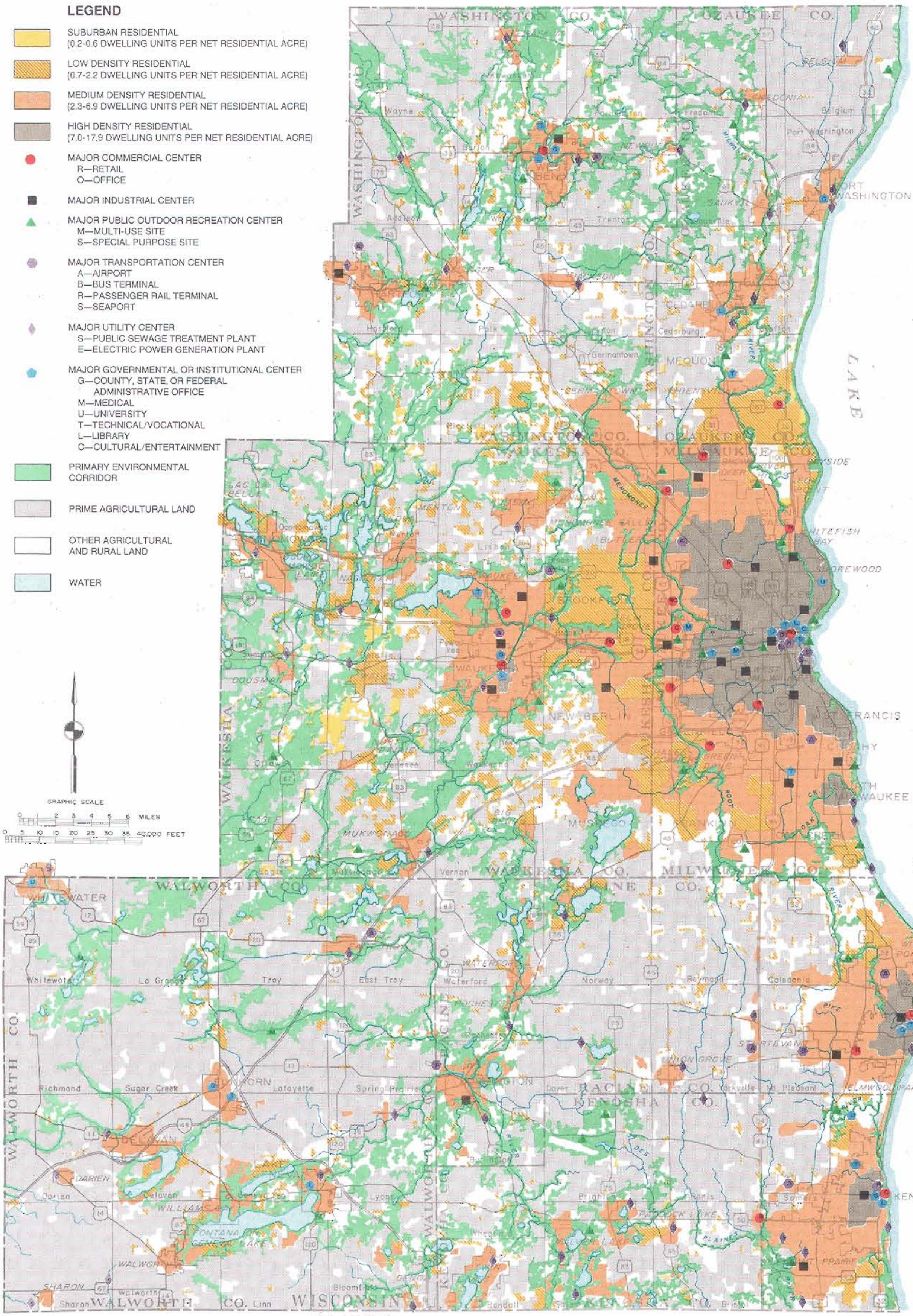
[7] *The adjustment of design year population levels in the southern portion of the Region, particularly Kenosha County, was necessitated in part by a perceived "Illinois" influence, that is, workers in northeastern Illinois increasingly seeking residences in Wisconsin, a phenomenon not anticipated in the intermediate-growth scenario forecasts.*

## Map 64

### ADOPTED LAND USE PLAN FOR THE SOUTHEASTERN WISCONSIN REGION: 2010




The adopted design year 2010 regional land use plan envisions a need to convert about 86 square miles of land from rural to urban use to accommodate an anticipated population increase of about 168,000 persons and an anticipated employment increase of about 223,000 jobs in the Region between 1985 and 2010. The plan seeks to promote a centralized regional settlement pattern, maintaining, to the extent practicable, population and employment levels of the central portions of the Kenosha, Milwaukee, and Racine urbanized areas. The plan seeks to encourage the location of new urban development only in areas which are covered by soils suitable for such use; which are not subject to special hazards such as flooding and erosion; and which can be readily provided with basic urban services and facilities, including public sanitary sewer, water supply, and mass transit services. The plan seeks to preserve all the remaining primary environmental corridors and most remaining prime agricultural lands in the Region.

*Source: SEWRPC.*

Plan Description[8]

Under the adopted land use plan for Southeastern Wisconsin, the population of the Region may be expected to reach a level of about 1,911,000 persons by the year 2010, an increase of about 168,300 persons over the 1985 population level, while employment may be expected to reach about 1,095,000 jobs by the year 2010, an increase of 223,100 jobs over the 1985 level. The plan proposes to accommodate this growth in population and employment through the conversion of approximately 86 square miles of rural to urban use by the year 2010. The future land use pattern proposed by the plan is shown on Map 64 and is summarized for the Region overall in Table 114 and for the individual counties and planning analysis areas in Appendices C and D of SEWRPC Planning Report No. 40.

Residential Development and Redevelopment

The adopted land use plan proposes to meet the residential needs of the growing regional population through the maintenance of existing urban areas and, as needed, the outward expansion of those areas. The conservation and redevelopment of existing urban residential areas is an important element of the adopted plan. Indeed, of the approximately 222,000 acres of urban residential land envisioned by the year 2010, 83 percent, or 185,000 acres, existed in 1985.

The bulk of the remaining 37,700 acres of required residential land would be developed at urban medium densities.[9] As shown in Table 115, medium-density residential land would increase by about 30,800 acres, or 57 percent; high-density residential land would increase by 1,800 acres, or 7 percent; low-density residential land would increase by 3,000 acres, or 3 percent; and suburban-density land would increase by 1,300 acres, or 17 percent.

Among the seven counties in the Region, Waukesha County would experience the largest increase in urban residential land, 13,100 acres (see Table 115). For the other six counties in the Region, the proposed increase in urban residential land ranges from about 3,100 acres in Walworth County to about 4,600 acres in Kenosha County. As further indicated in Table 115, the plan proposes a modest increase of just over 700 acres in land to be developed for rural residential use.[10]

The plan encourages the development of new urban residential land in planned neighborhoods. Insofar as possible, each neighborhood should be bounded by arterial streets; major park, parkway, or institutional lands; bodies of water; or other natural or cultural features which serve to physically separate each unit from the surrounding units.

Commercial Development

Major Commercial Centers: The adopted land use plan proposes the development of approximately 1,300 acres of new commercial land within the Region, excluding related off-street parking. Such development would increase the total stock of commercial land in the Region to about 10,000 acres by the year 2010 (see Table 116). This increase would accommodate anticipated increases in retail and service employment and the demands associated with growth and redistribution of the population within the Region.

To accommodate planned increases in commercial employment and to facilitate the efficient provision of services and goods throughout the Region, the plan recommends the 14 existing commercial centers be retained and that five

[8]*The last detailed land use inventory for the Region was completed for the year 1985 and therefore the base year for socio-economic data presented in this section of the chapter is 1985.*

[9]*Under medium residential density, a single-family lot would typically be about one-quarter acre in size and a multiple-family development would typically average about 10 dwelling units per net acre.*

[10]*Rural residential development by definition implies a parcel size of at least five acres for single-family housing development. Frequently, particularly in woodland areas and areas of steep slope, only a small portion of the total parcel is developed as homesite and yard, the remainder is kept in a natural condition. Accordingly, the incremental area allocated to rural residential development under the recommended plan is based on the assumption that only one-fifth of each additional rural residential parcel would be developed as homesite and associated yard area.*

Table 114

EXISTING AND PROPOSED LAND USE IN THE REGION: 1985 AND 2010 RECOMMENDED REGIONAL LAND USE PLAN

| Land Use Category | Existing 1985 | | Planned Increment 1985-2010 | | Total 2010 | |
|---|---|---|---|---|---|---|
| | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total |
| Urban | | | | | | |
| Residential | | | | | | |
| High-Density | 27,797 | 1.6 | 1,817 | 6.5 | 29,614 | 1.7 |
| Medium-Density | 54,153 | 3.1 | 30,776 | 56.8 | 84,929 | 4.9 |
| Low-Density | 94,618 | 5.5 | 3,039 | 3.2 | 97,657 | 5.7 |
| Suburban-Density | 8,035 | 0.5 | 1,344 | 16.7 | 9,379 | 0.6 |
| Subtotal | 184,603 | 10.7 | 36,976 | 20.0 | 221,579 | 12.9 |
| Commercial | 8,714 | 0.5 | 1,320 | 15.1 | 10,034 | 0.6 |
| Industrial | 12,080 | 0.7 | 5,186 | 42.9 | 17,266 | 1.0 |
| Transportation, Communication, and Utilities[a] | 120,279 | 7.0 | 14,560 | 12.1 | 134,839 | 7.8 |
| Governmental and Institutional | 17,240 | 1.0 | 1,042 | 6.0 | 18,282 | 1.1 |
| Recreational | 25,564[b] | 1.5 | 4,089[c] | 16.0 | 29,653 | 1.7 |
| Unused Urban Land | 19,215 | 1.1 | -8,400 | -43.7 | 10,815 | 0.6 |
| Urban Subtotal | 387,695 | 22.5 | 54,773 | 14.1 | 442,468 | 25.7 |
| Rural | | | | | | |
| Residential | - -[d] | - - | 721 | - - | 721 | - -[e] |
| Agricultural | 931,956 | 54.1 | -40,487 | -4.3 | 891,469 | 51.8 |
| Other Open Lands[f] | 401,462 | 23.4 | -15,007 | -3.7 | 386,455 | 22.5 |
| Rural Subtotal | 1,333,418 | 77.5 | -54,773 | -4.1 | 1,278,645 | 74.3 |
| Total | 1,721,113 | 100.0 | 0 | 0.0 | 1,721,113 | 100.0 |

[a]*Includes off-street parking areas.*

[b]*Includes net site area of public and nonpublic recreation sites.*

[c]*Includes only that net site area recommended for public recreation use.*

[d]*Included in 1985 land use inventory as part of urban residential land use.*

[e]*Less than 0.1 percent.*

[f]*Includes woodlands, water, wetlands, unused rural land, landfill sites, and quarries.*

*Source: SEWRPC.*

new commercial centers be developed (see Map 65). As indicated in Chapter III of this report, two types of commercial centers are identified under the regional planning process: retail and office. To qualify as a major retail center, a site must accommodate at least 2,000 retail jobs. To qualify as a major office center a site must accommodate 3,500 office and service-related jobs.

In 1985, the 14 major commercial centers located within the Region provided 164,300 jobs. As shown in Table 117, the adopted plan envisions that by the year 2010 employment at these centers will increase by about 58,500 jobs, or about 36 percent, to about 223,100 jobs. Four of the five proposed centers, located at Park Place in northwestern Milwaukee County, along IH 43 in the City of Mequon, near the Milwaukee

## Table 115

### EXISTING AND PROPOSED RESIDENTIAL LAND USE IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | Residential Land Use | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Urban High-Density | | | | Urban Medium-Density | | | | Urban Low-Density | | | |
| | Existing 1985 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) | Existing 1985 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) | Existing 1985 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) |
| Kenosha ..... | 1,619 | 90 | 5.6 | 1,709 | 6,676 | 5,233 | 78.4 | 11,909 | 6,718 | -723 | -10.8 | 5,995 |
| Milwaukee .... | 22,721 | 1,424 | 6.3 | 24,145 | 16,055 | 3,932 | 24.5 | 19,987 | 8,295 | -969 | -11.7 | 7,326 |
| Ozaukee ..... | 30 | 0 | 0.0 | 30 | 3,664 | 2,431 | 66.3 | 6,095 | 9,006 | 1,229 | 13.6 | 10,235 |
| Racine ...... | 2,436 | 51 | 2.1 | 2,487 | 6,913 | 3,619 | 52.4 | 10,532 | 10,033 | 519 | 5.2 | 10,552 |
| Walworth ..... | 0 | 0 | 0.0 | 0 | 5,446 | 2,499 | 45.9 | 7,945 | 10,639 | 368 | 3.5 | 11,007 |
| Washington ... | 268 | 135 | 50.4 | 403 | 3,277 | 3,131 | 95.5 | 6,408 | 12,019 | 587 | 4.9 | 12,606 |
| Waukesha .... | 723 | 117 | 16.2 | 840 | 12,122 | 9,931 | 81.9 | 22,053 | 37,908 | 2,028 | 5.3 | 39,936 |
| Region | 27,797 | 1,817 | 6.5 | 29,614 | 54,153 | 30,776 | 56.8 | 84,929 | 94,618 | 3,039 | 3.2 | 97,657 |

| County | Residential Land Use | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Suburban-Density | | | | Total Urban | | | | Rural | | | |
| | Existing 1985 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) | Existing 1985 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) | Existing 1985[a] (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) |
| Kenosha ..... | 307 | 21 | 6.8 | 328 | 15,320 | 4,621 | 30.2 | 19,941 | - - | 84 | - - | 84 |
| Milwaukee .... | 924 | 0 | 0.0 | 924 | 47,995 | 4,387 | 9.1 | 52,382 | - - | 74 | - - | 74 |
| Ozaukee ..... | 994 | 43 | 4.3 | 1,037 | 13,694 | 3,703 | 27.0 | 17,397 | - - | 55 | - - | 55 |
| Racine ...... | 59 | 44 | 74.6 | 103 | 19,441 | 4,233 | 21.8 | 23,674 | - - | 99 | - - | 99 |
| Walworth ..... | 395 | 185 | 46.8 | 580 | 16,480 | 3,052 | 18.5 | 19,532 | - - | 221 | - - | 221 |
| Washington ... | 512 | 16 | 3.1 | 528 | 16,076 | 3,869 | 24.1 | 19,945 | - - | 68 | - - | 68 |
| Waukesha .... | 4,844 | 1,035 | 21.4 | 5,879 | 55,597 | 13,111 | 23.6 | 68,708 | - - | 120 | - - | 120 |
| Region | 8,035 | 1,344 | 16.7 | 9,379 | 184,603 | 36,976 | 20.0 | 221,579 | - - | 721 | - - | 721 |

[a]*Included in 1985 land use inventory as part of urban residential land use.*

*Source: SEWRPC.*

## Table 116

### EXISTING AND PROPOSED COMMERCIAL LAND USE IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

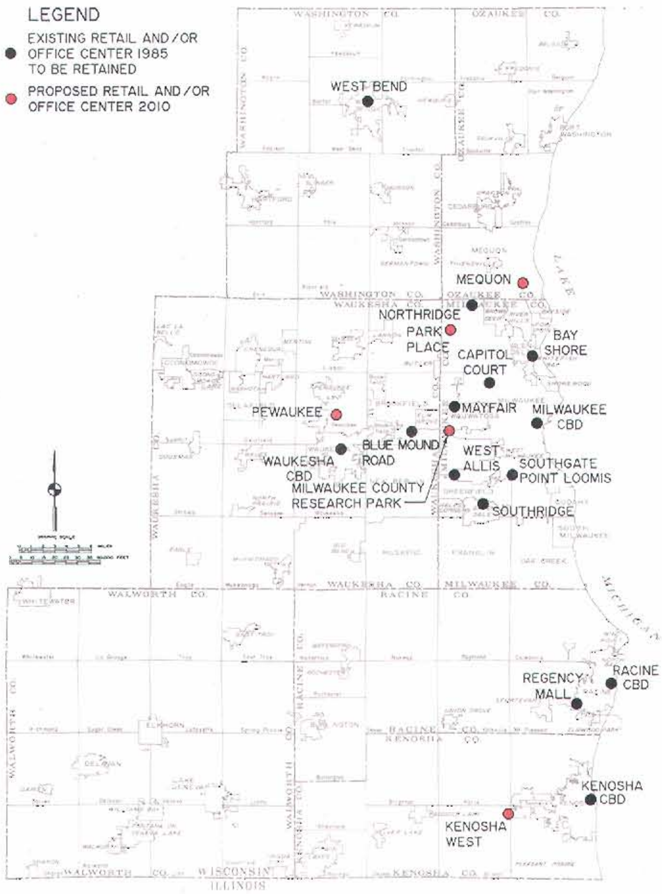
| County | Commercial Land Use[a] | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1985 | | Planned Increment 1985-2010 | | Total 2010 | |
| | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total |
| Kenosha ....... | 615 | 7.1 | 227 | 36.9 | 842 | 8.4 |
| Milwaukee ...... | 3,454 | 39.6 | 261 | 7.6 | 3,715 | 37.0 |
| Ozaukee ....... | 470 | 5.4 | 77 | 16.4 | 547 | 5.4 |
| Racine ........ | 906 | 10.4 | 123 | 13.6 | 1,029 | 10.3 |
| Walworth ...... | 776 | 8.9 | 47 | 6.1 | 823 | 8.2 |
| Washington ..... | 547 | 6.3 | 66 | 12.1 | 613 | 6.1 |
| Waukesha ...... | 1,946 | 22.3 | 519 | 26.7 | 2,465 | 24.6 |
| Region | 8,714 | 100.0 | 1,320 | 15.1 | 10,034 | 100.0 |

[a]*Excludes related off-street parking areas.*

*Source: SEWRPC.*

Map 65

**MAJOR COMMERCIAL CENTERS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN**




The recommended year 2010 regional land use plan envisions a total of 19 major commercial centers to serve the needs of the Region through the plan design year, including eight major retail centers, eight major office centers, and three major combined retail and office centers. Fourteen of these centers existed in 1985 and would be retained through the year 2010. Five new centers would be developed by the year 2010, including a major retail center located along IH 94 in Kenosha County and four new office centers located in the Cities of Mequon, Milwaukee, and Wauwatosa and the Town of Pewaukee. It is envisioned that by the year 2010 the 19 planned major commercial centers would accommodate a total of about 199,000 retail and service jobs, or about 38 percent of all such jobs in the Region.

*Source: SEWRPC.*

County Institutions grounds in the City of Wauwatosa, and near the intersection of IH 94 and CTH J in the Town of Pewaukee, would function primarily as office centers. The fifth proposed commercial center, Kenosha West, located near the intersection of IH 94 and STH 50 in Kenosha County, would function primarily as a retail center. The plan envisions that employment at these sites will increase from 3,300 in 1985 to 21,700 by the design year 2010.

By the year 2010, the 19 major commercial centers proposed under the recommended land use plan would accommodate a total of 199,300 retail and service jobs, or 38 percent of all retail and service employment within the Region. These centers would encompass about 1,700 acres of commercial land, or 17 percent of all commercial land in the Region.

Local Commercial Development: Under the adopted plan, almost 800 additional acres of land would be developed as neighborhood and community commercial areas between 1985 and 2010. By the year 2010, land devoted to neighborhood and community commercial use would total 8,300 acres, representing about 83 percent of all commercial land in the Region. This land would accommodate a total of 330,100 retail and service jobs, or 62 percent of all retail and service jobs in the Region in the year 2010.

Industrial Development

Major Industrial Centers: The plan proposes to add about 5,200 acres of industrial land in the Region, increasing the total stock of such land to almost 17,300 acres by the plan design year (see Table 118). This increase would meet the land requirements of the anticipated increases in, and redistribution of, manufacturing and wholesaling activity within the Region and would be so distributed as to protect and enhance the continued efficient operation of these important components of the economic base of the Region.

This is proposed to be accomplished through the development of planned industrial centers properly located with respect to the existing and proposed transportation systems, through the protection and enhancement of existing industrial areas, and through the efficient provision of adequate utility services. The plan provides adequate sites for industrial development which meet the full array of criteria for such development, including ready accessibility to high-speed, all-weather arterial highway facilities; soils suitable for industrial development; adequate power and water supply; sanitary sewer service and stormwater drainage; reasonable access to airport, seaport, and railway facilities, as appropriate; and ready access to the labor supply.

Table 117

**SELECTED CHARACTERISTICS OF PLANNED MAJOR COMMERCIAL CENTERS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN**

| Major Commercial Center | Center Type | | Commercial Land Use in Acres | | | Total Employment | | |
|---|---|---|---|---|---|---|---|---|
| | Retail | Office | Existing 1985 | Planned Increment 1985-2010 | Total 2010 | Existing 1985 | Planned Increment 1985-2010 | Total 2010 |
| Existing | | | | | | | | |
| Kenosha CBD | - - | X | 40 | 5 | 45 | 4,600 | 700 | 5,300 |
| Bay Shore | X | - - | 43 | 5 | 48 | 4,000 | 800 | 4,800 |
| Capitol Court | X | - - | 25 | 0 | 25 | 3,400 | 500 | 3,900 |
| Mayfair | X | X | 82 | 2 | 84 | 13,200 | 200 | 13,400 |
| Milwaukee CBD | X | X | 160 | 7 | 167 | 82,500 | 30,600 | 113,100 |
| Northridge | X | - - | 61 | 13 | 74 | 6,100 | 1,300 | 7,400 |
| Southgate-Point Loomis | X | - - | 41 | 0 | 41 | 3,400 | 500 | 3,900 |
| Southridge | X | - - | 64 | 10 | 74 | 4,900 | 700 | 5,600 |
| West Allis | X | - - | 95 | 0 | 95 | 4,900 | 600 | 5,500 |
| Racine CBD | - - | X | 51 | 6 | 57 | 4,700 | 800 | 5,500 |
| Regency Mall | X | - - | 46 | 47 | 93 | 4,400 | 2,000 | 6,400 |
| West Bend | - - | X | 71 | 11 | 82 | 5,100 | 700 | 5,800 |
| Blue Mound Road | X | X | 257 | 230 | 487 | 17,500 | 19,200 | 36,700 |
| Waukesha CBD | - - | X | 49 | 1 | 50 | 5,600 | 200 | 5,800 |
| Subtotal | - - | - - | 1,085 | 337 | 1,422 | 164,300 | 58,800 | 223,100 |
| Proposed | | | | | | | | |
| Kenosha West | X | - - | 21 | 57 | 78 | 600 | 2,800 | 3,400 |
| Park Place | - - | X | 13 | 45 | 58 | 200 | 4,500 | 4,700 |
| Milwaukee County Research Park | - - | X | 0 | 44 | 44 | 10,700 | 4,700 | 15,400 |
| Mequon | - - | X | 48 | 37 | 85 | 1,800 | 3,400 | 5,200 |
| Pewaukee | - - | X | 6 | 38 | 44 | 300 | 3,400 | 3,700 |
| Subtotal | - - | - - | 88 | 221 | 309 | 13,600 | 18,800 | 32,400 |
| Total | - - | - - | 1,173 | 558 | 1,731 | 177,900 | 77,600 | 255,500 |

NOTES: To qualify as a major retail center, a site must accommodate at least 2,000 retail jobs. To qualify as a major office center, a site must accommodate at least 3,500 office and service-related jobs.

The total 1985 employment of 177,900 at the above sites includes 124,000 commercial jobs and 53,900 other jobs. The total year 2010 employment of 255,500 includes 199,300 commercial jobs and 56,200 other jobs. Commercial jobs include the retail; service; and finance, insurance, and real estate employment categories; and self-employed.

Land use and employment data are based upon aggregations of data for U. S. Public Land Survey quarter sections which approximate the major commercial centers. The specific quarter sections included in each planned major commercial center are shown in Appendix E of SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010. There is some "overlap" between certain planned major commercial and planned major industrial centers as approximated by quarter section, owing to the mixture of land uses. For the overlapping quarter sections, all employment other than industrial related has been reported in this table.

*Source: SEWRPC.*

As indicated in Chapter III of this report, to qualify as a major industrial centers a site must accommodate at least 3,500 industrial jobs. The proposed major industrial centers range in character from older industrial complexes in central-city areas, which have traditionally emphasized heavy manufacturing activity, to planned industrial parks in outlying areas of the Region. It should be noted that, both nationally and within the Region, new industrial centers are increasingly characterized by a mix of uses, a mix which may include service operations, research facilities, and office facilities in addition to manufacturing and wholesaling uses. The

Table 118

EXISTING AND PROPOSED INDUSTRIAL LAND USE IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | Industrial Land Use[a] | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1985 | | Planned Increment 1985-2010 | | Total 2010 | |
| | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total |
| Kenosha | 917 | 7.6 | 567 | 61.8 | 1,484 | 8.6 |
| Milwaukee | 5,375 | 44.5 | 1,211 | 22.5 | 6,586 | 38.1 |
| Ozaukee | 577 | 4.8 | 388 | 67.2 | 965 | 5.6 |
| Racine | 1,416 | 11.7 | 564 | 39.8 | 1,980 | 11.5 |
| Walworth | 678 | 5.6 | 494 | 72.9 | 1,172 | 6.8 |
| Washington | 690 | 5.7 | 777 | 112.6 | 1,467 | 8.5 |
| Waukesha | 2,427 | 20.1 | 1,185 | 48.8 | 3,612 | 20.9 |
| Region | 12,080 | 100.0 | 5,186 | 42.9 | 17,266 | 100.0 |

[a]*Excludes related off-street parking areas.*

*Source: SEWRPC.*

developing industrial centers recommended under the year 2010 land use plan may thus be expected to accommodate an increasing diversity of industrial and industry-related uses and jobs.

The major industrial centers recommended under the year 2010 regional land use plan are identified on Map 66 and in Table 119. The 22 centers existing in 1985 encompassed a total of about 5,700 acres of industrial land, excluding off-street parking, and accommodated about 171,500 industrial jobs, or 60 percent of all industrial employment in the Region in 1985.

The plan proposes to retain all 22 existing sites as major industrial centers through the year 2010 and to expand certain of these centers. It is anticipated that by the year 2010 the 22 existing major centers would encompass an additional 1,800 acres of industrial land and accommodate an additional 29,400 industrial jobs.

The plan also proposes to add three new major industrial centers by the year 2010. The three proposed centers would be located in or near the Cities of Burlington and Hartford and the Village of Pleasant Prairie. Under the plan, it is anticipated that industrial employment at these sites would increase from 3,800 jobs in 1985 to 15,000 by the year 2010. Industrial land use at these three sites would increase from 200 acres in 1985 to 1,000 acres in 2010.

By the year 2010, the 25 major industrial centers proposed under the adopted land use plan would accommodate a total of 212,100 industrial jobs, or 58 percent of all industrial employment in the Region. These centers would encompass about 8,500 acres of industrial land, or about 49 percent of all industrial land in the Region. The three sites included under the year 2010 plan but not under the year 2000 plan include the Pewaukee and Waukesha North industrial areas, which were developed after the preparation of the year 2000 plan, and the proposed new Hartford industrial center.

Local Industrial Development: Under the adopted plan, about 2,600 additional acres of land would be developed at smaller, community-level industrial areas. By the year 2010, land devoted to community-level industrial use would total 8,800 acres, representing 51 percent of all industrial land in the Region. This land would accommodate a total of 152,600 industrial jobs, or 42 percent of all industrial jobs in the Region.

### Governmental and Institutional Land Use

As indicated in Table 120, the adopted land use plan proposes to add by the year 2010 about 1,000 acres of new governmental and institutional land to the existing stock of such land within the Region, resulting in a total of about 18,300 acres of governmental and institutional land by the plan design year. The additional

## Table 119

### SELECTED CHARACTERISTICS OF PLANNED MAJOR INDUSTRIAL CENTERS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN

| Major Industrial Center | Industrial Land Use in Acres | | | Total Employment | | |
|---|---|---|---|---|---|---|
| | Existing 1985 | Planned Increment 1985-2010 | Total 2010 | Existing 1985 | Planned Increment 1985-2010 | Total 2010 |
| Existing | | | | | | |
| Kenosha | 219 | -20 | 199 | 8,600 | -2,500 | 6,100 |
| Cudahy-South Milwaukee | 240 | 21 | 261 | 10,200 | 500 | 10,700 |
| Milwaukee-Glendale | 308 | 32 | 340 | 12,900 | 1,200 | 14,100 |
| Milwaukee-Granville | 530 | 417 | 947 | 12,700 | 6,600 | 19,300 |
| Milwaukee-Menomonee Valley East | 357 | -9 | 348 | 18,400 | 3,200 | 21,600 |
| Milwaukee-Menomonee Valley West | 125 | 0 | 125 | 8,600 | 400 | 9,000 |
| Milwaukee-Near North | 111 | 0 | 111 | 9,300 | 300 | 9,600 |
| Milwaukee-Near South | 319 | 20 | 339 | 13,000 | 600 | 13,600 |
| Milwaukee-North | 349 | 0 | 349 | 17,500 | 400 | 17,900 |
| Milwaukee-South | 96 | 10 | 106 | 6,200 | 500 | 6,700 |
| Oak Creek | 281 | 318 | 599 | 9,300 | 5,000 | 14,300 |
| West Allis-East | 211 | 2 | 213 | 8,200 | 1,900 | 10,100 |
| West Allis-West | 136 | 80 | 216 | 9,100 | 1,500 | 10,600 |
| West Milwaukee | 355 | 4 | 359 | 8,900 | -1,300 | 7,600 |
| Mt. Pleasant | 216 | 144 | 360 | 5,200 | 2,000 | 7,200 |
| Racine-East | 332 | 14 | 346 | 12,300 | 1,400 | 13,700 |
| West Bend-North | 118 | 116 | 234 | 4,600 | 1,700 | 6,300 |
| Butler | 596 | 114 | 710 | 25,500 | 1,500 | 27,000 |
| New Berlin | 309 | 39 | 348 | 11,200 | 500 | 11,700 |
| Pewaukee | 136 | 279 | 415 | 4,900 | 5,500 | 10,400 |
| Waukesha-North | 103 | 107 | 210 | 6,300 | 2,700 | 9,000 |
| Waukesha-South | 225 | 135 | 360 | 7,000 | 2,400 | 9,400 |
| Subtotal | 5,672 | 1,823 | 7,495 | 229,900 | 36,000 | 265,900 |
| Proposed | | | | | | |
| Pleasant Prairie | 0 | 425 | 425 | 300 | 6,100 | 6,400 |
| Burlington | 169 | 119 | 288 | 4,600 | 1,700 | 6,300 |
| Hartford | 39 | 245 | 284 | 1,400 | 3,500 | 4,900 |
| Subtotal | 208 | 789 | 997 | 6,300 | 11,300 | 17,600 |
| Total | 5,880 | 2,612 | 8,492 | 236,200 | 47,300 | 283,500 |

NOTES: To qualify as a major industrial center, a site must accommodate at least 3,500 industrial jobs.

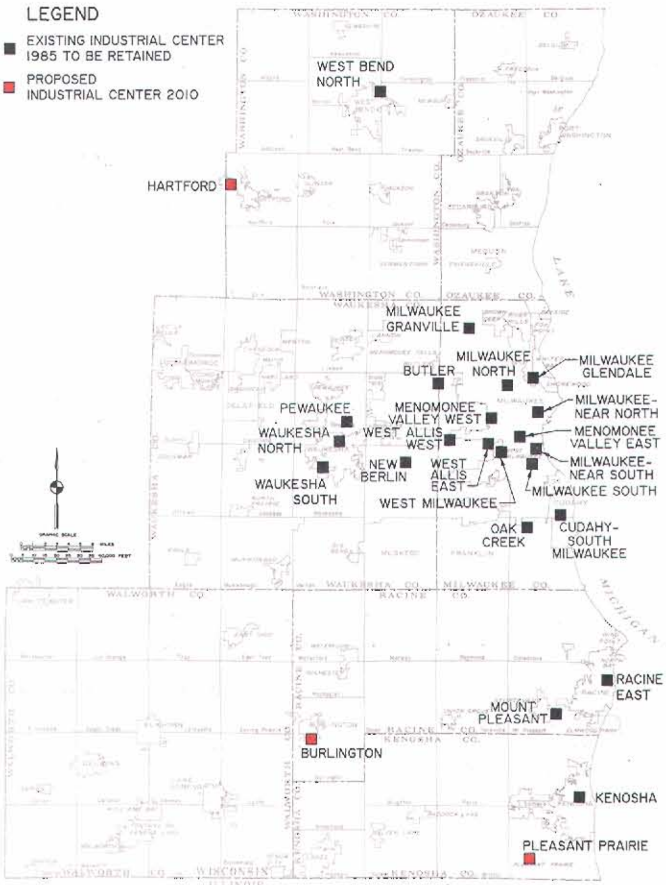
The total 1985 employment of 236,200 at the above sites includes 171,500 industrial jobs and 64,700 other jobs. The total year 2010 employment of 283,500 includes 212,100 industrial jobs and 71,400 other jobs.

Land use and employment data are based upon aggregations of data for U. S. Public Land Survey quarter sections which approximate the major industrial centers. The specific quarter sections included in each planned major industrial center are shown in Appendix E of SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010. There is some "overlap" between certain planned major industrial and planned major commercial centers as approximated by quarter section, owing to the mixture of land uses. For the overlapping quarter sections, only the industrial related employment has been reported in this table.

*Source: SEWRPC.*

Map 66

MAJOR INDUSTRIAL CENTERS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN




The recommended year 2010 regional land use plan envisions a total of 25 major industrial centers to serve the needs of the Region through the plan design year. Twenty-two of these centers existed in 1985 and would be retained through the year 2010. Three new centers are proposed, including centers located in or near the Cities of Burlington and Hartford and the Village of Pleasant Prairie. It is envisioned that by the year 2010, the 25 planned major industrial centers would accommodate about 212,000 industrial jobs, or about 58 percent of all industrial jobs in the Region.

*Source: SEWRPC.*

governmental and institutional lands proposed under the plan would consist of such neighborhood and community uses as new schools, churches, hospitals and nursing homes, and public facilities, including police and fire stations and city, village, and town halls.

Major existing governmental and institutional centers to be retained under the plan, including county seats and State and Federal office buildings, medical complexes, universities, technical schools, major libraries, and major cultural centers, are shown on Map 67.[11] No new major governmental or institutional centers are envisioned, and additional development of existing major centers would be limited to that necessary to meet the needs of the growing population.

## Transportation, Communication, and Utility Land Use

As indicated in Table 121, the adopted land use plan proposes to add approximately 14,600 acres of new transportation, communication, and utility land to the existing stock of such land within the Region. A total of about 134,800 acres of land would be devoted to transportation, communication, and utility uses by the year 2010, an increase of about 12 percent over the 1985 level. Most of the additional land would be required for rights-of-way for new or improved arterial, collector, and minor streets needed to serve new urban development or to provide adequate transportation service to existing urban development. Some of the additional land would be required for planned airport expansions recommended in the regional airport system plan. Minor amounts of land would also be required for the planned expansion of existing, or construction of new, public sanitary sewage treatment facilities, as recommended in the regional water quality management plan.

The plan envisions only two new major utility centers in the Region through the plan design year: a new public sewage treatment plant serving the Village of Wales and a new peak-load electric power generation plant in the Town

[11] *With respect to major educational centers, Map 67 shows only four-year universities and public technical colleges. It should be noted that there are numerous other public and private post-secondary educational institutions in the Region.*

Table 120

EXISTING AND PROPOSED GOVERNMENTAL AND INSTITUTIONAL LAND USE IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | Governmental and Institutional Land Use | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1985 | | Planned Increment 1985-2010 | | Total 2010 | |
| | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total |
| Kenosha . . . . . . . | 1,314 | 7.6 | 155 | 11.8 | 1,469 | 8.0 |
| Milwaukee . . . . . . | 7,154 | 41.5 | 172 | 2.4 | 7,326 | 40.1 |
| Ozaukee . . . . . . . | 1,024 | 6.0 | 88 | 8.6 | 1,112 | 6.1 |
| Racine . . . . . . . . | 1,813 | 10.5 | 96 | 5.3 | 1,909 | 10.4 |
| Walworth . . . . . . | 1,259 | 7.3 | 75 | 6.0 | 1,334 | 7.3 |
| Washington . . . . . | 1,087 | 6.3 | 102 | 9.4 | 1,189 | 6.5 |
| Waukesha . . . . . . | 3,589 | 20.8 | 354 | 9.9 | 3,943 | 21.6 |
| Region | 17,240 | 100.0 | 1,042 | 6.0 | 18,282 | 100.0 |

Source: SEWRPC.

Table 121

EXISTING AND PROPOSED TRANSPORTATION, COMMUNICATION, AND UTILITY LAND USE IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | Transportation, Communication, and Utility Land Use | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1985 | | Planned Increment 1985-2010 | | Total 2010 | |
| | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total |
| Kenosha . . . . . . . | 9,912 | 8.2 | 2,200 | 22.2 | 12,112 | 9.0 |
| Milwaukee . . . . . . | 36,337 | 30.2 | 2,288 | 6.3 | 38,625 | 28.6 |
| Ozaukee . . . . . . . | 8,637 | 7.2 | 1,205 | 14.0 | 9,842 | 7.3 |
| Racine . . . . . . . . | 12,973 | 10.8 | 1,523 | 11.7 | 14,496 | 10.8 |
| Walworth . . . . . . | 14,603 | 12.1 | 1,085 | 7.4 | 15,688 | 11.6 |
| Washington . . . . . | 12,828 | 10.7 | 1,539 | 12.0 | 14,367 | 10.7 |
| Waukesha . . . . . . | 24,989 | 20.8 | 4,720 | 18.9 | 29,709 | 22.0 |
| Region | 120,279 | 100.0 | 14,560 | 12.1 | 134,839 | 100.0 |

Source: SEWRPC.

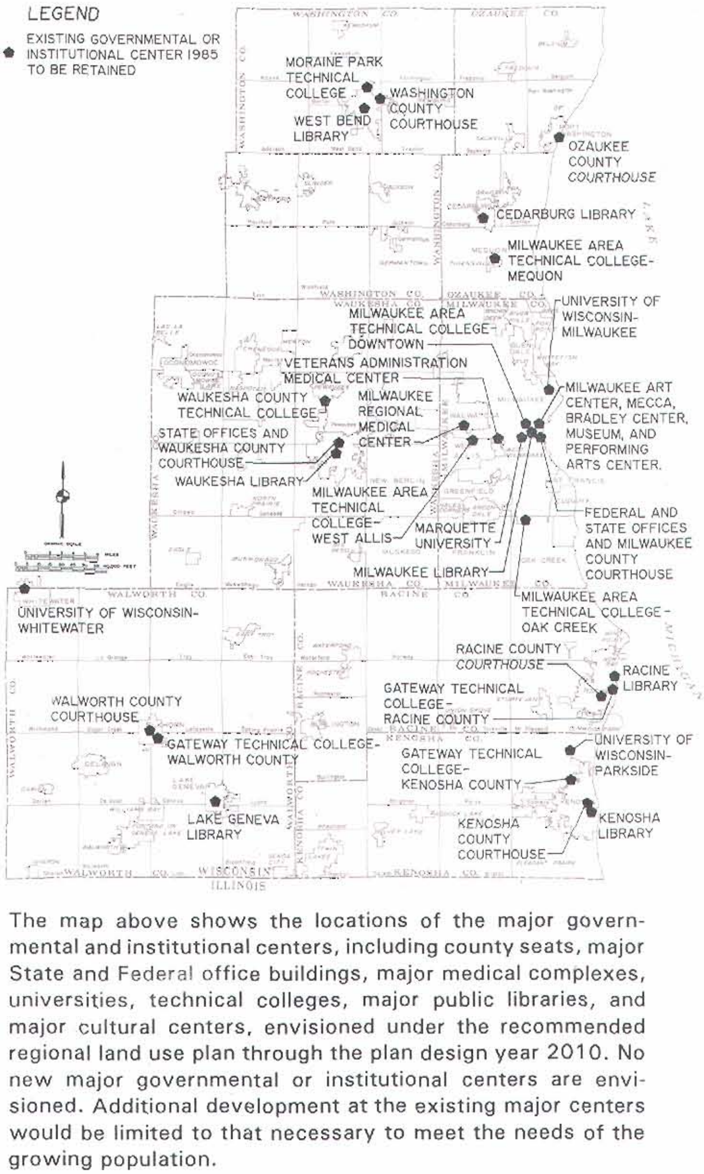
of Paris.[12] The major transportation and utility centers envisioned under the recommended year

[12]*The adopted regional water quality management plan proposed the development of a public sanitary sewerage system to serve the Village of North Prairie by the year 2000. The plan envisioned that sewage would be treated at a new plant serving the Village. A detailed sewerage facilities plan, documented in Village of North Prairie Wastewater Facility Plan, Phase One, 1986; and Village of North Prairie Wastewater Facility Plan, Phase Two, 1989, has since concluded that the least costly alternative for sewage treatment in the Village of North Prairie is the continued reliance on onsite sewage disposal systems.*

*It may be expected that the approach recommended in the facilities plan will be reflected in the removal from the regional plan of the proposal for a public sanitary sewerage system in the Village of North Prairie. In anticipation of this, the year 2010 regional land use plan does not reflect public sanitary sewer service for the Village.*

## Map 67

### MAJOR GOVERNMENTAL AND INSTITUTIONAL CENTERS IN THE REGION 2010 RECOMMENDED LAND USE PLAN

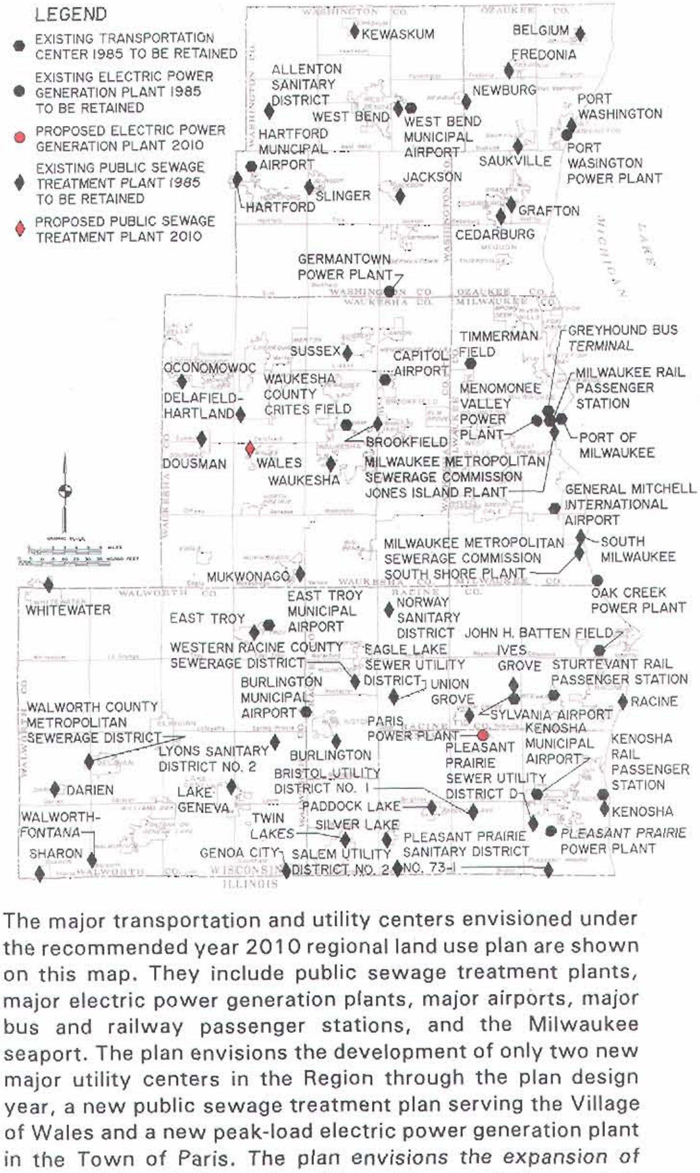



The map above shows the locations of the major governmental and institutional centers, including county seats, major State and Federal office buildings, major medical complexes, universities, technical colleges, major public libraries, and major cultural centers, envisioned under the recommended regional land use plan through the plan design year 2010. No new major governmental or institutional centers are envisioned. Additional development at the existing major centers would be limited to that necessary to meet the needs of the growing population.

*Source: SEWRPC.*

## Map 68

### MAJOR TRANSPORTATION AND UTILITY CENTERS IN THE REGION 2010 RECOMMENDED LAND USE PLAN




The major transportation and utility centers envisioned under the recommended year 2010 regional land use plan are shown on this map. They include public sewage treatment plants, major electric power generation plants, major airports, major bus and railway passenger stations, and the Milwaukee seaport. The plan envisions the development of only two new major utility centers in the Region through the plan design year, a new public sewage treatment plan serving the Village of Wales and a new peak-load electric power generation plant in the Town of Paris. The plan envisions the expansion of certain of the existing major utility and transportation centers in accordance with the adopted regional water quality management and regional airport system plans.

*Source: SEWRPC.*

2010 regional land use plan, including public sewage treatment plants, major electric power generation plants, major airports, major bus and railway passenger stations, and the Milwaukee seaport, are shown on Map 68.

### Open Space: Recreational Land Use

As indicated in Table 122, under the plan, about 4,100 acres of land would be added to the existing stock of recreational land use in the Region. This represents an increase of about 16 percent over the 1985 acreage. It should be noted that the data in Table 122 pertain to "intensive use" areas, that is, land actually developed or anticipated to be developed as outdoor recreation facility areas. It should also be noted that the additional recreational land indicated in Table 122 represents only the

Table 122

EXISTING AND PROPOSED RECREATIONAL LAND USE IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | Recreational Land Use[a] | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1985 | | Planned Increment 1985-2010[b] | | Total 2010 | |
| | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total |
| Kenosha ....... | 2,749 | 10.8 | 415 | 15.1 | 3,164 | 10.7 |
| Milwaukee ...... | 7,206 | 28.2 | 932 | 12.9 | 8,138 | 27.4 |
| Ozaukee ....... | 1,809 | 7.1 | 272 | 15.0 | 2,081 | 7.0 |
| Racine ........ | 2,391 | 9.4 | 390 | 16.3 | 2,781 | 9.4 |
| Walworth ...... | 3,541 | 13.8 | 258 | 7.3 | 3,799 | 12.8 |
| Washington ..... | 1,874 | 7.3 | 605 | 32.3 | 2,479 | 8.4 |
| Waukesha ...... | 5,994 | 23.4 | 1,217 | 20.3 | 7,211 | 24.3 |
| Region | 25,564 | 100.0 | 4,089 | 16.0 | 29,653 | 100.0 |

[a]*Includes only that land intensively used for recreational purposes.*

[b]*Includes only that increment which is for public recreational use.*

*Source: SEWRPC.*

increase in land devoted to public recreational use. The additional recreational areas called for under the plan are based in part on neighborhood development standards, which seek to provide adequate neighborhood park land in developing areas. The recreational land use recommendations also reflect specific park site acquisition and development proposals set forth in the county park and open space plans recently prepared by the Commission for each of the seven counties in the Region.[13]

The year 2010 regional land use plan proposes a system of 31 major parks of regional size and significance to serve the needs of the Region through the year 2010. Such parks have an area of at least 250 acres and provide opportunities for a variety of resource-oriented outdoor recreational activities. Twenty-nine of the 31 sites were recommended as major park sites under the year 2000 regional land use plan. Of the 29 previously recommended sites, only two, Sugar Creek in Walworth County and Paradise Valley in Washington County, have yet to be publicly acquired.

The plan recognizes the development of two major parks not identified in the year 2000 plan: Mitchell Park, an approximately 800-acre site located in the City and Town of Brookfield, and an approximately 400-acre unnamed site surrounding a major lake recently created from an abandoned quarry in the Village of Pleasant Prairie. Facility development at these sites as envisioned in local site plans would qualify both sites as major parks. The recommended major

[13]*The park and open space plans of the seven counties are documented in SEWRPC Community Assistance Planning Report No. 131, A Park and Open Space Plan for Kenosha County, 1987; SEWRPC Community Assistance Planning Report No. 132, A Park and Open Space Plan for Milwaukee County, 1991; SEWRPC Community Assistance Planning Report No. 133, A Park and Open Space Plan for Ozaukee County, 1987; SEWRPC Community Assistance Planning Report No. 134, A Park and Open Space Plan for Racine County, 1988; SEWRPC Community Assistance Planning Report No. 135, A Park and Open Space Plan for Walworth County, 1991; SEWRPC Community Assistance Planning Report No. 136, A Park and Open Space Plan for Washington County, 1989; and SEWRPC Community Assistance Planning Report No. 137, A Park and Open Space Plan for Waukesha County, 1989.*

park sites, along with existing major special-use outdoor recreation sites in the Region, are listed in Table 123 and shown on Map 69.

### Open Space: Environmental Corridors

The most important elements of the natural resource base of the Region, including the best remaining woodlands; wetlands; prairies; wildlife habitats; surface waters and associated shorelands and floodlands; and historic, scenic, and scientific sites, have been found to occur combined in linear patterns throughout the Region. These linear patterns of prime natural resource concentrations have been termed primary environmental corridors. The preservation and protection of these environmental corridors in accordance with regional development objectives is considered essential to the maintenance of a wholesome environment within the Region and the preservation of the unique cultural and natural heritage of the Region, as well as of its natural beauty.

In 1985, primary environmental corridor lands in the Region encompassed about 299,600 acres, or 17 percent of the total area of the Region. These corridors are generally located along major stream valleys, along the Lake Michigan shoreline, around major inland lakes, and in the Kettle Moraine area of the Region. The adopted year 2010 land use plan, proposes the preservation of the existing primary environmental corridor lands in essentially natural, open uses. Under the plan, development within these corridors would be limited to that needed to accommodate required transportation and utility facilities, compatible outdoor recreational facilities, and, on a limited basis, rural-density residential use.

In addition to the preservation of existing primary environmental corridor lands, the land use plan envisions that certain adjacent floodland areas currently in agricultural or other open use would be restored to a wetland condition, thereby becoming part of the environmental corridor network. These lands, which together encompass about 3,600 acres, have been recommended for county or State acquisition for open space preservation purposes under the aforementioned county park and open space plans.

The proposed environmental corridor network recommended under the year 2010 regional land use plan, including the existing corridors and the proposed additional areas, is shown on Map 64. The planned environmental corridors encompass 303,200 acres, or about 18 percent of the total area of the Region (see Table 124).

### Open Space: Agricultural and Other Open Land Uses

There were approximately 1,333,400 acres, or 2,083 square miles, of open land within the Region in 1985, including almost 932,000 acres of agricultural land and almost 401,500 acres of other open lands. These rural lands serve at least two important functions in the Region. As a land use, they provide open areas which lend form and shape to urban development; provide invaluable opportunities for passive recreation; and serve to preserve, protect, and enhance certain elements of the natural resource base. As the site of an economic activity, these lands provide employment opportunities in agriculture and the extractive industries of forestry and mining.

Under the adopted land use plan, the expansion of urban activities into present rural areas would result in the conversion of about 54,800 acres, or about 86 square miles, of rural land, to urban land uses between 1985 and 2010. This conversion would occur at an average annual rate of about 2,200 acres, or about 3.4 square miles. In addition to the conversion of rural land to urban land uses, the plan envisions that about 700 additional acres of rural land would be developed for rural estate use.

As indicated in Table 125, much of the urban expansion proposed under the recommended land use plan, 40,500 acres, would take place on lands now in agricultural use and would result in a decrease of about 4 percent in the existing stock of agricultural land within the Region. Among the seven counties, the greatest decline in agricultural land, 13,400 acres, would occur in Waukesha County. For the other six counties, the required conversion of agricultural land would range from about 3,500 acres in Walworth County to about 6,100 acres in Kenosha County.

The adopted plan seeks to hold the conversion of prime agricultural lands to urban land uses to a minimum. Prime agricultural lands are well suited for highly productive agricultural use. Accordingly, the recommended year 2010 land use plan proposes to convert to urban use only those prime agricultural lands which were already committed to urban development

Table 123

SELECTED CHARACTERISTICS OF MAJOR PUBLIC OUTDOOR RECREATION CENTERS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN

| Major Public Outdoor Recreation Center | Land Use Area in Acres | | | | | |
|---|---|---|---|---|---|---|
| | Gross Area[a] | | | Net Area[b] | | |
| | Existing 1985 | Planned Increment 1985-2010 | Total 2010 | Existing 1985 | Planned Increment 1985-2010 | Total 2010 |
| Parks | | | | | | |
| Existing | | | | | | |
| Brighton Dale | 360 | 0 | 360 | 186 | 0 | 186 |
| Petrifying Springs | 358 | 0 | 358 | 187 | 0 | 187 |
| Silver Lake | 258 | 100 | 358 | 24 | 28 | 52 |
| Brown Deer | 365 | 0 | 365 | 268 | 0 | 268 |
| Dretzka | 327 | 0 | 327 | 305 | 0 | 305 |
| Greenfield | 295 | 0 | 295 | 173 | 0 | 173 |
| Lake Michigan-North | 415 | 0 | 415 | 192 | 63 | 255 |
| Lake Michigan-South | 841 | 0 | 841 | 323 | 120 | 443 |
| Lincoln | 312 | 0 | 312 | 226 | 0 | 226 |
| Oakwood | 278 | 0 | 278 | 242 | 0 | 242 |
| Whitnall | 640 | 0 | 640 | 315 | 0 | 315 |
| Harrington Beach | 636 | 6 | 642 | 17 | 64 | 81 |
| Hawthorne Hills | 285 | 0 | 285 | 210 | 0 | 210 |
| Mee-Kwon | 239 | 0 | 239[c] | 165 | 5 | 170 |
| Cliffside | 223 | 315 | 538 | 69 | 79 | 148 |
| Johnson | 357 | 0 | 357 | 250 | 0 | 250 |
| Big Foot Beach | 272 | 57 | 329 | 69 | 0 | 69 |
| Whitewater Lake | 250 | 0 | 250 | 86 | 0 | 86 |
| Pike Lake | 678 | 58 | 736 | 28 | 32 | 60 |
| Menomonee | 397 | 0 | 397 | 159 | 26 | 185 |
| Minooka | 297 | 0 | 297 | 105 | 0 | 105 |
| Mukwonago | 222 | 0 | 222[c] | 141 | 0 | 141 |
| Naga-Waukee | 416 | 157 | 573 | 222 | 59 | 281 |
| Ottawa Lake | 220 | 0 | 220[c] | 95 | 0 | 95 |
| Subtotal | 8,941 | 693 | 9,634 | 4,057 | 476 | 4,533 |
| Existing—Site Acquired But Not Developed | | | | | | |
| Bender | 308 | 127 | 435 | 0 | 159 | 159 |
| Ela | 239 | 0 | 239[c] | 0 | 40 | 40 |
| Monches | 194 | 248 | 442 | 0 | 32 | 32 |
| Subtotal | 741 | 375 | 1,116 | 0 | 231 | 231 |
| Proposed—New Site | | | | | | |
| Pleasant Prairie | 0 | 370 | 370 | 0 | 120 | 120 |
| Sugar Creek | 0 | 305 | 305 | 0 | 138 | 138 |
| Paradise Valley | 0 | 450 | 450 | 0 | 89 | 89 |
| Mitchell | 0 | 813 | 813 | 0 | 100 | 100 |
| Subtotal | 0 | 1,938 | 1,938 | 0 | 447 | 447 |
| Subtotal Parks | 9,682 | 3,006 | 12,688 | 4,057 | 1,154 | 5,211 |
| Special-Use Sites | | | | | | |
| Existing | | | | | | |
| Bong Recreation Area | 4,515 | 460 | 4,975 | 138 | 26 | 164 |
| Maier Festival Park | 51 | 0 | 51 | 51 | 0 | 51 |
| Milwaukee County Stadium | 102 | 0 | 102 | 26 | 0 | 26 |
| Milwaukee County Zoo | 170 | 0 | 170 | 84 | 9 | 93 |
| Mitchell Conservatory | 61 | 0 | 61 | 53 | 0 | 53 |
| State Fair Park | 214 | 0 | 214 | 159 | 0 | 159 |
| Old World Wisconsin | 450 | 0 | 450 | 77 | 4 | 81 |
| Subtotal Special-Use Sites | 5,563 | 460 | 6,023 | 588 | 39 | 627 |
| Total | 15,245 | 3,466 | 18,711 | 4,645 | 1,193 | 5,838 |

[a] *Includes entire site area.*

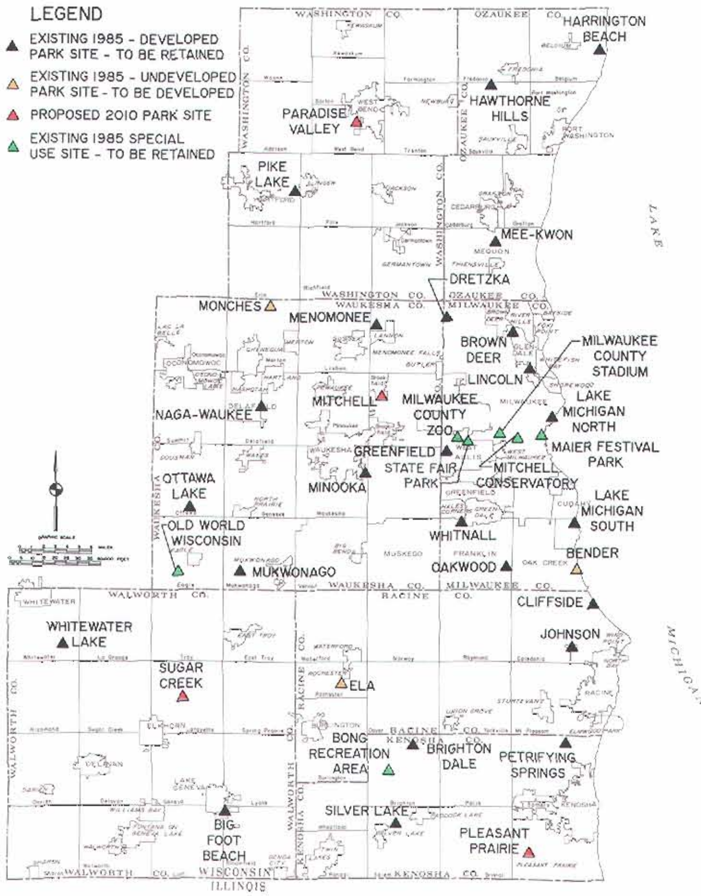
[b] *Includes only that land intensively used for recreation purposes.*

[c] *Site abuts existing parkway lands or lands recommended for parkway acquisition. The area of the site proper in conjunction with the associated parkway lands exceeds 250 acres.*

*Source: SEWRPC.*

## Map 69

### MAJOR OUTDOOR RECREATION CENTERS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN




The map above shows the major park sites and major special use outdoor recreation sites envisioned under the recommended regional land use plan. The plan proposes a total of 31 major parks to meet the needs of the Region through the year 2010. Twenty four of the sites for these parks were publicly owned and developed in 1985, while three sites had been publicly acquired for park purposes in 1985 but not yet developed. The plan envisions four new major parks at sites in the City and Town of Brookfield, in the Village of Pleasant Prairie, at the long-recommended Paradise Valley site in Washington County, and at the Sugar Creek site in Walworth County.

*Source: SEWRPC.*

because of their proximity to existing and expanding concentrations of urban uses and prior commitment of heavy capital investments and utility extensions. The identified prime agricultural lands encompassed about 670,100 acres, or about 72 percent of all land in agricultural use in the Region in 1985. As indicated in Table 125, the adopted land use plan proposes to convert only about 10,300 acres, or just over 1 percent, of the remaining prime agricultural lands to urban use by the year 2010. These prime agricultural lands are shown on Map 70.

#### Table 124

#### PRIMARY ENVIRONMENTAL CORRIDOR AREA IN THE REGION BY COUNTY 2010 RECOMMENDED LAND USE PLAN

| County | Acres[a] | Percent of Total |
|---|---|---|
| Kenosha | 28,900 | 9.5 |
| Milwaukee | 10,300 | 3.4 |
| Ozaukee | 19,900 | 6.6 |
| Racine | 23,800 | 7.8 |
| Walworth | 65,500 | 21.6 |
| Washington | 60,900 | 20.1 |
| Waukesha | 93,900 | 31.0 |
| Region | 303,200 | 100.0 |

[a] *The planned environmental corridor area includes 299,600 acres within the existing primary environmental corridor configuration in the Region in 1985 and 3,600 additional acres within adjacent floodland areas that are currently in agricultural and other open use that are recommended to be restored to a wetland condition by the plan design year.*

*Source: SEWRPC.*

In addition to agricultural lands, there were 401,500 acres of other open land uses in the Region in 1985, including woodlands, water, wetlands, quarries, landfill sites, and unused rural land. As indicated in Table 126, under the recommended land use plan, a total of 15,000 acres, or about 4 percent of the remaining acreage of these other open lands, would be converted to urban use by the year 2010.

Distribution of Population and Households

Under the adjusted intermediate regional growth scenario, the resident population of the Region would increase by about 168,000 persons, or about 10 percent, from about 1,743,000 persons in 1985 to about 1,911,000 persons by the year 2010. Under the recommended plan, the year 2010 regional population would be distributed among the seven counties as shown in Table 127. As indicated in Table 127, under the plan, Waukesha County would gain about 78,000 persons, while Kenosha, Ozaukee, Racine, Walworth, and Washington Counties would experience population increases ranging from 12,000 to 27,000 persons. Milwaukee County would experience some population loss.

Table 125

EXISTING AND PROPOSED AGRICULTURAL LAND USE IN THE REGION
BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | Agricultural Land Use | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | | | | Prime | | | |
| | Existing 1985 (acres) | Planned Increment 1985-2010 | | Total 2010 (acres) | Existing 1985 (acres) | Planned Increment 1985-2010 | | Total 2010 (acres) |
| | | Acres | Percent | | | Acres | Percent | |
| Kenosha | 106,165 | -6,057 | -5.7 | 100,108 | 76,471 | -2,042 | -2.7 | 74,429 |
| Milwaukee | 21,128 | -4,072 | -19.3 | 17,056 | 1,351 | 0 | 0.0 | 1,351 |
| Ozaukee | 92,650 | -4,016 | -4.3 | 88,634 | 73,335 | -1,425 | -1.9 | 71,910 |
| Racine | 137,196 | -4,576 | -3.3 | 132,620 | 98,626 | -526 | -0.5 | 98,100 |
| Walworth | 249,705 | -3,510 | -1.4 | 246,195 | 208,941 | -917 | -0.4 | 208,024 |
| Washington | 168,134 | -4,900 | -2.9 | 163,234 | 108,256 | -1,463 | -1.4 | 106,793 |
| Waukesha | 156,978 | -13,356 | -8.5 | 143,622 | 103,078 | -3,886 | -3.8 | 99,192 |
| Region | 931,956 | -40,487 | -4.3 | 891,469 | 670,058 | -10,259 | -1.5 | 659,799 |

*Source: SEWRPC.*

Table 126

EXISTING AND PROPOSED OPEN LAND USES IN THE REGION
BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | Open Land Use[a] | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1985 | | Planned Increment 1985-2010 | | Total 2010 | |
| | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total |
| Kenosha | 40,038 | 10.0 | -1,560 | -3.9 | 38,478 | 10.0 |
| Milwaukee | 17,267 | 4.3 | -2,081 | -12.1 | 15,186 | 3.9 |
| Ozaukee | 30,514 | 7.6 | -1,204 | -3.9 | 29,310 | 7.6 |
| Racine | 40,377 | 10.0 | -1,704 | -4.2 | 38,673 | 10.0 |
| Walworth | 81,169 | 20.2 | -1,385 | -1.7 | 79,784 | 20.6 |
| Washington | 77,029 | 19.2 | -1,827 | -2.4 | 75,202 | 19.5 |
| Waukesha | 115,068 | 28.7 | -5,246 | -4.6 | 109,822 | 28.4 |
| Region | 401,462 | 100.0 | -15,007 | -3.7 | 386,455 | 100.0 |

[a]*Includes woodlands, water, wetlands, unused rural land, landfill sites, and quarries.*

*Source: SEWRPC.*

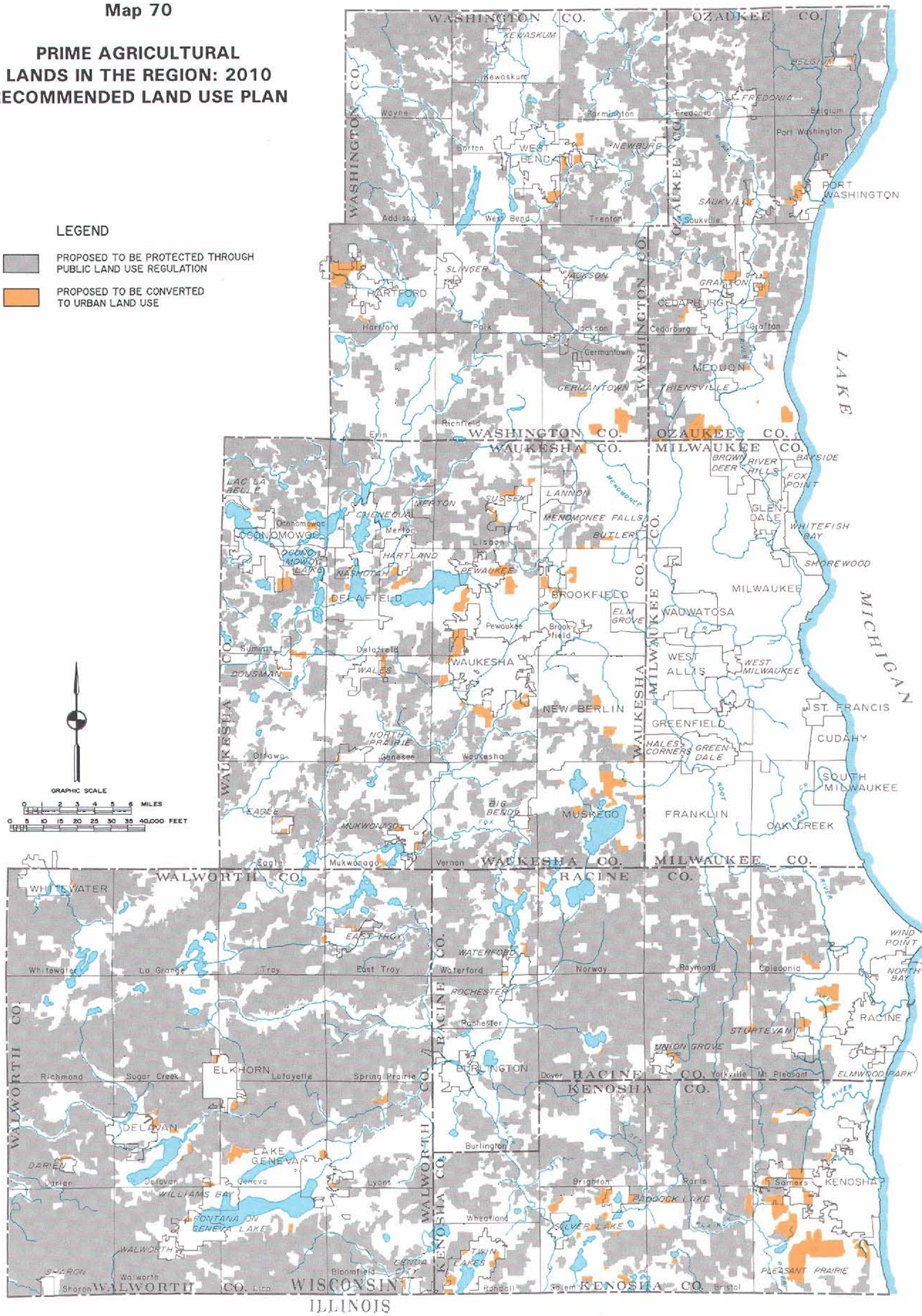
Under the plan, the number of households in the Region would increase from about 644,000 in 1985 to about 774,000 by the year 2010, an overall increase of about 130,000 households, or about 20 percent. As previously indicated, in relative terms, the number of households in the Region would continue to grow at a faster rate than the regional population. As indicated in Table 128, under the plan, each county would experience a significant increase in the number of households between 1985 and 2010, ranging from just under 8,000 additional households in Ozaukee County to about 39,000 additional households in Waukesha County. Despite a slight decrease in population, as noted above, Milwaukee County would gain almost 33,000 households between 1985 and 2010, second only to Waukesha County.

## Map 70

### PRIME AGRICULTURAL LANDS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN

LEGEND

- PROPOSED TO BE PROTECTED THROUGH PUBLIC LAND USE REGULATION
- PROPOSED TO BE CONVERTED TO URBAN LAND USE




The recommended year 2010 regional land use plan proposes the preservation in agricultural use of most of the remaining prime agricultural lands in Region. Under the plan, conversion of prime agricultural lands to urban use would be limited to those areas which were already committed to urban development because of their proximity to existing and expanding concentrations of urban uses and the prior commitment of heavy capital investments and utility extensions. Under the plan about 10,300 acres, or just over 1 percent of the remaining prime agricultural lands in the Region, would be converted to urban use by the year 2010.

*Source: SEWRPC.*

Table 127

EXISTING AND PROPOSED POPULATION DISTRIBUTION IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | 1985 Population | | Planned Increment 1985-2010 | | 2010 Population | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent | Number | Percent of Total |
| Kenosha | 121,100 | 7.0 | 26,800 | 22.1 | 147,900 | 7.7 |
| Milwaukee | 939,600 | 53.9 | -5,600 | -0.6 | 934,000 | 48.9 |
| Ozaukee | 67,500 | 3.9 | 12,300 | 18.2 | 79,800 | 4.2 |
| Racine | 169,200 | 9.7 | 16,800 | 9.9 | 186,000 | 9.7 |
| Walworth | 72,200 | 4.1 | 15,100 | 20.9 | 87,300 | 4.6 |
| Washington | 87,200 | 5.0 | 24,500 | 28.1 | 111,700 | 5.8 |
| Waukesha | 285,900 | 16.4 | 78,400 | 27.4 | 364,300 | 19.1 |
| Region | 1,742,700 | 100.0 | 168,300 | 9.7 | 1,911,000 | 100.0 |

*Source: SEWRPC.*

Table 128

EXISTING AND PROPOSED HOUSEHOLD DISTRIBUTION IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | 1985 Households | | Planned Increment 1985-2010 | | 2010 Households | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent | Number | Percent of Total |
| Kenosha | 44,200 | 6.9 | 14,900 | 33.7 | 59,100 | 7.6 |
| Milwaukee | 368,200 | 57.2 | 32,800 | 8.9 | 401,000 | 51.8 |
| Ozaukee | 22,900 | 3.5 | 7,600 | 33.2 | 30,500 | 3.9 |
| Racine | 61,200 | 9.5 | 12,700 | 20.8 | 73,900 | 9.6 |
| Walworth | 25,600 | 4.0 | 10,000 | 39.1 | 35,600 | 4.6 |
| Washington | 28,500 | 4.4 | 13,100 | 46.0 | 41,600 | 5.4 |
| Waukesha | 93,200 | 14.5 | 39,400 | 42.3 | 132,600 | 17.1 |
| Region | 643,800 | 100.0 | 130,500 | 20.3 | 774,300 | 100.0 |

*Source: SEWRPC.*

As further indicated in Tables 127 and 128, the relative distribution of population and households among the seven counties would change somewhat, with Milwaukee and Waukesha Counties most affected. Under the plan, Milwaukee County's share of the regional population would decrease from 54 percent to 49 percent, while Waukesha County's share would increase from just over 16 percent to about 19 percent. Similarly, Milwaukee County's share of all households in the Region would decrease from 57 percent to 52 percent, while Waukesha County's share would increase from just over 14 percent to about 17 percent. For each of the other five counties in the Region, the relative share of the total population and households in the Region would change by 1 percent or less.

The land use plan proposes an amount of urban land use sufficient to accommodate the anticipated future population and household levels in the Region through the plan design year. The increase in the amount of urban land proposed is compared to the anticipated increases in

Table 129

INCREMENTAL URBAN LAND USE, POPULATION, AND HOUSEHOLDS IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | Increment: 1985-2010 | | | | | |
|---|---|---|---|---|---|---|
| | Urban Land Area | | Population | | Households | |
| | Acres | Percent | Number | Percent | Number | Percent |
| Kenosha | 7,533 | 23.6 | 26,800 | 22.1 | 14,900 | 33.7 |
| Milwaukee | 6,079 | 5.2 | -5,600 | -0.6 | 32,800 | 8.9 |
| Ozaukee | 5,165 | 18.9 | 12,300 | 18.2 | 7,600 | 33.2 |
| Racine | 6,181 | 15.3 | 16,800 | 9.9 | 12,700 | 20.8 |
| Walworth | 4,674 | 12.3 | 15,100 | 20.9 | 10,000 | 39.1 |
| Washington | 6,659 | 19.8 | 24,500 | 28.1 | 13,100 | 46.0 |
| Waukesha | 18,482 | 18.6 | 78,400 | 27.4 | 39,400 | 42.3 |
| Region | 54,773 | 14.1 | 168,300 | 9.7 | 130,500 | 20.3 |

*Source: SEWRPC.*

population and households in Table 129. In total, the recommended land use plan would accommodate the approximately 10 percent increase in population and 20 percent increase in households with an approximately 14 percent increase in urban land uses.

As indicated in Table 130 and Figure 55, the population density in the developed area of the Region under the adopted plan would decline from the 1985 level of about 3,600 persons per square mile to a year 2010 level of about 2,800 persons per square mile, continuing the trend toward declining densities evident in the Region since 1920. The rate of decline would be reduced, however, by implementation of the plan proposals to develop the majority of new residential land within the Region at medium, instead of low, densities and to provide such development with public sanitary sewer and water supply services.

Employment Distribution

Under the adjusted intermediate regional growth scenario, the total number of jobs in the Region would increase from about 872,000 in 1985 to about 1,095,000 in 2010, an increase of about 223,000 jobs, or 26 percent. Under the recommended plan, each county would gain a significant number of jobs between 1985 and 2010 (see Table 131). Employment in Milwaukee County would increase by about 85,000 jobs, more than in any other county. Employment in Waukesha County would increase by almost 59,000 jobs. Among the other five counties in the Region, planned employment increases would range from just under 12,000 jobs in Ozaukee County to almost 21,000 jobs in Kenosha County.

As indicated in Table 131, on a relative basis, employment would increase at a faster rate in outlying counties of the Region than in Milwaukee County. While the plan seeks to centralize employment to the extent practicable, Milwaukee County's share of the total regional employment would, nevertheless, continue to decline somewhat, from just over 60 percent in 1985 to about 56 percent in 2010. Conversely, Waukesha County's share of total regional employment would increase from about 16 percent to about 18 percent. For each of the other five counties, the share of total regional employment would change by less than 1 percent between 1985 and 2010.

Public Sanitary Sewer and Water Supply Service

Under the adopted land use plan, all proposed new urban development within the Region would be served with public sanitary sewer and water supply facilities (see Map 71). In addition, public sanitary sewer and water supply service would be extended to certain urban areas lacking these facilities in 1985. In 1985, about 320 square miles, or about 67 percent of the total developed urban area of the Region, and about 1.51 million persons, or almost 87 percent of the resident population of the Region, were served by public sanitary sewer facilities (see Table 132). About 263 square miles, or about 55 percent of the

Table 130

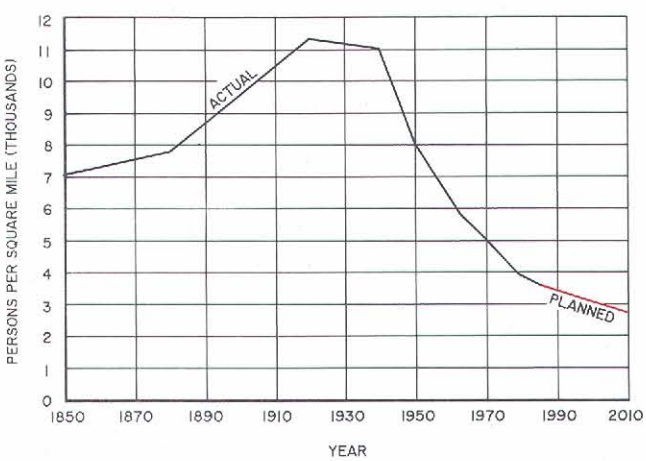
POPULATION DENSITY IN THE REGION: SELECTED YEARS, 1850-1985, AND 2010 RECOMMENDED LAND USE PLAN

| | Urban Population | | Rural Population | | | Area (square miles) | | Persons per Square Mile | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Number | Percent of Total | Number | Percent of Total | Total Population | Urban | Total | Urban | Total |
| 1850 | 28,623 | 25.2 | 84,766 | 74.8 | 113,389 | 4 | 2,689 | 7,156 | 42.2 |
| 1880 | 139,509 | 50.3 | 137,610 | 49.7 | 277,119 | 18 | 2,689 | 7,751 | 103.1 |
| 1900 | 354,082 | 70.6 | 147,726 | 29.4 | 501,808 | 37 | 2,689 | 9,570 | 186.6 |
| 1920 | 635,376 | 81.1 | 148,305 | 18.9 | 783,681 | 56 | 2,689 | 11,346 | 291.4 |
| 1940 | 991,535 | 92.9 | 76,164 | 7.1 | 1,067,699 | 90 | 2,689 | 11,017 | 397.1 |
| 1950 | 1,179,084 | 95.0 | 61,534 | 5.0 | 1,240,618 | 146 | 2,689 | 8,076 | 461.4 |
| 1963 | 1,634,200 | 97.6 | 40,100 | 2.4 | 1,674,300 | 282 | 2,689 | 5,795 | 622.6 |
| 1970 | 1,728,946 | 98.5 | 27,137 | 1.5 | 1,756,083 | 338 | 2,689 | 5,115 | 653.1 |
| 1980 | 1,749,238 | 99.1 | 15,558 | 0.9 | 1,764,796 | 444 | 2,689 | 3,940 | 656.3 |
| 1985 | 1,730,500 | 99.3 | 12,200 | 0.7 | 1,742,700 | 477 | 2,689 | 3,628 | 648.1 |
| 2010 | 1,902,800 | 99.6 | 8,200 | 0.4 | 1,911,000 | 668 | 2,689 | 2,849 | 710.7 |

*Source: U. S. Bureau of the Census and SEWRPC.*

Figure 55

URBAN POPULATION DENSITY IN THE REGION: ACTUAL 1850-1985 AND 2010 RECOMMENDED LAND USE PLAN




*Source: SEWRPC.*

developed area of the Region, and about 1.39 million persons, or about 80 percent of the resident population of the Region, were served by public water supply facilities. Under the adopted plan, about 570 square miles, or about 85 percent of the developed urban area, and about 1.74 million persons, or about 91 percent of the total population, would be served by public sanitary sewer facilities and public water supply facilities by the plan design year.

The developed urban area and the population levels which would be served by public sanitary sewer and water supply service under the adopted plan is summarized by county in Table 133. The developed area served by sanitary sewer and water supply service by the year 2010 would range from about 57 percent in Washington County to nearly 100 percent in Milwaukee County. The proportion of the resident population so served would range from a low of about 67 percent in Walworth and Washington Counties to a high of almost 100 percent in Milwaukee County.

## ALTERNATIVE LAND USE PLANS

In view of the continuing uncertainty surrounding future social and economic conditions in the Region, it would be imprudent to dismiss the possibility of future growth and change in the Region occurring in a manner significantly at variance with that envisioned under the adopted plan. Accordingly, a determination was made to prepare alternative land use plans. Four alternative land use plans were prepared: a high-growth decentralized plan, a high-growth centralized plan, an intermediate-growth decentralized plan,

Table 131

EXISTING AND PROPOSED EMPLOYMENT DISTRIBUTION IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| County | 1985 Employment | | Planned Increment 1985-2010 | | 2010 Employment | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent | Number | Percent of Total |
| Kenosha | 42,500 | 4.9 | 20,500 | 48.2 | 63,000 | 5.7 |
| Milwaukee | 527,300 | 60.5 | 85,400 | 16.2 | 612,700 | 56.0 |
| Ozaukee | 26,900 | 3.1 | 11,800 | 43.9 | 38,700 | 3.5 |
| Racine | 74,500 | 8.5 | 17,600 | 23.6 | 92,100 | 8.4 |
| Walworth | 28,100 | 3.2 | 12,400 | 44.1 | 40,500 | 3.7 |
| Washington | 31,300 | 3.6 | 16,600 | 53.0 | 47,900 | 4.4 |
| Waukesha | 141,300 | 16.2 | 58,800 | 41.6 | 200,100 | 18.3 |
| Region | 871,900 | 100.0 | 223,100 | 25.6 | 1,095,000 | 100.0 |

*Source: SEWRPC.*

Table 132

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| Area and Population | Existing Service 1985 | | Planned Service Increment | | Total Service 2010 | |
|---|---|---|---|---|---|---|
| | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply |
| Developed Area[a] | | | | | | |
| Total Square Miles | 476.5 | 476.5 | 191.3 | 191.3 | 667.8 | 667.8 |
| Square Miles Served | 319.8[b] | 262.9[c] | 250.5 | 309.8 | 570.3[d] | 572.7[d] |
| Percent of Total Served | 67.1 | 55.2 | - - | - - | 85.4 | 85.8 |
| Population | | | | | | |
| Total Population | 1,742,700 | 1,742,700 | 168,300 | 168,300 | 1,911,000 | 1,911,000 |
| Population Served | 1,507,800 | 1,389,700 | 231,300 | 352,800 | 1,739,100 | 1,742,500 |
| Percent of Total Served | 86.5 | 79.7 | - - | - - | 91.0 | 91.2 |

NOTE: Public sanitary sewer and water supply service areas presented in this table do not include lands that are located adjacent to, but outside, the Region, including 1.1 square miles of land in the Jefferson County portion of the Whitewater urban service area, 0.4 square mile of land in the Jefferson County portion of the Oconomowoc urban service area, and 0.4 square mile of land in the Dodge County portion of the Hartford urban service area.

[a] *Based on historic urban growth analysis; see Table 67 of SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010.*

[b] *Does not include 57.1 square miles of land served with public sanitary sewer located outside the 1985 developed urban area.*

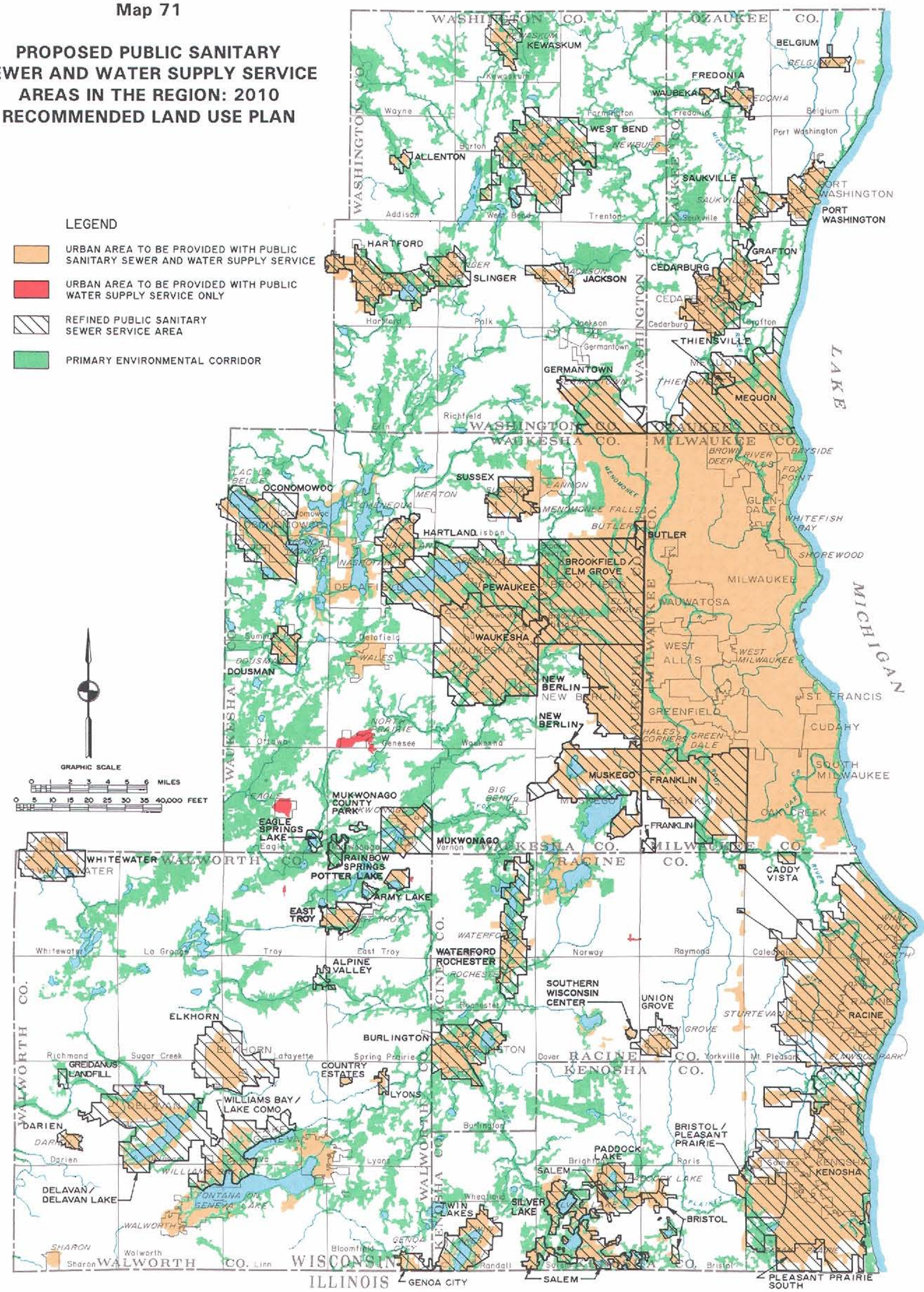
[c] *Does not include 30.1 square miles of land served with public water supply located outside the 1985 developed urban area.*

[d] *Does not include 4.9 square miles of land to be served with public sanitary sewer and water supply service located outside the planned 2010 developed urban area.*

*Source: SEWRPC.*

Map 71

## PROPOSED PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE AREAS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN




The recommended regional land use plan proposes to serve essentially all new urban development within the Region with public sanitary sewer and public water supply service. About 570 square miles, or 85 percent of the developed urban area of the Region, and about 1.74 million persons, or 91 percent of the total regional population, would be served with public sanitary sewer and water supply facilities by the year 2010. As shown above, public water supply would be provided in several outlying communities for which public sanitary sewer service is not planned.

*Source: SEWRPC.*

## Table 133

### EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION BY COUNTY: 1985 AND 2010 RECOMMENDED LAND USE PLAN

| | Existing 1985 | | | | | | | | | Planned 2010 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Public Sewer Service | | | | Public Water Supply Service | | | | | Public Sewer and Water Supply Service[a] | | | |
| | Developed Area[e] (square miles) | Developed Area Served[b] | | Population Served | | Developed Area Served[c] | | Population Served | | Developed Area (square miles) | Developed Area Served[d] | | Population Served | |
| County | | Square Miles | Percent of County | Number | Percent of County | Square Miles | Percent of County | Number | Percent of County | | Square Miles | Percent of County | Number | Percent of County |
| Kenosha ....... | 34.7 | 24.9 | 71.8 | 101,800 | 84.1 | 17.6 | 50.7 | 86,700 | 71.6 | 67.5 | 63.5 | 94.1 | 135,300 | 91.5 |
| Milwaukee ...... | 167.1 | 162.2 | 97.1 | 933,100 | 99.3 | 155.1 | 92.8 | 915,000 | 97.4 | 203.5 | 202.0 | 99.3 | 932,500 | 99.8 |
| Ozaukee ....... | 29.7 | 17.0 | 57.2 | 50,700 | 75.1 | 8.1 | 27.3 | 33,800 | 50.1 | 45.2 | 39.5 | 87.4 | 66,400 | 83.2 |
| Racine ........ | 45.0 | 33.7 | 74.9 | 144,300 | 85.3 | 24.2 | 53.8 | 126,500 | 74.8 | 69.2 | 61.3 | 88.6 | 167,300 | 89.9 |
| Walworth ...... | 32.8 | 13.8 | 42.1 | 41,200 | 57.1 | 11.5 | 35.1 | 37,100 | 51.4 | 44.7 | 30.9 | 69.1 | 59,100 | 67.7 |
| Washington ..... | 36.6 | 10.9 | 29.8 | 45,400 | 52.1 | 10.6 | 29.0 | 43,900 | 50.3 | 54.0 | 31.0 | 57.4 | 75,100 | 67.2 |
| Waukesha ...... | 130.6 | 57.3 | 43.9 | 191,300 | 66.9 | 35.8 | 27.4 | 146,700 | 51.3 | 183.7 | 142.1 | 77.4 | 303,400 | 83.3 |
| Region | 476.5 | 319.8 | 67.1 | 1,507,800 | 86.5 | 262.9 | 55.2 | 1,389,700 | 79.7 | 667.8 | 570.3 | 85.4 | 1,739,100 | 91.0 |

NOTE: Public sanitary sewer and water supply service areas presented in this table do not include lands that are located adjacent to, but outside, the Region, including 1.1 square miles of land in the Jefferson County portion of the Whitewater urban service area, 0.4 square mile of land in the Jefferson County portion of the Oconomowoc urban service area, and 0.4 square mile of land in the Dodge County portion of the Hartford urban service area.

[a] *Does not include an area of 2.4 square miles and a population of 3,400 persons in those communities which, in the year 2010, would have public water supply systems but not public sanitary sewer service.*

[b] *Does not include 57.1 square miles of land served with public sanitary sewer located outside the 1985 developed urban area.*

[c] *Does not include 30.1 square miles of land served with public water supply located outside the 1985 developed urban area.*

[d] *Does not include 4.9 square miles of land to be served with public sanitary sewer and water supply service located outside the planned 2010 developed urban area.*

[e] *Based on historic urban growth analysis; see Table 67 of SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010.*

*Source: SEWRPC.*

and a low-growth decentralized plan. Such plans differ from the adopted year 2010 land use plan in terms of the overall scale of development to be accommodated and the distribution of such development within the Region.

Together, the alternative plans, along with the adopted plan, provide a range of possible future conditions with respect to the level and distribution of population and economic activity and attendant land use patterns in the Region. The plans therefore broaden the framework within which local level and systems level transportation planning and other major facility planning can take place. Within this framework, for example, proposals for major transportation improvements may be evaluated to determine how well they would perform under a range of possible future conditions. Through such sensitivity analyses more robust plan elements which may be expected to remain viable under greatly varying conditions can be identified.

#### Design Year Population and Economic Activity Levels

The alternative land use plans were designed to accommodate the population and employment levels envisioned under the respective scenarios. Thus, the high-growth decentralized and high-growth centralized land use plans would accommodate a year 2010 resident population of about 2,316,100 persons and a total of about 1,251,600 jobs. The intermediate-growth decentralized plan would accommodate a year 2010 population of about 1,872,200 persons and 1,051,000 jobs. The low-growth decentralized plan would accommodate a year 2010 population of about 1,517,000 persons and 871,000 jobs. In comparison, the adopted land use plan would accommodate a year 2010 population of 1,911,000 persons and an employment total of 1,095,000 jobs.

#### Planned Distribution of Population and Economic Activity

While the alternative land use plans differ from the adopted land use plan in the scale and distribution of population and economic activity, and, accordingly, in the amount of and location of new urban development, the alternative land use plans incorporate certain key normative aspects of the adopted plan. Specifically, the following design guidelines, used in the preparation of the adopted plan, were also used in the preparation of the alternative futures plans:

1. New urban development would emphasize medium densities and would, for the most part, be located in areas of the Region provided with centralized sanitary sewer and water supply services.

2. No new urban development would be allocated to the delineated primary environmental corridors, thereby preserving the best remaining elements of the natural resource base of the Region.

3. To the greatest extent practicable, no new urban development would be allocated to the delineated prime agricultural lands, thereby preserving highly productive lands for the continuing production of food and fiber.

The alternative land use plans, like the adopted plan, would preserve virtually all remaining primary environmental corridors in the Region. The alternative plans, like the adopted plan, also emphasize the provision of basic public utilities and services to new urban development and the preservation of prime agricultural lands. The alternative plans do differ from one another and from the recommended plan in the extent to which such objectives can be met, owing to differences in the scale and distribution of development to be accommodated.

It is important to recognize that the "decentralization" of population and economic activity under the high-growth, intermediate-growth, and low-growth decentralized plans was accommodated within the framework of the aforementioned plan design guidelines. Each of these plans envisions the decentralization of population and economic activity on a county basis, with Milwaukee County continuing to lose population and employment to Ozaukee, Walworth, Washington, and Waukesha Counties, and the population and employment of the Kenosha and Racine urbanized areas decentralizing to the outlying areas of Kenosha and Racine Counties. While thus emphasizing decentralization of population and economic activity on a county basis, each of these plans envisions that new urban development occurring in the outlying counties and outlying areas of Kenosha and Racine Counties would be concentrated in and around existing urban centers of those counties and be provided with basic urban services and facilities from and by those centers. These plans thus represent controlled decentralization and do not represent uncontrolled urban sprawl.

Plan Description

The land use patterns envisioned under the high-growth decentralized, high-growth centralized, intermediate-growth decentralized, and low-growth decentralized alternative land use plans are shown on Maps 72 through 75. The balance of this chapter provides a description and comparison of these four alternative futures plans. For the purpose of comparing the various plans with the adopted plan, each of the tables accompanying the text below provides data on both the alternative plans and adopted plan.

Land Use: Of particular importance in a comparison of the plans is the anticipated change in urban land uses. As indicated in Table 134, under the high-growth decentralized plan, urban lands would increase by about 110,000 acres, or about 28 percent, from about 388,000 acres in 1985 to about 498,000 acres by the year 2010. Urban lands would increase by about 86,000 acres, or 22 percent, under the high-growth centralized plan; by about 67,000 acres, or about 17 percent, under the intermediate-growth decentralized plan; and by about 33,000 acres, or about 9 percent, under the low-growth decentralized plan. The amounts of urban land envisioned under the alternative futures plans and the recommended plan are set forth by county in Figure 56 and in Table 135.

Major Centers: Because of the differences in the level and distribution of population and employment to be accommodated, the alternative futures plans differ from each other and from the recommended year 2010 regional land use plan in terms of the number and location of planned major commercial and industrial centers.[14]

[14]*Proposals for the major governmental and institutional, major transportation and utility, and major recreational centers are the same as those of the recommended land use plan.*

## Table 134

## EXISTING AND PROPOSED LAND USE IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| Land Use Category | Existing 1985 (acres) | Recommended Plan: Planned Increment 1985-2010 Acres | Recommended Plan: Planned Increment 1985-2010 Percent | Recommended Plan: Total 2010 (acres) | Low-Growth Decentralized Plan: Planned Increment 1985-2010 Acres | Low-Growth Decentralized Plan: Planned Increment 1985-2010 Percent | Low-Growth Decentralized Plan: Total 2010 (acres) | Intermediate-Growth Decentralized Plan: Planned Increment 1985-2010 Acres | Intermediate-Growth Decentralized Plan: Planned Increment 1985-2010 Percent | Intermediate-Growth Decentralized Plan: Total 2010 (acres) | High-Growth Decentralized Plan: Planned Increment 1985-2010 Acres | High-Growth Decentralized Plan: Planned Increment 1985-2010 Percent | High-Growth Decentralized Plan: Total 2010 (acres) | High-Growth Centralized Plan: Planned Increment 1985-2010 Acres | High-Growth Centralized Plan: Planned Increment 1985-2010 Percent | High-Growth Centralized Plan: Total 2010 (acres) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Urban Land Use | | | | | | | | | | | | | | | | |
| Residential | 184,603 | 36,976 | 20.0 | 221,579 | 19,170 | 10.4 | 203,773 | 43,927 | 23.8 | 228,530 | 72,269 | 39.1 | 256,872 | 56,960 | 30.9 | 241,563 |
| Commercial | 8,714 | 1,320 | 15.1 | 10,034 | 739 | 8.5 | 9,453 | 1,581 | 18.1 | 10,295 | 2,317 | 26.6 | 11,031 | 1,852 | 21.3 | 10,566 |
| Industrial | 12,080 | 5,186 | 42.9 | 17,266 | 4,005 | 33.2 | 16,085 | 6,650 | 55.0 | 18,730 | 9,586 | 79.4 | 21,666 | 9,041 | 74.8 | 21,121 |
| Transportation, Communication, and Utilities[a] | 120,279 | 14,560 | 12.1 | 134,839 | 8,994 | 7.5 | 129,273 | 16,947 | 14.1 | 137,226 | 27,736 | 23.1 | 148,015 | 22,377 | 18.6 | 142,656 |
| Governmental and Institutional | 17,240 | 1,042 | 6.0 | 18,282 | 591 | 3.4 | 17,831 | 1,168 | 6.8 | 18,408 | 2,019 | 11.7 | 19,259 | 1,639 | 9.5 | 18,879 |
| Recreational | 25,564[b] | 4,089[c] | 16.0 | 29,653 | 3,783[c] | 14.8 | 29,347 | 4,359[c] | 17.1 | 29,923 | 5,551[c] | 21.7 | 31,115 | 4,943[c] | 19.3 | 30,507 |
| Unused Urban Land | 19,215 | -8,400 | -43.7 | 10,815 | -4,496 | -23.4 | 14,719 | -7,363 | -38.3 | 11,852 | -9,239 | -48.1 | 9,976 | -10,835 | -56.4 | 8,380 |
| Subtotal | 387,695 | 54,773 | 14.1 | 442,468 | 32,786 | 8.5 | 420,481 | 67,269 | 17.4 | 454,964 | 110,239 | 28.4 | 497,934 | 85,977 | 22.2 | 473,672 |
| Rural Land Use | | | | | | | | | | | | | | | | |
| Residential | - -[d] | 721 | - - | 721 | 246 | - - | 246 | 1,368 | - - | 1,368 | 1,368 | - - | 1,368 | 738 | - - | 738 |
| Agricultural | 931,956 | -40,487 | -4.3 | 891,469 | -24,763 | -2.7 | 907,193 | -52,123 | -5.6 | 879,833 | -90,242 | -9.7 | 841,714 | -67,863 | -7.3 | 864,093 |
| Other Open Lands[e] | 401,462 | -15,007 | -3.7 | 386,455 | -8,269 | -2.1 | 393,193 | -16,514 | -4.1 | 384,948 | -21,365 | -5.3 | 380,097 | -18,852 | -4.7 | 382,610 |
| Subtotal | 1,333,418 | -54,773 | -4.1 | 1,278,645 | -32,786 | -2.5 | 1,300,632 | -67,269 | -5.0 | 1,266,149 | -110,239 | -8.3 | 1,223,179 | -85,977 | -6.4 | 1,247,441 |
| Total | 1,721,113 | 0 | 0.0 | 1,721,113 | 0 | 0.0 | 1,721,113 | 0 | 0.0 | 1,721,113 | 0 | 0.0 | 1,721,113 | 0 | 0.0 | 1,721,113 |

[a]*Includes off-street parking areas.*

[b]*Includes net site area of public and nonpublic recreation sites.*

[c]*Includes only that net site area recommended for public recreation use.*

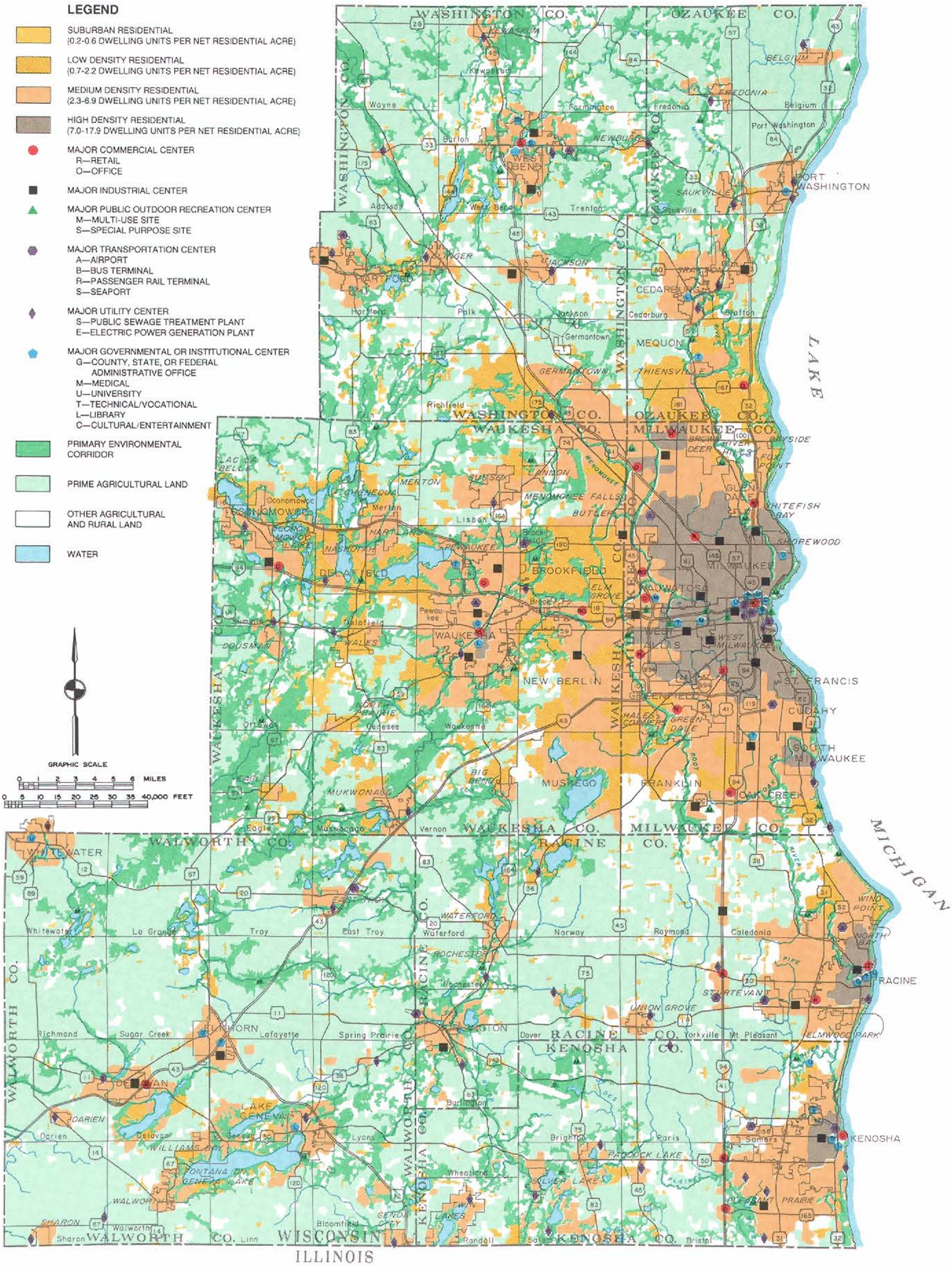
[d]*Included in 1985 land use inventory as part of urban residential land use.*

[e]*Includes woodlands, water, wetlands, unused rural land, landfill sites, and quarries.*

*Source: SEWRPC.*

## Map 72

## HIGH-GROWTH DECENTRALIZED PLAN FOR THE SOUTHEASTERN WISCONSIN REGION: 2010

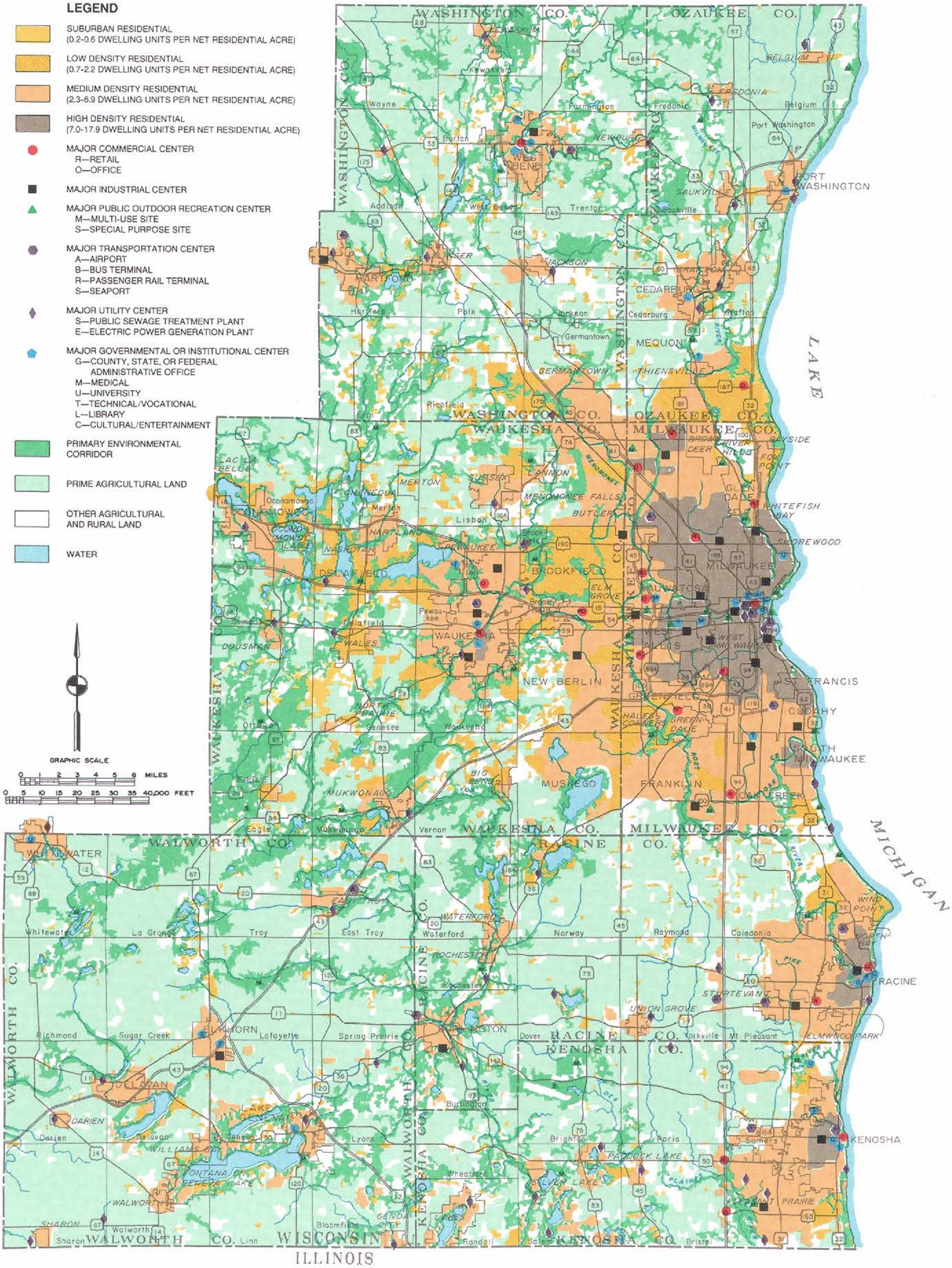



The high-growth decentralized plan envisions a relatively high rate of growth in population and economic activity in the Region and a continuation of the trend observed over the past several decades toward decentralization of population, employment, and attendant urban development away from the older urban cities of the Region. The plan envisions the conversion of about 110,000 acres, or 172 square miles, of land from rural to urban use in order to accommodate the growth and redistribution of population and economic activity in the Region through the year 2010. Under this plan, the resident population of the Region would increase substantially, to about 2,316,000 persons by the year 2010, an increase of about 573,000 persons, or 33 percent, over 1985. Employment within the Region would also increase substantially, to a level of about 1,252,000 jobs by the year 2010, an increase of 380,000 jobs, or 44 percent, over 1985. Under the plan much of the proposed new urban development would occur in outlying areas of the Region.

*Source: SEWRPC.*

## Map 73

### HIGH-GROWTH CENTRALIZED PLAN FOR THE SOUTHEASTERN WISCONSIN REGION: 2010

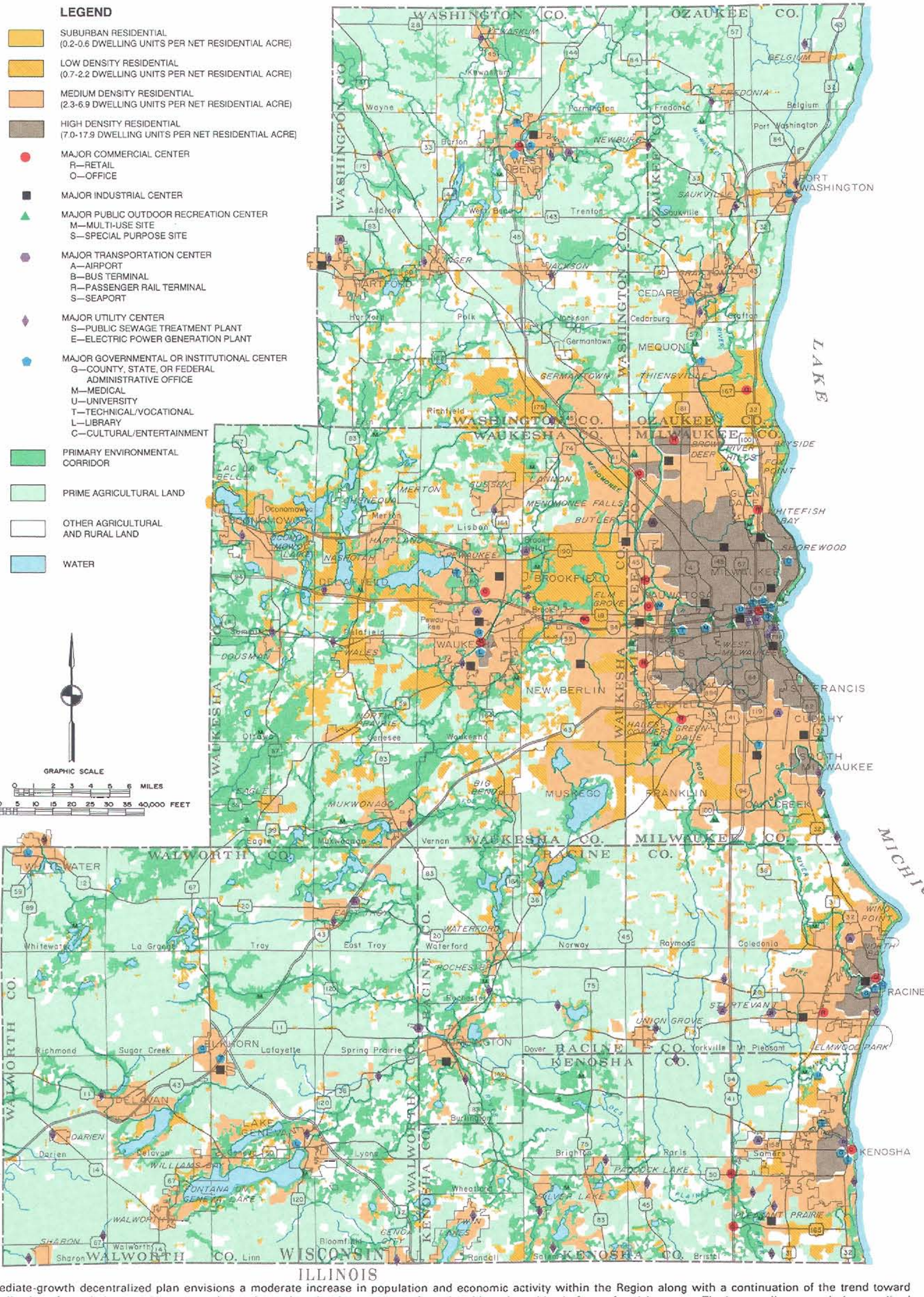



The high-growth centralized land use envisions a relatively high rate of growth in population and economic activity along with a moderation of the past trends toward decentralization of population and economic activity within the Region. Under this plan, about 86,000 acres, or 134 square miles, of land would be converted from rural to urban use between 1985 and the year 2010. Like the high-growth decentralized plan, this plan would accommodate an increase of about 573,000 persons, or 33 percent, in the resident population of the Region and an increase of 380,000, or 44 percent, in total employment. In contrast to the high-growth decentralized plan, however, this plan emphasizes the maintenance and enhancement of the population and employment levels of the older, large urban centers of the Region and would result in a more centralized distribution of population and economic activity in the Region.

*Source: SEWRPC.*

# Map 74

## INTERMEDIATE-GROWTH DECENTRALIZED PLAN FOR THE SOUTHEASTERN WISCONSIN REGION: 2010

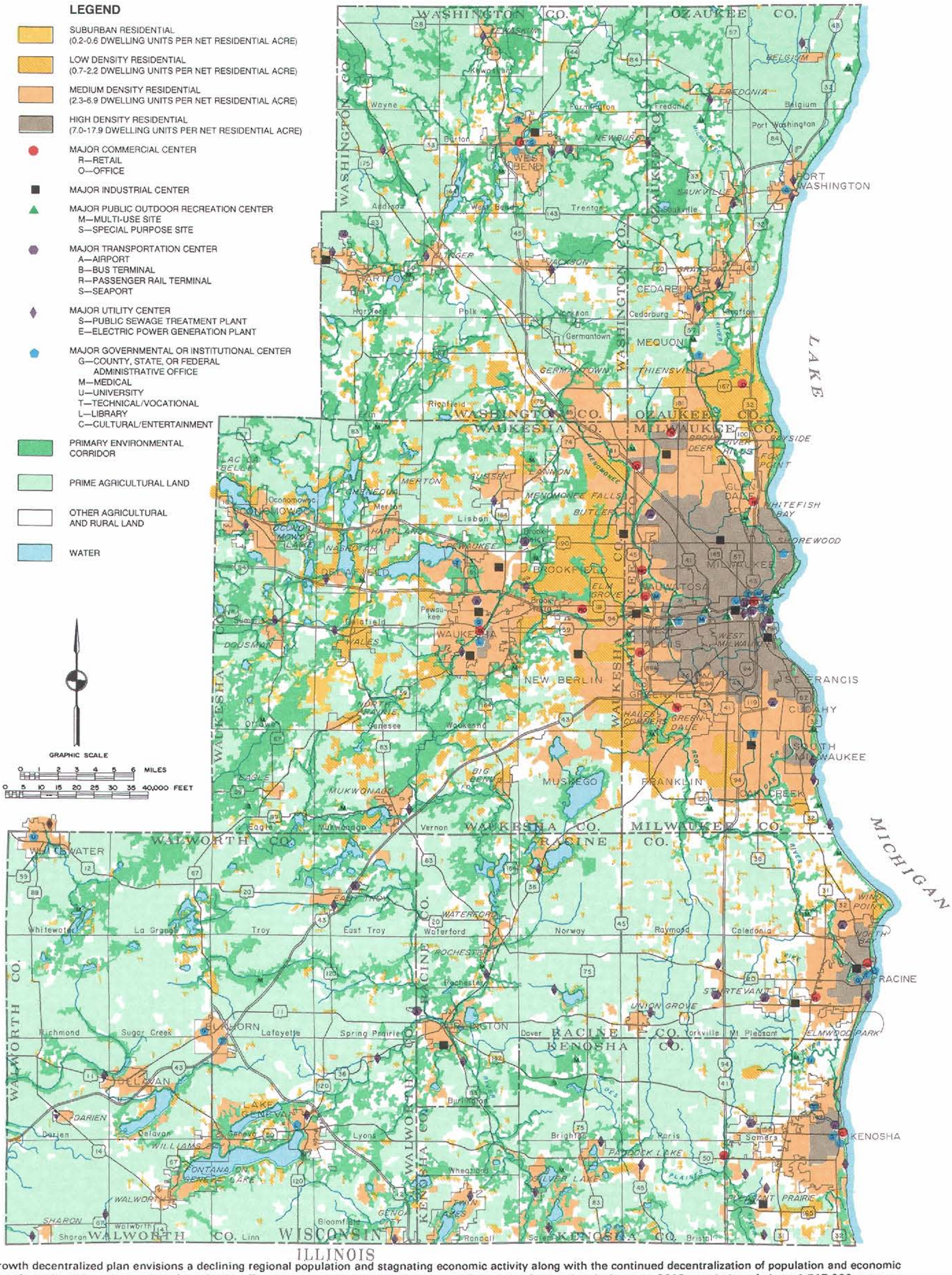



The intermediate-growth decentralized plan envisions a moderate increase in population and economic activity within the Region along with a continuation of the trend toward the decentralization of population, employment, and attendant urban development away from the older urban cities in favor of outlying areas. The intermediate-growth decentralized plan envisions the conversion of 67,000 acres, or 105 square miles, of land from rural to urban use in the Region between 1985 and the year 2010. Under this plan, the resident population of the Region would increase by about 129,000 persons, or about 7 percent, to a level of 1,872,000 by the year 2010, while total employment would increase by 179,000 jobs, or about 21 percent, to a level of 1,051,000.

*Source: SEWRPC.*

## Map 75

## LOW-GROWTH DECENTRALIZED PLAN FOR THE SOUTHEASTERN WISCONSIN REGION: 2010

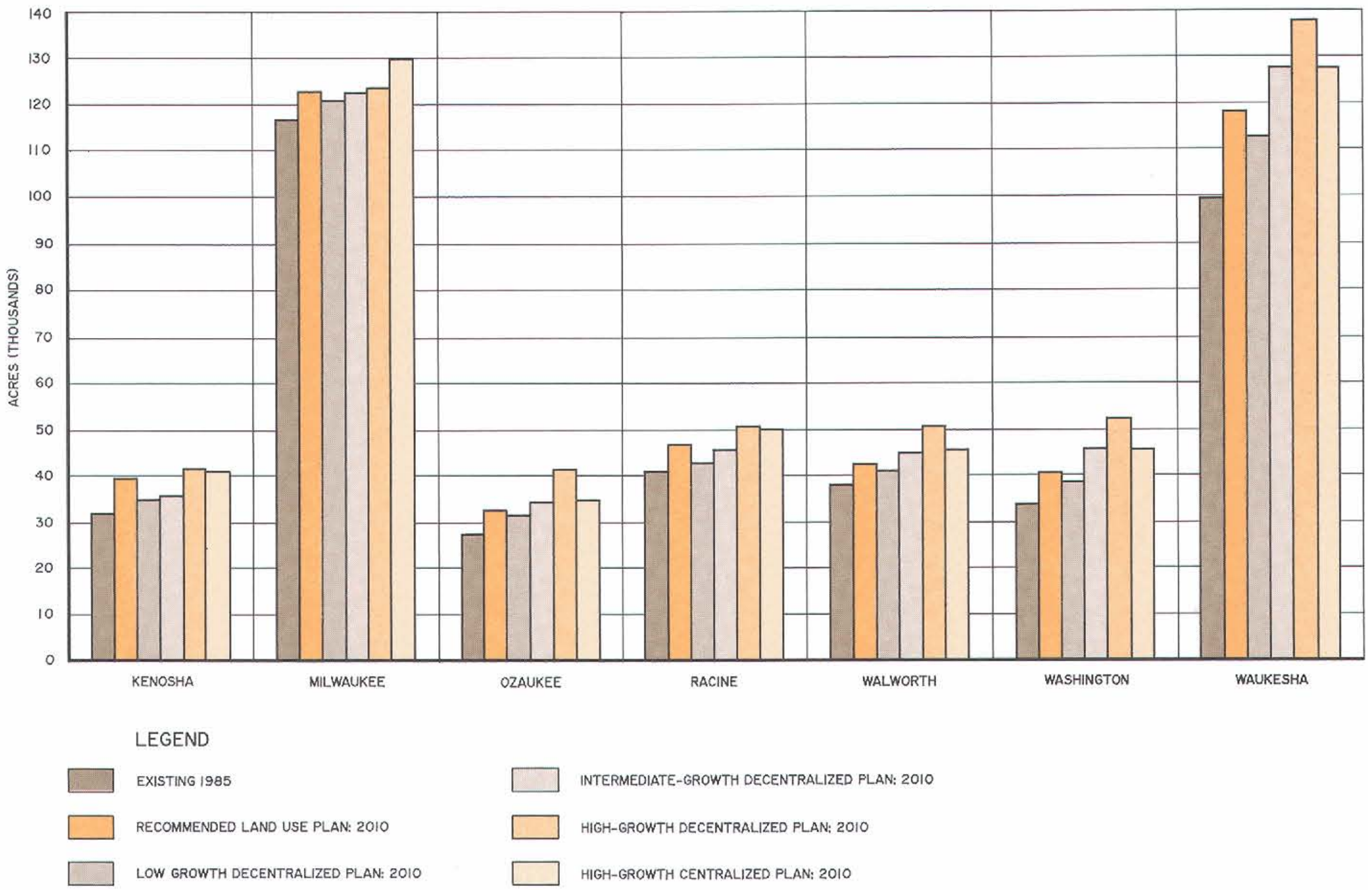



The low-growth decentralized plan envisions a declining regional population and stagnating economic activity along with the continued decentralization of population and economic activity away from the older urban areas of the Region. The low-growth decentralized plan would accommodate a plan design year 2010 population of about 1,517,000 persons, a decrease of 226,000 persons, or about 13 percent, from the 1985 level, and total regional employment of 871,000 jobs, about the same as the 1985 level. Despite the anticipated decrease in population, the number of households would increase by about 32,000, or by about 5 percent, as household sizes continue to decrease. The plan envisions the conversion of about 33,000 acres, or 51 square miles, of land from rural to urban use to accommodate the continued redistribution of population and employment and the modest increase in the number of households.

*Source: SEWRPC.*

## Figure 56

### EXISTING AND PROPOSED URBAN LAND USE IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS




*Source: SEWRPC.*

## Table 135

### EXISTING AND PROPOSED URBAN LAND USE IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Urban Land Use[a] | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Recommended Plan | | | Low-Growth Decentralized Plan | | | Intermediate-Growth Decentralized Plan | | | High-Growth Decentralized Plan | | | High-Growth Centralized Plan | | |
| | Existing 1985 (acres) | Planned Increment 1985-2010 | | Total 2010 (acres) | Planned Increment 1985-2010 | | Total 2010 (acres) | Planned Increment 1985-2010 | | Total 2010 (acres) | Planned Increment 1985-2010 | | Total 2010 (acres) | Planned Increment 1985-2010 | | Total 2010 (acres) |
| | | Acres | Percent | | Acres | Percent | | Acres | Percent | | Acres | Percent | | Acres | Percent | |
| Kenosha | 31,971 | 7,533 | 23.6 | 39,504 | 2,739 | 8.6 | 34,710 | 3,997 | 12.5 | 35,968 | 9,430 | 29.5 | 41,401 | 9,013 | 28.2 | 40,984 |
| Milwaukee | 116,795 | 6,079 | 5.2 | 122,874 | 3,767 | 3.2 | 120,562 | 5,653 | 4.8 | 122,448 | 6,379 | 5.5 | 123,174 | 12,650 | 10.8 | 129,445 |
| Ozaukee | 27,292 | 5,165 | 18.9 | 32,457 | 4,126 | 15.1 | 31,418 | 6,773 | 24.8 | 34,065 | 13,926 | 51.0 | 41,218 | 7,466 | 27.4 | 34,758 |
| Racine | 40,340 | 6,181 | 15.3 | 46,521 | 1,762 | 4.4 | 42,102 | 4,746 | 11.8 | 45,086 | 10,430 | 25.9 | 50,770 | 9,747 | 24.2 | 50,087 |
| Walworth | 38,082 | 4,674 | 12.3 | 42,756 | 2,744 | 7.2 | 40,826 | 6,512 | 17.1 | 44,594 | 12,134 | 31.9 | 50,216 | 7,061 | 18.5 | 45,143 |
| Washington | 33,670 | 6,659 | 19.8 | 40,329 | 4,582 | 13.6 | 38,252 | 11,610 | 34.5 | 45,280 | 18,637 | 55.4 | 52,307 | 11,741 | 34.9 | 45,411 |
| Waukesha | 99,545 | 18,482 | 18.6 | 118,027 | 13,066 | 13.1 | 112,611 | 27,978 | 28.1 | 127,523 | 39,303 | 39.5 | 138,848 | 28,299 | 28.4 | 127,844 |
| Region | 387,695 | 54,773 | 14.1 | 442,468 | 32,786 | 8.5 | 420,481 | 67,269 | 17.4 | 454,964 | 110,239 | 28.4 | 497,934 | 85,977 | 22.2 | 473,672 |

[a] *Urban land uses include residential; commercial; industrial; transportation, communication, and utility; governmental and institutional; and recreational land uses and unused urban lands.*

*Source: SEWRPC.*

## Table 136

### EXISTING AND PROPOSED MAJOR COMMERCIAL CENTERS IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| | | Existing 1985 | | Recommended Plan: 2010 | | Low-Growth Decentralized Plan: 2010 | | Intermediate-Growth Decentralized Plan: 2010 | | High-Growth Decentralized Plan: 2010 | | High-Growth Centralized Plan: 2010 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| County | Major Commercial Center | Retail | Office | Retail | Office | Retail | Office | Retail | Office | Retail | Office | Retail | Office |
| Kenosha | Kenosha CBD | -- | X | -- | X | -- | X | -- | X | -- | X | -- | X |
| | Kenosha-Southwest | -- | -- | -- | -- | -- | -- | -- | X | -- | X | -- | X |
| | Kenosha-West | -- | -- | X | -- | X | -- | X | -- | X | -- | X | -- |
| Milwaukee | Bay Shore | X | -- | X | -- | X | -- | X | -- | X | -- | X | -- |
| | Capitol Court | X | -- | X | -- | -- | -- | -- | -- | X | -- | X | -- |
| | Mayfair | X | X | X | X | X | X | X | X | X | X | X | X |
| | Milwaukee CBD | X | X | X | X | X | X | X | X | X | X | X | X |
| | Milwaukee County Research Park | -- | -- | -- | X | -- | X | -- | X | -- | X | -- | X |
| | Northridge | X | -- | X | -- | X | -- | X | -- | X | -- | X | -- |
| | Oak Creek | -- | -- | -- | -- | -- | -- | -- | -- | X | -- | X | -- |
| | Park Place | -- | -- | -- | X | -- | X | -- | X | -- | X | -- | X |
| | Southgate-Point Loomis | X | -- | X | -- | -- | -- | -- | -- | X | -- | X | -- |
| | Southridge | X | -- | X | -- | X | -- | X | -- | X | -- | X | -- |
| | West Allis | X | -- | X | -- | X | -- | X | -- | X | -- | X | -- |
| Ozaukee | Mequon | -- | -- | -- | X | -- | X | -- | X | -- | X | -- | X |
| Racine | Racine CBD | -- | X | -- | X | -- | X | -- | X | -- | X | -- | X |
| | Racine-West | -- | -- | -- | -- | -- | -- | -- | -- | X | -- | -- | -- |
| | Regency Mall | X | -- | X | -- | X | -- | X | -- | X | -- | X | -- |
| Walworth | Delavan | -- | -- | -- | -- | -- | -- | -- | -- | X | -- | -- | -- |
| Washington | West Bend | -- | X | -- | X | -- | X | -- | X | -- | X | -- | X |
| Waukesha | Blue Mound Road | X | X | X | X | X | X | X | X | X | X | X | X |
| | Oconomowoc | -- | -- | -- | -- | -- | -- | -- | -- | -- | X | -- | -- |
| | Pewaukee | -- | -- | -- | X | -- | -- | -- | X | -- | X | -- | X |
| | Waukesha CBD | -- | X | -- | X | -- | X | -- | X | -- | X | -- | X |

NOTE: To qualify as a major retail center, a site must accommodate at least 2,000 retail jobs. To qualify as a major office center, a site must accommodate at least 3,500 office and service-related jobs.

*Source: SEWRPC.*

*Major Commercial Centers*: The major commercial centers envisioned under the alternative futures land use plans and the recommended year 2010 land use plan are shown on Map 76 and listed in Table 136.

The high-growth decentralized plan envisions a total of 24 major commercial centers in the Region in the year 2010. The plan envisions the retention of the 14 existing major centers and the addition of 10 new centers, including four retail centers and six office centers. As shown on Map 76, a number of the proposed new sites would be located in outlying areas of the Region.

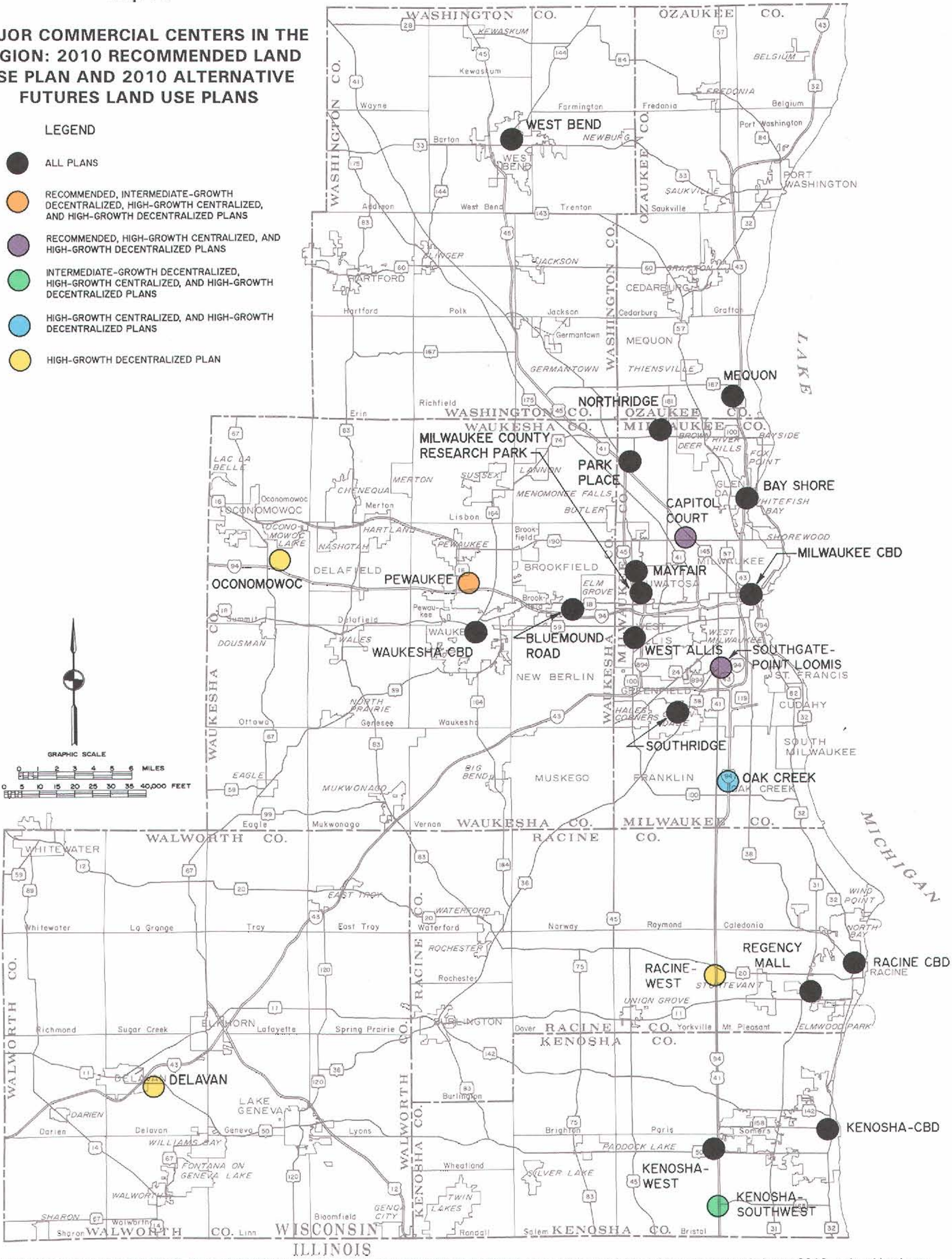
The other high-growth plan, the high-growth centralized plan, envisions a total of 21 major commercial centers. That plan envisions the retention of the 14 existing major centers and the addition of seven new centers, including two retail centers and five office centers, by the year 2010.

The intermediate-growth decentralized plan envisions a total of 18 major commercial centers. The plan envisions the retention of 12 of the 14 existing major centers and the addition of six new centers, including one retail center and five office centers. Under the intermediate-growth decentralized plan, with the continued decrease in population and employment levels in the central portion of Milwaukee County, two existing major centers, the Capitol Court shopping center and the Southgate-Point Loomis shopping center, would decline in importance and no longer function as major commercial centers. They would, however, continue to serve as community-level commercial centers.

The low-growth decentralized plan envisions a total of 16 major commercial centers. This plan envisions the retention of 12 of the 14 existing major centers and the addition of four new centers, including one retail center and three office centers. This plan, like the intermediate-

## Map 76

## MAJOR COMMERCIAL CENTERS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN AND 2010 ALTERNATIVE FUTURES LAND USE PLANS




This map shows the locations of the major commercial centers envisioned under the alternative futures land use plans and the recommended year 2010 regional land use plan. Such sites include major retail centers accommodating retail employment of at least 2,000 jobs and major office centers accommodating office and service related employment of at least 3,500 jobs. Twenty-four major commercial centers are envisioned under the high-growth decentralized plan compared to 21 centers under the high-growth centralized plan, 18 centers under the intermediate-growth decentralized plan, and 16 centers under the low-growth decentralized plan. The recommended regional land use plan envisions 19 major commercial centers in the Region by the year 2010.

*Source: SEWRPC.*

growth decentralized plan, envisions that two existing centers in Milwaukee County, Capitol Court and Southgate-Point Loomis, would decline in importance and cease to function as major commercial centers.

*Major Industrial Centers*: The major industrial centers envisioned under the alternative futures plans and the recommended year 2010 regional land use plan are shown on Map 77 and listed in Table 137.

The high-growth decentralized plan envisions a total of 33 major industrial centers in the Region by the year 2010. The plan envisions the retention of all 22 existing major industrial centers and the addition of 11 new centers. Many of the new sites envisioned under the plan are located in outlying areas of the Region.

The high-growth centralized plan envisions a total of 27 major industrial centers in the Region. The plan envisions the retention of all 22 existing major industrial centers and the addition of five new centers, six fewer than would be added under the high-growth decentralized plan.

The intermediate-growth decentralized plan envisions a total of 22 major industrial centers. The plan envisions the retention of 18 of the 22 existing centers and the addition of four new centers. Under this plan, four existing centers, Kenosha, Milwaukee-South, West Allis-East,[15] and West Milwaukee, would experience substantial employment losses and cease functioning as major industrial centers.

The low-growth decentralized plan envisions a total of 17 major industrial centers. The plan envisions the retention of 14 of the 22 existing major industrial centers and the addition of three new centers. Under the plan, eight existing centers, Kenosha, Cudahy-South Milwaukee, Milwaukee-Glendale, Milwaukee-Menomonee Valley West, Milwaukee-Near North, Milwaukee-South, West Allis-East, and West Milwaukee, would decline in importance and cease functioning as major centers.

[15]*Monitoring of industrial employment data indicates that by 1990 industrial employment at the West Allis-East site had fallen below the threshold level of 3,500 jobs required for classification as a major industrial center.*

Primary Environmental Corridors: In the design of the alternative futures land use plans, as in the design of the adopted plan, no new urban development was allocated to the delineated primary environmental corridors.

Prime Agricultural Lands: Under each of the alternative futures plans, substantial amounts of agricultural land would be converted to urban use to accommodate expanding urban areas. In the design of the alternative futures plans, however, an attempt was made to minimize the loss of prime agricultural lands, while accommodating required urban development.

The anticipated losses of prime agricultural land under the alternative futures plans and under the recommended regional land use plan are indicated in Table 138. As indicated, from 1985 to 2010, the high-growth decentralized plan envisions the loss of about 34,900 acres, or about 5 percent of the remaining prime agricultural lands within the Region; the high-growth centralized plan envisions a loss of 20,400 acres, or 3 percent; the intermediate-growth decentralized plan envisions a loss of about 17,500 acres, or just under 3 percent; and the low-growth decentralized plan envisions a loss of 6,700 acres, or about 1 percent.

Public Sanitary Sewer and Water Supply Services: Under both of the alternative futures plans and the adopted land use plan, all proposed new urban development within the Region would be served with public sanitary sewer and water supply facilities. In addition, under each plan, public sanitary sewer and water supply service would be extended to certain existing urban areas lacking these facilities in 1985. Table 139 shows the land area and population served in the Region in 1985 and under the year 2010 adopted and alternative futures land use plans.

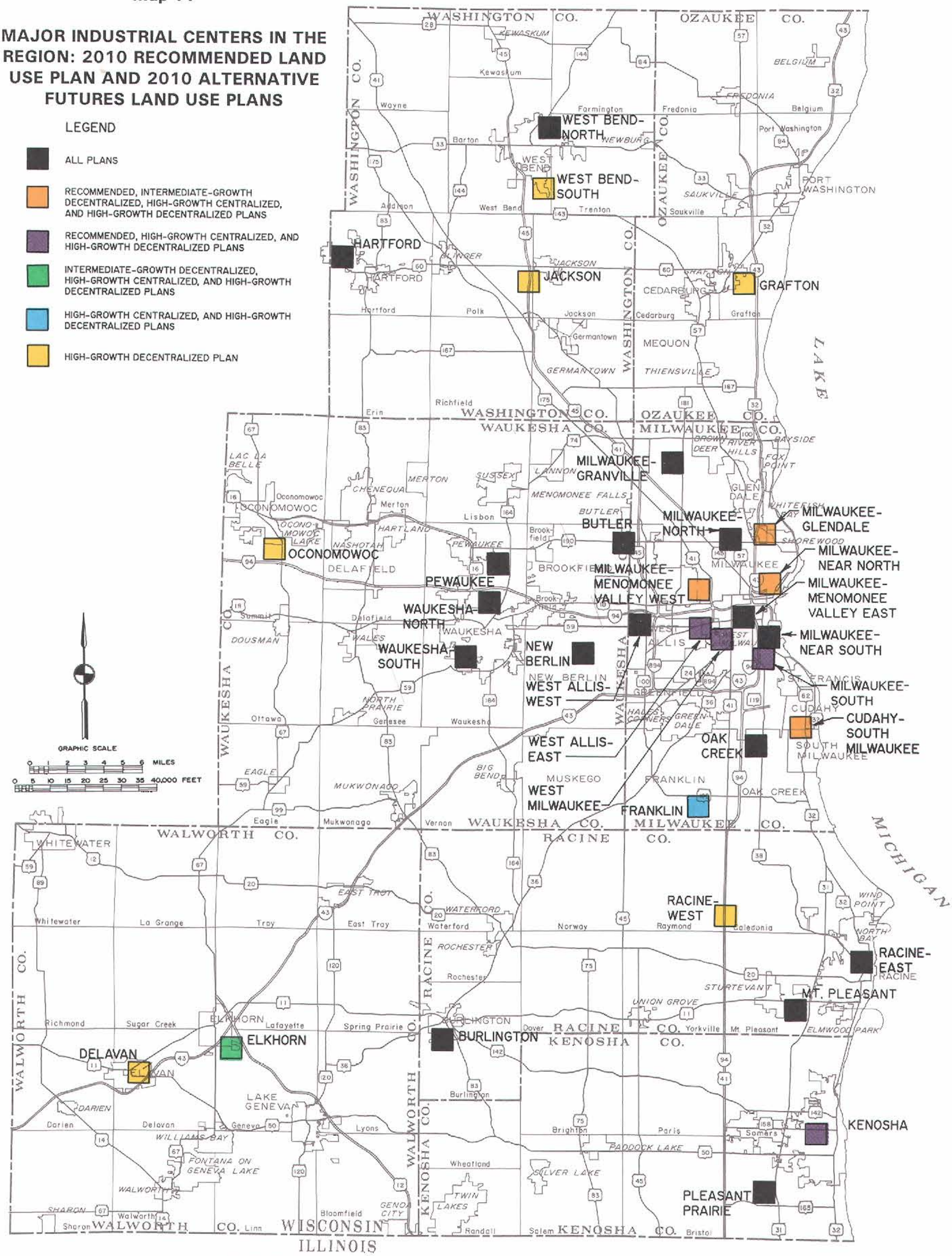
As indicated in Table 139, among the alternative futures plans, the high-growth decentralized plan envisions the greatest expansion of sanitary sewer and water supply service. Under that plan, about 734 square miles, or about 91 percent of the developed urban area, and about 2.17 million persons, or about 94 percent of the resident population of the Region, would be served with public sanitary sewer and public water supply facilities by the plan design year. Under the high-growth centralized plan, about 653 square miles, or 88 percent of the developed area of the Region, and about 2.14 million

## Map 77

# MAJOR INDUSTRIAL CENTERS IN THE REGION: 2010 RECOMMENDED LAND USE PLAN AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

LEGEND

- ALL PLANS
- RECOMMENDED, INTERMEDIATE-GROWTH DECENTRALIZED, HIGH-GROWTH CENTRALIZED, AND HIGH-GROWTH DECENTRALIZED PLANS
- RECOMMENDED, HIGH-GROWTH CENTRALIZED, AND HIGH-GROWTH DECENTRALIZED PLANS
- INTERMEDIATE-GROWTH DECENTRALIZED, HIGH-GROWTH CENTRALIZED, AND HIGH-GROWTH DECENTRALIZED PLANS
- HIGH-GROWTH CENTRALIZED, AND HIGH-GROWTH DECENTRALIZED PLANS
- HIGH-GROWTH DECENTRALIZED PLAN




Shown on this map are the locations of the major industrial centers envisioned under the alternative futures land use plans and the recommended year 2010 regional land use plan. Major industrial centers are defined as concentrations of industrial land having industrial related employment of at least 3,500 jobs. The high-growth decentralized plan envisions a total of 33 major industrial centers, compared to 27 centers under the high-growth centralized plan; 22 centers under the intermediate-growth decentralized plan; and 17 centers under the low-growth decentralized plan. The recommended regional land use plan envisions a total of 25 major industrial centers in the plan design year 2010.

*Source: SEWRPC.*

## Table 137

### EXISTING AND PROPOSED MAJOR INDUSTRIAL CENTERS IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Major Industrial Center | Existing 1985 | Recommended Plan: 2010 | Low-Growth Decentralized Plan: 2010 | Intermediate-Growth Decentralized Plan: 2010 | High-Growth Decentralized Plan: 2010 | High-Growth Centralized Plan: 2010 |
|---|---|---|---|---|---|---|---|
| Kenosha | Kenosha | X | X | -- | -- | X | X |
| | Pleasant Prairie | -- | X | X | X | X | X |
| Milwaukee | Cudahy-South Milwaukee | X | X | -- | X | X | X |
| | Franklin | -- | -- | -- | -- | X | X |
| | Milwaukee-Glendale | X | X | -- | X | X | X |
| | Milwaukee-Granville | X | X | X | X | X | X |
| | Milwaukee-Menomonee Valley East | X | X | X | X | X | X |
| | Milwaukee-Menomonee Valley West | X | X | -- | X | X | X |
| | Milwaukee-Near North | X | X | -- | X | X | X |
| | Milwaukee-Near South | X | X | X | X | X | X |
| | Milwaukee-North | X | X | X | X | X | X |
| | Milwaukee-South | X | X | -- | -- | X | X |
| | Oak Creek | X | X | X | X | X | X |
| | West Allis-East | X | X | -- | -- | X | X |
| | West Allis-West | X | X | X | X | X | X |
| | West Milwaukee | X | X | -- | -- | X | X |
| Ozaukee | Grafton | -- | -- | -- | -- | X | -- |
| Racine | Burlington | -- | X | X | X | X | X |
| | Mt. Pleasant | X | X | X | X | X | X |
| | Racine-East | X | X | X | X | X | X |
| | Racine-West | -- | -- | -- | -- | X | -- |
| Walworth | Delavan | -- | -- | -- | -- | X | -- |
| | Elkhorn | -- | -- | -- | X | X | X |
| Washington | Hartford | -- | X | X | X | X | X |
| | Jackson | -- | -- | -- | -- | X | -- |
| | West Bend-North | X | X | X | X | X | X |
| | West Bend-South | -- | -- | -- | -- | X | -- |
| Waukesha | Butler | X | X | X | X | X | X |
| | New Berlin | X | X | X | X | X | X |
| | Oconomowoc | -- | -- | -- | -- | X | -- |
| | Pewaukee | X | X | X | X | X | X |
| | Waukesha-North | X | X | X | X | X | X |
| | Waukesha-South | X | X | X | X | X | X |

NOTE: To qualify as a major industrial center, a site must accommodate at least 3,500 industrial jobs.

*Source: SEWRPC.*

persons, or about 92 percent of the resident population, would be served by public sanitary sewer and water supply facilities by the plan design year. Under the intermediate-growth decentralized plan, about 617 square miles, or about 87 percent of the developed urban area of the Region, and about 1.70 million persons, or about 91 percent of the resident population, would be served with public sanitary sewer and water supply facilities. Under the low-growth decentralized plan, about 491 square miles, or 84 percent of the developed urban area, and about 1.37 million persons, or about 90 percent of the resident population, would be so served.

Distribution of Population and Households: Population levels for the Region and the constituent counties anticipated under the alternative futures plans and the adopted year 2010 land use plan are presented in Table 140 and Figure 57.

Under both the high-growth decentralized and high-growth centralized plans the resident population of the Region would increase by about 573,000 persons, or about 33 percent, from about 1,743,000 persons in 1985 to about 2,316,000 persons in the year 2010. The two high-growth plans differ significantly, however, in terms of the distribution of the anticipated growth. Under the high-growth decentralized plan, each county in the Region except Milwaukee County would experience significant population growth between 1985 and 2010, with the increases ranging from about 46,000 persons in Kenosha County to about 244,000 persons in

## Table 138

### EXISTING AND PROPOSED PRIME AGRICULTURAL LAND IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Prime Agricultural Land | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing 1985 (acres) | Recommended Plan | | | Low-Growth Decentralized Plan | | | Intermediate-Growth Decentralized Plan | | | High-Growth Decentralized Plan | | | High-Growth Centralized Plan | | |
| | | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) | Planned Increment 1985-2010 Acres | Planned Increment 1985-2010 Percent | Total 2010 (acres) |
| Kenosha | 76,471 | -2,042 | -2.7 | 74,429 | -694 | -0.9 | 75,777 | -1,091 | -1.4 | 75,380 | -3,019 | -3.9 | 73,452 | -2,979 | -3.9 | 73,492 |
| Milwaukee | 1,351 | 0 | 0.0 | 1,351 | 0 | 0.0 | 1,351 | 0 | 0.0 | 1,351 | 0 | 0.0 | 1,351 | 0 | 0.0 | 1,351 |
| Ozaukee | 73,335 | -1,425 | -1.9 | 71,910 | -1,130 | -1.5 | 72,205 | -2,105 | -2.9 | 71,230 | -5,987 | -8.2 | 67,348 | -2,273 | -3.1 | 71,062 |
| Racine | 98,626 | -526 | -0.5 | 98,100 | -207 | -0.2 | 98,419 | -537 | -0.5 | 98,089 | -1,552 | -1.6 | 97,074 | -1,189 | -1.2 | 97,437 |
| Walworth | 208,941 | -917 | -0.4 | 208,024 | -688 | -0.3 | 208,253 | -1,496 | -0.7 | 207,445 | -4,366 | -2.1 | 204,575 | -1,821 | -0.9 | 207,120 |
| Washington | 108,256 | -1,463 | -1.4 | 106,793 | -1,120 | -1.0 | 107,136 | -2,951 | -2.7 | 105,305 | -5,690 | -5.3 | 102,566 | -2,945 | -2.7 | 105,311 |
| Waukesha | 103,078 | -3,886 | -3.8 | 99,192 | -2,829 | -2.7 | 100,249 | -9,292 | -9.0 | 93,786 | -14,326 | -13.9 | 88,752 | -9,187 | -8.9 | 93,891 |
| Region | 670,058 | -10,259 | -1.5 | 659,799 | -6,668 | -1.0 | 663,390 | -17,472 | -2.6 | 652,586 | -34,940 | -5.2 | 635,118 | -20,394 | -3.0 | 649,664 |

*Source: SEWRPC.*

## Table 139

### AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| Area and Population | Existing Service 1985 | | Recommended Plan 2010 | | Low-Growth Decentralized Plan 2010 | | Intermediate-Growth Decentralized Plan 2010 | | High-Growth Decentralized Plan 2010 | | High-Growth Centralized Plan 2010 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply |
| Developed Area | | | | | | | | | | | | |
| Total Square Miles[a] | 476.5 | 476.5 | 667.8 | 667.8 | 582.2 | 582.2 | 708.1 | 708.1 | 804.7 | 804.7 | 740.5 | 740.5 |
| Square Miles Served | 319.8[b] | 262.9[c] | 570.3[d] | 572.7[d] | 490.5[d] | 492.8[d] | 617.4[d] | 620.7[d] | 734.2[e] | 734.5[e] | 653.2[d] | 656.2[d] |
| Percent of Total Served | 67.1 | 55.2 | 85.4 | 85.8 | 84.2 | 84.6 | 87.2 | 87.7 | 91.2 | 91.3 | 88.2 | 88.6 |
| Population | | | | | | | | | | | | |
| Total Population | 1,742,700 | 1,742,700 | 1,911,000 | 1,911,000 | 1,517,100 | 1,517,100 | 1,872,200 | 1,872,200 | 2,316,100 | 2,316,100 | 2,316,100 | 2,316,100 |
| Population Served | 1,507,800 | 1,389,700 | 1,739,100 | 1,742,500 | 1,365,800 | 1,369,000 | 1,700,800 | 1,706,500 | 2,172,300 | 2,172,700 | 2,136,700 | 2,141,800 |
| Percent of Total Served | 86.5 | 79.7 | 91.0 | 91.2 | 90.0 | 90.2 | 90.8 | 91.1 | 93.8 | 93.8 | 92.3 | 92.5 |

NOTE: Public sanitary sewer and water supply service areas presented in this table do not include lands that are located adjacent to, but outside, the Region, including 1.1 square miles of land in the Jefferson County portion of the Whitewater urban service area, 0.4 square mile of land in the Jefferson County portion of the Oconomowoc urban service area, and 0.4 square mile of land in the Dodge County portion of the Hartford urban service area.

[a] *Based on historic urban growth; see Table 67 of SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010.*

[b] *Does not include 57.1 square miles of land served with public sanitary sewer located outside the 1985 developed urban area.*

[c] *Does not include 30.1 square miles of land served with public water supply located outside the 1985 developed urban area.*

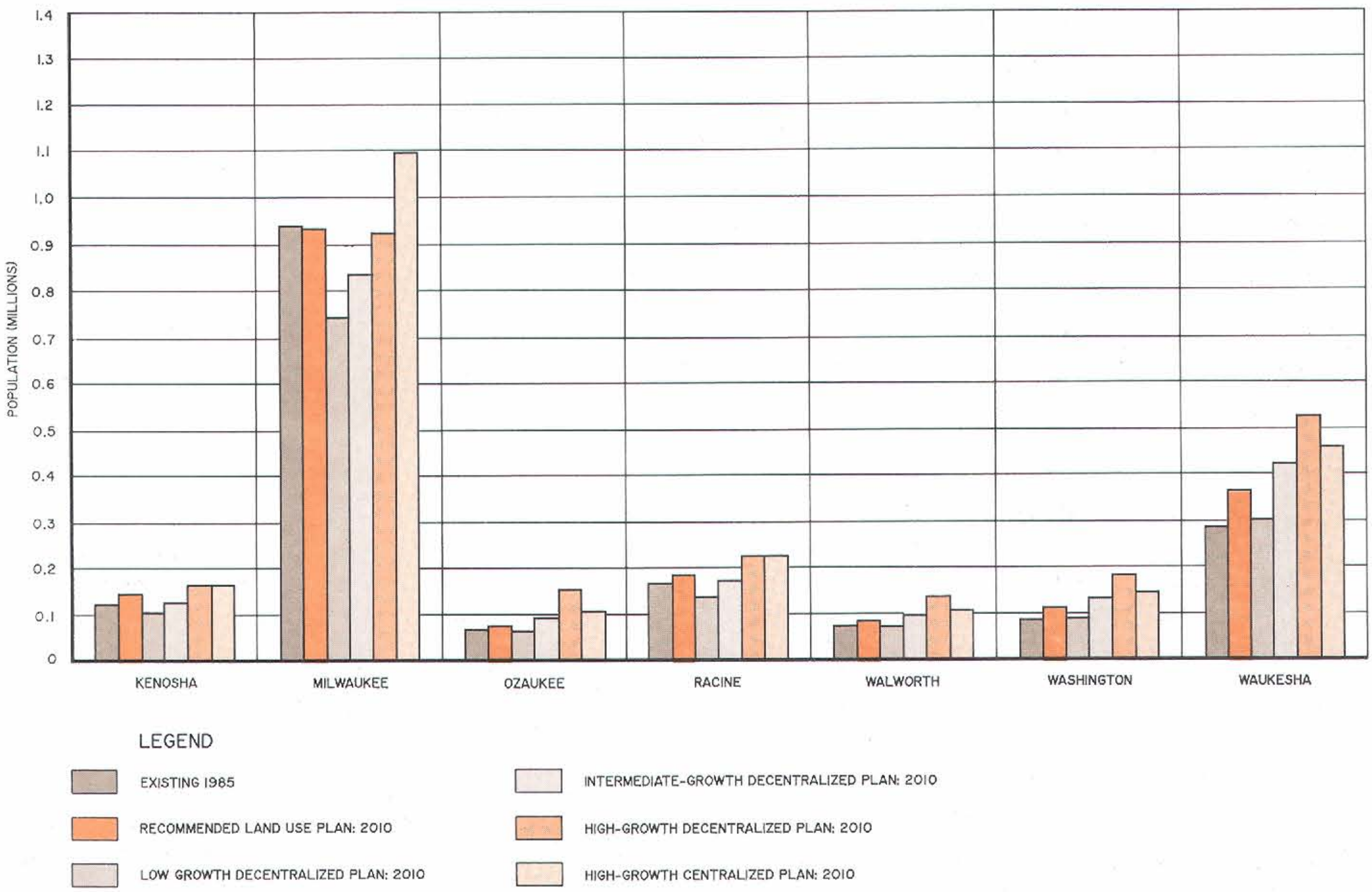
[d] *Does not include 4.9 square miles of land to be served with public sanitary sewer and water supply service located outside the planned 2010 developed urban area.*

[e] *Does not include 6.2 square miles of land to be served with public sanitary sewer and water supply service located outside the planned 2010 developed urban area.*

*Source: SEWRPC.*

## Figure 57

### EXISTING AND PROPOSED POPULATION IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS




*Source: SEWRPC.*

## Table 140

### EXISTING AND PROPOSED POPULATION IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Population | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing 1985 | Recommended Plan | | | Low-Growth Decentralized Plan | | | Intermediate-Growth Decentralized Plan | | | High-Growth Decentralized Plan | | | High-Growth Centralized Plan | | |
| | | Planned Increment 1985-2010 | | Total 2010 | Planned Increment 1985-2010 | | Total 2010 | Planned Increment 1985-2010 | | Total 2010 | Planned Increment 1985-2010 | | Total 2010 | Planned Increment 1985-2010 | | Total 2010 |
| | | Number | Percent | | Number | Percent | | Number | Percent | | Number | Percent | | Number | Percent | |
| Kenosha | 121,100 | 26,800 | 22.1 | 147,900 | -19,300 | -15.9 | 101,800 | 2,200 | 1.8 | 123,300 | 45,700 | 37.7 | 166,800 | 45,700 | 37.7 | 166,800 |
| Milwaukee | 939,600 | -5,600 | -0.6 | 934,000 | -193,500 | -20.6 | 746,100 | -108,500 | -11.5 | 831,100 | -18,700 | -2.0 | 920,900 | 159,200 | 16.9 | 1,098,800 |
| Ozaukee | 67,500 | 12,300 | 18.2 | 79,800 | 100 | 0.1 | 67,600 | 25,500 | 37.8 | 93,000 | 83,800 | 124.1 | 151,300 | 38,900 | 57.6 | 106,400 |
| Racine | 169,200 | 16,800 | 9.9 | 186,000 | -29,600 | -17.5 | 139,600 | 2,600 | 1.5 | 171,800 | 55,500 | 32.8 | 224,700 | 55,500 | 32.8 | 224,700 |
| Walworth | 72,200 | 15,100 | 20.9 | 87,300 | -2,100 | -2.9 | 70,100 | 24,800 | 34.3 | 97,000 | 65,400 | 90.6 | 137,600 | 36,600 | 50.7 | 108,800 |
| Washington | 87,200 | 24,500 | 28.1 | 111,700 | 3,900 | 4.5 | 91,100 | 47,400 | 54.4 | 134,600 | 97,800 | 112.2 | 185,000 | 61,800 | 70.9 | 149,000 |
| Waukesha | 285,900 | 78,400 | 27.4 | 364,300 | 14,900 | 5.2 | 300,800 | 135,500 | 47.4 | 421,400 | 243,900 | 85.3 | 529,800 | 175,700 | 61.5 | 461,600 |
| Region | 1,742,700 | 168,300 | 9.7 | 1,911,000 | -225,600 | -12.9 | 1,517,100 | 129,500 | 7.4 | 1,872,200 | 573,400 | 32.9 | 2,316,100 | 573,400 | 32.9 | 2,316,100 |

*Source: SEWRPC.*

Table 141

PERCENTAGE DISTRIBUTION OF POPULATION IN THE REGION BY COUNTY: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Percentage Distribution of Population within the Region | | | | | | |
|---|---|---|---|---|---|---|---|
| | Existing 1985 | Existing 1990 | Recommended Plan: 2010 | Low-Growth Decentralized Plan: 2010 | Intermediate-Growth Decentralized Plan: 2010 | High-Growth Decentralized Plan: 2010 | High-Growth Centralized Plan: 2010 |
| Kenosha | 7.0 | 7.1 | 7.7 | 6.7 | 6.6 | 7.2 | 7.2 |
| Milwaukee | 53.9 | 53.0 | 48.9 | 49.2 | 44.4 | 39.8 | 47.5 |
| Ozaukee | 3.9 | 4.0 | 4.2 | 4.5 | 4.9 | 6.5 | 4.6 |
| Racine | 9.7 | 9.7 | 9.7 | 9.2 | 9.2 | 9.7 | 9.7 |
| Walworth | 4.1 | 4.1 | 4.6 | 4.6 | 5.2 | 5.9 | 4.7 |
| Washington | 5.0 | 5.3 | 5.8 | 6.0 | 7.2 | 8.0 | 6.4 |
| Waukesha | 16.4 | 16.8 | 19.1 | 19.8 | 22.5 | 22.9 | 19.9 |
| Region | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Source: SEWRPC.*

Waukesha County. Milwaukee County would experience a decrease of about 19,000 persons during that time. Under the high-growth centralized plan, each county in the Region would experience significant growth, with the increases ranging from 37,000 persons in Walworth County to 176,000 persons in Waukesha County. Under this plan, Milwaukee County would experience the second largest increase, about 159,000 persons, between 1985 and 2010.

Under the intermediate-growth decentralized plan, the resident population of the Region would increase by about 129,000 persons, or by just over 7 percent, to a level of about 1,872,000 persons by the year 2010. Among the seven counties, Waukesha County would experience the largest absolute increase in population, about 136,000 persons. Ozaukee, Walworth, and Washington Counties would experience population increases of 26,000, 25,000, and 47,000 persons, respectively. Kenosha and Racine Counties would experience slight increases in population, while Milwaukee County would experience a substantial decrease in population, more than 108,000 persons.

Under the low-growth decentralized plan, the resident population of the Region would decline to a level of about 1,517,000 persons by the year 2010, a loss of about 226,000 persons, or about 13 percent, from the 1985 level. Most of the anticipated population loss would occur in Kenosha, Milwaukee, and Racine Counties. Walworth County would experience a modest decrease of about 2,000 persons, while Ozaukee County would experience virtually no population change. Washington and Waukesha Counties would experience increases in population of about 4,000 persons and 15,000 persons, respectively.

The changes in population anticipated under the alternative futures plans and the adopted land use plan would significantly alter the relative distribution of population among the counties within the Region (see Table 141). The greatest change in this respect would occur in Milwaukee and Waukesha Counties. Between 1985 and 2010, Milwaukee County's share of the regional population would decrease from about 54 percent to about 49 percent under the low-growth decentralized plan, to about 48 percent under the high-growth centralized plan, to about 44 percent under the intermediate-growth decentralized plan, and to about 40 percent under the high-growth decentralized plan. Conversely, Waukesha County's share of the regional population would increase from about 16 percent in 1985 to about 20 percent under the low-growth decentralized and high-growth centralized plans, to about 22 percent under the intermediate-growth decentralized plan, and to about 23 percent under the high-growth decentralized plan.

Similar information regarding the number and distribution of households in the Region anticipated under the alternative futures plans and the adopted land use plan is presented in Table 142 and Figure 58. As indicated in Table 142, between 1985 and 2010 the number of households in the Region would increase by about 202,600, or about 32 percent, to about

## Table 142

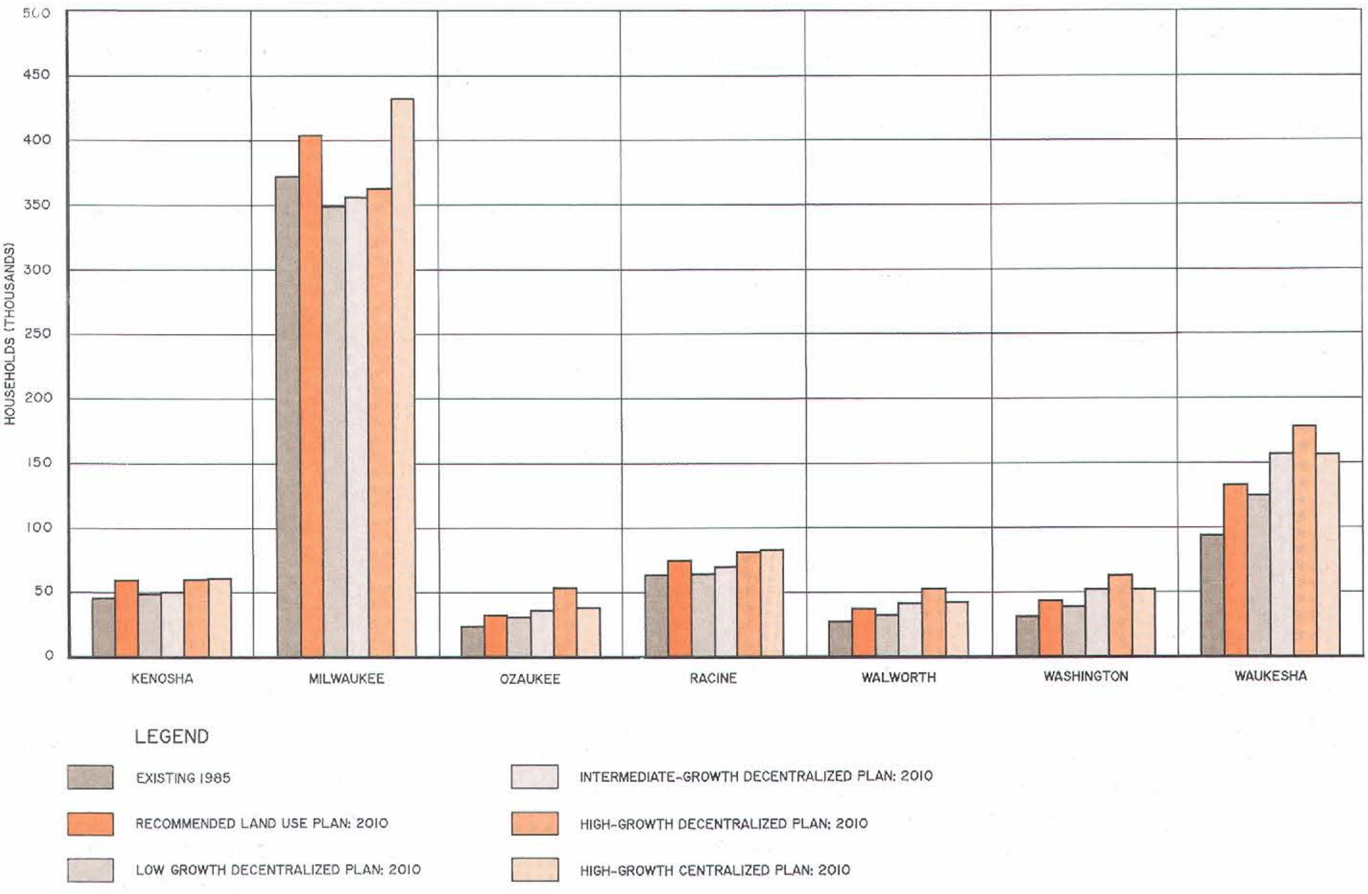
## EXISTING AND PROPOSED HOUSEHOLDS IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Households | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Existing 1985 | Recommended Plan | | | Low-Growth Decentralized Plan | | | Intermediate-Growth Decentralized Plan | | | High-Growth Decentralized Plan | | | High-Growth Centralized Plan | | |
| | | Planned Increment 1985-2010 | | Total 2010 | Planned Increment 1985-2010 | | Total 2010 | Planned Increment 1985-2010 | | Total 2010 | Planned Increment 1985-2010 | | Total 2010 | Planned Increment 1985-2010 | | Total 2010 |
| | | Number | Percent | | Number | Percent | | Number | Percent | | Number | Percent | | Number | Percent | |
| Kenosha | 44,200 | 14,900 | 33.7 | 59,100 | 3,300 | 7.5 | 47,500 | 5,700 | 12.9 | 49,900 | 17,100 | 38.7 | 61,300 | 17,500 | 39.6 | 61,700 |
| Milwaukee | 368,200 | 32,800 | 8.9 | 401,000 | -21,600 | -5.9 | 346,600 | -13,600 | -3.7 | 354,600 | -9,000 | -2.4 | 359,200 | 62,400 | 16.9 | 430,600 |
| Ozaukee | 22,900 | 7,600 | 33.2 | 30,500 | 5,600 | 24.5 | 28,500 | 12,700 | 55.5 | 35,600 | 29,800 | 130.1 | 52,700 | 14,100 | 61.6 | 37,000 |
| Racine | 61,200 | 12,700 | 20.8 | 73,900 | 1,700 | 2.8 | 62,900 | 7,700 | 12.6 | 68,900 | 20,500 | 33.5 | 81,700 | 20,900 | 34.2 | 82,100 |
| Walworth | 25,600 | 10,000 | 39.1 | 35,600 | 5,700 | 22.3 | 31,300 | 13,900 | 54.3 | 39,500 | 26,200 | 102.3 | 51,800 | 14,700 | 57.4 | 40,300 |
| Washington | 28,500 | 13,100 | 46.0 | 41,600 | 8,900 | 31.2 | 37,400 | 21,600 | 75.8 | 50,100 | 34,000 | 119.3 | 62,500 | 21,800 | 76.5 | 50,300 |
| Waukesha | 93,200 | 39,400 | 42.3 | 132,600 | 28,700 | 30.8 | 121,900 | 61,000 | 65.5 | 154,200 | 84,000 | 90.1 | 177,200 | 61,100 | 65.6 | 154,300 |
| Region | 643,800 | 130,500 | 20.3 | 774,300 | 32,300 | 5.0 | 676,100 | 109,000 | 16.9 | 752,800 | 202,600 | 31.5 | 846,400 | 212,500 | 33.0 | 856,300 |

*Source: SEWRPC.*

## Figure 58

## EXISTING AND PROPOSED HOUSEHOLDS IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS




*Source: SEWRPC.*

Table 143

PERCENTAGE DISTRIBUTION OF HOUSEHOLDS IN THE REGION BY COUNTY: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Percentage Distribution of Households within the Region | | | | | | |
|---|---|---|---|---|---|---|---|
| | Existing 1985 | Existing 1990 | Recommended Plan: 2010 | Low-Growth Decentralized Plan: 2010 | Intermediate-Growth Decentralized Plan: 2010 | High-Growth Decentralized Plan: 2010 | High-Growth Centralized Plan: 2010 |
| Kenosha | 6.9 | 6.9 | 7.6 | 7.0 | 6.6 | 7.3 | 7.2 |
| Milwaukee | 57.2 | 55.2 | 51.8 | 51.3 | 47.1 | 42.4 | 50.3 |
| Ozaukee | 3.5 | 3.8 | 3.9 | 4.2 | 4.7 | 6.2 | 4.3 |
| Racine | 9.5 | 9.4 | 9.6 | 9.3 | 9.2 | 9.7 | 9.6 |
| Walworth | 4.0 | 4.1 | 4.6 | 4.6 | 5.2 | 6.1 | 4.7 |
| Washington | 4.4 | 4.9 | 5.4 | 5.6 | 6.7 | 7.4 | 5.9 |
| Waukesha | 14.5 | 15.7 | 17.1 | 18.0 | 20.5 | 20.9 | 18.0 |
| Region | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Source: SEWRPC.*

846,400 under the high-growth decentralized plan; by about 212,500 households, or about 33 percent, to about 856,300 under the high-growth centralized plan; by about 109,000, or about 17 percent, to about 752,800 under the intermediate-growth decentralized plan; and by 32,300, or about 5 percent, to 676,100 under the low-growth decentralized plan.[16] Differences in relative rates of growth in population and households, are primarily attributable to anticipated changes in household types and related changes in household sizes, including a continued increase in the relative proportion of single-parent and single-person households.

The change in the relative distribution of households among the seven counties envisioned under the alternative futures plans and the recommended plan is indicated in Table 143. These changes generally parallel the anticipated changes in the relative distribution of the population described above, with Milwaukee and Waukesha Counties being the most affected.

The population density of the developed urban area of the Region would continue to decline under each of the alternative futures plans and also under the adopted plan. As indicated in Table 144, between 1985 and 2010 the urban population density would decrease from about 3,600 persons per square mile to about 3,100 persons per square mile under the high-growth centralized plan, to about 2,900 persons per square mile under the high-growth decentralized plan, and to about 2,600 persons per square mile under the intermediate-growth decentralized and low-growth decentralized plans.

Employment Distribution: Employment levels anticipated under the alternative futures plans and the recommended land use plan are presented by county in Table 145 and Figure 59. Under both the high-growth decentralized and high-growth centralized plans, total employment in the Region would increase by 380,000 jobs, or about 44 percent, from about 872,000 jobs in 1985 to about 1,252,000 jobs by the year 2010. Under the high-growth decentralized plan, Waukesha County would experience the largest absolute increase in employment, about 116,000 jobs. The other six counties in the Region would experience increases ranging from 27,000 jobs in Walworth County to 95,000 jobs in Milwaukee County. Under the high-growth centralized plan,

[16] *The number of households anticipated under the high-growth centralized plan differs from that anticipated under the high-growth decentralized plan even though the plans are based on the same design year regional population level. This situation is due to the differences in the anticipated distribution of population under the respective plans combined with anticipated differences in household size within the Region. The high-growth decentralized plan envisions fewer households than the high-growth centralized plan because it envisions higher population levels in outlying areas, where household sizes are typically larger, and lower population levels in older urban areas, where household sizes are typically smaller.*

Table 144

POPULATION DENSITY IN THE REGION: SELECTED YEARS 1850-1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| Condition | Urban Population | | Rural Population[a] | | Total Population | Area (square miles) | | Persons per Square Mile | |
|---|---|---|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent of Total | | Urban | Total | Urban | Total |
| Actual | | | | | | | | | |
| 1850 | 28,623 | 25.2 | 84,766 | 74.8 | 113,389 | 4 | 2,689 | 7,156 | 42 |
| 1880 | 139,509 | 50.3 | 137,610 | 49.7 | 277,119 | 18 | 2,689 | 7,751 | 103 |
| 1900 | 354,082 | 70.6 | 147,726 | 29.4 | 501,808 | 37 | 2,689 | 9,570 | 187 |
| 1920 | 635,376 | 81.1 | 148,305 | 18.9 | 783,681 | 56 | 2,689 | 11,346 | 291 |
| 1940 | 991,535 | 92.9 | 76,164 | 7.1 | 1,067,699 | 90 | 2,689 | 11,017 | 397 |
| 1950 | 1,179,084 | 95.0 | 61,534 | 5.0 | 1,240,618 | 146 | 2,689 | 8,076 | 461 |
| 1963 | 1,634,200 | 97.6 | 40,100 | 2.4 | 1,674,300 | 282 | 2,689 | 5,795 | 623 |
| 1970 | 1,728,946 | 98.5 | 27,137 | 1.5 | 1,756,083 | 338 | 2,689 | 5,115 | 653 |
| 1980 | 1,749,238 | 99.1 | 15,558 | 0.9 | 1,764,796 | 444 | 2,689 | 3,940 | 656 |
| 1985 | 1,730,500 | 99.3 | 12,200 | 0.7 | 1,742,700 | 477 | 2,689 | 3,628 | 648 |
| Planned | | | | | | | | | |
| Low-Growth Decentralized: 2010 | 1,508,000 | 99.4 | 9,100 | 0.6 | 1,517,100 | 582 | 2,689 | 2,591 | 564 |
| Intermediate-Growth Decentralized: 2010 | 1,865,400 | 99.6 | 6,800 | 0.4 | 1,872,200 | 708 | 2,689 | 2,635 | 696 |
| High-Growth Decentralized: 2010 | 2,310,000 | 99.7 | 6,100 | 0.3 | 2,316,100 | 805 | 2,689 | 2,870 | 861 |
| High-Growth Centralized: 2010 | 2,309,300 | 99.7 | 6,800 | 0.3 | 2,316,100 | 741 | 2,689 | 3,116 | 861 |
| Recommended: 2010 | 1,902,800 | 99.6 | 8,200 | 0.4 | 1,911,000 | 668 | 2,689 | 2,849 | 711 |

[a] *The rural population has been divided into rural farm and rural nonfarm by the U. S Bureau of the Census since 1930. The rural population shown on this table for the years 1850 to 1920 includes the total rural population as enumerated by the Census Bureau. The rural population for 1940 and after includes the rural farm population only, the rural nonfarm population being included in the urban population.*

*Source: U. S. Bureau of the Census and SEWRPC.*

Milwaukee County would experience the largest absolute gain in employment, 135,000 jobs, while the other six counties would experience increases ranging from 18,000 in Walworth County to 90,000 in Waukesha County.

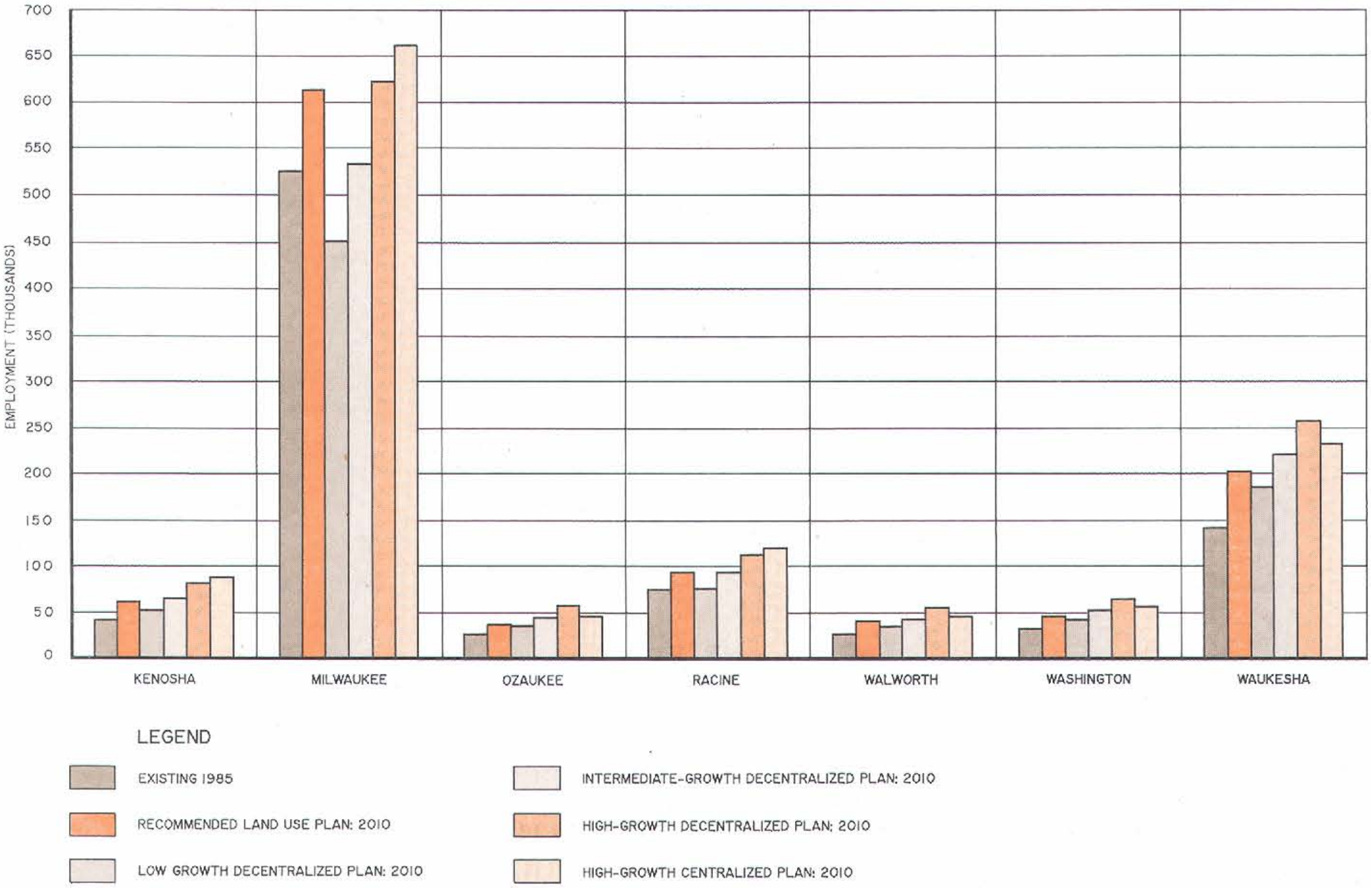
Under the intermediate-growth decentralized plan, total employment within the Region would increase to about 1,051,000 jobs by the year 2010, an increase of about 179,000 jobs, or about 21 percent, over 1985. Under that plan, Milwaukee County would experience a modest increase in employment of about 5,000 jobs, or about 1 percent. The other six counties in the Region would experience larger employment increases ranging from about 15,000 jobs in Walworth County to about 79,000 jobs in Waukesha County.

Under the low-growth decentralized plan, total employment within the Region in the year 2010 would be about the same as in 1985, although the distribution of jobs in the Region would continue to change. Among the seven counties the largest absolute changes anticipated under the low-growth decentralized plan would be an increase of about 41,000 jobs in Waukesha County and a decrease of about 77,000 jobs in Milwaukee County.

The relative distribution of jobs among the seven counties in the Region called for under the alternative futures plans and the adopted land use plan is indicated in Table 146. As indicated in that table, between 1985 and 2010, Milwaukee County's share of the total regional employment would decrease from about 60 percent to about

## Figure 59

### EXISTING AND PROPOSED EMPLOYMENT IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS




*Source: SEWRPC.*

## Table 145

### EXISTING AND PROPOSED EMPLOYMENT IN THE REGION: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Employment | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Recommended Plan | | | Low-Growth Decentralized Plan | | | Intermediate-Growth Decentralized Plan | | | High-Growth Decentralized Plan | | | High-Growth Centralized Plan | | |
| | | Planned Increment 1985-2010 | | | Planned Increment 1985-2010 | | | Planned Increment 1985-2010 | | | Planned Increment 1985-2010 | | | Planned Increment 1985-2010 | | |
| | Existing 1985 | Number | Percent | Total 2010 | Number | Percent | Total 2010 | Number | Percent | Total 2010 | Number | Percent | Total 2010 | Number | Percent | Total 2010 |
| Kenosha | 42,500 | 20,500 | 48.2 | 63,000 | 7,900 | 18.6 | 50,400 | 23,200 | 54.6 | 65,700 | 38,300 | 90.1 | 80,800 | 46,400 | 109.2 | 88,900 |
| Milwaukee | 527,300 | 85,400 | 16.2 | 612,700 | -76,500 | 14.5 | 450,800 | 4,800 | 0.9 | 532,100 | 94,900 | 18.0 | 622,200 | 135,300 | 25.7 | 662,600 |
| Ozaukee | 26,900 | 11,800 | 43.9 | 38,700 | 8,900 | 33.1 | 35,800 | 17,400 | 64.7 | 44,300 | 29,900 | 111.2 | 56,800 | 20,400 | 75.8 | 47,300 |
| Racine | 74,500 | 17,600 | 23.6 | 92,100 | 1,200 | 1.6 | 75,700 | 19,100 | 25.6 | 93,600 | 38,100 | 51.1 | 112,600 | 43,500 | 58.4 | 118,000 |
| Walworth | 28,100 | 12,400 | 44.1 | 40,500 | 6,700 | 23.8 | 34,800 | 14,600 | 52.0 | 42,700 | 27,400 | 97.5 | 55,500 | 18,300 | 65.1 | 46,400 |
| Washington | 31,300 | 16,600 | 53.0 | 47,900 | 9,700 | 31.0 | 41,000 | 21,400 | 68.4 | 52,700 | 34,800 | 111.2 | 66,100 | 25,600 | 81.8 | 56,900 |
| Waukesha | 141,300 | 58,800 | 41.6 | 200,100 | 41,100 | 29.1 | 182,400 | 78,900 | 55.8 | 220,200 | 116,300 | 82.3 | 257,600 | 90,200 | 63.8 | 231,500 |
| Region | 871,900 | 223,100 | 25.6 | 1,095,000 | -1,000 | -0.1 | 870,900 | 179,400 | 20.6 | 1,051,300 | 379,700 | 43.5 | 1,251,600 | 379,700 | 43.5 | 1,251,600 |

*Source: SEWRPC.*

Table 146

PERCENTAGE DISTRIBUTION OF EMPLOYMENT IN THE REGION BY COUNTY: 1985, 2010 RECOMMENDED LAND USE PLAN, AND 2010 ALTERNATIVE FUTURES LAND USE PLANS

| County | Percentage Distribution of Employment within the Region | | | | | | |
|---|---|---|---|---|---|---|---|
| | Existing 1985 | Existing 1990 | Recommended Plan: 2010 | Low-Growth Decentralized Plan: 2010 | Intermediate-Growth Decentralized Plan: 2010 | High-Growth Decentralized Plan: 2010 | High-Growth Centralized Plan: 2010 |
| Kenosha | 4.9 | 4.7 | 5.7 | 5.8 | 6.3 | 6.5 | 7.1 |
| Milwaukee | 60.5 | 54.8 | 56.0 | 51.8 | 50.6 | 49.7 | 52.9 |
| Ozaukee | 3.1 | 3.2 | 3.5 | 4.1 | 4.2 | 4.5 | 3.8 |
| Racine | 8.5 | 8.3 | 8.4 | 8.7 | 8.9 | 9.0 | 9.4 |
| Walworth | 3.2 | 3.7 | 3.7 | 4.0 | 4.1 | 4.4 | 3.7 |
| Washington | 3.6 | 4.2 | 4.4 | 4.7 | 5.0 | 5.3 | 4.6 |
| Waukesha | 16.2 | 17.4 | 18.3 | 20.9 | 20.9 | 20.6 | 18.5 |
| Region | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.01 |

*Source: SEWRPC.*

53 percent under the high-growth centralized plan; to about 52 percent under the low-growth decentralized plan; to about 51 percent under the intermediate-growth decentralized plan; and to about 50 percent under the high-growth decentralized plan. Under the recommended plan, Milwaukee County would account for about 56 percent of the total regional employment. Waukesha County's share of the total regional employment would increase from about 16 percent in 1985 to about 19 percent by the year 2010 under the high-growth centralized plan; and to about 21 percent under the low-growth decentralized, the intermediate-growth decentralized, and the high-growth decentralized plans. The other five counties would maintain or experience modest increases in their shares of total regional employment under the respective plans.

## SUMMARY

Forecasting future population and economic activity levels is a necessary step precedent to the design of physical development plans. Since surveillance activities point to increasing uncertainty with regard to future social and economic conditions in Southeastern Wisconsin, the Commission has adopted an "alternative futures" approach to forecast preparation. This approach involves the postulation of alternative future growth scenarios for the Region and the preparation of related projections of population and employment, thereby providing a broader basis for plan design and evaluation.

Three alternative futures growth scenarios were postulated for the Region. The sets of conditions postulated for each "future" are intended to represent consistent, reasonable scenarios of future change in population and economic activity within the Region through the year 2010. A "high-growth" scenario and a "low-growth" scenario are intended to represent reasonable extremes; a third scenario, an "intermediate-growth" scenario, is intended to represent a likely future.

The projections of population, household, employment, and personal income levels and related land use demand projections were made prior to the release of the 1990 U. S. Census data. Consequently, actual conditions in 1980 were used as a basis upon which future conditions were projected. A comparison of the recently released 1990 Federal data for the Region is included in the first section of this chapter. A summary of changes in population, households, employment, personal income, and land use projected under the three regional growth scenarios follows.

1. Under the high-growth scenario, the resident population of the Region would increase by about 551,300 persons, or 31 percent, from 1,764,800 persons in 1980 to 2,316,100 persons in the year 2010. The intermediate-growth scenario envisions a population increase of 107,400 persons, or 6 percent, to a level of 1,872,200 persons in 2010. Conversely, the low-growth scenario

envisions a decrease in the regional population of 247,700 persons, or 14 percent, to a level of 1,517,100 persons in the year 2010.

2. The anticipated changes in the number of households in the Region would not necessarily parallel the anticipated changes in population levels under the respective scenarios because of changing household types and related changes in household size. Under the high-growth scenario, the number of households in the Region would increase by 224,700, or 36 percent, from 628,000 in 1980 to 852,700 in 2010. The projected relative increase in households of 36 percent is slightly greater than the relative increase of 31 percent in the regional population projected for the high-growth scenario. Under the intermediate-growth scenario, the number of households would increase by 140,600, or 22 percent, to a level of 768,600 in 2010. The projected 22 percent increase in households is significantly greater than the projected increase of 6 percent in the regional population for this scenario. Under the low-growth scenario, the number of households would increase by 73,900, or 12 percent, to about 701,900 in the year 2010. This is in contrast to the projected 14 percent decrease in the regional population under this scenario and is a result of the anticipated increase in smaller households, particularly single-person and single-parent households.

3. Under the high-growth scenario, total regional employment would increase by 367,400 jobs, or 42 percent, from 884,200 jobs in 1980 to about 1,251,600 jobs in 2010. Under the intermediate-growth scenario, employment would increase by 167,100 jobs, or 19 percent, to about 1,051,300 jobs in 2010. Under the low-growth scenario, total employment would approximate 870,900 jobs in 2010, about 13,300 jobs, or about 2 percent, less than the 1980 level.

4. Anticipated trends in personal income vary significantly for the three regional growth scenarios.[17] Under the high-growth scenario, per capita income would recover rapidly from the depressed levels of the 1979 to 1983 recession and continue rising to about $20,700 in the year 2010, an increase of about $7,800, or 60 percent, over 1980. The intermediate-growth scenario anticipates a slower but nevertheless significant increase, with per capita income rising to about $15,800 in the year 2010, an increase of $2,900, or 22 percent, over 1980. Under the low-growth scenario, recovery from the depressed recessionary income levels would be very slow, with per capita income only expected to approximate $12,700 in the year 2010, about the same as the 1980 level.

5. Changes in the levels and distribution of population, households, and employment may be expected to generate additional demand for urban land development in the Region. Under the high-growth scenario, urban lands, consisting of areas devoted to residential, commercial, industrial, governmental and institutional, transportation, and recreational uses, could be expected to increase by about 159,400 acres, or 42 percent, from about 378,100 acres in 1980 to 537,500 acres in 2010. Increases of 98,000 acres, or 26 percent, and 50,900 acres, or 14 percent, could be expected under the intermediate- and low-growth scenarios, respectively. By the year 2010, lands devoted to urban uses would account for about 31 percent of the total area of the Region under the high-growth scenario, nearly 28 percent under the intermediate-growth scenario and about 25 percent under the low-growth scenario.

The adopted regional land use plan was designed to accommodate the intermediate-growth forecasts, modestly adjusted, however, to reflect trends indicated by 1990 U. S. Census data. Accordingly, the plan envisions an increase of about 168,000 persons in the resident population, an increase of 130,000 in the number of households, and an increase of about 223,000 in total regional employment between 1985 and 2010. The plan proposes to accommodate the anticipated growth in population, households, and employment by converting about 54,800 acres of land from rural to urban uses. Under the plan, urban population density would decrease from about 3,600 persons per square mile in 1985

[17] *All historic and projected income data presented in this chapter are expressed in constant 1990 dollars.*

to about 2,800 persons per square mile in the year 2010.

The adopted year 2010 regional land use plan incorporates the basic concepts of the year 2000 regional land use plan and updates and extends that plan to a new design year. The year 2010 plan recommends a relatively compact, centralized regional settlement pattern, with urban development occurring generally in concentric rings along the full periphery of, and outward from, existing urban centers. Within urban areas the plan envisions a total of 19 major commercial centers and 25 major industrial centers by the plan design year, including five new commercial centers and three new industrial centers. The plan also envisions a total of 31 major park sites, only two of which remain to be publicly acquired.

The adopted plan recommends that new urban development occur primarily in those areas of the Region which are covered by soils suitable for such development; which are not subject to special hazards such as flooding and shoreline erosion; and which can be readily served by essential municipal facilities and services, including public sanitary sewerage, water supply, and public transit systems. The plan recommends the preservation in essentially natural, open uses of primary environmental corridors and the preservation in agricultural and related use of most of the remaining prime agricultural lands in the Region.

Because of the possibility of future growth and change in the Region at variance with the rates assumed in the adopted land use plan, four alternative land use plans were prepared. The four alternative plans differ from the recommended plan in terms of the overall scale and distribution of urban development. While the recommended plan seeks to centralize urban development, three of the alternative plans assume that the historic trend toward decentralized urban development in the Region will continue.

A high-growth decentralized plan was designed to accommodate future population and economic activity levels that could be anticipated under a high-growth scenario. An intermediate-growth decentralized plan and a low-growth decentralized plan were designed to accommodate population and economic activity levels anticipated under the intermediate- and low-growth scenarios, respectively. A fourth alternative plan, high-growth centralized, was designed to accommodate population and economic activity levels anticipated under the high-growth scenario, and unlike the other alternative plans emphasized a centralized development pattern for the Region.

Consideration of alternative land use plans broadens the scope of the regional transportation system plan. The ability of various alternative transportation system plans to accommodate travel demand generated under different development conditions can be determined and a plan identified as most adaptable to various possible futures can then be selected for adoption. It may be that no transportation system plan can be designed to serve cost-effectively each identified future land use scenario. Nevertheless, such plan evaluation permits the identification of potential problems under alternative development futures. Having identified such potential problems, local project level planning can be executed to solve or mediate potential problems should they occur.

It is in this regard that the alternative futures approach validates the cyclical nature of planning recognized by the Commission as essential to plan implementation (see Chapter II). It is recommended that local detailed transportation project planning, county jurisdictional highway system planning, and local transit development programs give consideration to the full range of possible future conditions to ensure that any proposal is sufficiently adjusted to accommodate travel demand under various scenarios. Such analyses undertaken at the local project level may prevent costly future problems associated with, among other things, insufficient capacity and service.

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# Chapter VII

# TRAVEL SIMULATION MODELS

## INTRODUCTION

One of the seven basic principles, set forth in Chapter II of this report, upon which the regional transportation plan reevaluation is based, is:

> Transportation facilities and management proposals must be planned as an integrated system. The capacities of each link in the system must be carefully fitted to traffic loads and the effects of each proposed facility and management proposal on the remainder of the system quantitatively tested.

This principle is particularly important because, unless transportation system plans are subject to quantitative test and evaluation permitting preparation of forecasts of the amount of travel and traffic the system must carry, the adequacy of the plans must remain in doubt from an engineering standpoint. Transportation system plans prepared without quantitative test and evaluation are little more than intuitively created street patterns and transit networks rather than engineered transportation system designs. Such untested plans cannot provide a sound basis for project design, capital investment, or operating funding decisions. Nor can the implementation of such plans be expected to provide the desired long-range solution to traffic and transportation problems. Indeed, such untested plans may create more problems than they purport to solve. The lack of quantitative system test and evaluation is one of the major factors which has in the past contributed to the ineffectiveness of many transportation planning programs carried on at the local level of government, since State and Federal transportation agencies have, quite properly, refused to implement plans which were unsupported by carefully prepared travel and traffic forecasts and assignments.

### The Role of Quantitative Analysis

Quantitative traffic analysis is a fundamental requirement for any transportation planning effort but is a particularly important and complex requirement of the urban transportation planning process. Three basic questions must be confronted in the planning and design of a new transportation facility, an improvement to an existing transportation facility, or a new transportation management action.

1. How will the existing travel and traffic patterns be distributed on the proposed facility or affected by the management proposal? That is, how many persons and vehicles will use the proposed facility upon its completion or be affected by the management proposal?

2. How will future traffic patterns be distributed on the proposed facility or affected by the management proposal? That is, how many persons and vehicles will use the proposed facility at the end of its physical and economic life or be affected by the management proposal?

3. How will the proposed facility or management proposal affect traffic on the total transportation system? That is, how many persons and vehicles will be diverted by the proposed facility or management proposal to or from other facilities comprising the total transportation system?

No transportation facility service or management action can be soundly planned, designed, or implemented without answers to these three basic transportation planning questions. It should be noted that these three questions not only recognize the need for an understanding of present travel and traffic patterns but also recognize that future travel and traffic conditions may differ from present conditions. Existing patterns change in form and intensity as new land use activities and transportation facilities are added to the regional complex and as established land use activities and transportation facilities are changed or relocated. Thus, sound transportation system planning must recognize the need to consider both existing and future travel and traffic patterns and must do so in an explicit, quantitative manner.

Originally, the only quantitative traffic information available for use in the transportation planning process consisted of traffic volume counts. Such counts can indicate only the distribution of traffic patterns on the existing transportation network. Alone, such counts are of little value for long-range transportation planning since they do not provide an answer to even the first of the three transportation planning questions. For many years, however, the application of growth factors to traffic volume counts was the only traffic forecasting technique available for planning purposes.

About 50 years ago, the origin and destination study was developed to collect factual information about existing travel habits and patterns. This survey provided the travel data necessary to answer the first of the three transportation planning questions on existing travel habits and patterns, but not the data necessary to answer directly the second or third transportation planing questions which involve the characteristics of future travel behavior.

About 35 years ago, new transportation planning techniques were developed which for the first time provided quantitative answers to the second and third of the three basic transportation planing questions. These techniques made it possible to calculate future travel demand quantitatively as a function of regional development patterns instead of deriving such demand, as was necessary in the past, from simple expansions of existing traffic patterns. The techniques were based on the concept that those aspects of regional development which affect the magnitude and pattern of regional travel demand could be identified, quantified, and correlated with such travel through the analysis of origin and destination and land use survey data. The concept, further, was that the relationships between land use and travel so established would remain reasonably stable over time, enabling the simulation of future travel patterns on the basis of projected or planned future land use patterns. By considering the future distribution of land use activity within an urban region as the major factor influencing future traffic patterns, integrated transportation system designs could be developed which would not only serve the existing traffic patterns within an urban region but which would also serve the entirely new patterns that will evolve with changing development.

The first time that these new transportation planning techniques were used on a regional scale in Southeastern Wisconsin was during the initial land use-transportation study conducted by the Commission from 1963 to 1966. The historic design year 1990 regional transportation plan was in large part based upon the quantitative analysis of the performance of alternative highway and transit systems permitted by the battery of traffic simulation models developed for the 1963 to 1966 study.

Since the need for quantitative analysis of the performance of alternative transportation systems has, if anything, increased over the last 30 years, it has been necessary to review and, as needed, refine the initial battery of traffic simulation models developed by the Commission for use in the regional transportation planning effort. As part of the preparation of the second-generation regional transportation plan in the 1970s, such refinement consisted of an analysis of the adequacy of each individual model used in the initial study. The effectiveness of this analysis was greatly enhanced by the fact that the findings of major travel inventories were available for two points in time, 1963 and 1972, thus permitting examination of the temporal stability of the traffic simulation models. In this manner those initial traffic simulation procedures which were shown to be reliable could be retained for use in the plan reevaluation effort. Significant advances in the state of the art of traffic simulation occurred since the conduct of the initial transportation study. An investigation of newer modeling strategies was conducted and some of these strategies were incorporated into the simulation process for use in the second-generation plan reevaluation. A complete description of the initial study procedures can be found in SEWRPC Planning Report No. 7, The Regional Land Use-Transportation Study, Volume Two, Forecasts and Alternative Plans: 1990. The refinements to the initial procedures incorporated in the battery of traffic simulation models used in the second-generation plan preparation are documented in SEWRPC Planning Report No. 25, A Regional Land Use and a Regional Transportation Plan for Southeastern Wisconsin: 2000, Volume Two, Alternative and Recommended Plans. A similar review and refinement of those second-generation models was conducted as part of this preparation of a third-generation transportation plan, and is documented in this chapter. This refinement again has the benefit of not only the findings of a new major travel inventory conducted in 1991, but also of consistent inventory data for three points in time, 1963, 1972, and 1991.

## Basic Modeling Concepts

The simulation of existing and future travel demand is a complex procedure requiring application of a variety of mathematical and statistical techniques. Although the basic formats of the traffic simulation process used in all major urban transportation studies today are similar, the specific needs and characteristics of each study area require a certain amount of individualization for the precise procedures used.

The simulation of travel and traffic is based upon the premise that the magnitude and pattern of travel is a stable function of the characteristics of the land use pattern and of the transportation system, with the term land use referring to not only land use type and intensity, but also to population and employment levels and characteristics. In travel simulation modeling, those aspects of the land use pattern and of the highway and public transit system characteristics which affect the magnitude and distribution of travel demand are identified, quantified, and correlated through the analysis of detailed travel origin-and-destination and land use and transportation system survey data. It has been demonstrated that the relationships between travel and land use and transportation system characteristics remain reasonably stable over time, thus enabling the forecast of future travel and traffic patterns based upon postulated future land use patterns and transportation system configurations.

Given the necessary land use and transportation system data, the complete sequence of travel simulation occurs in four steps:

1. Trip generation, in which the total number of person trips generated in each subarea of the planning area for the time period under analysis is determined by using relationships found to exist between land use and travel by analyses of the land use and travel inventory data. The output from this step is the total number of person trip ends, that is, trips entering and leaving each subarea of the study area.

2. Trip distribution, in which the person trips generated in each subarea are linked with trip ends in other subareas, thereby defining the universe of person trips by point of origin and point of destination. The output from this step is the number of person trips made between each subarea pair.

3. Modal choice, in which the number of person trips between each subarea pair is divided among the travel modes, primarily public transit and automobile. The output of this step is the number of person trips made between each subarea pair by automobile, including those driving alone and those using carpools and vanpools. The person trips made by automobile are correlated to vehicle trips by the application of automobile occupancy factors or by estimating the number of automobile trips made by driving alone or by carpools.

4. Traffic assignment, in which the subarea transit trips are assigned to the existing or to proposed alternative future transit system networks and the subarea vehicle trips are assigned to the existing or proposed alternative arterial street and highway facility networks. The output of this step is the number of people utilizing the routes and facilities of the existing or proposed public transit system and the number of vehicles utilizing each segment of the existing or proposed public transit and arterial street and highway systems.

The result of the four-step travel simulation process is a complete description of the use of an existing or proposed transportation system consisting of both arterial streets and highways and transit lines. Although the four steps set forth above provide a general description of the travel simulation modeling process, some variations are necessary and desirable for the various types of trips to be simulated.

As noted earlier, a battery of travel simulation models was first developed and applied on a regional scale in Southeastern Wisconsin during the initial regional land use-transportation study conducted by the Commission in 1963.[1] These models were developed by using an extensive data base developed from specific land use, socio-economic, and travel inventories conducted by the Commission. A massive travel survey was conducted in the late spring of 1963 to obtain data describing the amount, kind, and

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[1] *See SEWRPC Planning Report No. 7, The Regional Land Use-Transportation Study, Volume Two, Forecasts and Alternative Plans: 1990.*

distribution of travel occurring throughout the Region on an average weekday and the characteristics of the tripmakers. Four separate travel surveys were conducted, including a home interview survey, a truck and taxi survey, and a postal questionnaire survey used to obtain information on travel internal to the Region and an external (roadside) survey used to obtain information on travel between the Region and other areas of the Country.

The home interview survey was the most comprehensive of the four surveys, providing an inventory of the travel habits and patterns of 18,000 households in the Kenosha, Milwaukee, and Racine urbanized areas. It was conducted at a 3 percent sample rate in the Milwaukee area and at a 10 percent sample rate in both the Kenosha and Racine areas. The truck and taxi survey was conducted at a sample rate of 8.5 percent in the Milwaukee area and 25 percent in the Racine and Kenosha areas and included the survey of trips generated by over 4,300 trucks.

The postal questionnaire survey was conducted to provide basic travel data relating to households, trucks, and taxis in the less populated areas of the Region outside of the Milwaukee, Racine, and Kenosha home interview areas. The survey, which was sent to all households and commercial vehicle operators in the rural areas of the Region, had a usable sample rate of 16 percent of the 69,000 households and 18 percent of the 18,400 commercial vehicle operators in the rural areas. In the external cordon survey, nearly 75,000 of the 101,500 vehicles crossing the boundaries of the Region, or about 74 percent, were stopped and interviewed.

In addition to gathering information on actual travel on the day preceding the receipt of the survey, these surveys also obtained census-type socio-economic data for households in the Region, including total population, income, household size, and migration patterns, which were also used in travel model development. The extensive travel inventory data were then combined for the purposes of travel model development with land use type and density data for each of the 10,800 quarter-sections in the Region and with detailed 1960 U. S. Census data on populating and housing.

The development of the Commission's original, design year 1990, regional transportation system plan was in part based upon quantitative analyses of the performance of alternative highway and transit systems permitted by the battery of travel simulation models developed to forecast average weekday travel under that study. These models were subsequently applied in detailed jurisdictional highway planning studies for each of the seven counties in the Region, freeway and other arterial highway location and design studies, a preliminary engineering study of a busway in the Milwaukee east-west corridor, and other transportation studies.

Between the completion of that initial regional land use-transportation planning effort in 1966 and the initiation of the major land use and transportation plan reevaluation effort in 1972, the emphasis on, and consequent need for, quantitative analysis of the performance of alternative transportation systems increased. In addition, between 1963 and 1972, substantial changes had occurred within the Region, including substantial growth in population and employment, increases in personal income and automobile availability, and further decentralization of land use. As a consequence, the Commission found it desirable to validate, and, as necessary, recalibrate, the initial battery of traffic simulation models for use in the regional transportation system plan reevaluation effort in 1972.[2]

This review of the initial models was possible because the Commission conducted a new regional inventory of travel in 1972. The 1972 surveys included all the basic origin-destination surveys conducted in 1963, including household travel, truck and taxi, and external cordon surveys, and also a special public transit user survey. The home interview survey involved 17,500 households, or about 3 percent of the Region's households. About 5 percent of all trucks within the Region and about 82 percent of all licensed taxis were sampled under the truck and taxi survey. In the external cordon survey, interviewers at roadside stations stopped and interviewed about 80,300 of the 130,300 motor vehicles crossing the cordon lines, or about

[2]*See SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin: 2000, Volume Two, Alternative and Recommended Plans.*

59 percent. Sampling rates of transit riders varied among the systems, ranging from about 25 percent in the Milwaukee area to about 50 percent in the Racine and Kenosha areas. Land use data for the Region's 10,800 quarter-sections were updated and 1970 U. S. Census data were collated and analyzed, as was done in 1963, for use in the reevaluation of the models.

The first step in this review process consisted of an analysis of the adequacy of the travel simulation model battery and of each individual model used in the initial study. The analysis of the temporal stability of the individual models, trip generation, trip distribution, and mode choice, was possible only because major travel inventories were available for two points in time, 1963 and 1972. The Commission's original travel simulation models, calibrated using 1963 home interview survey data, were shown through this testing, which used as input socio-economic and land use survey data gathered in 1972, to estimate accurately travel in Southeastern Wisconsin in 1972. This successful testing of the initial study procedures constituted an important validation of the accuracy of those procedures. The testing included a test of each individual model, as well as a test of the final model estimate of transit ridership and highway traffic to actual counts of transit ridership and highway traffic. Although the validity of the initial study procedures was proven through these analyses, an investigation of newer modeling strategies was conducted and, as applicable, newer techniques were incorporated into a refined battery of the travel and traffic simulation models.

This refined, second-generation, battery of travel simulation models was used in the regional land use-transportation plan reevaluation efforts, completed in mid-1978, and in several short- and long-range highway and transit planning studies since the completion of the 1978 plan reevaluation. One such study which involved extensive application of travel simulation models was the areawide rapid transit system planning study, completed in 1982, which extensively evaluated alternative rapid transit systems for the Milwaukee area.[3] Another such study which involved extensive application of the models was the Northwest Corridor Rapid Transit Study, an in-depth analysis of light-rail and express bus alternatives in the corridor and which constituted a transit alternatives analysis-draft environmental impact statement under the review of the Federal Transit Administration.[4] The battery of travel simulation models was also applied in many arterial street and highway planning studies.

A third regional inventory of travel was conducted in the fall of 1991 and spring of 1992. The 1991 survey included all the basic origin-destination surveys conducted in 1972, including household travel, truck, external cordon, and public transit user surveys. The household travel and public transit user surveys were conducted in the fall of 1991; the external cordon and truck and taxi surveys were conducted in the spring of 1992. The home interview survey again involved about 17,500 households, or about 2.5 percent of the Region's households. About 5 percent of all commercial trucks within the Region and about 35 percent of all licensed taxis were sampled under the truck and taxi survey. In the external cordon survey, interviewers at roadside stations stopped and distributed postal card interview forms to about 160,000 of the 230,000 motor vehicles crossing the cordon lines. Approximately 30 percent of the vehicles surveyed returned the survey forms, providing about a 20 percent sample. Sample rates of transit riders varied among the systems, ranging from about 10 percent in the Milwaukee area to about 20 to 30 percent in the Racine, Kenosha, and Waukesha areas. Land use and employment data for the Region's 10,800 quarter-sections were updated to the year 1990 and 1990 U. S. Census data were collated and analyzed for use in the reevaluation of the models.

The first step in this review process again consisted of an analysis of the adequacy of the travel simulation model battery and of each individual model used in the initial study. The analysis of the temporal stability of the indi-

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[3]*See SEWRPC Planning Report No. 33, <u>A Primary Transit System Plan for the Milwaukee Area</u>, June 1982.*

[4]*See SEWRPC Community Assistance Planning Report No. 150, <u>A Rapid Transit Facility Plan for the Milwaukee Northwest Corridor</u>, January 1988, and <u>The Milwaukee Northwest Corridor Rapid Transit Study</u>, Report No. 2, "Travel Simulation Models," 1986.*

vidual models, including trip generation, trip distribution, and mode choice, was again possible only because comparable findings of major travel inventories were now available for three points in time: 1963, 1972, and 1991. The Commission's second-generation travel simulation models, calibrated on the basis of 1972 survey data, were shown through this testing, which used as input socio-economic and land use survey data gathered in 1990, to estimate accurately travel in Southeastern Wisconsin in 1991. This successful testing of the travel modeling procedures constituted an important validation of the accuracy of those procedures. Although the validity of the second-generation travel modeling procedures developed in the mid-1970s was proven through these analyses, an investigation of newer modeling strategies was again conducted and, as applicable, newer techniques were incorporated into a refined battery of the travel and traffic simulation models. The travel simulation modeling to be conducted for the preparation of the third-generation regional transportation system plan utilizes this refined battery of travel and traffic simulation models.

Classification of Travel

An important aspect of the Commission's battery of travel and traffic simulation models is the classification of the different components of travel within the Region. Such classification of trips is necessary because different types of trips exhibit different characteristics and, as a consequence, require different simulation techniques. In addition, some of these types of trips represent very small proportions of total travel in an urban region. The classification of trips and the determination of the relative proportion of total travel they represent allow travel simulation modeling resources to be focused on those types of trips which represent the greater proportions of travel.

As shown in Table 147, the first major division of trips involves the distinction between internal and external trips. Internal trips are defined as those trips which have both ends within the Southeastern Wisconsin Region. External trips are defined as those trips which have one or both ends outside of the Region. As intraregional travel by residents of the Region has consistently since 1963 accounted for over 96 percent of the vehicle trips and 97 percent of the person trips observed on an average weekday, the primary emphasis in the modeling process is on internal trips. It should be noted, however, that external trips do have important effects in the use of facilities in certain major travel corridors, particularly near the boundaries of the Region.

Among internal trips a further classification is made based upon mode of travel. The major transportation modes in Southeastern Wisconsin include personal vehicle, such as automobile, van, or light truck; public mass transit; school bus; commercial truck; and taxicab. The manner in which these modes are combined for simulation purposes depends not only upon modal characteristics but also upon the type of travel inventory survey used for calibrating relationships.

The vast majority of trips belong to the category of internal bus and automobile trips. These trips are further classified by the living quarters of the persons making the trip. Essentially trips by group-quartered persons and nonresidents of the Region are separated for special consideration because of the limitations of the trip generation procedure and to the unique travel habits and patterns exhibited by these persons. Group-quartered persons are defined as those persons residing in dormitories, convents, homes for the aged, and similar group residences. Together, group-quartered trips and nonresident trips have consistently accounted for about 1 percent of the total person trips within the Region since 1963.

Because of the sheer volume of travel involved, the primary emphasis of the traffic simulation modeling process focuses on internal automobile and mass transit trips made by nongroup-quartered residents. These trips represent over 90 percent of total trips made within the Region on an average weekday. This group of trips is further subdivided by trip purpose into: home-based work; home-based shopping; home-based other (excluding school); nonhome-based (excluding school); and school trips. Home-based trips are defined as those trips having one end located at the residence of the tripmaker. The purpose of a home-based trip is thus determined by the nonhome end of the trip as either work, shopping, or other, the last representing an aggregation of personal business, medical-dental, social-eatmeal, recreation, and serve passenger purposes. Nonhome-based trips are defined as those trips having neither end located at the place of residence of the tripmaker and can be made for any purpose except school. Separate considera-

Table 147

**TRIP CLASSIFICATION AND TRAVEL SIMULATION PROCEDURE**

| Trip Classification | | | | | Simulation Procedure | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Trip Generation | | | | |
| Internal or External | Mode[a] of Travel | Types of Quarters | Trip Purpose | Percent of Total Trips[b] | Production | Attraction | Trip Distribution | Modal Split | Traffic Assignment |
| Internal | Automobiles, transit bus, and school bus | Residents in households | Home-based work | 22 | Cross-classification analysis | Cross-classification analysis | Gravity model | Logit analysis | Minimum path |
| | | | Home-based shopping | 13 | | | | | |
| | | | Home-based other (excluding school) | 28 | | | | | |
| | | | Nonhome-based (excluding school) | 18 | | | | | |
| | | | School Central Milwaukee area colleges and universities[c] | 9 | Factor existing total person trip levels | | Existing patterns | Logit analysis | Minimum path |
| | | | Other | | Factor existing trip levels by mode | | Existing patterns by mode | N/A | |
| | | Group-quartered residents | All | 0.5 | Factor existing trip levels by mode | | Existing patterns by mode | N/A | |
| | | Nonresidents | All | 0.5 | | | | | |
| | Heavy truck | All | All | 3 | Multiple-regression analysis | | Fratar model | | |
| | Light truck and taxi | All | All | 3 | | | | | |
| External | All | All | All | 3 | | | | | |

NOTE: N/A indicates not applicable.

[a]*Not including the lesser modes of railroad, bicycle, motorcycle, air travel, water travel, and charter bus.*

[b]*Percentage of total travel based upon 1991 origin-destination survey trip information.*

[c]*Includes University of Wisconsin-Milwaukee, Marquette University, Milwaukee Area Technical College, and Milwaukee School of Engineering.*

*Source: SEWRPC.*

tion of home-based and nonhome-based school trips is necessary because of the arbitrary constraints imposed upon travel patterns by school service area boundaries, constraints which cannot be adequately represented in the normal travel simulation sequence in current trip distribution models. In addition, most schools serve local neighborhoods or communities so that tripmaking to or from such schools has a relatively small impact on arterial street and highway travel. Trips to and from all schools, elementary, junior and senior high, vocational and technical schools, and colleges and universities, have consistently represented approximately 9 percent of all person trips observed in the Region on an average weekday.

On the basis of the classification of trips noted above, Table 147 indicates the specific modeling techniques used for each type of trip in the plan reevaluation effort. Each of these techniques will be more fully described in the appropriate sections of this chapter.

## Geographic Aggregation System

Another aspect of the traffic simulation modeling process that warrants discussion is the method of spatially aggregating trips. In the description of the four-step simulation process, trips are described as being generated within, distributed between, and split by mode among subareas of the study area. The manner in which these subareas are determined is critical to the travel simulation process. One objective of the geographic aggregation is to achieve maximum homogeneity of land use, broadly defined, within each subarea. Another objective is to replicate as closely as possible the way in which traffic in each zone gains access to the transportation system, that is, the movement of vehicular traffic between local land-access, collector, and arterial streets and the use by transit riders of pedestrian, bicycle, automobile, and feeder bus access to transit service. Although not all models are calibrated on the basis of average subarea characteristics, all models must eventually be applied by subarea. The greater the degree of homogeneity of the land uses in the subareas and the closer the replication of subarea access to the transportation system, the better able the models are to accurately simulate actual traffic conditions.

The basic unit of geographic identification used by the Commission for the collection and analysis of land use, demographic and economic, and travel inventory data is the U. S. Public Land Survey quarter-section, consisting of an approximately one-half mile on a side rectilinear area containing approximately 160 acres. Inventory data are summed to the quarter-section level for all parts of the Region except the central business district (CBD) of the Cities of Milwaukee, Racine, and Kenosha. In these areas, quarter-sections are divided into smaller areas representing individual city blocks or aggregations of city blocks. Using these basic geographic units, special analytical units can be developed for use in the travel demand modeling process.

Essentially, two related systems of analytical areas are used in the modeling effort to define internal subareas of the Region, as shown on Map 78. A system of 1,431 traffic analysis zones, composed of entire quarter-sections or of combinations of quarter-sections outside the major CBDs and of groupings of city blocks within the major CBD area, is the first such system delineated for the travel demand simulation process. These 1,431 zones are typically used in the calibration of the traffic simulation models and for most applications of the travel simulation models. Except for the major CBDs, where groups of city blocks are delineated as zones, the zone system provides an analytical unit equal to, or larger than, the quarter-section and, thus, decreases the number of geographic units for which data must be handled and forecasts made regarding the approximately 10,800 quarter-sections within the Region. Within the Region, the traffic analysis zones range in area from 0.04 square mile in the Milwaukee central business district to 36 square miles in the more sparsely settled portions of the Region.

The second system of subareas used in the simulation modeling effort consists of a set of 60 planning analysis areas. These analysis areas are intended to represent rational areas for comprehensive urban planning purposes and, as such, are generally intended to be composed of a number of "neighborhoods." The neighborhoods can be grouped to form "communities," which may consist of groups of minor civil divisions, cities, villages, and towns or subareas of such minor civil divisions. In cases where the minor civil division was considered too large to constitute a viable analysis area, subcommunity areas were delineated within the civil divisions as planning analysis areas. Each planning analysis area represents an aggregation of traffic analysis zones. The 60 planning analysis areas within the Region are shown on Map 78. Another set of aggregated analysis areas divides the Region into 37 areas; yet another set into 110 areas, as shown on Map 79. Both are used principally for travel pattern analyses based on the household survey sample size.

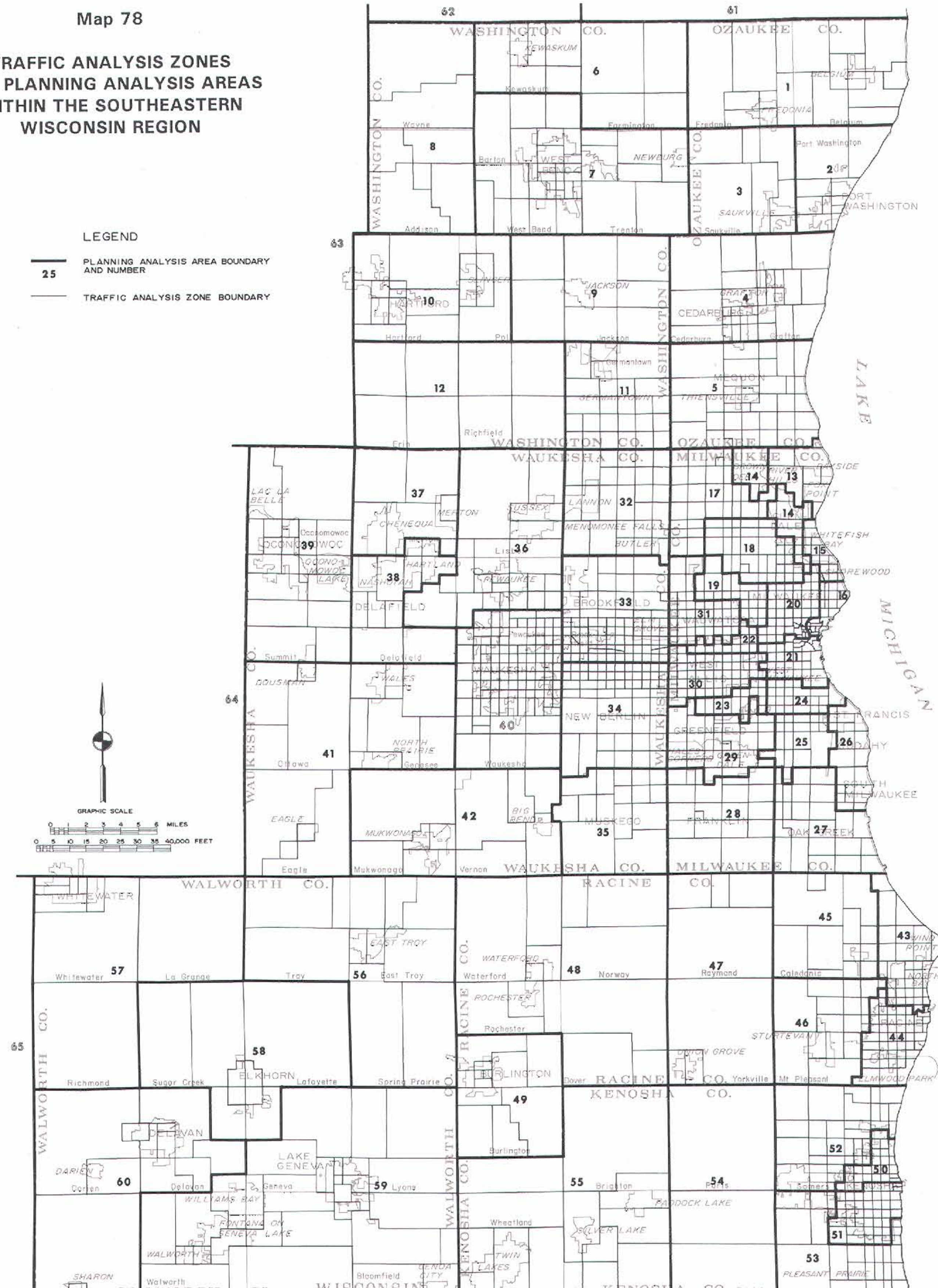
Format of Presentation

This chapter is intended to document the simulation models used in the regional transportation plan reevaluation effort to forecast future travel demand and the manner in which that demand may be expected to impact alternative transportation systems. The documentation includes not only a description of the specific model formats but also a description of the methods used to develop, apply, and test the models.

In the first section of this chapter, it was noted that land use data comprise the basic input to the traffic simulation process. Although Chapter VII of the 1992 land use plan contains a description of most land use characteristics and the methodology used in the land use plan reevaluation to develop probable future land use patterns, there are certain critical land use variables which were specifically developed for the individual traffic simulation models. In this section these variables are identified and the procedures for their forecasting described. Subsequent sections of this chapter are then devoted to describing the development and application of each of the following four steps in the traffic simulation process: trip generation, trip distribution, modal split, and traffic assignment. For each step a more complete explanation of basic modeling concepts is presented followed by a description and assessment of the specific models developed and applied in the initial land use-transportation planning effort. On the basis of this assessment, refinements made in the simulation modeling procedures for the plan reevaluation are described. Finally, the results of various statistical and mathematical testing

Map 78

## TRAFFIC ANALYSIS ZONES AND PLANNING ANALYSIS AREAS WITHIN THE SOUTHEASTERN WISCONSIN REGION




It is necessary to relate travel data to geographic areas within the Region for analytical purposes. The Commission has identified a series of geographical subareas of the region for such analytical purposes. This map identifies the boundaries of the 1,431 traffic analysis zones within the Region used in the transportation system modeling effort and for related analytical purposes. Outside the major central business districts in the Region, each traffic analysis zone is composed of one or more U. S. Public Land Survey quarter sections. Within the major central business districts, each traffic analysis zone is composed of groupings of city blocks. Traffic analysis zones are used in the calibration of the traffic simulation models in many applications of those models and in related analyses. The zones range in size from 0.04 square mile in the Milwaukee central business district to 36 square miles in the most rural portions of the region. This map also identifies a set of 60 planning analysis areas. Each planning analysis area represents an aggregation of traffic analysis zones. The planning analysis areas, in most cases comprised of groups of minor civil divisions, are used by the Commission for comprehensive and land use planning purposes.

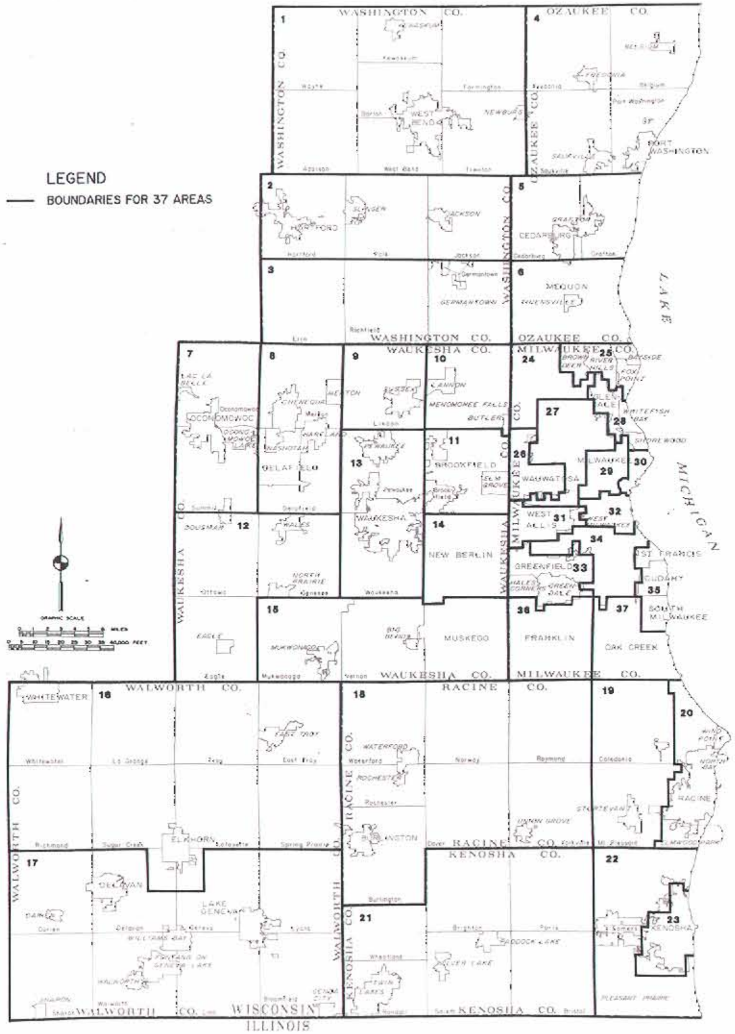
*Source: SEWRPC.*

# Map 79

## SUPPLEMENTAL SUBAREAS USED FOR TRAVEL PATTERN ANALYSIS WITHIN THE SOUTHEASTERN WISCONSIN REGION

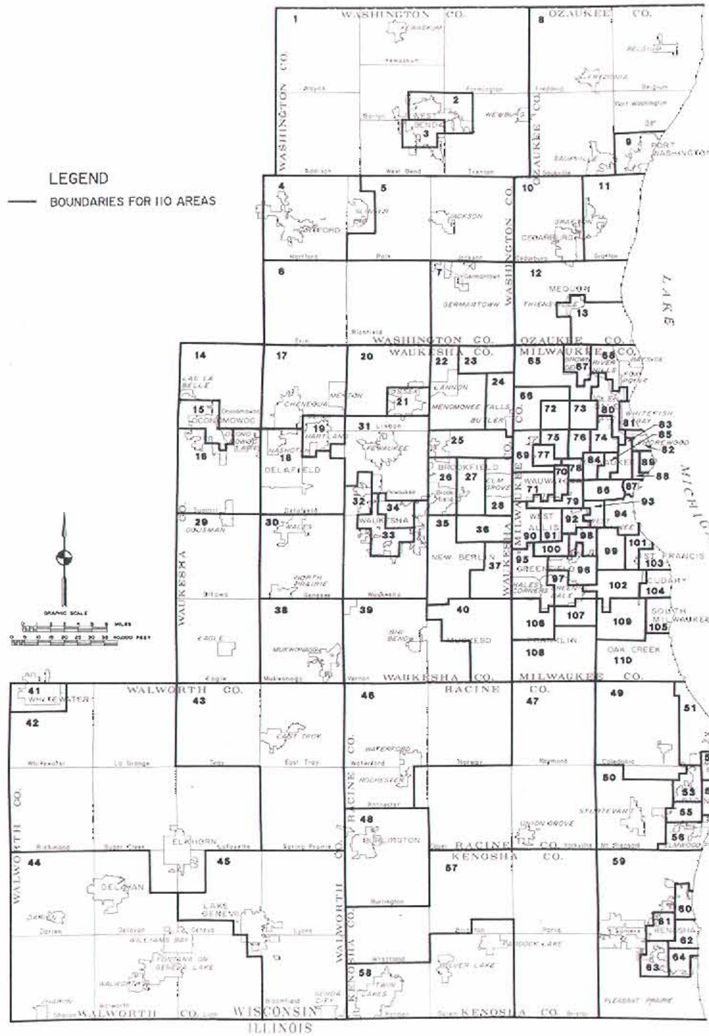
LEGEND

— BOUNDARIES FOR 37 AREAS




LEGEND

— BOUNDARIES FOR 110 AREAS




For purposes of data compilation and analysis, it was found useful to create two additional geographic subareas of the Region comprised of aggregations of individual traffic analysis zones. One aggregation results in 37 geographic subareas; the other results in 110 geographic subareas. Both sets of subareas are identified on this map. These particular aggregations of traffic analysis zones were used in conducting analyses of subarea travel characteristics, including number and characteristics of trips within each subarea, and between subareas. The subareas were defined to allow statistically valid analyses to be conducted from the findings of the origin and destination travel surveys.

*Source: SEWRPC.*

procedures used to validate each individual model are presented. A test of the adequacy of the entire four-step simulation process is also presented in the traffic assignment section. In this section the simulated traffic volumes derived from using the initial and revised simulation models are compared with actual observed vehicle ground counts.

## TRANSPORTATION-SPECIFIC LAND USE FORECASTS

As noted earlier, current traffic simulation models are based upon relationships between land use and travel. As such, the development and application of traffic simulation models requires a detailed description of existing land uses to calibrate the models and a similar description of future land uses to apply the models. As noted earlier, the term "land use" as used in this context has a special meaning, including demographic and economic variables.

Ideally, it would be desirable, from a planning standpoint, to be able to express trip end generation rates in terms of the broad, generalized land use categories used in the existing land use inventories and in the preparation of land use plans. Each of these broad land use categories, however, represents a complex of related and unrelated human activities comprising the reasons for which trips are actually made. Broad land use categories, therefore, usually are inadequate as a basis for analyzing and forecasting trip generation. Refinement of these broad land use categories is, therefore, required for trip generation analysis and forecast purposes; and this refinement is usually best expressed in terms of more detailed characteristics of the activities taking place on the land, such as resident population, population density, employment, income level, and automobile availability. These more detailed socio-economic characteristics of land use, however, must be capable of derivation from a forecast of future land use, or from a land use plan. Since the ability to predict or control the future location and intensity of land use activity tends to diminish rapidly as the detail of classification increases, a balance must be struck between the transportation planning needs and the land use planning capabilities.

Chapter VI of this report includes a description of the methodologies used to establish forecast and planned levels of future land use variables, including land use, population, households, and employment. In addition, there are certain land use variables which are specifically required by and thus derived for the travel simulation process. The next section describes the specific procedures used to forecast and allocate the transportation-specific land use variables of vehicle availability in the land use-transportation plan reevaluation effort.

### Personal Vehicles

The availability of a personal vehicle, be it automobile, van, or truck, is a very significant variable in the travel simulation modeling process, influencing not only the ability to make a trip, or trip generation, but also the decision of which travel mode to use in making the trip-mode choice. For traffic simulation purposes, it is necessary to forecast vehicle availability not only on the regional and county level, but it is also necessary to allocate regional totals to the traffic analysis zone level.

An important criterion in the selection of the model to be used to forecast vehicle ownership was that it realistically reflect the decision process of owning a vehicle through the variables specified in its formulation to represent the decision process of households. In this respect, vehicle availability, or ownership, within an area is influenced, for the most part, by the number of households or persons within the area and by the residential density of the area, and the characteristics of household income and family size of the persons residing in the area. These relationships are rational, because the number of vehicles per household would logically be affected by household income, indicating ability of ownership, and influenced by residential density, indicating ability to use public transit or walking as a means of transportation. Analyses of 1990 U. S. Census and origin and destination survey data indicated, however, that in central Milwaukee County, where vehicle ownership and incomes are relatively low, vehicle ownership was principally affected by income.

Therefore, under the Commission's battery of travel simulation models, average household vehicle availability was determined with two linear equations developed through multiple regression analyses with 1990 U. S. Bureau of Census socio-economic data and 1990 Commission land use data and applied at the traffic analysis zone level. Reflecting the above discussion, the model for household vehicle availability in central Milwaukee County is a function of household income, and for the remainder of the Region it is a function of household income, household size, and residential density. Specifically, the equation used to derive average zonal household vehicle availability is:

Central Milwaukee County

$$VAH = 0.0466\ HI - 0.0622$$

Remainder of Region

$$VAH = 0.445 \log_e(HI) + 0.200\ PH - 0.163 \log_e(HGRA) - 0.144$$

Where: VAH = number of vehicles available per household
HI = average household income in \$1,000s
PH = number of persons per household
HGRA = number of households per developed gross residential acre

Because the cross-classification models used to forecast total person trip productions require knowledge of the distribution of households within each zone with zero, one, or two or more vehicles available by household size, one person, two persons, three or four persons, and five or more persons, a household stratification model was developed to forecast the probability of auto availability by household size. The household stratification model is actually a combination of a household size stratification model and vehicle ownership stratification model. The household size stratification model provides estimates of the proportion of households within a zone for each specific household size category, given the zonal average household size as derived from forecast population and household levels. Similarly, the vehicle ownership stratification model provides estimates of the proportion of households within a zone for each vehicle ownership category, given the zonal average household vehicle ownership as derived by the above equation. The household size and vehicle ownership stratification models were verified and calibrated by using zonal population, household, and vehicle data from the 1991 origin-destination survey.

In order to determine the number of households within each category by both household size and vehicle availability, the results of the two individual stratification models were combined. This was done by defining the proportions of households in each category as probabilities and then applying elementary probability theory to determine the joint probability of a household possessing a specific family size and a specific vehicle availability. If the two characteristics were considered independent, then the joint probability of a particular household size category K ($HHS_k$), and a particular vehicle availability category j, ($AA_j$) for a zone i would merely be the product of the two probabilities, or:

$$P(HHS_k - AA_j)i = P(HHS_k)i \times P(AA_j)i.$$

Examination of the available data, however, indicated that there was a certain degree of dependence between the two characteristics. The joint probability thus includes a conditional probability, that is:

$$P(HHS_k - (AA_j)i = P(AA_j)i \times P(HHS_k/AA_j)i.$$

The value of the conditional probability ($PAA_j/HHS_k/$)i, representing the probability of vehicle availability category j given the household size category K, was determined by the calibration of the equation:

$$P(HHS_k/AA_j)i = C_1(HHS_k)i + C_2P(HHS_k/AA_j)\text{region}$$

Where: $C_1$ and $C_2$ are the calibrated weights reflecting the amount of independence and dependence, respectively, of the two characteristics, and $C_1$ and $C_2 = 1$. $P(HHS_k/AA_j)$region is the observed conditional probability for the Region.

A number of combinations of $C_1$ and $C_2$ were examined to find that combination which best replicated the observed household classification. The final version of the household stratification model, using equal dependent and independent weights, is summarized as:

$$P(HHS_k - AA_j)i = P(AA_j)i \times [0.5\ P(HHS_k)i + 0.5\ P(HHS_k/AA_j)\text{region}]$$

Travel survey-estimated and model-estimated distributions of households by size and automobile availability are shown in Table 148.

## TRIP GENERATION

### Basic Concepts

The first major step in the travel simulation process is trip generation whereby the total number of trip ends generated within each zone of the study area is determined through the identification and quantification of relationships between travel and land use. As such, trip

Table 148

PERCENTAGE OF HOUSEHOLD BY VEHICLES AVAILABLE AND HOUSEHOLD SIZE: 1991

| Household Travel Survey Estimate | | | | | |
|---|---|---|---|---|---|
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Total |
| None | 5.4 | 1.5 | 1.5 | 0.7 | 9.1 |
| One | 17.8 | 10.2 | 5.0 | 1.6 | 34.6 |
| Two or More | 1.8 | 20.0 | 26.1 | 8.4 | 56.3 |
| Total | 25.0 | 31.7 | 32.6 | 10.7 | 100.0 |

| Model Estimate | | | | | |
|---|---|---|---|---|---|
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Total |
| None | 4.6 | 2.6 | 2.6 | 1.0 | 10.8 |
| One | 13.5 | 10.8 | 8.1 | 2.5 | 34.9 |
| Two or More | 7.0 | 18.3 | 21.9 | 7.1 | 54.3 |
| Total | 25.1 | 31.7 | 32.6 | 10.6 | 100.0 |

*Source: SEWRPC.*

generation occupies a critical position between land use and transportation planning. The inputs to this step include a detailed accounting of relevant existing and forecast or planned future land use characteristics. The output of the trip generation step is an estimate of the probable future number of trips, usually by trip purpose, entering or leaving each zone.

Within trip generation, then, the travel data are expressed in terms of trip ends, which may be conveniently represented as points in space with no regard to the direction, length, or duration of the trip. By convention, one end of each trip is termed the "production end" while the other end is termed the "attraction end." For trips beginning or ending at home, termed "home-based trips," the production end is always considered as the home end of the trip while the attraction end is always considered as the nonhome end, irrespective of the actual direction of the trip. For trips having neither end at home, termed "nonhome-based trips," the production end is defined as the origin of the trip while the attraction end is defined as the destination.

Two sets of trip generation relationships are consequently developed. One set is developed for the production end of trips generated within the planning area and involves relating trip ends to primarily residential land uses. The other set is developed for the attraction end of trips generated within the planning area and involves relating trip ends to primarily nonresidential land uses.

There are four basic approaches to trip generation: factoring of existing trip patterns, land area trip analysis, regression analysis, and cross-classification analysis. The most basic approach to trip generation is the application of growth factors to existing travel patterns. Since the growth factor is applied to observed trip interchanges, this approach actually represents a combination of the trip generation and trip distribution steps. Usually this approach is used only for relatively small trip categories, such as external trips, or for trip purposes for which trip distribution would be artificially constrained, such as school trips.

The second approach deals explicitly with land areas and has as its objective the establishment of trip rates which reflect the character, location, and intensity of land use. Trip rates, in terms of trips per acre, are determined for different kinds of land uses, such as residential, commercial, and industrial. To project future trip generation, these rates are simply applied to the projected land use distribution in each zone.

The third approach involves the development of trip generation relationships by using linear regression analysis. In this procedure, the dependent variable, the number of trips generated per zone or household, is determined by a linear combination of independent variables representing the land use and socio-economic characteristics of the zone or household. To account for any potential nonlinear effects of an independent variable on the dependent variable, a monotonic transform, such as a logarithmic or exponential transform, may be made on an independent variable.

The fourth approach involves cross-classification, whereby the trip generation relationships are developed by establishing a multi-dimensional matrix. Each dimension of the matrix represents an independent or explanatory variable of tripmaking, such as household income, household size, or automobile availability, which is stratified into several classes. Values of the dependent variables, number of trips, are accumulated for each matrix cell from the household survey data; thus the mean trip generation rate for that cell is determined. Thus, the value of each matrix cell represents the average trip production rate of households which possess the cell's independent variable characteristics. The model can then be applied to any geographic subarea of the planning area to obtain trip production estimates by linking the characteristics of the households within the subarea to the appropriate trip generation rate and summing the total number of trips made by all households residing in that area.

The selection of approaches to determine trip generation is dependent upon the type of trip to be simulated, the data available for calibration, and the particular needs and character of the study area.

Validation of Second-Generation Trip Generation Procedures: The second-generation trip generation models developed by the Commission with 1972 origin and destination survey data for internal regional travel by resident households of the Region use cross-classification analysis for trip productions and multiple regression analysis for trip attractions for all trip purposes except school trips. School trip generation involved factoring of existing travel patterns for school trips. These second-generation trip generation models are fully documented in SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin: 2000, Volume Two, Alternative and Recommended Plans, May 1978.

Internal home-based and nonhome-based trips by the residents of households in the Region for all purposes except school constitute the vast majority of daily trips made within the Region, over 80 percent. The production of these home-based and nonhome-based trips was analyzed and forecast under the second-generation models through the use of cross-classification analysis. Home-based trips were stratified into categories of home-based work, home-based shopping, and home-based other. The home-based trip purposes of personal business, medical-dental, social-eatmeal, and recreation, as well as trips made solely to transport passengers, were combined into a single category, home-based other, since such trips were found in the travel inventories to have reasonably similar trip production, attraction, and length characteristics. Within each trip purpose used in the modeling process, four cross-classification models were developed for forecasting future household trip production by geographic location. These models were developed for the Milwaukee urban area, the Racine urban area, the Kenosha urban area, and the remaining rural area within the Region.

An important consideration in the development of the trip production cross-classification models was the selection of the variables to be used to explain household trip frequency. Among the variables considered and investigated were automobile availability, household size, household income, structure type, neighborhood density, and stage in family life cycle. Household automobile availability and household size were selected as the independent variables to explain tripmaking in the trip generation model, since these variables exhibited a high correlation with tripmaking frequency and explained most of the variation in household tripmaking as observed in the 1963 and 1972 surveys.

The ability of the second-generation trip production and attraction models to simulate 1991 internal person tripmaking was investigated by comparing the result of the application of the trip production and attraction equations using 1990 land use data to actual 1991 travel survey data. As shown in Table 149, the travel surveys conducted by the Commission indicated that trip generation within Southeastern Wisconsin increased substantially in all trip purpose categories from 1972 to 1991. The ability of the trip generation models developed in 1972 to predict these changes in regional trip generation accurately is also demonstrated in Table 149. As can be seen, the equations were able to predict regional trip generation quite closely considering the nature of the phenomena involved. In this respect, it must be recognized that the actual 1991 regional trip generation used the 1972 trip generation data used to calibrate the original equations as the basis for comparison and much of the data necessary to prepare predictions of 1991 trip generation, such as household socioeconomic characteristics, are in themselves estimates. Thus, considering the limitations inherent in the data being compared, it may be

Table 149

COMPARISON OF OBSERVED AND ESTIMATED INTERNAL PERSON TRIP GENERATION WITHIN THE SOUTHEASTERN WISCONSIN REGION: 1972 AND 1991

| Trip Purpose | 1972 Observed | 1991 Observed | Percent Change 1972-1991 | 1991 Estimated[a] | Percent Difference[b] |
|---|---|---|---|---|---|
| Home-Based Work . . . . . . | 1,055,500 | 1,302,700 | 23.4 | 1,355,400 | 4.1 |
| Home-Based Shopping . . . . | 673,600 | 798,100 | 18.4 | 802,300 | 0.5 |
| Home-Based Other . . . . . . | 1,532,600 | 1,687,400 | 10.1 | 1,960,300 | 16.1 |
| Nonhome-Based . . . . . . . . | 779,800 | 1,127,500 | 44.6 | 1,075,100 | -4.9 |
| Total | 4,041,500 | 4,915,700 | 21.6 | 5,193,600 | 5.6 |

[a]*Estimated with 1972 models using 1990 land use inputs.*

[b]*Percent difference* $= \frac{\text{(Estimated-Observed)}}{\text{Observed}} \times 100$

*Source: SEWRPC.*

concluded that the total trips generated within the Region in 1991 were predicted by the equations developed under the 1972 second-generation planning effort with a high degree of accuracy even though some divergence exists within specific trip purpose categories.

As already noted, the generation of school trips was measured in the second-generation travel models by factoring of existing travel patterns. Such separate consideration of home-based school trips was necessitated by the limitations imposed by fixed school service area boundaries. Since trips to and from all schools, including elementary, junior and senior high, vocational and technical schools, and colleges and universities, amounted to less than 6 percent of total person trips generated within the Region on an average weekday in 1972 and to less than 3 percent of total vehicle trips, and since most schools serve local neighborhoods or communities so that tripmaking to and from such schools has a very small impact on arterial street and highway travel, it was considered adequate for planning purposes to let the 1972 pattern of vehicle trips for school purposes represent the probable future pattern of such trips. A factor based upon population growth was applied to the observed 1972 automobile school trip interchanges to derive the future-year interchange volumes.

Transit trips to and from schools comprised about 31 percent of total transit trips made within the Region on an average weekday in 1972. Transit trips to or from schools were forecast by initially applying a growth factor based upon population and by further adjusting the trips in those zones where significant changes in school enrollment were anticipated. Adjustments were made in those areas where school service boundaries were expected to change in accordance with the recommended land use plan, where new construction of educational institutions was anticipated, and where improvements in public transit service were programmed. The most significant of these adjustments reflected the improvement of transit service to the University of Wisconsin-Milwaukee (UWM) resulting from the 1974 initiation of the UBUS program and from the opening of three new vocational school extensions: Milwaukee Area Technical College in Oak Creek and Mequon and Waukesha County Technical Institute in Pewaukee.

The ability of the initial study procedures to predict the future generation of home-based school trips can be discerned by a comparison of the estimated and observed trip generation for 1991. The travel inventories indicated that the number of school trips in the Region increased 49.9 percent between 1972 and 1991, from 418,400 to 627,100, respectively. These totals represent all school trips made on an average weekday by all modes of travel, including the school bus. Using the second-generation procedures, a 1991 estimate of 480,000 school trips was derived, a total approximately 23 percent lower than the observed figure largely as a result of underestimation of school purpose trips by automobile. Considering the nature and significance of the home-based school trips, it may be concluded that the second-generation modelling procedure was adequate for traffic analysis purposes. Consequently, the same procedure was used in the third-generation models.

The generation of internal trips by group-quartered persons and nonresidents was forecast in the second-generation travel models by the application of uniform growth factors. Trip generation by group-quartered persons, persons residing in dormitories, convents, homes for the aged, and other similar residences, and by nonresidents was considered separately from that for persons living in households because the survey data indicated that the travel behavior and characteristics of group-quartered persons and of nonresidents in the Region were significantly different from those of persons living within the Region in households. Accounting for less than 1 percent of the total person trips within the Region in 1972, travel by group-quartered and nonresident persons was accordingly analyzed and then forecast through use of a growth factor. This approach assumed that the 1972 pattern of trips could be adjusted through application of zonal growth factors reflecting the increases in travel of group-quartered persons by zone, expressed as a function of the change in the number of group-quartered persons by zone of residence. The travel surveys indicated that, from 1972 to 1991, average weekday travel by group-quartered persons increased from 25,400 trips to 53,400 trips, or a 110.2 percent increase, which compares favorably to the 60,500 trips by group-quartered persons forecast by the second-generation models developed in 1972.

Truck trips within the Region constitute a relatively small proportion of total vehicle trips, approximately 12 percent of all such trips generated within the Region on an average weekday. In the second-generation regional transportation planning effort, the generation of truck trips was accomplished by the use of multiple linear regression analysis. Taxi trips, comprising less than one-third of 1 percent of total trips within the Region on an average weekday, were included with truck trips because they displayed trip characteristics similar to those of truck trips. Analysis of the 1972 travel inventory data had indicated that both truck and taxi trips were primarily of a nonhome-based nature with short average trip lengths; trips made by both types of vehicles were made as essentially pickup and delivery functions.

The ability of the truck and taxi trip generation technique utilized in the second-generation planning program to predict 1991 truck and taxi travel was evaluated by using inventory data from the 1991 origin and destination survey. These travel inventories indicated that truck and taxi travel within the Region had increased substantially from 385,300 to 536,500 trips per average weekday over the past two decades. The travel forecasting techniques, as developed in 1972, predicted this increase in regional truck and taxi travel within 14 percent of the actual number of truck and taxi trips observed in the 1991 travel survey. In view of the demonstrated accuracy of this technique employed in the second-generation planning effort, the same technique was utilized for forecasting truck and taxi trips within the Region in the plan reevaluation process.

External trips comprised less than 4 percent of total vehicular travel within the Region in 1972. In the second-generation land use-transportation planning effort, external travel was forecast by extrapolating the existing 1972 pattern of external tripmaking by applying growth factors to the 1972 trips on the basis of the forecast changes in population over employment at the production and attraction ends of the trips, respectively.

The ability of this forecasting technique to forecast external tripmaking within the Region in 1991 was tested by using the travel inventory data collected by the Commission in 1991. Over the past two decades, external travel affecting the Region has increased by approximately 117 percent, from 125,700 vehicle trips per average weekday in 1972 to 273,300 such trips in 1991. Comparison of observed and forecast 1991 external travel indicated that the second-generation study procedures underestimated the increase in external travel, predicting an increase to 160,000 trips. The underestimation was a result of underestimation of the decline in vehicle occupancy and of basing the prediction of the increase in travel on population change rather than change in households and employment.

Third-Generation Trip Generation Procedures

The third-generation trip generation relationships developed with the new 1991 origin and destination survey data again use cross-classification analysis for major internal resident household home-based trip productions, cross-classification analysis for major internal resident household home-based trip attractions, and factoring of existing travel patterns for school trips.

The cross-classification, or category trip production models calibrated for the Milwaukee, Racine, and Kenosha urban areas and the remaining area of the Region, are presented by trip purpose in Tables 150 through 153. Like the second-generation models, the third-generation models provide unique trip production rates for each of the Region's three urban areas and for the rural areas of the Region as those areas are shown on Map 80. The models base the household trip production rate on household size and on household automobile availability. As shown in these tables, the trip generation rates vary with the areas concerned, generally exhibiting higher tripmaking frequencies in the urban than in the rural area of the Region, particularly for nonwork trip purposes. Tables 150 through 153 also indicate the generally direct relationships that exist between the rate of household tripmaking and household size and household automobile availability.

While Table 153 includes a cross-classification trip rate model for nonhome-based trip productions, the forecast of nonhome-based trip production by zone must be accomplished through an additional step which allocates the forecast regional total production of nonhome-based trips to zones. The production of nonhome-based trips cannot be directly simulated by zone with the cross-classification approach since neither end of the trip represents the place of residence of the tripmaker. Cross-classification, however, can provide an estimate of total regional nonhome-based trip productions based on the total number of regional households and their characteristics. The allocation of the regional totals of nonhome-based trip productions to each zone is accomplished by use of a trip rate, which is also developed through cross-classification analysis. This trip rate relates the number of nonhome-based trip productions in a zone to the number of households, retail employment, and other employment in a zone, based upon analyses of the 1991 household travel survey data with respect to nonhome-based trip production from residential land uses, retail land uses, and other land uses.

$$NHBP = 0.29 \times HH + 2.38 \times REMP + 0.76 \times OEMP$$

| | | | |
|---|---|---|---|
| Where: | NHBP | = | number of nonhome-based productions |
| | HH | = | number of households |
| | REMP | = | number of retail employees |
| | OEMP | = | number of other employees |

The other set of trip end relationships developed in the trip generation process was for trip attractions, which are primarily a function of the nonresidential land use activity within the subareas of the Region. Person trip attraction relationships were developed through the calibration of four cross-classification, or trip rate models, representing home-based work, home-based shopping, home-based other, and nonhome-based trip purposes. The models relate home-based person trip attractions to employment by type and households on the basis of analysis of the 1991 household travel survey with respect to the trip attractions by trip purpose to residential and nonresidential land uses. The calibrated trip attraction equations are presented in Figure 60.

Two adjustments are made to the forecast trip attractions derived through application of the calibrated trip attraction model. The first adjustment is necessary to account for special trip attraction rate to major commercial centers and to General Mitchell International Airport.

The second adjustment is made to balance the total number of forecast trip attractions and the total number of forecast trip productions. Because trip productions and attractions are forecast independently, the total number of forecast trip productions do not always match the total number of forecast trip attractions. Work trip productions are factored so that the regional sum of the productions equals the regional total work trip attractions. The latter are based directly upon the number of jobs in the Region and are, therefore, a better estimate of total work trips made within the Region.

## Table 150

### INTERNAL PERSON TRIP PRODUCTION CROSS-CLASSIFICATION MODELS: HOME-BASED WORK TRIPS

| Milwaukee Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.40 | 0.74 | 0.94 | 0.97 | 0.60 |
| One | 1.01 | 1.09 | 1.84 | 2.04 | 1.21 |
| Two or More | 1.16 | 2.30 | 3.00 | 3.21 | 2.72 |
| Average | - - | - - | - - | - - | 1.93 |

| Kenosha Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.19 | 0.31 | 0.77 | 0.86 | 0.35 |
| One | 0.69 | 0.76 | 1.34 | 1.53 | 0.84 |
| Two or More | 1.16 | 1.49 | 2.35 | 2.49 | 2.03 |
| Average | - - | - - | - - | - - | 1.52 |

| Racine Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.18 | 0.40 | 0.89 | 0.99 | 0.29 |
| One | 1.03 | 1.09 | 1.74 | 2.13 | 1.20 |
| Two or More | 1.33 | 2.11 | 2.87 | 3.30 | 2.62 |
| Average | - - | - - | - - | - - | 2.04 |

| Rural Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.20 | 0.40 | 1.20 | 1.30 | 0.31 |
| One | 0.77 | 0.79 | 1.53 | 1.98 | 0.91 |
| Two or More | 1.07 | 1.99 | 2.75 | 3.04 | 2.48 |
| Average | - - | - - | - - | - - | 2.01 |

*Source: SEWRPC.*

## Table 151

### INTERNAL PERSON TRIP PRODUCTION CROSS-CLASSIFICATION MODELS: HOME-BASED SHOPPING TRIPS

| Milwaukee Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.32 | 0.34 | 0.51 | 0.57 | 0.39 |
| One | 0.67 | 1.13 | 1.33 | 1.54 | 0.95 |
| Two or More | 0.68 | 1.27 | 1.63 | 1.85 | 1.50 |
| Average | - - | - - | - - | - - | 1.17 |

| Kenosha Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.24 | 0.33 | 0.66 | 0.75 | 0.36 |
| One | 0.69 | 1.17 | 1.24 | 1.41 | 0.93 |
| Two or More | 0.83 | 1.41 | 1.66 | 1.82 | 1.57 |
| Average | - - | - - | - - | - - | 1.28 |

| Racine Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.33 | 0.39 | 0.69 | 0.89 | 0.38 |
| One | 0.70 | 1.18 | 1.26 | 1.38 | 0.94 |
| Two or More | 0.89 | 1.39 | 1.69 | 1.97 | 1.60 |
| Average | - - | - - | - - | - - | 1.32 |

| Rural Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.22 | 0.45 | 0.73 | 0.94 | 0.30 |
| One | 0.69 | 0.94 | 1.13 | 1.35 | 0.84 |
| Two or More | 0.73 | 1.09 | 1.24 | 1.77 | 1.26 |
| Average | - - | - - | - - | - - | 1.12 |

*Source: SEWRPC.*

## Table 152

### INTERNAL PERSON TRIP PRODUCTION CROSS-CLASSIFICATION MODELS: HOME-BASED OTHER TRIPS

| Milwaukee Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.45 | 0.92 | 1.19 | 1.34 | 0.73 |
| One | 1.07 | 2.23 | 2.48 | 3.32 | 1.73 |
| Two or More | 1.65 | 2.42 | 3.19 | 5.02 | 3.13 |
| Average | - - | - - | - - | - - | 2.35 |

| Kenosha Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.42 | 0.84 | 1.50 | 2.53 | 0.31 |
| One | 1.32 | 2.49 | 3.29 | 4.13 | 2.05 |
| Two or More | 2.25 | 2.73 | 4.04 | 5.45 | 3.72 |
| Average | - - | - - | - - | - - | 2.98 |

| Racine Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.52 | 0.78 | 1.17 | 1.94 | 0.63 |
| One | 1.03 | 1.09 | 1.74 | 2.13 | 2.06 |
| Two or More | 1.33 | 2.11 | 2.87 | 3.30 | 3.70 |
| Average | - - | - - | - - | - - | 3.00 |

| Rural Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.41 | 0.71 | 1.22 | 2.54 | 0.58 |
| One | 1.30 | 1.93 | 3.05 | 3.49 | 1.78 |
| Two or More | 1.44 | 2.08 | 3.41 | 5.25 | 3.19 |
| Average | - - | - - | - - | - - | 2.75 |

*Source: SEWRPC.*

## Table 153

### INTERNAL PERSON TRIP PRODUCTION CROSS-CLASSIFICATION MODELS: NONHOME-BASED TRIPS

| Milwaukee Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.16 | 0.37 | 0.49 | 0.54 | 0.28 |
| One | 1.06 | 1.31 | 1.36 | 1.46 | 1.20 |
| Two or More | 1.31 | 2.09 | 2.17 | 2.42 | 2.15 |
| Average | - - | - - | - - | - - | 1.59 |

| Kenosha Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.21 | 0.31 | 0.38 | 0.43 | 0.26 |
| One | 0.93 | 1.01 | 1.27 | 1.54 | 1.03 |
| Two or More | 1.81 | 2.02 | 2.32 | 2.47 | 2.22 |
| Average | - - | - - | - - | - - | 1.69 |

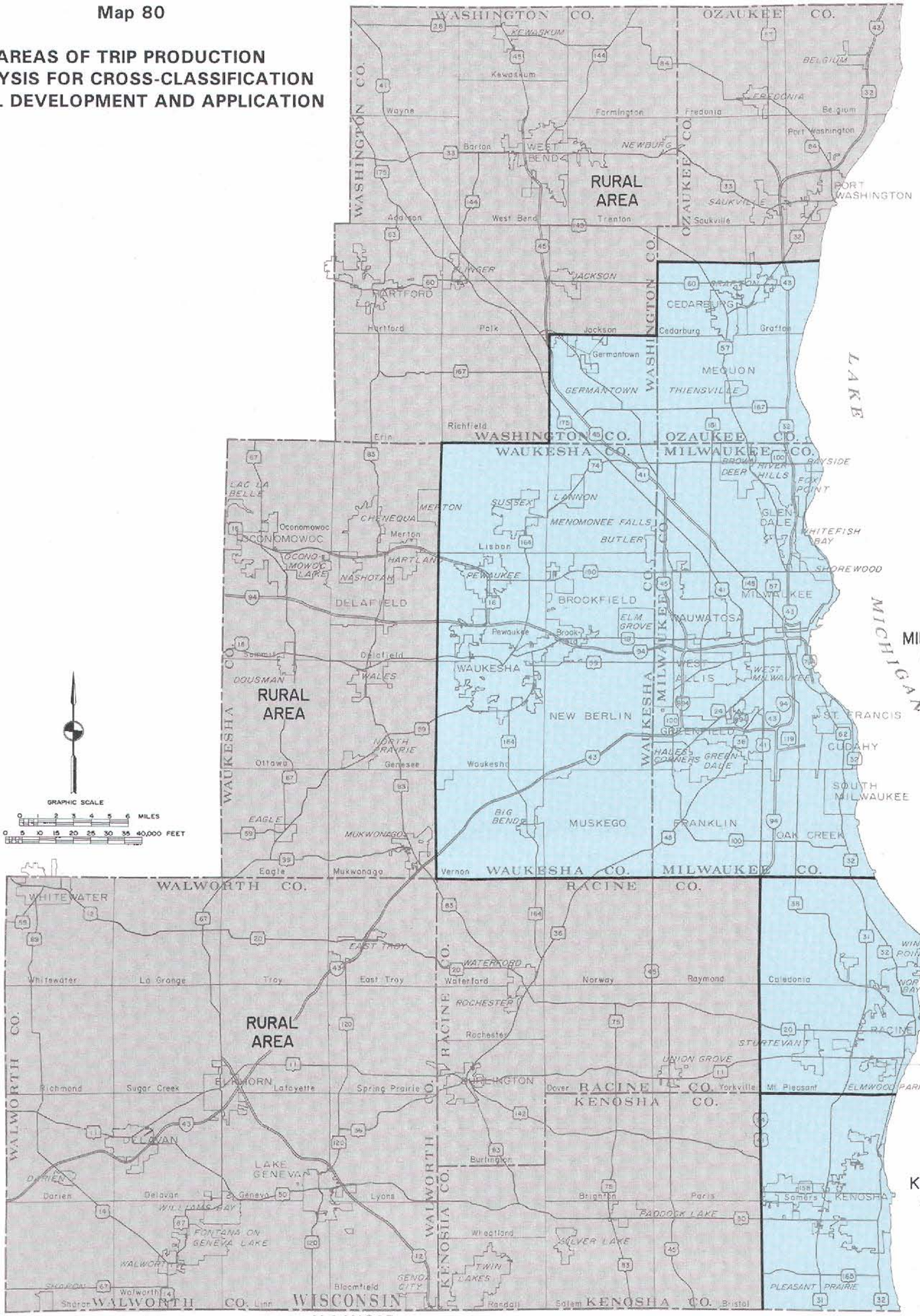
| Racine Urbanized Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.18 | 0.28 | 0.37 | 0.45 | 0.22 |
| One | 1.11 | 1.34 | 1.48 | 1.86 | 1.26 |
| Two or More | 1.94 | 2.03 | 2.67 | 3.23 | 2.51 |
| Average | - - | - - | - - | - - | 1.98 |

| Rural Area | | | | | |
|---|---|---|---|---|---|
| | Trips per Household | | | | |
| | Household Size | | | | |
| Vehicles Available | One | Two | Three to Four | Five or More | Average |
| None | 0.20 | 0.32 | 0.40 | 0.49 | 0.24 |
| One | 0.93 | 1.29 | 1.72 | 1.91 | 1.17 |
| Two or More | 1.47 | 1.97 | 2.30 | 2.36 | 2.17 |
| Average | - - | - - | - - | - - | 1.85 |

*Source: SEWRPC.*

Map 80

## AREAS OF TRIP PRODUCTION ANALYSIS FOR CROSS-CLASSIFICATION MODEL DEVELOPMENT AND APPLICATION




Individual trip production rates were developed for each of the three major urban areas of the Region, Milwaukee, Racine, and Kenosha, as well as for the remaining rural areas. This map identifies those four individual areas. Trip generation rates vary within the areas concerned on the basis of the number and characteristics of the households and upon household automobile availability, generally exhibiting higher tripmaking frequencies in the urban than in the rural areas of the Region.

*Source: SEWRPC.*

Figure 60

INTERNAL PERSON TRIP ATTRACTION CROSS-CLASSIFICATION MODELS

| Trip Purpose | Trips per Job or Household | | |
|---|---|---|---|
| Home-Based Work Trips | Region | | |
| Total Employment | 1.32 | | |
| | Central | Remainder | |
| Home-Based Shopping Trips | Milwaukee County[a] | of Region | |
| Retail Employment | 2.74 | 5.38 | |
| | Central | Remainder of | Remainder |
| Home-Based Other Trips | Milwaukee County[a] | Milwaukee County | of Region |
| Households | 0.25 | 0.48 | 0.64 |
| Retail Employment | 1.25 | 1.41 | 1.49 |
| Other Employment | 0.66 | 1.53 | 2.26 |
| | Central | Remainder of | Remainder |
| Nonhome-Based Trips | Milwaukee County[a] | Milwaukee County | of Region |
| Households | 0.15 | 0.21 | 0.24 |
| Retail Employment | 1.94 | 3.11 | 3.27 |
| Other Employment | 0.39 | 0.66 | 0.68 |

[a] *Central Milwaukee County includes areas 29, 30, and 32 as shown on Map 79.*

*Source: SEWRPC.*

For the other trip purposes, home-based shopping, home-based other, and nonhome-based, the zonal trip attractions derived from application of the trip attraction model are factored so that the sum of the zonal trip attractions for each nonwork trip purpose equals the total regional cross-classification estimate of trip productions for that trip purpose. This procedure for the nonwork trip purposes is applied because it was considered that for nonwork trip purposes the cross-classification models used to forecast trip productions provide a better estimate of the total number of nonwork trips made within the Region than do the trip attraction models.

As already noted, the exclusion of trips to or from all schools, be they elementary, junior high, senior high, vocational, and technical, college, or university, from the other internal trip production, attraction, and distribution analyses is necessary because a trip distribution modeling procedure would inherently treat all schools as possible attractions, not being able to account for limitations imposed by school service boundaries. The generation of school trips was, therefore, measured separately through the application of growth factors to the observed 1991 travel patterns for school purpose trips made by each mode, automobile, school bus, and public transit. In 1991, vehicle trips made for school purposes by automobile and school bus accounted for approximately 3 percent of all regional vehicle trips. Trips made for school purposes by public transit accounted for about 40 percent of all transit person trips in the Region.

Essentially, school purpose trips are generated in two steps. In the first step, growth factors are applied separately by mode to the observed 1991 trip tables of school trips. The growth factors are based upon the forecast changes in population observed at the planning analysis level between 1990 and the plan design year. The average growth factor used for the Milwaukee area for Grades K through 12 is 1.16. In the second step, the initial forecasts of auto and transit person school trips are then adjusted at the traffic analysis zone level to account for potential changes in school service boundaries and the construction of new educational institutions.

With respect to trips to such universities and colleges within central Milwaukee County as the University of Wisconsin-Milwaukee, Marquette University, Milwaukee Area Technical College, and Milwaukee School of Engineering, the growth factor procedure is applied to total person, rather than to individual mode, travel patterns and the growth factor is based on projected enrollment. A mode choice model, described later in this report then is used to divide the total person trips into those using public transit and those using the automobile. Public transit school trips to these colleges and universities represent about 20 percent of all school purpose public transit trips within Southeastern Wisconsin.

School trips made by public transit on special bus routes are operated only on schooldays. These special schoolday-only routes are designed to serve only elementary and secondary school students, providing only a very limited level of service each weekday. They typically consist of bus runs to school in the morning and from school in the evening. These routes are not included in the transit network used in the traffic assignment process. School purpose transit trips served by special bus routes are also not included in the forecast transit travel demand; they are removed from existing school transit trip tables. It is estimated that about 5 percent of the public transit school purpose trips made in the Milwaukee urbanized area in 1991 use such special schoolday-only bus routes.

Accounting for less than 1 percent of total regional travel, the generation of internal trips by group-quartered persons and nonresidents was accomplished by the application of uniform growth factors, similar to the approach used in the second-generation travel models. This approach assumes that the 1991 pattern of trips can be adjusted through application of zonal growth factors reflecting the increases in travel of group-quartered persons by zone, expressed as a function of the change in the number of group-quartered persons by zone of residence. It was assumed that the trip generation rate of group-quartered persons as observed in the 1991 travel survey would remain stable.

The generation of truck and taxi trips was accomplished using the same technique as in the initial and second-generation studies, namely, multiple regression analysis. Using the 1991 travel survey data, a new analysis of the relationship between land use and truck and taxi tripmaking was undertaken. The results of the analysis indicated that truck and taxi trip generation could be best expressed on a zonal level as a function of employment, population, and retail and service land, the same variables used to explain truck and taxi trip generation in the initial and second-generation studies. The new truck and taxi trip generation equation as derived from this analysis is:

$$TTRP = 0.05 \times POP + 0.11 \times REMP + 0.17 \times OTHEMP + 234$$

| | | | |
|---|---|---|---|
| Where: | TTRP | = | Number of truck and taxi trip ends |
| | POP | = | Number of persons |
| | REMP | = | Number of retail employees |
| | OTHEMP | = | Number of other employees |

Unlike the equation used in 1963 and 1972, which was based on traffic analysis zone data from 619 and 1,220 subareas within the Region, respectively, the 1991 equation was developed for a zone system of 1,431 subareas within the Region. As a result of this change in the aggregation of the data used in the calibration of the model and because slight changes have occurred over time in the relationship between truck and taxi trip generation and population and employment, and particularly, retail and service land use, the terms and factors in the equation defined with 1991 data vary modestly from those in the equation used in the previous planning efforts.

The generation of the final trip category, external trips, was accomplished through the use of a growth factor approach. Growth factors were developed for defined external and internal areas which relate the forecast change in trips to the change in the number of households at the production trip end and employment at the attraction trip end.

## TRIP DISTRIBUTION

### Basic Concepts

The second major step in the travel simulation process is trip distribution whereby the number of trips between each zonal pair is determined. The input to this step from trip generation is the number of trip ends produced by, or attracted to, each zone. Additional inputs, such as the travel times between zones, may also be required for calibration and application depending on the type of trip distribution model used.

There are currently three basic types of trip distribution models in general use: growth factor models, the gravity model, and the opportunity model. Growth factor models derive the number of trips between two zones for some projection year as a function of the number of trips observed between those two zones in the base year and some growth factor. The growth factor may simply represent an annual increment of number of trips or may be an annual percentage increase similar to a compounding interest function. The actual growth factors used, however, are usually determined by some other characteristic, such as forecast population growth. As such, this type of formulation represents a combined trip generation-trip distribution model and is used for relatively small trip categories, which cannot be easily simulated by more sophisticated techniques. The most popular growth factor model is the Fratar method, in which growth factors are applied to both the trip productions and attractions. A trip generation model must precede the Fratar method since the growth factors are calculated as the ratio of projection year productions and attractions to base year productions and attractions. Calibration of the Fratar model is necessary to ensure that the number of projection year trips entering or leaving each zone matches the generated productions and attractions for that zone, respectively.

The gravity model is the most widely accepted and used trip distribution model. The basic premise of the gravity model is that a trip interchange, or the number of trips between two zones in the study area, is a direct function of the number of trip ends in each zone and some inverse function of their spatial separation. This function of spatial separation adjusts the relative attraction of each zone by the ability, desire, or necessity of the tripmaker to overcome the travel distance or travel time involved.

Mathematically, the gravity model may be stated as follows:

$$T_{ij} = P_i \frac{\dfrac{A_j}{d_{ij}^{\,b}}}{\left[ \dfrac{A_1}{d_{i1}^{\,b}} + \dfrac{A_2}{d_{i2}^{\,b}} + \cdots + \dfrac{A_n}{d_{in}^{\,b}} \right]}$$

Where: $T_{ij}$ = trips produced in zone i and attracted to zone j
$P_i$ = trips produced by zone i
$A_j$ = trips attracted by zone j
$d_{ij}$ = the spatial separation between zones i and j, generally expressed in terms of door-to-door travel time
b = an empirically determined exponent which expresses the average areawide effect of spatial separation between zones on trip interchange
n = the number of traffic analysis zones within the planning area

The exponent b has been observed to vary with trip purpose, assuming values of about 3.0 for social trips, 2.0 for shopping trips, and 1.0 for work trips, when spatial separation has been expressed as in-vehicle travel time.

The decrease in the exponent implies that spatial separation is a less restrictive factor on a trip interchange or that people generally are willing to travel farther for a purpose such as work than for purposes such as shopping or social functions. The exponent b also has been observed to increase as the separation increased, indicating that the effect of spatial separation increases as the separation itself increases. Moreover, the value of the exponent has been found to vary from urban area to urban area, particularly for nonwork purpose trips.

As a consequence of the variability in the exponent b, it is necessary to develop and calibrate gravity work models for each region under study and for each trip purpose category considered. Moreover, since past experience has demonstrated that the exponent of travel time is not necessarily constant for all intervals of time and that travel patterns are affected by various social and economic characteristics of the travelers, it has become common practice to express the gravity model formula in the following form:

$$T_{ij} = \frac{P_i A_j F_{ij} K_{ij}}{\sum_{j=1}^{n} A_j F_{ij} K_{ij}}$$

Where: $F_{ij}$ = an empirically derived travel time friction factor which expresses the average areawide effect of spatial separation on trip interchange between zones which are tij minutes apart

$K_{ij}$ = an adjustment factor applied on a zone-to-zone basis to allow for the incorporation of the effect on travel patterns of social, economic, political, or historic characteristics not otherwise accounted for in the model formulation

$T_{ij}$, $P_i$, and $A_j$ are as previously defined

The use of the set of travel time friction factors to express the effect of spatial distribution on zonal trip interchange as a modification of the classic inverse exponential function serves to provide for the consideration that the effect of spatial separation generally increases as the separation itself increases. Derived from the characteristics of the origin and destination zones, the zonal adjustment factor is essentially the ratio necessary to adjust the model so as to match computed travel patterns with the travel patterns observed between subareas of the Region in origin and destination surveys. This factor accounts quantitatively for effects of biases which can generally be identified qualitatively through experienced knowledge about the areas affected.

In order to apply the gravity model to forecast future travel patterns, it is necessary to calibrate the model to reflect existing travel patterns and characteristics within a Region accurately. This calibration process actually determines the numerical values of the travel time friction factors and the zonal adjustment factors so that the gravity model accurately simulates the trip length characteristics determined in the travel inventory. These numerical values are assumed to remain constant over time, thereby providing a model which can be used to simulate the future trip interchange patterns, given future trip productions, attractions, and travel times between subareas of the Region.

The available evidence indicates that the assumption that the friction factors are stable over time is reasonable. However, research studies have shown that drastic changes in the level of service provided by the transportation system or radical changes in the distribution of land use activity throughout a Region will invalidate this assumption. The assumption of constant zonal adjustment factors is more difficult to justify since social, economic, historic, or political effects or biases which exist in the base year may not exist in the future.

The final type of trip distribution model is the opportunity model, either the intervening opportunity model or the competing opportunity model. Although both of these models have a strong theoretical basis, there is no standardized procedure for calibration, operation, or application which is as efficient or as well tested as the gravity model. Moreover, little research has been done to verify the ability of the opportunity model to either replicate existing travel patterns or remain stable over time. Consequently, while investigated, the opportunity model was not considered a viable alternative for the trip distribution stage in the plan reevaluation effort.

Validation of Second-Generation Trip Distribution Procedures

The distribution of major internal person trips was accomplished in the second-generation models developed with 1972 origin and destination survey data by using the gravity model. Individual gravity models were calibrated for home-based work, home-based shopping, home-based other, and nonhome-based trip purposes for combined total automobile and transit person trips.

The distribution of internal school trips, group-quartered person trips, internal truck and taxi trips, and external trips was accomplished by using the Fratar model.

The ability of the second-generation gravity trip distribution models, calibrated by using 1972 travel inventory data, to predict changes in trip distribution, as measured by average trip lengths and trip length frequency distribution, was determined through the application of the models with 1991 data; that is, the gravity model was applied by using the second-generation study friction factors, 1991 observed productions and attractions, and 1991 observed travel times. It should be noted that average trip lengths measured in terms of travel time changed by only about 5 percent between 1972 and 1991. Work purpose trips exhibited a 5 percent increase and trips for all other purposes exhibited about a 5 percent decrease. In terms of trip length measured in miles, work trips exhibited about a 20 percent increase in length and trips for other purposes exhibited about a 10 percent increase in length. As shown in Table 154, the average trip lengths for all purposes were predicted with a quite adequate degree of accu-

Table 154

**COMPARISON OF OBSERVED AND ESTIMATED AVERAGE TRIP LENGTH FOR TOTAL PERSON TRAVEL WITHIN THE REGION: 1972 AND 1991**

| Trip Purpose | 1972 Observed Trip Length | | 1991 Observed Trip Length | | Percent Change 1972-1991 | | 1991 Estimated[a] Trip Length | | Percent Difference[b] | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Minutes | Miles | Minutes | Miles | Minutes | Miles | Minutes | Miles | Minutes | Miles |
| Home-Based Work . . . . . . | 16.1 | 7.5 | 16.9 | 9.1 | 5.0 | 21.3 | 14.1 | 7.4 | -16.6 | -18.7 |
| Home-Based Shopping . . . | 9.6 | 4.0 | 9.1 | 4.3 | -5.5 | 7.5 | 9.1 | 4.5 | - - | 4.7 |
| Home-Based Other . . . . . . | 11.6 | 4.9 | 10.9 | 5.4 | -6.0 | 10.2 | 10.3 | 5.3 | -5.6 | -1.9 |
| Nonhome-Based . . . . . . . . | 12.4 | 4.9 | 11.6 | 5.7 | -6.5 | 16.3 | 9.4 | 4.5 | -19.0 | -21.1 |

[a]*Estimated with 1991 models and 1991 inputs.*

[b]*Percent difference =* $\frac{\text{(Estimated-Observed)}}{\text{Observed}} \times 100$

*Source: SEWRPC.*

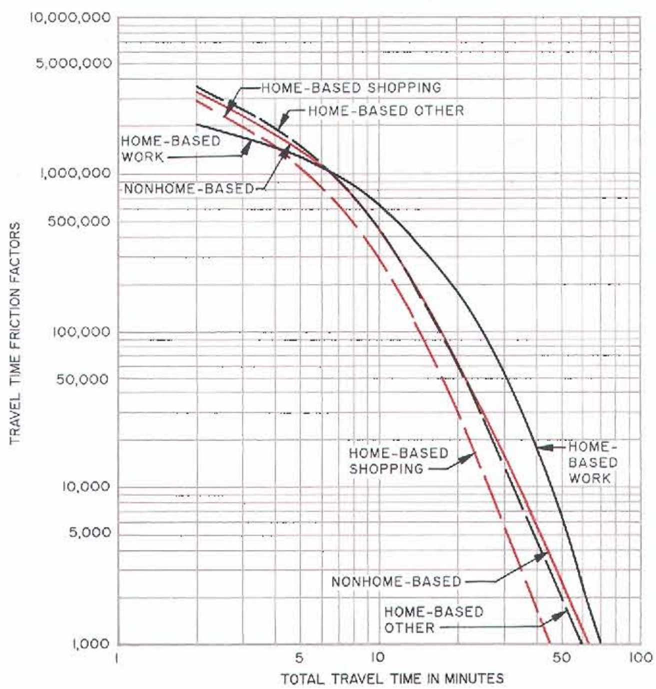
racy, considering that all data utilized to establish both the actual and estimated trip distribution were estimates derived from travel surveys. Thus, although changes in the land use pattern and the transportation system within the Region resulted in changes in average trip lengths, the basic relationships determined by the gravity model between relative travel times and trip distribution have remained relatively stable over time.

Third-Generation Trip Distribution Procedures

The third-generation trip distribution model developed with 1991 origin and destination survey data again accomplishes the distribution of major internal person trips through use of the gravity model. Gravity models were calibrated for total internal person travel for home-based work, home-based shopping, home-based other, and nonhome-based trip purposes. Peak-hour highway travel times were used in the calibration of the work trip purpose model, and off-peak highway travel times were used in the calibration of the gravity models for the other trip purposes. Indicating the effect of spatial separation on trip interchanges observed in the 1991 travel surveys, the calibrated friction factors for each trip purpose are shown in Figure 61. Since friction factors are relative, of greater importance than their absolute magnitudes is the slope of the smoothed friction factor curve. For this reason, the friction factor curves in Figure 61 were normalized and plotted on logarithmic scales to facilitate a comparison of trip purposes. As shown in Figure 61, the friction

Figure 61

**TRAVEL TIME FRICTION FACTORS FOR INTERNAL TOTAL PERSON TRIPS IN THE REGION: 1991**




*Source: SEWRPC.*

factor curve with the smallest negative slope is that for home-based work, indicating the smaller effects of spatial separation on the distribution of work trips as the travel time increases. Conversely, the curve for home-based shopping trips shows the greatest sensitivity to spatial separation, as the travel time increases.

The distribution of internal person school purpose trips, group-quartered person trips, internal truck and taxi trips, and external trips was accomplished through the use of the Fratar model.

## Modal Split

Basic Concepts: The third major step in the travel simulation process is modal split, or mode choice, whereby the total number of trips traveling between each pair of traffic analysis zones by trip purpose is divided on the basis of travel mode used. Primarily, this step involves the division of internal person trips between the two major modes of travel, public transit and the private automobile. The determination of modal split is essentially an evaluation of the potential demand for public transit service. The aggregate demand for public transit service is determined by many individual decisions; many factors operate to influence each individual choice of public transportation over the private automobile. For analytical purposes, however, the factors affecting individual modal choice may be grouped into three categories: factors relating to the characteristics of the tripmaker, factors relating to the characteristics of the trip, and factors relating to the characteristics of the transportation system. The purpose of modal split modeling is to select from within these three general categories those quantifiable factors that best explain modal choice.

The modal split step must also determine for each zone-to-zone interchange those auto trips which will drive alone and those which will carpool, or "share a ride," and thus determine the average number of persons per automobile trip. Both automobile vehicle trips and transit person trips are determined in this step as necessary inputs to the traffic assignment step of the travel simulation process.

### Validation of Second-Generation Modal Split Procedures

The second-generation modal split models were developed from the 1972 origin and destination survey data for the trip purposes of home-based work, home-based shopping and other purposes combined, and nonhome-based. These models were applied in the second-generation regional plan reevaluation effort and in subsequent public transit studies conducted by the Commission, including the Milwaukee Northwest Corridor transit alternative analysis conducted in the 1980s. The method used to define the mode choice models mathematically was logit analysis, one of the three techniques that have been devised to calibrate disaggregate, behavioral, probabilistic models of mode choice. The use of logit analysis in the development of modal split or choice models is consistent with the economic theory of consumer behavior, specifically, that maximization of utility establishes choice decisions.

The models calibrated for home-based work and home-based shopping and other trip purposes express the probability of mode choice as a function of household automobile availability, in-vehicle travel time, out-of-vehicle travel time, and out-of-pocket cost differences between automobile and transit modes. The nonhome-based mode choice model expresses the probability of mode choice as a function of in-vehicle time, out-of-vehicle travel time, and out-of-pocket cost differences between automobile and transit modes. Representing that part of door-to-door travel time spent outside a vehicle, out-of-vehicle time includes for automobile travel, any automobile access and parking time; for public transit, travel waiting and transfer time. In-vehicle time represents that part of door-to-door travel time spent inside the public transit vehicle or the automobile. A distinction was made in the mode choice model between the in-vehicle and out-of-vehicle portions of total travel time, because available data indicate that travelers find time spent walking, waiting, or transferring, that is, time spent outside the vehicle, more inconvenient than time spent in the vehicle. The other transportation system variable considered, out-of-pocket cost, was intended to represent those costs of travel that individuals normally consider in the choice of mode. Out-of-pocket costs for transit were considered to consist of fares and the costs of driving an automobile to, and parking at, a public transit station. Out-of-pocket costs associated with automobile travel were considered to consist of parking costs and fuel costs.

In applying the modal choice models, two sets of transportation system variables are prepared: one to represent the in-vehicle and out-of-vehicle travel times and out-of-pocket costs of the automobile and transit modes during average weekday peak travel periods and one to represent the in-vehicle and out-of-vehicle travel times and out-of-pocket costs of the automobile and transit modes during average weekday off-peak periods.

The transportation system variables for the peak-travel periods are used to forecast home-based work trips made by automobile and transit. Data collected under the Commission 1991 travel surveys indicated that approximately 70 percent of all home-based work trips made on an average weekday are made during the peak-travel periods. Forecasts of home-based shopping and other trips and nonhome-based trips made by automobile and transit were based upon the set transportation system variables representative of the average weekday off-peak travel periods. Data collected under the Commission 1991 travel surveys indicated that total trips made for these purposes during the off-peak periods accounted for 70 percent of the home-based shopping trips, home-based other trips, and nonhome-based trips made on an average weekday.

The second major part of the modal split step of the second-generation models is the determination of automobile occupancy. An automobile occupancy model converts automobile person trips into automobile vehicle trips by determining the number of persons, driver and passenger(s), per automobile. Average automobile occupancies were calculated for all zone-to-zone interchanges by trip purpose based on the Commission's 1972 travel survey, and these automobile occupancies were assumed to remain stable over time. The average automobile occupancies, while varying according to trip purposes, were relatively similar for all interchanges within a particular trip purpose with the exception of higher occupancies for trips to and from the Milwaukee CBD, and for trips of longest length. The average regional automobile occupancy, as observed in the 1972 travel surveys, was 1.17 for home-based work, 1.47 for home-based shopping, 1.54 for home-based other, and 1.38 for nonhome-based trips.

A major validation of the second-generation modal split model was conducted by the Commission in 1984 under the Milwaukee Northwest Corridor transit alternatives analysis. This validation is documented in the Commission publication entitled, The Milwaukee Northwest Corridor Rapid Transit Study, Report No. 2, "Travel Simulation Models," 1986. The validation entailed applying the second-generation models with inventoried 1980 demographic, economic, and land use data, and 1984 highway and transit transportation system data. The model-estimated 1984 travel demand was then assigned to the 1984 transportation system to produce simulated volumes of vehicle trips and transit passengers. The results of the transit and highway traffic assignments were then used to evaluate the performance of the travel simulation models by comparing the model-estimated volumes of transit passenger trips to observed transit passenger counts.

A comparison of the average weekday unlinked passenger trips, or boarding passengers, observed during 1984 versus those estimated for 1984 by the traffic assignment is presented in Table 155. About 239,700 boarding passengers were simulated for 1984 by the models, or about 8 percent fewer than the 261,600 average weekday boarding passengers observed during 1984 for the routes simulated in the transit network. The model-estimated transfer ratio of 0.45 transfers per linked revenue trip simulated on the transit network for 1984 was found to be slightly below the transfer ratio of 0.50 transfers per trip observed for the same routes in 1984.

A comparison of the transit ridership by time period as observed in 1984 and estimated for 1984 by the models is shown in Table 156. The number of total daily trips estimated to be made in the midday and afternoon peak periods were about equal to the trips actually made, while the number of trips made in the morning peak period was slightly overstated and the number made in the evening nonpeak period was slightly understated.

With respect to automobile occupancy, a significant decline in automobile occupancy rates has been observed within the Region from the 1972 occupancy rates assumed and proposed to remain stable on the basis of implementation of travel demand management measures, including an aggressive carpool promotion program, an areawide freeway ramp-metering system with high-occupancy vehicle bypasses, parking rate reversal and supply control in the Milwaukee CBD, and implementation of the regional land use plan. Table 157 compares the 1972 and 1991 survey-estimated automobile occupancy by trip purpose.

Third-Generation Modal Split Procedures: The third-generation modal choice models developed with the new origin and destination survey data again use logit analysis for the trip purposes of home-based work, home-based shopping and

Table 155

**COMPARISON OF AVERAGE WEEKDAY TRANSIT RIDERSHIP IN THE MILWAUKEE URBANIZED AREA: 1984 OBSERVED VERSUS 1984 MODEL-ESTIMATED FIGURES**

| Trip Category | Average Weekday Transit Passengers | | | |
|---|---|---|---|---|
| | 1984 Observed | 1984 Estimated | Difference between Estimated and Observed | |
| | | | Number | Percent |
| Linked Revenue Passenger Trips | 174,100[a] | 165,600 | -8,500 | -5.1 |
| Unlinked Passenger Trips (boarding passengers) | 261,600[b] | 239,700 | -21,900 | -8.4 |
| Boards per Passenger Trip | 1.50 | 1.45 | -0.05 | -3.3 |

[a]*Based on a total annual ridership of 51,175,000 linked revenue passengers for the Milwaukee urbanized area in 1984. A factor of 294 was used to convert annual ridership to average weekday ridership.*

[b]*Based on actual counts taken on the routes included in the simulated transit network.*

*Source: SEWRPC.*

Table 156

**COMPARISON OF 1984 OBSERVED AND 1984 MODEL-ESTIMATED AVERAGE WEEKDAY TRANSIT RIDERSHIP BY TIME PERIOD**

| Time Period | Average Weekday Unlinked Passenger Trips (boarding passengers) | | | | | |
|---|---|---|---|---|---|---|
| | 1984 Observed | | 1984 Estimated | | Difference between Estimated and Observed | |
| | Number | Percent of Daily Total | Number | Percent of Daily Total | Number | Percent |
| Morning Peak Period | 65,000 | 24.9 | 65,400 | 27.2 | 400 | 0.5 |
| Midday Nonpeak Period | 88,500 | 33.8 | 80,200 | 33.5 | -8,300 | -8.3 |
| Evening Peak Period | 75,700 | 28.9 | 69,400 | 29.0 | -6,300 | -8.6 |
| Night Nonpeak Period | 32,400 | 12.4 | 24,700 | 10.3 | -7,700 | -24.5 |
| Total | 261,600 | 100.0 | 239,700 | 100.0 | -21,900 | -8.4 |

*Source: SEWRPC.*

other purposes combined and nonhome-based. The model calibrated for the home-based work trip purpose, the home-based shopping and other trip purpose, the nonhome-based trip purpose, and the home-based school purpose, for university or college trips, are shown in Table 158. The modal choice model calibrated for the home-based work trip purpose expresses the probability of mode choice as a function of household automobile availability, in-vehicle travel time, out-of-vehicle travel time, and out-of-pocket cost differences between three modes: public transit, drive alone, and shared ride. This modal choice model incorporated these three alternatives into

Table 157

**COMPARISON OF 1972 AND 1991 SURVEY-ESTIMATED AUTOMOBILE OCCUPANCY BY TRIP PURPOSE**

| Trip Purpose | 1972 Persons per Automobile | 1991 Persons per Automobile | Percentage Change 1972-1991 |
|---|---|---|---|
| Home-Based Work | 1.17 | 1.06 | 9.4 |
| Home-Based Shopping | 1.47 | 1.27 | 13.6 |
| Home-Based Other | 1.54 | 1.33 | 13.6 |
| Nonhome-Based | 1.38 | 1.20 | 13.0 |
| Average | 1.38 | 1.21 | 12.3 |

*Source: SEWRPC.*

Table 158

MODE-CHOICE MODELS

Home-Based Work

$$P_T = \frac{e^{U_T}}{e^{U_T} + e^{U_{DA}} + e^{U_{SR}}}$$

Where: $U_T$ = -.0045 TC - .0157 TI - .0412 TO
$U_{SR}$ = -.0045 SC - .0157 SI - .0412 SO - 1.207
$U_{DA}$ = -.0045 DC - .0157 DI - .0412 DO + 1.359 A - .8276

Home-Based Shopping and Other

$$P_T = \frac{e^{U_T}}{e^{U_T} + e^{U_A}}$$

Where: $U_T$ = -.0133 TC - .0094 TI - .0692 TO
$U_A$ = -.0133 AC - .0094 AI - .0692 AO + 3.067 A - 2.447

Nonhome-Based

$$P_T = \frac{e^{U_T}}{e^{U_T} + e^{U_A}}$$

Where: $U_T$ = -.0031 TC - .0106 TT
$U_A$ = -.0031 AC - .0106 AT + 1.815

Home-Based School[a]

$$P_T = \frac{e^{U_T}}{e^{U_T} + e^{U_A}}$$

Where: $U_T$ = -.0133 TC - .0090 TT
$U_A$ = -.0133 AC - .0090 TT + .5762 A - .1344

Where: $U_T$ = transit utility
$U_{DA}$ = drive alone utility
$U_{SR}$ = shared ride or carpool utility
$U_A$ = automobile person utility (driver and/or passenger)
TC = transit cost
TI = transit in-vehicle time
TO = transit out-of-vehicle time
SC = shared ride cost
SI = shared ride in-vehicle time
SO = shared ride out-of-vehicle time
DC = drive alone cost
DI = drive alone in-vehicle time
DO = drive alone out-of-vehicle time
AC = automobile person cost
AI = automobile person in-vehicle time
AO = automobile person out-of-vehicle time
TT = transit total travel time (in-vehicle time plus out-of-vehicle time factored by 7.0 for nonhome-based trips and not factored for home-based school trips)
A = number of autos in household (0 for 0 autos, 1 for 1 auto, 2 for 2 or more autos)
AT = automobile person total travel time (in-vehicle time plus out-of-vehicle time factored by 7.0 for nonhome-based trips and not factored for home-based school trips)

[a] *The home-based school trip model is applied to trips to and from colleges and universities in the study area and is applied to trips by households with one or more automobiles.*

*Source: SEWRPC.*

a single model since some of the alternatives to be considered in the third-generation regional transportation system planning effort were anticipated to include high-occupancy vehicle lanes for use by both carpools and buses. The majority of home-based work trips within the Region are made during peak-travel periods, when high-occupancy vehicle lanes provide travel time savings over the single-occupancy automobile may encourage the use of transit and car- and vanpools. The models calibrated for home-based shopping and other trip purposes express the probability of mode choice as a function of household automobile availability, in-vehicle travel time, out-of-vehicle travel time, and out-of-pocket cost differences between automobile and transit modes. The nonhome-based mode choice model expresses the probability of mode choice as a function of in-vehicle time, out-of-vehicle travel time, and out-of-pocket cost differences between automobile and transit modes. An automobile occupancy model is used to convert total automobile person trips for home-based shopping and other trips based on household size and automobile availability of the zone of trip production.

In applying the modal choice models, two basic sets of transportation system variables are prepared: one to represent the in-vehicle and out-of-vehicle travel times and out-of-pocket costs of the automobile and transit modes during average weekday peak travel periods and one to represent the in-vehicle and out-of-vehicle travel times and out-of-pocket costs of the automobile and transit modes during average weekday off-peak-travel periods. The transportation system variables for the peak-travel period are used to forecast home-based work trips made by automobile and transit.

The mode choice models were reviewed for both reasonableness and validity. The model coefficients are all of correct sign and significantly different from zero at a 99 percent level of confidence. In addition, the model coefficients are reasonable with respect to relative magnitude, indicating out-of-vehicle time is more onerous than in-vehicle time by a factor of 2.6 for work trips and 7.4 for other trips, and the value of time is approximately $2.00 per hour for work trip in-vehicle time and $5.20 per hour for out-of-vehicle time as measured in 1991 dollars. The models, calibrated with observations of individual tripmaker behavior, were also determined to estimate total regional and subregional transit trips accurately.

The second major part of the modal split step is the determination of automobile occupancy. For home-based work trips within the greater Milwaukee transit service area, the mode choice model also estimates automobile occupancy. For home-based work trips outside the Milwaukee area and for home-based shopping and other trips, an auto occupancy model was developed to convert auto person trips into auto vehicle trips based upon the household size and automobile availability characteristics of the zone of trip production as shown in Table 159. Analyses of automobile occupancy of trips for all purposes, be they home-based work, home-based shopping, home-based other or nonhome-based, indicated that travel distance and out-of-pocket cost had little or no effect on automobile occupancy. Household automobile availability and household size of the tripmaker, however, had significant effect. By definition, model predicted nonhome-based trips cannot be related to the characteristics of the tripmaker on a zone-by-zone basis. Therefore, for the nonhome-based trip purpose, average automobile occupancies were calculated for all zone-by-zone interchanges based on the origin and destination survey, and these automobile occupancies are adjusted based upon forecast regional changes in automobile availability and household size.

### Traffic Assignment

The fourth and final major step in the traffic forecasting and analysis process is the assignment of the zone-to-zone trip volumes forecast in the trip distribution and modal split phases to specific routes of existing and proposed alternative transportation systems. The output of traffic assignments for the arterial street and highway system is a forecast of the number of vehicles on an annually averaged weekday that may be expected to use each segment of the arterial street and highway system by direction, complete with turning movements at intersections. The output of traffic assignment for the transit system is an estimate of the number of passengers on an annual average weekday that may be expected to use each segment of the transit system by direction, complete with transfers at route intersections. The assignment

Table 159

VEHICLE OCCUPANCY BY TRIP PURPOSE: AUTOMOBILE PERSON TRIPS PER VEHICLE TRIP

| Home-Based Work Trips | | | | |
|---|---|---|---|---|
| | Household Size | | | |
| Vehicles Available | One | Two | Three to Four | Five or More |
| None | 3.55 | 2.74 | 2.45 | 3.10 |
| One | 1.01 | 1.21 | 1.24 | 1.29 |
| Two or More | 1.02 | 1.04 | 1.04 | 1.07 |

| Home-Based Other Trips | | | | |
|---|---|---|---|---|
| | Household Size | | | |
| Vehicles Available | One | Two | Three to Four | Five or More |
| None | 11.50 | 3.31 | 2.42 | 4.20 |
| One | 1.06 | 1.44 | 1.48 | 1.46 |
| Two or More | 1.02 | 1.20 | 1.32 | 1.48 |

| Home-Based Shopping Trips | | | | |
|---|---|---|---|---|
| | Household Size | | | |
| Vehicles Available | One | Two | Three to Four | Five or More |
| None | 14.20 | 3.28 | 4.89 | 9.28 |
| One | 1.03 | 1.46 | 1.43 | 1.59 |
| Two or More | 1.02 | 1.17 | 1.26 | 1.32 |

| Nonhome-Based Trips | | | | |
|---|---|---|---|---|
| | Household Size | | | |
| Vehicles Available | One | Two | Three to Four | Five or More |
| None | 6.63 | 5.60 | 5.98 | 5.29 |
| One | 1.05 | 1.46 | 1.49 | 1.49 |
| Two or More | 1.02 | 1.12 | 1.19 | 1.30 |

*Source: SEWRPC.*

of traffic demand to the transportation system is accomplished separately for the highway and transit systems and in several steps.

The first step in the assignment process is the preparation of highway and transit network maps to provide a definitive description of the arterial street and highway and the transit systems to be tested. The definitive description of the highway and transit systems involves, in addition to the preparation of highway and transit network maps, the collection, coding, and transfer to computer-usable form of data describing the location, capacity, and operating speeds of each link in the two networks so that the operation of the overall transportation system can be simulated. Inasmuch as the transit and highway networks are the source of the zonal travel time information used in the trip distribution and modal split steps, the initial preparation of highway and transit networks must actually be completed near the beginning of the entire travel simulation process.

The first step in the preparation of the highway network is to define in detail the highway system for the alternative plan to be tested, identifying all freeways and standard surface arterial constituting the system. The highway network includes all arterial streets in the Region, which represents about 35 percent of total street mileage and on which about 90 percent of vehicle miles of travel occur on an average weekday. The highway network is constructed using the battery of urban transportation planning programs known as TRANPLAN. This battery of microcomputer-based programs is similar to the battery of mainframe-computer-based urban transportation programs developed by the Federal Highway and Transit Administrations. An example of a computer encoded highway network map is shown in Figure 17.

The transfer of information on the highway system to computer-usable form requires the assignment of node numbers to all intersections of, and access points to, the arterial street and highway system. Each arterial street segment between two nodes is defined as an arterial link. All freeways and freeway ramps, all surface arterial streets, and some nonarterial local roads are represented in the highway network for the Region as different types of arterial links. For each arterial link, attendant data pertinent to system analysis are also encoded. The types of data which are encoded for each arterial link are listed in Table 160. Of the data encoded, link operating speed and 24-hour average weekday capacity are of particular importance. Link operating speeds are calculated by direction of travel as a function of the speed limit and the number and type of traffic controls at interme-

Table 160

TYPE OF DATA ENCODED FOR LINKS IN HIGHWAY NETWORK

| Type of Information | Description |
|---|---|
| Distance | Distance in miles by direction |
| Speed or Time | Speed in miles per hour by direction for arterial link; time in minutes by direction for centroid connector links |
| 24-Hour Capacity | Capacity expressed in vehicles per 24-hours by direction |
| 24-Hour Traffic Count | Average daily vehicles by direction (coded for existing or base year networks only) |
| Administrative Classification | Jurisdiction |
| Assignment Group Code | Type of link in network |
| Number of Lanes | Number of existing lanes |
| County | County in Region in which link is located |
| Functional Classification | Classification under U.S. Department of Transportation functional classification system |
| Urban Area | Urban area of Region in which link is located |
| Zone Number | Traffic analysis zone in which link is located |

*Source: SEWRPC.*

diate and terminating intersections. Hourly and 24-hour average weekday capacities for each link are calculated as a function of the typical cross-section of the facility, which includes consideration of area type, functional classification, number of through traffic lanes, and number of turn lanes.

A second type of link is used in the highway network to connect the land uses served to the arterial street and highway system. For each traffic analysis zone in the Region, the center of activity is determined and marked by load nodes, or centroids, representing the points from which all trips originate, and to which they are destined, the zones enter or leave the highway network. The centroids are connected to the access points on the highway network by access links termed centroid connector links, representing nonarterial collector streets. Access times coded on the centroid connector links are a function of the time required to access the vehicle and the time required to access the arterial system over the collector streets within each zone.

As for the highway network, the first step in the preparation of the transit network is to define in detail the transit system to be tested. This involves the identification of all existing and planned routes in the public transit system to be simulated, along with the street and highway facilities and special rapid and express transit facilities over which the routes of the system are to operate. The transit networks include all existing transit routes, with the exception of special school routes. The transit network is also constructed using the aforementioned urban transportation planning programs known as TRANPLAN. An example of a computer encoded transit network is shown in Figure 25.

After the transit routes and facilities have been identified, node numbers are assigned to all terminal and transfer points for each route. Each section of street or special transit facility between two nodes is defined as a transit link. Different types of transit links are encoded in the network to represent the different types of transit service provided on the transit system, including local and feeder bus transit service,

**Table 161**

**MODE DESIGNATIONS FOR TRANSIT AND ACCESS LINKS USED IN ENCODED TRANSIT NETWORKS**

| Mode and Link Type | Designated Mode Number | Information Code |
|---|---|---|
| Access | | |
| Walk Access Link | 1 | Distance and speed |
| Automobile Access Link | 2 | Distance and speed |
| Special Access/Transfer Link | 3,5,6 | Distance and time |
| Dummy Park/Ride Transfer Link | 4 | Distance and time |
| Transit | | |
| Local Transit Link | 14,15 | Distance and time |
| Express Transit Link: Freeway Flyer | 16 | Distance and time |
| Suburban Commuter Bus | 17 | Distance and time |
| Express Transit Link: Arterial Street | 18 | Distance and time |
| Guideway (light rail/busway) Link | 21 | Distance and time |

*Source: SEWRPC.*

express transit service, and rapid transit service. In addition, where different types of transit service with different operating characteristics and speeds, such as local bus service and skip-stop express bus service, are provided over the same street or route, a separate set of parallel transit links is encoded to represent each type of service. The types of data which are encoded each transit link are listed in Table 161.

Each transit link is encoded with travel times by direction of travel for both peak and off-peak travel periods. The travel times are initially based upon current schedules for the existing routes operating over each transit link; for future, networks are modified to reflect future conditions on the arterial street and highway and transit systems. In this step, forecast future traffic volumes and capacity of arterial streets carrying transit routes are compared to existing traffic volumes and capacities. If the comparison indicates a significant decline in the level of service, the effects on the arterial travel speeds are estimated and the transit route travel times during peak periods are adjusted accordingly. Specifically, existing 1991 peak and off-peak travel speeds were plotted for each segment of the arterial street system and travel times between key activity centers within the corridor determined. Forecast plan design year 2010 highway traffic volumes under the no-build alternative were utilized to forecast future peak and off-peak travel speeds and travel times. These estimated future speeds were also plotted by segment of the arterial street system with average travel times between key activity centers recalculated. These speeds and travel times were then used to describe the highway element of the transportation system under the no-build alternative. The forecast 2010 travel speeds and travel times were then compared to the estimated 1991 travel speeds and travel times to identify changes in speed and travel time. These changes were reviewed to identify those transit routes which required adjustment to the remaining speeds to reflect increased traffic congestion. All changes of 5 percent or more in highway operating speeds resulted in an adjustment of transit running speeds. The adjusted transit speeds were defined by segment of the transit system. A similar review of highway and transit speeds was conducted for each transit build alternative; that is, a comparison was made of the year 2010 no-build network to each transit build alternative network.

Generally, current local bus speeds, including dwell time in the outlying portions of the urban areas of the Region, range from 15 to 18 miles per hour; in the areas surrounding the central business districts, from 12 to 15 miles per hour; and in the central business districts, from five to 10 miles per hour. Some arterial streets in the urban areas of the Region may experience future increases in traffic sufficient to result in weekday traffic volumes approaching maximum arterial capacity and, thereby, result in congestion severe enough to reduce transit running speeds. For planned local routes, such as for extensions of routes into areas presently unserved by the existing transit system, transit running speeds were based upon scheduled times observed for transit routes operating in similar areas over similar streets. Travel times for express bus services provided on arterial streets and for bus-on-busway and light-rail transit service were specifically developed as part of the operational plan for each such alternative considered.

The transit network is more complex than the highway network in that access to the transit system both by walking and by automobile must be allowed for in the simulation, as must the transfer between the different types of transit service. To allow for the different access methods and transfer capabilities, four different types of nontransit access links are used: walk access links, special service access and transfer links, auto drive access links, and auto drive dummy transfer links.

Walk access links are used to represent walk access to the transit system from the areas which each route serves. Each traffic analysis zone centroid is connected to the network so that the zone is directly connected by walk access only to those routes which directly serve the zone. Exceptions to this rule are made if over 50 percent of the development or the major traffic generator within the zone is within a reasonable walking distance, that is, one-quarter mile, of a route not directly serving the zone. Special attention is given to the presence of any natural or man-made geographic barriers, such as rivers, railways, and freeways, which would prevent direct walk access from a zone to transit service. In cases where a zone is divided by such a barrier, walk access is not provided for unless pedestrian bridges are available. Each walk link is encoded with the distance measured from the center of the activity of the zone at the zone centroid to the access node on the network at an average walking speed of three miles per hour.

To allow for a more accurate simulation of the use of the various types of transit service, walk access links are generally used only to connect zone centroids to access nodes on transit links representing local transit service, with the times resulting from the encoded speed and distances representing times associated with accessing local transit service. Access from a zone centroid to express transit service is allowed for through the use of special access links encoded between access nodes on the local transit links and access nodes on the express transit links. Such links also allow for the simulation of the transfer of passengers between the different types of transit service. Walk access for rapid transit service is provided for directly between the zone centroid and the rapid transit station or stop. However, the walk access times are generally longer than those encoded for access to local transit service. This method of coding access to express and rapid transit service is used to reflect differences between the walk access times for these transit services and local transit service.

Because walk access times are a function of transit stop spacing and because a different stop spacing is associated with each type of transit service, walk access times for rapid and express transit service should reflect the fact that it may take longer to access such transit services than to access local transit service. This is because stops on rapid and express transit services are spaced farther apart than stops on local transit service. Accordingly, the times encoded on the special access links for express service and the walk access links for rapid transit service reflect the additional walk time required to access rapid and express transit service compared to the walk time required to access local transit service.

In addition, because additional time is used in traveling by rapid or express transit service for access to, and egress from, the service, a corresponding decrease in travel time spent on the vehicle, or in-vehicle time, should be provided in order to induce travelers to choose rapid or express transit service over local transit service for a particular trip. Generally, the in-vehicle time savings required to offset the increased walk access time can only be realized on long trips. The encoding of additional walk access time for rapid and express transit service permits the calibration of the network so that the shortest trips are made using local transit service, the longest trips are made using rapid and express transit services. Calibration of the network in this manner is important to obtain an accurate assignment of trips in travel corridors where two different types of transit service compete for trips made between the same origins and destinations, as is the case where both local and skip-stop express bus service is provided over the same route and is simulated separately in the network.

The third and fourth types of nontransit links, auto drive access and auto drive transfer links, are used to represent access to transit service by automobile to loading points on the transit system where such access is feasible. For the existing and planned public transit system networks serving the Milwaukee area, auto drive access is limited to rapid transit service at both formally designated park-ride lots, and at some stops where patrons are known to "park-and-ride" or "kiss-and-ride," although a formal park-ride lot may not be designated.

Rapid transit service, by Commission definition, includes all service other than local bus, including freeway flyer bus service, express or limited-stop bus service, and includes express and rapid rail transit services as well. Furthermore, automobile drive access is only considered to be available where park-and-ride or kiss-and-ride facilities are provided. The only exception would be where it is explicitly known that sufficient on-street parking is available in the vicinity of the transit stops. In areas with extensive local bus or feeder bus service to the park-ride lot, auto drive access is generally limited to an area within three miles of the station. In outlying areas with little or no feeder bus service to the park-ride lot, auto drive access is generally limited to an area within five miles of a station. Exceptions for longer distances are made where a zone has access to a park-ride lot via a freeway or major arterial street.

In defining the service areas for auto drive access of each park-ride lot, the presence of competing lots is taken into consideration, as well as the reluctance of tripmakers to "backtrack" to access a particular transit route or type of service if another route or type of service is available which would allow a more direct travel route. As a result, the auto drive service area for each park-ride lot generally reflects the logical service area of the lot and includes only those zones which could be reasonably expected to use the rapid transit service provided at the lot. As a general rule, automobile access links from a particular zone are coded to only one park-ride lot, primarily to those lots where parking is available.

The coding of modes of access to rapid transit stations in the transit networks utilizes all four of the above access links. Basically, three potential access modes to rapid transit stations may be provided: walk, feeder bus, and automobile. Walk access is provided for by encoding walk access links between the stations and the zones located within one-half mile of the stations. It is anticipated that most, if not all, transit stations will have some walk access provided for in this manner. The transfer of passengers between feeder bus lines and rapid transit lines at a station is provided for by encoding transfer links between the terminal or transfer node on the feeder bus line and the station node. Times are encoded on the transfer link which reflect walking times spent, reaching the rapid transit boarding platform. Finally automobile access is provided for by encoding automobile access links between zones located more than one-half mile from the transit station. Automobile access links are encoded only to those transit stations where parking is available. The encoding of automobile access links utilizes an auto drive transfer link between all automobile access links and the transit station node. A time is encoded on the transfer link which reflects the time spent in walking from the automobile to the boarding platform at each station.

The automobile access connection includes a one-minute connection penalty between the park-and-ride lot and the transit station to reflect walking time. The automobile access connection also includes the travel time of automobile access between the zone and the park-ride lot, including walking between home and the automobile, driving over the local street system within the zone to access the arterial street system, and driving over the arterial street system to the park-ride lots. The typical total encoded travel time for an automobile access connection is about 50 percent, or three minutes, more than the over-the-road arterial street travel time. This automobile access travel time is usually less than the travel time which would result if local bus service were available as an alternative.

Transit access travel times reflect the actual travel times of the potential feeder bus or connecting bus service. Introduction of feeder bus transit service under a new alternative to an area previously served only by automobile drive access to park-ride lots, therefore, cannot reduce transit ridership under the new alternative, but may have the potential to increase transit ridership.

As the final step in encoding the transit network, the routes of the transit system are converted to transit lines on the network, defined by the series of node numbers along a given route and the operating headways associated with the route. Where a route operates regular service with specific branches and turnback points, separate lines are encoded on the network to represent each branch or truncated portion of the route. Similarly, separate lines are encoded where routes utilize different streets by direction of travel, as with the use of one-way pairs of arterial streets or where headways on a route or portion thereof vary by direction of travel or during peak periods, to reflect a higher level of service in the peak travel direction. All routes which regularly provide a significant level of transit service on an average weekday are encoded on the transit system.

Special routes providing a limited level of service, such as special school routes operating only one or two bus trips per day, are not included in the transit network. As was done in coding transit links, different types of transit lines are encoded to represent the different types of transit service provided on the transit system. Operating headways are encoded for each line to reflect the level of service provided during each of four times: a morning peak period, a midday off-peak period, an afternoon peak hour, and a night off-peak period. The routes and operating headways encoded in the transit network are defined by the operational plans prepared for each alternative.

The second step in the traffic assignment process involves the computation, from the descriptions of the transportation networks, of two sets of minimum time paths from each traffic analysis zone within the Region to all other such zones, one for automobile travel and one for transit travel. For the highway network, the minimum time paths are computed by systematically comparing travel time for all links in the system in successfully outward steps from the starting centroid until the shortest time path to all centroids has been computed. The shortest travel time and routes through the system between the starting centroid and all other centroids are systematically recorded and mapped. The resulting minimum time path routes are referred to as "trees," and represent the shortest door-to-door travel times between any two zones within the Region, including walk times at either end of the trip and park and unpark times for automobile trips.

A similar process is used to define the zone-to-zone travel paths for transit except that the computed time paths are weighted to reflect the different coefficients assigned to work and nonwork trips in the modal split model. In this respect, the out-of-vehicle times, such as walk and drive access times, initial waiting times, and waiting times incurred in transferring between bus routes, along the transit travel path are factored by the ratio of the out-of-vehicle and in-vehicle coefficients in the modal split model. The minimum time path for a particular zonal pair, consequently, reflects the path with the lowest combined in-vehicle and weighted out-of-vehicle time. While this path may not reflect the shortest absolute time path for a zonal pair on the transit network, it is believed to be more representative of the path a transit patron would take since out-of-vehicle time is viewed as the most onerous part of a transit trip.

From minimum time paths for the highway and transit networks, the zone-to-zone travel times for automobile and transit trips can be determined. These zone-to-zone travel times are used as inputs to the trip distribution and modal split steps in the travel simulation process. Total highway travel time is used as the measure of spatial separation of the zones input into the gravity model used for the trip distribution. The in-vehicle and out-of-vehicle portions of total travel time on the highway and transit networks are used as inputs into the modal choice models.

In the third step in the traffic assignment process, matrices, or tables, of both vehicle trip interchanges and transit passenger trip interchanges are prepared from the matrices of average weekday trip interchange volumes created by the process of trip generation, trip distribution, and modal split. For assignment of traffic demand to the highway network system, approximately 11 individual trip interchange tables which are direct outputs of the application of the modal split and trip distribution models must be combined to provide total zonal trip interchanges volumes. The individual trip inter-

### Table 162

### FACTORS TO CONVERT AVERAGE WEEKDAY TRANSIT TRAVEL BY TRIP PURPOSE TO TRAVEL BY TIME PERIOD

| Trip Purpose | 6:00 A.M. to 9:00 A.M. | | | 9:00 A.M. to 3:00 P.M.[a] | | | 3:00 P.M. to 6:00 P.M.[a] | | | 6:00 P.M. to 6:00 A.M. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Morning | | | Midday | | | Evening | | | Night | | |
| | 1972 | 1984 | 1991 | 1972 | 1984 | 1991 | 1972 | 1984 | 1991 | 1972 | 1984 | 1991 |
| Home-Based Work | 0.37 | 0.38 | 0.33 | 0.16 | 0.19 | 0.16 | 0.39 | 0.34 | 0.34 | 0.08 | 0.09 | 0.17 |
| Home-Based Shopping | 0.00 | 0.02 | 0.02 | 0.59 | 0.58 | 0.59 | 0.34 | 0.28 | 0.25 | 0.07 | 0.12 | 0.14 |
| Home-Based Other | 0.08 | 0.12 | 0.11 | 0.48 | 0.45 | 0.45 | 0.27 | 0.22 | 0.27 | 0.17 | 0.21 | 0.17 |
| Nonhome-Based | 0.08 | 0.07 | 0.04 | 0.45 | 0.45 | 0.50 | 0.41 | 0.32 | 0.33 | 0.06 | 0.16 | 0.13 |
| School | 0.42 | 0.30 | 0.35 | 0.19 | 0.38 | 0.22 | 0.39 | 0.24 | 0.37 | 0.00 | 0.08 | 0.06 |

[a] *For 1991, the midday period is defined as 9:00 a.m. to 2:30 p.m. and the evening period is defined as 2:30 p.m. to 6:00 p.m.*

*Source: SEWRPC.*

change tables which are thus combined include tables for internal vehicle trips by automobile for each of the four trip purposes derived from the modal split phase plus those made for school purposes, tables for internal automobile truck trips made by nonresidents of the Region, tables for automobile trips made by persons residing in group quarters, tables for external vehicle trips made by automobile, and tables for internal and external truck and taxi trips. For assignment of trips to the transit system, the individual trip interchange tables for transit passenger trips for each of the four trip purposes derived from the modal split phase plus those transit passenger trips made for school purposes are factored to create tables of transit passenger trips by purpose made during specific time periods of each weekday and then combined by time period. Four tables are thus created to represent transit passenger trips made during each of the aforementioned time periods using specific factors and on the basis of origin-destination surveys. The factors obtained in the Commission 1972 large-scale travel survey, the 1984 small-scale origin and destination survey, and the 1991 large-scale travel survey are shown in Table 162. The factors display considerable stability; the most current factors from the most recent survey are those used to convert average weekday transit passenger trips made by time period for current year transit ridership estimation and future year ridership forecasts.

In the final step of the traffic assignment process, the tables of zone-to-zone trip volumes for vehicles and transit passengers created in the previous step are assigned to all the individual arterial street segments and route segments comprising the minimum time paths for all zonal interchanges on the highway and transit networks. Thus, traffic volumes are accumulated on the links for all zonal interchanges, resulting in a complete assignment of traffic demand to the network.

In assigning travel to the highway network, an iterative process is used to account for the impact of assigned traffic volumes and congestion on link speeds and zone-to-zone travel times. In this respect, since vehicle trips are assigned to the shortest time paths on the highway network, some of the volumes on the individual links of the network may exceed the actual design capacity of the arterial street facilities being simulated, thus affecting the travel time used initially to determine the minimum time paths. The output of the assignment program at this stage is termed an "unrestrained" assignment. The ratios of the assigned volumes to the capacity of each link in the highway network are then calculated. The travel times are then reduced for those links having a volume-to-design capacity ratio of less than one and increased for those links having a ratio greater than one. Minimum time paths are reassigned on the basis of the revised minimum time path through the highway network. This iterative process is continued until the assigned volumes are observed to stabilize. Thus, the operating speed at which each segment of the transportation system can be traveled is modified to simulate the affect of increasing congestion in the system. The resulting capacity restraint serves to modify the unrestrained assignment volumes and provide a more accurate distribution of vehicular traffic over the highway system and more accurate travel times and travel speeds by simulating the manner in which vehicle operator will seek less congested arterial routes in tripmaking.

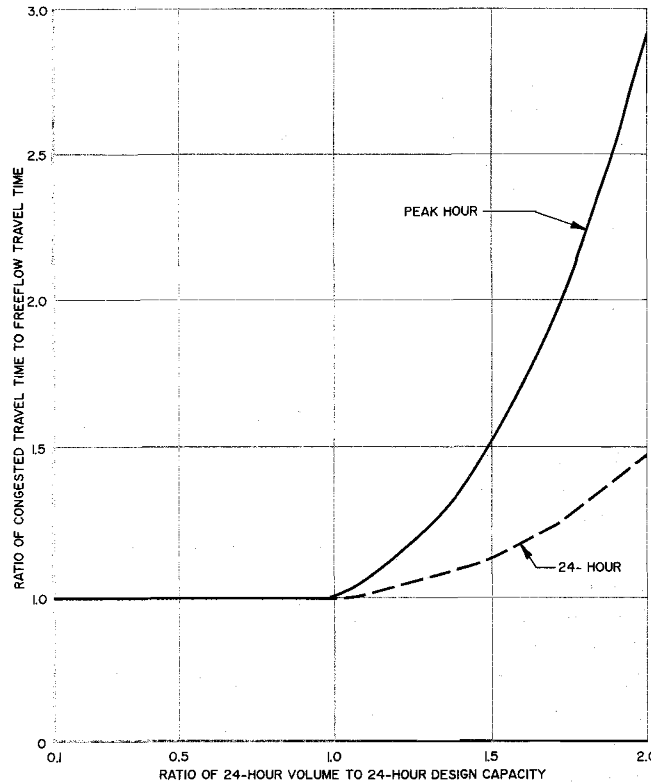
The travel time-volume-to-capacity ratio relationship used to establish 24-hour average weekday travel times is shown on Figure 62. The 24-hour average weekday average travel times include about one-third peak travel period travel time and two-thirds off-peak travel period travel time. These travel times are used for highway traffic assignment. Such travel times have been shown to permit accurate 24-hour assignments within the Region, including the assignment of the 1991 origin and destination survey vehicle trip data to the 1991 highway networks. Also shown in Figure 62 is the travel time, volume-to-capacity ratio relationship used to establish peak hour travel times based on average weekday total traffic volume-to-capacity ratios. The estimated peak hour travel times are used for home-based work trip distribution and modal choice.

As noted above, one output of the highway traffic assignment is an adjusted set of capacity-restrained travel times. As travel times are also input to trip distribution and mode choice steps, the resulting travel times from traffic assignment must be reviewed and compared to those input to trip distribution and modal choice. If differences are found, then the trip distribution and modal choice steps in the simulation process must be repeated with the revised travel times. The percentile difference considered significant for this purpose is 5 percent. The travel simulation model estimated 1990 travel speeds under peak-hour and off-peak-hour conditions were found to be within 5 percent of observed 1990 travel speeds.

It should be noted that the vehicle traffic loadings determined with the above procedure are expressed in terms of 24-hour average weekday vehicle traffic volumes, which are comparable to the highway network capacities derived from the transportation system inventories conducted by the Commission. These 24-hour average weekday traffic volumes can be converted to peak hourly volumes by applying the appropriate factors shown in Table 163. With respect to high occupancy vehicle (HOV) lanes, a different procedure is used to convert shared-

**Figure 62**

**TRAVEL TIME TO VOLUME/CAPACITY RATIO RELATIONSHIPS: 24-HOUR AND PEAK-HOUR**




*Source: SEWRPC.*

ride trips from a daily travel forecast to a peak-hour travel forecast. The potential ridership on the HOV lanes has two components. One is the incremental number of ridesharers projected by the home-based work trip purpose modal choice model as using the HOV lane. These ridesharers are assumed to use the lane during the morning and afternoon peak periods, with 50 percent using the lane during the peak travel hours. A second component is nonwork trips. It is assumed that 7 percent of these trips occur during the morning peak period and 15 percent during the evening peak travel period, with 50 percent of the peak- period trips occurring during the peak hour.

The assignment of transit passenger travel to the transit network involves the assignment of the four tables of transit passenger trips by time period, using minimum time paths created for each of the time periods. Unlike the highway assignment, the capacity of the transit system is

Table 163

FACTORS TO CONVERT AVERAGE WEEKDAY HIGHWAY TRAVEL TO PEAK-PERIOD TRAVEL

| Arterial Type | Proportion of Total Vehicle Travel on the Arterial Street and Highway System in the Peak Hour | | | |
|---|---|---|---|---|
| | Milwaukee Central Business District | | Remainder of Region | |
| | Peak-Hour Both Directions | Peak-Hour Both Directions | Peak-Hour Both Directions | Peak-Hour Peak Direction |
| Freeways . . . . . . . . . . . . . . . . | 0.080 | 0.040 | 0.080 | 0.048 |
| Standard Surface Arterials . . . . . | 0.100 | 0.050 | 0.100 | 0.060 |

*Source: SEWRPC.*

not restrained as additional transit capacity can be readily provided by the provision of additional transit vehicles and the attendant reduction of headways. Accordingly, after the transit passenger trips for a particular time period have been assigned to the transit network, each transit line in the network is reviewed to determine how the initial operating headways and passenger-carrying capacity of the line relate to the assigned volume of trips. If more trips are assigned to the line than can be accommodated by the initial capacity of the line, the operating headway for the line is reduced, thereby providing additional vehicles and passenger-carrying capacity for the line. If the trips assigned indicate a significant amount of surplus capacity, operating headways for the line are increased to policy headway levels, thereby reducing the number of vehicles operated on, and the passenger-carrying capacity of, the line. The adjustment of headways based upon assigned passenger volumes is performed to balance the supply of transit service with the simulated demand, providing for realistic estimates of equipment requirements and operating characteristics for the transit system and consistent assumptions for ridership and cost estimation. Significant changes in operating headways require repetition of simulation of the modal split with the modification headways.

Estimates of the volume of transit trips using the specific types of transit services and facilities being simulated in the network can be made directly from the assigned link and line volumes. With regard to rapid transit services and facilities, estimates of the volume of trips made using the various access and egress modes available at each rapid transit station must also be derived in order to provide information needed to estimate the size and amenities needed for each transit station and the attendant capital costs. Although the transit network is encoded with links between zone centroids and public transit stations, representing the major access and egress modes: walk, automobile, and local and feeder bus access, the volume of passengers for each zone which may be expected to use each access and egress mode available at each station sometimes cannot be derived directly from the assigned link volumes. This particular problem occurs whenever both automobile and feeder bus access are encoded in the network between a zone and transit station. This is because the algorithm used to determine the minimum time path between a zone and a rapid transit station assigns all trips to the access or egress mode encoded in the network which has the shortest travel time, which usually is the automobile access mode. Consequently, the algorithm does not allow for the possibility that, for some zones and transit stations, the passenger volumes assigned between the zone and the station should be divided between the automobile and feeder bus modes.

Accordingly, a special model is used to determine the access and egress modes of transit passengers at public transit stations. This special model was developed primarily to obtain estimates of parking demand at public transit stations, utilizing information on the characteristics of transit passenger trips made using rapid transit services provided in the Milwaukee area,

Table 164

PERCENT OF BOARDING AND ALIGHTING PASSENGERS BY MODE OF ACCESS/EGRESS AT PUBLIC TRANSIT STATIONS

| Access/Egress Mode | Type of Transit Station[a]: Stations Serving High- to Medium-Density Residential Areas and with Good Local Feeder-Bus Service | Stations Serving Medium- to Low-Density Residential Areas with Poor Local Feeder-Bus Service | Stations Serving Low- to Rural-Density Residential Areas with Demand-Responsive Feeder-Bus Service | Stations Serving Low- to Rural-Density Residential Areas with Poor Local Feeder-Bus Service |
|---|---|---|---|---|
| Walk | 20 | 15 | 10 | 10 |
| Feeder Bus | 20 | 10 | 20 | - - |
| Auto | | | | |
| Park and Ride | 30 | 41 | 56 | 72 |
| Kiss and Ride | 30 | 34 | 14 | 18 |
| Subtotal | 60 | 75 | 70 | 90 |
| Total | 100 | 100 | 100 | 100 |

[a]*High density is 7.0 to 17.9 dwelling units per net residential acre; medium density is 2.3 to 6.9 dwelling units per net residential acre; and, low density is 0.7 to 2.2 dwelling units per net residential acre.*

*Poor local bus service to a transit station is considered to be bus service which has headways of 30 minutes or more, and only one to two local bus routes serve the station. Good bus service is considered to be bus service with headways of about 15 minutes, and multiple routes serve the station, including local and express routes.*

*Source: SEWRPC.*

which consist solely of "freeway flyer" bus service operated from outlying park-ride lots to the Milwaukee CBD. On bus survey data were analyzed regarding the mode used by freeway flyer passengers to access freeway flyer bus service at park-ride lots, along with current operational information for each freeway flyer route to determine the number of boarding passengers per parked car at each park-ride lot.

Information was also reviewed concerning the density of residential development within the service areas of each of the existing park-ride lots and concerning how well the park-ride lot was provided with local bus service. From this information, estimates of the percent of total boarding passengers that may be expected to use different access modes were developed as a function of the density of residential development in the service area of the park-ride lot and the level of local bus service provided to each park-ride lot. To estimate the number of trips made by each mode of access and egress for each park-ride lot, the percentages for each mode of access are applied to the total simulated volume of passengers boarding rapid transit service at each park-ride lot. The percentages used to estimate access and egress modes are shown in Table 164. The model assumes that the percentage of passengers using the automobile for access to, or egress from, a park-ride lot will be highest in areas of low residential density with poor local feeder bus service, lowest in areas of high residential density with good local feeder bus service.

The mode of access model is applied to all boarding passenger volumes at a transit station, with no distinction between households which do, or do not, own automobiles. Existing and planned future park-and-ride lots are generally located in outlying parts of the Milwaukee urbanized area where there are few households with no automobile available for travel. The mode of access model does include an equilibration step which assures that the automobile parking demand at any given station, as determined by the mode of access model, does not exceed the proposed parking supply at the station.

The access trips determined to use feeder bus access are not directly included in the transit trip table and assigned to transit feeder bus routes; they are not accounted for in system service level equilibration and fare box revenue estimation. On the basis of the transit fare schedule assumed for planning purposes, however, no fare would be received for feeder bus route use. Transit access to stations is encoded only for those zones within walking distance of a feeder bus route. Walk access to stations is coded only for zones within walking distance of a station and these zones are generally located immediately adjacent to the station. The area of all zones within the study area encoded with access to park-ride lots generally approximates a U. S. Public Land survey one-quarter section, or 160 acres.

All transit alternatives have nearly identical coding for automobile access, for transit access, and for walk access. In addition, the zone sizes are all small enough so that access opportunities are homogeneous across each zone. Therefore, the proposed mode of access procedure permits a valid comparison to be made between transit alternatives with respect to total ridership and mode of access. It also permits an estimation of feeder bus ridership which can then be utilized in feeder bus system equilibration and costing analyses.

The access-egress model may be used in the detailed corridor as well as areawide planning efforts to obtain estimates of passengers using the various access modes available at transit stations where parking is supplied. For stations without parking, a different method of estimating the access-egress modes at such stations would presumably be limited to the walk, feeder bus, and kiss-and-ride modes. The proportion of total boarding stations at each station using the kiss-and-ride mode is estimated on the basis of the proportions found for stations with parking. The proportion of the remaining boarding passengers who would use the walk and feeder bus modes is estimated on the basis of the proportion of passengers using these access-egress modes as derived directly from the assigned link volumes in the transit network. This methodology assumes that stations without parking will be located within the service area of a station with parking, or within densely developed areas served by feeder bus routes. Consequently, the primary access-egress modes at such stations would be the walk and feeder bus modes, rather than the automobile mode.

### Traffic Assignment Calibration

The traffic assignment process was calibrated by assigning trip interchanges from the 1991 Commission travel survey to the existing highway network and comparing link volumes with corresponding actual volumes determined by ground counts. If the comparisons so indicated, appropriate modifications were coded into the network describing the highway system so that the simulated traffic volumes would correspond with the observed volumes. Such modifications included, as necessary, adjustments in link capacities or operating speeds, addition or deletion of loading links and modification in the location of load nodes. Such adjustments were required for less than 1 percent of the arterial street system and included increasing arterial segment speed or capacity by approximately 5 to 10 percent to account for increased capacity or increased speeds on arterial street segments to reflect traffic signal progression.

Calibration of the transit assignment process was accomplished through a detailed analysis of the minimum time paths and associated zone-to-zone travel times on the simulated transit network utilizing data such as current route schedules. Where necessary, modifications were made in the transit network so that simulated travel paths would reflect the most logical path followed by the trip concerned. These modifications included changes similar to those made in the highway network regarding adjustment of link speeds and location of access links, and also included adjustments made to the wait and transfer times on the network. Minimal adjustments were made to transit route segments and access links in the transit network to bring the 1990 simulated transit passenger volumes into conformance with actual 1990 transit system ridership. The minimal changes necessary included limited changes in access links to provide more direct access from selected zones to selected routes, and adjustments in route speeds for selected routes by about 5 percent.

## TRAVEL SIMULATION MODEL VALIDATION

The third-generation travel simulation models developed by the Commission using the new 1991 travel survey data to forecast design year travel demand were described in the preceding sections of this chapter. This section of the chapter presents the findings of the validation effort for the third-generation travel simulation models.

The model validation entailed applying the full battery of simulation models with inventoried

1990 demographic, economic, and land use data and 1991 transportation system data to estimate year 1990 travel demand and traffic flows. First, automobile availability and trip production and attraction models were applied to estimate total travel demand in 1990. Then, the trip distribution model was applied to estimate zone-to-zone travel demand and the mode choice model was applied to estimate zone-to-zone travel demand by individual mode. The estimated year 1990 travel demand was then assigned to the 1991 transportation system to produce simulated volumes of vehicle trips and transit passengers. The result of the transit and highway traffic assignments were then used to evaluate the performance of the travel simulation models by comparing the simulated volumes of highway vehicle and transit passenger trips to observed vehicle and transit passenger counts. In this respect, it should be recognized that the observed counts of vehicle and transit trips to which the model estimates are compared do in fact themselves represent "estimates" which contain their own errors. Many of the counts were taken on only one or two days of the entire year and, therefore, reflect the effects of the daily and monthly variations in travel, requiring adjustment to reflect average weekday conditions.

Total Travel Demand—Model Validation

The year 1990 was selected as the base year for model validation. Major inventories of population, employment, and land use within the Region were undertaken by the Commission in 1990 as part of its continuing efforts to maintain an accurate and up-to-date planning data base for the Region. Also, the latest Federal census of population and housing was conducted in 1990. Computer encoded networks representing the 1991 arterial street and highway system within the Region and the 1991 public transit systems in the Milwaukee, Racine, and Kenosha urbanized areas were also available. In addition, a comprehensive survey of travel was conducted in the Region by the Commission in 1991.

Starting with the trip generation and trip distribution steps in the travel simulation process, the basic socio-economic and land use inventory data were input into the automobile availability and trip generation models to obtain estimates of the total number of trips made by trip purpose. The results of the application of these steps are presented in Table 165. The results of the application of the trip distribution step are presented in Table 166 and on Figure 63, which compares model-estimated to survey-estimated trip length frequency distributions and travel patterns for the 37 planning analysis areas of the Region.

Table 165

COMPARISON OF OBSERVED AND MODEL-ESTIMATED AVERAGE WEEKDAY INTERNAL PERSON TRIP GENERATION WITHIN THE SOUTHEASTERN WISCONSIN REGION: 1990

| Trip Purpose | 1990 Observed[a] | 1990 Estimated[b] | Percent Difference |
|---|---|---|---|
| Home-Based Work | 1,302,700 | 1,307,200 | 0.3 |
| Home-Based Shopping | 798,100 | 774,800 | -2.9 |
| Home-Based Other | 1,687,400 | 1,601,000 | -5.1 |
| Nonhome-Based | 1,127,500 | 1,127,700 | - - |
| Total | 4,915,700 | 4,810,700 | -2.1 |

[a] *Based upon 1991 origin and destination travel survey.*

[b] *The necessary adjustment of estimated trip production to equal estimated trip attraction was less than five percent for each trip purpose.*

*Source: SEWRPC.*

Transit Travel Demand

The estimated 1990 travel demand was divided into automobile and transit person trips by applying the modal split and auto occupancy travel simulation models. The procedure followed to validate the simulation of transit passenger travel within the Milwaukee urbanized area began with the conversion of the transit trips by trip purpose estimated by the modal choice models into trip tables. These trip tables, including school purpose transit trips, were then assigned by time period to the 1991 transit network for the Milwaukee urbanized area. The transit passenger volumes derived from the traffic assignment were then compared with 1990 passenger count information obtained from the local transit operators. The comparisons used to evaluate the transit assignment and the overall travel simulation process included systemwide comparisons of observed versus estimated passenger trips in total and by time period. Comparisons were also made between observed and estimated transit ridership on selected major transit routes.

A comparison of the average weekday linked passenger trips, as determined from the Commission travel survey, with those estimated by the application of the simulation models for the

Figure 63

HOME-BASED WORK TRIPS

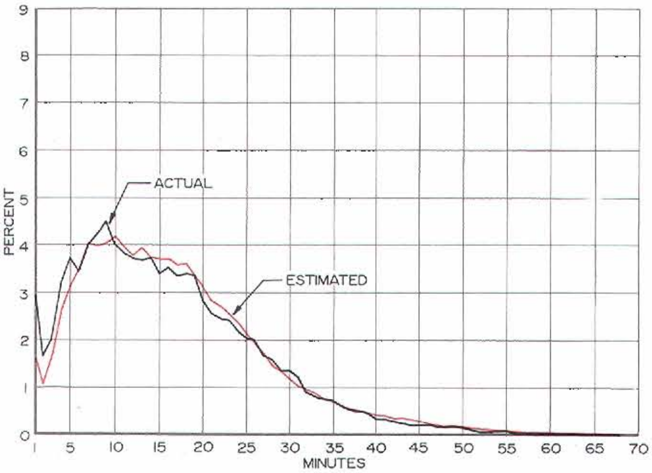



Figure 63 (continued)

HOME-BASED OTHER TRIPS

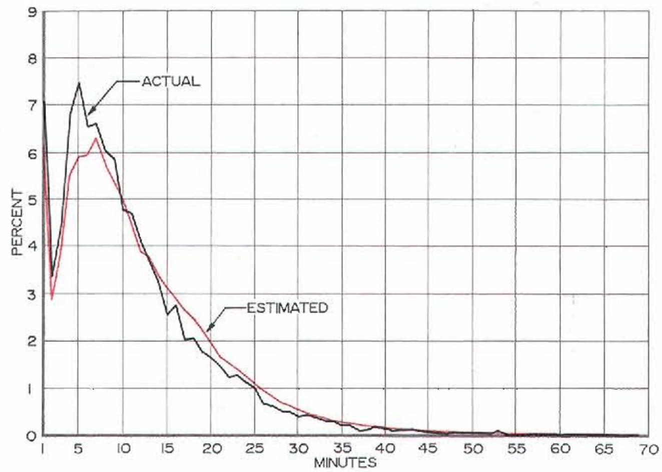



Figure 63 (continued)

HOME-BASED SHOPPING TRIPS

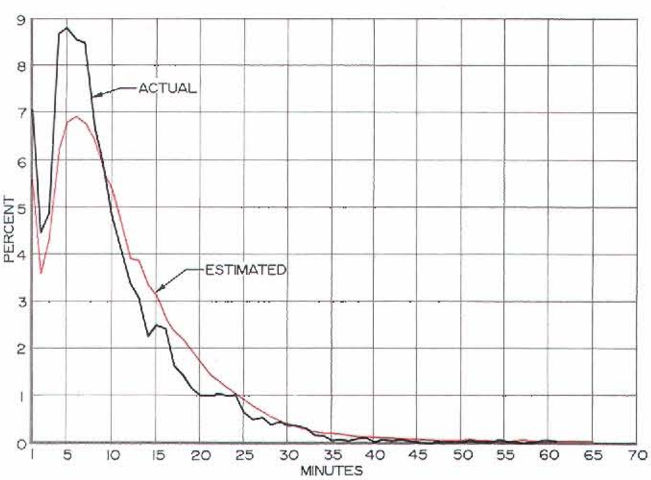
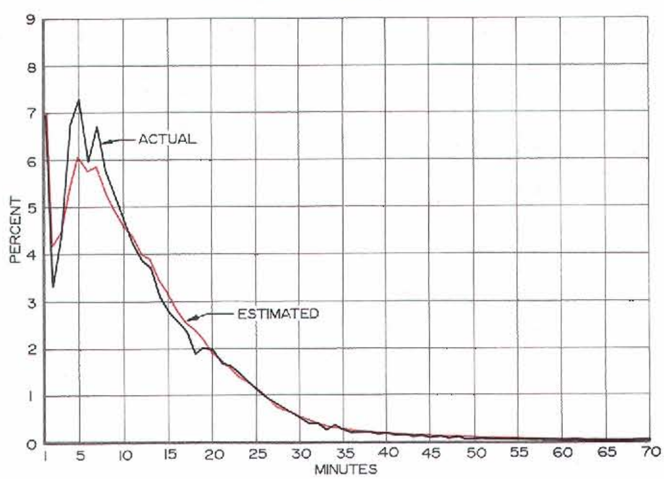



Figure 63 (continued)

NONHOME-BASED TRIPS




*Source: SEWRPC.*

Milwaukee urbanized area, is presented in Table 167. A comparison of average weekday unlinked passenger trip, that is, of boarding passengers observed during 1990 by the transit operator with those estimated by the application of the simulation models, is presented in Table 168. A comparison of the transit ridership by time period as observed by operator counts in 1990 with that estimated by application of the simulation models is presented in Table 169. The factors applied to convert the estimated 1990 transit trips by trip purpose to trips by time period are set forth in Table 163.

Table 170 presents a comparison of the 1990 average weekday transit ridership for selected routes as observed through passenger counts with that estimated by application of the simulation models. Map 81 shows the routes considered. The passenger count information is based

## Table 166

## TOTAL PERSON TRIP TABLE: 1991 SURVEY ESTIMATE AND MODEL ESTIMATE

| Production Zone | Attraction Zone: 1991 Survey | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 1 | 107,138 | 6,804 | 2,668 | 1,684 | 2,483 | 809 | 230 | 132 | 448 | 2,301 | 1,032 | 0 | 492 | 102 | 64 | 0 | 0 | 0 | 0 |
| 2 | 8,570 | 31,130 | 3,195 | 366 | 1,575 | 840 | 40 | 309 | 223 | 2,703 | 520 | 0 | 690 | 32 | 0 | 20 | 42 | 55 | 0 |
| 3 | 1,283 | 4,270 | 24,861 | 192 | 593 | 1,246 | 206 | 719 | 632 | 14,805 | 2,103 | 0 | 1,444 | 671 | 57 | 0 | 0 | 24 | 104 |
| 4 | 1,764 | 185 | 105 | 37,775 | 7,952 | 2,201 | 0 | 57 | 0 | 360 | 285 | 0 | 119 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 761 | 1,090 | 438 | 5,368 | 51,130 | 7,044 | 0 | 54 | 50 | 857 | 472 | 0 | 256 | 308 | 105 | 29 | 0 | 0 | 0 |
| 6 | 261 | 77 | 547 | 1,010 | 4,196 | 29,125 | 42 | 74 | 0 | 828 | 943 | 0 | 328 | 273 | 0 | 0 | 36 | 58 | 0 |
| 7 | 36 | 0 | 217 | 0 | 0 | 0 | 42,745 | 5,848 | 373 | 358 | 3,411 | 2,191 | 3,679 | 448 | 64 | 104 | 122 | 118 | 0 |
| 8 | 43 | 414 | 313 | 0 | 70 | 0 | 6,782 | 28,689 | 746 | 981 | 5,576 | 2,738 | 9,718 | 740 | 479 | 195 | 103 | 48 | 56 |
| 9 | 30 | 134 | 1,196 | 59 | 0 | 144 | 229 | 896 | 9,421 | 6,376 | 3,096 | 59 | 4,013 | 353 | 24 | 162 | 0 | 0 | 0 |
| 10 | 310 | 523 | 6,585 | 112 | 395 | 700 | 0 | 181 | 2,326 | 51,895 | 10,592 | 127 | 2,436 | 581 | 141 | 64 | 0 | 0 | 80 |
| 11 | 102 | 69 | 913 | 84 | 194 | 672 | 675 | 1,027 | 594 | 6,924 | 97,693 | 303 | 17,383 | 6,269 | 612 | 93 | 49 | 92 | 186 |
| 12 | 19 | 0 | 38 | 0 | 0 | 0 | 5,147 | 5,495 | 311 | 639 | 4,029 | 16,398 | 14,648 | 1,051 | 5,137 | 675 | 0 | 0 | 38 |
| 13 | 207 | 192 | 781 | 63 | 109 | 498 | 2,300 | 4,193 | 2,117 | 2,496 | 28,090 | 3,069 | 160,574 | 6,217 | 2,588 | 482 | 337 | 119 | 148 |
| 14 | 52 | 0 | 106 | 42 | 57 | 230 | 60 | 408 | 134 | 956 | 14,495 | 242 | 6,556 | 36,987 | 2,474 | 0 | 88 | 307 | 46 |
| 15 | 72 | 0 | 34 | 0 | 48 | 57 | 103 | 289 | 189 | 265 | 2,698 | 1,412 | 5,354 | 3,046 | 27,925 | 1,144 | 40 | 856 | 55 |
| 16 | 0 | 0 | 0 | 0 | 0 | 66 | 108 | 31 | 113 | 31 | 1,239 | 776 | 2,017 | 872 | 4,383 | 52,588 | 8,719 | 2,222 | 122 |
| 17 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 60 | 0 | 276 | 0 | 497 | 11,781 | 84,047 | 4,123 | 204 |
| 18 | 0 | 39 | 24 | 39 | 29 | 0 | 0 | 164 | 0 | 0 | 810 | 156 | 543 | 834 | 2,836 | 1,603 | 2,579 | 68,193 | 3,482 |
| 19 | 0 | 20 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 174 | 72 | 76 | 221 | 140 | 0 | 0 | 0 | 1,457 | 16,976 |
| 20 | 160 | 0 | 98 | 212 | 0 | 240 | 0 | 212 | 60 | 230 | 550 | 0 | 313 | 458 | 85 | 364 | 377 | 4,843 | 26,850 |
| 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 0 | 233 | 80 | 0 | 211 | 698 | 5,058 | 384 |
| 22 | 0 | 37 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 24 | 0 | 0 | 110 | 0 | 0 | 0 | 0 | 331 | 990 |
| 23 | 0 | 0 | 0 | 0 | 0 | 78 | 0 | 0 | 24 | 72 | 81 | 0 | 0 | 0 | 0 | 72 | 511 | 583 | 1,225 |
| 24 | 785 | 332 | 1,737 | 281 | 1,366 | 3,024 | 303 | 221 | 329 | 12,562 | 5,526 | 0 | 1,239 | 479 | 96 | 179 | 0 | 133 | 0 |
| 25 | 69 | 311 | 512 | 173 | 1,120 | 5,487 | 0 | 0 | 58 | 1,626 | 1,599 | 0 | 595 | 179 | 0 | 0 | 58 | 0 | 96 |
| 26 | 389 | 268 | 791 | 195 | 250 | 842 | 306 | 244 | 374 | 3,636 | 21,539 | 236 | 3,012 | 1,706 | 671 | 29 | 0 | 150 | 0 |
| 27 | 567 | 485 | 2,370 | 145 | 1,168 | 2,049 | 419 | 542 | 899 | 10,778 | 20,410 | 0 | 4,328 | 3,350 | 660 | 0 | 0 | 384 | 182 |
| 28 | 299 | 98 | 250 | 331 | 570 | 2,858 | 266 | 77 | 173 | 1,114 | 2,564 | 36 | 712 | 469 | 127 | 0 | 108 | 35 | 0 |
| 29 | 59 | 69 | 59 | 430 | 582 | 1,596 | 236 | 260 | 23 | 2,193 | 5,010 | 0 | 1,316 | 871 | 273 | 0 | 186 | 36 | 217 |
| 30 | 157 | 34 | 231 | 241 | 518 | 911 | 124 | 105 | 331 | 846 | 3,544 | 24 | 1,338 | 196 | 76 | 0 | 0 | 0 | 64 |
| 31 | 155 | 115 | 397 | 94 | 187 | 353 | 20 | 272 | 220 | 1,067 | 8,664 | 324 | 3,932 | 7,487 | 1,556 | 222 | 49 | 317 | 0 |
| 32 | 66 | 0 | 55 | 45 | 261 | 841 | 84 | 89 | 0 | 1,455 | 2,631 | 0 | 1,044 | 919 | 0 | 39 | 0 | 67 | 295 |
| 33 | 164 | 0 | 251 | 0 | 278 | 413 | 338 | 310 | 110 | 970 | 3,548 | 149 | 2,633 | 2,514 | 2,030 | 408 | 0 | 1,121 | 124 |
| 34 | 75 | 508 | 347 | 392 | 145 | 808 | 169 | 89 | 59 | 1,042 | 4,025 | 182 | 2,004 | 3,555 | 910 | 308 | 845 | 758 | 445 |
| 35 | 72 | 144 | 112 | 34 | 120 | 0 | 69 | 141 | 189 | 332 | 1,269 | 70 | 282 | 453 | 166 | 0 | 0 | 418 | 480 |
| 36 | 0 | 0 | 68 | 34 | 0 | 122 | 0 | 34 | 43 | 235 | 849 | 138 | 421 | 689 | 1,044 | 146 | 0 | 435 | 445 |
| 37 | 27 | 0 | 0 | 0 | 0 | 101 | 0 | 18 | 65 | 162 | 497 | 0 | 350 | 100 | 214 | 0 | 26 | 228 | 804 |
| Total | 123,692 | 47,369 | 49,299 | 49,401 | 75,420 | 63,392 | 61,001 | 51,223 | 20,634 | 131,293 | 259,586 | 28,706 | 254,609 | 82,429 | 55,294 | 70,918 | 99,020 | 92,569 | 54,098 |

## Table 166 (continued)

| Production Zone | Attraction Zone: 1991 Survey | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | |
| 1 | 64 | 0 | 0 | 0 | 2,072 | 369 | 1,334 | 1,473 | 644 | 947 | 1,023 | 310 | 254 | 207 | 427 | 55 | 164 | 128 | 135,858 |
| 2 | 0 | 46 | 0 | 0 | 1,379 | 363 | 827 | 918 | 269 | 371 | 541 | 238 | 247 | 86 | 403 | 0 | 0 | 0 | 55,998 |
| 3 | 27 | 0 | 0 | 84 | 4,825 | 1,174 | 1,733 | 3,842 | 769 | 1,484 | 806 | 1,176 | 562 | 220 | 840 | 62 | 107 | 166 | 71,087 |
| 4 | 32 | 0 | 0 | 0 | 1,637 | 891 | 216 | 912 | 1,085 | 1,092 | 1,166 | 430 | 102 | 43 | 81 | 40 | 0 | 0 | 58,530 |
| 5 | 0 | 0 | 0 | 0 | 3,119 | 2,373 | 959 | 1,831 | 1,815 | 1,570 | 2,199 | 534 | 571 | 220 | 626 | 128 | 46 | 46 | 83,999 |
| 6 | 128 | 112 | 46 | 0 | 5,410 | 6,655 | 1,650 | 2,080 | 3,403 | 2,199 | 4,024 | 588 | 949 | 306 | 894 | 64 | 42 | 34 | 66,382 |
| 7 | 38 | 0 | 0 | 0 | 382 | 241 | 1,474 | 1,025 | 23 | 1,402 | 405 | 627 | 122 | 314 | 357 | 92 | 0 | 54 | 66,270 |
| 8 | 0 | 0 | 44 | 0 | 846 | 135 | 1,880 | 976 | 267 | 1,151 | 775 | 1,049 | 281 | 202 | 488 | 36 | 23 | 0 | 65,844 |
| 9 | 0 | 0 | 0 | 0 | 1,689 | 168 | 1,440 | 729 | 256 | 865 | 200 | 434 | 219 | 155 | 225 | 0 | 23 | 0 | 32,595 |
| 10 | 60 | 0 | 0 | 44 | 7,865 | 1,262 | 5,170 | 4,727 | 1,262 | 2,257 | 1,142 | 1,913 | 812 | 1,145 | 734 | 271 | 207 | 0 | 105,919 |
| 11 | 476 | 35 | 70 | 0 | 3,739 | 782 | 18,587 | 8,307 | 1,381 | 4,798 | 3,650 | 8,208 | 1,102 | 2,391 | 2,681 | 548 | 367 | 773 | 191,829 |
| 12 | 58 | 56 | 38 | 0 | 516 | 0 | 1,643 | 249 | 212 | 773 | 627 | 893 | 546 | 177 | 648 | 57 | 191 | 87 | 60,396 |
| 13 | 497 | 282 | 100 | 63 | 777 | 458 | 5,023 | 3,286 | 742 | 3,213 | 2,123 | 6,016 | 757 | 1,616 | 1,921 | 499 | 456 | 249 | 242,658 |
| 14 | 300 | 177 | 56 | 29 | 738 | 459 | 4,667 | 2,000 | 396 | 2,718 | 2,339 | 14,883 | 1,158 | 8,133 | 3,725 | 684 | 650 | 803 | 107,155 |
| 15 | 304 | 64 | 32 | 46 | 405 | 132 | 1,694 | 492 | 334 | 1,573 | 518 | 3,300 | 993 | 5,993 | 2,619 | 571 | 1,149 | 739 | 64,545 |
| 16 | 392 | 297 | 58 | 155 | 0 | 62 | 593 | 245 | 0 | 93 | 281 | 485 | 141 | 821 | 477 | 97 | 64 | 166 | 77,714 |
| 17 | 285 | 2,570 | 138 | 554 | 0 | 0 | 0 | 80 | 0 | 60 | 45 | 513 | 138 | 252 | 188 | 0 | 0 | 0 | 105,875 |
| 18 | 7,031 | 3,173 | 1,158 | 728 | 77 | 115 | 1,247 | 533 | 46 | 1,388 | 516 | 1,884 | 737 | 3,275 | 2,000 | 727 | 934 | 1,062 | 107,962 |
| 19 | 34,621 | 409 | 914 | 1,643 | 54 | 88 | 54 | 168 | 84 | 453 | 226 | 220 | 666 | 537 | 1,167 | 905 | 402 | 2,248 | 64,019 |
| 20 | 276,082 | 1,488 | 4,591 | 9,027 | 280 | 372 | 1,201 | 405 | 377 | 2,543 | 1,341 | 719 | 567 | 1,409 | 3,779 | 1,064 | 764 | 3,701 | 344,762 |
| 21 | 1,792 | 32,597 | 3,343 | 8,052 | 0 | 82 | 0 | 160 | 48 | 66 | 273 | 0 | 0 | 129 | 90 | 0 | 0 | 107 | 53,467 |
| 22 | 6,180 | 1,924 | 6,771 | 28,795 | 0 | 0 | 177 | 104 | 0 | 308 | 102 | 49 | 0 | 76 | 143 | 60 | 0 | 0 | 46,218 |
| 23 | 15,058 | 5,489 | 20,682 | 185,796 | 162 | 0 | 331 | 261 | 135 | 871 | 96 | 230 | 416 | 525 | 496 | 80 | 130 | 152 | 233,556 |
| 24 | 94 | 0 | 0 | 0 | 60,281 | 10,767 | 11,276 | 25,883 | 7,373 | 7,531 | 5,225 | 3,364 | 2,267 | 1,193 | 2,011 | 474 | 68 | 372 | 166,771 |
| 25 | 209 | 0 | 0 | 0 | 10,881 | 24,553 | 1,822 | 4,520 | 11,658 | 3,683 | 5,666 | 747 | 1,001 | 293 | 1,191 | 183 | 24 | 0 | 78,314 |
| 26 | 228 | 152 | 218 | 0 | 5,535 | 1,365 | 67,136 | 24,291 | 2,396 | 10,324 | 6,025 | 11,028 | 2,083 | 3,007 | 4,921 | 463 | 487 | 249 | 174,546 |
| 27 | 668 | 0 | 422 | 184 | 42,500 | 9,471 | 58,200 | 166,111 | 17,577 | 51,862 | 15,866 | 20,865 | 9,344 | 7,135 | 12,534 | 2,529 | 855 | 1,386 | 466,245 |
| 28 | 253 | 0 | 0 | 130 | 6,117 | 10,512 | 3,490 | 8,706 | 53,317 | 12,719 | 16,939 | 1,633 | 1,746 | 734 | 1,214 | 210 | 244 | 180 | 128,231 |
| 29 | 375 | 0 | 35 | 40 | 6,547 | 2,458 | 11,535 | 40,973 | 10,524 | 88,080 | 26,240 | 7,641 | 12,176 | 3,731 | 7,557 | 1,086 | 379 | 1,006 | 233,799 |
| 30 | 383 | 0 | 0 | 0 | 2,172 | 3,050 | 4,780 | 5,613 | 13,370 | 19,270 | 40,080 | 3,732 | 4,359 | 2,838 | 5,028 | 1,146 | 382 | 493 | 115,436 |
| 31 | 475 | 0 | 0 | 225 | 2,680 | 1,198 | 13,645 | 11,187 | 1,269 | 8,495 | 4,152 | 101,316 | 5,775 | 18,987 | 15,806 | 954 | 1,823 | 798 | 214,216 |
| 32 | 261 | 0 | 0 | 39 | 856 | 551 | 3,273 | 5,252 | 1,581 | 13,887 | 5,772 | 11,431 | 36,843 | 9,305 | 25,733 | 2,780 | 668 | 1,318 | 127,441 |
| 33 | 977 | 0 | 80 | 427 | 1,262 | 104 | 7,050 | 3,770 | 1,000 | 6,370 | 5,085 | 20,031 | 5,343 | 84,574 | 32,087 | 5,731 | 7,795 | 4,960 | 202,007 |
| 34 | 1,721 | 99 | 220 | 170 | 3,131 | 1,205 | 8,177 | 8,438 | 2,791 | 17,935 | 13,743 | 26,373 | 23,100 | 42,481 | 112,503 | 16,062 | 4,386 | 9,211 | 308,412 |
| 35 | 859 | 92 | 100 | 124 | 682 | 402 | 2,573 | 2,027 | 683 | 4,916 | 3,717 | 2,843 | 4,428 | 6,578 | 19,408 | 75,415 | 2,468 | 9,646 | 141,312 |
| 36 | 750 | 59 | 91 | 34 | 363 | 38 | 1,621 | 1,332 | 267 | 2,824 | 1,671 | 3,748 | 1,412 | 15,508 | 7,227 | 1,780 | 13,503 | 4,369 | 61,300 |
| 37 | 1,133 | 96 | 211 | 42 | 186 | 240 | 845 | 642 | 305 | 2,058 | 1,495 | 960 | 1,649 | 4,052 | 7,625 | 8,681 | 2,474 | 18,684 | 53,970 |
| Total | 351,811 | 49,217 | 39,418 | 236,431 | 179,165 | 82,095 | 247,323 | 343,548 | 137,659 | 282,149 | 176,094 | 260,411 | 122,866 | 228,648 | 279,854 | 123,534 | 41,275 | 63,187 | 4,914,638 |

## Table 166 (continued)

| Production Zone | Attraction Zone: 1991 Trip Distribution Model | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 1 | 99,993 | 8,331 | 2,435 | 2,942 | 3,212 | 1,190 | 171 | 322 | 349 | 3,009 | 1,408 | 45 | 1,151 | 261 | 77 | 17 | 11 | 35 | 25 |
| 2 | 8,102 | 26,883 | 3,535 | 480 | 2,185 | 925 | 317 | 610 | 388 | 2,671 | 1,072 | 64 | 1,058 | 203 | 62 | 26 | 11 | 26 | 18 |
| 3 | 1,897 | 3,608 | 18,672 | 317 | 1,409 | 2,581 | 507 | 1,367 | 1,584 | 13,517 | 3,269 | 90 | 2,592 | 466 | 105 | 36 | 17 | 51 | 38 |
| 4 | 3,167 | 430 | 397 | 32,570 | 8,134 | 2,466 | 26 | 48 | 50 | 645 | 354 | 4 | 193 | 80 | 32 | 6 | 9 | 21 | 24 |
| 5 | 2,150 | 1,319 | 1,347 | 6,479 | 44,558 | 7,064 | 45 | 101 | 125 | 1,856 | 766 | 16 | 357 | 185 | 47 | 17 | 4 | 32 | 30 |
| 6 | 427 | 318 | 1,747 | 1,220 | 4,988 | 20,879 | 41 | 93 | 120 | 2,441 | 832 | 16 | 370 | 187 | 50 | 9 | 6 | 38 | 26 |
| 7 | 155 | 392 | 391 | 28 | 66 | 103 | 39,059 | 6,784 | 530 | 839 | 2,782 | 1,933 | 5,488 | 644 | 339 | 226 | 74 | 98 | 24 |
| 8 | 243 | 645 | 950 | 40 | 121 | 179 | 7,800 | 22,099 | 1,625 | 1,820 | 5,332 | 2,315 | 11,150 | 985 | 471 | 176 | 74 | 130 | 26 |
| 9 | 315 | 402 | 2,288 | 50 | 175 | 301 | 428 | 1,423 | 5,703 | 4,676 | 3,921 | 91 | 4,893 | 548 | 94 | 26 | 16 | 42 | 15 |
| 10 | 806 | 664 | 6,281 | 175 | 721 | 1,541 | 250 | 637 | 1,818 | 39,363 | 10,976 | 82 | 3,239 | 876 | 158 | 43 | 25 | 64 | 48 |
| 11 | 318 | 245 | 1,098 | 78 | 251 | 493 | 746 | 1,640 | 1,726 | 8,752 | 78,948 | 399 | 21,757 | 8,275 | 767 | 128 | 80 | 238 | 85 |
| 12 | 77 | 157 | 176 | 16 | 37 | 69 | 4,333 | 5,039 | 287 | 570 | 3,627 | 14,316 | 14,159 | 1,275 | 4,791 | 1,963 | 562 | 711 | 55 |
| 13 | 321 | 360 | 920 | 68 | 187 | 332 | 2,395 | 5,539 | 2,672 | 3,587 | 34,899 | 3,471 | 132,881 | 9,559 | 3,463 | 607 | 327 | 943 | 124 |
| 14 | 84 | 67 | 197 | 36 | 80 | 179 | 228 | 462 | 287 | 1,100 | 15,936 | 261 | 10,833 | 21,963 | 3,347 | 238 | 150 | 563 | 134 |
| 15 | 45 | 56 | 98 | 19 | 46 | 86 | 364 | 519 | 121 | 424 | 2,786 | 2,209 | 6,614 | 3,631 | 20,479 | 1,578 | 546 | 2,221 | 206 |
| 16 | 18 | 33 | 51 | 9 | 15 | 41 | 406 | 332 | 55 | 171 | 889 | 1,314 | 2,202 | 685 | 4,458 | 48,431 | 9,220 | 2,955 | 131 |
| 17 | 10 | 16 | 22 | 3 | 10 | 19 | 96 | 106 | 34 | 82 | 417 | 249 | 877 | 295 | 678 | 10,891 | 79,518 | 5,174 | 160 |
| 18 | 45 | 26 | 67 | 25 | 53 | 89 | 105 | 151 | 75 | 312 | 1,524 | 304 | 2,937 | 1,473 | 4,083 | 1,795 | 2,224 | 57,942 | 2,989 |
| 19 | 14 | 11 | 23 | 18 | 25 | 58 | 20 | 21 | 19 | 102 | 318 | 17 | 244 | 168 | 188 | 38 | 46 | 1,701 | 12,751 |
| 20 | 34 | 27 | 50 | 41 | 82 | 130 | 41 | 63 | 30 | 244 | 802 | 45 | 576 | 407 | 411 | 107 | 138 | 3,295 | 24,509 |
| 21 | 5 | 5 | 7 | 6 | 12 | 21 | 19 | 16 | 5 | 44 | 152 | 28 | 246 | 105 | 190 | 318 | 1,132 | 4,642 | 1,116 |
| 22 | 5 | 2 | 7 | 1 | 9 | 20 | 6 | 6 | 3 | 31 | 97 | 3 | 74 | 50 | 52 | 30 | 71 | 831 | 1,662 |
| 23 | 12 | 11 | 19 | 11 | 32 | 49 | 10 | 21 | 12 | 86 | 253 | 16 | 209 | 129 | 128 | 78 | 210 | 1,699 | 3,135 |
| 24 | 554 | 440 | 2,620 | 400 | 1,530 | 5,775 | 161 | 343 | 646 | 14,304 | 7,388 | 58 | 2,035 | 984 | 215 | 47 | 31 | 109 | 55 |
| 25 | 181 | 121 | 708 | 458 | 1,181 | 6,394 | 33 | 75 | 104 | 2,322 | 1,017 | 18 | 382 | 190 | 56 | 11 | 10 | 33 | 34 |
| 26 | 235 | 175 | 676 | 95 | 283 | 598 | 224 | 395 | 332 | 4,743 | 19,417 | 105 | 3,896 | 2,888 | 491 | 72 | 56 | 185 | 105 |
| 27 | 753 | 528 | 2,141 | 557 | 1,321 | 4,116 | 415 | 743 | 851 | 13,629 | 22,055 | 181 | 5,838 | 3,619 | 734 | 150 | 87 | 374 | 287 |
| 28 | 144 | 93 | 329 | 409 | 819 | 2,775 | 49 | 92 | 106 | 1,538 | 1,467 | 18 | 662 | 338 | 109 | 23 | 15 | 79 | 109 |
| 29 | 226 | 145 | 437 | 377 | 690 | 1,708 | 192 | 271 | 174 | 2,002 | 5,694 | 95 | 2,414 | 1,580 | 419 | 88 | 55 | 264 | 296 |
| 30 | 100 | 60 | 148 | 187 | 330 | 734 | 82 | 106 | 62 | 639 | 1,935 | 37 | 957 | 609 | 180 | 40 | 27 | 134 | 161 |
| 31 | 182 | 106 | 409 | 89 | 203 | 412 | 242 | 423 | 270 | 2,254 | 13,838 | 168 | 5,290 | 8,589 | 1,156 | 140 | 95 | 358 | 215 |
| 32 | 77 | 52 | 146 | 122 | 217 | 479 | 96 | 160 | 78 | 716 | 2,893 | 57 | 1,387 | 1,014 | 343 | 59 | 40 | 238 | 234 |
| 33 | 117 | 77 | 232 | 80 | 151 | 315 | 150 | 251 | 152 | 1,258 | 5,475 | 123 | 3,033 | 4,553 | 2,863 | 197 | 123 | 994 | 565 |
| 34 | 150 | 99 | 280 | 177 | 324 | 674 | 201 | 306 | 165 | 1,448 | 6,031 | 155 | 3,153 | 4,010 | 1,537 | 193 | 139 | 881 | 934 |
| 35 | 56 | 25 | 96 | 78 | 127 | 238 | 68 | 85 | 54 | 414 | 1,454 | 49 | 934 | 795 | 434 | 73 | 53 | 531 | 1,304 |
| 36 | 41 | 26 | 60 | 29 | 47 | 97 | 42 | 71 | 46 | 336 | 1,354 | 38 | 896 | 1,108 | 1,526 | 73 | 46 | 871 | 571 |
| 37 | 22 | 22 | 37 | 27 | 50 | 99 | 40 | 30 | 18 | 196 | 685 | 16 | 441 | 381 | 315 | 33 | 30 | 517 | 1,550 |
| Total | 121,081 | 45,977 | 49,097 | 47,717 | 73,681 | 63,229 | 59,408 | 50,750 | 20,676 | 132,141 | 262,063 | 28,406 | 255,418 | 83,108 | 54,848 | 67,983 | 95,278 | 89,020 | 53,751 |

## Table 166 (continued)

| Production Zone | Attraction Zone: 1991 Trip Distribution Model | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | |
| 1 | 57 | 9 | 4 | 14 | 2,155 | 756 | 1,463 | 1,752 | 627 | 1,104 | 677 | 815 | 346 | 409 | 419 | 131 | 54 | 82 | 135,858 |
| 2 | 37 | 3 | 4 | 9 | 1,657 | 533 | 1,030 | 1,234 | 366 | 666 | 360 | 577 | 199 | 265 | 253 | 83 | 43 | 43 | 55,998 |
| 3 | 70 | 7 | 7 | 21 | 5,581 | 1,782 | 2,563 | 3,090 | 821 | 1,278 | 715 | 1,231 | 412 | 544 | 530 | 140 | 85 | 87 | 71,087 |
| 4 | 65 | 8 | 6 | 15 | 1,263 | 1,201 | 480 | 1,134 | 1,239 | 1,616 | 1,075 | 378 | 469 | 201 | 444 | 145 | 52 | 83 | 58,530 |
| 5 | 94 | 11 | 9 | 30 | 3,663 | 2,405 | 1,040 | 1,977 | 1,914 | 2,296 | 1,518 | 624 | 671 | 310 | 582 | 188 | 59 | 110 | 83,999 |
| 6 | 103 | 11 | 7 | 34 | 8,437 | 8,247 | 1,226 | 3,375 | 3,713 | 2,754 | 1,722 | 750 | 729 | 373 | 701 | 213 | 68 | 111 | 66,382 |
| 7 | 72 | 14 | 2 | 24 | 491 | 118 | 1,115 | 810 | 156 | 765 | 449 | 920 | 310 | 404 | 419 | 114 | 53 | 79 | 66,270 |
| 8 | 83 | 12 | 12 | 28 | 890 | 208 | 1,816 | 1,313 | 260 | 1,053 | 577 | 1,423 | 427 | 611 | 601 | 156 | 92 | 101 | 65,844 |
| 9 | 40 | 7 | 8 | 10 | 1,428 | 302 | 1,304 | 1,171 | 260 | 588 | 316 | 769 | 216 | 309 | 295 | 66 | 49 | 50 | 32,595 |
| 10 | 123 | 13 | 13 | 36 | 11,346 | 2,051 | 6,963 | 7,503 | 1,365 | 2,002 | 1,035 | 2,568 | 630 | 1,050 | 938 | 220 | 146 | 150 | 105,919 |
| 11 | 299 | 34 | 29 | 99 | 4,927 | 741 | 21,208 | 9,967 | 1,026 | 4,182 | 2,034 | 11,556 | 1,712 | 3,837 | 2,789 | 570 | 415 | 380 | 191,829 |
| 12 | 151 | 79 | 24 | 56 | 383 | 93 | 1,286 | 750 | 153 | 943 | 539 | 1,347 | 397 | 813 | 714 | 183 | 134 | 131 | 60,396 |
| 13 | 394 | 95 | 55 | 120 | 2,088 | 456 | 7,507 | 4,330 | 720 | 4,027 | 2,211 | 7,958 | 1,683 | 3,768 | 2,903 | 704 | 512 | 472 | 242,658 |
| 14 | 320 | 65 | 35 | 93 | 1,120 | 240 | 6,341 | 3,061 | 467 | 2,963 | 1,584 | 16,341 | 1,438 | 9,794 | 4,789 | 803 | 960 | 596 | 107,155 |
| 15 | 515 | 150 | 52 | 180 | 450 | 120 | 1,783 | 1,060 | 233 | 1,437 | 836 | 3,059 | 760 | 6,683 | 2,481 | 577 | 1,477 | 644 | 64,545 |
| 16 | 345 | 440 | 73 | 208 | 176 | 46 | 584 | 389 | 98 | 537 | 336 | 770 | 272 | 848 | 697 | 181 | 159 | 139 | 77,714 |
| 17 | 471 | 2,967 | 230 | 718 | 87 | 36 | 301 | 214 | 52 | 286 | 183 | 394 | 155 | 422 | 383 | 113 | 95 | 111 | 105,875 |
| 18 | 6,271 | 3,780 | 1,027 | 2,481 | 362 | 121 | 1,216 | 814 | 287 | 1,588 | 1,046 | 1,742 | 864 | 3,501 | 2,542 | 975 | 1,681 | 1,445 | 107,962 |
| 19 | 31,295 | 546 | 1,262 | 2,689 | 133 | 74 | 389 | 395 | 186 | 1,117 | 742 | 616 | 591 | 1,033 | 2,003 | 1,831 | 731 | 2,604 | 64,019 |
| 20 | 267,393 | 1,192 | 5,453 | 14,412 | 313 | 187 | 967 | 902 | 461 | 2,501 | 1,665 | 1,358 | 1,303 | 2,015 | 3,795 | 4,139 | 1,218 | 4,456 | 344,762 |
| 21 | 2,414 | 31,530 | 2,290 | 6,069 | 50 | 35 | 146 | 155 | 74 | 372 | 255 | 218 | 205 | 365 | 518 | 254 | 161 | 287 | 53,467 |
| 22 | 6,953 | 1,649 | 7,586 | 24,672 | 44 | 21 | 123 | 110 | 49 | 306 | 200 | 155 | 175 | 222 | 401 | 201 | 125 | 266 | 46,218 |
| 23 | 16,967 | 3,672 | 19,699 | 181,252 | 119 | 46 | 296 | 308 | 134 | 735 | 501 | 426 | 394 | 583 | 957 | 508 | 276 | 563 | 233,556 |
| 24 | 200 | 17 | 20 | 66 | 52,573 | 13,993 | 11,353 | 25,242 | 7,753 | 5,368 | 2,854 | 4,083 | 1,418 | 1,628 | 1,638 | 401 | 213 | 256 | 166,771 |
| 25 | 113 | 10 | 14 | 34 | 15,323 | 21,976 | 1,528 | 6,395 | 9,398 | 3,942 | 2,540 | 874 | 993 | 443 | 929 | 256 | 73 | 145 | 78,314 |
| 26 | 301 | 36 | 33 | 99 | 7,010 | 994 | 52,700 | 30,603 | 2,091 | 10,525 | 4,043 | 17,098 | 3,188 | 4,985 | 4,161 | 719 | 513 | 476 | 174,546 |
| 27 | 753 | 64 | 90 | 245 | 36,942 | 9,818 | 60,244 | 152,354 | 25,535 | 45,710 | 18,908 | 25,462 | 10,248 | 7,084 | 10,326 | 2,007 | 855 | 1,221 | 466,245 |
| 28 | 252 | 27 | 27 | 84 | 6,995 | 8,171 | 2,643 | 15,535 | 45,089 | 15,388 | 14,857 | 1,982 | 2,941 | 1,104 | 2,655 | 708 | 207 | 392 | 128,231 |
| 29 | 842 | 73 | 90 | 264 | 4,554 | 2,916 | 12,142 | 29,364 | 14,001 | 70,765 | 32,987 | 11,705 | 14,546 | 5,217 | 12,281 | 2,615 | 790 | 1,520 | 233,799 |
| 30 | 438 | 40 | 40 | 148 | 1,475 | 1,302 | 3,017 | 6,857 | 9,479 | 25,527 | 40,830 | 3,699 | 6,325 | 2,199 | 5,079 | 1,323 | 377 | 753 | 115,436 |
| 31 | 564 | 54 | 60 | 182 | 2,850 | 604 | 20,629 | 12,643 | 1,453 | 10,954 | 4,987 | 75,157 | 7,383 | 20,161 | 17,871 | 1,583 | 1,468 | 1,174 | 214,216 |
| 32 | 619 | 60 | 63 | 183 | 1,108 | 741 | 4,643 | 6,152 | 2,531 | 20,505 | 10,100 | 11,730 | 25,989 | 6,260 | 23,087 | 3,085 | 773 | 1,404 | 127,441 |
| 33 | 1,277 | 126 | 136 | 356 | 1,524 | 438 | 7,483 | 4,521 | 1,203 | 7,863 | 4,616 | 20,063 | 5,619 | 73,103 | 34,282 | 5,078 | 8,477 | 5,133 | 202,007 |
| 34 | 2,240 | 192 | 215 | 580 | 1,990 | 1,027 | 8,653 | 8,156 | 3,215 | 21,173 | 12,323 | 26,929 | 22,361 | 43,502 | 101,028 | 19,134 | 5,001 | 9,836 | 308,412 |
| 35 | 3,595 | 132 | 158 | 476 | 578 | 345 | 1,881 | 1,989 | 1,091 | 6,367 | 4,439 | 3,223 | 5,272 | 6,856 | 22,099 | 62,896 | 2,309 | 10,738 | 141,312 |
| 36 | 1,177 | 109 | 93 | 292 | 412 | 143 | 1,754 | 1,111 | 372 | 2,343 | 1,446 | 3,563 | 1,418 | 15,449 | 7,552 | 2,660 | 8,913 | 5,215 | 61,300 |
| 37 | 3,579 | 116 | 152 | 402 | 237 | 138 | 867 | 848 | 407 | 2,420 | 1,532 | 1,477 | 1,462 | 3,980 | 8,200 | 8,795 | 2,779 | 12,070 | 53,970 |
| Total | 350,482 | 47,350 | 39,078 | 236,681 | 180,734 | 82,425 | 250,684 | 347,584 | 138,279 | 283,966 | 177,038 | 263,040 | 123,521 | 230,331 | 281,342 | 123,755 | 41,393 | 63,323 | 4,914,638 |

*Source: SEWRPC.*

Table 167

COMPARISON OF AVERAGE WEEKDAY TRANSIT RIDERSHIP IN THE MILWAUKEE URBANIZED AREA: 1990 OBSERVED VERSUS 1990 MODEL-ESTIMATED FIGURES

| Trip Category | Linked Transit Revenue Trips | | |
|---|---|---|---|
| | Observed 1990 | Estimated 1990 | Percent Difference |
| Milwaukee Urbanized Area | | | |
| Home-Based Work | 40,900 | 45,300 | 10.8 |
| Home-Based Shopping | 14,900 | 15,100 | 1.3 |
| Home-Based Other | 26,900 | 29,100 | 8.2 |
| Nonhome-Based | 10,800 | 13,700 | 26.9 |
| School[a] | 61,700 | 61,800 | 0.2 |
| Total | 155,200 | 165,000 | 6.3 |

[a]*Excludes trips made on yellow school bus.*

*Source: SEWRPC.*

Table 168

COMPARISON OF AVERAGE WEEKDAY UNLINKED TRANSIT PASSENGER TRIPS (BOARDING PASSENGERS) CARRIED BY TRANSIT OPERATORS SERVING THE FOUR-COUNTY MILWAUKEE METROPOLITAN STATISTICAL AREA: ACTUAL 1990 OPERATOR COUNTS AND 1990 MODEL ESTIMATES

| Transit Provider | 1990 Actual[a] | 1990 Model Estimated |
|---|---|---|
| Milwaukee County Transit System | 228,900 | 236,500 |
| Waukesha County (Wisconsin Coach Lines, Inc.) | 600 | 2,800 |
| City of Waukesha Transit System Utility—Metro Transit | 2,800 | 4,400 |
| Total | 232,300 | 243,700 |

[a]*Based on actual operator counts taken during the months of September through June during 1989 through 1991 by the Milwaukee County Transit System, the City of Waukesha Transit System Utility, and Wisconsin Coach Lines, Inc., for Waukesha County. Counts were adjusted to account for monthly and annual variations in ridership so as to be more representative of average weekday 1990 volumes.*

*Source: SEWRPC.*

Table 169

COMPARISON OF 1990 OBSERVED AND 1990 MODEL-ESTIMATED AVERAGE WEEKDAY TRANSIT RIDERSHIP BY TIME PERIOD FOR TRANSIT OPERATORS SERVING THE FOUR-COUNTY MILWAUKEE METROPOLITAN STATISTICAL AREA

| Time Period | Average Weekday Unlinked Passenger Trips (boarding passengers) | | | |
|---|---|---|---|---|
| | 1990 Observed | | 1990 Estimated | |
| | Number | Percent of Daily Total | Number | Percent of Daily Total |
| Morning Peak Period | 52,700 | 22.7 | 62,700 | 25.7 |
| Midday Nonpeak Period | 69,800 | 30.0 | 71,200 | 29.2 |
| Afternoon Peak Period | 76,100 | 32.8 | 82,600 | 33.9 |
| Night Nonpeak Period | 33,700 | 14.5 | 27,200 | 11.2 |
| Total | 232,300 | 100.0 | 243,700 | 100.0 |

*Source: SEWRPC.*

upon actual weekday passenger counts taken by the transit operators between 1989 and 1991 as adjusted to account for monthly and annual variations in ridership levels so as to be representative of average weekday 1990 ridership.

## Highway Travel Demand

The estimated 1990 arterial street average weekday traffic volumes derived from application of the traffic simulation models were compared to estimated 1990 average weekday traffic volumes derived from actual traffic counts. Table 171 presents a comparison of estimated vehicle-miles of travel from the traffic models and traffic counts for each county within Southeastern Wisconsin. Map 82 presents a comparison of the estimated average weekday traffic for the freeway system and selected major

Table 170

**COMPARISON OF ACTUAL TRANSIT RIDERSHIP COUNTS TO MODEL-ESTIMATED TRANSIT RIDERSHIP ON SELECTED BUS ROUTES WITHIN THE REGION: 1990**

| Bus Route | Average Weekday Unlinked Trips (boarding passengers) | | | |
|---|---|---|---|---|
| | 1990 Actual[a] | 1990 Model Estimated | Difference (estimated to actual) | Percent Difference |
| Milwaukee County Transit System | | | | |
| Route No. 10 | 6,400 | 8,310 | 1,910 | 30 |
| Route No. 12 | 13,000 | 12,560 | -400 | -3 |
| Route No. 14, 14X | 7,950 | 7,080 | -870 | -11 |
| Route No. 15 | 11,930 | 15,040 | 3,110 | 26 |
| Route No. 18 | 7,430 | 6,700 | -730 | -10 |
| Route No. 19 | 16,130 | 16,150 | 20 | 0 |
| Route No. 23, 23X | 10,510 | 13,930 | 3,420 | 32 |
| Route No. 27 | 16,530 | 14,190 | -2,340 | -14 |
| Route No. 30, 30X | 24,690 | 29,870 | 5,180 | 21 |
| Route No. 31 | 8,050 | 8,190 | 140 | 2 |
| Route No. 62 | 10,900 | 7,790 | -3,110 | -28 |
| Route No. 76 | 9,430 | 12,550 | 3,120 | -33 |
| Route No. 80 | 9,620 | 10,890 | 1,270 | -13 |
| Total | 152,570 | 163,250 | 10,680 | 7 |

[a]*Based on actual operator counts taken during the months of September through June during 1989 through 1991 by the Milwaukee County Transit System. Counties were adjusted to account for monthly and annual variations in ridership so as to be more representative of average weekday 1990 volumes.*

*Source: SEWRPC.*

Table 171

**COMPARISON OF ESTIMATED VEHICLE MILES OF TRAVEL ON AN AVERAGE WEEKDAY IN THE REGION: 1990**

| County | Estimated Average Weekday Vehicle-Miles of Travel from Traffic Counts | Estimated Average Weekday Forecast Vehicle-Miles of Travel from Travel Simulation Models | Percent of Estimated Travel |
|---|---|---|---|
| Kenosha | 2,500,000 | 2,755,000 | 110.2 |
| Milwaukee | 14,391,000 | 14,691,000 | 102.1 |
| Ozaukee | 1,942,000 | 2,057,000 | 105.9 |
| Racine | 2,966,000 | 3,273,000 | 110.4 |
| Walworth | 1,913,000 | 2,179,000 | 113.9 |
| Washington | 2,379,000 | 2,436,000 | 102.4 |
| Waukesha | 6,981,000 | 7,693,000 | 110.2 |
| Region | 33,072,000 | 35,054,000 | 106.0 |

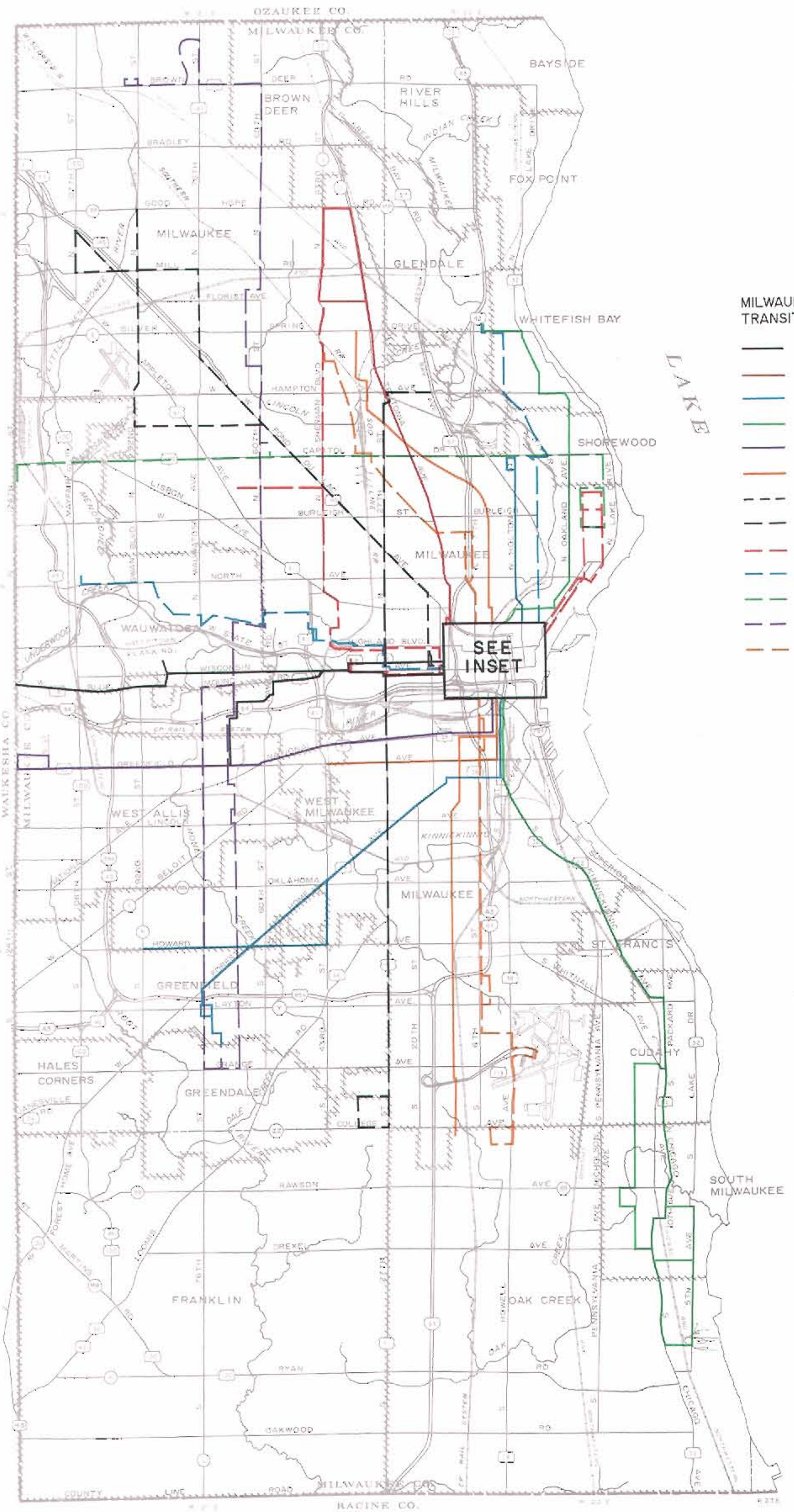
*Source: SEWRPC.*

arterials within Southeastern Wisconsin and Map 83 presents such a comparison for all arterial facilities within the East-West Corridor in Southeastern Wisconsin.

It may be concluded that the traffic simulation models have the ability to forecast traffic volume with adequate accuracy for transportation planning and facility design purposes. This is particularly true when it is recognized that the actual traffic counts are estimates themselves, having been taken over a triennial period centered on the base year. As such, the counts reflect yearly as well as seasonal variations in traffic flow and random errors that occur in the counting process itself.

## Map 81

## MAJOR LOCAL AND EXPRESS BUS ROUTES OPERATED WITHIN MILWAUKEE COUNTY: 1991




LEGEND

MILWAUKEE COUNTY TRANSIT SYSTEM

- ROUTE NO. 10
- ROUTE NO. 12
- ROUTE NO. 14, 14X
- ROUTE NO. 15
- ROUTE NO. 18
- ROUTE NO. 19
- ROUTE NO. 23, 23X
- ROUTE NO. 27
- ROUTE NO. 30, 30X
- ROUTE NO. 31
- ROUTE NO. 62
- ROUTE NO. 76
- ROUTE NO. 80

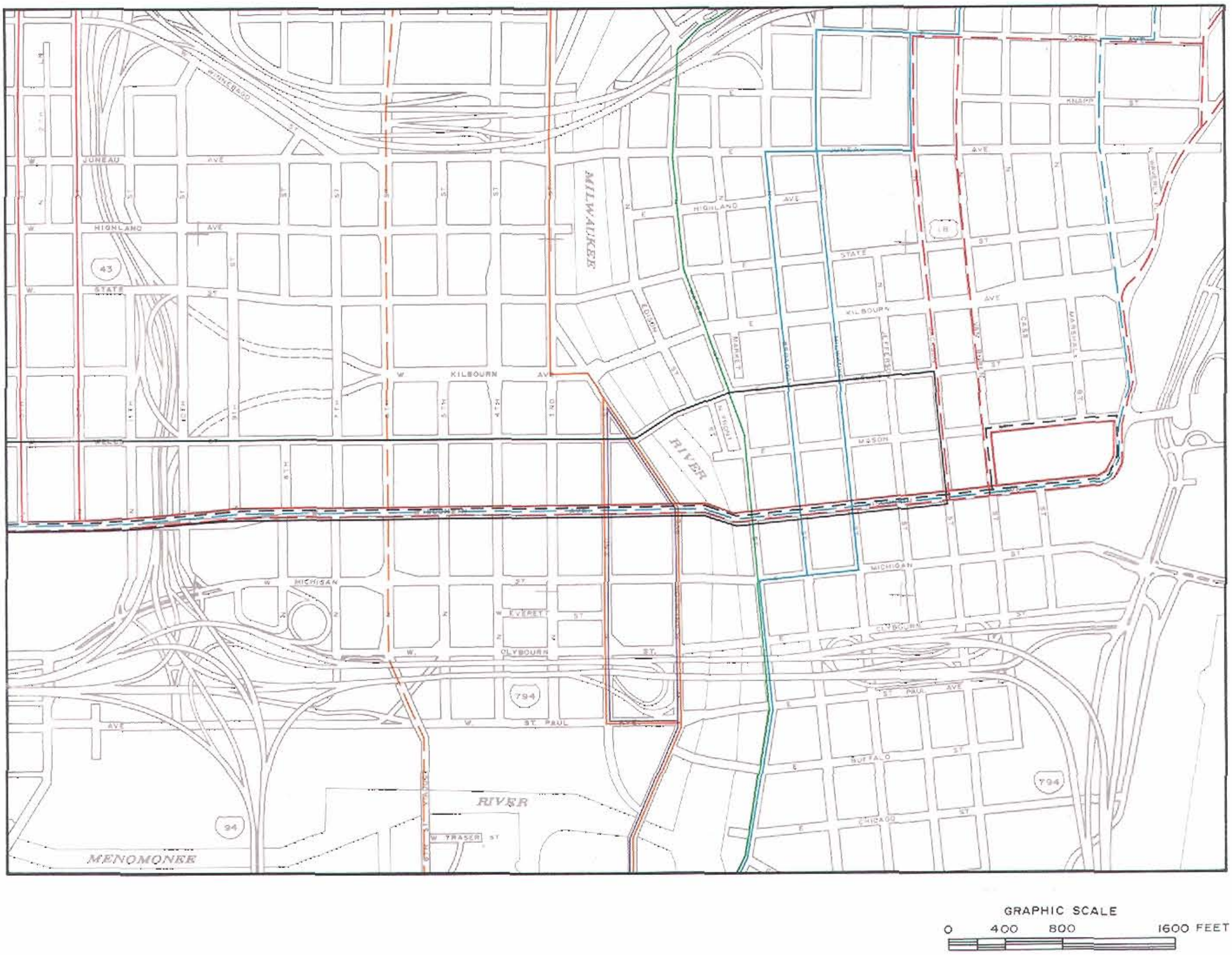
GRAPHIC SCALE

0 2 MILES

0 4000 8000 12000 FEET

*Source: SEWRPC.*

**Map 81 Inset**




The major local and express bus routes operated by the Milwaukee County Transit System in 1991 are shown on this map. These routes were selected for purposes of comparing passenger counts with ridership estimates obtained by application of the travel simulation models. A comparison of the passenger counts with the ridership estimates obtained through simulation modeling is set forth in Table 170 for these routes. That comparison demonstrates that the models accurately simulate actual loadings on the transit system.

*Source: SEWRPC.*

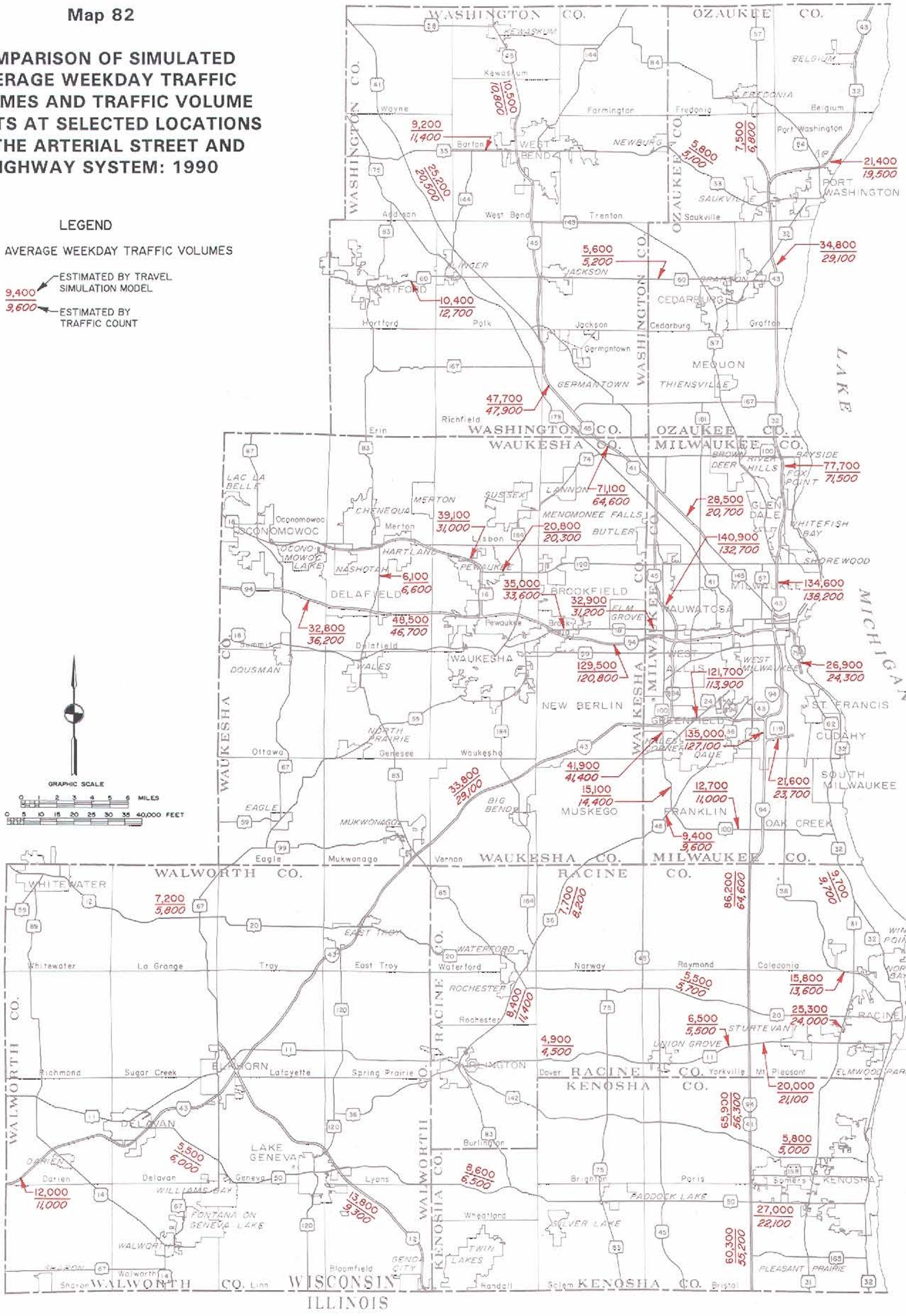
## ISSUES RELATING TO TRAVEL SIMULATION MODELS

Nationally, criticisms have from time to time been leveled against the travel simulation models now widely used in transportation system planning. These criticisms have usually been general and leveled primarily by academicians. Some of these criticisms are valid. Others, however, are not valid, particularly with respect to the travel simulation models which have been developed and refined by the Commission over the past 30 years for application in Southeastern Wisconsin. This section of the report identifies and responds to these criticisms.

One of the principal general criticisms of traffic simulation models is that the models have been designed only to produce forecasts of vehicular traffic for use in highway planning and engineering. This is not true with respect to the Commission travel simulation models. For over 30 years the Commission travel simulation models have been developed to assist in both transit and

## Map 82

**COMPARISON OF SIMULATED AVERAGE WEEKDAY TRAFFIC VOLUMES AND TRAFFIC VOLUME COUNTS AT SELECTED LOCATIONS ON THE ARTERIAL STREET AND HIGHWAY SYSTEM: 1990**

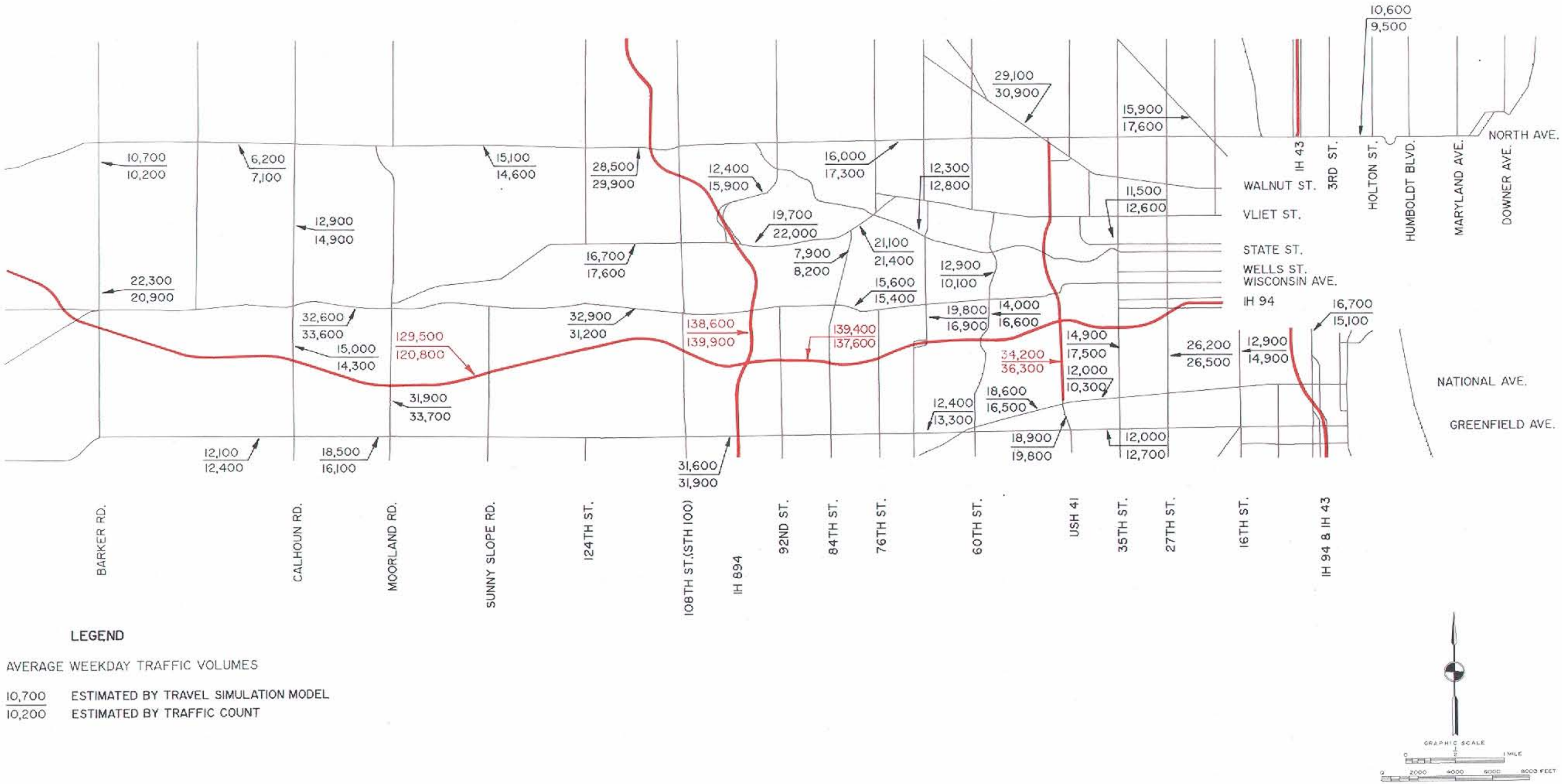



Portrayed on this map are comparisons of the estimated average weekday travel volumes as obtained by traffic counts and by travel simulation model application at selected locations on the regional freeways and surface arterial streets and highways within the Region. These comparisons between traffic counts and simulation model results indicate that the models have the ability to simulate traffic volumes with an accuracy fully adequate for transportation planning and facility design purposes.

*Source: SEWRPC.*

## Map 83

### COMPARISON OF ESTIMATED AVERAGE WEEKDAY TRAFFIC VOLUMES AT SELECTED LOCATIONS ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE EAST-WEST TRAVEL CORRIDOR IN SOUTHEASTERN WISCONSIN: 1991




This map, like Map 82, provides a comparison of average weekday traffic volumes obtained through traffic counting programs and through the application of the regional travel simulation models. This particular comparison demonstrates the validity of the models for use in conducting the East-West corridor study, a study sponsored by the Wisconsin Department of Transportation and carried out simultaneously with the preparation of the new regional transportation system plan. The comparison indicates that the models can adequately simulate traffic flows on the arterial street and highway system.

*Source: SEWRPC.*

highway system planning and facility engineering, as well as to facilitate consideration of the implications of potential public transit and arterial street and highway improvements on transit ridership and on arterial street and highway traffic volumes and operating conditions. In this respect, it may be noted that the Commission second-generation and the new third-generation travel simulation models presented in this chapter have been reviewed and approved by the Federal Transit Administration for use in detailed corridor-level evaluation of transit alternatives. The Commission travel simulation models have also been designed and applied to facilitate consideration of the implications of alternative regional land use patterns and of the effects of differing levels of population and economic activity and of socio-economic change on travel patterns and on transit and arterial street and highway traffic volumes.

Another general criticism typically leveled against traffic simulation models is that such models are often developed utilizing travel data which may be 10 to 20 years old and substantially out of date or that such models are often developed on the basis of a very small sample survey of existing travel habits and patterns. The Commission travel simulation models, however, have been developed, calibrated, and validated using current travel data. The initial model development took place in 1963 using then current travel and related land use data derived from a comprehensive travel survey. The models were re-calibrated and validated in 1972 based upon the findings of a second "full scale" comprehensive travel survey. The models were again re-calibrated and revalidated in 1991 based upon the findings of a third full-scale comprehensive travel survey.

Another general criticism typically leveled against travel simulation models is that the models reflect neither the implications of traffic congestion nor of substantial highway improvements on trip length and modal choice. This criticism sometimes notes that some models do reflect the effect of traffic congestion and substantial highway improvements on route choice. The Commission travel simulation models, however, have been designed and applied to reflect the effect of congestion, as well as of substantial highway improvements, on travel patterns and trip lengths through use of the trip distribution model, and the effect on modal choice through use of the modal split model, as well as on route choice. The Commission travel simulation models do not, however, assume that traffic congestion or substantial highway improvements will substantially alter trip generation, that is, the number of trips made by households on an average weekday for work, shopping, and other trip purposes. As shown by the Commission travel surveys conducted in a consistent, comprehensive manner at three points in time over a 30-year period, household trip generation rates have been remarkably stable, particularly when the households are categorized by automobile availability and household size.

Another general criticism of travel simulation models relates to the application of the models in the preparation of a transportation system plan. The criticism is that the model applications result in "self-fulfilling" projections of substantially increasing highway traffic and congestion in outlying areas, and this leads to recommendations for excessive highway improvements. This criticism is not valid with respect to the Commission use of its travel simulation models in the regional transportation system planning process. The criticized projections of increasing highway congestion in outlying areas are the result of assumed continuation of existing trends toward the areawide dispersion of urban development and the attendant inputs to the travel models. The Commission, however, has never based its transportation system planning on a forecast of a land use pattern resulting from an assumed continuation of existing land use trends; rather, it derives its travel and traffic forecasts from a normative land use plan which seeks to modify existing land use development trends by a return to a centralized pattern of development.[5] The

[5]*It should be noted in this respect that, in the preparation of the first generation regional transportation system plan, the then State Highway Commission of Wisconsin asked that the Regional Planning Commission prepare an "unplanned" existing trends projection of land use development trends to test the sensitivity of the then recommended highway element of the regional transportation system to a land use pattern substantially different from the recommended regional land use plan. In the preparation of the third generation regional transportation system plan, the Wisconsin Departments of Transportation and Natural Resources made a similar request.*

application of the Commission travel simulation models, therefore, indicates the potential travel patterns and highway and transit traffic volumes attendant to a centralized development plan and recommends transportation improvements which would provide the implementation of that land use plan.

Another general criticism typically leveled at the application of travel simulation models in transportation system planning is that, following the application of the travel simulation models in the design and test of alternative transportation system plans and in the development of a recommended transportation system plan, there is no test through application of a land use simulation model of the recommended transportation system plan with respect to its potential to promote desirable land use development and redevelopment. The Commission has always conducted such a test of its recommended transportation system plan. The Commission, however, has conducted such tests through direct measurement of the accessibility provided by the recommended transportation system plan and by comparing the overall level of accessibility and change in accessibility levels to the desired land use pattern in the adopted regional land use plan. The Commission transportation planning objectives and standards explicitly call for higher levels of accessibility to be provided to areas proposed for urban development and redevelopment. The Commission believes that this is a better test than the use of land use simulation models which the Commission has investigated but rejected as unreliable. Land use simulation models typically do not forecast the location of basic employment, which is an important determinant of a future land use pattern, but distribute such employment intuitively. Land use simulation models typically also do not incorporate the effects of natural resource features on the location of land use development. Historically, natural resource features and the availability of sewer service rather than transportation facilities have been the most important factors influencing land use development patterns within Southeastern Wisconsin. The Commission review of accessibility nevertheless allows direct analysis of the potential influence of transportation improvements on land use development and redevelopment.

Another criticism typically leveled against travel simulation models is that the models have not been developed and applied at a level of detail sufficient to provide reasonable forecasts of traffic for individual highway and transit facilities, or even for broader multi-facility corridors. The Commission has historically developed and maintained a highly detailed travel model with respect to size of traffic analysis zones and level of detail of the highway and transit networks. This has been done specifically to permit the models to be used in the development of traffic forecasts for the second-level planning and engineering of individual highway and transit facilities. The Commission travel simulation models utilize 1,431 internal traffic analysis zones within the 2,689-square-mile Region. The zone size varies with the type and density of land use and ranges down to individual city blocks of about five acres in size. The Commission transportation networks include all arterial street and highway facilities in the Region, totaling approximately 3,300 miles. The Commission transportation networks also include every public transit route operating in the Region. Traffic analysis zones are carefully delineated to permit accurate determination of transit walk access distances and times for each zone, which is necessary to estimate potential transit ridership accurately. The Commission simulation models are calibrated and validated against actual highway traffic and transit ridership volumes and travel times in order to assure that the model accurately represents highway and transit travel times between subareas of the Region, as well as highway and transit traffic on individual facilities.

A related common criticism of travel simulation models is that the highway networks used do not separate street segment and street intersection capacities to permit consideration of the potential effects of both on highway travel time. The Commission has carefully investigated this issue and found that the refinement implied by the criticism is not essential to producing accurate arterial street and highway travel times and volumes in Southeastern Wisconsin. The investigation involved the comparison of model-estimated traffic volumes to actual ground counts and model-estimated travel times to actual measured travel times in both peak and off-peak travel periods. The comparisons consistently indicate that model-estimated traffic volumes and travel times are within 5 to 10 percent of ground traffic counts and measured travel times.

Another general criticism typically leveled against travel simulation models is that the models do not accurately estimate future changes in trip generation or account for varying trip generation rates within a planning area. Commission validations of its travel simulation models, however, have demonstrated that the models do indeed accurately estimate trip production over time, even during periods of substantial socio-economic, lifestyle, and land use changes. To this end, the Commission trip production model incorporates considerations of household size, vehicle ownership, residential density, and household income.

Another general criticism of travel models is that the models may accurately forecast average weekday traffic but do not produce accurate estimates of peak-hour traffic. The Commission travel simulation models provide forecasts of peak-hour traffic volumes from 24-hour average weekday traffic volumes, using factors developed for each individual arterial facility. Within the Region, peak-hour traffic generally represents about 10 percent of the average weekday traffic on an arterial facility, almost always falling within a range of 8 to 12 percent, with the lower percentage typical of facilities serving areas devoted to retail land uses and/or subject to substantial traffic congestion and the higher percentage typical of lower-volume facilities and facilities which serve areas devoted to residential, industrial, and office land use development. Because of the relatively small variation in peak-hour traffic on arterial facilities, the Commission intends to maintain this procedure.

A related criticism is that work and school travel trip distribution and modal choice should be based on peak-hour travel times and not on average daily travel times. However, while the Commission travel simulation models are designed to normally produce forecasts of average weekday traffic volumes for all trip purposes, the models have a feature which permits the incorporation in the trip distribution and modal choice steps of peak-hour travel times for the modeling of work and school travel.

Another general criticism of travel simulation models is that the models cannot directly incorporate the effects of substantial changes in the price, or cost, of travel which may be postulated as potential public policy for demand management purposes. The Commission travel simulation models do permit the incorporation of such pricing measures directly into the modal choice element. The Commission has also in the past utilized trip distribution models which can be used to determine the probable effects of substantial changes in travel costs. In the consideration of pricing alternatives as part of the third-generation regional transportation system plan preparation, the Commission will directly incorporate the pricing alternatives in the modal choice model and will utilize a trip distribution model which considers both travel time and cost in the determination of travel patterns and trip length.

Another general criticism of the travel simulation models is that the models do not directly incorporate the potential for reduced trip production and reduced automobile travel as a result of higher-density land use development and site designs which promote travel by modes other than the automobile. The Commission travel simulation models indirectly incorporate the effect of higher-density development by including residential density in the automobile ownership model, automobile ownership being a key variable in the forecast of trip production. Modifications to the models to consider site design considerations directly are described in the next section of this chapter.

The Commission's third-generation travel simulation models are entirely adequate for use in travel and traffic forecasting within the Region. As has been the Commission's practice, these models will be reviewed and, as may be found desirable, further refined in the years ahead to incorporate any potential improvements developed in national research efforts, just as the Commission's third-generation models reflect refinements and improvements with respect to the Commission's first- and second-generation travel simulation models. Indeed, these third-generation models reflect refinement and improvement with respect to the Commission's first- and second-generation travel simulation models. Such refinements, however, are not essential to the development of accurate travel and traffic forecast within the Region.

### Modifications to Travel Simulation Models

As noted in the previous section of this chapter, modifications were made to the travel simulation models to permit the test and evaluation of the impacts of policies that would significantly increase the cost of operating an automobile and of policies that would promote the use of land use site-design practices for new development that would encourage the use of bicycles and walking rather than the automobile for travel. In addition, the vehicle ownership model was modified to include the potential effect of improved and expanded transit service on vehicle ownership. The modifications made to each travel simulation model and applied in the testing of alternative transportation system plans are described below.

Vehicle Ownership: The vehicle ownership model as described in the preceding section of this chapter was modified to include consideration of the effect of transit accessibility on household vehicle ownership. The original and revised models are linear multiple regression equations which were calibrated with 1990 U. S. Bureau of the Census socio-economic data, 1990 Commission land use data, and 1990 Commission transportation network data. The original model expresses vehicle availability to be a function of household income, household size, and residential density, while the revised model also includes transit accessibility. Transit accessibility is a measure of the availability and quality of transit service.[6] The effect of the addition of transit accessibility to the vehicle ownership model is that improvements in transit service have the potential to reduce vehicle ownership, which in turn has the potential to reduce total trip generation and increase transit ridership. The revised vehicle ownership model may be expressed as:

Central Milwaukee County

$$VAH = 0.0436HI - (0.402 \times 10^{-11})TA + 0.0803$$

Remainder of Region

$$VAH = 0.0446\log_e(HI) + 0.190PH - 0.145\log_e(HGRA) - (0.351 \times 10\text{-}11)TA - 0.164$$

| | | | |
|---|---|---|---|
| Where: | VAH | = | number of vehicles available per household |
| | HI | = | average household income in $1,000s |
| | PH | = | number of persons per household |
| | HGRA | = | number of households per developed gross residential acre |
| | TA | = | transit accessibility factor |

Trip Generation: The results of the application of the Commission trip production and attraction models were adjusted to reflect the potential impacts of the adoption of land use site-design practices for new development to the year 2010 that would better accommodate bicycle and pedestrian travel, thereby promoting travel by those modes, rather than by automobile. A reduction factor was applied to total number of person trips made, by personal vehicle and transit, as estimated by the Commission trip production and attraction models, the reduction factor representing the proportion of trips which may be expected to be made by bicycle and walking, rather than by personal vehicle or transit. The reduction factor was applied only to trip productions from, and attractions to, analysis zones which were envisioned in the regional land use plan to have an increase of 50 or more households, or 50 or more jobs, by the year 2010. The percentage reduction was applied across all trip purposes.

The reduction factor applied was 5 percent. A review of the literature indicated that little information existed concerning the potential reduction in vehicle trips per household that may be attributed to bicycle- and pedestrian-friendly land use site design. Two studies indicated that the potential reduction in vehicle trips per household which may be attributed to bicycle- and pedestrian-friendly land use site design as compared to a typical site design would be a maximum of about 5 percent. That is, a maximum of about 5 percent of total trips generated may be expected to use the bicycle or walking modes for travel rather than personal vehicle. It should be noted that this modification was only applied to those transportation system plan alternatives which included policies to implement bicycle and pedestrian friendly land use site designs.

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[6]*Transit accessibility is a quantitative measure of the relative availability and quality of transit service. It is expressed in the form of an index which for any zone, i, within the Region is defined as the product of the person trip attractions in zone j times the friction factor for the transit travel time value of the interchange from zone i to zone j summed for all interchanges with zone i. The friction factor is an empirically derived relationship defined as the inverse of the door-to-door travel time raised to some power which varies with the travel time. Further clarification of the variables used in the accessibility measure is found in the trip generation, trip distribution, and modal choice sections of this chapter.*

Trip Distribution

The trip distribution model was modified by considering both automobile travel time and travel costs, as opposed to only automobile travel times, in the determination by the trip distribution model of the number of trips made between each pair of traffic analysis zones. The premise of the trip distribution model is that the number of trips between two zones in the Region is a direct function of the trips in each zone and a measure of the spatial separation of the zones. The original third-generation trip distribution model only utilized automobile travel time to measure spatial separation, as did the first- and second-generation models. The revised third-generation model was modified to include both automobile travel time and travel cost to permit testing of the implications on trip distribution and trip length of policies which would significantly increase automobile operating cost.

Air Quality-Related Issues

Some concerns have also been raised nationally with respect to the validity of transportation-related air pollution emissions estimates, which are the product of the travel simulation models and air pollutant emission factor models. Based on the foregoing, it is apparent that in Southeastern Wisconsin the travel simulating models have been shown to be totally adequate for highway and transit system planning and engineering purposes. With respect to air pollutant emission estimation, the Commission utilizes the pollutant emission factor models, maintained by the U. S. Environmental Protection Agency. These models have been criticized as having some shortcomings. These include an inability to reflect the effect of vehicle pollutant emission enrichment which results from rapid vehicle acceleration and deceleration and to differentiate between emissions attendant to starting and stopping from emissions attendant to motion. The Commission must look to the Federal and State agencies concerned to address these issues since the Commission has not been responsible for air quality management planning within the Region since the completion of the first regional air quality maintenance plan in 1982.

## SUMMARY AND CONCLUSIONS

This chapter describes the travel simulation models used in the design, test, and evaluation of the alternative transportation system plans under the third-generation regional transportation system plan preparation process. These models and the relationships and techniques incorporated in these models are important, not only because they provide the technical basis for the design of a regional transportation system plan which is properly related to the travel patterns that the planned system must serve, but also because these techniques provide the necessary link between land use and transportation system planning.

The Commission has over 30 years of experience in travel simulation modeling. The initial travel simulation models were developed in 1963, utilizing the findings of comprehensive travel survey and applied in the initial regional land use-transportation study. The initial models were validated in 1972, utilizing the results of a second full-scale travel survey and demonstrated to simulate accurately 1972 travel patterns, arterial street and highway traffic volumes, and transit ridership. Some refinements were made to the models in 1972 before their application in the second-generation transportation study. The refined set of models was revalidated in 1991, utilizing the findings of a third comprehensive travel survey. They were again demonstrated to accurately simulate 1991 conditions. Again, some refinements were made to produce a third-generation set of travel models. The Commission staff thus has substantially demonstrated expertise and substantial experience in the development and application of travel simulation models, as well as intimate knowledge of the travel habits and patterns of the Region and of changes in these habits and patterns over time. The Commission believes that the general criticisms of travel models leveled materially by academicians are not applicable to the Commission travel models. The Commission believes that the most rigorous test possible of a set of travel simulation models consists of applying the full set of models to socio-economic and transportation system data from a year, be it past or future, other than the year of the data from which the models were calibrated and then comparing the model-estimated travel and traffic to survey-estimated travel and actual measured traffic counts. The Commission models have passed this test, not once, but twice, as demonstrated by comparisons indicating model-estimated traffic volumes are within 10 percent of ground traffic counts.

The travel simulation process used by the Commission consists of four major steps: trip generation, trip distribution, modal split, and traffic assignment. The first step in the development of these models for the third-generation planning effort consisted of an assessment of the models developed and used in the second-generation land use-transportation planning effort. Such an assessment was possible because the findings of three identical large-scale comprehensive travel surveys were available for 1963, 1972, and 1991, allowing the testing of the temporal stability of the models. Despite the major changes in socioeconomic conditions, in land use development, and in transportation system development that occurred in the interims involved, the travel simulation models from the first- and second-generation planning efforts demonstrated an ability to simulate current travel habits and patterns with remarkable accuracy.

In spite of the excellent performance of the travel and traffic forecasting models developed under the first- and second-generation transportation planning efforts and the conclusions that these models could continue to be used with confidence in either their original form or in a refined form through re-calibration with more recent travel survey data, certain refinements in the models were determined to be desirable.

A summary description of the travel simulation models used in the third-generation planning effort can be found in Table 147. Each of these models was individually validated by using travel survey data; the entire model process chain validated by comparing the outputs of the models to observed ground counts, transit and highway. These analyses clearly demonstrated the validity of the calibrated models to predict future travel and traffic conditions under a broad range of development conditions with accuracies adequate for transportation system planning and engineering. The Commission models are believed to provide the Region with a technically sound transportation systems planning tool which can be used with confidence in the planning and design of surface transportation facilities within the Region.

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# Chapter VIII

# OBJECTIVES, PRINCIPLES, AND STANDARDS

## INTRODUCTION

Planning is a rational process for formulating and meeting objectives. The formulation of objectives, therefore, is an essential task which must be undertaken before plans can be prepared. The seven-county Southeastern Wisconsin Planning Region is composed of many diverse and often divergent interests. Consequently, formulating objectives for the preparation of advisory comprehensive regional development plans is a difficult task.

Soundly conceived regional development objectives should incorporate the combined knowledge of many people who are informed about the Region and should be established by elected or appointed representatives legally assigned this task, rather than by planning technicians. This consideration is particularly important because of the value-system implications inherent in any set of development objectives. Active participation by elected or appointed public officials and by citizen leaders in the regional planning program is implicit in the structure and organization of the Southeastern Wisconsin Regional Planning Commission. Moreover, the Commission, since its inception, has provided for the establishment of advisory committees to assist the Commission and its staff in conducting the regional planning program and in developing objectives, principles, and standards in particular.

The objectives, principles and standards set forth in this chapter reflect the insight of advisory committees operating, since the adoption of the second-generation regional transportation system plan, within the framework of the continuing regional land use-transportation study. Such advisory committees have guided all major transportation planning efforts including the following: the jurisdictional highway system plans prepared for all seven counties in the Region; the transit system development plans and programs prepared for the Racine, Kenosha and Waukesha areas; A Primary Transit System Plan for the Milwaukee Urbanized Area; A Land Use and Transportation System Development Plan for the IH 94 South Freeway Corridor; A Transportation System Plan for the Milwaukee Northwest Side/Ozaukee County Study Area; and A Regional Transportation System Plan for the Transportation Handicapped. The advisory committees involved have had a combined membership of elected and appointed officials and concerned citizens.

The use of advisory committees has been, and still appears to be, the most practical and effective procedure available for actively involving interested and knowledgeable public officials, technicians, and private citizens in the regional planning process and of openly arriving at decisions and programs which can shape the future physical development of the Region. Only by combining the accumulated knowledge and experience about the Region which the various advisory committee members possess can a meaningful expression of the desired direction, magnitude, and quality of future regional development be obtained. One of the major tasks of these committees in the initial regional land use-transportation planning effort was, therefore, to assist in the formulation of regional development objectives and supporting planning principles and standards.

Because of the passage of time, the attainment of additional knowledge about the Region, the formulation of additional development objectives under other related regional and subregional planning programs, the degree of attainment of each of the various adopted regional development objectives, and both adverse and favorable public reaction to plan implementation proposals, careful review of the regional development objectives and supporting principles and standards was deemed essential. This chapter sets forth the results of that review in the form of revised regional transportation system development objectives, principles, and standards. These have been adopted by the Commission after careful review and upon recommendations by the Commission staff and the Technical Coordinating and Advisory Committee on Regional Transportation System Planning.

## BASIC CONCEPTS AND DEFINITIONS

Definitions for the term "objective," as well as for the terms "principle," "standard," "plan," "policy," and "program," were established for use as a common frame of reference in the initial land use-transportation study. These definitions have remained valid over time and for convenience are set forth below as originally established:

1. Objective: a goal or end toward the attainment of which plans and policies are directed.

2. Principle: a fundamental, primary, or generally accepted tenet used to support objectives and prepare standards and plans.

3. Standard: a criterion used as a basis of comparison to determine the adequacy of plan proposals to attain objectives.

4. Plan: a design which seeks to achieve agreed upon objectives.

5. Policy: a rule or course of action used to ensure plan implementation.

6. Program: a coordinated series of policies and actions to carry out a plan.

Although this chapter deals with only the first three of these terms, an understanding of the interrelationship between the foregoing definitions and the basic concepts which they represent is essential to the following discussion of objectives, principles, and standards.

## OBJECTIVES

In order to be useful in the regional transportation system planning process, objectives must be logically sound and related in a demonstrable and measurable way to alternative system development proposals. Only if the objectives can be clearly related to physical development and only if they are subject to objective tests can an intelligent choice be made from among alternative plans so as to select the one plan or combination of plans which best meets the agreed upon objectives.

Recognizing that: 1) various public and private interest groups within a Region as large and diverse as Southeastern Wisconsin may have varying, and at times conflicting, objectives, 2) many of these objectives are of a qualitative nature and, therefore, difficult to quantify, and 3) many objectives which may be held to be important by the various interest groups within the Region may not be related in a demonstrable manner to physical development plans, the Commission identified two basic types of objectives under the first and second regional land use-transportation system planning efforts. These are general development objectives, often referred to by other agencies as "goals," which are by their very nature either qualitative or difficult to relate directly to development plans and to specific development objectives which can be directly related to physical development plans and at least crudely quantified. The other type of objectives, the specific objectives, will be dealt with below. The rationale for using these two types of objectives remains valid; for the most part, the general and specific regional development objectives which have been adopted for use in the transportation system plan reevaluation are quite similar to those formulated and adopted in the first and second land use-regional transportation system planning efforts. Thus, the broad needs which the regional transportation system plan is to be designed to satisfy, as expressed in the form of development objectives, have remained essentially the same.

### General Objectives

The following general development objectives have been adopted by the Commission after careful review and recommendation by the Technical Coordinating and Advisory Committee on Regional Transportation System Planning:

1. Economic growth at a rate consistent with regional resources, including land, labor, and capital, coupled with a primary dependence on free enterprise, in order to provide needed employment opportunities for the expanding labor force of the Region.

2. A wide range of employment opportunities through a broad, diversified economic base.

3. Conservation and protection of desirable existing residential, commercial, industrial, and agricultural development in order to maintain desirable social and economic values; renewal of obsolete and deteriorating residential, commercial, and industrial areas in the rural, as well as in the urban, areas of the Region; and prevention of slums and blight.

4. A broad range of choice among housing designs, sizes, types, and costs, recogniz-

ing changing trends in age-group composition, income, and family living habits.

5. An adequate, flexible, and balanced level of community services and facilities.

6. An efficient and equitable allocation of fiscal resources within the public sector of the economy.

7. An attractive and healthful physical and social environment with ample opportunities for high-quality education, cultural activities, and outdoor recreation.

8. Protection, wise use, and enhancement of the natural resource base.

9. Development of communities having distinctive individual character, based on physical conditions, historical factors, and local desires.

The foregoing general development objectives are proposed as goals which public policy within the Region should promote over time. They are all necessarily general but, nevertheless, provide the broad framework within which regional planning can take place and the more specific goals of the various functional elements and component parts of the Region stated and pursued. No ranking is implied by the order in which these objectives are listed. The statement of these objectives is concerned entirely with ends and not with means; the principal emphasis of these general objectives is on those aspects of regional development which relate either to the expenditure of public funds or to the effects of government actions and regulations. With respect to these general development objectives, it was deemed sufficient to arrive at a consensus among the Advisory Committees and the Commission itself that the plan proposals do not conflict with the objectives. Such a consensus represents the most practical evaluation of the ability of the alternative plan proposals to meet the general development objectives.

Specific Development Objectives

Within the framework established by the general development objectives, a secondary set of more specific objectives can be postulated which is directly relatable to physical development plans and can be at least crudely quantified. The quantification is facilitated by complementing each specific objective with a set of quantifiable planning standards which can, in turn, be related to a planning principle supporting the chosen objective. The planning principles thus augment each specific objective by asserting its inherent validity as an objective.

The specific objectives adopted for the regional transportation system plan are largely self-descriptive. They are concerned primarily with providing a flexible multi-modal transportation system; alleviating traffic congestion; reducing travel time and accident exposure; and minimizing costs and disruptive effects upon communities and upon the natural resource base. The following specific transportation development objectives have been adopted by the Commission after careful review and recommendation by the Technical Coordinating and Advisory Committee on Transportation System Planning:

1. A multi-modal transportation system which, through its location, capacity, and design, will effectively serve the existing regional land use pattern and promote the implementation of the regional land use plan, meeting and managing the anticipated travel demand generated by existing and proposed land uses.

2. A transportation system which is economical and efficient and best meets all other objectives at the lowest possible cost.

3. A multi-modal transportation system which provides appropriate types of transportation needed by all residents of the various subareas of the Region regardless of race, color, national origin, age, physical ability or income status at an adequate level of service; choices among transportation modes; and intermodal connectivity. The transportation system shall also permit ready adaptation to changes in travel demand, transportation technology, modal use, and new transportation system management measures.

4. A transportation system which minimizes disruption of existing neighborhood and community development, including adverse effects upon the property tax base.

5. A transportation system which serves to protect the overall quality of the natural environment, which promotes the public

health, and which helps achieve ambient air quality standards.

6. A transportation system which facilitates the movement of people between component parts of the Region.

7. A transportation system which reduces accident exposure and provides for increased travel safety and personal security.

8. A transportation system which minimizes the amount of energy consumed, especially of such nonrenewable energy sources as fossil fuels.

9. A transportation system which facilitates linked tripmaking, providing facilities and services necessary for efficient, fast, safe, and convenient intermodal connections.

These transportation development objectives are very similar, but not identical, to those adopted under the two previous regional transportation planning efforts. The review and evaluation of the objectives by the Commission staff, Advisory Committee, and the Commission itself indicated that the basic needs which a transportation system should seek to satisfy in the Region have not changed appreciably in the past three decades.

## PRINCIPLES AND STANDARDS

A planning principle and a set of planning standards complements each of the foregoing specific transportation system development objectives, as shown in Table 172. Each set of standards is directly related to the planning principle, as well as to the objective, and serves to facilitate quantitative application of the objectives in plan design, test, and evaluation.

In the preparation of the necessary planning principles for the initial regional land use-transportation planning effort, a careful search of the planning literature failed to reveal a documented set of comprehensive principles which were universally accepted as tenets basic to the physical planning process. It was necessary, therefore, to adapt such principles as could be found to the regional planning effort and then to draw upon the collective experience of the practitioners of the many technical disciplines represented on the Technical Coordinating and Advisory Committee to formulate additional principles to augment those adapted from the literature. Thus, through the combined knowledge of experienced technicians, a set of comprehensive planning principles was formulated. These principles were used as guidelines in the first and second regional land use-transportation planning processes and were incorporated, largely unchanged, into the current planning effort. For a comparison of the year 2000 and the year 2010 development standards, see Table 173.

The planning standards herein adopted fall into two groups: comparative and absolute. Comparative standards can be applied only through a comparison of alternative plan proposals, as in the example, minimizing the total vehicle-miles of travel within the Region. No desirable value can be realistically assigned to this standard, therefore, its application must be a comparative one, in which the alternative plan resulting in the lowest vehicle-miles of travel is deemed to best meet this standard. Absolute standards can be applied individually to each alternate plan proposal since they are expressed in terms of maximum, minimum, or desirable values, as, for example, a maximum overall travel time of 35 minutes to three major retail and service centers.

## OVERRIDING CONSIDERATIONS

In applying planning standards and in preparing the regional transportation system plan, several overriding considerations must be recognized.

1. Standards cannot be used to determine the effect of individual facilities on each other or on the system as a whole. Traffic simulation models are used in this respect to perform a quantitative test of the ability of a proposed system to accommodate the travel demand derived from the land use plan.

2. An overall evaluation of each transportation plan must be made on the basis of cost. Such an analysis may show that the attainment of one or more of the standards is beyond the economic capability of the Region.

3. It is unlikely that any one plan proposal will meet all the standards completely.

The extent to which each standard is met, exceeded, or violated must serve as a measure of the ability of each alternative plan proposal to achieve the specific objectives which the given standard complements.

4. Certain objectives and standards may be complementary; the achievement of one objective or standard may support the achievement of others. Conversely, some objectives and standards may be conflicting, requiring resolution through compromise. Meaningful plan evaluation can take place only through a comprehensive assessment of each of the alternative plans against all of the objectives and standards.

5. Standards must be judiciously applied to areas or facilities which are already partially or fully developed. Application of standards in such cases may require extensive renewal or reconstruction programs. In this connection it should be noted that standards concerned with natural resource protection, use, or development or with neighborhood and community development relate primarily to those areas of the Region where the resource base has not as yet been significantly diminished, depleted, or destroyed and where neighborhood and community development has not yet been significantly disrupted. In areas where such disruption, deterioration, depletion, or destruction has already occurred, application of the standards may make it necessary to inaugurate programs which would restore neighborhoods and the resource base to a higher level of quality as well as quantity.[1]

The formulation of objectives continues throughout the planning process. As alternative plan proposals are designed and evaluated and as plan implementation is considered, objectives may change. In the planning process, the various alternative plans proposed are ranked according to ability to meet objectives. If the best plan so identified nevertheless falls short of meeting the chosen objectives, either a better plan must be designed or the objectives must be compromised. The plan evaluation process provides the basis for deciding which objectives to compromise. The compromises may take three forms: certain objectives may be dropped because their satisfaction has been proven unrealistic, new objectives may be suggested, or conflicts between inconsistent objectives may be balanced out.

The continued validity of the objectives set forth in this chapter is ultimately derived from community values. Such values are expressed within the framework of the political system as actions to implement plan proposals are advanced over time. Continued adverse public reaction or response to plan implementation actions may indicate a need to reevaluate specific objectives, principles, and/or standards for continued relevance. Conversely, favorable public reaction may indicate that the objectives involved continue to be valid.

Care must be exercised in assessing public reaction to plan implementation proposals to ensure that such reaction, adverse or favorable, truly reflects the values of the citizen body as a whole within the Region and not the values of small special-interest groups. Care must also be exercised to ensure that public reaction reflects long-term, stable community values and not ephemeral opinions. To this end, the plan reevaluation process incorporated attitudinal and personal opinion surveys to provide information on public preferences for various types and levels of transportation facilities and services and for various housing types and locations. When considered in relation to the results of accompanying behavioral studies of travel habits and patterns and of housing types and locations, these surveys probably provide the best available measure of not only current public opinion but also of underlying attitudes and of changes in these attitudes. Therefore, continued assessment of public reaction to plan implementation proposals and of public attitudes and opinions provides a sound basis for considering needed revisions in regional development objectives and standards.

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[1] *Such programs are specifically recommended for surface water resources in the adopted comprehensive watershed plans and in the regional water quality management plan, for air resources in the regional air quality attainment and maintenance plan, and for certain recreational resources in the park and open space plan.*

## Table 172

## TRANSPORTATION SYSTEM DEVELOPMENT OBJECTIVES, PRINCIPLES, AND STANDARDS

### OBJECTIVE NO. 1

A multi-modal transportation system which, through its location, capacity, and design, will effectively serve the existing regional land use pattern and promote the implementation of the regional land use plan, meeting and managing the anticipated travel demand generated by the existing and proposed land uses.

### PRINCIPLE

An integrated multi-modal regional transportation system connects major land use activities within the Region, providing the accessibility essential to the support of these activities. Through its effect on accessibility, the regional transportation system can be used to induce development in desirable locations and to discourage development in undesirable locations.

### STANDARDS

1. The transportation system should provide service by highway and public transit modes within each urbanized area of the Region so that all residents of an urbanized area, without regard to color, race, or national origin, are:

   a. within 30 minutes' overall travel time[a] through travel by personal vehicle on the arterial street and highway system and 45 minutes' overall travel time through travel on the public transit system of 40 percent of that urbanized area's employment opportunities;

   b. within 35 minutes' overall travel time of three major retail and service centers in the Milwaukee urbanized area and one such center in the Kenosha and Racine urbanized areas;

   c. within 40 minutes' overall travel time of a major medical center and/or 30 minutes' overall travel time of a hospital and/or medical clinic;

   d. within 40 minutes' overall travel time of a major park or outdoor recreation area;

   e. within 40 minutes' overall travel time of a vocational school, college, or university; and

   f. within 60 minutes' overall travel time of a scheduled air transport terminal.

2. The regional transportation system should be adjusted to the regional land use plan so that a higher relative accessibility is provided to areas in which higher-density development is planned than to areas in which low-density development is planned or to areas which should be protected from development.

3. Urban rapid transit service should connect and serve:

   a. major retail and service centers;

   b. major industrial centers;

   c. major medical centers;

   d. major park and outdoor recreation areas;

   e. vocational schools, colleges, and universities;

   f. scheduled air transport terminals; and

   g. high-density residential areas.

### OBJECTIVE NO. 2

A transportation system which is economical and efficient and best meets all other objectives while minimizing public and private costs.

PRINCIPLE

The total resources of the Region are limited, and any undue investment in transportation facilities and services must occur at the expense of other public and private investment; therefore, total transportation costs for the desired level of service should be minimized.

STANDARDS

1. The sum of transportation system operating and capital investment costs[b] should be minimized.

2. The direct benefits derived from transportation system improvements should exceed the direct costs of such improvements.

3. Full use of all existing major transportation facilities should be encouraged through low-capital-intensive and noncapital-intensive transportation system management measures[c] cooperatively fostered by government, business, and industry, prior to any capital-intensive or disruptive construction or provision of new facilities and services.

OBJECTIVE NO. 3

A multi-modal transportation system which provides appropriate types of transportation needed by all residents of the Region regardless of race, color, national origin, age, physical ability, or income status, at an adequate level of service; choices among transportation modes; and intermodal connectivity. The transportation system shall also permit ready adaptation to changes in travel demand, transportation technology, modal use, and new transportation management measures.

PRINCIPLE

A flexible, intermodal regional transportation system, functionally integrated into the larger urban complex, is necessary to provide an adequate level of transportation service to all segments of the population and to support essential economic and social activities. A regional transportation system consisting, as may be found appropriate, of arterial street and highway facilities, public transit facilities, bicycle and pedestrian facilities, associated terminal facilities, and transportation system management measures can be located and designed to be readily adaptable to changes in transportation technology and to the major socio-economic changes that affect travel demand. Arterial streets and highways provide for the movement of persons utilizing automobiles, taxicabs, buses, and bicycles and for the major transport of goods utilizing trucks and buses. Public transit provides passenger service utilizing rail vehicles, buses, vans, and taxicabs. Public transit supplies additional passenger transportation system capacity which can alleviate peak loadings on highway facilities and assist in reducing the demand for additional highways and for land necessary for parking facilities at major regional land use activities. Bicycle and pedestrian facilities which may provide for the sole movement of bicyclists and pedestrians may share the rights-of-way of arterial streets and can be designed to promote connectivity between various modes of travel. Transportation system management can facilitate safe and efficient travel on highway and public transit facilities, can influence travel demand, and reduce peak loadings on the transportation system.

STANDARDS

**1. ARTERIAL STREET AND HIGHWAY SYSTEM**

a. Arterial streets and highways should be provided at intervals of no more than one-half mile in each direction in urban high-density areas, at intervals of no more than one mile in each direction in urban medium-density areas, at intervals of no more than two miles in each direction in urban low-density and suburban-density areas, and at intervals of no less than two miles in each direction in rural areas.

b. Freeways or expressways should be considered for those travel corridors[d] within the Region which meet all of the following criteria:

1) The corridor provides intercommunity service;

2) The desired speeds or a volume-to-design capacity ratio of 1.0 requires control of access and an uninterrupted flow; and

3) Potential average weekday traffic exceeds 45,000 vehicles per day in urban areas and 25,000 vehicles per day in rural areas.

## 2. PUBLIC TRANSIT

a. Urban public transit facilities should be provided to connect[e] noncontiguous urban development with the urban center[f] of an urbanized area and within urbanized areas local transit should be provided to serve[g] only high- and medium-density residential neighborhoods and to connect such neighborhoods to the following land areas:

1) Transportation terminal facilities, including interregional and urban rapid and express transit service loading and unloading points and scheduled air transport terminals;

2) Major and community retail and service centers;

3) Major and community industrial centers;

4) Major parks and such special-use areas as zoological and botanical gardens, civic centers, senior citizen centers, fairgrounds, arenas, and stadiums; and

5) Such institutions as universities, colleges, vocational schools, secondary schools, community libraries, hospitals, mental health centers and sanitariums, and seats of State, county, and local governments.

b. Urban rapid transit service should be provided in travel corridors where service will save a minimum of one minute per mile of travel over alternative local transit service and where in-vehicle trip length is four miles or longer.

c. Rapid or express transit service should be provided as necessary to reduce peak loadings on arterial streets and highways so as to maintain a desirable level of transportation service between component parts of the Region.

d. Rapid and express transit service should be extended as warranted to perform a collection and distribution function so as to maximize the convenience of transit service.

e. Urban residential land shall be considered as served by urban public transit when such land is within the distance or time of the various types of service set forth in the following table:

| Type of Urban Public Transit Service | Maximum Distance or Time | | |
|---|---|---|---|
| | Walking | Driving | Feeder Bus or Van |
| Rapid[h] . . . . . . . . . . . . . . . . . . . . . | 0.50 mile | 3.0 miles | 15 minutes |
| Express[i] . . . . . . . . . . . . . . . . . . . . | 0.50 mile | 1.5 miles | - - |
| Local[j] . . . . . . . . . . . . . . . . . . . . . | 0.25 mile | 1.5 miles | - - |

f. The number of residents of an urbanized area served by rapid transit should be maximized.

g. The number of jobs in an urbanized area served by rapid transit should be maximized. A job shall be considered served by rapid transit if it is within a one-half mile walking distance or a 15-minute feeder bus ride of a rapid transit stop.

h. Public transit routes should be direct in alignment, with a minimum number of turning movements, and arranged to minimize duplication of service and minimize transfers which would discourage transit use.

i. Operating headways[k] for local transit service within urban areas shall be designed to provide service at intervals capable of accommodating passenger demand at the recommended load standards, but shall not exceed 30 minutes during weekday peak periods nor 60 minutes during weekday off-peak periods and weekends.

j. Operating headways for rapid transit service should be designed to provide service at intervals capable of accommodating demand at the recommended load standards, but shall not exceed 30 minutes. Operating headways shall be less than 30 minutes if necessary to meet transit demand during weekday peak periods.

k. Urban fixed-route public transit stops within urban areas should be located as follows:

| Type of Urban Public Transit Service | Location of Stops |
|---|---|
| Rapid | At terminal areas and one-half mile or more on line-haul sections |
| Express | At terminal areas, intersecting public transit routes, intersecting arterial streets, and major traffic generators |
| Local | From 600 to 1,200 feet apart |

l. Express and local public transit routes should be located sufficiently near concentrations of demand, including within the central business districts, so that 90 percent of transit users need walk no more than one block,[l] or 600 feet, to a stop.

m. Rapid transit routes should be located sufficiently near concentrations of demand, including the central business districts, so as to maximize the number of users who need walk no more than one-quarter mile to a stop.

n. The proportion of total trips to the Milwaukee central business district by public transit should be increased to at least 30 percent.

o. Public transit stops should be located and designed to minimize walking distance to and from major trip generators; to provide protection from inclement weather; to promote ready access by feeder bus service where appropriate; and to provide, to the greatest extent practicable, modal interface with other forms of personal and public transportation service.

p. Paratransit service should be available within transit service areas to meet the transportation needs of the elderly and of those persons who because of a mental or physical disability are unable to avail themselves of conventional transit service. Specialized transportation service should be available within the rural portions of the Region to provide a level of transit service at least one day per week.

### 3. BICYCLE AND PEDESTRIAN FACILITIES

Appropriate bicycle and pedestrian facilities should be provided on those arterial streets and highways, on which bicyclists and pedestrians are legally permitted to operate, identified in the Regional Bicycle and Pedestrian Facilities Plan for Southeastern Wisconsin.

## OBJECTIVE NO. 4

A transportation system which minimizes disruption of existing neighborhood and community development, including adverse affects upon the property tax base.

## PRINCIPLE

The social and economic costs attendant to the disruption and dislocation of homes, businesses, industries, and communication and utility facilities as well as the adverse affects on the natural resource base can be minimized through the proper location, design, and operation of transportation facilities and terminals.

## STANDARDS

1. The penetration of neighborhood units and of neighborhood facility service areas by arterial streets and highways and primary rapid transit routes should be minimized.

2. The dislocation of households, businesses, industries, and public and institutional buildings caused by the reconstruction of existing or the construction of new transportation facilities and terminals should be minimized.

3. The total amount of land used for transportation facilities and terminals should be minimized.

4. The reduction of the property tax base caused by the reconstruction of existing or the construction of new transportation facilities and terminals should be minimized.

5. The destruction of historic buildings and of historic, scenic, scientific, archaeological, and cultural sites caused by the reconstruction of existing or the construction of planned transportation facilities and terminals should be minimized.

6. The proper use of land for, and adjacent to, transportation facilities should be maximized and the disruption of future development minimized through advance reservation of rights-of-way for transportation facilities.

7. Transportation facility construction plans should be developed which use sound geometric, structural, and landscape design standards which consider the aesthetic quality of the transportation facilities and the areas through which they pass and which consider any environmental enhancement activities likely to be required.

8. Transportation facilities should be so located as to avoid destruction of visually pleasing buildings, structures, and natural features and to enhance vistas to such features.

**OBJECTIVE NO. 5**

A transportation system which serves to protect the overall quality of the natural environment, which promotes the public health, and which helps to achieve ambient air quality standards.

**PRINCIPLE**

Adverse effects on the natural environment, air pollution, water pollution, and the loss of natural habitat and biological diversity in particular, can be minimized through the proper location, design, and operation of the transportation system. The relationship of the residents of the Southeastern Wisconsin Region to the natural environment should be one of stewardship.

**STANDARDS**

1. The location of transportation facilities in or through primary environmental corridors, particularly through the woodland and wetland portions of such corridors, should be minimized.

2. Any damaging effects on the natural resource base caused by the construction of transportation facilities should be minimized.

3. The amount of air pollutants emitted through the operation of the transportation system should be minimized.[m]

4. The loss of prime agricultural farmland to transportation facility construction should be minimized.

**OBJECTIVE NO. 6**

A transportation system which facilitates the movement of people and goods between component parts of the Region.

**PRINCIPLE**

To support the everyday economic and social activities, a transportation system which provides for reasonably fast, convenient travel is essential. Personal vehicle travel, while offering a high degree of mobility, comfort, and convenience, can result, particularly in corridors of high travel demand, in traffic congestion, excessive air pollutant emissions, and unnecessary motor fuel consumption. Effective and attractive high-quality public transit service and bicycle and pedestrian facilities may have the potential to directly reduce traffic congestion and associated personal delay, energy consumption, and air pollution when used by previous automobile users. Traffic congestion increases the costs of transportation and can adversely affect the attractiveness of an area for residential use and for the location and operation of businesses and industries.

**STANDARDS**

1. Total passenger-hours of travel, by highway and public transit modes, within the Region should be minimized.

2. Total vehicle-hours of highway travel within the Region should be minimized.

3. Total vehicle-miles of travel within the Region should be minimized.

4. Highway transportation facilities should be located and designed so as to provide adequate capacity, that is, a volume-to-design capacity ratio[n] equal to, or less than, 1.0 on the basis of 24-hour average weekday traffic volumes, to meet the existing and potential travel demand.

5. Urban public transit facilities should be designed, implemented, and operated so as to attract the maximum number of travelers currently operating single occupancy vehicles and to provide adequate transit vehicle capacity to meet existing and potential travel demand. The average maximum load factor[o] shall not exceed 1.00 in rapid, express, and local transit service in off-peak periods or beyond the 10-minute point[p] in peak periods. The load factor should not exceed 1.00 in rapid and express transit service provided by bus in peak periods or 1.25 in rapid and express transit provided by rail in peak periods. The load factor should not exceed 1.25 in local transit service in peak periods.

6. Bicycle and pedestrian facilities should be located and designed to attract the greatest number of travelers currently operating single-occupancy vehicles.

7. Adequate capacity and a sufficiently high level of geometric design should be provided to achieve the following overall travel speeds based on average weekday conditions for the arterial street and highway and the urban public transit components of the transportation system:

| Transportation System Component | Overall Travel Speed by Area[q] (miles per hour) | | |
|---|---|---|---|
| | CBD | Urban | Rural |
| Arterial Street and Highway | | | |
| Freeway | 35-55 | 40-55 | 50-55 |
| Expressway | 25-40 | 30-50 | 50-55 |
| Standard Arterial | | | |
| Divided | 15-25 | 25-45 | 45-55 |
| Undivided | 15-25 | 20-40 | 40-50 |
| Urban Public Transit | | | |
| Rapid | | | |
| Rail | 20-30 | 40-60 | 40-60 |
| Bus | 10-20 | 40-50 | 40-50 |
| Express | 10-20 | 20-35 | 40-50 |
| Local | 5-15 | 10-20 | 40-50 |

8. The use of transportation system management measures should be maximized in travel corridors to achieve the desired level of service for both arterial street and highway and public transit facilities and services.

**OBJECTIVE NO. 7**

A transportation system which reduces accident exposure and provides for increased travel safety and personal security.

**PRINCIPLE**

Accidents take a heavy toll in life, property damage, and human suffering; contribute substantially to overall transportation costs; and increase public costs for police, emergency medical services, and other social services. Therefore, every attempt should be made to reduce both the incidence and severity of accidents. Crime and the perception of crime hamper the mobility of persons who must travel within areas deemed unsafe, especially those persons dependent on public transportation; promotes urban blight and unsafe and difficult living and working conditions for those individuals and business who cannot move away from high-crime areas; promotes the costly dispersion of urban development as business and residents seek safer commercial and residential arrangements; increases public costs for police, emergency medical services, and other social services. Therefore, every attempt should be made to reduce the incidence of crime where it hampers mobility and access to basic opportunities the transportation system would otherwise provide in the absence of crime and to increase personal security in the operation of the transportation system.

**STANDARDS**

1. Travel on facilities which exhibit the lowest accident exposure should be maximized.

2. Traffic congestion and vehicle conflicts should be reduced by maintaining a volume-to-design capacity ratio equal to, or less than, 1.0, on the basis of 24-hour average weekday traffic volumes.

3. Railroad grade separations should be provided at all crossings involving the provision of intercity passenger and commuter train service. For all other crossings, the decision whether or not to provide grade separations should be made at the project planning stage.

## OBJECTIVE NO. 8

A transportation system which minimizes the amount of energy consumed, especially such nonrenewable energy sources as fossil fuels.

### PRINCIPLE

The environmental costs attendant to the widespread consumption, as well the mining, drilling, and transport, of fossil fuels used in the operation of the transportation system can include air and water pollution and the despoiling of natural land- and water-based wildlife habitats. The long-term efficiency of the transportation system depends on the conservation of existing nonrenewable energy sources and the increased application of renewable energy sources to fuel transportation.

### STANDARDS

1. The total amount of nonrenewable energy consumed in the operation of the transportation system, particularly petroleum-based fuels, should be minimized.

## OBJECTIVE NO. 9

A transportation system which facilitates linked tripmaking, providing facilities and services necessary for efficient, fast, safe, and convenient intermodal connections.

### PRINCIPLE

An intermodal transportation system provides for efficient interaction among appropriate modes of transportation to facilitate effective passenger and freight movement. Where the use of more than one transportation mode is essential for travel between two points or is best able to achieve transportation related objectives, proper modal access, terminal capacity, coordination among transportation providers and between route and schedule information and services are necessary to prevent travel delays and unwanted transportation movements. Time spent waiting for transfers between or among modes raises the costs of travel and may discourage the use of certain modes.

1. The time individuals spend waiting at any modal transfer point for connecting modes of transportation should be minimized.

2. Parking should be provided at park-and-ride transit stations to accommodate the total parking demand generated by trips which change from auto and bicycle to public transit at each station and at carpool lots to accommodate the total parking demand generated by carpool and other ridesharing participants.

NOTE: Standard 1a of Objective No. 1, as initially approved by the Advisory Committee, indicated that both highway and transit modes should provide, within 30 minutes overall travel time, access to 40 percent of an urbanized area's employment opportunities in an urbanized area. In the preparation of alternative system plans, it was found difficult to meet this standard by travel on transit even with significant improvements in transit service. Two factors were found to contribute to this difficulty: the dispersed nature of employment and resident locations within the urbanized areas; and the fact that nearly one-half of overall transit travel time was spent out-of-vehicle. Accordingly, the standard public transit travel time was increased to 45 minutes.

[a] *Overall travel time is defined as the total door-to-door time of travel from origin to destination, including the time required to arrive at the vehicle and leave the vehicle as well as over-the-road travel time.*

[b] *The costs to be considered may be termed "life-cycle costs" and include capital, maintenance, and operational costs for facilities over the projected physical and economic life of the facility.*

[c]*Low-capital-intensive and noncapital-intensive alternatives to the construction and provision of new transportation facilities and services may include, but are not limited to, the following transportation management measures:*

1. *Such traffic engineering improvements as left- and right-turn lanes, channelization, one-way streets, reversible traffic lanes, intersection widening, bus turnout bays, and improved signing and pavement markings.*

2. *Such traffic control improvements as coordination of traffic signals, use of bus-priority signal control systems, and computer-based traffic control and freeway traffic management.*

3. *Such freeway operational control as advisory information, incident management, on-ramp metering and monitoring, and high-occupancy-vehicle (HOV) lanes and preferential access.*

4. *Ride-sharing programs.*

5. *Such parking management measures as pricing of off-street parking to encourage ride-sharing for short-term parking, preferential carpool/vanpool parking, and increased rates for weekday parking in the central business district.*

6. *Such transit service improvements as special bus lanes, transfer centers, bus turnout bays, shelters, reduced transit fare programs, shuttle service between retail and employment sites, and computer-based interactive scheduling and routing systems.*

7. *Employer-designed trip reduction strategies.*

8. *Staggered work hours.*

9. *Liberal licensing of taxicabs.*

10. *Banning private vehicles from sections of central business districts during weekdays.*

[d]*The term travel corridor is defined as a relatively long and narrow geographic area centered on an existing or proposed arterial highway or rapid transit facility along which a substantial volume of persons or goods are, or are expected to be, transported.*

[e]*Urban public transit facilities shall be considered to connect noncontiguous urban development with the urban center of an urbanized area when the transit vehicle provides immediate access to the urban center and to a public transit system serving the urbanized area.*

[f]*The term "urban center" is defined as the largest concentrated complex of commercial activities within a single urbanized area.*

[g]*Urban residential land when shall be considered served by public transit when such land is within the distances of a transit route set forth in Standard 2e of Objective 3.*

[h]*Rapid transit is intended to facilitate relatively fast and convenient transportation along heavily traveled corridors and between major activity centers and high-density residential communities. Rapid transit has relatively high average operating speeds and relatively low accessibility, with station spacings located one-half mile or more apart. Rapid transit service can be provided by commuter rail and "heavy" rail operating over exclusive, grade-separated rights-of-way or by buses operating over exclusive, grade-separated busways. Rapid transit can also be provided by buses operating in mixed traffic on freeways and by "light" rail operating over exclusive, though unseparated-grade, rights-of-way.*

[i]*Express transit service is provided over arterial streets and highways with stops generally located less than 1,200 feet apart at intersecting transit routes, intersecting arterial streets, and major traffic generators. Express transit serves trips of moderate length and can be provided by bus or by light rail operating in mixed traffic on shared rights-of-way. Express mass transit service provides a greater degree of accessibility at somewhat slower operating speeds than rapid transit; it may provide "feeder" service to the rapid transit system.*

[j]*Local transit service is characterized by a high degree of accessibility and low operating speeds. Local service is provided over arterial and collector streets, with stops located no more than 1,200 feet apart. Such service can be provided by bus, trolley, or light rail vehicles. Local transit also provides a passenger collection-circulation-distribution function within major*

*activity centers. The collection-circulation-distribution function of local transit service may include the use of buses, vans, trolleys, light rail vehicles, automated guideway vehicles, and other types of people movers, such as moving ramps.*

[k]*The term "operating headway" is defined as the time between any two vehicles operating with fixed routes and schedules.*

[l]*The percent of urban public transit users walking less than one block from transit stop to destination within the Kenosha, Milwaukee, and Racine central business districts in 1991 is set forth below.*

| *Central Business District* | *Percent of Transit Users Walking Less than One Block (1991)* |
|---|---|
| *Kenosha* . . . . . . . . . . . . . . . . | *87* |
| *Milwaukee* . . . . . . . . . . . . . . . | *81* |
| *Racine* . . . . . . . . . . . . . . . . . | *90* |

[m]*An analysis, based upon guidelines promulgated by the U. S. Environmental Protection Agency, will be undertaken to demonstrate conformity of the final recommended regional transportation system to the objectives of the Federal Clean Air Act as reflected in the State Implementation Plan for Air Quality.*

[n]*Volume-to-design capacity ratio is defined as the relationship between the average weekday traffic volume on a particular section of the arterial system and the design capacity of that section, with volume and design capacity expressed in terms of number of vehicles per 24 hours. The design capacity of arterial facilities is set forth in the following table.*

| *Facility Type* | *Average Daily Traffic Volumes (vehicles per 24 hours)* |
|---|---|
| *Urban Freeway* | |
| *Four-Lane* . . . . . . . . . . . . . . . . . . | *60,000* |
| *Six-Lane* . . . . . . . . . . . . . . . . . . . | *90,000* |
| *Rural Freeway* | |
| *Four-Lane* . . . . . . . . . . . . . . . . . . | *52,500* |
| *Six-Lane* . . . . . . . . . . . . . . . . . . . | *85,000* |
| *Urban Standard Arterial* | |
| *Two-Lane* . . . . . . . . . . . . . . . . . . | *13,000* |
| *Four-Lane Undivided* . . . . . . . . . . . | *17,000* |
| *Four-Lane Divided* . . . . . . . . . . . . . | *25,000* |
| *Six-Lane Divided* . . . . . . . . . . . . . . | *35,000* |
| *Eight-Lane Divided* . . . . . . . . . . . . | *45,000* |
| *Rural Standard Arterial* | |
| *Two-Lane* . . . . . . . . . . . . . . . . . . | *7,000* |
| *Four-Lane Divided* . . . . . . . . . . . . . | *25,000* |

*Arterial facilities operating at or under design capacity will generally permit the following average speeds to be achieved during peak-traffic periods:*

| *Facility Type* | *Average Traffic Speed* | |
|---|---|---|
| | *Urban* | *Rural* |
| *Freeway* | | |
| *Posted Speed 50 mph* . . . . . . . | *40-50* | *- -* |
| *Posted Speed 55 mph* . . . . . . . | *45-55* | *45-55* |
| *Posted Speed 65 mph* . . . . . . . | *- -* | *55-65* |
| *Standard Arterial* | | |
| *Posted Speed 30 mph* . . . . . . . | *18-27* | *- -* |
| *Posted Speed 40 mph* . . . . . . . | *27-37* | *30-40* |
| *Posted Speed 55 mph* . . . . . . . | *- -* | *40-55* |

*Urban standard arterial streets operating over design capacity will provide substantial delays at signalized intersections. During peak-traffic periods, vehicles may have to wait through more than one traffic signal red phase. The average delay* *to each vehicle at controlled intersections will be at least 35 seconds and may approach 120 seconds. The average travel speed along such urban arterials will generally be less than 15 to 20 miles per hour (mph). In addition, the potential for accidents is increased on arterials carrying traffic volumes over design capacity. Standard arterials operating at design capacity will have average speeds of about 20 to 30 mph and average delays at signalized intersections of about 25 seconds. Urban standard arterials operating below design capacity will have average speeds of 25 to 40 mph and average delays at signalized intersections of five to 15 seconds.*

*Rural arterials (with a 55-mph speed limit) operating over design capacity will have average speeds of 30 to 45 mph with significant restrictions on lane changing on multi-lane facilities and on passing on two-lane facilities. Rural arterials operating at design capacity will have average speeds of 40 to 50 mph with some restrictions on lane changing or passing. Rural arterials operating under design capacity will have average speeds of 50 to 55 mph with minimal restrictions on lane changing or passing.*

*Freeways operating over design capacity will have average speeds of 30 to 45 mph with significant restrictions on lane changing. Stop-and-go traffic at speeds below 30 mph may occur behind over-design-capacity freeway sections. Freeways operating at design capacity will have speeds of 40 to 50 mph with some restrictions on lane changing. Freeways operating under design capacity (with 55-mph speed limit) will have average speeds of 55 mph with no restrictions on lane changing.*

[o] *The average maximum load factor is defined as the ratio of the number of passengers carried on public transit vehicles past the maximum load point of any route to the seating capacity of vehicles past that point in the peak-flow direction during the operating period.*

[p] *The 10-minute point is a point located 10 minutes of travel time from the maximum load point on any public transit route. Application of this standard would provide that no passenger would have to stand on board the public transit vehicle for longer than 10 minutes.*

[q] *Overall travel speed is defined as the over-the-road travel distance divided by the overall travel time.*

*Source: SEWRPC.*

## Table 173

## COMPARISON OF TRANSPORTATION SYSTEM DEVELOPMENT STANDARDS: DESIGN YEAR 2000 AND REVISED YEAR 2010 REGIONAL TRANSPORTATION SYSTEM PLANS

| Objective and Standard Numbers | | Standard | | | |
|---|---|---|---|---|---|
| Year 2000 | Revised Year 2010 | Name | Year 2000 | Revised Year 2010 | Rationale for Change |
| 3(1b) | (3)1b | Traffic volume threshold for freeway consideration | 30,000 vehicles per day, urban areas; 15,000 vehicles per day, rural areas | 45,000 vehicles per day, urban areas; 25,000 vehicles per day, rural areas | Revised threshold more accurately reflects volumes standard arterials currently carry |
| - - | (3)3 | Bicycle and pedestrian facility | - - | Should be provided along arterials identified in the Regional Bicycle and Pedestrian Facilities Plan for Southeastern Wisconsin | New standard emphasizes multi-modal approach to regional transportation planning |
| (3)3b | - - | Parking in central business district (CBD) | Within central business district parking should be provided at various levels | - - | Standard dropped because the regional planning effort does not explicitly consider CBD parking |
| (3)3c | - - | Short-term parking in central business districts | Parking provided so that 90 percent of short term parkers need walk no more than one block | - - | Standard dropped because the regional planning effort does not explicitly consider CBD parking |
| (3)4a | - - | System adaptability | Transportation system should be capable of ready adaptation to changes in travel demand and transportation technology | - - | Standard dropped, since experience has shown standard cannot be applied as comparative criterion; emphasis is better addressed in other objectives and standards |
| 4(7) | - - | Harmful and annoying noise levels | Transportation system should be designed and located to minimize exposure of residents to harmful and annoying noise levels | - - | Standard dropped, since experience has shown standard to be more suitably applied in local/project level planning |
| 4(8) | (4)5 | Destruction of important sites | Destruction of historic buildings and of historic, scenic, scientific, and cultural sites should be minimized | Destruction of historic buildings and of historic, scenic, scientific, archaeological, and cultural sites should be minimized | Revised standard reflects need to preserve archaeological sites in the Region |
| - - | 5(3) | Air pollution | - - | The transportation system should be located, designed, and operated so as to minimize air pollution | New standard to recognize importance of minimizing mobile sources of air pollution |
| - - | 5(4) | Minimize loss of prime agricultural land | - - | Loss of prime agricultural land to transportation facility construction should be minimized | New standard to reinforce one of the basic recommendation of the regional land use plan, preservation of prime farmland |
| (5)5&6 | (6)4 | Highway facilities, adequate design capacity | Volume to design capacity equal to, or less than, 1.1 | Volume to design capacity equal to, or less than, 1.0 | Revised standard reflects more precise calculation of volume to capacity ratios as set forth in Highway Research Board: Highway Capacity Movement, 1985 |
| - - | (6)6 | Location and design of bicycle and pedestrian facilities | - - | Located and designed to attract the maximum proportion of travelers currently using automobile | New standard reflects need to offer bicycling and walking as attractive alternatives to the automobile for certain trips |

**Table 173 (continued)**

| Objective and Standard Numbers | | Standard | | | |
|---|---|---|---|---|---|
| Year 2000 | Revised Year 2010 | Name | Year 2000 | Revised Year 2010 | Rationale for Change |
| - - | 6(8) | Transportation system management in travel corridors | - - | Use of transportation system management should be maximized in travel corridors to achieve desired levels of highway and public transit service | New standard reflects need to promote more efficient travel in certain corridors in light of severe traffic congestion and attendant problems, including air pollution |
| (3)3a | (9)2 | Provision of parking | At park-and-ride public transit stations to accommodate demand generated by trips changing from auto to transit | At park-and-ride public transit stations to accommodate demand generated by trips changing from auto and bicycle to transit and at carpool lots to accommodate demand generated by ridesharing participants | Add criteria for bicycle parking demand to emphasize intermodal connections and new criteria for provision of parking at carpool lots |

*Source: SEWRPC.*

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# Chapter IX

# ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM MANAGEMENT PLANS

## INTRODUCTION

The travel demand generated by a given land use pattern can be met by various combinations of transportation facilities, services, and demand management measures. With respect to arterial street and highway facilities, the travel loads unconstrained by demand management measures can be distributed in relatively low volumes over a large number of surface arterials, providing a relatively low level of service. Those travel loads can also be concentrated in relatively high volumes on a small number of high-capacity freeways, providing a relatively high level of service. A similar wide range in the configuration of transit facilities can be envisioned. In addition, the various highway and transit facility configurations can be combined with various travel demand management measures which serve to constrain demand and limit the loads on transportation facilities as well and to reduce the need for investment in new or expanded facilities. Actual transportation systems will inevitably consist of a complex combination of these extreme approaches to capacity provisions, modal split, and demand management.

Ultimately, the attainment of a balance between traffic loads and service levels in system design will be dictated by an assortment of factors, including the transportation facilities that already exist or have been committed to construction, the transportation system development objectives and standards to be met, considerations of system integration and continuity, the pattern of land uses to be served, and related benefits and costs. Some of these considerations may be conflicting, and as a result, the transportation system plan finally selected for adoption and implementation will represent a compromise between the theoretical and the practical, the desirable and the possible, and between the demand for transportation facilities and services and the ability to pay for those facilities and services. The design of the year 2010 alternative regional transportation system plans required a methodology permitting the thoughtful incorporation of these design considerations. This chapter presents that methodology.

This chapter also describes the no-build transportation system plan alternative, evaluates the operation of the no-build system under the travel demand derived from the adopted regional land use plan, describes the three alternative transportation system management plans designed and considered, and describes the results of testing these alternatives under the adopted regional land use plan.

## PLAN DESIGN METHODOLOGY

It is in the system design phase of the transportation planning process that alternative future transportation networks are synthesized to satisfy regional transportation system development objectives and standards while meeting overriding criteria of system integration and continuity. As already noted, the design of transportation networks is a highly complex process, requiring not only the assimilation of large amounts of information and the development and application of traffic simulation models, but also the exercise of experienced engineering judgment. To a considerable extent, the process is one of finding successive approximations of the best design solution, with specific solutions being proposed to specific system problems in each iteration, then tested through application of the traffic simulation models. The more comprehensive and detailed the knowledge and understanding of regional traffic patterns to be served, the more readily sound design solutions can be found to satisfy development objectives.

Proper utilization of traffic assignments, derived from application of traffic simulation models, requires careful analysis of the resulting network volumes to find possible design solutions to indicated problems. Such utilization also requires the conversion of these volumes into a form usable in plan evaluation, so that the degree to which plan objectives and standards are met can be determined. The analyses made for system design and evaluation purposes involve application of certain well-developed engineering techniques, the most important of which warrant brief description here.

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causing traffic overloads nor of the tripmakers located in areas inadequately served. Future traffic assignments alone will not effectively suggest possible design solutions to eliminate these deficiencies most effectively.

To provide the necessary information about the characteristics of trips, special screenline, trip origin-destination, and selected link analyses were made using the traffic simulation models. In the screenline analyses, traffic distribution within major corridors was examined along sections across the corridors which cut all of the major transportation facilities. The sections, or screenlines, were delineated on the basis of an analysis of the results of the initial traffic assignments. The distribution and characteristics of the traffic crossing the screenline on the major facilities within the corridor were then determined and compared with the distribution of the physical capacity of the various facilities serving each such corridor, the total transportation system capacity in the corridor evaluated against the loads, and the possible diversion of traffic between overloaded and underloaded facilities within the corridor analyzed.

Since highway service is virtually ubiquitous within the Region, if direct routes do not exist between two subareas of the Region, trips desired to be made between such areas will still be made, albeit by less direct routes. Also, as more desirable transportation facilities between two subareas of the Region become overloaded, additional trips between these areas will still be made, but on less direct routes, utilizing facilities that have available capacity. Traffic loads, therefore, are continuously redistributed as existing facilities become overloaded and new facilities are constructed until a state of equilibrium is approximated in the system. If the volume of future trips between certain concentrations of trip origins and destinations within the Region is sufficiently large, the use of demand management, the provision of direct transit service, or the construction of a direct transportation facility may be justified to assist in achieving the desired equilibrium in the system. The need for such transportation improvements becomes particularly acute if the circuitous movement of heavy traffic volumes between portions of the Region results in the overloading of facilities required to serve other travel demands.

To facilitate identification of the demand for direct movement between subareas of the Region, the Region was divided into planning analysis areas consisting of combinations of adjacent traffic analysis zones. In this way, shorter local trips could be treated as intra-area trips, leaving considerably fewer traffic movements to be studied to ascertain major future travel desires. Similar results can also be achieved by assigning selected trip length categories to the existing plus committed transportation network, a technique which was also used in plan design.

Finally, a better understanding of the characteristics of trips utilizing overloaded links in the network was gained through selected link analyses. This involved the identification of heavily overloaded links in the existing plus committed network and identification of the origins and destinations of all trips passing through these links as well as of the land use activities at the origins and destinations. Thus, it was possible to identify the specific interzonal trips which may be expected to utilize heavily overloaded facilities and to analyze the feasibility of rerouting these trips over other portions of the transportation system. It was also possible to consider travel demand management measures to reduce travel demand on specified overloaded facilities. This technique provided a particularly powerful tool to identify circuitous travel paths as well as facilities requiring transportation system management and additional capacity to relieve overloads on more direct routings.

To provide the necessary information about characteristics of tripmakers located in residential areas inadequately served by the transportation system, trip pattern, household income, and automobile availability data were analyzed to determine the type of transportation improvements most appropriate to meet Standard No. 1 of Objective No. 1. Public transit service is not ubiquitous within the Region, nor even within the urbanized areas of the Region. Therefore, if transit routes between subareas of an urbanized area do not exist, trips desired to be made between such subareas may be made by alternatives to transit, by less direct transit routes if available, involving increased travel times and inconvenience, or such trips may not be made at all. If the volume of desired trips between certain concentrations of trip origin and destination is large and these trips cannot be conveniently made or cannot be made at all because of the lack of transit service, the provision of direct and frequent transit service linking such concentrations may be justified. The need for such service becomes particularly acute when its absence contributes to a lack of access to employment, educational, shopping, recreational, and social opportunities otherwise provided to those able to make private use of highway facilities.

Plan Synthesis

On the basis of the analyses of the assignment of future trips to the existing plus committed transportation facilities, utilizing the techniques described, the need for new facilities was identified and alternative transportation system plans synthesized. The assignment of future trips was then made to alternative transportation system management plans. These alternative plans consisted of the existing plus committed arterial street and highway system and the proposed transit systems and demand management measures. This analysis procedure was repeated until all possible system deficiencies could be found to be resolved. Finally, as described in Chapter X of this report, arterial street and highway improvements were postulated to resolve remaining identified deficiencies until a practical and workable transportation system design had been evolved. Thus, proposals advanced to overcome indicated deficiencies in the transportation system were tested and evaluated.

Thus, the plan design process consisted of sequentially postulating, evaluating, and selecting alternative combinations of transportation system management measures (including demand management measures, traffic management measures, and public transit improvements) and arterial street and highway improvements. The degree to which such combinations resolved expected deficiencies was tested until a combination of solutions deemed best able to achieve transportation development objectives was found. Arterial street and highway improvements were postulated only to resolve residual system deficiencies, that is, traffic congestion problems not resolved through postulated transportation system management measures.

It is important to note that the alternative travel demand management measures selected for consideration provided alternative frameworks for the subsequent construction of the public transit and the arterial street and highway improvement alternatives. This concept becomes clear when it is considered that travel demand management measures that substantially increase the cost of single-occupancy vehicle travel tend to reduce travel demand and affect mode choice more than measures that do not increase the cost of travel. Since travel demand and modal choice are affected to varying degrees through this process, the consideration of alternative combinations of public transit and arterial street and highway improvements is required. A mix of transportation improvements well suited to one demand management alternative may not be well suited to another.

As previously indicated, transportation system deficiencies expected to occur under future land use patterns can be met by various combinations of transportation system improvements. The methodology employed in the design of the year 2010 alternative transportation system plans allowed for explicit consideration of a variety of such combinations and enabled the most cost-effective alternative plans to be designed. Because the design process started with the consideration of transportation system management measures, relatively inexpensive and nondisruptive measures to resolve expected deficiencies and to meet development objectives and standards were considered before more costly and potentially disruptive improvements. The plan design methodology thus explicitly considered travel demand management measures, traffic management measures, and public transit improvements to address the transportation needs of the Region prior to considering arterial highway improvements and expansions.

The traffic analyses used in plan design required application of the full battery of travel and traffic simulation models described in Chapter VII of this report. Application of these models included the generation of person trips at the zonal level, distribution of trips generated by trip purpose between traffic analysis zones, subdivision of distributed trips by personal vehicle and public transit modes, assignment of travel demand to the arterial street and highway network and the transit network, and evaluation of the assigned travel demand against the supply of transportation capacity provided by each alternative plan analyzed. Other transportation service and facility improvements were added to the alternative system plans until the demand for transportation service could be met and the agreed-upon transportation system development objectives and standards largely satisfied.

The plan design methodology permitted the implications of a broad range of actions concerning transportation system development to be evaluated and presented for critical public review and reaction. The Technical Coordinating and Advisory Committee assisted the Commission staff in identifying the base year system, reviewing the traffic analyses made to identify the operating conditions associated with that system in the design year, developing and analyzing the initial alternatives postulated to address deficiencies identified in the existing system under future traffic loadings, and in designing the final alternative regional transportation system plans.

Sources of Design Solutions

In designing the year 2010 alternative regional transportation system plans, preliminary design solutions to be tested and evaluated were drawn from three major sources. The first source consisted of travel demand management measures and traffic management measures drawn from the Clean Air Act Amendments of 1990 and relevant literature. It was recognized that, upon consideration and incorporation of these measures in the final recommended plan, the Wisconsin Department of Natural Resources may have classified them as transportation control measures for inclusion in the State Implementation Plan for Air Quality and in the multi-state plan for Southeastern Wisconsin, Northeastern Illinois, Northeastern Indiana, to attain ambient air quality standards for ozone.

The second source of preliminary design solutions consisted of a detailed reconsideration of the adopted regional transportation plan undertaken by public transit operators, the Wisconsin Department of Transportation, the seven county highway agencies concerned, local municipal planning and public works agencies, and county and local elected officials and concerned citizens serving on jurisdictional highway planning and transit development planning advisory committees. Such reconsideration of the adopted plan was undertaken in the preparation of transit development programs for the urban areas of Kenosha, Milwaukee, Racine, and Waukesha and the preparation of the seven county jurisdictional highway plans. The preliminary design solutions from the second source thus originated with the experienced professional engineers and planners in the employ of the State, county, and local units of government, who had a knowledge of, and long-standing experience with, the transportation system within the Region and county and local elected officials who had intimate knowledge of public attitudes and concerns within their political jurisdictions.

The third source of preliminary design solutions was developed directly from analyses of the traffic assignments and subsequent network analyses, in which solutions to correct system deficiencies became apparent through the knowledge acquired of the existing and probable future traffic patterns within the Region and the manner in which these were being distributed on the existing plus committed transportation network.

All proposed design solutions developed from these three sources were carefully reviewed by the Technical Coordinating and Advisory Committee. As approved or modified by the Committee process, the proposed improvements were synthesized into a potential transportation system and the resulting system was tested and refined as heretofore described.

Consideration of Federal Provisions in Plan Design

The methodology used in the design of the year 2010 alternative regional transportation system plans reflected careful consideration of the requirements of the Clean Air Act Amendments of 1990 (CAAA) and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). ISTEA in particular requires that the metropolitan transportation plan address specific elements. Appendix B of this report documents the Commission's explicit consideration of these elements.

## NO-BUILD TRANSPORTATION SYSTEM PLAN

One possible course of action for the provision of transportation services and facilities in the Region would be to make no major improvements to the existing transportation system. This course would attempt to serve existing and probable future travel demand entirely with existing arterial street and highway and transit facilities. This "do-nothing," or no-build, alternative not only represents a possible policy alternative for the Region but, from a technical standpoint, also becomes the point of departure for initial testing and design of alternative transportation plans which do incorporate facility and service improvements. Thus, the no-build alternative comprises both the final system to result from pursuing a course of action that would minimize capital investment in transportation facilities and the point of departure for investigating a range of possible transportation system improvements that would serve travel demand through additional capital investment and offering increased system capacity and improved levels of service.

Determination of a No-Build Transportation System

In developing the transportation system which would constitute the no-build alternative plan, three possible definitions were considered by the Advisory Committee.

The first definition identified the no-build system as composed only of those transportation facilities in use as of January 1, 1994. The advantages of this approach lie principally in the simplicity of identification and the potential that it offers for agreement on the part of all concerned. The principal disadvantage of this approach is that it ignores improvements to the regional transportation system that may currently be in a stage of implementation. Some of these improvements or modifications may be so nearly complete that to ignore them would not only be unrealistic but could lead to misinterpretation of any system test results.

Since transportation system development is a dynamic process and since certain transportation facility improvements within an urbanizing region are normally in some stage of implementation and will become available to system users in the near future, there may be certain proposed, as well as partially completed, facilities that should, as a practical matter, be incorporated into the no-build transportation system. While no absolute certainty exists that these improvements will be completed and placed in operation, most reasonable persons probably would agree that certain transportation improvement projects will indeed be implemented and should, therefore, properly be considered a part of the no-build system.

It is evident, then, that a second definition of the no-build system is one composed of all facilities actually in use in the base year plus certain facilities under construction whose completion may reasonably be regarded as irreversible. The advantage of this expanded definition that it provides a basis for identifying system deficiencies by recognizing and incorporating improvement projects likely to be available for use in the short-term future. The disadvantage of this definition lies principally in the difficulty of all concerned in reaching agreement upon those projects currently in various stages of implementation that can be expected to be completed and available for use.

Yet a third definition of the no-build transportation system recognizes that certain political and administrative decisions have been made which, in effect, should commit resources to facility improvements, and that such committed improvements should be added to the transportation network already in use. This was the course of action followed in preparing the first- and second-generation regional transportation system plans.

The principal advantage of the third definition is that it is consistent with official actions and decisions undertaken to commit public resources to transportation facilities, facilities which may have been proposed in a legally adopted long-range plan. Any decision to reverse such a commitment must be made only after the most careful reappraisal if public funds are not to be wasted and great harm done to the public interest originally intended to be served. The principal disadvantage of this alternative is that, while some projects may appear to be committed by administrative and political actions, these projects may not be completed because of litigation or change in administrative or political decisions. This approach to defining the no-build system for the third-generation plan was selected by the Technical Coordinating and Advisory Committee.

Arterial Street and Highway System: Following extended consideration of the alternative ways to define the no-build transportation system, the Technical Coordinating and Advisory Committee recommended that the no-build arterial street and highway system be defined as those arterial facilities completed and opened to traffic as of January 1, 1994, with the addition of those facilities programmed for construction in the annual element, the element applicable to calendar years 1994 and 1995, of the 1993 through 1998 Federally approved Transportation Improvement Program for Southeastern Wisconsin prepared by the Regional Planning Commission.

The arterial street and highway component of the no-build alternative regional transportation system plan is shown on Map 84. The number of miles of existing and committed arterial street and highway facilities in the Region is defined by arterial facility type on a county-by-county basis in Table 174. On a regional basis, the arterial street and highway system would increase from 3,274 miles in 1991 to 3,480 miles, an increment of about 206 miles, or 6 percent. The additional 206 miles consist of three miles of new arterial streets and highways opened to traffic by January 1, 1994; 11 miles of committed new facilities scheduled for completion in 1994 and 1995; and 192 miles of existing nonarterial streets which could be expected to function as arterial streets or highways by 2010.

Transit System: The Technical Coordinating and Advisory Committee recommended that the no-build regional public transit system be defined as the existing intraregional urban transit systems operating within the Region on January 1, 1994, with the addition of those facility and service improvements programmed for implementation in the annual element of the 1993 through 1998 Transportation Improvement Program for Southeastern Wisconsin.

The committed transit improvements consisted primarily of minor route extensions and modifications. The no-build regional transit system is identified on Map 85. As shown in Table 175, rapid transit service within the Region would consist of 519 round trip route miles, representing an increase of 70 miles, or about 16 percent, over the 1991 level. The number of round trip route miles provided by express transit would decrease between 1991 and 2010 by 16 miles, or 4 percent, from 393 miles to 377 miles. This reduction would be the result of the conversion of certain express routes to rapid transit service. Table 175 also indicates that the number of round trip route miles of local service within the Kenosha and Milwaukee urbanized areas would increase by 21 and 68 miles, respectively, and the number would be reduced in the Racine urbanized area by three miles.

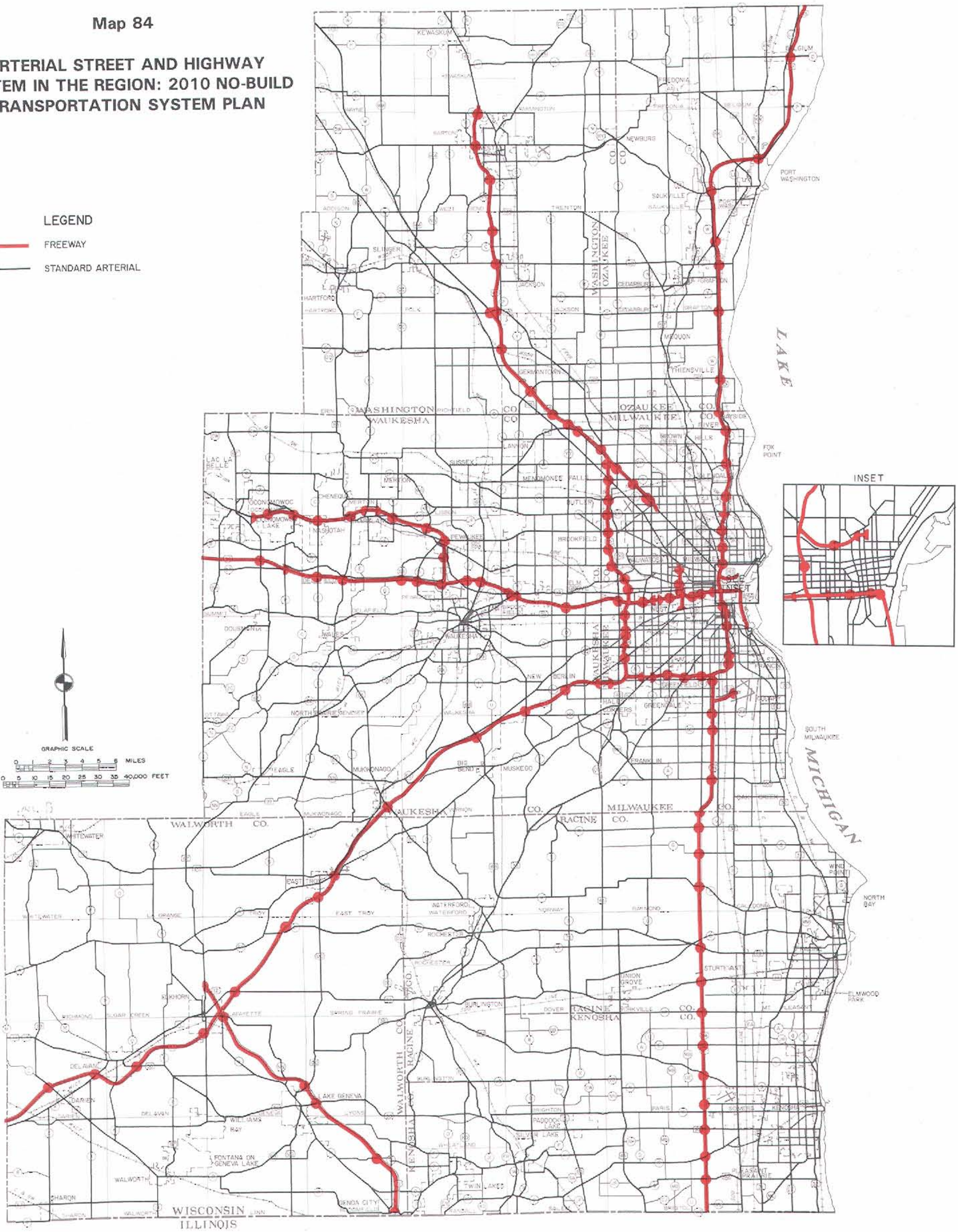
Maps 86 through 88 show the local transit service area in the Kenosha, Milwaukee, and Racine urbanized areas, respectively. The maps show the additional areas that would be served under the no-build alternative plan, as well as the areas which would no longer be served by local transit. These minor changes in service area will have relatively insignificant impacts on the number of people served by local transit. The local transit service area is that area located one-quarter mile on either side of a local transit route, the maximum convenient walking distance to a transit stop.

The population served by local transit within urbanized areas may be anticipated to increase, largely because of the planned distribution of future population growth to those areas served by local transit. Through the land use settlement pattern envisioned under the adopted regional land use plan and the minor transit changes envisioned under the no-build plan, the number of persons residing within the Kenosha local transit service area may be expected to decline by about 3 percent, from 86,600 in 1991 to 84,200 by 2010. The proportion of the Kenosha urbanized area population served by transit may be expected to decrease, as well, from 92 percent to 79 percent. The number of persons residing within the Milwaukee local transit service area may be expected to decline from 935,400 in 1991 to 926,500 by 2010. The proportion of the Milwaukee urbanized area population served by local transit may be expected to decrease from 76 percent to 73 percent. The number of people residing within the Racine local transit service area may be expected to decrease by 5 percent, from 114,600 in 1991 to 108,900 by 2010. As within the Kenosha and Milwaukee urbanized areas, the proportion of the population within the Racine urbanized area served by local transit may be expected to decline, from 94 percent to 82 percent.

Transportation System Management: The Technical Coordinating and Advisory Committee recommended that the travel demand management measures considered part of the no-build transportation system be defined as those measures in operation within the Region as of January 1, 1994, with the addition of those measures for which funding has been committed in the annual element of the 1993 through 1998 Transportation Improvement Program for Southeastern Wisconsin. Such measures include, among others, freeway traffic management system implementation and the construction and reconstruction of bikeways.

## Map 84

### ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN




The no-build street and highway system plan includes those surface arterial streets and highways proposed to be open to traffic during the period from 1991 through 1994, the committed facilities identified in the annual element of the 1993 through 1998 Transportation Improvement Program for Southeastern Wisconsin, and certain existing streets and highways which did not function as arterials in 1991 but which would function as arterials by the year 2010. On a regional basis, the arterial street and highway system would increase from 3,274 miles in 1991 to 3,480 miles by 2010, an increment of about 206 miles, or 6 percent.

*Source: SEWRPC.*

Table 174

**ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE AND BY COUNTY: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN**

| | Arterial Streets and Highways | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Planned Increment | | 2010 | |
| Arterial Facility Type | Miles | Percent of Total | Miles | Percent Change | Miles | Percent of Total |
| Kenosha County | | | | | | |
| Freeway | | | | | | |
| Four-Lane ........... | - - | - - | - - | - - | - - | - - |
| Six-Lane ............ | 12.0 | 3.8 | - - | - - | 12.0 | 3.5 |
| Eight-Lane .......... | - - | - - | - - | - - | - - | - - |
| Subtotal | 12.0 | 3.8 | - - | - - | 12.0 | 3.5 |
| Standard Arterial | | | | | | |
| Two-Lane ........... | 256.1 | 80.6 | 19.0 | 7.4 | 275.1 | 79.7 |
| Four-Lane ........... | 49.6 | 15.6 | 8.5 | 17.1 | 58.1 | 16.8 |
| Six-Lane ............ | - - | - - | - - | - - | - - | - - |
| Subtotal | 305.7 | 96.2 | 27.5 | 9.0 | 333.2 | 96.5 |
| County Subtotal | 317.7 | 100.0 | 27.5 | 8.7 | 345.2 | 100.0 |
| Milwaukee County | | | | | | |
| Freeway | | | | | | |
| Four-Lane ........... | 13.9 | 1.8 | - - | - - | 13.9 | 1.8 |
| Six-Lane ............ | 53.9 | 6.9 | - - | - - | 53.9 | 6.8 |
| Eight-Lane .......... | 1.4 | 0.2 | - - | - - | 1.4 | 0.2 |
| Subtotal | 69.2 | 8.9 | - - | - - | 69.2 | 8.8 |
| Standard Arterial | | | | | | |
| Two-Lane ........... | 379.0 | 48.9 | -1.4 | -0.4 | 377.6 | 47.8 |
| Four-Lane ........... | 288.9 | 37.3 | 12.3 | 4.3 | 301.2 | 38.2 |
| Six-Lane ............ | 38.3 | 4.9 | 3.0 | 7.8 | 41.3 | 5.2 |
| Subtotal | 706.2 | 91.1 | 13.9 | 2.0 | 720.1 | 91.2 |
| County Subtotal | 775.4 | 100.0 | 13.9 | 1.8 | 789.3 | 100.0 |
| Ozaukee County | | | | | | |
| Freeway | | | | | | |
| Four-Lane ........... | 27.4 | 9.5 | - - | - - | 27.4 | 8.3 |
| Six-Lane ............ | - - | - - | - - | - - | - - | - - |
| Eight-Lane .......... | - - | - - | - - | - - | - - | - - |
| Subtotal | 27.4 | 9.5 | - - | - - | 27.4 | 9.5 |
| Standard Arterial | | | | | | |
| Two-Lane ........... | 241.3 | 83.6 | - - | - - | 241.3 | 83.6 |
| Four-Lane ........... | 19.8 | 6.9 | - - | - - | 19.8 | 6.9 |
| Six-Lane ............ | - - | - - | - - | - - | - - | - - |
| Subtotal | 261.1 | 90.5 | - - | - - | 261.1 | 90.5 |
| County Subtotal | 288.5 | 100.0 | - - | - - | 288.5 | 100.0 |
| Racine County | | | | | | |
| Freeway | | | | | | |
| Four-Lane ........... | - - | - - | - - | - - | - - | - - |
| Six-Lane ............ | 12.0 | 3.4 | - - | - - | 12.0 | 2.9 |
| Eight-Lane .......... | - - | - - | - - | - - | - - | - - |
| Subtotal | 12.0 | 3.4 | - - | - - | 12.0 | 2.9 |
| Standard Arterial | | | | | | |
| Two-Lane ........... | 301.6 | 86.7 | 57.8 | 19.2 | 359.4 | 88.2 |
| Four-Lane ........... | 31.1 | 9.0 | 1.8 | 5.8 | 32.9 | 8.1 |
| Six-Lane ............ | 3.2 | 0.9 | - - | - - | 3.2 | 0.8 |
| Subtotal | 335.9 | 96.6 | 59.6 | 17.7 | 395.5 | 97.1 |
| County Subtotal | 347.9 | 100.0 | 59.6 | 17.1 | 407.5 | 100.0 |

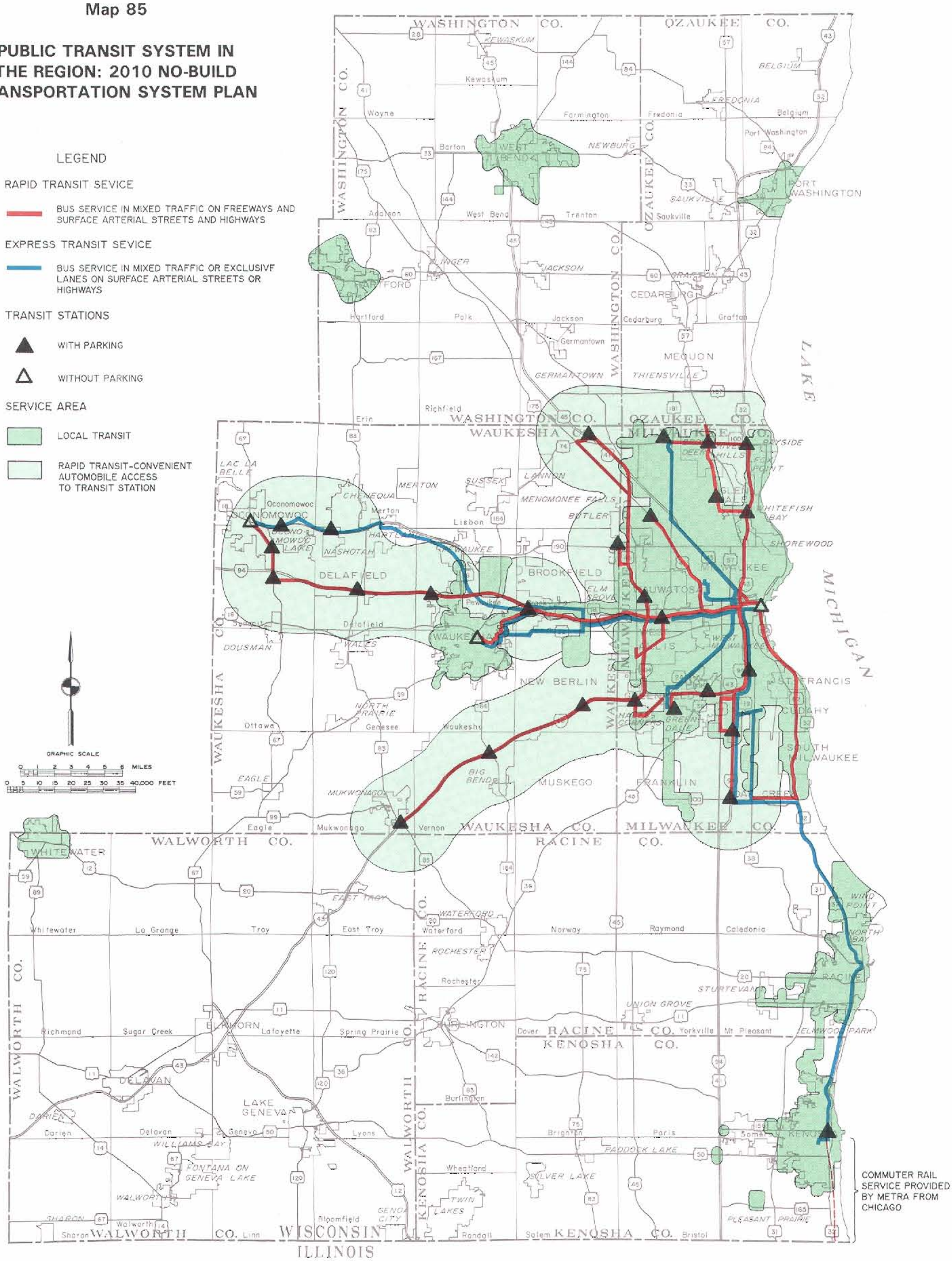
Table 174 (continued)

| Arterial Facility Type | Arterial Streets and Highways | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Planned Increment | | 2010 | |
| | Miles | Percent of Total | Miles | Percent Change | Miles | Percent of Total |
| Walworth County | | | | | | |
| Freeway | | | | | | |
| Four-Lane . . . . . . . . . . . | 50.0 | 11.7 | - - | - - | 50.0 | 11.2 |
| Six-Lane . . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Eight-Lane . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 50.0 | 11.7 | - - | - - | 50.0 | 11.2 |
| Standard Arterial | | | | | | |
| Two-Lane . . . . . . . . . . . | 370.5 | 86.3 | 14.6 | 3.9 | 385.1 | 86.6 |
| Four-Lane . . . . . . . . . . . | 8.7 | 2.0 | 1.1 | 12.6 | 9.8 | 2.2 |
| Six-Lane . . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 379.2 | 88.3 | 15.7 | 4.1 | 394.9 | 88.8 |
| County Subtotal | 429.2 | 100.0 | 15.7 | 3.7 | 444.9 | 100.0 |
| Washington County | | | | | | |
| Freeway | | | | | | |
| Four-Lane . . . . . . . . . . . | 15.1 | 3.8 | - - | - - | 15.1 | 3.4 |
| Six-Lane . . . . . . . . . . . . | 6.5 | 1.6 | - - | - - | 6.5 | 1.4 |
| Eight-Lane . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 21.6 | 5.4 | - - | - - | 21.6 | 4.8 |
| Standard Arterial | | | | | | |
| Two-Lane . . . . . . . . . . . | 340.0 | 85.2 | 49.5 | 14.6 | 389.5 | 86.8 |
| Four-Lane . . . . . . . . . . . | 37.6 | 9.4 | - - | - - | 37.6 | 8.4 |
| Six-Lane . . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 377.6 | 94.6 | 49.5 | 13.1 | 427.1 | 95.2 |
| County Subtotal | 399.2 | 100.0 | 49.5 | 12.4 | 448.7 | 100.0 |
| Waukesha County | | | | | | |
| Freeway | | | | | | |
| Four-Lane . . . . . . . . . . . | 45.6 | 6.3 | - - | - - | 45.6 | 6.0 |
| Six-Lane . . . . . . . . . . . . | 13.4 | 1.9 | - - | - - | 13.4 | 1.8 |
| Eight-Lane . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 59.0 | 8.3 | - - | - - | 59.0 | 7.8 |
| Standard Arterial | | | | | | |
| Two-Lane . . . . . . . . . . . | 600.2 | 83.8 | 25.0 | 4.2 | 625.2 | 82.7 |
| Four-Lane . . . . . . . . . . . | 52.2 | 7.3 | 14.3 | 27.4 | 66.5 | 8.8 |
| Six-Lane . . . . . . . . . . . . | 4.9 | 0.7 | - - | - - | 4.9 | 0.7 |
| Subtotal | 657.3 | 91.8 | 39.3 | 6.0 | 696.6 | 92.2 |
| County Subtotal | 716.3 | 100.0 | 39.3 | 5.5 | 755.6 | 100.0 |
| Southeastern Wisconsin Region | | | | | | |
| Freeway | | | | | | |
| Four-Lane . . . . . . . . . . . | 152.0 | 4.6 | - - | - - | 152.0 | 4.3 |
| Six-Lane . . . . . . . . . . . . | 97.8 | 3.0 | - - | - - | 97.8 | 2.8 |
| Eight-Lane . . . . . . . . . . . | 1.4 | 0.1 | - - | - - | 1.4 | 0.1 |
| Subtotal | 251.2 | 7.7 | - - | - - | 251.2 | 7.2 |
| Standard Arterial | | | | | | |
| Two-Lane . . . . . . . . . . . | 2,488.7 | 76.0 | 164.5 | 6.6 | 2,653.2 | 76.3 |
| Four-Lane . . . . . . . . . . . | 487.9 | 14.9 | 38.0 | 7.8 | 525.9 | 15.1 |
| Six-Lane . . . . . . . . . . . . | 46.4 | 1.4 | 3.0 | 6.5 | 49.4 | 1.4 |
| Subtotal | 3,023.0 | 92.3 | 205.5 | 6.8 | 3,228.5 | 92.8 |
| Region Total | 3,274.2 | 100.0 | 205.5 | 6.3 | 3,479.7 | 100.0 |

*Source: SEWRPC.*

Map 85

## PUBLIC TRANSIT SYSTEM IN THE REGION: 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN




The no-build regional public transit system may be defined as the transit system operating within the Region on January 1, 1994, with the addition of those facility and service improvements programmed for implementation in the annual element of the 1993 through 1998 Transportation Improvement Program for Southeastern Wisconsin. Under the no-build plan, the urbanized area population to be served by public transit would remain stable at about 1.1 million.

*Source: SEWRPC.*

Table 175

**TRANSIT SYSTEM OPERATING CHARACTERISTICS AND FACILITIES IN THE REGION: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN**

| Transit Service | Base Year 1991 | | Planned Increment | | 2010 | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Round-Trip Route Length (miles) | | | | | | |
| Rapid Routes | 449 | 19.6 | 70 | 15.6 | 519 | 21.3 |
| Express Routes | 393 | 17.1 | -16 | -4.1 | 377 | 15.5 |
| Local Routes | | | | | | |
| Kenosha Urbanized Area | 171 | 7.4 | 21 | 12.3 | 192 | 7.9 |
| Milwaukee Urbanized Area | 1,112 | 48.5 | 68 | 6.1 | 1,180 | 48.4 |
| Racine Urbanized Area | 171 | 7.4 | -3 | -1.8 | 168 | 6.9 |
| Subtotal | 1,454 | 63.3 | 86 | 5.9 | 1,540 | 63.2 |
| Total | 2,296 | 100.0 | 140 | 6.1 | 2,436 | 100.0 |
| Special Facilities (miles) | | | | | | |
| Exclusive Right-of-Way | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Exclusive Lanes on Streets | 2 | 100.0 | 0 | 0.0 | 2 | 100.0 |
| Total | 2 | 100.0 | 0 | 0.0 | 2 | 100.0 |
| Average Weekday Vehicle Requirements[a] | | | | | | |
| Peak Period | 530 | - - | -3 | -0.6 | 527 | - - |
| Midday to Off-Peak Period | 285 | - - | 6 | 2.1 | 291 | - - |

*[a]Represents only the vehicles required for daily system operation. Excludes vehicles needed as spare or backup vehicles.*

*Source: SEWRPC.*

Assignment of Travel to Highway and Transit Networks

As previously indicated, an analysis of the performance of the no-build alternative transportation system plan, under present and probable future travel demand, was the first step in the plan design process. This analysis indicated the location and magnitude of deficiencies in the no-build transportation system; information essential to the development of alternative system plans, implementation of which could overcome identified deficiencies. The analysis of the performance of the no-build system was undertaken with the aid of the travel simulation models described in Chapter VII of this report.

Personal Vehicle Availability: Given the postulated no-build alternative transportation system plan and land use development in conformance with the adopted regional land use plan, it may be expected that the number of personal vehicles available in the Region will increase by nearly 177,300, or 16 percent, from about 1.13 million in 1991 to about 1.31 million in 2010 (see Table 176). This compares with a forecast increase of approximately 6 percent in resident population, 8 percent in households, and 11 percent in employment. Under the no-build plan, the number of vehicles per person would decrease from 1.6 in 1991 to 1.5 by 2010, and the number of vehicles per household would remain at 1.7.

Person Trip Generation:[2] If fully developed, the land use pattern postulated under the adopted land use plan, together with the transportation

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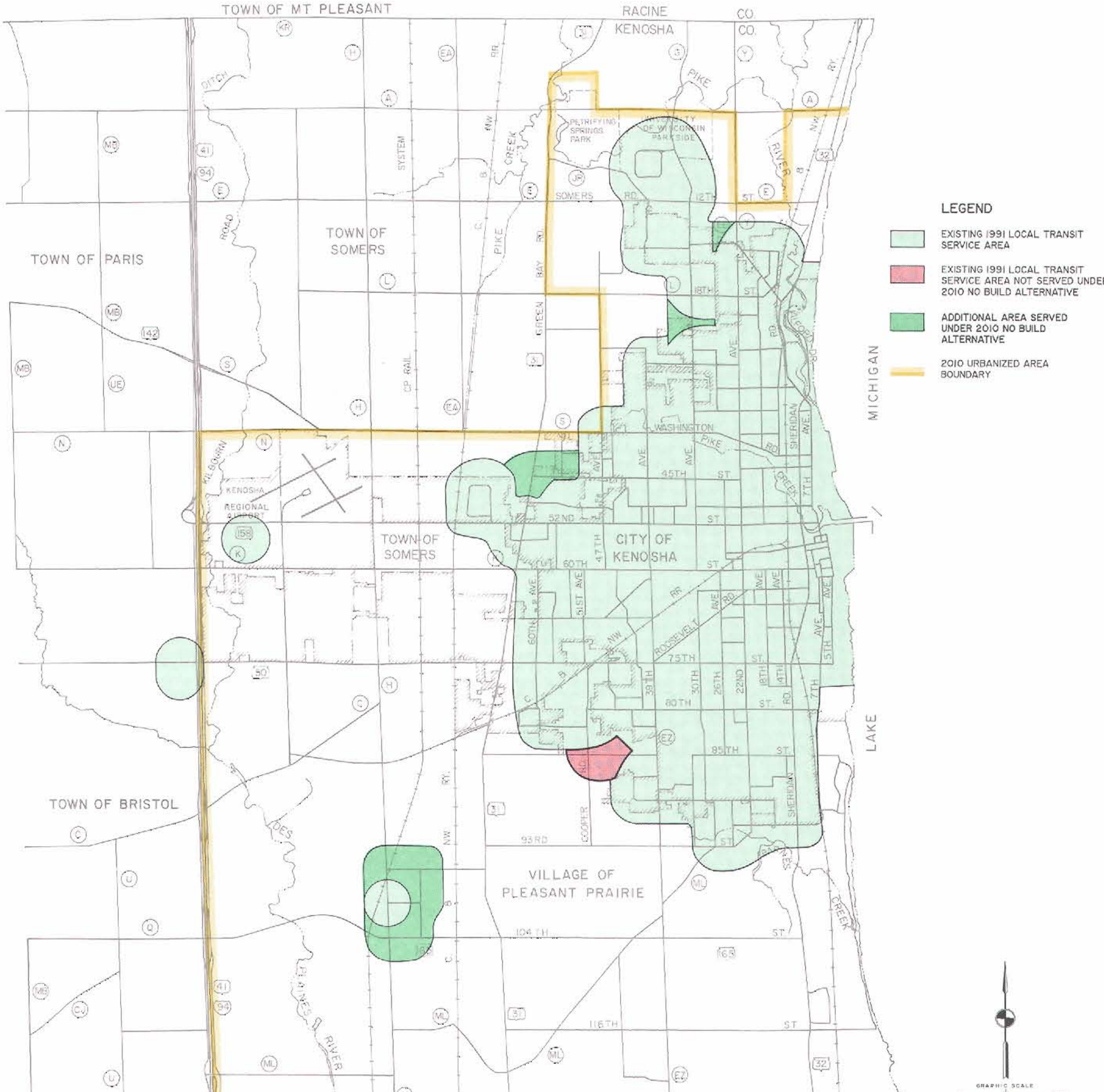
*[2]In deriving future travel demand for all transportation plan alternatives presented in this chapter, the simulation models were applied at the traffic analysis zone level. To present the resulting detailed traffic demand data in conventional report format is impractical. For the purpose of presenting the travel demand data in this report, it was necessary to aggregate the zonal data to obtain regional totals which could be used to present and analyze the major traffic characteristics under each alternative plan at the regional scale. It is important to note that all travel demand figures are estimates of probable future conditions and, while expressed as exact numbers, in reality reflect the variability and uncertainties inherent in any forecasting procedure.*

## Map 86

### AREA SERVED BY LOCAL FIXED-ROUTE TRANSIT IN THE KENOSHA URBANIZED AREA: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

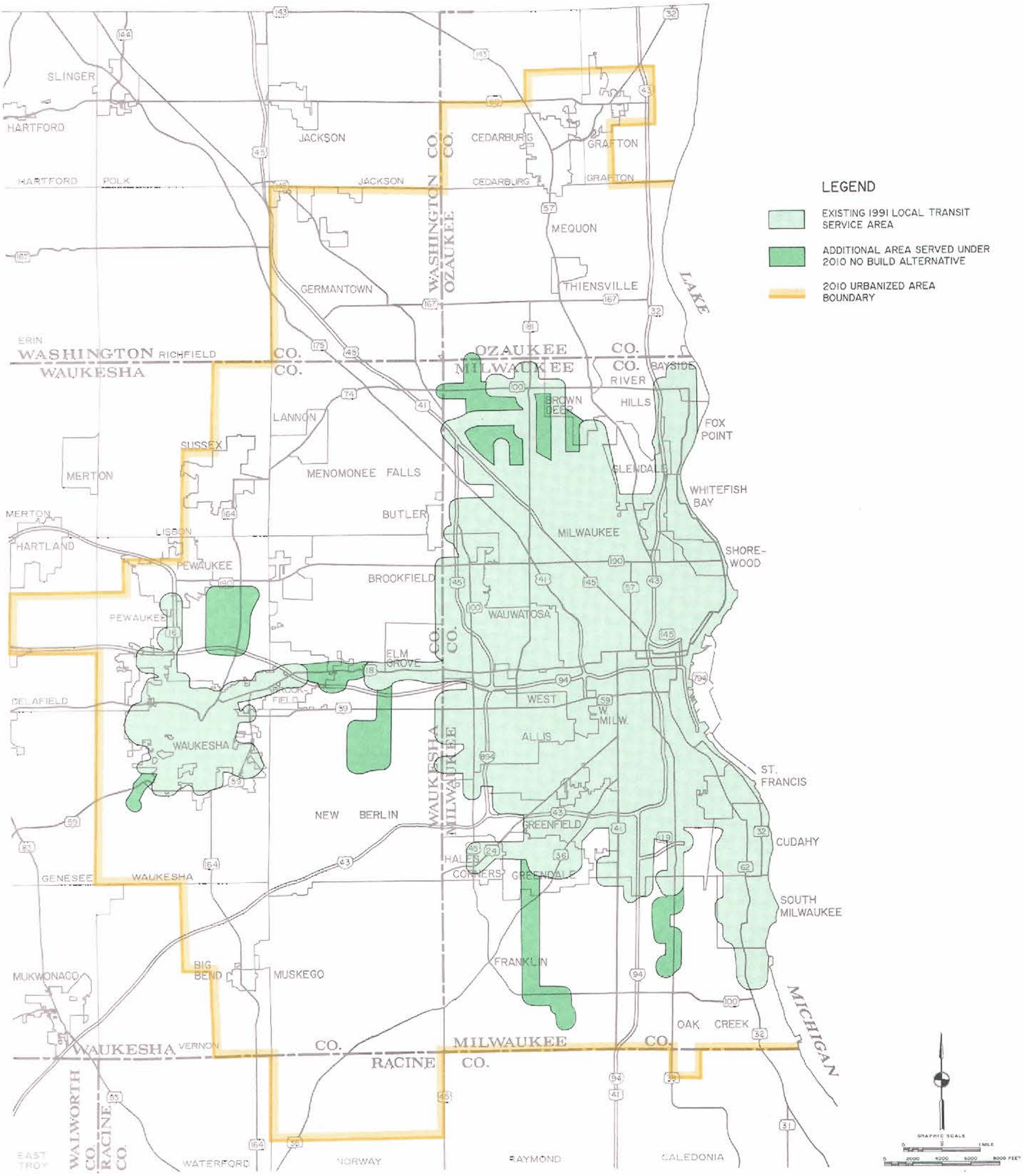



Map 86 shows the changes in the Kenosha local transit service area which would come about under the no-build alternative transportation system plan. Through the land use settlement pattern envisioned under the adopted regional land use plan and the minor transit changes proposed, the number of persons residing within the Kenosha local transit service area may be expected to decrease by about 3 percent, from 86,600 in 1991 to 84,200 by 2010.

*Source: SEWRPC.*

Map 87

## AREA SERVED BY LOCAL FIXED-ROUTE TRANSIT IN THE MILWAUKEE URBANIZED AREA: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

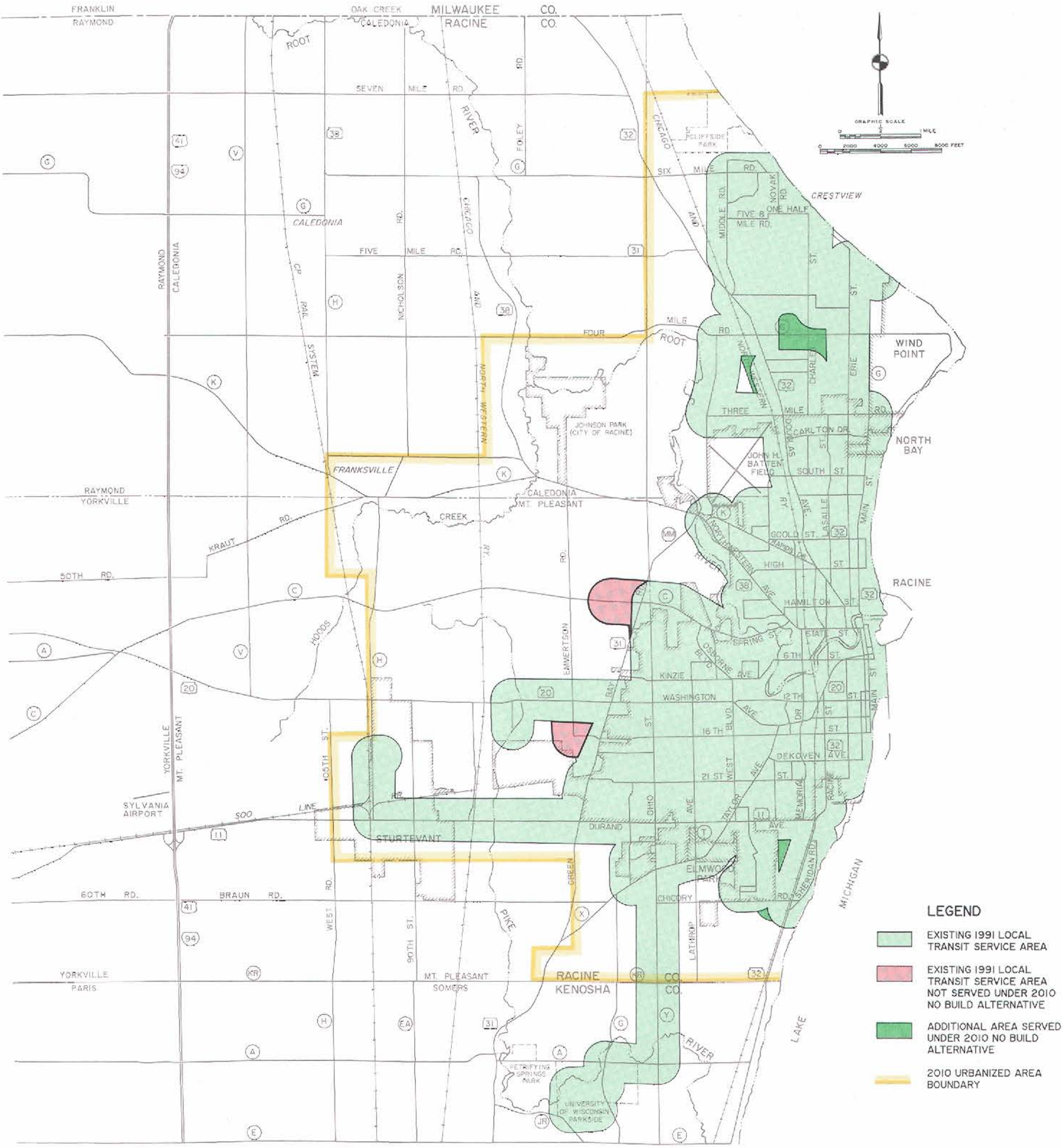



Map 87 shows the changes in the Milwaukee local transit service area which would come about under the no-build alternative transportation system plan. The population of the local transit service area may be expected to decrease by about 1 percent, from 935,400 in 1991 to 926,500 by 2010.

*Source: SEWRPC.*

## Map 88

### AREA SERVED BY LOCAL FIXED-ROUTE TRANSIT IN THE RACINE URBANIZED AREA: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN




Map 88 shows the changes in the Racine local transit service area which would come about under the no-build alternative transportation system plan. The number of people residing within the Racine local transit service area may be expected to decrease by about 5 percent, from 114,600 in 1991 to 108,900 by 2010.

*Source: SEWRPC.*

Table 176

SELECTED SOCIO-ECONOMIC AND TRANSPORTATION CHARACTERISTICS OF THE REGION: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| Characteristic | Base Year 1991 | No-Build | Forecast Change | |
|---|---|---|---|---|
| | | | Number | Percent |
| Population | 1,810,400 | 1,911,000 | 100,600 | 5.6 |
| Households | 714,900 | 774,300 | 59,400 | 8.3 |
| Employment | 990,300 | 1,095,000 | 104,700 | 10.6 |
| Vehicles Available | 1,132,000 | 1,309,300 | 177,300 | 15.7 |
| Internal Person Trips | 5,541,000 | 6,116,100 | 575,200 | 10.4 |
| Persons per Vehicle | 1.6 | 1.5 | -0.1 | -6.3 |
| Vehicles per Household | 1.7 | 1.7 | 0.0 | 0.0 |
| Trips Per Capita | 3.1 | 3.2 | 0.1 | 3.2 |
| Trips per Household | 7.8 | 7.9 | 0.1 | 1.3 |

*Source: SEWRPC.*

Table 177

DISTRIBUTION OF INTERNAL PERSON TRIPS MADE BY HOUSEHOLD RESIDENT IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| Trip Purpose Category | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,302,700 | 23.5 | 152,100 | 11.7 | 1,454,800 | 23.8 |
| Home-Based Shopping | 798,000 | 14.4 | 88,200 | 11.1 | 886,200 | 14.5 |
| Home-Based Other | 1,687,300 | 30.5 | 143,500 | 8.5 | 1,830,800 | 29.9 |
| Nonhome-Based | 1,127,400 | 20.3 | 124,600 | 11.1 | 1,252,000 | 20.5 |
| School | 625,600 | 11.3 | 66,700 | 10.7 | 692,300 | 11.3 |
| Total | 5,541,000 | 100.0 | 575,100 | 10.4 | 6,116,100 | 100.0 |

*Source: SEWRPC.*

system postulated under the no-build transportation system plan, may be expected to generate a total of nearly 6.12 million internal person trips on an average weekday. This represents an increase of about 10 percent over the nearly 5.54 million internal person trips generated within the Region on an average weekday in 1991, as shown in Table 176. The average number of internal person trips generated per capita within the Region on an average weekday may be expected to increase under this alternative from about 3.1 in 1991 to about 3.2 by 2010, while the average number of internal person trips generated per household may be expected to increase from 7.8 to about 7.9. The distribution of internal person trips by trip purpose is set forth in Table 177.

Mode of Travel: The distribution of internal person trips within the Region by mode of travel under the adopted land use plan and the no-build transportation system plan is summarized in Table 178. Average weekday transit trip production may be expected to decline by about 4 percent, from 172,200 trips in 1991 to about 168,000 trips by 2010. Trips made by automobile drivers may be expected to increase by about 16 percent, from 4.06 million in 1991 to 4.72

Table 178

DISTRIBUTION OF INTERNAL PERSON TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY MODE OF TRAVEL: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| Mode of Travel | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Automobile Driver | 4,060,900 | 73.3 | 660,700 | 16.3 | 4,721,600 | 77.2 |
| Automobile Passenger | 1,080,300 | 19.5 | -138,900 | -12.9 | 941,400 | 15.4 |
| Transit Passenger | 172,200 | 3.1 | -4,200 | -2.4 | 168,000 | 2.7 |
| School Bus Passenger | 227,600 | 4.1 | 57,500 | 25.3 | 285,100 | 4.7 |
| Total | 5,541,000 | 100.0 | 575,100 | 10.4 | 6,116,100 | 100.0 |

*Source: SEWRPC.*

million in 2010. The relative utilization of transit and personal vehicles is indicated by trip purpose categories in Tables 179, 180, and 181.

Average weekday internal vehicle trips may be expected to increase, as will person trips (see Table 182). If fully developed, the land use pattern recommended under the adopted land use plan may be expected to generate about 5.3 million internal vehicle trips, including automobile and truck trips, by the year 2010. This represents an increase of about 16 percent over the nearly 4.58 million internal vehicle trips generated on an average weekday in 1991.

System Performance

Allocation of the vehicle travel demand generated under the adopted land use plan to the no-build alternative transportation system plan indicates that vehicle miles of travel on the arterial street and highway system may be expected to increase from about 33.07 million per average weekday in 1991 to nearly 44.52 million by 2010, an increase of about 35 percent. The most significant increase in vehicle miles of travel may be expected to occur on the regional freeway system, where such travel would increase from about 11.6 million vehicle-miles in 1991 to about 17.3 million vehicle-miles in 2010, an increase of about 49 percent. The anticipated level of vehicle miles of travel on an average weekday under the no-build plan is identified by county and facility type in Table 183. The anticipated performance of the regional transit system under the no-build plan is summarized in Table 184. Under the no-build plan, the number of revenue vehicle-miles of transit service provided on an average weekday would increase by 4 percent, from 63,300 in 1991 to 65,400 in 2010. The number of revenue vehicle-hours of service would also increase, by 8 percent, from 5,220 in 1991 to 5,600 in 2010. Despite the slight increase in transit service provided, annual transit ridership may be expected to decline by about 4 percent, from about 50.2 million passengers in 1991 to about 48.0 million by 2010.

System Deficiencies

The impact of the anticipated increase in travel on the no-build arterial street and highway system is reflected in the number of arterial miles that may be expected to operate over design capacity by the year 2010 (see Table 185 and Map 89). In 1991, about 279 miles, or nearly 9 percent of the 3,274-mile arterial street and highway system, were operating over design capacity.

By 2010, the number of miles operating over design capacity may be expected to increase to about 681, an increase of 401 miles, or about 144 percent. Thus, by 2010, about 20 percent of total arterial mileage may be expected to operate over design capacity. By 2010, the number of miles expected to operate at design capacity may be expected to increase from 264 in 1991 to about 510 by the year 2010. Thus, the proportion of arterial mileage that may be expected to operate at design capacity would increase from 8 percent in 1991 to about 15 percent in 2010.

Table 179

**DISTRIBUTION OF INTERNAL TRANSIT TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN**

| | Internal Transit Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| Trip Purpose Category | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 44,000 | 25.5 | -100 | -0.2 | 43,900 | 26.1 |
| Home-Based Shopping | 15,800 | 9.2 | -2,400 | -15.2 | 13,400 | 8.0 |
| Home-Based Other | 28,200 | 16.4 | -2,400 | -8.5 | 25,800 | 15.4 |
| Nonhome-Based | 11,700 | 6.8 | 3,800 | 32.5 | 15,500 | 9.2 |
| School | 72,500 | 42.1 | -3,100 | -4.3 | 69,400 | 41.3 |
| Total | 172,200 | 100.0 | -4,200 | -2.4 | 168,000 | 100.0 |

*Source: SEWRPC.*

Table 180

**DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN**

| | Internal Automobile Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| Trip Purpose Category | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,258,700 | 24.5 | 152,200 | 12.1 | 1,410,900 | 24.9 |
| Home-Based Shopping | 782,200 | 15.2 | 90,600 | 11.7 | 872,800 | 15.4 |
| Home-Based Other | 1,659,100 | 32.3 | 145,900 | 8.8 | 1,805,000 | 31.9 |
| Nonhome-Based | 1,115,700 | 21.7 | 120,800 | 10.8 | 1,236,500 | 21.8 |
| School | 325,500 | 6.3 | 12,300 | 3.8 | 337,800 | 6.0 |
| Total | 5,141,200 | 100.0 | 521,800 | 10.1 | 5,663,000 | 100.0 |

*Source: SEWRPC.*

Table 181

**DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN**

| | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| Trip Purpose Category | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,149,500 | 28.3 | 217,000 | 18.9 | 1,366,500 | 28.9 |
| Home-Based Shopping | 616,600 | 15.2 | 98,500 | 16.0 | 715,100 | 15.1 |
| Home-Based Other | 1,246,900 | 30.7 | 162,600 | 13.0 | 1,409,500 | 29.9 |
| Nonhome-Based | 928,500 | 22.9 | 146,100 | 15.7 | 1,074,600 | 22.8 |
| School | 119,400 | 2.9 | 36,500 | 30.6 | 155,900 | 3.3 |
| Total | 4,060,900 | 100.0 | 660,700 | 16.3 | 4,721,600 | 100.0 |

*Source: SEWRPC.*

Table 182

DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| | Total Vehicle Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| Vehicle Class | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Automobile | | | | | | |
| Internal . . . . . . . . . | 4,060,900 | 83.0 | 660,700 | 16.3 | 4,721,600 | 82.4 |
| External . . . . . . . . . | 229,200 | 4.7 | 77,100 | 33.6 | 306,300 | 5.3 |
| Other . . . . . . . . . . . | 39,300 | 0.8 | 26,200 | 66.7 | 65,500 | 1.2 |
| Subtotal | 4,329,400 | 88.5 | 764,000 | 17.6 | 5,093,400 | 88.9 |
| Truck | | | | | | |
| Internal . . . . . . . . . | 520,100 | 10.6 | 58,900 | 11.3 | 579,000 | 10.1 |
| External . . . . . . . . . | 44,100 | 0.9 | 14,100 | 32.0 | 58,200 | 1.0 |
| Subtotal | 564,200 | 11.5 | 73,000 | 12.9 | 637,200 | 11.1 |
| Total | 4,893,600 | 100.0 | 837,000 | 17.1 | 5,730,600 | 100.0 |

*Source: SEWRPC.*

The identification of deficiencies under the no-build transportation system alternative plan and adopted regional land use plan also included the identification of existing and proposed urban residential areas of the Region inadequately served by the highway and public transit modes. The criteria for making this determination consisted of the travel time standards accompanying Objective No. 1 as set forth in Chapter VIII of this report. Table 186 summarizes data on the resident population within the urbanized areas of the Region adequately served by the street and highway system. Table 187 provides similar data for the public transit system.

Table 186 and Map 90 indicate that adequate highway service is nearly ubiquitous throughout the urbanized portions of the Region and may be expected to remain so through the year 2010 under the no-build plan. The percent of total urbanized population in the Region able to meet the employment travel time standard through highway travel may be expected to remain at about 94 percent. The population anticipated to be able to meet the other travel time standards in each of the three urbanized areas is shown on Table 186. Maps showing the location of the resident population expected to meet these other travel time accessibility standards are included in Appendix C of this report.

Table 187 indicates that under the no-build plan residents of significant portions of the urbanized area in the Region are unable, and may continue to be unable, to access in a timely manner important employment, shopping, recreational, educational, and health-related activity centers by transit. The urbanized area population able to meet the employment travel time standard through travel on the transit system may be expected to decrease from 131,300 in 1991, or 9 percent of the urbanized area population, to 108,400 in 2010, or 7 percent of the urbanized area population (see Map 91). Maps showing the location of the resident population expected to meet the travel time accessibility standards are included in Appendix C of this report.

When comparing the accessibility provided by transit and automobile modes, it should be noted that nearly one-half of the travel time entailed in making a local transit trip is "out-of-vehicle" time, that is, time spent walking to a transit stop, waiting for a transit vehicle, and walking to the trip destination. Significantly less out-of-vehicle travel time is usually involved in making a trip by automobile. Consequently, more activities can typically be accessed within a given period of time by automobile than by transit.

Table 183

VEHICLE-MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| County | Arterial Vehicle Miles of Travel on an Average Weekday (thousands) | | | | | | Average Annual Rate of Increase in Arterial Travel 1991-2010 (percent) |
|---|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total | |
| Kenosha | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 675 | 27.0 | 410 | 60.7 | 1,085 | 26.6 | 2.5 |
| Standard Arterial . . . . . . . . . . | 1,825 | 73.0 | 1,170 | 64.1 | 2,995 | 73.4 | 2.6 |
| Subtotal | 2,500 | 100.0 | 1,580 | 63.2 | 4,080 | 100.0 | 2.6 |
| Milwaukee | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 5,945 | 41.3 | 1,849 | 31.1 | 7,794 | 45.6 | 1.4 |
| Standard Arterial . . . . . . . . . . | 8,446 | 58.7 | 859 | 10.2 | 9,305 | 54.4 | 0.5 |
| Subtotal | 14,391 | 100.0 | 2,708 | 18.8 | 17,099 | 100.0 | 0.9 |
| Ozaukee | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 762 | 39.2 | 280 | 36.7 | 1,042 | 44.5 | 1.7 |
| Standard Arterial . . . . . . . . . . | 1,180 | 60.8 | 118 | 10.0 | 1,298 | 55.5 | 0.5 |
| Subtotal | 1,942 | 100.0 | 398 | 20.5 | 2,340 | 100.0 | 1.0 |
| Racine | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 708 | 23.9 | 541 | 76.4 | 1,249 | 29.8 | 3.0 |
| Standard Arterial . . . . . . . . . . | 2,258 | 76.1 | 687 | 30.4 | 2,945 | 70.2 | 1.4 |
| Subtotal | 2,966 | 100.0 | 1,228 | 41.4 | 4,194 | 100.0 | 1.8 |
| Walworth | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 540 | 28.2 | 454 | 84.1 | 994 | 37.8 | 3.3 |
| Standard Arterial . . . . . . . . . . | 1,373 | 71.8 | 260 | 18.9 | 1,633 | 62.2 | 0.9 |
| Subtotal | 1,913 | 100.0 | 714 | 37.3 | 2,627 | 100.0 | 1.7 |
| Washington | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 546 | 23.0 | 267 | 48.9 | 813 | 25.2 | 2.1 |
| Standard Arterial . . . . . . . . . . | 1,833 | 77.0 | 581 | 31.7 | 2,414 | 74.8 | 1.5 |
| Subtotal | 2,379 | 100.0 | 848 | 35.6 | 3,227 | 100.0 | 1.6 |
| Waukesha | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 2,421 | 34.7 | 1,896 | 78.3 | 4,317 | 39.4 | 3.1 |
| Standard Arterial . . . . . . . . . . | 4,560 | 65.3 | 2,078 | 45.6 | 6,638 | 60.6 | 2.0 |
| Subtotal | 6,981 | 100.0 | 3,974 | 56.9 | 10,955 | 100.0 | 2.4 |
| Southeastern Wisconsin Region | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 11,597 | 35.1 | 5,697 | 49.1 | 17,294 | 38.8 | 2.1 |
| Standard Arterial . . . . . . . . . . | 21,475 | 64.9 | 5,753 | 26.8 | 27,228 | 61.2 | 1.3 |
| Total | 33,072 | 100.0 | 11,450 | 34.6 | 44,522 | 100.0 | 1.6 |

*Source: SEWRPC.*

Table 184

TRANSIT SYSTEM PERFORMANCE IN THE REGION: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| Transit System Characteristics | Base Year 1991 | 2010 | Forecast Increment | |
|---|---|---|---|---|
| | | | Number | Percent Change |
| Service Provided, Average Weekday | | | | |
| Revenue Vehicle-Miles | | | | |
| Rapid | 3,400 | 3,100 | -300 | -8.8 |
| Express | 3,300 | 6,000 | 2,700 | 81.8 |
| Local | 56,600 | 56,800 | 200 | 0.4 |
| Total | 63,300 | 65,900 | 2,600 | 4.1 |
| Revenue Vehicle-Hours | | | | |
| Rapid | 170 | 160 | -10 | -5.9 |
| Express | 170 | 360 | 190 | 111.8 |
| Local | 4,880 | 5,130 | 250 | 5.1 |
| Total | 5,220 | 5,650 | 430 | 8.2 |
| Seat-Miles | 2,975,000 | 3,028,300 | 53,300 | 1.8 |
| Service Utilization | | | | |
| Ridership | | | | |
| Average Weekday Revenue Passengers | 172,200 | 168,000 | -4,200 | -2.4 |
| Annual Revenue Passengers | 50,222,900 | 48,998,000 | -1,224,900 | -2.4 |
| Revenue Passengers per Revenue Vehicle-Hour | 33.0 | 29.7 | -3.3 | -9.9 |
| Average Weekday Passenger Miles | 609,100 | 728,800 | 119,700 | 19.7 |

*Source: SEWRPC.*

## CONSIDERATION OF TRAVEL DEMAND MANAGEMENT

Travel demand management refers to a series of measures or strategies which are intended to reduce or eliminate personal and vehicular travel or to shift such travel to alternative times and routes. The general intent of such measures, in combination with public transit and arterial street and highway improvements, is to reduce traffic congestion, air pollution, and fuel consumption and, importantly, to assist in implementing the adopted regional land use plan. Travel demand management, in particular, implicitly emphasizes reducing the rate of urban decentralization and encouraging the development of more compact and interconnected neighborhoods, as recommended in the adopted year 2010 regional land use plan.

The achievement of the regional transportation system development objectives through the use of demand management depends on four factors: 1) the degree to which the appropriate variables influencing travel demand are identified for management, 2) the degree to which travel demand management measures are combined into coherent packages, 3) the degree to which travel demand management measures are integrated with public transit and arterial street and highway improvements, and 4) the extent to which demand management measures are practicable and implementable.

Many variables influence individual travel behavior; these have been described in detail in previous chapters of this report. These variables can generally be divided into three categories: the characteristics of the transportation system, the characteristics of the travelers, and the physical and temporal distribution of human activities as reflected in the land use pattern. In designing travel demand management measures it is essential that only those variables amenable to control, in the context of the Southeastern Wisconsin Region, be identified for manage-

Table 185

ARTERIAL MILEAGE IN THE REGION OPERATING UNDER, AT, AND OVER DESIGN CAPACITY: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| County | Base Year 1991 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Under Design Capacity | | At Design Capacity | | Over Design Capacity | | Total Miles |
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | |
| Kenosha . . . . . . . . . | 286.0 | 90.0 | 16.6 | 5.2 | 15.1 | 4.8 | 317.7 |
| Milwaukee . . . . . . . . | 543.2 | 70.1 | 110.3 | 14.2 | 121.9 | 15.7 | 775.4 |
| Ozaukee . . . . . . . . . | 254.2 | 88.1 | 21.0 | 7.3 | 13.3 | 4.6 | 288.5 |
| Racine . . . . . . . . . . | 288.7 | 83.0 | 24.9 | 7.2 | 34.3 | 9.9 | 347.9 |
| Walworth . . . . . . . . | 411.1 | 95.8 | 15.0 | 3.5 | 3.1 | 0.7 | 429.2 |
| Washington . . . . . . . | 356.5 | 89.3 | 23.2 | 5.8 | 19.5 | 4.9 | 399.2 |
| Waukesha . . . . . . . . | 591.3 | 82.5 | 53.0 | 7.4 | 72.0 | 10.1 | 716.3 |
| Total | 2,731.0 | 83.4 | 264.0 | 8.1 | 279.2 | 8.5 | 3,274.2 |

| County | Year 2010 No-Build | | | | | | |
|---|---|---|---|---|---|---|---|
| | Under Design Capacity | | At Design Capacity | | Over Design Capacity | | Total Miles |
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | |
| Kenosha . . . . . . . . . | 230.1 | 66.7 | 74.2 | 21.5 | 40.9 | 11.8 | 345.2 |
| Milwaukee . . . . . . . . | 490.0 | 62.1 | 122.6 | 15.6 | 176.7 | 22.3 | 789.3 |
| Ozaukee . . . . . . . . . | 233.9 | 81.1 | 26.3 | 9.1 | 28.3 | 9.8 | 288.5 |
| Racine . . . . . . . . . . | 241.7 | 59.3 | 80.5 | 19.8 | 85.3 | 20.9 | 407.5 |
| Walworth . . . . . . . . | 387.2 | 87.0 | 40.2 | 9.0 | 17.5 | 4.0 | 444.9 |
| Washington . . . . . . . | 337.7 | 75.3 | 54.1 | 12.1 | 56.9 | 12.6 | 448.7 |
| Waukesha . . . . . . . . | 369.1 | 48.8 | 111.6 | 14.7 | 274.9 | 36.5 | 755.6 |
| Total | 2,289.7 | 65.8 | 509.5 | 14.6 | 680.5 | 19.6 | 3,479.7 |

*Source: SEWRPC.*

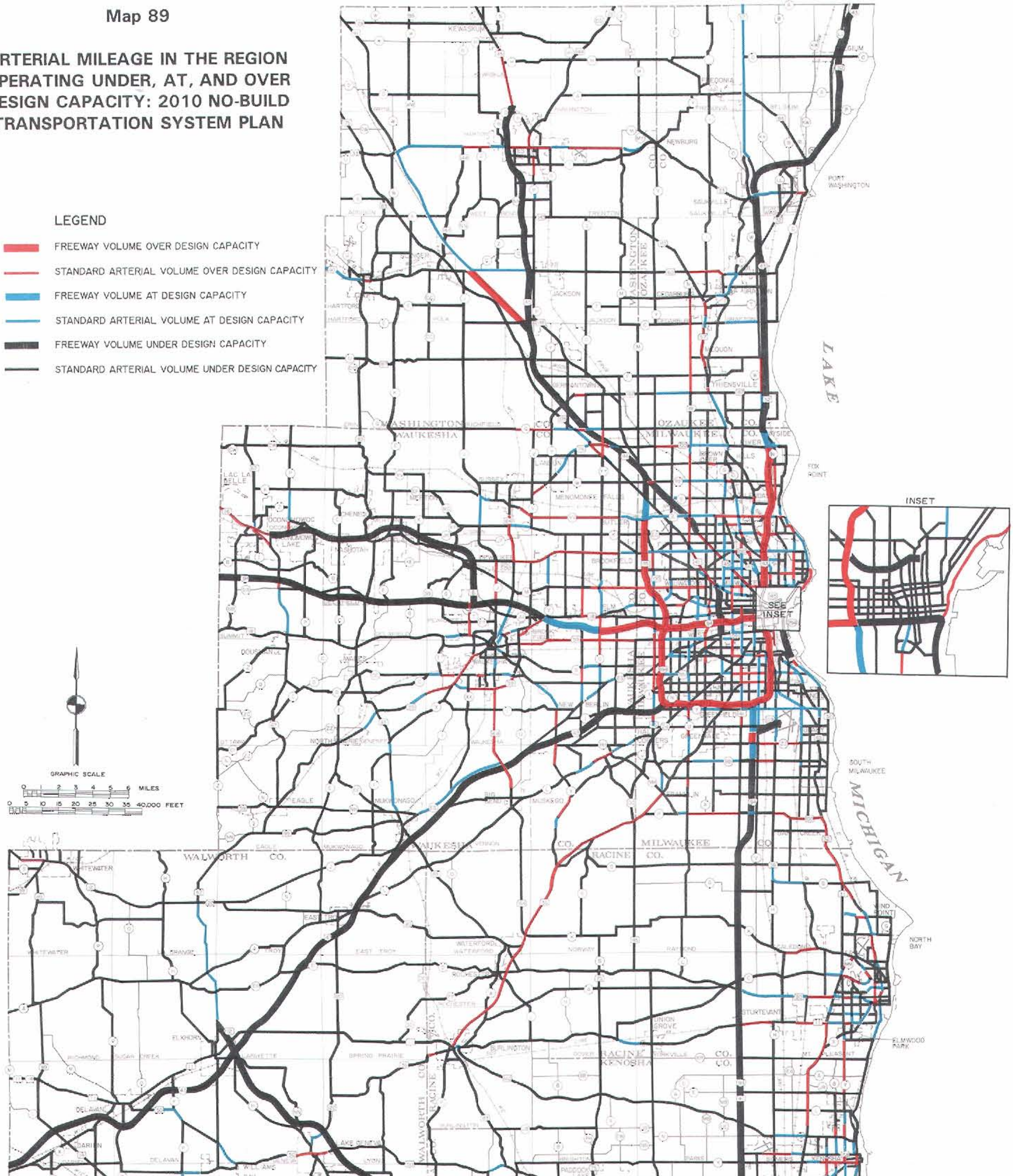
ment. Household income, for example, is a variable characteristic of travelers which influences individual travel behavior and demand. Household income, however, is not practicably amenable to control by measures that seek to change travel behavior. Measures that seeks to manage other variables that influence travel demand, such as travel time or costs, may prove more practicable.

The second factor crucial to the successful design and implementation of travel demand management is the degree to which measures are combined into coherent, and possibly synergistic, packages. The impact on highway use and traffic congestion may be minimal, for instance, if only a single measure, such as congestion pricing, is implemented. Should such a single measure be advanced in the absence of complementary strategies, commuters may not make intended shifts to alternative modes but, instead, may simply select alternative highway routes, shifting congestion to other routes without impacting vehicle-miles traveled. Combining measures may enhance the chances of achieving intended results. The impact of travel demand management is enhanced when a variety of coordinated measures are considered.

The third factor to be considered in the design of travel demand management measures is the degree to which such measures are integrated

## Map 89

### ARTERIAL MILEAGE IN THE REGION OPERATING UNDER, AT, AND OVER DESIGN CAPACITY: 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN




The traffic congestion impacts of anticipated increases in travel on the no-build arterial street and highway system are shown on the above map. By the year 2010, the number of miles operating over design capacity may be expected to increase to about 681, an increase of 401 miles, or about 144 percent. Thus, by the year 2010, about 20 percent of total arterial mileage may be expected to operate over design capacity.

*Source: SEWRPC.*

Table 186

URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON ARTERIAL STREETS AND HIGHWAYS: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| Urbanized Area and Activity Center | Urbanized Area Population | | Base Year 1991 | | No-Build Transportation System Plan: 2010 | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | 2010 | Number | Percent | Number | Percent |
| Kenosha Urbanized Area | 94,300 | 107,300 | - - | - - | - - | - - |
| Employment-Related[a] | - - | - - | 90,900 | 96.4 | 107,300 | 100.0 |
| Major Retail-Service[b] | - - | - - | 0 | 0.0 | 0 | 0.0 |
| Medical Facility[c] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 |
| Major Park[d] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 |
| Higher-Education Facility[e] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 |
| Scheduled Air Transport[f] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 |
| Milwaukee Urbanized Area | 1,226,300 | 1,277,100 | - - | - - | - - | - - |
| Employment-Related | - - | - - | 1,147,900 | 93.6 | 1,180,500 | 92.4 |
| Major Retail-Service | - - | - - | 1,161,400 | 94.7 | 1,277,100 | 100.0 |
| Medical Facility | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 |
| Major Park | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 |
| Higher-Education Facility | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 |
| Scheduled Air Transport | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 |
| Racine Urbanized Area | 121,800 | 132,100 | - - | - - | - - | - - |
| Employment-Related | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 |
| Major Retail-Service | - - | - - | 32,200 | 26.4 | 132,100 | 100.0 |
| Medical Facility | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 |
| Major Park | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 |
| Higher-Education Facility | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 |
| Scheduled Air Transport | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 |

[a]*Standard: 30 minutes' overall travel time of 40 percent of urbanized area employment opportunities.*

[b]*Standard: 35 minutes' overall travel time of three major retail and service centers.*

[c]*Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d]*Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e]*Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

[f]*Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

*Source: SEWRPC.*

with public transit and arterial street and highway improvements. Because travel demand management consists largely of measures intended to affect individual travel behavior, alternative means of transportation must be available that can effectively and efficiently serve the altered behavioral patterns. Where such alternatives are not provided, demand management may be perceived simply as an attempt to usurp personal freedom and to restrict mobility.

Finally, the importance of setting must be understood. Any demand management measure proposed must be practicable, technically and politically, within the complex governmental setting presented by a large metropolitan region.

Table 187

**URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON TRANSIT: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLANS**

| Urbanized Area and Activity Center | Urbanized Area Population | | Base Year 1991 | | No-Build Transportation System Plan: 2010 | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | 2010 | Number | Percent | Number | Percent |
| Kenosha Urbanized Area | 94,300 | 107,300 | - - | - - | - - | - - |
| Employment-Related[a] | - - | - - | 58,000 | 61.5 | 51,400 | 47.9 |
| Major Retail-Service[b] | - - | - - | 0 | 0.0 | 1,400 | 1.3 |
| Medical Facility[c] | - - | - - | 60,600 | 64.3 | 53,300 | 49.7 |
| Major Park[d] | - - | - - | 12,600 | 13.4 | 20,700 | 19.3 |
| Higher-Education Facility[e] | - - | - - | 33,200 | 35.2 | 51,400 | 47.9 |
| Scheduled Air Transport[f] | - - | - - | 0 | 0.0 | 0 | 0.0 |
| Milwaukee Urbanized Area | 1,226,300 | 1,277,100 | - - | - - | - - | - - |
| Employment-Related | - - | - - | 14,200 | 1.2 | 600 | 0.0 |
| Major Retail-Service[g] | - - | - - | 10,100 | 0.8 | 35,300 | 2.8 |
| Medical Facility | - - | - - | 700,400 | 57.1 | 648,000 | 50.7 |
| Major Park | - - | - - | 636,300 | 51.9 | 617,300 | 48.3 |
| Higher-Education Facility | - - | - - | 775,700 | 63.2 | 740,900 | 58.0 |
| Scheduled Air Transport | - - | - - | 338,600 | 27.6 | 316,800 | 24.8 |
| Racine Urbanized Area | 121,800 | 132,100 | - - | - - | - - | - - |
| Employment-Related | - - | - - | 59,100 | 48.5 | 56,400 | 42.7 |
| Major Retail-Service | - - | - - | 21,500 | 17.7 | 18,300 | 13.9 |
| Medical Facility | - - | - - | 53,700 | 44.1 | 46,700 | 35.4 |
| Major Park | - - | - - | 24,000 | 19.7 | 37,000 | 28.0 |
| Higher-Education Facility | - - | - - | 79,600 | 65.4 | 88,400 | 66.9 |
| Scheduled Air Transport | - - | - - | 18,300 | 15.0 | 18,600 | 14.1 |

[a]*Standard: 45 minutes' overall travel time of 40 percent of urbanized area employment opportunities.*

[b]*Standard: 35 minutes' overall travel time of one major retail and service center.*

[c]*Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d]*Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e]*Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

[f]*Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

[g]*Standard: 35 minutes' overall travel time of three major retail and service centers.*

*Source: SEWRPC.*

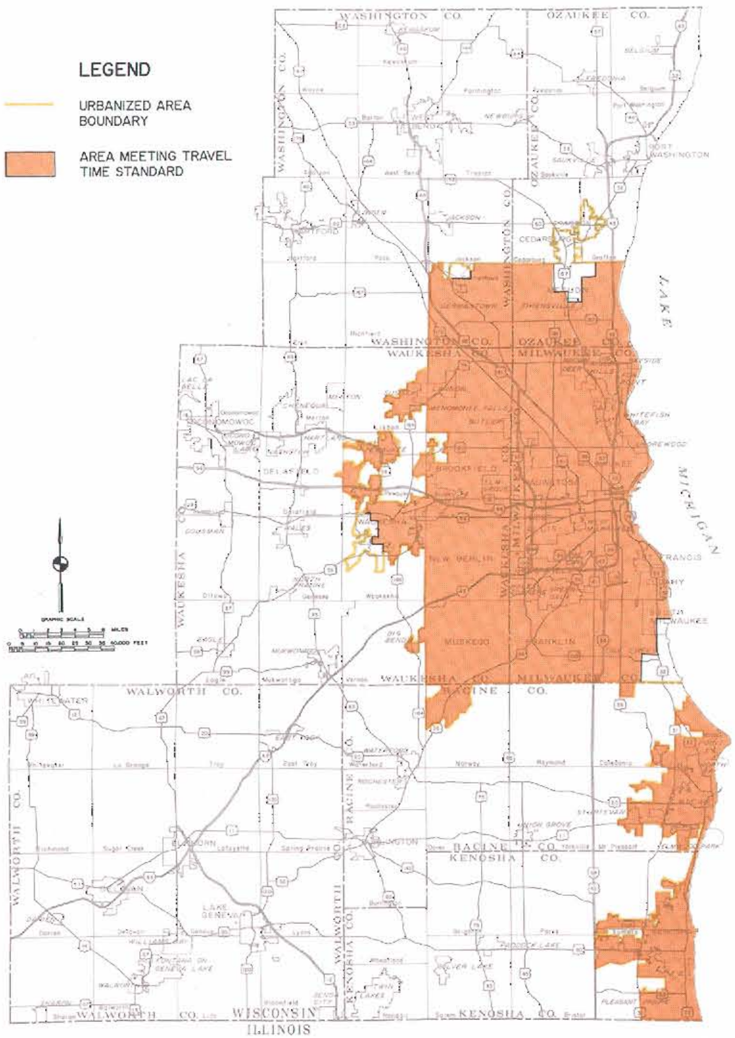
An attempt to promote travel demand management measures that are perceived as highly impractical will have negative value.

Table 188 sets forth a description of some of the various travel demand management measures and a qualitative assessment of the potential impacts of these measures, in isolation, on vehicle trips and vehicle miles traveled. The table also assesses the current potential for such measures to be implemented and the actions necessary for implementation. The measures considered in Table 188 fall under the following five headings: pricing, parking control, land use, work-schedule changes, and other measures. It was assumed in qualitatively estimating the

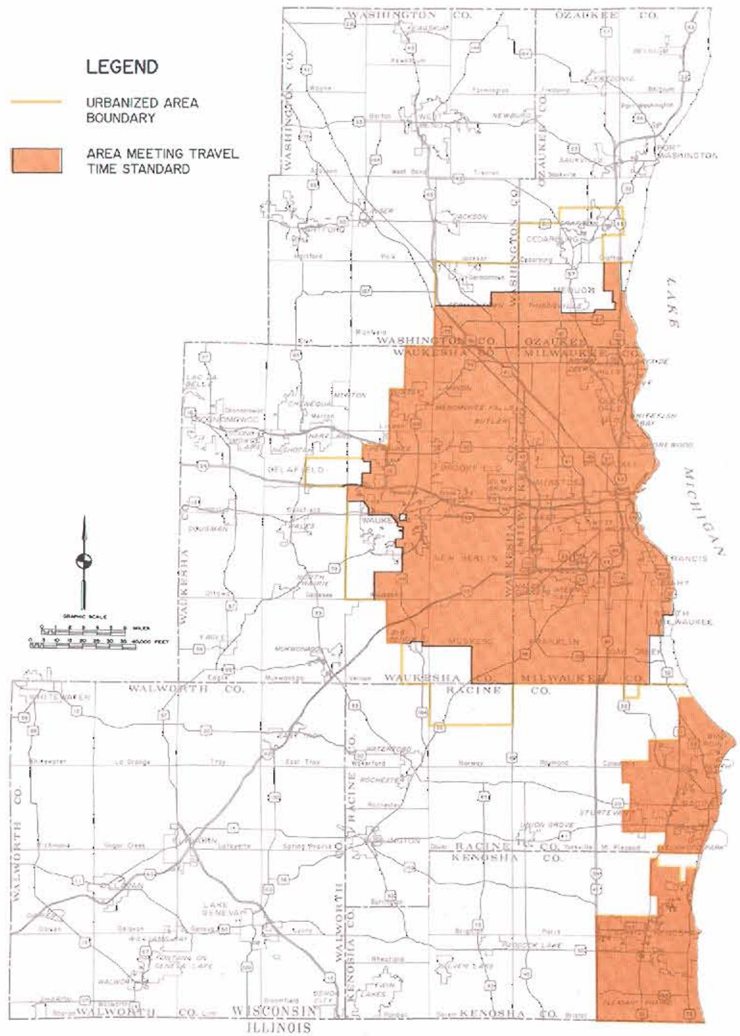
# Map 90

## AREAS MEETING THE TRAVEL TIME STANDARDS FOR EMPLOYMENT OPPORTUNITIES BY ARTERIAL STREET AND HIGHWAY: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

EXISTING 1991




2010 NO-BUILD TRANSPORTATION SYSTEM PLAN




In terms of timely access to employment opportunities, adequate highway service is nearly ubiquitous throughout the urbanized area of the Region and may be expected generally to remain so through the year 2010 under the no-build alternative. The percent of the total urbanized area population in the Region able to access 40 percent of urbanized area jobs within 30 minutes through arterial travel may be expected to remain at about 94 percent.

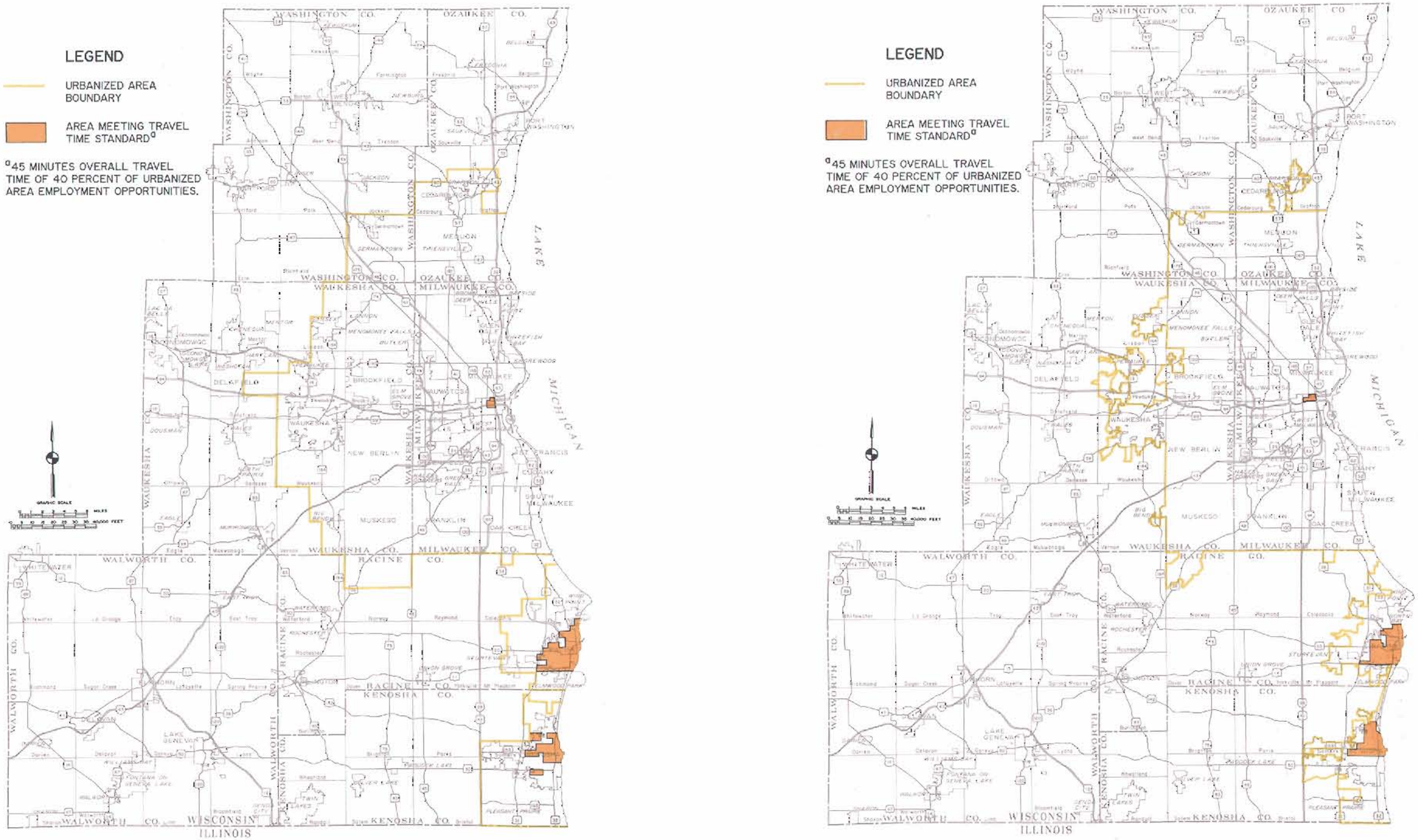
*Source: SEWRPC.*

## Map 91

### AREAS MEETING TRAVEL TIME STANDARDS FOR EMPLOYMENT OPPORTUNITIES THROUGH TRAVEL ON TRANSIT: 1991 AND 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

EXISTING 1991

2010 NO-BUILD TRANSPORTATION SYSTEM PLAN




Generally, public transit service currently is, and may be expected to remain, inadequate in providing timely access to employment opportunities within the Region. The urbanized area population able to access 40 percent of urbanized area jobs within 45 minutes by transit may be expected to decrease from 131,300 in 1991, or 9 percent, to 108,400 in 2010, or 7 percent.

*Source: SEWRPC.*

## Table 188

## TRANSPORTATION SYSTEM DEMAND MANAGEMENT MEASURES POTENTIALLY APPLICABLE TO THE SOUTHEASTERN WISCONSIN REGION

| Demand Management | | | | | |
|---|---|---|---|---|---|
| Category | Specific Measure | Description | Potential Impact On Vehicle Trips and Vehicle-Miles Traveled | Actions Required to Implement | Probability of Implementation |
| Pricing | Cash-out of employer-paid parking | Require employers offering free/subsidized parking to employees to give cash value of parking to those employees and to charge those employees the market value of parking. Such a program would apply initially to leased parking and new employer-owned parking. (Such a program could apply to schools and universities) | Potential reduction in vehicle trips through increased use of transit and ridesharing on theory that some employees will "pocket" cash payment and use other mode of travel | Employer cooperation, Federal legislation, and State legislation | Medium; potential resistance by employers |
| | Pay-as-you-drive auto insurance | Offset of automobile insurance premiums by per-gallon insurance fee collected at the pump. Recognize that portion of risk is related to vehicle use | Potential reduction in vehicle trips and vehicle-miles of travel | State legislation | Low; high degree of resistance by insurance companies and retail fuel dealers; potential to purchase cheaper fuel in nonparticipating adjacent jurisdictions |
| | Public sector parking pricing | Local and county governments can alter the price of off-street parking to discourage long-term commuter-related parking and encourage use of other modes | Limited potential reduction in single-occupancy work-related vehicle trips | Local and county policies | Low; does not affect cost of parking provided in private sector; potential adverse effect on land use |
| | Parking excise tax | A State or local parking excise tax would be imposed on all parking spaces. The tax could be increased incrementally and revenues could be used to defray the cost of transportation services | Potential reduction in vehicle trips and vehicle-miles of travel if fees encourage a reduction in nonwork vehicle trips | State legislation, county and local policies | Low; potential high degree of resistance from the general public |
| | Parking pricing for nonwork-related destinations | A charge would be levied through use of Intelligent Vehicle Highway System (IVHS)-related electronic "smart cards." Low-cost sensors which interact with in-vehicle smart cards would be installed on the public right-of-way which abuts driveways to shopping and other activity centers to enable the imposition of modest trip destination charges. Charges could vary depending on location and time of day | Potential reduction in vehicle-miles of travel and nonwork vehicle trips, particularly if the policy is implemented uniformly on a regionwide basis | State, county and local policies | Low; potential high degree of resistance from the general public |
| | Road pricing | Users of designated highway segments charged a fee; fees may vary according to time of day and congestion levels | Potential reduction in vehicle trips and vehicle-miles of travel if alternative routes are not attractive and if more distant land use destinations are not available | State legislation | Low; high degree of resistance from general public; potential adverse effect on land use |
| | Area pricing | Personal vehicles entering designated areas would be required to purchase a permit. Permit fees may be varied by time of day, ambient air quality conditions, and traffic congestion levels | Potential for significant reductions in vehicle trips to and within designated areas | State legislation | Low; enforcement difficulty; potential adverse effects on land use |

## Table 188 (continued)

| Demand Management | | | Potential Impact On | | |
|---|---|---|---|---|---|
| Category | Specific Measure | Description | Vehicle Trips and Vehicle-Miles Traveled | Actions Required to Implement | Probability of Implementation |
| Pricing (continued) | Graduated registration fees | A graduated registration fee related to annual miles traveled and vehicle emission production | Potential reduction in trip-making and vehicle-miles of travel | State legislation | Medium |
| | Motor fuel tax | Per gallon tax | Potential reduction in trip-making and vehicle-miles of travel | Federal or State legislation | Medium |
| | Employee commuter option (ECO) pass systems | The ECO Pass is a program allowing employers and institutions to offer low-cost annual bus passes as a benefit to their employees and students. The pass would also include a guaranteed ride home in the event an employee works late or encounters a personal emergency. The cost of the program varies by the employer's location, number of employees, and level of transit service | Potential reduction in trip-making and vehicle-miles of travel as the cost of transit is reduced | Federal or State legislation | High |
| Parking Control Measures | Parking management; control of parking supply | The use of local zoning regulations to limit the number of parking spaces provided for new development; the number of spaces provided may be varied depending on the location of the development and alternative transportation options provided to the property. (Parking supply restrictions can also be applied to schools and universities) | Potential reduction in vehicle trips | Local ordinance | Low; potential adverse effects on land use |
| | Preferential parking for carpools and vanpools | Reservation of most convenient parking spaces for carpool and vanpool vehicles | Potential reduction in vehicle trips by encouraging ridesharing | Employer cooperation | High |
| | Major activity center fringe park and ride parking | Parking facilities constructed in locations remote to major activity centers to promote use of other modes | Potential reduction in vehicle-miles of travel | State, county, and local governments policy | High |
| Land Use Measures | Major activity center and neighborhood site planning | Use of zoning, official mapping, subdivision control, site plan review, and permitting to achieve appropriate urban design that reduces dependence on automobile; provide good circulation systems for bicyclists and pedestrians and associated amenities, a mix of land use activities, higher residential densities, public transit access, and traffic calming | Potential reduction in vehicle trips and vehicle-miles of travel | Revision of land use regulations, State legislation, changes in funding to provide financial incentives | Medium |
| | Growth management | The use of land use regulation to direct the extent, timing, rate, and location of new urban development in accord with the adopted regional land use plan | Potential reduction in vehicle trips and vehicle-miles of travel | Adoption of growth management policy, revision of land use regulations, State regulation or law, changes in funding to provide financial incentives | Medium |

Table 188 (continued)

| Demand Management | | | | | |
|---|---|---|---|---|---|
| Category | Specific Measure | Description | Potential Impact On Vehicle Trips and Vehicle-Miles Traveled | Actions Required to Implement | Probability of Implementation |
| Work Schedule Charges | Telecommuting | Employees work at remote locations and avoid trip to central office. The telecommuting office could be at home, at a satellite work center, or a neighborhood work center | Potential reduction in vehicle trips and vehicle-miles of travel | Employer cooperation | Medium |
| | Flextime and compressed work week | Flextime allows employees to set work starting and ending times to avoid peak-period congestion and to coordinate with transit scheduling. A compressed work week allows employees to work fewer days per week | Potential reduction in vehicle trips made during peak hours; may increase off-peak vehicle trips and vehicle-miles of travel | Employer cooperation | Medium |
| Other | Trip-reduction ordinance | Public land use regulations promoting employer efforts to reduce the number of single occupancy vehicle trips made by employees; ordinances may permit increased densities in return for measures to reduce vehicle tripmaking | Potential reduction in trip-making and vehicle-miles of travel | Local ordinance | Medium |
| | Areawide rideshare | Public coordination of private efforts to encourage ridesharing | Potential reduction in vehicle trips and vehicle-miles of travel | State, county, and local governments | High |
| | Transportation management associations | Promotion of geographically related transportation demand management measures; associations may be policy- and/or service-oriented | Potential reduction in vehicle trips and vehicle-miles of travel | Employer cooperation | High |
| | Education/marketing | Measures to heighten public interest and knowledge of the Region's transportation and air quality problems to promote responsible trip-making and reduce single occupancy travel. Possible measures include, but are not limited to, expanded driver education, increased driver license educational requirements, and regular public service announcements | Potential reduction in vehicle trips and vehicle-miles of travel | State, county, and local government | High |
| | IVHS advanced transit information systems | IVHS to provide transit and paratransit information regarding departures, arrivals and specialized services designed to help system users better structure their time and reduce waiting time | Limited potential reduction in vehicle trips and vehicle-miles of travel | State, county, and local policies | Medium |

*Source: SEWRPC.*

potential impacts of the demand management measures that all measures which increase the cost of vehicle operation may be expected to reduce the number of vehicle-miles traveled, but not necessarily the number of vehicle trips.

Pricing Measures

As indicated in Table 188, there are a number of pricing measures which have a potential to reduce vehicular travel, including "cash-out" of employer-paid parking, pay-as-you-drive automobile insurance, road pricing, area pricing, parking pricing, graduated registration fees, fuel taxes, and Employee Commute Option (ECO) pass programs. Collectively, such pricing measures have the potential to reduce vehicular travel demand on par with major transit improvements. Placing more of the full costs of construction, maintenance, and operation of transportation facilities and services directly on the user of the system at the time of use induces the user to more closely evaluate the utility achieved in travel choices and to adjust behavior accordingly. Congestion pricing, in particular, takes the assignment of costs one step further by imposing on the users of congested facilities those costs currently shifted to others.

Experience with congestion pricing in Europe and Asia, identified as road and area pricing in Table 188, has shown that reductions in vehicle miles traveled, traffic congestion, and motor vehicle emissions may be effected. Issues remaining to be addressed with respect to congestion pricing in the United States include legal impediments, feasibility and acceptance, and enforcement. However, recent technological innovations have increasingly made enforcement more feasible. Congestion pricing measures have not been implemented to date anywhere in the United States.

Other measures that directly increase the cost of vehicle operation can affect travel behavior. Commission analysis of the utilization of carpool parking and public transit ridership has indicated that both carpooling and transit use increased during the late 1970s and early 1980s as motor fuel prices increased. Indeed, Commission findings indicated that the major factor contributing to the transit ridership increases of 1979 and 1980 was the increase in gasoline prices.[3] Conversely, the decline in gasoline prices since 1981 has contributed to reductions in transit ridership. Since the cost of travel significantly influences travel behavior and is within the purview of governmental action to affect, the cost of travel constitutes a viable variable to consider.

[3]*See SEWRPC, Memorandum Report No. 7, Public Transit Ridership Trends in Southeastern Wisconsin: 1975-1986, May 1987.*

Parking Measures

Table 188 identifies three parking management measures: control of parking supply, preferential parking for high occupancy vehicles, and central business district (CBD)-fringe park and ride facilities. Vehicle parking management has long been recognized by the Commission as a measure capable of reducing work related vehicle travel and increasing transit ridership. The second-generation regional transportation system plan adopted by the Commission in 1978 recommended that the City of Milwaukee evaluate the effects of changing the parking rate structure in the CBD to eliminate discounts for long-term parking. The parking measures listed in Table 174 focus on managing the amount of parking provided through the use of land use regulation and the provision of preferential parking for high-occupancy vehicles.

Land Use Measures

Table 188 identifies land use-related travel demand management measures intended to reduce vehicle miles of travel, vehicle trips, and average trip lengths by reducing the need for vehicular travel and by enhancing the attractiveness of alternatives to the use of a personal vehicle. Since land use development practices significantly influence travel behavior and fall within the legal purview of local governmental police power, land use development is a variable that should be managed to achieve transportation system development objectives.

The land use-related measures set forth in Table 188 are divided into two categories: growth management and land use site design. Growth management refers to the use of land use regulation to direct the type, extent, location, timing, and rate of urban development within the Region. In its most basic sense, within the context of the regional transportation planning effort, growth management constitutes a policy framework designed to facilitate the implementation of the adopted regional land use plan. Within the Region, appropriate growth management policy would encourage urban development to occur only in areas suitable and planned for such development, within sanitary sewer and public transit service areas in particular, and only when necessary supporting facilities and services were in place.

The second category, land use site design, emphasizes the enforcement of local land development regulations, within existing and planned public transit service areas in particular, to encourage mixed-use urban development, integrated pedestrian and bicycle circulation systems, and to promote residential densities that permit the efficient provision of urban services such as public transit. Such measures are intended to promote urban settlement patterns that are amenable to the provision of public transit service, especially within existing and planned transit corridors. Conventional land development practices and regulations within much of the Region generally have promoted large, single-use office parks, shopping centers, and residential subdivisions well served only by highway transportation. Travel to, and within, such development is, as a practical matter, limited to automobiles and trucks.

Work Schedule Changes

As shown in Table 188, some changes in work scheduling, such as telecommuting, flextime, and compressed work weeks, have limited potential for managing travel demand. Such changes are becoming more feasible with certain technological and organizational changes. Such advances in telecommunications as fiber optics and computers, structural changes in the economy, and increasing employee demands for quality-of-life benefits are making the typical five-day-weekly commute unnecessary for some employees and are redefining managerial-employee relationships. Accordingly, changes in work schedules and in the travel behavior related to work scheduling may be expected to occur regardless of governmental action, and may be expected to impact travel demand. Reducing work tripmaking, however, does not necessarily result in a reduction in total tripmaking by an individual. Shifting to a four-day work week for example, will reduce by 20 percent the number of work trips. That reduction, however, may be more than offset by increased nonwork tripmaking on the "extra" day off.

The Federal Clean Air Act Amendments of 1990 mandate that, for the six severe ozone nonattainment counties in the Region, Employer Commute Option programs be designed and implemented by businesses employing 100 or more workers at a single site. This provision is likely to promote the use of changes in work schedules, including telecommuting. Because of the potentially favorable transportation impacts of these measures and the minimal costs imposed upon employees, these measures were considered for inclusion in the alternative plans.

Other Measures

The travel demand management measures listed in Table 188 under the heading "other" include: trip reduction ordinances, areawide rideshare programs, transportation management associations, and education and marketing campaigns. These measures are largely publicly sponsored efforts to coordinate private-sector activities intended to reduce travel demand. Transportation control measures which are likely to assist in reducing air pollution, but which are not expected to impact travel demand, such as the use of alternative-fuel vehicles, are being considered by the Wisconsin Department of Natural Resources as part of its preparation of the State Implementation Plan for Air Quality.

## ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

With an understanding of the probable magnitude and distribution of future travel demand within the Region and of the probable impact of that demand on the existing transportation system, as made possible by analyses of the assignment of traffic to the no-build arterial street and highway and transit networks, alternative transportation system plans were postulated to overcome system deficiencies and to serve the adopted regional land use plan.

The process initially included the development and analyses of three alternative transportation system management plans: Alternative Plan 1, Alternative Plan 2, and Alternative Plan 3. Each plan consisted mainly of travel demand management measures, transit improvements, and traffic management measures.

Each of the alternative transportation system management plans contained several major elements in common: comprehensive freeway traffic management; traffic management; promotion of areawide carpooling and work schedule changes, including telecommuting; the recognition of the eventual potential to apply intelligent vehicle highway systems technology to the management of travel in the Region; a focus on land use planning and site design; the use of measures to increase the perceived cost of driving an automobile or light truck; and improvement in public transit service. These measures are intended to ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment. The implementation of such measures would have the effect of encouraging use of high-occupancy vehicles; reducing vehicle use, especially within congested areas and during peak travel periods; reducing motor fuel consumption; and facilitating efficient traffic flow.

The three alternative transportation system management plans differ, however, in the degree to which pricing measures and land use planning and site design would influence travel demand. The plans also differ in the degree to which the existing public transit system in the Region would be improved and expanded. The traffic management measures included in each of the alternative plans are described below, then the land use planning and site design recommendations and pricing measures of each plan are described, and finally, the public transit recommendations of each plan are described.

Comprehensive Freeway Traffic Management

Each of the alternative third-generation transportation system management plans includes the freeway traffic management plan for the Greater Milwaukee Area prepared by the Commission in 1988. The freeway traffic management plan is composed of recommendations concerning incident management, advisory information, traffic monitoring and control, and freeway operational control. The proposed freeway traffic management system is intended to encourage the use of carpools and transit vehicles, reduce congestion owing to accidents and disabled vehicles, encourage motorists to make better route decisions through advance information signing, and reduce peak freeway travel demand by managing access to the freeway system.

The 1988 freeway traffic management plan called for a greatly expanded system of on-ramp meters and corresponding traffic detectors to manage freeway access throughout the Milwaukee area, preferential access by buses and other high-occupancy vehicles, provision of driver advisory information signs, and the establishment of a central control center to monitor, on a real-time basis, traffic volumes and flow conditions and to adjust access accordingly to achieve reasonable operating conditions.

Traffic Management

The traffic management recommendations emphasize the use of traffic engineering practices to assist in achieving efficient traffic flow. Each of the alternative plans includes synchronized traffic signalization, the provision of right- and left-hand turn lanes at major intersections, and the proper spacing of driveway and local street intersections. Arrangements to facilitate pedestrian and bicycle movements and transit use must be considered in all traffic engineering activities and in the design of new or widened arterial streets and highways.

Intelligent Vehicle Highway Systems (IVHS)[4]

The aforereferenced traffic management measures are currently applicable within the Region. It should be realized, however, that by the year 2010 newer elements of Intelligent Vehicle Highway Systems technology currently under development may become applicable within the Region. Indeed, aspects of advanced traffic management systems (ATMS) technology are currently being applied by the Wisconsin Department of Transportation as part of the Department efforts to implement the freeway traffic management system recommended in the second-generation regional transportation system plan. Other elements of IVHS that may have future application within the Region include: advanced travel information systems (ATIS), providing travelers with real-time information on route-specific traffic conditions; advanced public transportation systems (APTS), facilitating transit use by providing, among other things, real-time transit vehicle location and scheduling information to transit users; commercial vehicle operations (CVO), technology automating commercial vehicle licensing, registrations, and toll collection; advanced rural transportation systems (ARTS), providing up-to-date weather and road condition reports to rural highway users; and advanced vehicle control systems (AVCS) and in-vehicle technology that improve the safety and efficiency of automobile travel. The potential impacts of these and other

[4]*The Commission, beginning in the early 1970s, provided technical assistance on a study of the application of technology that would permit vehicles to be operated both fully automatically on designated guideways and manually over the conventional street system. The Dual Mode Planning Case Study was funded by the United States Department of Transportation, Urban Mass Transit Administration, and executed by Cambridge Systematics, Inc., with Barton-Aschman Associates, August 1977.*

technological innovations cannot be estimated at this time.

Land Use Planning and Site Design Measures

Each of the three alternative plans proposes that new urban development occur in neighborhood units with a mix of land uses to promote travel by transit, to facilitate bicycle and pedestrian travel, and to provide for shorter automobile tripmaking.

Alternative Plan 1 places a much greater emphasis on land use planning and site design as a measure to bring about reductions in travel demand than Alternative Plans 2 and 3. Under Alternative Plan 1, as new neighborhoods are developed and as older neighborhoods are redeveloped, detailed land use plans would be prepared and implemented that would seek to orient, within the overall density framework of the regional land use plan, higher-density residential development and employment locations along transit lines and around transit stations. In the design of Alternative Plan 1, transit walk-access times were reduced by one-third to reflect the increase in the convenience of transit travel made possible through the use of higher residential densities along transit lines. This reduction was incorporated in the mode choice model and consequently indicated that higher levels of transit ridership could be achieved under Alternative Plan 1 than under the other alternatives. Also, in the design of Alternative Plan 1, the land use planning and site design measures were assumed to reduce total trip generation by both automobile and transit by 5 percent and the trip generation model was accordingly adopted.

Pricing Measures

Commission travel simulation models indicated that travel behavior is, in part, a function of the costs perceived by travelers to be directly associated with daily vehicle operation, specifically fuel and parking costs. In 1991, the perceived cost of operating or driving an automobile, as determined by Commission analyses, was about $0.055 per mile, and approximated the combined effect of the 1991 motor fuel price of $1.10 per gallon and average motor fuel efficiency of 20 miles per gallon. It should be noted that this perceived cost of driving an automobile is substantially less than the true total cost of owning and operating an automobile, which includes depreciation, insurance, garaging, repairs, fees, and maintenance. These costs are generally fixed, or upfront, costs that do not vary significantly with the amount of driving.

Only fuel and parking costs are "perceived" at the time of driving. In 1991, the true cost approximated $0.28 per mile. It is the perceived cost, that is, the cost that varies directly with driving, of $0.055 per mile, which is assumed to be increased under the transportation system management plans.

Alternative Plan 1 proposes to increase the perceived cost of driving substantially as a measure to moderate vehicle travel demand and make more efficient use of the arterial street and highway system. Under Alternative Plan 1, the perceived cost of driving would increase by 100 percent, from $0.055 per mile to $0.11 per mile. This increase assumes no change in the average motor fuel efficiency of the vehicle fleet. For perspective, should this entire cost increase be achieved through use of the motor fuel tax, the addition to that tax would approximate $1.10 per gallon.

Under Alternative Plan 2, the perceived costs of driving an automobile would be increased by 50 percent, from $0.055 per mile to $0.0825 per mile. If the full cost increase were to be achieved through the use of the motor fuel tax, the addition to that tax would approximate $0.55 per gallon.

Unlike the other alternatives, Alternative Plan 3 would not increase the perceived costs of automobile operation to offset travel demand. Rather, this alternative would use pricing measures, increasing the perceived cost per mile of driving only enough to cover revenue shortfalls incurred in implementing the plan.

One way to ameliorate the impacts of the cost increases would be to use the revenues generated by the measures to replace those revenues generated through property taxes. Hence, both Alternative Plans 1 and 2 propose to shift the local share of funding for the construction, maintenance, and operation of arterial streets and highways and public transit away from the property tax to transportation system user fees. The extensive package of pricing measures under Alternative Plan 1 may be expected to yield approximately $512 million per year in additional revenue. The moderate package of pricing measures under Alternative Plan 2 may be expected to yield approximately $102 million per year.

The level of pricing proposed under Alternative Plan 2 would be sufficient to permit removal of local transit and arterial funding from the local property tax and permit funding of full implementation of the second-generation regional transportation system plan. Of the measures listed in Table 188, those applied could be a motor fuel tax or a graduated registration fee, or some combination thereof. The level of pricing under Alternative Plan 1 would be sufficient to accomplish the above, as well as to permit the removal of some nonarterial transportation costs from the property tax.

To ensure that individual travelers retain the capacity to adjust to the pricing measures, a series of short-term and longer-term complementary nonpricing travel demand management measures are included in Alternative Plans 1 and 2. Short-term measures include the provision of preferential parking at reduced rates for high-occupancy vehicles in parking facilities serving work trips; the immediate use of public service announcements, marketing, and educational campaigns which would promote the changes in travel behavior intended through the use of the measures; and the public transit improvements described in the next section of this chapter. Longer-term measures of this type would include promoting telecommunications and sound local land use planning and site design.

Public Transit Improvement and Expansion

As previously indicated, the three alternative transportation system management plans differ in the degree to which the existing public transit system is proposed to be improved and expanded. The transit elements of each plan, however, were designed to meet, to the extent practicable, the transportation system planning development objectives and design standards, listed in Chapter VIII, including the desired levels of accessibility to be provided by transit, cost-effectiveness of service, frequency of service, and location and spacing of routes, stops, and stations.

Alternative Plan 1 emphasized the full achievement of the accessibility standards, relative to the cost-effectiveness standards. It proposed a substantial expansion of rapid, express, and local transit service and a significant improvement in the frequency of existing transit service (see Map 92). These extensions of service and improvements in frequency of service may exceed what is warranted by potential transit ridership. This transit alternative was thus similar to the transit element of the adopted year 2000 regional transportation system plan.

As shown in Table 189, the transit system envisioned under Alternative Plan 1 would consist of 4,190 round-trip route miles, some 1,894 miles, or 82 percent, greater than that provided in 1991. The transit system would require 914 vehicles operating during peak travel periods; the system would provide about 141,900 revenue vehicle-miles and 9,200 revenue vehicle-hours of service per average weekday. In 1991, the transit system provided 530 buses during peak travel periods and 63,300 revenue vehicle-miles and 5,200 revenue vehicle-hours of service per average weekday.

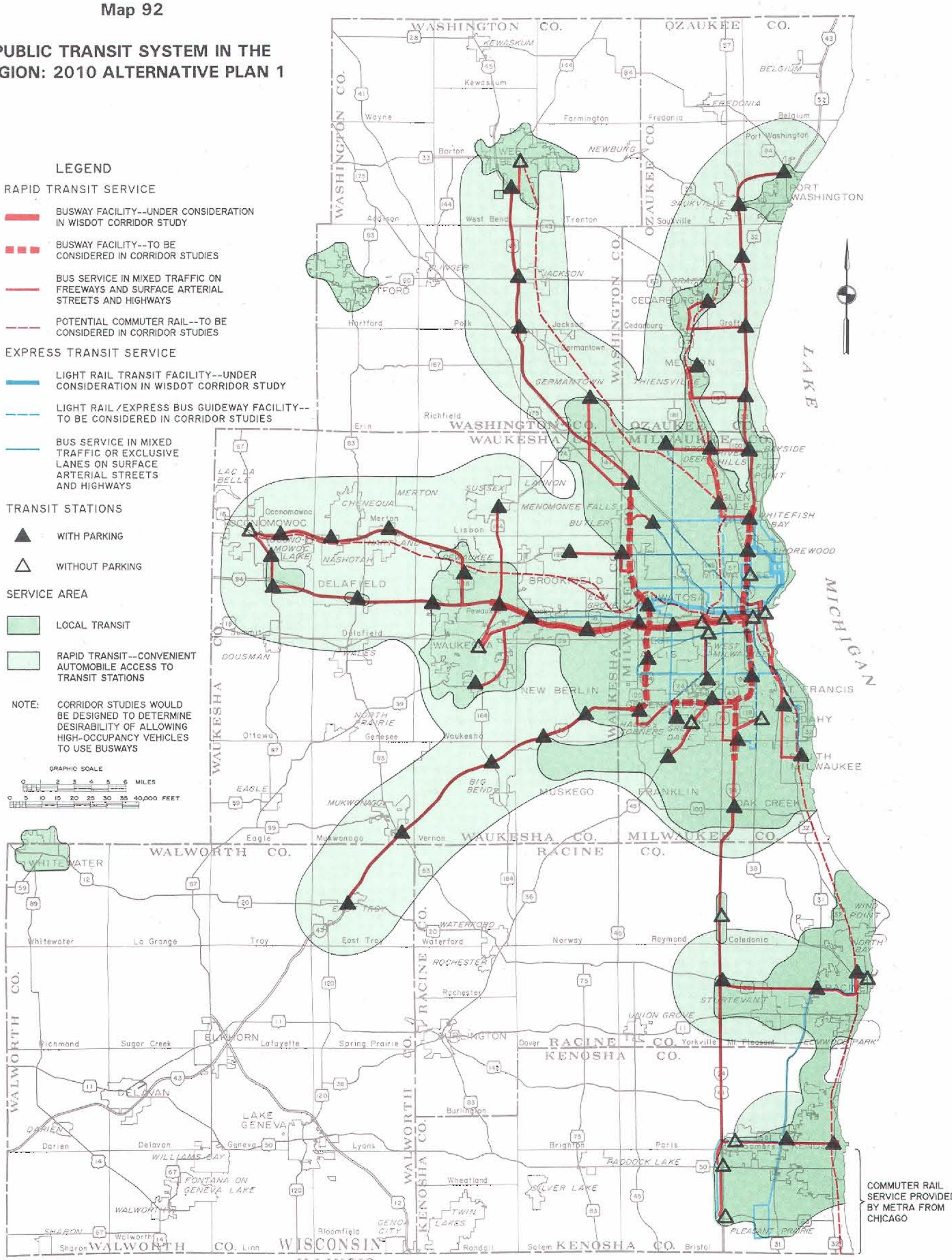
The transit element of Alternative Plan 2, shown in Map 93, was also designed to meet the transportation system planning objectives and design standards. It emphasized, however, the full achievement of the cost-effectiveness standards and proposed to provide only the extent and frequency of service warranted by potential transit ridership. As shown in Table 190, the transit system envisioned under this alternative plan would consist of 3,680 round-trip route miles, some 1,400 miles, or 61 percent, greater than what was provided in 1991. The transit system would require 791 vehicles operating during peak travel periods; the system would provide about 114,700 revenue vehicle-miles and 7,800 revenue vehicle-hours of service per average weekday.

The transit element of Alternative Plan 3, shown in Map 94, focused primarily on providing weekday rapid and express transit service in selected portions of major travel corridors within the Region. This alternative proposed minimal expansion of the local transit service areas and no improvement in the frequency of local service. As shown in Table 191, the transit system envisioned under Alternative Plan 3 would consist of 3,260 round-trip route miles, which would be 964 miles, or about 42 percent, greater than that provided in 1991. The transit system would require 667 vehicles operating during peak periods; the system would provide 96,900 revenue vehicle-miles and 6,700 revenue vehicle-hours of service per average weekday.

The rapid, express, and local transit service elements of each of the alternative transportation system management plans are described below.

## Map 92

### PUBLIC TRANSIT SYSTEM IN THE REGION: 2010 ALTERNATIVE PLAN 1




Alternative Plan 1 proposes significant extensions of transit service and improvements in the frequency of service. The transit system envisioned under Alternative Plan 1 would consist of 4,190 round-trip route-miles, which would be about 1,894 miles, or 82 percent, greater than that provided in 1991. The transit system would require that 914 vehicles operate during peak travel periods; the system would provide about 141,900 revenue vehicle-miles and 9,200 revenue vehicle-hours of service per average weekday.

*Source: SEWRPC.*

Table 189

TRANSIT SYSTEM OPERATING CHARACTERISTICS AND FACILITIES IN THE REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLAN 1

| Transit Service | Base Year 1991 | | Planned Increment | | 2010 | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Round-Trip Route Length (miles) | | | | | | |
| Rapid Routes | 449 | 19.6 | 1,131 | 251.9 | 1,580 | 37.7 |
| Express Routes | 393 | 17.1 | 97 | 24.7 | 490 | 11.7 |
| Local Routes | | | | | | |
| Kenosha Urbanized Area | 171 | 7.4 | 69 | 40.4 | 240 | 5.7 |
| Milwaukee Urbanized Area | 1,112 | 48.5 | 548 | 49.3 | 1,660 | 39.6 |
| Racine Urbanized Area | 171 | 7.4 | 49 | 28.7 | 220 | 5.3 |
| Subtotal | 1,454 | 63.3 | 666 | 45.8 | 2,120 | 50.6 |
| Total | 2,296 | 100.0 | 1,894 | 82.5 | 4,190 | 100.0 |
| Special Facilities (miles) | | | | | | |
| Exclusive Right-of-Way | 0 | 0.0 | 30 | - - | 30 | 93.8 |
| Exclusive Lanes on Streets | 2 | 100.0 | 0 | 0.0 | 2 | 6.2 |
| Total | 2 | 100.0 | 30 | 1,500.0 | 32 | 100.0 |
| Average Weekday Vehicle Requirements[a] | | | | | | |
| Peak Period | 530 | - - | 384 | 72.5 | 914 | - - |
| Midday to Off-Peak Period | 285 | - - | 216 | 75.8 | 501 | - - |

*[a]Represents only the vehicles required for daily system operation. Excludes vehicles needed as spare or backup vehicles.*

*Source: SEWRPC.*

Rapid Transit: Within each major travel corridor, each alternative plan proposes to provide bus rapid transit service either over operationally controlled freeway lanes in mixed traffic, or over exclusive busways. In each bus rapid transit corridor, a busway capable of accommodating buses and high-occupancy vehicles would be provided if the freeway within the corridor is determined to be operating under severe traffic congestion and if the busway is determined to have the potential to accommodate more travel than the open freeway lanes.[5] A busway would carry more traffic than a regular freeway lane if it carried more than 2,200 passengers in the peak traffic direction in the peak traffic hour. Buses operating in mixed traffic on freeways may be expected to operate at speeds of 40 miles per hour or more during peak traffic periods.

Consideration was given as to whether each busway facility should be developed through the preemption of an existing freeway lane or through the development of a new facility. Preemption of existing freeway lanes, however, was rejected. Busways were proposed only for freeway stretches exhibiting severe traffic congestion. Consequently, a removal of a freeway lane on severely congested freeway facility would substantially increase traffic congestion on the remaining lanes. The substantial increase in traffic congestion could be expected even given the anticipated shift of single-occupancy automobile traffic to carpools and public transit. The resultant level of congestion could be expected to far exceed levels currently experienced in the Region.

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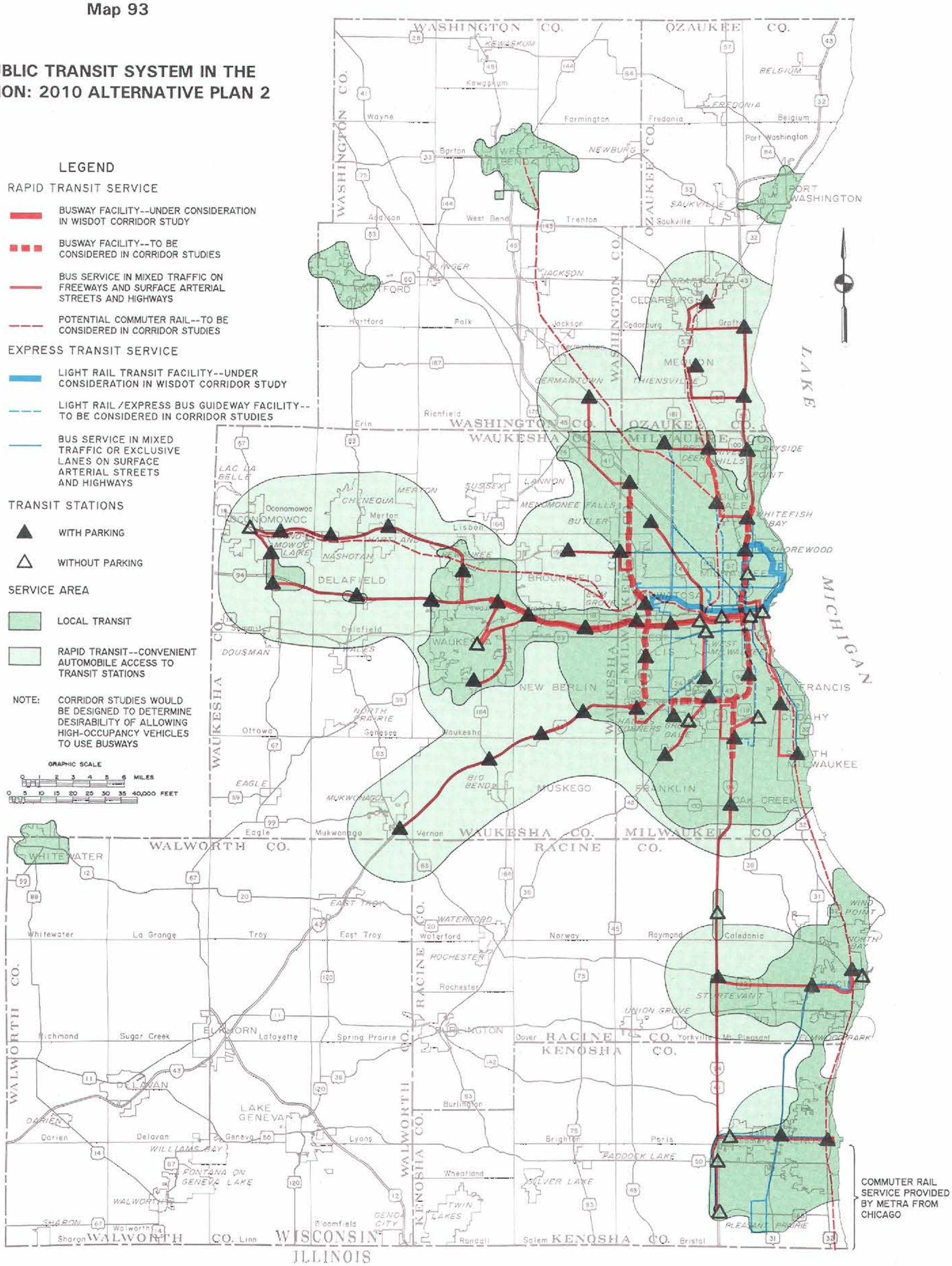
*[5]Congested facilities carry existing or forecast future traffic volumes which exceed the design capacity of the facility by more than 30 percent, or by 80,000 vehicles per average weekday for a four-lane freeway and 120,000 vehicles per average weekday for a six-lane freeway. Under such traffic volumes, freeway speeds during peak hours may be expected to drop to 30 miles per hour or less and the freeway may be expected to experience stop-and-go traffic conditions.*

Map 93

## PUBLIC TRANSIT SYSTEM IN THE REGION: 2010 ALTERNATIVE PLAN 2




The transit system envisioned under Alternative Plan 2 would consist of 3,680 round-trip route-miles, which would be about 1,384 miles, or 60 percent, greater than that provided in 1991. The transit system would require that 804 vehicles operate during peak travel periods; the system would provide about 114,700 revenue vehicle-miles and 7,800 revenue vehicle-hours of service per average weekday.

*Source: SEWRPC.*

Table 190

TRANSIT SYSTEM OPERATING CHARACTERISTICS AND FACILITIES IN THE REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLAN 2

| Transit Service | Base Year 1991 | | Planned Increment | | 2010 | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Round-Trip Route Length (miles) | | | | | | |
| Rapid Routes | 449 | 19.6 | 761 | 169.5 | 1,210 | 32.9 |
| Express Routes | 393 | 17.1 | 27 | 6.9 | 420 | 11.4 |
| Local Routes | | | | | | |
| Kenosha Urbanized Area | 171 | 7.4 | 69 | 40.4 | 240 | 6.5 |
| Milwaukee Urbanized Area | 1,112 | 48.5 | 478 | 43.0 | 1,590 | 43.2 |
| Racine Urbanized Area | 171 | 7.4 | 49 | 28.7 | 220 | 6.0 |
| Subtotal | 1,454 | 63.3 | 596 | 41.0 | 2,050 | 55.7 |
| Total | 2,296 | 100.0 | 1,384 | 60.3 | 3,680 | 100.0 |
| Special Facilities (miles) | | | | | | |
| Exclusive Right-of-Way | 0 | 0.0 | 30 | - - | 30 | 93.8 |
| Exclusive Lanes on Streets | 2 | 100.0 | 0 | 0.0 | 2 | 6.2 |
| Total | 2 | 100.0 | 30 | 1,500.0 | 32 | 100.0 |
| Average Weekday Vehicle Requirements[a] | | | | | | |
| Peak Period | 530 | - - | 274 | 51.7 | 804 | - - |
| Midday to Off-Peak Period | 285 | - - | 217 | 41.1 | 402 | - - |

[a]*Represents only the vehicles required for daily system operation. Excludes vehicles needed as spare or backup vehicles.*

*Source: SEWRPC.*

Table 191

TRANSIT SYSTEM OPERATING CHARACTERISTICS AND FACILITIES IN THE REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLAN 3

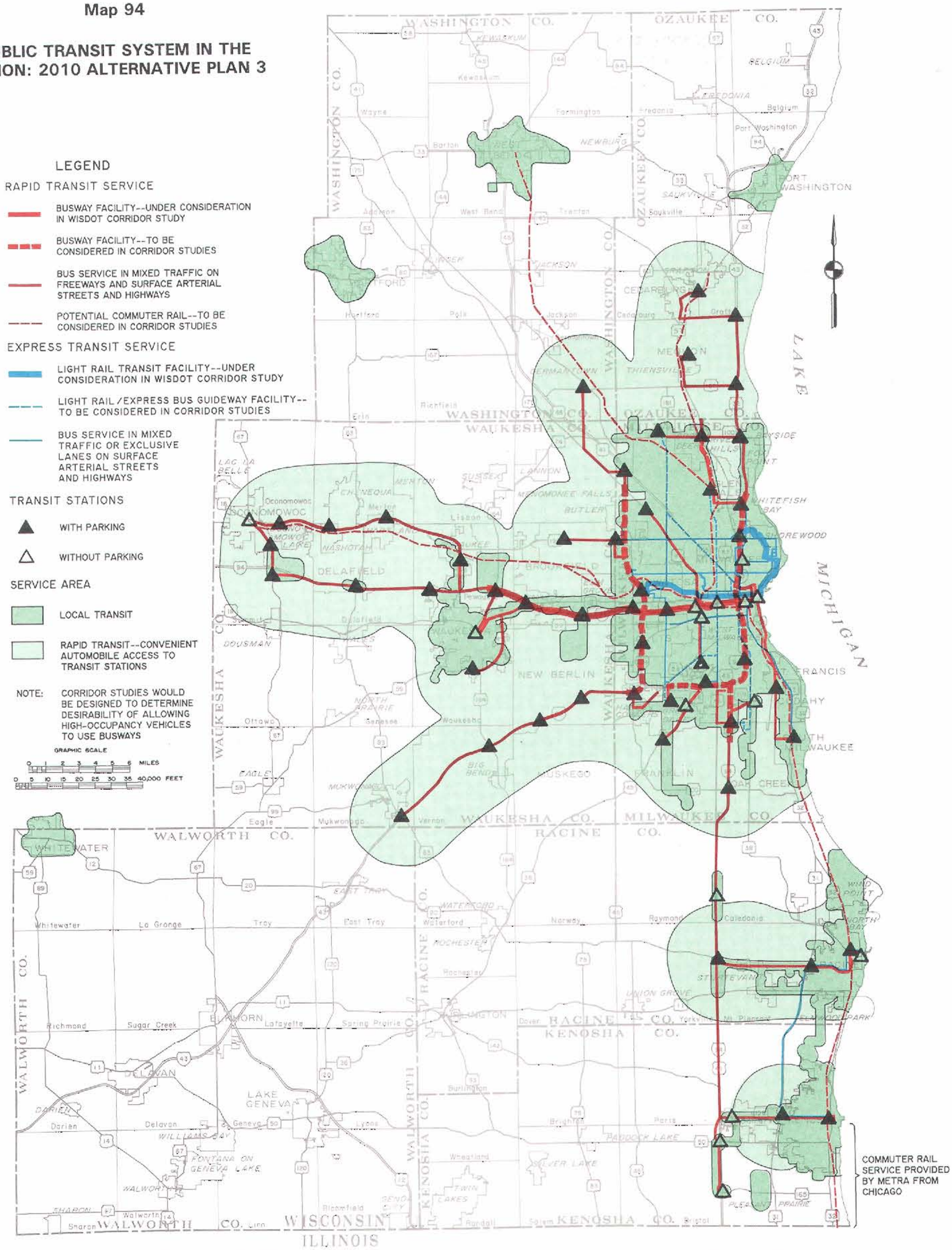
| Transit Service | Base Year 1991 | | Planned Increment | | 2010 | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Round-Trip Route Length (miles) | | | | | | |
| Rapid Routes | 449 | 19.6 | 761 | 169.5 | 1,210 | 37.1 |
| Express Routes | 393 | 17.1 | -3 | -0.8 | 390 | 12.0 |
| Local Routes | | | | | | |
| Kenosha Urbanized Area | 171 | 7.4 | 19 | 11.1 | 190 | 5.8 |
| Milwaukee Urbanized Area | 1,112 | 48.5 | 178 | 16.0 | 1,290 | 39.6 |
| Racine Urbanized Area | 171 | 7.4 | 9 | 5.3 | 180 | 5.5 |
| Subtotal | 1,454 | 63.3 | 206 | 14.2 | 1,660 | 50.9 |
| Total | 2,296 | 100.0 | 964 | 42.0 | 3,260 | 100.0 |
| Special Facilities (miles) | | | | | | |
| Exclusive Right-of-Way | 0 | 0.0 | 30 | - - | 30 | 93.8 |
| Exclusive Lanes on Streets | 2 | 100.0 | 0 | 0.0 | 2 | 6.2 |
| Total | 2 | 100.0 | 30 | 1,500.0 | 32 | 100.0 |
| Average Weekday Vehicle Requirements[a] | | | | | | |
| Peak Period | 530 | - - | 137 | 25.8 | 667 | - - |
| Midday to Off-Peak Period | 285 | - - | 47 | 16.5 | 332 | - - |

[a]*Represents only the vehicles required for daily system operation. Excludes vehicles needed as spare or backup vehicles.*

*Source: SEWRPC.*

## Map 94

### PUBLIC TRANSIT SYSTEM IN THE REGION: 2010 ALTERNATIVE PLAN 3




Alternative Plan 3 would focus primarily on providing weekday rapid and express transit service in selected travel corridors within the Region and would minimally expand local transit service, making no improvements in the frequency of local transit service. The transit system envisioned under Alternative Plan 3 would consist of 3,260 round-trip route-miles, which would be 964 miles, or about 42 percent, greater than that provided in 1991. The transit system would require that 667 vehicle operate during peak periods; the system would provide 96,900 revenue vehicle-miles and 6,700 revenue vehicle-hours of service per average weekday.

*Source: SEWRPC.*

Under a preemption of existing freeway lanes, single-occupancy automobile traffic demand may be expected at a minimum to exceed maximum freeway capacity by more than 10 to 20 percent and to exceed design capacity by more than 45 to 60 percent. In addition, preemption of existing freeway lanes for busway use would require reconstruction of freeway-to-freeway interchanges and freeway-to-arterial-street interchanges to eliminate the left-hand on- and off-ramps which would make such facilities discontinuous.

Under each alternative, commuter railway passenger service could be considered as a rapid transit alternative to a busway facility. Consideration of commuter rail as an option to busways would occur during the conduct of major investment studies. Such studies are required by current Federal regulations prior to programming fixed-guideway transit facilities for implementation.

As previously indicated, rapid transit service under each of the alternative plans would be provided within the major travel corridors emanating from the Milwaukee CBD. Under Alternative Plan 1, such service would be extended southward to the Cities of Racine and Kenosha, to the southwest to the Village of East Troy, to the west to the Cities of Waukesha and Oconomowoc, to the northwest to the City of West Bend, and northward to the Cities of Cedarburg and Port Washington. The extent of rapid transit service would be more limited, however, under Alternative Plans 2 and 3. Under these plans, the existing service would be extended to the southwest only to the Village of Mukwonago, to the northwest only to the Village of Germantown, and to the north only to the City of Cedarburg and the Village of Grafton. Each of the alternative plans includes the busway and high-occupancy vehicle facility in the East-West corridor between STH 164 near the City of Waukesha and the City of Milwaukee currently being studied by the Wisconsin Department of Transportation.

Under Alternative Plan 1, rapid transit buses would operate over 28 routes, totalling 1,500 weekday round-trip route-miles and serving 74 transit stations. Under Alternative Plans 2 and 3, 28 routes would be operated over 1,210 round-trip route-miles and 65 transit stations would be served. Under each of the alternatives, three routes would provide direct service to the University of Wisconsin-Milwaukee campus. Also under all the alternatives, rapid transit routes from public transit stations in Milwaukee County to the Milwaukee CBD would be operated with a limited number of intermediate stops as necessary to connect and coordinate with feeder express and local bus services, thereby providing access to major travel generators other than the Milwaukee CBD. Rapid transit routes originating at locations outside Milwaukee County, but within the anticipated future limits of the Milwaukee urbanized area, would generally serve two or three outlying park-ride lots prior to proceeding nonstop to downtown Milwaukee.

Under each of the alternatives, rapid transit routes originating at locations outside of the Milwaukee urbanized area would stop at two to six outlying public transit stations prior to proceeding essentially nonstop to the Milwaukee CBD. The public transit stations would be located, to the extent practicable, within, or near, freeway interchanges to minimize travel times. The rapid transit networks proposed under Alternative Plans 1, 2, and 3 are shown in red on Maps 92, 93, and 94, respectively.

Each alternative envisions a significant improvement in rapid transit service levels over those provided in 1991. Rapid transit service under Alternative Plan 1 would operate on weekdays between 6:00 a.m. and 6:00 p.m., on weekend evenings until 10:00 p.m., and on weekends over selected routes. Peak-period headways would range from five to 30 minutes, and off-peak headways would range from 30 to 60 minutes. Under Alternative Plans 2 and 3, weekday service would be provided over all routes during morning and afternoon peak periods, or from 6:00 a.m. to 9:00 a.m, and from 3:00 p.m. to 6:00 p.m. Under Alternative Plan 2, service would be provided over selected routes in Milwaukee County and over routes in the west and south corridors connecting the Cities of Waukesha, Racine, and Kenosha to the Milwaukee CBD during weekday off-peak periods, weekday evenings until 10:00 p.m., and on weekends. No evening or weekend service would be provided. Like Alternative Plan 1, Alternative Plan 2 would provide service in both directions of travel at peak-period headways of five to 30 minutes and nonpeak-period headways of 30 to 60 minutes. Peak-period headways under Alternative Plan 3 would range from 10 to 30 minutes.

Express Transit: Each alternative plan also proposed to develop a comprehensive express transit system. Express, or limited-stop, transit service would be provided in major travel corridors in the Milwaukee urbanized areas to connect concentrations of urban development and activity centers with each other and with the Milwaukee CBD. The express service would operate with preferential treatment over other vehicles in one of three ways: with buses operating over exclusive lanes on arterial streets, with buses on guideways, or with light-rail transit vehicles over exclusive arterial street lanes or guideways. For system evaluation purposes, the express transit service was designed to reflect stop spacings, operating speeds, and alignments typical of these three options. All three alternatives recommended that express service be provided with buses, in mixed traffic and over exclusive lanes, as soon as practicable. Consideration of bus-on-guideway or light-rail transit would coincide with Federally required major investment studies for each corridor concerned. The light-rail facilities in the East-West and North corridors of Milwaukee County currently under study by the Wisconsin Department of Transportation are included in each of the alternative plans.

The express transit network proposed under Alternative Plans 1, 2, and 3 are shown in blue on Maps 92, 93, and 94, respectively. Under Alternative Plan 1, express transit service would be provided over 15 routes, totalling 450 round-trip route-miles. Under Alternative Plan 2, express transit service would be provided over 12 routes, totalling 420 round-trip route-miles. Under Alternative Plan 3, express transit service would also be provided over 12 routes, totaling 390 round-trip route-miles. The express routes proposed under each of the alternatives within Milwaukee County would provide crosstown service as well as service oriented to the Milwaukee CBD.

Express transit service would be operated on a regular basis on weekdays between 6:00 a.m. and 6:00 p.m. under each of the alternatives. Service would also be provided over certain routes until 10:00 p.m. and on weekends. Peak-period headways would range from five to 15 minutes under Alternative Plan 1, and from 10 to 15 minutes under the other two alternatives. Nonpeak-period headways would range from 15 to 30 minutes under Alternative Plan 1 and 20 to 30 minutes under the other two alternatives.

Within the Racine and Kenosha urbanized areas, the express transit service plan under each of the alternatives would directly connect the Cities of Racine and Kenosha. Under Alternative Plans 2 and 3, such service would also connect the Cities of Racine and Kenosha with new and expanding commercial, office, and employment centers located along IH 94 in the western portion of each urbanized area. In all areas, buses providing express transit service would, where appropriate, provide collection and distribution services beyond the proposed termini of the express route.

Local Transit: Alternative Plans 1 and 2 propose a significant expansion of the existing local transit service provided within the Milwaukee, Racine, and Kenosha urbanized areas. Alternative Plan 3, however, proposes a limited expansion of such service when compared to the other plans. Under Alternative Plans 1 and 2, local transit service would be extended to all contiguous areas of high- and medium-density urban development within the Milwaukee, Kenosha, and Racine urbanized areas. Within the Milwaukee urbanized area, in particular, local bus service would be extended, primarily into northern and southern Milwaukee County, southern Ozaukee County, southeastern Washington County, and eastern Waukesha County. Under Alternative Plan 3, service would be extended only within northern and southern Milwaukee County and the densely developed eastern Waukesha County area.

Each of the alternative plans envisions the possibility of developing a transit route system based on the transit center concept within those newly developing areas to be provided with local transit service. Transit centers would serve as the focus for the local bus routes serving a particular area, much like the CBDs of the Cities of Kenosha, Racine, and Waukesha serve as the focus for local bus routes serving these areas. The transit centers would be located at rapid transit stations, the termini of express bus transit routes, or at major activity centers. Buses on all routes would connect at these locations simultaneously, at which time necessary transfers between buses could be effected. This approach to the provision of local transit service would permit transit operators to operate fewer vehicle-miles of service and yet achieve virtually the same levels of transit service as provided under a more traditional grid system.

In the Kenosha and Racine urbanized areas, each of the alternative plans envision that local transit service would reflect the changes to the Racine and Kenosha transit systems identified in the current transit system development plans for each system, along with extensions into contiguous areas anticipated to be fully developed, where cost-effective. Under Alternative Plans 1 and 2, local service would be extended west from the Cities of Kenosha and Racine to serve the areas of commercial and industrial development expected to occur around the major interchanges along IH 94.

The proposed local transit service areas under Alternative Plans 1, 2, and 3 are shown on Maps 92, 93, and 94, respectively. The number of round-trip route-miles provided within the Milwaukee urbanized area would be 1,660 under Alternative Plan 1, 1,590 under Alternative Plan 2, and 1,290 under Alternative Plan 3. Under Alternative Plans 1 and 2, service levels on existing routes in the Milwaukee urbanized area would be substantially improved over 1991 levels, particularly within the portion of Milwaukee County south of Silver Spring Drive, east of 76th Street, and north of Layton Avenue. In corridors in this area where express transit is not provided, headways would be 10 minutes during peak travel periods, 20 minutes during midday off-peak travel periods, and 30 minutes during all other times. Outside this area, headways on local transit routes would range from 15 to 30 minutes during weekday peak period and 30 to 60 minutes during off-peak periods. Peak-period headways under Alternative Plan 3 would range from 10 to 40 minutes in Milwaukee County.

Within the Kenosha and Racine urbanized areas, local transit service would consist of 240 and 220 round-trip route-miles, respectively, under Alternative Plan 1 and Alternative Plan 2 and 190 and 180 under Alternative Plan 3. Peak-period headways within these areas would range from 15 to 30 minutes under Alternative Plans 1 and 2 and 20 to 30 minutes under Alternative Plan 3.

Transit Fares: Transit fares under Alternative Plans 1 and 2 were assumed to be consistent with fares charged in the Region in 1991, while fares under Alternative Plan 3 were assumed to be consistent with fares charged in the Region in 1994. Accordingly, the base adult fare for local and express bus services within Milwaukee County was assumed to be $1.00 per ride under Alternative Plans 1 and 2 and $1.25 per ride under Alternative Plan 3, expressed in constant 1994 dollars. The rapid transit fare within Milwaukee County would be $1.25 under Alternative Plans 1 and 2 and $1.50 under Alternative Plan 3. The fares for rapid transit between Milwaukee County and surrounding counties would increase with the distance traveled outside Milwaukee County and would generally range from $1.75 per ride at the outer limits of the future urbanized area to about $2.50 at the extreme limit of service from the Milwaukee CBD under Alternative Plans 1 and 2, $2.00 at the outer limits of the urbanized area, and $3.00 at the extreme limits of service from the Milwaukee CBD under Alternative Plan 3. Local transit fares would range from $0.50 per ride on the Racine transit system to $0.60 per ride on the Kenosha and Waukesha transit systems under Alternative Plans 1 and 2 and from $0.60 per ride on the Racine transit system to $0.75 per ride on the Kenosha and Waukesha transit systems under Alternative Plan 3.

Summary of Alternative Transportation System Management Plans

As previously indicated, the successful design and implementation of measures to reduce the demand for personal vehicle travel depends on several factors including the degree to which travel demand management measures are integrated with public transit improvements. Because one of the purposes of travel demand management is to promote changes in modal use, the provision of modes of travel alternative to the personal vehicle is essential. The combinations of public transit improvements, travel demand management measures, and traffic management measures considered are intended to ensure that such alternatives are available both to promote and to serve altered travel habits and patterns.

Three alternative regional transportation system management plans were developed (see Table 192). Alternative Plan 1 proposes to increase the perceived costs of vehicle operation by 100 percent, from $0.055 per mile to $0.11 per mile, and to approximately double the level of transit service by 2010. Alternative Plan 2 proposes to increase the perceived cost of vehicle

## Table 192

## SUMMARY OF ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| Plan Elements | Alternative Transportation System Plans | | |
|---|---|---|---|
| | Alternative Plan 1 | Alternative Plan 2 | Alternative Plan 3 |
| Public Transit[a] | Expansion of rapid and express service in all major corridors during weekdays, weekday evenings, and weekends. Expansion of local service throughout urban areas. Provision of weekday evening service throughout local transit service areas. Substantial areawide improvements in frequency of transit service. Transit fares reduced by approximately 25 percent to 1991 level. Estimated 124 percent increase in transit vehicle-miles and 76 percent increase in vehicle-hours of service | Provision of rapid and express service in selected portions of all major travel corridors. Limited weekday evening and weekend rapid and express service. Limited expansion of local service. Improvements in frequency of service limited to major Milwaukee area routes and Kenosha, Racine, and Waukesha transit systems. Estimated 81 percent increase in transit vehicle-miles and 50 percent increase in vehicle-hours of service | Provision of rapid and express service in selected portions of all major travel corridors. No weekday evening and weekend rapid and express service. Minimal expansion in local service. No improvement in frequency of local service. Estimated 53 percent increase in transit vehicle-miles and 28 percent increase in vehicle-hours of service |
| Travel Demand Management | | | |
| Pricing[b] | Increase in perceived cost of operating an automobile from $0.055 per mile to $0.11 per mile | Increase in perceived cost of operating an automobile from $0.055 per mile to $0.0825 per mile | Increase in perceived cost of operating an automobile from $0.055 to an amount necessary to cover anticipated revenue shortfalls to implement the plan[c] |
| Land Use Site Design | Design of new urban development to promote bicycle and pedestrian travel.[d] Higher residential densities along all transit lines and stations.[e] New urban development in neighborhood units with mix of land uses to encourage pedestrian travel and shorter automobile trips | New urban development in neighborhood units with mix of land uses to encourage bicycle and pedestrian travel and shorter automobile trips | New urban development in neighborhood units with mix of land uses to encourage bicycle and pedestrian travel and shorter automobile trips |
| Other[f] | Other measure, including areawide ridesharing, telecommuting, and work time rescheduling programs, as well as the promotion of transportation management associations and educational campaigns to encourage ridesharing and transit use | Other measures, including areawide ridesharing, telecommuting, and work time rescheduling programs, as well as the promotion of transportation management associations and educational campaigns to encourage ridesharing and transit use | Other measures, including areawide ridesharing, telecommuting, and work time rescheduling programs, as well as the promotion of transportation management associations and educational campaigns to encourage ridesharing and transit use |
| Traffic Management[g] | Completion of Milwaukee comprehensive freeway traffic management system; general traffic management activities, including synchronized traffic signalization, the provision of right- and left-hand turn lanes, and proper spacing of driveways and local street intersections; use of intelligent transportation systems technology as such technology becomes applicable | Completion of Milwaukee comprehensive freeway traffic management system; general traffic management activities, including synchronized traffic signalization, the provision of right- and left-hand turn lanes, and proper spacing of driveways and local street intersections; use of intelligent transportation systems technology as such technology becomes applicable | Completion of Milwaukee comprehensive freeway traffic management system; general traffic management activities, including synchronized traffic signalization, the provision of right- and left-hand turn lanes, and proper spacing of driveways and local street intersections; use of intelligent transportation systems technology as such technology becomes applicable |

[a] *The quality of public transit service is directly incorporated in the automobile ownership and mode choice travel simulation models and improvements in service quality serve to reduce automobile ownership and increase transit ridership.*

[b] *The cost of automobile travel is directly incorporated in the trip distribution and mode choice models and cost increases serve to reduce trip length and increase transit ridership.*

[c] *Based upon past similar analysis results, perceived automobile operating costs necessary to cover the revenue shortfall tentatively envisioned under a fully developed plan may be expected to have to increase to $0.06 per mile.*

[d] *The design of new development to promote bicycle and pedestrian travel is assumed to have the potential to reduce total trip generation by automobile and transit by 5 percent, and model forecast trip generation is accordingly adjusted. All travel forecasts assume implementation of the adopted regional land use plan which proposes that new urban development occur in neighborhood units with a mix of land uses. This would be directly incorporated in the trip distribution model, and may be expected to result in reducing automobile trip length.*

[e] *The postulated higher-residential density along all transit routes was assumed to reduce all transit walk-access by 33 percent, which was incorporated in the mode choice model and resulted in an increase in transit ridership.*

[f] *Other measures were assumed to have minimal impact on travel.*

[g] *Traffic management not assumed to impact travel in this analysis.*

*Source: SEWRPC.*

Table 193

SELECTED SOCIO-ECONOMIC AND TRANSPORTATION CHARACTERISTICS OF THE REGION: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| Characteristic | Base Year 1991 | Year 2010 Alternative Plans | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No-Build | Percent Change | Plan 1 | Percent Change | Plan 2 | Percent Change | Plan 3 | Percent Change |
| Population | 1,810,400 | 1,911,000 | 5.6 | 1,911,000 | 5.6 | 1,911,000 | 5.6 | 1,911,000 | 5.6 |
| Households | 714,900 | 774,300 | 8.3 | 774,300 | 8.3 | 774,300 | 8.3 | 774,300 | 8.3 |
| Employment | 990,300 | 1,095,000 | 10.6 | 1,095,000 | 10.6 | 1,095,000 | 10.6 | 1,095,000 | 10.6 |
| Vehicles Available | 1,132,000 | 1,309,300 | 15.7 | 1,287,400 | 13.7 | 1,291,900 | 14.1 | 1,296,400 | 14.5 |
| Internal Person Trips | 5,541,000 | 6,116,100 | 10.4 | 6,055,700 | 9.3 | 6,098,300 | 10.1 | 6,103,500 | 10.2 |
| Persons per Vehicle | 1.6 | 1.5 | -6.3 | 1.5 | -6.3 | 1.5 | -6.3 | 1.5 | -6.3 |
| Vehicles per Household | 1.7 | 1.7 | 0.0 | 1.7 | 0.0 | 1.7 | 0.0 | 1.7 | 0.0 |
| Trips Per Capita | 3.1 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| Trips per Household | 7.8 | 7.9 | 1.3 | 7.8 | 0.0 | 7.9 | 1.3 | 7.9 | 1.3 |

*Source: SEWRPC.*

operation by 50 percent, to about $0.08 per mile, and to increase to the level of transit service by about 50 percent by 2010. Alternative Plan 3 does not propose to increase the perceived cost of driving to affect changes in travel demand, like the other alternatives, but instead proposes to increase perceived vehicle operating costs by an amount necessary to cover anticipated revenue shortfall in funding to implement the plan. Alternative Plan 3 proposes to increase transit service in the Region by about 35 percent.

## TESTING OF ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

The second step in the design of alternative transportation system plans was to evaluate the three alternative transportation system management plans that were designed. It should be noted that at this critical stage of the plan design process, no improvements to the arterial street and highway system were considered. Each alterative transportation system management plan was thus combined with the no-build arterial street and highway system for the purpose of testing. As previously indicated, it was only after the ability of each of the transportation system management plans to resolve transportation system deficiencies was determined that arterial improvements were considered.

### Assignment of Travel to Highway and Transit Networks

The performance of each of the three alternative transportation system management plans under probable future land use and travel conditions was analyzed with the assistance of the traffic simulation models described in Chapter VII of this report. By applying these models, the probable future travel demand generated under the adopted regional land use plan was assigned to the no-build arterial street and highway network and to the alternative transit networks pertaining to each plan.

Personal Vehicle Availability: Given the transportation system demand management measures and transit system improvements envisioned under each alternative plan, it is estimated that by the year 2010 the number of personal vehicles available in the Region may be expected to increase from about 1.13 million in 1991 to about 1.29 million, or by about 14 percent, under Alternative Plans 1 and 2 and to 1.30 million, or by nearly 15 percent, under Alternative Plan 3 (see Table 193). Personal vehicles are defined to include automobiles and those trucks weighing 8,000 pounds or less which are used for personal travel rather than for commercial reasons. Under the no-build plan, the number of personal vehicles is estimated to increase to 1.31 million, or by about 16 percent, by the year 2010.

The resident population of the Region is expected to increase by about 6 percent during the same period, the number of households by about 15 percent, and employment by about 11 percent. The number of persons per vehicle may then be expected to continue to decline from 1.6 in 1991 to about 1.5 under each of the alternative plans and the no-build plan, while the number of vehicles per household may be expected to increase from 1.6 in 1991 to 1.7 under each of the alternative plans and the no-build plan.

Table 194

DISTRIBUTION OF INTERNAL PERSON TRIPS WITHIN THE REGION BY MODE: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| Mode of Travel | Base Year 1991 | Year 2010 Alternative Plans | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No-Build | Percent Change | Plan 1 | Percent Change | Plan 2 | Percent Change | Plan 3 | Percent Change |
| Automobile Driver | 4,060,900 | 4,721,600 | 16.3 | 4,583,600 | 12.9 | 4,673,500 | 15.1 | 4,694,500 | 15.6 |
| Automobile Passenger[a] | 1,080,300 | 941,400 | -12.9 | 915,400 | -15.3 | 932,000 | -13.7 | 937,000 | -13.2 |
| Transit Passenger | 172,200 | 168,000 | -2.4 | 271,600 | 57.7 | 207,700 | 20.6 | 186,900 | 8.5 |
| School Bus Passenger | 227,600 | 285,100 | 25.3 | 285,100 | 25.3 | 285,100 | 25.3 | 285,100 | 25.3 |
| Total | 5,541,000 | 6,116,100 | 10.4 | 6,055,700 | 9.3 | 6,098,300 | 10.1 | 6,103,500 | 10.2 |

[a] *The cost of travel was incorporated into the forecast of nonwork trips with respect to potential use of transit and trip length. It was not incorporated into the forecast of nonwork trip vehicle occupancy. Analyses of the factors influencing vehicle occupancies for nonwork trips indicated that travel time, distance, and cost had little effect on vehicle occupancy and that the number of persons per household and the number of automobiles available per household established the differences observed in vehicle occupancy.*

*Source: SEWRPC.*

Person Trip Generation: Table 193 also shows the increases in internal tripmaking that may be expected under each of the alternative plans. Given the travel demand management measures and transit system improvements envisioned under each of the three alternative plans, average weekday internal person trips may be expected to increase from nearly 5.54 million trips in 1991 to about 6.06 million by 2010, or by about 9 percent, under Alternative Plan 1, and to about 6.1 million, or by 10 percent, under Alternative Plans 2 and 3. Under the no-build plan internal person trips may be expected to increase to nearly 6.12 million. As shown in Table 193, the average number of internal person trips per capita may be expected to increase from about 3.1 in 1991 to 3.2 by 2010 under each of the alternative plans and the no-build plan. The average number of internal person trips per household may be expected to remain at 7.8 under Alternative Plan 1 and to increase to 7.9 under the other alternatives.

Mode of Travel: The distribution of internal person trips within the Region by mode of travel under each of the alternative transportation system management plans and the no-build plan is summarized in Table 194. Average weekday transit trip production within the Region may be expected to increase from about 172,200 trips in 1991 to about 271,600 trips by 2010, or by about 58 percent, under Alternative Plan 1; to about 207,700 trips, or by about 21 percent, under Alternative Plan 2; and to about 186,900 trips, or by about 9 percent, under Alternative Plan 3. The proportion of total internal travel generated within the Region served by transit may be expected to increase from 3.1 percent in 1991 to 4.5 percent by 2010 under Alternative Plan 1, to increase to 3.4 percent under Alternative Plan 2, and to remain at about 3.1 percent under Alternative Plan 3. The proportion of trips made within Milwaukee County by transit may be expected to be 7 percent in 2010 under Alternative Plan 1 and 4.3 percent under Alternative Plan 3. Under the no-build plan, average weekday transit trip production may be expected to decrease to 168,000 trips by 2010, or by about 2 percent, and the proportion of total internal person trips made by transit within the Region may be expected to decline to 2.7 percent. The proportion of total trips within Milwaukee County made by transit may be expected to be 3.3 percent in the year 2010 under the no-build plan.

Table 194 also shows that average weekday internal automobile driver trips, including personal-use light truck driver trips, may be expected to increase from nearly 4.06 million trips in 1991 to about 4.58 million trips by 2010, or by about 13 percent, under Alternative Plan 1; to about 4.67 million trips, or by 15 percent, under Alternative Plan 2; and to about 4.69 million trips, or by 16 percent, under Alternative Plan 3. The proportion of all internal person trips made as an automobile driver may be expected to increase from 73.3 percent in 1991 to 75.5 percent

Table 195

DISTRIBUTION OF VEHICLE TRIPS WITHIN THE REGION BY VEHICLE CLASS: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| Vehicle Class | Base Year 1991 | Year 2010 Alternative Plans | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No-Build | Percent Change | Plan 1 | Percent Change | Plan 2 | Percent Change | Plan 3 | Percent Change |
| Automobile | | | | | | | | | |
| Internal | 4,060,900 | 4,721,600 | 16.3 | 4,583,600 | 12.9 | 4,673,500 | 15.1 | 4,694,500 | 15.6 |
| External[a] | 229,200 | 306,300 | 33.6 | 306,300 | 33.6 | 306,300 | 33.6 | 306,300 | 33.6 |
| Other[a] | 39,300 | 65,500 | 66.7 | 65,500 | 66.7 | 65,500 | 66.7 | 65,500 | 66.7 |
| Subtotal | 4,329,400 | 5,093,400 | 17.6 | 4,955,400 | 14.5 | 5,045,300 | 16.5 | 5,066,300 | 17.0 |
| Truck | | | | | | | | | |
| Internal[a] | 520,100 | 579,000 | 11.3 | 579,000 | 11.3 | 579,000 | 11.3 | 579,000 | 11.3 |
| External[a] | 44,100 | 58,200 | 32.0 | 58,200 | 32.0 | 58,200 | 32.0 | 58,200 | 32.0 |
| Subtotal | 564,200 | 637,200 | 12.9 | 637,200 | 12.9 | 637,200 | 12.9 | 637,200 | 12.9 |
| Total | 4,893,600 | 5,730,600 | 17.1 | 5,592,600 | 14.3 | 5,682,500 | 16.1 | 5,703,500 | 16.6 |

[a] *The number of external automobile, other automobile, external commercial truck, and internal commercial truck trips are shown to be the same in the year 2010 for each of the alternative plans since the availability of transit service and the promotion of bicycle and pedestrian friendly development may not be expected to significantly affect the generation of external travel and internal truck travel.*

*Source: SEWRPC.*

by 2010 under Alternative Plan 1, to 76.7 percent under Alternative Plan 2, and to 76.9 percent under Alternative Plan 3. Under the no-build alternative, average weekday automobile driver trips would increase to 4.72 million trips, or by 16 percent. The proportion of all trips made as an automobile driver may be expected to increase to 77.2 percent under the no-build plan.

The anticipated increases in internal and external vehicle trips by vehicle class are shown in Table 195. Internal vehicle trip production, including trips made by both automobile and truck, on an average weekday is estimated to increase from 4.58 million trips in 1991 to 5.16 million trips by 2010, or by about 13 percent, under Alternative Plan 1; to 5.25 million trips, or by about 15 percent, under Alternative Plan 2; and to 5.27 million trips, or also by 15 percent, under Alternative Plan 3. Under the no-build plan, internal vehicle trips may be expected to increase to 5.30 million trips, or by about 16 percent, over the 1991 level. Whereas the transportation system management measures would probably impact internal vehicle tripmaking under each plan differently, the variance in the impact of such measures on external tripmaking among the plans may be expected to be minimal. Accordingly, the number of external vehicle trips may be expected to remain the same for each of the alternative plans, increasing by 33 percent, from 273,300 in 1991 to 364,500 in 2010.

System Performance

Arterial vehicle-miles of travel generated within the Region on an average weekday under each of the alterative plans may be expected to increase from about 33.07 million in 1991 to about 38.87 million by 2010, or by 18 percent, under Alternative Plan 1; to about 41.57 million, or by 26 percent, under Alternative Plan 2; and to about 44.09 million, or by 33 percent, under Alternative Plan 3. Under the no-build plan, vehicle-miles of travel may be expected to increase to about 44.52 million by 2010, or by 35 percent (see Table 196). Thus, a 13 percent reduction in vehicle-miles of travel from that which may be expected to occur under the no-build plan may be realized under Alternative Plan 1. Similarly, a 7 percent reduction may be realized under Alternative Plan 2. No meaningful reduction in vehicle-miles of travel from that expected to occur under the no-build plan may be realized under Alternative Plan 3.

Allocation of the transit travel demands to each of the alternative transportation system management plans indicates that the number of annual revenue passengers in the Region may be expected to increase from about 50.22 million in 1991 to about 73.75 million by 2010, or by 47 percent, under Alternative Plan 1; to 60.65 million, or by 21 percent, under Alternative Plan 2; and to 54.11 million, or by 8 percent, under Alternative Plan 3 (see Table 197). Under the no-

Table 196

VEHICLE-MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM WITHIN THE REGION BY COUNTY: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| County | Base Year 1991 | Year 2010 Alternative Plans | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No-Build | Percent Change | Plan 1 | Percent Change | Plan 2 | Percent Change | Plan 3 | Percent Change |
| Kenosha | 2,500,000 | 4,080,000 | 63.2 | 3,658,000 | 46.3 | 3,813,000 | 52.5 | 3,930,000 | 57.2 |
| Milwaukee | 14,391,000 | 17,099,000 | 18.8 | 14,497,000 | 0.7 | 15,576,000 | 8.2 | 16,585,000 | 15.2 |
| Ozaukee | 1,942,000 | 2,340,000 | 20.5 | 2,143,000 | 10.4 | 2,249,000 | 15.8 | 2,360,000 | 21.5 |
| Racine | 2,966,000 | 4,194,000 | 41.4 | 3,500,000 | 18.0 | 3,776,000 | 27.3 | 4,036,000 | 36.1 |
| Walworth | 1,913,000 | 2,627,000 | 37.3 | 2,373,000 | 24.0 | 2,554,000 | 33.5 | 2,754,000 | 44.0 |
| Washington | 2,379,000 | 3,227,000 | 35.6 | 2,800,000 | 17.7 | 2,998,000 | 26.0 | 3,161,000 | 32.9 |
| Waukesha | 6,981,000 | 10,955,000 | 56.9 | 9,895,000 | 41.7 | 10,604,000 | 51.9 | 11,262,000 | 61.3 |
| Total | 33,072,000 | 44,522,000 | 34.6 | 38,866,000 | 17.5 | 41,570,000 | 25.7 | 44,088,000 | 33.3 |

*Source: SEWRPC.*

Table 197

TRANSIT SYSTEM PERFORMANCE IN THE REGION: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| Transit System Characteristics | Base Year 1991 | Year 2010 Alternative Plans | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No-Build | | Plan 1 | | Plan 2 | | Plan 3 | |
| | | Number | Percent Change | Number | Percent Change | Number | Percent Change | Number | Percent Change |
| Service Provided, Average Weekday | | | | | | | | | |
| Revenue Vehicle-Miles | | | | | | | | | |
| Rapid | 3,400 | 3,100 | -8.8 | 25,600 | 652.9 | 18,400 | 441.2 | 15,900 | 367.6 |
| Express | 3,300 | 6,000 | 81.8 | 29,800 | 803.0 | 21,100 | 539.4 | 20,400 | 518.2 |
| Local | 56,600 | 56,800 | 0.4 | 86,500 | 52.8 | 75,200 | 32.9 | 60,600 | 7.1 |
| Total | 63,300 | 65,900 | 4.1 | 141,900 | 124.2 | 114,700 | 81.2 | 96,900 | 53.1 |
| Revenue Vehicle-Hours | | | | | | | | | |
| Rapid | 170 | 160 | -5.9 | 1,100 | 547.1 | 700 | 311.8 | 600 | 252.9 |
| Express | 170 | 360 | 111.8 | 1,500 | 782.4 | 1,000 | 488.2 | 1,000 | 488.2 |
| Local | 4,880 | 5,130 | 5.1 | 6,600 | 35.2 | 6,100 | 25.0 | 5,100 | 4.5 |
| Total | 5,220 | 5,650 | 8.2 | 9,200 | 76.2 | 7,800 | 49.4 | 6,700 | 28.4 |
| Seat-Miles | 2,975,000 | 3,028,000 | 1.8 | 6,403,000 | 115.2 | 5,235,000 | 76.0 | 4,425,000 | 48.7 |
| Service Utilization | | | | | | | | | |
| Ridership | | | | | | | | | |
| Average Weekday Revenue Passengers | 172,200 | 168,000 | -2.4 | 271,600 | 57.7 | 207,700 | 20.6 | 186,900 | 8.5 |
| Annual Revenue Passengers | 50,222,900 | 48,998,000 | -2.4 | 80,122,000 | 59.5 | 60,648,000 | 20.8 | 54,575,000 | 8.7 |
| Revenue Passengers per Revenue Vehicle-Hour | 33.0 | 29.7 | -9.9 | 29.5 | -10.5 | 26.6 | -19.3 | 25.3 | -23.4 |
| Average Weekday Passenger Miles | 609,100 | 728,800 | 19.7 | 1,376,000 | 125.9 | 1,004,900 | 65.0 | 903,400 | 48.3 |

*Source: SEWRPC.*

build plan the number of revenue passengers may be expected to decline to about 49.00 million per year, or by 2 percent. Thus, a 50 percent increase in annual transit ridership over that expected to occur under the no-build transportation system plan may be realized under Alternative Plan 1. Similarly, a 24 percent increase in annual transit ridership may be expected under Alternative Plan 2. Under Alternative Plan 3, a 10 percent increase in annual transit ridership over that expected to occur under the no-build plan may be realized.

Table 197 also compares the anticipated utilization of the transit service proposed to be provided under each of the alternative plans. The highest utilization of transit service among the alternative plans, as measured in revenue passengers per revenue vehicle hour, may be expected to occur under Alternative Plan 1. Under that plan, about 30 passengers per vehicle hour may be expected to be carried. Because the proposed increase in vehicle hours of service provided is proportionately greater than the anticipated ridership under Alternative Plan 1,

Table 198

**POPULATION SERVED BY LOCAL PUBLIC TRANSIT IN THE REGION BY URBANIZED AREA: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS**

| Urbanized Area | Base Year 1991 | Year 2010 Alternative Transportation System Plans | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No-Build | Percent Change | Plan 1 | Percent Change | Plan 2 | Percent Change | Plan 3 | Percent Change |
| Kenosha | | | | | | | | | |
| Urbanized Area Population . . . . | 94,300 | 107,300 | 13.8 | 107,300 | 13.8 | 107,300 | 13.8 | 107,300 | 13.8 |
| Service Area Population . . . . . . | 86,600 | 84,200 | -2.7 | 99,000 | 14.3 | 99,000 | 14.3 | 84,600 | 97.7 |
| Percent Served . . . . . . . . . . . . | 91.8 | 78.5 | -14.5 | 92.3 | 0.5 | 92.3 | 0.5 | 78.8 | -14.2 |
| Milwaukee | | | | | | | | | |
| Urbanized Area Population . . . . | 1,226,300 | 1,277,100 | 4.1 | 1,277,100 | 4.1 | 1,277,100 | 4.1 | 1,277,100 | 4.1 |
| Service Area Population . . . . . . | 935,400 | 926,500 | -1.0 | 1,147,300 | 22.7 | 1,089,800 | 16.5 | 935,600 | 0.0 |
| Percent Served . . . . . . . . . . . . | 76.2 | 72.5 | -4.9 | 89.8 | 17.8 | 85.3 | 11.9 | 73.3 | -3.8 |
| Racine | | | | | | | | | |
| Urbanized Area Population . . . . | 121,800 | 132,100 | 8.5 | 132,100 | 8.5 | 132,100 | 8.5 | 132,100 | 8.5 |
| Service Area Population . . . . . . | 114,600 | 108,900 | -5.0 | 125,300 | 9.3 | 125,300 | 9.3 | 111,100 | -3.9 |
| Percent Served . . . . . . . . . . . . | 94.1 | 82.4 | -12.4 | 94.9 | 0.9 | 94.9 | 0.9 | 84.1 | -10.6 |
| Total | | | | | | | | | |
| Urbanized Area Population . . . . | 1,442,400 | 1,516,500 | 5.1 | 1,516,500 | 5.1 | 1,516,500 | 5.1 | 1,516,500 | 5.1 |
| Service Area Population . . . . . . | 1,136,600 | 1,119,600 | -1.5 | 1,371,600 | 20.7 | 1,314,100 | 15.6 | 1,130,300 | -0.6 |
| Percent Served . . . . . . . . . . . . | 78.8 | 73.8 | -6.3 | 90.4 | 14.7 | 86.7 | 10.0 | 74.5 | -5.5 |

*Source: SEWRPC.*

the anticipated utilization of transit is actually lower than the existing utilization of 33 passengers per vehicle hour.

Table 198 shows the proportion of the resident population that may be expected to be served by local public transit in the urbanized areas by the year 2010 under each of the alternative plans. As shown in Table 198, the resident population within the Kenosha urbanized area expected to reside in areas served by local transit would increase from about 86,600 persons in 1991, or about 92 percent of the urbanized area population, to about 99,000 persons, or 92 percent, under Alternative Plans 1 and 2 and decrease to about 84,600 persons or 79 percent under Alternative Plan 3. Under Alternative Plan 3, by the year 2010 a smaller proportion of the Kenosha urbanized area population would be served by local transit than was served in 1991.

In the Milwaukee urbanized area the population expected to reside in areas served by local transit would increase from about 935,400 persons in 1991, or about 76 percent of the urbanized area population, to about 1.15 million persons, or 90 percent, under Alternative Plan 1; to about 1.09 million persons, or 85 percent, under Alternative Plan 2; and decrease to about 934,600 persons, or 73 percent, under Alternative Plan 3. Under Alternative Plan 3, by the year 2010 a smaller proportion of the Milwaukee urbanized area population would be served by local transit than was served in 1991.

In the Racine urbanized area the population expected to reside in areas served by local transit would increase from 114,600 persons in 1991, or 94 percent of the urbanized area population, to about 125,300 persons, or 95 percent, under Alternative Plans 1 and 2; and decrease to about 111,100 persons, or 84 percent, under Alternative Plan 3. Under Alternative Plan 3, by the year 2010 a smaller proportion of Racine urbanized area population would be served by local transit than was served in 1991.

System Deficiencies

The impact of the anticipated increase in travel on the arterial street and highway system is reflected in the anticipated number of arterial miles projected to operate at or over design capacity in the year 2010. As shown in Table 199 by 2010, the number of miles operating over design capacity may be expected to increase from 279 in 1991 to about 601, or by 115 percent, under Alternative Plan 1; to 628, or by 125 percent, under Alternative Plan 2; and to about 679, or 143 percent, under Alternative Plan 3. Under the no-build plan, the number of miles operating over design capacity may be expected to increase to 681 miles, or by

## Table 199

## ARTERIAL MILEAGE OPERATING UNDER, AT, AND OVER DESIGN CAPACITY: 1991 AND 2010 NO-BUILD ALTERNATIVE AND TRANSPORTATION SYSTEM MANAGEMENT PLANS

| | Base Year 1991 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Under Design Capacity | | At Design Capacity | | Over Design Capacity | | |
| County | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Total Miles |
| Kenosha | 286.0 | 90.0 | 16.6 | 5.2 | 15.1 | 4.8 | 317.7 |
| Milwaukee | 543.2 | 70.1 | 110.3 | 14.2 | 121.9 | 15.7 | 775.4 |
| Ozaukee | 254.2 | 88.1 | 21.0 | 7.3 | 13.3 | 4.6 | 288.5 |
| Racine | 288.7 | 83.0 | 24.9 | 7.2 | 34.3 | 9.9 | 347.9 |
| Walworth | 411.1 | 95.8 | 15.0 | 3.5 | 3.1 | 0.7 | 429.2 |
| Washington | 356.5 | 89.3 | 23.2 | 5.8 | 19.5 | 4.9 | 399.2 |
| Waukesha | 591.3 | 82.5 | 53.0 | 7.4 | 72.0 | 10.1 | 716.3 |
| Total | 2,731.0 | 83.4 | 264.0 | 8.1 | 279.2 | 8.5 | 3,274.2 |

| | Year 2010 No-Build Plan | | | | | | |
|---|---|---|---|---|---|---|---|
| | Under Design Capacity | | At Design Capacity | | Over Design Capacity | | |
| County | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Total Miles |
| Kenosha | 230.1 | 66.7 | 74.2 | 21.5 | 40.9 | 11.8 | 345.2 |
| Milwaukee | 490.0 | 62.1 | 122.6 | 15.6 | 176.7 | 22.3 | 789.3 |
| Ozaukee | 233.9 | 81.1 | 26.3 | 9.1 | 28.3 | 9.8 | 288.5 |
| Racine | 241.7 | 59.3 | 80.5 | 19.8 | 85.3 | 20.9 | 407.5 |
| Walworth | 387.2 | 87.0 | 40.2 | 9.0 | 17.5 | 4.0 | 444.9 |
| Washington | 337.7 | 75.3 | 54.1 | 12.1 | 56.9 | 12.6 | 448.7 |
| Waukesha | 369.1 | 48.8 | 111.6 | 14.7 | 274.9 | 36.5 | 755.6 |
| Total | 2,289.7 | 65.8 | 509.5 | 14.6 | 680.5 | 19.6 | 3,479.7 |

| | 2010 Alternative Plan 1 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Under Design Capacity | | At Design Capacity | | Over Design Capacity | | |
| County | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Total Miles |
| Kenosha | 233.8 | 67.7 | 76.9 | 22.3 | 34.5 | 10.0 | 345.2 |
| Milwaukee | 496.1 | 62.9 | 136.4 | 17.3 | 156.8 | 19.9 | 789.3 |
| Ozaukee | 248.5 | 86.1 | 18.0 | 6.2 | 22.0 | 7.6 | 288.5 |
| Racine | 251.2 | 61.6 | 89.2 | 21.9 | 67.1 | 16.5 | 407.5 |
| Walworth | 387.2 | 87.0 | 40.2 | 9.0 | 17.5 | 3.9 | 444.9 |
| Washington | 348.5 | 77.7 | 49.3 | 11.0 | 50.9 | 11.3 | 448.7 |
| Waukesha | 377.9 | 50.0 | 125.8 | 16.6 | 251.9 | 33.3 | 755.6 |
| Total | 2,343.2 | 67.3 | 535.8 | 15.4 | 600.7 | 17.3 | 3,479.7 |

| | 2010 Alternative Plan 2 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Under Design Capacity | | At Design Capacity | | Over Design Capacity | | |
| County | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Total Miles |
| Kenosha | 232.8 | 67.4 | 74.5 | 21.6 | 37.9 | 11.0 | 345.2 |
| Milwaukee | 493.9 | 62.6 | 133.0 | 16.9 | 162.4 | 20.6 | 789.3 |
| Ozaukee | 244.5 | 84.7 | 19.0 | 6.6 | 25.0 | 8.7 | 288.5 |
| Racine | 246.9 | 60.6 | 85.4 | 21.0 | 75.2 | 18.5 | 407.5 |
| Walworth | 392.8 | 88.3 | 38.5 | 8.7 | 13.6 | 3.1 | 444.9 |
| Washington | 337.7 | 75.3 | 58.1 | 12.9 | 52.9 | 11.8 | 448.7 |
| Waukesha | 376.7 | 49.9 | 117.7 | 15.6 | 261.2 | 34.6 | 755.6 |
| Total | 2,325.3 | 66.8 | 526.2 | 15.1 | 628.2 | 18.1 | 3,479.7 |

| | 2010 Alternative Plan 3 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Under Design Capacity | | At Design Capacity | | Over Design Capacity | | |
| County | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Total Miles |
| Kenosha | 230.1 | 66.7 | 74.2 | 21.5 | 40.9 | 11.8 | 345.2 |
| Milwaukee | 490.0 | 62.1 | 122.6 | 15.5 | 176.7 | 22.4 | 789.3 |
| Ozaukee | 236.2 | 81.9 | 25.5 | 8.8 | 26.8 | 9.3 | 288.5 |
| Racine | 243.0 | 59.6 | 79.2 | 19.4 | 85.3 | 20.9 | 407.5 |
| Walworth | 337.7 | 87.0 | 40.2 | 9.0 | 17.5 | 3.9 | 444.9 |
| Washington | 387.7 | 75.3 | 54.1 | 12.0 | 56.9 | 12.7 | 448.7 |
| Waukesha | 369.1 | 48.8 | 111.6 | 14.8 | 274.9 | 36.4 | 755.6 |
| Total | 2,293.3 | 65.9 | 507.4 | 14.6 | 679.0 | 19.5 | 3,479.7 |

*Source: SEWRPC.*

## Table 200

### URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON ARTERIAL STREETS AND HIGHWAYS: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| Urbanized Area and Activity Center | Urbanized Area Population | | Urbanized Area Population Meeting Travel Time Standard on Arterial Streets and Highways | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Proposed 2010 | | | | | | | |
| | Base Year 1991 | 2010 | Base Year 1991 | | No-Build Transportation System Plan | | Alternative Plan 1 | | Alternative Plan 2 | | Alternative Plan 3 | |
| | | | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kenosha Urbanized Area | 94,300 | 107,300 | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related[a] | - - | - - | 90,000 | 96.4 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Major Retail-Service[b] | - - | - - | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Medical Facility[c] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Major Park[d] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Higher-Education Facility[e] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Scheduled Air Transport[f] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Milwaukee Urbanized Area | 1,226,300 | 1,277,100 | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 1,147,900 | 93.6 | 1,180,500 | 92.4 | 1,180,500 | 92.4 | 1,180,500 | 92.4 | 1,180,500 | 92.4 |
| Major Retail-Service | - - | - - | 1,161,400 | 94.7 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Medical Facility | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Major Park | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Higher-Education Facility | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Scheduled Air Transport | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Racine Urbanized Area | 121,800 | 132,100 | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Major Retail-Service | - - | - - | 32,200 | 26.4 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Medical Facility | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Major Park | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Higher-Education Facility | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Scheduled Air Transport | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |

[a] *Standard: 30 minutes' overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes' overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

*Source: SEWRPC.*

144 percent, by the year 2010. Similarly, the number of arterial miles operating at design capacity, which totaled about 264 in 1991, may be expected to increase to about 536, or by 103 percent, under Alternative Plan 1; to 526, or by 99 percent, under Alternative Plan 2; and to about 507, or by 92 percent, under Alternative Plan 3. Under the no-build plan such mileage may be expected to increase to about 510 miles, or by 93 percent, by the year 2010.

To further identify the transportation system deficiencies that remained after the alternative transportation system management plans were postulated, the previously indicated travel time standards were applied to identify existing and proposed urban residential areas inadequately served by the highway mode and by the public transit mode. As shown in Table 200, the alternative plans do not differ in their ability to provide timely access to employment and major activity centers through travel on the arterial system. A comparison of the findings set forth in Table 201 indicates, however, that the alternative plans vary significantly in the degree to which they provide timely access to important activity centers and employment opportunities through travel on the public transit system.

While each of the alternative plans generally provides an improvement in access over that provided by the no-build plan, Alternative Plans 1 and 2 generally provide the greatest level of access. For instance, the proportion of the

## Table 201

### URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON TRANSIT: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| Urbanized Area and Activity Center | Urbanized Area Population | | Urbanized Area Population Meeting Travel Time Standard on Transit | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Base Year 1991 | | 2010 | | | | | | | |
| | | | | | No-Build Transportation System Plan | | Alternative Plan 1 | | Alternative Plan 2 | | Alternative Plan 3 | |
| | Base Year 1991 | 2010 | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kenosha Urbanized Area ...... | 94,300 | 107,300 | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related[a] ...... | - - | - - | 58,000 | 61.5 | 51,400 | 47.9 | 97,700 | 91.1 | 97,700 | 91.1 | 53,200 | 49.6 |
| Major Retail-Service[b] ....... | - - | - - | 0 | 0.0 | 1,400 | 1.3 | 9,500 | 8.9 | 9,500 | 8.9 | 1,400 | 1.3 |
| Medical Facility[c] .......... | - - | - - | 60,600 | 64.3 | 53,300 | 49.7 | 63,600 | 59.3 | 63,600 | 59.3 | 53,300 | 49.7 |
| Major Park[d] ............ | - - | - - | 12,600 | 13.4 | 20,700 | 19.3 | 77,500 | 72.2 | 77,500 | 72.2 | 24,700 | 23.0 |
| Higher-Education Facility[e] ... | - - | - - | 33,200 | 35.2 | 51,400 | 47.9 | 80,800 | 75.3 | 80,800 | 75.3 | 68,100 | 63.5 |
| Scheduled Air Transport[f] .... | - - | - - | 0 | 0.0 | 0 | 0.0 | 51,900 | 48.4 | 51,900 | 48.4 | 51,900 | 48.4 |
| Milwaukee Urbanized Area .... | 1,226,300 | 1,277,100 | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related ....... | - - | - - | 14,200 | 1.2 | 600 | 0.0 | 619,900 | 48.5 | 276,000 | 21.6 | 243,600 | 19.1 |
| Major Retail-Service[g] ....... | - - | - - | 10,100 | 0.8 | 35,300 | 2.8 | 282,800 | 22.1 | 107,900 | 8.4 | 66,200 | 5.2 |
| Medical Facility .......... | - - | - - | 700,400 | 57.1 | 648,000 | 50.7 | 870,200 | 68.1 | 770,000 | 60.2 | 728,900 | 57.1 |
| Major Park ............. | - - | - - | 636,300 | 51.9 | 617,300 | 48.3 | 994,200 | 77.8 | 790,500 | 61.9 | 701,000 | 54.9 |
| Higher-Education Facility .... | - - | - - | 775,600 | 63.2 | 740,900 | 58.0 | 1,168,000 | 91.5 | 1,092,200 | 85.5 | 931,900 | 73.0 |
| Scheduled Air Transport .... | - - | - - | 338,600 | 27.6 | 316,800 | 24.8 | 776,800 | 60.8 | 665,600 | 52.1 | 569,400 | 44.6 |
| Racine Urbanized Area ....... | 121,800 | 132,100 | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related ....... | - - | - - | 59,100 | 48.5 | 56,400 | 42.7 | 107,500 | 81.4 | 107,500 | 81.4 | 94,400 | 71.5 |
| Major Retail-Service ........ | - - | - - | 21,500 | 17.7 | 18,300 | 13.9 | 52,500 | 29.7 | 52,500 | 29.7 | 32,100 | 24.3 |
| Medical Facility .......... | - - | - - | 53,700 | 44.1 | 46,700 | 35.4 | 61,300 | 46.4 | 61,300 | 46.4 | 49,200 | 37.2 |
| Major Park ............. | - - | - - | 24,000 | 19.7 | 37,000 | 28.0 | 59,800 | 45.3 | 59,800 | 45.3 | 38,300 | 29.0 |
| Higher-Education Facility .... | - - | - - | 79,600 | 65.4 | 88,400 | 66.9 | 110,700 | 83.8 | 110,700 | 83.8 | 102,700 | 77.7 |
| Scheduled Air Transport .... | - - | - - | 18,300 | 15.0 | 18,600 | 14.1 | 63,800 | 48.3 | 63,800 | 48.3 | 60,100 | 45.5 |

[a] *Standard: 45 minutes' overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes' overall travel time of one major retail and service center.*

[c] *Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

[g] *Standard: 35 minutes' overall travel time of three major retail and service centers.*

*Source: SEWRPC.*

Kenosha urbanized area population expected to be within 45 minutes of 40 percent of jobs within the Kenosha urbanized area may be expected to increase from about 62 percent in 1991 to about 91 percent under Alternative Plans 1 and 2 and to decrease to about 50 percent under Alternative Plan 3. The proportion of the Milwaukee urbanized area population expected to be within 45 minutes of 40 percent of the jobs in the Milwaukee urbanized area may be expected to increase from about 1 percent in 1991 to about 49 percent under Alternative Plan 1, to about 22 percent under Alternative Plan 2, and to about 19 percent under Alternative Plan 3. The proportion of the Racine urbanized area population expected to be within 45 minutes of 40 percent of jobs within the Racine urbanized area may be expected to increase from about 49 percent in 1991 to about 81 percent under Alternative Plans 1 and 2 and to increase to about 72 percent under Alternative Plan 3.

### Conclusions from the Testing of Alternative Transportation System Management Plans

As indicated in Table 202, the alternative transportation system management plans may be expected to vary in the degree to which they impact travel within the Region by the year 2010. The most significant difference is evident with regard to use of the arterial street and highway system, as measured in vehicle-miles of travel. Under both the no-build alternative and Alternative Plan 3, daily vehicle-miles of travel in the Region may be expected to increase between 1991 and 2010 by about 35 percent, to about 44.52 million vehicle miles. Under Alternative Plans 1 and 2, however, vehicle-miles of travel may be expected to increase by only 18 percent, to 38.87 million per day, and by 26 percent, to 41.57 million per day, respectively. Thus, both Alternative Plans 1 and 2 may be expected to reduce the amount of arterial travel forecast under the no-build alternative.

Table 202

COMPARISON OF MAJOR TRANSPORTATION IMPACTS OF THE YEAR 2010 ALTERNATIVE TRANSPORTATION SYSTEM MANAGEMENT PLANS

| Category | Measure | Base Year 1991 | No-Build Alternative | Alternative Plan 1 | Alternative Plan 2 | Alternative Plan 3 |
|---|---|---|---|---|---|---|
| Travel | Average weekday internal person trips (millions) | 5.54 | 6.12 | 6.06 | 6.10 | 6.10 |
| | Average weekday internal vehicle-trips (millions) | 4.58 | 5.30 | 5.16 | 5.25 | 5.27 |
| | Average weekday vehicle-miles of travel (millions) | 33.07 | 44.52 | 38.87 | 41.57 | 44.09 |
| | Average weekday transit ridership | 172,200 | 168,000 | 271,600 | 207,700 | 186,900 |
| Traffic Congestion | Average weekday arterial traffic congestion | | | | | |
| | Amount and proportion of arterial mileage at design capacity | 264 miles<br>8.1 percent | 509.5 miles<br>14.9 percent | 535.8 miles<br>15.4 percent | 526.2 miles<br>15.1 percent | 507.4 miles<br>14.6 percent |
| | Amount and proportion of arterial mileage over design capacity | 279 miles<br>8.5 percent | 681 miles<br>19.6 percent | 601 miles<br>17.3 percent | 628 miles<br>18.1 percent | 679 miles<br>19.5 percent |
| Accessibility by Transit | Percent population meeting employment access standard by transit[a] | | | | | |
| | Kenosha Urbanized Area | 61.5 | 47.9 | 91.1 | 91.1 | 49.6 |
| | Milwaukee Urbanized Area | 1.2 | 0.0 | 48.5 | 21.6 | 19.1 |
| | Racine Urbanized Area | 48.5 | 42.7 | 81.5 | 81.5 | 71.5 |
| | Population served by local transit (millions) | 1.14 | 1.12 | 1.37 | 1.31 | 1.13 |

[a] *Within a given urbanized area: 45 minutes' overall travel time of 40 percent of that urbanized area's jobs.*

*Source: SEWRPC.*

The reduction in the use of the arterial system from what can be expected to occur under the no-build alternative, 12 percent under Alternative Plan 1 and 6 percent under Alternative Plan 2, is attributable to the impacts of the proposed transportation system management measures, including travel pricing, land use site design, and public transit improvements. The impact of the pricing measures on trip length would appear to account for the principal differences between the alternative plans in vehicle-miles of travel within the Region. Indeed, the alternative plans differ by less than one percent in the number of vehicle trips generated. Further, the transit improvements proposed under Alternative Plan 1, while having the potential to significantly impact weekday transit ridership, have an estimated impact of less than 2 percent on weekday vehicle-miles of travel.

It can be concluded from the above that the significant increases in the perceived costs of automobile travel proposed under Alternative Plan 1 tend to reduce the distance people are willing to travel by automobile. This impact may be manifest in the decisions of households to locate closer to employment centers or to pursue shopping and recreational opportunities closer to home.

## SUMMARY AND CONCLUSIONS

The travel demand generated by a given land use pattern can be met by various combinations of transportation facilities, services, and demand management measures. This chapter has summarized a complex process of plan design that allowed for the explicit consideration of a variety of improvements and enabled cost-effective alternative transportation system management plans to be developed.

The plan design process began by identifying a no-build transportation system which included existing and committed transportation system facilities, services, and management measures. A forecast of future travel demand derived from the adopted year 2010 regional land use plan was then assigned to the no-build system. The results of this assignment indicated potential problems and deficiencies expected to occur in the absence of significant improvements in transportation facilities, services, and demand management.

On the basis of the results of the assignment of future travel demand to the no-build plan, three transportation system management plans were prepared. The plans combined measures to resolve deficiencies identified in the no-build plan, traffic congestion, and inadequate transit service, in particular. The plans include measures to manage and reduce vehicular travel demand and to manage traffic flow, as well as public transit improvements. These plans did not include arterial street and highway improvements and, for the purpose of system analysis, included the arterial street and highway system element of the no-build alternative. Forecasts of future regional travel were assigned to the three alternative plans and their ability to resolve the transportation problems and deficiencies expected to occur under the no-build plan was tested.

As is described in Chapter X, arterial street and highway improvements were postulated to resolve remaining transportation system deficiencies. Such improvements were proposed only after the full potential transportation-related impacts of the transportation system management measures were understood. The major findings of the foregoing plan design process are summarized below.

No-Build Transportation System Plan

The no-build plan represents both a policy alternative for the Region and a point of departure for the initial testing and design of alternative transportation plans which incorporate facility and service improvements and travel demand management measures. The arterial street and highway and public transit systems under the no-build plan include those facilities and services completed and open to traffic as of January 1, 1994, and those facilities programmed for construction in the annual element, that is, the element applicable to the calendar years 1994 and 1995, of the 1993 through 1998 Federally approved Transportation Improvement Program for Southeastern Wisconsin. The no-build plan also includes those existing streets and highways which did not function as arterials in 1991 but would function as arterials by the year 2010. The arterial street and highway system would increase from 3,274 miles in 1991 to 3,480 miles by 2010, an increment of about 206 miles, or 6 percent.

The no-build regional transit system was defined as the existing transit facilities and services in operation on January 1, 1994, plus those improvements programmed for implementation in the annual element of the transportation improvement program. Under the no-build plan, rapid transit service within the Region would consist of 519 round-trip route-miles, representing an increase of 70 miles, or 16 percent, over the 1991 level. Express transit service would consist of 377 round-trip route-miles, a decrease of 16 route-miles, or 4 percent, from the level provided in 1991. Local transit service within the Region would consist of 1,540 round-trip route-miles, an increase of 86 route-miles, or 6 percent, over the 1991 level. The no-build transportation system also includes those transportation system management measures included in the annual element of the transportation improvement program. Such measures include, among others, freeway traffic management system implementation and the construction and reconstruction of bikeways.

Under the no-build plan, the number of personal automobiles and light trucks available in the Region may be expected to increase by about 16 percent, from 1.13 million in 1991 to 1.31 million by 2010. Nearly 6.12 million internal person trips may be expected to be made on an average weekday, an increase of about 10 percent over the nearly 5.54 million trips generated within the Region in 1991. Average weekday transit ridership may be expected to decline by about 4 percent, from 172,200 trips in 1991 to about 168,000 trips by 2010. Trips made as an automobile driver may be expected to increase by about 16 percent, from 4.06 million in 1991 to 4.72 million in 2010. Under the no-build plan, the number of average weekday internal vehicle trips may be expected to increase by about 16 percent, from 4.58 million in 1991 to 5.3 million by the year 2010.

Allocation of the vehicle travel demand generated under the adopted land use plan to the no-build alternative indicates that vehicle-miles of travel on the arterial system may be expected to increase by about 35 percent, from 33.07 million in 1991 to nearly 44.52 million by 2010. A significant increase in the use of the regional freeway system may be expected to occur between 1991 and the year 2010 under the no-build plan. Vehicle-miles of travel on the freeway system may be expected to increase by 49 percent, from 11.60 million vehicle-miles in 1991 to 17.29 vehicle-miles in 2010. The number of arterial miles operating over design capacity may be expected to increase by about 401 miles, from 279 in 1991, or about 9 percent of the total system mileage to 681 miles, or about 20 percent of the total system mileage. The number of arterial miles operating at design capacity may be expected to increase by about 93 percent, from 264 miles in 1991, or 8 percent of the total system mileage in 1991, to about 510 miles, or about 15 percent of the total system mileage in 2010.

Under the no-build plan, the number of urbanized area residents within the Region able to access 40 percent of the urbanized area jobs within 45 minutes by public transit may be expected to decrease from 131,300, or 9 percent of the urbanized area population in 1991, to 108,400, or 7 percent of the urbanized area population in 2010.

Alternative Transportation System Management Plans

Each of the alternative transportation system management plans contain several elements in common: comprehensive freeway traffic management, general traffic management, the recognition of the potential to eventually apply intelligent vehicle highway system technology to the management of travel within the Region, and travel demand management measures including work-schedule changes, telecommuting, and transportation management associations. The three alternatives differ in the degree to which they emphasize pricing measures and land use planning and site design to bring about reductions in travel demand. The plans also differ in the degree to which public transit service would be improved and expanded.

In an effort to manage travel demand, Alternative Plan 1 would, by the year 2010, increase perceived vehicle operating costs by 100 percent, from $0.055 in 1991 to $0.11 in 2010. This proposed cost increase would be the equivalent to a $1.10 per gallon increase in the cost of motor fuel. The transit system envisioned under Alternative Plan 1 would consist of 4,190 round-trip route-miles, which would be about 1,894 miles, or 82 percent, greater than that provided in 1991. The transit system would require that 914 vehicles operate during peak travel periods, and that 141,900 revenue vehicle-miles and 9,200 revenue vehicle-hours of service be provided per average weekday. In 1991, 530 buses provided 63,300 revenue vehicle-miles and 5,220 revenue vehicle-hours of service per average weekday.

In an effort to manage travel demand, Alternative Plan 2 would, by the year 2010, increase the perceived vehicle operating cost by 50 percent, from $0.055 cents per mile in 1991 to $0.0825 per mile by 2010. The 50 percent increase in the perceived cost of vehicle operation proposed under Alternative Plan 2 would be equivalent to a $0.55 per gallon increase in the cost of motor fuel. The transit system envisioned under Alternative Plan 2 would consist of 3,680 round-trip route-miles, about 1,384 miles, or 61 percent, greater than that provided in 1991. The transit system would require 804 vehicles operating during peak periods and providing 114,700 revenue vehicle-miles and 7,800 revenue vehicle-hours of service per average weekday.

Alternative Plan 3, unlike the other alternatives, does not propose to increase perceived vehicle operating costs in an effort to manage travel demand, but rather proposes to increase such costs only to the extent necessary to cover the revenue shortfall anticipated to be incurred in implementing the plan. The transit system envisioned under Alternative Plan 3 would consist of 3,260 round-trip route-miles, some 964 miles, or about 42 percent, greater than that provided in 1991. The system would require 667 vehicles operating during peak periods and providing 96,900 vehicle revenue miles and 6,700 revenue vehicle-hours of service per average weekday.

Testing of Alternative Transportation System Management Plans

The performance of each of the three alternative transportation system management plans under future land use and travel conditions was analyzed with the assistance of the Commission traffic simulation models, as previously indicated. It is estimated that, by the year 2010, the number of vehicles available in the Region may be expected to increase from 1.13 million in 1991 to 1.29 million, or by about 14 percent, under Alternative Plan 1; to 1.29 million, or by about 14 percent, under Alternative Plan 2; and to 1.30 million, or by nearly 15 percent, under Alternative Plan 3.

Average weekday internal person trips may be expected to increase from nearly 5.54 million trips in 1991 to about 6.06 million by 2010, or by 9 percent, under Alternative Plan 1 and to about 6.10 million, or by nearly 10 percent, under Alternative Plans 2 and 3. The average number of internal person trips per capita may be expected to increase from about 3.1 in 1991 to 3.2 by 2010, or by about 3 percent, under each of the alternative plans. The average number of internal person trips per household may be expected to remain at 7.8 under Alternative Plan 1 and to increase to 7.9 under the other alternatives.

Average weekday transit trip production may be expected to increase from about 172,200 trips in 1991 to about 271,600 by 2010, or by about 58 percent, under Alternative Plan 1; to about 207,700 trips, or by about 21 percent, under Alternative Plan 2; and to about 186,900 trips, or by about 9 percent, under Alternative Plan 3. The proportion of all internal person trips within the Region served by transit may be expected to increase from 3.1 percent in 1991 to 4.5 percent by 2010 under Alternative Plan 1; to increase to 3.4 percent under Alternative Plan 2; and to remain at about 3.1 percent under Alternative Plan 3.

Internal automobile driver trips, including personal-use light truck driver trips, may be expected to increase from nearly 4.06 million trips in 1991 to about 4.58 million trips by 2010, or by about 13 percent, under Alternative Plan 1; to about 4.67 million trips, or by 15 percent, under Alternative Plan 2; and to about 4.69 million trips, or by about 16 percent, under Alternative Plan 3. The proportion of all internal person trips made as an automobile driver may then be expected to increase from 73.3 percent in 1991 to 75.5 percent by 2010 under Alternative Plan 1, to 76.7 percent under Alternative Plan 2, to 76.9 percent under Alternative Plan 3.

Internal vehicle trip production, including internal trips made by both automobiles and trucks, on an average weekday, may be expected to increase from 4.58 million trips in 1991 to about 5.16 million trips by 2010, or by about 13 percent, under Alternative Plan 1; to 5.25 million trips, or by about 15 percent, under Alternative Plan 2; and to 5.27 million trips, or also by about 15 percent, under Alternative Plan 3.

Arterial vehicle miles of travel within the Region on an average weekday may be expected to increase from about 33.07 million in 1991 to about 38.87 million by 2010, or by 18 percent, under Alternative Plan 1; to about 41.57 million, or by 26 percent, under Alternative Plan 2; and to about 44.09 million, or by 33 percent, under Alternative Plan 3.

The number of arterial miles operating over design capacity may be expected to increase from 279 in 1991 to about 601, or by 115 percent, under Alternative Plan 1; to 628 miles, or by 125 percent, under Alternative Plan 2; and to about 679 miles, or 143 percent, under Alternative Plan 3. The number of arterial miles operating at design capacity may be expected to increase from about 264 in 1991 to 536, or by 103 percent, under Alternative Plan 1; to 526 miles, or by 99 percent, under Alternative Plan 2; and to about 507 miles, or by 92 percent, under Alternative Plan 3.

The proportion of the total urbanized area population within the Region able to access 40 percent of jobs within 45 minutes by public transit may be expected to increase from 131,300 persons, or 9 percent, in 1991, to 825,100 persons, or about 54 percent, under Alternative Plan 1; to 481,200, or about 32 percent, under Alternative Plan 2; and to 391,200, or about 26 percent, under Alternative Plan 3. The proportion of the population within each urbanized area expected to meet the standard is shown in Table 202.

After careful consideration of the alternatives set forth in this chapter, the Technical Coordinating and Advisory Committee selected Alternative Plans 1 and 3 for further refinement and evaluation, including the incorporation of necessary arterial street and highway improvements to resolve identified transportation deficiencies, particularly traffic congestion. In selecting Alternative Plans 1 and 3, the Technical Coordinating and Advisory Committee recommended the elimination of Alternative Plan 2 from further consideration because its performance was not sufficiently different from the performances of Alternative Plans 1 and 3. This set of options would not provide the Commission, elected officials, and the public with information sufficient to permit selection of a recommended plan and because the proposed pricing mechanism assumed for demand management purposes under Plan 2 was insufficient to effect the degree of change in travel behavior sought by proponents of demand management in the Advisory Committee. The Advisory Committee determined that Alternative Plans 1 and 3 presented a reasonable range of alternatives upon which to base the preliminary selection of a recommended plan. A detailed description of the alternatives selected, including proposed arterial street and highway improvements, is set forth in Chapter X of this report.

# Chapter X

# ALTERNATIVE PLAN COMPARISON AND EVALUATION

## INTRODUCTION

As described in Chapter IX, the design of alternative transportation system plans proceeded from an analysis of how effectively transportation system management measures alone could serve future travel demand. This chapter describes the alternative plans selected by the Advisory Committee for further analysis complete with attendant improvements to the arterial street and highway system. This chapter also describes the results of an evaluation of the alternatives plans and compares the plans against the adopted development objectives and design standards.

Upon careful consideration and extensive deliberation, the Technical Coordinating and Advisory Committee on Regional Transportation System Planning advised the Commission to evaluate Alternative Transportation System Management Plans 1 and 3 fully. The Committee directed that the full evaluation of these plan alternatives follow the inclusion of arterial street and highway system improvements necessary to resolve the remaining deficiencies in each plan. As described in Chapter IX, the Advisory Committee reasoned that Alternative Plans 1 and 3 presented appropriate ranges of alternatives upon which to base a selection of a preliminary recommended plan. Alternative Plans 1 and 3 are fully described in this chapter and summarized in Table 203. The no-build alternative transportation system plan is fully described in the previous chapter of this report.

## ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLAN 1

Alternative Plan 1 represents a significant departure from the historic and existing transportation development policy within the Region. The plan emphasizes the management of travel demand. Because Commission studies have shown that travel behavior is largely a function of the perceived cost of travel, the plan proposes to increase those costs to bring about changes in travel behavior which have been shown to help meet transportation system development objectives.

Additionally, the plan proposes specific changes in current land use practices within the Region, consistent with the adopted regional land use plan. Such changes would promote the development of compact communities and encourage the use of bicycling, walking, and transit. Alternative Plan 1 also proposes other travel demand management measures, including, telecommuting, ridesharing, trip reduction ordinances, and transportation management associations.

To accommodate anticipated changes in travel patterns, the travel demand management measures may engender and to encourage further reductions in single-occupancy vehicle travel, Alternative Plan 1 also proposes to nearly double the level of public transit service. More specifically, the plan proposes to develop comprehensive rapid and express transit systems connecting major concentrations of urban development to the Milwaukee central business district (CBD). The plan proposes to expand local transit service throughout the urbanized areas of the Region and to improve the frequency of all levels of transit service.

Alternative Plan 1 also includes recommendations to maintain and improve the arterial street and highway system in the region. The plan proposes to expand arterial capacity where it was determined that the full implementation of transit improvement recommendations and transportation system management resources, including pricing, could not be anticipated to alleviate future traffic congestion. Because of the extensive reliance on transit improvement and transportation system management measures, most notably pricing, fewer improvements to the arterial system were determined to be needed under Alternative Plan 1 than under Alternative Plan 3.

### Transportation System Management

Alternative Plan 1 proposes a number of transportation system management measures to reduce the demand for travel, travel demand management, and to ensure that full use is achieved of existing transportation facilities before commitments are made to new capital investment. The proposed measures may be grouped into four categories: pricing, land use

Table 203

SUMMARY OF MAJOR PLAN ELEMENTS COMPRISING THE NO-BUILD AND ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS FOR SOUTHEASTERN WISCONSIN: 2010

| Major Plan Element | | | | |
|---|---|---|---|---|
| Category | Specific Measure | No-Build Alternative | Alternative Plan 1 | Alternative Plan 3 |
| Transportation System Management | Traffic management | • Implementation of Milwaukee-area freeway traffic management system<br>• Curb parking restrictions on 291 arterial route-miles during peak travel periods<br>• Application of traffic engineering techniques, e.g., turning lanes, traffic control signals, and coordinated timing of signals | • Implementation of Milwaukee-area freeway traffic management system<br>• Curb parking restrictions on 458 arterial route-miles during peak travel periods<br>• Application of traffic engineering techniques, e.g., turning lanes, traffic control signals, and coordinated timing of signals | • Implementation of Milwaukee-area freeway traffic management system<br>• Curb parking restrictions on 464 arterial route-miles during peak travel periods<br>• Application of traffic engineering techniques, e.g., turning lanes, traffic control signals, and coordinated timing of signals |
| | Pricing | • No increase in perceived cost of operating an automobile | • Significant increase in perceived cost of automobile operation from 5.5 cents per mile to 11.0 cents per mile; could be achieved by a variety of measures equivalent to motor fuel tax increase of $1.10 per gallon; cost increase intended to reduce automobile travel | • Insignificant increase in perceived cost of operating an automobile from 5.5 cents per mile to 6.0 cents per mile; equivalent to motor fuel tax increase of 10 cents per gallon; cost increase not intended to reduce automobile travel |
| | Areawide promotional | • Minimal effort to promote ridesharing and transportation management associations | • Aggressive areawide effort to promote ridesharing, transit use, bicycle use, telecommuting, work-time rescheduling, and transportation management associations | • Aggressive areawide effort to promote ridesharing, transit use, bicycle use, telecommuting, work-time rescheduling, and transportation management associations |
| | Land use | • Modest effort to promote travel by transit and to facilitate bicycle and pedestrian travel through detailed site-specific neighborhood land use planning, including appropriate mixtures of land use | • Aggressive effort to promote travel by transit and to facilitate bicycle and pedestrian travel through detailed site-specific neighborhood land use planning, including provision of appropriate mixtures of land use, efficient and direct pedestrian and bicycle pathways, and higher land use densities along transit lines | • Modest effort to promote travel by transit and to facilitate bicycle and pedestrian travel through detailed site-specific neighborhood land use planning, including appropriate mixtures of land use |
| Public Transit System Maintenance and Improvement | Rapid transit | • Continue service within Milwaukee County in major corridors and to Milwaukee central business district from Oak Creek, Waukesha, Mukwonago, Oconomowoc, and Menomonee Falls, and from sites in River Hills and Glendale in the IH 43-North Corridor | • Expand service in all major corridors to Milwaukee central business district from Racine, Kenosha, East Troy, Waukesha, Oconomowoc, West Bend, Cedarburg, Grafton, and Port Washington | • Provide service in major corridors to Milwaukee central business district from Racine, Kenosha, Waukesha, Oconomowoc, Mukwonago, Germantown, Cedarburg, and Grafton |

Table 203 (continued)

| Major Plan Element | | | | |
|---|---|---|---|---|
| Category | Specific Measure | No-Build Alternative | Alternative Plan 1 | Alternative Plan 3 |
| Public Transit System Maintenance and Improvement (continued) | Rapid transit (continued) | • Service Hours[a] Weekdays—6:00 a.m. to 8:30 a.m., 3:30 p.m. to 6:00 p.m. | • Service Hours Weekdays—6:00 a.m. to 6:00 p.m. (evening and weekend service on some routes) | • Service Hours Weekdays—6:00 a.m. to 8:30 a.m., 3:30 p.m. to 6:00 p.m. (midday service over some routes; no weekend or evening service) |
| | | • Headways Peak—15 to 60 minutes | • Headways Peak—five to 30 minutes<br>Off-peak—30 to 60 minutes | • Headways Peak—five to 30 minutes<br>Off-peak—30 to 60 minutes |
| | | • Fares Within Milwaukee County, $1.50; Milwaukee County to limits of Milwaukee urbanized area, $2.00; Milwaukee central business district to outer limits, $2.50 | • Fares Within Milwaukee County, $1.25; Milwaukee County to limits of urbanized area, $1.75; Milwaukee central business district to outer limits, $2.50 | • Fares Within Milwaukee County, $1.50; Milwaukee County to limits of urbanized area, $2.00; Milwaukee central business district to outer limits, $3.00 |
| | Express transit | • Continue Milwaukee-area central business district-oriented service and special UW-Milwaukee service; service between Oconomowoc, Waukesha, and Milwaukee central business district; and between Milwaukee central business district, Racine, and Kenosha | • Expand Milwaukee-area central business district-oriented service; provide cross-town service in Milwaukee County; provide service between Racine and Kenosha, and to connect Racine and Kenosha with urbanizing areas along IH 94 | • Expand Milwaukee central business district-oriented service; provide cross-town service in Milwaukee County; provide service to connect Cities of Racine and Kenosha; no connection of such cities to urbanizing areas along IH 94 |
| | | • Service Hours[a] Weekdays—6:00 a.m. to 10:00 p.m. (weekend service on some routes) | • Service Hours Weekdays—6:00 a.m. to 6:00 p.m. (weekdays until 10:00 p.m. and weekends on some routes) | • Service Hours Weekdays—6:00 a.m. to 6:00 p.m. (weekdays until 10:00 p.m. and weekends on some routes) |
| | | • Headways Peak—10 to 15 minutes (60 minutes in Waukesha, Racine, and Kenosha areas)<br>Off-peak—15 to 20 minutes (60 to 120 minutes in Waukesha, Racine, and Kenosha areas) | • Headways Peak—five to 15 minutes (30 minutes in Racine and Kenosha areas)<br>Off-peak—15 to 30 minutes (60 minutes in Racine and Kenosha areas) | • Headways Peak—10 to 15 minutes (30 minutes in Racine and Kenosha areas)<br>Off-peak—20 to 30 minutes (60 minutes in Racine and Kenosha areas) |
| | | • Fares Milwaukee County, $1.25; Milwaukee County to limits of Milwaukee urbanized area, $2.00; Milwaukee central business district to outer limits, $2.50 to $4.00 | • Fares Milwaukee County, $1.00; Racine and Kenosha, $0.60 | • Fares Milwaukee County, $1.25; Racine and Kenosha, $0.75 |

Table 203 (continued)

| Major Plan Element | | | | |
|---|---|---|---|---|
| Category | Specific Measure | No-Build Alternative | Alternative Plan 1 | Alternative Plan 3 |
| Public Transit System Maintenance and Improvement (continued) | Local transit | • Continue fixed-route service in Milwaukee County and in Cities of Waukesha, Racine, and Kenosha; continue shared-ride taxi service in Cities of Hartford, West Bend, Whitewater, and Port Washington<br>• Headways<br>Peak—10 to 40 minutes in Milwaukee County; 30 to 60 minutes in Waukesha; 30 minutes in Kenosha; 20 to 30 minutes in Racine<br>Off-peak—20 to 45 minutes in Milwaukee County; 30 to 60 minutes outside Milwaukee County | • Extend fixed-route service to all high- and medium-density development within Milwaukee, Racine, and Kenosha urbanized areas; new service to be provided to northern and southern Milwaukee County, southern Ozaukee County, southeastern Washington County, and eastern Waukesha County; continue shared-ride taxi services<br>• Headways<br>Peak—10 minutes in central Milwaukee County; 15 to 30 minutes outside central Milwaukee County<br>Off-peak—20 to 60 minutes in Milwaukee County; 30 to 60 minutes outside Milwaukee County | • Extend fixed-route service to all high- and medium-density development with densities of five dwelling units per acre or greater; new service to be provided to portions of northern and southern Milwaukee County, and eastern Waukesha County contiguous to existing service areas; continue shared-ride taxi services<br>• Headways<br>Peak—10 to 40 minutes in Milwaukee County; 30 minutes in Waukesha; 20 to 30 minutes in Kenosha and Racine<br>Off-peak—30 to 45 minutes in Milwaukee County; 60 minutes outside Milwaukee County |
| | Total transit | • Average Weekday<br>Round-trip route-miles: 2,440<br>Vehicle-miles of service: 65,990<br>Vehicle-hours of service: 5,700<br>Vehicles required in peak period: 527 | • Average Weekday<br>Round-trip route-miles: 4,190<br>Vehicle-miles of service: 141,900<br>Vehicle-hours of service: 9,200<br>Vehicles required in peak period: 915 | • Average Weekday<br>Round-trip route-miles: 3,260<br>Vehicle-miles of service: 96,900<br>Vehicle-hours of service: 6,700<br>Vehicles required in peak period: 670 |
| | Rail transit considerations | • No provision of transit service by light rail or commuter rail | • Potential provision of commuter rail service in four travel corridors dependent upon detailed corridor studies<br>• Potential provision of light rail express transit service in six travel corridors dependent upon detailed corridor studies | • Potential provision of commuter rail service in four travel corridors dependent upon detailed corridor studies<br>• Potential provision of light rail express transit service in six travel corridors dependent upon detailed corridor studies |
| Arterial Street and Highway System Maintenance and Improvement | New facilities | • 11 route-miles of newly constructed facilities | • 112 route-miles of newly constructed facilities | • 124 route-miles of newly constructed facilities |
| | Widened facilities | • 47 route-miles of widened arterial street and highway facilities | • 382 route-miles of widened arterial street and highway facilities | • 410 route-miles of widened arterial street and highway facilities |
| | Preserved facilities | • 3,422 route-miles of facilities to be preserved through resurfacing or reconstruction for same capacity | • 3,104 route-miles of facilities to be preserved through resurfacing or reconstruction for same capacity | • 3,075 route-miles of facilities to be preserved through resurfacing or reconstruction for same capacity |
| | Total facilities | • Total system of 3,480 route-miles of arterial streets and highways | • Total system of 3,598 route-miles of arterial streets and highways | • Total system of 3,609 route-miles of arterial streets and highways |

[a] *The Milwaukee County Transit System would continue to operate one freeway flyer rapid transit bus route between the Milwaukee central business district and Northridge Shopping Center during nonpeak periods at 60-minute headways.*

*Source: SEWRPC.*

planning and site design, areawide promotional programs, and traffic management.

Pricing: Alternative Plan 1 assumes a substantial increase in the perceived cost of driving a personal vehicle as measure to moderate vehicle travel demand. Under Alternative Plan 1, the perceived cost of driving would double, to $0.11 per mile. The cost increase could result from a combination of pricing related travel demand management measures, such as cash-out of employer paid parking, pay-as-you-drive automobile insurance, vehicle registration fees, and motor fuel taxes. For perspective, should the entire 100 percent cost increase be achieved through use of the motor fuel tax, the addition to that tax would approximate $1.10 per gallon. It is envisioned under Alternative Plan 1 that the revenue generated through these measures would reduce or eliminate the need for transportation funding from the property tax and provide adequate funding for full transportation system plan implementation.

Land Use Planning and Site Design Measures: Alternative Plan 1 also emphasizes significant land use-related travel demand management measures to reduce vehicle-miles of travel, vehicle trips, and average trip lengths by reducing the need for vehicular travel and by enhancing the attractiveness of alternatives to personal vehicle use. Since land use development practices significantly influence travel behavior and fall within the legal purview of local governmental police power, land use development is a variable that is proposed to be significantly managed under Alternative Plan 1 to achieve transportation system development objectives.

Implementation of appropriate land use measures by county and local units of government under Alternative Plan 1 would provide: that all newly developing areas be designed to provide integrated bicycle and pedestrian systems, that building and sites be oriented to promote effective transit provision and use, and that an appropriate mix of land use activities be encouraged in newly developing areas. In addition, Alternative Plan 1 proposes that high-density residential development and employment locations be provided along all existing and new transit routes. Such land use measures would permit travellers in areas affected to travel more easily and safely by walking, bicycle, or transit and to make shorter automobile trips than are required under more conventional recent development patterns.

In the design of Alternative Plan 1, the travel forecasting models were adjusted to reflect the probable impact of the land use measures on travel demand. Specifically, assumed transit walk-access was reduced by one-third to reflect the planned increase in the convenience of transit travel made possible by the development of higher residential densities along transit lines. This reduction was incorporated into the mode choice model. Further, the land use planning and site design measures were assumed to reduce, by 5 percent, total trip generation within areas so affected. The trip generation model was adjusted accordingly.

Areawide Promotional Measures: Alternative Plan 1 recommends a coordinated areawide effort to promote travel through ridesharing, transit use, and bicycle use. This program would aggressively promote carpooling and vanpooling, telecommuting, and rescheduling of work time to reduce travel by automobile, particularly by single-occupancy automobile, particularly in the peak periods. In addition, this program would include the promotion and support of transportation management associations at major employment centers throughout the Region to provide an institutional structure for helping to achieve the goal of reducing travel by single-occupancy vehicles.

Traffic Management: Alternative Plan 1 also proposes the use of traffic management measures to accommodate vehicular travel demand not abated through the use of travel demand management measures and public transit improvements. Traffic management measures are intended to ensure that available highway capacity is used prior to the construction of additional capacity. The traffic management measures of the Alternative Plan 1 include restrictions on peak-period curb-lane parking; the implementation of the Milwaukee area comprehensive freeway traffic management system plan; and the extensive application of traffic engineering measures by State, county, and municipal agencies responsible for plan implementation. The plan recommends that curb restrictions be placed on a total of 458 arterial route-miles during peak periods. The plan also recommends the use of advanced traffic management technology, Intelligent Transportation Systems (ITS), as such technology becomes practical within the Region.

Table 204

TRANSIT SYSTEM OPERATING CHARACTERISTICS AND FACILITIES IN THE REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| Transit Service | Existing 1991 | | Planned Increment | | 2010 | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Round-Trip Route Length (miles) | | | | | | |
| Rapid Routes | 449 | 19.6 | 1,131 | 251.9 | 1,580 | 37.7 |
| Express Routes | 393 | 17.1 | 97 | 24.7 | 490 | 11.7 |
| Local Routes | | | | | | |
| Kenosha Urbanized Area | 171 | 7.4 | 69 | 40.4 | 240 | 5.7 |
| Milwaukee Urbanized Area | 1,112 | 48.5 | 548 | 49.3 | 1,660 | 39.6 |
| Racine Urbanized Area | 171 | 7.4 | 49 | 28.7 | 220 | 5.3 |
| Subtotal | 1,454 | 63.3 | 666 | 45.8 | 2,120 | 50.6 |
| Total | 2,296 | 100.0 | 1,894 | 82.5 | 4,190 | 100.0 |
| Special Facilities (miles) | | | | | | |
| Exclusive Right-of-Way | 0 | 0.0 | 30 | - - | 30 | 93.8 |
| Exclusive Lanes on Streets | 2 | 100.0 | 0 | 0.0 | 2 | 6.2 |
| Total | 2 | 100.0 | 30 | 1,500.0 | 32 | 100.0 |
| Average Weekday Vehicle Requirements[a] | | | | | | |
| Peak Period | 530 | - - | 384 | 72.5 | 914 | - - |
| Midday Off-Peak Period | 285 | - - | 216 | 75.8 | 501 | - - |

[a]*Represents only the vehicles required for daily system operation. Excludes vehicles needed as spare or backup vehicles.*

*Source: SEWRPC.*

Public Transit System Maintenance and Improvement

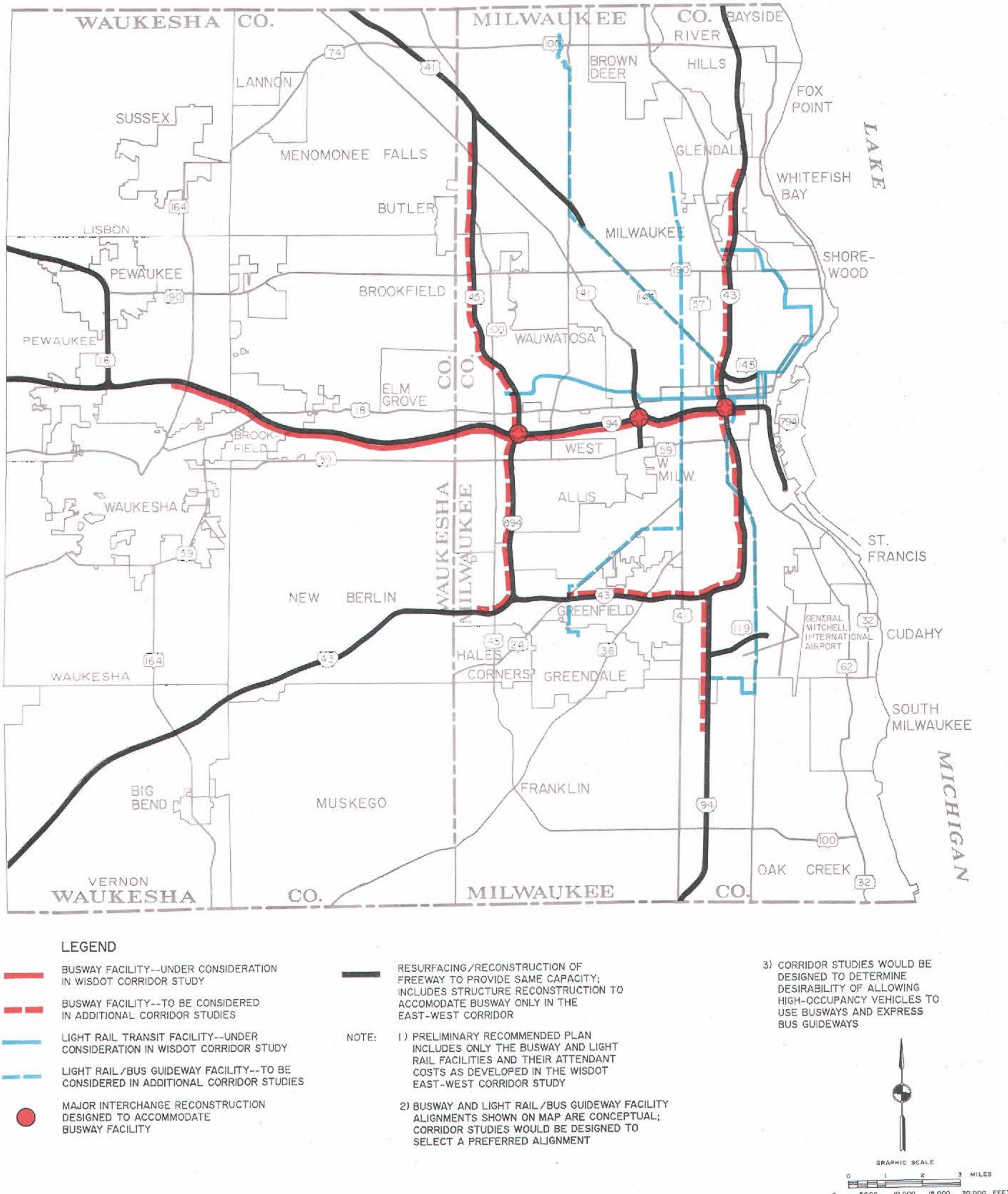
Alternative Plan 1 proposes a near doubling of existing transit service within the Region. The public transit element of this alternative is shown on Map 92 on page 398 in Chapter IX and is summarized in Table 204. The transit system envisioned under Alternative Plan 1 would consist of about 4,190 round-trip route-miles, 1,894 miles, or 82 percent, more than provided in 1991. The transit system would require that 914 vehicles operate during peak periods and would provide about 141,900 revenue vehicle-miles and 9,200 revenue vehicle-hours of service per weekday. The base year 1991 system required that 530 buses operate during peak periods and provided about 63,300 revenue vehicle-miles and 5,220 revenue vehicle-hours of service per weekday.

Rapid Transit Service: Under Alternative Plan 1, a rapid transit system would be developed to connect the major outlying activity centers with the Milwaukee CBD. The existing network of bus rapid transit routes would be expanded to provide service in all major travel corridors emanating from the Milwaukee CBD: to the south to the Cities of Racine and Kenosha, to the southwest to the Village of East Troy, to the west to the Cities of Waukesha and Oconomowoc, to the northwest to the City of West Bend, and to the north to the Cities of Cedarburg and Port Washington and the Village of Grafton.

Within each of these major travel corridors, bus rapid transit service would be provided over operationally controlled freeway lanes in mixed traffic, or over exclusive busways. In each rapid transit corridor, a busway capable of accommodating buses and high-occupancy vehicles (HOVs) would be considered if the freeway within the corridor is determined to be operating under severe traffic congestion and if the busway is determined to have the potential to accommodate more travel than the existing freeway lanes, as described in Chapter IX of this report. The extent of potential busway facilities in the Milwaukee area is shown on Map 95.

## Map 95

### EXTENT OF POTENTIAL BUSWAY AND LIGHT-RAIL/EXPRESS BUS GUIDEWAY FACILITIES IN THE MILWAUKEE AREA




Under both Alternative Plans 1 and 3, rapid transit busway facilities and express transit light-rail facilities would be considered as an alternative to providing transit service by motor bus over arterial highway lanes. Consideration of such fixed-guideway transit service would be initiated as part of Federally required major investment studies for each of the identified corridors.

*Source: SEWRPC.*

The bus rapid transit system would consist of 35 routes totaling 1,580 round-trip route-miles. The system would serve 74 public transit stations or stops, located to the extent practicable within or near freeway interchanges to minimize travel times. Three of the 35 rapid transit routes envisioned under the plan would provide special service directly to the University of Wisconsin-Milwaukee campus. The other 32 routes would be focused on the Milwaukee CBD.

In addition, commuter railway passenger train service is recommended as a potential alternative to bus-on-freeway rapid transit service in four corridors emanating from the Milwaukee CBD: to the south to the Cities of Racine and Kenosha, to the west to the City of Oconomowoc, to the northwest to the City of West Bend, and to the north to the City of Cedarburg. Pursuant to Federal law, the ultimate decision to provide such facilities would be made following the completion of major investment studies in each corridor. The corridor studies would compare the cost-effectiveness of commuter rail to bus-on-freeway service and would also establish the financial feasibility of the commuter railway passenger train service in each identified corridor.

Alternative Plan 1 also envisions a significant improvement in existing rapid transit service levels: the planned weekday hours of operation for all routes, 6:00 a.m. to 6:00 p.m. Service would also be provided on weekday evenings until 10:00 p.m., as well as on weekends over selected routes within corridors connecting the Cities of Waukesha, Racine, and Kenosha to the Milwaukee CBD. Headways, the time interval between the departure of successive buses at transit stops or stations, during weekday peak periods would range from five to 30 minutes. At all other times, headways would range from 30 to 60 minutes. Service would be provided in both travel directions over all routes.

Express Transit: The development of a comprehensive express transit system is also proposed under Alternative Plan 1. Express transit in the form of express bus service in mixed arterial traffic and over exclusive lanes would be provided in major urbanized area travel corridors. Consideration of bus on guideway or light rail transit service would be initiated as part of major investment studies for those express transit corridors shown on Map 95.

Express transit service totaling about 490 round-trip route-miles would be provided over 15 routes within the Milwaukee, Racine, and Kenosha urbanized areas. Within Milwaukee County, the routes would be located so as to provide crosstown service, as well as service oriented to the Milwaukee CBD. Within Milwaukee County, express transit routes would be operated with headways ranging from five to 15 minutes during weekday peak periods and 15 to 30 minutes during off-peak periods. Express transit service over some routes would replace local bus service. Basic hours of operation would be similar to those proposed for rapid transit service.

Within the Racine and Kenosha urbanized areas, express service would provide a direct connection between the Cities of Racine and Kenosha. Express routes would also connect these cities with new and expanding commercial centers located along IH 94 in the western portion of each urbanized area. Express transit service in these areas would be operated at headways of 30 minutes during weekday peak periods and 60 minutes during weekday midday off-peak periods. In all areas, buses providing express transit service would, where appropriate, also provide a collection and distribution function beyond the proposed termini of the express routes.

Local Transit Service: The local transit service proposed under Alternative Plan 1 also represents a significant expansion over existing service. Within the Milwaukee, Kenosha, and Racine urbanized areas, local transit service would be extended into all contiguous areas of high- and medium-density urban development. Within the Milwaukee urbanized area, local bus service would thus be extended into northern and southern Milwaukee County, southern Ozaukee County, southeastern Washington County, and eastern Waukesha County.

Alternative Plan 1 envisions that within portions of Milwaukee County currently served by local bus service, a grid system of local bus routes would continue to be operated. Where local transit service would be extended into portions of northern and southern Milwaukee County, as well as adjacent portions of Waukesha, Washington, and Ozaukee Counties, the plan envisions that either a grid system of routes or a transit center-based route system would be developed.

Should a transit-center system be established, the centers would serve as focal points for buses serving a particular area, much like the CBDs of the Cities of Kenosha, Racine, and Waukesha serve as the focal points for the local bus routes serving these areas. The transit centers would be located at rapid transit stations, at the termini of express transit routes, or at major activity centers. These locations would allow local bus routes serving each center to provide convenient collection and distribution transit services.

While the majority of expanded local transit service would be within Milwaukee County and eastern Waukesha County, the plan envisions that a limited level of service would be extended into the Germantown area of Washington County and the Mequon, Cedarburg, and Grafton areas of Ozaukee County. Additionally, special local circulator transit services would connect various land uses within areas of high-intensity development which are envisioned to be developed along IH 94 in western Waukesha County in the future.

Within the Kenosha and Racine urbanized areas, transit service would be extended to contiguous areas which are anticipated to be fully developed in the future. These areas include future commercial, office, and industrial development around major interchanges along IH 94. The westward expansion of local transit service would be facilitated by the development of additional transit centers for the Racine and Kenosha transit systems located in the central portion of each urbanized area closer to areas of new urban development along IH 94.

The areas served by the expanded local transit services proposed under this alternative are shown on Map 92 on page 398 of Chapter IX. The proposed local transit service in the Milwaukee urbanized area would consist of approximately 1,660 round-trip route-miles. Service levels on existing local transit routes in the Milwaukee urbanized area would be substantially improved over existing 1991 levels, particularly within the portion of Milwaukee County south of Silver Spring Drive, east of 76th Street, and north of Layton Avenue. In corridors where express service is not also provided, headways on all local transit routes within this central area would be established at maximums of 10 minutes during the morning and afternoon peak periods, 20 minutes during the midday off-peak periods, and 30 minutes during all other times of operation. Outside of this area, headways on local transit routes would range from 15 to 30 minutes during weekday peak periods and from 30 to 60 minutes during all other off-peak periods of operation. The hours of operation for local transit routes serving the City of Waukesha would also be extended to include evening service.

Within the Racine and Kenosha urbanized areas, the expanded local transit systems would consist of a total of approximately 240 and 220 round-trip route-miles, respectively. Headways on local routes serving these areas would range from 15 to 30 minutes during peak periods and 30 to 60 minutes during off-peak periods. Hours of operation in the Cities of Racine and Kenosha would be extended to include evening service.

Alternative Plan 1 also proposes to maintain the existing demand responsive shared-ride taxi service within the Cities of Hartford, Port Washington, West Bend, and Whitewater. The plan proposes to provide similar local transit service in other urban areas of like size and in some lower-density portions of the Milwaukee urbanized area as demand for such service may warrant.

Transit Fares: Transit fares under this transit alternative were assumed to be consistent with fares charged by transit operators within the Region in 1991. The base adult fare, expressed in constant 1994 dollars, within Milwaukee County was assumed to be $1.00 per ride for local and express bus service and $1.25 per ride for rapid transit service. Fares for rapid transit service between Milwaukee County and surrounding counties would increase with distance traveled outside of Milwaukee County, generally ranging from about $1.75 per ride at the outer limits of the future urbanized area to about $2.50 at the extreme limits of service from the Milwaukee CBD. Local transit fares in the Cities of Racine, Kenosha, and Waukesha and their immediate environs were assumed to be consistent with 1991 fares expressed in 1994 dollars. Accordingly, such fares would range from $0.50 per ride on the Racine transit system to $0.60 per ride on the Kenosha and Waukesha transit systems.

Arterial Street and Highway System Maintenance and Improvement

Despite an extensive commitment to transportation systems management and public transit improvement, the large majority of travel in the Region in the year 2010 may be expected to occur on the arterial street and highway system. That system under Alternative Plan 1 would total 3,599 route-miles and 10,071 lane-miles of facilities (see Table 205). The arterial street and highway maintenance and improvement recommendations are graphically presented on Map 96 and summarized below.

New Arterial Facilities: The plan would provide for the construction of 112 route- and 266 lane-miles of new arterial street and highway facilities. As shown on Map 96, these include such long-planned facilities as the Lake Arterial highway south from the Hoan Bridge to E. Layton Avenue, the USH 12 bypass of Whitewater, the STH 16 Freeway bypass of Oconomowoc, the Waukesha bypass, and the STH 36 bypass of Burlington. Excluded from this alternative are previously planned new arterial facilities, including the USH 12 Freeway extension in Walworth County, the STH 83 bypass of Beaver Lake in Waukesha County, and the Lake Arterial through southern Milwaukee County and eastern Racine and Kenosha Counties. In all, the proposed new arterial highway facilities would represent about 3 percent of the total planned arterial route-miles and nearly 3 percent of the total planned arterial lane-miles.

Widening of Existing Arterial Facilities: Also under Alternative Plan 1, a total of 382 route-miles of facilities would be widened to provide an additional 1,571 arterial lane-miles. This represents about 11 percent of the total route-miles and about 16 percent of the total lane-miles. As shown on Map 96, this includes many long-planned arterial widening projects, such as the STH 36 widening in Milwaukee, Waukesha, and Racine Counties, the STH 31 widening in Kenosha and Racine Counties, the STH 57 widening in Ozaukee County, and the completion of the STH 50 widening in Kenosha and Walworth Counties.

Preserving Arterial Streets and Highways: With respect to the remaining 3,105 route-miles and 8,234 lane-miles of facilities envisioned under Alternative Plan 1, representing about 86 percent of the total route-miles and 82 percent of the total lane-miles, this alternative plan calls only for resurfacing or, as may be necessary because of pavement deterioration, reconstruction to provide the same capacity. These facilities are also shown on Map 96. Important among such preservation actions would be the resurfacing and bridge replacement work needed to maintain the Milwaukee-area freeway system.

Assignment of Travel to
Highway and Transit Networks

An analysis of the performance of Alterative Plan 1 under probable future land use and travel conditions was undertaken with the aid of the traffic simulation models described in Chapter VII of this report. Through application of these models, travel demand for the design year 2010 was developed based upon the land use pattern proposed under the adopted regional land use plan and assigned to the arterial street and highway and transit networks.

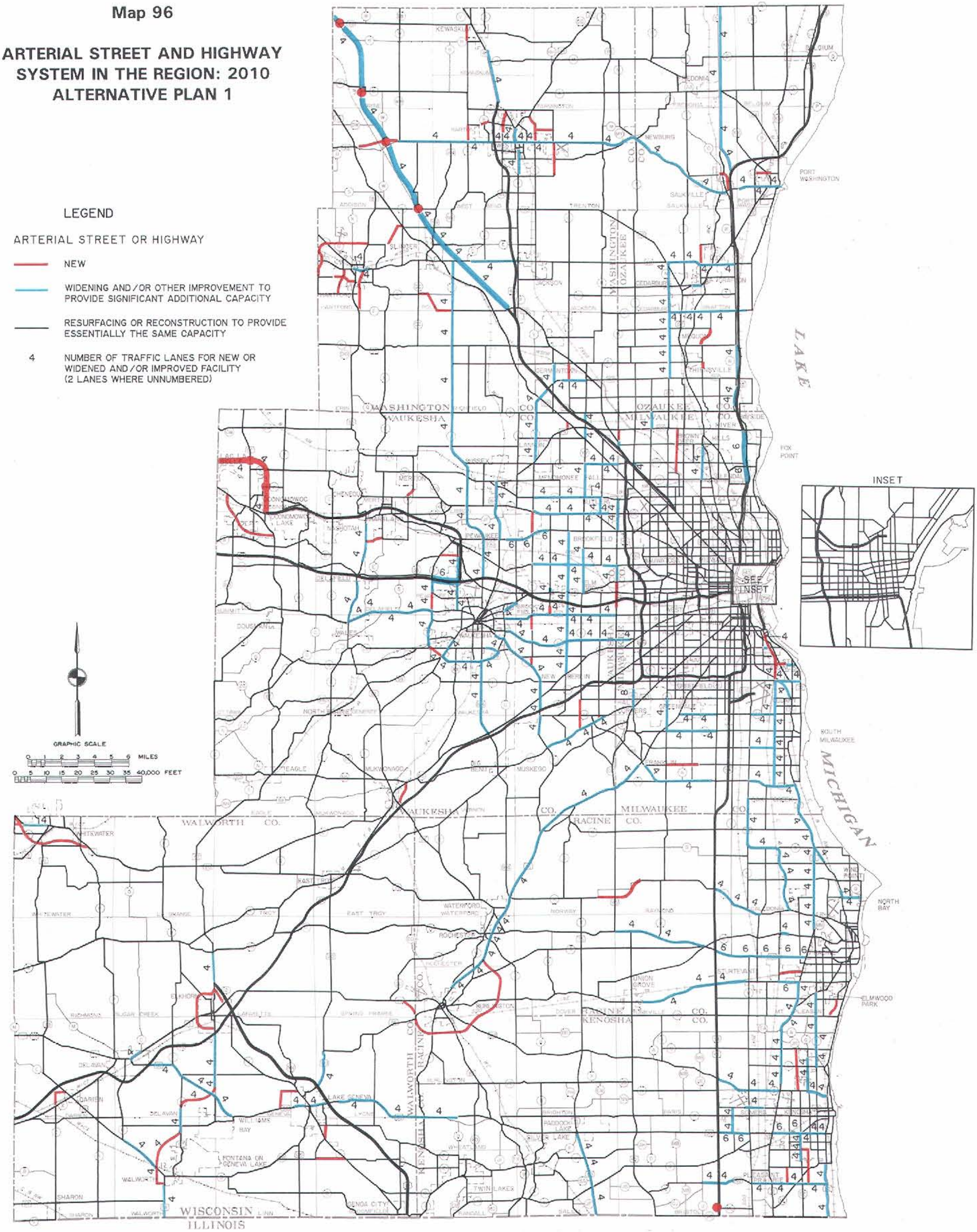
Vehicle Availability: Given transportation system development in accordance with Alternative Plan 1 and land use development in accordance with the adopted regional land use plan, it may be expected that the number of automobiles and light trucks available for personal use within the Region may increase from about 1.13 million in 1991 to about 1.29 million in 2010, an increase of about 14 percent (see Table 206). This increase compares with an approximate 6 percent increase in resident population, an 8 percent increase in the number of households, and 11 percent increase in the number of jobs in the Region between 1991 and 2010. The number of persons per vehicle may be expected to continue to decline by 8 percent, from 1.60 in 1991 to 1.48 in 2010. The number of vehicles per household may be expected in increase by 5 percent, from 1.58 in 1991 to 1.66 in 2010.

Person Trip Generation: Given transportation system development in accordance with Alternative Plan 1 and land use development in accordance with the adopted regional land use plan, internal person trips may be expected to increase from nearly 5.54 million trips per day in 1991 to about 6.06 million trips by 2010, or by 9 percent. The average number of trips per capita may then be expected to increase from about 3.1 in 1991 to about 3.2 in 2010. The average number of internal person trips per household may be expected to remain at about 7.8. Future internal person trip production within the Region by trip purpose under this alternative plan is indicated in Table 207 and compared to existing trip production.

Mode of Travel: A comparison of the distribution of internal trips in the Region by mode of travel under the adopted regional land use plan and Alternative Plan 1 is set forth in Table 208. Average weekday transit trip production within

**Map 96**

**ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 ALTERNATIVE PLAN 1**




The arterial street and highway system under Alternative Plan 1 would total 3,599 route-miles and 10,071 lane-miles of facilities. The plan would provide for the construction of 112 route-miles and 266 lane-miles to widen 382 route-miles, providing an additional 1,571 lane-miles, and also for the preservation of 3,105 route-miles and 8,234 lane-miles of arterial street and highway facilities. Important among the preservation activities would be the resurfacing and interchange and bridge replacement work needed to maintain the Milwaukee area freeway system.

*Source: SEWRPC.*

Table 205

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY COUNTY
1991 AND 2010 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLAN 1

| Arterial Facility Type | Arterial Streets and Highways | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1991 | | Planned Increment | | Total 2010 | |
| | Miles | Percent of Total | Miles | Percent Change | Miles | Percent of Total |
| Kenosha County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | - - | - - | - - | - - | - - | - - |
| Six-Lane | 12.0 | 3.8 | - - | - - | 12.0 | 3.4 |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 12.0 | 3.8 | - - | - - | 12.0 | 3.4 |
| Standard Arterial | | | | | | |
| Two-Lane | 256.1 | 80.6 | -9.6 | -3.7 | 246.5 | 69.2 |
| Four-Lane | 49.6 | 15.6 | 43.2 | 87.1 | 92.8 | 26.0 |
| Six-Lane | - - | - - | 4.9 | - - | 4.9 | 1.4 |
| Subtotal | 305.7 | 96.2 | 38.5 | 12.6 | 344.2 | 96.6 |
| County Subtotal | 317.7 | 100.0 | 38.5 | 12.1 | 356.2 | 100.0 |
| Milwaukee County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | 13.9 | 1.8 | -3.0 | -21.6 | 10.9 | 1.4 |
| Six-Lane | 53.9 | 6.9 | 3.0 | 5.6 | 56.9 | 7.1 |
| Eight-Lane | 1.4 | 0.2 | 0.0 | 0.0 | 1.4 | 0.2 |
| Subtotal | 69.2 | 8.9 | 0.0 | 0.0 | 69.2 | 8.7 |
| Standard Arterial | | | | | | |
| Two-Lane | 379.0 | 48.9 | -63.2 | -16.7 | 315.8 | 39.7 |
| Four-Lane | 288.9 | 37.3 | 52.6 | -18.2 | 341.5 | 43.0 |
| Six-Lane | 38.3 | 4.9 | 28.7 | 74.9 | 67.0 | 8.4 |
| Eight-Lane | - - | - - | 1.4 | - - | 1.4 | 0.2 |
| Subtotal | 706.2 | 91.1 | 19.5 | 2.8 | 725.7 | 91.3 |
| County Subtotal | 775.4 | 100.0 | 19.5 | 2.5 | 794.9 | 100.0 |
| Ozaukee County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | 27.4 | 9.5 | 0.0 | 0.0 | 27.4 | 8.8 |
| Six-Lane | - - | - - | - - | - - | - - | - - |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 27.4 | 9.5 | 0.0 | 0.0 | 27.4 | 8.8 |
| Standard Arterial | | | | | | |
| Two-Lane | 241.3 | 83.6 | -11.4 | -4.7 | 229.9 | 74.0 |
| Four-Lane | 19.8 | 6.9 | 33.4 | 168.7 | 53.2 | 17.1 |
| Six-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 261.1 | 90.5 | 22.0 | 8.4 | 283.1 | 91.2 |
| County Subtotal | 288.5 | 100.0 | 22.0 | 7.6 | 310.5 | 100.0 |
| Racine County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | - - | - - | - - | - - | - - | - - |
| Six-Lane | 12.0 | 3.4 | 0.0 | 0.0 | 12.0 | 2.9 |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 12.0 | 3.4 | 0.0 | 0.0 | 12.0 | 2.9 |
| Standard Arterial | | | | | | |
| Two-Lane | 301.6 | 86.7 | 4.3 | 1.4 | 305.9 | 73.0 |
| Four-Lane | 31.1 | 9.0 | 59.9 | 192.6 | 91.0 | 21.7 |
| Six-Lane | 3.2 | 0.9 | 6.9 | 215.6 | 10.1 | 2.4 |
| Subtotal | 335.9 | 96.6 | 71.1 | 21.2 | 407.0 | 97.1 |
| County Subtotal | 347.9 | 100.0 | 71.1 | 20.4 | 419.0 | 100.0 |

**Table 205 (continued)**

| Arterial Facility Type | Arterial Streets and Highways | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1991 | | Planned Increment | | Total 2010 | |
| | Miles | Percent of Total | Miles | Percent Change | Miles | Percent of Total |
| Walworth County | | | | | | |
| Freeway | | | | | | |
| Four-Lane . . . . . . . . . . . | 50.0 | 11.7 | 0.0 | 0.0 | 50.0 | 10.6 |
| Six-Lane . . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Eight-Lane . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 50.0 | 11.7 | 0.0 | 0.0 | 50.0 | 10.6 |
| Standard Arterial | | | | | | |
| Two-Lane . . . . . . . . . . . | 370.5 | 86.3 | 5.5 | 1.5 | 376.0 | 79.4 |
| Four-Lane . . . . . . . . . . . | 8.7 | 2.0 | 38.7 | 444.8 | 47.4 | 10.0 |
| Six-Lane . . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 379.2 | 88.3 | 44.2 | 11.7 | 423.4 | 89.4 |
| County Subtotal | 429.2 | 100.0 | 44.2 | 10.3 | 473.4 | 100.0 |
| Washington County | | | | | | |
| Freeway | | | | | | |
| Four-Lane . . . . . . . . . . . | 15.1 | 3.8 | 21.1 | 139.7 | 36.2 | 7.7 |
| Six-Lane . . . . . . . . . . . . | 6.5 | 1.6 | 0.0 | 0.0 | 6.5 | 1.4 |
| Eight-Lane . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 21.6 | 5.4 | 21.1 | 97.7 | 42.7 | 9.1 |
| Standard Arterial | | | | | | |
| Two-Lane . . . . . . . . . . . | 340.0 | 85.2 | 37.6 | 11.1 | 377.6 | 80.4 |
| Four-Lane . . . . . . . . . . . | 37.6 | 9.4 | 11.9 | 31.6 | 49.5 | 10.5 |
| Six-Lane . . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 377.6 | 94.6 | 49.5 | 13.1 | 427.1 | 90.9 |
| County Subtotal | 399.2 | 100.0 | 70.6 | 17.7 | 469.8 | 100.0 |
| Waukesha County | | | | | | |
| Freeway | | | | | | |
| Four-Lane . . . . . . . . . . . | 45.6 | 6.3 | 6.3 | 13.8 | 51.9 | 6.7 |
| Six-Lane . . . . . . . . . . . . | 13.4 | 1.9 | 0.0 | 0.0 | 13.4 | 1.7 |
| Eight-Lane . . . . . . . . . . . | - - | - - | - - | - - | - - | - - |
| Subtotal | 59.0 | 8.3 | 6.3 | 10.7 | 65.3 | 8.4 |
| Standard Arterial | | | | | | |
| Two-Lane . . . . . . . . . . . | 600.2 | 83.8 | -79.0 | 13.2 | 521.2 | 67.2 |
| Four-Lane . . . . . . . . . . . | 52.2 | 7.3 | 118.4 | 226.8 | 170.6 | 22.0 |
| Six-Lane . . . . . . . . . . . . | 4.9 | 0.7 | 10.0 | 204.1 | 14.9 | 1.9 |
| Eight-Lane . . . . . . . . . . . | - - | - - | 3.1 | - - | 3.1 | 0.4 |
| Subtotal | 657.3 | 91.8 | 52.5 | 8.0 | 709.8 | 91.6 |
| County Subtotal | 716.3 | 100.0 | 58.8 | 8.2 | 775.1 | 100.0 |
| Southeastern Wisconsin Region | | | | | | |
| Freeway | | | | | | |
| Four-Lane . . . . . . . . . . . | 152.0 | 4.6 | 24.4 | 16.1 | 176.4 | 4.9 |
| Six-Lane . . . . . . . . . . . . | 97.8 | 3.0 | 3.0 | 3.1 | 100.8 | 2.8 |
| Eight-Lane . . . . . . . . . . . | 1.4 | 0.1 | 0.0 | 0.0 | 1.4 | 0.0 |
| Subtotal | 251.2 | 7.7 | 27.4 | 10.9 | 278.6 | 7.7 |
| Standard Arterial | | | | | | |
| Two-Lane . . . . . . . . . . . | 2,488.7 | 76.0 | -115.8 | -4.7 | 2,372.9 | 65.9 |
| Four-Lane . . . . . . . . . . . | 487.9 | 14.9 | 358.1 | 73.4 | 846.0 | 23.5 |
| Six-Lane . . . . . . . . . . . . | 46.4 | 1.4 | 50.5 | 108.8 | 96.9 | 2.7 |
| Eight-Lane . . . . . . . . . . . | - - | - - | 4.5 | - - | 4.5 | 0.1 |
| Subtotal | 3,023.0 | 92.3 | 297.3 | 9.8 | 3,320.3 | 92.3 |
| Region Total | 3,274.2 | 100.0 | 324.7 | 9.9 | 3,598.9 | 100.0 |

*Source: SEWRPC.*

Table 206

VEHICLE AVAILABILITY WITHIN THE REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| Characteristic | Base Year 1991 | Forecast Increment | | 2010 |
|---|---|---|---|---|
| | | Number | Percent | |
| Vehicles Available | 1,132,000 | 155,400 | 13.7 | 1,287,400 |
| Population | 1,810,400 | 100,600 | 5.6 | 1,911,000 |
| Persons per Vehicle | 1.60 | -0.12 | -7.5 | 1.48 |
| Households | 714,900 | 59,400 | 8.3 | 774,300 |
| Vehicles per Household | 1.58 | 0.08 | 5.1 | 1.66 |

*Source: SEWRPC.*

Table 207

DISTRIBUTION OF INTERNAL PERSON TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 ADOPTED LAND USE PLAN AND ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| Trip Purpose Category | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,302,700 | 23.5 | 141,900 | 10.9 | 1,444,600 | 23.9 |
| Home-Based Shopping | 798,000 | 14.4 | 75,200 | 9.4 | 873,200 | 14.4 |
| Home-Based Other | 1,687,300 | 30.5 | 114,900 | 6.8 | 1,802,200 | 29.8 |
| Nonhome-Based | 1,127,400 | 20.3 | 116,000 | 10.3 | 1,243,400 | 20.5 |
| School | 625,600 | 11.3 | 66,700 | 10.7 | 692,300 | 11.4 |
| Total | 5,541,000 | 100.0 | 514,700 | 9.3 | 6,055,700 | 100.0 |

*Source: SEWRPC.*

Table 208

DISTRIBUTION OF INTERNAL PERSON TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY MODE OF TRAVEL: 1991 AND 2010 ADOPTED LAND USE PLAN AND ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| Mode of Travel | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Automobile Driver | 4,060,900 | 73.3 | 522,700 | 12.9 | 4,583,600 | 75.7 |
| Automobile Passenger | 1,080,300 | 19.5 | -164,900 | -15.3 | 915,400 | 15.1 |
| Transit Passenger | 172,200 | 3.1 | 99,400 | 57.7 | 271,600 | 4.5 |
| School Bus Passenger | 227,600 | 4.1 | 57,500 | 25.3 | 285,100 | 4.7 |
| Total | 5,541,000 | 100.0 | 514,700 | 9.3 | 6,055,700 | 100.0 |

*Source: SEWRPC.*

Table 209

DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 ADOPTED LAND USE PLAN AND ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| Trip Purpose Category | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,149,500 | 28.3 | 163,600 | 14.2 | 1,313,100 | 28.6 |
| Home-Based Shopping | 616,600 | 15.2 | 76,500 | 12.4 | 693,100 | 15.1 |
| Home-Based Other | 1,246,900 | 30.7 | 118,800 | 9.5 | 1,365,700 | 29.8 |
| Nonhome-Based | 928,500 | 22.9 | 127,400 | 13.7 | 1,055,900 | 23.0 |
| School | 119,400 | 2.9 | 36,400 | 30.5 | 155,800 | 3.4 |
| Total | 4,060,900 | 100.0 | 522,700 | 12.9 | 4,583,600 | 100.0 |

*Source: SEWRPC.*

Table 210

DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 ADOPTED LAND USE PLAN AND ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| Trip Purpose Category | Internal Automobile Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,258,700 | 24.5 | 95,900 | 7.6 | 1,354,600 | 24.6 |
| Home-Based Shopping | 782,200 | 15.2 | 63,800 | 8.2 | 846,000 | 15.4 |
| Home-Based Other | 1,659,100 | 32.3 | 90,300 | 5.4 | 1,749,400 | 31.8 |
| Nonhome-Based | 1,115,700 | 21.7 | 99,000 | 8.9 | 1,214,700 | 22.1 |
| School | 325,500 | 6.3 | 8,800 | 2.7 | 334,300 | 6.1 |
| Total | 5,141,200 | 100.0 | 357,800 | 7.0 | 5,499,000 | 100.0 |

*Source: SEWRPC.*

the Region may be expected to increase from about 172,200 trips in 1991, to about 271,600 trips by 2010, or by about 58 percent. The proportion of total internal travel generated within the Region served by transit could be expected to increase from 3.1 percent in 1991, to about 4.5 percent by 2010.

Table 208 also shows that internal automobile driver trips may be expected to increase from nearly 4.06 million trips per day in 1991 to about 4.58 million trips by 2010, or by about 13 percent. The proportion of all trips made as an automobile driver may be expected to increase from 73.3 percent in 1991 to 75.7 percent under Alterative Plan 1. Anticipated increases in automobile driver trips by trip purpose category are identified in Table 209, while anticipated increases in internal automobile person trips are shown in Table 210.

The use of transit under this combination of plans is indicated by trip purpose category in Table 211. Significant increases in transit trip production of 105 percent and 145 percent may be anticipated to occur in home-based work and nonhome-based tripmaking categories, respectively. Home-based work transit trips may be expected to increase from about 44,000 trips per average weekday, or 26 percent of daily transit trips in 1991, to 90,000 trips per average weekday, or 33 percent of daily transit trips in 2010. Trips not involving the home as either origin or destination, or nonhome-based trips, may be

Table 211

DISTRIBUTION OF INTERNAL TRANSIT TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 ADOPTED LAND USE PLAN AND ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| Trip Purpose Category | Internal Transit Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 44,000 | 25.6 | 46,000 | 104.5 | 90,000 | 33.1 |
| Home-Based Shopping | 15,800 | 9.2 | 11,400 | 72.2 | 27,200 | 10.0 |
| Home-Based Other | 28,200 | 16.4 | 24,600 | 87.2 | 52,800 | 19.4 |
| Nonhome-Based | 11,700 | 6.8 | 17,000 | 145.3 | 28,700 | 10.6 |
| School | 72,500 | 42.0 | 400 | 0.6 | 72,900 | 26.8 |
| Total | 172,200 | 100.0 | 99,400 | 57.7 | 271,600 | 100.0 |

*Source: SEWRPC.*

expected to increase from 11,700 trips per average weekday, or about 7 percent of transit trips in 1991, to 28,700 trips per average weekday, or about 11 percent of daily transit trips in 2010. The significant increase in nonhome-based transit tripmaking may be expected to occur under Alternative Plan 1 because of the proposed reduced headways and wait time. Such improvements enhance the relative attractiveness of transit, especially within high-density areas.

The anticipated increases in internal vehicle trips by vehicle class are shown in Table 212. Total vehicle trip production on an average weekday is estimated to increase from about 4.89 million trips in 1991 to about 5.59 million trips by 2010, or by about 14 percent.

System Performance: Allocation to Alternative Plan 1 of the vehicle travel demand generated under the adopted land use plan indicates that vehicle-miles of travel on the arterial street and highway system may be expected to increase by about 5.3 million vehicle-miles, or 16 percent, from about 33.07 million per average weekday in 1991 to about 38.38 million per average weekday in 2010. About one-half of the total increase in regional vehicle-miles of travel may be expected to occur on the regional freeway system, where such travel is estimated to increase by 22 percent, from about 11.60 million vehicle-miles per average weekday in 1991 to 14.19 million vehicle-miles per average weekday in 2010. Anticipated increases in vehicle-miles of travel identified by county and facility type are set forth in Table 213.

Allocation to Alternative Plan 1 of transit demand generated under the adopted regional land use plan indicates that annual transit ridership within the Region may be expected to increase by about 60 percent from about 50.22 million revenue passengers in 1991 to about 80.12 million revenue passengers in 2010, approximating the annual ridership level of 1967. Most of this increase in transit ridership may be expected to occur within the Milwaukee urbanized area as the combined rapid, express, and local transit service area is expanded to cover nearly 100 percent of the Milwaukee urbanized area population.

As indicated in Chapter IX, under the no-build plan the number of annual revenue passengers may be expected to decrease by 2 percent to 49.0 million. The performance of the regional public transit system under Alternative Plan 1 is summarized in Table 214. Anticipated utilization of the planned transit service as measured in revenue passengers per revenue vehicle-hour may be expected to decline by about 11 percent between 1991 and 2010. In 1991, the transit system carried 33 passengers for every hour it operated. By 2010, because of proportionately larger increases in service provided than in

Table 212

DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1991 AND 2010 ADOPTED LAND USE PLAN AND ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| Vehicle Class | Total Vehicle Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Automobile | | | | | | |
| Internal . . . . . . . . . | 4,060,900 | 83.0 | 522,700 | 12.9 | 4,583,600 | 82.0 |
| External . . . . . . . . . | 229,200 | 4.7 | 77,100 | 33.6 | 306,300 | 5.5 |
| Other . . . . . . . . . . . | 39,300 | 0.8 | 26,200 | 66.7 | 65,500 | 1.2 |
| Subtotal | 4,329,400 | 88.5 | 626,000 | 14.5 | 4,955,400 | 88.6 |
| Truck | | | | | | |
| Internal . . . . . . . . . | 520,100 | 10.6 | 58,900 | 11.3 | 579,000 | 10.4 |
| External . . . . . . . . . | 44,100 | 0.9 | 14,100 | 32.0 | 58,200 | 1.0 |
| Subtotal | 564,200 | 11.5 | 73,000 | 12.9 | 637,200 | 11.4 |
| Total | 4,893,600 | 100.0 | 699,000 | 14.3 | 5,592,600 | 100.0 |

*Source: SEWRPC.*

transit ridership, the regional transit system may be expected to carry about 30 passengers every hour of its operation.

Table 215 shows the population of the combined rapid, express, and local transit service area. Up to this point in the planning report, only the population served by local public transit has been noted in the context of evaluating the performance of the existing transit system and that of alternative plans. The total service area population shown in Table 215 represents the population located within one-quarter mile of a local transit route plus the population located within one-quarter mile of an express transit route and within a three-mile radius of a rapid transit station. The population served by local demand-responsive shared-ride taxi service is not included in the total service area population figures. The total transit service area population may be expected to increase by 20 percent from 1.36 million in 1991 to 1.63 million by 2010. As is indicated in Table 215, as a result of the significant planned expansion of rapid transit, the population located outside the urbanized area served by transit may be expected to comprise almost 9 percent of the total population served, up from 3 percent in 1991. Conversely, the population located within the urbanized areas served by transit, while likely to increase by about 14 percent under Alternative Plan 1, will decrease as a proportion of total population served, from 97 percent in 1991 to about 91 percent in 2010.

System Deficiencies

As indicated in other chapters of this report, the volume-to-design-capacity (V/C) ratio exhibited by an arterial facility is a useful means of identifying and quantifying possible future imbalances between street usage and supply. The V/C ratio is defined as the relationship between the average daily weekday traffic utilizing a particular section of an arterial facility and the design capacity of that particular section. In all prior chapters of this report, V/C ratios were grouped into three categories: under design capacity (V/C ratio of 0.90 or less), at design capacity (V/C ratio of 0.91 to 1.10), and over design capacity (V/C ratio of 1.11 or more). Segments of arterial facilities operating over design capacity are said to be congested.

After considerable deliberation, the Advisory Committee determined that the minimum V/C ratio which would define a facility operating over design capacity should be lowered to 1.01.

Table 213

VEHICLE-MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| County | Arterial Vehicle-Miles of Travel on an Average Weekday (thousands) | | | | | | Average Annual Rate of Increase in Arterial Travel 1991-2010 (percent) |
|---|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total | |
| Kenosha | | | | | | | |
| Freeway | 675 | 27.0 | 287 | 42.5 | 962 | 26.8 | 1.90 |
| Standard Arterial | 1,825 | 73.0 | 803 | 44.0 | 2,628 | 73.2 | 1.90 |
| Subtotal | 2,500 | 100.0 | 1,090 | 43.6 | 3,590 | 100.0 | 1.90 |
| Milwaukee | | | | | | | |
| Freeway | 5,945 | 41.3 | -66 | -1.1 | 5,879 | 41.2 | -0.05 |
| Standard Arterial | 8,446 | 58.7 | -59 | -0.7 | 8,387 | 58.8 | -0.04 |
| Subtotal | 14,391 | 100.0 | -125 | -0.9 | 14,266 | 100.0 | -0.05 |
| Ozaukee | | | | | | | |
| Freeway | 762 | 39.2 | 45 | 5.9 | 807 | 39.9 | 0.30 |
| Standard Arterial | 1,180 | 60.8 | 35 | 3.0 | 1,215 | 60.1 | 0.20 |
| Subtotal | 1,942 | 100.0 | 80 | 4.1 | 2,022 | 100.0 | 0.20 |
| Racine | | | | | | | |
| Freeway | 708 | 23.9 | 202 | 28.5 | 910 | 26.2 | 1.30 |
| Standard Arterial | 2,258 | 76.1 | 307 | 13.6 | 2,565 | 73.8 | 0.70 |
| Subtotal | 2,966 | 100.0 | 509 | 17.2 | 3,475 | 100.0 | 0.80 |
| Walworth | | | | | | | |
| Freeway | 540 | 28.2 | 302 | 55.9 | 842 | 35.2 | 2.40 |
| Standard Arterial | 1,373 | 71.8 | 180 | 13.1 | 1,553 | 64.8 | 0.60 |
| Subtotal | 1,913 | 100.0 | 482 | 25.2 | 2,395 | 100.0 | 1.20 |
| Washington | | | | | | | |
| Freeway | 546 | 23.0 | 1,150 | 210.6 | 1,696 | 51.7 | 6.10 |
| Standard Arterial | 1,833 | 77.0 | -251 | -13.7 | 1,582 | 48.3 | -0.70 |
| Subtotal | 2,379 | 100.0 | 899 | 37.8 | 3,278 | 100.0 | 1.70 |
| Waukesha | | | | | | | |
| Freeway | 2,421 | 34.7 | 669 | 27.6 | 3,090 | 33.0 | 1.30 |
| Standard Arterial | 4,560 | 65.3 | 1,705 | 37.4 | 6,265 | 67.0 | 1.70 |
| Subtotal | 6,981 | 100.0 | 2,374 | 34.0 | 9,355 | 100.0 | 1.60 |
| Southeastern Wisconsin Region | | | | | | | |
| Freeway | 11,597 | 35.1 | 2,588 | 22.3 | 14,185 | 37.0 | 1.10 |
| Standard Arterial | 21,475 | 64.9 | 2,721 | 12.7 | 24,196 | 63.0 | 0.60 |
| Total | 33,072 | 100.0 | 5,309 | 16.1 | 38,381 | 100.0 | 0.80 |

*Source: SEWRPC.*

The Committee determined that this modification would more accurately reflect the actual traffic conditions on the arterial system. This modification resulted in the classification of more arterial mileage as congested. In the remainder of the planning report, the volume-to-design-capacity ratios are grouped into the following three categories: under design capacity (V/C ratio of 0.90 or less), at design capacity (V/C ratio of 0.91 to 1.0), and over design capacity (V/C ratio of 1.01 or more).

The arterial mileage which operated under, at, and over design capacity in 1991 is shown on

Table 214

**TRANSIT SYSTEM PERFORMANCE IN THE SOUTHEASTERN WISCONSIN REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1**

| Transit System Characteristics | Base Year 1991 | 2010 | Forecast Increment Number | Forecast Increment Percent Change |
|---|---|---|---|---|
| Service Provided, Average Weekday | | | | |
| Revenue Vehicle-Miles | | | | |
| Rapid | 3,400 | 25,600 | 22,200 | 652.9 |
| Express | 3,300 | 29,800 | 26,500 | 803.0 |
| Local | 56,600 | 86,500 | 29,900 | 52.8 |
| Total | 63,300 | 141,900 | 78,600 | 124.2 |
| Revenue Vehicle-Hours | | | | |
| Rapid | 170 | 1,100 | 930 | 547.1 |
| Express | 170 | 1,500 | 1,330 | 782.4 |
| Local | 4,880 | 6,600 | 1,720 | 35.2 |
| Total | 5,220 | 9,200 | 3,980 | 76.2 |
| Seat-Miles | 2,975,000 | 6,507,600 | 3,532,600 | 118.7 |
| Service Utilization | | | | |
| Ridership | | | | |
| Average Weekday Revenue Passengers | 172,200 | 271,600 | 99,400 | 57.7 |
| Annual Revenue Passengers | 50,222,900 | 80,122,000 | 29,899,100 | 59.5 |
| Revenue Passengers per Revenue Vehicle-Hour | 33.0 | 29.5 | -3.5 | -10.5 |
| Average Weekday Passenger-Miles | 609,100 | 1,375,900 | 766,800 | 125.9 |

*Source: SEWRPC.*

Table 215

**POPULATION SERVED BY PUBLIC TRANSIT IN THE REGION 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1[a]**

| Location | 1991 Population Served | 1991 Percent of Total | 2010 Population Served | 2010 Percent of Total |
|---|---|---|---|---|
| Kenosha Urbanized Area | 87,400[b] | 6.4 | 99,300[c] | 6.1 |
| Milwaukee Urbanized Area | 1,114,500[d] | 82.0 | 1,267,600[e] | 77.6 |
| Racine Urbanized Area | 114,300[f] | 8.4 | 127,200[g] | 7.8 |
| Subtotal | 1,316,200 | 96.8 | 1,494,100 | 91.5 |
| Outside Urbanized Areas | 43,900 | 3.2 | 138,700 | 8.5 |
| Total | 1,360,100 | 100.0 | 1,632,800 | 100.0 |

[a] *Does not include that population served by demand-responsive shared-ride taxi service.*

[b] *Represents about 93 percent of the 1991 Kenosha urbanized area population.*

[c] *Represents about 93 percent of the 2010 Kenosha urbanized area population.*

[d] *Represents about 91 percent of the 1991 Milwaukee urbanized area population.*

[e] *Represents about 99 percent of the 2010 Milwaukee urbanized area population.*

[f] *Represents about 94 percent of the 1991 Racine urbanized area population.*

[g] *Represents about 96 percent of the 2010 Racine urbanized area population.*

*Source: SEWRPC.*

Table 216

TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1991

| County | Under Design Capacity[a] | | At Design Capacity[b] | | Over Design Capacity | | | | | | Total Mileage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Moderate[c] | | Severe[d] | | Extreme[e] | | |
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | |
| Kenosha . . . . . . . | 286.0 | 90.0 | 8.1 | 2.5 | 8.5 | 2.7 | 10.4 | 3.3 | 4.7 | 1.5 | 317.7 |
| Milwaukee . . . . . | 543.2 | 70.1 | 67.6 | 8.7 | 42.7 | 5.5 | 101.4 | 13.1 | 20.5 | 2.6 | 775.4 |
| Ozaukee . . . . . . . | 254.2 | 88.1 | 10.5 | 3.6 | 10.5 | 3.6 | 7.0 | 2.4 | 6.3 | 2.3 | 288.5 |
| Racine . . . . . . . . | 288.7 | 83.0 | 16.9 | 4.9 | 8.0 | 2.3 | 28.3 | 8.1 | 6.0 | 1.7 | 347.9 |
| Walworth . . . . . . | 411.1 | 95.8 | 8.4 | 2.0 | 6.6 | 1.5 | 3.1 | 0.7 | - - | - - | 429.2 |
| Washington . . . . . | 356.5 | 89.3 | 20.2 | 5.1 | 3.0 | 0.7 | 12.5 | 3.1 | 7.0 | 1.8 | 399.2 |
| Waukesha . . . . . . | 591.3 | 82.5 | 25.9 | 3.6 | 27.1 | 3.8 | 54.5 | 7.6 | 17.5 | 2.5 | 716.3 |
| Total | 2,731.0 | 83.4 | 157.6 | 4.8 | 106.4 | 3.2 | 217.2 | 6.6 | 62.0 | 2.0 | 3,274.2 |

[a] *Volume-to-design-capacity ratio: 0.00-0.90*

[b] *Volume-to-design-capacity ratio: 0.91-1.00*

[c] *Volume-to-design-capacity ratio: 1.01-1.10*

[d] *Volume-to-design-capacity ratio: 1.11-1.30*

[e] *Volume-to-design-capacity ratio: over 1.30*

*Source: SEWRPC.*

Map 97 and summarized by county on Table 216. In 1991, 12 percent of 3,274-mile arterial system, or 385 miles, operated over design capacity. To better refine the identification of traffic congestion problems, the Advisory Committee grouped the mileage classified as over design capacity into three categories: moderately congested (V/C ratio of 1.01 to 1.10), severely congested (V/C ratio of 1.11 to 1.30), and extremely congested (V/C ratio of 1.31 or more). In 1991, about 106 miles, or 3 percent, of the total arterial mileage was moderately congested; 217 miles, or 7 percent, was severely congested; and 62 miles, or 2 percent, was extremely congested.

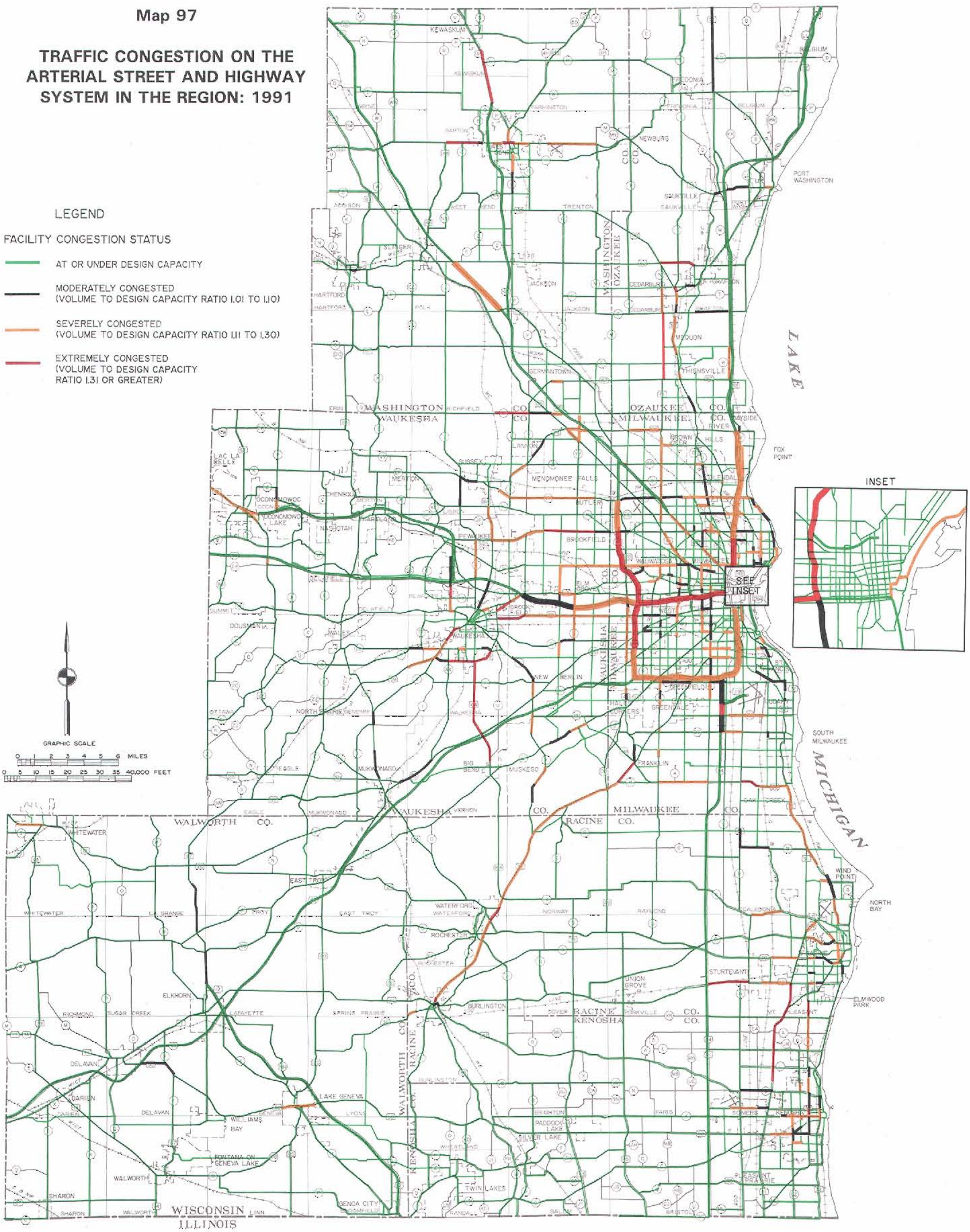
As shown on Map 98 and in Table 217 under the no-build alternative, traffic congestion may be expected to increase significantly. Indeed, by the year 2010, about 20 percent of the 3,480-mile arterial system, or 712 miles, may be expected to operate over design capacity. About 31 miles, or 1 percent of planned arterial mileage, may be expected to be moderately congested; 538 miles, or 15 percent, may be expected to be severely congested; and 143 miles, or 4 percent, may be expected to be extremely congested.

As a result of the transportation system management measures, public transit improvements, and arterial street and highway improvements recommended under Alternative Plan 1, the level of traffic congestion may be expected to be substantially below that which would occur under the no-build plan. Indeed, under Alternative Plan 1, only 4 percent of the planned 3,599-mile arterial system, or 131 miles, would operate over design capacity. As shown in Table 218, about 87 miles, or 2 percent of planned arterial mileage, would be moderately congested; 39 miles, or 1 percent, severely congested; and five miles, or less than 1 percent, extremely congested. The locations of those arterial facilities which would operate under, at, and over design capacity under Alternative Plan 1 are shown on Map 99.

As shown on Map 99, the freeway system in the Milwaukee urbanized area may be expected to carry traffic volumes exceeding its design capacity and to operate under congested conditions through the year 2010, even with the transportation development proposals advanced under this alternative plan. The east-west

## Map 97

### TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1991




In the base year 1991, 12 percent of the 3,274-mile arterial system, or 385 miles, operated over design capacity, with a volume-to-design-capacity ratio of 1.01 or greater. About 106 miles, or 3 percent of the arterial mileage, was moderately congested; 217 miles, or 7 percent of arterial mileage, was severely congested; and 62 miles, or about 2 percent of the arterial mileage, was extremely congested.

*Source: SEWRPC.*

Table 217

TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

| County | Under Design Capacity[a] | | At Design Capacity[b] | | Over Design Capacity | | | | | | Total Mileage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Moderate[c] | | Severe[d] | | Extreme[e] | | |
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | |
| Kenosha | 230.1 | 66.7 | 70.9 | 20.5 | 3.3 | 1.0 | 33.4 | 9.7 | 7.5 | 2.1 | 345.2 |
| Milwaukee | 490.0 | 62.1 | 120.6 | 15.3 | 2.0 | 0.2 | 132.4 | 16.8 | 44.3 | 5.6 | 789.3 |
| Ozaukee | 233.9 | 81.1 | 19.8 | 6.9 | 6.5 | 2.2 | 28.3 | 9.8 | - - | - - | 288.5 |
| Racine | 241.7 | 59.3 | 77.0 | 18.9 | 3.5 | 0.8 | 62.6 | 15.4 | 22.7 | 5.6 | 407.5 |
| Walworth | 387.2 | 87.0 | 31.7 | 7.1 | 8.5 | 1.9 | 9.2 | 2.1 | 8.3 | 1.9 | 444.9 |
| Washington | 337.7 | 75.3 | 54.1 | 12.1 | - - | - - | 49.8 | 11.1 | 7.1 | 1.5 | 448.7 |
| Waukesha | 369.1 | 48.8 | 103.8 | 13.7 | 7.8 | 1.1 | 222.0 | 29.4 | 52.9 | 7.0 | 755.6 |
| Total | 2,289.7 | 65.8 | 477.9 | 13.7 | 31.6 | 0.9 | 537.7 | 15.5 | 142.8 | 4.1 | 3,479.7 |

[a] *Volume-to-design-capacity ratio: 0.00-0.90*

[b] *Volume-to-design-capacity ratio: 0.91-1.00*

[c] *Volume-to-design-capacity ratio: 1.01-1.10*

[d] *Volume-to-design-capacity ratio: 1.11-1.30*

[e] *Volume-to-design-capacity ratio: over 1.30*

*Source: SEWRPC.*

freeway between the Milwaukee CBD and CTH Y in Waukesha County would experience severe traffic congestion, with volume-to-design-capacity ratios in the range of 1.11 to 1.30. The number of arterial miles in each of the counties of the Region that may be expected to operate under, at, and over design capacity in the year 2010 is shown in Table 218.

System Development Cost: The capital costs of preserving, improving, and expanding the arterial street and highway system is estimated at $4.8 billion, or $298 million annually. The estimated average annual operating and maintenance cost for the planned arterial street and highway system is $68 million. The total capital costs of preserving, improving, and expanding the regional public transit system is estimated at $1.0 billion, or $65 million annually. The average annual operating and maintenance cost for the planned transit system is estimated at $158 million. With the subtraction of anticipated average annual farebox revenues of $43 million, the net average annual transit operating and maintenance cost would be $115 million.

## ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLAN 3

Alternative Plan 3 seeks to accommodate future travel demand primarily through the improvement and expansion of the arterial street and highway and public transit systems. Alternative Plan 3 proposes the use of measures to increase the perceived cost of vehicle travel but only to the extent necessary to cover shortfalls in plan funding. The revenue necessary to cover revenue shortfalls experienced in implementing the transportation improvements envisioned under Alternative Plan 3 could be raised with an increase in the motor fuel tax. The magnitude of the motor fuel tax increase, however, would not be significant enough to impact travel demand within the Region.

Alternative Plan 3 proposes to expand the public transit system by approximately 35 percent, focusing primarily on providing weekday rapid and express transit service in selected portions of major travel corridors within the Region. The plan proposes minimal expansion of the local transit service areas and no improvement in the

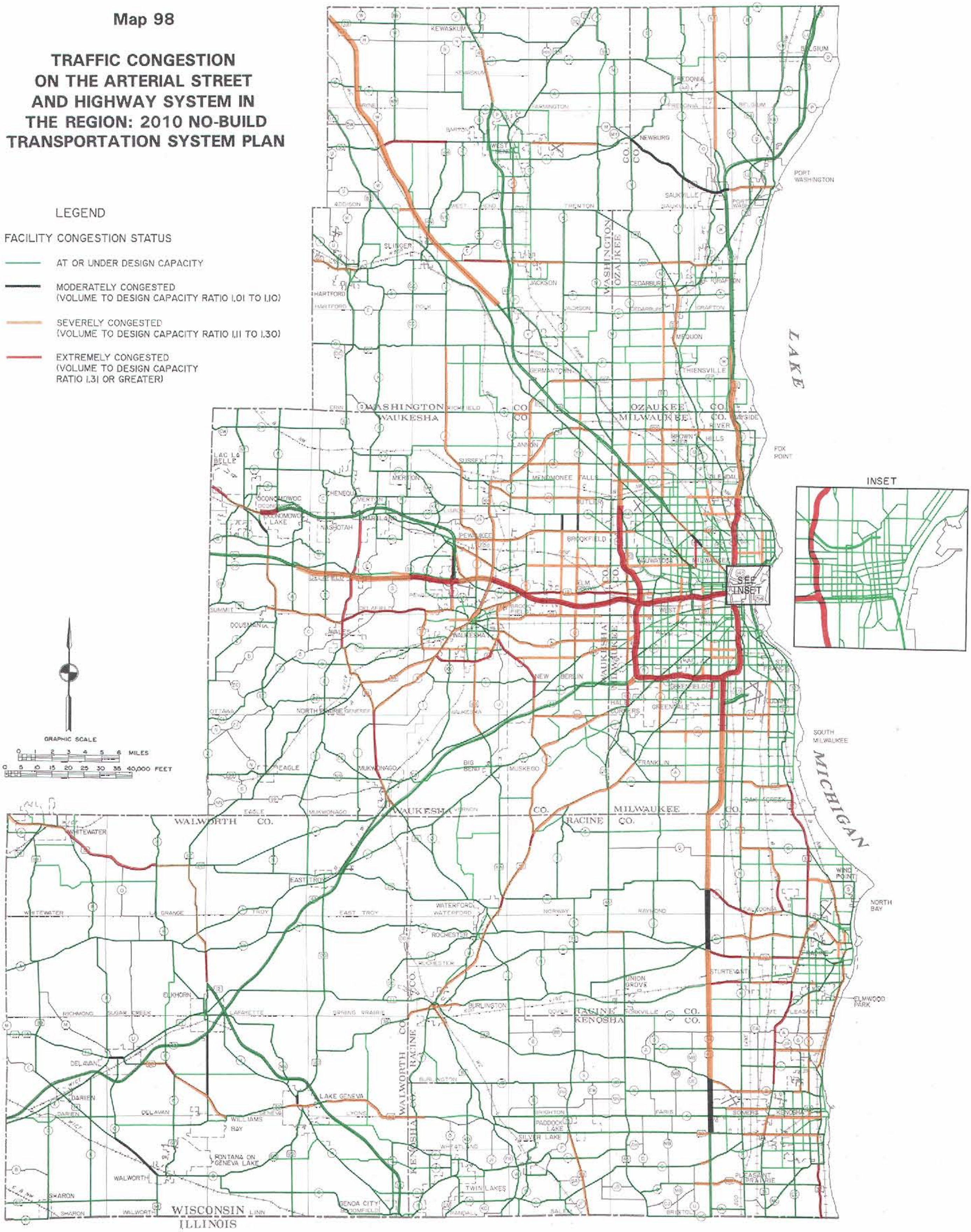
## Map 98

### TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 NO-BUILD TRANSPORTATION SYSTEM PLAN

LEGEND

FACILITY CONGESTION STATUS

- AT OR UNDER DESIGN CAPACITY
- MODERATELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.01 TO 1.10)
- SEVERELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.11 TO 1.30)
- EXTREMELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.31 OR GREATER)




Under the "no-build" alternative, traffic congestion may be expected to increase significantly between 1991 and 2010. By the year 2010, about 20 percent of the 3,480-mile arterial system, or 712 miles, may be expected to operate over design capacity. About 31 miles, or about 1 percent, of the arterial mileage, may be expected to be moderately congested; 538 miles, or about 15 percent, of the arterial mileage may be expected to be severely congested; and 143 miles, or about 4 percent, of the arterial mileage may be expected to be extremely congested.

*Source: SEWRPC.*

Table 218

TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1

| County | Under Design Capacity[a] | | At Design Capacity[b] | | Over Design Capacity | | | | | | Total Mileage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Moderate[c] | | Severe[d] | | Extreme[e] | | |
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | |
| Kenosha . . . . . . . | 327.1 | 91.8 | 25.8 | 7.2 | - - | - - | 3.3 | 0.9 | - - | - - | 356.2 |
| Milwaukee . . . . . | 673.2 | 84.7 | 57.0 | 7.2 | 37.9 | 4.8 | 21.7 | 2.7 | 5.1 | 0.6 | 794.9 |
| Ozaukee . . . . . . . | 308.3 | 99.3 | 0.8 | 0.3 | 1.4 | 0.5 | - - | - - | - - | - - | 310.5 |
| Racine . . . . . . . . | 405.0 | 96.7 | 12.7 | 3.0 | 0.6 | 0.1 | 0.7 | 0.1 | - - | - - | 419.0 |
| Walworth . . . . . . | 449.8 | 95.0 | 11.9 | 2.5 | 11.7 | 2.5 | - - | - - | - - | - - | 473.4 |
| Washington . . . . . | 469.1 | 99.9 | 0.7 | 0.1 | - - | - - | - - | - - | - - | - - | 469.8 |
| Waukesha . . . . . . | 681.5 | 87.9 | 45.3 | 5.8 | 35.3 | 4.6 | 13.0 | 1.7 | - - | - - | 775.1 |
| Total | 3,314.0 | 92.1 | 154.2 | 4.3 | 86.9 | 2.4 | 38.7 | 1.1 | 5.1 | 0.1 | 3,598.9 |

[a] *Volume-to-design-capacity ratio: 0.00-0.90*

[b] *Volume-to-design-capacity ratio: 0.91-1.00*

[c] *Volume-to-design-capacity ratio: 1.01-1.10*

[d] *Volume-to-design-capacity ratio: 1.11-1.30*

[e] *Volume-to-design-capacity ratio: over 1.30*

*Source: SEWRPC.*

frequency of local transit service. Significant improvements to the arterial street and highway system are proposed under Alternative Plan 3. Such improvements would be necessary to accommodate the significant increases in demand for automobile travel within the Region in the future.

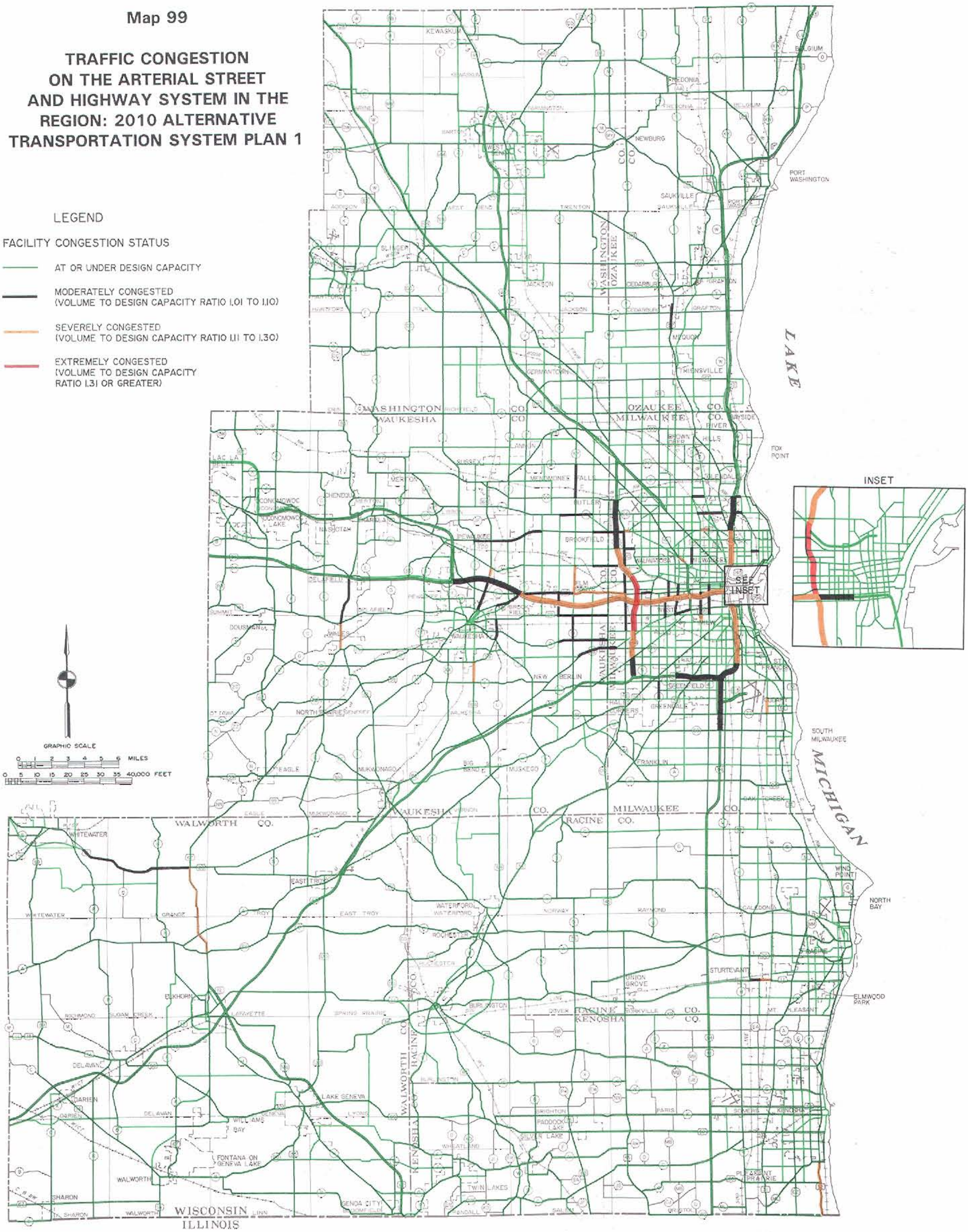
Transportation System Management
Alternative Plan 3, like Alternative Plan 1, proposes a number of transportation system management measures to ensure that full use of existing transportation facilities is achieved before commitments are made to new capital investment. Unlike Alternative Plan 1, however, this plan does not propose to reduce a moderate travel demand through the use of pricing measures. The proposed measures included in Alternative Plan 3 may be grouped in three categories: land use planning and site design, areawide promotional programs, and traffic management.

Land Use Planning and Site Design: As does Alternative Plan 1, this plan recommends that local units of government design land use plans that encourage urban development to occur in neighborhood units developed at medium or higher densities in areas adjacent to existing urban development. In such areas transit service can be provided economically and shorter automobile trips can be made. Alternative Plan 3 would not, however, provide specifically that high-density residential and commercial development occur along transit lines. Consequently, in the design of Alternative Plan 3, neither the mode choice model nor the trip generation model were adjusted.

Areawide Promotional Measures: Like Alternative Plan 1, Alternative Plan 3 recommends a coordinated areawide effort to promote travel through ridesharing, transit use, and bicycle use. This program would aggressively promote carpooling and vanpooling, telecommuting, and rescheduling of work time to reduce travel by automobile, particularly by single-occupancy automobile, and particularly in the peak periods. In addition, this program would include the promotion and support of transportation management associations at major employment

## Map 99

### TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 1




Under Alternative Plan 1, the level of traffic congestion may be expected to be substantially below that which would occur under the no-build alternative. By the year 2010, only about 4 percent of the planned 3,599-mile arterial system, or 131 miles, would operate over design capacity. About 87 miles, or 2 percent, of planned arterial mileage would be moderately congested; 39 miles, or about 1 percent, would be severely congested; and 5 miles, or less than 1 percent, would be extremely congested. While the transportation development proposals included in Alternative Plan 1 serve to reduce the amount of congested facilities throughout the entire Region, the Milwaukee area freeway system may be expected to carry traffic volumes exceeding its design capacity and to operate with congested conditions through the year 2010.



*Source: SEWRPC.*

Table 219

**TRANSIT SYSTEM OPERATING CHARACTERISTICS AND FACILITIES IN THE REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3**

| Transit Service | Base Year 1991 | | Planned Increment | | 2010 | |
|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Round-Trip Route Length (miles) | | | | | | |
| Rapid Routes | 449 | 19.6 | 761 | 169.5 | 1,210 | 37.1 |
| Express Routes | 393 | 17.1 | -3 | -0.8 | 390 | 12.0 |
| Local Routes | | | | | | |
| Kenosha Urbanized Area | 171 | 7.4 | 19 | 11.1 | 190 | 5.8 |
| Milwaukee Urbanized Area | 1,112 | 48.5 | 178 | 16.0 | 1,290 | 39.6 |
| Racine Urbanized Area | 171 | 7.4 | 9 | 5.3 | 180 | 5.5 |
| Subtotal | 1,454 | 63.3 | 206 | 14.2 | 1,660 | 50.9 |
| Total | 2,296 | 100.0 | 964 | 42.0 | 3,260 | 100.0 |
| Special Facilities (miles) | | | | | | |
| Exclusive Right-of-Way | 0 | 0.0 | 30 | - - | 30 | 93.8 |
| Exclusive Lanes on Streets | 2 | 100.0 | 0 | 0.0 | 2 | 6.2 |
| Total | 2 | 100.0 | 30 | 1,500.0 | 32 | 100.0 |
| Average Weekday Vehicle Requirements[a] | | | | | | |
| Peak Period | 530 | - - | 137 | 25.8 | 667 | - - |
| Midday Off-Peak Period | 285 | - - | 47 | 16.5 | 332 | - - |

[a]*Represents only the vehicles required for daily system operation. Excludes vehicles needed as spare or backup vehicles.*

*Source: SEWRPC.*

centers throughout the Region to provide an institutional structure for helping to achieve the goal of reducing travel by single-occupancy vehicles.

Traffic Management: Alternative Plan 3 proposes the use of traffic management measures, as does Alternative Plan 1, to accommodate vehicular travel demand not abated through travel demand management and public transit improvements. Traffic management measures are intended to make full use of existing arterial capacity prior to the construction of new capacity. The traffic management measures included in the Alternative Plan 3 include restrictions on peak-period curb-lane parking; comprehensive freeway traffic management; and the use of traffic engineering by State, county, and municipal agencies responsible for plan implementation. The plan recommends that curb parking restrictions be placed on a total of 464 arterial route-miles during peak periods.

Public Transit System Maintenance and Improvement
Alternative Plan 3 envisions that public transit service within the Milwaukee, Racine, and Kenosha urbanized areas would be improved over existing services, but to a lesser degree than proposed under Alternative Plan 1. The public transit element of Alternative Plan 3 is shown on Map 94 on page 402 in Chapter IX and summarized in Table 219.

The transit system envisioned under Alternative Plan 3 would consist of 3,260 round-trip route-miles, which would be 964 miles, or about 42 percent, greater than that provided in 1991. The system would require that 667 vehicles operate during peak periods and would provide about 96,900 revenue vehicle-miles and 6,700 revenue vehicle-hours of service per weekday. The base year 1991 system required that 530 buses operate during peak periods and provided about 63,300 revenue vehicle-miles and 5,220 revenue vehicle-hours of service per average weekday.

Rapid Transit Service: Alternative Plan 3 proposes to expand the rapid transit system to connect major activity centers with central Milwaukee County and the Milwaukee CBD. The existing network of bus rapid transit routes would be expanded but not to the same degree proposed under Alternative Plan 1. The rapid transit routes would extend from the Milwaukee CBD south to the Cities of Racine and Kenosha, southwest to the Village of Mukwonago, west to the City of Oconomowoc, northwest to the Village of Germantown, and north to the City of Cedarburg and the Village of Grafton.

Alternative Plan 3 proposes to operate bus rapid transit service either over operationally controlled freeway lanes in mixed traffic or over exclusive busways. Such busways, capable of accommodating buses and high-occupancy vehicles should be provided only in segments of corridors where the freeway in those corridors is determined to be operating under severe traffic congestion and only if the busway is found to have potential to serve more travel than freeway lanes open to all traffic. As with Alternative Plan 1, commuter railway passenger train service would be considered as an alternative option in selected travel corridors for providing rapid transit service.

The proposed rapid transit system would consist of 28 routes totaling 1,210 round-trip route miles. Three routes would provide direct service to the University of Wisconsin-Milwaukee campus. The routes would serve a total of 65 public transit stops or stations.

Alternative Plan 3 proposes to improve service, but not to the level envisioned under Alternative Plan 1. Under Alternative Plan 3, service would be provided over all rapid transit routes during the morning and afternoon peak periods of each weekday, or from 6:00 a.m. to 9:00 a.m. and from 3:00 p.m. to 6:00 p.m. Service would also be provided during weekday midday off-peak periods over routes within Milwaukee County which provide midday service. Service would be provided in both directions of travel at headways ranging from 10 to 30 minutes during weekday peak periods to between 30 to 60 minutes during weekday off-peak periods. No evening or weekend service is proposed to be provided under Alternative Plan 3.

Express Transit Service: The development of a comprehensive express transit system is also proposed under this alternative plan. Alternative Plan 3 recommends that express service be implemented as bus service operating in mixed traffic and upgraded to exclusive lanes as warranted. Consideration of bus on guideway or light rail transit service would be initiated as part of major investment studies for those express transit corridors shown on Map 95.

Express transit service would be provided over 12 transit routes within the Milwaukee, Racine, and Kenosha urbanized areas. As compared to Alternative Plan 1, the express route system of Alternative Plan 3 is less dense and extensive, totaling about 390 round trip route-miles. About 490 round trip route-miles would be provided under Alternative Plan 1. Express routes proposed to be located within Milwaukee County would provide crosstown service, as well as service oriented to the Milwaukee CBD. The planned service would be operated on weekdays between 6:00 a.m. and 6:00 p.m. Weekend express transit service would be provided over some routes. Operating headways for the express routes would range from 10 to 15 minutes during weekday peak periods and from 20 to 30 minutes during off-peak periods.

Express transit service would directly connect the Cities of Racine and Kenosha but would not connect these cities to newly developing areas west of STH 31 as is proposed under Alternative Plan 1. Service over the express routes between Racine and Kenosha would be operated at headways of 30 minutes during weekday peak periods and 60 minutes during weekday midday off-peak periods. In all areas, buses providing express transit service would, where appropriate, also provide collection and distribution service beyond the proposed termini of the express routes.

Local Transit Service: Alternative Plan 3 also proposes to expand local transit service within the Milwaukee, Racine, and Kenosha urbanized areas. Local transit services would be extended into residential areas of high- and medium-density (5.0 dwelling units per acre or greater) which are contiguous to existing transit service areas. Local bus service within the Milwaukee urbanized area would be extended principally to northern and southern Milwaukee County and around the City of Waukesha.

Alternative Plan 3 proposes to continue the grid system of local bus routes within the portion of Milwaukee County currently served by local transit. This alternative, like Alternative Plan 1, envisions the potential development of special local circulator transit services to connect various land uses within areas of high-intensity development along IH 94 in western Waukesha County. The proposed local transit services in the Milwaukee urbanized area would consist of about 1,290 round-trip route-miles. Service levels, including headways, on existing local transit routes in the Milwaukee urbanized area would be maintained at existing 1991 levels.

Proposed local transit service within the Racine and Kenosha urbanized areas would include extensions of service to areas contiguous to existing local transit service areas anticipated to develop at medium- and high-densities as previously described. Special, local circulator transit service is proposed to serve areas of commercial, office, and industrial development along IH 94. Local transit would also connect to the rapid and express transit routes proposed to be operated between the Milwaukee, Racine, and Kenosha urbanized areas.

The local transit system in the Kenosha and Racine urbanized areas would consist of 190 and 180 round-trip route-miles, respectively. Headways on local routes serving these areas would be maintained at existing levels, generally 20 to 30 minutes during peak periods and 60 minutes during off-peak periods. The areas served by the expanded local transit services proposed under this alternative are shown on Map 94 on page 402 in Chapter IX.

Transit Fares: Transit fares under Alternative Plan 3 were assumed to remain consistent with fares charged by transit operators within the Region in 1994, increasing only with general price inflation. Accordingly, the base adult fare within Milwaukee County, expressed in constant 1994 dollars, would remain at $1.25 per ride for local and express bus service and at $1.50 per ride for rapid transit bus service. Similarly, fares for rapid transit service between Milwaukee County and surrounding counties would increase with distance traveled outside of Milwaukee County and would generally range from about $2.00 per ride at the outer limits of the future urbanized area to about $3.00 at the extreme limits of service from the Milwaukee CBD. Local transit fares in the Cities of Racine, Kenosha, and Waukesha and their immediate environs are proposed to be consistent with 1994 fares, expressed in 1994 dollars. Accordingly, such fares would range from $0.60 per ride on the Racine transit system to $0.75 per ride on the Kenosha and Waukesha transit systems.

Arterial Street and Highway System Maintenance and Improvement

As under Alternative Plan 1, under Alternative Plan 3 the large majority of travel in the Region in the year 2010 will continue to have to be accommodated on the arterial street and highway system. That system, under Alternative Plan 3 would total 3,609 route-miles and 10,182 lane-miles, or 111 route-miles more than Alternative Plan 1 (see Table 220). The arterial street and highway maintenance and improvement recommendations are graphically presented on Map 100 and summarized below. Alternative Plan 3 envisions the following with respect to the arterial street and highway system:

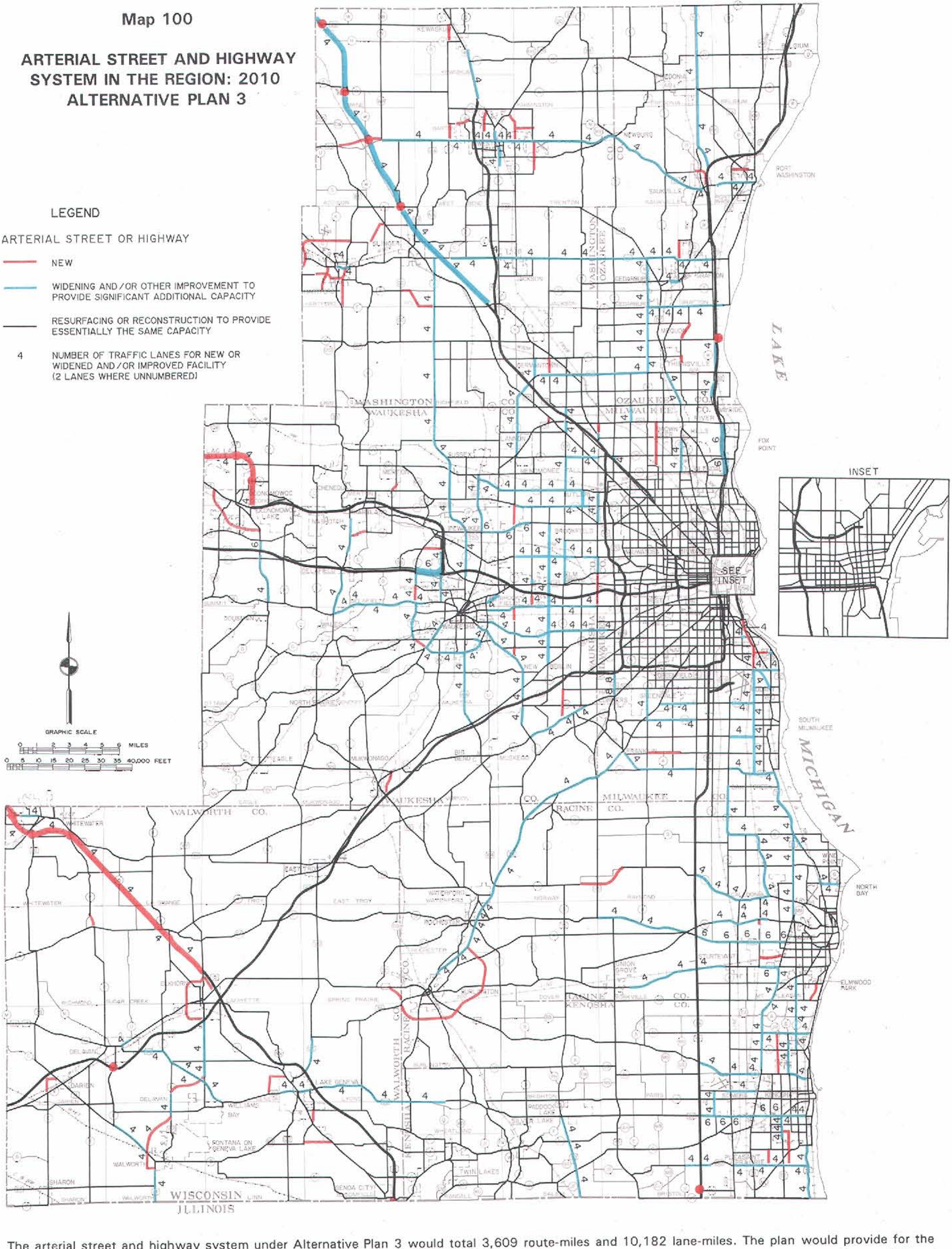
New Arterial Facilities: The plan would provide for the construction of 124 route-miles and 323 lane-miles of new arterial street and highway facilities. In addition to all of the planned new facilities included in Alternative Plan 1, Alternative Plan 3 includes one new major facility, the completion of the STH 12 freeway in Walworth County, as well as several relatively minor new facilities. The proposed new arterial highway facilities would represent 3 percent of the total planned arterial route-miles and 3 percent of the total planned arterial lane-miles.

Widening of Existing Arterial Facilities: Under Alternative Plan 3, a total of 410 route-miles of facilities would be widened to provide an additional 1,676 arterial lane-miles. This represents about 11 percent of the total route-miles and 16 percent of the total lane-miles. This may be compared with the widening of 382 route-miles to provide an additional 1,571 lane-miles envisioned under Alternative Plan 1. In addition to the arterial widening projects included under Alternative Plan 1, Alternative Plan 3 includes a series of arterial widenings in the outlying portions of the Region, including the widening of STH 60 in Ozaukee and Washington Counties and STH 67 in Waukesha County.

Preserving Arterial Streets and Highways: With respect to the remaining 3,075 route-miles and 8,183 lane-miles of facilities envisioned under Alternative Plan 3, representing about 85 per-

## Map 100

### ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 ALTERNATIVE PLAN 3




The arterial street and highway system under Alternative Plan 3 would total 3,609 route-miles and 10,182 lane-miles. The plan would provide for the construction of 124 route-miles and 323 lane-miles of new arterial street and highway facilities to widen 410 route-miles of facilities to provide an additional 1,676 arterial lane-miles and for the preservation of 3,075 route-miles and 8,183 lane-miles of arterial street and highway facilities. Like Alternative Plan 1, Alternative Plan 3 includes the pavement resurfacing and interchange and bridge replacement work on the Milwaukee area freeway system.

*Source: SEWRPC.*

Table 220

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY COUNTY: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3

| Arterial Facility Type | Arterial Streets and Highways | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1991 | | Planned Increment | | Total 2010 | |
| | Miles | Percent of Total | Miles | Percent Change | Miles | Percent of Total |
| Kenosha County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | - - | - - | - - | - - | - - | - - |
| Six-Lane | 12.0 | 3.8 | 0.0 | 0.0 | 12.0 | 3.4 |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 12.0 | 3.8 | - - | - - | 12.0 | 3.4 |
| Standard Arterial | | | | | | |
| Two-Lane | 256.1 | 80.6 | -11.8 | -4.6 | 244.3 | 68.6 |
| Four-Lane | 49.6 | 15.6 | 45.4 | 91.5 | 95.0 | 26.7 |
| Six-Lane | - - | - - | 4.9 | - - | 4.9 | 1.4 |
| Subtotal | 305.7 | 96.2 | 38.5 | 12.6 | 344.2 | 96.6 |
| County Subtotal | 317.7 | 100.0 | 38.5 | 12.1 | 356.2 | 100.0 |
| Milwaukee County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | 13.9 | 1.8 | -3.0 | -21.6 | 10.9 | 1.4 |
| Six-Lane | 53.9 | 6.9 | 3.0 | 5.6 | 56.9 | 7.1 |
| Eight-Lane | 1.4 | 0.2 | 0.0 | 0.0 | 1.4 | 0.2 |
| Subtotal | 69.2 | 8.9 | 0.0 | 0.0 | 69.2 | 8.7 |
| Standard Arterial | | | | | | |
| Two-Lane | 379.0 | 48.9 | -63.2 | -16.7 | 315.8 | 39.7 |
| Four-Lane | 288.9 | 37.3 | 52.6 | 18.2 | 341.5 | 43.0 |
| Six-Lane | 38.3 | 4.9 | 28.7 | 74.9 | 67.0 | 8.4 |
| Eight-Lane | 0.0 | 0.0 | 1.4 | - - | 1.4 | 0.2 |
| Subtotal | 706.2 | 91.1 | 19.5 | 2.8 | 725.7 | 91.3 |
| County Subtotal | 775.4 | 100.0 | 19.5 | 2.5 | 794.9 | 100.0 |
| Ozaukee County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | 27.4 | 9.5 | 0.0 | 0.0 | 27.4 | 8.8 |
| Six-Lane | - - | - - | - - | - - | - - | - - |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 27.4 | 9.5 | 0.0 | 0.0 | 27.4 | 8.8 |
| Standard Arterial | | | | | | |
| Two-Lane | 241.3 | 83.6 | -17.5 | -7.3 | 223.8 | 72.1 |
| Four-Lane | 19.8 | 6.9 | 39.5 | 199.5 | 59.3 | 19.1 |
| Six-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 261.1 | 90.5 | 22.0 | 8.4 | 283.1 | 91.2 |
| County Subtotal | 288.5 | 100.0 | 22.0 | 7.6 | 310.5 | 100.0 |
| Racine County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | - - | - - | - - | - - | - - | - - |
| Six-Lane | 12.0 | 3.4 | 0.0 | 0.0 | 12.0 | 2.9 |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 12.0 | 3.4 | 0.0 | 0.0 | 12.0 | 2.9 |
| Standard Arterial | | | | | | |
| Two-Lane | 301.6 | 86.7 | -0.2 | -0.1 | 301.4 | 71.9 |
| Four-Lane | 31.1 | 9.0 | 64.4 | 207.1 | 95.5 | 22.8 |
| Six-Lane | 3.2 | 0.9 | 6.9 | 215.6 | 10.1 | 2.4 |
| Subtotal | 335.9 | 96.6 | 71.1 | 21.2 | 407.0 | 97.1 |
| County Subtotal | 347.9 | 100.0 | 71.1 | 20.4 | 419.0 | 100.0 |

Table 220 (continued)

| Arterial Facility Type | Arterial Streets and Highways | | | | | |
|---|---|---|---|---|---|---|
| | Existing 1991 | | Planned Increment | | Total 2010 | |
| | Miles | Percent of Total | Miles | Percent Change | Miles | Percent of Total |
| Walworth County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | 50.0 | 11.6 | 16.7 | 33.4 | 66.7 | 13.8 |
| Six-Lane | - - | - - | - - | - - | - - | - - |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 50.0 | 11.6 | 16.7 | 33.4 | 66.7 | 13.8 |
| Standard Arterial | | | | | | |
| Two-Lane | 370.5 | 86.4 | 1.0 | 0.3 | 371.5 | 76.7 |
| Four-Lane | 8.7 | 2.0 | 37.2 | 427.6 | 45.9 | 9.5 |
| Six-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 379.2 | 88.4 | 38.2 | 10.1 | 417.4 | 86.2 |
| County Subtotal | 429.2 | 100.0 | 54.9 | 12.8 | 484.1 | 100.0 |
| Washington County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | 15.1 | 3.8 | 21.0 | 139.7 | 36.2 | 7.7 |
| Six-Lane | 6.5 | 1.6 | 0.0 | 0.0 | 6.5 | 1.4 |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 21.6 | 5.4 | 21.1 | 97.7 | 42.7 | 9.1 |
| Standard Arterial | | | | | | |
| Two-Lane | 340.0 | 85.2 | 32.1 | 9.4 | 372.1 | 79.2 |
| Four-Lane | 37.6 | 9.4 | 17.4 | 46.3 | 55.0 | 11.7 |
| Six-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 377.6 | 94.6 | 49.5 | 13.1 | 427.1 | 90.9 |
| County Subtotal | 399.2 | 100.0 | 70.6 | 17.7 | 469.8 | 100.0 |
| Waukesha County | | | | | | |
| Freeway | | | | | | |
| Four-Lane | 45.6 | 6.3 | 6.3 | 13.8 | 51.9 | 6.7 |
| Six-Lane | 13.4 | 1.9 | 0.0 | 0.0 | 13.4 | 1.7 |
| Eight-Lane | - - | - - | - - | - - | - - | - - |
| Subtotal | 59.0 | 8.2 | 6.3 | 10.7 | 65.3 | 8.4 |
| Standard Arterial | | | | | | |
| Two-Lane | 600.2 | 83.8 | -84.8 | -14.1 | 515.4 | 66.5 |
| Four-Lane | 52.2 | 7.3 | 123.7 | 237.0 | 175.9 | 22.7 |
| Six-Lane | 4.9 | 0.7 | 10.5 | 214.3 | 15.4 | 2.0 |
| Eight-Lane | - - | - - | 3.1 | - - | 3.1 | 0.4 |
| Subtotal | 657.3 | 91.8 | 52.5 | 8.0 | 709.8 | 91.6 |
| County Subtotal | 716.3 | 100.0 | 58.8 | 8.2 | 775.1 | 100.0 |
| Southeastern Wisconsin Region | | | | | | |
| Freeway | | | | | | |
| Four-Lane | 152.0 | 4.6 | 41.1 | 27.0 | 193.1 | 5.3 |
| Six-Lane | 97.8 | 3.0 | 3.0 | 3.1 | 100.8 | 2.8 |
| Eight-Lane | 1.4 | 0.1 | 0.0 | 0.0 | 1.4 | 0.0 |
| Subtotal | 251.2 | 7.7 | 44.1 | 17.6 | 295.3 | 8.2 |
| Standard Arterial | | | | | | |
| Two-Lane | 2,488.7 | 76.0 | -144.4 | -5.8 | 2,344.3 | 64.9 |
| Four-Lane | 487.9 | 14.9 | 380.2 | 77.9 | 868.1 | 24.0 |
| Six-Lane | 46.4 | 1.4 | 51.0 | 109.9 | 97.4 | 2.7 |
| Eight-Lane | - - | - - | 4.5 | - - | 4.5 | 0.1 |
| Subtotal | 3,023.0 | 92.3 | 291.3 | 9.6 | 3,314.3 | 91.8 |
| Region Total | 3,274.2 | 100.0 | 335.4 | 10.2 | 3,609.6 | 100.0 |

*Source: SEWRPC.*

Table 221

VEHICLE AVAILABILITY WITHIN THE REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3

| Characteristic | Base Year 1991 | Forecast Increment | | 2010 |
|---|---|---|---|---|
| | | Number | Percent | |
| Vehicles Available | 1,132,000 | 164,400 | 14.5 | 1,296,400 |
| Population | 1,810,400 | 100,600 | 5.6 | 1,911,000 |
| Persons per Vehicle | 1.60 | -0.13 | -8.1 | 1.47 |
| Households | 714,900 | 59,400 | 8.3 | 774,300 |
| Vehicles per Household | 1.58 | 0.09 | 5.7 | 1.67 |

*Source: SEWRPC.*

cent of the total route-miles and 80 percent of the total lane-miles, this alternative calls only for resurfacing or reconstruction. Like Alternative Plan 1, Alternative Plan 3 includes important preservation actions involving the resurfacing and bridge replacement work on the Milwaukee-area freeway system.

Assignment of Travel to Highway and Transit Networks

An analysis of the performance of Alterative Plan 3 under probable future land use and travel conditions was undertaken with the aid of the traffic simulation models described in Chapter VII of this report. Through application of these models, travel demand for the design year 2010 was developed for the land use pattern proposed under the adopted regional land use plan and assigned to the arterial street and highway and transit networks.

Vehicle Availability: Given transportation system development in accordance with Alternative Plan 3 and land use development in accordance with the adopted regional land use plan, it may be expected that the number of automobiles and light trucks available within the Region may increase from about 1.13 million in 1991 to about 1.30 million in 2010, an increase of about 15 percent, (see Table 221). This increase compares with an approximate 6 percent increase in resident population, 8 percent increase in the number of households, and 11 percent increase in the number of jobs over the same time period. The number of persons per automobile then may be expected to continue to decline by 8 percent between 1991 and 2010, from 1.60 to 1.47. The number of automobiles per household may be expected to increase by about 6 percent, from 1.58 in 1991 to 1.67 in 2010.

Person Trip Generation: Given transportation system development in accordance with Alternative Plan 3 and land use development in accordance with the adopted regional land use plan, internal person trips may be expected to increase from 5.54 million trips per day in 1991, to about 6.11 million trips by 2010, or by 10.2 percent. The average number of trips per capita may then be expected to increase from about 3.1 in 1991 to 3.2 in 2010. The average number of internal person trips per household may be expected to increase from 7.8 in 1991 to 7.9 in 2010. Future internal person trip production within the Region by trip purpose under this alternative plan is shown in Table 222 and compared to existing 1991 trip production.

Mode of Travel: A comparison of the distribution of internal trips in the Region by mode of travel under the adopted regional land use plan and Alternative Plan 3 is summarized in Table 223. Average weekday transit trip production within the Region may be expected to increase from about 172,200 trips in 1991, to about 186,900 trips by 2010, or by nearly 9 percent. The proportion of total internal travel generated within the Region served by transit could be expected to remain at about 3.1 percent between 1991 and 2010.

Table 223 also shows that internal automobile driver trips may be expected to increase from 4.06 million trips per average weekday in 1991, to about 4.70 million trips per average weekday by 2010, or by about 16 percent. The proportion of all trips made as an automobile driver may be expected to increase from 73.3 percent in 1991 to 76.9 percent under Alterative Plan 3. Anticipated increases in automobile driver trips by trip purpose category are identified in Table 224,

Table 222

**DISTRIBUTION OF INTERNAL PERSON TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3**

| Trip Purpose Category | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,302,700 | 23.5 | 152,100 | 11.7 | 1,454,800 | 23.8 |
| Home-Based Shopping | 798,000 | 14.4 | 85,000 | 10.7 | 883,000 | 14.5 |
| Home-Based Other | 1,687,300 | 30.5 | 136,100 | 8.1 | 1,823,400 | 29.9 |
| Nonhome-Based | 1,127,400 | 20.3 | 124,600 | 11.1 | 1,252,000 | 20.5 |
| School | 625,600 | 11.3 | 66,700 | 10.7 | 692,300 | 11.3 |
| Total | 5,541,000 | 100.0 | 564,500 | 10.2 | 6,105,500 | 100.0 |

*Source: SEWRPC.*

Table 223

**DISTRIBUTION OF INTERNAL PERSON TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY MODE OF TRAVEL: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3**

| Mode of Travel | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Automobile Driver | 4,060,900 | 73.3 | 634,700 | 15.6 | 4,695,600 | 76.9 |
| Automobile Passenger | 1,080,300 | 19.5 | -142,400 | -13.2 | 937,900 | 15.4 |
| Transit Passenger | 172,200 | 3.1 | 14,700 | 8.5 | 186,900 | 3.1 |
| School Bus Passenger | 227,600 | 4.1 | 57,500 | 25.3 | 285,100 | 4.7 |
| Total | 5,541,000 | 100.0 | 564,500 | 10.2 | 6,105,500 | 100.0 |

*Source: SEWRPC.*

Table 224

**DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3**

| Trip Purpose Category | Internal Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,149,500 | 28.3 | 205,500 | 17.9 | 1,355,000 | 28.9 |
| Home-Based Shopping | 616,600 | 15.2 | 94,800 | 15.4 | 711,400 | 15.2 |
| Home-Based Other | 1,246,900 | 30.7 | 153,500 | 12.3 | 1,400,400 | 29.8 |
| Nonhome-Based | 928,500 | 22.9 | 144,500 | 15.6 | 1,073,000 | 22.9 |
| School | 119,400 | 2.9 | 36,400 | 30.5 | 155,800 | 3.3 |
| Total | 4,060,900 | 100.0 | 634,700 | 15.6 | 4,695,600 | 100.0 |

*Source: SEWRPC.*

Table 225

DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3

| Trip Purpose Category | Internal Automobile Person Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work | 1,258,700 | 24.5 | 139,400 | 11.1 | 1,398,100 | 24.8 |
| Home-Based Shopping | 782,200 | 15.2 | 86,300 | 11.0 | 868,500 | 15.4 |
| Home-Based Other | 1,659,100 | 32.3 | 136,100 | 8.2 | 1,795,200 | 31.9 |
| Nonhome-Based | 1,115,700 | 21.7 | 119,200 | 10.7 | 1,234,900 | 21.9 |
| School | 325,500 | 6.3 | 11,300 | 3.5 | 336,800 | 6.0 |
| Total | 5,141,200 | 100.0 | 492,300 | 9.6 | 5,633,500 | 100.0 |

*Source: SEWRPC.*

while anticipated increases in internal automobile person trips within the Region are shown in Table 225.

The use of transit under this combination of plans is indicated by trip purpose category in Table 226. Home-based work transit trips may be expected to increase by nearly 29 percent, from 44,000 trips in 1991 to 56,700 trips in 2010. Nonhome-based transit trips may be expected to increase by about 46 percent from 11,700 trips in 1991 to about 17,100 trips in 2010. Home-base shopping transit trips may be expected to decrease by about 8 percent, from 15,800 trips in 1991 to 14,500 trips in 2010. School trips made by transit may also be expected to decline by 2,100 trips, or about 3 percent.

The anticipated increases in internal vehicle trips by vehicle class are shown in Table 227. Total vehicle trip production, on an average weekday, is estimated to increase from about 4.9 million trips in 1991 to about 5.7 million trips by 2010, or by about 15 percent.

System Performance: Allocation of vehicle travel demand generated under the adopted regional land use plan to Alternative Plan 3 indicates that vehicle-miles of travel on the arterial street and highway system may be expected to increase by about 9.78 million vehicle-miles or 30 percent, from about 33.07 million per average weekday in 1991 to about 42.85 million per average weekday in 2010. About 45 percent of this increase may be expected to occur on the regional freeway system, where such travel is estimated to increase from about 11.6 million vehicle-miles per average weekday in 1991 to 16 million vehicle-miles per average weekday in 2010. The anticipated increases in vehicle-miles of travel identified according to county and facility type are set forth in Table 228.

Allocation of transit demand generated under the adopted regional land use plan to Alternative Plan 3 indicates that annual transit ridership within the Region may be expected to increase by about 9 percent, from about 50.22 million revenue passengers in 1991 to about 54.58 million revenue passengers in 2010. As with Alternative Plan 1, most of this increase in transit ridership may be expected to occur within the Milwaukee urbanized area as the combined rapid, express, and local transit service area is expanded to cover some 98 percent of the Milwaukee urbanized area population.

The performance of the regional public transit system under Alternative Plan 3 is summarized in Table 229. Under Alternative Plan 3 the number of revenue vehicle-miles of service provided may be expected to increase by 53 percent from, 63,300 in 1991 to 96,900 by 2010. Over 88 percent of this increase will come about through expanded rapid and express transit service reflecting the plan's emphasis on providing fast and convenient transit service over long distances. Local transit vehicle-miles would be increased by about 7 percent, a relatively minor

Table 226

DISTRIBUTION OF INTERNAL TRANSIT TRIPS MADE BY HOUSEHOLD RESIDENTS IN THE REGION BY TRIP PURPOSE: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3

| Trip Purpose Category | Internal Transit Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Home-Based Work ......... | 44,000 | 25.6 | 12,700 | 28.9 | 56,700 | 30.3 |
| Home-Based Shopping ....... | 15,800 | 9.2 | -1,300 | -8.2 | 14,500 | 7.8 |
| Home-Based Other ......... | 28,200 | 16.4 | 0 | 0.0 | 28,200 | 15.1 |
| Nonhome-Based ........... | 11,700 | 6.8 | 5,400 | 46.2 | 17,100 | 9.1 |
| School ................. | 72,500 | 42.0 | -2,100 | -2.9 | 70,400 | 37.7 |
| Total | 172,200 | 100.0 | 14,700 | 8.5 | 186,900 | 100.0 |

*Source: SEWRPC.*

Table 227

DISTRIBUTION ON TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3

| Vehicle Class | Total Vehicle Trips Generated on an Average Weekday | | | | | |
|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total |
| Automobile | | | | | | |
| Internal ......... | 4,060,900 | 83.0 | 634,700 | 15.6 | 4,695,600 | 82.3 |
| External ......... | 229,200 | 4.7 | 77,100 | 33.6 | 306,300 | 5.4 |
| Other ........... | 39,300 | 0.8 | 26,200 | 66.7 | 65,500 | 1.1 |
| Subtotal | 4,329,400 | 88.5 | 738,000 | 17.0 | 5,067,400 | 88.8 |
| Truck | | | | | | |
| Internal ......... | 520,100 | 10.6 | 58,900 | 11.3 | 579,000 | 10.1 |
| External ......... | 44,100 | 0.9 | 14,100 | 32.0 | 58,200 | 1.0 |
| Subtotal | 564,200 | 11.5 | 73,000 | 12.9 | 637,200 | 11.2 |
| Total | 4,893,600 | 100.0 | 811,000 | 16.6 | 5,704,600 | 100.0 |

*Source: SEWRPC.*

increase compared to the 53 percent increase envisioned under Alternative Plan 1. The same emphasis on the expansion of rapid and express transit is evident with respect to revenue vehicle hours of service as shown in Table 229.

Transit service utilization may be expected to decline under Alternative Plan 3, from 33 revenue passengers per revenue vehicle-hour in 1991 to 28 by 2010. The transit system under Alternative Plan 3 would carry nearly 2 fewer passengers per vehicle hour than the system under Alternative Plan 1. The combined population served by rapid, express, and local transit is shown for 1991 and 2010 under Alternative Plan 3 in Table 230. The total service area population may be expected to increase by about 14 percent, from 1.36 million in 1991 to 1.55

Table 228

VEHICLE-MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3

| County | Arterial Vehicle-Miles of Travel on an Average Weekday (thousands) | | | | | | Average Annual Rate of Increase in Arterial Travel 1991-2010 (percent) |
|---|---|---|---|---|---|---|---|
| | Base Year 1991 | | Forecast Increment | | 2010 | | |
| | Number | Percent of Total | Number | Percent Change | Number | Percent of Total | |
| Kenosha | | | | | | | |
| Freeway | 675 | 27.0 | 319 | 47.3 | 994 | 25.9 | 2.1 |
| Standard Arterial | 1,825 | 73.0 | 1,014 | 55.6 | 2,839 | 74.1 | 2.4 |
| Subtotal | 2,500 | 100.0 | 1,333 | 53.3 | 3,833 | 100.0 | 2.3 |
| Milwaukee | | | | | | | |
| Freeway | 5,945 | 41.3 | 472 | 7.9 | 6,417 | 40.1 | 0.4 |
| Standard Arterial | 8,446 | 58.7 | 1,159 | 13.7 | 9,605 | 59.9 | 0.7 |
| Subtotal | 14,391 | 100.0 | 1,631 | 11.3 | 16,022 | 100.0 | 0.7 |
| Ozaukee | | | | | | | |
| Freeway | 762 | 39.2 | 111 | 14.6 | 873 | 39.3 | 0.7 |
| Standard Arterial | 1,180 | 60.8 | 169 | 14.3 | 1,349 | 60.7 | 0.7 |
| Subtotal | 1,942 | 100.0 | 280 | 14.4 | 2,222 | 100.0 | 0.7 |
| Racine | | | | | | | |
| Freeway | 708 | 23.9 | 330 | 46.6 | 1,038 | 26.3 | 2.0 |
| Standard Arterial | 2,258 | 76.1 | 648 | 28.7 | 2,906 | 73.7 | 1.3 |
| Subtotal | 2,966 | 100.0 | 978 | 33.0 | 3,944 | 100.0 | 1.5 |
| Walworth | | | | | | | |
| Freeway | 540 | 28.2 | 754 | 139.6 | 1,294 | 45.9 | 4.7 |
| Standard Arterial | 1,373 | 71.8 | 151 | 11.0 | 1,524 | 54.1 | 0.5 |
| Subtotal | 1,913 | 100.0 | 905 | 47.3 | 2,818 | 100.0 | 2.1 |
| Washington | | | | | | | |
| Freeway | 546 | 23.0 | 1,254 | 229.7 | 1,800 | 50.4 | 6.5 |
| Standard Arterial | 1,833 | 77.0 | -63 | -3.4 | 1,770 | 49.6 | -0.2 |
| Subtotal | 2,379 | 100.0 | 1,191 | 50.1 | 3,570 | 100.0 | 2.2 |
| Waukesha | | | | | | | |
| Freeway | 2,421 | 34.7 | 1,142 | 47.2 | 3,563 | 34.1 | 2.1 |
| Standard Arterial | 4,560 | 65.3 | 2,320 | 50.9 | 6,880 | 65.9 | 2.2 |
| Subtotal | 6,981 | 100.0 | 3,462 | 49.6 | 10,443 | 100.0 | 2.1 |
| Southeastern Wisconsin Region | | | | | | | |
| Freeway | 11,597 | 35.1 | 4,382 | 37.8 | 15,979 | 37.3 | 1.7 |
| Standard Arterial | 21,475 | 64.9 | 5,398 | 25.1 | 26,873 | 62.7 | 1.2 |
| Total | 33,072 | 100.0 | 9,780 | 29.6 | 42,852 | 100.0 | 1.4 |

*Source: SEWRPC.*

million by 2010. About 85,700 fewer people would be served by transit under this plan than under Alternative Plan 1. As shown in Table 230, the population located outside of the urbanized area which may be expected to be served by transit would increase from 43,900 to 77,100, or by 76 percent. Under this plan, 5 percent of the population served would be located outside of urbanized areas, as compared to about 9 percent under Alternative Plan 1.

System Deficiencies: Like Alternative Plan 1, Alternative Plan 3 may be expected to result in substantially less traffic congestion than the no-

Table 229

**TRANSIT SYSTEM PERFORMANCE IN THE REGION: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3**

| Transit System Characteristics | Base Year 1991 | 2010 | Forecast Increment Number | Forecast Increment Percent Change |
|---|---|---|---|---|
| Service Provided, Average Weekday | | | | |
| Revenue Vehicle-Miles | | | | |
| Rapid | 3,400 | 15,900 | 12,500 | 367.6 |
| Express | 3,300 | 20,400 | 17,100 | 518.2 |
| Local | 56,600 | 60,600 | 4,000 | 7.1 |
| Total | 63,300 | 96,900 | 33,600 | 53.1 |
| Revenue Vehicle-Hours | | | | |
| Rapid | 170 | 600 | 430 | 252.9 |
| Express | 170 | 1,000 | 830 | 488.2 |
| Local | 4,880 | 5,100 | 220 | 4.5 |
| Total | 5,220 | 6,700 | 1,480 | 28.4 |
| Seat-Miles | 2,975,000 | 4,460,900 | 1,485,900 | 49.9 |
| Service Utilization | | | | |
| Ridership | | | | |
| Average Weekday Revenue Passengers | 172,200 | 186,900 | 14,700 | 8.5 |
| Annual Revenue Passengers | 50,222,900 | 54,575,000 | 4,352,100 | 8.7 |
| Revenue Passengers per Revenue Vehicle-Hour | 33.0 | 27.9 | -5.1 | -15.4 |
| Average Weekday Passenger-Miles | 609,100 | 903,400 | 294,300 | 48.3 |

*Source: SEWRPC.*

Table 230

**POPULATION SERVED BY PUBLIC TRANSIT IN THE REGION 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3[a]**

| Location | 1991 Population Served | 1991 Percent of Total | 2010 Population Served | 2010 Percent of Total |
|---|---|---|---|---|
| Kenosha Urbanized Area | 87,400[b] | 6.4 | 90,400[c] | 5.8 |
| Milwaukee Urbanized Area | 1,114,500[d] | 82.0 | 1,252,700[e] | 81.0 |
| Racine Urbanized Area | 114,300[f] | 8.4 | 126,900[g] | 8.2 |
| Subtotal | 1,316,200 | 96.8 | 1,470,000 | 95.0 |
| Outside Urbanized Areas | 43,900 | 3.2 | 77,100 | 5.0 |
| Total | 1,360,100 | 100.0 | 1,547,100 | 100.0 |

[a]*Does not include that population served by demand-responsive shared-ride taxi service.*

[b]*Represents about 93 percent of the 1991 Kenosha urbanized area population.*

[c]*Represents about 84 percent of the 2010 Kenosha urbanized area population.*

[d]*Represents about 91 percent of the 1991 Milwaukee urbanized area population.*

[e]*Represents about 98 percent of the 2010 Milwaukee urbanized area population.*

[f]*Represents about 94 percent of the 1991 Racine urbanized area population.*

[g]*Represents about 96 percent of the 2010 Racine urbanized area population.*

*Source: SEWRPC.*

Table 231

TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3

| County | Under Design Capacity[a] | | At Design Capacity[b] | | Over Design Capacity | | | | | | Total Mileage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Moderate[c] | | Severe[d] | | Extreme[e] | | |
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | |
| Kenosha | 310.3 | 87.1 | 42.6 | 12.0 | - - | - - | 3.3 | 0.9 | - - | - - | 356.2 |
| Milwaukee | 654.5 | 82.3 | 56.1 | 7.1 | 53.3 | 6.7 | 24.2 | 3.1 | 6.8 | 0.8 | 794.9 |
| Ozaukee | 306.2 | 98.6 | 2.9 | 0.9 | - - | - - | - - | - - | - - | - - | 310.5 |
| Racine | 387.8 | 92.6 | 25.0 | 6.0 | 1.4 | 0.3 | 0.7 | 0.1 | - - | - - | 419.0 |
| Walworth | 478.0 | 98.7 | 6.1 | 1.3 | 5.5 | - - | - - | - - | - - | - - | 484.1 |
| Washington | 469.1 | 99.9 | 0.7 | 0.1 | - - | - - | - - | - - | - - | - - | 469.8 |
| Waukesha | 636.9 | 82.2 | 65.3 | 8.4 | 47.3 | 6.1 | 25.6 | 3.3 | - - | - - | 775.1 |
| Total | 3,242.8 | 89.8 | 198.7 | 5.5 | 107.5 | 3.0 | 53.8 | 1.5 | 6.8 | 0.2 | 3,609.6 |

[a] *Volume-to-design-capacity ratio: 0.00-0.90*

[b] *Volume-to-design-capacity ratio: 0.91-1.00*

[c] *Volume-to-design-capacity ratio: 1.01-1.10*

[d] *Volume-to-design-capacity ratio: 1.11-1.30*

[e] *Volume-to-design-capacity ratio: over 1.30*

*Source: SEWRPC.*

build plan. As indicated in Table 231, only 168 miles, or 5 percent of the planned arterial street and highway system mileage, may be expected to operate over design capacity by the year 2010. Under the no-build plan, 712 miles or nearly 21 percent of arterial mileage would be congested (see Map 98). Under Alternative Plan 3, about 107 miles, or 3 percent of planned arterial mileage may be expected to be moderately congested; 54 miles, or about 2 percent, severely congested; and seven miles, or less than 1 percent, extremely congested. The location of those arterial facilities which would operate under, at, and over design capacity under Alternative Plan 3 are shown on Map 101.

System Development Cost: The capital costs of preserving, improving, and expanding the arterial street and highway system is estimated at $4.8 billion, or $302 million annually. The estimated average annual operating and maintenance costs of the planned arterial street and highway system is $68 million. The total capital costs of preserving, improving, and expanding the regional public transit system is estimated at $0.9 billion, or $57 million annually. The average annual operating and maintenance costs attendant to the planned transit system is estimated at $129 million. With the subtraction of anticipated average annual farebox revenues of $36 million, the net average annual operating and maintenance costs would total $93 million.

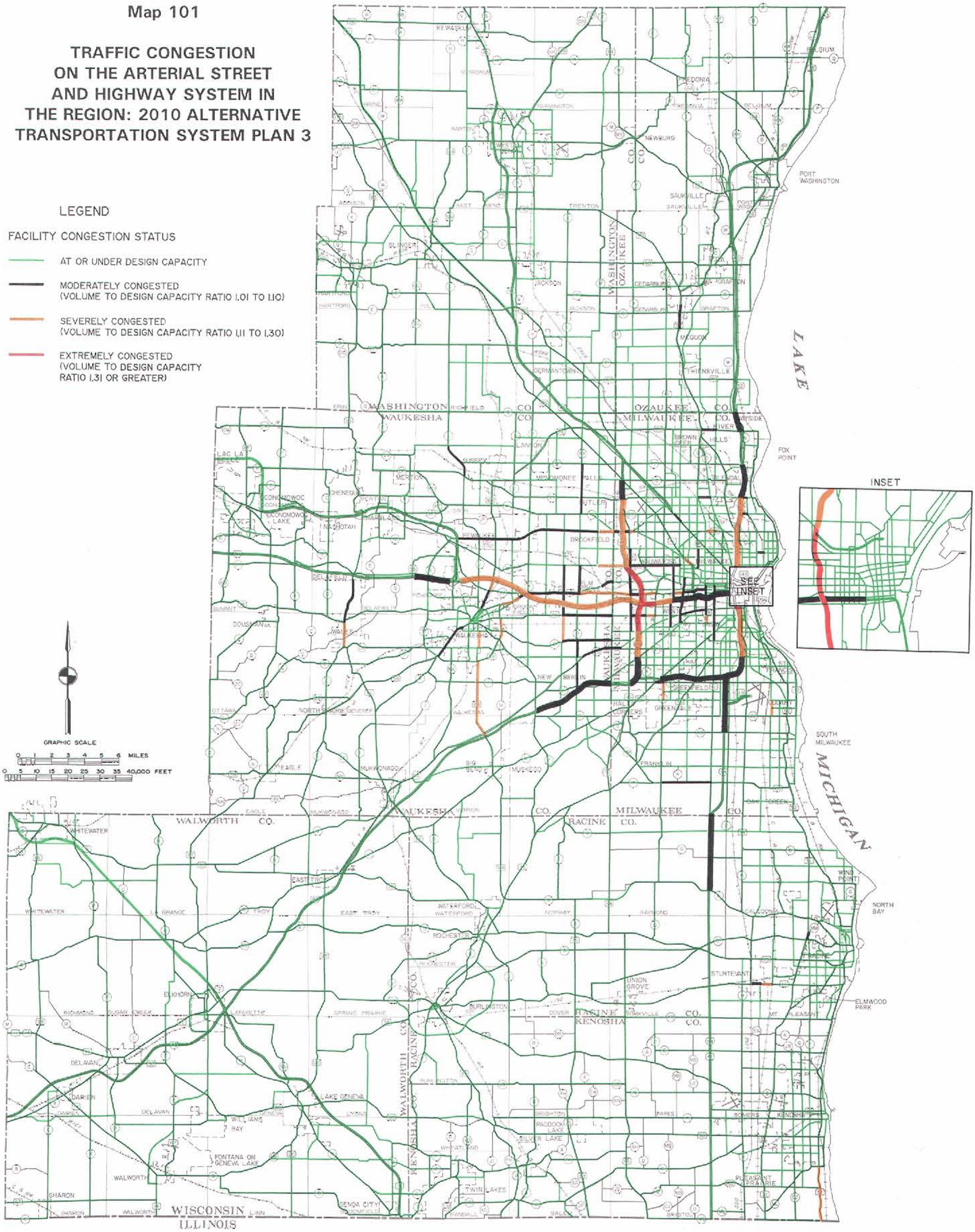
## ALTERNATIVE TRANSPORTATION SYSTEM PLAN EVALUATION, SATISFACTION OF OBJECTIVES, AND STANDARDS

The transportation system development objectives to be met by the regional transportation system plans and the plan design standards have been set forth in Chapter VIII of this report. To determine the ability of the alternative transportation plans to meet the development objectives, the plans were scaled against the standards supporting each development objective. Results of this evaluation are presented in the following section of this chapter.

Objective No. 1: Serve Regional Land Use Pattern Efficiently
The first transportation system development objective refers to the achievement of an integrated transportation system which, through its location, capacity, and design, will effectively

Map 101

# TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLAN 3




Like Alternative Plan 1, Alternative Plan 3 may be expected to result in substantially less traffic congestion on the regional arterial street and highway system than the no-build plan. Under Alternative Plan 3, about 168 miles, or 5 percent, of the planned arterial street and highway mileage may be expected to operate over design capacity by the year 2010. About 107 miles, or about 3 percent, of the planned arterial mileage may be expected to be moderately congested; 54 miles, or about 2 percent, of planned arterial mileage may be expected to be severely congested; and 7 miles, less than 1 percent, may be expected to be extremely congested.

*Source: SEWRPC.*

serve the existing regional land use pattern and promote the implementation of the regional land use plan. This objective is supported by three standards. Each standard relates to measures of accessibility provided by the transportation system.

Standard No. 1 of Objective No. 1 indicates that the regional transportation system should provide service within each urbanized area of the Region so that all residents of those areas are within 30 and 45 minutes' overall travel time of at least 40 percent of the employment opportunities in the urbanized area by arterial street and highway and transit modes, respectively; 35 minutes' overall travel time of at least three major retail and service centers (one major center within the Kenosha and Racine urbanized areas); 40 minutes' overall travel time of a major medical center and/or 30 minutes' overall travel time of a hospital or medical clinic; 40 minutes' overall travel time of a major park or outdoor recreation area; 40 minutes' overall travel time of a vocational school, college, or university; and 60 minutes' overall travel time of an airport offering scheduled air transportation service, that is, General Mitchell International Airport.

Overall travel time is defined as the total door-to-door time of travel from origin to destination. This includes the time required to arrive at the transportation vehicle, as well as the over-the-road travel time. The results of these analyses for the arterial street and highway components of the alternative transportation system plans are shown in Table 232. The results of the analyses for the transit components of the alternative plans are shown in Table 233.

When comparing the accessibility provided by transit with that provided by the automobile, it should be noted that nearly one-half of travel time entailed in making a local transit trip is "out-of-vehicle" time, that is, time spent walking to a transit stop, waiting for a transit vehicle, and walking to a trip destination. Significantly less out-of-vehicle travel time is usually involved in making the same trip by automobile. Consequently, typically more activities can be accessed within a given time by automobile than by transit.

As indicated in Table 232, the alternative plans may be expected to meet the highway component of Standard No. 1 equally well. As indicated in Table 233, however, the plans differ significantly in the degree to which they meet the standard when applied to transit. Alternative Plan 1 may be expected to provided a greater degree of accessibility to the residents of the urbanized areas who use transit than Alternative Plan 3 or the no-build plan. Indeed, 91 percent, 49 percent, and 81 percent of the Kenosha, Milwaukee and Racine urbanized area populations, respectively, may be expected to meet the employment standard by transit under Alternative Plan 1. Alternative Plan 3 provides accessibility in this regard to about 50 percent, 19 percent, and 72 percent of the Kenosha, Milwaukee, and Racine urbanized area populations, respectively. Despite the differences in the level of accessibility provided by Alternative Plans 1 and 3, the implementation of either plan would contribute significantly to improving the access of transit users to employment and major activity centers. As shown in Table 233, less than 1 percent of the Milwaukee urbanized area populations may be expected to access 40 percent of urbanized area jobs within 45 minutes under the no-build plan.

It is also apparent from the above analysis that the provision of transit services within a large urbanized area such as Milwaukee at a level sufficient to meet land use service standards such as those set forth in Objective No. 1 is difficult because of the extent to which a diffused, low-density land use pattern has already been allowed to develop. The analysis indicates that persons dependent upon transit may not have good access to as many opportunities within a given travel time as they would if an automobile were available. Map 102 shows the portions of the urbanized areas of the Region that may be expected to be within 30 minutes' travel time of 40 percent of the urbanized area jobs by arterial street and highway under the alternative plans. Map 103 shows the portions of the urbanized area that may be expected to be within 45 minutes' travel time of 40 percent of the jobs within the particular urbanized area by transit under the alternative plans. Maps showing the results of applying the remaining travel time standards of Standard No. 1 are included in Appendix C of this report.

Standard No. 2 indicates that the transportation system should be adjusted to the regional land use plan so that a higher relative accessibility is provided to areas in which higher-density development is planned than to areas in which

Table 232

URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON ARTERIAL STREETS AND HIGHWAYS: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| Urbanized Area and Activity Center | Urbanized Area Population | | Urbanized Area Population Meeting Travel Time Standard on Arterial Streets and Highways | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Proposed 2010 | | | | | |
| | | | Base Year 1991 | | No-Build Transportation System Plan | | Alternative Plan 1 | | Alternative Plan 3 | |
| | Existing 1991 | 2010 | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kenosha Urbanized Area | 94,300 | 107,300 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related[a] | - - | - - | 90,000 | 96.4 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Major Retail-Service[b] | - - | - - | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Medical Facility[c] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Major Park[d] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Higher-Education Facility[e] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Scheduled Air Transport[f] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Milwaukee Urbanized Area | 1,226,300 | 1,277,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 1,147,900 | 93.6 | 1,180,500 | 92.4 | 1,230,800 | 94.3 | 1,230,800 | 94.3 |
| Major Retail-Service | - - | - - | 1,161,400 | 94.7 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Medical Facility | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Major Park | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Higher-Education Facility | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Scheduled Air Transport | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Racine Urbanized Area | 121,800 | 132,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Major Retail-Service | - - | - - | 32,200 | 86.4 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Medical Facility | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Major Park | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Higher-Education Facility | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Scheduled Air Transport | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |

[a] *Standard: 30 minutes' overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes' overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

*Source: SEWRPC.*

low-density development is planned or areas which should be protected from development. In order to determine the relative accessibility of the various subareas of the Region under base year 1991 conditions and under proposed transportation system plans, combined accessibility indices were computed for all traffic analysis zones within the Region.

The combined accessibility index measures the ease with which any land use activity can be reached from any other land use activity within the Region. Under this approach a high index indicates a greater degree of accessibility than a low index. Land use activity is defined as the location to which a trip destination can be satisfied for home-based work, home-based shopping, home-based other, and nonhome-based trip purposes. The combined index for any zone was calculated by summing the four indices computed for the zone, one for each of four trip purposes. These combined indices were plotted as iso-accessibility lines for each of the alternative transportation system plans and for base year 1991 conditions, and are shown on Map 104.

In essence, the accessibility index measures the relative ease with which a traveller living at a given point can reach all possible trip destinations. If the travel times to destinations are

Table 233

URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON TRANSIT 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| Urbanized Area and Activity Center | Urbanized Area Population | | Urbanized Area Population Meeting Travel Time Standard on Transit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Proposed 2010 | | | | | |
| | | | Base Year 1991 | | No-Build Transportation System Plan | | Alternative Plan 1 | | Alternative Plan 3 | |
| | Base Year 1991 | 2010 | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kenosha Urbanized Area | 94,300 | 107,300 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related[a] | - - | - - | 58,000 | 61.5 | 51,400 | 47.9 | 97,700 | 91.1 | 53,200 | 49.6 |
| Major Retail-Service[b] | - - | - - | 0 | 0.0 | 1,400 | 1.3 | 9,500 | 8.9 | 1,400 | 1.3 |
| Medical Facility[c] | - - | - - | 60,600 | 64.3 | 53,300 | 49.7 | 63,600 | 59.3 | 53,300 | 49.7 |
| Major Park[d] | - - | - - | 12,600 | 13.4 | 20,700 | 19.3 | 77,500 | 72.2 | 24,700 | 23.0 |
| Higher-Education Facility[e] | - - | - - | 33,200 | 35.2 | 51,400 | 47.9 | 80,800 | 75.3 | 68,100 | 63.5 |
| Scheduled Air Transport[f] | - - | - - | 0 | 0.0 | 0 | 0.0 | 51,900 | 48.4 | 51,900 | 48.4 |
| Milwaukee Urbanized Area | 1,226,300 | 1,277,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 14,200 | 1.2 | 600 | 0.0 | 619,900 | 48.5 | 243,600 | 19.1 |
| Major Retail-Service[g] | - - | - - | 10,100 | 0.8 | 35,300 | 2.8 | 282,800 | 22.1 | 66,200 | 5.2 |
| Medical Facility | - - | - - | 700,400 | 57.1 | 648,000 | 50.7 | 870,200 | 68.1 | 728,900 | 57.1 |
| Major Park | - - | - - | 636,300 | 51.9 | 617,300 | 48.3 | 994,200 | 77.8 | 701,000 | 54.9 |
| Higher-Education Facility | - - | - - | 775,600 | 63.2 | 740,900 | 58.0 | 1,168,000 | 91.5 | 931,900 | 73.0 |
| Scheduled Air Transport | - - | - - | 338,600 | 27.6 | 316,800 | 24.8 | 776,800 | 60.8 | 569,400 | 44.6 |
| Racine Urbanized Area | 121,800 | 132,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 59,100 | 48.5 | 56,400 | 42.7 | 107,500 | 81.4 | 94,400 | 71.5 |
| Major Retail-Service | - - | - - | 21,500 | 17.7 | 18,300 | 13.9 | 52,500 | 29.7 | 32,100 | 24.3 |
| Medical Facility | - - | - - | 53,700 | 44.1 | 46,700 | 35.4 | 61,300 | 46.4 | 49,200 | 37.2 |
| Major Park | - - | - - | 24,000 | 19.7 | 37,000 | 28.0 | 59,800 | 45.3 | 38,300 | 29.0 |
| Higher-Education Facility | - - | - - | 79,600 | 65.4 | 88,400 | 66.9 | 110,700 | 83.8 | 102,700 | 77.7 |
| Scheduled Air Transport | - - | - - | 18,300 | 15.0 | 18,600 | 14.1 | 63,800 | 48.3 | 60,100 | 45.5 |

[a]*Standard: 45 minutes' overall travel time of 40 percent of urbanized area employment opportunities.*

[b]*Standard: 35 minutes' overall travel time of one major retail and service center.*

[c]*Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d]*Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e]*Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

[f]*Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

[g]*Standard: 35 minutes' overall travel time of three major retail and service centers.*

*Source: SEWRPC.*

relatively low because of the proximity of the points to the trip origin, or because of the efficiency of the transportation system, a high value for the index will be evident. A high accessibility index value will also be evident if the destination points nearest a traveller's origin have large population or employment bases. On the other hand, if a traveller is located at a point relatively distant in travel time from major trip destinations, either because of low speeds or indirect routes on the transportation system, a low accessibility index will be evident.

As indicated by the accompanying maps, rural areas of the Region generally have lower accessibility than urbanized areas. The areas of highest accessibility within the Region, both under existing and alternative plan conditions, are generally located in western and northwestern Milwaukee County and in eastern Waukesha County. From these locations of relatively high accessibility, accessibility levels decrease in irregular concentric rings to the fringe areas of the Region, with certain exceptions of high relative accessibility in the Cities of Kenosha and Racine. Changes in accessibility levels due to transportation system improvements can be identified by comparing alternative plans with the no-build plan. Such comparisons indicate that the transportation improvements will only marginally change accessibility, as measured by the index, within the Region.

Objective No. 2: Minimize Costs

The second transportation system development objective concerns the achievement of a transportation system which is economical and efficient, satisfying all other objectives at the lowest possible cost. This objective is supported by three standards relating to transportation system costs and benefits and utilization of existing transportation facilities.

Standard No. 1 indicates that the sum of the transportation system operating and capital investment costs should be minimized. Accordingly, an analysis was made to determine the estimated total costs of implementing each alternative transportation system plan. These estimates were prepared by applying unit improvement costs to the estimated mileage of proposed future facility improvements, including acquisition of rights-of-way and construction of new arterial street and highway facilities, and by preparing special estimates of the cost of constructing proposed transit facilities, including transitways and preferential transit lanes, transit parking stations, transit vehicles, and transit vehicle storage and maintenance facilities. In addition, the costs of operating and maintaining the existing and proposed arterial street and highway and transit systems were estimated. Operating cost estimates included not only the costs to public implementing agencies with responsibilities for operating and maintaining the transportation system, but also the operating cost to system users in terms of time, vehicle operating costs, and accident costs. All cost estimates have been developed in constant 1994 dollars.

Rights-of-way costs include the cost to acquire land and structures necessary to provide a right-of-way capable of accommodating the required improvement cross-section, as well as the costs associated with relocation and assistance payments. The right-of-way and relocation costs were based upon recent experience of local units of government and the Wisconsin Department of Transportation in the Southeastern Wisconsin Region.

Construction costs, which include engineering and utility relocation, also reflect capital cost experiences of highway agencies within the Region and have been developed for each street and highway cross-section type. Where applicable, the construction costs reflect current estimates developed for those projects.

In addition to the initial investment required to provide new or expanded facility capacity, resurfacing of all other streets and highways was assumed during the plan implementation period, as well as the additional resurfacing of some arterial facilities a second time to achieve adequate pavement life over the 16-year plan design period. The cost of reconstructing and resurfacing collector and minor streets during the plan implementation period was calculated on the basis of unit cost data for each cross-section type and the amount of such mileage to be preserved.

Unit operation and maintenance cost data for arterial streets were developed from information provided by the Wisconsin Department of Transportation and local units of government in the Region. Similarly, unit operation and maintenance cost data for transit facilities were developed from information provided by local transit agencies in the Region.

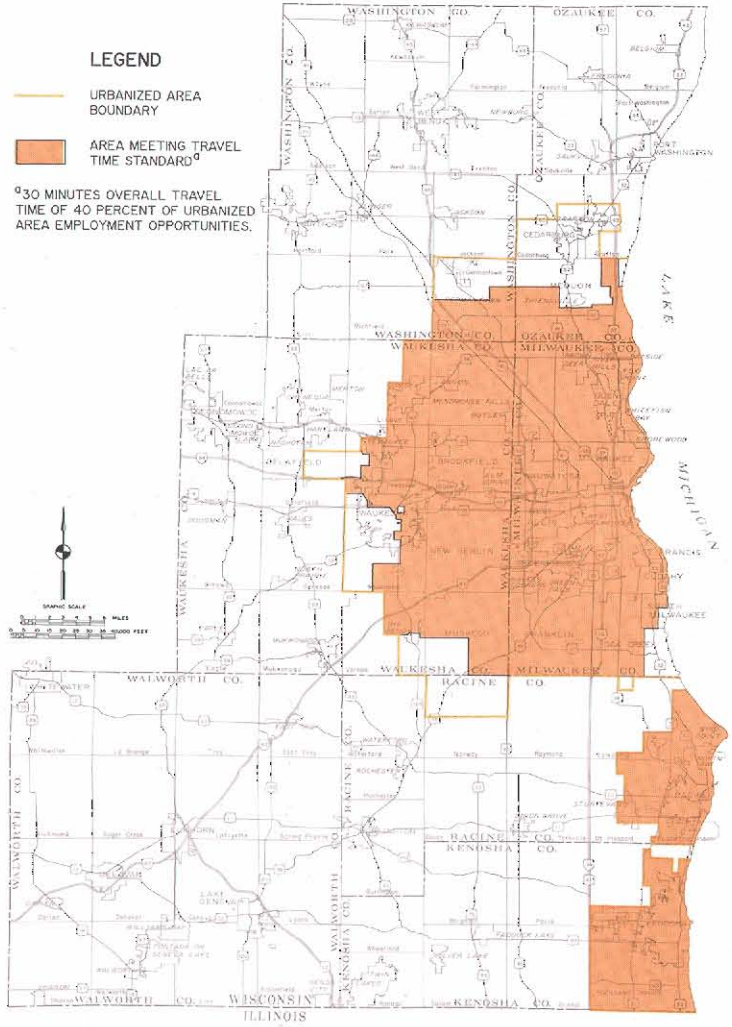
User costs include the value of time spent in travel, the cost of accidents, and, in the case of auto and truck users, the out-of-pocket costs of vehicle operation and parking, depreciation, and that portion of insurance costs not represented in accident costs. Vehicle operating costs were developed on the basis of gasoline used at $1.10 per gallon as a function of vehicle and facility types used plus a cost of $0.15 per mile. Heavy duty truck operating costs were developed to include estimates of the cost of fuel used plus $0.25 per mile, a function of vehicle speed. The value of time spent in automobile and transit travel was estimated at $3.00 per hour. The trip value attendant to light commercial truck operations was estimated at $9.00 per hour. The trip value attendant to heavy duty truck operations was estimated at $15 per hour. Although transit fares are out-of-pocket costs to the transit user, in an economic analysis such fares represent revenue to offset transit operating and maintenance costs. Transit fares are not, therefore, included as a transit user cost since such inclusion would represent a double accounting. Transit fares, therefore, were treated in the same manner as road user taxes.

The resulting total cost estimates for each of the alternative transportation system plans are set forth in summary form in Table 234. Alternative Plan 3, with an estimated total cost of $98.1 billion, would be the least expensive "build" plan. Of this total, about $5.74 billion would

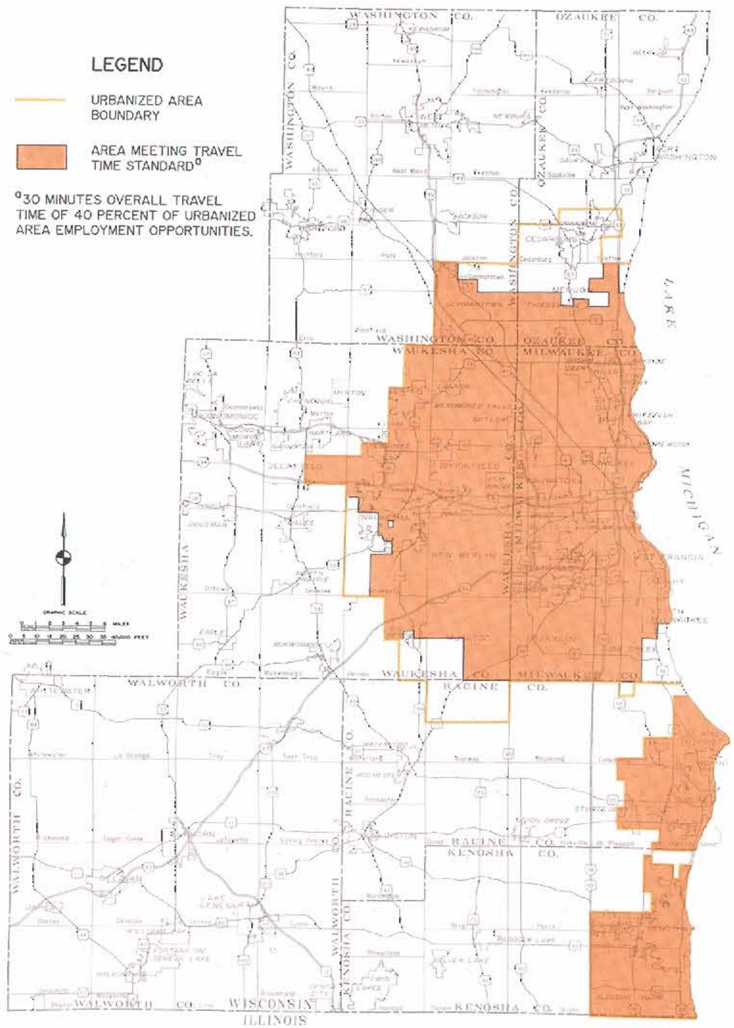
# Map 102

## AREAS MEETING THE TRAVEL TIME STANDARD FOR EMPLOYMENT BY ARTERIAL STREET AND HIGHWAY

2010 NO-BUILD ALTERNATIVE PLAN

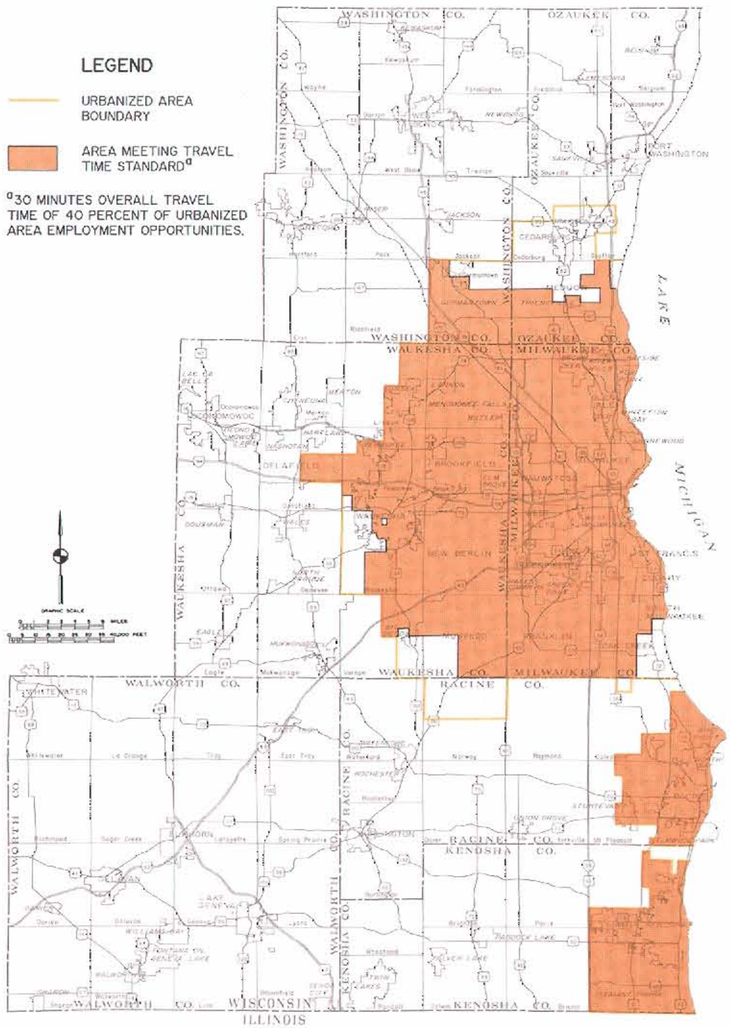



2010 ALTERNATIVE PLAN 1



## Map 102 (continued)

2010 ALTERNATIVE PLAN 3



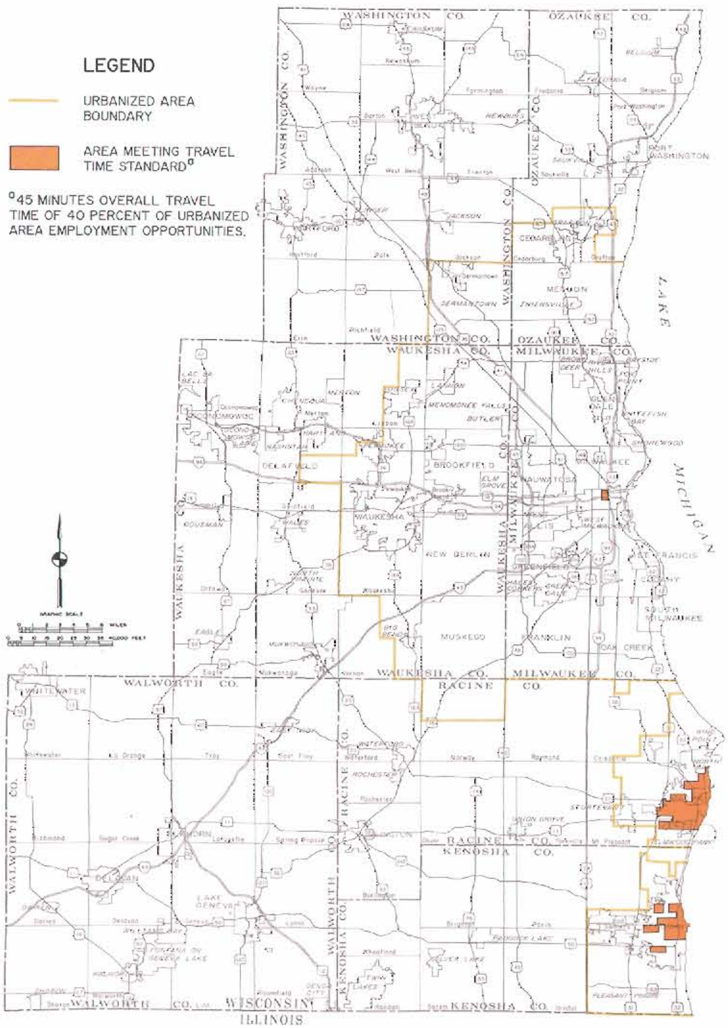

In terms of timely access to employment opportunities, adequate highway service is nearly ubiquitous throughout the urbanized areas of the Region and may be expected to remain so, as indicated on the accompanying maps. Nearly 100 percent of the population of the Kenosha and Racine urbanized areas and about 95 percent of the population the Milwaukee urbanized area may be expected to be able to access 40 percent of the urbanized area jobs within 30 minutes through arterial travel under each alternative plan.

*Source: SEWRPC.*

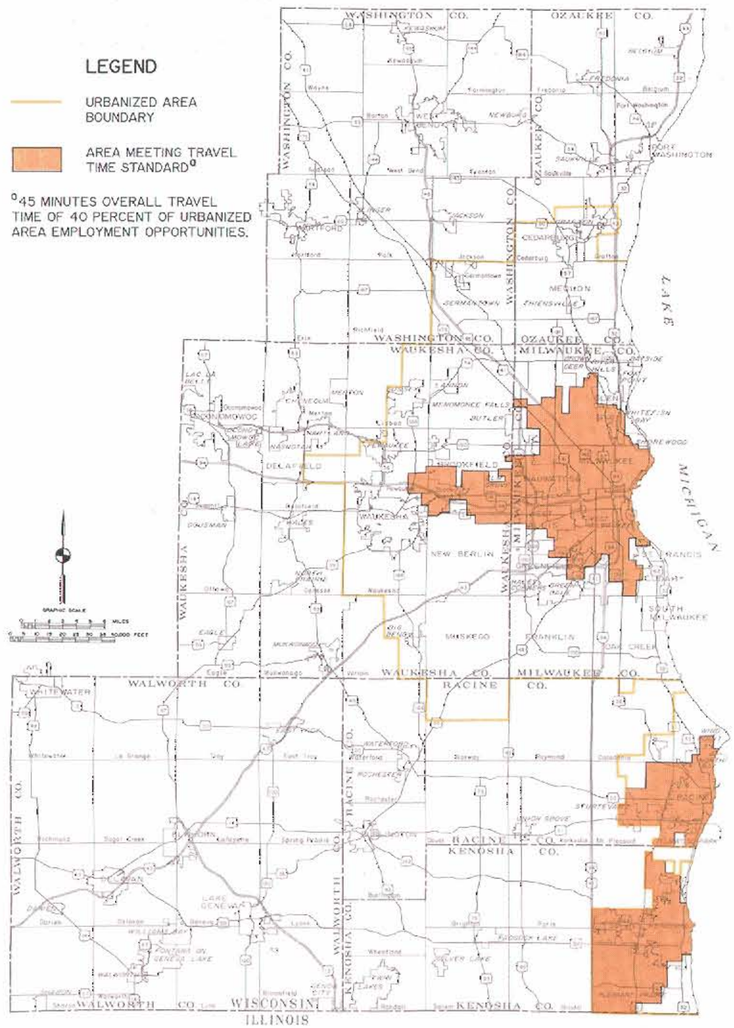
## Map 103

## AREAS MEETING THE TRAVEL TIME STANDARD FOR EMPLOYMENT BY TRANSIT

### 2010 NO-BUILD ALTERNATIVE PLAN

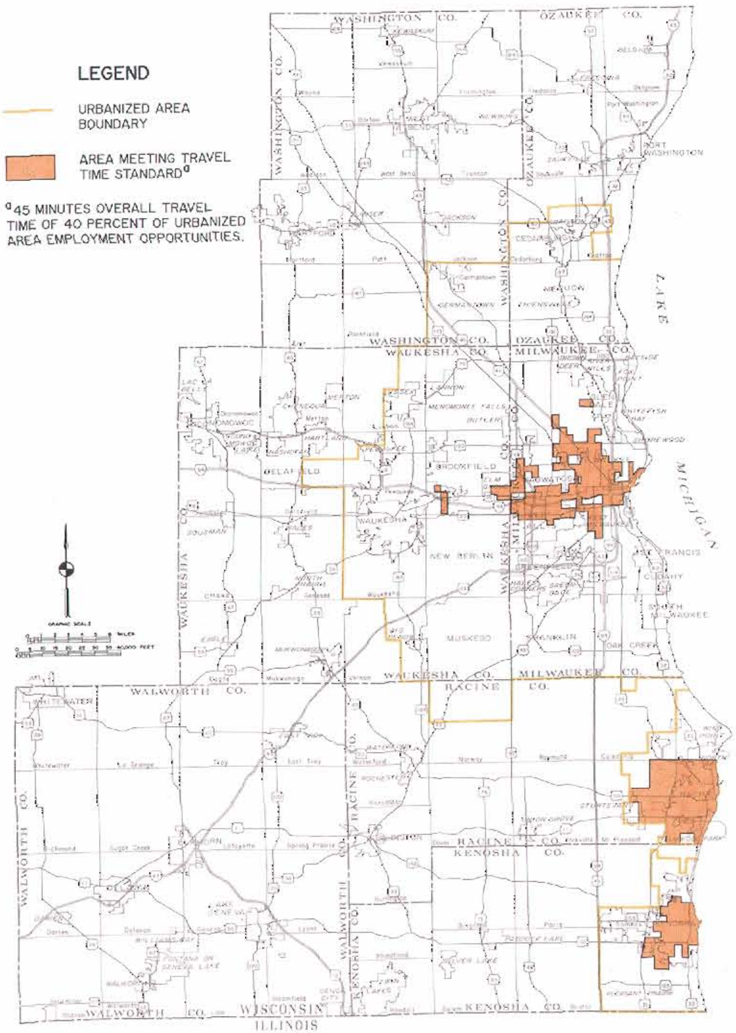



### 2010 ALTERNATIVE PLAN 1



## Map 103 (continued)

### 2010 ALTERNATIVE PLAN 3



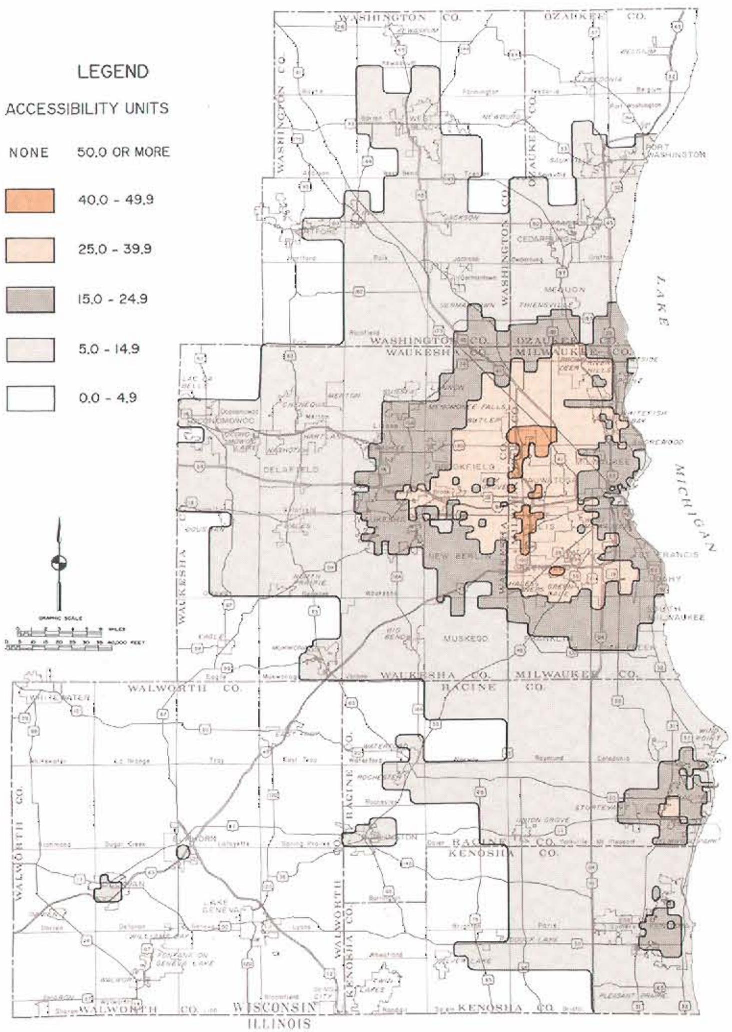

In terms of providing timely access to employment opportunities throughout the urbanized areas, public transit service is not as adequate as highway service, though some substantial improvements in such service could be expected under Alternative Plans 1 and 3, as is indicated on the accompanying maps. In the Milwaukee urbanized area in particular, the percent of urbanized area population able to access 40 percent of urbanized area employment opportunities within 45 minutes through transit travel may be expected to increase from 0 percent to nearly 49 percent under Alternative Plan 1 and to about 20 percent under Alternative Plan 3.

*Source: SEWRPC.*

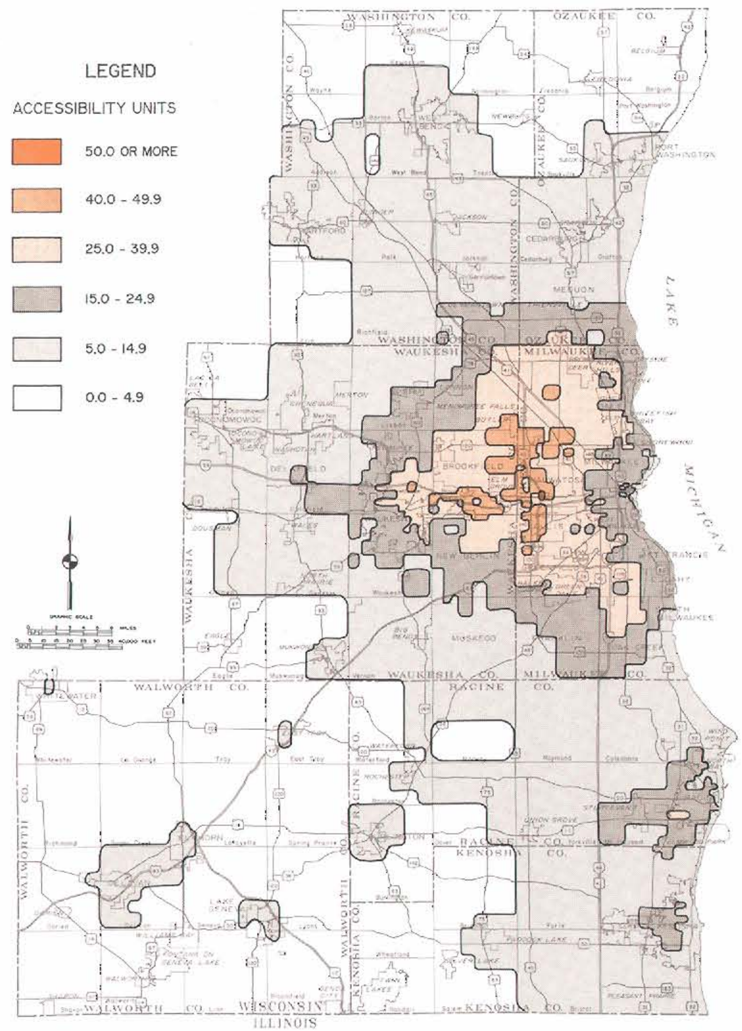
# Map 104

## ACCESSIBILITY TO LAND USE ACTIVITIES IN THE REGION

1991

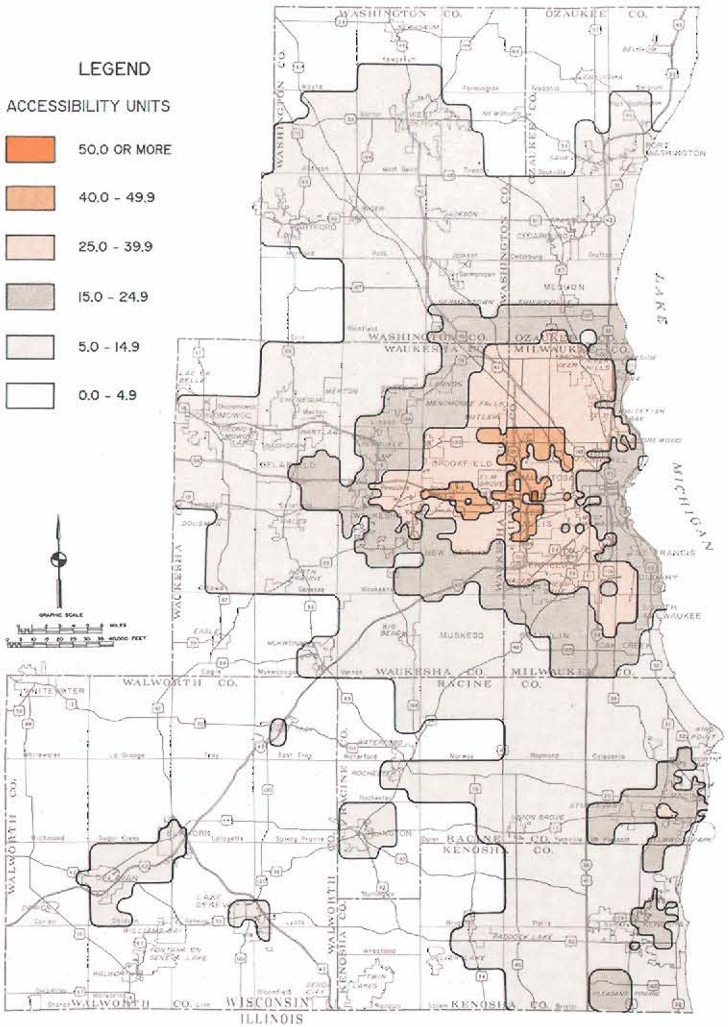



2010 NO-BUILD ALTERNATIVE PLAN

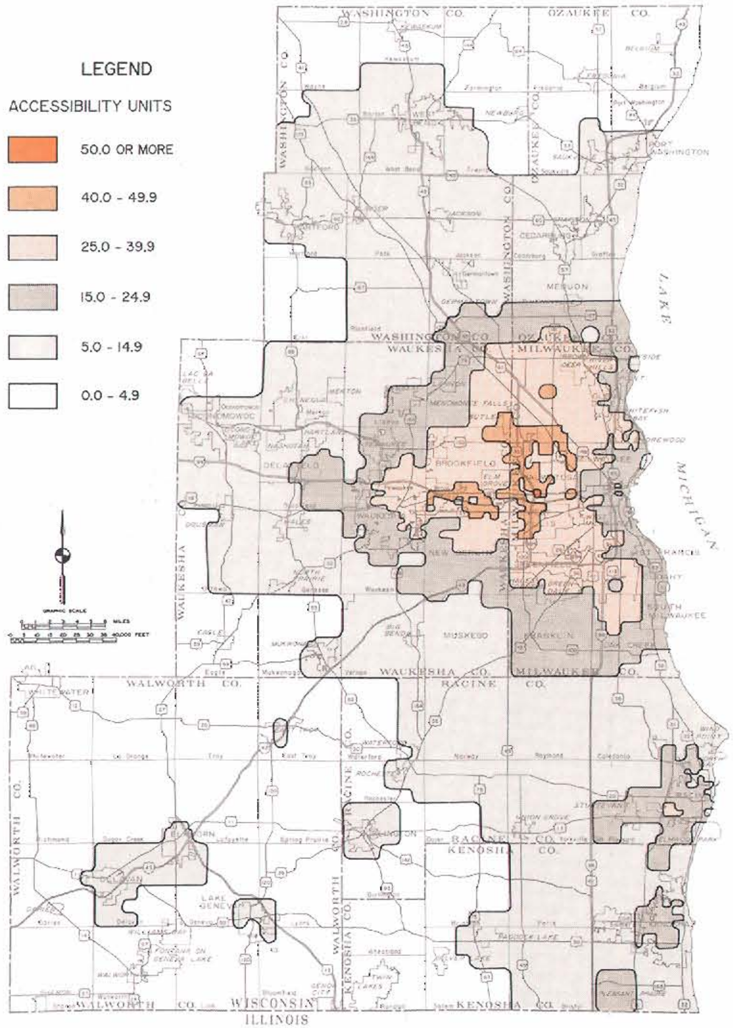


## Map 104 (continued)

2010 ALTERNATIVE PLAN 1




2010 ALTERNATIVE PLAN 3




This series of four maps graphically portrays the relative accessibility in the Region under base year 1991 land use and transportation system conditions and under year 2010 land use and proposed transportation system conditions. The areas of highest relative accessibility, both under existing conditions and under the alternative plan, are generally located in western and northwestern Milwaukee County and in eastern Waukesha County. From these locations, the accessibility levels decrease in irregular concentric circles toward the fringe areas of the Region, excepting only small areas of relatively high accessibility in the Cities of Kenosha and Racine. Accessibility levels in the Region could be expected to increase throughout the Region under all of the alternative plans. The major cause of change in accessibility levels would be population and associated land use redistribution, rather than transportation system improvements.

*Source: SEWRPC.*

Table 234

TRANSPORTATION SYSTEM CAPITAL, OPERATION AND MAINTENANCE, AND USER COSTS IN THE REGION OVER THE PERIOD 1994-2010: NO-BUILD AND ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

| Cost Element | Cumulative Cost: 1995-2010 No-Build Transportation System Plan | Alternative Plan 1 | Alternative Plan 3 |
|---|---|---|---|
| System Element Costs | | | |
| Arterial Streets and Highways | | | |
| Construction | $ 3,040,000,000 | $ 4,768,000,000 | $ 4,832,000,000 |
| Operation and Maintenance | 1,072,000,000 | 1,088,000,000 | 1,088,000,000 |
| Subtotal | $ 4,112,000,000 | $ 5,856,000,000 | $ 5,920,000,000 |
| Public Transit | | | |
| Construction | $ 304,000,000 | $ 1,040,000,000 | $ 912,000,000 |
| Operation and Maintenance | 1,344,000,000 | 1,840,000,000 | 1,488,000,000 |
| Subtotal | $ 1,648,000,000 | $ 2,880,000,000 | $ 2,400,000,000 |
| Subtotal | $ 5,760,000,000 | $ 8,736,000,000 | $ 8,320,000,000 |
| User Costs | | | |
| Street and Highway | | | |
| Time | $27,129,300,000 | $ 24,715,200,000 | $26,298,800,000 |
| Out-of-Pocket | 44,156,900,000 | 49,617,000,000 | 43,307,000,000 |
| Accident | 19,544,000,000 | 18,192,000,000 | 19,288,000,000 |
| Subtotal | $90,830,200,000 | $ 92,524,200,000 | $88,893,800,000 |
| Transit | | | |
| Time | $ 700,800,000 | $ 855,000,000 | $ 707,900,000 |
| Accident | 152,000,000 | 224,000,000 | 176,000,000 |
| Subtotal | $ 852,800,000 | $ 1,079,000,000 | $ 883,900,000 |
| Subtotal | $91,683,000,000 | $ 93,603,200,000 | $89,777,700,000 |
| Total | $97,443,000,000 | $102,339,200,000 | $98,097,700,000 |

*Source: SEWRPC.*

represent capital or construction costs, about $2.58 billion operation and maintenance costs, and $89.78 billion users costs. Total costs under Alternative Plan 1 would approximate $102.34 billion. Of this total, about $5.81 billion would represent capital costs, about $2.93 operation and maintenance costs, and about $93.60 billion user costs. The no-build plan would have an estimated total cost of $97.44 billion. Of this total, about $3.34 billion would represent capital costs, about $2.42 billion operation and maintenance costs, and about $91.68 billion user costs.

Standard No. 2 indicates that the direct benefits derived from transportation system improvements should exceed the direct costs of such improvements. Application of this standard permits a comparative analysis of the "build" alternatives, those that include transportation system improvements, with the no-build alternative plan. The direct benefits derived from transportation system improvements include a reduction in the cost of travel time, of vehicle operation, and of accidents that are achieved through improvements to the transportation system. The direct costs of such improvements are composed of the necessary capital investments and the cost to public agencies of operating and maintaining the physical facilities and transportation services. A benefit-cost ratio was accordingly derived for the "build" plans by computing the difference in transit and highway user costs between the no-build alternative and the "build" alternatives and dividing that number by the difference in transportation system costs between the no-build alternative and the "build" alternatives.

The benefit-cost analysis is intended to demonstrate the economic value of the transportation

Table 235

COMPARISON OF THE USER AND SYSTEM COSTS AND BENEFIT-COST RATIOS: 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| Alternative Plan | 1994-2035 Road User Costs[a] (millions) | Construction, Operation, and Maintenance Costs[a] 1994-2035 (millions) | Incremental Benefits (millions) | Incremental Costs (millions) | Benefit-Cost Ratio |
|---|---|---|---|---|---|
| No-Build . . . . . . . . . . . . | $135,222.6 | $6,869.1 | - - | - - | - - |
| Alternative Plan 1 . . . . . . | 129,979.8 | 9,984.1 | $5,242.8 | $3,115.0 | 1.68 |
| Alternative Plan 3 . . . . . . | 132,538.7 | 9,138.7 | 2,683.9 | 2,269.6 | 1.18 |

*[a]Present worth in 1994 costs incurred between 1994 and 2035 under proposed transportation system plan alternatives.*

*It should be noted that a 3 percent rate of return was used in the calculation of the present worth of both plan benefits and costs. An analysis of an alternative rate of return, namely 4 percent, indicated that the benefit-cost ratio for Alternative Plan 1 would be 1.55 and for Alternative Plan 3 would be 1.06.*

*Source: SEWRPC.*

system plan proposals. In presenting the results of the benefit-cost analysis, it should be noted that benefits and costs were calculated as accruing over a period of time extending from 1994 to 2035 in order to bring the salvage value of each staged facility recommended in the plans to zero. It should also be noted that the benefit-cost ratios set forth in Table 235 apply to the aggregation of system improvements proposed in the regional transportation plans and do not imply that each individual project within this aggregation will have a similar benefit-cost ratio.

The economic analysis resulted in a benefit-cost ratio of 1.68 for Alternative Plan 1. This means that for every dollar invested in implementing the plan, transportation system users, on the average, could be expected to enjoy $1.68 in benefits in terms of reduced accidents, travel time and vehicle operation costs. The benefit-cost ratio of Alternative Plan 3 is 1.18.

The next standard of Objective No. 2 was used as a fundamental input in the design of both Alternative Plans 1 and 3. Standard No. 3 indicates that the full use of all existing transportation facilities should be encouraged through low-capital- and noncapital-intensive transportation system management measures, cooperatively fostered by government, business, and industry prior to any capital-intensive or disruptive construction or provision of new facilities and services. In essence, this standard specifies that full use should be made of all existing transportation facilities.

Standard No. 3 was used to constrain the plan design process. For example, in the computation of system capacity, curb parking was assumed to have been eliminated in the peak direction during the peak hours on all arterial streets in order to minimize traffic congestion and the need for additional capital investment. Similarly, every effort was made in the plan design to facilitate a higher level of transit service by utilizing available arterial street capacity for the exclusive or preferential movement of transit vehicles in major transportation corridors. It should be understood that the specific development and implementation of the traffic management techniques assumed in system plan design will require local planning and engineering and plan implementation actions. Such actions are essential if congestion is to be reduced and kept at tolerable levels.

Objective No. 3: Provide a Multimodal Transportation System

The third transportation system development objective calls for the achievement of a multimodal transportation system which will provide appropriate types transportation needed by all residents of the various subareas of the Region at an adequate level of service and which will

Table 236

TOTAL POPULATION SERVED BY PUBLIC TRANSIT: 2010
NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS[a]

| Location | No-Build Alternative | Alternative Plan 1 | Alternative Plan 3 |
|---|---|---|---|
| Urbanized Area | | | |
| Kenosha | 84,900 | 99,300 | 90,400 |
| Milwaukee | 1,175,800 | 1,267,600 | 1,252,700 |
| Racine | 108,800 | 127,200 | 126,900 |
| Subtotal | 1,369,500 | 1,494,100 | 1,470,000 |
| Nonurbanized Area | 67,300 | 138,700 | 77,100 |
| Total | 1,436,500 | 1,632,800 | 1,547,100 |

[a] *Does not include the population served by demand-responsive shared-ride taxi service.*

*Source: SEWRPC.*

permit ready adaptation to both changes in travel demand and in transportation technology, modal use, and new transportation management measures. This objective is supported by two arterial street and highway standards, sixteen public transit standards, and one bicycle and pedestrian facility standard.

Standard No. 1 indicates that arterial streets and highways should be provided at intervals of no more than one-half mile in each direction in urban high-density areas, at intervals of no more than one mile in each direction in urban medium-density areas, at intervals of no more than two miles in each direction in urban low-density and suburban residential areas, and at intervals of no less than two miles in each direction in rural areas. This standard has been essentially met under each of the alternative plans because it served as an input to the plan design process. It is important to note that the initial preparation and subsequent amendments to the seven county jurisdictional highway system plans serve to ensure, to the maximum extent practical, the designation of an arterial street and highway system properly related to this standard.

Standard No. 2 states that freeways or expressways should be considered for those travel corridors within the Region which meet all of the following criteria: the corridor provides intercommunity service, the desired speed or a volume-to-design-capacity ratio of 1.0 requires control of access and uninterrupted flow, and potential average weekday traffic exceeds 45,000 vehicles per day in urban areas and 25,000 vehicles per day in rural areas. This standard was also applied as an input to the plan design process.

Objective No. 3, as it relates to public transit service, is supported by sixteen standards. Three of the standards are explicitly comparative in nature and thus are set forth here. The remaining standards under this objective either have all been met in the design of the alternative plans or could be met by the plans if those plans are properly implemented.

The first comparative transit-related standard indicates that the number of persons served by public transit should be maximized. The Region's population which would be located within the combined service areas or rapid, express, and local transit in the year 2010 totals about 1.63 million, or about 85 percent of the Region's population, under Alternative Plan 1; about 1.55 million, or about 81 percent of the Region's population, under Alternative Plan 3; and about 1.44 million, or about 75 percent of the Region's population, under the no-build alternative plan (see Table 236). Thus, Alternative Plan 1 best meets this standard as it proposes to provide service to about 85,600 more residents than Alternative Plan 3 and to about 196,000 more residents than no-build plan.

The second comparative standard indicates that the number of jobs served by rapid transit should be maximized. The standard states that a job shall be considered served by rapid transit

Table 237

NUMBER OF JOBS SERVED BY RAPID TRANSIT: 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| Location | No-Build Alternative | Alternative Plan 1 | Alternative Plan 3 |
|---|---|---|---|
| Urbanized Area | | | |
| Kenosha | 0 | 24,400 | 24,400 |
| Milwaukee | 146,700 | 328,000 | 335,600 |
| Racine | 0 | 26,500 | 26,500 |
| Subtotal | 146,700 | 378,900 | 386,500 |
| Nonurbanized Area | 0 | 34,000 | 21,800 |
| Total | 146,700 | 412,900 | 408,300 |

*Source: SEWRPC.*

if it is located within one-half mile walking distance, or a 15-minute feeder-bus ride, from a rapid transit stop. As shown in Table 237, the jobs which would be served by rapid transit total 412,900 under Alternative Plan 1, or about 38 percent of the jobs in the Region; 408,300 under Alternative Plan 3, or about 37 percent of the jobs in the year 2010 in the Region; and 146,700 under the no-build plan, or about 13 percent of the jobs in the Region. Though Alternative Plan 1 best meets this standard, both "build" alternatives represent significant improvements over the no-build plan; indicative of the expansion of rapid transit routes within the Region proposed under these plans.

The third comparative standard indicates that the proportion of total person trips to the Milwaukee CBD made by public transit should be increased to at least 30 percent. Under Alternative Plan 1, 54,000 of the 360,200 total person trips to the Milwaukee CBD on an average weekday in the year 2010, or 15 percent, may be expected to be made by transit. Under Alternative Plan 3, 40,800 trips of the 364,200 total trips to the Milwaukee CBD on an average weekday in the year 2010, or 11 percent, may be expected to be made by transit. Under the no-build alternative, 37,900 of the 364,700 total trips to the Milwaukee CBD on an average weekday in the year 2010, or 10 percent, may be expected to be made by public transit.

The last standard supporting Objective No. 3 indicates that appropriate bicycle and pedestrian facilities should be provided on those arterial streets and highways identified in the regional bicycle and pedestrian facilities plan for Southeastern Wisconsin. This standard was assumed to be met equally well by each of the two "build" alternative plans considered.

Objective No. 4: Minimize Disruption

The fourth transportation objective is to minimize disruption by the transportation system of existing neighborhoods and community development including adverse affects upon the property tax base. This objective is supported by eight standards.

Standard No. 1 indicates that the penetration of neighborhood units and facility service areas by arterial streets and highways and rapid transit routes should be minimized. A precise quantitative evaluation of the extent to which this standard is met depends, in large part, upon the completion of project planning, including a determination of the precise alignment of new transportation facilities. In addition, it is necessary for local units of government to delineate neighborhood boundaries.

Standard No. 2 provides that the dislocation of households, businesses, industries, and public and institutional buildings caused by the reconstruction of existing, or the construction of new, transportation facilities and terminals should be minimized. In order to estimate the extent to which the alternative plans met this standard, an estimate was made of the number of residential and nonresidential units that would have to be displaced and relocated because of transpor-

Table 238

COMPARISON OF LAND-TAKING REQUIREMENTS FOR TRANSPORTATION SYSTEM IMPROVEMENTS IN THE REGION BY COUNTY: 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| County and Taking | No-Build Alternative | Alternative Plan 1 | Alternative Plan 3 |
|---|---|---|---|
| Kenosha County | | | |
| Number of Residential Units | - - | 62 | 87 |
| Number of Nonresidential Structures | - - | 32 | 33 |
| Acquisition, Demolition, and Relocation Cost | $ 198,000 | $ 15,996,000 | $ 16,864,000 |
| Milwaukee County | | | |
| Number of Residential Units | 11 | 61 | 61 |
| Number of Nonresidential Structures | 8 | 43 | 43 |
| Acquisition, Demolition, and Relocation Cost | $1,768,000 | $ 11,231,000 | $ 9,532,000 |
| Ozaukee County | | | |
| Number of Residential Units | 9 | 40 | 53 |
| Number of Nonresidential Structures | 1 | 2 | 5 |
| Acquisition, Demolition, and Relocation Cost | $1,210,000 | $ 12,344,000 | $ 13,721,000 |
| Racine County | | | |
| Number of Residential Units | - - | 191 | 198 |
| Number of Nonresidential Structures | - - | 27 | 27 |
| Acquisition, Demolition, and Relocation Cost | $ 68,000 | $ 23,761,000 | $ 25,236,000 |
| Walworth County | | | |
| Number of Residential Units | - - | 44 | 46 |
| Number of Nonresidential Structures | - - | 8 | 4 |
| Acquisition, Demolition, and Relocation Cost | $ 92,000 | $ 25,786,000 | $ 49,084,000 |
| Washington County | | | |
| Number of Residential Units | 8 | 128 | 138 |
| Number of Nonresidential Structures | 1 | 10 | 12 |
| Acquisition, Demolition, and Relocation Cost | $ 369,000 | $ 19,302,000 | $ 20,058,000 |
| Waukesha County | | | |
| Number of Residential Units | 11 | 125 | 137 |
| Number of Nonresidential Structures | 4 | 41 | 41 |
| Acquisition, Demolition, and Relocation Cost | $ 999,000 | $ 37,023,000 | $ 36,180,000 |
| Southeastern Wisconsin Region | | | |
| Number of Residential Units | 39 | 651 | 720 |
| Number of Nonresidential Structures | 14 | 163 | 165 |
| Acquisition, Demolition, and Relocation Cost | $4,704,000 | $145,393,000 | $170,675,000 |

*Source: SEWRPC.*

tation system improvements. The results of this analysis are set forth in Table 238. The number of residential structures estimated to be displaced would total 651 under Alternative Plan 1 and 720 under Alternative Plan 3. The number of nonresidential structures estimated to be displaced would total 163 under Alternative Plan 1, 165 under Alternative Plan 3.

Standard No. 3 indicates that the amount of land used for new transportation facilities should be minimized. To estimate the relative extent to which each of the alternative plans meets the standard, an estimate was made of the amount of land required for new facilities. This estimate, expressed in terms of total acquisition, demolition, and relocation costs required to carry out each alternative plan, is also set forth in Table 238. This cost would total about $4.70 million under the no-build plan, about $145.39 million under Alternative Plan 1, and about $170.68 million under Alternative Plan 3.

Standard No. 4 indicates that the reduction of the property tax base caused by the reconstruction of existing or the construction of new transportation facilities and terminals should be minimized. The analysis set forth above for minimizing the total amount of land needed to provide new and improved transportation facilities under the alternative plans would hold equally true for this standard on the assumption that the direct impact upon the property tax base of land and building acquisition for transportation facility improvements would be directly proportional to the cost of such land and building acquisition. Accordingly, since under Alternative Plan 1, less land-taking would be required than under Alternative Plan 3, it may be concluded that the impact upon the property tax base would be less under Alternative Plan 1 than under Alternative Plan 3. Thus, Alternative Plan 1 may be considered to meet this transportation system development standard better.

While this analysis would indicate that the acquisition of land and buildings results in a direct tax base loss, it can be established that there may, in fact, be no tax base loss to the Region if the property owners relocate elsewhere in the Region. Accordingly, a presumed cost due to tax base loss is not used in the benefit-cost analysis under system level planning. Indeed, what may appear as a loss as a result of improvements in one area, or to one community, may result in a gain in the tax base elsewhere. In addition, improvements to transportation facilities have often increased the value of abutting properties so that a tax base gain follows a facility improvement.

Standard No. 5 states that the destruction of historic buildings and of historical, scenic, scientific, archaeological, and cultural sites caused by the reconstruction of existing or the construction of planned transportation facilities and terminals should be minimized. Attainment of this standard cannot be measured at the system level of planning since the standard can only be met through attention to historic preservation at the project level of planning. Accordingly, this standard was assumed to be met equally well by each alternative plan considered.

Standard No. 6 states that the proper use of land for, and adjacent to, transportation facilities should be maximized and the disruption of future development minimized through advance reservation of rights-of-way for transportation facilities. This standard was assumed to be met equally well by each alternative transportation system plan considered. The proper use of land adjacent to new transportation facilities, arterial streets and highways, public transit lines and stations, as well as the preservation of land for such future public works, can be effectively ensured through vigorous attention to plan implementation and proper use of available land use regulatory techniques by the State and local units and agencies of government concerned.

Standard No. 7 indicates that transportation facility construction plans should be developed using sound geometric, structural, and landscape design standards which consider the aesthetic quality of the transportation facilities and the areas through which they pass and which consider any environmental enhancement activities likely to be required. This standard can be met through proper facility design during plan implementation. Accordingly, this standard was assumed to be met equally well by each alternative plan considered.

Standard No. 8 indicates that transportation facilities should be located so as to avoid destruction of visually pleasing buildings, structures, and natural features and to enhance vistas to such features. This standard can be met through careful facility design during plan implementation by each alternative plan considered. Accordingly, this standard was assumed to be met equally well by each alternative plan considered.

Objective No. 5: Protect Natural Environment, Promote Public Health, and Achieve Ambient Air Quality Standards

The fifth transportation system development objective is a transportation system which serves to protect the overall quality of the natural environment, which promotes the public health, and which helps to achieve ambient air quality standards. Four specific standards support this objective.

Standard No. 1 states that the location of transportation facilities in, or through, primary environmental corridors, particularly through the woodland and wetland portions of such corridors, should be minimized. To determine the relative extent to which each of the alternative plans met the standard, an analysis was made of the location of all new, or substantially improved, transportation facilities proposed under the plan. The results of this analysis are summarized in Table 239.

Table 239

LOSS OF PRIMARY ENVIRONMENTAL CORRIDORS IN THE REGION TO IMPROVEMENT AND EXPANSION OF ARTERIAL STREET AND HIGHWAY FACILITIES: 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLANS 1 AND 3

| County | Wetlands (acres) | | Woodlands (acres) | | Other (acres) | | Total Primary Environmental Corridor Lands (acres) | |
|---|---|---|---|---|---|---|---|---|
| | Alternative Plan 1 | Alternative Plan 3 | Alternative Plan 1 | Alternative Plan 3 | Alternative Plan 1 | Alternative Plan 3 | Alternative Plan 1 | Alternative Plan 3 |
| Kenosha . . . . . | 3.5 | 3.9 | 2.7 | 3.5 | 3.4 | 4.5 | 9.6 | 11.9 |
| Milwaukee . . . | 7.8 | 7.8 | 0.9 | 0.9 | 7.8 | 7.8 | 16.5 | 16.5 |
| Ozaukee . . . . . | 6.5 | 6.5 | 2.3 | 2.3 | 10.9 | 10.9 | 19.7 | 19.7 |
| Racine . . . . . . | 6.5 | 6.5 | 5.6 | 5.6 | 4.6 | 4.6 | 16.7 | 16.7 |
| Walworth . . . . | 15.0 | 19.8 | 8.5 | 34.9 | 14.4 | 22.7 | 37.9 | 77.4 |
| Washington . . . | 141.8 | 141.8 | 19.1 | 19.1 | 61.3 | 61.3 | 222.2 | 222.2 |
| Waukesha . . . . | 69.1 | 70.4 | 18.1 | 18.2 | 22.1 | 22.4 | 109.3 | 111.0 |
| Region | 250.2 | 256.7 | 57.2 | 84.5 | 124.5 | 134.2 | 431.9 | 475.4 |

*Source: SEWRPC.*

As shown in Table 239, the number acres of primary environmental corridor land, including upland and wetland areas, that may be expected to be lost to new or substantially improved transportation facilities would approximate 432 acres under Alternative Plan 1 and 475 acres under Alternative Plan 3. Under Alternative Plan 1, 250 acres of primary environmental corridor wetlands would be lost and under Alternative Plan 3, 256 acres of primary environmental corridor wetlands would be lost. About one-tenth of 1 percent of the total 303,200 planned acres of primary environmental corridor in the Region would be lost as a result of the construction or improvement of transportation facilities envisioned in the alternative plans.

It is important to note that the foregoing analysis had been made at the system planning level and is necessarily general in nature. A more detailed examination during the project planning and design phases may indicate that the new or improved transportation facilities could be placed outside the environmental corridor lands. This is particularly possible where transportation facilities are to be constructed along an alignment that approximately parallels to a primary environmental corridor.

Standard No. 2 states that any damaging affects on the natural resource base caused by the construction of transportation facilities should be minimized. This standard can be met through proper facility design and proper use of appropriate construction techniques during plan implementation. Accordingly, this standard was assumed to be met equally well by each alternative plan considered.

Standard No. 3 states that the amount of air pollutants emitted through the operation of motor vehicles on the arterial street and highway system should be minimized. Table 240 shows estimates of the amount of volatile organic compounds, nitrogen oxide, and carbon monoxide pollutant emissions generated in 1990 and expected to be generated in 2010 under the no-build plan, and Alternate Plans 1 and 3. As shown in Table 240, Alternative Plan 1 best meets this standard. Under Alternative Plan 1, about 25.6 tons of volatile organic compound may be expected to be generated per day, 3.1 tons per day fewer than under Alternative Plan 3; 71.3 tons of nitrogen oxides may be expected to be generated per day, 8.6 tons per day fewer than under Alternative Plan 3; and 211.5 tons of carbon monoxide may be expected to be generated per day, 26.7 tons per day fewer than under Alternative Plan 3.

Significant reductions in volatile organic compounds, nitrogen oxides, and carbon monoxide emissions may be expected by the year 2010. Such reductions will occur despite forecast increases in travel within the Region over time. These reductions are expected to come about

### Table 240

**AVERAGE WEEKDAY AIR-POLLUTANT EMISSIONS IN THE REGION BY TRANSPORTATION SYSTEM PLAN: 1990 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS**

| Transportation System | Volatile Organic Compounds (tons per day) | Nitrogen Oxides (tons per day) | Carbon Monoxide (tons per day) |
|---|---|---|---|
| 1990 Existing | 119.2 | 129.8 | 815.1 |
| 2010 No-Build Alternative | 29.8 | 81.4 | 248.4 |
| 2010 Alternative Plan 1 | 25.6 | 71.3 | 211.5 |
| 2010 Alternative Plan 3 | 28.7 | 79.9 | 238.2 |

*Source: SEWRPC.*

because of Federally mandated changes in vehicle emission standards and through the required use of cleaner-burning motor fuels.

Table 240 also indicates that both of the "build" alternative plans result in lower levels of air pollutant emissions than the no-build plan. This is directly related to the lower levels of vehicle-miles of travel anticipated under Alternative Plans 1 and 3. This potential reduction in transportation-related air pollutant emissions is significant because, to the extent to which mobile-source emissions can be reduced, fewer restrictions on industrial source emissions will be necessary to meet national ambient air quality standards within the Region.

Standard No. 4 indicates that the loss of prime agricultural land to transportation facility construction should be minimized. To determine the relative extent to which each of the alternative plans met this standard, an analysis was made of the location of all new or substantially improved transportation facilities proposed under each plan. The results of this analysis are summarized in Table 241. The number of acres of prime agricultural areas within the Region that may be lost to the improvement and expansion of the arterial street and highway system approximates 1,039 acres under Alternative Plan 1 and 1,644 acres under Alternative Plan 3. About 95 percent of the difference in acreage lost can be attributed to the construction of the long-planned USH 12 freeway in Walworth County included in Alternative Plan 3.

### Table 241

**LOSS OF PRIME AGRICULTURAL LAND IN THE REGION TO IMPROVEMENT AND EXPANSION OF ARTERIAL STREET AND HIGHWAY FACILITIES: 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLANS 1 AND 3**

| County | Alternative Plan 1 (acres) | Alternative Plan 3 (acres) |
|---|---|---|
| Kenosha | 39.1 | 39.1 |
| Milwaukee | 0.0 | 0.0 |
| Ozaukee | 40.1 | 49.3 |
| Racine | 119.0 | 120.2 |
| Walworth | 320.1 | 895.5 |
| Washington | 302.8 | 311.1 |
| Waukesha | 217.6 | 228.5 |
| Region | 1,038.7 | 1,643.7 |

*Source: SEWRPC.*

<u>Objective No. 6: Facilitate Movement between Component Parts of the Region</u>

The principle for Objective No. 6 indicates that to support everyday economic and social activities, a transportation system which provides for reasonably fast, convenient travel is essential. It further implies that traffic congestion increases the cost of transportation and can adversely affect the attractiveness of an area for residential use and for the location and operation of businesses and industries. Eight specific standards support Objective No. 6.

Standard Nos. 1, 2, and 3 indicate that the total passenger-hours and vehicle-hours of travel and the total miles of travel within the Region, respectively, should be minimized. Data pertaining to these standards are set forth in Table 242. Alternative Plan 1 may be expected to generate about 38.38 million total highway and about 142,000 total transit vehicle-miles and 1.02 million highway vehicle-hours and 9,200 transit vehicle-hours on an average weekday. By contrast, Alternative Plan 3 may be expected to

Table 242

COMPARISON OF THE AMOUNT OF TOTAL TRAVEL IN THE REGION: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| Travel Characteristics | Base Year 1991 | | 2010 No-Build Transportation System Plan | | 2010 Alternative Plan 1 | | 2010 Alternative Plan 3 | |
|---|---|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total |
| Vehicle-Miles of Travel (thousands) | | | | | | | | |
| Arterial Streets and Highways | | | | | | | | |
| Freeway | 11,597 | 35.1 | 17,294 | 38.8 | 14,185 | 37.0 | 15,979 | 37.3 |
| Standard Arterial | 21,475 | 64.9 | 27,228 | 61.2 | 24,196 | 63.0 | 26,873 | 62.7 |
| Total | 33,072 | 100.0 | 44,522 | 100.0 | 38,381 | 100.0 | 42,852 | 100.0 |
| Transit | | | | | | | | |
| Rapid | 3 | 5.4 | 3 | 4.7 | 26 | 18.0 | 16 | 16.4 |
| Express | 3 | 5.2 | 6 | 9.1 | 30 | 21.0 | 20 | 21.1 |
| Local | 57 | 89.4 | 57 | 86.2 | 85 | 61.0 | 61 | 62.5 |
| Total | 63 | 100.0 | 66 | 100.0 | 142 | 100.0 | 97 | 100.0 |
| Vehicle-Hours of Travel (thousands) | | | | | | | | |
| Arterial Streets and Highways | | | | | | | | |
| Freeway | 236.0 | 26.2 | 329.0 | 27.4 | 269.3 | 26.5 | 304.6 | 26.8 |
| Standard Arterial | 665.2 | 73.8 | 873.5 | 72.6 | 746.0 | 73.5 | 833.5 | 73.2 |
| Total | 901.2 | 100.0 | 1,202.5 | 100.0 | 1,015.3 | 100.0 | 1,138.1 | 100.0 |
| Transit | | | | | | | | |
| Rapid | 0.2 | 3.3 | 0.2 | 2.8 | 1.1 | 12.0 | 0.6 | 9.0 |
| Express | 0.2 | 3.3 | 0.4 | 6.4 | 1.5 | 16.3 | 1.0 | 14.9 |
| Local | 4.8 | 93.4 | 5.1 | 90.8 | 6.6 | 71.7 | 5.1 | 76.1 |
| Total | 5.2 | 100.0 | 5.7 | 100.0 | 9.2 | 100.0 | 6.7 | 100.0 |
| Passenger-Hours of Travel (thousands) | | | | | | | | |
| Arterial Streets and Highways | 1,120 | 95.8 | 1,431 | 96.6 | 1,208 | 94.3 | 1,354 | 96.4 |
| Transit | 49 | 4.2 | 50 | 3.4 | 72 | 5.7 | 51 | 3.6 |
| Total | 1,169 | 100.0 | 1,481 | 100.0 | 1,280 | 100.0 | 1,405 | 100.0 |

*Source: SEWRPC.*

generate 42.85 million highway vehicle-miles of travel and 97,000 transit vehicle-miles of travel in the year 2010, and 1.14 million highway vehicle-hours of travel and 6,700 transit vehicle-hours of travel. The no-build plan may be expected to generate 44.52 million highway vehicle-miles and 66,000 transit vehicle-miles of travel and 1.2 million highway vehicle hours and 5,700 transit vehicle-hours of travel within the Region in the year 2010.

Standard No. 4 states that highway transportation facilities should be located and designed so as to provide adequate capacity; that is, a volume-to-design-capacity-ratio equal to or less than 1.0 based on 24-hour average weekday traffic volumes to meet the existing and potential travel demand. To determine the degree to which each alternative transportation plan meets this standard, the anticipated travel demand expected to be generated under each plan was assigned to the alternative transportation networks to evaluate the adequacy of the proposed improvements. The levels of service of each of the alternative plans, as measured by arterial street and highway volume-to-design-capacity ratios, are summarized in Table 243. Under Alternative Plan 1, about 131 arterial miles would have volume-to-design-capacity ratios exceeding 1.0 and would thus experience traffic congestion. Under Alternative Plan 3, about 168 arterial miles would have volume-to-design-capacity ratios which exceed 1.0.

Standard No. 5 indicates that public transit facilities should be located and designed so as to provide adequate transit vehicle capacity to meet existing and potential travel demand. Average

Table 243

**ARTERIAL STREET AND HIGHWAY FACILITIES OPERATING UNDER, AT, AND OVER DESIGN CAPACITY IN THE REGION: 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS**

| | No-Build Alternative | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Under Design Capacity[a] | | At Design Capacity[b] | | Over Design Capacity | | | | | | |
| | | | | | Moderate[c] | | Severe[d] | | Extreme[e] | | |
| County | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Total Mileage |
| Kenosha . . . . . . . | 230.1 | 66.7 | 70.9 | 20.5 | 3.3 | 1.0 | 33.4 | 9.7 | 7.5 | 2.1 | 345.2 |
| Milwaukee . . . . . | 490.0 | 62.1 | 120.6 | 15.3 | 2.0 | 0.2 | 132.4 | 16.8 | 44.3 | 5.6 | 789.3 |
| Ozaukee . . . . . . . | 233.9 | 81.1 | 19.8 | 6.9 | 6.5 | 2.2 | 28.3 | 9.8 | - - | - - | 288.5 |
| Racine . . . . . . . . | 241.7 | 59.3 | 77.0 | 18.9 | 3.5 | 0.8 | 62.6 | 15.4 | 22.7 | 5.6 | 407.5 |
| Walworth . . . . . . | 387.2 | 87.0 | 31.7 | 7.1 | 8.5 | 1.9 | 9.2 | 2.1 | 8.3 | 1.9 | 444.9 |
| Washington . . . . . | 337.7 | 75.3 | 54.1 | 12.1 | - - | - - | 49.8 | 11.1 | 7.1 | 1.5 | 448.7 |
| Waukesha . . . . . . | 369.1 | 48.8 | 103.8 | 13.7 | 7.8 | 1.1 | 222.0 | 29.4 | 52.9 | 7.0 | 755.6 |
| Total | 2,289.7 | 65.8 | 477.9 | 13.7 | 31.6 | 0.9 | 537.7 | 15.5 | 142.8 | 4.1 | 3,479.7 |

| | Alternative Plan 1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Under Design Capacity[a] | | At Design Capacity[b] | | Over Design Capacity | | | | | | |
| | | | | | Moderate[c] | | Severe[d] | | Extreme[e] | | |
| County | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Total Mileage |
| Kenosha . . . . . . . | 327.1 | 91.8 | 25.8 | 7.2 | - - | - - | 3.3 | 0.9 | - - | - - | 356.2 |
| Milwaukee . . . . . | 673.2 | 84.7 | 57.0 | 7.2 | 37.9 | 4.8 | 21.7 | 2.7 | 5.1 | 0.6 | 794.9 |
| Ozaukee . . . . . . . | 308.3 | 99.3 | 0.8 | 0.3 | 1.4 | 0.5 | - - | - - | - - | - - | 310.5 |
| Racine . . . . . . . . | 405.0 | 96.7 | 12.7 | 3.0 | 0.6 | 0.1 | 0.7 | 0.1 | - - | - - | 419.0 |
| Walworth . . . . . . | 449.8 | 95.0 | 11.9 | 2.5 | 11.7 | 2.5 | - - | - - | - - | - - | 473.4 |
| Washington . . . . . | 469.1 | 99.9 | 0.7 | 0.1 | - - | - - | - - | - - | - - | - - | 469.8 |
| Waukesha . . . . . . | 681.5 | 87.9 | 45.3 | 5.8 | 35.3 | 4.6 | 13.0 | 1.7 | - - | - - | 775.1 |
| Total | 3,314.0 | 92.1 | 154.2 | 4.3 | 86.9 | 2.4 | 38.7 | 1.1 | 5.1 | 0.1 | 3,598.9 |

| | Alternative Plan 3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Under Design Capacity[a] | | At Design Capacity[b] | | Over Design Capacity | | | | | | |
| | | | | | Moderate[c] | | Severe[d] | | Extreme[e] | | |
| County | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Total Mileage |
| Kenosha . . . . . . . | 310.3 | 87.1 | 42.6 | 12.0 | - - | - - | 3.3 | 0.9 | - - | - - | 356.2 |
| Milwaukee . . . . . | 654.5 | 82.3 | 56.1 | 7.1 | 53.3 | 6.7 | 24.2 | 3.1 | 6.8 | 0.8 | 794.9 |
| Ozaukee . . . . . . . | 306.2 | 98.6 | 2.9 | 0.9 | - - | - - | - - | - - | - - | - - | 310.5 |
| Racine . . . . . . . . | 387.8 | 92.6 | 25.0 | 6.0 | 1.4 | 0.3 | 0.7 | 0.1 | - - | - - | 419.0 |
| Walworth . . . . . . | 478.0 | 98.7 | 6.1 | 1.3 | 5.5 | - - | - - | - - | - - | - - | 484.1 |
| Washington . . . . . | 469.1 | 99.9 | 0.7 | 0.1 | - - | - - | - - | - - | - - | - - | 469.8 |
| Waukesha . . . . . . | 636.9 | 82.2 | 65.3 | 8.4 | 47.3 | 6.1 | 25.6 | 3.3 | - - | - - | 775.1 |
| Total | 3,242.8 | 89.8 | 198.7 | 5.5 | 107.5 | 3.0 | 53.8 | 1.5 | 6.8 | 0.2 | 3,609.6 |

[a] *Volume-to-design-capacity ratio: 0.00-0.90*

[b] *Volume-to-design-capacity ratio: 0.91-1.00*

[c] *Volume-to-design-capacity ratio: 1.01-1.10*

[d] *Volume-to-design-capacity ratio: 1.11-1.30*

[e] *Volume-to-design-capacity ratio: over 1.30*

*Source: SEWRPC.*

maximum load factors are specified in the standard for rapid, express, and local levels of service in both peak and off-peak travel periods. This standard has been met under each of the alternative plans considered because it served as an input to the plan design process.

Standard No. 6 states that bicycle and pedestrian facilities should be located and designed to attract the maximum number of travelers currently operating single-occupancy vehicles. This standard can be met through proper facility design during the implementation of the regional bicycle and pedestrian facilities plan and through the proper consideration of bicycle travel in traffic engineering and management activities. Accordingly, this standard is assumed to be met equally well by each alternative plan considered.

Standard No. 7 indicates that adequate capacity and a sufficiently highly level of geometric design should be provided to achieve specific overall travel speeds based on average weekday conditions for the highway and public transit components of the transportation system. The overall travel speeds specified in the standard were utilized in the design of the alternative transportation plans. Accordingly, this standard was assumed to be met equally well by each alternative plan considered.

Standard No. 8 provides that the use of transportation system management be maximized in travel corridors to achieve the desired level of service for both arterial street and highway and public transit facilities and services. Since the plan design process emphasized the use of transportation system management to resolve all practicable transportation deficiencies prior to the consideration of arterial street and highway system improvement or expansion, each alternative plan essentially meets this standard.

<u>Objective No. 7: Reduce Accident Exposure</u>

The seventh transportation system development objective relates to the reduction of accident exposure and the provision of increased travel safety and personal security on the regional transportation system. This objective is supported by three specific standards.

Standard No. 1 indicates that travel on transportation facilities which exhibit the lowest accident rates should be maximized. Freeways have been found to experience significantly lower accident rates than standard surface arterial facilities. Further, travel on transit is generally safer for passengers than travel in other vehicles. From the foregoing, it can be concluded that an alternative plan which provides for the greatest amount of travel on freeways and transit would best meet this standard. Both Alternative Plans 1 and 3 would accommodate about 37 percent of average weekday arterial vehicle miles of travel on the freeway system. Under the no-build plan, about 36 percent of vehicle miles of travel would occur on the freeway system. Additionally, under Alternative Plan 1, 4.5 percent of total travel would occur on the transit system, while under Alternative Plan 3, 3.1 percent regional travel would occur on the transit system. Under the no-build plan the public transit system would serve 2.7 percent of the trips made on an average weekday within the Region. Thus, Alternative Plan 1 would maximize the total amount of travel within the Region made by transit and both Alternative Plans 1 and 3 would serve about the same amount of travel in the Region on the freeway system.

In an effort to identify the safest alternative transportation system plan, an analysis was made of the distribution of passenger-miles of travel by load and facility type, assuming that the alternative plan which maximizes passenger travel on a combination of freeways and mass transit would best meet the standard. The results of this analysis are identified in Table 244. The no-build plan represents the safest plan, since it would provide that 40 percent of total passenger miles of travel occur on a combination of freeways and mass transit. Alternative Plan 1 and Alternative Plan 3 would provide for about 38 percent.

A comparison of anticipated traffic accident experience and cost on the transportation system in the Region under the alternative plans is set forth in Table 245. The total cost of accidents in the Region in the plan design year 2010 would approximate $1.39 billion for the no-build transportation plan, $1.23 billion for Alternative Plan 1, and $1.37 billion for Alternative Plan 3.

Standard No. 2 states that traffic congestion and vehicle conflicts should be reduced by maintaining a volume-to-design-capacity ratio equal to or less than 1.0, based on a 24-hour average weekday traffic volume. As shown in the previously cited Table 243, Alternative Plan 1 best meets this standard, in that 92 percent of the total arterial street and highway mileage in the Region would be expected to operate under design capacity. Under Alternative Plan 3, about 90 percent of arterial street and highway mileage in the Region would be expected to operate under design capacity. Under the no-build plan, about 66 percent of arterial street and highway mileage would be expected to operate under design capacity.

Standard No. 3 provides that railway grade separations be provided at all crossings involving the provision of intercity passenger and commuter train service. This standard also provides that, for all other crossings, the deci-

Table 244

DISTRIBUTION OF PASSENGER-MILES OF TRAVEL IN THE REGION BY MODE AND FACILITY TYPE: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| | Passenger-Miles of Travel on an Average Weekday (thousands) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2010 | | | | | |
| | Base Year 1991 | | No-Build Transportation System Plan | | Alternative Plan 1 | | Alternative Plan 3 | |
| Mode and Facility Type | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total |
| Freeways . . . . . . . . . . | 18,555.2 | 34.7 | 25,941.0 | 38.4 | 20,993.8 | 36.1 | 23,489.1 | 36.8 |
| Public Transit . . . . . . . . | 609.1 | 1.1 | 728.8 | 1.1 | 1,375.9 | 2.3 | 903.4 | 1.4 |
| Subtotal | 19,164.3 | 35.8 | 26,669.8 | 39.5 | 22,369.7 | 38.4 | 24,392.5 | 38.2 |
| Standard Arterials . . . . . | 34,360.0 | 64.2 | 40,842.0 | 60.5 | 35,810.1 | 61.6 | 39,503.3 | 61.8 |
| Total | 53,524.3 | 100.0 | 67,511.8 | 100.0 | 58,179.8 | 100.0 | 63,895.8 | 100.0 |

*Source: SEWRPC.*

sion whether or not to provide a grade separation should be made at the project planning stage. This particular standard could be met through local planning and plan implementation activities under each of the alternative transportation system plans considered.

Objective No. 8: Minimize Energy Consumption

The eighth transportation system development objective relates to achieving a transportation system which minimizes the amount of energy consumed, especially nonrenewable energy. One specific standard supports this objective. Standard No. 1 states that the total amount of nonrenewable energy consumed in the operation of the transportation system, particularly petroleum-based fuels, should be minimized. To determine the relative degree to which each of the alternative plans meet this standard, an analysis was made of the estimated total annual consumption of motor vehicle fuel. The results of this analysis are summarized in Table 246.

For automobiles and trucks, the indicated motor fuel consumption data were determined as a function of the vehicle type, operating speed, the amount of travel on each link in the transportation network, and the type of highway facility traveled. Rates of fuel consumption for gasoline- and diesel engine-powered vehicles at different speeds, representative of the efficiency of these vehicles in 1991, were used in the analysis. For gasoline-powered vehicles, different rates of fuel consumption were used for freeway and arterial facilities; travel on freeway facilities being somewhat more efficient than travel on standard arterials. For diesel-powered trucks, fuel usage was determined by applying a variable rate of fuel consumption depending upon vehicle speed to the total amount of vehicle miles of travel by diesel-powered vehicles. Transit diesel fuel usage was determined by applying an average rate of fuel consumption for all vehicle speeds to the total amount of vehicle-miles of travel by transit vehicles.

As indicated in Table 246, the total annual motor fuel consumption, including gasoline and diesel fuel, within the Region approximated 359 million gallons in 1991. Annual motor fuel consumption, under Alternative Plan 1 could be expected to increase by 53 million gallons to about 412 million gallons by 2010, an increase of about 15 percent. Annual motor fuel consumption under Alternative Plan 3 could be expected to increase by 96 million gallons to about 455 million gallons by 2010, an increase of about 27 percent. Annual motor fuel consumption under the no-build plan could be expected to increase by about 109 million gallons to about 468 million gallons by 2010, an increase of about 30 percent.

Objective No. 9: Facilitate Linked Tripmaking

The ninth transportation system development objective calls for the achievement of a transportation system which facilitates linked tripmaking, providing facilities and services necessary for efficient, fast, safe, and convenient intermodal connections. This objective recognizes that

Table 245

TRAFFIC ACCIDENT EXPERIENCE AND COST ON THE TRANSPORTATION SYSTEM IN THE REGION: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| | Arterial Street and Highway System Cumulative Accident Experience and Cost | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Base Year 1991 | | | | No-Build Alternative | | | |
| County | Property Damage Accidents | Number of Injuries | Number of Fatalities | Cost of Accidents (million dollars) | Property Damage Accidents | Number of Injuries | Number of Fatalities | Cost of Accidents (million dollars) |
| Kenosha County | | | | | | | | |
| Freeway | 303 | 220 | 1 | 9 | 488 | 353 | 1 | 14 |
| Standard Arterial | 3,677 | 1,556 | 8 | 77 | 6,035 | 2,553 | 14 | 127 |
| Subtotal | 3,980 | 1,776 | 9 | 86 | 6,523 | 2,906 | 15 | 141 |
| Milwaukee County | | | | | | | | |
| Freeway | 2,672 | 1,935 | 6 | 79 | 3,503 | 2,537 | 7 | 104 |
| Standard Arterial | 17,019 | 7,200 | 38 | 357 | 18,750 | 7,933 | 42 | 393 |
| Subtotal | 19,691 | 9,135 | 44 | 436 | 22,253 | 10,470 | 49 | 497 |
| Ozaukee County | | | | | | | | |
| Freeway | 343 | 248 | 1 | 10 | 468 | 339 | 1 | 14 |
| Standard Arterial | 2,378 | 1,006 | 5 | 50 | 2,615 | 1,107 | 6 | 55 |
| Subtotal | 2,721 | 1,254 | 6 | 60 | 3,083 | 1,446 | 7 | 69 |
| Racine County | | | | | | | | |
| Freeway | 318 | 230 | 1 | 9 | 561 | 407 | 1 | 17 |
| Standard Arterial | 4,550 | 1,925 | 10 | 95 | 5,934 | 2,511 | 13 | 124 |
| Subtotal | 4,868 | 2,155 | 11 | 104 | 6,495 | 2,918 | 14 | 141 |
| Walworth County | | | | | | | | |
| Freeway | 243 | 176 | 1 | 7 | 447 | 324 | 1 | 13 |
| Standard Arterial | 2,767 | 1,170 | 6 | 58 | 3,290 | 1,392 | 7 | 69 |
| Subtotal | 3,010 | 1,346 | 7 | 65 | 3,737 | 1,716 | 8 | 82 |
| Washington County | | | | | | | | |
| Freeway | 245 | 178 | 1 | 7 | 365 | 265 | 1 | 11 |
| Standard Arterial | 3,693 | 1,563 | 8 | 77 | 4,864 | 2,058 | 11 | 102 |
| Subtotal | 3,938 | 1,741 | 9 | 84 | 5,229 | 2,323 | 12 | 113 |
| Waukesha County | | | | | | | | |
| Freeway | 1,088 | 788 | 2 | 32 | 1,940 | 1,405 | 4 | 58 |
| Standard Arterial | 9,188 | 3,887 | 21 | 193 | 13,376 | 5,659 | 30 | 280 |
| Subtotal | 10,276 | 4,675 | 23 | 225 | 15,316 | 7,064 | 34 | 338 |
| Southeastern Wisconsin Region | | | | | | | | |
| Freeway | 5,212 | 3,775 | 11 | 153 | 7,772 | 5,630 | 16 | 231 |
| Standard Arterial | 43,272 | 18,307 | 98 | 907 | 54,864 | 23,213 | 123 | 1,150 |
| Subtotal | 48,484 | 22,082 | 109 | 1,060 | 62,636 | 28,843 | 139 | 1,381 |
| Transit Systems within Southeastern Wisconsin Region | 1,015 | 302 | 1 | 9 | 1,047 | 362 | 1 | 10 |
| Total | 49,499 | 22,384 | 110 | 1,069 | 63,683 | 29,205 | 140 | 1,391 |

where the use of more than one transportation mode is essential for travel between two points, proper modal access, terminal capacity, coordination among transportation providers concerning, among other things, route and schedule information, are necessary to prevent travel delays or unwanted transportation movements. Two specific standards support Objective No. 9.

Standard No. 1 indicates that the time passengers spend waiting at public transit stops for connecting modes of transportation should be minimized. This standard could be expected to be met better under Alternative Plan 1 than under Alternative Plan 3 because Alternative Plan 1 generally proposes lower headways, which translate into lower waiting times at public transit stops. In this regard, the transit element of Alternative Plan 1 proposed the development of transit centers in the western portions of the Kenosha and Racine urbanized areas, and in certain portions of Waukesha

Table 245 (continued)

| County | Arterial Street and Highway System Cumulative Accident Experience and Cost | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Alternative Plan 1 | | | | Alternative Plan 3 | | | |
| | Property Damage Accidents | Number of Injuries | Number of Fatalities | Cost of Accidents (million dollars) | Property Damage Accidents | Number of Injuries | Number of Fatalities | Cost of Accidents (million dollars) |
| Kenosha County | | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 432 | 313 | 1 | 13 | 454 | 328 | 1 | 13 |
| Standard Arterial . . . . . . . . . . | 5,295 | 2,240 | 12 | 111 | 5,719 | 2,419 | 13 | 120 |
| Subtotal | 5,728 | 2,553 | 13 | 124 | 6,173 | 2,747 | 14 | 133 |
| Milwaukee County | | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 2,643 | 1,914 | 5 | 78 | 2,859 | 2,070 | 6 | 85 |
| Standard Arterial . . . . . . . . . . | 16,900 | 7,150 | 38 | 354 | 19,455 | 8,231 | 44 | 408 |
| Subtotal | 19,543 | 9,064 | 43 | 432 | 22,314 | 10,301 | 50 | 493 |
| Ozaukee County | | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 363 | 263 | 1 | 11 | 422 | 306 | 1 | 13 |
| Standard Arterial . . . . . . . . . . | 2,448 | 1,036 | 6 | 51 | 2,809 | 1,188 | 6 | 59 |
| Subtotal | 2,811 | 1,299 | 7 | 62 | 3,231 | 1,494 | 7 | 72 |
| Racine County | | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 409 | 296 | 1 | 12 | 471 | 341 | 1 | 14 |
| Standard Arterial . . . . . . . . . . | 5,168 | 2,187 | 12 | 108 | 5,868 | 2,482 | 13 | 123 |
| Subtotal | 5,577 | 2,483 | 13 | 120 | 6,339 | 2,823 | 14 | 137 |
| Walworth County | | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 378 | 274 | 1 | 11 | 617 | 447 | 1 | 18 |
| Standard Arterial . . . . . . . . . . | 3,129 | 1,324 | 7 | 66 | 3,133 | 1,326 | 7 | 66 |
| Subtotal | 3,507 | 1,598 | 8 | 77 | 3,750 | 1,773 | 8 | 84 |
| Washington County | | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 762 | 552 | 2 | 23 | 563 | 408 | 1 | 17 |
| Standard Arterial . . . . . . . . . . | 3,188 | 1,349 | 7 | 67 | 3,718 | 1,573 | 8 | 78 |
| Subtotal | 3,950 | 1,901 | 9 | 90 | 4,281 | 1,981 | 9 | 95 |
| Waukesha County | | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 1,389 | 1,006 | 3 | 41 | 1,638 | 1,186 | 3 | 49 |
| Standard Arterial . . . . . . . . . . | 12,624 | 5,341 | 29 | 265 | 13,865 | 5,866 | 31 | 291 |
| Subtotal | 14,013 | 6,347 | 32 | 306 | 15,503 | 7,052 | 34 | 340 |
| Southeastern Wisconsin Region | | | | | | | | |
| Freeway . . . . . . . . . . . . . . . . | 6,376 | 4,618 | 14 | 189 | 7,022 | 5,086 | 14 | 209 |
| Standard Arterial . . . . . . . . . . | 48,752 | 20,627 | 111 | 1,022 | 54,566 | 23,085 | 122 | 1,145 |
| Subtotal | 55,128 | 25,245 | 125 | 1,211 | 61,588 | 28,171 | 136 | 1,354 |
| Transit Systems within Southeastern Wisconsin Region . . . . | 2,174 | 640 | 2 | 19 | 1,682 | 473 | 1 | 15 |
| Total | 57,302 | 25,885 | 127 | 1,230 | 63,270 | 28,644 | 137 | 1,369 |

*Source: SEWRPC.*

County. The transit-center approach to the provision of local transit would permit timed transfers, that is, the simultaneous arrival of all buses at a center and transfer of all passengers.

Standard No. 2 indicates that parking should be provided at park-and-ride transit stations to accommodate the total parking demand generated by trips which change from auto and bicycle to public transit at each station and at carpool lots to accommodate the total parking demand generated by carpool and other ridesharing participants. This standard was assumed to be equally met by each alternative plan as it served as an input to the design of the plans.

Satisfaction of Objectives and Standards

The foregoing discussion concerning the scaling of the alternative regional transportation system plans against the transportation system development objectives and standards is summarized in tabular form in Table 247. This table indicates,

Table 246

COMPARISON OF MOTOR FUEL CONSUMPTION BY VEHICLES TRAVELING IN THE REGION: 1991 AND 2010 NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| Vehicle Type | Annual Motor Fuel Consumption (millions of gallons) | | | |
|---|---|---|---|---|
| | | Proposed 2010 | | |
| | Base Year 1991 | No-Build Transportation System Plan | Alternative Plan 1 | Alternative Plan 3 |
| Street and Highway | 353.2 | 462.3 | 400.0 | 446.5 |
| Transit[a] | 5.7 | 5.8 | 12.1 | 8.2 |
| Total | 358.9 | 468.1 | 412.1 | 454.7 |

NOTE: A 50 percent improvement over the existing average motor fuel efficiency would result in an annual motor fuel consumption of 314.2 million gallons under the no-build plan, 278.9 million gallons under Alternative Plan 1, and 306.0 million gallons under Alternative Plan 3.

The Clean Air Act Amendments of 1990 require that certain centrally fueled fleets in severe ozone nonattainment areas use alternatively fueled vehicles. Therefore, some reductions in the annual amount of motor fuel consumed set forth in the table under each of the alternative plans may be anticipated through the plan design period.

[a]*An average fuel efficiency for transit vehicles of four miles per gallon was assumed in the forecast of annual motor fuel consumption for transit vehicles.*

*Source: SEWRPC.*

based on the foregoing discussion, the relative ability of each of the alternative plans, and the no-build alternative to meet the system development objectives. For the purpose of plan comparison, only the quantitative standards are included in Table 247.

Comparison of Alternative Plan Costs to Estimated Available Revenues

Estimates of the average annual costs and revenues associated with the no-build alternative and Alternative Plans 1 and 3 are set forth in Table 248. The estimates include both the capital and operating costs associated with the arterial street and highway system and with the transit system. The costs and revenues are expressed on an average annual basis for the 16-year period from 1995 through 2010. The estimated average annual revenues set forth in Table 248 reflect assumptions attendant to the continuation of Federal, State, and local revenue streams for highway capital and operating and transit operating and capital purposes (see footnotes of Table 248). All figures are set forth in constant 1994 dollars.

The estimated average annual cost of the no-build alternative is $360 million. The equivalent costs of Alternative Plans 1 and 3 are, respectively, $546 million and $520 million. The principal reason for the difference between the two alternative plans is the greater annual operating cost associated with the more extensive transit system proposed under Alternative Plan 1.

Under the no-build alternative, average annual revenues could be expected to total about $352 million. This results in an estimated average annual shortfall over the plan design period of $8 million. That shortfall occurs in the area of transit capital and operating costs. For perspective, the Advisory Committee directed that an estimate be made of the additional motor fuel tax that would be required to fund any such shortfall. On that basis, an additional one-cent-per-gallon motor fuel tax levied on gasoline and diesel fuel in the Region was found to be sufficient to cover the anticipated shortfall.

Under Alternative Plan 1, average annual revenues could be expected to total about $389 million. This results in an estimated average annual shortfall over the plan design period of $157 million. About 60 percent of the shortfall occurs in the highway area, with the remaining 40 percent occurring in the transit area. An additional 20-cents-per-gallon motor fuel tax would be required to cover the anticipated shortfall. This amount could be raised as part of the assumed doubling of the perceived cost of automobile operation that is an important

# Table 247

## SUMMARY OF RELATIVE ABILITY OF THE NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS TO MEET TRANSPORTATION DEVELOPMENT OBJECTIVES

| Development Objective and Supporting Standards[a] | Year 2010 Alternative Transportation System Plans | | | | | |
|---|---|---|---|---|---|---|
| | No-Build | | Plan 1 | | Plan 3 | |
| **Objective No. 1: Effectively Serve Regional Land Pattern** | Highway | Transit | Highway | Transit | Highway | Transit |
| Percent of Urbanized Area Population within | | | | | | |
| 30 Minutes of 40 Percent of Jobs (30 percent of transit) | 93.6 | 7.1 | 95.2 | 54.4 | 95.2 | 25.8 |
| 35 Minutes of Three Major Retail and Service Centers[b] | 92.9 | 3.6 | 88.1 | 22.7 | 88.1 | 6.6 |
| 40 Minutes of a Major Medical Center or 30 Minutes of a Hospital or Clinic | 100.0 | 49.3 | 100.0 | 65.6 | 100.0 | 54.8 |
| 40 Minutes of a Major Outdoor Recreation Center | 100.0 | 44.5 | 100.0 | 74.6 | 100.0 | 50.4 |
| 40 Minutes of a Higher-Educational Facility | 100.0 | 58.1 | 100.0 | 89.6 | 100.0 | 72.7 |
| 60 Minutes of General Mitchell International Airport | 100.0 | 22.1 | 100.0 | 58.9 | 100.0 | 44.9 |
| **Objective No. 2: Minimize Costs** | | | | | | |
| Sum of Transportation System Capital and Operating Costs | $360 million annually | | $546 million annually | | $520 million annually | |
| Benefit-Cost Ratio | - - | | 1.68 | | 1.18 | |
| **Objective No. 3: Provide Flexible, Balanced Transportation System** | | | | | | |
| Residents Served by Transit | 1,436,500 | | 1,493,900 | | 1,469,700 | |
| Jobs Served by Rapid Transit | 146,700 | | 412,900 | | 408,300 | |
| Local Transit Headways-Peak (Milwaukee County) | 10 to 45 minutes | | 10 to 30 minutes | | 10 to 45 minutes | |
| Rapid Transit Headways-Peak | 15 to 60 minutes | | Five to 30 minutes | | Five to 30 minutes | |
| Percent of Total Trips to Milwaukee Central Business District Made by Transit[c] | 10 | | 15 | | 11 | |
| **Objective No. 4: Minimize Disruption** | | | | | | |
| Residential and Nonresidential Structures to be Dislocated | Residential: 39<br>Nonresidential: 14 | | Residential: 651<br>Nonresidential: 163 | | Residential: 720<br>Nonresidential: 165 | |
| Value of Land Used for Transportation and Terminal Facilities | $4.7 million | | $145.4 million | | $170.7 million | |
| Amount of Property Tax Base Reduction | $3.7 million | | $129.1 million | | $152.7 million | |
| **Objective No. 5: Protect Natural Environment** | | | | | | |
| Acres of Primary Environmental Corridor Land Lost | 15 | | 432 | | 475 | |
| Tons of Air Pollution Emitted per Day | | | | | | |
| Volatile Organic Compounds | 29.8 | | 25.6 | | 28.7 | |
| Nitrogen Oxide | 81.4 | | 71.3 | | 79.9 | |
| Carbon Monoxide | 248.4 | | 211.5 | | 238.2 | |
| Acres of Prime Agricultural Land Lost | 8 | | 1,039 | | 1,644 | |
| **Objective No. 6: Facilities Traffic Flow** | | | | | | |
| Average Weekday Passenger-Hours of Travel | | | | | | |
| Arterial Street and Highway | 1.8 million | | 1.5 million | | 1.7 million | |
| Transit | 50,000 | | 72,000 | | 51,000 | |
| Average Weekday Vehicle-Hours of Travel | | | | | | |
| Arterial Street and Highway | 1.2 million | | 1.0 million | | 1.1 million | |
| Transit | 5,700 | | 9,200 | | 6,700 | |
| Average Weekday Vehicle-Miles of Travel | | | | | | |
| Arterial Street and Highway | 44.5 million | | 38.4 million | | 42.9 million | |
| Transit | 66,000 | | 142,000 | | 97,000 | |
| Percent of Arterial Mileage Operating at and under Design Capacity[d] | 79.5 | | 96.4 | | 95.3 | |
| **Objective No. 7: Reduce Accident Exposure** | | | | | | |
| Percent of Passenger Miles of Travel on Facilities with Lowest Accident Exposure, Transit and Freeways | 39.5 | | 38.4 | | 38.2 | |
| **Objective No. 8: Minimize Energy Consumption** | | | | | | |
| Gallons of Motor Fuel Consumed Annually | 468.1 million | | 412.0 million | | 454.7 million | |
| **Objective No. 9: Facilitate Linked Tripmaking** | | | | | | |
| Average Wait Time at Transit Stops | 11.6 minutes | | 9.1 minutes | | 10.4 minutes | |

[a] *The standards which are listed in this table are all comparative in nature. Standards not listed include those that have been completely met because they served as input to the design of the plans, or those that could be met through proper local or project level planning and plan implementation activities. The standards listed in this table are easily quantifiable and provide a sound basis for determining the relative ability of the alternative plans to meet the transportation development objectives.*

[b] *Or one major retail or service center by transit within the Kenosha and Racine urbanized areas.*

[c] *Does not include those trips made by persons residing in group quarters, trips made by nonresidents of the Region, or trips made by persons in school buses.*

[d] *Volume-to-design-capacity ratio equal to or less than 1.0.*

*Source: SEWRPC.*

## Table 248

### AVERAGE ANNUAL COSTS AND REVENUES ASSOCIATED WITH NO-BUILD AND ALTERNATIVE TRANSPORTATION SYSTEM PLANS IN THE REGION: 1995 THROUGH 2010

| Cost or Revenue Item | No-Build Alternative | Alternative Plan 1 | Alternative Plan 3 |
|---|---|---|---|
| Transportation System Cost[a] (average annual 1995-2010 expressed as millions of dollars) | | | |
| Arterial Street and Highway System | | | |
| Capital | 190 | 298 | 302 |
| Operating[b] | 67 | 68 | 68 |
| Subtotal | 257 | 366 | 370 |
| Transit System | | | |
| Capital | 19 | 65 | 57 |
| Operating | 84 | 115 | 93 |
| Subtotal | 103 | 180 | 150 |
| Total | 360 | 546 | 520 |
| Transportation System Revenue (average annual 1995-2010 expressed as millions of dollars) | | | |
| Highway Capital | | | |
| Federal | 126 | 132 | 132 |
| State | 66 | 66 | 66 |
| Local | 11 | 11 | 11 |
| Subtotal | 203 | 209 | 209 |
| Highway Operating | | | |
| State | 36 | 36 | 36 |
| Local | 28 | 28 | 28 |
| Subtotal | 64 | 64 | 64 |
| Transit Capital | | | |
| Federal | 10 | 23 | 23 |
| Local | 3 | 3 | 3 |
| Subtotal | 16 | 26 | 26 |
| Transit Operating | | | |
| Federal | 6 | 6 | 6 |
| State | 54 | 72 | 61 |
| Local | 12 | 12 | 12 |
| Subtotal | 72 | 90 | 79 |
| Total | 352 | 389 | 378 |
| Cost-Revenue Comparison | | | |
| Average Annual Difference between Cost and Revenue (millions of dollars) | -8 | -157 | -142 |
| Motor Fuel Tax Required to Fund Shortfall (cents per gallon) | 1 | 20 | 18 |

[a] *The costs for Alternative Plans 1 and 3 include a busway/high-occupancy vehicle (HOV) facility and a light-rail line in the East-West Corridor. The busway/HOV cost is part of the highway operating cost ($18 million annually) and the light-rail cost is part of the transit capital cost ($32 million annually). The costs for the system of busway/HOV facilities have also been included in the highway capital costs of these two plans ($58 million annually).*

*The transit operating costs presented in this table are net operating costs, that is, total operating costs less farebox revenues. Estimated current 1993 annual transit farebox revenues in Southeastern Wisconsin are $34 million, total annual operating costs are $97 million, and net annual operating costs are $63 million. Upon full implementation of the paratransit service needed to meet the requirements of the Federal Americans with Disabilities Act of 1990, it is estimated that total and net annual operating costs would substantially increase. This is reflected in the No-Build alternative plan year 2010 total annual operating cost of $119 million in 1994 constant dollars, compared to the current 1993 total operating cost of $97 million.*

*The estimated year 2010 annual total operating costs in constant 1994 dollars are $197 million for Alternative Plan 1 and $143 million for Alternative Plan 3.*

*The estimated year 2010 annual farebox revenues in 1994 constant dollars are $38 million for the No-Build plan, $51 million for Alternative Plan 1, and $42 million for Alternative Plan 3. These farebox revenues were adjusted for this plan cost and revenue comparison to reflect the historic differential impact of general price ridership of increasing fares. The adjusted year 2010 farebox revenues are $32 million for the No-Build plan, $43 million for alternative Plan 1, and $36 million for Alternative Plan 3. The year 2010 annual net operating costs in 1994 constant dollars are $87 million for the No-Build plan, $154 million for Alternative Plan 1, and $107 million for Alternative Plan 3.*

[b] *Highway operating costs include those annual costs associated with snow and ice control, cleaning of arterial street and highway facilities, lighting and signalization, and routine maintenance such as crack sealing and pavement patching.*

*Source: SEWRPC.*

element of Alternative Plan 1. A 20-cents-per-gallon tax increase would represent about one-fifth of the cost increase assumed under Alternative Plan 1.

Under Alternative Plan 3, average annual revenues could be expected to total about $378 million. This results in an estimated average annual shortfall over the plan design period of $142 million. About two-thirds of the shortfall occurs in the highway area with the remaining one-third occurring in the transit area. An additional 18-cents-per-gallon motor fuel tax would be required to cover the anticipated shortfall.

It is important to note that the funding shortfalls attendant to the alternative plans are more substantial than the shortfalls estimated by the Commission in its recent regional transportation authority feasibility study.[1] This is primarily because, unlike the analysis conducted previously, this analysis includes consideration of State trunk highway costs, including reconstruction of the Milwaukee area freeway system busway/HOV facility costs. It also considers a plan implementation period of 16 years, rather than 20 years.

## ADVISORY COMMITTEE RECOMMENDATION FOR PRELIMINARY RECOMMENDED PLAN

After significant deliberation, the Advisory Committee determined that Alternative Plan 3 should be further refined and detailed and advanced as the preliminary recommended plan to be taken to public hearing. The Advisory Committee made that decision based on consideration of the relatively low probability of achieving the significant increases in automobile pricing assumed under Alternative Plan 1 within the plan design period; the additional cost of Alternative Plan 1 and attendant shortfall of available revenues for plan implementation in the absence of significant increases in nonproperty-tax-based revenues for transportation purposes; and the marginal differences between Alternative Plan 1 and Alternative Plan 3 with respect to required arterial highway improvement and expansion.

[1] *See SEWRPC Memorandum Report No. 38, A Regional Transportation Authority Feasibility Study for Southeastern Wisconsin, 1990.*

Compared to the no-build alternative, Alternative Plan 3 provides substantial improvements in transit service and accessibility in the Region and potential substantial reduction in traffic congestion. Alternative Plan 3, however, also has a substantial revenue shortfall with respect to plan implementation. In proposing that Alternative Plan 3 be refined and taken to public hearing as the preliminary recommended plan, the Advisory Committee also recommended that, subject to the exceptions noted below, the busway/HOV lanes in the plan, together with the express light-rail/bus guideway and commuter rail lines in the plan, be identified as potential future guideway facilities. These potential future facilities would be confirmed as integral parts of the plan, and subsequently implemented, only upon the completion of corridor major investment studies as required by Federal regulations. An important part of such corridor studies is the identification of funding sources for any additional guideway facilities recommended to be added to the plan and then implemented. The exceptions to the foregoing consist of the following guideway facilities:

1. A busway/HOV lane guideway in the east-west freeway corridor, from about N. 4th Street in the City of Milwaukee west to the STH 164 interchange in the City of Waukesha and Town of Pewaukee.

2. An express light-rail guideway in the east-west travel corridor, from the Milwaukee CBD to the Milwaukee Regional Medical Center.

3. An express light-rail guideway in the northeast travel corridor, from the Milwaukee CBD to the University of Wisconsin-Milwaukee campus and Village of Glendale area.

These guideway facilities were included as integral parts of the preliminary recommended plan based upon the preliminary results of a corridor major investment study being conducted by the Wisconsin Department of Transportation at the time of the preparation of the plan.[2]

[2] *The formal name of the referenced major investment study sponsored by the Wisconsin Department of Transportation is "Milwaukee East/West Corridor Transit Study." The study had proceeded to the point of a draft Environmental Impact Statement as of summer 1994.*

## SUMMARY AND CONCLUSIONS

This chapter has described two complete alternative regional transportation system plans considered in the preparation of a new regional transportation system plan for Southeastern Wisconsin. The chapter presents the results of an evaluation and a comparison of these plans against agreed-upon transportation system development objectives and supporting standards. Both alternatives contain three elements: transportation system management, public transit system maintenance and improvement, and arterial street and highway system maintenance and improvement. The arterial improvements were added to resolve remaining transportation deficiencies identified through the testing of the alternative transportation system management plans described in Chapter IX of this report.

In the category of transportation system management, each plan includes traffic management measures, such as peak-period curb-lane parking restrictions and freeway operational control, and areawide promotional measures to promote carpooling, vanpooling, and telecommuting. In addition, Alternative Plan 1 proposes to approximately double the perceived cost of driving to $0.11 per mile, the equivalent of a $1.10 increase in the motor fuel tax, and assumes the implementation by local units of government of land use and site design plans to moderate travel demand. Both alternative plans would improve and expand the public transit system, albeit Alternative Plan 1 envisions a much greater increase in transit service: a 124 percent increase as measured in vehicle-miles of service, compared to a 53 percent increase under Alternative Plan 3.

Despite the substantial increase in transit service and the emphasis on travel demand management, the bulk of travel under Alternative Plan 1, as under Alternative Plan 3, may be expected to occur on the arterial street and highway system. Consequently, the envisioned scale of arterial system improvement is similar under both plans. Under Alternative Plan 1, 112 new route-miles would be constructed, compared to 124 route-miles under Alternative Plan 3; 382 route-miles would be widened for additional capacity, compared to 410 route-miles under Alternative Plan 3. A summary of the elements comprising the alternative plans and the costs and revenues associated with these alternatives is set forth in Table 203 and 248, respectively.

The evaluation and comparison of the alternative plans indicated that the principal difference between the plans was the use of the highway system: Alternative Plan 1 would generate over 10 percent less vehicle-miles of travel than Alternative Plan 3. This difference is principally the result of the pricing measures assumed under Alternative Plan 1. Alternative Plan 1 would also result in the emission of 11 percent fewer tons of volatile organic compounds per day, 11 percent fewer tons of nitrogen oxides per day, and 11 percent fewer tons of carbon monoxide per day, and about 9 percent fewer gallons of motor fuel consumed annually. Alternative Plan 1 would also have a substantially higher benefit-cost ratio than Alternative Plan 3, providing $1.68 in benefits for every dollar invested in implementing the plan. This compares to $1.18 under Alternative Plan 3. Because Alternative Plan 1 proposes similar arterial street and highway improvements as Alternative Plan 3 and substantially greater transit system improvements, its total cost is about 5 percent higher than the cost of Alternative Plan 3.

Finding a low probability of achieving the automobile pricing increases of Alternative Plan 1 within the plan design period, finding Alternative Plan 1 to have higher costs and higher attendant shortfalls of available revenues, and finding marginal differences between Alternative Plans 1 and 3 with respect to needed arterial highway improvements, the Advisory Committee selected Alternative Plan 3 for refinement and advancement to public hearing as the preliminary recommended plan.

# Chapter XI

# RECOMMENDED YEAR 2010 REGIONAL TRANSPORTATION SYSTEM PLAN

## INTRODUCTION

As described in Chapter X of this report, the Commission's Technical Coordinating and Advisory Committee on Regional Transportation System Planning recommended that three alternative plans be fully evaluated and tested as a basis for the selection of a preliminary recommended plan to be taken to public hearing. Upon careful consideration of the three alternative plans, the Committee determined that the alternative known as Alternative Plan 3 should become the basis for the design of a recommended plan which would be submitted to public review. The public review process began at a Regional Planning Conference held on June 27, 1994, and extended through the summer of 1994. This chapter describes the preliminary recommended plan taken to public hearing, summarizes the public review comments received regarding the preliminary plan, describes the changes made to the preliminary plan in response to the comments received, and describes the final year 2010 regional transportation system plan recommended for adoption. In selecting Alternative Plan 3 as the basis for the preliminary recommended plan, the Advisory Committee did not select the no-build plan and the alternative known as Alternative Plan 1. The no-build plan proposed no significant improvements in transportation facilities and services over those improvements which were considered to be committed, that is, programmed for implementation in the annual element of the 1993 through 1998 Transportation Improvement Program for Southeastern Wisconsin. The Committee rejected the no-build plan, finding the limited scope of improvements proposed therein inadequate to provide the levels of highways and transit service deemed essential to the continuous sound social and economic development and redevelopment of the Region.

The Committee also chose not to select Alternative Plan 1. Alternative Plan 1 proposed substantial increases in automobile operating costs as a measure to moderate travel demand, particularly the use of the single-occupancy automobile, as well as substantial improvements to the public transit system in the Region. The Committee made the decision not to select Alternative Plan 1 because of the relatively low probability of achieving, within the plan design period, the significant increases in automobile pricing assumed under that plan; the additional costs of the plan and attendant shortfall with respect to available revenues for plan implementation in the absence of a significant increase in nonproperty tax-based revenues for transportation purposes; and the marginal differences between Alternative Plans 1 and 3 with respect to required arterial highway improvement and expansion.

Upon selecting Alternative Plan 3 as the basis for the preliminary recommended plan, the Advisory Committee recommended that certain changes be made to the level of transit improvement and expansion proposed in that alternative plan to improve the accessibility provided by local transit service. The following changes were made to the local public transit service initially envisioned under Alternative Plan 3.

- Peak-period headways on major Milwaukee County transit routes in the area south of Silver Spring Drive, east of 76th Street, and north of Layton Avenue were reduced from the 10 to 40 minutes assumed under Alternative Plan 3 to 10 minutes.

- Peak-period headways in the Kenosha and Racine urban areas were reduced from the 20 to 30 minutes assumed under the Alternative Plan 3 to 15 to 30 minutes.

- Peak-period headways in the Waukesha urban area were reduced from the 30 minutes on some routes and 60 minutes on other routes assumed under Alternative Plan 3 to 30 minutes on all routes.

- Local transit routes within all three urbanized areas of the Region were expanded. Within the Milwaukee urbanized area, about 160 route-miles would be added to the system initially proposed under Alternative Plan 3; within the Racine urbanized area, about 20 route-miles would be added; and within the Kenosha urbanized area, about 20 route-miles would be added.

The changes made in the frequency and extent of local transit service in the Milwaukee, Kenosha, Racine, and Waukesha areas have served to increase the level of vehicle-miles and vehicle-hours of transit service provided on an average weekday. Under the preliminary recommended plan, therefore, 72,300 revenue vehicle-miles of local transit service would be provided within the Region, an increase of 11,700 vehicle-miles, or 19 percent, over that proposed under Alternative Plan 3. Similarly, 5,800 revenue vehicle-hours of local transit service would be provided within the Region, an increase of 700 vehicle-hours, or 14 percent, over that proposed under Alternative Plan 3.

As a result of these improvements in transit service levels, transit ridership may be expected to reach about 197,000 revenue passengers per average weekday, an increment of about 5 percent over the 187,000 revenue passengers per weekday forecast under Alternative Plan 3. The expansion and improvement of local transit service envisioned under the preliminary recommended plan would require that 760 vehicles operate during peak travel periods within the Region, or 93 more than would be required to operate under Alternative Plan 3.

## THE PRELIMINARY RECOMMENDED YEAR 2010 REGIONAL TRANSPORTATION SYSTEM PLAN

The preliminary year 2010 regional transportation system plan consists of recommendations in three major component areas: transportation systems management, public transit, and arterial street and highways.

### Transportation Systems Management

The preliminary plan proposes the use of transportation systems management measures to ensure more efficient use of existing transportation facilities before commitments are made to new capital investment; to encourage use of high-occupancy vehicles, including buses, vanpools, and carpools; to reduce vehicle use, primarily in congested areas; to effect motor fuel savings; and to modify travel demand through reductions in vehicular travel during peak periods, thereby better adjusting travel demand to the available transportation system capacity. The preliminary recommended plan also proposes transit improvements and areawide coordinated efforts to promote carpooling, vanpooling, telecommuting, and work schedule changes which would assist in implementation of the Employee Commute Options program.

Comprehensive Freeway Traffic Management System: The preliminary plan includes the implementation of the long-planned Milwaukee area freeway traffic management system. This system would provide the means to monitor traffic flows system-wide and to regulate access to the freeways on the basis of current "real-time" traffic conditions. The system would also provide preferential access to buses and other high-occupancy vehicles, a central traffic management center, incident management procedures, and a motorist advisory information and assistance service.

Curb-Lane Parking Restrictions: The preliminary plan recommends that, as necessary, curb-lane parking on arterial streets be prohibited during peak hours of travel in order to ensure that all available arterial capacity is effectively used. The plan identifies 464 miles of the 3,614-mile arterial system where it is envisioned that curb-lane parking restrictions will be necessary. In some cases such restrictions have already been placed into effect. In other cases it will be necessary for municipalities to restrict on-street parking as traffic volumes increase over time.

Traffic Management: The preliminary plan recommends the use of traffic engineering practices, including synchronized traffic signalization, the provision of right- and left-turn lanes at major intersections, and proper spacing of driveway and local street intersections, to assist in achieving efficient traffic flow on arterial facilities. The plan also recognizes, in accordance with the regional bicycle and pedestrian facilities plan, that arrangements to facilitate pedestrian and bicycle movements must be considered in all traffic engineering activities and in the design of new or widened arterial streets and highways.

Intelligent Transportation Systems (ITS): While the aforereferenced traffic management measures are currently applicable within the Region, by the year 2010 the application of more advanced traffic management technology known as Intelligent Transportation Systems may become practical. Advanced traffic management systems (ATMS) technology is currently being applied by the Wisconsin Department of Transportation as part of the Department efforts to implement the freeway traffic management system recommended in the second-generation regional transportation system plan. Other elements of ITS that may have future application within the Region include advanced travel information systems (ATIS), which provide travelers with "real-time" information on route-specific traffic conditions; advanced public transportation systems (APTS), which facilitate transit use by providing "real-time" transit vehicle location and scheduling information to transit users; commercial vehicle operations (CVO) technology, which automates commercial vehicle licensing, registration, and toll collection; advanced rural transportation systems (ARTS), which provide up-to-date reports of weather and road condition to rural highway users; and advanced vehicle control systems (AVCS), the in-vehicle technology which may improve the safety and efficiency of automobile travel.

Areawide Carpooling Promotion Measures: The preliminary plan recommends a coordinated areawide effort to promote travel through ride-sharing, transit use, and bicycle use. This effort would aggressively promote carpooling and vanpooling, as well as telecommuting and work time rescheduling programs, to reduce automobile travel, particularly during peak periods and by single-occupancy vehicles. In addition, the plan would include the promotion and support of transportation management associations throughout the Region to provide an institutional structure for helping to achieve the goal of reducing travel by single-occupancy vehicles during peak travel periods.

Land Use Measures: The preliminary plan recommends that local units of government in the Region give careful attention to detailed, site-specific land use planning in an effort to reduce the number of automobile trips, to reduce the length of automobile trips, to promote travel by transit, and to facilitate bicycle and pedestrian travel. The plan, therefore, proposes the use of appropriate land use regulation to promote a coordinated mix of land use activities in newly developing areas, higher-density development near transit lines and stations, orientation of buildings on sites in a manner which facilitates transit use, and integrated bicycle and pedestrian circulation systems. The plan envisions that as new neighborhoods are developed and older neighborhoods are redeveloped, detailed land use and community facility plans would be prepared and implemented that would be in accord with the aforementioned recommendations.

In recognition of the relationship between regional patterns of land use development and travel demand, the plan further proposes that county and local units of government within the Region employ the regional land use plan as a guide in making decisions regarding urban development. In this regard, the plan envisions that county and local units of government would institute land use policies that would serve to implement the adopted regional land use plan, helping to direct the type, extent, location, timing, and rate of urban development in accordance with that plan. Such development policies would provide that urban development occur in planned neighborhood units or in planned major activity centers and only in areas covered by soils suitable for urban use, not subject to such special hazards as flooding, and readily provided with essential urban services including sanitary sewerage, public water supply, and public mass transit.

Public Transit

The preliminary recommended plan calls for major increases in the levels of rapid and express transit service, as well as increases in the level of local service provided (see Table 249). The plan proposes the development of a true system of rapid and express routes integrated with local transit service. Rapid transit routes would operate within all major travel corridors oriented to the Milwaukee central business district (CBD) and express transit would operate in a grid pattern of routes within Milwaukee County. In total, the plan proposes a 72 percent increase in transit service as measured by vehicle-miles of transit service provided, from 63,300 in 1991 to 108,600 in 2010. This increase embodies the combined effects of proposed improvements in the frequency of operation of rapid and express transit and the additions and extensions of rapid and express transit routes. The plan also proposes a 28 percent increase in local transit service as measured by vehicle miles of service provided. The transit recommendations shown in graphic summary form on Map 105 include the following.

Rapid Transit: The preliminary recommended plan proposes that the existing freeway flyer bus service within the Region continue to be operated from the Milwaukee CBD to the southwest to the Village of Mukwonago and to the west to

Table 249

TRANSIT SYSTEM OPERATING CHARACTERISTICS IN THE REGION: 1991 AND 2010 PRELIMINARY RECOMMENDED PLAN

| Transit Service | Base Year 1991 | Planned Increment | | 2010 |
|---|---|---|---|---|
| | | Number | Percent | |
| Round-Trip Route Length (miles) | | | | |
| Rapid Routes | 449 | 761 | 169.5 | 1,210 |
| Express Routes | 393 | -3 | -0.8 | 390 |
| Local Routes | | | | |
| Kenosha Urbanized Area | 171 | 39 | 22.8 | 210 |
| Milwaukee Urbanized Area | 1,112 | 338 | 30.4 | 1,450 |
| Racine Urbanized Area | 171 | 29 | 17.0 | 200 |
| Subtotal | 1,454 | 406 | 27.9 | 1,860 |
| Total | 2,296 | 1,164 | 50.7 | 3,460 |
| Average Weekday Vehicle Requirements[a] | | | | |
| Peak Period | 530 | 230 | 43.4 | 760 |
| Midday Off-Peak Period | 285 | 62 | 21.8 | 347 |
| Revenue Vehicle-Miles (average weekday) | | | | |
| Rapid | 3,400 | 12,500 | 367.6 | 15,900 |
| Express | 3,300 | 17,100 | 518.2 | 20,400 |
| Local | 56,600 | 15,700 | 27.7 | 72,300 |
| Total | 63,300 | 45,300 | 71.6 | 108,600 |
| Revenue Vehicle-Hours (average weekday) | | | | |
| Rapid | 170 | 430 | 252.9 | 600 |
| Express | 170 | 830 | 488.2 | 1,000 |
| Local | 4,880 | 920 | 18.9 | 5,800 |
| Total | 5,220 | 2,180 | 41.8 | 7,400 |

*[a]Represents only the vehicles required for daily system operation. Excludes vehicles needed as spare or backup.*

*Source: SEWRPC.*

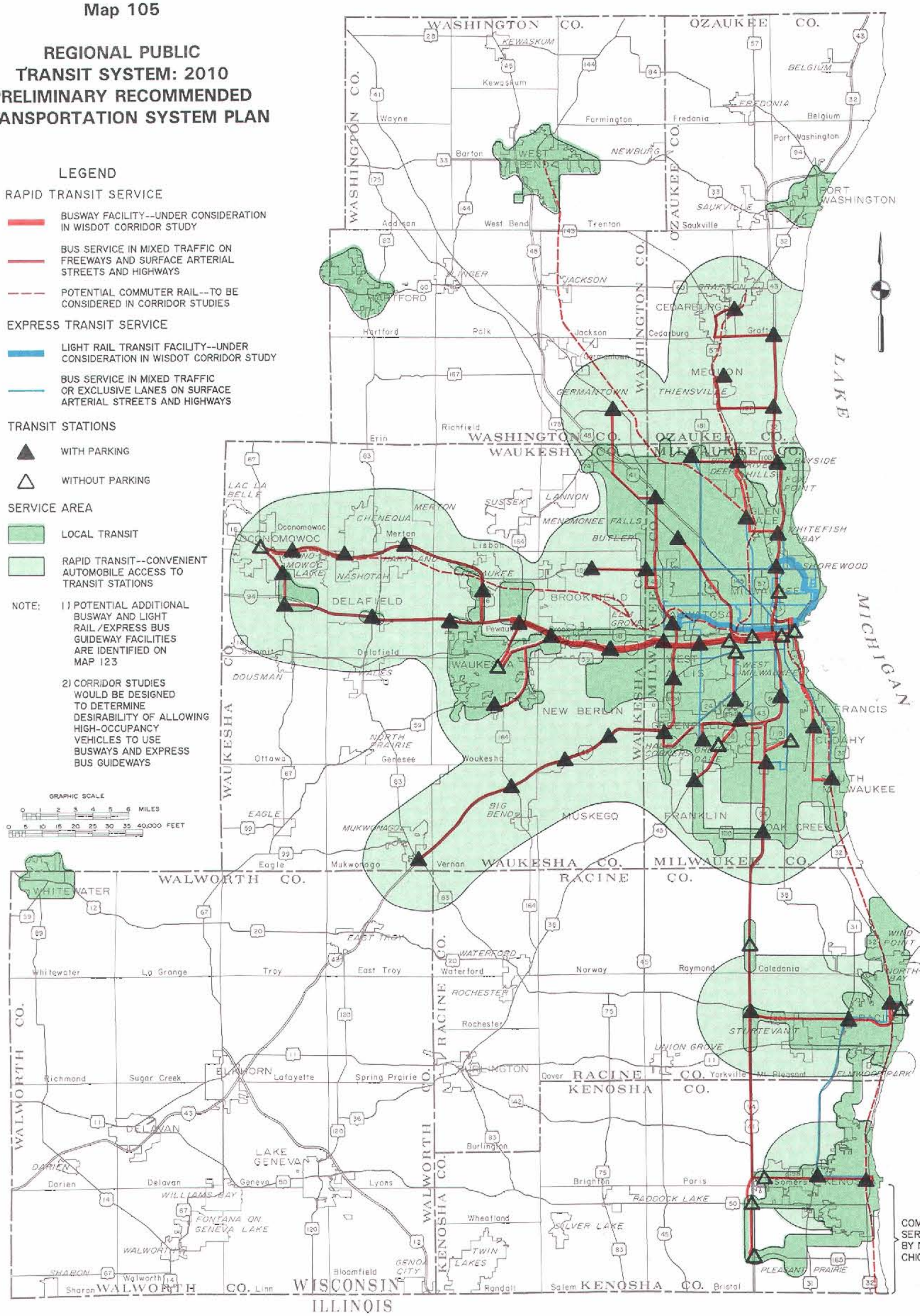
the Cities of Waukesha and Oconomowoc. The plan also calls for the expansion of such service in the south corridor to the Cities of Racine and Kenosha, in the northwest corridor from its current terminus at the Pilgrim Road transit station to the Village of Germantown, and in the IH 43 north corridor from its current terminus at the Brown Deer Road transit station in River Hills to the City of Cedarburg and Village of Grafton. The rapid transit system envisioned would provide relatively fast and convenient service in all major travel corridors connecting major activity centers in the Region with the Milwaukee CBD. The network of rapid transit routes is shown in red on Map 105.

In all, 28 rapid transit freeway flyer routes, 25 oriented to the Milwaukee CBD and three to the University of Wisconsin-Milwaukee campus, would be operated over 1,210 round-trip route-miles. The rapid transit system would be served by 65 transit stations, spaced about every three to five miles. In 1991, the base year for the new plan, 13 rapid transit freeway flyer routes were operated over 449 round-trip route-miles within the Region. The planned service also differs from existing service in that the planned rapid transit system would serve intermediate stations and would provide service in both directions during both peak periods.

Central to the expansion of rapid transit service proposed under the recommended plan is the planned increase in the number of miles and hours transit vehicles would operate on an average weekday. In this regard, the plan recommends that the number of rapid transit revenue vehicle-miles of service provided be increased by 12,500 vehicle-miles, from 3,400 in 1991 to 15,900 by 2010. Similarly, the plan

## Map 105

# REGIONAL PUBLIC TRANSIT SYSTEM: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN




The preliminary recommended plan proposes to extend rapid transit service within all major Milwaukee-oriented travel corridors; to provide a comprehensive system of express transit routes, particularly within Milwaukee County, and to expand local transit service areas as urban development proceeds in conformance with the adopted regional land use plan. By the year 2010, the transit system envisioned under the preliminary recommended plan would consist of about 3,460 round-trip route-miles, about 51 percent greater than the level provided in 1991. The planned transit system would provide 108,600 revenue vehicle-miles of service per average weekday, or about 72 percent more than in 1991, and 7,400 revenue vehicle-hours of service per average weekday, or about 30 percent more than in 1991.



*Source: SEWRPC.*

recommends that the number of rapid transit revenue hours be increased by 430 vehicle-hours, from 170 in 1991 to 600 by 2010.

The plan also identifies a potential system of almost 49 miles of exclusive busway and high-occupancy vehicle (HOV) facilities. These facilities would be located within, or parallel to, the most heavily congested freeway corridors. The ultimate decisions concerning the provision of exclusive busways or combined busway and HOV facilities would be made through detailed corridor studies. If corridor studies determine that the implementation of busway facilities should not be pursued, rapid transit service would continue to be provided in mixed traffic over existing freeway lanes. The corridor studies would also determine whether or not high-occupancy vehicles would operate on the busways that might be constructed. One such study for the east-west corridor between the Cities of Waukesha and Milwaukee is now underway under the sponsorship of the Wisconsin Department of Transportation. Only this busway and its attendant costs have been included in the preliminary plan.

The rapid transit service provided under the preliminary plan would operate primarily during peak periods, that is, between 6:00 a.m. and 8:30 a.m. and 3:30 p.m. and 6:00 p.m. on weekdays. Midday service over some routes would be provided. No weekend or evening service would be provided. Headways on the rapid transit system would range from five to 30 minutes during peak periods, and 30 to 60 minutes during off-peak periods over those routes provided with service during the midday.

The fares for rapid transit service would remain at 1994 levels. The freeway flyer rapid transit bus fare for a trip within Milwaukee County would be $1.50. The fare charged for a trip between points within Milwaukee County and the limits of the Milwaukee urbanized area would be $2.00. The fare charged for a trip between the Milwaukee CBD and the outer limits of the rapid transit system would be $3.00. It is assumed that these fares would increase over the plan design period only with general price inflation.

The preliminary plan also recognizes the potential to establish commuter railway passenger train service as an alternative to freeway flyer or exclusive busway rapid transit service in four major travel corridors: from Milwaukee to Racine and Kenosha, from Milwaukee to Oconomowoc, from Milwaukee to West Bend, and from Milwaukee to Cedarburg and Grafton (see Map 105). Detailed corridor studies would be required to determine whether or not to add such commuter rail service to the regional plan for implementation, as well as to identify funding sources.

Express Transit

The express level of transit service envisioned in the plan would operate over arterial streets with stops generally located at intersecting arterial streets and at intersecting rapid and express transit routes. Express service is distinguished from rapid service in that it provides a greater degree of accessibility at somewhat slower overall operating speeds. The preliminary plan proposes that 12 regular express transit bus routes be provided in a grid pattern, largely within Milwaukee County. In 1991, seven regular express transit routes were in place. Within the Milwaukee urbanized area, the express transit would be provided in major travel corridors to connect major activity centers to the Milwaukee CBD. One express transit route would also connect the Cities of Racine and Kenosha, although this route could be replaced by commuter rail service. The planned express routes are shown in blue on Map 105.

The preliminary plan also proposes light-rail express transit in both the east-west and northeast travel corridors in Milwaukee County, as shown on Map 105. The necessary corridor studies are currently being conducted by the Wisconsin Department of Transportation. Four other travel corridors have been identified with potential for light-rail express transit service. These include the Milwaukee CBD to the South Milwaukee area, the Milwaukee CBD to the General Mitchell International Airport, the 27th Street crosstown corridor to the Southridge Shopping Center, and the Milwaukee CBD to the Northridge Shopping Center. The feasibility of light rail in these corridors would be determined through Federally required major investment studies.

The frequency of operation of transit vehicles over express routes would be significantly increased. As shown in Table 249, the plan envisions that the number of vehicle-miles provided on an average weekday would increase by 17,100 vehicle-miles, from about 3,300 in 1991 to about 20,400. Similarly, vehicle-hours of express service provided on an average weekday would increase by 830 vehicle-hours, from 170 in 1991 to 1000 in 2010.

Express transit service would be provided on weekdays from 6:00 a.m. to 6:00 p.m. on all routes and during weekday evenings and weekends on some routes. Peak-period headways would range from five to 15 minutes in the Milwaukee urbanized area to 30 minutes on the route connecting Racine and Kenosha. Off-peak headways would range from 10 to 30 minutes within the Milwaukee urbanized area to 60 minutes on the Racine-Kenosha route. Express transit fares would remain at 1994 levels, that is, $1.25 in Milwaukee County and $0.75 on the Racine-Kenosha route. It is assumed that these fares would increase over the plan design period only with general price inflation.

Local Transit: The local level of service envisioned in the plan consists of buses operating over arterial and collector streets with frequent stops for passenger boarding and alighting. Local fixed-route service would continue to be provided within Milwaukee County and the Cities of Waukesha, Racine, and Kenosha and their immediate environs. The preliminary recommended plan proposes to expand local transit service into residential areas of high and medium density. As shown on Map 105, these areas of expanded service are generally located in southern and northern Milwaukee County and in the most heavily developed portions of Waukesha County. As proposed under the preliminary plan, local transit service would operate over 1,860 round-trip route-miles within the Region, an increase of 406 route-miles, or 28 percent, over the approximately 1,454 route-miles provided in 1991.

The frequency of local transit service would be improved over 1991 levels. Within Milwaukee County peak-period headways on the major routes in the area south of Silver Spring Drive, east of 76th Street, and north of Layton Avenue would be improved from 10 to 40 minutes to 10 minutes. Peak-period headways in the Racine and Kenosha urban areas would be improved from 20 to 30 minutes to 15 to 30 minutes. Peak-period headways in the Waukesha urban area would be improved such that all routes would operate at 30 minute headways.

As already indicated, under the preliminary recommended plan, local transit fares would remain at 1994 levels. Accordingly, fares within Milwaukee County would be $1.25; within Racine, $0.60; and within Waukesha and Kenosha, $0.75, increasing only with general price inflation. The preliminary recommended plan also recognizes the need to provide local transit service in the small urban communities of the Region, particularly through shared-ride taxi service.

The recommended plan also includes a paratransit service component which is consistent with the Americans with Disabilities Act (ADA) of 1990. Accordingly, the plan assumes that all transit vehicles that provide conventional fixed-route transit service would be accessible to persons with disabilities, including persons using wheelchairs. This assumption is reflected in the capital cost estimate for transit vehicle fleet replacement and expansion under the recommended plan. The plan also ensures that all public entities operating fixed-route transit systems will provide comparable paratransit service to those disabled persons within local transit service areas who are unable to use fixed-route transit services. Accordingly, the complementary paratransit services currently provided within the Region would continue to be operated and expanded, consistent with the planned expansion of local transit service areas within the Kenosha, Milwaukee, and Racine urbanized areas.

Like existing complementary paratransit services provided within the Region, the planned paratransit services would meet Federally specified ADA eligibility and service requirements. In this respect, the complementary paratransit services would serve any person with a permanent or temporary disability who is unable independently to board, ride, or disembark from an accessible vehicle used to provide fixed-route transit service, who is capable of using an accessible vehicle, but one is not available for the desired trip, or who is unable to travel to or from the boarding or disembarking location of the fixed-route transit service. Within a given area, the planned paratransit service would be available during the same hours and on the same days as the fixed-route transit service, would be provided to eligible persons on a "next day" trip reservation basis, would not limit service to eligible persons based on restrictions or priorities relative to trip purpose, and would not be operated under capacity constraints which might limit the ability of eligible persons to receive service for a particular trip. The paratransit service fares assumed under the preliminary recommended plan would range from about $1.20 to $2.50 per one-way trip.

Arterial Street and Highway System

In 1991, the arterial street and highway system in the Region consisted of about 3,274 route-miles of facilities. Under the preliminary recommended plan, the arterial system would be increased by about 340 route-miles, to 3,614 route-miles and 10,208 lane-miles, by the year 2010 (see Map 106). The additional arterial mileage reflects primarily the conversion of existing nonarterial facilities to arterial status and function as urban development proceeds within the Region. The proposed arterial street and highway improvements are shown in summary form for each county on Maps 107 through 113 and are set forth by county and by arterial facility type in Table 250. The preliminary recommended plan includes the following improvements to the arterial street and highway system.

System Expansion: Constructing New Facilities: System expansion includes all projects which would significantly increase the capacity of the existing system through construction of new facilities. The plan would provide for the construction of 128 route-miles and 331 lane-miles of new arterial facilities. These include such long-planned facilities as the Lake Parkway south from the Hoan Bridge to E. Layton Avenue, the STH 16 freeway bypass of Oconomowoc, the completion of the Waukesha bypass, the STH 36 bypass of Burlington, and the completion of the USH 12 freeway in Walworth County. Excluded from the plan are the previously planned STH 83 bypass of the Village of Chenequa in Waukesha County and the Lake Arterial through southern Milwaukee County and eastern Racine and Kenosha Counties. In all, proposed new arterial street and highway facilities would represent about 3 percent of both the total planned arterial route-miles and lane-miles.

System Improvement: Widening Existing Facilities: System improvement includes all projects which would significantly increase the capacity of the existing system through street widening or relocation. Under the preliminary plan, 418 route-miles of facilities would be widened to provide an additional 1,713 arterial lane-miles. Proposed improvements would include the widening of STH 36 in Milwaukee, Waukesha, and Racine Counties; Pewaukee Road (CTH J) in Washington and Waukesha Counties; Cleveland Avenue (CTH D) and Racine Avenue (CTH Y) in Waukesha County; STH 31 and CTH Y in Kenosha and Racine Counties; Northwestern Avenue (CTH K) and Spring Street (CTH C) in Racine County; STH 57 and Port Washington Road (CTH W) in Ozaukee County; STH 33 in Ozaukee and Washington Counties; Sherman Boulevard (CTH G) and Rawson Avenue (CTH BB) in Milwaukee County; and the completion of the widening of STH 50 in Kenosha and Walworth Counties. The system improvement activities would comprise about 12 percent of the total planned route-miles and 17 percent of the total planned lane-miles.

System Preservation: Maintaining Existing Facilities: System preservation includes all arterial improvement projects required to maintain the structural adequacy and serviceability of the existing arterial system without significantly increasing the capacity of that system. This would include all projects classified as resurfacing and reconstruction for the same capacity. The preliminary plan proposes system preservation activities for about 3,068 route-miles and 8,164 lane-miles, representing about 85 percent of the total planned route-miles and 80 percent of the total planned lane-miles. Important preservation actions would include the pavement, bridge, and intersection restoration and reconfiguration work needed to maintain and modernize the Milwaukee area freeway system, which will reach the end of its physical life during the plan implementation period.

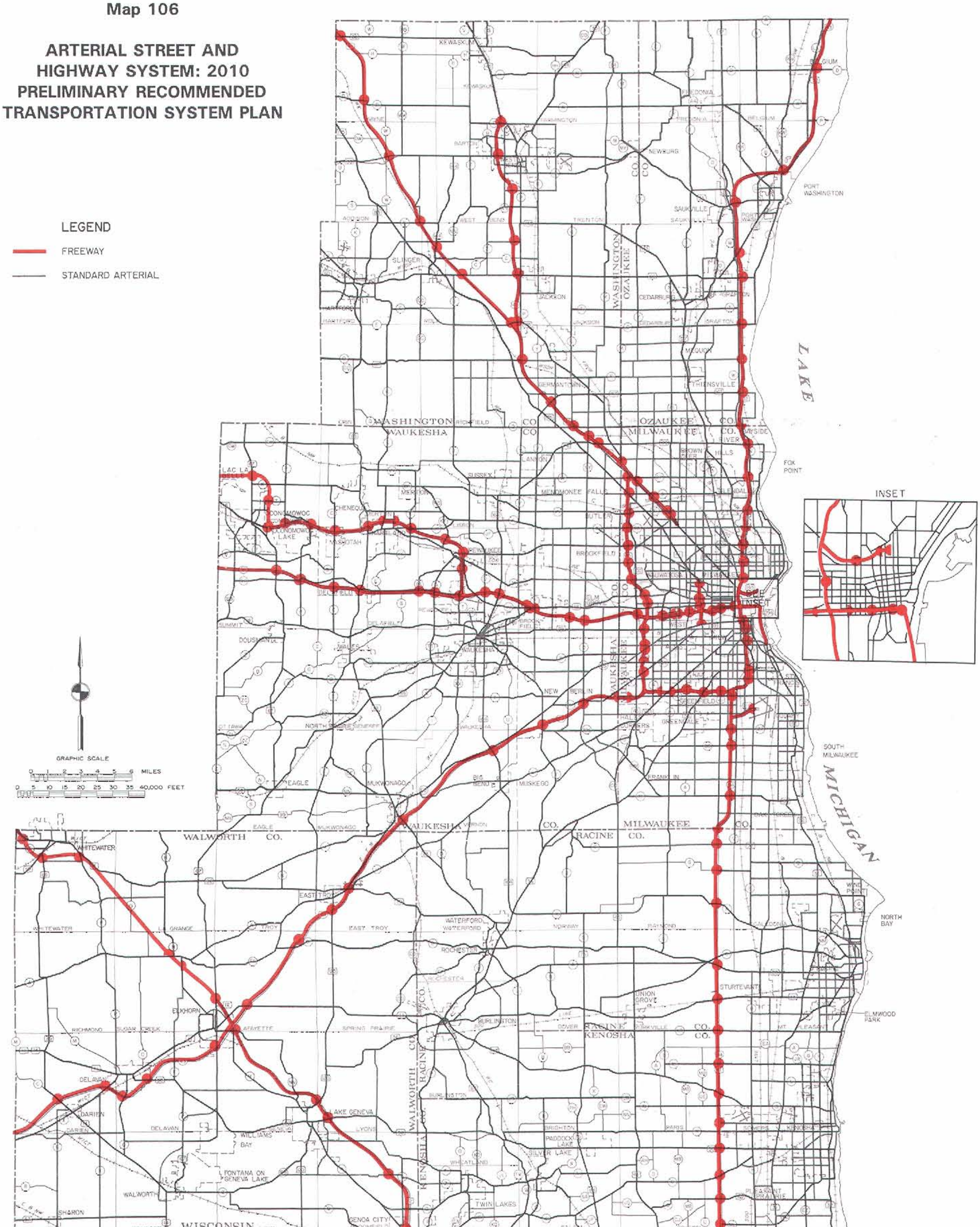
## PLAN PERFORMANCE AND COSTS

Selected characteristics of the preliminary recommended regional transportation system plan for 2010 are identified in Tables 251 and 252. The number of internal person trips generated within the Region on an average weekday is expected to increase under the plan from 5.54 million in 1991 to about 6.10 million in the year 2010, or by about 10 percent. The number of transit trips made on an average weekday is expected to increase from about 172,200 in 1991 to about 196,600 in the year 2010, or by about 14 percent, assuming the transit plan recommendations are implemented. Despite this increase in daily transit tripmaking, the proportion of total internal person trips made by transit would remain at about 3 percent over the plan design period.

The number of vehicle-miles of travel within the Region on an average weekday is expected to increase by about 29 percent, from about 33.07 million in 1991 to about 42.70 million in 2010. Of the latter total, about 16 million vehicle-miles of

Map 106

## ARTERIAL STREET AND HIGHWAY SYSTEM: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN

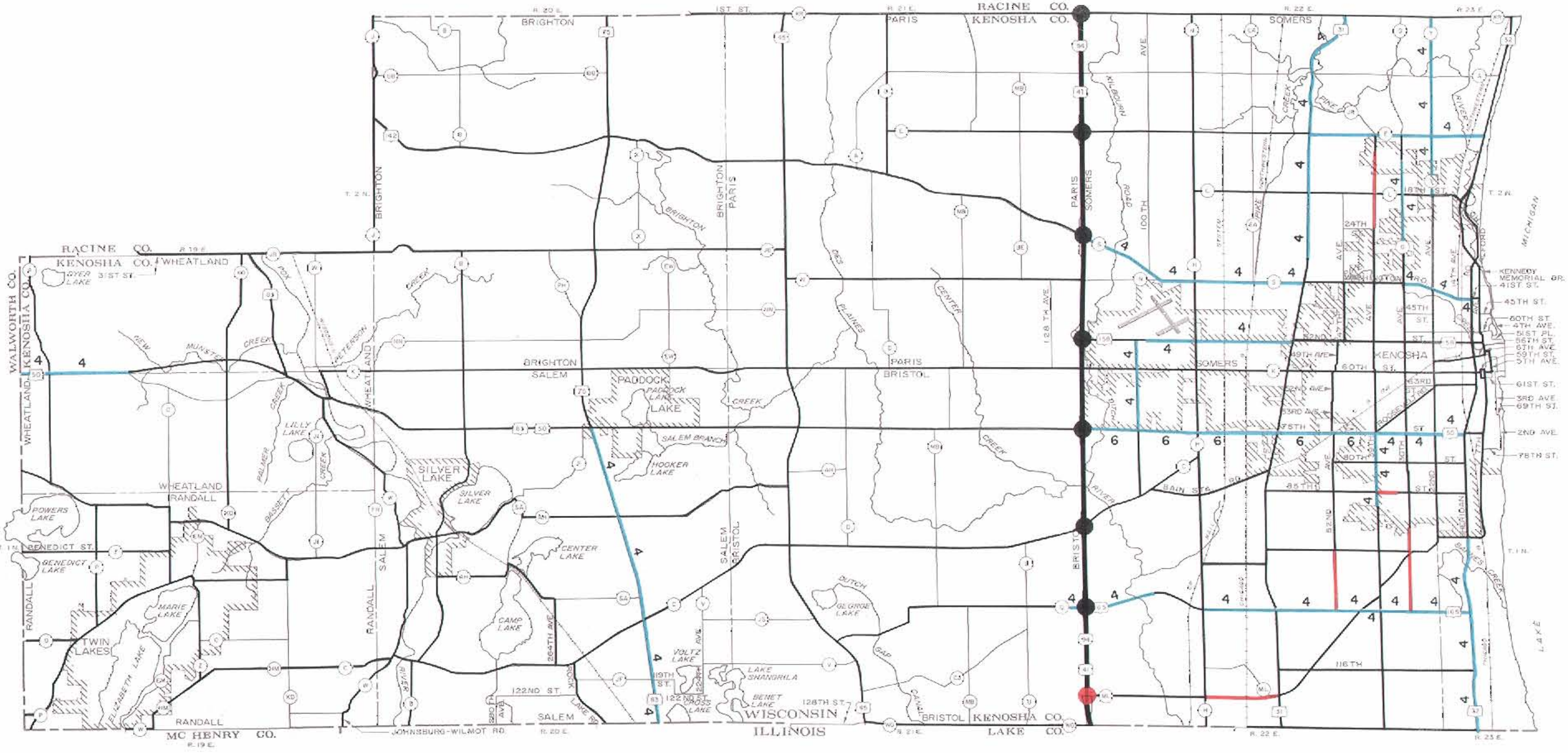



The arterial street and highway system under the preliminary recommended plan would total 3,614 route-miles and 10,208 lane-miles of facility. The plan would provide for the construction of 128 route-miles and 331 lane-miles; for the widening of 418 route-miles, which would provide an additional 1,713 lane-miles; and for the preservation of 3,068 route-miles and 8,164 lane-miles of arterial street and highway facilities.

*Source: SEWRPC.*

## Map 107

## FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN KENOSHA COUNTY: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN




**LEGEND**

ARTERIAL STREET OR HIGHWAY

- NEW
- WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY
- RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY
- 4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

GRAPHIC SCALE

0 1/2 1 2 MILES

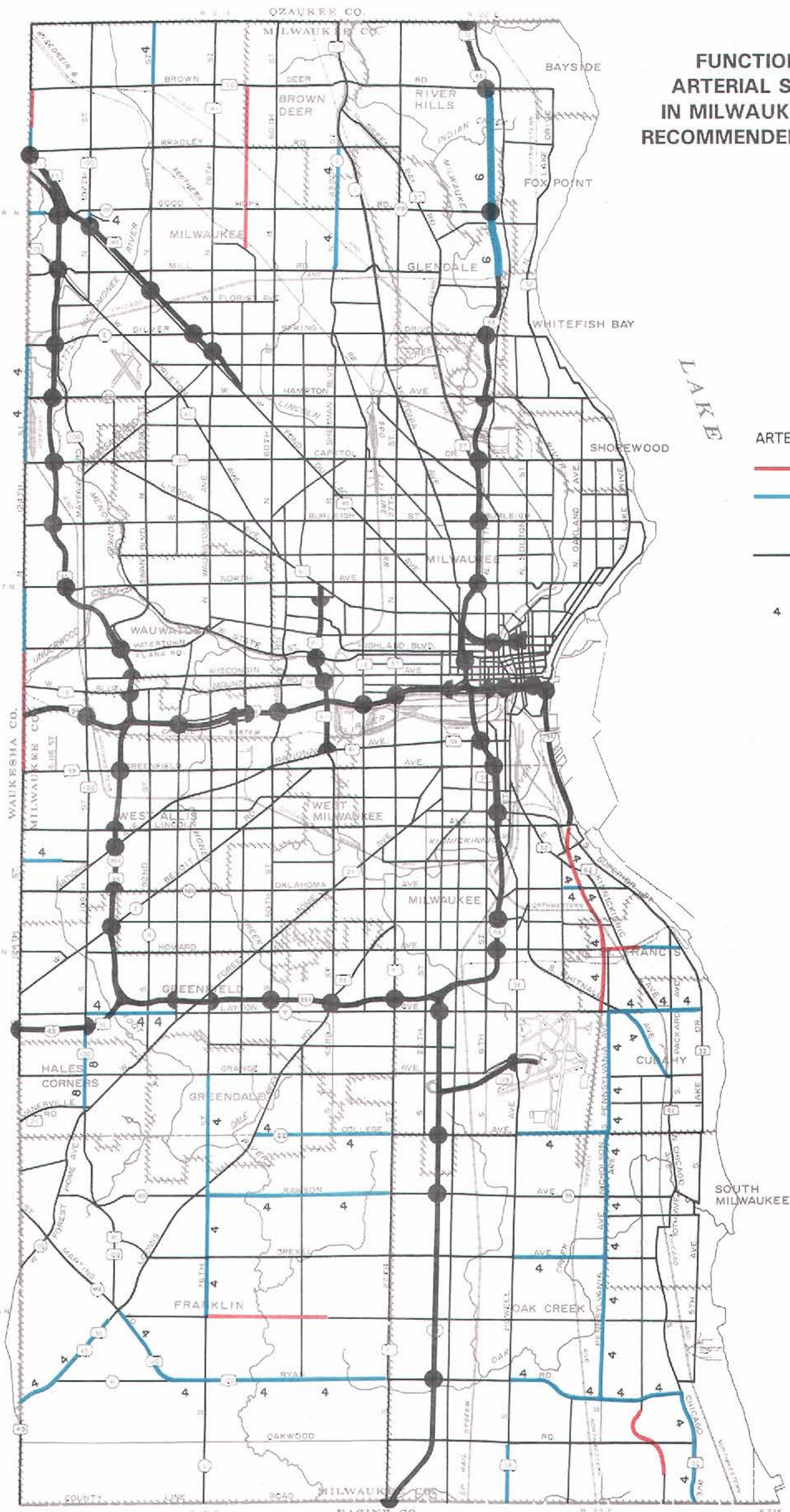
0 4000 8000 12000 FEET

Under the preliminary recommended plan, the arterial street and highway system in Kenosha County would increase by 39 miles, or 12 percent, to 357, miles by the year 2010. The increase in arterial mileage would come about largely through the conversion of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of about seven miles, for the widening of about 43 miles, and for the preservation of about 307 miles of arterial facilities within the County.

*Source: SEWRPC.*

Map 108

# FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN MILWAUKEE COUNTY: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN




LEGEND

ARTERIAL STREET OR HIGHWAY

NEW

WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY

RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY

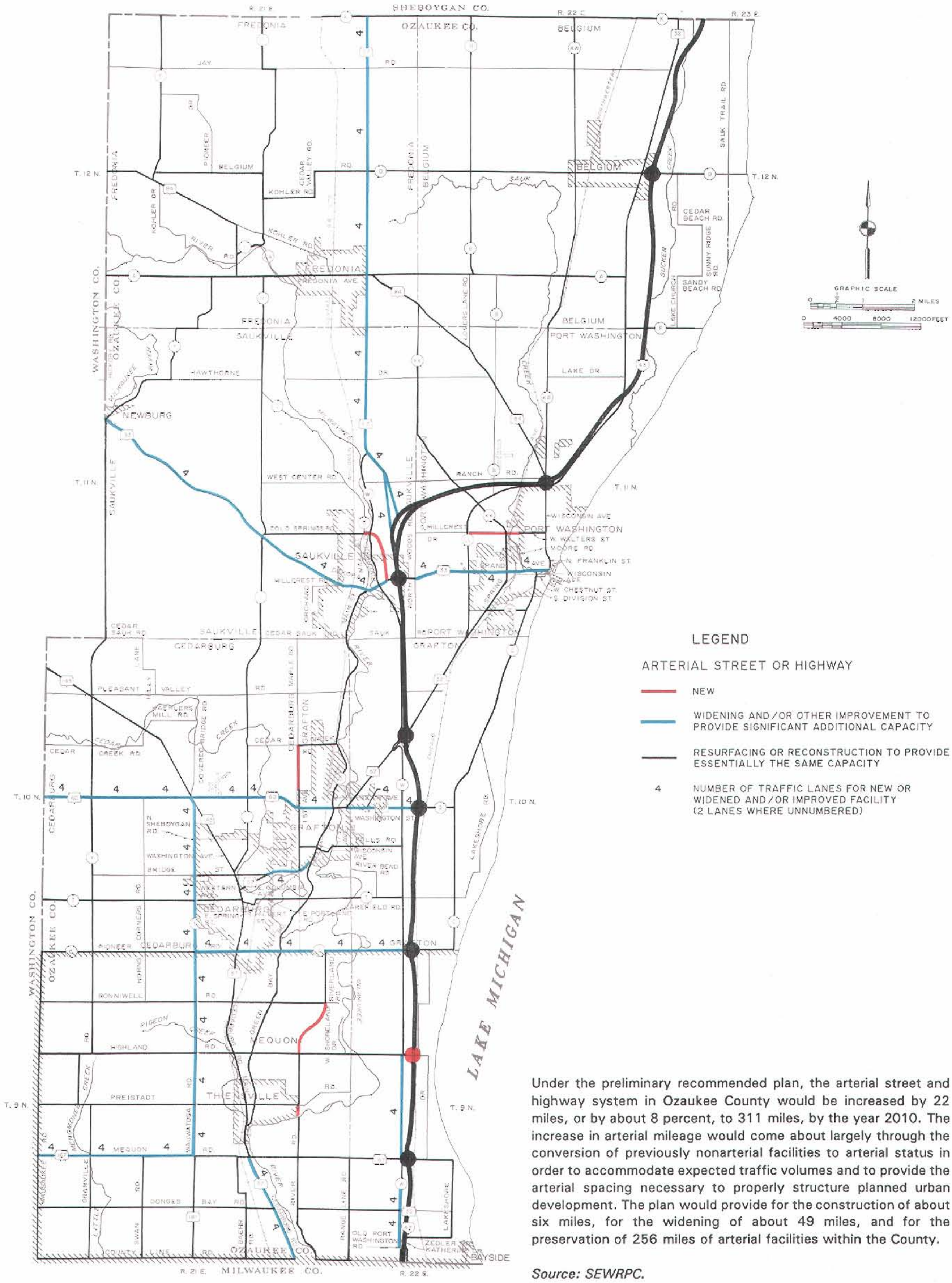
4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

Under the preliminary recommended plan, the arterial street and highway system in Milwaukee County would be increased by 21 miles, or 3 percent, to 796 miles, by the year 2010. The increase in arterial mileage would come about largely through the conversion of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for construction of about 12 miles, for the widening of about 49 miles, and for the preservation of about 735 miles of arterial facilities within the County.

*Source: SEWRPC.*

## Map 109

## FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN OZAUKEE COUNTY: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN

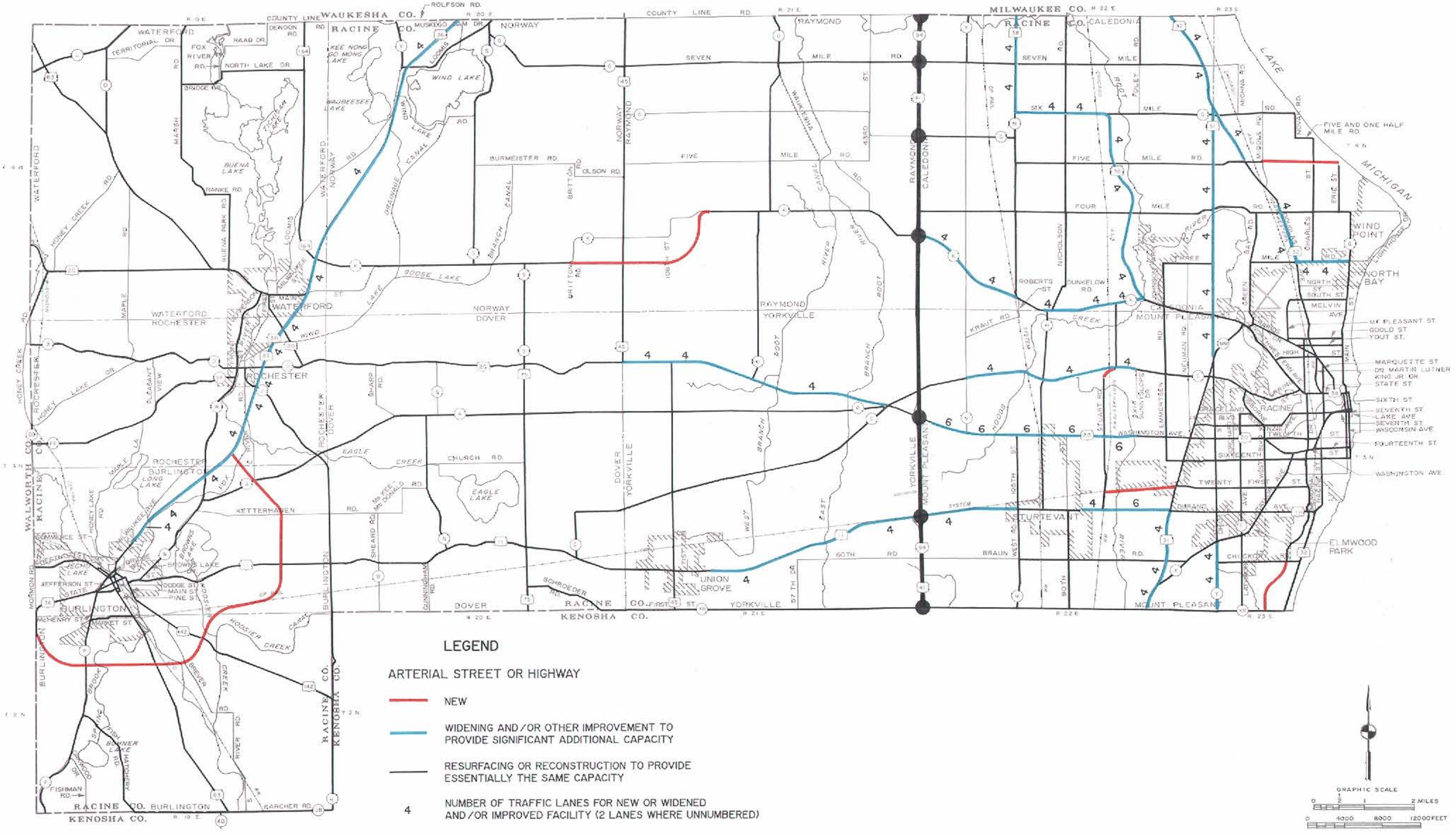



Under the preliminary recommended plan, the arterial street and highway system in Ozaukee County would be increased by 22 miles, or by about 8 percent, to 311 miles, by the year 2010. The increase in arterial mileage would come about largely through the conversion of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of about six miles, for the widening of about 49 miles, and for the preservation of 256 miles of arterial facilities within the County.

*Source: SEWRPC.*

## Map 110

### FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN RACINE COUNTY: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN

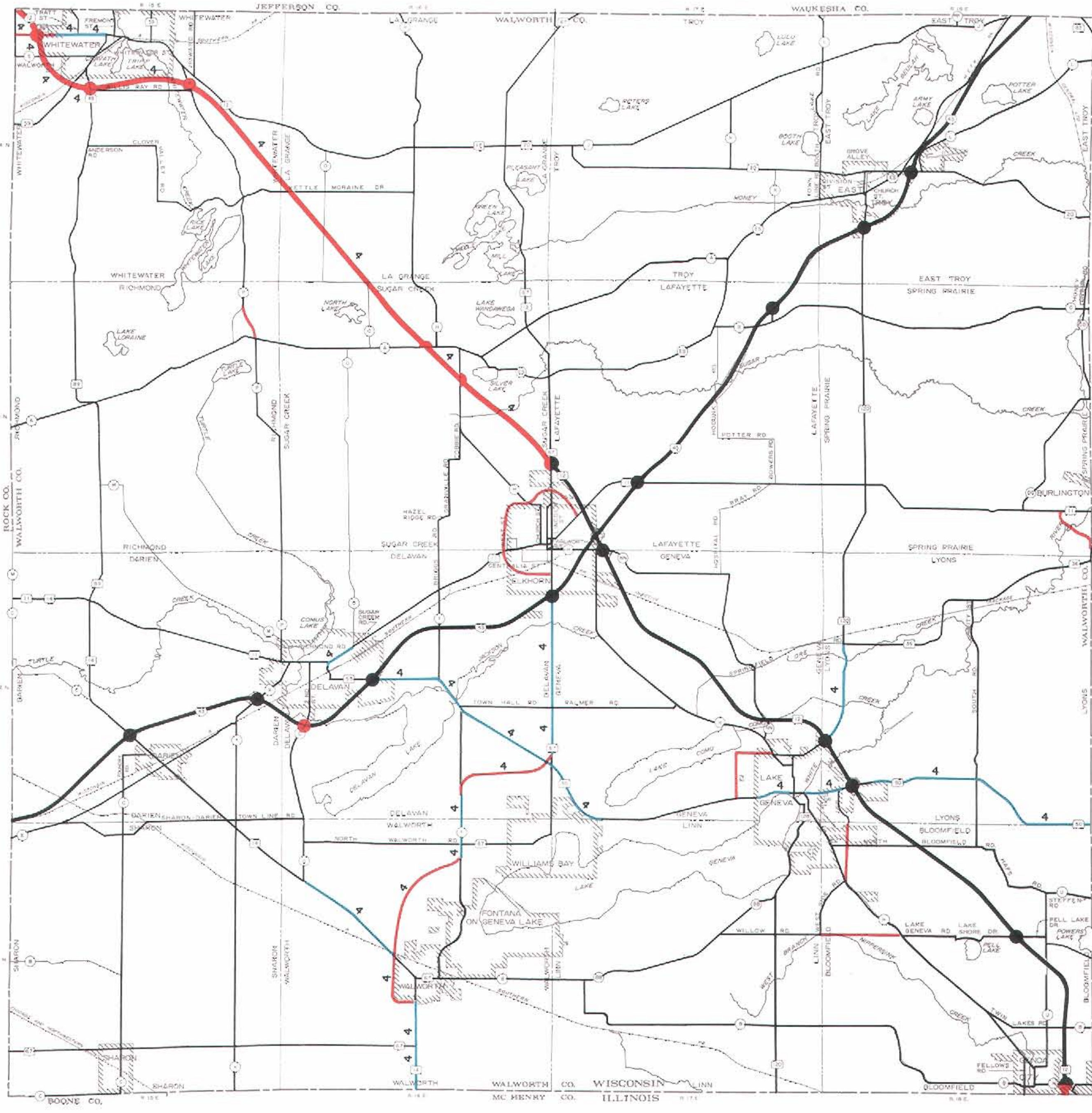



Under the preliminary recommended plan, the arterial street and highway system in Racine County would increase by 72 miles, or by about 21 percent, to about 420 miles, by the year 2010. The increase in arterial mileage would come about largely through the conversion of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of about 16 miles, for the widening of about 62 miles, and for the preservation of about 342 miles of arterial facilities within the County.

*Source: SEWRPC.*

## Map 111

### FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WALWORTH COUNTY: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN




LEGEND

ARTERIAL STREET OR HIGHWAY

NEW

WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY

RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY

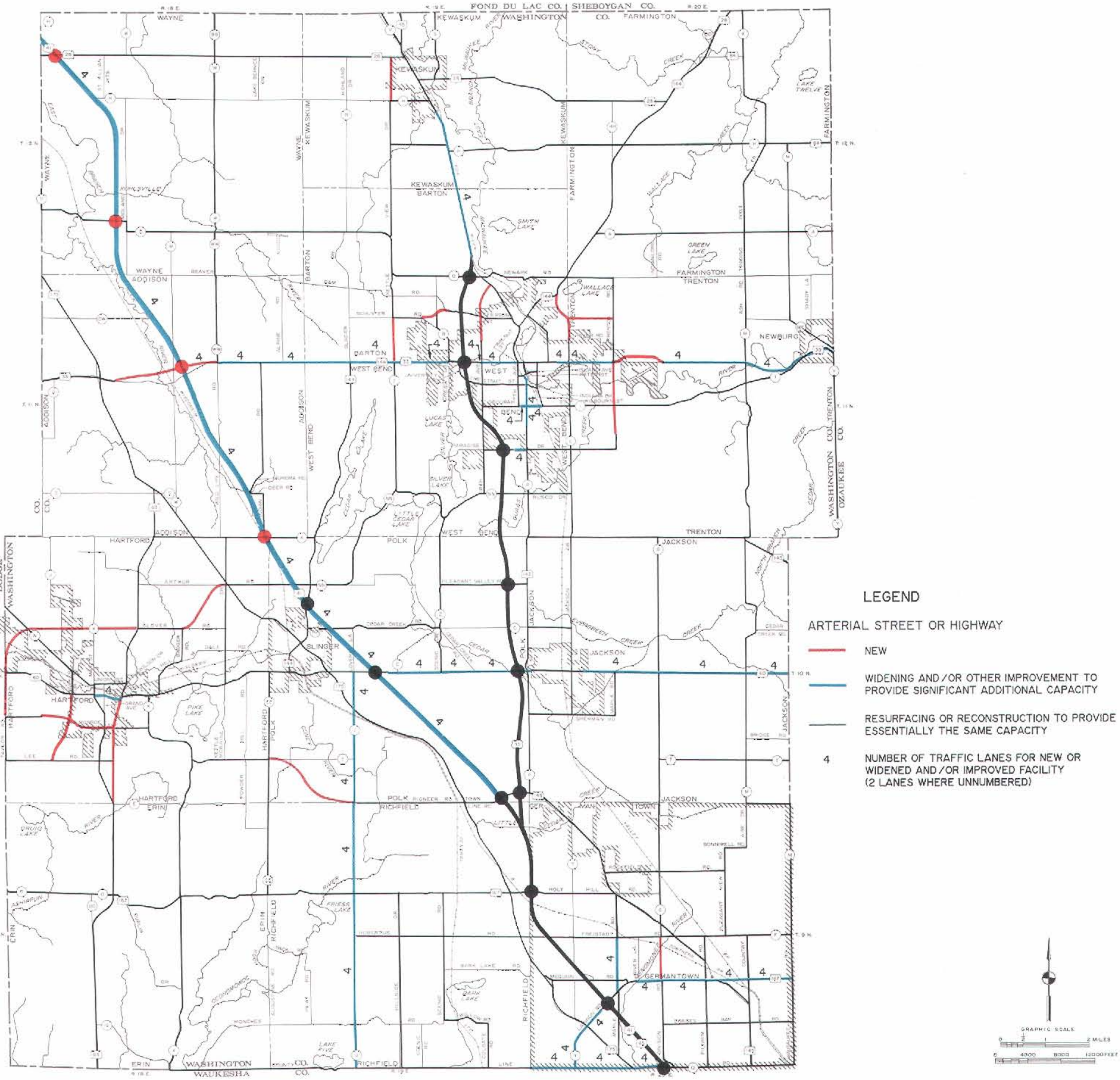
4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

Under the preliminary recommended plan, the arterial street and highway system in Walworth County would increase by about 55 miles, or by about 13 percent, to 484 miles, by the year 2010. The increase in arterial mileage would come about largely through the conversion of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of about 36 miles, for the widening of nearly 28 miles, and for the preservation of about 420 miles of arterial facilities within the County.

*Source: SEWRPC.*

## Map 112

### FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WASHINGTON COUNTY: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN

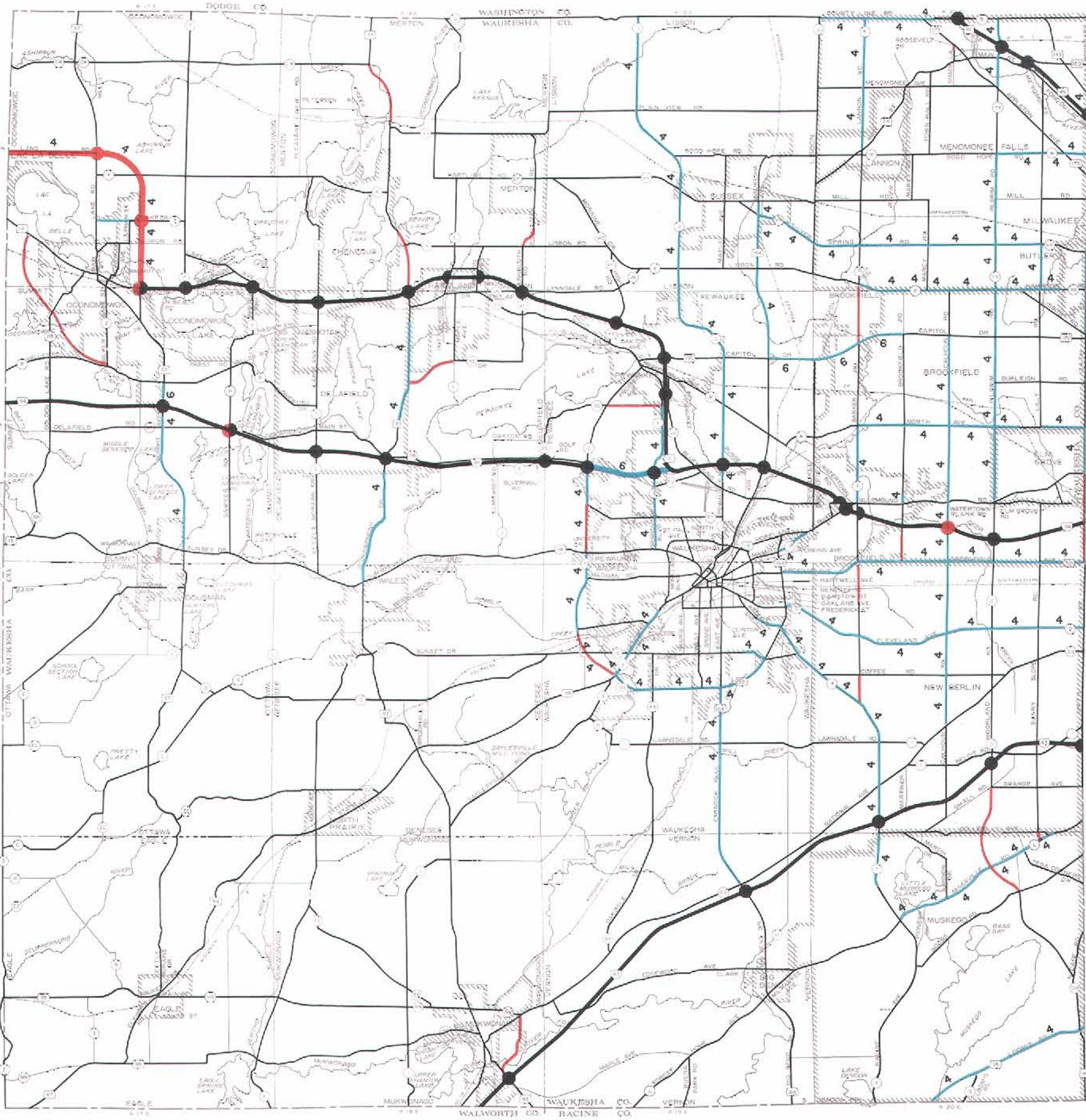



Under the preliminary recommended plan, the arterial street and highway system in Washington County would be increased by 71 miles, or by about 18 percent, to 470 miles, by the year 2010. The increase in arterial mileage would come about largely through the conversion of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of about 25 miles, for the widening of about 70 miles, and for the preservation of about 375 miles of arterial facilities.

*Source: SEWRPC.*

## Map 113

### FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WAUKESHA COUNTY: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN



LEGEND

ARTERIAL STREET OR HIGHWAY

NEW

WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY

RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY

4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

Under the preliminary recommended plan, the arterial street and highway system in Waukesha County would be increased by 60 miles, or by about 8 percent, to 776 miles, by the year 2010. The increase in arterial mileage would come about largely through the conversion of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of about 25 miles, for the widening of about 119 miles, and for the preservation of 632 miles of arterial facilities.

*Source: SEWRPC.*

Table 250

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN

| County | System Preservation | | System Improvement | | System Expansion | | Total |
|---|---|---|---|---|---|---|---|
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | |
| Kenosha | | | | | | | |
| Freeway | 12.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.0 |
| Standard Arterial | 295.5 | 85.6 | 42.6 | 12.3 | 7.3 | 2.1 | 345.4 |
| Subtotal | 307.5 | 86.1 | 42.6 | 11.9 | 7.3 | 2.0 | 357.4 |
| Milwaukee | | | | | | | |
| Freeway | 66.2 | 95.7 | 3.0 | 4.3 | 0.0 | 0.0 | 69.2 |
| Standard Arterial | 669.3 | 92.0 | 45.7 | 6.3 | 12.1 | 1.7 | 727.1 |
| Subtotal | 735.5 | 92.4 | 48.7 | 6.1 | 12.1 | 1.5 | 796.3 |
| Ozaukee | | | | | | | |
| Freeway | 27.4 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 27.4 |
| Standard Arterial | 228.7 | 80.8 | 48.5 | 17.1 | 5.9 | 2.1 | 283.1 |
| Subtotal | 256.1 | 82.5 | 48.5 | 15.6 | 5.9 | 1.9 | 310.5 |
| Racine | | | | | | | |
| Freeway | 12.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.0 |
| Standard Arterial | 329.7 | 80.8 | 62.2 | 15.2 | 16.1 | 4.0 | 408.0 |
| Subtotal | 341.7 | 81.4 | 62.2 | 14.8 | 16.1 | 3.8 | 420.0 |
| Walworth | | | | | | | |
| Freeway | 50.0 | 75.0 | 0.0 | 0.0 | 16.7 | 25.0 | 66.7 |
| Standard Arterial | 370.3 | 88.7 | 27.4 | 6.6 | 19.7 | 4.7 | 417.4 |
| Subtotal | 420.3 | 86.8 | 27.4 | 5.7 | 36.4 | 7.5 | 484.1 |
| Washington | | | | | | | |
| Freeway | 21.6 | 50.6 | 21.1 | 49.4 | 0.0 | 0.0 | 42.7 |
| Standard Arterial | 353.2 | 82.7 | 48.9 | 11.4 | 25.0 | 5.9 | 427.1 |
| Subtotal | 374.8 | 79.8 | 70.0 | 14.9 | 25.0 | 5.3 | 469.8 |
| Waukesha | | | | | | | |
| Freeway | 57.6 | 88.2 | 2.0 | 3.1 | 5.7 | 8.7 | 65.3 |
| Standard Arterial | 574.7 | 80.9 | 116.7 | 16.4 | 19.2 | 2.7 | 710.6 |
| Subtotal | 632.3 | 81.5 | 118.7 | 15.3 | 24.9 | 3.2 | 775.9 |
| Region | | | | | | | |
| Freeway | 246.8 | 83.6 | 26.1 | 8.8 | 22.4 | 7.6 | 295.3 |
| Standard Arterial | 2,821.4 | 85.0 | 392.0 | 11.8 | 105.3 | 3.2 | 3,318.7 |
| Total | 3,068.2 | 84.9 | 418.1 | 11.6 | 127.7 | 3.5 | 3,614.0 |

*Source: SEWRPC.*

travel, or about 37 percent, is expected to be made on freeways which would comprise about 8 percent of the total arterial system.

Arterial street and highway congestion, evidenced by the number of arterial miles operating over capacity, is expected to decrease from about 385 miles, or about 12 percent of the total system, in 1991 to about 167 miles, or about 5 percent of the total system, in 2010. The number of arterial miles operating at design capacity, however, is expected to increase from about 158 miles, or about 5 percent of the total system in 1991, to about 218 miles, or about 6 percent of the total system in 2010. The location of the facilities expected to operate under, at, and over design

Table 251

SUMMARY OF TRANSPORTATION PERFORMANCE CHARACTERISTICS: 1991 AND 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN

| Performance Characteristic | | | | |
|---|---|---|---|---|
| Category | Specific Measure | Base Year 1991 | Preliminary Plan: 2010 | Percent Change |
| Travel | Internal person trips (average weekday) | 5.54 million | 6.10 million | 10.1 |
| | Internal vehicle trips (average weekday) | 4.58 million | 5.27 million | 15.1 |
| | Vehicle-miles of travel[a] (average weekday) | 33.07 million | 42.70 million | 29.1 |
| | Transit ridership (average weekday) | 172,200 | 196,600 | 14.2 |
| | Relative distribution of trips by mode of travel (average weekday) | | | |
| | Auto driver[b] | 73.3 percent | 76.8 percent | - - |
| | Auto passenger | 19.5 percent | 15.3 percent | - - |
| | Transit passenger | 3.1 percent | 3.2 percent | - - |
| | School bus passenger | 4.1 percent | 4.7 percent | - - |
| | Proportion of trips made by transit within Milwaukee County | 3.8 percent | 3.8 percent | - - |
| | Proportion of trips made by transit to Milwaukee central business district | 13 percent | 12 percent | - - |
| | Proportion of passenger-miles of travel made on transit (average weekday) | 1.1 percent | 1.5 percent | - - |
| Traffic Congestion[c] | Amount and proportion of arterial street and highway system over design capacity | | | |
| | Moderately congested (V/C ratio 1.01 to 1.10) | 106 miles<br>3.2 percent | 83 miles<br>2.3 percent | -21.7<br>- - |
| | Severely congested (V/C ratio 1.11 to 1.30) | 217 miles<br>6.6 percent | 48 miles<br>1.3 percent | -77.9<br>- - |
| | Extremely congested (V/C ratio over 1.31) | 62 miles<br>2.0 percent | 36 miles<br>1.0 percent | -41.9<br>- - |
| | Total | 385 miles<br>11.8 percent | 167 miles<br>4.6 percent | -56.6<br>- - |
| Energy Use | Annual motor fuel consumption (millions of gallons) | | | |
| | By auto and truck | 353.2 | 444.2 | 25.8 |
| | By motor bus | 5.7 | 9.2 | 61.4 |
| | Total | 358.9 | 453.4 | 26.3 |
| Air Quality | Air pollutant emission from vehicles on the arterial street and highway system (tons per average weekday) | | | |
| | Volatile organic compounds | 119.2 | 28.6 | -76.0 |
| | Nitrogen oxides | 129.8 | 79.1 | -39.1 |
| | Carbon monoxide | 815.1 | 237.8 | -70.8 |

**Footnotes to Table 251**

[a] *Within Walworth County, the number of vehicle-miles of travel may be expected to increase from 1.91 million in 1991 to 2.81 million in 2010, or by 47 percent, under the preliminary recommended plan.*

[b] *The average vehicle occupancy for work trips within the Region may be expected to decline from 1.06 in 1991 to 1.03 under the preliminary recommended plan.*

[c] *Level of service designations are used to qualitatively measure the operational characteristics of a given link in the arterial network. Under this approach, there are six levels of service corresponding to letters "A" through "F"; "A" describing free flow, unrestricted traffic conditions, and "F" describing a breakdown in traffic flow. Arterial facilities operating under design capacity exhibit travel conditions representative of levels of service "A" or "B." Facilities operating at design capacity exhibit travel conditions representative of level of service "C." Facilities operating moderately over design capacity, with volume to design capacity ratios of 1.01 to 1.10, exhibit travel conditions representative of level of service "D." Facilities operating severely over design capacity, with volume to design capacity ratios of 1.11 to 1.30, exhibit travel conditions representative of levels of service "E" or "F." Facilities operating extremely over design capacity, with volume to design capacity ratios of 1.31 or higher, exhibit travel conditions representative of level of service "F."*

*Source: SEWRPC.*

capacity are shown on Map 114. Annual motor fuel consumption in the year 2010 is expected to approximate 453 million gallons, or about 94 million gallons more than the amount consumed in the Region in 1991.

The average annual public cost of carrying out the recommended plan, including the construction of new facilities and the operation and maintenance of the arterial street and highway and transit systems, is estimated at nearly $473 million. The anticipated average annual public revenues, excluding transit fare box revenues, is estimated at $381 million. Thus, the difference between anticipated costs and expected revenues is $92 million per year over the plan design period. The equivalent of an $0.11 per gallon increase in the motor fuel tax within the Region would be necessary to eliminate the estimated $92 million annual shortfall.

<u>Anticipated Impact on Travel Attendant to a 100 Percent Increase in Perceived Automobile Operating Costs</u>

The Technical Coordinating and Advisory Committee determined that the potential impacts associated with a policy of substantially increasing automobile operating costs should be presented for public discussion. The Advisory Committee, while recognizing the potential benefits attributable to such a demand management policy, considered implementation of the degree of pricing measures necessary to significantly affect travel demand impractical within the 16-year plan implementation period. The following review of the potential impacts attendant to such a policy is based upon the Commission analyses of Alternative Plan 1. It should be noted that the information provided in Table 253 assumes not only the institution of significant pricing measures to discourage the use of the automobile for personal travel but also assumes full implementation of substantial improvements and expansions of public transit service within the Region included in Alternative Plan 1.

The pricing measures proposed would increase perceived costs of automobile use by 100 percent over the 1991 level. This doubling would mean that the cost of automobile operation per mile would increase from about $0.055 to about $0.11 per mile. This would be the equivalent of a $1.10 per gallon increase in the cost of motor fuel. Several measures could be used in combination to increase the cost; the Advisory Committee suggested for consideration motor fuel taxes, travel-sensitive automobile insurance payments, travel-sensitive vehicle registration fees, and the elimination of employer-paid parking, among others.

Should the perceived cost of automobile operation be increased by 100 percent, 38.38 million vehicle-miles of travel could be expected to take place on

Table 252

**AVERAGE ANNUAL PUBLIC COSTS AND REVENUES ASSOCIATED WITH THE PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN: 1995 THROUGH 2010**

| Cost or Revenue Item | Preliminary Plan 2010 |
|---|---|
| Transportation System Cost (average annual 1995-2010 expressed as millions of dollars) | |
| Arterial Street and Highway System | |
| Capital | 228 |
| Operating | 68 |
| Subtotal | 296 |
| Transit System | |
| Capital | 76 |
| Operating[a] | 101 |
| Subtotal | 177 |
| Total | 473 |
| Transportation System Revenues (average annual 1995-2010 expressed as millions of dollars) | |
| Highway Capital[b] | |
| Federal | 132 |
| State | 66 |
| Local | 11 |
| Subtotal | 209 |
| Highway Operating | |
| State | 36 |
| Local | 28 |
| Subtotal | 64 |
| Transit Capital[b] | |
| Federal | 23 |
| Local | 3 |
| Subtotal | 26 |
| Transit Operating | |
| Federal | 6 |
| State | 64 |
| Local | 12 |
| Subtotal | 82 |
| Total | 381 |
| Cost-Revenue Comparison | |
| Average Annual Difference between Cost and Revenue (millions of dollars) | -92 |
| Motor Fuel Tax Required to Fund Shortfall (cents per gallon) | 11 |

[a] *The transit operating costs presented in this table represent net operating costs, that is, total operating costs less farebox revenues. Estimated current 1993 annual transit farebox revenues in Southeastern Wisconsin were $34 million, total annual operating costs were $97 million, and net operating costs were $63 million. It is estimated that upon full implementation of the paratransit service needed to meet the requirements of the Federal Americans with Disabilities Act of 1990, total and net annual operating costs would substantially increase. Indeed, under the no-build plan, total annual operating costs would be expected to increase to $119 million, expressed in 1994 constant dollars. The estimated year 2010 annual total operating costs of the preliminary recommended plan is $143 million, expressed in 1994 constant dollars. The estimated year 2010 annual farebox revenues adjusted to reflect the historic differential impact of general price inflation on transit operating costs and farebox revenues, including the effect on ridership of increasing fares, is $36 million, expressed in 1994 constant dollars. The year 2010 annual net operating cost, accordingly, is $107 million, also expressed in 1994 constant dollars.*

[b] *Federal funds for capital assistance may, in general, be used for either arterial street and highway or transit capital projects.*

*Source: SEWRPC.*

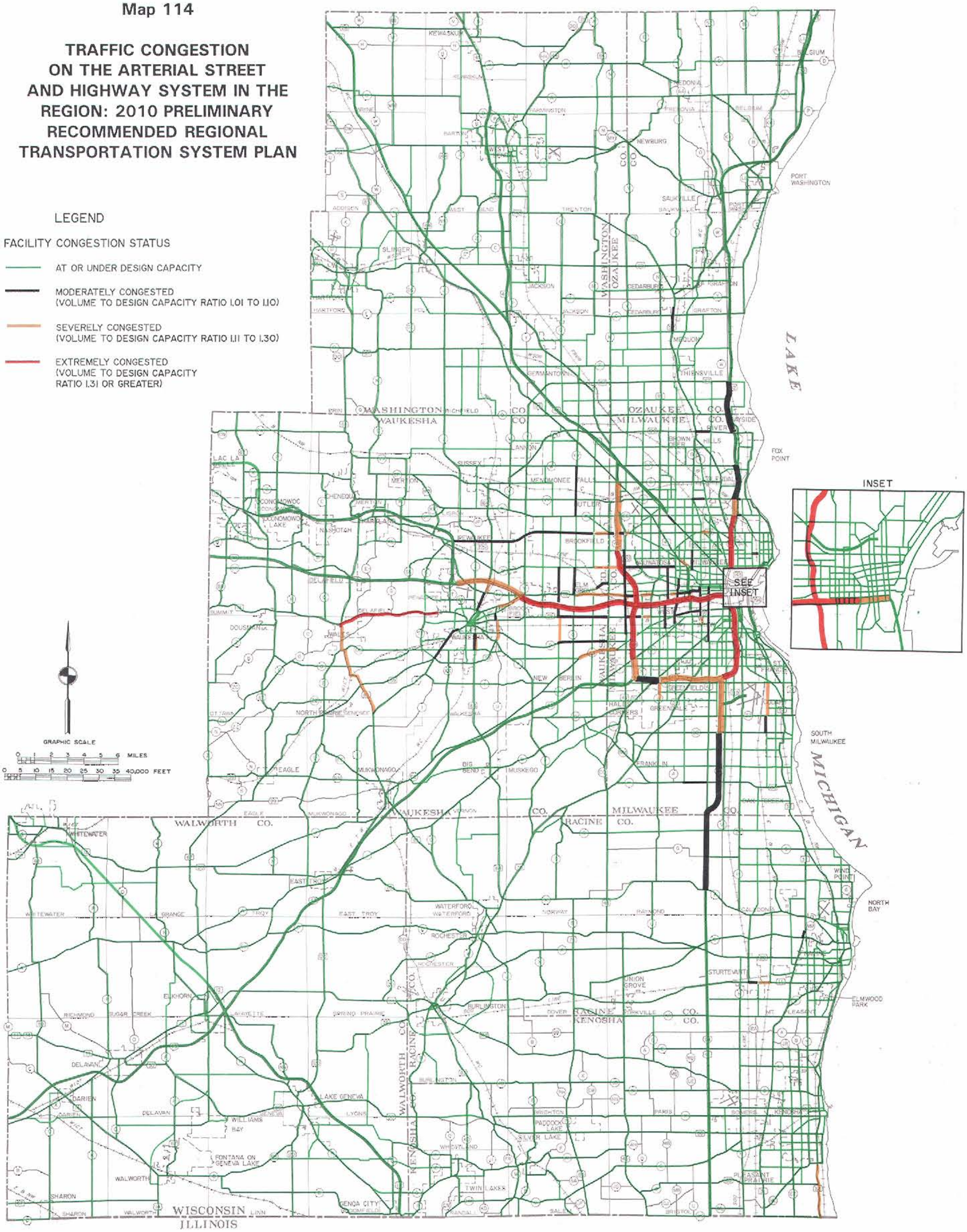
**Map 114**

## TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 PRELIMINARY RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

LEGEND

FACILITY CONGESTION STATUS

- AT OR UNDER DESIGN CAPACITY
- MODERATELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.01 TO 1.10)
- SEVERELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.11 TO 1.30)
- EXTREMELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.31 OR GREATER)




Under the preliminary recommended plan, the level of traffic congestion may be expected to be substantially below that which would occur under the no-build plan. By the year 2010, only about 5 percent of the 3,614-mile arterial highway system would operate over design capacity. About 83 miles, or more than 2 percent, of the planned arterial mileage, would be moderately congested; 48 miles, or about 1 percent, would be severely congested; and about 36 miles, or about 1 percent, would be extremely congested. While the transportation development proposals included in the preliminary recommended plan serve to reduce the amount of congested facilities throughout the entire region, the Milwaukee area freeway system may be expected to carry traffic volumes which exceed its design capacity and to operate with congested conditions through the year 2010.

*Source: SEWRPC.*

Table 253

COMPARISON OF THE PERFORMANCE OF ALTERNATIVE PLANS: 2010 PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN AND PLAN WITH PRICING MEASURES

| Performance Characteristic | | Alternative Plan with Pricing Measures:[a] 2010 | Preliminary Plan: 2010 |
|---|---|---|---|
| Category | Specific Measure | | |
| Travel | Vehicle-miles of travel (average weekday) | 38.38 million | 42.70 million |
| Traffic Congestion | Amount and proportion of arterial street and highway system over design capacity | | |
| | Moderately congested (V/C ratio 1.01 to 1.10) | 87 miles<br>2.4 percent | 107 miles<br>3.0 percent |
| | Severely congested (V/C ratio 1.11 to 1.30) | 39 miles<br>1.1 percent | 54 miles<br>1.5 percent |
| | Extremely congested (V/C ratio over 1.31) | 5 miles<br>0.1 percent | 7 miles<br>0.2 percent |
| | Total | 131 miles<br>3.6 percent | 168 miles<br>4.5 percent |
| Energy Use | Annual motor fuel consumption (millions of gallons) | | |
| | By auto and truck | 400.0 | 444.2 |
| | By motor bus | 12.1 | 9.2 |
| | Total | 412.1 | 453.4 |
| Air Quality | Air pollutant emission from vehicles on the arterial street and highway system (tons per average weekday) | | |
| | Volatile organic compounds | 25.6 | 28.6 |
| | Nitrogen oxides | 71.3 | 79.1 |
| | Carbon monoxide | 211.5 | 237.8 |
| Natural Resource Land Lost | Primary Environmental Corridors (acres) | 431.9 | 475.4 |
| | Prime Agriculture Lands (acres) | 1,038.7 | 1,643.7 |

*[a] This alternative assumes a 100 percent increase in the cost of automobile operation, equivalent to a motor fuel tax increase of $1.10 per gallon.*

*Source: SEWRPC.*

the arterial street and highway system on an average weekday in the plan design year 2010. This would be about 4.32 million fewer vehicle-miles than expected under the preliminary recommended plan. By way of comparison, in 1991 about 33.07 million vehicle-miles of travel took place on the arterial street and highway system of the Region.

About 131 miles of arterial facilities could be expected to operate over design capacity during peak travel periods should the perceived cost of driving be increased by 100 percent as proposed under Alternative Plan 1. This would be about 37 miles, or 22 percent, fewer than could be expected under the preliminary recommended plan. The lower levels of travel and traffic congestion could be expected to result in less air pollutants emitted and motor fuel consumed within the Region; 25.6 tons of volatile organic compounds, 71.3 tons of nitrogen oxides, and 211.5 tons of carbon monoxide would be generated, representing 3.0, 7.8, and 26.3 fewer tons, respectively. Also, 412 million gallons of fuel could be expected to be consumed annually within the Region, about 41 million gallons, or 9 percent, less per year than could be expected under the preliminary recommended plan. Should significant pricing measures be implemented, the planned extent of the arterial street and highway system could be reduced by about 15 route-miles from the 3,614-mile system proposed under the preliminary recommended plan. The lower levels of arterial improvement and expansion necessary would mean that nearly 44 fewer acres of primary environmental corridor land and 605 fewer acres of prime farmland would be lost to highway construction.

Commission analyses of the impacts of doubling automobile operating costs indicate that residents of the Region would tend to reduce the distance they are willing to travel by automobile. This change in travel behavior would be manifest in the decisions of households to locate closer to employment centers and to pursue shopping and recreational opportunities closer to home. Such a change in travel behavior would reduce motor vehicle related air pollution and motor fuel consumption. The change in travel behavior would also slightly reduce the number of arterial street and highway improvements and expansions necessary over the plan design period. Though the Commission analyses did not specifically focus on the potential land use impacts attendant to such pricing measures, the findings indicated that, given the strong relationship between travel behavior and urban development patterns, the potential for such measures to reduce urban sprawl regionwide exists.

## PUBLIC REACTION TO THE PRELIMINARY RECOMMENDED PLAN

The preliminary recommended regional transportation system plan was the subject of a Regional Planning Conference held on June 27, 1994; a series of public informational meetings and hearings held in each of the seven counties of the Region in July and August of 1994; meetings of the Commission's Kenosha, Ozaukee, Racine, Walworth, Washington, and Waukesha County Technical Coordinating and Advisory Committees on Jurisdictional Highway System Planning; and a joint meeting of the Intergovernmental Coordinating and Advisory Committees on Transportation System Planning and Programming for the Kenosha, Milwaukee, and Racine Urbanized Areas. The conference and public hearings were attended by a total of 760 persons; 143 letters were received for the record following the public hearings. Membership of the jurisdictional highway system planning committees totals 157 persons; membership of the three transportation system planning and programming committees totals 42 persons. It is important to note that every local unit of government within a county, as well as the county government, is represented on the county jurisdictional highway planning committees.

For use in connection with the meetings and hearings, the Commission prepared and widely distributed three SEWRPC Newsletters. These included Vol. 33, No. 5, "Work Begins on a New Regional Transportation System Plan"; Vol. 34, No. 2, "Alternative Regional Transportation System Plans Designed and Evaluated"; and Vol. 34, No. 3, "New Regional Transportation System Plan Readied for Public Review." Together, these Newsletters provide background on the transportation system planning process and the existing transportation system; descriptive and evaluative information on the plan alternatives; and, in summary form, a description of the preliminary recommended plan. In addition, copies were made available of SEWRPC Newsletter, Vol. 32, No. 2, which summarized the design year 2010 regional land use plan that formed the basis for the new regional transportation system plan.

Through the Newsletters, the Regional Planning Conference, the public hearings, and the various Advisory Committee meetings, information on the findings of the inventories and analyses, on alternative plans, and on the preliminary plan was provided in considerable depth and detail to the elected officials of each county and local unit of government within the Region, as well as to officials of the State and Federal governments, representatives of business and industry, and interested citizens. The planning work received substantial attention from the mass media in the form of numerous newspaper articles and editorials and radio and television announcements, some based upon Commission news releases. The record of the public hearings, together with attendant correspondence and supporting materials, was published by the Commission and provided for review to each member of the Commission Technical Coordinating and Advisory Committee on Regional Transportation

System Planning and to each member of the Regional Planning Commission. The full record is on file at the Commission offices.[1]

The following sections of this chapter summarize the public reaction to the preliminary recommended regional transportation system plan as expressed at the County jurisdictional highway system planning advisory committee meetings; at the joint transportation system planning and programming advisory committee meetings; and at the public hearings, including the written comments received by the Commission following the hearings. In addition, the Advisory Committee response to the public reaction is documented.

<u>County Jurisdictional Highway System Planning Advisory Committee and Transportation System Planning and Programming Advisory Committee Meetings</u>

The Commission Technical Coordinating and Advisory Committees on Jurisdictional Highway System Planning for Kenosha, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties each met to consider and each acted to approve the preliminary recommended regional transportation system plan with the following requested changes:

- <u>Kenosha County</u>
  1. The addition to the plan of the improvement of CTH KR from two to four traffic lanes from IH 94 to STH 32
  2. The addition to the plan of the improvement of IH 94 from six to eight traffic lanes within Kenosha County
  3. The addition to the plan of the long-planned extension of CTH KD and the long-planned realignments of CTH F, CTH Q, and CTH AH
  4. The modification of the plan to reroute STH 50 between 39th Avenue and STH 32 over Roosevelt Road and 63rd Street rather than the existing route of 75th Street and the improvement of this new route from two to four traffic lanes
- <u>Ozaukee County</u>
  1. The addition to the plan of the improvement of IH 43 from four to six traffic lanes from Brown Deer Road in Milwaukee County to Highland Road in Ozaukee County
  2. The addition to the plan of the long-planned extension of Granville Road from Freistadt Road to Highland Road
  3. The modification of the plan to retain Belgium-Kohler Road between CTH E and STH 57 as a local arterial facility
- <u>Racine County</u>
  1. The modification of the plan to retain the existing state trunk highway routing of STH 11 and to retain CTH KR as a county trunk highway facility
  2. The addition to the plan of recommendations to protect the potential for future widening of IH 94 from six to eight lanes and for the development of a new interchange on IH 94 at a relocated CTH C
  3. The modification of the plan to retain Four Mile Road as a local, rather than county, arterial between IH 94 and STH 31
- <u>Walworth County</u>
  1. The addition to the plan of a proposed commuter railway passenger train service from the Village of Walworth through Fox Lake, Illinois, to Chicago
- <u>Washington County</u>
  1. The addition to the plan of a new half interchange on USH 41-USH 45 with Freistadt Road
  2. The modification of the plan to incorporate an alignment for the proposed east-west northern arterial route connecting the communities of Hartford and Slinger to USH 41 over Arthur Road between USH 41 and CTH U, then over new alignment between CTH U and Independence Drive, and then over Independence Drive to STH 60

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[1]*See <u>Record of Public Informational Meetings and Public Hearings, Preliminary New Regional Transportation System Plan for Southeastern Wisconsin: 2010</u>, July 11 through August 3, 1994.*

- Waukesha County
  1. The addition to the plan of the improvement of CTH X from two to four traffic lanes from STH 59 to CTH H
  2. The addition to the plan of the improvement of STH 164 from four to six traffic lanes from IH 94 to USH 18
  3. The addition to the plan of the extension of River Crest Drive from STH 175 to CTH Q
  4. The addition to the plan of the expansion of the interchange of IH 94 with CTH P from a half to a full interchange
  5. The addition to the plan of the improvement of Barker Road from two to four traffic lanes between Racine Avenue and STH 59 and between North Avenue and STH 74 to provide a continuous facility with four traffic lanes from Racine Avenue and CTH Q

In addition, the Transportation System Planning and Programming Advisory Committees for the Kenosha, Milwaukee, and Racine Urbanized Areas acted unanimously to endorse the preliminary plan and to recommend that the proposals for implementing the plan include not only the full funding of the attendant shortfall in revenues needed to implement the plan, but also the substitution of alternative funding for the existing property tax support of public transit services and county and municipal arterial street and highway facilities.

Public Hearing Comments and Correspondence

The comments received at the public hearings and in correspondence following the hearings may be divided into six categories, that is, comments regarding the overall plan, the transit element of the plan, the highway element of the plan, land use, funding, and other comments.

A number of comments were received expressing support and approval of the preliminary plan and, in particular, endorsing the plan as a balanced approach to the use of transit, highway, system management, and land use actions in addressing the future transportation needs of Southeastern Wisconsin. A number of comments were made that the plan should incorporate greater improvement and expansion of transit service and less expansion of highway capacity. However, some comments were also received that the plan should incorporate less transit improvement and expansion.

With respect to the transit element of the plan, a number of statements were made in support of the proposed express and rapid transit service in particular. Support was expressed for the proposed extensions of rapid transit service into Ozaukee, Washington, and Waukesha Counties. A substantial number of comments were received in support of rail transit, including light-rail and particularly commuter rail transit. With respect to commuter-rail passenger service, comments were made expressing the need to improve existing Chicago-based commuter-rail service to Kenosha and to extend such service to the Cities of Racine and Milwaukee. Support was also expressed for the proposed consideration of commuter-rail service in corridors in Waukesha, Washington, and Ozaukee Counties. Comments were made that Chicago-based commuter-rail service to western Kenosha County and Walworth County and Milwaukee-based service to the City of Waukesha should be included in the final plan. Concerning light-rail transit, comments were made that the final plan should recognize that light-rail service could function to provide both express and rapid transit service, depending upon station spacing and facility location, either on reserved street lanes or on such exclusive rights-of-way as abandoned railway corridors. Other technologies were also suggested as alternatives to light-rail service, including personal rapid transit and "pipe rail" technology, used for amusement park rides.

With respect to the bus element of the plan, some comments were received which requested that the final plan incorporate even greater improvements in the frequency of bus service in both peak and off-peak periods. Other statements encouraged that a greater geographic expansion of transit service, including that an areawide grid of express bus service, be included in the final plan. Some statements suggested modifying the plan to provide improved frequency of transit by reducing the geographic expansion of transit service proposed in the preliminary plan; other statements asked that the final plan propose a greater geographic expansion of transit service and a reduction in improved service frequency. Suggestions were made that transit service improvements should be implemented prior to any improvement in highway facilities.

Statements, however, were also made in opposition to the improvement and expansion of transit service proposed in the preliminary plan. Statements were made that the plan placed an inordinate emphasis on public transit, given the proportion of the existing and potential future travel which is, and may be expected to be, carried by public transit in Southeastern Wisconsin and the attendant small impacts on arterial street and highway system traffic volumes and congestion and on air pollutant emissions. Comments were made that the plan should not include light-rail or commuter-rail service because of the high capital costs involved compared to bus alternatives. Suggestions were made that busways and HOV lanes be built prior to any rail transit construction in order to demonstrate the potential market for transit. Opposition was also expressed to the construction of any transit facility through the Veterans Administration Center at Wood, Wisconsin.

With respect to the highway element of the plan, most of the statements made expressed opposition to a specific arterial highway improvement and expansion project proposed in the preliminary plan. There were also some statements providing support for specific arterial highway improvements. Some comments were received which indicated overall support of the highway element in the plan and comments were received expressing overall opposition to the highway element of the plan. With respect to individual improvements recommended in the plan, many comments were received in opposition to the long-proposed extension of 30th Avenue as an arterial street between 89th Street and STH 165 in Kenosha County. Some statements of opposition suggested that other alternatives be considered, including the extension of 22nd Avenue or the widening of 39th Avenue.

Comments were also received in opposition to the following arterial street improvements proposed in the preliminary plan: the proposed extension of Cold Spring Road over the Milwaukee River in Ozaukee County, the proposed widening to four traffic lanes of STH 59 between 124th Street and STH 164 in Waukesha County, the construction of a new interchange on IH 94 at Calhoun Road in Waukesha County, the widening of CTH J to four traffic lanes between IH 94 and STH 60 in Washington and Waukesha Counties, the widening of STH 38 between CTH K and the Racine-Milwaukee county line and of CTH K between STH 38 and IH 94 in Racine County, the widening of STH 50 to six lanes between IH 94 and 39th Avenue and to four lanes between 39th Avenue and STH 32 in Kenosha County, the widening of STH 158 to four lanes between IH 94 and STH 31 in Kenosha County, the expansion of the CTH ML interchange on IH 94 and the proposed extension of CTH ML in Kenosha County, the widening of Washington Road to four traffic lanes between 30th Avenue and STH 32 in the City of Kenosha, the widening of STH 165 to four traffic lanes between STH 31 and STH 32, the widening of STH 60 to four traffic lanes between USH 41 and IH 43 in Ozaukee and Washington Counties, the widening of STH 33 to four traffic lanes between West Bend and IH 43 in Ozaukee and Washington Counties, the construction of the West Waukesha Bypass in Waukesha County, the widening of STH 164 to four traffic lanes between STH 59 and IH 43 in Waukesha County, the widening of STH 67 to four traffic lanes between USH 18 and IH 94 in Waukesha County, the widening of Racine Avenue to four traffic lanes between STH 164 and IH 43 in Waukesha County, and the widening of STH 100 to eight traffic lanes in the Village of Hales Corners between IH 43 and STH 24. Opposition was expressed to all highway capacity expansion projects connecting urban areas and within urban fringe areas because of their perceived potential to promote urban sprawl. Statements were also made in opposition to the proposed HOV facility recommended in the east-west corridor and the proposed consideration of similar facilities in future corridor studies of the Milwaukee area freeway system.

Comments were also made in support of a number of highway improvement and expansion projects recommended in the preliminary plan, including a HOV facility in the east-west corridor and other such facilities in other corridors of the Milwaukee area freeway system. Support was also expressed for the proposed modernization of IH 94 in Waukesha and Milwaukee Counties, including the reconstruction of freeway interchanges to modern design standards, utilizing all right-hand on- and off-ramps and auxiliary lanes. Support was also expressed for the widening of STH 31 to four traffic lanes between CTH MM and STH 38 in Racine County, the widening of CTH J to four traffic lanes between IH 94 and STH 60 in Waukesha and Washington Counties, and the construction of extensions of Barker Road to provide a second continuous north-south arterial facility in Waukesha County between IH 43 and the Waukesha-Washington county line.

Also, with respect to the highway element, a number of statements were made opposing modification of the preliminary plan, including the addition to the plan of the long-planned realignments of CTH F and CTH KD in Kenosha County, the retention on the plan of the current routing of STH 11 between STH 75 and STH 32 in Racine County, the addition to the plan of the widening of USH 14 between CTH O and the Walworth-Rock county line in Walworth County, and the replacement of the proposed CTH ML interchange in Kenosha County with a new interchange at 60th Street (CTH K) and the widening of 60th Street to four traffic lanes between IH 94 and 39th Avenue. Statements were also made in support of the widening of STH 158 and CTH S to four traffic lanes as proposed in the plan to provide relief to STH 50; statements were made in support of the deletion in the preliminary plan of the proposed extension of CTH W in Kenosha County.

With respect to land use, comments were received which proposed that the transportation system plan should be based upon a land use plan which assumes all existing and proposed land use be configured and reconfigured to provide a compact high-density land use pattern around transit stations and that legislation strengthening land use control be provided. Other suggestions proposed legislation that would relate highway funding to the implementation of land use plans. Comments were received supporting a no-growth policy in Southeastern Wisconsin. In addition, comments were received stating that urban sprawl was desirable as well as inevitable and needed to be accommodated in transportation planning.

With respect to issues regarding the funding of the estimated $92 million annual shortfall attendant to the plan, some comments were received which suggested that addressing the shortfall through an additional 11 cent per gallon motor fuel tax was acceptable. A number of comments were made in support of significantly raising automobile operating costs by the equivalent of a dollar per gallon added tax on motor fuel to reflect more appropriately the full social and environmental cost attendant to automobile use. An equal number of comments were made in opposition to such increases in the costs of driving. A number of comments were made in support of developing a new dedicated funding source for public transit and removing transit costs from the local property tax. A statement was made in support of a proposed regional transportation authority and in support of taxing parking facilities.

Other suggestions made with respect to the transportation plan included comments in support of the construction of bicycle ways to promote the use of the bicycle as an alternative to the automobile. A comment was made in support of annual vehicle inspections for compliance with air pollutant emission standards. Comments were made that the increase in vehicle-miles of travel within the Region envisioned in the plan was too high, given the forecast increase in population; it was suggested that vehicle-miles of travel should be reduced by increased transit service. However, a comment was also made that the impact of transit improvements on the transportation system and vehicle-miles of travel was very small and that such transit improvements cannot be justified on the basis of their impacts on air quality. A comment was also made that additional alternatives should be examined with respect to land use and travel demand management and that the Regional Planning Commission should work with citizen groups to facilitate evaluation of such additional alternatives. A comment was made that the plan should accept the occurrence of traffic congestion, not propose measures to reduce congestion.

The City Engineer of the City of Milwaukee expressed support for the preliminary plan, noting that the plan was generally in accord with the development and redevelopment goals and objectives of the City of Milwaukee and appropriately emphasized public transit and travel demand management actions. The City Engineer, however, also expressed concern over the feasibility and desirability of implementing the additional curb-lane parking restrictions proposed in the plan, the need for adequate funding of proposed implementation of good traffic engineering practices, and the need to conduct the light-rail and commuter-rail major investment studies in the corridors identified in the preliminary plan in a timely manner. The City Engineer also requested that the following changes be made to the arterial street and highway system element of the preliminary plan: the addition, as an arterial facility, of Canal Street between USH 41 and S. 2nd Street; the addition of the widening to four traffic lanes of W. Fond du Lac Avenue between N. 20th Street and N. 35th Street; the addition of the widening to four traffic lanes of E. Oklahoma Avenue from S. Kinnickinnic Avenue to Lake Parkway; the addition of the provision of four traffic lanes on N. 124th Street between STH 145 and Brown Deer Road; the addition of W. Metro Boulevard from USH 45 to N. 107th Street as a four-lane arterial; and the deletion of N. 68th Street between N. Industrial Road and W. Brown Deer Road.

The Mayor of the City of Kenosha requested that the following changes be made to the plan: the addition of 50th Street between Sheridan Road and 30th Avenue as an arterial facility; the addition of the long-planned extension of 85th Street between Sheridan Road to 7th Avenue as an arterial facility; the modification of the plan to recommend six traffic lanes, rather than the proposed four traffic lanes, on STH 158 between IH 94 and STH 31; and the addition of a proposed improvement of 60th Street between Sheridan Road and 39th Avenue to four traffic lanes and between IH 94 and STH 31 to six traffic lanes. In addition, the Mayor requested that, following completion and adoption of the new regional plan, a special study be conducted of the special transportation needs between the Kenosha urbanized area and northeastern Illinois. The requested study would consider particularly commuter movements between these areas and the potential transit services and facilities that would serve those movements.

The Kenosha County Executive expressed support for the preliminary plan and particularly its balanced approach to public transit and arterial highway improvement and expansion. The County Executive also requested that the plan be modified to include the following long-planned highway improvements in Kenosha County: the realignments of CTH F, CTH Q, CTH AH, and CTH KD; the long-planned extension of CTH W; and the improvement of IH 94 from the Wisconsin-Illinois state line to Milwaukee to provide eight traffic lanes.

The Mayor of the City of New Berlin expressed support of the preliminary plan as a realistic proposal to meet existing and future transportation needs and supported the balance proposed in the plan with respect to highways, transit, land use, and travel demand management. The Mayor further commented that there was no need for the extension of commuter-rail or light-rail service into Waukesha County, expressing concern that the plan devoted too much of the limited available capital resources to public transit.

The President of the Village of Grafton commented that the final plan must provide needed transportation services for the Region as a whole and that needed transportation improvements should not be eliminated from the preliminary plan because of opposition of individual local governments, citing as an example the opposition of the City of Mequon to the long-proposed improvement of Wauwatosa Road in Ozaukee County between STH 167 and STH 60. The Village President also requested the extension in the final plan of rapid transit bus service from the Village of Grafton to the City of Port Washington.

The Mayor of the City of Port Washington also requested that the planned rapid transit bus service be extended from the Village of Grafton to the City of Port Washington. The Mayor also supported the proposal in the plan for commuter-rail service into Ozaukee County, requesting that the potential for the extension of such service to Port Washington be considered. The Mayor also expressed opposition to the long-planned extension of Walter Street between Grant Street and CTH LL in the City and Town of Port Washington.

The Chairman of the Town of Saukville expressed opposition to the proposed extension of Cold Springs Road over the Milwaukee River, suggesting that a new bridge over the Milwaukee River instead be provided at some point north of Cold Springs Road. The Town Chairman also expressed support of the proposed improvement of STH 33 through the Village of Saukville from two to four traffic lanes.

The Planner for the Town of Mt. Pleasant suggested that the preliminary plan be modified by replacing the proposed incorporation of

Willow Road, Stuart Road, and Airline Road as an arterial facility with an arterial facility consisting of Airline Road, Oakes Road, and extensions of Oakes Road between STH 11 and CTH K. The Town Planner noted that the Town was attempting to preserve right-of-way for this facility and that such a facility would not require any railway crossings, unlike the proposal in the preliminary regional plan.

The Director of Community Services of the City of West Bend requested that the preliminary plan be modified to incorporate the extension of rapid transit bus service from the Village of Germantown to the City of West Bend.

The City of Waukesha, through comments made at a briefing on the plan for the Mayor and Common Council and through a letter from the City Director of Public Works, requested that the plan be modified to incorporate the widening to four traffic lanes of CTH X from CTH H to STH 59. The Mayor and Common Council, as well, indicated their support of the plan and, in particular, noted that the West Waukesha bypass was a particularly needed facility.

The Planner for the Village of Pleasant Prairie requested that the extension of 30th Avenue between 89th Street and STH 165 be deleted from the plan and that the widening of STH 50 between 60th Avenue and STH 32 be deleted from the plan.

State Senator Joseph F. Andrea, through his comments in a newspaper article appearing in the Kenosha News, indicated his overall support of the plan but questioned the ability to fund fully the financial shortfall attendant to the plan. He also expressed concern over the extent of public transit service improvement and expansion in the plan, given the small proportion of regional travel which is now carried and which may be expected to be carried by public transit.

The Mayor and Common Council of the City of Oak Creek requested that the preliminary plan be modified to include long-planned new freeway interchanges on IH 94 at Drexel Avenue and Puetz Road and that the proposed widening of Pennsylvania Avenue within the City be deleted from the plan.

## ADVISORY COMMITTEE RESPONSE TO PUBLIC COMMENT ON PRELIMINARY PLAN

In response to the public comments concerning the modal balance struck in the preliminary new regional transportation system plan, the Advisory Committee determined that the plan provided an appropriate balance with respect to meeting the existing and probable future transportation needs within Southeastern Wisconsin. The Advisory Committee noted that in the plan design process careful consideration was given first to the potential of land use site design, public transit, and transportation system management measures to address the identified transportation needs. Highway system capacity improvement and expansion were considered only as a measure of last resort, that is, as a measure to address traffic congestion problems which the analyses indicated could not be resolved by expansion of public transit services and the implementation of travel and traffic demand management measures.

It was also noted that the plan proposed more than a 74 percent expansion of transit service, measured in terms of vehicle-miles of service, or about a 70 percent expansion in terms of seat-miles of service, and about a 26 percent expansion of highway capacity, measured in terms of added lane-miles. In addition, the plan proposes a significant increase in the proportion of total transportation funding to be devoted to public transit. Under the plan, the proportion of total transportation system funding devoted to public transit would increase from a current 22 percent to nearly 38 percent. The public transit element of the plan would be expected to carry about 3 percent of total person trips generated within Southeastern Wisconsin. The Advisory Committee did note that the relative timing of implementation of transit and highway capacity improvement and expansion was an important issue and that this should be explicitly addressed in the implementation schedule for the planned highway and transit system improvement.

In regard to the transit system element, the Advisory Committee concluded that only modest modifications to the preliminary plan were warranted in response to the public comments. As modified, the plan would extend bus rapid transit service from the Village of Germantown to the City of West Bend and from the Village of Grafton to the City of Port Washington. The plan would also, as modified, recognize the potential to provide commuter passenger train service from the City of Burlington through Silver Lake and Antioch, Illinois, to Chicago and from the Village of Walworth through Fox Lake, Illinois, to Chicago. As modified, the final plan would recommend that feasibility studies, followed by a major investment analyses, be conducted to explore the feasibility and desirability of implementing these extensions of Chicago-based commuter railway passenger train service. As modified, the recommended plan would also include a study to consider the feasibility of providing commuter transit service between the City of Kenosha and Lake County, Illinois.

The Advisory Committee also acted to identify specific measures to improve transit convenience and facilitate transit use. Such measures are of a transportation system management nature and were thus proposed to be part of the transportation system management element of the recommended plan.

The Advisory Committee determined that further modification of the transit element of the plan was not warranted, including extension of additional commuter-rail lines, for example, from the City of Kenosha into western Kenosha County or from the City of Milwaukee to the City of Waukesha, as suggested in some comments on the preliminary plan. With respect to local transit service, the Advisory Committee concluded that the preliminary plan proposed a proper balance between the geographic extension of transit service and the improvement of the frequency of such service and noted that the proposed local transit service component of the plan could be provided as fixed-route local transit service, or, in the alternative, route deviation or demand-responsive service.

With respect to the arterial street and highway element, the Advisory Committee also concluded that only modest modifications to the preliminary plan were warranted in response to the public comments. It was concluded that the level of congestion used to define the need for improvements was appropriate, given that the highway capacity improvements were proposed as a measure of last resort to address traffic congestion problems. The timing of the highway capacity improvements would be coordinated with the timing of transit improvements in a schedule for plan implementation. This schedule would define the highway system improvements needed in the short term to address existing traffic problems or, in the long term, to address potential future traffic problems.

In response to the public comment, the Advisory Committee did recommend the following specific changes with respect to the arterial street and highway element of the plan:

- <u>Kenosha County</u>
  1. The deletion from the plan of the extension of 30th Avenue from 89th Street to STH 165
  2. The addition to the plan of the long-planned extension of CTH KD, and the long-planned realignments of CTH F, CTH Q, and CTH AH
  3. The modification of the plan to reroute STH 50 between 39th Avenue and STH 32 over Roosevelt Road and 63rd Street rather than the existing route of 75th Street and the improvement of this new route from two to four traffic lanes
  4. The addition to the plan as an arterial facility of 50th Street from Sheridan Road to 30th Avenue
  5. The addition to the plan of the extension of 85th Street from Sheridan Road to 7th Avenue
  6. The addition to the plan of the preservation of the potential for future widening, including acquisition of right-of-way, of STH 158 to six traffic lanes from IH 94 to STH 31, of 60th Street to six traffic lanes from STH 31 to IH 94, and of CTH KR from two to four traffic lanes from IH 94 to STH 32
  7. The addition to the plan of the improvement of 60th Street from two to four traffic lanes from Sheridan Road to 39th Avenue and the preservation for future widening to six lanes of 60th Street from IH 94 to STH 31
  8. The addition to the plan of the preservation of the potential for future widening of IH 94 from six to eight lanes within Kenosha County, including preservation of the potential to provide HOV

lanes, and of the potential for the construction of a new interchange on IH 94 at 60th Street

- Milwaukee County
  1. The addition to the plan of Canal Street from USH 41 to S. 2nd Street as an arterial street
  2. The addition to the plan of the widening from two to four traffic lanes of W. Fond du Lac Avenue from N. 20th Street to N. 35th Street
  3. The addition to the plan of the widening to four traffic lanes of E. Oklahoma Avenue from S. Kinnickinnic Avenue to the Lake Parkway
  4. The addition to the plan of the provision of four traffic lanes on N. 124th Street from STH 145 to W. Brown Deer Road
  5. The addition to the plan of a new W. Metro Boulevard from USH 45 to N. 107th Street
  6. The deletion from the plan of a new N. 68th Street from N. Industrial Road to W. Brown Deer Road
  7. The addition to the plan as an arterial of existing W. Cold Spring Road from S. 60th Street to S. 84th Street

- Ozaukee County
  1. The addition to the plan of the improvement of IH 43 from four to six traffic lanes from Brown Deer Road in Milwaukee County to Highland Road in Ozaukee County
  2. The addition to the plan of the long-planned extension of Granville Road from Freistadt Road to Highland Road
  3. The modification of the plan to drop Belgium-Kohler Road from CTH E to STH 57 from the arterial system
  4. The deletion from the plan of the long-planned extension of Walters Street from Grant Street to CTH LL

- Racine County
  1. The modification of the plan to retain the existing routing of STH 11 and to retain CTH KR as a county trunk highway facility
  2. The modification of the plan to retain Four Mile Road as a local, rather than county, arterial from IH 94 to STH 31
  3. The modification of the plan to replace the designation of Willow Road, Stuart Road, and Airline Road as an arterial facility with Oakes Road and its extensions from STH 11 to CTH K
  4. The modification of the plan to include CTH S and STH 75 from CTH K to STH 50 as county, rather than State, facilities
  5. The addition to the plan of the preservation of the potential for future widening of IH 94 from six to eight lanes, including preservation of the potential to provide HOV lanes, and of a potential new interchange on IH 94 at a relocated CTH C

- Walworth County
  1. The addition to the plan of the improvement of USH 14 from two to four traffic lanes from CTH O to the Walworth-Rock county line
  2. The addition to the plan of the improvement of STH 67 from Lincoln Street to USH 12 from two to four traffic lanes

- Washington County
  1. The modification of the plan to incorporate an alignment for the proposed east-west northern arterial route connecting the communities of Hartford and Slinger to USH 41 over Arthur Road from USH 41 to CTH U, then over new alignment from CTH U to Independence Drive, and then over Independence Drive to STH 60

- Waukesha County
  1. The addition to the plan of the improvement of CTH X from two to four traffic lanes from STH 59 to CTH H
  2. The addition to the plan of the improvement of STH 164 from four to six traffic lanes from IH 94 to USH 18

3. The addition to the plan of the extension of River Crest Drive from STH 175 to CTH Q

4. The addition to the plan of the expansion of the interchange of IH 94 with CTH P from a half to a full interchange

5. The addition to the plan of the improvement of Barker Road from two to four traffic lanes from Racine Avenue to STH 59 and from North Avenue to STH 74 to provide a continuous four traffic lanes from Racine Avenue and CTH Q

With respect to the consideration of the interrelationship between land use and transportation, the Advisory Committee determined that the transportation plan was appropriately based upon the adopted regional land use plan and that the transportation plan as proposed would serve to promote implementation of the land use plan and, therefore, a desirable pattern for future land use. The Advisory Committee did recommend that sensitivity of the performance of the regional transportation system plan, particularly with respect to vehicle-miles of travel, be identified with respect to potential high-growth as well as intermediate-growth futures for the Region and with respect to continuing trends and decentralized land use scenarios, as well as to centralized land use scenarios, including the adopted regional land use plan.

The Advisory Committee further recommended that a subsequent study be conducted by the Commission in an attempt to determine the extent to which transportation travel habits and patterns and transportation needs would differ under a land use scenario which may propose a more radical departure from continued land use development trends than recommended in the adopted regional land use plan. Such a plan may entail the substantial restructuring of existing, as well as future, development and incorporate significantly higher densities along transit corridors.

With respect to funding, the Advisory Committee concluded that the final plan should generally incorporate the recommendations of the preliminary plan. Accordingly, the final plan would entail a substantial funding shortfall. How best to address that shortfall will be set forth in the plan implementation chapter. The Advisory Committee also determined that the plan implementation chapter would need to address the funding attendant to the removal of the existing costs of public transit and arterial street and highway capital and operating costs from local property tax.

## FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

In accordance with the Committee determinations noted above, a final recommended regional transportation plan was synthesized and evaluated. The final plan reflects the consensus of the Kenosha, Ozaukee, Racine, Walworth, Washington, and Waukesha County Jurisdictional Highway System Planning Committees and the Milwaukee, Kenosha, and Racine Urbanized Area Transportation System Planning and Programming Committees, as well as the Technical Coordinating and Advisory Committee on Regional Transportation System Planning. The final plan is largely identical to the preliminary plan, differing only with respect to a relatively few recommended facilities and services. Each of the three major elements of the final plan, transportation system management, public transit maintenance and improvement, and arterial street and highway system maintenance and improvement, is described below.

### Transportation Systems Management

The final recommended plan, like the preliminary plan, emphasizes transportation systems management. The plan proposes measures within six separate categories to ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment; to encourage use of high-occupancy vehicles, including buses, vanpools, and carpools; to reduce vehicle use; to effect motor fuel savings; and to modify travel behavior through reductions in vehicular travel during peak travel periods and thereby better adjust travel demand to the available transportation system capacity. The six categories of management measures are:

- Freeway Traffic Management System
  The final plan includes implementation of the long-proposed Milwaukee-area freeway traffic management system. This system has the following components:

1. A freeway incident management program, including an electronic freeway traffic data-gathering and analysis system, a citizens' band radio monitoring system, a closed-circuit television monitoring system, an emergency service patrol, and a major-incident response team

2. A motorist advisory information program, consisting of fixed changeable message signs, transportable changeable message signs, and improved provision of information to commercial radio broadcasting stations

3. A freeway operational control program, consisting of ramp meters, high-occupancy-vehicle preferential access lanes, and computer-executed strategies for managing freeway operations by controlling access through an integrated areawide system of ramp meters. The control strategy would seek to provide for average operating speeds of approximately 35 miles per hour on all freeway segments during peak travel periods, although growing traffic volumes and a specified two-minute maximum delay at ramp meters may prevent achieving that objective on certain freeway segments. Preferential access would be provided at the metered ramps for buses and other HOVs

4. A central traffic management center, established to coordinate the incident management program, operate the real-time data collection system, and adjust operations through operation of the ramp meters to carry out the control strategy

The Wisconsin Department of Transportation is in the process of implementing this important management recommendation, which was first proposed by the Commission in 1978.

- <u>Curb-Lane Parking Restrictions</u>
The plan identifies 442 miles of the planned 3,607-mile arterial system where it is envisioned that curb-lane parking would be prohibited during peak hours of travel. Maps 115 through 121 identify for each county those arterial facilities where curb-lane parking restrictions may be advisable. In some cases such restrictions have already been placed into effect. In other cases it will probably be necessary for municipalities to restrict on-street parking as traffic volumes increase over time. It should be noted that such restrictions are essential to providing good transit service as well as to reducing traffic congestion on arterial streets and highways to acceptable levels.

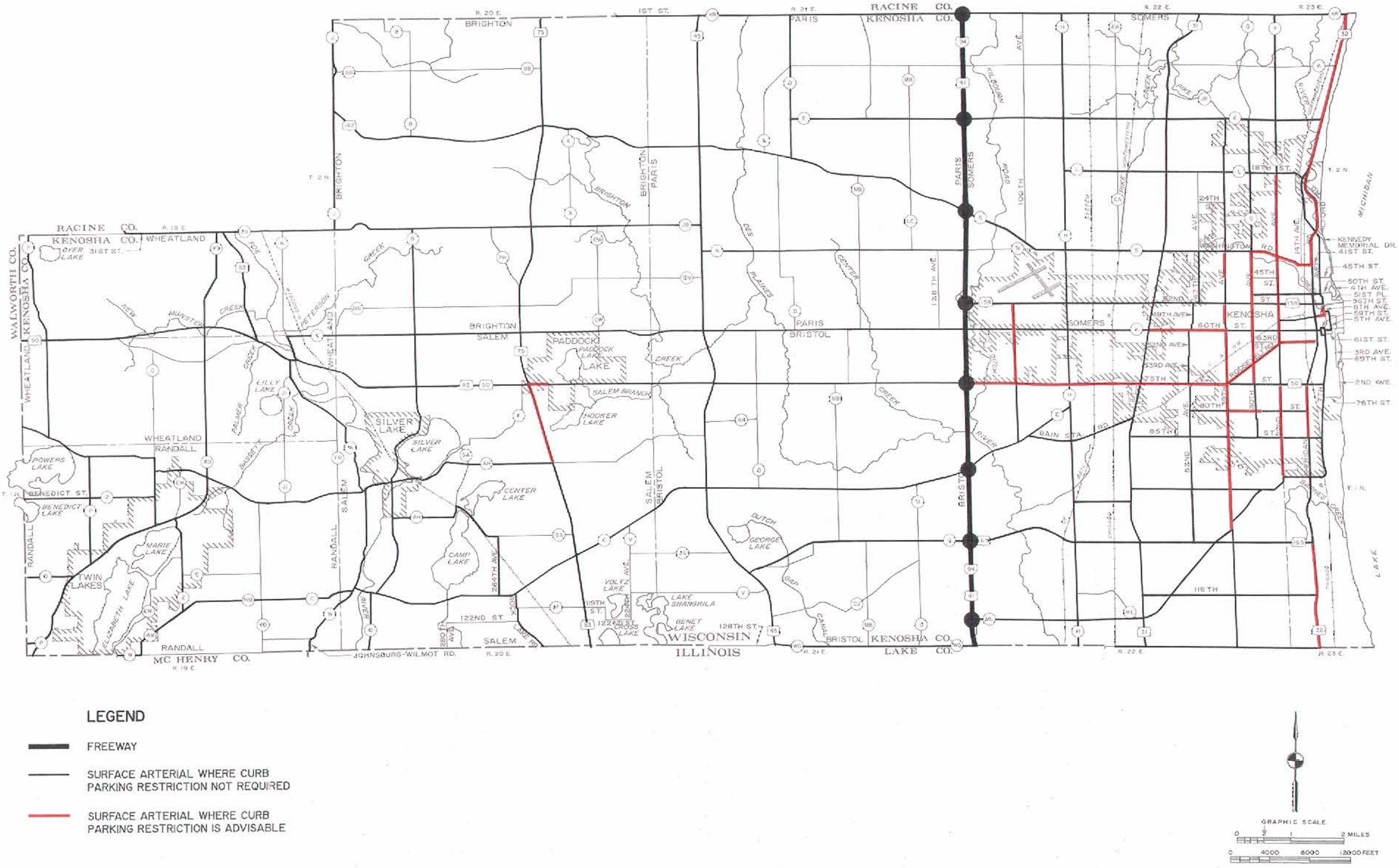
- <u>Traffic Management</u>
The plan recommends the use of state-of-the-art traffic engineering practices to assist in achieving efficient traffic flow on arterial facilities. The plan also recommends that arrangements to facilitate pedestrian and bicycle movements be considered in all traffic engineering activities and in the design of new or widened arterial streets and highways.

- <u>Intelligent Transportation Systems</u>
The plan recommends the application of advanced traffic management technology known as Intelligent Transportation Systems (ITS) as such technology becomes practical within the Region. Advanced traffic management systems (ATMS) technology is currently being applied by the Wisconsin Department of Transportation as part of the Department efforts to implement the freeway traffic management system. Other elements of ITS include: advanced travel information systems (ATIS) that provide travelers with real-time information on route-specific traffic conditions; advanced public transportation systems (APTS) that facilitate transit use by providing real-time transit vehicle location and scheduling information to transit users; commercial vehicle operations (CVO) technology that automates commercial vehicle licensing, registration, and fee collection; advanced rural transportation systems (ARTS) that provide up-to-date weather and road condition reports to rural highway users; and advanced vehicle control systems (AVCS) or the in-vehicle technology that may improve the safety and efficiency of automobile travel.

- <u>Areawide Promotional Measures</u>
The plan recommends coordinated areawide programs to promote travel through ride-

Map 115

## LOCATION OF ANTICIPATED CURB-LANE PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN KENOSHA COUNTY: 2010

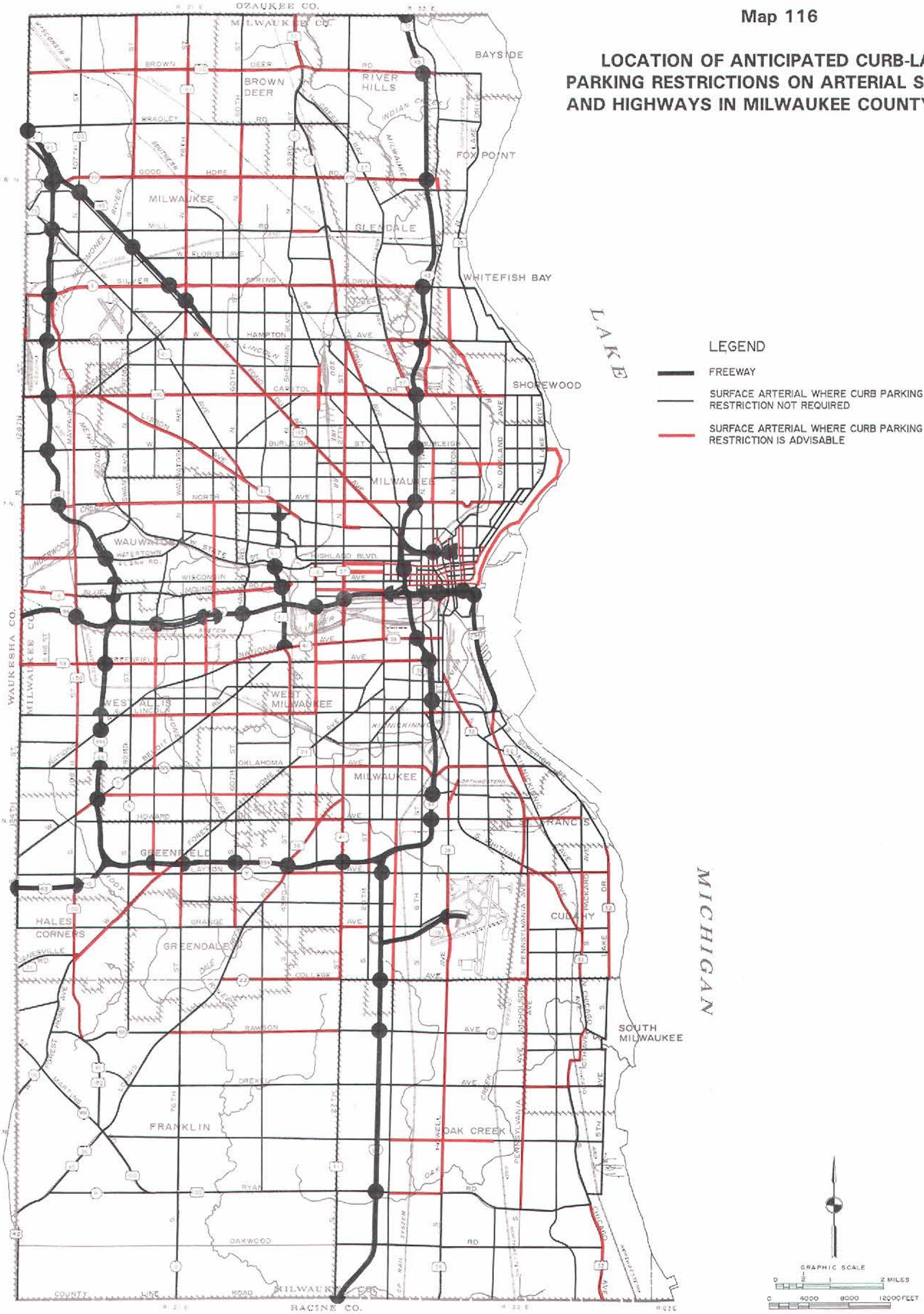



To help ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment, it is recommended that concerned local units of government restrict curb-lane parking on certain arterial streets and highways during peak travel periods. The final recommended plan identified about 34.0 route-miles of arterial streets and highways in Kenosha County where it would be advisable for municipalities to restrict parking.

*Source: SEWRPC.*

## Map 116

### LOCATION OF ANTICIPATED CURB-LANE PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN MILWAUKEE COUNTY: 2010

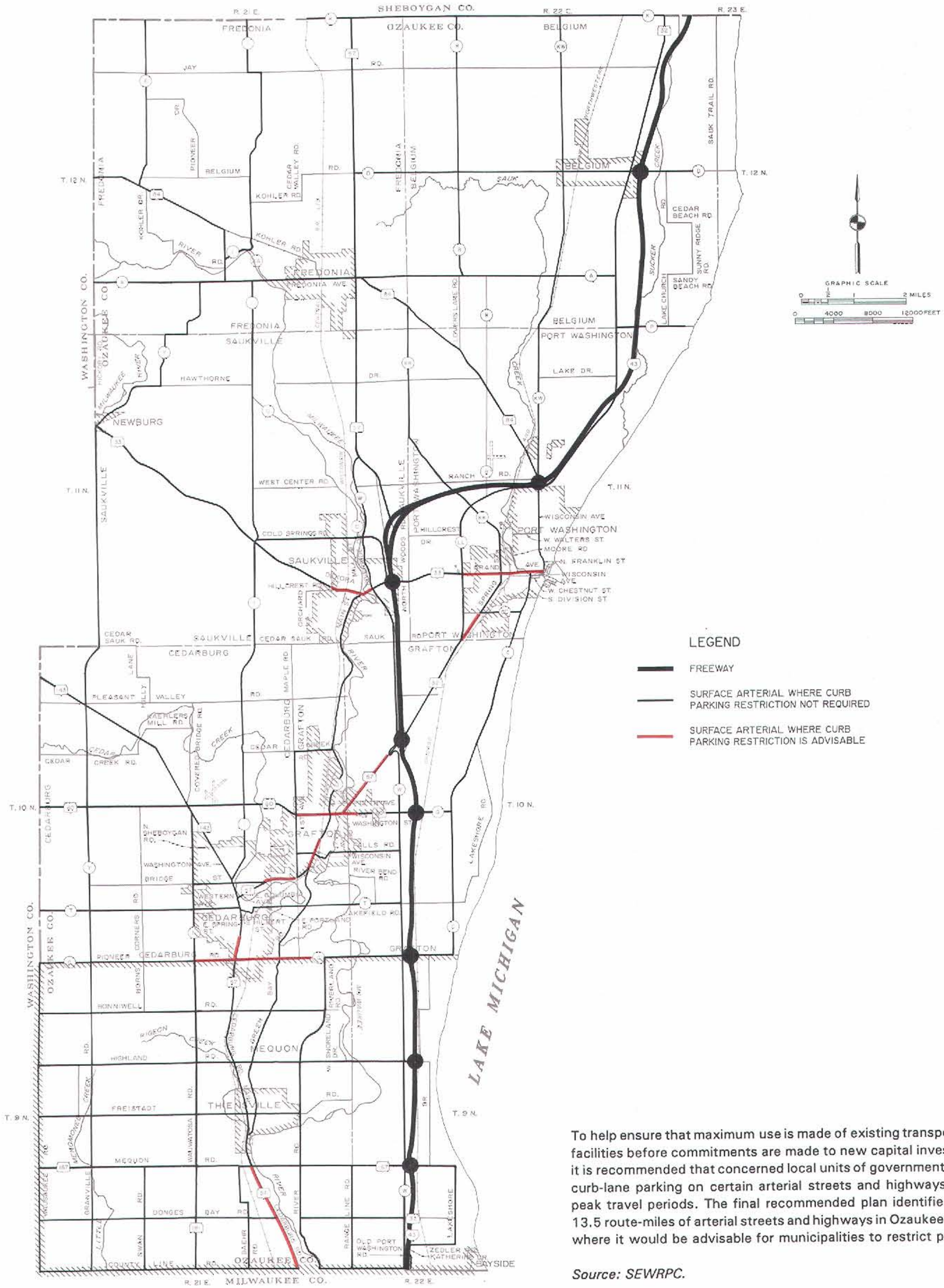



To help ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment, it is recommended that concerned local units of government restrict curb-lane parking on certain arterial streets and highways during peak travel periods. The final recommended plan identified about 212.5 route-miles of arterial streets and highways in Milwaukee County where it would be advisable for municipalities to restrict parking.

*Source: SEWRPC.*

## Map 117

### LOCATION OF ANTICIPATED CURB-LANE PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN OZAUKEE COUNTY: 2010

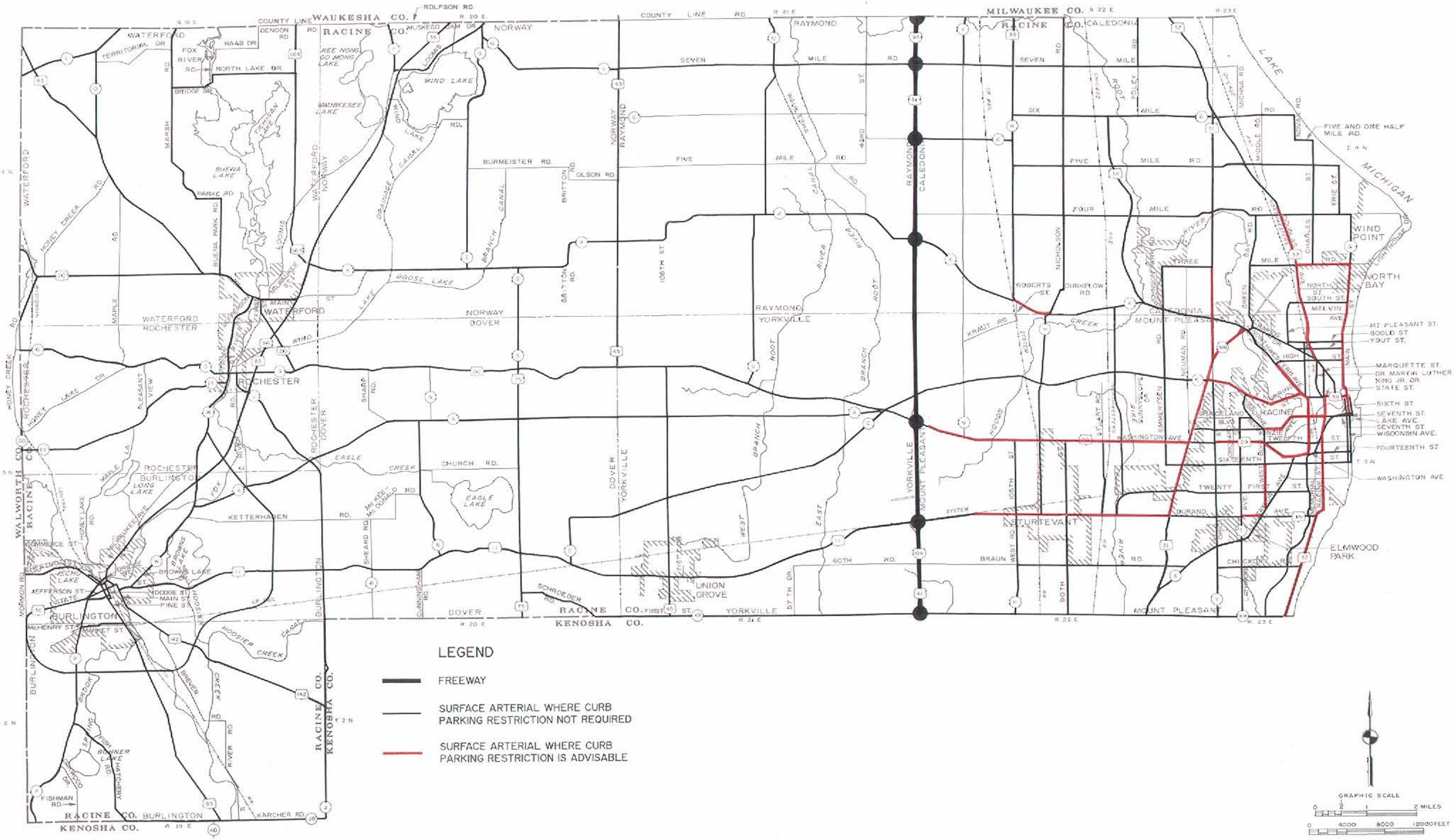



To help ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment, it is recommended that concerned local units of government restrict curb-lane parking on certain arterial streets and highways during peak travel periods. The final recommended plan identified about 13.5 route-miles of arterial streets and highways in Ozaukee County where it would be advisable for municipalities to restrict parking.

*Source: SEWRPC.*

## Map 118

## LOCATION OF ANTICIPATED CURB-LANE PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN RACINE COUNTY: 2010

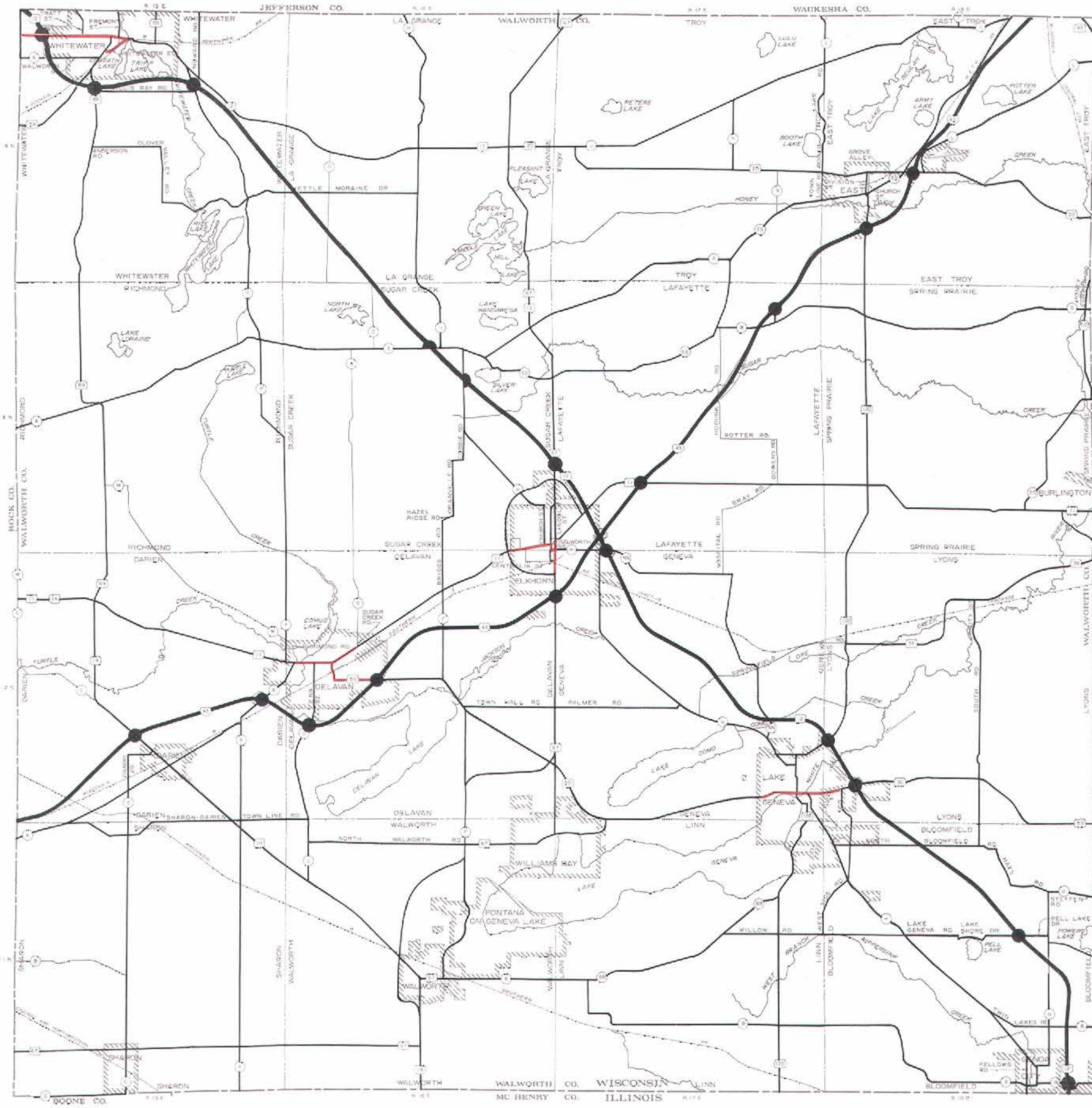



To help ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment, it is recommended that concerned local units of government restrict curb-lane parking on certain arterial streets and highways during peak travel periods. The final recommended plan identified about 36.5 route-miles of arterial streets and highways in Racine County where it would be advisable for municipalities to restrict parking.

*Source: SEWRPC.*

## Map 119

### LOCATION OF ANTICIPATED CURB-LANE PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN WALWORTH COUNTY: 2010




LEGEND

FREEWAY

SURFACE ARTERIAL WHERE CURB PARKING RESTRICTION NOT RQUIRED

SURFACE ARTERIAL WHERE CURB PARKING RESTRICTION IS ADVISIABLE

GRAPHIC SCALE

0 1 2 MILES

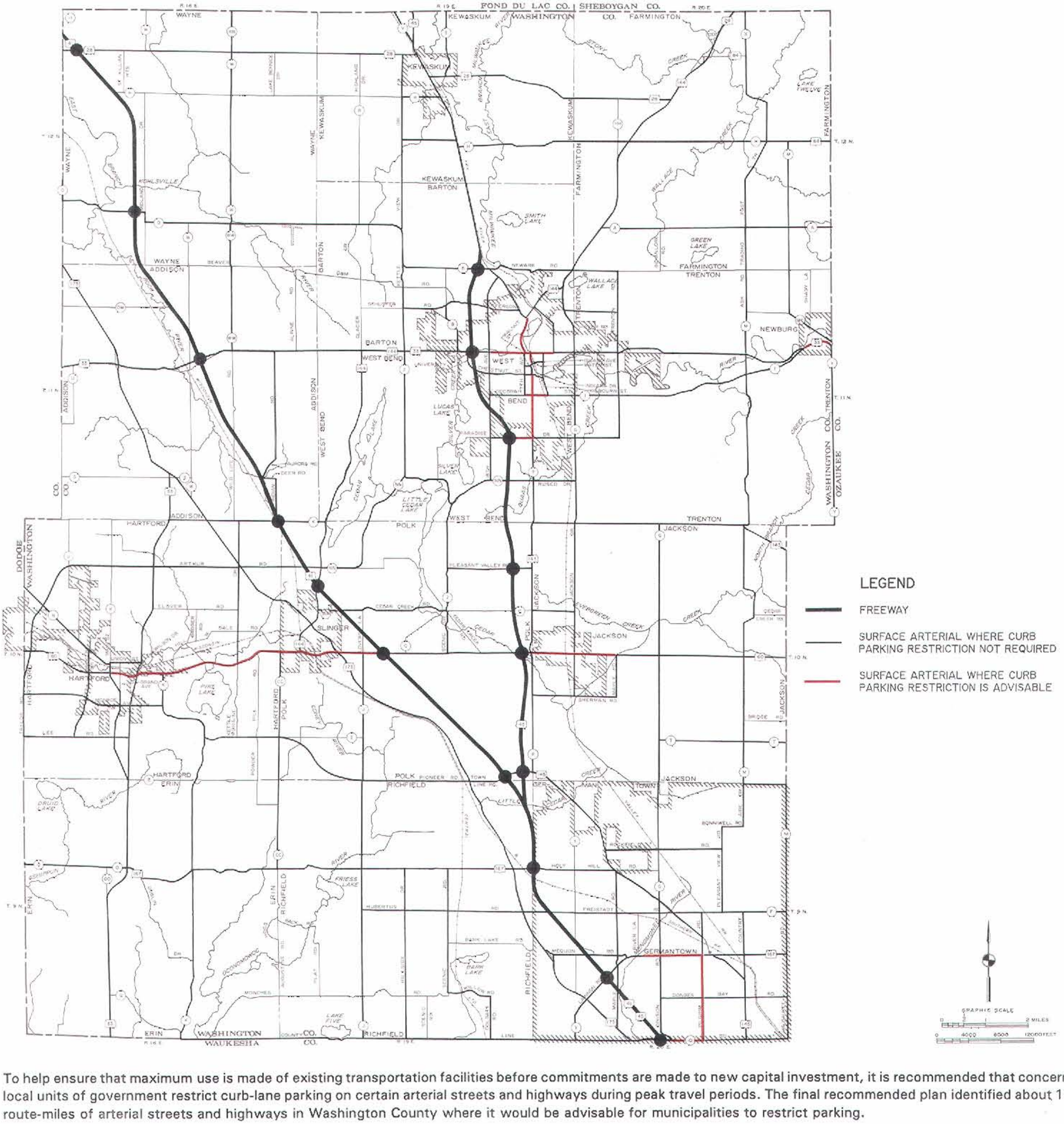
0 4000 8000 12000 FEET

To help ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment, it is recommended that concerned local units of government restrict curb-lane parking on certain arterial streets and highways during peak travel periods. The final recommended plan identified about 9.5 route-miles of arterial streets and highways in Walworth County where it would be advisable for municipalities to restrict parking.

*Source: SEWRPC.*

## Map 120

## LOCATION OF ANTICIPATED CURB-LANE PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN WASHINGTON COUNTY: 2010

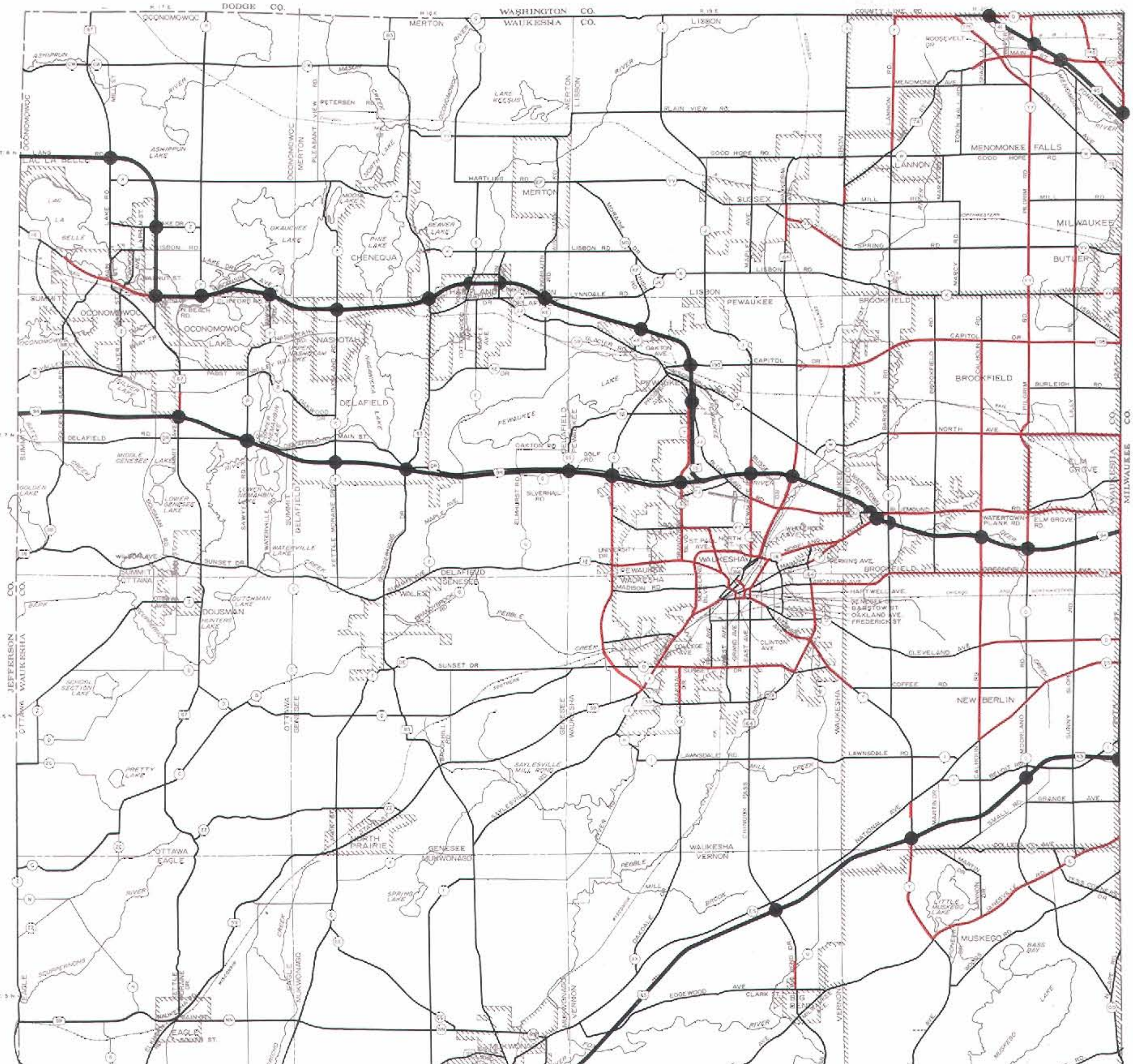



To help ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment, it is recommended that concerned local units of government restrict curb-lane parking on certain arterial streets and highways during peak travel periods. The final recommended plan identified about 18.5 route-miles of arterial streets and highways in Washington County where it would be advisable for municipalities to restrict parking.

*Source: SEWRPC.*

## Map 121

### LOCATION OF ANTICIPATED CURB-LANE PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN WAUKESHA COUNTY: 2010




**LEGEND**

- FREEWAY
- SURFACE ARTERIAL WHERE CURB PARKING RESTRICTION NOT REQUIRED
- SURFACE ARTERIAL WHERE CURB PARKING RESTRICTION IS ADVISABLE

GRAPHIC SCALE

0 — 1 — 2 MILES

0 — 4000 — 8000 — 12000 FEET

To help ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment, it is recommended that concerned local units of government restrict curb-lane parking on certain arterial streets and highways during peak travel periods. The final recommended plan identified about 117.5 route-miles of arterial streets and highways in Waukesha County when it would be advisable for municipalities to restrict parking.

*Source: SEWRPC.*

sharing, transit use, bicycle use and pedestrian movement, as well as telecommuting and rescheduling of work time. The plan recommends that the State and local units of government promote and support transportation management associations. Such associations would provide an institutional structure for helping to achieve the goals of the Federal Clean Air Act and the mandated Federally Employee Commute Options program.

- Land Use Measures
  The plan recommends that local units of government prepare detailed, site-specific land use plans to facilitate travel by transit, bicycle, and walking movement. The plan recommends the use of zoning, subdivision control, official mapping, and other land use plan implementation devices to promote the development over time of a coordinated mix of land use activities in newly developing areas, higher-density development near transit lines and stations, the orientation of buildings on sites in a manner which facilitates transit use, and integrated bicycle and pedestrian circulation systems linked to transit stops and stations.

In recognition of the relationship between regional patterns of land use development and travel demand, the plan recommends that county and local units of government within the Region employ the regional land use plan as a guide in making decisions regarding urban development. In this regard, the plan envisions that county and local units of government would institute land use policies that would help to direct the type, extent, location, timing, and rate of urban development in accordance with the regional land use plan. Such development policies would provide that urban development occur in planned neighborhood units or in planned major activity centers and only in areas covered by soils suitable for urban use, not subject to such special hazards as flooding, and readily provided with essential urban services including sanitary sewerage, public water supply, and public mass transit.

Transit Systems Management and Service Enhancement Measures: The plan recommends a range of activities to be undertaken by the transit agencies in the Region to enhance the quality of transit services and to facilitate transit use. The plan recommends that transit agencies take steps to improve transit information systems, including real-time vehicle locators to reduce waiting time; to improve facilities for transfers and waiting; to improve bicycle storage at stops and to consider the use of onboard carriers as appropriate; to work with local governments to provide transit only street connections to facilitate through movement of transit vehicles; to use marketing/public education activities to promote the use of transit; to improve transit security; to consider improved vehicle design, including low-floor vehicles, alternative fuels, improved noise and vibration control, and comfort improvement; to investigate methods for increased bus speeds through priority systems and signal preemption; and to promote innovative fare payment systems such as the UPASS, commuter check, smart card, employer treatment of transit as a fringe benefit, and other means to provide alternative ways to pay for transit services.

Public Transit Maintenance and Improvement
The final recommended plan calls for major increases in the levels of rapid and express transit service provided within the Region, as well as increases in the level of local service provided (see Table 254). The plan proposes the development of a true system of rapid and express transit routes integrated with local transit service. Rapid transit routes would operate within all major travel corridors oriented to the Milwaukee CBD and be coordinated with express transit operating over a grid pattern of routes within Milwaukee County. The recommended year 2010 public transit system for the Region is presented in graphic summary form on a one inch equals 8,000 feet scale regional map available from the Regional Planning Commission upon request.

Over all, the plan proposes a 75 percent increase in transit service as measured in vehicle-miles of service provided, from 63,300 in 1991 to 110,600 in 2010. This increase embodies the combined effects of proposed improvements in the frequency of operation of rapid and express transit and the additions and extensions of rapid, express, and local transit routes. The transit recommendations are graphically summarized on Map 122.

Rapid Transit: Like the preliminary recommended plan, the final plan recommends that existing freeway flyer bus service within the Region continue to be operated from the Milwau-

Table 254

**TRANSIT SYSTEM OPERATING CHARACTERISTICS IN THE REGION: 1991 AND 2010 FINAL RECOMMENDED TRANSPORTATION SYSTEM PLAN**

| Transit Service | Base Year 1991 | Planned Increment | | 2010 |
|---|---|---|---|---|
| | | Number | Percent | |
| Round-Trip Route Length (miles) | | | | |
| Rapid Routes | 449 | 911 | 202.9 | 1,360 |
| Express Routes | 393 | 27 | 6.9 | 420 |
| Local Routes | | | | |
| Kenosha Urbanized Area | 171 | 39 | 22.8 | 210 |
| Milwaukee Urbanized Area | 1,112 | 338 | 30.4 | 1,450 |
| Racine Urbanized Area | 171 | 29 | 17.0 | 200 |
| Subtotal | 1,454 | 406 | 27.9 | 1,860 |
| Total | 2,296 | 1,344 | 58.5 | 3,640 |
| Average Weekday Vehicle Requirements[a] | | | | |
| Peak Period | 530 | 249 | 47.0 | 779 |
| Midday Off-Peak Period | 285 | 65 | 22.8 | 350 |
| Revenue Vehicle-Miles (average weekday) | | | | |
| Rapid | 3,400 | 13,500 | 397.1 | 16,900 |
| Express | 3,300 | 18,100 | 548.5 | 21,400 |
| Local | 56,600 | 15,700 | 27.7 | 72,300 |
| Total | 63,300 | 47,300 | 74.7 | 110,600 |
| Revenue Vehicle-Hours (average weekday) | | | | |
| Rapid | 170 | 530 | 311.8 | 700 |
| Express | 170 | 930 | 547.1 | 1,100 |
| Local | 4,880 | 920 | 18.9 | 5,800 |
| Total | 5,220 | 2,380 | 45.6 | 7,600 |

[a]*Represents only the vehicles required for daily system operation. Excludes vehicles needed as spare or backup.*

*Source: SEWRPC.*

kee CBD to the south to the Cities of Racine and Kenosha, to the southwest to the Village of Mukwonago, and to the west to the Cities of Waukesha and Oconomowoc. The plan also calls for the expansion of such service in the northwest corridor from its current terminus at the Pilgrim Road transit station to the City of West Bend and in the IH 43 north corridor from its current terminus at the Brown Deer Road transit station in River Hills through Cedarburg, Grafton and Saukville to Port Washington. The network of rapid transit routes is shown in red on Map 122.

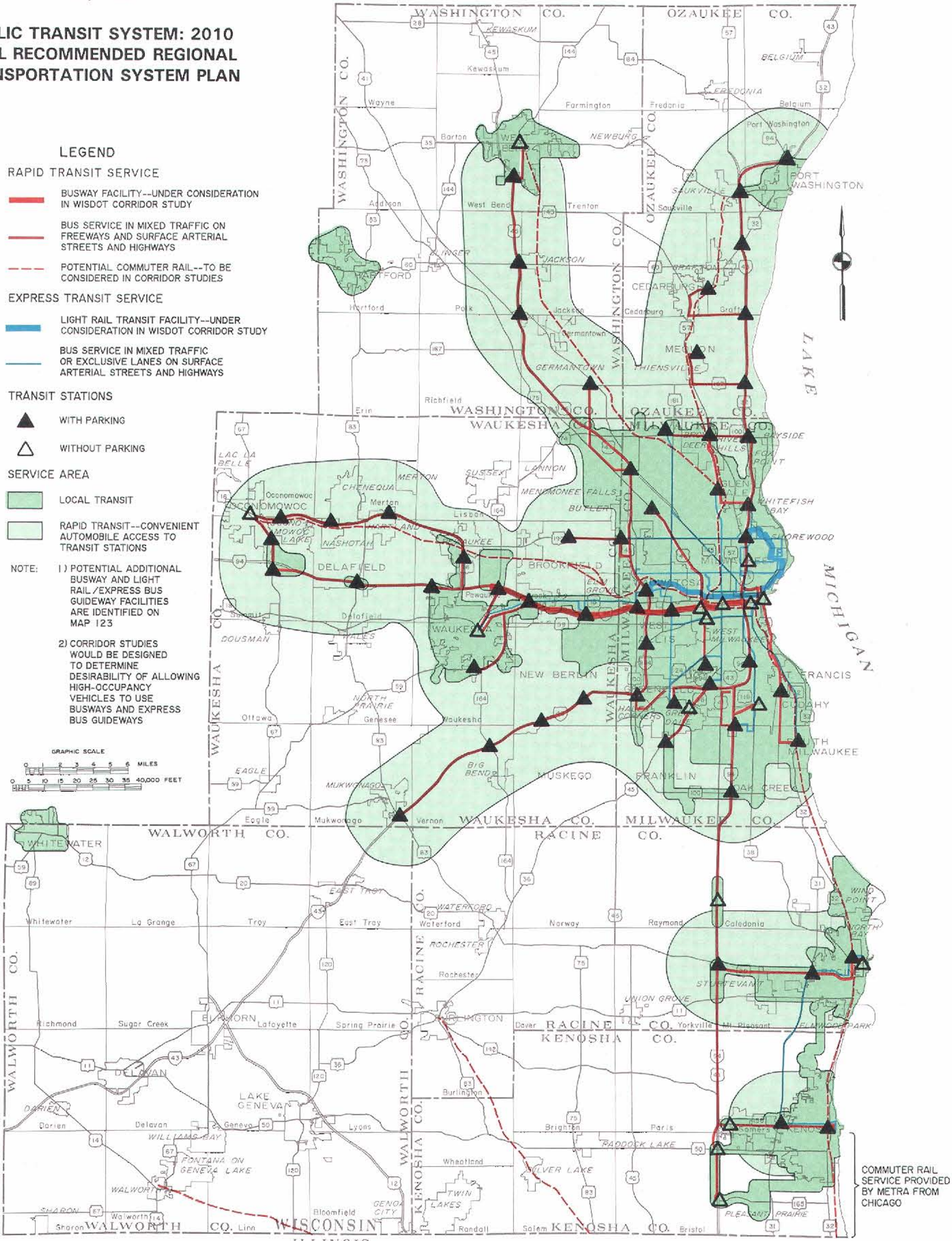
Under the final plan, 30 rapid transit routes, 27 oriented to the Milwaukee CBD and three to the University of Wisconsin-Milwaukee campus, would be operated over 1,360 round-trip route-miles. The rapid transit system would be served by 73 transit stations, spaced about every three to five miles. In 1991, the base year for the new plan, 13 rapid transit freeway flyer routes were operated over 449 round-trip route-miles within the Region. These routes served 25 transit stations.

The planned rapid transit system would serve intermediate stations and would provide service in both directions during both peak periods. The final plan recommends that the number of rapid transit revenue vehicle-miles of service provided be increased by 13,500 vehicle-miles, from 3,400 in 1991 to 16,900 by 2010. Similarly, the plan recommends that the number of rapid transit revenue vehicle-hours of service be increased by 530 vehicle-hours, from 170 in 1991 to 700 by 2010.

The rapid transit service provided under the recommended plan would operate primarily during peak periods, that is, between the hours

## Map 122

## PUBLIC TRANSIT SYSTEM: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN




The year 2010 final recommended regional transit system consists of an extensive rapid transit system serving all major Milwaukee central business district travel corridors, an extensive grid system of express transit routes particularly in Milwaukee County, and an expansion of local transit service areas with enhancements to accompanying paratransit services. The plan also incorporates the continuation of local shared-ride taxi service currently provided in certain smaller urban areas of the Region. The regional public transit system envisioned under the final recommended plan would consist of 3,640 round-trip route-miles, which would be about 59 percent greater than that provided in 1991. The planned transit system would provide 110,600 revenue vehicle-miles of service per average weekday, or 75 percent more than in 1991, and 7,600 revenue vehicle-hours of service per average weekday, or 46 percent more than in 1991.

*Source: SEWRPC.*

of 6:00 a.m. and 8:30 a.m. and 3:30 p.m. and 6:00 p.m. on weekdays. Midday service over some routes would be provided. No weekend or evening service would be provided. Headways on the rapid transit system would range from five to 30 minutes during peak periods, and 30 to 60 minutes during off-peak periods over those routes provided with service during the midday.

The fares for rapid transit service would remain at 1994 levels, adjusted only for future general price inflation. The freeway flyer rapid transit bus fare for a trip within Milwaukee County would be $1.50. The fare charged for a trip between points within Milwaukee County and the limits of the Milwaukee urbanized area would be $2.00. The fare charged for a trip between the Milwaukee CBD and the outer limits of the rapid transit system would be $3.00.

Like the preliminary plan, the final plan identifies a potential system of almost 49 miles of exclusive busway and HOV facilities, including a 15-mile-long busway/HOV facility in the east-west corridor between the Cities of Waukesha and Milwaukee (see Map 123). These facilities would be located within, or parallel to, the most heavily congested freeway corridors. The ultimate decision concerning the inclusion of such facilities in the regional transportation system plan would be made following the completion of detailed major investment studies for each corridor.

The plan also recognizes the potential to establish commuter passenger train service as an alternative to freeway flyer or exclusive busway rapid transit service in four major Milwaukee-oriented travel corridors: from Milwaukee through St. Francis, Cudahy, South Milwaukee, Oak Creek, Racine, and Kenosha over CP Rail System (former Chicago, Milwaukee, St. Paul & Pacific Railroad Company) and Chicago & North Western Transportation Company lines; from Milwaukee through Wauwatosa, Elm Grove, Brookfield, Pewaukee, Hartland, Delafield, and Nashotah to Oconomowoc over CP Rail System (former Chicago, Milwaukee, St. Paul & Pacific Railroad Company) lines; from Milwaukee through Germantown and Jackson to West Bend over the CP Rail System (former Chicago, Milwaukee, St. Paul & Pacific Railroad Company), Chicago & North Western Transportation Company, and Wisconsin Central Transportation Corporation (former Chicago & North Western Transportation Company) lines; and from Milwaukee through Brown Deer, Cedarburg and Grafton to Saukville over CP Rail System and Wisconsin Central Transportation Corporation (former Chicago, Milwaukee, St. Paul & Pacific Railroad Company) lines. The plan also recognizes the potential to provide commuter passenger train service in two Chicago-oriented corridors: from the Village of Walworth through Fox Lake, Illinois, to the Chicago area over Wisconsin and Southern Railroad Company and Metra railway lines (former Chicago, Milwaukee, St. Paul & Pacific Railroad Company); and from the City of Burlington through Silver Lake and Antioch, Illinois, to Chicago over Wisconsin Central Transportation Company lines (former Soo Line Railroad Company) (see Map 122). Detailed corridor studies would be required for these proposals.

Express Transit

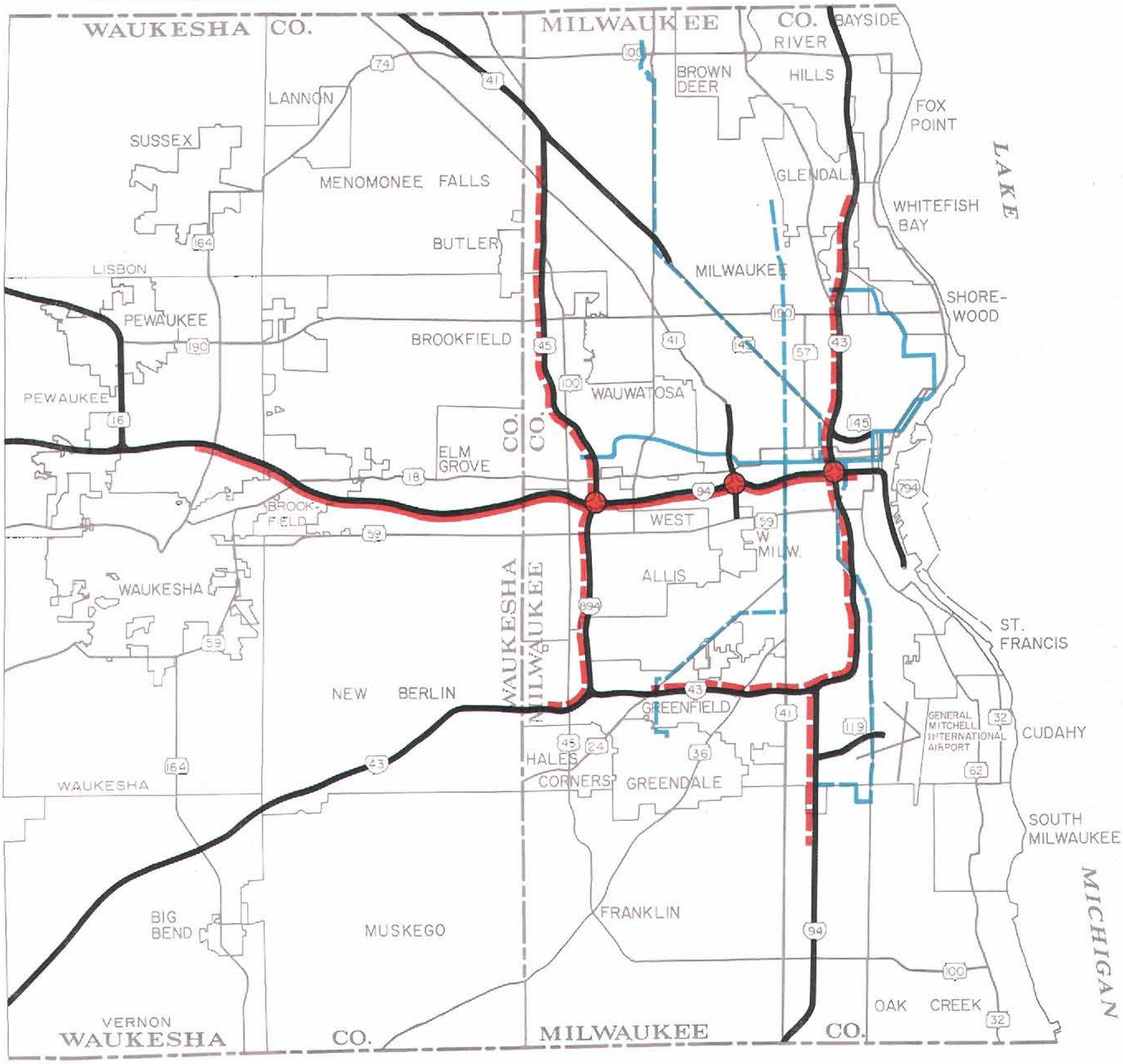
Like the preliminary plan, the final plan recommends that 12 regular express transit bus routes be provided in a grid pattern, largely within Milwaukee County. In 1991, seven regular express transit routes were in operation. Within the Milwaukee urbanized area, the express transit would be provided in major travel corridors to connect major activity centers to the Milwaukee CBD. One express transit route would also connect the CBDs of the Cities of Racine and Kenosha. The planned express routes are shown in blue on Map 122.

Like the preliminary plan, the final plan identifies a potential 15-mile-long light-rail express transit line connecting the City of Glendale, the University of Wisconsin-Milwaukee, the Milwaukee CBD, and the Milwaukee Regional Medical Center and Research Park (see Map 123). These facilities would serve heavily traveled corridors in Milwaukee County. The ultimate decision concerning the inclusion of such facilities in the regional transportation system plan would be made following the completion of the major investment study now underway for the east-west travel corridor.

Three other travel corridors are identified in the plan as having potential for light-rail express transit service. These include the corridors that extend from the Milwaukee CBD to the General Mitchell International Airport, along the 27th Street crosstown corridor from W. Silver Spring Drive to the Southridge Shopping Center, and from the Milwaukee CBD to the Northridge

## Map 123

## EXTENT OF POTENTIAL BUSWAY AND LIGHT-RAIL/EXPRESS BUS GUIDEWAY FACILITIES IN THE MILWAUKEE AREA: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN




LEGEND

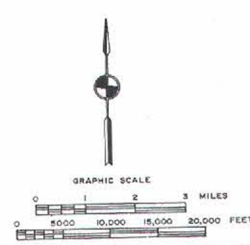
- BUSWAY FACILITY--UNDER CONSIDERATION IN WISDOT CORRIDOR STUDY
- BUSWAY FACILITY--TO BE CONSIDERED IN ADDITIONAL CORRIDOR STUDIES
- LIGHT RAIL TRANSIT FACILITY--UNDER CONSIDERATION IN WISDOT CORRIDOR STUDY
- LIGHT RAIL/BUS GUIDEWAY FACILITY--TO BE CONSIDERED IN ADDITIONAL CORRIDOR STUDIES
- MAJOR INTERCHANGE RECONSTRUCTION DESIGNED TO ACCOMMODATE BUSWAY FACILITY
- RESURFACING/RECONSTRUCTION OF FREEWAY TO PROVIDE SAME CAPACITY; INCLUDES STRUCTURE RECONSTRUCTION TO ACCOMODATE BUSWAY ONLY IN THE EAST-WEST CORRIDOR

NOTE:

1) PRELIMINARY RECOMMENDED PLAN INCLUDES ONLY THE BUSWAY AND LIGHT RAIL FACILITIES AND THEIR ATTENDANT COSTS AS DEVELOPED IN THE WISDOT EAST-WEST CORRIDOR STUDY

2) BUSWAY AND LIGHT RAIL/BUS GUIDEWAY FACILITY ALIGNMENTS SHOWN ON MAP ARE CONCEPTUAL; CORRIDOR STUDIES WOULD BE DESIGNED TO SELECT A PREFERRED ALIGNMENT

3) CORRIDOR STUDIES WOULD BE DESIGNED TO DETERMINE DESIRABILITY OF ALLOWING HIGH-OCCUPANCY VEHICLES TO USE BUSWAYS AND EXPRESS BUS GUIDEWAYS




Under the final recommended regional transportation system plan, rapid transit busway facilities and express transit light-rail facilities would be considered as alternatives to motor bus transit service over arterial highway lanes. Consideration of such fixed-guideway transit service facilities would be initiated as part of Federally required major investment studies for each of the identified corridors. The busway facility, which extends along the IH 94 corridor from the City of Milwaukee to the STH 164 interchange in Waukesha County, shown on the accompanying map, and the light-rail facility, which extends from the Village of Glendale through the central business district of Milwaukee to the Milwaukee County Institutions Grounds, have been explicitly included in the final recommended plan. It is recognized that the implementation of these fixed-guideway transit facilities depends upon the ultimate outcome of the corridor study currently being conducted by the Wisconsin Department of Transportation. Upon completion of that study, the local units of government concerned, the Wisconsin Department of Transportation, and the Regional Planning Commission would have to affirm the study findings and, if necessary, amend the regional transportation system plan.



*Source: SEWRPC.*

Shopping Center. The feasibility of effectively providing light-rail service in these corridors would be determined through Federally required major investment studies. The potential light-rail facilities are envisioned to operate with preferential treatment over reserved street lanes within street rights-of-way or over such exclusive rights-of-way as along railway or former electric interurban railway rights-of-way. Light-rail operating characteristics may be expected to vary depending upon the type of right-of-way and adjacent development and attendant station spacing, and may approach rapid transit operating characteristics.

Under the plan, the extent of express transit service would be significantly expanded through the provision of a grid of express routes. The frequency of operation of transit vehicles over the express routes would also be significantly increased. As shown in Table 254, the number of vehicle-miles provided on an average weekday would increase by 18,100 vehicle-miles, from about 3,300 in 1991 to about 21,400. Similarly, vehicle-hours of express service provided on an average weekday would increase by 930 vehicle-hours, from 170 in 1991 to 1,100 in 2010.

Express transit service would be provided on weekdays from 6:00 a.m. to 6:00 p.m. on all routes and during weekday evenings and weekends on some routes. Peak-period headways would range from five to 15 minutes in the Milwaukee urbanized area to 30 minutes on the route connecting Racine and Kenosha. Off-peak headways would range from 10 to 30 minutes within the Milwaukee urbanized area to 60 minutes on the Racine-Kenosha route. Express transit fares would remain at 1994 levels, that is, $1.25 in Milwaukee County and $0.75 on the Racine-Kenosha route. It is assumed that these fares would increase with general price inflation over the plan design period.

Local Transit: The level of local service envisioned in the plan consists of buses operating over arterial and collector streets with frequent stops for passenger boarding and alighting. Local fixed-route service would continue to be provided and would be extended within Milwaukee County and the Cities of Waukesha, Racine, and Kenosha and their immediate environs. The plan recommends that the local transit operators undertake detailed implementation studies to identify the best way to provide for the service extensions, holding open the possibility of transit center-oriented local route systems to replace, in some areas, the grid route systems. As shown on Map 122, these areas of expanded service are generally located in southern and northern Milwaukee County and in the most heavily developed portions of Waukesha County. Under the final plan, local transit service would operate over 1,860 round-trip route-miles within the Region, representing an increase of 406 route-miles, or 28 percent, over the approximately 1,454 route-miles provided in 1991.

The frequency of local transit service would be substantially improved over 1991 levels. Within Milwaukee County peak-period headways on the major routes in the area south of Silver Spring Drive, east of 76th Street, and north of Layton Avenue would be improved from 10 to 40 minutes to 10 minutes. Peak-period headways in the Racine and Kenosha urban areas would be improved from 20 to 30 minutes to 15 to 30 minutes. Peak-period headways in the Waukesha urban area would be improved so that all routes would operate at 30 minute headways.

Under the final plan, local transit fares would remain at 1994 levels, adjusted only for the effects of general price inflation. Accordingly, fares within Milwaukee County would be $1.25; within Racine, $0.60; and within Waukesha and Kenosha, $0.75. Transit fares would increase only with general price inflation. The final recommended plan also recognizes the need to provide local transit service in the smaller urban communities of the Region, particularly through shared-ride taxi service. Explicitly incorporated into the plan are the continuation of the shared-ride taxi services provided in the Cities of Hartford, Port Washington, West Bend, and Whitewater.

The recommended plan also includes a paratransit service component which is consistent with the Americans with Disabilities Act (ADA) of 1990. The plan assumes that all transit vehicles that provide conventional fixed-route transit service would be accessible to persons with disabilities, including those persons using wheelchairs. This assumption is reflected in the capital cost estimate for transit vehicle fleet replacement and expansion under the recommended plan. The plan also ensures that all public entities operating fixed-route transit systems will provide comparable paratransit service to those disabled persons within local transit service areas who are unable to use fixed-route transit services. Accordingly, the complementary paratransit services currently provided within the Region would continue to be operated and expanded consistent with the planned expansion of local transit service areas within the Kenosha, Milwaukee, and Racine urbanized areas.

Like existing complementary paratransit services provided within the Region, the planned paratransit services would meet Federally specified ADA eligibility and service requirements. The complementary paratransit services would serve any person with a permanent or temporary disability who is unable independently to board, ride, or disembark from an accessible vehicle used to provide fixed-route transit service; who is capable of using an accessible vehicle, but one is not available for the desired trip; or who is unable to travel to or from the boarding or disembarking location of the fixed-route transit service. Within a given area, the planned paratransit service would be available during the same hours and on the same days as the fixed-route transit service, would be provided to eligible persons on a "next day" trip reservation basis, would not limit service to eligible persons based on restrictions or priorities relative to trip purpose, and would not be operated under capacity constraints which might limit the ability of eligible persons to receive service for a particular trip. The paratransit service fares assumed under the recommended plan would range from about $1.20 to $2.50 per one-way trip.

#### Relationship between the East-West Corridor Transit Study and the Recommended Plan

The final recommended plan provisionally includes an east-west travel corridor busway and light-rail express transit lines emanating from the Milwaukee CBD west to the Milwaukee Regional Medical Center and Research Park and northeast to the City of Glendale through the University of Wisconsin-Milwaukee campus. It is recognized that, when the East-West Corridor Transit Study is completed, it will be necessary for the Regional Planning Commission to appropriately affirm or amend the regional transportation system plan before any projects that would implement these potential facilities could be placed into the regional transportation improvement program.

#### Arterial Street and Highway System Maintenance and Improvement

The planned additions and changes to the arterial street and highway system in the Region between 1991 and 2010 are summarized in Table 255. The proposed arterial street and highway system is shown on Map 124. In 1991, the arterial street and highway system in the Region consisted of about 3,274 route-miles of facilities. Under the final recommended plan, by the year 2010 the arterial system would be increased by about 333 route-miles and would total 3,607 route-miles and 10,303 lane-miles. The additional arterial mileage reflects primarily the conversion of existing nonarterial facilities to arterial status and function as urban development proceeds within the Region. About 131 route-miles, or 4 percent of the proposed additional arterial mileage, would be added through new construction.

The recommended year 2010 arterial street and highway system for the Region is presented in graphic summary form on a one inch equals 8,000 feet scale regional map available from the Regional Planning Commission upon request. Each link in the arterial street and highway system is identified on this map, together with the proposed number of through travel lanes to be provided on that link. Freeways are identified as having either four, six, or eight lanes. Standard surface arterials are identified as having either two, four, or six lanes.

There are no typical cross-sections identified on the aforementioned planned arterial system map. Rather, only the number of lanes recommended to be provided on each link in the arterial network is indicated. The number of lanes identified refers to through travel lanes, that is, those lanes that would carry traffic directly through intersections. Thus, the number does not include any auxiliary traffic lanes to be provided for left- and right-turning movements, for vehicle parking, or for use by distressed vehicles. It was assumed in the regional systems analysis that such right- and left-turn lanes will be provided where the volumes of turning vehicles would adversely affect the movement of vehicles through the intersection. The provision of turn lanes would, therefore, follow a design investigation in connection with a given improvement project. In addition to determining whether or not right- and/or left-turn lanes should be provided at intersections, the design investigation should determine whether or not a given arterial street improvement should be made using a divided or an undivided roadway cross-section. Thus, the precise cross-section to

Table 255

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

| County | System Preservation (miles) | System Improvement (miles) | System Expansion (miles) | Total Miles |
|---|---|---|---|---|
| Kenosha | | | | |
| Freeway | 12.0 | 0.0 | 0.0 | 12.0 |
| Standard Arterial | 288.9 | 44.8 | 9.4 | 343.1 |
| Subtotal | 300.9 | 44.8 | 9.4 | 355.1 |
| Milwaukee | | | | |
| Freeway | 69.2 | 0.0 | 0.0 | 69.2 |
| Standard Arterial | 666.3 | 50.2 | 11.3 | 727.8 |
| Subtotal | 735.5 | 50.2 | 11.3 | 797.0 |
| Ozaukee | | | | |
| Freeway | 27.4 | 0.0 | 0.0 | 27.4 |
| Standard Arterial | 222.6 | 48.5 | 5.9 | 277.0 |
| Subtotal | 250.0 | 48.5 | 5.9 | 304.4 |
| Racine | | | | |
| Freeway | 12.0 | 0.0 | 0.0 | 12.0 |
| Standard Arterial | 330.5 | 62.2 | 19.1 | 411.8 |
| Subtotal | 342.5 | 62.2 | 19.1 | 423.8 |
| Walworth | | | | |
| Freeway | 50.0 | 0.0 | 16.7 | 66.7 |
| Standard Arterial | 359.5 | 38.2 | 19.7 | 417.4 |
| Subtotal | 409.5 | 38.2 | 36.4 | 484.1 |
| Washington | | | | |
| Freeway | 21.6 | 21.1 | 0.0 | 42.7 |
| Standard Arterial | 354.1 | 48.9 | 22.6 | 425.6 |
| Subtotal | 375.7 | 70.0 | 22.6 | 468.3 |
| Waukesha | | | | |
| Freeway | 57.6 | 2.0 | 5.7 | 65.3 |
| Standard Arterial | 556.3 | 132.1 | 20.5 | 710.0 |
| Subtotal | 613.9 | 134.1 | 26.2 | 774.2 |
| Region | | | | |
| Freeway | 249.8 | 23.1 | 22.4 | 295.3 |
| Standard Arterial | 2,778.2 | 424.9 | 108.5 | 3,311.6 |
| Total | 3,028.0 | 448.0 | 130.9 | 3,606.9 |

*Source: SEWRPC.*

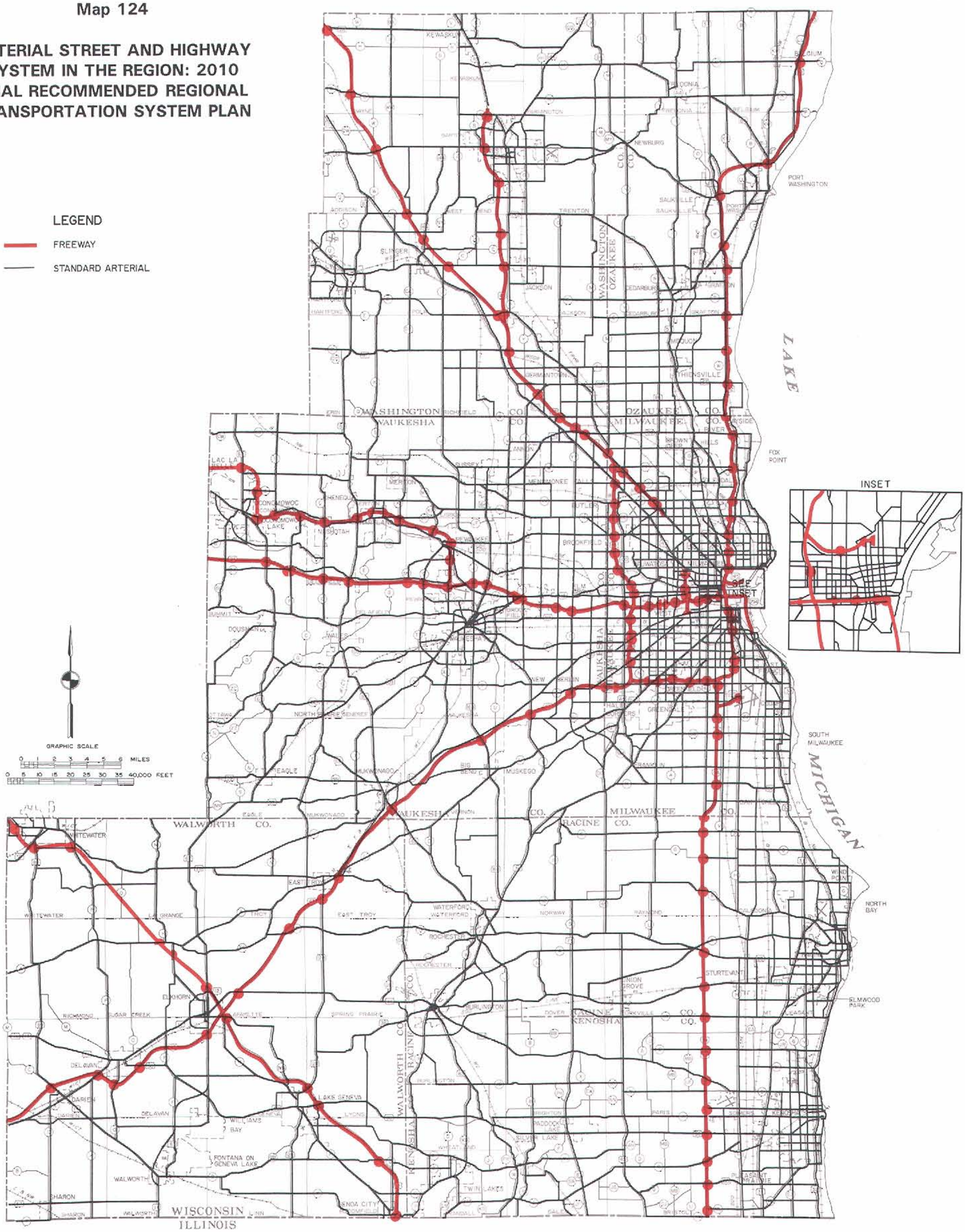
be selected for a given improvement project should be determined by the State, county, and local implementing agencies following appropriate design study.

The proposed arterial street and highway improvements are shown in summary form for each county on Maps 125 through 131 and are set forth by county and by arterial facility type in Table 255. The final recommended plan includes arterial street and highway system expansion, improvement and preservation recommendations.

<u>System Expansion: Constructing New Facilities:</u> System expansion includes all projects which would significantly increase the capacity of the existing system through construction of new facilities. The plan would provide for the construction of 131 route-miles and 337 lane-miles of

## Map 124

## ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

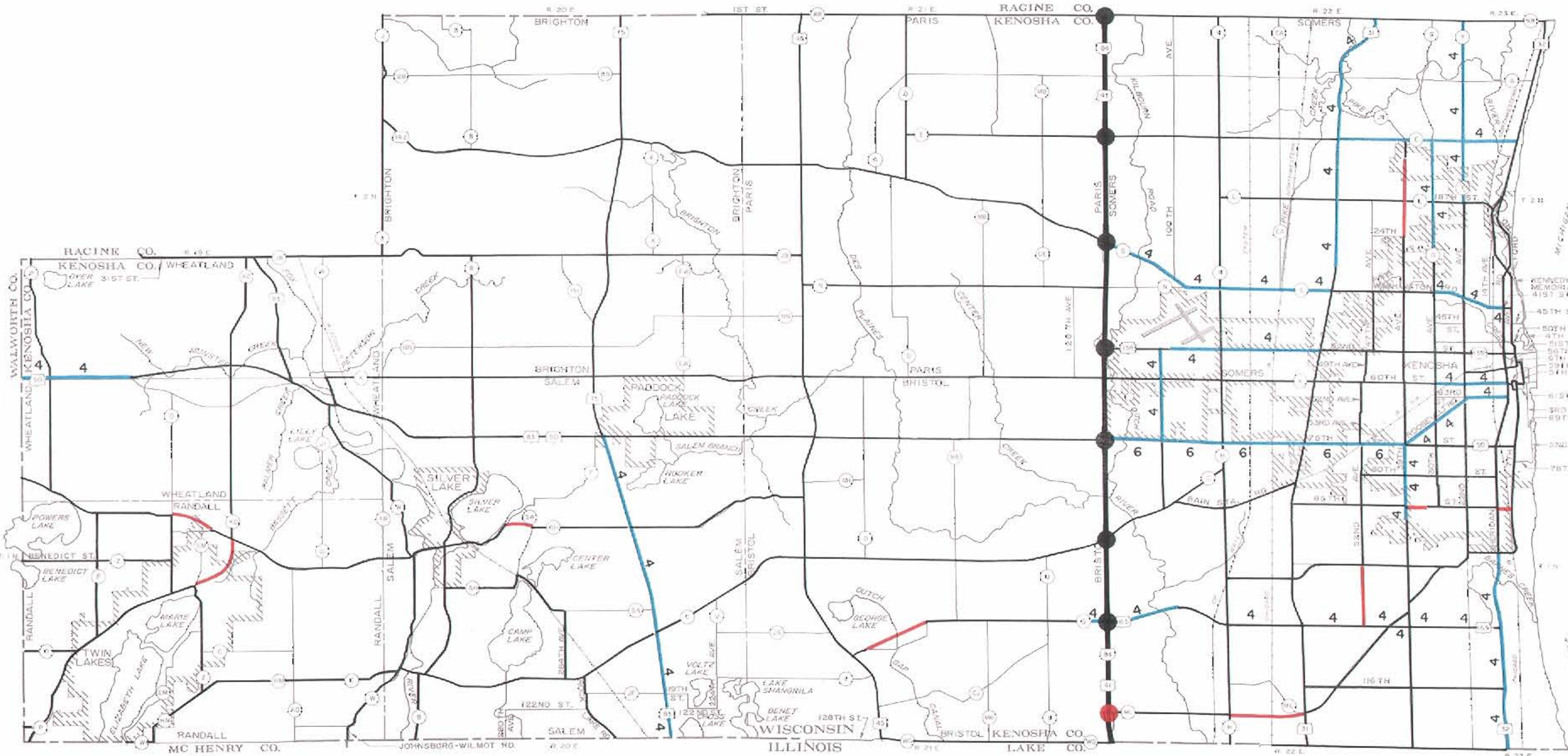



The year 2010 final recommended regional arterial street and highway system consists of 3,607 route-miles and 10,303 lane-miles of facilities. The recommended plan would provide for the construction of 131 route-miles and 337 lane-miles of new facilities within the Region and the widening or other improvement of 448 route-miles, adding 854 lane-miles to the 1,023 lane-miles already provided on those routes. The plan also calls for pavement resurfacing and bridge and interchange restoration and reconfiguration work necessary to maintain and appropriately modernize the remaining 3,028 route-miles and 8,089 lane-miles of planned arterial facilities.

*Source: SEWRPC.*

## Map 125

### FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN KENOSHA COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN




## LEGEND

ARTERIAL STREET OR HIGHWAY

NEW

WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY

RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY

4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

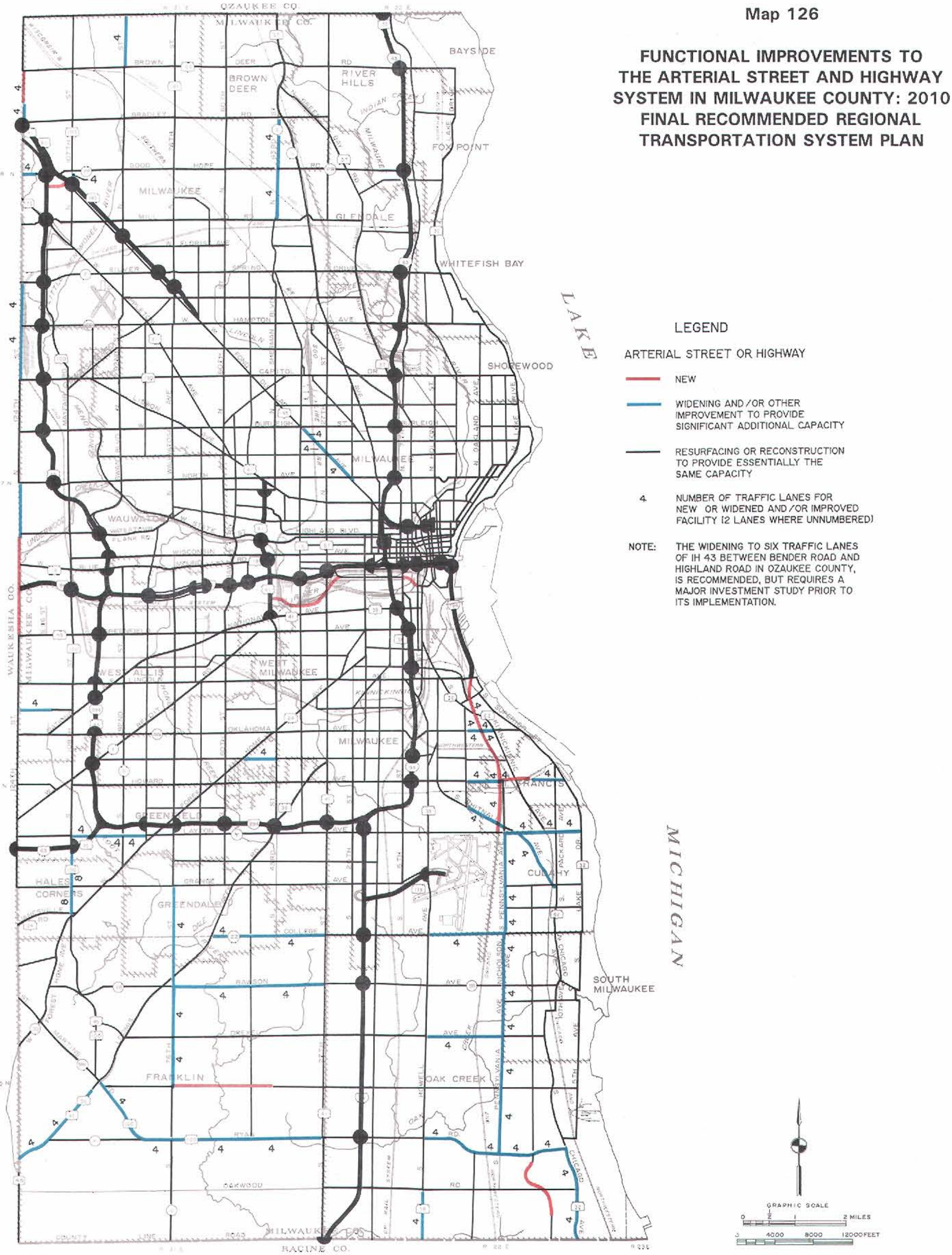
GRAPHIC SCALE
0 1 2 MILES
0 4000 8000 12000 FEET

Under the final recommended regional transportation system plan, the arterial street and highway system in Kenosha County would be expanded by 37 miles, or 12 percent, from 318 miles in 1991 to 355 miles in the year 2010. The increase in arterial mileage would come about through the construction of nine miles of facilities and through the conversion of 28 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of nine miles of new arterial facilities, for the widening of 45 miles, and for the preservation of 301 miles of facilities within the County.

*Source: SEWRPC.*

Map 126

## FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN MILWAUKEE COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

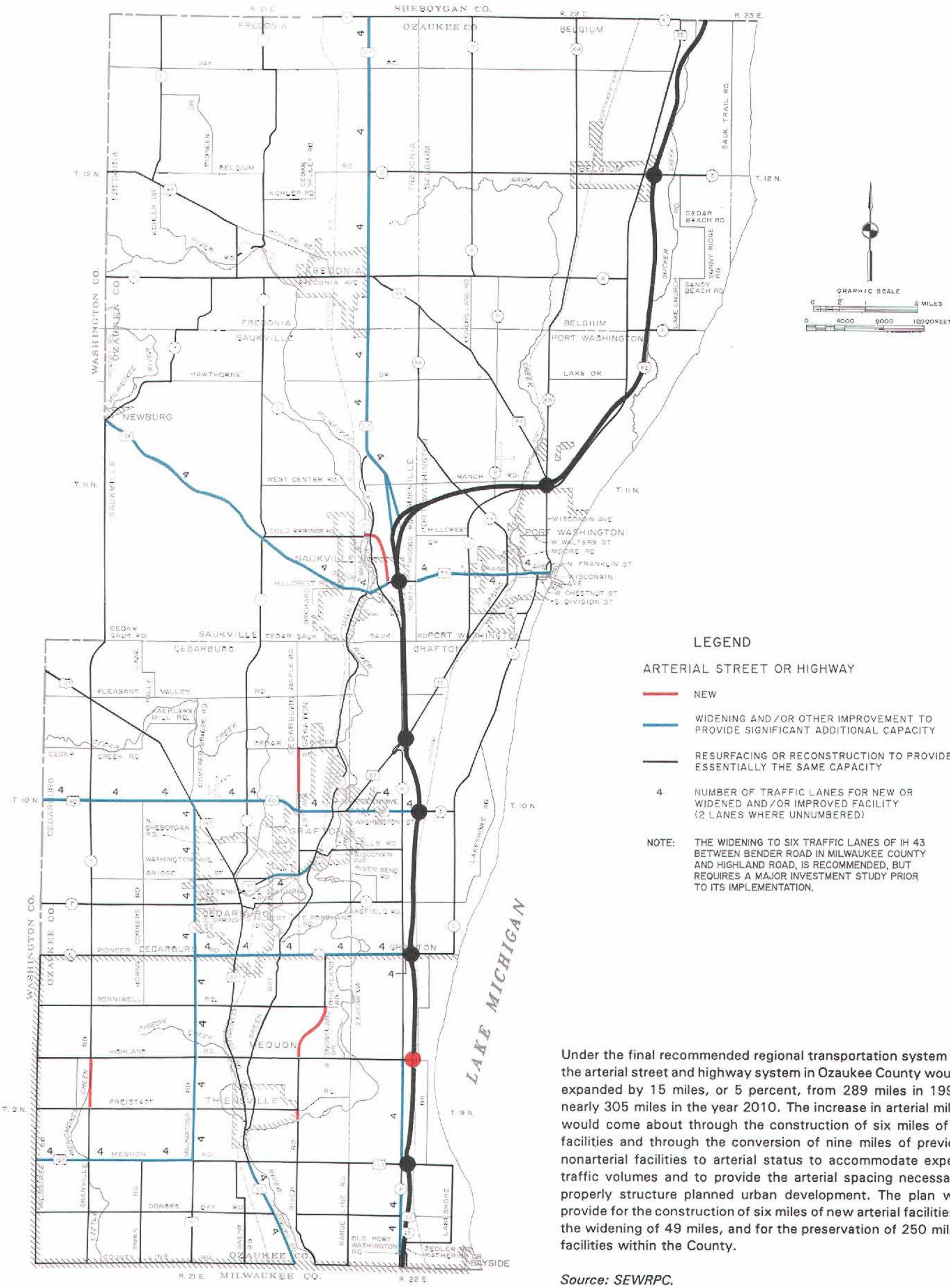



Under the final recommended regional transportation system plan, the arterial street and highway system in Milwaukee County would be expanded by 22 miles, or 3 percent, from 775 miles in 1991 to 797 miles in the year 2010. The increase in arterial mileage would come about through the construction of 11 miles of new facilities and through the conversion of 11 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of 11 miles of new arterial facilities, for the widening of 50 miles, and for the preservation of 736 miles of facilities within the County.

*Source: SEWRPC.*

## Map 127

## FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN OZAUKEE COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

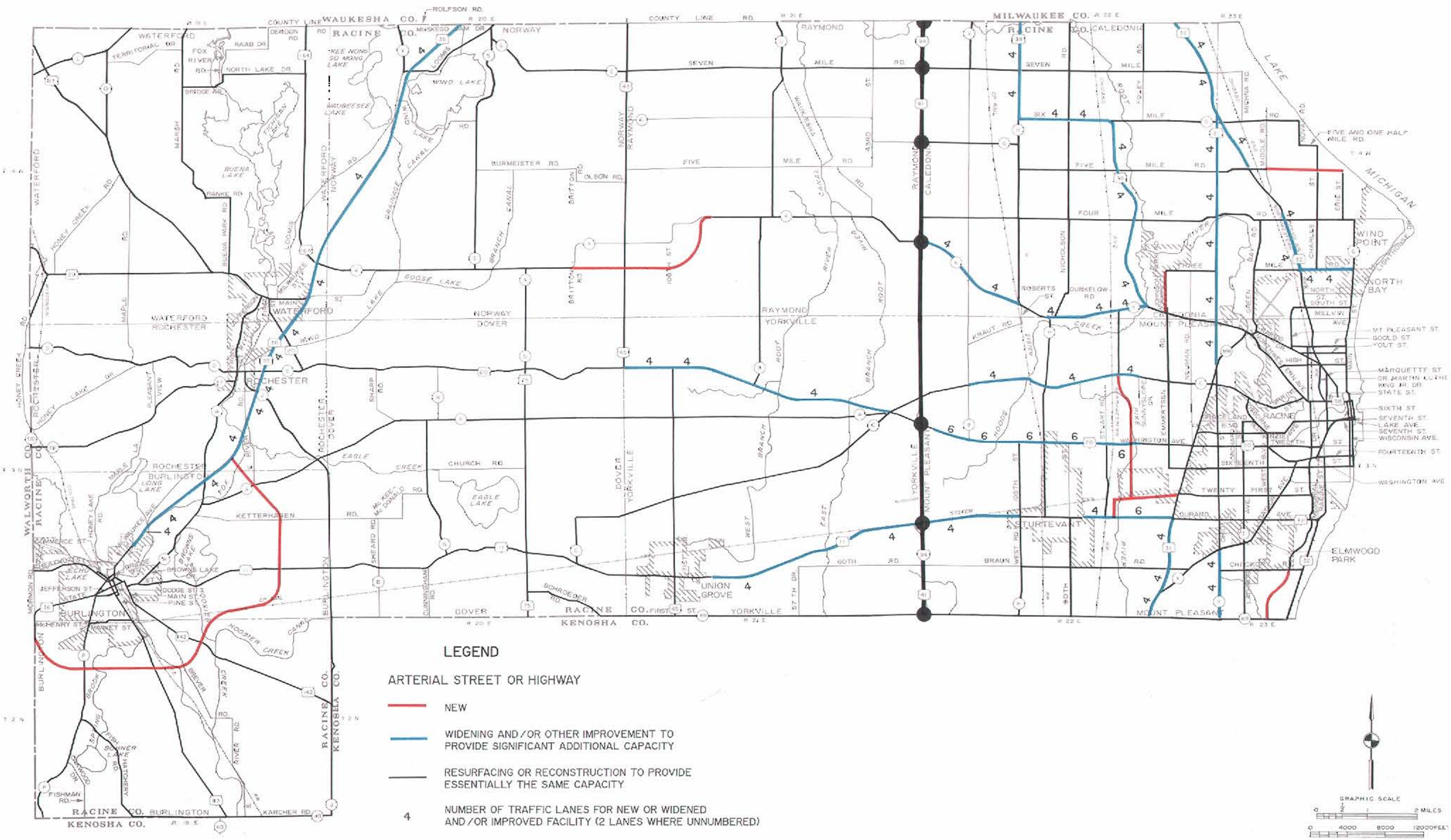



Under the final recommended regional transportation system plan, the arterial street and highway system in Ozaukee County would be expanded by 15 miles, or 5 percent, from 289 miles in 1991 to nearly 305 miles in the year 2010. The increase in arterial mileage would come about through the construction of six miles of new facilities and through the conversion of nine miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of six miles of new arterial facilities, for the widening of 49 miles, and for the preservation of 250 miles of facilities within the County.

*Source: SEWRPC.*

## Map 128

## FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN RACINE COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

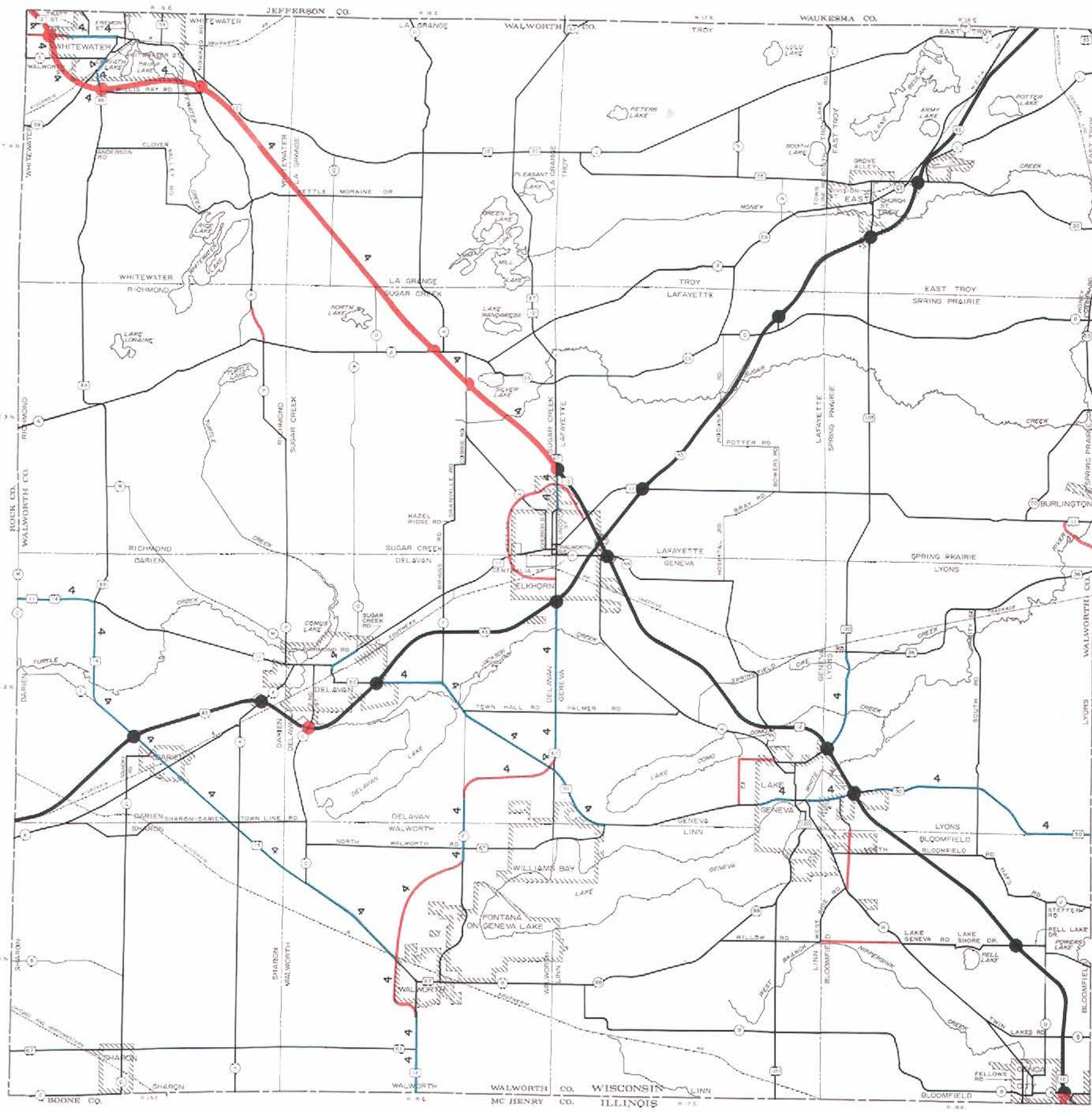



Under the final recommended regional transportation system plan, the arterial street and highway system in Racine County would be expanded by 76 miles, or 22 percent, from 348 miles in 1991 to 424 miles in the year 2010. The increase in arterial mileage would come about through the construction of 19 miles of new facilities and through the conversion of 57 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of 19 miles of new arterial facilities, for the widening of 62 miles, and for the preservation of 343 miles of facilities within the County.

*Source: SEWRPC.*

## Map 129

## FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WALWORTH COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN




LEGEND

ARTERIAL STREET OR HIGHWAY

NEW

WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY

RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY

4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

GRAPHIC SCALE

0 1 2 MILES

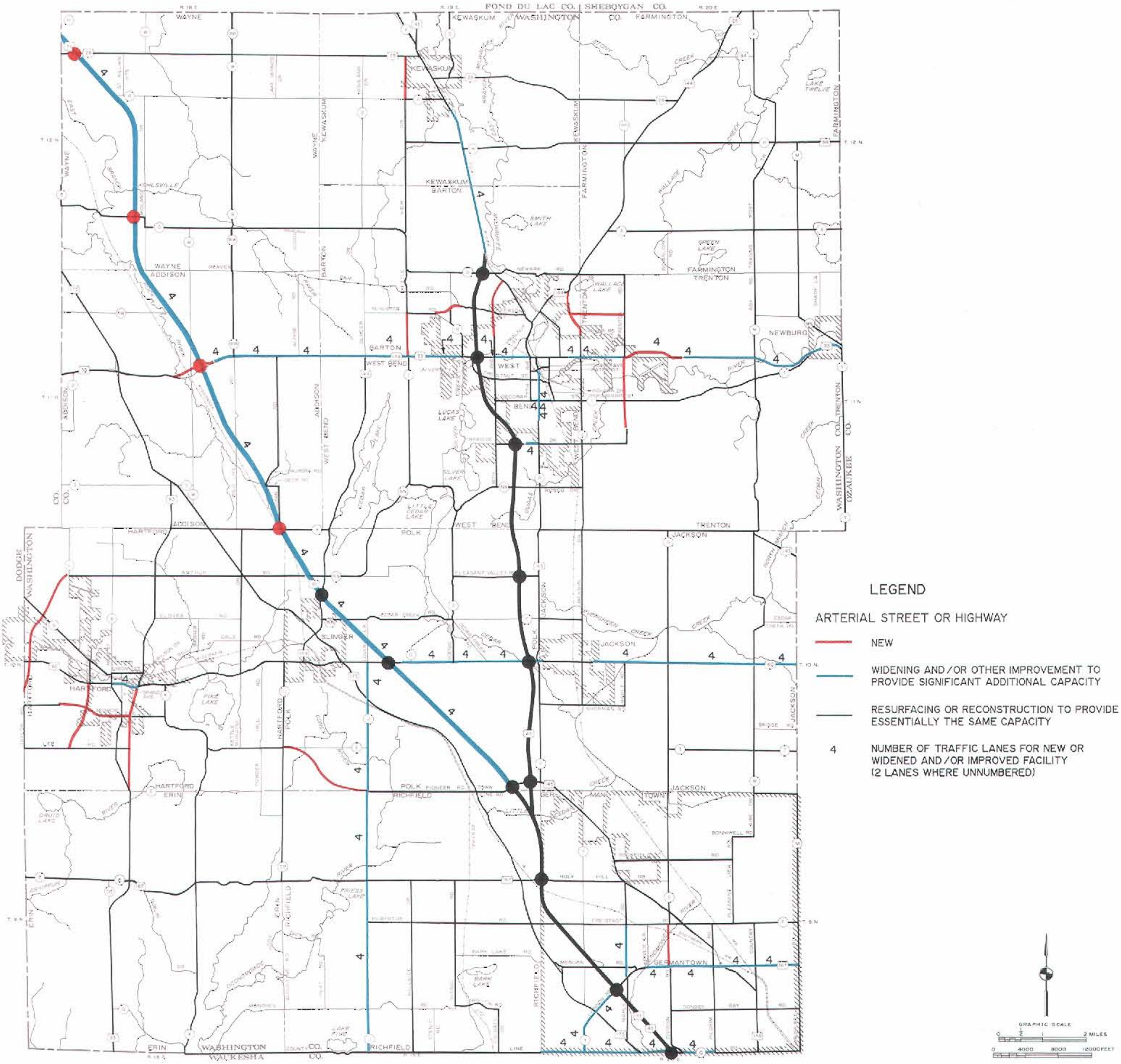
0 4000 8000 12000 FEET

Under the final recommended regional transportation system plan, the arterial street and highway system in Walworth County would be expanded by 55 miles, or 13 percent, from 429 miles in 1991 to 484 miles in the year 2010. The increase in arterial mileage would come about through the construction of 36 miles of new facilities and through the conversion of 19 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of 36 miles of new arterial facilities, for the widening of 38 miles, and for the preservation of 410 miles of facilities within the County.

*Source: SEWRPC.*

## Map 130

## FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WASHINGTON COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

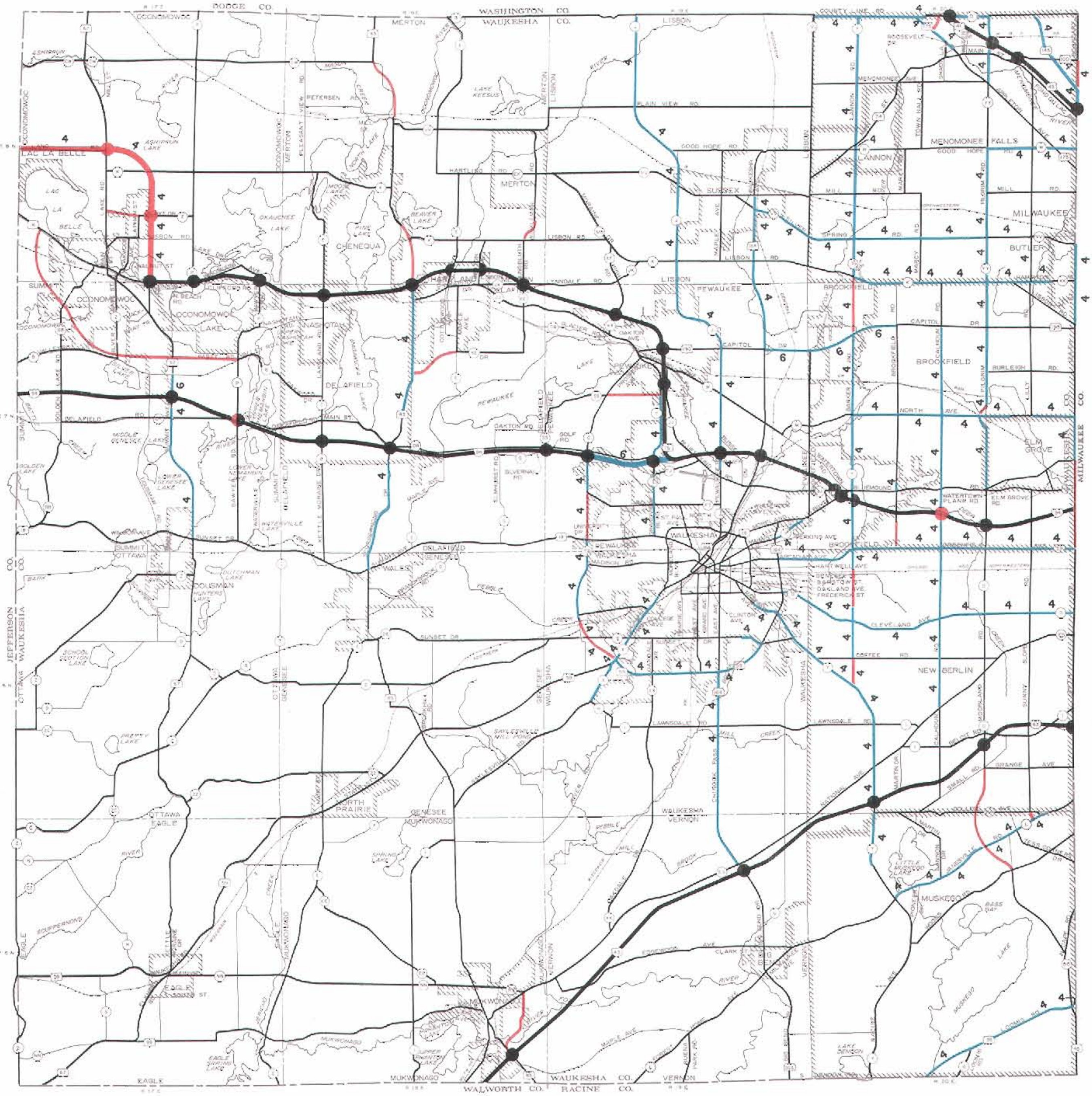



Under the final recommended regional transportation system plan, the arterial street and highway system in Washington County would be expanded by 69 miles, or 17 percent, from 399 miles in 1991 to 468 miles in the year 2010. The increase in arterial mileage would come about through the construction of 23 miles of new facilities and through the conversion of 46 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of 23 miles of new arterial facilities, for the widening of 70 miles, and for the preservation of 375 miles of facilities within the County.

*Source: SEWRPC.*

## Map 131

### FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WAUKESHA COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN




LEGEND

ARTERIAL STREET OR HIGHWAY

NEW

WIDENING AND/OR OTHER IMPROVEMENT TO PROVIDE SIGNIFICANT ADDITIONAL CAPACITY

RESURFACING OR RECONSTRUCTION TO PROVIDE ESSENTIALLY THE SAME CAPACITY

4 NUMBER OF TRAFFIC LANES FOR NEW OR WIDENED AND/OR IMPROVED FACILITY (2 LANES WHERE UNNUMBERED)

Under the final recommended regional transportation system plan, the arterial street and highway system in Waukesha County would be expanded by 58 miles, or 8 percent, from 716 miles in 1991 to 774 miles in the year 2010. The increase in arterial mileage would come about through the construction of 26 miles of new facilities and through the conversion of 32 miles of previously nonarterial facilities to arterial status in order to accommodate expected traffic volumes and to provide the arterial spacing necessary to properly structure planned urban development. The plan would provide for the construction of 26 new miles of arterial facilities, for the widening of 134 miles, and for the preservation of 614 miles of facilities within the County.

*Source: SEWRPC.*

new arterial facilities. These include such long-planned facilities as the Lake Parkway south from the Hoan Bridge to E. Layton Avenue, the STH 16 freeway bypass of Oconomowoc, the completion of the Waukesha bypass, the STH 36 bypass of Burlington, and the completion of the USH 12 freeway in Walworth County. Excluded from the plan are such previously planned new facilities as the STH 83 bypass of the Village of Chenequa in Waukesha County and the Lake Arterial through southern Milwaukee County and eastern Racine and Kenosha Counties. In all, proposed new arterial street and highway facilities would represent about 4 percent of the total planned arterial route-miles and 3 percent of the total planned lane-miles.

System Improvement: Widening Existing Facilities: System improvement includes all projects which would significantly increase the capacity of the existing system through street widening or relocation. Under the final plan, a total of 448 route-miles of facilities would be widened or otherwise improved, representing a total of 1,877 lane-miles after widening. Proposed improvements would include the widening of STH 36 in Milwaukee, Waukesha, and Racine Counties; Pewaukee Road (CTH J) in Washington and Waukesha Counties; Cleveland Avenue (CTH D) and Racine Avenue (CTH Y) in Waukesha County; STH 31 and CTH Y in Kenosha and Racine Counties; Northwestern Avenue (CTH K) and Spring Street (CTH C) in Racine County; STH 57 and Port Washington Road (CTH W) in Ozaukee County; STH 33 in Ozaukee and Washington Counties; and Rawson Avenue (CTH BB) in Milwaukee County; and the completion of the widening of STH 50 in Kenosha and Walworth Counties. The system improvement activities would comprise about 12 percent of the total planned route system and 18 percent of the total planned lane-miles.

System Preservation: Maintaining Existing Facilities: System preservation includes all arterial improvement projects required to maintain the structural adequacy and serviceability of the existing arterial system without significantly increasing the capacity of that system. This would include all projects classified as resurfacing and reconstruction for the same capacity. The final plan proposes system preservation activities for about 3,028 route-miles and 8,089 lane-miles, representing about 84 percent of the total planned arterial system and about 79 percent of the total lane-miles.

System Preservation: The Milwaukee Area Freeway System: The plan recommends that the Milwaukee area freeway system be reconstructed and modernized to current freeway design standards. About $1.5 billion has been included in the plan for this purpose. It should be noted that any project to reconstruct the east-west freeway must be coordinated with decision-making under the East-West Corridor Transit Study being conducted by the Wisconsin Department of Transportation. As noted above, a busway facility in the east-west corridor is being considered under that study. Should the east-west corridor study ultimately conclude that a busway be provided, then the design of projects to rebuild the east-west freeway must take that decision into account.

It is accordingly recommended that the Wisconsin Department of Transportation, working closely with Milwaukee and Waukesha Counties, the City of Milwaukee, other local units of government in the corridor, and the Commission bring the East-West Corridor Transit Study to a conclusion in 1995. This will make it possible for a final decision to be made on the precise way in which the east-west freeway should be reconstructed. This may require adaptation of east-west freeway projects currently included in the regional transportation improvement program.

Plan Performance and Costs

All of the data and analyses necessary properly to relate the final recommended plan to the objectives and standards set forth in Chapter VIII of this report were developed so that comparisons could be made between the final recommended regional transportation plan and all of the alternative transportation plans considered and previously presented in this report. Summary plan performance data are presented in Table 256. Summary cost and revenue data are presented in Table 257.[2]

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[2]*The costs and revenues set forth for the final recommended plan differ significantly from the costs and revenues reported earlier in this chapter for the preliminary recommended plan. The differences may be accounted for by the following three factors: 1) changes to the recommendations for improvement of the regional arterial street and highway and transit systems made by the Advisory Committee in response to the results of the public participation process,*

*(Footnote 2 continued on page 544)*

Under the final recommended plan, the number of internal person trips generated within the Region on an average weekday may be expected to increase from 5.54 million in 1991 to about 6.10 million in the year 2010, or by about 10 percent. The number of transit trips made on an average weekday may be expected to increase from about 172,200 in 1991 to about 196,400 in the year 2010, or by about 14 percent, assuming the transit plan recommendations are implemented. Despite this increase in daily transit tripmaking, the proportion of total internal person trips made by transit would remain at about 3 percent of the total person trips generated within the Region on an average weekday through the plan design period.

The number of vehicle-miles of travel within the Region on an average weekday is expected to increase by about 28 percent, from about 33.07 million in 1991 to about 42.42 million in 2010. Of this total, about 15.40 million vehicle-miles of travel, or about 36 percent, are expected to be made on freeways, which would comprise about 8 percent of the total arterial system.

Arterial street and highway congestion, evidenced by the number of arterial miles operating over design capacity, is expected to decrease from about 385 miles, or about 12 percent of the total system in 1991, to about 165 miles, or about 5 percent, in 2010. The number of miles anticipated to operate as moderately congested would decrease from 106 to 82, as severely congested would decrease from 217 to 47, and as extremely congested would decrease from 62 to 36. The number of arterial miles operating at design capacity, however, is expected to increase from about 158 miles, or about 5 percent of the total system in 1991, to about 218 miles, or about 6 percent of the total system in 2010. The location of the facilities expected to operate under, at, and over design capacity are shown on Map 132.

Annual motor fuel consumption in the year 2010 is expected to approximate 444 million gallons, or about 85 million gallons more than the amount consumed in the Region in 1991 and 24 million gallons fewer than the amount consumed under the no-build plan.

The average annual public cost of carrying out the recommended plan, including the construction of new facilities and the operation and maintenance of the arterial street and highway and transit systems, is estimated at nearly $521.9 million. Base-year existing revenue trends, the anticipated average annual public revenues, excluding transit fare box revenues, is estimated at $299.9 million. Thus, the difference between anticipated costs and expected revenues is $222.0 million per year over the plan design period. The equivalent of an approximate $0.26 per gallon increase in the motor fuel tax would be necessary to fund this $222.0 million annual shortfall.

From an economic analysis viewpoint, the investment proposed in the final recommended plan in the Region's arterial street and highway and transit systems may be expected to generate benefits in excess of the costs incurred. One measure of this is the benefit-cost ratio of the plan. That ratio is derived by computing the difference in transit and highway user costs between the no-build alternative and the final recommended plan and dividing that number by the difference in transportation system costs

*(Footnote 2 continued from page 543)*

*2) more refined cost estimates attendant, in particular, to projects associated with the State trunk highway system submitted as a result of careful review of the preliminary plan by the Wisconsin Department of Transportation, and 3) the selection of a different revenue accounting procedure relative to certain sources of Federal and State revenues for both highway and transit plan implementation projects. With respect to the latter, for example, significant amounts of potential Federal and State revenue associated with implementation of the provisionally recommended busway and light-rail facilities in the east-west travel corridor, amounting to about $45 million annually, were in the financial analyses related to the preliminary plan counted as revenue prior to the calculation of the anticipated funding shortfall. Those same Federal and State revenues were factored into the cost-revenue analyses associated with the final recommended plan after calculation of the anticipated shortfall. This change in technique, which had the practical effect of significantly increasing the anticipated revenue shortfall, became necessary in order to correlate the final plan cost-revenue analyses with similar cost-revenue analyses associated with the State Intermodal Transportation Plan presented simultaneously by the Wisconsin Department of Transportation as part of the TRANSLINKS 21 statewide planning process.*

## Table 256

## SUMMARY OF TRANSPORTATION PERFORMANCE CHARACTERISTICS OF THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 2010

| Performance Characteristic | | | 2010 | | |
|---|---|---|---|---|---|
| Category | Specific Measure | Base Year 1991 | No-Build Alternative | Preliminary Recommended Plan | Final Recommended Plan |
| Travel | Automobile and light truck availability (millions) | 1.13 | 1.31 | 1.30 | 1.30 |
| | Average weekday internal person-trips (millions) | 5.54 | 6.12 | 6.10 | 6.10 |
| | Average weekday internal vehicle-trips (millions) | 4.58 | 5.33 | 5.27 | 5.27 |
| | Average weekday vehicle-miles of travel (millions)[a] | 33.07 | 44.52 | 42.70 | 42.42 |
| | Average weekday transit ridership | 172,200 | 168,000 | 196,600 | 196,400 |
| | Average weekday relative distribution of trips by mode of travel (percent)[b] | | | | |
| | Auto driver | 73.3 | 77.6 | 76.8 | 76.8 |
| | Auto passenger | 19.5 | 15.0 | 15.3 | 15.3 |
| | Transit passenger | 3.1 | 2.7 | 3.2 | 3.2 |
| | School bus passenger | 4.1 | 4.7 | 4.7 | 4.7 |
| | Proportion of trips made by transit within Milwaukee County (percent) | 3.8 | 3.3 | 3.8 | 3.8 |
| | Proportion of trips made by transit to Milwaukee central business district (percent) | 13 | 10 | 12 | 12 |
| | Average weekday proportion of passenger-miles of travel made on transit (percent) | 1.1 | 1.1 | 1.5 | 1.5 |
| Traffic Congestion | Amount and proportion of arterial street and highway system over design capacity | | | | |
| | Moderately congested (V/C ratio 1.01 to 1.10) | 106 miles<br>3.2 percent | 31 miles<br>0.9 percent | 83 miles<br>2.3 percent | 82 miles<br>2.3 percent |
| | Severely congested (V/C ratio 1.11 to 1.30) | 217 miles<br>6.6 percent | 538 miles<br>15.5 percent | 48 miles<br>1.3 percent | 47 miles<br>1.3 percent |
| | Extremely congested (V/C ratio over 1.31) | 62 miles<br>2.0 percent | 143 miles<br>4.1 percent | 36 miles<br>1.0 percent | 36 miles<br>1.0 percent |
| | Total | 385 miles<br>11.8 percent | 712 miles<br>20.5 percent | 167 miles<br>4.6 percent | 165 miles<br>4.6 percent |
| Energy Use | Annual motor fuel consumption (millions of gallons) | | | | |
| | By auto and truck | 353.2 | 462.3 | 444.2 | 434.9 |
| | By motor bus | 5.7 | 5.8 | 9.2 | 9.4 |
| | Total | 358.9 | 468.1 | 453.4 | 444.3 |
| Air Quality | Air pollutant emission from vehicles on the arterial street and highway system (tons per average weekday) | | | | |
| | Volatile organic compounds | 119.2 | 29.8 | 28.6 | 27.7 |
| | Nitrogen oxides | 129.8 | 81.4 | 79.1 | 78.9 |
| | Carbon monoxide | 815.1 | 248.4 | 237.8 | 226.0 |

[a] *Within Walworth County, the number of vehicle-miles of travel may be expected to increase from 1.91 million in 1991 to 2.90 in 2010, or by 52 percent, under the final recommended plan.*

[b] *The average vehicle occupancy for work trips within the Region may be expected to decline from 1.06 in 1991 to 1.03 under the final recommended plan.*

*Source: SEWRPC.*

Table 257

AVERAGE ANNUAL COSTS AND REVENUES ASSOCIATED WITH THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 1995 THROUGH 2010

| Cost or Revenue Item | Final Recommended Plan: 2010 |
|---|---|
| Transportation System Cost (average annual 1995-2010 expressed as millions of dollars) | |
| Arterial Street and Highway System | |
| Capital | 277.3 |
| Operating | 66.1 |
| Subtotal | 343.4 |
| Transit System | |
| Capital | 76.8 |
| Operating | 101.7[a] |
| Subtotal | 178.5 |
| Total | 521.9 |
| Transportation System Revenues (average annual 1995-2010 expressed as millions of dollars) | |
| Highway Capital | |
| Federal | 78.3 |
| State | 67.8 |
| Local | 13.3 |
| Subtotal | 159.4 |
| Highway Operating | |
| State | 30.0 |
| Local | 27.6 |
| Subtotal | 57.6 |
| Transit Capital | |
| Federal | 12.2 |
| Local | 2.5 |
| Subtotal | 14.7 |
| Transit Operating | |
| Federal | 6.0 |
| State | 45.1 |
| Local | 17.1 |
| Subtotal | 68.2 |
| Total | 299.9 |
| Cost-Revenue Comparison | |
| Average Annual Difference between Cost and Revenue (millions of dollars) | 222.0 |
| Motor Fuel Tax Required to Fund Shortfall (cents per gallon) | 26.1 |

[a] *This figure represents the anticipated operating deficit. The total average annual cost of operating the recommended transit system is estimated at $139.4 million. Farebox revenues are estimated at $37.7 million.*

*Source: SEWRPC.*

between the no-build alternative and the final recommended plan. The transit and highway user cost consists of accident, travel time, and vehicle operation costs, including motor fuel, maintenance, and vehicle depreciation. This economic analysis resulted in a benefit-cost ratio attendant to the recommended plan of 1.55. This means that for every dollar invested in implementing the plan, the transportation system users, on the average, could be expected to enjoy $1.55 in benefits in terms of reduced accidents, travel time, and vehicle operational costs.

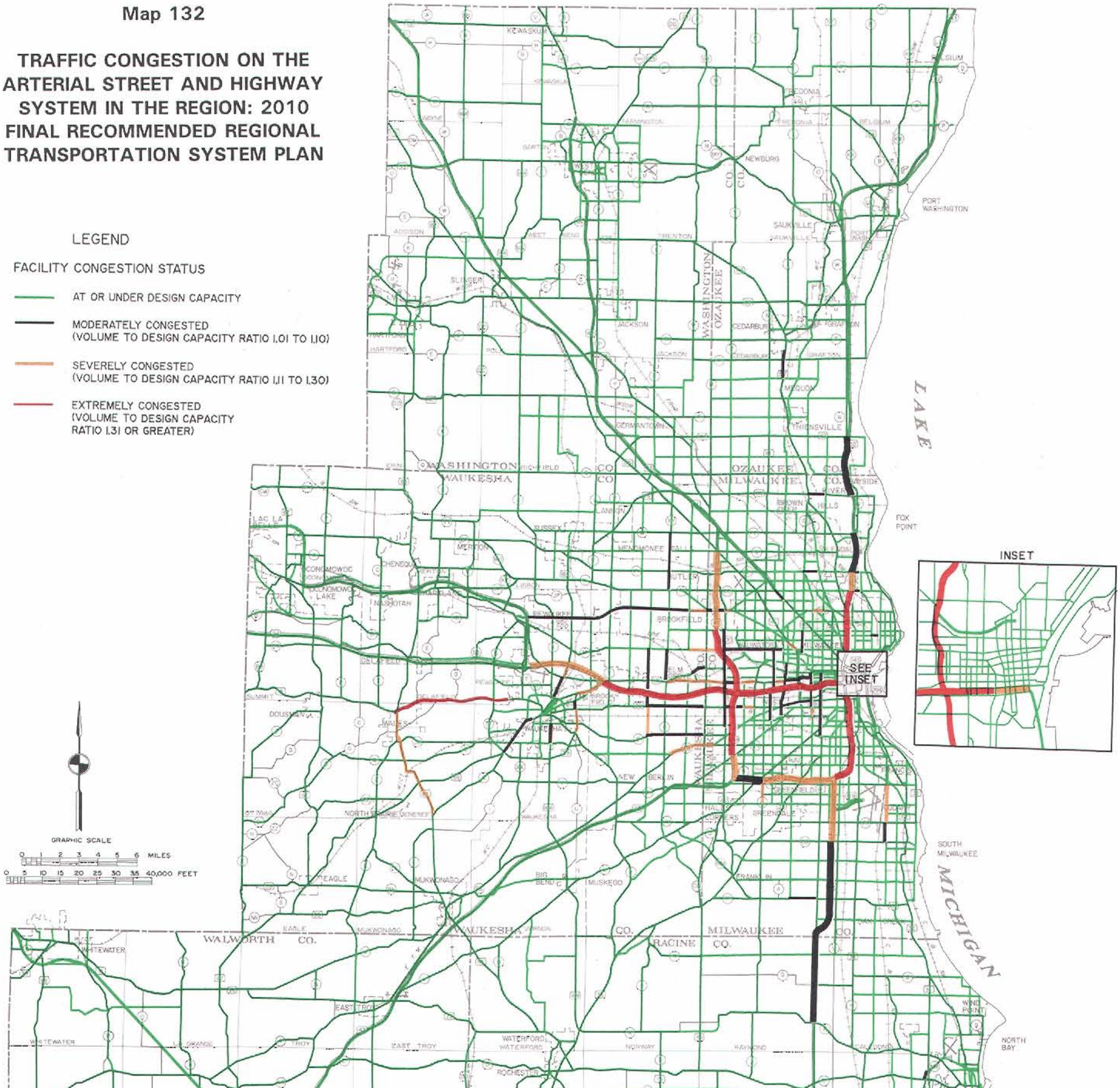
Map 132

## TRAFFIC CONGESTION ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

LEGEND

FACILITY CONGESTION STATUS

- AT OR UNDER DESIGN CAPACITY
- MODERATELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.01 TO 1.10)
- SEVERELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.11 TO 1.30)
- EXTREMELY CONGESTED (VOLUME TO DESIGN CAPACITY RATIO 1.31 OR GREATER)




Under the final recommended plan, the level of traffic congestion may be expected to be substantially below that which would occur under the no-build alternative plan. By the year 2010, only about 5 percent of the planned 3,607-mile arterial system, or 165 miles, would operate over design capacity. About 82 miles, or over 2 percent, of planned arterial mileage would be moderately congested; 47 miles, or about 1 percent, would be severely congested; and 36 miles, or about 1 percent, would be extremely congested. While the transportation development proposals included in the final recommended plan serve to reduce traffic congestion throughout the entire Region, the Milwaukee area freeway system may be expected to carry traffic volumes exceeding its design capacity and to operate with congested conditions through the year 2010.



*Source: SEWRPC.*

## ANALYSIS OF SENSITIVITY OF THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN TO ALTERNATIVE FUTURE REGIONAL GROWTH SCENARIOS

The following section of this chapter describes the results of an analysis of the sensitivity of the final recommended plan to alternative future land use patterns and related levels of population, households, and employment within the Region. The analysis was requested by the Technical Coordinating and Advisory Committee on Regional Transportation System Planning. The purpose of the analysis was to investigate the differences in the amount of regional travel that could be expected to attend future land use patterns that were significantly different from the pattern envisioned in the adopted land use plan.

It should again be noted that the recommended regional transportation system plan was based upon the adopted regional land use plan. This means that the transportation system plan was designed to accommodate and serve the travel demand expected to result from a centralized land use pattern and modest forecast increases in population, households, and economic activity through the year 2010. Accordingly, throughout this chapter, the description of the performance of the recommended transportation system plan has assumed full implementation of the adopted regional land use plan.

A detailed description of the adopted land use plan as well as the alternative forecasts of growth considered is provided in Chapter VI of this report and in SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010, 1992. The adopted regional land use plan proposes to reverse past trends within the Region toward the decentralization of urban development; thus, use of the term "centralized" to describe the plan. For the purpose of testing the sensitivity of the recommended transportation system plan, three other future land use patterns were considered. These alternatives were: an intermediate-growth existing trends, a high-growth centralized, and a high-growth decentralized land use pattern.

These alternative future land use patterns differ from the adopted regional land use plan in fundamental ways. The existing trends alternative was designed at the request of the Advisory Committee to investigate the potential impacts upon travel patterns and the recommended transportation system plan of a land use pattern that could be expected to result under intermediate population, household, and employment growth levels and under a continuation of existing trends toward the areawide dispersion of urban development. This alternative is described in Appendix A of this report. Both of the high-growth scenarios were considered by the Commission as alternatives during the preparation of the adopted regional land use plan. These alternative scenarios are described in the aforereferenced SEWRPC Planning Report No. 40. The high-growth centralized plan is similar to the adopted plan, except that it was designed to accommodate higher levels of future population, households, and economic activity than the adopted plan. The high-growth decentralized plan was also based upon higher regional growth levels. It envisioned, however, that much of the attendant land use development would occur in and around outlying urban communities of the Region rather than in and around the older central cities of Kenosha, Milwaukee, and Racine. It should be noted that this alternative was not a "sprawl plan" in that the growth in the outlying urban communities would be located in areas that could be served by sewer, water, and transit.

Table 258 compares the demographic and economic characteristic of each of the alternative land use plans. As shown, the high-growth plans would seek to accommodate over 20 percent more population, 9 percent more households, and 14 percent more employment than the two intermediate-growth plans. The greater levels of automobile availability under the high-growth plans are attributable to the higher population and household levels. Table 258 indicates that the demographic and economic characteristics of the existing trends land use pattern would not differ significantly from those of the adopted regional land use plan. Indeed, the table indicates that the minor differences between the two land use patterns are related to automobile availability; this difference is attributable to observed differences in the lifestyles of people residing in urban and in suburban and rural areas of the Region.

Table 259 compares the travel characteristics related to each future land use scenario assum-

## Table 258

### DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS: 1970, 1980, 1990, AND 2010 ADOPTED REGIONAL LAND USE PLAN AND ALTERNATIVE FUTURE SCENARIOS

| Characteristics | 1970 | 1980 | 1990 | 2010 Intermediate-Growth Scenario: Adopted Regional Plan | 2010 Intermediate-Growth Scenario: Existing Trends Land Use Alternative | 2010 High-Growth Scenario: Decentralized Land Use Plan | 2010 High-Growth Scenario: Centralized Land Use Plan |
|---|---|---|---|---|---|---|---|
| Demographic | | | | | | | |
| Households | 536,500 | 628,000 | 676,100 | 774,300 | 772,600 | 846,400 | 856,300 |
| Total Population | 1,756,100 | 1,764,800 | 1,810,400 | 1,911,000 | 1,912,700 | 2,316,100 | 2,316,100 |
| Household Size (household population/households) | 3.2 | 2.8 | 2.6 | 2.4 | 2.4 | 2.7 | 2.7 |
| Percent Population in Central County | 60.0 | 54.7 | 53.0 | 48.9 | 46.7 | 39.8 | 47.4 |
| Households per Net Residential Acre | 3.8 | 3.5 | 3.5 | 3.5 | 3.1 | 3.3 | 3.5 |
| Vehicles (includes personal-use trucks) | 648,300 | 886,200 | 1,114,000 | 1,307,200 | 1,311,600 | 1,597,500 | 1,566,100 |
| Average Household Income (1990 dollars) | $40,400 | $41,000 | $38,500 | $43,300 | $43,300 | $51,900 | $51,900 |
| Average Vehicles per Household | 1.2 | 1.4 | 1.6 | 1.7 | 1.7 | 1.9 | 1.8 |
| Economic | | | | | | | |
| Employment | 753,700 | 884,200 | 990,300 | 1,102,100 | 1,102,100 | 1,251,600 | 1,251,600 |
| Percent Employment in Central County | 67.3 | 61.3 | 58.4 | 55.6 | 51.9 | 49.7 | 52.9 |

*Source: SEWRPC.*

## Table 259

### TRAVEL CHARACTERISTICS IN THE REGION: 1970, 1980, 1990, AND 2010 ADOPTED REGIONAL LAND USE PLAN AND ALTERNATIVE FUTURE SCENARIOS

| Characteristics | 1970[a] | 1980 | 1990[b] | 2010 Intermediate-Growth Scenario: Adopted Regional Plan | 2010 Intermediate-Growth Scenario: Existing Trends Land Use Alternative | 2010 High-Growth Scenario: Decentralized Land Use Plan | 2010 High-Growth Scenario: Centralized Land Use Plan[c] |
|---|---|---|---|---|---|---|---|
| Auto Occupancy, Work | 1.17 | - - | 1.06 | 1.03 | 1.03 | 1.03 | 1.04 |
| Auto Occupancy, Nonwork | 1.48 | - - | 1.31 | 1.22 | 1.22 | 1.23 | 1.23 |
| Average Trip Length, Work (miles) | 7.5 | - - | 9.1 | 8.9 | 9.0 | 9.5 | 9.0 |
| Average Trip Length, Nonwork (miles) | 4.7 | - - | 5.2 | 5.9 | 6.0 | 6.2 | 6.1 |
| Average Weekday Trips[d] | 4.3 million | - - | 5.3 million | 5.8 million | 5.8 million | 6.7 million | 6.7 million |
| Transit Trips | 184,200 | 210,000 | 172,200 | 196,600 | 186,000 | 169,300 | 193,500 |
| Percent Transit Use | 4.3 | - - | 3.2 | 3.4 | 3.2 | 2.5 | 2.9 |
| Vehicle-Miles of Travel (VMT) | 20.1 million | 24.9 million | 33.1 million | 42.7 million | 42.8 million | 48.5 million | 47.1 million |
| Average Annual VMT Growth Rate (percent)[e] | - - | - - | - - | 1.4 | 1.4 | 1.9 | 1.9 |

[a] *Travel data are presented for the year 1972.*

[b] *Travel data are presented for the year 1991.*

[c] *Two modifications of this alternative were also analyzed at the request of the Wisconsin Department of Natural Resources, both assuming household sizes and incomes similar to the intermediate-growth future and one assuming high regional growth to the year 1999 and intermediate growth from the year 2001 to the year 2010. The latter future was determined to result in 44.4 million vehicle-miles of highway travel in the year 2010 at an average annual rate of 1.5 percent, and the other future in 46.1 vehicle-miles of highway travel in the year 2010 at an annual growth rate of 1.8 percent.*

[d] *Home-based work, home-based shop, home-based other, nonhome-based trips, and school trips; does not include trips by school bus.*

[e] *Growth rate is calculated on the basis of the 19-year period, 1991 to 2010. The growth rates do not incorporate any reduction in vehicle-miles of travel which may result from the implementation of the federally mandated employee commute options program. The potential maximum impact of the employee commute options program would be a reduction of 0.1 percent in the annual percentage growth rate in vehicle-miles of travel under any of the alternative futures. This potential maximum reduction assumes full implementation by all affected employers and that such implementation is achieved by employees modifying their travel in ways which eliminate auto travel such as using transit, carpools, vanpools, bicycle, or walking and not modifications which would not eliminate auto travel such as alternative fueled vehicles, shifted work start times, and employer shuttles from remote-park-ride lot.*

*Source: SEWRPC.*

ing that the recommended transportation system plan has been fully implemented. The data set forth in the table indicate that the most significant differences exist between the two intermediate-growth plans and the two high-growth plans with respect to three measures: total weekday trips, weekday transit trips, and vehicle-miles of travel. The high-growth plans, with significantly greater numbers of resident population, households, and employment, have, as would be expected, higher tripmaking levels than the intermediate-growth scenarios. The higher growth levels are the primary determinants of the differences in vehicle-miles of travel between the two sets of scenarios. The decentralized plan may be expected to generate nearly 1.5 million more vehicle-miles of travel per average weekday, or about 3 percent more than the high-growth centralized plan.

With regard to transit ridership, both of the high-growth plans show less ridership than the adopted regional land use plan. This is to be expected under the high-growth plans since these plans would accommodate population growth in areas not proposed to be well served by transit under the recommended transportation system plan. The recommended transportation system plan is based upon the intermediate-growth scenario and, accordingly, is not designed to provide transit service to the more extensive growth areas of the higher-growth alternatives. Transit ridership would be lowest under the high-growth decentralized plan, since much of the forecast population growth would be distributed almost entirely to areas not served under the recommended transportation system plan by public transit. In addition, the high-growth future scenarios assume higher household incomes, in part due to the higher employment levels.

Table 259 also indicates that there is little difference with respect to transportation impacts between the adopted land use plan and the continued trends land use pattern. Indeed, the travel that the recommended transportation system plan is expected to accommodate does not appreciably differ from the travel likely to occur under a scenario representing the continuation of existing urban development trends. The only significant difference is in the level of transit ridership. The adopted land use plan is likely to generate about 196,600 transit trips on an average weekday, while the existing trends land use alternative is likely to generate about 186,000 such trips on an average weekday.

The sensitivity analysis conducted indicates that rather insignificant differences may be expected in the character of travel between the adopted regional land use plan and the existing trends land use alternative. Two factors serve to explain this conclusion. First, both future land use scenarios were designed to serve over the plan design period a growth in resident population of about 6 percent, in households of about 14 percent, and in employment of about 11 percent. Second, the major difference between the two plans is the distribution of this forecast growth throughout the Region. Since monitoring of recent development trends by the Commission has indicated that nearly 80 percent of all new housing units constructed within the Region from 1970 to 1985 were located within the planned urban service areas, it may be expected that under the existing trends alternative a sizable proportion of forecast household growth will, under any conditions, occur in conformance with the adopted plan. The household being the primary determinant of internal tripmaking, it may be concluded that the travel demand that the recommended transportation plan was designed to serve will not significantly differ from the travel demand that may be expected to occur should the regional land use pattern continue to develop according to recent trends.

The differences in the character of travel between the adopted regional land use plan and the high-growth plans are largely related to the greater increases in resident population and economic activity levels forecast under these plans, and, in the case of the high-growth decentralized plan, the distribution of that anticipated growth. Should population and economic activity increase as forecast under the high-growth plans, the planned arterial street and highway system may be expected to carry higher volumes of traffic and, in some locations, experience greater levels of traffic congestion. Under the high-growth decentralized plan, the planned transit system may be expected to carry fewer passengers.

## SUMMARY

This chapter has described the preliminary recommended year 2010 regional transportation system plan and summarized the findings of the public review of that plan held throughout the Region during the summer of 1994. It has also described the revisions made to the preliminary plan in response to the comments received through the public review process and described the final recommended plan proposed for adoption by the Commission and the concerned constituent units and agencies of government.

The Advisory Committee recommended that three alternative plans be fully evaluated as a basis for selecting a preliminary recommended plan for public presentation and review. The no-build plan proposed no significant improvements in transportation facilities and services over those which were programmed for implementation in the annual element of the 1993 through 1998 Transportation Improvement Program for Southeastern Wisconsin. Alternative Plan 1 proposed substantial increases in automobile operating costs as a measure to moderate travel demand and substantial improvements to the regional public transit system. Alternative Plan 3, rather than emphasizing the management of travel demand, as did Alternative Plan 1, proposed to accommodate future travel demand largely through improvements to the public transit and arterial street and highway systems. Upon careful consideration of these alternatives, the Advisory Committee recommended that Alternative Plan 3 be further refined, detailed, and advanced to public review as a preliminary recommended plan.

The Committee rejected the no-build plan, finding the scope of improvements proposed therein inadequate to address the identified transportation problems, including severe traffic congestion and a relatively poor level of transit service provided. The Committee rejected Alternative Plan 1, finding the proposed doubling of automobile operating costs determined necessary to affect travel demand in the Region significantly impractical to implement within the plan design period. The Committee also recognized that the substantial pricing measures proposed under Alternative Plan 1 would not significantly reduce the need for arterial street and highway improvements through the year 2010. Indeed, under Alternative Plan 1, about 338 miles would need to be reconstructed for additional capacity, only 24 miles less than under Alternative Plan 3. Also, about 101 new miles of new arterial facility would need to be constructed, only 11 miles less than under Alternative Plan 3.

In recommending Alternative Plan 3 as a preliminary recommended plan, the Advisory Committee directed that additional improvements be proposed in the local transit service to be provided within the Milwaukee, Kenosha, Racine, and Waukesha areas. Accordingly, changes were made to the local public transit service initially envisioned under Alternative Plan 3, which increased the vehicle-miles of local transit service that would be provided an average weekday to 72,300, or by about 19 percent over that proposed under Alternative Plan 3, and increased the vehicle-hours of local transit service that would be provided on an average weekday to 5,800, or by 14 percent over that proposed under Alternative Plan 3.

Public Reaction to Preliminary Recommended Plan and Advisory Committee Response

The preliminary recommended regional transportation system plan was the subject of a Regional Planning Conference held on June 27, 1994; a series of public informational meetings and hearings held in each of the seven counties of the Region in July and August of 1994; meetings of the Commission's Kenosha, Ozaukee, Racine, Walworth, Washington, and Waukesha County Technical Coordinating and Advisory Committees on Jurisdictional Highway System Planning; and of a joint meeting of the Intergovernmental Coordinating and Advisory Committees on Transportation System Planning and Programming for the Kenosha, Milwaukee, and Racine urbanized areas. The conference and public hearings were attended by a total of 760 persons and 143 letters were received for the record following the public hearings. Membership of the jurisdictional highway system planning committees totaled 157 persons, while membership of the three transportation system planning and programming committees totaled 42 persons. Based upon the findings of this extensive public review process, the Technical Coordinating and Advisory Committee recommended certain modifications to the preliminary plan.

With respect to the transit system element, the Advisory Committee concluded that only minor modifications to the preliminary plan were warranted in response to the public comment. These modifications included the proposed extension of bus rapid transit service from the Village of Germantown to the City of West Bend and from the Village of Grafton to the Village of Saukville and City of Port Washington. These modifications also included the addition of commuter passenger train service from the City of Burlington through Silver Lake and Antioch, Illinois, to Chicago and from the Village of

Walworth through Fox Lake, Illinois, to Chicago. The final plan recommends that feasibility studies, followed by major investment analyses, be conducted to determine the feasibility and desirability of implementing these proposed extensions into the Region of Chicago-based commuter passenger train service.

With respect to the arterial street and highway element, the Advisory Committee also concluded that only modest modifications to the preliminary plan were warranted in response to the public comment. It was concluded that the level of congestion used to define the need for improvements was appropriate, given that the highway capacity improvements were proposed as a measure of last resort to address traffic congestion problems.

In response to the public comment, the Advisory Committee recommended certain specific changes with respect to the arterial street and highway element of the plan in each County of the Region. These changes are described in a previous section of this chapter.

Recommended Year 2010 Regional Transportation System Plan

Like the preliminary plan, the final recommended plan consists of recommendations in three component areas: transportation system management, public transit maintenance and improvement, and arterial street and highway maintenance and improvement.

The recommended plan proposed the use of transportation system management measures to, among other things, ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment. The plan envisions the completion of the comprehensive freeway traffic management system within the Milwaukee area; the imposition of peak-hour curb-lane parking restrictions on approximately 442 miles of urban arterial streets; the use of appropriate traffic management and engineering techniques to assist in achieving efficient traffic flow on urban arterial streets; the eventual application of intelligent transportation systems technology; areawide promotional measures to encourage carpooling, vanpooling, telecommuting, and rescheduling of work time; and transit management and operational measures that have the potential to make transit use more convenient.

The plan also envisions that, as new urban neighborhoods are developed and older neighborhoods are redeveloped, detailed land use and community facility plans would be prepared and implemented which would promote a mix of land use activities, higher-density development near transit lines and stations, the orientation of buildings on sites in a manner facilitating transit use; and the use of bicycle and pedestrian as well as transit facilities. Importantly, the plan recommends that the county and local units of government in the Region work to implement the adopted regional land use plan.

The plan also proposes that an integrated system of rapid, express, and local transit facilities be developed within the Region. The plan seeks to provide bus rapid transit service within the major travel corridors emanating from the Milwaukee CBD. The plan calls for the provision of such service south to the Cities of Racine and Kenosha, southwest to the Village of Mukwonago, and west to the Cities of Waukesha and Oconomowoc. The plan would also provide such service in the northwest corridor to the City of West Bend and in the IH 43 north corridor to the Village of Saukville and City of Port Washington. In all, 30 rapid transit bus routes would be operated within the Region, providing over 1,360 round-trip route-miles of service. In 1991, 13 rapid transit routes were in place, with service provided over 449 round-trip route-miles. The planned rapid transit system would be served by 73 transit stations. There were 25 such stations within the Region in 1991.

The plan also envisions the provision of a busway-HOV facility in the east-west corridor between the Cities of Waukesha and Milwaukee, pending the outcome of a major investment study conducted by the Wisconsin Department of Transportation. The plan recognizes the need to provide additional busway-HOV facilities within the Region as freeway traffic congestion increases to unacceptable levels.

The plan also envisions the provision of commuter passenger train service in four Milwaukee-oriented corridors: north to Saukville, northwest to West Bend, west to Oconomowoc, and south through Racine and Kenosha to Chicago and two Chicago-oriented corridors: Walworth to Chicago and Burlington to Chicago. The implementation of these proposed commuter transit facilities would necessitate the conduct of Federally required major investment studies prior to their implementation.

The plan also proposes that 12 regular express transit bus routes, or five more routes than in 1991, be provided within the Region. Within the Milwaukee urbanized area, the express transit routes would be provided in certain major travel corridors connecting major activity centers to the Milwaukee CBD, as well as in a grid pattern of crosstown routes. An express transit route would also connect the Cities of Racine and Kenosha.

The plan also provides for the development of a light-rail express transit line between the City of Glendale and the University of Wisconsin-Milwaukee campus, the Milwaukee CBD, and the Milwaukee County Institutions grounds. The necessary corridor study for this fixed-guideway facility is currently being undertaken by the Wisconsin Department of Transportation. The implementation of the light-rail proposal, as well as of the busway proposal in the east-west corridor, would depend upon confirmation by the study and the concurrence of the implementing units of government concerned in the final findings and recommendations of the corridor study. The plan identifies three other travel corridors with potential for the development of light-rail lines. The feasibility of light-rail service in these corridors would also have to be confirmed through the conduct of major investment studies.

The plan also proposes the expansion and improvement of local public transit service within Milwaukee County and the Cities of Waukesha, Racine, and Kenosha and their immediate environs. Local transit service would be expanded generally in southern and northern Milwaukee County and in the most heavily developed portions of eastern Waukesha County. The number of round-trip route-miles of local service would be increased from 171 in 1991 to 210 by 2010 within the Kenosha urbanized area; from 1,112 in 1991 to 1,450 by 2010 within the Milwaukee urbanized area; and from 171 in 1991 to 200 by 2010 within the Racine urbanized area. The plan also recognizes the need to provide local transit service in the smaller outlying urban communities of the Region, particularly through shared-ride taxi service.

The recommended plan envisions that the arterial street and highway system would, by the plan design year 2010, consist of about 3,607 route-miles and 10,303 lane-miles of facility. In 1991, the arterial system consisted of about 3,274 route-miles and 8,420 lane-miles of facility. The plan provides for the construction of 131 route-miles and 337 lane-miles of new arterial facilities, for the widening or otherwise improvement of 448 miles of existing arterial facilities to provide an additional 1,877 lane-miles, and for the preservation of 3,028 route-miles and 8,089 lane-miles. The recommended plan includes important preservation actions, including the reconstruction to current design standards of the failing Milwaukee area freeway system.

Recommended Plan Performance and Costs

The number of internal person trips generated within the Region on an average weekday may be expected to increase from 5.54 million in 1991 to about 6.10 million in the year 2010, or by 10 percent. The number of transit trips made on an average weekday may be expected to increase from about 172,200 in 1991 to about 196,400 by the year 2010, or by 14 percent. The proportion of total internal person trips made by transit may be expected to remain, however, at about 3 percent.

Vehicle-miles of travel within the Region on an average weekday may be expected to increase from about 33.07 million in 1991 to about 42.42 million by the year 2010, or by about 28 percent. Arterial street and highway congestion, as indicated by the number of arterial miles expected to operate over design capacity, may be expected to decrease from about 385 miles, or 12 percent of the total arterial mileage in 1991, to about 165 miles, or 5 percent, by 2010. The arterial mileage operating at design capacity, however, may be expected to increase from about 158 miles, or about 5 percent of the total system in 1991, to 218 miles, or about 6 percent in 2010.

The public cost of carrying out the recommended plan, including the construction of new facilities, and the operation and maintenance of the arterial street and highway and transit systems is estimated at $521.9 million per year over the 16-year plan implementation period. The public revenues anticipated to be available based on existing trends are estimated at $299.9 million per year. The difference between anticipated costs and revenues is approximately $222.0 million per year. An equivalent of a $0.26 per gallon motor fuel tax would be necessary to cover this $222.0 million annual shortfall in order to fully implement the recommended regional transportation system plan for the year 2010.

### Analysis of the Sensitivity of the Recommended Plan to Alternative Future Growth Scenarios

The Advisory Committee requested that the sensitivity of the recommended plan to alternative future land use patterns within the Region and associated levels of population, households, and employment be analyzed. The purpose of the analysis was to investigate the differences in the amount of travel that would attend future land use patterns different than that envisioned under the adopted regional land use plan. Three alternative land use patterns were used: an intermediate-growth existing trends, a high-growth centralized, and a high-growth decentralized.

It may be concluded that little difference may be expected in the character of travel within the Region between the adopted regional land use plan and the existing trends land use alternative. Two factors serve to explain this conclusion. First, both land use scenarios were designed to serve a growth in population of 6 percent, in households of about 14 percent, and in employment of about 11 percent. Second, a sizable portion of urban growth, household growth in particular, under the existing trends land use pattern may be expected to occur in conformance with the adopted land use plan. Since the household is the primary determinant of internal trip making, the travel demand the transportation system plan was designed to serve would not differ appreciably from the travel demand that may be expected to occur should the regional land use pattern continue to develop according to recent trends.

It may also be concluded that the difference in travel between the adopted regional land use plan and the high-growth scenarios is related to the greater increases in resident population and economic activity assumed under the high-growth scenarios. Should population and economic activity increase as forecast under the high-growth scenarios, the planned arterial street and highway system may be expected to carry higher traffic volumes and in some locations experience greater levels of traffic congestion. Under a high-growth decentralized plan, the planned transit system may be expected to carry substantially fewer passengers.

### Anticipated Impact on Travel Attendant to a 100 Percent Increase in Automobile Operating Costs

The Technical Coordinating and Advisory Committee also recommended that the potential impacts associated with a policy of substantially increasing automobile operating costs should be presented for informational purposes during the public review of the preliminary recommended plan. Alternative Plan 1 was used as a basis for this analysis as it assumed a 100 percent increase in the cost of driving. The preliminary recommended plan is compared to Alternative Plan 1 previously in this chapter but in this concluding section, the final recommended plan is compared to Alternative Plan 1. The pricing measures assumed under Alternative Plan 1 for the analyses would double the perceived costs of operating an automobile over the 1991 level. This doubling would mean that the perceived cost of driving an automobile would increase from about $0.055 to about $0.11 per mile.

Should the perceived cost of automobile operation be doubled, 38.38 million vehicle-miles of travel could be expected to take place on the arterial street and highway system on an average weekday in the plan design year 2010. This would be about 4.04 million vehicle-miles fewer than expected under the recommended plan. By way of comparison, in 1991 about 33.07 million vehicle-miles of travel took place on the arterial street and highway system of the Region. About 131 miles of arterial facilities could be expected to operate over design capacity during peak-hour travel periods, representing 34 miles, or 21 percent, less than could be expected under the recommended plan. The lower levels of travel and traffic congestion could be expected to result in the emission of fewer air pollutants and in the consumption of fewer gallons of motor fuel within the Region. About 25.6 tons of volatile organic compounds, 71.3 tons nitrogen oxides, and 211.5 tons carbon monoxide would be generated, representing 2.1, 7.6, and 14.5 fewer tons, respectively than under the recommended plan. Also, 412 million gallons of fuel could be expected to be consumed annually within the Region, or about 32 million gallons, or 7 percent, less per year than could be expected under the recommended plan.

### Concluding Remarks

The recommended regional transportation system plan for the year 2010 is a sound plan, worthy of consideration for adoption and implementation by all parties concerned. Among the reasons this is so are the following:

- Implementation of the recommended transportation system plan would provide the Region with an integrated transportation system that can both effectively serve and promote a desirable regional land use pattern. That pattern is defined in the adopted regional land use plan. The recommended transportation system plan was explicitly designed to serve the future travel demand that may be expected to be generated by the regional land use plan. Thus, the transportation system plan calls for the development of highway and transit facilities to serve those areas where land use development and redevelopment are recommended to occur.

- The plan explicitly proposes arterial street and highway system capacity expansion only as a measure of last resort in addressing traffic congestion problems. The potential ability for land use planning and site design, public transit service, travel demand management, and traffic management measures to address traffic congestion were first determined and the problems remaining after the assumed application of these measures explicitly identified. Only those residual problems were addressed by capacity expansion.

- The recommended transportation system plan will provide the facilities needed to meet anticipated future travel demand at an adequate level of service. The plan will abate traffic congestion, reduce travel time and costs between component parts of the Region, and reduce accident exposure. In 1991, 385 miles of arterial facilities, or 12 percent of the total arterial system, carried traffic volumes on an average weekday which exceeded their design capacity and therefore experienced congestion. Under the no-build plan, arterial mileage subject to congestion may be expected to increase to 712 miles, or about 21 percent of total arterial system mileage. Under the final recommended plan, that mileage may be expected to decline to 165 miles, or 5 percent of total arterial system mileage, principally as a result of the recommended highway system capacity improvement and expansion.

- The recommended transportation system plan will provide a balanced transportation system, with appropriate types of highway and transit facilities and services provided for the various subareas of the Region. For an increased proportion of the resident population of the Region, implementation of the plan would enable trips to be made either by automobile or by transit, thus enhancing choice in travel-related decision making. Transit service would be extended and improved to enhance access to employment opportunities and to major educational, medical, shopping, and recreational facilities and services. The plan would provide a system of rapid transit, express transit, and paratransit facilities and services, as well as conventional mass transit facilities and services, and seek to halt the historic decline in the use of transit and the funding for the operation and maintenance of transit service within the Region. As an indication of the emphasis in the plan on the improvement in transit service, it may be noted that less than 4 percent of total travel demand is now, or may in the future be expected to be accommodated on public transit facilities. Nevertheless, the plan proposes that 38 percent of the total financial resources available for transportation be allocated to transit. The transit system would be expanded by about 75 percent, as measured in vehicle-miles of service, while the highway capacity would be expanded by only 22 percent as measured by lane-miles of facility.

- The benefits to be secured by implementation of the recommended transportation system plan exceed the costs associated with that plan, indicating that the plan is economically sound and cost effective, as well as technically feasible and efficient.

- The plan is environmentally sound. It provides for a reduction in energy consumption and air pollutant emissions, compared to the no-build alternative. The loss in primary environmental corridor lands, wetlands, and primary agricultural lands attendant to construction proposed under the plan is less than three tenths of a percent of the existing total of such lands within the Region. Importantly, in this respect, the transportation system plan is based upon and serves to help implement the adopted regional land use plan, which plan seeks to preserve the environmental corridors and remaining prime agricultural areas of the Region and which seeks to discourage the further diffusion of low-density urban development and the decentralization of jobs within the Region.

- The plan would provide for the proper maintenance of the existing transit and arterial street and highway infrastructure within the Region, including provision for the rehabilitation of the existing greater Milwaukee area freeway system. The level of transit service within the Region has, over the last decade, been steadily reduced, measured by vehicle-miles of service. Similarly, the needed resurfacing and reconstruction of county and local arterials has been delayed with the rates of such maintenance being inadequate to maintain current pavement conditions into the future.

- The plan provides for the long-planned and long-needed improvement of the public transit and arterial street and highway systems. With respect to public transit, the plan proposes the development of rapid and express transit system elements. With respect to arterial streets, the plan proposes the widening to provide additional traffic lanes of 448 miles of arterial streets, or 3 percent of the total system, and the construction of 131 miles of new arterial streets, representing about a 4 percent expansion of arterial system capacity.

- The plan is realistic and achievable. The existing and new revenue sources necessary to implement the plan are identified and a proposal to secure the resources to resolve estimated funding shortfalls is set forth in Chapter XII.

# Chapter XII

# PLAN IMPLEMENTATION

## INTRODUCTION

The recommended regional transportation system plan, described in the preceding chapter of this report, provides a design for the attainment of specific transportation development objectives. The recommended plan proposes transportation system management measures to ensure that the most efficient use is made of existing transportation facilities. The plan also proposes needed improvements to the public transit and arterial street and highway systems within the Region. In a practical sense, however, the plan is not complete until the steps required to implement the plan are specified.

This chapter specifies the steps required to implement the recommended plan. It identifies the various units and agencies of government which have plan adoption and implementation responsibilities germane to the recommended plan and specifies necessary plan adoption and implementation actions. It prioritizes the transit and highway improvements included in the plan, providing the basis for the preparation of future regional transportation improvement programs. It describes the detailed implementation planning that will need to be conducted during the plan implementation period, identifying in particular transportation improvements that warrant Federally required major investment studies. The chapter also recommends how the identified funding shortfall should be addressed, as well as the manner in which the Federally required transportation management systems should operate over the plan implementation period. Finally, the chapter outlines a series of proposed special studies relating to transportation implementation matters.

## BASIC PRINCIPLES AND CONCEPTS

Plan implementation measures must grow out of adopted plans. Thus, action policies and programs must emphasize the most important and essential elements of the plan. This is particularly important in planning for the orderly and economical development of a large urban region. The task is so highly complex that care must be taken not to become lost in plan implementation detail, the effects of which may be meaningless at the regional scale. Accordingly, regional transportation system plan implementation should focus on those facilities having areawide significance. The regional plan will be largely achieved if: 1) the regional freeway system is completed and appropriately rehabilitated and modernized, 2) improvements to the major surface arterials, particularly those included in the recommended National Highway System, are implemented, and 3) the rapid and express transit expansion and improvement recommendations are carried out.

There are three main areas through which regional plan implementation may be achieved; these parallel the three functions of the Regional Planning Commission: areawide inventory or monitoring, preparation of a framework of long-range plans for the physical development of the Region, and provision of a center for the coordination of Federal, State, county, and local planning and plan implementation activities. All require a receptive attitude and, preferably, active planning and plan implementation programs at the local, county, State and Federal levels of government.

A great deal can be achieved in guiding areawide development along better lines if all concerned units and agencies of government, along with the Regional Planning Commission, perform the simple task of collecting, analyzing, and disseminating basic planning and engineering data on a continuing, uniform, areawide basis. Experience within the Region has shown that if this important inventory, or monitoring, function is properly carried out, the resulting information will be used and acted upon by local, county, State, and Federal agencies of government and by private investors. If these same data were used as a primary input into the regional plan preparation, their utilization in arriving at public and private development decisions on a day-to-day basis would tend to contribute toward implementation of the regional plans.

With respect to plan preparation it is essential that the regional plans, although confined to those functional elements having areawide significance, be prepared in sufficient depth and detail to provide a sound basis for plan implementation. This means that for necessary public works facilities, such as freeways, major surface arterials, and rapid and express transit facilities, the plans must be carried to a stage wherein the location and alignment has been determined with sufficient accuracy and precision to provide an adequate basis for right-of-way reservation. Given such detailed plans, implementation will further require the continuation of close working relationships between the Commission, the seven county boards, the local units of government, and such State agencies as the Wisconsin Departments of Transportation and Natural Resources.

Finally, it will be highly desirable, although not essential, to achieve an even finer degree of plan implementation than would be attainable through concern with the major plan elements alone through the Commission function of serving as a center for the coordination of local, county, State, and Federal planning and plan implementation activities within the Region. The Commission's community assistance program, which actively assists counties and local municipalities in the preparation of plans and plan implementation devices, is an important factor in this respect and will make possible the close integration of regional, county, and local plans, adjusting the details of the latter to the broad framework of the former.

## PLAN IMPLEMENTATION ORGANIZATIONS

Because the Commission is an advisory agency, implementation of the recommended plans will be entirely dependent upon the actions taken by certain local, county, areawide, State, and Federal agencies of government. Examination of the various agencies that are available to implement the recommend plan under existing enabling legislation reveals an array of departments, commissions, councils, boards, districts, and authorities at all levels of government. These agencies range from general-purpose units of local government, such as common councils and village boards, to such agencies as the Federal Highway and Transit Administrations.

The agencies whose actions will significantly impact, either directly or indirectly, the successful implementation of the recommended regional transportation system plan and whose full cooperation in plan implementation will be essential are listed and discussed below. For convenience, these agencies are arranged by level of government; however, the interdependence between the various levels, as well as between the various agencies, of government and the need for close intergovernmental cooperation cannot be overemphasized.

### Local-Level Agencies

Local Plan Commissions: Sections 62.23, 61.35, and 60.10(2)(c) of the Wisconsin Statutes permit municipalities to create plan commissions. Plan commissions, among other functions, are charged with the responsibility of making and adopting a master plan for the physical development of the community, including recommendations relating to streets and highways, routes for railways and buses, and terminals. Moreover, the location, extension, alteration, and acquisition of land for any street or other public way must be referred to the plan commission for recommendation prior to any action by the municipal governing body.

Boards of Public Works: Sections 62.14, 61.35, and 60.10(2)(c) of the Wisconsin Statutes permit municipalities, under the direction of the common council, village board, or town board, to form boards of public works to superintend the construction and maintenance of all public works. Such boards have primary responsibility for local arterial streets and highways and are able to take on public transit responsibilities as well.

Committees of the County Boards: Highway, Transit, and Public Works: These committees are responsible for the administration and expenditure of county funds for highway construction and maintenance. They are empowered to establish and change the county trunk highway systems, subject to the approval of the Wisconsin Department of Transportation; to acquire land for county highway purposes by purchase or condemnation; and to give direction to the operation and maintenance of public transit systems. All seven counties within the Southeastern Wisconsin Region have established such committees: in Kenosha County, a Highway and Parks Committee; in Milwaukee County, a Mass Transit Committee and a Transportation and Public Works Committee; in Ozaukee County, a Highway Committee; in Racine County, a Public Works Committee; in Walworth County, a Highway Committee; in Washington County, a Highway Committee; and in Waukesha County, a Public Works Committee.

Transit Commissions and Boards: Transit commissions can be established by cities and are empowered to establish, maintain, and operate a public transportation system, the major portions of which are located within the city. The Cities of Kenosha, Racine, and Waukesha have created such governmental bodies to provide urban public transit services. Transit boards may be established by counties and are empowered to create, maintain, and operate a public transportation system within that county and any contiguous or cornering counties. There currently are no county transit boards in the Region.

Areawide Agencies

Cooperative Contract Commissions: Section 66.30 of the Wisconsin Statutes provides that municipalities[1] may contract with each other to provide jointly any services or exercise jointly any powers that such municipalities may be authorized to provide or exercise separately. While no transportation-related cooperative contract commissions currently exist within the Region, there is potential to achieve significant economies through providing transportation services and facilities on a cooperative, areawide basis. Moreover, the nature of certain transportation problems often requires that solutions be approached on an areawide basis.

Metropolitan Transit Authority: Such an authority, if created pursuant to Section 66.94 of the Wisconsin Statutes, would have the power to acquire, construct, and operate a public transportation system and would have the power of eminent domain within a district which would include all of Milwaukee County and those units of government located in adjacent counties through, and into, which the transit system would extend. Such an authority does not have any powers of taxation. It can, however, issue revenue bonds. No such authority has been activated within the Region at present.

Regional Transportation Authority: The Regional Planning Commission studied the feasibility of creating a regional transportation authority (RTA) within Southeastern Wisconsin.[2] Following that study, State legislation was enacted to create an RTA encompassing all seven counties in the Region and directing that the RTA conduct its own study and recommend whether or not it should continue in existence after September 30, 1993.[3] Over an approximately 15-month period during 1992 and 1993, the RTA Board carried out its own study. The results of that study were set forth in a report to the Governor and the Legislature.[4] In that report, the RTA Board developed a proposal for a permanent authority, the essence of which consisted of the following:

1. Geographic Scope
   The study proposed a seven-county RTA providing, however, that during the first six months of existence, a county could exercise a withdrawal option. Absent such a withdrawal, the county would be a permanent member of the RTA. Any county which withdrew in the initial six months could petition later to rejoin. The RTA Board would be permitted to impose conditions for rejoining.

2. Board Structure
   The study proposed that the RTA be governed by an 11-member board, assuming all seven counties participated, including, on a ex-officio basis, the State Secretary of Transportation. Each participating county would have one representative residing in that county. There would be three at-large members residing in the Region, with one of those appointed residing within the City of Milwaukee. All members would be appointed by the Governor and confirmed

[1] *Under this section of the Statutes, the term municipality is defined to include the State and any agency thereof, cities, villages, towns, counties, school districts, and regional planning commissions.*

[2] *See SEWRPC Memorandum Report No. 38, A Regional Transportation Authority Feasibility Study for Southeastern Wisconsin, November 1990.*

[3] *See Wisconsin Statutes, Section 59.966.*

[4] *See Southeastern Wisconsin Regional Transportation Authority Report to Governor Thompson and the Wisconsin Legislature, May 1993.*

by the State Senate. The Governor would designate the Board chair.

3. Functions and Responsibilities
The study proposed that the RTA be empowered as a funding and plan implementation agency. All transportation projects supported with RTA funds would have to be drawn from the adopted regional transportation system plan. The RTA would not be enabled to construct and maintain arterial highway systems; however, the RTA would be enabled to provide funds to county and local governments for arterial highway construction, operation, and maintenance. The RTA would also be enabled to fund county and local governments that deliver transit services as well as to directly sponsor and provide transit services on a contractual basis either with public transit agencies or with private providers. The RTA would also be empowered to assume responsibilities to provide county and local transit services where county and local governments want to transfer that function to the RTA. Finally, the RTA would be given responsibility to carry out areawide transportation demand management programs, such as carpooling and vanpooling promotional efforts.

4. Revenues
The study proposed that the RTA be funded through two additional taxes levied in the Region by the RTA: a 0.4 percent general sales tax and a five-cent-per-gallon motor fuel tax. The motor fuel tax would not be levied on diesel fuel. These two taxes could be expected to raise a minimum of $90 million annually in the Region.

5. Revenue Allocation
The study proposed that the legislation guarantee that over a six-year period every county would receive a minimum of 98 percent of the revenue raised in the county. In addition, every county would be guaranteed to receive annually at least 80 percent of the revenue raised in the county.

The RTA Board delivered its study recommendations to the seven counties in the Region early in 1993. Resolutions supporting the study recommendations were defeated by the County Boards of Kenosha, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties. The Milwaukee County Board approved the supporting resolution on the condition that the regional taxes envisioned be levied instead Statewide and be confined to motor fuel taxes. On the strength of these County Board actions, the RTA Board recommended to the Governor and the Legislature that the Board be disbanded and that a permanent authority not be created at that time. Accordingly, the RTA went out of existence on September 30, 1993.

Regional Planning Commission: Although not a direct plan implementation agency, one other areawide agency warrants description herein: the Regional Planning Commission. The Commission, created under Section 66.945 of the Wisconsin Statutes, is empowered to prepare and adopt a master plan, of which the transportation system plan is a part, for the physical development of the Region. It has no statutory plan implementation powers. A special designation assigned to the Regional Planning Commission under Federal law is that of Metropolitan Planning Organization. This designation means that the Commission provides a forum for cooperative decision making concerning the preparation and adoption of transportation system plans and improvement programs. Under Federal law, the Commission, as the Metropolitan Planning Organization, is given the responsibility to program certain Surface Transportation Program monies allocated for use in the urbanized areas. The Commission has chosen to exercise this responsibility through its Intergovernmental Coordinating and Advisory Committee on Transportation System Planning and Programming for the Milwaukee Urbanized Area.

State-Level Agencies

Wisconsin Department of Transportation: The Wisconsin Department of Transportation is responsible for the planning of all transportation modes within the Region. The Department is authorized to provide the State with an integrated and intermodal transportation system and to administer State and Federal aids for highway and transit improvements. The Department is also responsible for planning, designing, constructing, and maintaining all State trunk highways and for planning, laying out, revising, constructing, reconstructing, and maintaining the National Highway System and the Interstate System, subject to Federal review and regulation.[5]

Wisconsin Department of Natural Resources: Pursuant to the provisions of the Federal Clean Air Act, the Wisconsin Department of Natural Resources must prepare a State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. Under the Clean Air Act Amendments of 1990, the seven-county Southeastern Wisconsin Region has been designated a nonattainment area with respect to ozone. Therefore, the recommended regional transportation system plan, together with subsequently prepared transportation improvement programs, must be found to conform to the State Implementation Plan for air quality. If a conformity finding cannot be made, then the plan must be revised until a conformity finding can be made. These requirements have made close cooperation between the Commission and the Wisconsin Department of Natural Resources essential both in the preparation and implementation of the plan.

Wisconsin Department of Administration: The Wisconsin Department of Administration provides the Governor with the information and policy alternatives necessary for the preparation of the State biennial budget. In addition, the Department acts as the State clearinghouse for intergovernmental review of Federally aided programs and projects. Through this review process the Department may comment on all Federally aided transportation projects.

Wisconsin Department of Development: The Department administers the State's economic development programs and policies. Though the Department has no direct role in the implementation of the regional transportation system plan, its activities, especially related to the retention or expansion of existing business and the attraction of new business, may significantly impact the use of the regional transportation system, particularly if such activities should run counter to the adopted land use plan for the Region.

University of Wisconsin-Extension

As a part of the University of Wisconsin System, the University of Wisconsin-Extension is the institution principally charged with implementing the "Wisconsin Idea" of extending the knowledge and resources of the University of Wisconsin System to the citizens of the State, thereby helping them to make more informed decisions. The Regional Planning Commission and the University of Wisconsin-Extension have entered into a contractual agreement for the provision of educational services, focused upon transportation, land use, and environmental protection planning and plan implementation issues. Each county in the Region has a University of Wisconsin-Extension office that can be used to expand the network of education related to plan implementation. It is recognized that educating public officials and the citizens at large in the Region about the plan findings and recommendations will contribute significantly to, and indeed is a necessary element of, plan implementation.

Federal-Level Agencies

U. S. Department of Transportation: The U. S. Department of Transportation, in cooperation with the Regional Planning Commission, as the Metropolitan Planning Organization for the Southeastern Wisconsin Region, must make the necessary determinations to ensure that the recommended regional transportation system plan and subsequently prepared improvement programs conform with the State Implementation Plan for air quality. When making the conformity determinations the Federal Highway and Federal Transit Administrations will require certain Federally specified technical

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[5] *The Wisconsin Department of Transportation's recommendations for major highway projects, defined in Section 13.489 of the Wisconsin Statutes as highway reconstruction or reconditioning costing $5 million or more and involving either relocation of 2.5 miles or more, or construction of five or more miles of additional lanes to an existing highway, are reviewed by the Wisconsin Transportation Projects Commission. This Commission, which is composed of the Governor, five Senators, five Assembly Representatives, three citizen members, and the Secretary of the Wisconsin Department of Transportation (a nonvoting member), reviews Department recommendations and, in turn, recommends to the Legislature highway projects proposed to be enumerated in the Statutes. The enumeration of major highway projects in the Statutes signifies a firm State commitment to funding such projects in future years.*

work to be completed by the Commission in order to demonstrate that the conformity criteria are met. Importantly, the plan implementation responsibilities of the two Federal agencies also extend to the funding of transportation improvement projects.

*U. S. Department of Transportation, Federal Highway Administration*: The Federal Highway Administration administers all Federal highway aid programs, working through the Wisconsin Department of Transportation. The Federal Highway Administration must approve all changes in the National Highway System and Interstate System and will, in this respect, have an important role in implementation of the highway element of the recommended transportation system plan for the Region.

*U. S. Department of Transportation, Federal Transit Administration*: The Federal Transit Administration administers a comprehensive set of programs offering Federal funds to eligible local recipients in partial support of the preservation, improvement, and expansion of public transit service. Federal Transit Administration programs germane to the recommended plan include Section 3, Section 9, and Section 18. Federal funds made available for transit projects under the Surface Transportation Program and the Congestion Mitigation and Air Quality Improvement Program are transferred from the Federal Highway Administration to the Federal Transit Administration Section 9 and Section 18 programs and thus become subject to the administrative requirements of the Federal Transit Administration.

U. S. Environmental Protection Agency: The U. S. Environmental Protection Agency (EPA) is responsible for approving the State Implementation Plan for air quality and for imposing sanctions on a State for failing to meet certain requirements of the Clean Air Act Amendments of 1990. If the EPA finds a failure on the part of the State to submit a State Implementation Plan for air quality, or a portion thereof, to implement the provisions of such an approved plan, or to conform to any other provision required by the Federal Clean Air Act, it must, after a period of grace during which the deficiency can be corrected, impose mandated sanctions. The EPA may cause Federal highway funds to be withheld and/or may require a two-to-one offset for major stationary air pollutant sources.[6]

## PLAN ADOPTION AND INTEGRATION

Upon adoption of the new regional transportation system plan by formal resolution of the Southeastern Wisconsin Regional Planning Commission, in accordance with Section 66.945(10) of the Wisconsin Statutes, the Commission will transmit a certified copy of the resolution and adopted plan to all local legislative bodies within the Region and to all of the aforementioned existing State, local, county, areawide, and Federal agencies. Endorsement, adoption, or formal acknowledgment and integration of these plans by the local legislative bodies and the existing local, county, areawide, State, and Federal agencies involved is highly desirable, and in some cases necessary, to assure a common understanding between the several government levels and to enable their staffs to program the necessary implementation work. Adoption of the new regional transportation system plan by units and agencies of government that have adopted the initial design year 1990 and the second-generation design year 2000 regional transportation plans will serve to substitute the new plan for the old.

Adoption of the recommended plan by any unit or agency of government pertains only to the statutory duties and functions of the adopting unit or agency. Such adoption does not and cannot in any way preempt action by another unit or agency of government within its jurisdiction. Thus, adoption of the regional transportation system plan by a county would make the plan applicable as a guide, for example, to county highway development but not to municipal street development. The plan would have to be adopted by the municipality concerned to make it applicable as a guide to municipal street development.

[6]*In an area under such a sanction, each ton of air pollutant emissions created by a new stationary source must be offset by a two-ton reduction through additional control measures on existing stationary sources.*

Finally, while the adoption and endorsement of the recommended regional transportation system plan is important, the need to also to adopt or endorse the companion year 2010 regional land use plan cannot be overlooked. The successful implementation of the regional transportation system plan is interrelated with the successful implementation of the regional land use plan. The development of the transportation system in accord with the recommended plan may not be sufficient to provide a high level of transportation service throughout the Region should urban development occur in a manner significantly contrary to the recommendations of the regional land use plan. Plan adoption, endorsement, and integration recommendations are listed below.

Local Agencies:

- It is recommended that the cities, villages, and towns in the Region, upon recommendation of their plan commissions and boards of public works, adopt the recommended regional transportation system plan as authorized by Section 66.945(12) of the Wisconsin Statutes and integrate the plan into their comprehensive plans and capital improvement programs.

- It is recommended that the seven county boards, upon recommendation of their highway, transit, and/or public works committees, formally adopt the recommended regional transportation system plan as authorized by Section 66.945(12) of the Wisconsin Statutes and integrate the plan into their comprehensive plans and capital improvement programs.

- It is recommended that the Cities of Kenosha, Hartford, Port Washington, Racine, Waukesha, West Bend, and Whitewater and the Counties of Milwaukee and Waukesha, as well as any local unit of government that may in the future begin to operate public transit service, adopt the recommended transportation system as a guide to future transit system development and integrate the plan into their transit development programs.

Areawide Agencies:

- It is recommended that any transportation-related cooperative contract commission subsequently created formally acknowledge the recommended transportation system plan in regard to the exercise of its specific powers and duties.

- It is recommended that, should a regional or metropolitan transportation authority be established, it, as one of its initial actions, adopt the recommended regional transportation system plan.

State Agencies:

- It is recommended that the Wisconsin Department of Transportation endorse the recommended regional transportation system plan. It is further recommended that the Department integrate the recommendations into the State long-range transportation plan, as authorized by Sections 84.01, 84.02, and 84.025 of the Wisconsin Statues, as a functional guide to highway and transit system development within the Region.

- It is recommended that the Wisconsin Natural Resources Board endorse the recommended regional transportation system plan and that the Wisconsin Department of Natural Resources continue to cooperate with the Regional Planning Commission to ensure its conformance with the State Implementation Plan for air quality.

- It is recommended that the Wisconsin Department of Administration endorse the recommended regional transportation system plan and use the plan in discharging its responsibilities in reviewing and commenting on Federally funded transportation programs and projects.

- It is recommended that the Wisconsin Department of Development endorse the recommended regional transportation system plan and support implementation of the plan through its economic development activities, considering the long-term transportation-related and environmental impacts of its decisions.

- It is recommended that the University of Wisconsin-Extension acknowledge the recommended regional transportation system plan and promote implementation of the plan through its educational programming.

Federal Agencies:

- It is recommended that the U. S. Department of Transportation, Federal Highway

Administration and Federal Transit Administration, endorse the recommended regional transportation system plan and find it to conform with the State Implementation Plan for air quality and to have been prepared in a manner consistent with the Intermodal Surface Transportation Efficiency Act of 1991.

- It is recommended that the U. S. Environmental Protection Agency endorse the recommended regional transportation system plan.

Subsequent Adjustment of the Plan

No plan can be permanent in all its aspects or precise in all its elements. The very definition and characteristics of "regional planning" suggest that a regional plan, to be viable and useful to local, State, and Federal units and agencies of government, be continually adjusted through formal amendments, extensions, additions, and refinements to reflect changing conditions. The Wisconsin Legislature foresaw this when it gave to regional planning commissions the power to "amend, extend, or add to the master plan or carry any part or subject matter into greater detail" under Section 66.945(9) of the Wisconsin Statutes.

Amendments, extensions, and additions to the regional transportation system plan will be forthcoming, not only from the work of the Commission under the continuing regional planning program, but also from Statewide plans and from Federal agencies as national policies are established or modified, new programs created, or existing programs expanded or curtailed. Adjustments may come from State, subregional, district, and county and local planning programs which, of necessity, must be prepared in greater detail and may result in refinement and adjustment of the regional plan. All refinements and adjustments will require cooperation between local, areawide, State, and Federal agencies, as well as coordination by the Southeastern Wisconsin Regional Planning Commission, which is empowered under Section 66.945(8) of the Wisconsin Statutes to act as a coordinating agency for programs and activities of the county and local units of government concerned. To achieve this coordination between local, areawide, State, and Federal programs most effectively and efficiently and, therefore, assure the timely adjustment of the regional transportation system plan, it is recommended that all the aforesaid agencies having various plan and plan implementation powers transmit all subsequently prepared planning studies, plan proposals and amendments, and plan implementation devices to the Southeastern Wisconsin Regional Planning Commission for consideration as to integration into the adopted regional plan.

## PLAN IMPLEMENTATION RECOMMENDATIONS

The recommended year 2010 regional transportation system plan has three major elements: transportation system management, public transit system maintenance and improvement, and arterial street and highway system maintenance and improvement. The specific actions and the agencies responsible for those actions required to implement each of these elements are described in the following sections of this chapter.

Transportation System Management

The planned transportation system management element includes the Milwaukee area freeway traffic management system; consideration of peak-period curb-lane parking restrictions on 464 route-miles of arterial facilities in the Region; areawide promotion of measures to encourage travel through ridesharing, transit use, and bicycle use, as well as to encourage telecommuting and work time rescheduling; and the use of site-specific land use planning to facilitate travel by transit, bicycle, and pedestrian modes. The following are specific implementation responsibilities with respect to these matters:

1. It is recommended that the Wisconsin Department of Transportation continue to develop and operate the Milwaukee area freeway traffic management system. The completed system should include a coordinated areawide system of ramp controls that will achieve the highest possible level of service on the freeways and that will encourage travel by transit and by carpools and vanpools.

2. It is recommended that the Wisconsin Department of Transportation develop an expanded ridesharing promotional campaign in the greater Milwaukee area; assist area businesses and industries to implement the Federally required Employee Commute Options program, including the formation of private section transportation

management associations (TMAs); promote employer-based transportation demand management strategies; review income tax policies to ensure that there is no modal bias in terms of employer-subsidized parking and employer-provided transit subsidies; explore the feasibility and desirability of influencing local parking pricing and management policies by directly linking State transportation aids to the enactment of local policies that discourage travel by single-occupant vehicles; fund a program to promote travel by bicycle and walking as well as telecommuting; and construct telecommuting centers and carpool lots as more detailed planning efforts and demand may indicate and warrant. It is recommended that upon endorsement of the regional transportation system plan, the Wisconsin Department of Transportation prepare a program plan to identify in detail how best to address the various transportation demand management activities recommended in the regional system plan. It is recognized that in preparing that program plan, the Department may determine to contract with others, including the Regional Planning Commission, to provide assistance in carrying out certain activities. It is further recommended that the work plan be subject to review and comment by a Task Force created by the Department for this purpose, the membership of which should include representatives of all interests concerned.

3. It is recommended that upon referral to, and recommendation of, the local plan commission, and upon appropriate further study by responsible local traffic engineering staffs, each common council and village board consider appropriately restrict curb-lane parking during peak travel periods on the 464 miles of arterial streets and highways designated as candidates for such restriction in the recommended plan.

4. It is recommended that upon referral to, and recommendation of, the local plan commission, each common council, village board, and town board within the Region evaluate zoning, subdivision, and other site planning and development ordinances and practices; identify the manner in which such ordinances and practices may discourage the development of integrated neighborhoods, transit use, bicycling, and walking; and institute measures to correct land development practices that promote dependence on the automobile.

   In this respect it is recommended that within the urban density framework provided by the adopted regional land use plan, higher-density, transit- and pedestrian-friendly urban development be promoted along transit lines and around transit stops and stations through neighborhood development and redevelopment plans. Further, it is recommended that appropriate land development incentives be used to promote high-density, mixed use development around fixed-guideway transit stations, as such fixed-guideway transit facilities are developed within the plan implementation period. It is recommended that local units of government strive to implement the regional bicycle and pedestrian facilities plan by providing both the on-street and off-street bicycle ways recommended in that plan. The former should be provided as the arterial streets and highways concerned are constructed and reconstructed.

   Finally, in this respect, it is recommended that the Southeastern Wisconsin Regional Planning Commission, with funding provided by the Wisconsin Department of Transportation, prepare a local planning guide designed to illustrate transit- and pedestrian-friendly land use development practices. It is further recommended that the University of Wisconsin-Extension use the guide in its educational programming.

Public Transit

Under the plan, rapid transit service by buses would operate over freeway lanes providing relatively fast and convenient commuter transit service in the major travel corridors of the Region. A grid pattern of express transit routes by buses operating in mixed traffic over arterial streets would be provided primarily within Milwaukee County. The plan recognizes that both rapid and express transit services could be provided in the future over fixed-guideway facilities pending the outcome of major investment studies. The preliminary recommended plan also proposes to expand and improve local public transit service within the Kenosha, Milwaukee, and Racine urbanized areas, including eastern Waukesha County. A suggested prioritization of the transit improvement and expansion recommendations is set forth in SEWRPC report Assessment of Conformity of the New Year 2010 Regional Transportation System Plan and the 1995 through 1997 Transportation Improvement Program with Respect to the State of Wisconsin Air Quality Implementation Plan.

To the extent that the recommended transit services are to be provided within the geographic limits of a single county, the county itself provides an adequate institutional structure for the provision of such services. Counties, working cooperatively with local units of government in the county, have all the authority needed to assume plan implementation responsibilities with respect to transit. A significant number of the rapid transit facilities and services recommended in the plan, however, extend geographically over two or more counties. This is true in that bus rapid transit facilities and services and potential commuter-rail passenger service are proposed in the plan to extend from Milwaukee County into Ozaukee, Washington, and Waukesha Counties and also south along the Lake Michigan shoreline from Milwaukee County through Racine and Kenosha Counties to potential connections with Chicago-oriented commuter-rail passenger service. The potential commuter-rail passenger service extension between Burlington and Antioch, Illinois, would also involve two counties within the Region, Racine and Kenosha.

The proposed Southeastern Wisconsin Regional Transportation Authority, as described earlier in this chapter, would have provided an ideal institutional structure for providing these multi-county rapid transit services. There was, however, little political support evidenced in 1993 among the seven County Boards for the creation of such a regional transportation authority. Consequently, absent a change in that political position among at least several of the County Boards concerned and absent a position by the Wisconsin Department of Transportation that it would assume responsibility for the engineering, management, and operation of multi-county rapid transit services, the only alternative for implementation of the rapid transit elements of the regional transportation plan appears to be through intergovernmental agreements on the part of the counties concerned. Some relatively modest examples of this type of approach to providing transit services that extend across county boundaries existed in 1991 within the Region in the form of agreements between Milwaukee and Waukesha Counties to extend local Milwaukee County bus routes into eastern Waukesha County and to provide freeway flyer bus services between communities in Waukesha County and the Milwaukee central business district (CBD). Similarly, in the Lake Michigan shoreline south corridor, the City of Racine has worked cooperatively with the City of Kenosha and Milwaukee County in providing express bus transit service between Kenosha, Racine, and Milwaukee.

The structure of the transit services recommended in the regional plan makes it important that, if a regional transportation authority is not created, and if the Wisconsin Department of Transportation does not assume engineering, management, and operational responsibilities for the multi-county rapid transit services recommended in the plan, the seven counties in the Region assume basic responsibility for the provision of public transit services. This is to be expected, given the areawide nature of the services provided not only within the Milwaukee, Racine, and Kenosha urbanized areas, but also between those urbanized areas and outlying communities as well. Milwaukee and Waukesha Counties have already assumed public transit responsibilities. Transit services in the other five counties to date, however, have been sponsored not by the counties but by individual communities.

Recent State legislation has made it more difficult for individual communities, as opposed to counties, to provide transit services on an areawide basis.[7] That legislation prohibits a local public transit operator, such as a city, from providing transit services outside its corporate limits without formal agreements between the city and the neighboring local units of government. Any such services provided as of the effective date of that legislation, April 28, 1994, are exempted from this new law. Clearly, then, bringing about the areawide public transit service recommendations contained in the regional plan has been made more difficult by the enactment of this new law, which augurs badly for providing even local public transit services at the county level of government.

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[7] *See 1993 Wisconsin Act 279.*

The issue of the lack of an appropriate institutional structure to provide the engineering, management, and operational capabilities necessary to provide a true rapid transit system in Southeastern Wisconsin must be addressed as the conduct of the several major investment studies attendant to the development of the rapid transit system envisioned in the plan are undertaken. For example, one of the major investment studies pertains to the provision of rapid transit services in the south travel corridor extending from Milwaukee to Racine and Kenosha with a potential interchange with the Chicago-oriented commuter-rail service that currently terminates in Kenosha. This major investment study will have to examine in detail how best to provide rapid transit services in this rapidly urbanizing corridor and, in particular, whether such services should be provided by bus-on-freeway, bus-on-busway, or commuter-rail service. Should that major investment study conclude that bus-on-freeway or bus-on-busway is the appropriate rapid transit alternative for the travel corridor, then the lack of an areawide institutional structure to implement the services is less problematic than if commuter-rail service were to be found to be the preferred alternative. This is because the rapid transit bus service would be provided over either the freeways or over busways attendant to the freeways and there is an appropriate institutional structure, the Wisconsin Department of Transportation, in place to engineer, manage, and operate all of the fixed-way facilities. The rolling stock and services could be provided through an intergovernmental contract between the three counties concerned. Should that major investment study, however, identify commuter-rail service as the alternative for implementation, then it will be necessary to either assign the responsibilities for engineering, managing, and operating the commuter-rail system to the Wisconsin Department of Transportation or to create a new areawide institutional structure in the form of a regional transit or transportation authority to assume those important functions.

It should be noted that the plan implementation problems relating to institutional structure pertain exclusively to the areawide rapid transit services which are proposed to extend into all seven counties of the Region. These services are identified on the recommended plan maps in Chapter XI in red lines, akin to the red lines on the maps which depict the recommended State trunk highway system. The express level of transit services recommended in the plan are located largely, although not entirely, within the limits of a single county and, accordingly, can be implemented by using the county level of government as the transit institutional structure. The few exceptions to this rule consist of express bus service proposed between Milwaukee and Waukesha Counties and between Racine and Kenosha Counties. Those services could be provided by intergovernmental contracts between the counties concerned. All the recommended potential light-rail express transit services are located within Milwaukee County. Consequently, Milwaukee County is the logical provider of those services.

Given the foregoing, recognizing that there will be uncertainty at least over the near-term future as to the institutional structure which the State and local elected officials determine should be used for providing needed public transit services in Southeastern Wisconsin, the following specific plan implementation recommendations are recommended. In considering these recommendations, it should be understood that the conduct of the major investment studies recommended later in this chapter may result in changes to these plan implementation recommendations. Moreover, it should be understood that the following recommendations, which would provide for greater county responsibilities so as to more efficiently implement the public transit element of the plan, may be expected to evolve over time. In particular, the larger cities within the Region that currently provide transit service may be expected to continue to do so until such time as they and their respective counties have cooperatively conducted appropriate studies and have found that the counties are ready, willing, and able to assume responsibility for the transit function.

1. It is recommended that Milwaukee County continue in its lead role as the major provider of public transit services in Southeastern Wisconsin. Milwaukee County should continue to provide rapid, express, and local transit services as recommended in the plan. In addition, it is recommended that Milwaukee County enter into appropriate agreements with Kenosha and Racine Counties for the joint provision of rapid transit services, consisting initially of bus service, south along the Lake Michi-

gan shoreline; with Ozaukee County for the joint provision of such rapid transit services north along the Lake Michigan shoreline; with Washington County for the joint provision of such rapid transit services in the northwest travel corridor; and with Waukesha County for the joint provision of bus express and bus rapid transit services in the northwest, east-west, and southwest travel corridors.

2. It is recommended that Ozaukee County enter into an agreement with Milwaukee County for the joint provision of bus rapid transit services north along the Lake Michigan shoreline. It is also recommended that Ozaukee County, after preparing a detailed transit development plan to refine and detail the recommendations of the regional system plan, work cooperatively with the local units of government in the County to implement the transit services recommended in that plan.

3. It is recommended that Washington County enter into an agreement with Waukesha and Milwaukee Counties for the joint provision of rapid transit services in the northwest travel corridor. It is also recommended that Washington County, after preparing a detailed transit development plan to refine and detail the recommendations of the regional system plan to refine and detail the recommendations of the regional system plan, work cooperatively with the local units of government in the County to implement the transit services recommended in that plan.

4. It is recommended that Waukesha County continue to provide rapid and express transit services as recommended in the plan, entering into agreements with Milwaukee and Washington Counties for the joint provision of rapid transit services in the northwest travel corridor and agreements with Milwaukee County for the joint provision of rapid transit services in the east-west and southwest travel corridors. It is also recommended that Waukesha County, working cooperatively with the local units of government in the County, implement the local transit services recommended in the plan. In this respect, it is further recommended that Waukesha County, working cooperatively with the City of Waukesha, conduct a study to explore the proposed transfer of the public transit function from the city to the county level of government.

5. It is recommended that Racine County enter into an agreement with Milwaukee and Kenosha Counties for the joint provision of bus rapid transit services south along the Lake Michigan shoreline and an agreement with Kenosha County to explore the potential for commuter-rail passenger service in the corridor from Burlington to Chicago through Antioch, Illinois. It is also recommended that Racine County, working cooperatively with the local units of government in the County, implement the local transit services recommended in the plan. Finally, it is recommended that Racine County, working cooperatively with the City of Racine, conduct a study to explore the proposed transfer of the public transit function from the city to the county level of government. Should that transfer become a reality, it is recommended that Racine County become the designated recipient of Federal transit funds in the County.

6. It is recommended that Kenosha County enter into an agreement with Racine and Milwaukee Counties for the joint provision of bus rapid transit services south along the Lake Michigan shoreline and an agreement with Racine County to explore the potential for commuter-rail passenger service in the corridor from Burlington to Chicago through Antioch, Illinois. It is also recommended that Kenosha County, working cooperatively with the local units of government in the County, implement the local transit services recommended in the plan. Toward this end, it is recommended that Kenosha County become the designated recipient of Federal transit funds in the County. Finally, it is recommended that Kenosha County, working cooperatively with the City of Kenosha, conduct a study to explore the proposed transfer of the public transit function from the city to the county level of government. Should that transfer become a reality, it is recommended that Kenosha County become the designated recipient of Federal transit funds in the County.

7. It is recommended that Walworth County participate in a study to explore the potential for commuter-rail passenger service in the corridor from Walworth to Chicago through to Fox Lake, Illinois, and, depending upon the outcome of that study, assume responsibility for sponsorship of any recommended services.

8. It is recommended that the three cities in the Region that currently provide fixed-route public transit services, the Cities of Kenosha, Racine, and Waukesha, continue to provide those services, but, over time, as the city transit systems are increasingly called upon to serve areas beyond their municipal limits, enter into cooperative studies with their respective counties to explore the transfer of the transit function to the county level of government and, in so doing, determine the manner in which the transit function could be most cost-efficiently administered.

9. It is recommended that the Cities of Hartford, Port Washington, West Bend, and Whitewater continue to provide demand-responsive shared-ride taxicab public transit services in their communities, seeking to coordinate these efforts with any county transit programs which may be established. Depending upon the outcome of detailed transit development planning by individual counties, it may be desirable to transfer responsibility for operation of the shared-ride taxicab services to the county level of government.

10. It is recommended that the Wisconsin Department of Transportation advise the Governor, after consultation with the counties and communities concerned and upon assumption by the counties of the transit function, to designate Kenosha and Racine Counties as the recipients of Federal transit funds for the Kenosha and Racine urbanized areas, respectively.

11. It is recommended that each of the seven counties, as well as any affected local transit operators, work cooperatively with the Wisconsin Department of Transportation and the Regional Planning Commission in the conduct of the major investment studies attendant to rapid and express transit services identified in a later section of this chapter.

<u>Arterial Streets and Highways</u>

The arterial street and highway system envisioned in the recommended plan would consist of 3,607 route-miles and 10,303 lane-miles of facilities. The plan recommends the construction of 131 route-miles and 337 lane-miles of new facilities within the Region. The plan also recommends the widening or other improvement of 448 route-miles, adding 854 lane-miles to the 1,023 lane-miles already provided on those routes. The plan also calls for pavement resurfacing and bridge and interchange restoration and reconfiguration work necessary to maintain and appropriately modernize the remaining 3,028 route-miles and 8,089 lane-miles of planned arterial facilities, including, importantly, the Milwaukee area freeway system.

<u>Jurisdictional Recommendations</u>: Jurisdictional classification is important to arterial street and highway plan implementation. It establishes which level of government, be it State, county, or local, has, or should have, responsibility for the design, construction, maintenance, and operation of each segment of the total street and highway system. Jurisdictional classification is intended to group all streets and highways logically into subsystems under the jurisdiction of a given level of government.

Jurisdictional classification is the first step in implementing arterial street and highway recommendations. Upon completion of the initial regional transportation system plan in 1966, detailed county jurisdictional highway system plans were prepared. These plans were updated as part of the second-generation regional transportation system plan, completed in 1978. As an integral part of the preparation of this, the third-generation plan, the county jurisdictional highway system plans have again been updated and revised. The recommended jurisdictional arterial street and highway systems for the seven counties are shown on Maps 133 through 139.

Table 260 sets forth the distribution of planned arterial street and highway mileage among each jurisdictional subsystem within the Region and within each county of the Region. By the year 2010, about 1,167 miles, or about 32 percent of the planned arterial system, are recommended to

Table 260

DISTRIBUTION OF ARTERIAL STREET AND HIGHWAY MILEAGE WITHIN IN THE REGION BY COUNTY AND JURISDICTIONAL CLASSIFICATION: 2010 RECOMMENDED PLAN

| County | State | | County | | Local | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total | Miles | Percent of Total |
| Kenosha . . . . . . | 103 | 8.8 | 203 | 12.8 | 49 | 5.7 | 355 | 9.8 |
| Milwaukee . . . . . | 220 | 18.9 | 184 | 11.6 | 393 | 45.9 | 797 | 22.1 |
| Ozaukee . . . . . . | 72 | 6.2 | 155 | 9.8 | 78 | 9.1 | 305 | 8.5 |
| Racine . . . . . . . | 160 | 13.7 | 156 | 9.8 | 108 | 12.6 | 424 | 11.7 |
| Walworth . . . . . | 223 | 19.1 | 239 | 15.1 | 22 | 2.6 | 484 | 13.4 |
| Washington . . . . | 159 | 13.6 | 234 | 14.8 | 75 | 8.8 | 468 | 13.0 |
| Waukesha . . . . . | 230 | 19.7 | 413 | 26.1 | 131 | 15.3 | 774 | 21.5 |
| Region | 1,167 | 100.0 | 1,584 | 100.0 | 856 | 100.0 | 3,607 | 100.0 |

*Source: Wisconsin Department of Transportation and SEWRPC.*

be classified as State trunk highways, including connecting streets; about 1,584 miles, or 44 percent, are recommended to be classified as county trunk highways; and the remaining 856 miles, or about 24 percent, are recommended to be classified as local arterials. The jurisdictional transfers proposed under the recommended plan in each county are summarized in Tables 261 through 267 and are displayed on Maps 140 through 146. The planned distributions among the three jurisdictional classifications of arterial mileage within each county are described below.

Kenosha County: By the year 2010, about 103 miles, or nearly 29 percent, of the planned arterial system in Kenosha County are recommended to be classified as State trunk highways, including connecting streets; about 203 miles, or 57 percent, are recommended to be classified as county trunk highways; and the remaining 49 miles, or about 14 percent, are recommended to be classified as local arterials. Map 133 shows the recommended plan year 2010 jurisdictionally classified arterial street and highway system for Kenosha County. Table 261 and Map 140 show the recommended transfers in highway system jurisdictional responsibility in Kenosha County.

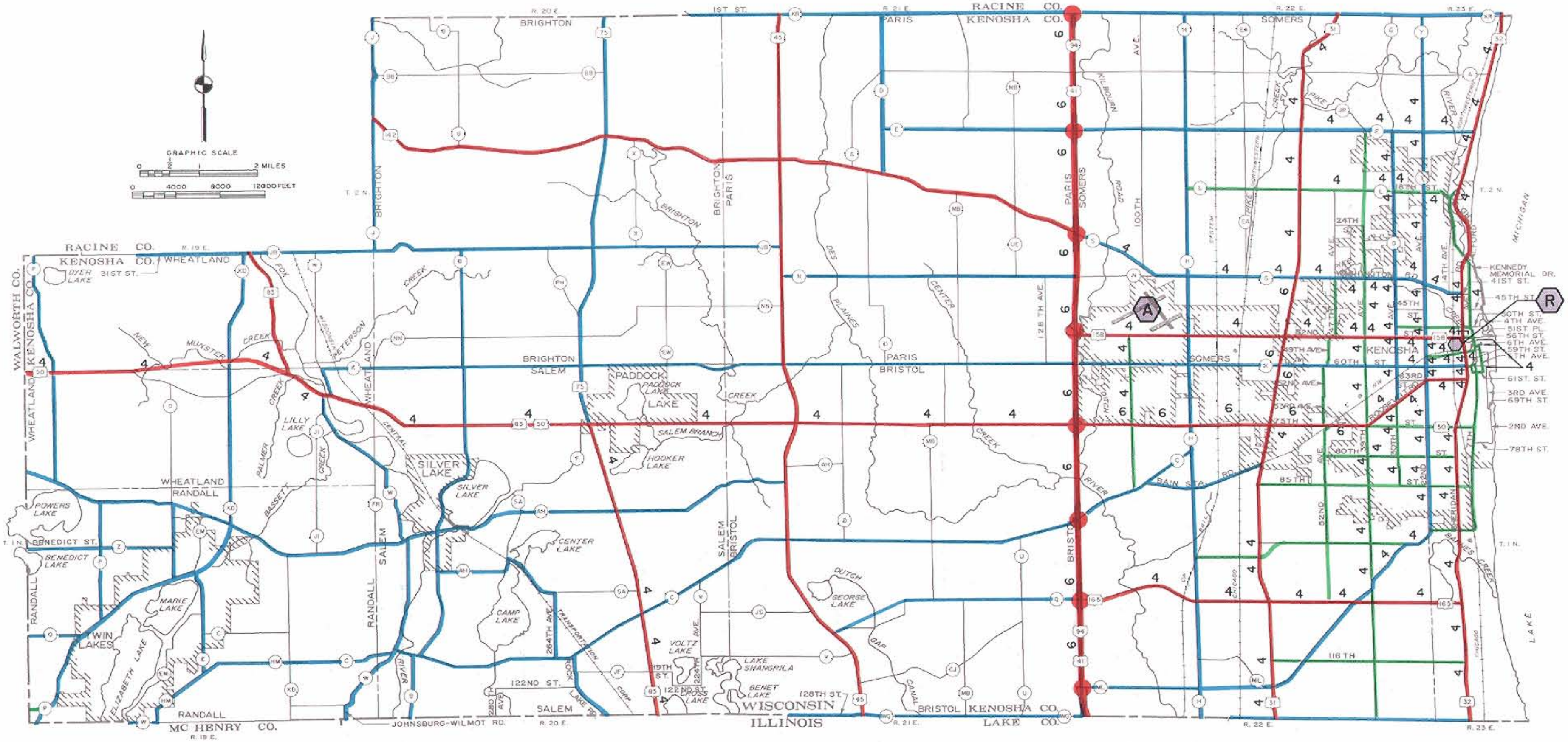
Milwaukee County: By the year 2010, about 220 miles, or nearly 28 percent, of the planned arterial system in Milwaukee County are recommended to be classified as State trunk highways, including connecting streets; about 184 miles, or 23 percent, are recommended to be classified as county trunk highways; and the remaining 393 miles, or about 49 percent, are recommended to be classified as local arterials. Map 134 shows the recommended plan year 2010 jurisdictionally classified arterial street and highway system for Milwaukee County. Table 262 and Map 141 show the recommended transfers in highway system jurisdictional responsibility in Milwaukee County.

Ozaukee County: In the year 2010, about 72 miles, or nearly 24 percent, of the planned arterial system in Ozaukee County are recommended to be classified as State trunk highways, including connecting streets; about 155 miles, or 51 percent, are recommended to be classified as county trunk highways; and the remaining 78 miles, or about 25 percent, are recommended to be classified as local arterials. Map 135 shows the recommended plan year 2010 jurisdictionally classified arterial street and highway system for Ozaukee County. Table 263 and Map 142 show the recommended transfers in highway system jurisdictional responsibility in Ozaukee County.

Racine County: In the year 2010, about 160 miles, or nearly 38 percent, of the planned arterial system in Racine County are recommended to be classified as State trunk highways, including connecting streets; about 156 miles, or 37 percent, are recommended to be classified as county trunk highways; and the remaining 108 miles, or about 25 percent, are recommended to be classified as local arterials. Map 136 shows

## Map 133

## PROPOSED JURISDICTION OF ARTERIAL STREETS AND HIGHWAYS INCLUDED IN THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO KENOSHA COUNTY: 2010




## LEGEND

**FREEWAY**

- STATE TRUNK HIGHWAY
- INTERCHANGE

**STANDARD ARTERIAL**

- STATE TRUNK HIGHWAY
- COUNTY TRUNK HIGHWAY
- LOCAL TRUNK HIGHWAY
- 4 NUMBER OF TRAFFIC LANES (2 WHERE UNNUMBERED)

**INTERMODAL TERMINAL**

- A-AIRPORT
- R-PASSENGER RAIL TERMINAL

THE FOLLOWING NOTES SUPPLEMENT THE RECOMMENDATIONS PORTRAYED ON THIS MAP:

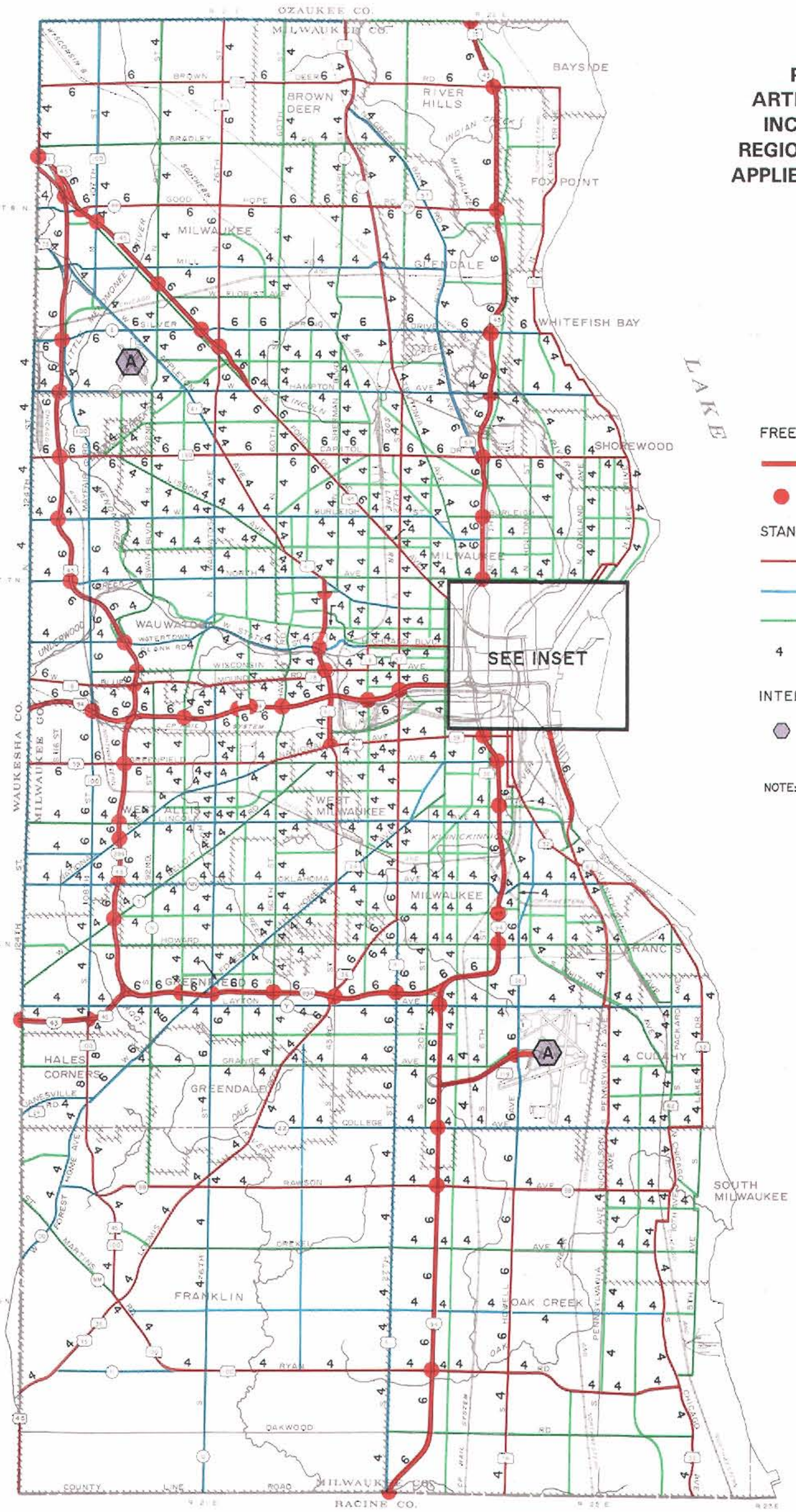
1. SUFFICIENT RIGHT-OF-WAY SHOULD BE RESERVED ALONG STH 158 FROM IH 94 TO STH 31 TO ACCOMMODATE ITS ULTIMATE IMPROVEMENT TO SIX TRAVEL LANES.
2. SUFFICIENT RIGHT-OF-WAY SHOULD BE RESERVED ALONG CTH K FROM IH 94 TO STH 31 TO ACCOMMODATE ITS ULTIMATE IMPROVEMENT TO SIX TRAVEL LANES.
3. AS IMPROVEMENTS ARE MADE TO IH 94, THE FRONTAGE ROADS ALONG IH 94, AND THE HIGHWAY FACILITIES WHICH INTERCHANGE WITH OR CROSS IH 94, THE ULTIMATE IMPROVEMENT OF IH 94 TO EIGHT TRAVEL LANES SHOULD BE TAKEN INTO CONSIDERATION.
4. AS IMPROVEMENTS ARE MADE TO IH 94 AND THE FRONTAGE ROADS ALONG IH 94 IN THE VICINITY OF CTH K, THE ULTIMATE PROVISION OF AN INTERCHANGE WITH CTH K SHOULD BE TAKEN INTO CONSIDERATION.
5. AS URBAN DEVELOPMENT PROCEEDS ON LANDS ABUTTING CTH KR BETWEEN IH 94 AND STH 32, SUFFICIENT RIGHT-OF-WAY SHOULD BE RESERVED FOR THE ULTIMATE IMPROVEMENT OF CTH KR TO FOUR TRAVEL LANES.

The level of government recommended to have the responsibility for the design, construction, maintenance, and operation of each segment of the arterial street and highway system in Kenosha County is shown on the accompanying map. By the year 2010, the arterial street and highway system in Kenosha County may be expected to total 355 miles. About 103 miles, or nearly 29 percent of planned arterial mileage, are recommended to be classified as State trunk highways, including connecting streets; about 203 miles, or 57 percent, are recommended to be classified as county trunk highways; and the remaining 49 miles, or about 14 percent, are recommended to be classified as local arterials.

*Source: SEWRPC.*

## Map 134

### PROPOSED JURISDICTION OF ARTERIAL STREETS AND HIGHWAYS INCLUDED IN THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO MILWAUKEE COUNTY: 2010




LEGEND

FREEWAY

STATE TRUNK HIGHWAY

INTERCHANGE

STANDARD ARTERIAL

STATE TRUNK HIGHWAY

COUNTY TRUNK HIGHWAY

LOCAL TRUNK HIGHWAY

4 NUMBER OF TRAFFIC LANES (2 WHERE UNNUMBERED)

INTERMODAL TERMINAL

A-AIRPORT
B-BUS TERMINAL
R-PASSENGER RAIL TERMINAL

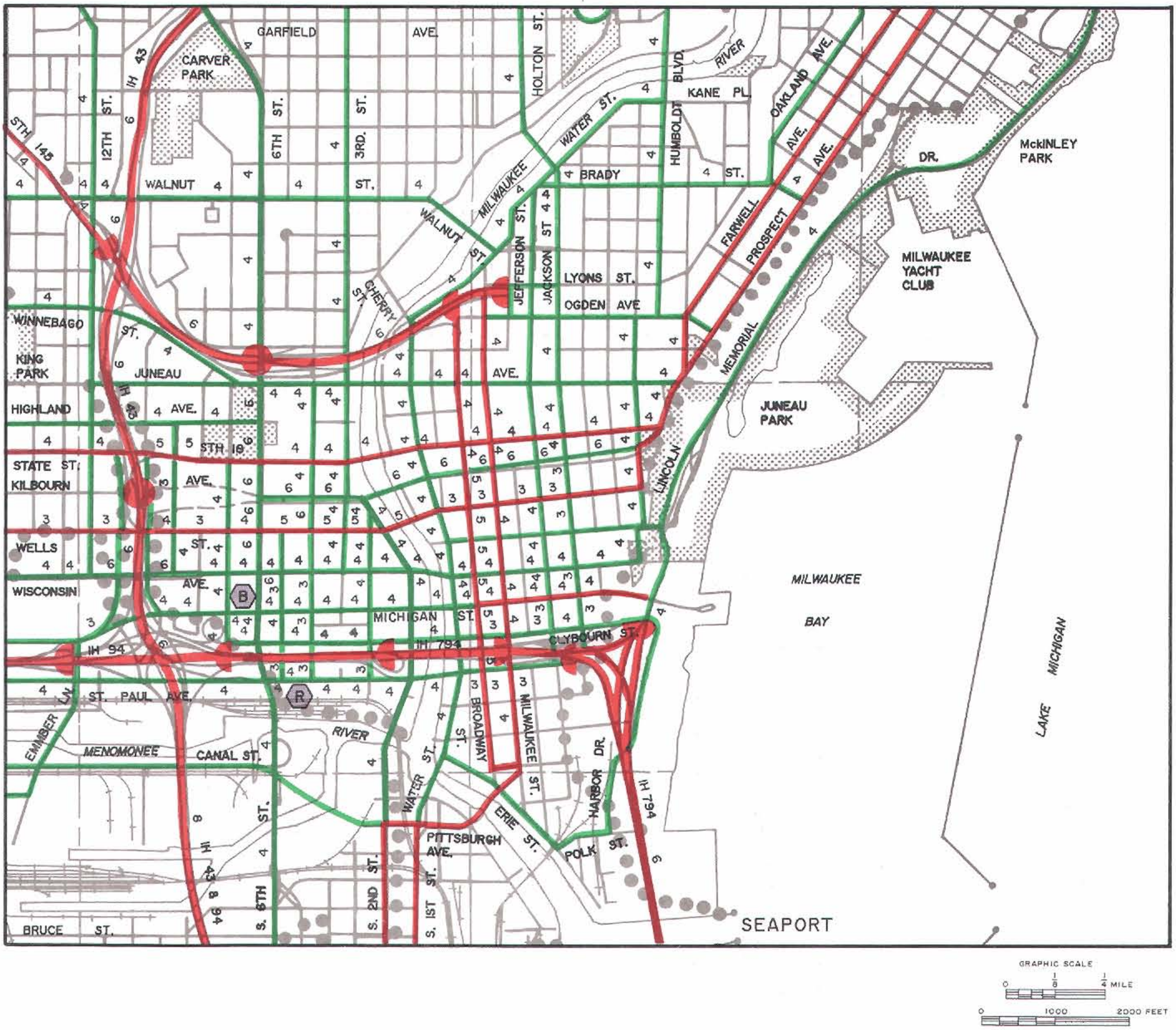
NOTE: THE WIDENING TO SIX TRAFFIC LANES OF IH 43 BETWEEN BENDER ROAD AND HIGHLAND ROAD IN OZAUKEE COUNTY, IS RECOMMENDED, BUT REQUIRES A MAJOR INVESTMENT STUDY PRIOR TO ITS IMPLEMENTATION.

GRAPHIC SCALE

0 1/2 1 2 MILES

0 4000 8000 12000 FEET

## Map 134 Inset




The level of government recommended to have the responsibility for the design, construction, maintenance, and operation of each segment of the arterial street and highway system in Milwaukee County is shown on the accompanying map. By the year 2010, the arterial street and highway system in Milwaukee County may be expected to total 797 miles. About 220 miles, or 28 percent of planned arterial mileage, are recommended to be classified as State trunk highways, including connecting streets; about 184 miles, or 23 percent, are recommended to be classified as county trunk highways; and the remaining 393 miles, or about 49 percent, are recommended to be classified as local arterials.

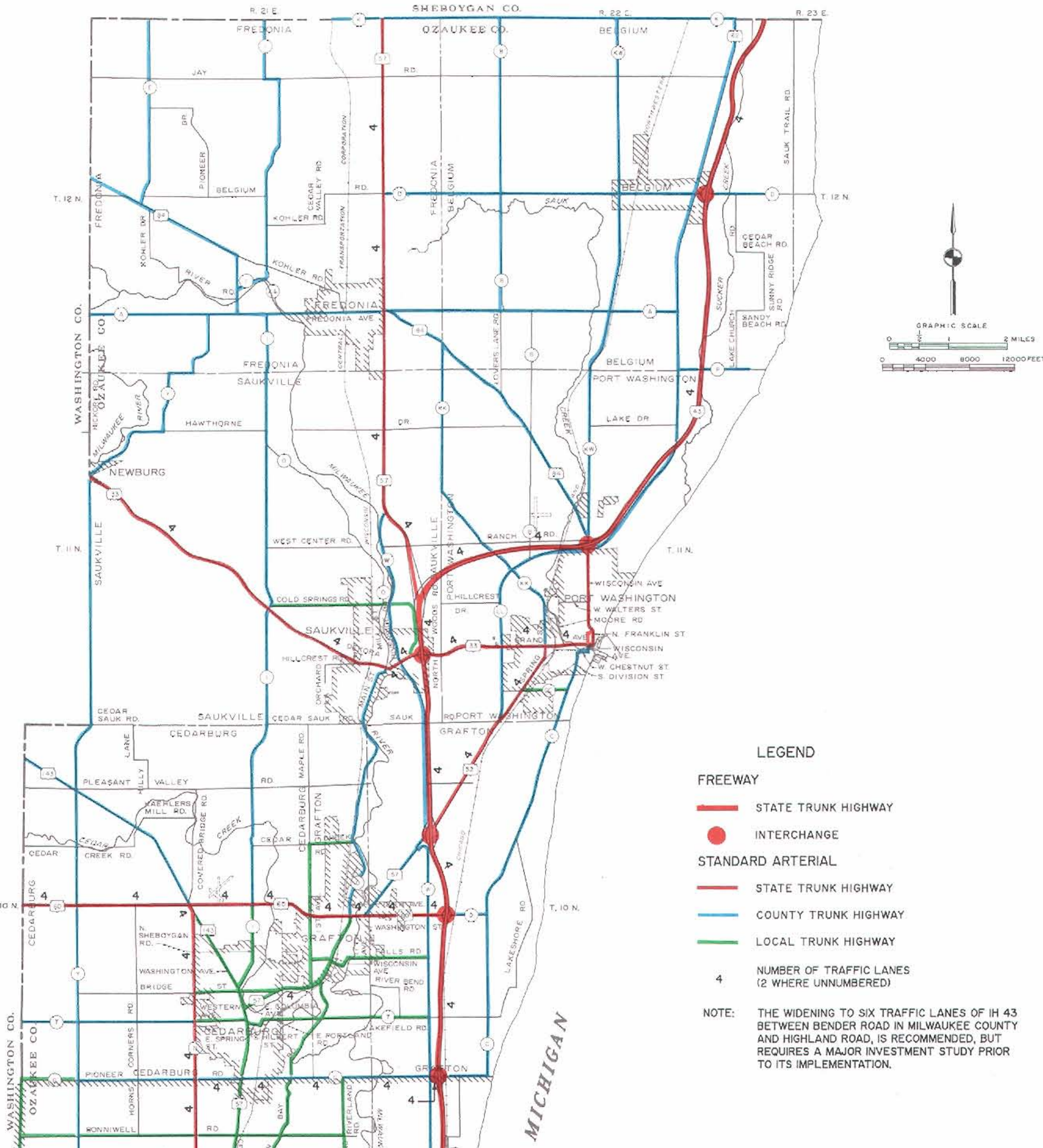
*Source: SEWRPC.*

the recommended plan year 2010 jurisdictionally classified arterial street and highway system for Racine County. Table 264 and Map 143 show the recommended transfers in highway system jurisdictional responsibility in Racine County.

*Walworth County*: In the year 2010, about 223 miles, or nearly 46 percent, of the planned arterial system in Walworth County are recommended to be classified as State trunk highways, including connecting streets; about 239 miles, or 49 percent, are recommended to be classified as county trunk highways; and the remaining 22 miles, or about 5 percent, are recommended to be classified as local arterials. Map 137 shows the recommended plan year 2010 jurisdictionally classified arterial street and highway system for Walworth County. Table 265 and Map 144 show

## Map 135

### PROPOSED JURISDICTION OF ARTERIAL STREETS AND HIGHWAYS INCLUDED IN THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO OZAUKEE COUNTY: 2010

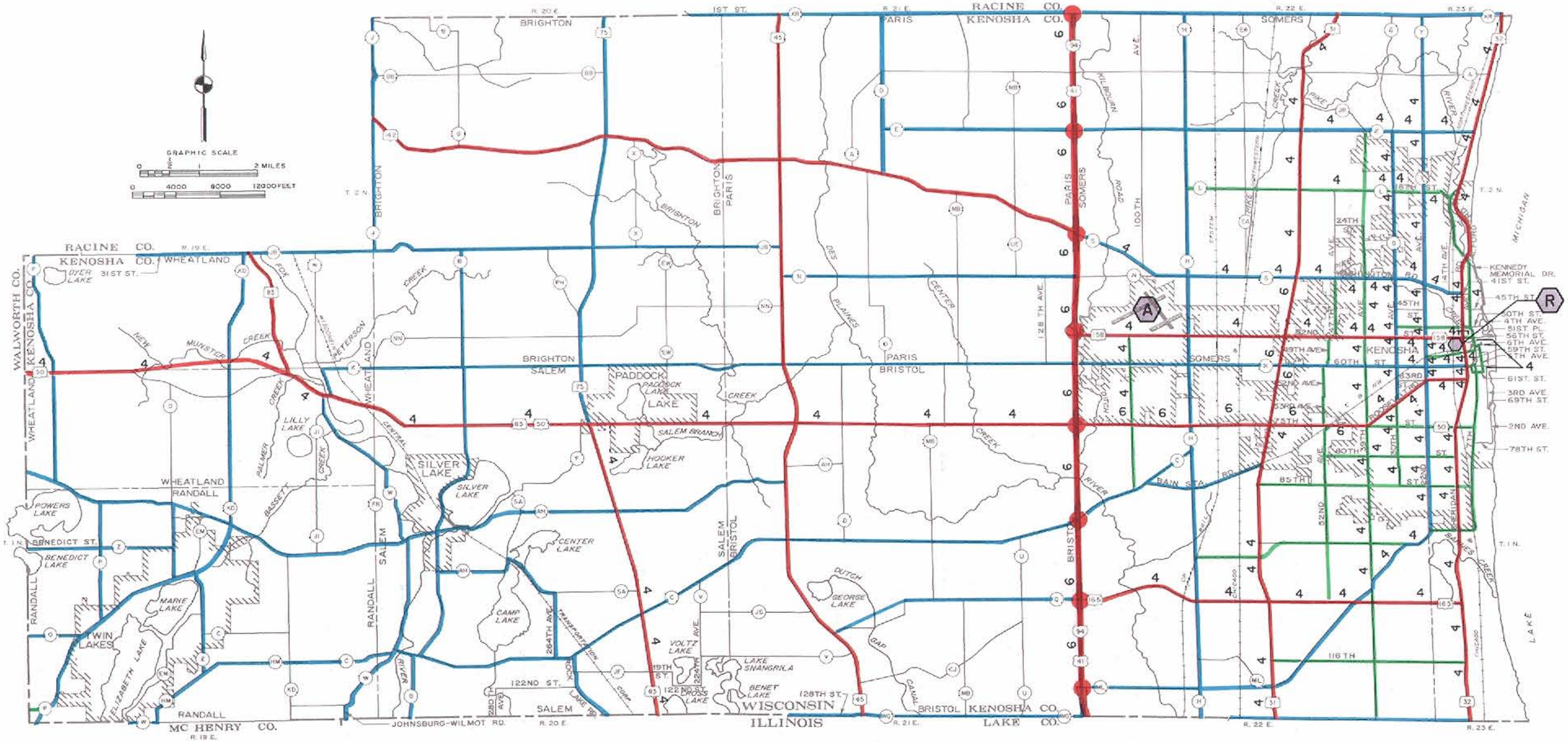



The level of government recommended to have the responsibility for the design, construction, maintenance, and operation of each segment of the arterial street and highway system in Ozaukee County is shown on the accompanying map. By the year 2010, the arterial street and highway system in Ozaukee County may be expected to total 305 miles. About 72 miles, or 24 percent of planned arterial mileage, are recommended to be classified as State trunk highways, including connecting streets; about 155 miles, or 51 percent, are recommended to be classified as county trunk highways; and the remaining 78 miles, or about 25 percent, are recommended to be classified as local arterials.

*Source: SEWRPC.*

## Map 133

## PROPOSED JURISDICTION OF ARTERIAL STREETS AND HIGHWAYS INCLUDED IN THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO KENOSHA COUNTY: 2010




## LEGEND

**FREEWAY**

- STATE TRUNK HIGHWAY
- INTERCHANGE

**STANDARD ARTERIAL**

- STATE TRUNK HIGHWAY
- COUNTY TRUNK HIGHWAY
- LOCAL TRUNK HIGHWAY
- 4 NUMBER OF TRAFFIC LANES (2 WHERE UNNUMBERED)

**INTERMODAL TERMINAL**

- A-AIRPORT
- R-PASSENGER RAIL TERMINAL

THE FOLLOWING NOTES SUPPLEMENT THE RECOMMENDATIONS PORTRAYED ON THIS MAP:

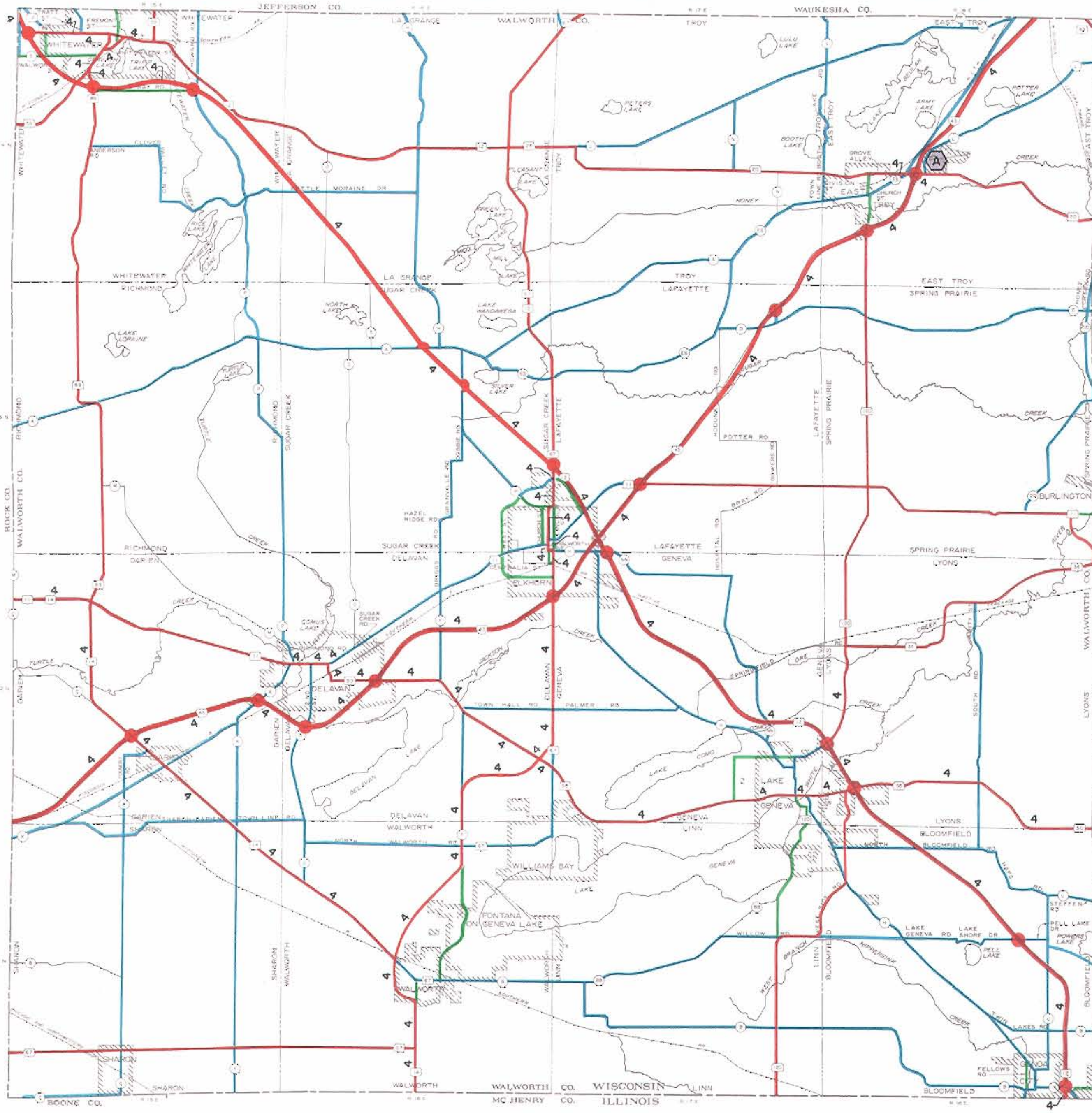
1. SUFFICIENT RIGHT-OF-WAY SHOULD BE RESERVED ALONG STH 158 FROM IH 94 TO STH 31 TO ACCOMMODATE ITS ULTIMATE IMPROVEMENT TO SIX TRAVEL LANES.
2. SUFFICIENT RIGHT-OF-WAY SHOULD BE RESERVED ALONG CTH K FROM IH 94 TO STH 31 TO ACCOMMODATE ITS ULTIMATE IMPROVEMENT TO SIX TRAVEL LANES.
3. AS IMPROVEMENTS ARE MADE TO IH 94, THE FRONTAGE ROADS ALONG IH 94, AND THE HIGHWAY FACILITIES WHICH INTERCHANGE WITH OR CROSS IH 94, THE ULTIMATE IMPROVEMENT OF IH 94 TO EIGHT TRAVEL LANES SHOULD BE TAKEN INTO CONSIDERATION.
4. AS IMPROVEMENTS ARE MADE TO IH 94 AND THE FRONTAGE ROADS ALONG IH 94 IN THE VICINITY OF CTH K, THE ULTIMATE PROVISION OF AN INTERCHANGE WITH CTH K SHOULD BE TAKEN INTO CONSIDERATION.
5. AS URBAN DEVELOPMENT PROCEEDS ON LANDS ABUTTING CTH KR BETWEEN IH 94 AND STH 32, SUFFICIENT RIGHT-OF-WAY SHOULD BE RESERVED FOR THE ULTIMATE IMPROVEMENT OF CTH KR TO FOUR TRAVEL LANES.

The level of government recommended to have the responsibility for the design, construction, maintenance, and operation of each segment of the arterial street and highway system in Kenosha County is shown on the accompanying map. By the year 2010, the arterial street and highway system in Kenosha County may be expected to total 355 miles. About 103 miles, or nearly 29 percent of planned arterial mileage, are recommended to be classified as State trunk highways, including connecting streets; about 203 miles, or 57 percent, are recommended to be classified as county trunk highways; and the remaining 49 miles, or about 14 percent, are recommended to be classified as local arterials.

*Source: SEWRPC.*

## Map 137

### PROPOSED JURISDICTION OF ARTERIAL STREETS AND HIGHWAYS INCLUDED IN THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO WALWORTH COUNTY: 2010




#### LEGEND

FREEWAY

- STATE TRUNK HIGHWAY
- INTERCHANGE

STANDARD ARTERIAL

- STATE TRUNK HIGHWAY
- COUNTY TRUNK HIGHWAY
- LOCAL TRUNK HIGHWAY

4 NUMBER OF TRAFFIC LANES (2 WHERE UNNUMBERED)

INTERMODAL TERMINAL

- A-AIRPORT

GRAPHIC SCALE

0 1 2 MILES

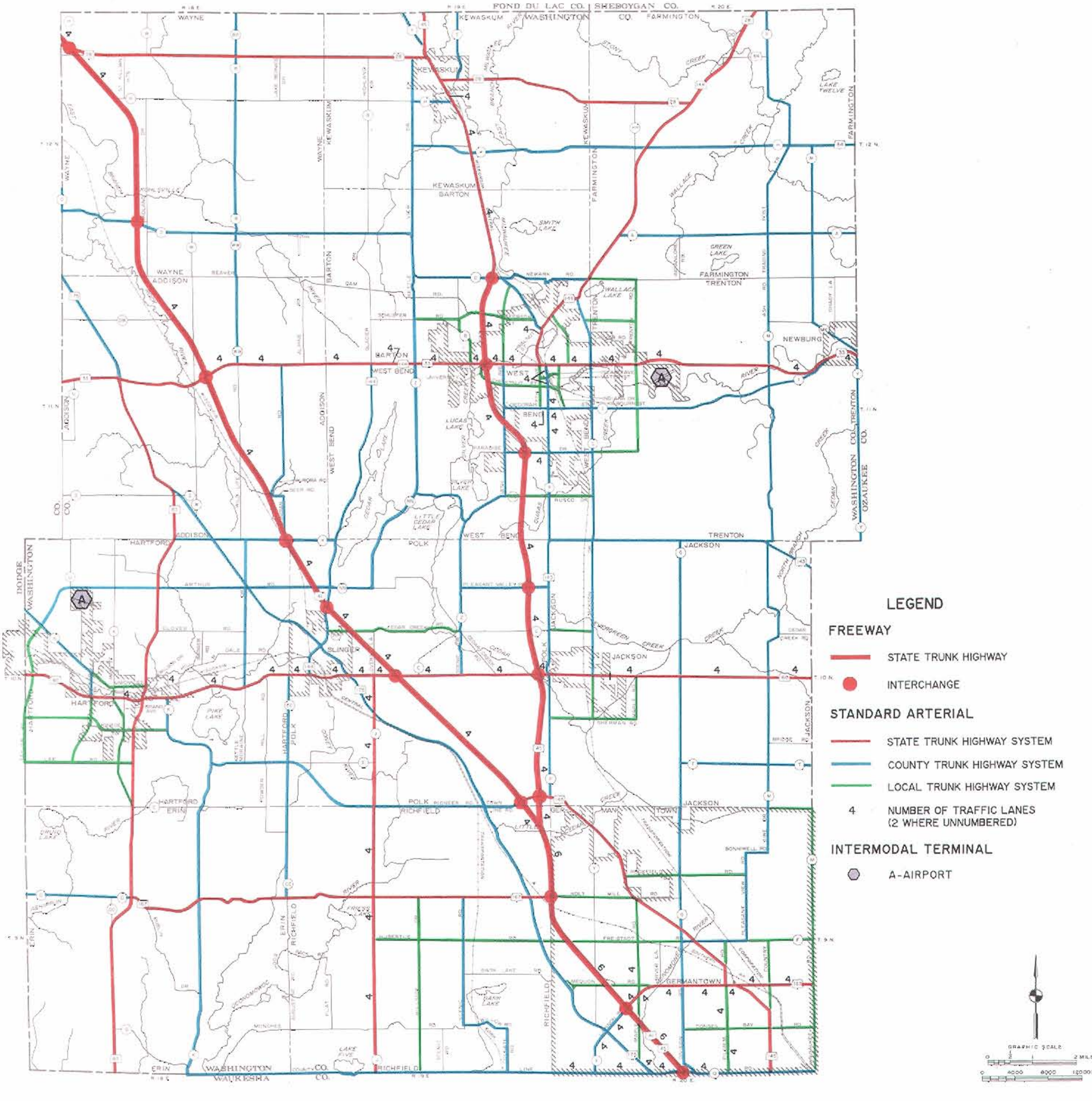
0 4000 8000 12000 FEET

The level of government recommended to have the responsibility for the design, construction, maintenance, and operation of each segment of the arterial street and highway system in Walworth County is shown on the accompanying map. By the year 2010, the arterial street and highway system in Walworth County may be expected to total 484 miles. About 223 miles, or 46 percent of planned arterial mileage, are recommended to be classified as State trunk highways, including connecting streets; about 239 miles, or 49 percent, are recommended to be classified as county trunk highways; and the remaining 22 miles, or about 5 percent, are recommended to be classified as local arterials.

*Source: SEWRPC.*

Map 138

## PROPOSED JURISDICTION OF ARTERIAL STREETS AND HIGHWAYS INCLUDED IN THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO WASHINGTON COUNTY: 2010

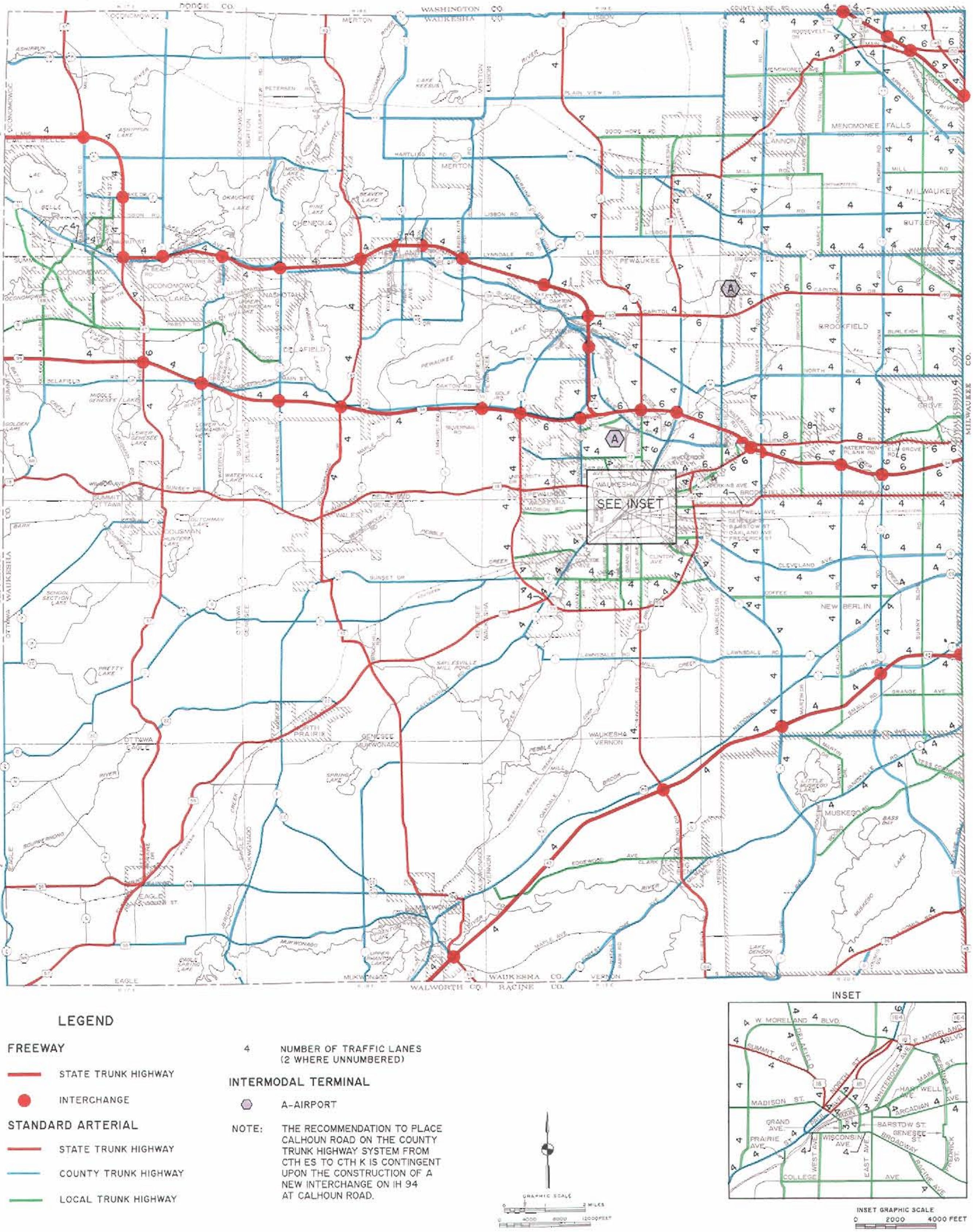



The level of government recommended to have the responsibility for the design, construction, maintenance, and operation of each segment of the arterial street and highway system in Washington County is shown on the accompanying map. By the year 2010, the arterial street and highway system in Washington County may be expected to total 468 miles. About 159 miles, or 34 percent of planned arterial mileage, are recommended to be classified as State trunk highways, including connecting streets; about 234 miles, or 50 percent, are recommended to be classified as county trunk highways; and the remaining 75 miles, or about 16 percent, are recommended to be classified as local arterials.

*Source: SEWRPC.*

## Map 139

### PROPOSED JURISDICTION OF ARTERIAL STREETS AND HIGHWAYS INCLUDED IN THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO WAUKESHA COUNTY: 2010

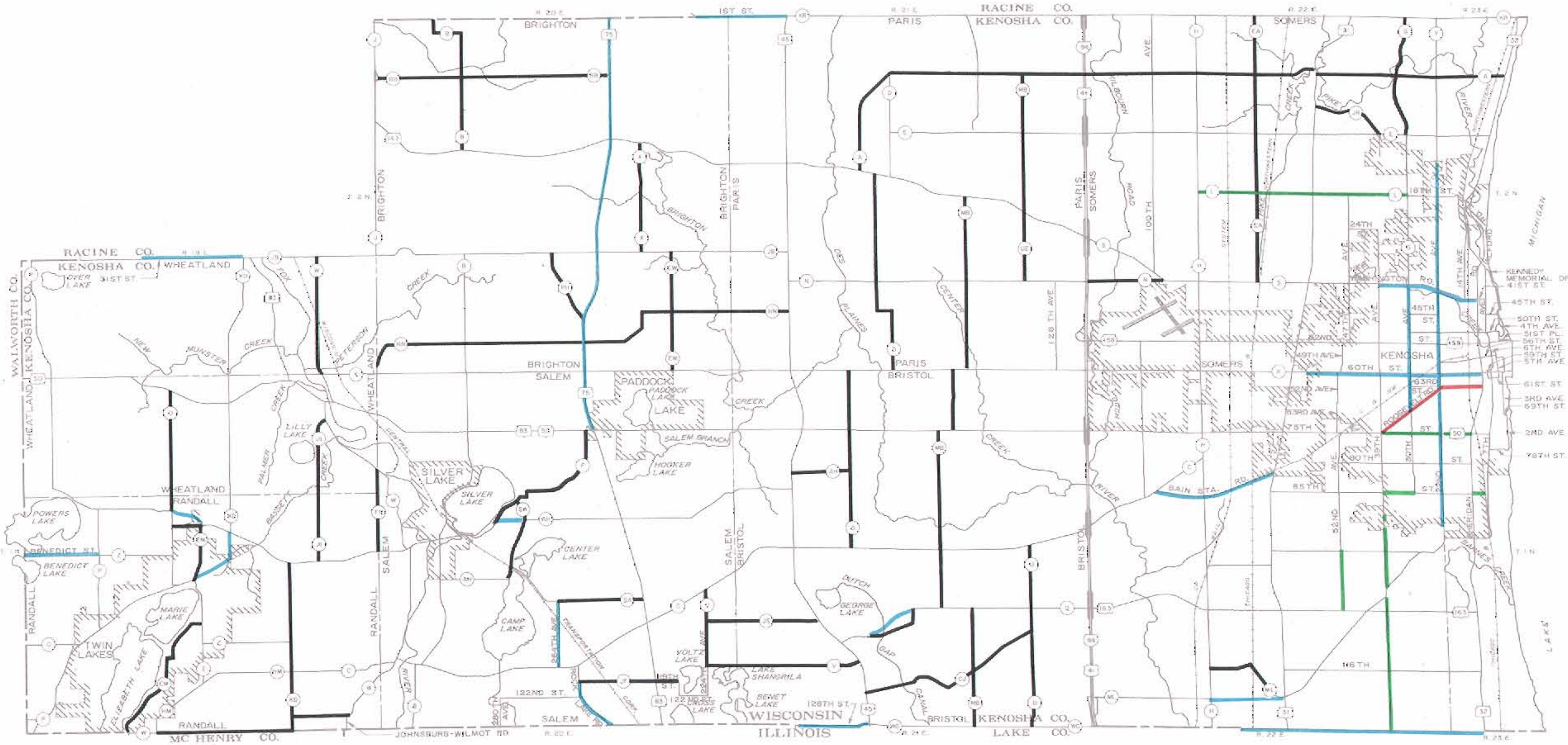



The level of government recommended to have the responsibility for the design, construction, maintenance, and operation of each segment of the arterial street and highway system in Waukesha County is shown on the accompanying map. By the year 2010, the arterial street and highway system in Waukesha County may be expected to total 774 miles. About 230 miles, or 30 percent of planned arterial mileage, are recommended to be classified as State trunk highways, including connecting streets; about 413 miles, or 53 percent, are recommended to be classified as county trunk highways; and the remaining 131 miles, or about 17 percent, are recommended to be classified as local arterials.

*Source: SEWRPC.*

## Map 140

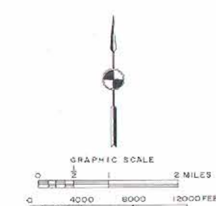
### PROPOSED CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS UNDER THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO KENOSHA COUNTY




LEGEND

TRANSFERS TO:

- STATE TRUNK HIGHWAY SYSTEM
- COUNTY TRUNK HIGHWAY SYSTEM
- LOCAL TRUNK HIGHWAY SYSTEM
- LOCAL (NONARTERIAL) SYSTEM




579

The proposed changes in jurisdictional responsibility for arterial streets and highways in Kenosha County are shown on the accompanying map. In 1991, the State trunk highway system totalled 119 miles, the county trunk highway system totalled 140 miles, and the local arterial system totalled 59 miles. By the year 2010, through the transfer of those facilities shown on the accompanying map and listed in Table 261, the State trunk highway system would total 103 miles, the county trunk highway system would total 203 miles, and the local arterial system would total 49 miles.

*Source: SEWRPC.*

## Table 261

## CHANGES IN JURISDICTIONAL RESPONSIBILITY OF ARTERIAL STREETS AND HIGHWAYS IN KENOSHA COUNTY UNDER THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Civil Division | Jurisdictional Responsibility | | Facility | From | To |
|---|---|---|---|---|---|
| | Existing | Planned | | | |
| Town of Brighton | State trunk highway | County trunk highway | STH 75 | North town line | South town line |
| | Local nonarterial | County trunk highway | 1st Street | 224th Avenue | East town line |
| | County trunk highway | Local nonarterial | CTH B | North town line | STH 142 |
| | County trunk highway | Local nonarterial | CTH X | STH 142 | CTH JB |
| | County trunk highway | Local nonarterial | CTH BB | CTH J | STH 75 |
| | County trunk highway | Local nonarterial | CTH EW | CTH JB | CTH K |
| | County trunk highway | Local nonarterial | CTH NN | CTH K | East town line |
| | County trunk highway | Local nonarterial | CTH PH | CTH JB | STH 75 |
| Town of Bristol | Local trunk arterial | County trunk highway | 128th Street | A point about 1.0 mile west of USH 45 | USH 45 |
| | New facility | County trunk highway | CTH Q extension | 184th Avenue extended | 104th Street |
| | County trunk highway | Local nonarterial | CTH D | CTH K | CTH C |
| | County trunk highway | Local nonarterial | CTH U | CTH C | South town line |
| | County trunk highway | Local nonarterial | CTH V | West town line | USH 45 |
| | County trunk highway | Local nonarterial | CTH AH | USH 45 | CTH D |
| | County trunk highway | Local nonarterial | CTH CJ | USH 45 | CTH U |
| | County trunk highway | Local nonarterial | CTH JS | West town line | USH 45 |
| | County trunk highway | Local nonarterial | CTH MB | North town line | South town line |
| Town of Paris | Local nonarterial | County trunk arterial | 1st Street | West town line | USH 45 |
| | County trunk highway | Local nonarterial | CTH A | STH 142 | IH 94 |
| | County trunk highway | Local nonarterial | CTH D | STH 142 | CTH K |
| | County trunk highway | Local nonarterial | CTH MB | CTH A | CTH K |
| | County trunk highway | Local nonarterial | CTH NN | West town line | USH 45 |
| | County trunk highway | Local nonarterial | CTH UE | STH 142 | CTH N |
| Town of Randall | Local trunk highway | County trunk highway | Benedict Street | West town line | CTH P |
| | New facility | County trunk highway | CTH KD extension | CTH EM | CTH F |
| | New facility | County trunk highway | CTH F extension | CTH O | CTH F |
| | County trunk highway | Local nonarterial | CTH F | CTH O | CTH F extension |
| | County trunk highway | Local nonarterial | CTH O | CTH F extension | North town line |
| | County trunk highway | Local nonarterial | CTH W | CTH HM | 322nd Avenue |
| | County trunk highway | Local nonarterial | CTH EM | CTH W | CTH Z |
| | County trunk highway | Local nonarterial | CTH EM | CTH F | CTH KD extension |
| | County trunk highway | Local nonarterial | CTH FR | CTH F | North town line |
| | County trunk highway | Local nonarterial | CTH JI | CTH F | North town line |
| | County trunk highway | Local nonarterial | CTH KD | CTH W | CTH F |
| Town of Salem | New facility | County trunk highway | CTH AH | CTH F | CTH SA |
| | State trunk highway | County trunk highway | STH 75 | North town line | STH 50-83 |
| | Local trunk highway | County trunk arterial | Rock Lake Road | South town line | CTH JF |
| | Local nonarterial | County trunk arterial | 264th Avenue | CTH C | CTH SA |
| | County trunk arterial | Local nonarterial | CTH F | CTH SA | STH 50 |
| | County trunk arterial | Local nonarterial | CTH F | CTH AH extension | CTH SA |
| | County trunk arterial | Local nonarterial | CTH V | CTH C | East town line |
| | County trunk arterial | Local nonarterial | CTH AH | 97th Street | 89th Street |
| | County trunk arterial | Local nonarterial | CTH FR | CTH F | CTH W |
| | County trunk arterial | Local nonarterial | CTH JF | Rock Lake Road | STH 83 |
| | County trunk arterial | Local nonarterial | CTH JS | CTH V | East town line |
| | County trunk arterial | Local nonarterial | CTH SA | 264th Avenue | STH 83 |
| | County trunk arterial | Local nonarterial | CTH SA | CTH F | CTH AH |
| Town of Somers | County trunk highway | Local trunk highway | CTH L | CTH H | CTH G |
| | County trunk arterial | Local nonarterial | CTH A | IH 94 | STH 32 |
| | County trunk highway | Local nonarterial | CTH EA | CTH KR | STH 142 |
| | County trunk highway | Local nonarterial | CTH G | CTH E | CTH KR |
| | County trunk highway | Local nonarterial | CTH N | IH 94 | CTH S |
| | County trunk highway | Local nonarterial | CTH JR | STH 31 | CTH E |
| Town of Wheatland | Local nonarterial | County trunk highway | Karcher Road | Fish Hatchery Road | CTH KD |
| | County trunk highway | Local nonarterial | CTH O | South town line | STH 50 |
| | County trunk highway | Local nonarterial | CTH W | CTH K | CTH JB |
| | County trunk highway | Local nonarterial | CTH FR | South town line | CTH W |
| | County trunk highway | Local nonarterial | CTH JI | South town line | CTH W |

Table 261 (continued)

| Civil Division | Jurisdictional Responsibility: Existing | Jurisdictional Responsibility: Planned | Facility | From | To |
|---|---|---|---|---|---|
| Village of Pleasant Prairie | Local trunk highway | County trunk highway | Bain Station Road | CTH C | STH 31 |
| | Local trunk highway | County trunk highway | 128th Street | A point about 0.4 mile west of STH 31 | STH 32 |
| | New Facility | County trunk highway | 122nd Street extension | CTH H | CTH ML |
| | County trunk highway | Local trunk highway | CTH EZ | 128th Street | CTH ML |
| | County trunk highway | Local trunk highway | CTH EZ | CTH ML | North corporate limit |
| | New Facility | Local trunk highway | 51st Avenue extension | STH 165 | 93rd Street |
| | County trunk highway | Local nonarterial | CTH ML | CTH H | 122nd Street extension |
| City of Kenosha | Local trunk highway | State trunk highway | Roosevelt Road | 75th Street | 63rd Street |
| | Local trunk highway | State trunk highway | 63rd Street | Roosevelt Road | STH 32 |
| | Local trunk highway | County trunk highway | Washington Road | 39th Avenue | STH 32 |
| | Local trunk highway | County trunk highway | 22nd Avenue | South corporate limit | North corporate limit |
| | Local trunk highway | County trunk highway | 30th Avenue | Roosevelt Road | Washington Road |
| | Local trunk highway | County trunk highway | 60th Street | West corporate limit | STH 32 |
| | State trunk highway | Local trunk highway | 75th Street | Roosevelt Road | STH 32 |
| | New facility | Local trunk highway | 85th Street extension | 39th Avenue | 30th Avenue |

*Source: SEWRPC.*

the recommended transfers in highway system jurisdictional responsibility in Walworth County.

Washington County: In the year 2010, about 159 miles, or nearly 34 percent, of the planned arterial system in Washington County are recommended to be classified as State trunk highways, including connecting streets; about 234 miles, or 50 percent, are recommended to be classified as county trunk highways; and the remaining 75 miles, or about 16 percent, are recommended to be classified as local arterials. Map 138 shows the recommended plan year 2010 jurisdictionally classified arterial street and highway system for Washington County. Table 266 and Map 145 show the recommended transfers in highway system jurisdictional responsibility in Washington County.

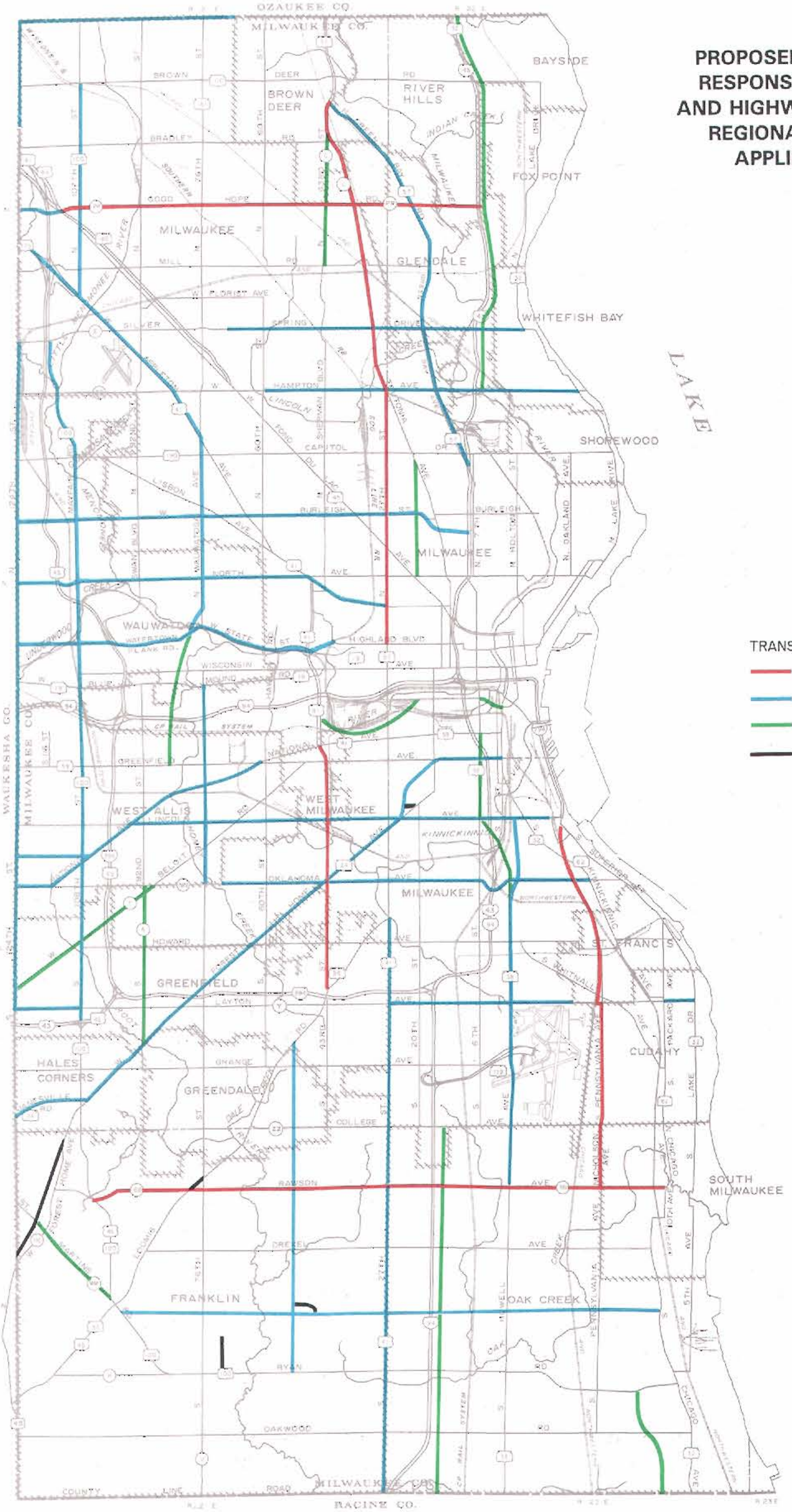
Waukesha County: In the year 2010, about 230 miles, or nearly 30 percent, of the planned arterial system in Waukesha County are recommended to be classified as State trunk highways, including connecting streets; about 413 miles, or 53 percent, are recommended to be classified as county trunk highways; and the remaining 131 miles, or about 17 percent, are recommended to be classified as local arterials. Map 139 shows the recommended plan year 2010 jurisdictionally classified arterial street and highway system for Waukesha County. Table 267 and Map 146 show the recommended transfers in highway system jurisdictional responsibility in Waukesha County.

Jurisdictional Transfers: It is recommended that the county boards of the seven constituent counties in the Region, upon recommendation of the county highway and transportation committees and in cooperation with the Wisconsin Department of Transportation, seek realignment of the State trunk, county trunk, and local trunk systems to the recommended regional transportation system plan. It is further recommended that the Wisconsin Department of Transportation seek, in cooperation with the seven county boards and appropriate local officials, realignment of the State trunk, county trunk, and local trunk systems consistent with the recommended regional transportation system plan.

Functional Improvement Recommendations: The plan provides for three types of functional improvement: system expansion, or the construction of new arterial facilities; system improvement, or the widening of facilities to provide significant additional capacity; and system preservation, or the resurfacing and reconstruction necessary to properly maintain and modernize existing arterial facilities. As previously indicated, the plan would provide for the con-

## Map 141

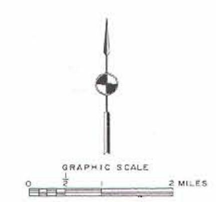
**PROPOSED CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS UNDER THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO MILWAUKEE COUNTY**




LEGEND

TRANSFERS TO:

- STATE TRUNK HIGHWAY SYSTEM
- COUNTY TRUNK HIGHWAY SYSTEM
- LOCAL TRUNK HIGHWAY SYSTEM
- LOCAL (NONARTERIAL) SYSTEM




The proposed changes in jurisdictional responsibility for arterial streets and highways in Milwaukee County are shown on the accompanying map. In 1991, the State trunk highway system in Milwaukee County totalled 251 miles, the county trunk highway system totalled 82 miles, and the local arterial system totalled 442 miles. By the year 2010, through the jurisdictional transfers identified on the accompanying map and listed on Table 262, the State trunk highway system would total 220 miles, the county trunk highway system would total 184 miles, and the local arterial system would total 393 miles.

*Source: SEWRPC.*

## Table 262

## CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS IN MILWAUKEE COUNTY UNDER THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Civil Division | Jurisdictional Responsibility: Existing | Jurisdictional Responsibility: Planned | Facility | From | To |
|---|---|---|---|---|---|
| Village of Bayside | County trunk highway | Local trunk highway | Port Washington Road | Ozaukee county line | South corporate limits |
| Village of Brown Deer | County trunk highway | State trunk highway | CTH D (Teutonia Avenue) | STH 57 | South corporate limits |
| | State trunk highway | County trunk highway | STH 57 (Green Bay Road) | STH 57 | South corporate limits |
| | County trunk highway | Local trunk highway | CTH G (Sherman Boulevard) | Green Bay Road | South corporate limits |
| City of Cudahy | Local trunk highway | County trunk highway | Layton Avenue | STH 62 | STH 32 (Lake Drive) |
| | Local trunk highway | State trunk highway | Pennsylvania Avenue | Layton Avenue | South corporate limits |
| Village of Fox Point | County trunk highway | Local trunk highway | Port Washington Road | North corporate limits | South corporate limits |
| City of Franklin | State trunk highway | County trunk highway | 27th Street | North corporate limits | Racine county line |
| | County trunk highway | State trunk highway | Rawson Avenue | STH 100 | East corporate limits |
| | County trunk highway | Local nonarterial | CTH J (Northcape Road) | Waukesha county line | Forest Home Avenue |
| | County trunk highway | Local nonarterial | CTH K (Crystal Ridge Lane) | Rawson Avenue | 76th Street |
| | County trunk highway | Local trunk highway | CTH MM (St. Martins Road) | CTH J | STH 100 |
| | Local trunk highway | County trunk highway | Puetz Road | STH 100 | 76th Street |
| | New facility | County trunk highway | Puetz Road extension | CTH U | Hunting Park Drive |
| | Local trunk highway | County trunk highway | Puetz Road | Hunting Park Drive | East corporate limits |
| | Local trunk highway | Local nonarterial | Hunting Park Drive | 51st Street | Puetz Road |
| | Local trunk highway | County trunk highway | 51st Street | North corporate limits | STH 100 (Ryan Road) |
| | County trunk highway | Local nonarterial | CTH A | Milwaukee County House of Corrections | STH 100 (Ryan Road) |
| City of Glendale | State trunk highway | County trunk highway | STH 57 (Green Bay Road) | Range Line Road | South corporate limits |
| | County trunk highway | Local trunk highway | Port Washington Road | North corporate limits | Daphne Road |
| | State trunk highway | Local trunk highway | Port Washington Road | Daphne Road | Hampton Avenue |
| | Local trunk highway | County trunk highway | Mill Road | West corporate limits | STH 57 |
| | Local trunk highway | County trunk highway | Silver Spring Drive | West corporate limits | East corporate limits |
| | Local trunk highway | County trunk highway | Hampton Avenue | West corporate limits | East corporate limits |
| Village of Greendale | Local trunk highway | County trunk highway | 51st Street | North corporate limits | South corporate limits |
| City of Greenfield | Local trunk highway | County trunk highway | 124th Street | North corporate limits | Layton Avenue |
| | State trunk highway | County trunk highway | STH 100 | North corporate limits | IH 43 |
| | State trunk highway | County trunk highway | 27th Street | Layton Avenue | South corporate limits |
| | State trunk highway | County trunk highway | Layton Avenue | Waukesha county line | STH 100 |
| | County trunk highway | Local trunk highway | 92nd Street | North corporate limits | Forest Home Avenue |
| | State trunk highway | County trunk highway | STH 24 (Forest Home Avenue) | South corporate limits | North corporate limits |
| | Local trunk highway | County trunk highway | 51st Street | STH 36 (Loomis Road) | South corporate limits |
| | County trunk highway | Local trunk highway | CTH T (Beloit Road) | Waukesha county line | East corporate limits |
| Village of Hales Corners | State trunk highway | County trunk highway | STH 24 (Janesville Road) | Waukesha county line | Forest Home Avenue |
| | State trunk highway | County trunk highway | STH 24 (Forest Home Avenue) | STH 100 | East corporate limits |
| City of Milwaukee | Local trunk highway | County trunk highway | Boundary Road | County Line Road | STH 100 |
| | New facility | County trunk highway | Boundary Road extension | STH 100 | STH 145 |
| | Local trunk highway | County trunk highway | 107th Street | STH 100 | USH 41 |
| | State trunk highway | County trunk highway | 76th Street | USH 41 | South corporate limits |
| | County trunk highway | State trunk highway | CTH D (Teutonia Avenue) | North corporate limits | Good Hope Road |
| | Local trunk highway | State trunk highway | CTH D (Teutonia Avenue) | Good Hope Road | Hampton Avenue |
| | State trunk highway | County trunk highway | STH 57 (Green Bay Road) | Silver Spring Drive | Capitol Drive |
| | State trunk highway | County trunk highway | STH 175 (Appleton Avenue) | Waukesha county line | USH 45 |
| | State trunk highway | County trunk highway | USH 41 (Appleton Avenue) | USH 45 | 76th Street |
| | Local trunk highway | County trunk highway | Lisbon Avenue | North Avenue | 27th Street |
| | Local trunk highway | County trunk highway | Silver Spring Drive | 68th Street | East corporate limits |
| | Local trunk highway | County trunk highway | Hampton Avenue | 60th Street | East corporate limits |
| | Local trunk highway | County trunk highway | Burleigh Street | West corporate limits | Hopkins Street |
| | Local trunk highway | County trunk highway | Hopkins Street | Burleigh Street | Locust Street |
| | Local trunk highway | County trunk highway | Locust Street | Hopkins Street | IH 43 |
| | Local trunk highway | County trunk highway | North Avenue | West corporate limits | USH 41 |
| | Local trunk highway | County trunk highway | State Street | West corporate limits | 35th Street |
| | State trunk highway | County trunk highway | Lover's Lane | Silver Spring Drive | South corporate limits |
| | Local trunk highway | State trunk highway | 27th Street | Teutonia Avenue | Highland Boulevard |
| | Local trunk highway | County trunk highway | Lincoln Avenue | West corporate limits | Bay Street |
| | Local trunk highway | County trunk highway | Forest Home Avenue | 27th Street | Lincoln Avenue |
| | Local trunk highway | County trunk highway | Muskego Avenue | Lincoln Avenue | Greenfield Avenue |
| | New facility | Local trunk highway | Canal Street extension | 6th Street | Water Street |
| | New facility | Local trunk highway | Canal Street extension | USH 41 | 27th Street |
| | Local trunk highway | County trunk highway | Greenfield Avenue | 16th Street | 1st Street |
| | Local trunk highway | County trunk highway | Howell Avenue | Lincoln Avenue | STH 38 |
| | State trunk highway | County trunk highway | STH 38 (Howell Avenue) | Howell Avenue | South corporate limits |
| | Local trunk highway | County trunk highway | Oklahoma Avenue | West corporate limits | Kinnickinnic Avenue |
| | State trunk highway | Local trunk highway | STH 38 (Chase Avenue) | 6th Street | Howell Avenue |
| | State trunk highway | Local trunk highway | 6th Street | National Avenue | Chase Avenue |
| | State trunk highway | County trunk highway | 27th Street | Layton Avenue | South corporate limits |
| | Local trunk highway | County trunk highway | Layton Avenue | West corporate limits | East corporate limits |
| | County trunk highway | Local trunk highway | 92nd Street | Oklahoma Avenue | Howard Avenue |
| | Local nonarterial | County trunk highway | 76th Street | Blue Mound Road | South corporate limits |
| | State trunk highway | Local trunk highway | 84th Street | Glenview Avenue | Schlinger Avenue |
| | Local trunk highway | Local nonarterial | Becher Street | Muskego Avenue | Forest Home Avenue |

Table 262 (continued)

| Civil Division | Jurisdictional Responsibility | | Facility | From | To |
|---|---|---|---|---|---|
| | Existing | Planned | | | |
| City of Milwaukee (continued) | State trunk highway | County trunk highway | STH 24 (Forest Home Avenue) | South corporate limits | Lincoln Avenue |
| | County trunk highway | Local trunk highway | CTH T (Beloit Road) | West corporate limits | North corporate limits |
| | New facility | State trunk highway | Lake Parkway | Lincoln Avenue | South corporate limits |
| | County trunk highway | Local trunk highway | CTH G (Sherman Boulevard) | North corporate limits | Mill Road |
| | State trunk highway | Local trunk highway | STH 57 (20th Street) | Capitol Drive | North Avenue |
| | State trunk highway | Local nonarterial | STH 57 (20th Street) | North Avenue | Highland Boulevard |
| | Local trunk highway | County trunk highway | Good Hope Road | Waukesha county line | 107th Street |
| | Local trunk highway | County trunk highway | County Line Road | Waukesha county line | East corporate limits |
| | Local trunk highway | County trunk highway | 124th Street | Silver Spring Drive | South corporate limits |
| | New facility | County trunk highway | 124th Street | STH 100 | STH 145 |
| City of Oak Creek | State trunk highway | County trunk highway | STH 38 (Howell Avenue) | North corporate limits | Rawson Avenue |
| | State trunk highway | County trunk highway | 27th Street | North corporate limits | Racine county line |
| | State trunk highway | Local trunk highway | 13th Street | North corporate limits | Racine county line |
| | County trunk highway | State trunk highway | CTH BB (Rawson Avenue) | West corporate limits | East corporate limits |
| | Local trunk highway | County trunk highway | Puetz Road | West corporate limits | STH 32 |
| | New facility | Local trunk highway | 10th/15th Avenue extension | STH 100 | Racine county line |
| Village of River Hills | State trunk highway | County trunk highway | STH 57 (Green Bay Road) | Bradley Road | South corporate limits |
| City of St. Francis | New facility | State trunk highway | Lake Parkway | North corporate limits | South corporate limits |
| | New facility | Local trunk highway | Howard Avenue extension | Thompson Avenue | Iowa Avenue |
| City of South Milwaukee | Local trunk highway | State trunk highway | Rawson Avenue | West corporate limits | STH 32 |
| | Local trunk highway | State trunk highway | Nicholson Avenue | North corporate limits | Rawson Avenue |
| City of Wauwatosa | State trunk highway | County trunk highway | 76th Street (Wauwatosa Avenue) | North corporate limits | Menomonee River Parkway |
| | Local trunk highway | County trunk highway | Burleigh Street | Waukesha county line | East corporate limits |
| | Local trunk highway | County trunk highway | North Avenue | Waukesha county line | East corporate limits |
| | Local trunk highway | County trunk highway | Watertown Plank Road | Waukesha county line | Glenview Avenue |
| | State trunk highway | County trunk highway | Glenview/Harwood/Harmonee Avenues | Watertown Plank Road | Menomonee River Parkway |
| | Local trunk highway | County trunk highway | State Street | Harmonee Avenue | East corporate limits |
| | Local trunk highway | County trunk highway | 124th Street | North corporate limits | Knoll Road |
| | New facility | County trunk highway | 124th Street extension | Knoll Road | Blue Mound Road |
| | Local trunk highway | County trunk highway | 124th Street | Blue Mound Road | South corporate limits |
| | State trunk highway | County trunk highway | STH 100 | North corporate limits | South corporate limits |
| | State trunk highway | Local trunk highway | Glenview Avenue | Blue Mound Road | South corporate limits |
| | State trunk highway | Local trunk highway | Glenview Avenue | Harwood Avenue | 84th Street |
| City of West Allis | New facility | County trunk highway | 124th Street | North corporate limits | Greenfield Avenue |
| | Local trunk highway | County trunk highway | 124th Street | Greenfield Avenue | South corporate limits |
| | State trunk highway | County trunk highway | STH 100 | North corporate limits | South corporate limits |
| | Local trunk highway | County trunk highway | National Avenue | Waukesha county line | Greenfield Avenue |
| | Local nonarterial | County trunk highway | Cleveland Avenue | Waukesha county line | National Avenue |
| | Local trunk highway | County trunk highway | Lincoln Avenue | National Avenue | East corporate limits |
| | Local trunk highway | County trunk highway | 76th Street | Greenfield Avenue | South corporate limits |
| | Local nonarterial | County trunk highway | 76th Street | North corporate limits | Greenfield Avenue |
| | County trunk highway | Local trunk highway | CTH T (Beloit Road) | South corporate limits | Oklahoma Avenue |
| Village of West Milwaukee | Local trunk highway | County trunk highway | Lincoln Avenue | West corporate limits | East corporate limits |
| Village of Whitefish Bay | Local trunk highway | County trunk highway | Silver Spring Drive | West corporate limits | STH 32 |
| | Local trunk highway | County trunk highway | Hampton Avenue | West corporate limits | STH 32 |

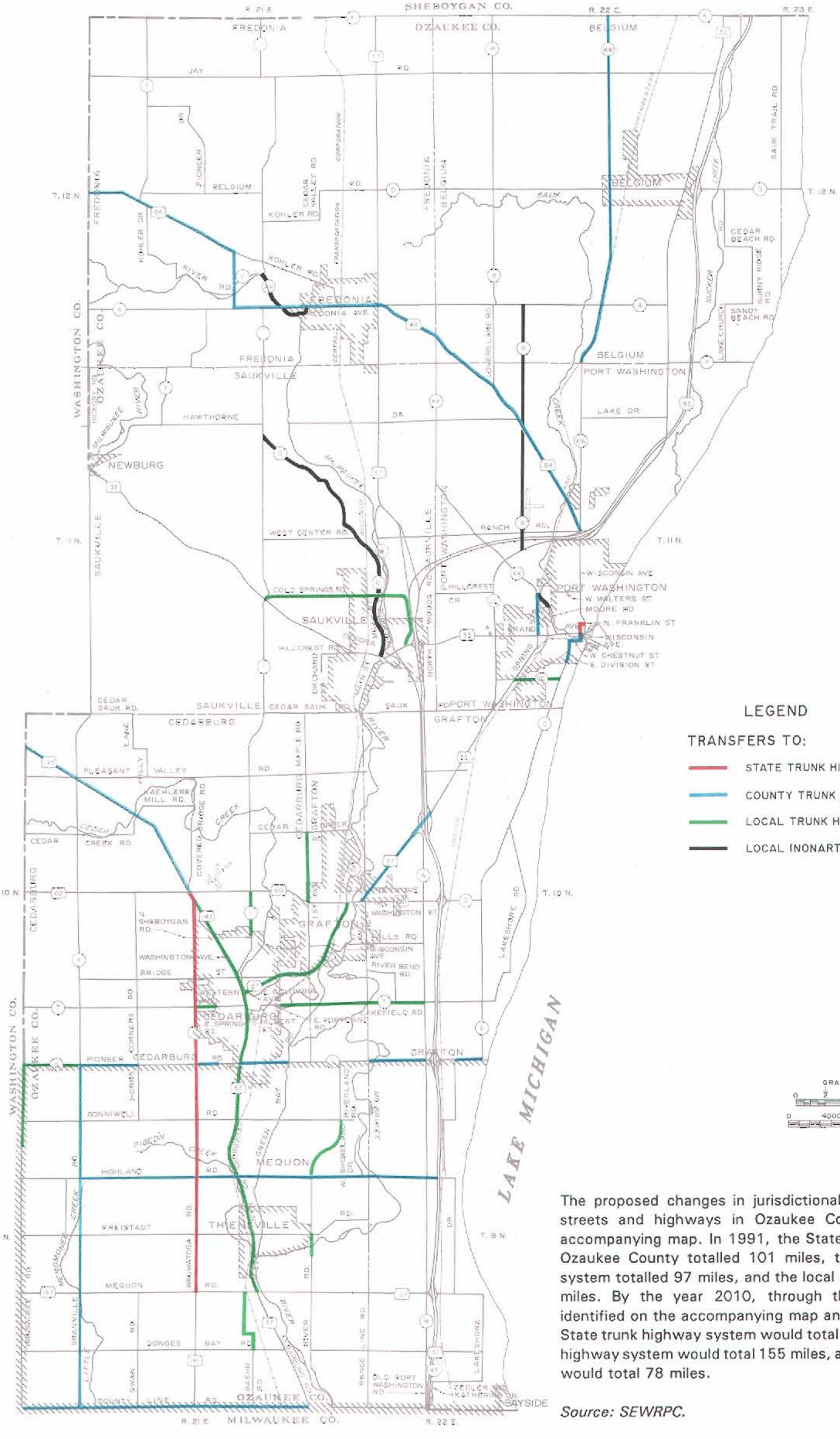
*Source: SEWRPC.*

struction of 131 route-miles and 337 lane-miles of new facilities within the Region; and the widening or other improvement of 448 route-miles, adding 854 lane-miles to the 1,023 lane-miles already provided on those routes. The plan also calls for pavement resurfacing and bridge and interchange restoration and reconfiguration work necessary to maintain and appropriately modernize the remaining 3,028 route-miles and 8,089 lane-miles of planned arterial facilities. The planned functional improvements to the regional arterial street and highway system are shown on a county-by-county basis on Maps 125 through 131 in Chapter XI of this report. The mileage of planned system expansion, system improvement, and system preservation within each county are described below.

*Kenosha County*: The arterial street and highway system in Kenosha County is recommended to be expanded by 37 miles, or 12 percent, from 318 miles in 1991 to 355 miles in the year 2010 (see Map 125, page 536). The increase in arterial mileage would come about through the construction of nine miles of new facility and through the conversion of 28 miles of previously nonarterial

## Map 142

## PROPOSED CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS UNDER THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO OZAUKEE COUNTY




The proposed changes in jurisdictional responsibility for arterial streets and highways in Ozaukee County are shown on the accompanying map. In 1991, the State trunk highway system in Ozaukee County totalled 101 miles, the county trunk highway system totalled 97 miles, and the local arterial system totalled 91 miles. By the year 2010, through the jurisdictional transfers identified on the accompanying map and listed on Table 263, the State trunk highway system would total 72 miles, the county trunk highway system would total 155 miles, and the local arterial system would total 78 miles.

*Source: SEWRPC.*

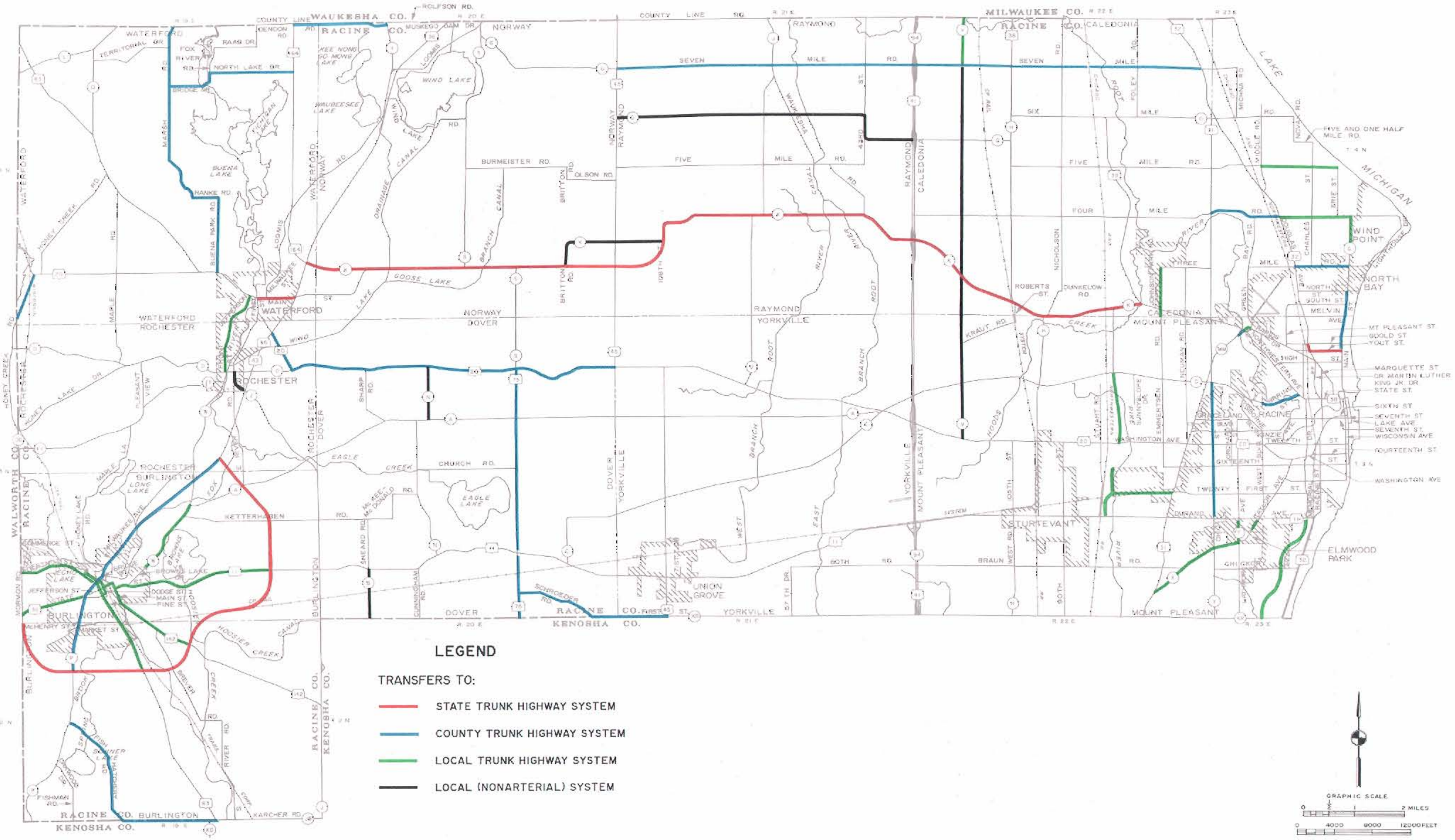
Table 263

CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS IN OZAUKEE COUNTY UNDER THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Civil Division | Jurisdictional Responsibility: Existing | Jurisdictional Responsibility: Planned | Facility | From | To |
|---|---|---|---|---|---|
| Town of Belgium | State trunk highway | County trunk highway | STH 84 | West town line | South town line |
| | Local nonarterial | County trunk highway | CTH KW | North town line | South town line |
| | County trunk highway | Local nonarterial | CTH B | South town line | CTH A |
| Town of Cedarburg | County trunk highway | State trunk highway | CTH N | STH 143 | Pioneer Road |
| | State trunk highway | County trunk highway | STH 143 | STH 60 | West town line |
| | New facility | Local trunk highway | Maple Road extension | Cedar Creek Road | Village of Grafton |
| | State trunk highway | Local trunk highway | STH 57 | City of Cedarburg | East town line |
| | State trunk highway | Local trunk highway | STH 143 | CTH N | City of Cedarburg |
| | County trunk highway | Local trunk highway | CTH C | Granville Road | CTH M |
| | County trunk highway | Local trunk highway | CTH I | City of Cedarburg | STH 60 |
| | County trunk highway | Local trunk highway | CTH T | East town line | City of Cedarburg |
| | County trunk highway | Local trunk highway | CTH T | CTH N | City of Cedarburg |
| Town of Fredonia | State trunk highway | County trunk highway | STH 84 | West town line | Village of Fredonia |
| | State trunk highway | County trunk highway | STH 84 | Village of Fredonia | East town line |
| | County trunk highway | Local nonarterial | CTH AA | CTH I | STH 84 |
| Town of Grafton | State trunk highway | County trunk highway | STH 57 | IH 43 | Village of Grafton |
| | New facility | Local trunk highway | Maple Road extension | Cedar Creek Road | Village of Grafton |
| | County trunk highway | Local trunk highway | CTH T | West town line | CTH W |
| Town of Port Washington | State trunk highway | County trunk highway | STH 84 | City of Port Washington | North town line |
| | Local trunk highway | County trunk highway | Spring Street | City of Port Washington | CTH KK |
| | County trunk highway | Local trunk highway | CTH CC | CTH C | STH 32 |
| | County trunk highway | Local nonarterial | CTH B | CTH LL | North town line |
| | County trunk highway | Local nonarterial | CTH KK | Spring Street | City of Port Washington |
| Town of Saukville | New facility | Local trunk highway | Cold Springs Road extension | CTH O | Village of Saukville |
| | County trunk highway | Local nonarterial | CTH O | CTH I | Village of Saukville |
| Village of Fredonia | State trunk highway | County trunk highway | STH 84 | STH 57 | CTH AA |
| | County trunk highway | Local nonarterial | CTH AA | STH 84 | STH 84 |
| Village of Grafton | State trunk highway | Local trunk highway | STH 57 | West corporate limit | East corporate limit |
| Village of Saukville | New facility | Local trunk highway | Cold Springs Road | STH 33 | North corporate limit |
| | County trunk highway | Local nonarterial | CTH O | STH 33 | North corporate limit |
| Village of Thiensville | State trunk highway | Local trunk highway | STH 57 | South corporate limit | North corporate limit |
| City of Cedarburg | County trunk highway | State trunk highway | CTH N | South corporate limit | North corporate limit |
| | Local trunk highway | County trunk highway | Pioneer Road | STH 57 | East corporate limit |
| | State trunk highway | Local trunk highway | STH 57 | Pioneer Road | Columbia Road |
| | State trunk highway | Local trunk highway | STH 57 | Washington Avenue | Keup Road |
| | State trunk highway | Local trunk highway | STH 57 | City of Mequon | Pioneer Road |
| | State trunk highway | Local trunk highway | STH 143 | STH 57 | North corporate limit |
| | County trunk highway | Local trunk highway | CTH I | STH 143 | North corporate limit |
| | County trunk highway | Local trunk highway | CTH T | Webster Avenue | Evergreen Boulevard |
| City of Mequon | Local trunk highway | State trunk highway | Wauwatosa Road | STH 167 | Pioneer Road |
| | Local trunk highway | County trunk highway | County Line Road | Wasaukee Road | STH 57 |
| | Local trunk highway | County trunk highway | Granville Road | County Line Road | Freistadt Road |
| | New facility | County trunk highway | Granville Road extension | Freistadt Road | Highland Road |
| | Local trunk highway | County trunk highway | Granville Road | Highland Road | Pioneer Road |
| | Local trunk highway | County trunk highway | Highland Road | Granville Road | IH 43 |
| | Local trunk highway | County trunk highway | Pioneer Road | Granville Road | Davis Road |
| | Local trunk highway | County trunk highway | Pioneer Road | Klugs Road | IH 43 |
| | County trunk highway | Local trunk highway | Pioneer Road | Wasaukee Road | Granville Road |
| | New facility | Local trunk highway | River Road | Highland Road | Bonniwell Road |
| | New facility | Local trunk highway | River Road | Grace Avenue | Freistadt Road |
| | State trunk highway | Local trunk highway | STH 57 | STH 167 | Village of Thiensville |
| | State trunk highway | Local trunk highway | STH 57 | Village of Thiensville | North corporate limit |
| City of Port Washington | Local trunk highway | State trunk highway | Wisconsin Street | Jackson Street | Grand Avenue |
| | Local trunk highway | State trunk highway | Swing Street | Franklin Street | Jackson Street |
| | Local trunk highway | State trunk highway | Jackson Street | Swing Street | Franklin Street |
| | Local trunk highway | County trunk highway | Chestnut Street | Division Street | Wisconsin Street |
| | Local trunk highway | County trunk highway | Division Street | South corporate limit | Chestnut Street |
| | Local trunk highway | County trunk highway | Spring Street | STH 33 | CTH KK |
| | Local trunk highway | County trunk highway | Wisconsin Street | Chestnut Street | Grand Avenue |
| | County trunk highway | Local trunk highway | CTH CC | STH 32 | CTH C |
| | County trunk highway | Local nonarterial | CTH KK | Spring Street | North corporate limit |

*Source: SEWRPC.*

## PROPOSED CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS UNDER THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO RACINE COUNTY




The proposed changes in jurisdictional responsibility for arterial streets and highways in Racine County are shown on the accompanying map. In 1991, the State trunk highway system in Racine County totalled 159 miles, the county trunk highway system totalled about 125 miles, and the local arterial system totalled 65 miles. By the year 2010, through the jurisdictional transfers identified on the accompanying map and listed on Table 264, the State trunk highway system would total 160 miles, the county trunk highway system would total 156 miles, and the local arterial system would total 108 miles.

*Source: SEWRPC.*

## Table 264

## CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS IN RACINE COUNTY UNDER THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Civil Division | Jurisdictional Responsibility: Existing | Jurisdictional Responsibility: Planned | Facility | From | To |
|---|---|---|---|---|---|
| Town of Burlington | New facility | State trunk highway | Burlington bypass | Town of Rochester | STH 36 |
| | Local nonarterial | County trunk highway | Fish Hatchery Road | CTH P | Karcher Road |
| | Local nonarterial | County trunk highway | Karcher Road | Fish Hatchery Road | CTH KD |
| | State trunk highway | County trunk highway | STH 36/83 | North town line | City of Burlington |
| | County trunk highway | Local trunk highway | CTH W | City of Burlington | CTH A |
| | State trunk highway | Local trunk highway | STH 11 | City of Burlington | Burlington bypass |
| | State trunk highway | Local trunk highway | STH 11 | Mormon Road | City of Burlington |
| | State trunk highway | Local trunk highway | STH 142 | City of Burlington | Bypass route |
| | State trunk highway | Local trunk highway | STH 36 | West town line | City of Burlington |
| | State trunk highway | Local trunk highway | STH 83 | City of Burlington | Bypass route |
| Town of Caledonia | County trunk highway | State trunk highway | CTH K | IH 94 | STH 38 |
| | Local trunk highway | County trunk highway | Seven Mile Road | West town line | STH 32 |
| | Local trunk highway | County trunk highway | Four Mile Road | STH 32 | STH 31 |
| | Local trunk highway | County trunk highway | Three Mile Road | STH 32 | CTH G |
| | New facility | Local trunk highway | Five Mile Road extension | Middle Road | Five Mile Road |
| | New facility | Local trunk highway | Five Mile Road extension | Charles Street | Erie Street |
| | County trunk highway | Local trunk highway | CTH G | STH 32 | Three Mile Road |
| | County trunk highway | Local trunk highway | CTH V | North town line | Seven Mile Road |
| | County trunk highway | Local nonarterial | CTH V | Seven Mile Road | Town of Mt. Pleasant |
| | New facility | Local trunk highway | Emmertsen Road | Three Mile Road | STH 38 |
| Town of Dover | State trunk highway | County trunk highway | STH 75 | STH 20 | South town line |
| | Local trunk highway | County trunk highway | Schroeder Road | STH 75 | East town line |
| | State trunk highway | County trunk highway | STH 20 | West town line | East town line |
| | County trunk highway | Local nonarterial | CTH B | STH 11 | South town line |
| | County trunk highway | Local nonarterial | CTH N | STH 20 | CTH A |
| Town of Mt. Pleasant | County trunk highway | State trunk highway | CTH K | Kraut Road | North town line |
| | New facility | County trunk highway | CTH MM realignment | West of STH 38 | STH 38 |
| | County trunk highway | Local nonarterial | CTH V | Town of Caledonia | STH 20 |
| | Local trunk highway | County trunk highway | Ohio Street | CTH C | City of Racine |
| | New facility | Local trunk highway | 21st Street | Oakes Road extension | City of Racine |
| | County trunk highway | Local trunk highway | CTH X | STH 31 | CTH T |
| | New facility | Local trunk highway | S. Memorial Drive | CTH KR | Chicory Road |
| | New facility | Local trunk highway | Oakes Road extension | Oakes Road | STH 11 |
| | New facility | Local trunk highway | Oakes Road extension | Spring Street | STH 20 |
| | New facility | Local trunk highway | Rapids Court extension | Rapids Drive | STH 38 |
| Town of Norway | County trunk highway | State trunk highway | CTH K | West town line | Britton Road |
| | New facility | State trunk highway | CTH K extension | Britton Road | USH 45 |
| | Local nonarterial | County trunk highway | Denoon Road | West town line | CTH Y |
| | County trunk highway | Local nonarterial | CTH K | Apple Road | East town line |
| Town of Raymond | County trunk highway | State trunk highway | CTH K | 108th Street | IH 94 |
| | New facility | State trunk highway | CTH K extension | 108th Street | USH 45 |
| | Local trunk highway | County trunk highway | Seven Mile Road | East town line | West town line |
| | County trunk highway | Local nonarterial | CTH G | USH 45 | IH 94 |
| | County trunk highway | Local nonarterial | CTH K | 108th Street | West town line |
| Town of Rochester | New facility | State trunk highway | Burlington bypass | STH 36/83 | Town of Burlington |
| | State trunk highway | County trunk highway | STH 20 | STH 36/83 | East town line |
| | State trunk highway | County trunk highway | STH 36/83 | Burlington bypass | South town line |
| Town of Waterford | County trunk highway | State trunk highway | CTH K | STH 36 | East town line |
| | Local nonarterial | County trunk highway | Bridge Drive | Marsh Road | Fox River Road |
| | Local nonarterial | County trunk highway | Buena Park Road | Ranke Road | STH 20 |
| | Local nonarterial | County trunk highway | Denoon Road | STH 164 | Town of Norway |
| | Local nonarterial | County trunk highway | Fox River Road | Bridge Drive | North Lake Drive |
| | Local trunk highway | County trunk highway | Honey Creek Road | West town line | STH 20 |
| | Local nonarterial | County trunk highway | Marsh Road | North town line | Ranke Road |
| | Local nonarterial | County trunk highway | North Lake Drive | Fox River Road | STH 164 |
| | Local nonarterial | County trunk highway | Ranke Road | Marsh Road | Buena Park Road |
| Town of Yorkville | Local trunk highway | County trunk highway | 1st Street | West town line | USH 45 |
| Village of Elmwood Park | County trunk highway | Local trunk highway | CTH T | North corporate limits | South corporate limits |
| Village of Rochester | County trunk highway | Local trunk highway | CTH W (Front Street) | Main Street-CTH D | North corporate limits |
| | County trunk highway | Local nonarterial | CTH J | STH 36/STH 83 | CTH D |
| Village of Waterford | Local trunk highway | State trunk highway | Main Street | First Street | East corporate limits |
| | County trunk highway | Local trunk highway | CTH W | Main Street | South corporate limits |
| Village of Wind Point | County trunk highway | Local trunk highway | CTH G | Four Mile Road | Three Mile Road |
| City of Burlington | Local trunk highway | County trunk highway | McHenry Street | STH 36 | South corporate limits |
| | State trunk highway | County trunk highway | STH 36/83 | North corporate limits | McHenry Street |
| | State trunk highway | Local trunk highway | STH 11 | East corporate limits | West corporate limits |
| | State trunk highway | Local trunk highway | STH 142 | STH 11 | South corporate limits |
| | State trunk highway | Local trunk highway | STH 36 | West corporate limits | McHenry Street |
| | State trunk highway | Local trunk highway | STH 83 | Milwaukee Avenue | South corporate limits |
| City of Racine | Local trunk highway | State trunk highway | Douglas Avenue | Yout Street | Gould Street |
| | Local trunk highway | State trunk highway | Yout Street | Douglas Avenue | Main Street |
| | Local trunk highway | County trunk highway | Main Street | Gould Street | North corporate limits |
| | Local trunk highway | County trunk highway | Spring Street | CTH C | STH 38 |
| | Local trunk highway | County trunk highway | Three Mile Road | STH 32 | CTH G |
| | New facility | Local trunk highway | 21st Street | West corporate limits | STH 31 |
| | County trunk highway | Local trunk highway | CTH T | STH 11 | South corporate limits |
| | County trunk highway | Local trunk highway | CTH X | STH 11 | South corporate limits |
| | New facility | Local trunk highway | Rapids Court extension | Rapids Drive | STH 38 |

*Source: SEWRPC.*

## Table 265

## CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS IN WALWORTH COUNTY UNDER THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Civil Division | Jurisdictional Responsibility: Existing | Jurisdictional Responsibility: Planned | Facility | From | To |
|---|---|---|---|---|---|
| Town of Bloomfield | New facility | State trunk highway | New facility | Town Line Road | West town line |
| | Local trunk highway | County trunk highway | N. Bloomfield Road | CTH H | Hafs Road |
| | Local nonarterial | County trunk highway | Clover Road | Lake Geneva Road | Lake Shore Drive |
| | Local trunk highway | County trunk highway | Darling Road | CTH H | Twin Lakes Road |
| | *Local trunk highway* | *County trunk highway* | *Hafs Road* | *N. Bloomfield Road* | CTH U |
| | Local trunk highway | County trunk highway | Lake Geneva Road | CTH H | Clover Road |
| | Local trunk highway | County trunk highway | Lake Shore Drive | Clover Road | Orchid Drive |
| | Local trunk highway | County trunk highway | Orchid Drive | Lake Shore Drive | Pell Lake Drive |
| | Local trunk highway | County trunk highway | Pell Lake Drive | Orchid Drive | CTH U |
| | Local trunk highway | County trunk highway | Powers Lake Road | CTH U | East town line |
| | Local trunk highway | County trunk highway | South Road | N. Bloomfield Road | North town line |
| | Local nonarterial | County trunk highway | Twin Lakes Road | Darling Road | CTH U |
| | New facility | County trunk highway | New facility | West Side Road | CTH H |
| Town of Darien | Local trunk highway | County trunk highway | Darien-Sharon Town Line Road | CTH X | East town line |
| | Local nonarterial | County trunk highway | Foundry Road | CTH X | New facility |
| | New facility | County trunk highway | Foundry Road extension | Foundry Road | Village of Darien |
| | County trunk highway | Local nonarterial | CTH C | USH 14 | North town line |
| | County trunk highway | Local nonarterial | CTH M | City of Delavan | North town line |
| Town of Delavan | County trunk highway | State trunk highway | CTH F | Bailey's Road | South town line |
| | Local nonarterial | State trunk highway | Bailey's Road | CTH F | New facility |
| | New facility | State trunk highway | Bailey's Road extension | Bailey's Road | STH 67 |
| | State trunk highway | County trunk highway | STH 11 | City of Delavan | City of Elkhorn |
| | State trunk highway | County trunk highway | STH 67 | New facility | Village of Williams Bay |
| | *Local nonarterial* | *County trunk highway* | *Briggs Road* | *North town line* | *STH 11* |
| | Local trunk highway | County trunk highway | Darien-Sharon Town Line Road | West town line | CTH O |
| | Local nonarterial | County trunk highway | Town Hall Road | STH 50 | East town line |
| | New facility | Local trunk highway | New facility | North town line | City of Elkhorn |
| | County trunk highway | Local nonarterial | CTH O | North town line | City of Delavan |
| Town of East Troy | Local trunk highway | County trunk highway | Booth Lake Road | STH 20 | New facility |
| | New facility | County trunk highway | Booth Lake Road extension | Booth Lake Road | St. Peter's Road |
| | Local trunk highway | County trunk highway | Booth Lake Road | CTH J | St. Peter's Road |
| | Local trunk highway | County trunk highway | Honey Creek Road | Racine County | South town line |
| | County trunk highway | Local trunk highway | CTH G | Village of East Troy | IH 43 |
| Town of Geneva | State trunk highway | County trunk highway | STH 67 | New facility | Village of Williams Bay |
| | State trunk highway | County trunk highway | STH 120 | Sheridan Street | City of Lake Geneva |
| | Local nonarterial | County trunk highway | Palmer Road | STH 67 | CTH H |
| | New facility | Local trunk highway | New facility | City of Lake Geneva | STH 50 |
| Town of Lafayette | State trunk highway | County trunk highway | STH 11 | IH 43 | City of Elkhorn |
| | Local trunk highway | County trunk highway | Bowers Road | IH 43 | CTH D |
| Town of LaGrange | New facility | State trunk highway | USH 12 freeway | West town line | South town line |
| | Local trunk highway | County trunk highway | Kettle Moraine Drive | West town line | CTH H |
| | Local nonarterial | County trunk highway | Palmyra Road | North town line | STH 67 |
| | County trunk highway | Local nonarterial | CTH O | USH 12 | Jackson Road |
| Town of Linn | New facility | State trunk highway | STH 120 bypass | East town line | STH 120 |
| | Local nonarterial | County trunk highway | Willow Road | CTH BB | STH 120 |
| | State trunk arterial | Local trunk highway | STH 120 | City of Lake Geneva | STH 120 bypass |
| | County trunk highway | Local nonarterial | CTH BB | Willow Road | STH 120 |
| Town of Lyons | New facility | State trunk highway | STH 120 bypass | City of Lake Geneva | South town line |
| | Local trunk highway | County trunk highway | Amity Street | STH 36 | Spring Valley Road |
| | Local trunk highway | County trunk highway | South Road | Spring Valley Road | South town line |
| Town of Richmond | New facility | County trunk highway | CTH P extension | Territorial Road | CTH A |
| | County trunk highway | Local nonarterial | CTH M | STH 89 | South town line |
| | County trunk highway | Local nonarterial | CTH M | West town line | South town line |
| | County trunk highway | Local nonarterial | CTH P | Territorial Road | CTH A |
| Town of Sharon | Local trunk highway | County trunk highway | Darien-Sharon Town Line Road | CTH X | East town line |
| | County trunk highway | Local nonarterial | CTH B | West town line | CTH C |
| Town of Spring Prairie | New facility | State trunk highway | Burlington bypass | STH 11 | STH 36 |
| | Local trunk highway | County trunk highway | Honey Creek Road | North town line | CTH D |
| | *State trunk highway* | *Local trunk highway* | STH 11 | Burlington bypass | East town line |
| Town of Sugar Creek | New facility | State trunk highway | USH 12 freeway | North town line | STH 67 |
| | Local nonarterial | County trunk highway | Briggs Road | Hazel Ridge Road | South town line |
| | Local nonarterial | County trunk highway | Cobbie Road | CTH H | Sugar Creek Road |
| | Local nonarterial | County trunk highway | Granville Road | Sugar Creek Road | Hazel Ridge Road |
| | Local nonarterial | County trunk highway | Hazel Ridge Road | Briggs Road | Granville Road |
| | Local nonarterial | County trunk highway | Sugar Creek Road | Granville Road | Cobbie Road |
| | New facility | Local trunk highway | New facility | CTH H | Town of Delavan |
| | New facility | County trunk highway | CTH H extension | CTH H | STH 67 |
| | County trunk arterial | Local nonarterial | CTH O | North town line | South town line |

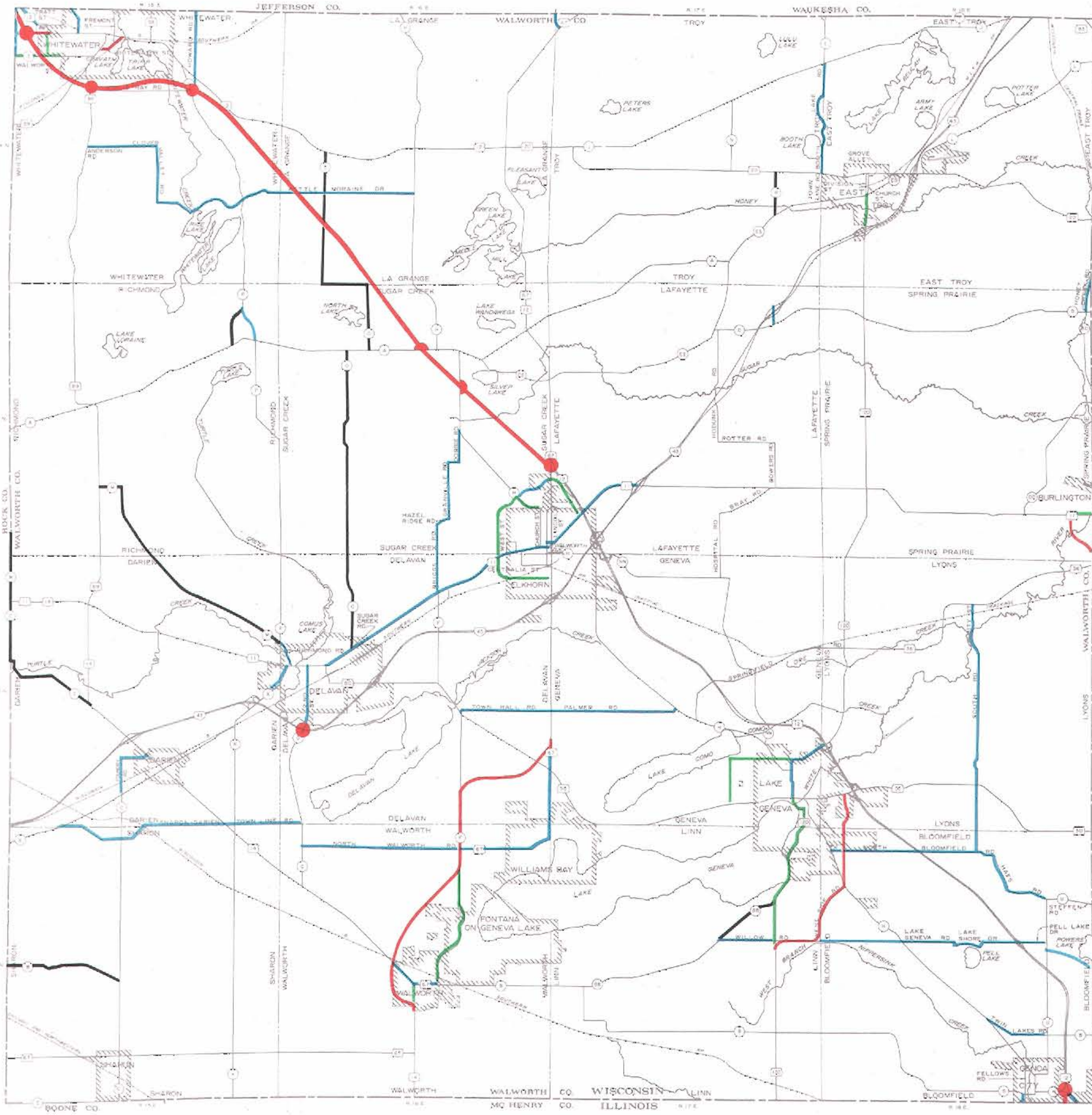
## Table 265 (continued)

| Civil Division | Jurisdictional Responsibility | | Facility | From | To |
|---|---|---|---|---|---|
| | Existing | Planned | | | |
| Town of Troy | Local trunk highway | County trunk highway | Booth Lake Road | CTH J | St. Peter's Road |
| | Local trunk highway | County trunk highway | Booth Lake Road | St. Peter's Road | STH 20 |
| | Local nonarterial | County trunk highway | Palmyra Road | North town line | STH 67 |
| | Local trunk highway | County trunk highway | Town Line Road | STH 20 | CTH ES |
| | County trunk highway | Local nonarterial | CTH N | CTH ES | STH 20 |
| Town of Walworth | New facility | State trunk highway | STH 67 bypass | STH 67 | USH 14 |
| | County trunk highway | State trunk highway | CTH F | North town line | STH 67 bypass |
| | State trunk highway | County trunk highway | STH 67 | CTH F | Theatre Road |
| | Local trunk highway | County trunk highway | N. Walworth Road | CTH O | STH 67 |
| | State trunk highway | Local trunk highway | STH 67 | Village of Walworth | Village of Fontana |
| | State trunk highway | Local trunk highway | STH 67 | STH 67 bypass | Village of Fontana |
| Town of Whitewater | New facility | State trunk highway | USH 12 freeway | West town line | East town line |
| | State trunk highway | County trunk highway | USH 12 | North town line | CTH S |
| | Local trunk highway | County trunk highway | Anderson Road | STH 89 | Clover Valley Road |
| | Local trunk highway | County trunk highway | Clover Valley Road | Anderson Road | Kettle Moraine Drive |
| | Local trunk highway | County trunk highway | Howard Road | North town line | USH 12 |
| | Local trunk highway | County trunk highway | Kettle Moraine Drive | Clover Valley Road | East town line |
| | New facility | County trunk highway | Howard Road extension | USH 12 | CTH P |
| | New facility | County trunk highway | Main Street extension | West town line | USH 12 freeway |
| | Local trunk highway | County trunk highway | Warner Road | North town line | CTH S |
| | County trunk highway | Local trunk highway | CTH S | West town line | City of Whitewater |
| Village of Darien | Local nonarterial | County trunk highway | Madison Street | West corporate limit | USH 14 |
| Village of East Troy | Local trunk highway | County trunk highway | Town Line Road | STH 20 | CTH ES |
| | County trunk arterial | Local trunk arterial | CTH G | CTH ES | South corporate limit |
| Village of Fontana | State trunk highway | Local trunk highway | STH 67 | North corporate limit | Village of Walworth |
| Village of Genoa City | Local nonarterial | County trunk highway | Fellows Road | CTH B | South corporate limit |
| | State trunk highway | County trunk highway | USH 12 | Freeway terminus | South corporate limit |
| | New facility | State trunk highway | USH 12 freeway extension | CTH H | South corporate limit |
| Village of Walworth | New facility | State trunk highway | STH 67 bypass | USH 14 | West corporate limit |
| | State trunk highway | County trunk highway | USH 14 | West corporate limit | STH 67 |
| | State trunk highway | County trunk highway | STH 67 | USH 14 | CTH B |
| | State trunk highway | Local trunk highway | USH 14 | STH 67 | South corporate limit |
| | State trunk highway | Local trunk highway | STH 67 | Village of Fontana | CTH B |
| Village of Williams Bay | State trunk highway | County trunk highway | STH 67 | West corporate limit | North corporate limit |
| City of Delavan | State trunk highway | County trunk highway | STH 11 | STH 50 | East corporate limit |
| | Local trunk highway | County trunk highway | Beloit Street | STH 11 | Creek Road |
| | Local trunk highway | County trunk highway | Richmond Road | North corporate limit | STH 11 |
| | Local trunk highway | County trunk highway | 2nd Street | STH 11 | South corporate limit |
| | County trunk highway | Local nonarterial | CTH M | West corporate limit | CTH P |
| | County trunk highway | Local nonarterial | CTH O | North corporate limit | A point 0.01 mile north |
| City of Elkhorn | State trunk highway | County trunk highway | STH 11 | Town of Delavan | STH 67 |
| | State trunk highway | County trunk highway | STH 11 | Lincoln Street | East corporate limit |
| | State trunk highway | Local trunk highway | STH 11 | STH 67 | CTH H |
| | New facility | Local trunk highway | New facility | STH 67 | STH 11 |
| | New facility | Local trunk highway | New facility | Town of Delavan | STH 67 |
| City of Lake Geneva | Local nonarterial | State trunk highway | Edwards Boulevard | STH 50 | End of Edwards Boulevard |
| | New facility | State trunk highway | STH 120 bypass | End of Edwards Boulevard | South corporate limit |
| | New facility | State trunk highway | STH 120 bypass | North corporate limit | N. Bloomfield Road |
| | State trunk highway | County trunk highway | STH 120 | USH 12 | STH 50 |
| | State trunk highway | Local trunk highway | STH 120 | STH 50 | South corporate limit |
| | New facility | Local trunk highway | Grant Street extension | West corporate limit | CTH H |
| City of Whitewater | New facility | State trunk highway | Main Street extension | USH 12 freeway | Frontage Road |
| | Local trunk facility | State trunk highway | Whitewater Street | Fremont Street | USH 12 |
| | Local trunk highway | County trunk highway | Tratt Street | Jefferson County | USH 12 |
| | County trunk highway | Local trunk highway | CTH S | West corporate limit | Pleasant Street |
| | New facility | Local trunk highway | New facility | USH 12 | CTH S |

*Source: SEWRPC.*

## Map 144

## PROPOSED CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS UNDER THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO WALWORTH COUNTY




LEGEND

TRANSFERS TO:

- STATE TRUNK HIGHWAY SYSTEM
- COUNTY TRUNK HIGHWAY SYSTEM
- LOCAL TRUNK HIGHWAY SYSTEM
- LOCAL (NONARTERIAL) SYSTEM

NOTE: USH 12 BYPASS ALIGNMENT SHOWN TO SOUTH. A PRELIMINARY ENGINEERING STUDY WILL DETERMINE WHETHER THE ALIGNMENT WILL BE TO THE NORTH OR SOUTH OF WHITEWATER.

GRAPHIC SCALE
0 1 2 MILES
0 4000 8000 12000 FEET

The proposed changes in jurisdictional responsibility for arterial streets and highways in Walworth County are shown on the accompanying map. In 1991, the State trunk highway system in Walworth County totalled 214 miles, the county trunk highway system totalled 168 miles, and the local arterial system totalled 47 miles. By the year 2010, through the jurisdictional transfers identified on the accompanying map and listed on Table 265, the State trunk highway system would total 223 miles, the county trunk highway system would total 239 miles, and the local arterial system would total 22 miles.

*Source: SEWRPC.*

## Table 266

## CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS IN WASHINGTON COUNTY UNDER THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Civil Division | Jurisdictional Responsibility | | Facility | From | To |
|---|---|---|---|---|---|
| | Existing | Planned | | | |
| Town of Addison | New facility | State trunk highway | STH 33 | Rock River | USH 41 |
| | State trunk highway | County trunk highway | STH 175 | STH 83 | CTH K |
| | State trunk highway | County trunk highway | STH 175 | West town line | STH 33 |
| | Local trunk highway | County trunk highway | Aurora Road, Deer Road, Indian Drive | STH 33 | CTH K |
| | State trunk highway | Local nonarterial | STH 33 | Rock River | USH 41 |
| | County trunk highway | Local nonarterial | CTH U | STH 33 | South town line |
| | County trunk highway | Local nonarterial | CTH S | CTH U | CTH W |
| | County trunk highway | Local nonarterial | CTH K | STH 83 | Turtle Road |
| | County trunk highway | Local nonarterial | CTH DW | USH 41 | West town line |
| | County trunk highway | Local nonarterial | CTH W | STH 175 | North town line |
| Town of Barton | New facility | County trunk highway | Kettle View Drive extension | Schuster Drive | STH 33 |
| | New facility | County trunk highway | N. River Road extension | City of West Bend | STH 144 |
| | Local trunk highway | County trunk highway | Kettle View Drive | North town line | CTH D |
| | Local trunk highway | County trunk highway | Kettle View Drive | CTH D | Schuster Drive |
| | Local trunk highway | County trunk highway | Newark Road/Lighthouse Drive | CTH D | STH 144 |
| | County trunk highway | Local trunk highway | CTH B | Schuster Drive extension | City of West Bend |
| | New facility | Local trunk highway | Schuster Drive extension | Schuster Drive | Beaver Dam Road |
| | New facility | Local trunk highway | 18th Avenue | City of West Bend | CTH D |
| | County trunk highway | Local nonarterial | CTH B | CTH D | North town line |
| | County trunk highway | Local nonarterial | CTH B | CTH D | Schuster Drive extension |
| Town of Erin | County trunk highway | Local nonarterial | CTH Q | STH 83 | CTH K |
| | County trunk highway | Local nonarterial | CTH OO | CTH O | STH 83 |
| | County trunk highway | Local nonarterial | CTH E | STH 83 | CTH K |
| Town of Farmington | State trunk highway | County trunk highway | STH 84 | CTH X | East town line |
| | Local trunk highway | County trunk highway | Trading Post Trail | CTH H | South town line |
| | State trunk highway | Local nonarterial | STH 84 | STH 144 | CTH X |
| | County trunk highway | Local nonarterial | CTH HH | STH 28 | STH 144 |
| | County trunk highway | Local nonarterial | CTH DD | Along STH 144 | -- |
| Town of Germantown | County trunk highway | Local nonarterial | CTH Y | STH 145 | North town line |
| Town of Hartford | New facility | State trunk highway | New STH 83 | City of Hartford | CTH E |
| | State trunk highway | County trunk highway | STH 175 | CTH K | Village of Slinger |
| | Local trunk highway | County trunk highway | Kettle Moraine Drive | CTH K | STH 60 |
| | Local trunk highway | County trunk highway | Arthur Road | CTH U | East town line |
| | New facility | County trunk highway | Arthur Road extension | Independence Avenue | Arthur Road |
| | New facility | Local trunk highway | Monroe Avenue extension | Pond Road | Monroe Avenue |
| | New facility | Local trunk highway | Taylor Road extension | STH 60 | Pond Road |
| | New facility | Local trunk highway | Wacker Drive extension | STH 60 | Lee Road |
| | State trunk highway | Local trunk highway | STH 83 | City of Hartford | CTH E |
| | County trunk highway | Local nonarterial | CTH U | CTH N | North town line |
| | County trunk highway | Local nonarterial | CTH K | STH 83 | City of Hartford |
| | County trunk highway | Local nonarterial | CTH E | STH 83 | CTH K |
| Town of Jackson | State trunk highway | County trunk highway | STH 143 | Town of Polk | CTH P |
| | State trunk highway | County trunk highway | STH 143 | CTH P | East town line |
| | Local trunk highway | County trunk highway | Jackson Road | STH 143 | Village of Jackson |
| | County trunk highway | Local trunk highway | CTH M | Country Aire Drive | East town line |
| Town of Kewaskum | New facility | County trunk highway | CTH H extension | USH 45 | Badger Road |
| | New facility | County trunk highway | Kettle View Drive | STH 28 | CTH H |
| | Local trunk highway | County trunk highway | Kettle View Drive | CTH H | South town line |
| | Local trunk highway | County trunk highway | Badger Road | Kettle View Drive | Prospect Drive |
| | County trunk highway | Local nonarterial | CTH B | CTH H | South town line |
| | County trunk highway | Local nonarterial | CTH H | Town of Wayne | Kettle View Road |
| Town of Polk | County trunk highway | State trunk highway | CTH J | STH 175 | South town line |
| | Local trunk highway | State trunk highway | Lovers Lane | STH 60 | STH 175 |
| | New facility | County trunk highway | Pioneer Road extension | Pioneer Road | CTH CC |
| | State trunk highway | County trunk highway | STH 144 | CTH K | Village of Slinger |
| | State trunk highway | County trunk highway | STH 175 | Village of Slinger | West town line |
| | State trunk highway | County trunk highway | STH 143 | USH 45 | East town line |
| | State trunk highway | County trunk highway | STH 175 | STH 60 | South town line |
| | Local trunk highway | County trunk highway | Arthur Road | STH 144 | West town line |
| | Local trunk highway | County trunk highway | Pioneer Road | USH 41 | Pioneer Road extension |
| | Local trunk highway | County trunk highway | Scenic Drive | CTH C | STH 60 |
| | Local trunk highway | County trunk highway | Pleasant Valley Road | CTH Z | USH 45 |
| | County trunk highway | Local trunk highway | CTH C | Lilly Road | CTH Z |
| | County trunk highway | Local trunk highway | CTH AA | STH 144 | USH 41 |
| | County trunk highway | Local nonarterial | CTH E | CTH CC | CTH J |
| | County trunk highway | Local nonarterial | CTH C | STH 60 | CTH P |
| Town of Richfield | County trunk highway | State trunk highway | CTH J | North town line | CTH Q |
| | State trunk highway | County trunk highway | STH 175 | Village of Germantown | STH 167 |
| | State trunk highway | County trunk highway | STH 175 | STH 167 | North town line |
| | Local trunk highway | County trunk highway | Pioneer Road | Pioneer Road extension | USH 41 |
| | Local trunk highway | County trunk highway | Scenic Drive | STH 167 | Willow Creek Road |
| | Local trunk highway | County trunk highway | Willow Creek Road | Scenic Drive | Colgate Road |
| | Local trunk highway | County trunk highway | Colgate Road | Willow Creek Road | CTH Q |

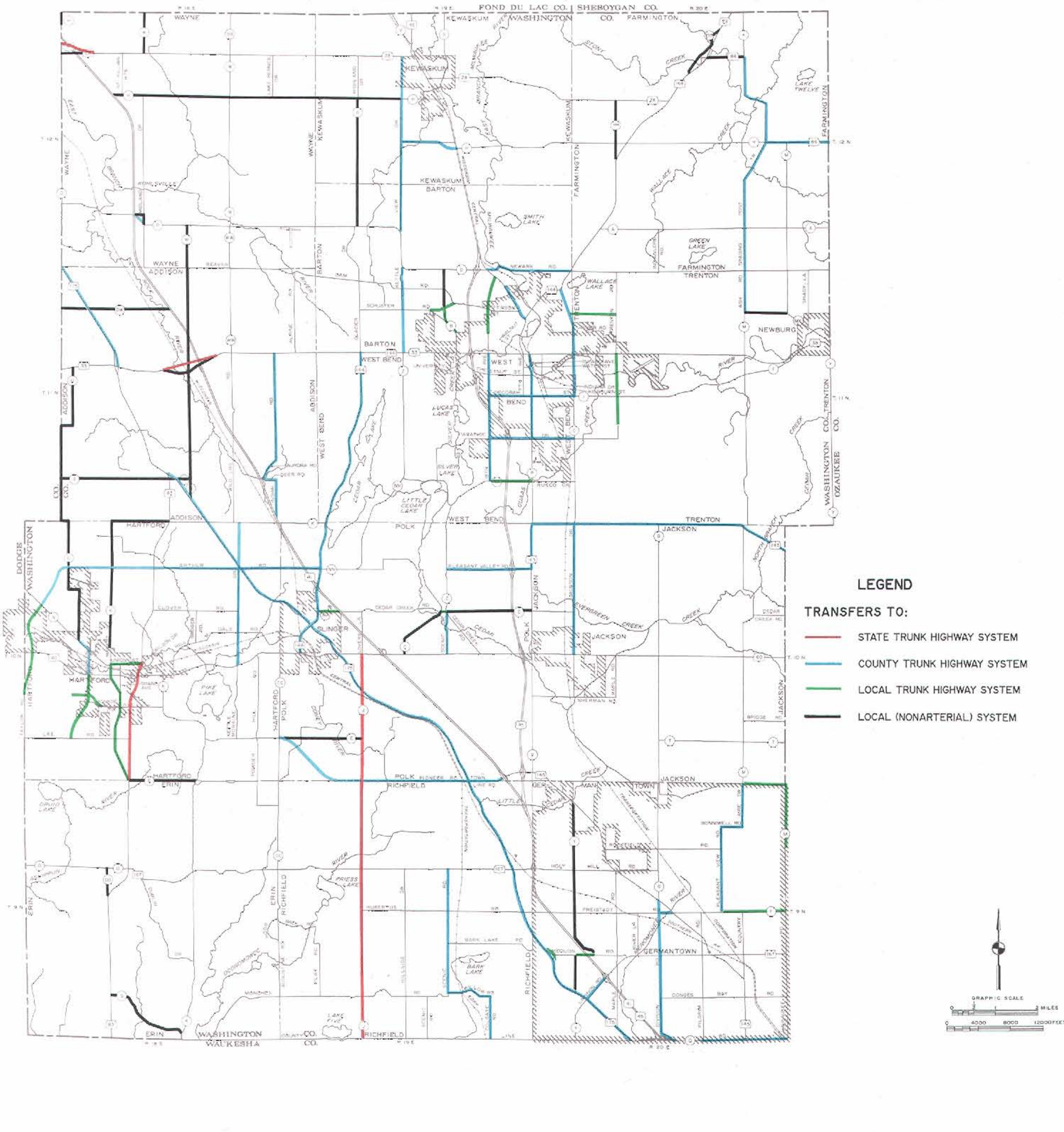
## Table 266 (continued)

| Civil Division | Jurisdictional Responsibility: Existing | Jurisdictional Responsibility: Planned | Facility | From | To |
|---|---|---|---|---|---|
| Town of Trenton | State trunk highway | County trunk highway | STH 143 | CTH G | CTH M |
| | Local trunk highway | County trunk highway | Trading Post Trail | North town line | CTH M |
| | Local trunk highway | County trunk highway | S. River Road | STH 33 | CTH I |
| | New facility | Local trunk highway | Jefferson Street extension | West town line | Trenton Road |
| | New facility | Local trunk highway | Trenton Road/Maple Road | STH 33 | Maple Road end |
| | County trunk highway | Local nonarterial | CTH M | CTH M | CTH MY |
| Town of Wayne | New facility | State trunk highway | STH 28 realignment | Mullen Lane | West town line |
| | New facility | County trunk highway | CTH D realignment | USH 41 | W. Beechnut Drive |
| | State trunk highway | Local nonarterial | STH 28 | USH 41 | Mullen Lane |
| | County trunk highway | Local nonarterial | CTH W | CTH D | South town line |
| | County trunk highway | Local nonarterial | CTH W | STH 28 | North town line |
| | County trunk highway | Local nonarterial | CTH H | USH 41 | East town line |
| | County trunk highway | Local nonarterial | CTH H | North town line | West town line |
| | County trunk highway | Local nonarterial | CTH D | USH 41 | CTH D |
| Town of West Bend | State trunk highway | County trunk highway | STH 144 | STH 33 | CTH K |
| | State trunk highway | County trunk highway | STH 143 | CTH P | CTH G |
| | Local trunk highway | County trunk highway | 18th Avenue | CTH NN | City of West Bend |
| | Local trunk highway | County trunk highway | Decorah Road | 18th Avenue | City of West Bend |
| | Local trunk highway | County trunk highway | S. River Road | STH 33 | City of West Bend |
| | Local trunk highway | County trunk highway | Paradise Drive | 18th Avenue | City of West Bend |
| | Local trunk highway | County trunk highway | Paradise Drive | City of West Bend | CTH G |
| | County trunk highway | Local trunk highway | CTH NN | 18th Avenue | CTH P |
| Village of Germantown | New facility | County trunk highway | Division Road extension | Mequon Road | Freistadt Road |
| | State trunk highway | County trunk highway | STH 175 | Maple Road | South corporate limit |
| | State trunk highway | County trunk highway | STH 175 | North corporate limit | Maple Road |
| | Local trunk highway | County trunk highway | Pleasant View Drive | CTH F | Bonniwell Road |
| | Local trunk highway | County trunk highway | County Line Road | Pilgrim Road | STH 145 |
| | Local trunk highway | County trunk highway | County Line Road | STH 145 | East corporate limit |
| | Local trunk highway | County trunk highway | Bonniwell Road | Pleasant View Drive | Country Aire Drive |
| | Local trunk highway | County trunk highway | Freistadt Road | Division Road | STH 145 |
| | Local trunk highway | County trunk highway | Division Road | STH 167 | CTH Q |
| | Local trunk highway | County trunk highway | Country Aire Drive | Bonniwell Road | CTH C |
| | Local trunk highway | County trunk highway | Division Road | Freistadt Road | STH 145 |
| | Local trunk highway | County trunk highway | Lannon Road | STH 175 | USH 41-45 |
| | County trunk highway | Local trunk highway | CTH F | Pleasant View Road | East corporate limit |
| | County trunk highway | Local trunk highway | CTH M | Country Aire Drive | East corporate limit |
| | County trunk highway | Local trunk highway | CTH M | CTH C | End |
| | County trunk highway | Local trunk highway | CTH Y | Hill Top Drive | Goldendale Road |
| | County trunk highway | Local nonarterial | CTH Y | STH 145 | Mequon Road |
| | County trunk highway | Local nonarterial | CTH Y | Mequon Road | STH 175 |
| | County trunk highway | Local nonarterial | CTH F | Mequon Road | STH 175 |
| Village of Jackson | Local trunk highway | County trunk highway | Jackson Road | STH 60 | North corporate limit |
| Village of Kewaskum | New facility | County trunk highway | Kettle View Drive extension | STH 28 | South corporate limit |
| Village of Slinger | State trunk highway | County trunk highway | STH 175 | North corporate limit | South corporate limit |
| | State trunk highway | County trunk highway | STH 144 | North corporate limit | STH 60 |
| | County trunk highway | Local trunk highway | CTH AA | STH 144 | USH 41 |
| City of Hartford | New facility | State trunk highway | New STH 83 | Monroe Avenue | North corporate limit |
| | Local trunk highway | State trunk highway | N. Wilson Avenue | STH 83 | Sumner Street |
| | Local trunk highway | State trunk highway | S. Wilson Avenue | Monroe Avenue | South corporate limit |
| | Local trunk highway | County trunk highway | Arthur Road | CTH U | East corporate limit |
| | Local trunk highway | County trunk highway | State Street | CTH U | Wacker Drive |
| | Local trunk highway | County trunk highway | Wacker Drive | State Street | Sumner Street |
| | New facility | Local trunk highway | Monroe Avenue extension | West corporate limit | Willow Lane |
| | New facility | Local trunk highway | Taylor Road extension | STH 60 | CTH N |
| | State trunk highway | Local trunk highway | Grand Avenue, Main Street, Union Street | North corporate limit | South corporate limit |
| | State trunk highway | Local trunk highway | Branch Street | Main Street | Lincoln Avenue |
| | County trunk highway | Local nonarterial | CTH U | Arthur Road | CTH N |
| | County trunk highway | Local nonarterial | CTH K | North corporate limit | South corporate limit |
| City of West Bend | New facility | County trunk highway | S. River Road extension | STH 33 | South corporate limit |
| | New facility | County trunk highway | N. River Road extension | Creek Road | North corporate limit |
| | Local trunk highway | County trunk highway | Island Avenue | STH 33 | Main Street |
| | Local trunk highway | County trunk highway | S. River Road | CTH I | North corporate limit |
| | Local trunk highway | County trunk highway | N. River Road | STH 33 | Creek Road |
| | Local trunk highway | County trunk highway | N. Main Street | Green Tree Road | Barton Avenue |
| | Local trunk highway | County trunk highway | Paradise Drive | 18th Avenue | East corporate limit |
| | Local trunk highway | County trunk highway | 18th Avenue | South corporate limit | STH 33 |
| | Local trunk highway | County trunk highway | Main Street | Island Avenue | Paradise Drive |
| | Local trunk highway | County trunk highway | Decorah Road | 18th Avenue | CTH I |
| | New facility | Local trunk highway | 18th Avenue extension | North corporate limit | Park Avenue |
| City of Milwaukee | Local trunk highway | County trunk highway | County Line Road | West corporate limit | Wausaukee Road |

*Source: SEWRPC.*

## Map 145

### PROPOSED CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS UNDER THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO WASHINGTON COUNTY

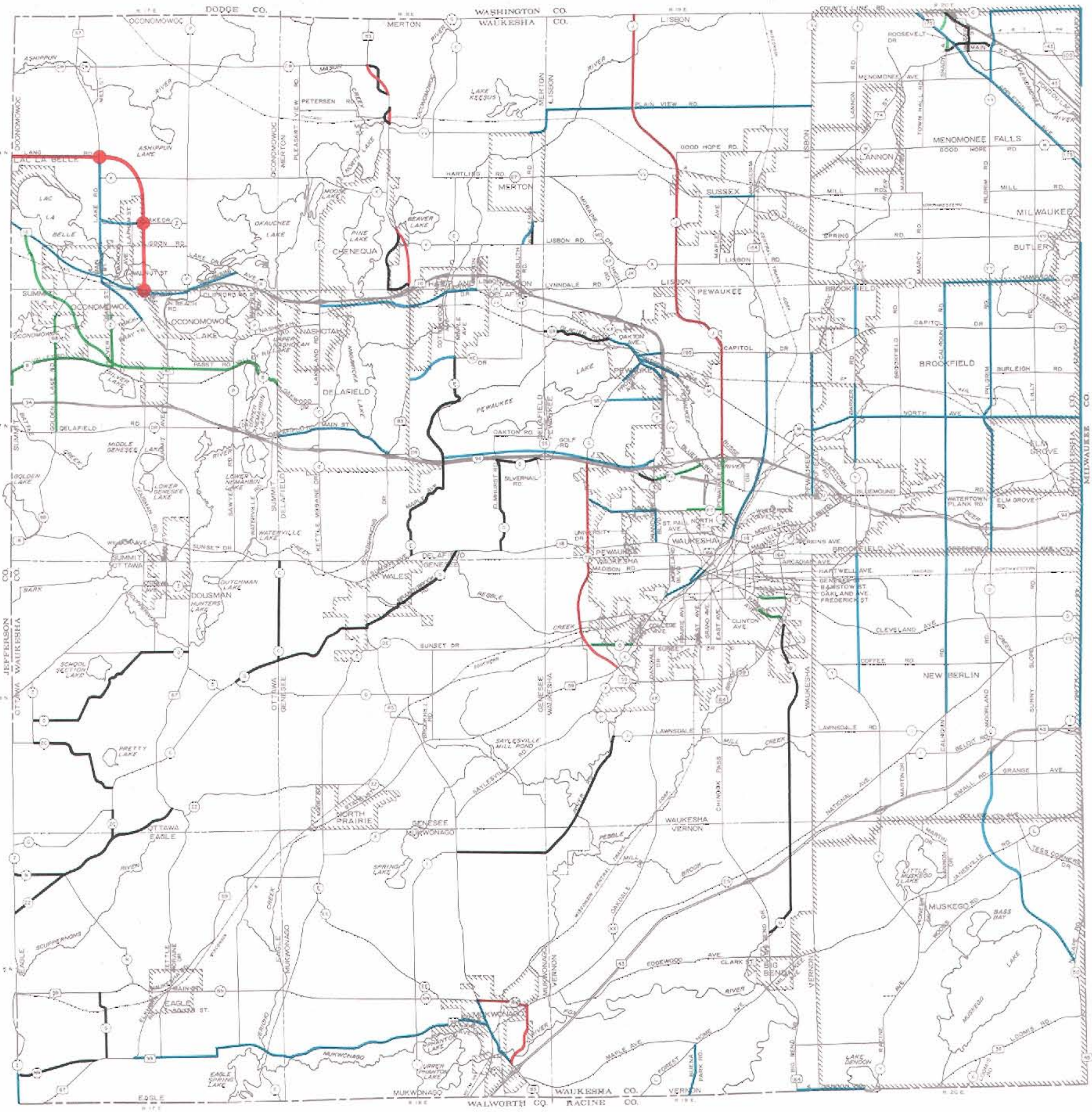



The proposed changes in jurisdictional responsibility for arterial streets and highways in Washington County are shown on the accompanying map. In 1991, the State trunk highway system in Washington County totalled 186 miles, the county trunk highway system totalled 148 miles, and the local arterial system totalled 65 miles. By the year 2010, through the jurisdictional transfers identified on the accompanying map and listed on Table 266, the State trunk highway system would total 159 miles, the county trunk highway system would total 234 miles, and the local arterial system would total 75 miles.

*Source: SEWRPC.*

Map 146

# PROPOSED CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS UNDER THE RECOMMENDED REGIONAL TRANSPORTATION PLAN AS APPLIED TO WAUKESHA COUNTY




## LEGEND

TRANSFERS TO:

STATE TRUNK HIGHWAY SYSTEM

COUNTY TRUNK HIGHWAY SYSTEM

LOCAL TRUNK HIGHWAY SYSTEM

LOCAL (NONARTERIAL) SYSTEM

NOTE: THE RECOMMENDATION TO PLACE CALHOUN ROAD ON COUNTY TRUNK HIGHWAY SYSTEM FROM CTH ES TO CTH K IS CONTINGENT UPON THE CONSTRUCTION OF A NEW INTERCHANGE ON IH 94 AT CALHOUN ROAD.

The proposed changes in jurisdictional responsibility for the arterial streets and highways in Waukesha County are shown on the accompanying map. In 1991, the State trunk highway system in Waukesha County totalled 231 miles, the county trunk highway system totalled 320 miles, and the local arterial system totalled 165 miles. By the year 2010, through the jurisdictional transfers identified on the accompanying map and listed on Table 267, the State trunk highway system would total 230 miles, the county trunk highway system would total 413 miles, and the local arterial system would total 131 miles.



*Source: SEWRPC.*

## Table 267

## CHANGES IN JURISDICTIONAL RESPONSIBILITY FOR ARTERIAL STREETS AND HIGHWAYS IN WAUKESHA COUNTY UNDER THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Civil Division | Jurisdictional Responsibility | | Facility | From | To |
|---|---|---|---|---|---|
| | Existing | Planned | | | |
| Town of Brookfield | Local trunk highway | County trunk highway | Springdale Road | CTH JJ | STH 190 |
| | - - | County trunk highway | Extension of Barker Road | STH 190 | Village of Menomonee Falls |
| | Local nonarterial | Local trunk highway | Brookfield Road | North corporate limits | South corporate limits |
| Town of Delafield | State trunk highway | County trunk highway | Frontage Road (Golf Road) | Town of Pewaukee | CTH E |
| | - - | County trunk highway | Extension of CTH KE | STH 83 | CTH E |
| | County trunk highway | Local nonarterial | CTH E | CTH KE | USH 18 |
| | County trunk highway | Local nonarterial | CTH G (Silvernail Road) | CTH G (Elmhurst Road) | CTH SS |
| | County trunk highway | Local nonarterial | CTH G (Elmhurst Road) | CTH G (Silvernail Road) | USH 18 |
| | County trunk highway | Local nonarterial | CTH G (Brandy Brook Road) | USH 18 | Town of Genesee |
| | County trunk highway | Local nonarterial | CTH GR | CTH KE | Town of Pewaukee |
| Town of Eagle | State trunk highway | County trunk highway | STH 99 | STH 67 | Town of Mukwonago |
| | Local nonarterial | County trunk highway | Little Prairie Road | CTH NN | Walworth county line |
| | County trunk highway | Local nonarterial | CTH N | Jefferson county line | STH 59 |
| | County trunk highway | Local nonarterial | CTH S | STH 59 | STH 67 |
| | County trunk highway | Local nonarterial | CTH NN | Jefferson county line | STH 67 |
| | County trunk highway | Local nonarterial | CTH ZC | Town of Ottawa | CTH ZZ |
| | County trunk highway | Local nonarterial | CTH ZZ | Jefferson county line | Town of Ottawa |
| Town of Genesee | County trunk highway | Local nonarterial | CTH C | USH 18 | CTH G |
| | County trunk highway | Local nonarterial | CTH G (Brandy Brook Road) | Town of Delafield | Town of Ottawa |
| Town of Lisbon | County trunk highway | State trunk highway | CTH J | Washington county line | Town of Pewaukee |
| | Local trunk highway | County trunk highway | Plain View Road | Oak Road | Town Line Road |
| Town of Merton | - - | State trunk highway | STH 83 | Oconomowoc River | Little Oconomowoc River |
| | - - | State trunk highway | STH 83 | Point 950 feet north of Little Oconomowoc River | CTH CW |
| | - - | State trunk highway | STH 83 | STH 16 | Village of Chenequa |
| | Local trunk highway | County trunk highway | Oak Road | Plain View Road | Village of Merton |
| | - - | County trunk highway | Extension of CTH KE | CTH K | CTH KE |
| | State trunk highway | Local nonarterial | STH 83 | Village of Chenequa | STH 16 |
| | County trunk highway | Local nonarterial | CTH KE | 0.5 mile north of CTH K | CTH K |
| Town of Mukwonago | - - | State trunk highway | STH 83 (Mukwonago bypass) | IH 43 | CTH NN |
| | State trunk highway | County trunk highway | STH 99 | Village of Mukwonago | Town of Eagle |
| | County trunk highway | Local nonarterial | CTH I | Town of Vernon | STH 83 |
| Town of Oconomowoc | - - | State trunk highway | STH 16-STH 67 (Oconomowoc bypass) | STH 67 at STH 16 | Jefferson county line |
| | State trunk highway | County trunk highway | STH 16 | City of Oconomowoc | Jefferson county line |
| | State trunk highway | County trunk highway | STH 67 | STH 16 Oconomowoc bypass | City of Oconomowoc |
| | Local trunk highway | County trunk highway | Wisconsin Avenue | CTH R | CTH P |
| | - - | Local trunk highway | Oconomowoc Parkway | STH 16 | Town of Summit |
| Town of Ottawa | County trunk highway | Local nonarterial | CTH C | USH 18 | CTH G |
| | County trunk highway | Local nonarterial | CTH D | CTH Z | STH 67 |
| | County trunk highway | Local nonarterial | CTH C (Brandy Brook Road) | East corporate limits | CTH D |
| | County trunk highway | Local nonarterial | CTH ZC | CTH Z | CTH C |
| | County trunk highway | Local nonarterial | CTH ZC | CTH C | Town of Eagle |
| | County trunk highway | Local nonarterial | CTH ZZ | Town of Eagle | STH 67 |
| Town of Pewaukee | County trunk highway | State trunk highway | CTH TT | USH 18 | Town of Waukesha |
| | County trunk highway | State trunk highway | CTH J | Town of Lisbon | IH 94 |
| | Local trunk highway | State trunk highway | Meadowbrook Road | IH 94 | City of Waukesha |
| | Local trunk highway | State trunk highway | Meadowbrook Road | City of Waukesha | Northview Road |
| | - - | State trunk highway | Waukesha western bypass | Northview Road | USH 18 |
| | State trunk highway | County trunk highway | STH 164 | STH 190 | City of Waukesha |
| | State trunk highway | County trunk highway | Frontage Road (Golf Road) | City of Waukesha | Town of Delafield |
| | Local trunk highway | County trunk highway | Northview Road | Meadowbrook Road | City of Waukesha |
| | Local trunk highway | County trunk highway | Springdale Road | CTH JJ | STH 190 |
| | - - | County trunk highway | Extension of CTH SS | CTH G | CTH T |
| | County trunk highway | Local trunk highway | CTH J | City of Waukesha | IH 94 |
| | County trunk highway | Local trunk highway | CTH FT | A point about 0.7 mile west of CTH J | CTH J |
| | County trunk highway | Local trunk highway | CTH TJ | City of Waukesha | CTH JJ |
| | County trunk highway | Local nonarterial | CTH GR | Town of Delafield | Village of Pewaukee |
| Town of Summit | State trunk highway | County trunk highway | STH 16 | CTH P | City of Oconomowoc |
| | - - | Local trunk highway | Valley Road | STH 67 | CTH P |
| | County trunk highway | Local trunk highway | CTH B | Jefferson county line | CTH Z |
| | County trunk highway | Local trunk highway | CTH B | CTH P | City of Delafield |
| | County trunk highway | Local trunk highway | CTH BB | CTH DR | City of Oconomowoc |
| | County trunk highway | Local trunk highway | CTH Z | CTH B | City of Oconomowoc |
| | - - | Local trunk highway | Oconomowoc Parkway | Town of Oconomowoc | STH 67 |
| | County trunk highway | Local nonarterial | CTH B | CTH Z | City of Oconomowoc |
| | County trunk highway | Local nonarterial | CTH B | STH 67 | CTH P |
| Town of Vernon | Local trunk highway | County trunk highway | Center Drive | CTH L | Racine county line |
| | County trunk highway | Local nonarterial | CTH U (Guthrie Road) | Town of Waukesha | STH 164 |
| | County trunk highway | Local nonarterial | CTH I | Town of Waukesha | Town of Mukwonago |

Table 267 (continued)

| Civil Division | Jurisdictional Responsibility Existing | Jurisdictional Responsibility Planned | Facility | From | To |
|---|---|---|---|---|---|
| Town of Waukesha | County trunk highway | State trunk highway | CTH TT | Town of Pewaukee | Macarthur Road |
| | - - | State trunk highway | Waukesha western bypass | Macarthur Road | STH 59 |
| | County trunk highway | Local trunk highway | CTH D (Broadway) | City of Waukesha | STH 59 |
| | County trunk highway | Local trunk highway | CTH D (Sunset Drive) | CTH TT | CTH X |
| | County trunk highway | Local trunk highway | CTH Y (Racine Avenue) | City of Waukesha | City of Waukesha |
| | County trunk highway | Local nonarterial | CTH I | Lawnsdale Road | Town of Vernon |
| | County trunk highway | Local nonarterial | CTH U (Guthrie Road) | CTH Y | City of Waukesha |
| | County trunk highway | Local nonarterial | CTH U (Guthrie Road) | City of Waukesha | Town of Vernon |
| Village of Butler | Local trunk highway | County trunk highway | 124th Street | North corporate limits | South corporate limits |
| Village of Chenequa | - - | State trunk highway | STH 83 | CTH K | Thompson Lane |
| | Local trunk highway | County trunk highway | Vettelson Drive | CP Rail System | City of Delafield |
| | State trunk highway | Local nonarterial | STH 83 | Thompson Lane | Town of Merton |
| Village of Elm Grove | Local trunk highway | County trunk highway | North Avenue | City of Brookfield | Milwaukee county line |
| | Local trunk highway | County trunk highway | Pilgrim Parkway | North Avenue | USH 18 |
| | Local trunk highway | County trunk highway | 124th Street | City of Brookfield | Knoll Road |
| | - - | County trunk highway | Extension of 124th Street | City of Brookfield | Knoll Road |
| Village of Hartland | Local trunk highway | County trunk highway | Vettelson Drive | City of Delafield | Capitol Drive |
| | Local trunk highway | County trunk highway | Capitol Drive | Vettelson Drive | CTH KC |
| | - - | County trunk highway | Extension of CTH KE | STH 83 | Town of Delafield |
| Village of Menomonee Falls | State trunk highway | County trunk highway | STH 175 | Milwaukee county line | Washington county line |
| | Local trunk highway | County trunk highway | Boundary Road | County Line Road | STH 100 |
| | Local trunk highway | County trunk highway | County Line Road | Pilgrim Road | Boundary Road |
| | Local trunk highway | County trunk highway | Lisbon Road | Calhoun Road | Hampton Avenue |
| | Local trunk highway | County trunk highway | Hampton Avenue | Lisbon Road | Village of Butler |
| | Local trunk highway | County trunk highway | Pilgrim Road | County Line Road | STH 175 |
| | - - | County trunk highway | Extension of Boundary Road | STH 100 | STH 145 |
| | - - | County trunk highway | Extension of Lannon Road | CTH K | City of Brookfield |
| | Local nonarterial | Local trunk highway | River Crest Drive | STH 175 | Shady Lane |
| | - - | Local trunk highway | Extension of River Crest Drive | Shady Lane | Village of Germantown |
| | - - | Local trunk highway | Extension of Shady Lane | STH 175 | Thomas Drive |
| | Local trunk highway | Local nonarterial | Roosevelt Drive | Shady Lane | Pilgrim Road |
| | Local trunk highway | Local nonarterial | Water Street | STH 74 | Richfield Way |
| | Local trunk highway | Local nonarterial | Richfield Way | Water Street | Village of Germantown |
| Village of Merton | Local trunk highway | County trunk highway | Oak Road | CTH VV | Town of Merton |
| Village of Mukwonago | County trunk highway | State trunk highway | CTH NN | Mukwonago bypass | STH 83 |
| | - - | State trunk highway | STH 83 (Mukwonago bypass) | North corporate limits | South corporate limits |
| | State trunk highway | County trunk highway | STH 83 (Rochester Street) | CTH NN | Mukwonago bypass |
| | State trunk highway | County trunk highway | STH 99 | Town of Mukwonago | STH 83 (Rochester Street) |
| Village of Nashotah | Local trunk highway | County trunk highway | Rasmus Drive | CTH C | City of Delafield |
| Village of Pewaukee | Local trunk highway | County trunk highway | Capitol Drive | Oakton Avenue | STH 16 |
| | Local trunk highway | County trunk highway | Oakton Avenue | Capitol Drive | Wisconsin Avenue |
| | Local trunk highway | County trunk highway | Prospect Avenue | Wisconsin Avenue | Town of Pewaukee |
| | Local trunk highway | County trunk highway | Wisconsin Avenue | East corporate limits | West corporate limits |
| | - - | County trunk highway | Extension of CTH SS | East corporate limits | West corporate limits |
| Village of Sussex | County trunk highway | State trunk highway | CTH J | North corporate limits | South corporate limits |
| | Local trunk highway | County trunk highway | Main Street | Locust Street | STH 164 |
| Village of Wales | County trunk highway | Local nonarterial | CTH G (Brandy Brook Road) | East corporate limits | West corporate limits |
| City of Brookfield | Local trunk highway | County trunk highway | Barker Road | North corporate limits | South corporate limits |
| | Local trunk highway | County trunk highway | Calhoun Road | STH 59 | CTH K |
| | Local trunk highway | County trunk highway | Lisbon Road | Calhoun Road | Hampton Avenue |
| | Local trunk highway | County trunk highway | Hampton Avenue | Lisbon Road | Village of Butler |
| | Local trunk highway | County trunk highway | Moorland Road | USH 18 | STH 59 |
| | Local trunk highway | County trunk highway | North Avenue | Town of Pewaukee | Milwaukee county line |
| | Local trunk highway | County trunk highway | Pilgrim Parkway | North Avenue | USH 18 |
| | Local trunk highway | County trunk highway | Pilgrim Road | Lisbon Road | North Avenue |
| | Local trunk highway | County trunk highway | 124th Street | Village of Elm Grove | Village of Butler |
| | Local trunk highway | County trunk highway | 124th Street | Robinwood Street | Village of Elm Grove |
| | Local trunk highway | County trunk highway | Springdale Road | STH 190 | South corporate limits |
| | - - | County trunk highway | Extension of 124th Street | North corporate limits | Robinwood Street |
| City of Delafield | Local trunk highway | County trunk highway | Main Street | Town of Summit | Milwaukee Street |
| | Local trunk highway | County trunk highway | Milwaukee Street | Main Street | STH 83 |
| | Local trunk highway | County trunk highway | Vettelson Drive | Village of Nashotah | CP Rail System |
| | Local trunk highway | County trunk highway | Vettelson Drive | Village of Chenequa | Village of Hartland |
| City of Muskego | Local trunk highway | County trunk highway | S. Denoon Road | Crowbar Drive | CTH Y |
| | - - | County trunk highway | Extension of Moorland Road | CTH HH | CTH L |
| | - - | County trunk highway | Extension of Moorland Road | CTH L | Durham Road |
| | Local nonarterial | County trunk highway | Durham Road | Woods Road | CTH OO |
| | Local nonarterial | Local trunk highway | Martin Drive | CTH HH | Lannon Drive |
| | Local nonarterial | Local trunk highway | Lannon Drive | Martin Drive | CTH L |
| | - - | Local trunk highway | Extension of Sunnyslope Road | CTH HH | CTH L |

Table 267 (continued)

| Civil Division | Jurisdictional Responsibility: Existing | Jurisdictional Responsibility: Planned | Facility | From | To |
|---|---|---|---|---|---|
| City of New Berlin | Local trunk highway | County trunk highway | Calhoun Road | CTH ES | STH 59 |
| | Local trunk highway | County trunk highway | Johnson Road | STH 59 | 0.4 mile south of STH 59 |
| | Local trunk highway | County trunk highway | Johnson Road | Lincoln Avenue | Coffee Road |
| | Local trunk highway | County trunk highway | Moorland Road | IH 43 | Grange Avenue |
| | - - | County trunk highway | Extension of Johnson Road | 0.4 mile south of STH 59 | Lincoln Avenue |
| | - - | County trunk highway | Extension of Johnson Road | Coffee Road | CTH Y |
| | - - | County trunk highway | Extension of Moorland Road | South corporate limits | Grange Avenue |
| City of Oconomowoc | - - | State trunk highway | STH 16-STH 67 (Oconomowoc bypass) | South corporate limits | North corporate limits |
| | State trunk highway | County trunk highway | STH 16 | East corporate limits | West corporate limits |
| | State trunk highway | County trunk highway | STH 67 | North corporate limits | STH 16 |
| | Local trunk highway | County trunk highway | Summit Avenue | Thackeray Trail | STH 16 |
| | Local nonarterial/-- | County trunk highway | Lake Drive/Fairview Road | STH 67 | Lapham Street |
| | County trunk highway | Local trunk highway | CTH Z | Marigold Street | Lake Drive |
| | - - | Local trunk highway | Oconomowoc Parkway | North corporate limits | East corporate limits |
| | County trunk highway | Local nonarterial | CTH B | East corporate limits | West corporate limits |
| City of Waukesha | County trunk highway | State trunk highway | CTH TT | North corporate limits | South corporate limits |
| | Local trunk highway | State trunk highway | Meadowbrook Road | North corporate limits | South corporate limits |
| | State trunk highway | County trunk highway | STH 164 | USH 18 | Town of Pewaukee |
| | State trunk highway | County trunk highway | Frontage Road (Golf Road) | CTH T | Town of Pewaukee |
| | Local trunk highway | County trunk highway | Grandview Boulevard | USH 18 | Northview Road |
| | Local trunk highway | County trunk highway | North Street | USH 18 | St. Paul Avenue |
| | Local trunk highway | County trunk highway | Northview Road | Town of Pewaukee | CTH T |
| | Local trunk highway | County trunk highway | St. Paul Avenue | Harris Highland Drive | USH 18 |
| | County trunk highway | Local trunk highway | CTH D (Sunset Drive) | CTH X | West corporate limits |
| | County trunk highway | Local trunk highway | CTH J | Gascoigne Drive | Town of Pewaukee |
| | County trunk highway | Local trunk highway | CTH FT | A point about 0.7 mile west of CTH J | CTH J |
| | Local nonarterial | Local trunk highway | Main Street | Hartwell Avenue | Moreland Boulevard |
| | County trunk highway | Local nonarterial | CTH U (Guthrie Road) | North corporate limits | South corporate limits |
| | County trunk highway | Local trunk highway | CTH TJ | CTH T | Town of Pewaukee |
| | County trunk highway | Local nonarterial | CTH TJ | Meadow Lane | CTH T |

*Source: SEWRPC.*

facilities to arterial status to accommodate expected traffic volumes and to provide the spacing of arterial facilities necessary to structure planned urban development properly. The plan would provide for the construction of nine new miles of arterial facilities, for the widening of 45 miles, and for the preservation of 301 miles of facilities within the County. The location and description of each of the planned functional improvements in Kenosha County is set forth in Table 268.

*Milwaukee County*: The arterial street and highway system in Milwaukee County is recommended to be expanded by 22 miles, or 3 percent, from 775 miles in 1991 to 797 miles in the year 2010 (see Map 126, page 537). The increase in arterial mileage would come about through the construction of 11 new miles of facility and through the conversion of 11 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the spacing of arterial facilities necessary to structure planned urban development properly. The plan would provide for the construction of 11 new miles of arterial facilities, for the widening of 50 miles, and for the preservation of 736 miles of facilities within the County. The location and description of each of the planned functional improvements in Milwaukee County is set forth in Table 269.

*Ozaukee County*: The arterial street and highway system in Ozaukee County is recommended to be expanded by 16 miles, or 6 percent, from 289 miles in 1991 to nearly 305 miles in the year 2010 (see Map 127, page 538). The increase in arterial mileage would come about through the construction of six new miles of facility and through the conversion of nine miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the spacing of arterial facilities necessary to structure planned urban development

Table 268

FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN KENOSHA COUNTY UNDER THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Recommended Jurisdiction | Improvement Type | Facility | Termini | Improvement Description |
|---|---|---|---|---|
| State | Widening | STH 31 | 31st Street to CTH KR | Widen from two to four traffic lanes |
| | | STH 32 | 128th Street to CTH T | Widen from two to four traffic lanes |
| | | STH 50 | Walworth county line to 381st Avenue | Widen from two to four traffic lanes |
| | | STH 50 | IH 94-USH 41 to 39th Avenue | Widen from four to six traffic lanes |
| | | STH 83 | 128th Street to STH 50 | Widen from two to four traffic lanes |
| | | STH 158 | 104th Avenue to STH 31 | Widen from two to four traffic lanes |
| | | STH 165 | CTH H to STH 31 | Widen from two to four traffic lanes |
| | | STH 165 | STH 31 to STH 32 | Widen from two to four traffic lanes |
| | | STH 165 | IH 94-USH 41 to a point approximately one mile west of CTH H | Widen from two to four traffic lanes |
| | | 63rd Street | 22nd Avenue to STH 32 | Widen from two to four traffic lanes |
| | | Roosevelt Road | 39th Avenue to 63rd Street | Widen from two to four traffic lanes |
| County | Widening | CTH E | STH 31 to STH 32 | Widen from two to four traffic lanes |
| | | 30th Avenue | 27th Street to CTH E | Widen from two to four traffic lanes |
| | | 60th Avenue | 39th Avenue to STH 32 | Widen from two to four traffic lanes |
| | | CTH S | IH 94-USH 41 to STH 31 | Widen from two to four traffic lanes |
| | | 22nd Avenue | CTH L to E | Widen from two to four traffic lanes |
| | | 22nd Avenue | CTH E to CTH KR | Widen from two to four traffic lanes |
| | | Washington Road | 39th Avenue to STH 32 | Widen from two to four traffic lanes |
| | Expansion | IH 94-USH 41 | CTH ML | Construct new interchange |
| | | CTH AH extension | CTH F to CTH SA | Construct two lanes on new alignment |
| | | CTH F extension | CTH O to 89th Street | Construct two lanes on new alignment |
| | | CTH KD extension | CTH EM to CTH F | Construct two lanes on new alignment |
| | | CTH ML extension | CTH H to STH 31 | Construct two lanes on new alignment |
| | | CTH Q extension | 184th Street extended to 168th Street | Construct two lanes on new alignment |
| Local | Widening | 39th Avenue | Van Buren Road to STH 50 | Widen from two to four traffic lanes |
| | | 104th Avenue | STH 50 to STH 158 | Widen from two to four traffic lanes |
| | Expansion | 39th Avenue extension | 24th Street to 15th Street | Construct two lanes on new alignment |
| | | 51st Avenue extension | 93rd Street to STH 165 | Construct two lanes on new alignment |
| | | 85th Street extension | 39th Avenue to 32nd Avenue | Construct two lanes on new alignment |
| | | 85th Street extension | Sheridan Road to 7th Avenue | Construct two lanes on new alignment |

*Source: SEWRPC.*

properly. The plan would provide for the construction of six new miles of arterial facilities, for the widening of 49 miles, and for the preservation of 250 miles of facilities within the County. The location and description of each of the planned functional improvements in Ozaukee County is set forth in Table 270.

Racine County: The arterial street and highway system in Racine County is recommended to be expanded by 76 miles, or 22 percent, from 348 miles in 1991 to 424 miles in the year 2010 (see Map 128, page 539). The increase in arterial mileage would come about through the construction of 19 new miles of facility and through the conversion of 57 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the spacing of arterial facilities necessary to structure planned urban development properly. The plan would provide for the construction of 19 new miles of arterial facilities, for the widening of 62 miles, and for the preservation of 343 miles of facilities within the County. The location and description of each of the planned functional improvements is set forth in Table 271.

Walworth County: The arterial street and highway system in Walworth County is recommended to be expanded by 55 miles, or 13 percent, from 429 miles in 1991 to 484 miles in the year 2010 (see Map 129, page 540). The increase in arterial mileage would come about through the construction of 36 new miles of

### Table 269

### FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN MILWAUKEE COUNTY UNDER THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Recommended Jurisdiction | Improvement Type | Facility | Termini | Improvement Description |
|---|---|---|---|---|
| State | Widening | USH 45-STH 36 | Waukesha County line to STH 100 | Widen from two to four traffic lanes |
| | | STH 32 | County Line Road to STH 100 | Widen from two to four traffic lanes |
| | | STH 38 | County Line Road to Oakwood Road | Widen from two to four traffic lanes |
| | | STH 100 | IH 43 to STH 24 | Widen from six to eight traffic lanes |
| | | STH 100 | CTH H to USH 41 | Widen from two to four traffic lanes |
| | | STH 100 | STH 36 to CTH H | Widen from two to four traffic lanes |
| | | STH 100 | STH 38 to STH 32 | Widen from two to four traffic lanes |
| | | CTH BB | CTH U to USH 41 | Widen from two to four traffic lanes |
| | | Fond du Lac Avenue | 35th Street to 20th Street | Widen from two to four traffic lanes |
| | | Pennsylvania Avenue | College Avenue to Layton Avenue | Widen from two to four traffic lanes |
| | | Pennsylvania Avenue | Rawson Avenue to College Avenue | Widen from two to four traffic lanes |
| | | 124th Street | STH 145 to USH 41-USH 45 | Widen from two to four traffic lanes |
| | Expansion | Lake Parkway | Lincoln Avenue to CTH Y | Construct four lanes on new alignment |
| County | Widening | 107th Street | Good Hope Road to STH 145 | Widen from two to four traffic lanes |
| | | CTH U | Grange Avenue to Rawson Avenue | Widen from two to four traffic lanes |
| | | CTH U | Rawson Avenue to Puetz Road | Widen from two to four traffic lanes |
| | | CTH Y | Pennsylvania Avenue to STH 32 | Widen from two to four traffic lanes |
| | | CTH ZZ | STH 36 to USH 41 | Widen from two to four traffic lanes |
| | | CTH ZZ | STH 38 to Pennsylvania Avenue | Widen from two to four traffic lanes |
| | | Cleveland Avenue | Waukesha County line to 113th Street | Widen from two to four traffic lanes |
| | | Good Hope Road | Waukesha County line to USH 41-USH 45 | Widen from two to four traffic lanes |
| | | Layton Avenue | 108th Street to 84th Street | Widen from two to four traffic lanes |
| | | Oklahoma Avenue | Clement Avenue to Kinnickinnic Avenue | Widen from two to four traffic lanes |
| | | 124th Street | STH 190 to Hampton Avenue | Widen from two to four traffic lanes |
| | | 124th Street | Hampton Avenue to CTH VV | Widen from two to four traffic lanes |
| | | 124th Street | North Avenue to Watertown Plank Road | Widen from two to four traffic lanes |
| | Expansion | Puetz Road extension | CTH U to Hunting Park Drive | Construct two lanes on new alignment |
| | | 124th Street extension | STH 100 to STH 145 | Construct four lanes on new alignment |
| | | 124th Street extension | Watertown Plank Road to STH 59 | Construct two lanes on new alignment |
| Local | Widening | CTH G | Mill Road to Bradley Road | Widen from two to four traffic lanes |
| | | Drexel Avenue | STH 38 to Pennsylvania Avenue | Widen from two to four traffic lanes |
| | | Howard Avenue | Thompson Avenue to STH 32 | Reconstruction of two traffic lanes |
| | | Howard Avenue | Clement Avenue to Lake Parkway | Widen from two to four traffic lanes |
| | | Morgan Avenue | Forest Home Avenue to 43rd Street | Widen from two to four traffic lanes |
| | | Pennsylvania Avenue | STH 100 to Drexel Avenue | Widen from two to four traffic lanes |
| | | Pennsylvania Avenue | Drexel Avenue to Rawson Avenue | Widen from two to four traffic lanes |
| | | Whitnall Avenue | CTH Y to Packard Avenue | Widen from two to four traffic lanes |
| | | Whitnall Avenue | Clement Avenue to Pennsylvania Avenue | Widen from two to four traffic lanes |
| | | 84th Street | Whitaker Avenue to Howard Avenue | Widen from two to four traffic lanes |
| | | 91st Street | Ozaukee County line to STH 100 | Widen from two to four traffic lanes |
| | Expansion | Canal Street extension | 6th Street to 2nd Street | Construct two lanes on new alignment |
| | | Canal Street extension | USH 41 to 21st Street | Construct two lanes on new alignment |
| | | Howard Avenue extension | Thompson Avenue to Kansas Avenue | Construct four lanes on new alignment |
| | | 15th Avenue extension | STH 100 to Elm Road | Construct two lanes on new alignment |
| | | Metro Boulevard | 115th Street to 107th Street | Construct two lanes on new alignment |

*Source: SEWRPC.*

facility and through the conversion of 19 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the spacing of arterial facilities necessary to structure planned urban development properly. The plan would provide for the construction of 36 new miles of arterial facilities, for the widening of 38 miles, and for the preservation of 410 miles of facilities within the County. The location and description of each of the planned functional improvements is set forth in Table 272.

<u>Washington County</u>: The arterial street and highway system in Washington County is recommended to be expanded by 69 miles, or

Table 270

**FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN OZAUKEE COUNTY UNDER THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010**

| Recommended Jurisdiction | Improvement Type | Facility | Termini | Improvement Description |
|---|---|---|---|---|
| State | Widening | STH 32 | Spring Street to Franklin Street | Widen from two to four traffic lanes |
| | | STH 33 | Washington county line to Progress Drive | Widen from two to four traffic lanes |
| | | STH 33 | Progress Drive to Foster Street | Widen from two to four traffic lanes |
| | | STH 33 | IH 43 to Spring Street | Widen from two to four traffic lanes |
| | | STH 57 | IH 43 to Sheboygan county line | Widen from two to four traffic lanes |
| | | STH 57 | Milwaukee county line to STH 167 | Widen from two to four traffic lanes |
| | | STH 60 | STH 143 to STH 57 | Widen from two to four traffic lanes |
| | | STH 60 | STH 57 to IH 43 | Widen from two to four traffic lanes |
| | | STH 60 | Washington county line to STH 143 | Widen from two to four traffic lanes |
| | | STH 143 | CTH N to STH 60 | Widen from two to four traffic lanes |
| | | STH 167 | Washington county line to Wauwatosa Road | Widen from two to four traffic lanes |
| | | CTH N/Wauwatosa Road | STH 143 to STH 167 | Widen from two to four traffic lanes |
| | Expansion | IH 43 | Highland Road | Construct new interchange |
| County | Widening | CTH C/Pioneer Road | CTH N to McKinley Boulevard | Widen from two to four traffic lanes |
| | | CTH C/Pioneer Road | McKinley Boulevard to IH 43 | Widen from two to four traffic lanes |
| | | CTH W | Port Washington Lane to a point about 0.5 mile north of Donges Bay Road | Widen from two to four traffic lanes |
| | | CTH W | STH 167 to Highland Road | Widen from two to four traffic lanes |
| | Expansion | Granville Road | Highland Road to Freistadt Road | Construct two lanes on new alignment |
| Local | Widening | STH 57 | Bridge Street to Chateau Drive | Widen from two to four traffic lanes |
| | Expansion | Cold Springs Road extension | CTH O to STH 33 | Construct two lanes on new alignment |
| | | Maple Road extension | Cedar Creek Road to Rose Street at the Village of Grafton north city limits | Construct two lanes on new alignment |
| | | River Road extension | Bonniwell Road to Highland Road | Construct two lanes on new alignment |
| | | River Road extension | Freistadt Road to Grace Avenue | Construct two lanes on new alignment |

*Source: SEWRPC.*

17 percent, from 399 miles in 1991 to 468 miles in the year 2010 (see Map 130, page 541). The increase in arterial mileage would come about through the construction of 23 new miles of facility and through the conversion of 46 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the spacing of arterial facilities necessary to structure planned urban development properly. The plan would provide for the construction of 23 new miles of arterial facilities, for the widening of 70 miles, and for the preservation of 375 miles of facilities within the County. The location and description of each of the planned functional improvements is set forth in Table 273.

*Waukesha County*: The arterial street and highway system in Waukesha County is recommended to be expanded by 58 miles, or 8 percent, from 716 miles in 1991 to 774 miles in the year 2010 (see Map 131, page 542). The increase in arterial mileage would come about through the construction of 26 new miles of facility and through the conversion of 32 miles of previously nonarterial facilities to arterial status to accommodate expected traffic volumes and to provide the spacing of arterial facilities necessary to structure planned urban development properly. The plan would provide for the construction of 26 new miles of arterial facilities, for the widening of 134 miles, and for the preservation of 614 miles of facilities within the County. The location and description of each of the planned functional improvements is set forth in Table 274.

*Functional Improvements*: It is recommended that the Wisconsin Department of Transportation act to expand, improve, and maintain, in accordance with the plan recommendations, the arterial street and highway facilities under State jurisdiction. It is also recommended that the county boards of the seven constituent counties

Table 271

FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN RACINE COUNTY UNDER THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Recommended Jurisdiction | Improvement Type | Facility | Termini | Improvement Description |
|---|---|---|---|---|
| State | Widening | STH 20 | IH 94-USH 41 to Sunnyslope Drive | Widen from four to six traffic lanes |
| | | STH 20 | USH 45 to a point 0.73 mile west of CTH C | Widen from two to four traffic lanes |
| | | STH 31 | CTH KR to STH 11 | Widen from two to four traffic lanes |
| | | STH 31 | CTH MM to STH 32 | Widen from two to four traffic lanes |
| | | STH 32 | Milwaukee County to Five Mile Road | Widen from two to four traffic lanes |
| | | STH 32 | A point about 0.3 mile north of CTH G to Three Mile Road | Widen from two to four traffic lanes |
| | | STH 36-STH 83 | Wegge Road to STH 20 | Widen from two to four traffic lanes |
| | | STH 36 | STH 20 to Waukesha County | Widen from two to four traffic lanes |
| | | STH 38 | Milwaukee County to CTH K | Widen from two to four traffic lanes |
| | | CTH K | IH 94 to CTH H | Widen from two to four traffic lanes |
| | | CTH K | Kraut Road to STH 38 | Widen from two to four traffic lanes |
| | | STH 11 | 71st Street in the Village of Union Grove to IH 94 | Widen from two to four traffic lanes |
| | | STH 11 | IH 94 to CTH H | Widen from two to four traffic lanes |
| | | STH 11 | 86th Street in the Village of Sturtevant to Willow Road | Widen from two to four traffic lanes |
| | | STH 11 | Willow Road to STH 31 | Widen from four to six traffic lanes |
| | Expansion | Burlington bypass | STH 36 (Milwaukee Avenue) to STH 11 | Construct two lanes on new alignment |
| | | Burlington bypass | STH 11 to STH 36 (State Street) | Construct two lanes on new alignment |
| | | CTH K extension | Britton Road to 108th Street | Construct two lanes on new alignment |
| County | Widening | CTH C | CTH V to Airline Road | Widen from two to four traffic lanes |
| | | CTH C | Airline Road to Sunnyslope Road | Widen from two to four traffic lanes |
| | | CTH Y | CTH KR to CTH X | Widen from two to four traffic lanes |
| | | Three Mile Road | STH 32 to CTH G | Widen from two to four traffic lanes |
| Local | Expansion | 21st Street extension | STH 31 to Oakes Road | Construct two lanes on new alignment |
| | | Emmertsen Road extension | Three Mile Road to STH 38 | Construct two lanes on new alignment |
| | | Five Mile Road extension | STH 32 to Erie Street | Construct two lanes on new alignment |
| | | Memorial Drive extension | Chicory Road to CTH KR | Construct two lanes on new alignment |
| | | Oakes Road extension | STH 11 to 16th Street | Construct two lanes on new alignment |
| | | Oakes Road extension | STH 20 to Airline Road | Construct two lanes on new alignment |

*Source: SEWRPC.*

in the Region, upon recommendation of the county public works, highway, and transportation committees, act to expand, improve, and maintain, in accordance with the plan recommendations, the arterial street and highway facilities under county jurisdiction. It is further recommended that the common councils, village boards, and town boards within the Region, upon recommendation of plan commissions and boards of public works, act to expand, improve, and maintain, in accordance with the plan recommendations, the arterial street and highway facilities under local jurisdiction.

Recommended Revisions to Proposed National Highway System: The Federal Intermodal Surface Transportation Efficiency Act of 1991 requires that a National Highway System be nominated by the Federal Highway Administration and confirmed by the U. S. Congress by September 30, 1995. The time schedule for nominating routes to be included on the proposed National Highway System required that the Wisconsin Department of Transportation consult with the Commission and the local units of governments concerned early in the process of preparing the new regional transportation system plan. That consultation resulted in a proposed National Highway System for the Southeastern Wisconsin Region shown on Map 147. Approval of this system is currently pending Congressional action. The system as initially proposed would include most of the existing freeways in the Region, totaling about

Table 272

**FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WALWORTH COUNTY UNDER THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010**

| Recommended Jurisdiction | Improvement Type | Facility | Termini | Improvement Description |
|---|---|---|---|---|
| State | Widening | USH 12 (Main Street) | Frontage Road to Fremont Street | Widen from two to four traffic lanes |
| | | USH 14 | CTH O to proposed STH 67 bypass | Widen from two to four traffic lanes |
| | | USH 14 | Proposed STH 67 bypass to McHenry county line | Widen from two to four traffic lanes |
| | | USH 14 | Rock county line to CTH O | Widen from two to four traffic lanes |
| | | STH 50 | STH 11 to Wisconsin Street | Widen from two to four traffic lanes |
| | | STH 50 | IH 43 to STH 67 | Widen from two to four traffic lanes |
| | | STH 50 | STH 67 to Geneva Street | Widen from two to four traffic lanes |
| | | STH 50 | Pearson Drive to Madison Street | Widen from two to four traffic lanes |
| | | STH 50 | CTH H to Edwards Boulevard | Widen from two to four traffic lanes |
| | | STH 50 | USH 12 to the Kenosha county line | Widen from two to four traffic lanes |
| | | STH 67 | IH 43 to the proposed STH 67 bypass at STH 50 | Widen from two to four traffic lanes |
| | | STH 67 | USH 12 to Lincoln Avenue | Widen from two to four traffic lanes |
| | | STH 89 | Willis Ray Road to Whitewater Street | Widen from two to four traffic lanes |
| | | STH 120 | STH 36 to USH 12 | Widen from two to four traffic lanes |
| | Expansion | IH 43 | CTH O | Construct new interchange |
| | | USH 12 freeway | Whitewater to Elkhorn[a] | Construct four lanes on new alignment |
| | | USH 12 freeway | CTH H to McHenry county line | Construct four lanes on new alignment |
| | | STH 67 bypass (Walworth, Fontana, and Williams Bay) | Existing STH 67 at Village of Walworth south corporate limits to existing STH 67 at STH 50 | Construct four lanes on generally new alignment |
| | | STH 120 bypass | Townline Road to existing STH 120 at Willow Road | Construct two lanes on existing and new alignment |
| | | Burlington bypass | STH 11 to Mormon Road | Construct two lanes on generally new alignment |
| County | Widening | STH 11 | CTH O to 7th Street | Widen from two to four traffic lanes |
| | Expansion | Willow Road extension | West Side Road to CTH H | Construct two lanes on new alignment |
| | | CTH P realignment | Territorial Road to CTH A | Construct two lanes on new alignment |
| | | New Facility | CTH H east to STH 67 | Construct two lanes on new alignment |
| Local | Expansion | Grant Street extension | CTH H to STH 50 in Lake Geneva | Construct two lanes on new alignment |
| | | Main Street extension | Frontage Road to Rock county line | Construct two lanes on new alignment |
| | | New Facility | STH 67 south to STH 11 west | Construct two lanes on new alignment |
| | | New Facility | STH 11 north to CTH H | Construct two lanes on new alignment |
| | | New Facility | STH 67 north to STH 11 east | Construct two lanes on new alignment |

[a] *The initial segment of the USH 12 freeway between the City of Whitewater and the City of Elkhorn is anticipated to be the segment bypassing the City of Whitewater from existing USH 12 at approximately Howard Road southeast of the City to existing USH 12 at approximately Cold Spring Road northwest of the City. Initially, only two travel lanes are anticipated to be constructed and are anticipated to be open to traffic by the year 2001.*

*Source: SEWRPC.*

242 route-miles, together with 400 route-miles of surface arterial streets and highways, resulting in a total National Highway System in the Region of about 642 route-miles.

With the completion of a new recommended regional transportation system plan, including updated jurisdictional highway system plans for each of the seven counties, consideration should be given to making revisions to the National Highway System at an appropriate future date. These proposed revisions relate largely to proposed changes in jurisdiction of a number of important surface arterial facilities in the Region. By definition, it is proposed that all routes in the Region that are ultimately included on the National Highway System be existing or planned State trunk highways. Accordingly, it is recommended that the changes to the National Highway System identified in Table 275 and on Map 148 be endorsed by the Wisconsin Department of Transportation and forwarded to the Federal Highway Administration. With these changes, the recommended National Highway

Table 273

FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WASHINGTON COUNTY UNDER THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Recommended Jurisdiction | Improvement Type | Facility | Termini | Improvement Description |
|---|---|---|---|---|
| State | Widening | USH 41 | STH 145 to Dodge County | Convert expressway to freeway |
| | | USH 45 | CTH D to Prospect Drive | Widen from two to four traffic lanes |
| | | STH 33 | USH 41 to CTH Z | Widen from two to four traffic lanes |
| | | STH 33 | CTH Z to Valley Avenue | Widen from two to four traffic lanes |
| | | STH 33 | 18th Avenue to STH 144 | Widen from two to four traffic lanes |
| | | STH 33 | Schmidt Road to Trenton Road | Widen from two to four traffic lanes |
| | | STH 33 | Oakes Road to Ozaukee county line | Widen from two to four traffic lanes |
| | | STH 60 | STH 83 to Wilson Avenue | Widen from two to four traffic lanes |
| | | STH 60 | USH 41 to CTH P | Widen from two to four traffic lanes |
| | | STH 60 | Wilshire Drive to Ozaukee county line | Widen from two to four traffic lanes |
| | | STH 167 | River Lane to Pilgrim Road | Widen from two to four traffic lanes |
| | | STH 167 | Pilgrim Road to Ozaukee county line | Widen from two to four traffic lanes |
| | | CTH J | CTH Q to STH 60 | Widen from two to four traffic lanes |
| | Expansion | USH 41 | CTH K | Construct new interchange |
| | | USH 41 | STH 33 | Construct new interchange |
| | | USH 41 | CTH D | Construct new interchange |
| | | USH 41 | STH 28 | Construct new interchange |
| | | STH 33 | Trenton Road to Oakes Road | Construct four lanes on new alignment |
| | | STH 33 | Newplat Street to USH 41 | Construct two lanes on new alignment |
| | | STH 83 | CTH E to Monroe Avenue | Construct two lanes on new alignment |
| | | STH 83 | Monroe Avenue to STH 60 | Construct two lanes on new alignment |
| County | Widening | CTH Q | Division Road to Pilgrim Road | Widen from two to four traffic lanes |
| | | CTH Q | CTH V to STH 175 | Widen from two to four traffic lanes |
| | | CTH Q | STH 175 to USH 41-45 | Widen from two to four traffic lanes |
| | | CTH Y | CTH Q to USH 41-45 | Widen from two to four traffic lanes |
| | | Decorah Road | 7th Avenue to Indiana Avenue | Widen from two to four traffic lanes |
| | | Main Street | Vine Street to Walnut Street | Widen from two to four traffic lanes |
| | | Paradise Drive | A point 1,250 feet east of USH 45 to Main Street | Widen from two to four traffic lanes |
| | Expansion | Arthur Road extension | CTH N to Arthur Road | Construct two lanes on new alignment |
| | | Division Road extension | STH 167 to Freistadt Road | Construct two lanes on new alignment |
| | | Kettleview Road extension | CTH H to STH 28 | Construct two lanes on new alignment |
| | | Kettleview Road extension | STH 33 to Schuster Drive | Construct two lanes on new alignment |
| | | Pioneer Road extension | CTH J to CTH CC | Construct two lanes on new alignment |
| Local | Widening | Maple Road | STH 167 to Freistadt Road | Widen from two to four traffic lanes |
| | Expansion | Independence Avenue extension | STH 60 to CTH N | Construct two lanes on new alignment |
| | | Jefferson Street extension | Trenton Road to N. River Road | Construct two lanes on new alignment |
| | | Monroe Avenue extension | Monroe Avenue to Pond Road | Construct two lanes on new alignment |
| | | River Crest Drive extension | CTH Q to Waukesha county line | Construct two lanes on new alignment |
| | | N. River Road extension | N. River Road to STH 144 | Construct two lanes on new alignment |
| | | Schuster Drive extension | Schuster Drive to Beaver Dam Road | Construct two lanes on new alignment |
| | | Taylor Road extension | Pond Road to STH 60 | Construct two lanes on new alignment |
| | | Trenton Road extension | STH 33 to Maple Road | Construct two lanes on new alignment |
| | | Wacker Drive extension | STH 60 to Lee Road | Construct two lanes on new alignment |
| | | 18th Avenue extension | Park Avenue to Jefferson Street | Construct two lanes on new alignment |
| | | 18th Avenue extension | Jefferson Street to CTH D | Construct two lanes on new alignment |

*Source: SEWRPC.*

System for the Region would approximate 613 route-miles, including 242 route-miles of freeway and 371 route-miles of surface arterial streets and highways (see Map 149).[8]

## PLAN IMPLEMENTATION PRIORITIES

To ensure that the areawide transportation system plans conform to the State Implementation Plan for air quality, the Federal Clean Air Act Amendments of 1990 require that the imple-

[8]*The recommended National Highway System shown on Map 149 reflects a requirement that the facilities exist at this time. Accordingly, as the regional transportation system plan is implemented, further adjustments in the recommended National Highway System would be required. These adjustments include the planned route of USH 12 as a freeway in Walworth County, the planned extension of future STH 164 along the west side of Waukesha, and the planned STH 36/STH 11 bypass of Burlington.*

## Table 274

## FUNCTIONAL IMPROVEMENTS TO THE ARTERIAL STREET AND HIGHWAY SYSTEM IN WAUKESHA COUNTY UNDER THE FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2010

| Recommended Jurisdiction | Improvement Type | Facility | Termini | Improvement Description |
|---|---|---|---|---|
| State | Widening | IH 94 | CTH G to STH 16 | Widen from four to six traffic lanes |
| | | STH 36 | Racine county line to Milwaukee county line | Widen from two to four traffic lanes |
| | | STH 59 | CTH X to Sunset Drive | Widen from two to four traffic lanes |
| | | STH 59 | STH 164 to Moorland Road | Widen from two to four traffic lanes |
| | | STH 59 | Moorland Road to Milwaukee county line | Widen from two to four traffic lanes |
| | | STH 67 | CTH B to IH 94 | Widen from four to six traffic lanes |
| | | STH 67 | IH 94 to USH 18 | Widen from two to four traffic lanes |
| | | STH 83 | CTH KE extension to USH 16 | Widen from two to four traffic lanes |
| | | STH 83 | Mariner Drive to CTH KE extension | Widen from two to four traffic lanes |
| | | STH 83 | IH 94 to USH 18 | Widen from two to four traffic lanes |
| | | STH 145 | Milwaukee county line to Washington county line | Widen from two to four traffic lanes |
| | | STH 164 | STH 74 to STH 190 | Widen from two to four traffic lanes |
| | | STH 164 | STH 59 to CTH ES | Widen from two to four traffic lanes |
| | | STH 190 | STH 164 to CTH Y | Widen from four to six traffic lanes |
| | | STH 190 | CTH Y to Brookfield Road | Widen from four to six traffic lanes |
| | | CTH J | Rockwood Drive to CTH M | Widen from two to four traffic lanes |
| | | CTH J | CTH M to Washington county line | Widen from two to four traffic lanes |
| | | CTH TT | MacArthur Road to USH 18 | Widen from two to four traffic lanes |
| | | Meadowbrook Road | Northview Road to IH 94 | Widen from two to four traffic lanes |
| | | 124th Street | STH 145 to USH 41-USH 45 | Widen from two to four traffic lanes |
| | Expansion | IH 94 | Calhoun Road | Construct new interchange |
| | | IH 94 | CTH P | Construct new interchange |
| | | STH 16-STH 67 bypass | Wisconsin Avenue to Jefferson county line | Construct four lanes on new alignment |
| | | STH 83 | STH 16 to Thompson Lane | Construct two lanes on new alignment |
| | | STH 83 | Kilbourne Road to CTH CW | Construct two lanes on new alignment |
| | | Mukwonago bypass | IH 43 to CTH ES | Construct two lanes on new alignment |
| | | Waukesha west bypass | CTH X to Macarthur Road | Construct four lanes on new alignment |
| | | Waukesha west bypass | Northview Road to USH 18 | Construct four lanes on new alignment |
| County | Widening | STH 164 | Moreland Boulevard to IH 94 | Widen from four to six traffic lanes |
| | | STH 175 | Roosevelt Drive to CTH Q | Widen from two to four traffic lanes |
| | | CTH D | STH 59-STH 164 to Moorland Road | Widen from two to four traffic lanes |
| | | CTH D | Moorland Road to Milwaukee county line | Widen from two to four traffic lanes |
| | | CTH K | CTH Y to Calhoun Road | Widen from two to four traffic lanes |
| | | CTH L | CTH Y to CTH HH | Widen from two to four traffic lanes |
| | | CTH Q | CTH V to STH 175 | Widen from two to four traffic lanes |
| | | CTH Q | Division Road to Pilgrim Road | Widen from two to four traffic lanes |
| | | CTH T | Northview Road to Silvernail Road | Widen from two to four traffic lanes |
| | | CTH T | Golf Road to proposed CTH SS extension | Widen from two to four traffic lanes |
| | | CTH W | Pilgrim Road to STH 175 | Widen from two to four traffic lanes |
| | | CTH W | STH 175 to Milwaukee county line | Widen from two to four traffic lanes |
| | | CTH X | CTH H to STH 59 | Widen from two to four traffic lanes |
| | | CTH X | STH 59 to Moreland Boulevard | Widen from two to four traffic lanes |
| | | CTH Y | Hillendale Drive to CTH HH | Widen from two to four traffic lanes |
| | | CTH Y | IH 43 to Coffee Road | Widen from two to four traffic lanes |
| | | CTH Y | STH 59-STH 164 to Coffee Road | Widen from two to four traffic lanes |
| | | CTH Y | STH 59 to USH 18 | Widen from two to four traffic lanes |
| | | CTH Y | North Avenue to STH 190 | Widen from two to four traffic lanes |
| | | CTH Y | USH 18 to North Avenue | Widen from two to four traffic lanes |
| | | CTH Y | CTH K to STH 74 | Widen from two to four traffic lanes |
| | | CTH Y | STH 74 to CTH Q | Widen from two to four traffic lanes |
| | | CTH VV | STH 164 to CTH Y | Widen from two to four traffic lanes |
| | | CTH VV | CTH Y to Betty Drive | Widen from two to four traffic lanes |
| | | CTH YY | Lisbon Road to CTH VV | Widen from two to four traffic lanes |
| | | CTH YY | CTH VV to CTH W | Widen from two to four traffic lanes |
| | | Calhoun Road | CTH ES to CTH D | Widen from two to four traffic lanes |
| | | Calhoun Road | CTH D to STH 59 | Widen from two to four traffic lanes |
| | | Calhoun Road | STH 59 to Gebhardt Road | Widen from two to four traffic lanes |
| | | Calhoun Road | Gebhardt Road to North Avenue | Widen from two to four traffic lanes |
| | | Calhoun Road | North Avenue to STH 190 | Widen from two to four traffic lanes |
| | | Grandview Boulevard | USH 18 to Northview Road | Widen from two to four traffic lanes |
| | | Hampton Road | Lisbon Road to 132nd Street | Widen from two to four traffic lanes |
| | | Johnson Road | Coffee Road to Lincoln Avenue | Widen from two to four traffic lanes |
| | | Johnson Road | A point about 2,000 feet south of STH 59 to STH 59 | Widen from two to four traffic lanes |
| | | Lisbon Road | Calhoun Road to Hampton Road | Widen from two to four traffic lanes |

Table 274 (continued)

| Recommended Jurisdiction | Improvement Type | Facility | Termini | Improvement Description |
|---|---|---|---|---|
| County | Widening (continued) | North Avenue | Barker Road to 147th Street | Widen from two to four traffic lanes |
| | | North Avenue | Lilly Road to 124th Street | Widen from two to four traffic lanes |
| | | Pilgrim Road | STH 175 to USH 41-USH 45 | Widen from two to four traffic lanes |
| | | Pilgrim Road | USH 41-USH 45 to Washington county line | Widen from two to four traffic lanes |
| | | Pilgrim Road | USH 18 to North Avenue | Widen from two to four traffic lanes |
| | | Pilgrim Road | A point about 700 feet north of North Avenue to Lisbon Road | Widen from two to four traffic lanes |
| | | 124th Street | STH 190 to Hampton Avenue | Widen from two to four traffic lanes |
| | | 124th Street | Hampton Avenue to CTH VV | Widen from two to four traffic lanes |
| | | 124th Street | North Avenue to Watertown Plank Road | Widen from two to four traffic lanes |
| | Expansion | CTH Y extension | STH 190 to CTH K | Construct four lanes on new alignment |
| | | CTH KE extension | CTH E to STH 83 | Construct two lanes on new alignment |
| | | CTH KE realignment | CTH K to a point about 800 feet north | Construct two lanes on new alignment |
| | | CTH SS extension | CTH G to CTH T | Construct two lanes on new alignment |
| | | Johnson Road extension | A point about 2,000 feet north of STH 59 to Lincoln Avenue | Construct four lanes on new alignment |
| | | Johnson Road extension | Coffee Road to CTH Y | Construct four lanes on new alignment |
| | | Lake Drive extension | Lapham Street to STH 67 | Construct four lanes on new alignment |
| | | Moorland Road extension | Woods Road to CTH L | Construct two lanes on new alignment |
| | | Moorland Road extension | CTH L to IH 43 | Construct two lanes on new alignment |
| | | Pilgrim Road realignment | North Avenue to a point about 700 feet north | Construct two lanes on new alignment |
| | | 124th Street extension | STH 100 to STH 145 | Construct four lanes on new alignment |
| | | 124th Street extension | Watertown Plank Road to STH 59 | Construct two lanes on new alignment |
| Local | Widening | Brookfield Road | USH 18 to a point approximately 1,000 feet north | Widen from two to four traffic lanes |
| | | Main Street | STH 164 to USH 18 | Widen from two to four traffic lanes |
| | | Racine Avenue | Downing Drive to STH 59-STH 164 | Widen from two to four traffic lanes |
| | | Sunset Drive | Tenny Avenue to STH 59-STH 164 | Widen from two to four traffic lanes |
| | Expansion | Brookfield Road extension | Davidson Road to STH 59 | Construct two lanes on new alignment |
| | | Oconomowoc Parkway | STH 16 to CTH Z | Construct two lanes on new alignment |
| | | Oconomowoc Parkway | CTH Z to STH 67 | Construct two lanes on new alignment |
| | | River Crest Drive extension | Shady Lane to Washington county Line | Construct two lanes on new alignment |
| | | Shady Lane extension | St. Thomas Drive to STH 175 | Construct two lanes on new alignment |
| | | Sunnyslope Road extension | CTH HH to CTH L | Construct two lanes on new alignment |
| | | Valley Road | STH 67 to CTH P | Construct two lanes on new alignment |

*Source: SEWRPC.*

mentation of areawide transportation system plans be accompanied by analyses of attendant transportation-related air pollutant emissions. The Clean Air Act sets forth criteria for identifying analysis years, in effect, implementation priority years, and, as applied to the Southeastern Wisconsin Region, the following years have been designated as these analysis years: 1996 as the benchmark year relating directly to the 1996 "target" year for the November 1993 State Implementation Plan submittal by the Wisconsin Department of Natural Resources; 2001, because it is at least five years beyond the benchmark year and serves to meet the criteria that analysis years be no more than 10 years apart; 2007, because it is the year in which the Region must demonstrate attainment of the National Ambient Air Quality Standards for ozone; and 2010, because it is the design year of the new regional transportation system plan.

The Clean Air Act Amendments require that a "baseline" scenario and an "action" scenario be defined for each of the analysis years. The baseline scenario is defined as the existing transportation system plus the completion of those significant transportation projects which are in final stages of implementation. The action

Table 275

RECOMMENDED CHANGES IN THE NATIONAL HIGHWAY SYSTEM DERIVED FROM THE RECOMMENDED 2010 REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN

| Recommended Changes to the National Highway System | Facility | From | To |
|---|---|---|---|
| Additions | CTH BB | Pennsylvania Avenue | STH 32 |
| | CTH J | STH 190 | IH 94 |
| | STH 190 | CTH J | STH 164 |
| | S. 43rd Street | Oklahoma Avenue | IH 43/IH 894 |
| | Pennsylvania Avenue | CTH ZZ | CTH BB |
| Deletions | CTH Y | S. 27th Street | STH 62 |
| | CTH ZZ | IH 94 | STH 32 |
| | STH 32 | CTH ZZ | CTH BB |
| | STH 74 | Pilgrim Road | USH 41/USH 45 |
| | STH 164 | STH 190 | IH 94 |
| | S. 27th Street | IH 43/IH 894 | CTH Y |
| | Moorland Road | USH 18 | IH 43 |
| | Oklahoma Avenue | IH 894/USH 45 | Lake Parkway |
| | Pilgrim Parkway | North Avenue | USH 18 |
| | Pilgrim Road | STH 74 | North Avenue |

*Source: SEWRPC.*

scenario is defined as the transportation system represented by the baseline scenario and improvements proposed for implementation by the analysis year: 1996, 2001, 2007, or 2010.

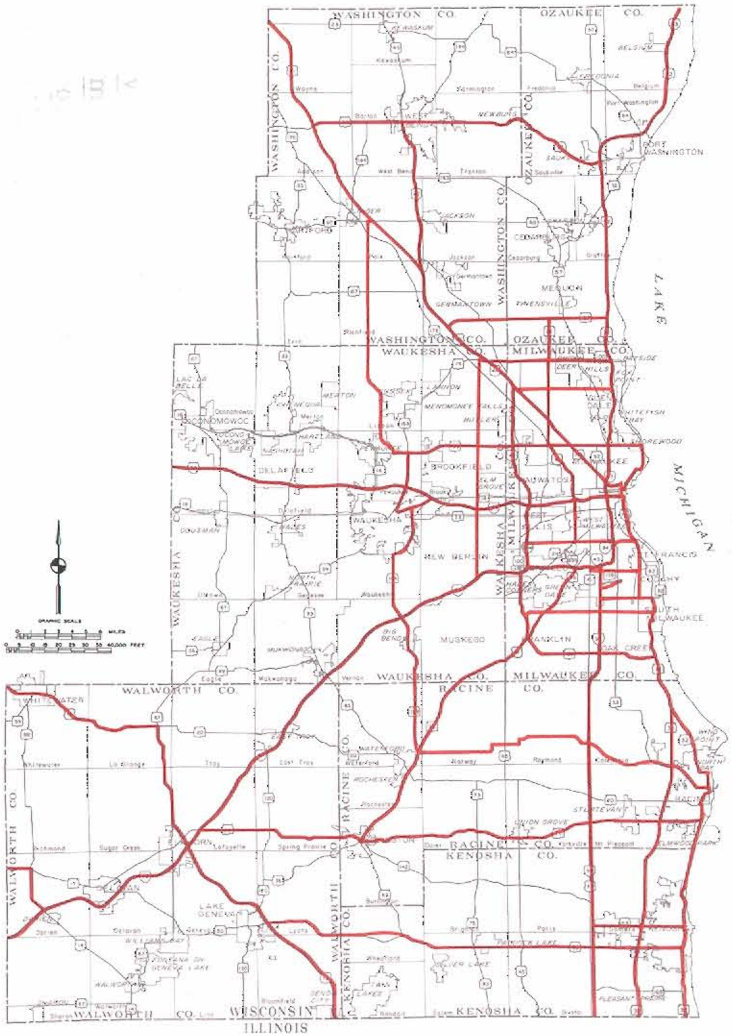
The purpose of defining the action and baseline scenarios is to provide a method by which the estimated reduction in the emission of ozone causing pollutants attributable to the implementation of transportation projects can be assessed. This assessment is made by estimating the anticipated emissions generated under both the baseline and the action scenarios for each analysis year. For any given analysis year, the transportation plan will be found to be in conformance with the State Implementation Plan for air quality if the level of emissions forecast for the action scenario is less than the level forecast for the baseline scenario. It must be demonstrated that the action scenario results in a reduction of ozone causing emissions after discounting all other factors that may also contribute to a reduction in such emissions, such as the Federally-mandated actions attendant to alternative fuels and enhanced motor vehicle inspection and maintenance programs.

The Federally required analyses demonstrating that the regional transportation system plan conforms to the State Implementation Plan for air quality are provided in SEWRPC report Assessment of Conformity of the New Year 2010 Regional Transportation System Plan and the 1995 through 1997 Transportation Improvement Program with Respect to the State of Wisconsin Air Quality Implementation Plan. Tables 276 and 277 summarize those analyses in terms of identifying incremental arterial street and highway and transit improvements, respectively, for each of the four analysis years. More specifically, Table 276 identifies the amount of additional lane-miles of arterial streets and highways to be constructed within each county of the Region for each analysis period. Table 277 provides information on the incremental vehicle-miles of revenue transit services to be provided within each analysis period by transit service type, rapid, express, and local.

For analytical purposes, the findings of conformity between the regional transportation system plan and the Wisconsin State Implementation Plan for air quality are predicated upon the existence in each of the four analysis years, 1996, 2001, 2007, and 2010, of specific arterial street and highway and transit networks. The detailed configuration of those networks is addressed in SEWRPC report Assessment of Conformity of the New Year 2010 Regional Transportation System Plan and the 1995 through 1997 Transportation Improvement Program with Respect to the State of Wisconsin Air Quality Implementation Plan. It is recom-

## Map 147

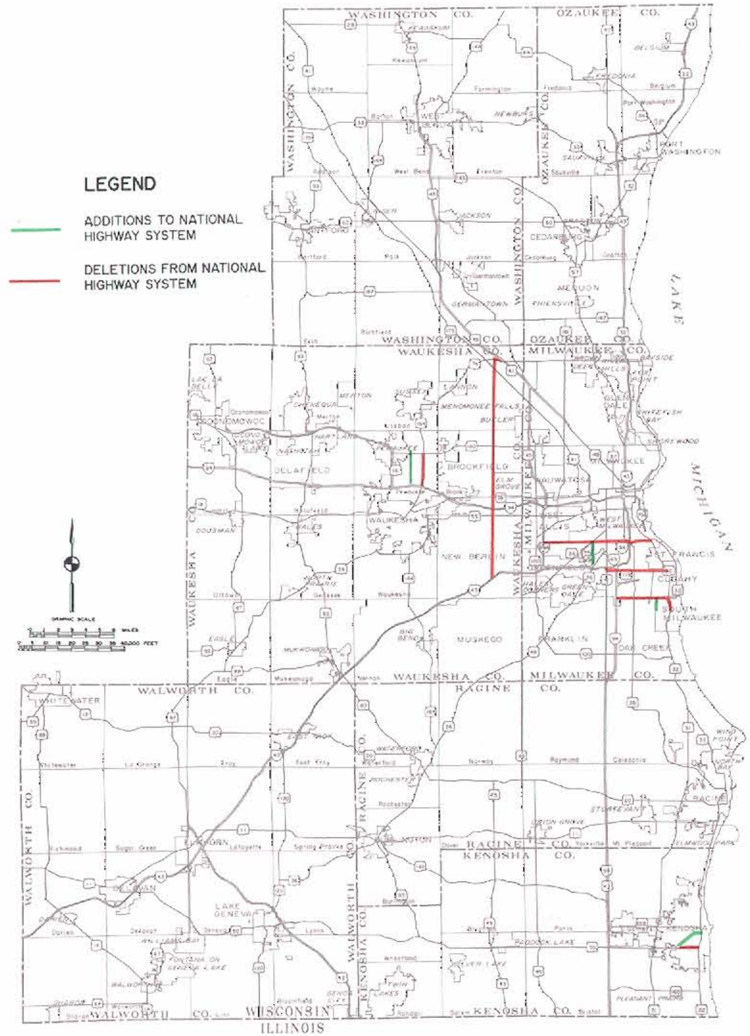
### THE PROPOSED NATIONAL HIGHWAY SYSTEM WITHIN SOUTHEASTERN WISCONSIN: JUNE 1994




*Source: Wisconsin Department of Transportation.*

## Map 148

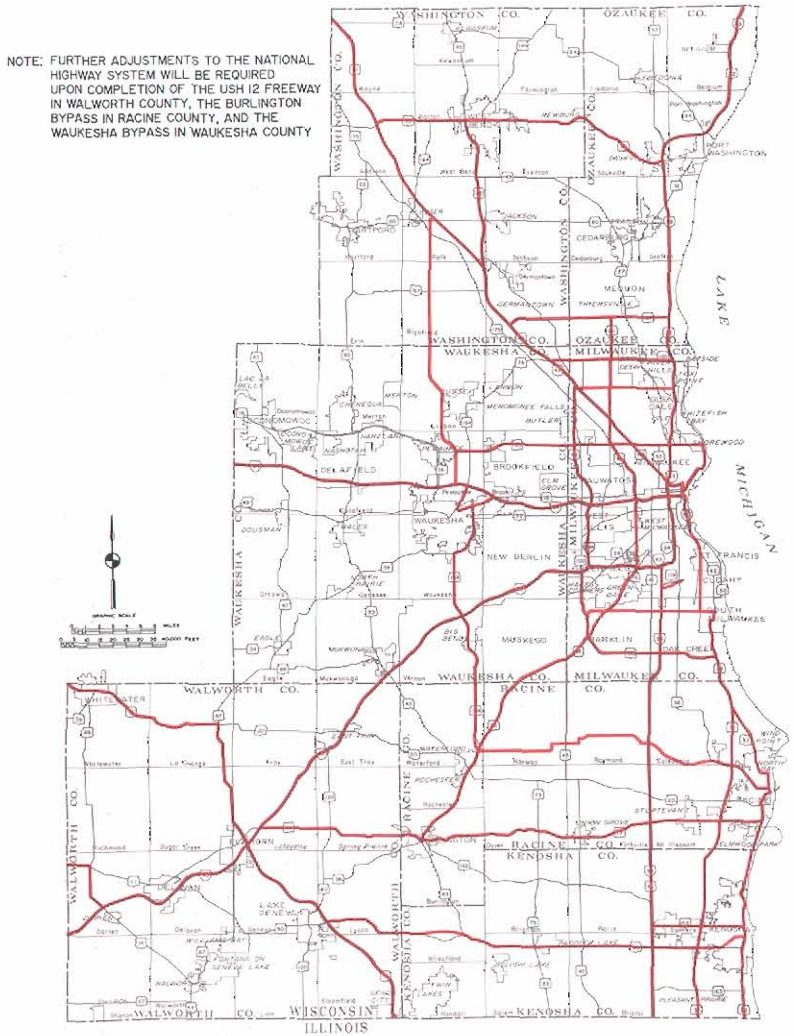
### RECOMMENDED ADDITIONS TO, AND DELETIONS FROM, THE PROPOSED NATIONAL HIGHWAY SYSTEM WITHIN SOUTHEASTERN WISCONSIN




*Source: SEWRPC.*

## Map 149

### RECOMMENDED NATIONAL HIGHWAY SYSTEM WITHIN SOUTHEASTERN WISCONSIN




*Source: SEWRPC.*

The Federal Intermodal Surface Transportation Efficiency Act of 1991 requires that a National Highway System be nominated by the Federal Highway Administration and confirmed by the U.S. Congress by September 30, 1995. Consultation between the Wisconsin Department of Transportation, the Regional Planning Commission, and concerned local units of government has resulted in the proposed National Highway System shown on Map 147. The system, as initially proposed, would include most of the existing freeways in the Region, totalling about 242 route-miles, together with 400 route-miles of surface arterial streets and highways. The National Highway System in the Southeastern Wisconsin Region would total 642 route-miles.

*Recommended revisions to the initially proposed National Highway System* in the Region are shown on Map 148. These revisions reflect the changes in jurisdictional responsibility of significant arterial street and highways in the Region recommended in the year 2010 plan. All arterial routes ultimately included on the National Highway System are existing or planned State trunk highways.

As a result of the revisions to the initially proposed National Highway System made necessary by jurisdictional changes of certain arterial facilities recommended in the year 2010 plan, the National Highway System for the Region would total 613 route-miles (see Map 149). The system would include 242 route-miles of freeway and 371 route-miles of surface arterial streets and highways.

Table 276

NUMBER AND PERCENT OF ADDITIONAL LANE-MILES OF ARTERIAL STREETS AND HIGHWAYS IN THE REGION BY COUNTY AND IMPLEMENTATION PRIORITY SCHEDULE: 1996, 2001, 2007, AND 2010

| County | Proposed State Trunk Highway Incremental Arterial Lane-Miles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1996 | | 2001 | | 2007 | | 2010 | | Total | |
| | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total |
| Kenosha . . . . . | 2 | 4 | 18 | 32 | 20 | 36 | 16 | 28 | 56 | 100 |
| Milwaukee . . . | 4 | 6 | 29 | 46 | 14 | 22 | 16 | 26 | 63 | 100 |
| Ozaukee . . . . . | - - | - - | 24 | 30 | 33 | 40 | 24 | 30 | 81 | 100 |
| Racine . . . . . . | - - | - - | 48 | 36 | 23 | 17 | 64 | 47 | 135 | 100 |
| Walworth . . . . | 3 | 2 | 25 | 14 | 24 | 13 | 128 | 71 | 180 | 100 |
| Washington . . . | 6 | 6 | 17 | 18 | 44 | 46 | 28 | 30 | 95 | 100 |
| Waukesha . . . . | 9 | 6 | 33 | 23 | 73 | 50 | 31 | 21 | 146 | 100 |
| Region | 24 | 3 | 194 | 26 | 231 | 30 | 307 | 41 | 756 | 100 |

| County | Proposed County and Local Trunk Highway Incremental Arterial Lane-Miles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1996 | | 2001 | | 2007 | | 2010 | | Total | |
| | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total |
| Kenosha . . . . . | - - | - - | 10 | 19 | 16 | 30 | 27 | 51 | 53 | 100 |
| Milwaukee . . . | 14 | 20 | 17 | 25 | 20 | 29 | 18 | 26 | 69 | 100 |
| Ozaukee . . . . . | - - | - - | 12 | 55 | 10 | 45 | - - | - - | 22 | 100 |
| Racine . . . . . . | - - | - - | 2 | 7 | 9 | 32 | 17 | 61 | 28 | 100 |
| Walworth . . . . | - - | - - | - - | - - | 4 | 21 | 15 | 79 | 19 | 100 |
| Washington . . . | 2 | 4 | 13 | 25 | 11 | 22 | 25 | 49 | 51 | 100 |
| Waukesha . . . . | 15 | 8 | 26 | 13 | 54 | 28 | 98 | 51 | 193 | 100 |
| Region | 31 | 7 | 80 | 18 | 124 | 29 | 200 | 46 | 435 | 100 |

| County | Proposed Total Incremental Arterial Lane-Miles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1996 | | 2001 | | 2007 | | 2010 | | Total | |
| | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total |
| Kenosha . . . . . | 2 | 2 | 28 | 26 | 36 | 33 | 43 | 39 | 109 | 100 |
| Milwaukee . . . | 18 | 14 | 46 | 34 | 34 | 26 | 34 | 26 | 132 | 100 |
| Ozaukee . . . . . | - - | - - | 36 | 35 | 43 | 42 | 24 | 23 | 103 | 100 |
| Racine . . . . . . | - - | - - | 50 | 31 | 32 | 19 | 81 | 50 | 163 | 100 |
| Walworth . . . . | 3 | 1 | 25 | 13 | 28 | 14 | 143 | 72 | 199 | 100 |
| Washington . . . | 8 | 5 | 30 | 21 | 55 | 38 | 53 | 36 | 146 | 100 |
| Waukesha . . . . | 24 | 7 | 59 | 17 | 127 | 38 | 129 | 38 | 339 | 100 |
| Region | 55 | 5 | 274 | 23 | 355 | 30 | 507 | 42 | 1,191 | 100 |

*Source: SEWRPC.*

mended that, as the target years approach, the basic test of plan implementation, insofar as conformity with the air quality plan is concerned, be measured differently for the principal regional arterial highway facilities than for the minor arterial street facilities and local transit services. The former category, all of which consists of State trunk highway facilities, can be programmed with greater certainty since a simple agency exists that is staffed to program expeditiously the design and construction of the facilities concerned. The latter category of projects depends for implementation on a diffused decision-making structure that consists of seven counties and numerous cities, villages, and towns. Consequently, the programming of this latter group of facilities and services is far more difficult and requires the provision for greater flexibility in the programming of improvements. This should not, however, detract from the overall attainment of plan implementation levels which are reflected in Tables 276 and

Table 277

NUMBER AND PERCENT OF ADDITIONAL REVENUE VEHICLE-MILES OF TRANSIT SERVICE IN THE REGION BY TYPE OF SERVICE AND IMPLEMENTATION PRIORITY SCHEDULE: 1996, 2001, 2007, AND 2010

| Transit Service Type | Existing Transit Vehicle-Miles of Revenue Service: 1991 | Proposed Incremental Transit Vehicle-Miles of Revenue Service | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1996 | | 2001 | | 2007 | | 2010 | | Total | |
| | | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total | Number | Percent of Total |
| Rapid . . . . | 3,400 | -300 | -2.2 | 5,000 | 37.0 | 6,100 | 45.2 | 2,700 | 20.0 | 13,500 | 100.0 |
| Express . . . | 3,300 | 2,700 | 14.9 | 3,500 | 19.3 | 5,800 | 32.1 | 6,100 | 33.7 | 18,100 | 100.0 |
| Local . . . . | 56,600 | 200 | 1.3 | 7,700 | 49.0 | 7,800 | 49.7 | - - | - - | 15,700 | 100.0 |
| Total | 63,300 | 2,600 | 5.5 | 16,200 | 34.3 | 19,700 | 41.6 | 8,800 | 18.6 | 47,300 | 100.0 |

*Source: SEWRPC.*

277 in terms of the number of additional lane-miles of arterial streets and highways, the incremental vehicle-miles of transit services, and the impacts on air pollutant emissions.

## FUNDING PLAN IMPLEMENTATION

As noted in Chapter XI, an analysis of plan implementation costs and of potential revenues for such implementation, the latter based upon current revenue levels and patterns, indicates that an average annual shortfall in revenues over the 16-year period 1995 through 2010 of about $222 million may be expected. This section of this chapter addresses that funding deficit, setting forth a recommended course of action for securing the additional revenues necessary to implement the plan. If such revenues cannot be secured in a timely manner, a restructuring of the plan to reduce costs to match the available revenues may become necessary.[9]

### State Trunk Highway Revenues and Expenditures

The average annual cost of implementing the State trunk highway preservation, improvement, and expansion element of the recommended plan is about $229 million (see Table 278). This includes a nearly $1.5-billion program to reconstruct and modernize the Milwaukee-area freeway system, as well as a series of projects to preserve, improve, and expand the remainder of the State trunk highway system in the Region. This also includes the estimated costs of operating and maintaining that system over the plan implementation period.

An analysis of the existing revenue sources that support the State trunk highway program indicates that those revenues, for both capital and operating and maintenance purposes, currently total about $144 million annually. Thus, there is an estimated revenue shortfall of $85 million annually to implement the State trunk highway element of the plan. Expressed in terms of an equivalent motor fuel tax, that shortfall approximates 10.0 cents per gallon on the basis of the amount of motor fuel estimated to be sold within the Region.

The recommended regional transportation system plan was completed almost simultaneously with, and was fully coordinated with, the Wisconsin Department of Transportation Intermodal Transportation Plan developed through the long-range Statewide transportation planning process termed TRANSLINKS 21.[10] The draft State plan recognizes a need, not only in Southeastern Wisconsin, but also throughout the remainder of the State, to provide increased funding for all modes of transportation. It proposes that over the period 1995 through 2020 Statewide transportation user fees be increased about every five years to pay for implementing the multi-modal State plan.

Full funding of the TRANSLINKS 21 proposals would yield about $95 million annually in

[9] *The cost entailed in implementing the Federally-mandated conversion of signage to the metric system of measurement has not been included in the cost estimates set forth in this chapter.*

[10] *See report, Wisconsin TRANSLINKS 21 Draft Intermodal Transportation Plan, published by the Wisconsin Department of Transportation in September 1994.*

Table 278

**AVERAGE ANNUAL COSTS AND REVENUE ASSOCIATED WITH IMPLEMENTATION OF THE STATE TRUNK HIGHWAY PRESERVATION, IMPROVEMENT, AND EXPANSION PROJECTS INCLUDED IN THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN: 1995 THROUGH 2010**

| Cost or Revenue Item | Millions of Dollars (average annual 1995-2010) |
|---|---|
| State Trunk Highway Cost | |
| Capital | |
| Preservation | 157.4 |
| Improvement | 35.1 |
| Expansion | 14.1 |
| Subtotal | 206.6 |
| Operation and Maintenance | 22.6 |
| Total | 229.2 |
| State Trunk Highway Revenues | |
| Capital[a] | |
| Federal (modified existing trend) | 64.0 |
| State (modified existing trend) | 60.0 |
| Subtotal | 124.0 |
| Operation and Maintenance (existing trend) | 20.0 |
| Total | 144.0 |
| Cost-Revenue Comparison | |
| Average Annual Difference between Costs and Revenues (existing trend) | -85.2 |
| Equivalent Motor Fuel Tax in Cents per Gallon of the Cost-Revenue Shortfall | 10.0 |
| Resolving the Funding Shortfall | |
| Estimated Additional State Revenue from TRANSLINKS 21 Proposals[b] | 85.2 |
| Equivalent Motor Fuel Tax in Cents per Gallon of Additional TRANSLINKS 21 Funds | 10.0 |

[a] *The Federal capital revenue estimate assumes continuation of Federal highway funding to the State at the levels authorized in the Intermodal Surface Transportation Efficiency Act of 1991, as well as the full appropriation of those funds, and the receipt by the Region of a fair share of those funds defined as 30 percent of State funding, which is the Region's share of Statewide vehicle-miles of travel. This includes $10 million of Interstate Maintenance funds; $17 million of National Highway System funds; $33 million of Surface Transportation Program, discretionary and other funds; and $4 million of Surface Transportation Program, Milwaukee area funds. The State capital revenue estimate assumes continuation of State trunk highway construction funding at historic levels of about $200 million Statewide annually, and the receipt by the Region of 30 percent, or a fair share, of that funding. Historically, the Region has received about 23 percent of such funding, or about $47 million annually. The difference between the assumed funding level of $60 million and the historic level of $47 million is $13 million annually.*

[b] *The TRANSLINKS 21 proposals for increased funding of the State trunk highway system, including the Milwaukee-area freeway system, would provide an additional $95.0 million annually to the seven-county Southeastern Wisconsin Region. The difference between the shortfall and the estimated additional revenue, about $9.8 million annually, represents the revenue needed to provide State trunk highway funding in the Region at a "fair-share" level.*

*Source: SEWRPC.*

additional funding in the Region for State trunk highway purposes. This revenue enhancement would be sufficient to fund the anticipated shortfall attendant to implementation of the recommended State trunk highway improvements within the Region, including the major rehabilitation of the Milwaukee area freeway system. In addition, there would be an opportunity to secure revenue for regional projects from the proposed major investment studies described later in this chapter, particularly including any busways and high-occupancy vehicle (HOV) lanes that might be identified for implementation in such studies.

County and Local Highway and Transit Revenues and Expenditures[11]

The average annual cost to implement the county and local arterial highway preservation, improvement, and expansion element of the recommended plan is about $114 million (see Table 279). This includes the estimated costs of operating and maintaining the county trunk highways and local arterial street systems over the plan implementation period. This cost does not include the capital and operating costs attendant to local land-access and collector streets.

An analysis of the existing revenue sources that support the county and local arterial street and highway programs indicates that those revenues, for both capital and operating and maintenance purposes, currently total about $73 million annually within the Region. Thus, there is an estimated shortfall of $41 million annually to implement the county and local arterial street and highway element of the recommended regional system plan. Expressed in terms of a motor fuel tax, that shortfall approximates five cents per gallon on the basis of the amount of motor fuel estimated to be sold within the Region. As shown in Table 279, that shortfall varies throughout the Region, ranging from a low of the equivalent of a 1.4 cents per gallon motor fuel tax in Milwaukee County to a high of 12.5 cents per gallon in Walworth County.

Also as shown in Table 279, the draft State Intermodal Transportation Plan recognizes the need to provide additional State revenues to help county and local governments fund solutions to the increasing needs associated with the arterial street and highway system. Based on the TRANSLINKS 21 proposal, an additional approximately $13 million annually may be expected over the plan implementation period through the Wisconsin Local Road Improvement Program (LRIP). This proposed infusion of additional State aid would reduce the anticipated average annual funding deficit for county and local arterial streets and highways attendant to regional plan implementation from about $41 million annually to about $28 million annually. The additional State funds would represent the equivalent of nearly two cents per gallon in terms of a motor fuel tax levied within the Region. The resulting remaining deficit of about $28 million annually would represent the equivalent of about three cents per gallon in terms of such a motor fuel tax. As shown in Table 279, that equivalent motor fuel tax would range from a low of no tax at all in Milwaukee County to a high of about 11 cents per gallon in Walworth County.

The average annual cost of implementing the transit element of the recommended regional transportation system plan is about $179 million (see Table 280). This includes the estimated costs of building transit stations and acquiring rolling stock, as well as operating the transit system after taking into account anticipated farebox revenues. This amount also includes the capital and operating costs associated with the busway and light-rail facilities included in the recommended plan pending the results of the east-west corridor major investment study being conducted by the Wisconsin Department of Transportation.

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[11] *The expenditure restraint program, formerly known as the tax rate disparity program, provides State aid to cities, villages, and towns as an incentive for limiting increases in local expenditures. The program applies to communities with a property tax rate for general purposes exceeding five mills. Such communities are eligible for aid under the expenditure restraint program if the annual percentage increase in its municipal budget, exclusive of principal and interest on long term debt, is less than the sum of the annual percentage increase in the consumer price index plus a growth factor percentage. The growth factor percentage is calculated for each community based upon the change in equalized value due to new construction and other factors; it may not exceed 2 percent. Qualifying communities share in funds budgeted for the program by the State Legislature; forty two million dollars is currently budgeted. The formula for allocation of the aid among qualifying communities takes into account the equalized value of property in each community and each community's property tax rate. This program constitutes an additional source of uncertainty attendant to implementation of the local transportation improvements recommended in the plan.*

Table 279

AVERAGE ANNUAL COSTS AND REVENUE ASSOCIATED WITH IMPLEMENTATION OF THE COUNTY AND LOCAL TRUNK HIGHWAY PRESERVATION, IMPROVEMENT, AND EXPANSION ELEMENT OF THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN BY COUNTY: 1995 THROUGH 2010

| Cost or Revenue Item | Millions of Dollars (average annual 1995-2010) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | County | | | | | | | Region |
| | Kenosha | Milwaukee | Ozaukee | Racine | Walworth | Washington | Waukesha | |
| County/Local Trunk Highway Costs | | | | | | | | |
| Capital | | | | | | | | |
| Preservation | 3.8 | 14.8 | 3.9 | 4.2 | 3.4 | 4.3 | 7.9 | 42.3 |
| Improvement | 2.1 | 2.4 | 0.7 | 1.0 | 1.1 | 0.7 | 8.8 | 16.8 |
| Expansion | 0.9 | 3.9 | 0.6 | 0.6 | 1.1 | 2.3 | 2.2 | 11.6 |
| Subtotal | 6.8 | 21.1 | 5.2 | 5.8 | 5.6 | 7.3 | 18.9 | 70.7 |
| Operation and Maintenance | 3.2 | 15.3 | 2.9 | 5.3 | 3.0 | 4.1 | 9.7 | 43.5 |
| Total | 10.0 | 36.4 | 8.1 | 11.1 | 8.6 | 11.4 | 28.6 | 114.2 |
| County/Local Trunk Highway Revenues | | | | | | | | |
| Capital | | | | | | | | |
| Federal (existing trend) | 0.7 | 7.5 | 0.9 | 0.7 | 0.3 | 0.5 | 3.7 | 14.3 |
| State (existing trend) | 0.5 | 3.6 | 0.3 | 0.6 | 0.1 | 0.7 | 2.0 | 7.8 |
| County/Local (existing trend) | 0.7 | 6.0 | 0.4 | 1.0 | 0.1 | 1.3 | 3.8 | 13.3 |
| Subtotal | 1.9 | 17.1 | 1.6 | 2.3 | 0.5 | 2.5 | 9.5 | 35.4 |
| Operation and Maintenance | | | | | | | | |
| State (existing trend) | 0.8 | 3.5 | 0.7 | 1.2 | 0.7 | 0.9 | 2.2 | 10.0 |
| County/Local | 2.0 | 10.4 | 1.7 | 3.2 | 1.9 | 2.5 | 5.9 | 27.6 |
| Subtotal | 2.8 | 13.9 | 2.4 | 4.4 | 2.6 | 3.4 | 8.1 | 37.6 |
| Total | 4.7 | 31.0 | 4.0 | 6.7 | 3.1 | 5.9 | 17.6 | 73.0 |
| Cost-Revenue Comparison | | | | | | | | |
| Average Annual Difference between Costs and Revenues (existing trend) | -5.3 | -5.4 | -4.1 | -4.4 | -5.5 | -5.5 | -11.0 | -41.2 |
| Equivalent Motor Fuel Tax in Cents per Gallon of the Cost-Revenue Shortfall[a] | 9.3 | 1.4 | 9.1 | 6.0 | 12.5 | 10.4 | 6.2 | 4.8 |
| Resolving the Funding Shortfall | | | | | | | | |
| Estimated Additional State Revenue from TRANSLINKS 21 Proposals | 1.4 | 5.4[b] | 0.7 | 1.4 | 0.7 | 0.7 | 2.8 | 13.1 |
| Equivalent Motor Fuel Tax in Cents per Gallon of Additional TRANSLINKS 21 Funds | 2.5 | 1.4 | 1.5 | 1.9 | 1.6 | 1.3 | 1.6 | 1.5 |
| Remaining Revenue Required from Local-County-Regional Sources | 3.9 | - - | 3.4 | 3.0 | 4.8 | 4.8 | 8.2 | 28.1 |
| Equivalent Motor Fuel Tax in Cents per Gallon of Remaining Required Revenue | 6.8 | - - | 7.6 | 4.1 | 10.9 | 9.1 | 4.6 | 3.3 |

*[a]Because of many factors that affect the revenue yield of a motor fuel tax, including the efficiency of the motor vehicle fleet in terms of fuel utilization, the amount of vehicle-miles of travel, transit use, general price inflation, and the general condition of the National, State, and regional economies, it was determined for the purpose of this analysis to make simplifying assumptions that would tend to yield conservative estimates of motor fuel tax revenues in future years. More specifically, it was assumed that any change in the average fuel utilization efficiency of the motor vehicle fleet over the plan implementation period would be offset by anticipated increases in vehicle-miles of travel. Presently, the fleet efficiency approximates 21 miles per gallon. At that efficiency level, and at current travel levels, a one-cent-per-gallon motor fuel tax yields the following estimated revenues annually: Kenosha County, $0.57 million; Milwaukee County, $4 million; Ozaukee County, $0.45 million; Racine County, $0.74 million; Walworth County, $0.44 million; Washington County, $0.53 million; and Waukesha County, $1.77 million. The regional average is $8.5 million annually.*

*[b]Milwaukee County would receive an additional $2.3 million annually under the TRANSLINKS 21 proposals. This additional amount could be applied to the $6 million in county and local funds now being spent for this purpose and would represent property tax relief.*

*Source: SEWRPC.*

An analysis of the existing revenue sources supporting county and local public transit programs in the Region indicates that those revenues, for both capital and operating and maintenance purposes, currently total nearly $83 million annually. Thus, there is an estimated shortfall of $96 million annually to implement the transit element of the plan. Expressed in terms of a motor fuel tax, that shortfall approximates 11 cents per gallon based upon the amount of motor fuel estimated to be sold in the Region. As shown in Table 280, that shortfall

## Table 280

**AVERAGE ANNUAL COSTS AND REVENUE ASSOCIATED WITH IMPLEMENTATION OF THE TRANSIT ELEMENT OF THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN BY COUNTY: 1995 THROUGH 2010**

| Cost or Revenue Item | Millions of Dollars (average annual 1995-2010) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | County | | | | | | | |
| | Kenosha | Milwaukee | Ozaukee | Racine | Walworth | Washington | Waukesha | Region |
| Transit Costs | | | | | | | | |
| Capital[a] | 2.6 | 62.3 | 0.4 | 2.0 | - - | 0.2 | 9.3 | 76.8 |
| Operating[b] | 7.0 | 77.4 | 0.7 | 7.4 | - - | 0.6 | 8.6 | 101.7 |
| Total | 9.6 | 139.7 | 1.1 | 9.4 | - - | 0.8 | 17.9 | 178.5 |
| Transit Revenues | | | | | | | | |
| Capital | | | | | | | | |
| Federal (existing trend) | 1.2 | 9.8 | - - | 0.5 | - - | - - | 0.7 | 12.2 |
| County/Local (existing trend) | 0.1 | 2.2 | - - | 0.1 | - - | - - | 0.1 | 2.5 |
| Subtotal | 1.3 | 12.0 | - - | 0.6 | - - | - - | 0.8 | 14.7 |
| Operating | | | | | | | | |
| Federal (existing trend) | 0.5 | 4.5 | - - | 0.7 | - - | - - | 0.3 | 6.0 |
| State (existing trend) | 1.1 | 40.7 | - - | 1.7 | - - | - - | 1.6 | 45.1 |
| County/Local (existing trend) | 0.5 | 15.5 | - - | 0.5 | - - | - - | 0.6 | 17.1 |
| Subtotal | 2.1 | 60.7 | - - | 2.9 | - - | - - | 2.5 | 68.2 |
| Total | 3.4 | 72.7 | - - | 3.5 | - - | - - | 3.3 | 82.9 |
| Cost-Revenue Comparison | | | | | | | | |
| Average Annual Difference between Costs and Revenues (existing trend) | -6.2 | -67.0 | -1.1 | -5.9 | - - | -0.8 | -14.6 | -95.6 |
| Equivalent Motor Fuel Tax in Cents per Gallon of the Cost-Revenue Shortfall | 10.9 | 16.8 | 2.4 | 8.0 | - - | 1.5 | 8.2 | 11.2 |
| Resolving the Funding Shortfall | | | | | | | | |
| Estimated Additional Federal Revenue[c] | - - | 34.0 | - - | - - | - - | - - | 5.5 | 39.5 |
| Estimated Additional State Operating Revenue Assumed Prior to TRANSLINKS 21 Proposals[d] | 3.7 | 1.9 | 0.7 | 2.7 | - - | 0.6 | 3.7 | 13.3[e] |
| Estimated Additional State Operating Revenue from TRANSLINKS 21 Proposals[f] | 1.2 | 8.0 | - - | 1.2 | - - | - - | 1.3 | 11.7[e] |
| Estimated Additional State Capital Revenue from Proposed New State Transit Capital Program | 1.1 | 9.9 | 0.2 | 0.8 | - - | 0.1 | 1.7 | 13.8 |
| Equivalent Motor Fuel Tax in Cents per Gallon of Foregoing Additional Federal and State Funds | 10.5 | 13.5 | 2.0 | 6.4 | - - | 1.3 | 6.9 | 9.2 |
| Remaining Revenue Required from Local-County-Regional Sources | 0.2 | 13.2 | 0.2 | 1.2 | - - | 0.1 | 2.4 | 17.3 |
| Equivalent Motor Fuel Tax in Cents per Gallon of Remaining Required Revenue | 0.4 | 3.3 | 0.4 | 1.6 | - - | 0.2 | 1.4 | 2.0 |

*[a]Transit capital costs include $792 million in expenditures associated with the proposed busway in the east-west travel corridor and the proposed light-rail transit lines in the east-west and Northeast travel corridors. The following assumptions were made attendant to the funding of these facilities, which are subject to confirmation in the major investment study being sponsored by the Wisconsin Department of Transportation: 1) all of the Interstate Conversion Estimate (ICE) monies reserved for Wisconsin, about $289 million, would be made available for these projects; 2) Wisconsin would receive a previously reserved Federal Transit Administration Section 3 grant of $200 million for this purpose; 3) Wisconsin would ultimately receive an additional $145 million in Federal funds for this purpose, thus raising the total Federal contribution to an 80 percent participation rate; and 4) the required 20 percent match to Federal funds would be divided equally between the State of Wisconsin and the local governments concerned. In addition, for the purpose of allocating costs within this table to the counties, it was assumed that all costs associated with the light-rail facilities would be incurred within Milwaukee County, and that the costs of the busway would be apportioned 60 percent to Milwaukee County and 40 percent to Waukesha County. Detailed funding arrangements for the proposed busway and light-rail facilities are to be determined as the Wisconsin Department of Transportation completes the east-west corridor study.*

*[b]Operating costs are net of transit fares. It was assumed in this analysis that transit fares would over the plan implementation period approximate the existing 1994 fare levels, adjusted as may be necessary over time to account for general price inflation. The current fare levels are: Milwaukee County, local and express service, $1.25, rapid service, $1.50; City of Waukesha, local service, $0.75; City of Kenosha, local service, $0.75; City of Racine, local service, $0.60; and rapid service in the remainder of the Region, a distance based fare schedule ranging from $1.50 to $3.00.*

*[c]All of this additional revenue is associated with the proposed busway and light-rail transit facilities in the east-west and northeast travel corridors.*

*[d]Represents incremental State operating revenues needed to provide for State operating assistance equal to 42 percent of the projected total transit operating expenses within each county up to the amount of the projected operating deficits exceeding the existing trend operating revenues. Assumes that a fixed level of local matching funds will no longer be required for use of State operating assistance funds.*

*[e]Together these amounts total $25.0 million annually. This total represents about two-thirds of the statewide total average annual new urban transit funds proposed in the TRANSLINKS 21 plan. The assumed apportionment to Southeastern Wisconsin reflects historic experience. Programmatic proposals and constraints outlined in the TRANSLINKS 21 plan are assumed to be subject to change to meet plan implementation needs.*

*[f]The additional State operating revenues were assumed to be used first to increase the combined Federal and State operating levels within Racine and Kenosha Counties to cover up to 65 percent of the projected total transit operating expenses up to the amount of the projected operating deficits exceeding the existing trend revenues. The remaining funds were used to increase the combined Federal and State operating assistance levels within Milwaukee and Waukesha Counties to cover up to about 54 percent of the projected total transit operating expenses. Assumes that a fixed level of local matching funds will no longer be required for use of State transit operating assistance funds.*

*Source: SEWRPC.*

varies throughout the Region, ranging from no shortfall at all in Walworth County to a high of nearly 17 cents per gallon in Milwaukee County.

Also as shown in Table 280, substantial additional Federal and State monies may be available to reduce the transit-related shortfall. It is assumed that, over the plan implementation period, nearly $40 million annually in supplemental Federal funds will be made available for the purposes of constructing the busway and light-rail transit facilities identified in the aforereferenced east-west corridor major investment study. This includes an estimated $289 million in Federal Interstate Conversion Estimate (ICE) monies; an estimated $200 million in Federal Transit Administration Section 3 monies reserved in the present Federal transportation legislation for Milwaukee; and an additional $145 million in Federal funds presumed to be secured in subsequent Federal transportation legislation.

In addition, the draft State Intermodal Transportation Plan recognizes the need to provide additional State revenues to help county and local governments fund improved transit service, including the extension of transit service to provide greater geographic service in metropolitan regions and more frequent service reflected in shorter vehicle headways. Based on the TRANSLINKS 21 proposal, an additional approximately $25 million could be expected over the plan implementation period through the operation of various State transit operating assistance programs.[12] In addition, it is tentatively proposed that a State transit capital program be established, subject to confirmation in a special study outlined later in this chapter. The envisioned State transit capital aid program would provide State funding for up to 50 percent of the nonFederal share of transit capital costs. This is consistent with the position being taken by the Wisconsin Department of Transportation in the east-west travel corridor major investment study. As shown in Table 280, it is estimated that such a new program could bring an additional $13.8 million annually in State aid to county and local governments in the Region which sponsor the transit systems.

The foregoing assumed total infusion of additional Federal and State aid would reduce the anticipated average annual funding deficit for county and local transit systems from about $96 million annually to about $17 million annually. The additional Federal and State funds would represent the equivalent of about nine cents per gallon in terms of a motor fuel tax levied within the Region. The resulting deficit of about $17 million annually would represent the equivalent of about two cents per gallon in terms of such a motor fuel tax. As shown in Table 280, that equivalent motor fuel tax would range from a low of no tax at all in Walworth County to a high of about three cents per gallon in Milwaukee County.

<u>Concluding Recommendations</u>

Based upon the foregoing analyses of anticipated expenditures and revenues attendant to implementing the regional transportation system plan, the following conclusions may be drawn:

1. Assuming acceptance of the supplemental State funding proposals identified in the Statewide Intermodal Transportation Plan prepared by the Wisconsin Department of Transportation, there should be sufficient Federal and State revenues becoming available over the plan implementation period to fund the plan implementation recommendations attendant to the State trunk highway system, including rehabilitation and reconstruction of the Milwaukee area freeway system.

2. Also assuming that the proposed supplemental Federal transit funding, together with the supplemental funding recommendations for county and local arterial highways and transit identified in the draft Intermodal Transportation Plan for Wisconsin, are forthcoming, the anticipated funding deficits with respect to implementation of those two elements of the regional transportation system plan should be significantly reduced. Nevertheless, there is an anticipated funding deficit of about $28 million annually attendant to the county and local arterial street and highway system, and an additional funding deficit of about $17 annually attendant

[12] *This estimate assumes that certain existing programmatic constraints would ultimately be adjusted to reflect needs, including a cap of 50 percent State operating assistance in the Milwaukee area and a requirement that there be fixed levels of local matching funds in order to obtain State operating assistance funds.*

Table 281

SUMMARY OF ADDITIONAL LOCAL REVENUE REQUIRED TO IMPLEMENT THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN BY COUNTY: AVERAGE ANNUAL, 1995 THROUGH 2010

| County | Average Annual Plan Implementation Local Funding Shortfall: 1995-2010 (millions of dollars) | | | Equivalent Motor Fuel Tax Required to Fund the Shortfall[a] (cents per gallon) | | | Equivalent General Sales Tax Required to Fund the Shortfall[b] (percent) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Arterial Highways | Transit | Total | Arterial Highways | Transit | Total | Arterial Highways | Transit | Total |
| Kenosha | 3.9 | 0.2 | 4.1 | 6.8 | 0.4 | 7.2 | 0.5 | - -[c] | 0.5 |
| Milwaukee | - - | 13.2 | 13.2 | - - | 3.3 | 3.3 | - - | 0.2 | 0.2 |
| Ozaukee | 3.4 | 0.2 | 3.6 | 7.6 | 0.4 | 8.0 | 0.7 | - -[c] | 0.7 |
| Racine | 3.0 | 1.2 | 4.2 | 4.1 | 1.6 | 5.7 | 0.3 | 0.1 | 0.4 |
| Walworth | 4.8 | - - | 4.8 | 10.9 | - - | 10.9 | 1.0 | - - | 1.0 |
| Washington | 4.8 | 0.1 | 4.9 | 9.1 | 0.2 | 9.3 | 0.8 | - -[c] | 0.8 |
| Waukesha | 8.2 | 2.4 | 10.6 | 4.6 | 1.4 | 6.0 | 0.4 | 0.1 | 0.5 |
| Region | 28.1 | 17.3 | 45.4 | 3.3 | 2.0 | 5.3 | 0.2 | 0.1 | 0.3 |

[a] *For the assumptions attendant to the calculation of these estimates, see footnote "a" to Table 279.*

[b] *For analysis purposes, it was assumed that existing sales tax yields would be maintained over the plan implementation period. Presently, a 1 percent sales tax yields the following amounts of revenue annually: Kenosha County, $8.5 million; Milwaukee County, $63.9 million; Ozaukee County, $4.9 million; Racine County, $11.7 million; Walworth County $4.9 million; Washington County, $6.4 million; and Waukesha County $20.3 million. The regional total is $120.6 million.*

[c] *Less than 0.1 percent.*

*Source: SEWRPC.*

to the public transit systems. Together these two anticipated funding deficits total about $45 million annually and represent a significant challenge to be addressed as plan implementation proceeds.

The creation of a regional transportation authority, which proved to be politically infeasible in 1993, would have provided a good structure for securing and allocating the additional revenues required to implement the county and local arterial street and highway and transit elements of the plan. The authority would have been empowered to raise sufficient revenues to fund the anticipated shortfalls through a combination of transportation user fees and a general sales tax. Most transportation systems in large metropolitan areas in the Nation are funded in part by a dedicated areawide revenue source, typically a sales tax.

Assuming that there continues to be insufficient political support for the creation of a regional transportation authority and further assuming that county and local property taxes can no longer be viewed as either an adequate or an appropriate funding source for major transportation system improvement, operation, and maintenance activities, then the only other alternative appears to be to seek State enabling legislation that would provide permissive authority to counties to impose, within limits, either supplemental transportation user fees or a supplemental general sales tax, or a combination of such taxes, dedicated to transportation purposes. The local plan implementation funding shortfall by county is identified in Table 281, together with an estimate of the magnitude of a motor fuel tax or general sales tax required within each county to raise the revenue to fund that shortfall. A supplemental motor fuel tax required to fund the shortfall would range from a low of about three cents in Milwaukee County to a high of nearly 11 cents in Walworth County, averaging, throughout the Region, about five cents per gallon. A supplemental general sales tax required to fund the shortfall would range from a low of about 0.2 percent in Milwaukee County to a high of about 1 percent in Walworth County, averaging about 0.3 percent throughout the Region.

Given the foregoing, it is recommended that the seven counties in the Region, in cooperation with the cities, villages, and towns and the Wisconsin Department of Transportation, collectively work

Table 282

SUMMARY OF ADDITIONAL LOCAL REVENUE REQUIRED TO IMPLEMENT THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN FOR SOUTHEASTERN WISCONSIN AND TO RELIEVE THE PROPERTY TAX OF COSTS ASSOCIATED WITH ARTERIAL STREETS AND HIGHWAYS BY COUNTY

| County | Current Annual Estimate of Property Tax Funded Expenditures (millions of dollars) | | | | | | | Equivalent Motor Fuel Tax (cents per gallon) | | | Equivalent General Sales Tax (percent) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Arterial Streets and Highways | | | Transit | | | | | | | | | |
| | Capital | Operation and Maintenance | Subtotal | Capital | Operation and Maintenance | Subtotal | Total | Required to Relieve the Property Tax | Required to Fund Shortfall | Total | Required to Relieve the Property Tax | Required to Fund Shortfall | Total |
| Kenosha | 0.7 | 2.0 | 2.7 | 0.1 | 0.5 | 0.6 | 3.3 | 5.8 | 7.2 | 13.0 | 0.4 | 0.5 | 0.9 |
| Milwaukee | 6.0 | 10.4 | 16.4 | 2.2 | 15.5 | 17.7 | 34.1 | 8.5 | 3.3 | 11.8 | 0.5 | 0.2 | 0.7 |
| Ozaukee | 0.4 | 1.7 | 2.1 | - - | - - | - - | 2.1 | 4.7 | 8.0 | 12.7 | 0.4 | 0.7 | 1.1 |
| Racine | 1.0 | 3.2 | 4.2 | 0.1 | 0.5 | 0.6 | 4.8 | 6.5 | 5.7 | 12.2 | 0.4 | 0.4 | 0.8 |
| Walworth | 0.1 | 1.9 | 2.0 | - - | - - | - - | 2.0 | 4.5 | 10.9 | 15.4 | 0.4 | 1.0 | 1.4 |
| Washington | 1.3 | 2.5 | 3.8 | - - | - - | - - | 3.8 | 7.2 | 9.3 | 16.5 | 0.6 | 0.8 | 1.4 |
| Waukesha | 3.8 | 5.9 | 9.7 | 0.1 | 0.6 | 0.7 | 10.4 | 5.9 | 6.0 | 11.9 | 0.5 | 0.5 | 1.0 |
| Region | 13.3 | 27.6 | 40.9 | 2.5 | 17.1 | 19.6 | 60.5 | 7.1 | 5.3 | 12.4 | 0.5 | 0.3 | 0.8 |

*Source: SEWRPC.*

through the State legislative delegation from the Region to secure enabling legislation that would permit the counties to impose either a transportation user fee, such as the motor fuel tax, or a general sales tax, or some combination thereof, at a level sufficient in each county to raise the revenue required to fund the anticipated plan implementation shortfall. Such legislation should ensure that the revenues obtained are dedicated to the sole purpose of implementing the recommendations included in the regional transportation system plan. The legislation must also require the establishment of a technique, perhaps unique to each county, whereby revenues raised within each county are apportioned to the county and the local units of government therein in proportion to their need for such revenue as determined by the implementation recommendations included in the regional plan. State-level oversight would likely be required in this respect as, for example, a determination by the Wisconsin Department of Transportation that a proposed revenue allocation scheme within a given county is consistent with the regional transportation system plan implementation recommendations. The Regional Planning Commission could assist the Department in such matters by making findings appropriate to any given proposal for revenue allocation within a county. It is further recommended that the Wisconsin Department of Transportation, as part of its TRANSLINKS 21 funding initiative, make known to the State Legislature the need to provide the counties in Southeastern Wisconsin with the authority to raise nonproperty-tax revenue dedicated for transportation purposes.

A proposal set forth later in this chapter, which was derived from the public hearing process, calls for a study of the potential for removing from county and local property taxes all existing funding burdens associated with building and maintaining the arterial street and highway system and providing public transit services in each county. An estimate of the current amount of county and local property taxes expended for that purpose in the Region is set forth in Table 282. Over $60 million of property taxes annually are used in the Region for purposes related to implementation of the regional transportation system plan, about two-thirds of which are expended for arterial streets and highways and about one-third for public transit. Estimates of the equivalent motor fuel tax and general sales tax that would be required within each county and within the Region as a whole to remove these funding burdens from the property tax are also set forth in Table 282. At the regional level, such property tax relief would require about a 7-cent-per-gallon motor fuel tax or a 0.5 percent general sales tax.

Table 282 also identifies the total motor fuel tax or general sales tax that would be required in the Region and within each county of the Region if it were ultimately determined to be desirable to enable either a regional transportation authority, should the re-creation of such an authority become politically feasible, or individual counties both to fund the plan implementation shortfall and to remove all major transportation expenditures from the property tax. At the regional level, accomplishing these dual objectives would require about a 12-cent-per-gallon motor fuel tax or a 0.8 percent general sales tax.

In any consideration of the financial analysis presented herein, it is important to note that extensive opportunity was provided for public review of, and comment on, the plan and its attendant costs. Two of three issues of the Commission Newsletter published during the planning process presented plan cost-related data, including the equivalent increases in motor fuel taxes that would be required to cover the revenue shortfalls attendant to plan implementation. Further, during the Regional Planning Conference held on June 27, 1994, by the Commission for the purpose of presenting the recommended plan for public review, a session devoted to transportation plan financing was conducted to receive public input on costs, revenues, revenue shortfalls, and potential means of raising additional needed revenues. The Commission also held public hearings on the plan in all seven counties of the Region. During such hearings, the costs associated with the plan, as well as the equivalent increases in the motor fuel tax required to eliminate anticipated funding shortfalls, were addressed. There was no widespread opposition expressed to the findings that additional revenue would be required to implement the plan, nor any suggestions whatsoever made that the plan be scaled back to fit current revenues.

Finally, it is recognized that the Federal Intermodal Surface Transportation Efficiency Act of 1991 requires that transportation system plans be constrained to reasonable estimates of available revenue. Accordingly, it is recommended that monitoring activities be undertaken by the Regional Planning Commission in the near-term plan implementation period with respect to the actions needed to secure the additional funding required to implement the plan. Should that monitoring indicate a determination not to make available sufficient supplemental funding to implement the plan, then it is recommended that such a finding be taken into account as a fourth-generation regional transportation system plan is prepared for the design year 2020.

## DETAILED IMPLEMENTATION PLANNING

More detailed planning will be required prior to the programming of certain elements of the recommended regional transportation system plan. This includes the conduct of work identified under the Federal Intermodal Surface Transportation Efficiency Act as "major investment studies," as well as of the more detailed State, county, or local planning efforts required to refine the basic transit and highway improvement recommendations contained in the plan.

### Major Investment Studies

Under Federal law, a major investment study (MIS) is required as an integral part of the implementation of major highway and transit improvement projects recommended in the system plan. While the regional transportation system plan may identify a need for such a project in a travel corridor, a major investment study is required to confirm that need and to provide the basis for more detailed consideration of alternatives before a final decision on the major transportation investment concerned is made. The Federal Highway and Transit Administrations have promulgated rules and guidance under which major investment studies are to be conducted. These studies are intended to focus on travel corridors.

Under the Federal rules, the following types of transportation facility improvements may be included on a provisional basis in a regional transportation system plan, but are subject to further study and confirmation in a major investment study:

1. New freeways.[13]

2. The addition of through travel lanes to existing freeways for a distance of one mile or more.

3. New expressways.[14]

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[13] *A freeway is defined as a fully grade-separated, divided highway with access permitted only at interchanges with other arterial facilities.*

[14] *An expressway is defined as a partially grade separated, partially divided highway with access permitted only at interchanges and intersections with other arterial facilities.*

4. The addition of through travel lanes to existing expressways for a distance of one mile or more.

5. Any type of fixed-guideway transit facility, including busways, light-rail lines, heavy-rail lines, and commuter-rail lines.

Within Southeastern Wisconsin the Federal rules governing the conduct of major investment studies apply only to the six-county Milwaukee Transportation Management Area (TMA) defined by the U. S. Department of Transportation. That area, which excludes Walworth County, is coterminous with the six-county "severe" ozone nonattainment area for air quality management designated by the U. S. Environmental Protection Agency.

The recommended regional transportation system plan recognizes the potential for 11 major highway or transit facilities that are provisionally included in the plan. For some facilities, initial feasibility studies may first be undertaken to evaluate the project potential further before proceeding to the more expensive and time-consuming major investment study. Where the project potential is confirmed, a major investment study will be conducted by the Wisconsin Department of Transportation or the Regional Planning Commission, in cooperation with all interested parties, and will evaluate all feasible technologies. Thereafter, the regional plan will be amended to specifically include the project proposed by the major investment study, as well as the financial provisions necessary for its development and operation.

As each major investment study is completed, it is recommended that appropriate consideration be given to establishing a transit corridor overlay zoning district and attendant regulations. Such an ordinance would be intended to be adopted cooperatively by the affected municipalities along whatever rapid transit lines ultimately may be constructed and would be designed to help ensure the proper development and redevelopment of areas near transit stops and stations.

1. <u>Current WisDOT East-West Travel Corridor Study</u>
   A corridor study sponsored by the Wisconsin Department of Transportation was underway at the time of the completion of the new regional transportation system plan in 1994. As noted in Chapter XI, a decision was made to incorporate into the new system plan the preliminary recommendations formulated by the advisory committee created by the Department to guide that study. While the current corridor study was conceived prior to the promulgation of rules and guidance by the Federal government attendant to the conduct of major investment studies, it is assumed that the completed study will meet all of the requirements of a major investment study.

   The following major transportation facilities have been included in the recommended regional transportation system plan subject to further evaluation in the current major investment study (see Map 150):

   a. A busway/HOV facility in the east-west travel corridor extending for about 15 miles from the Milwaukee CBD west to STH 164 in Waukesha County. That busway would be used by 16 of the 30 rapid transit bus routes recommended in the regional transportation system plan.

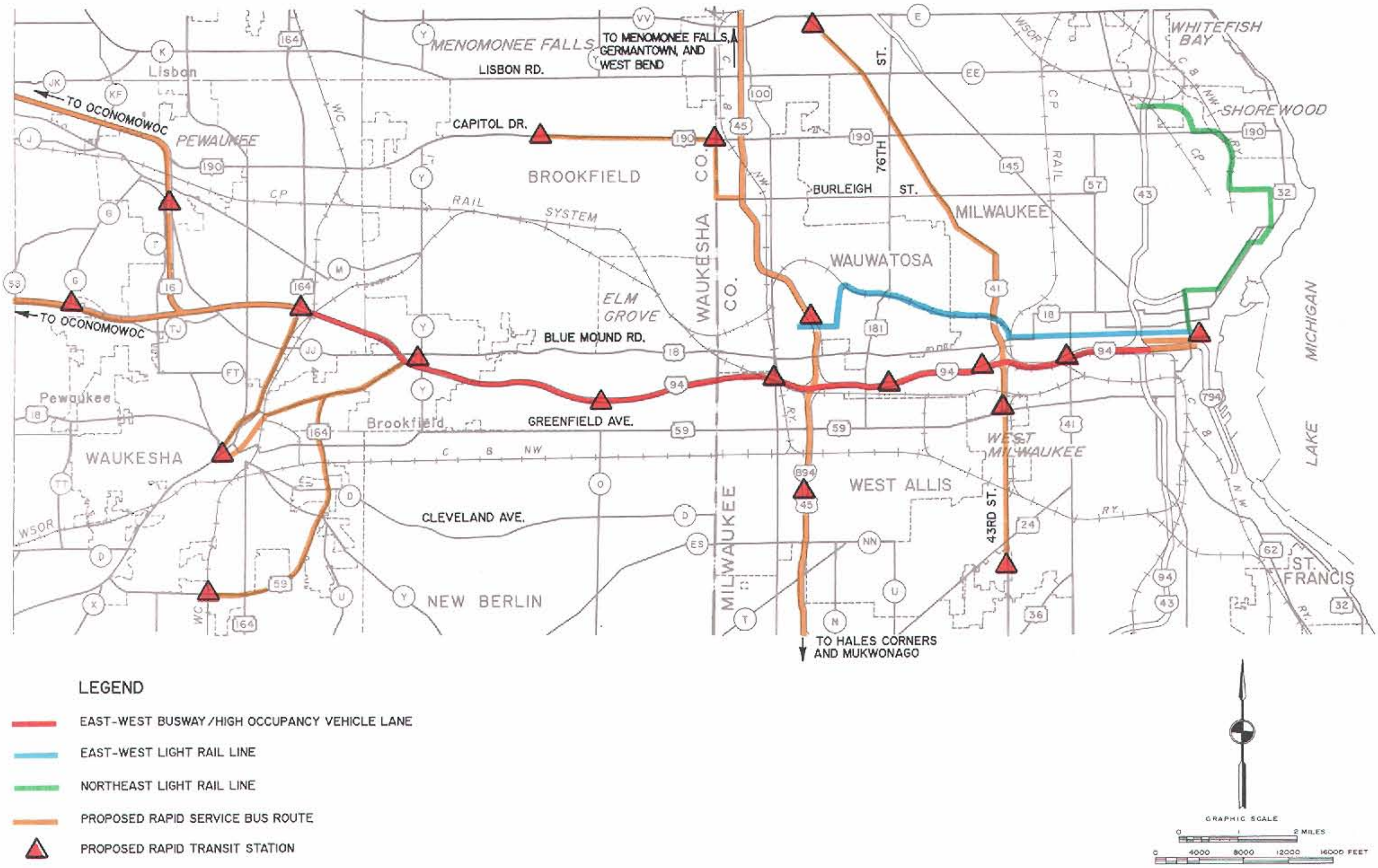
   b. A light-rail transit line in the east-west travel corridor extending for about 7.5 miles from the Milwaukee CBD west to the Milwaukee County Research Park located west of the Zoo Freeway and south of Watertown Plank Road.

   c. A light-rail transit line in the northeast travel corridor extending for about 7.5 miles from the CBD of Milwaukee through the University of Wisconsin-Milwaukee campus to a terminus in the City of Glendale in the vicinity of the IH 43 Freeway and E. Hampton Avenue.

   d. Rehabilitation of the east-west freeway, defined for reconstruction purposes as that segment extending along IH 794 from S. Carferry Drive to, and along, IH 94, west to the interchange with STH 16. The rehabilitation of the east-west freeway would include the redesign and reconstruction of the Marquette, Stadium, and Zoo interchanges; the redesign and reconstruction of the major interchanges connecting the freeway to surface arterials; and the replacement of pavements and bridges.

## Map 150

### TRANSPORTATION FACILITIES UNDER CONSIDERATION IN THE CURRENT WISCONSIN DEPARTMENT OF TRANSPORTATION EAST-WEST TRAVEL CORRIDOR STUDY (MAJOR INVESTMENT STUDY)




The fixed-guideway transit facilities shown on the accompanying map have been provisionally included in the recommended regional transportation system plan. A corridor study sponsored by the Wisconsin Department of Transportation is currently underway to determine the feasibility of these proposed facilities. Upon completion of that study, the local units of government concerned, the Regional Planning Commission, and the Wisconsin Department of Transportation will affirm the study findings and amend the regional transportation plan if necessary.

*Source: SEWRPC.*

2. <u>North Travel Corridor Major Investment Study</u>[15]
   A major investment study will be required for proposed facilities in the north travel corridor extending from the Milwaukee CBD to the Saukville-Port Washington area of Ozaukee County. The following major transportation facilities have been provisionally included in the recommended regional transportation system plan and are subject to further evaluation in the proposed north travel corridor study (see Map 151):

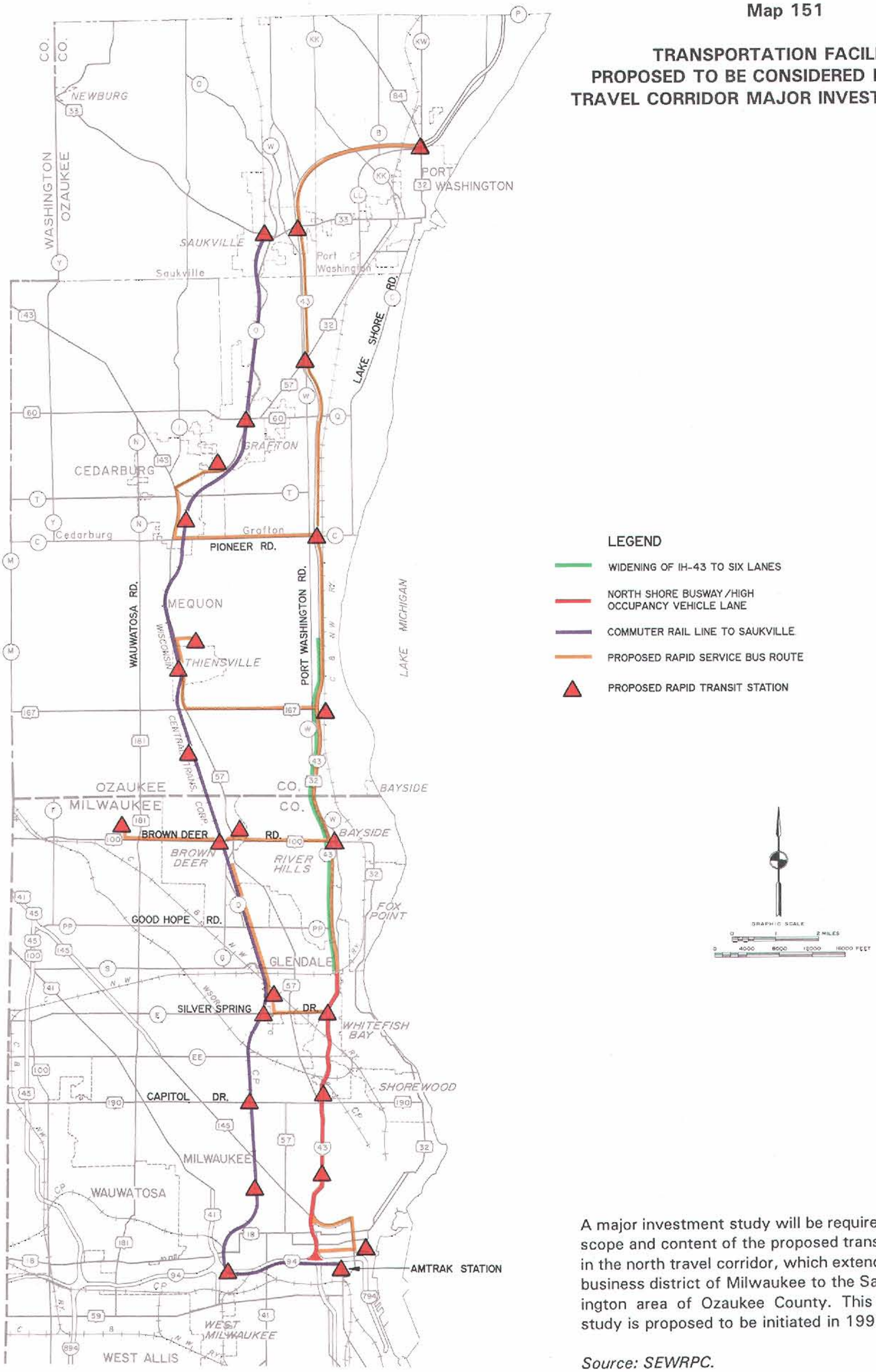
   a. The widening of the IH 43 freeway from four to six lanes from W. Bender Road in the City of Glendale to Highland Road in the City of Mequon, a distance of about eight miles.

   b. A busway/high occupancy vehicle facility along IH 43 extending for about seven miles from the Milwaukee CBD north to W. Bender Road. That busway would be used by six of the 30 rapid transit bus routes recommended in the regional transportation system plan.

[15] *This major investment study is proposed to be initiated in 1995.*

# Map 151

## TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A NORTH TRAVEL CORRIDOR MAJOR INVESTMENT STUDY




A major investment study will be required to determine the scope and content of the proposed transportation facilities in the north travel corridor, which extends from the central business district of Milwaukee to the Saukville-Port Washington area of Ozaukee County. This major investment study is proposed to be initiated in 1995.

*Source: SEWRPC.*

c. A commuter-rail passenger line extending from the Milwaukee AMTRAK station north for about 28 miles to the Village of Saukville.

3. Northwest Travel Corridor Major Investment Study
A major investment study will be required for proposed facilities in the northwest travel corridor extending from the Milwaukee CBD to the City of West Bend in Washington County. The following major transportation facilities have been provisionally included in the recommended regional transportation system plan and are subject to further evaluation in the proposed northwest travel corridor study (see Map 152):

a. A busway/HOV facility along the Zoo Freeway extending for about eight miles from the Zoo Interchange north to W. Mill Road. That busway would be used by eight of the 30 rapid transit routes recommended in the regional transportation system plan.

b. A commuter-rail passenger line extending from the Milwaukee AMTRAK station for about 35 miles to a terminal in the City of West Bend.

4. South Travel Corridor Major Investment Study[16]
A major investment study will be required for proposed facilities in the south travel corridor extending from the Milwaukee CBD to Racine and Kenosha. The following major transportation facilities have been provisionally included in the recommended regional transportation system plan and are subject to further evaluation in the proposed south travel corridor study (see Map 153):

a. A busway/HOV lane extending along IH 43/IH 94 for about six miles from the Milwaukee CBD south to the Mitchell Interchange, along IH 43/IH 894 for about four miles from the Mitchell Interchange to W. Forest Home Avenue, and another along IH 94 south for about three miles from the Mitchell Interchange to W. Rawson Avenue. These busways, which together would total about 13 miles in length, would be used by seven of the 30 rapid transit routes recommended in the regional transportation system plan. The busway along IH 43/IH 894 would be used by two of the rapid transit routes. The busway along IH 94 would be used by five of the rapid transit bus routes.

b. A commuter-rail passenger line extending from the Milwaukee AMTRAK station south through St. Francis, Cudahy, South Milwaukee, and Racine to the Kenosha Metra station in the Kenosha CBD, a distance of about 33 miles. In 1994, Chicago-oriented commuter-rail service was provided by Metra, the Chicago based public agency created to deliver commuter-rail services, from the Kenosha station. Accordingly, this particular major investment study will need to examine potential relationships between the proposed commuter-rail passenger service in Southeastern Wisconsin and the existing Chicago-oriented commuter-rail service.

5. Southwest Corridor Major Investment Study
A major investment study will be required in the southwest travel corridor for a proposed facility provisionally included in the recommended regional transportation system plan: a busway/HOV lane along the Zoo Freeway, extending for about six miles from the Zoo Interchange south through the Hale Interchange to S. 116th Street (see Map 154). This busway would be used by three of the 30 rapid transit routes recommended in the regional transportation system plan.

6. Milwaukee Crosstown Corridor Major Investment Study
A major investment study will be required in the Milwaukee crosstown travel corridor for a proposed facility provisionally included in the recommended regional transportation system plan: a light-rail transit facility extending from a terminal

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[16] *This major investment study is proposed to be initiated in 1995.*

## Map 152

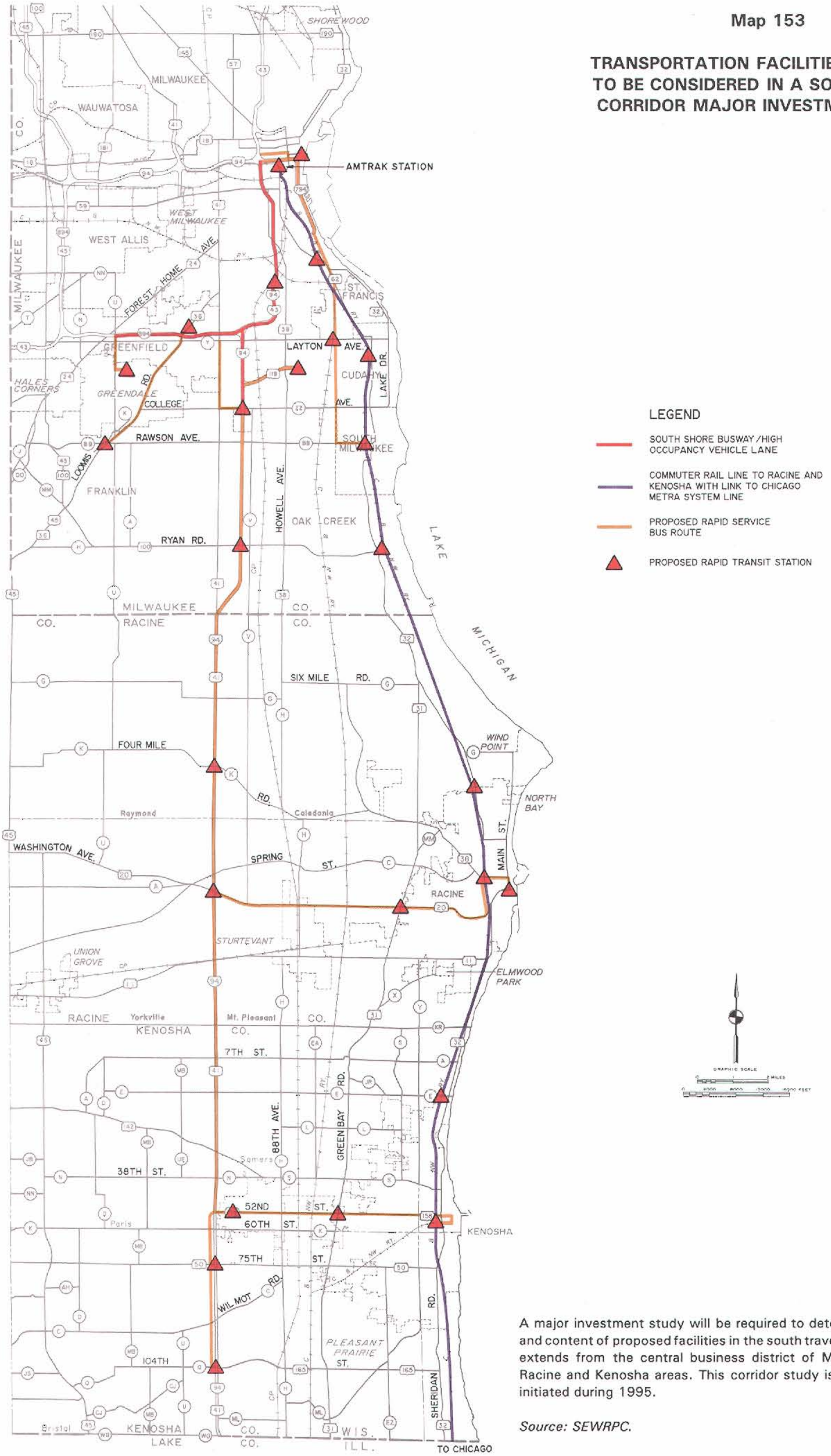
### TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A NORTHWEST TRAVEL CORRIDOR MAJOR INVESTMENT STUDY


A major investment study will be required to determine the scope and content of the proposed transportation facilities in the northwest travel corridor, which extends from the central business district of Milwaukee to the City of West Bend in Washington County.

*Source: SEWRPC.*

## Map 153

### TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A SOUTH TRAVEL CORRIDOR MAJOR INVESTMENT STUDY

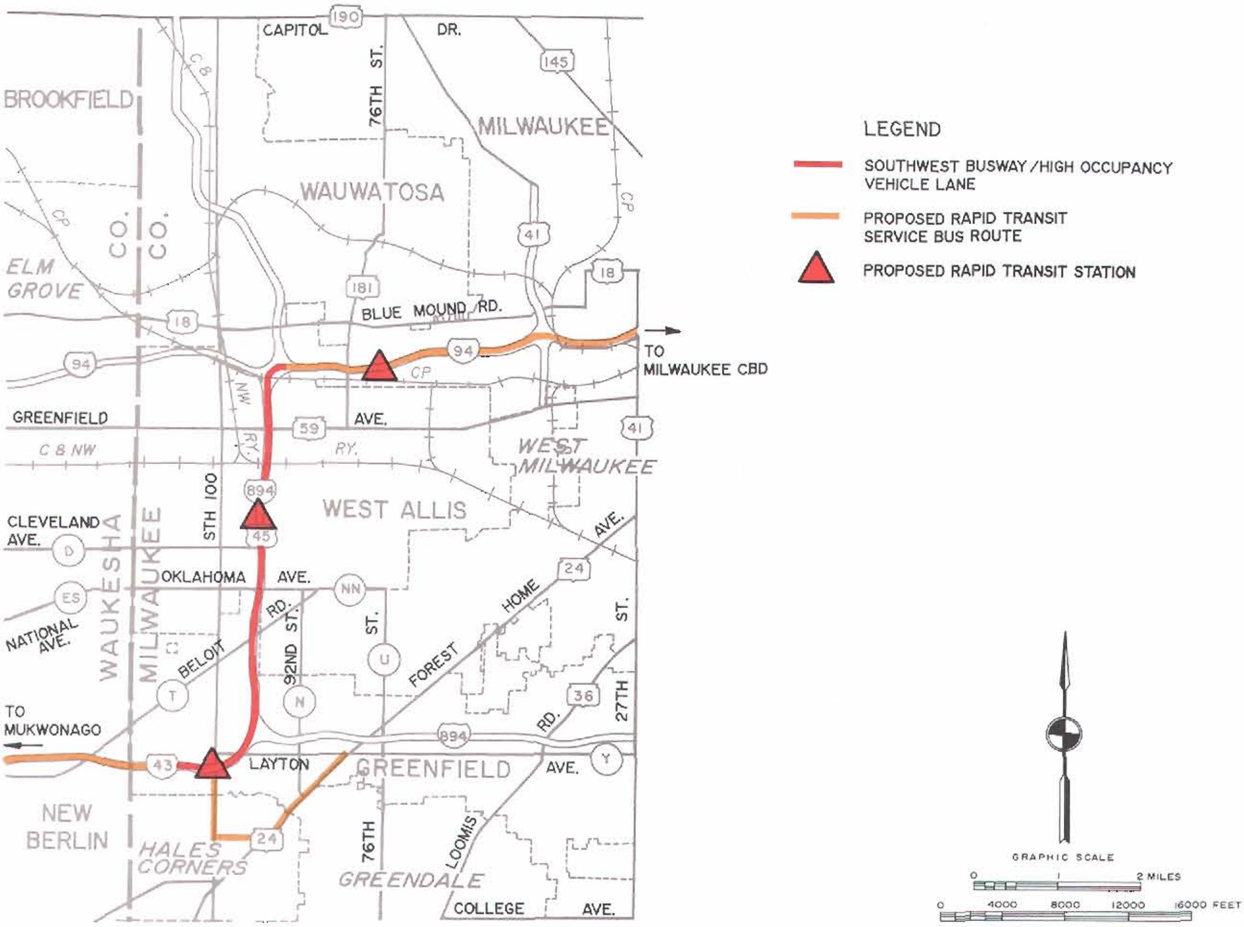



A major investment study will be required to determine the scope and content of proposed facilities in the south travel corridor, which extends from the central business district of Milwaukee to the Racine and Kenosha areas. This corridor study is proposed to be initiated during 1995.

*Source: SEWRPC.*

Map 154

**TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A SOUTHWEST TRAVEL CORRIDOR MAJOR INVESTMENT STUDY**




A major investment study will be required in the southwest travel corridor attendant to a southwest busway/high-occupancy vehicle lane. This facility would extend along the Zoo Freeway for about six miles from the Zoo interchange south through the Hale interchange to 116th Street.

*Source: SEWRPC.*

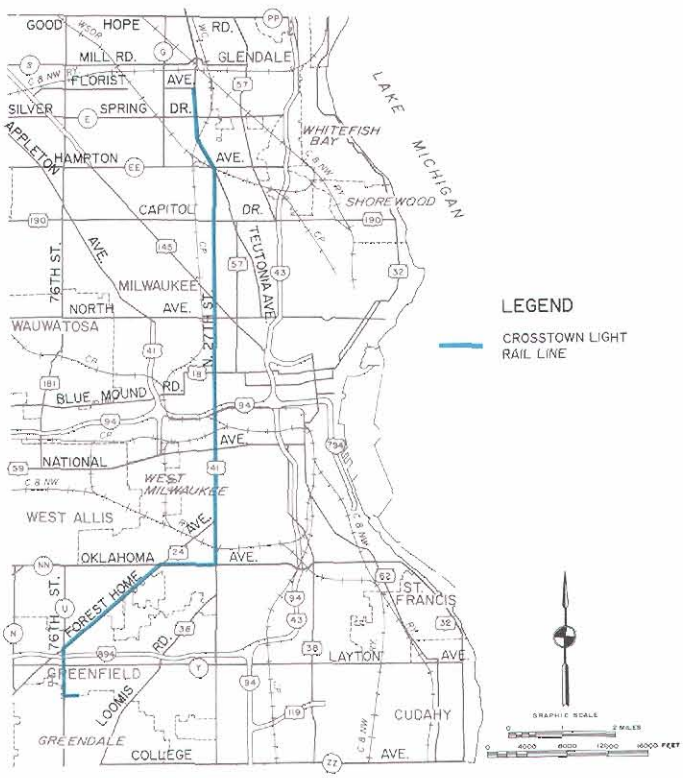
near the Southridge Shopping Center in the Village of Greendale and City of Greenfield to and along S. and N. 27th Street to a terminus near the intersection of Teutonia Avenue and W. Florist Avenue in the City of Milwaukee, a distance of about 14 miles (see Map 155). In addition to potential crosstown light-rail transit service, this facility would serve potential light-rail routes to and from the Milwaukee CBD.

7. <u>Mitchell Field Corridor Major Investment Study</u>
   A major investment study will be required in the Mitchell Field travel corridor for a single proposed facility provisionally included in the recommended regional transportation system plan: a light-rail transit facility extending from the Milwaukee CBD south to General Mitchell International Airport and to a terminal near the interchange of IH 94 and W. College Avenue, a distance of about 10 miles (see Map 156).

8. <u>Milwaukee Northridge Corridor Major Investment Study</u>
   The regional transportation system plan recognizes the potential to establish an express transit service in the Milwaukee Northridge travel corridor, extending for about 12 miles from the Milwaukee CBD to

Map 155

**TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A MILWAUKEE CROSSTOWN TRAVEL CORRIDOR MAJOR INVESTMENT STUDY**

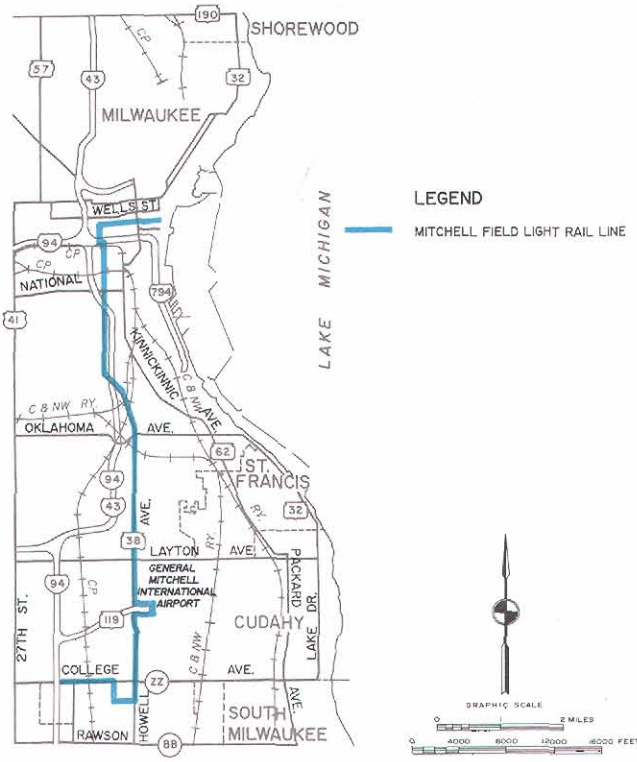



A major investment study will be required in the Milwaukee crosstown travel corridor attendant to a crosstown light-rail line. The light-rail transit line would extend from a terminal near the Southridge Shopping Center in the Village of Greendale and the City of Greenfield to and along North and South 27th Street, ending near the intersection of Teutonia Avenue and W. Florist Avenue in the City of Milwaukee. The facility would extend a distance of about 14 miles.

*Source: SEWRPC.*

Map 156

**TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A FUTURE MITCHELL FIELD TRAVEL CORRIDOR MAJOR INVESTMENT STUDY**




A major investment study will be required attendant to a light-rail transit facility extending from the Milwaukee central business district south to the General Mitchell International Airport and to a terminal near the interchange of IH 94 and W. College Avenue. This facility, would extend for about 10 miles.

*Source: SEWRPC.*

a terminal near the Northridge Shopping Center (see Map 157). This particular service, which could be provided by bus or light-rail service, was the subject of a corridor study conducted by the Commission for Milwaukee County. The findings and recommendations of this study are documented in SEWRPC Community Assistance Planning Report No. 150, A Rapid Transit Facility Plan for the Milwaukee Northwest Corridor, January 1988. Based upon that study, Milwaukee County determined to implement an express bus system in the corridor. It was recognized, however, that, should transit ridership increase significantly in the corridor following initiation of the express bus service, it may be desirable to again examine the potential for light-rail service. The recommended regional transportation system plan thus holds open the possibility for such a reexamination.

9. East-West Corridor Major Investment Study

Because the scope of the current Wisconsin Department of Transportation East-West Corridor Transit Study did not include consideration of commuter-rail passenger service, a future major investment study

Map 157

TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED
IN A NORTHRIDGE TRAVEL CORRIDOR MAJOR INVESTMENT STUDY

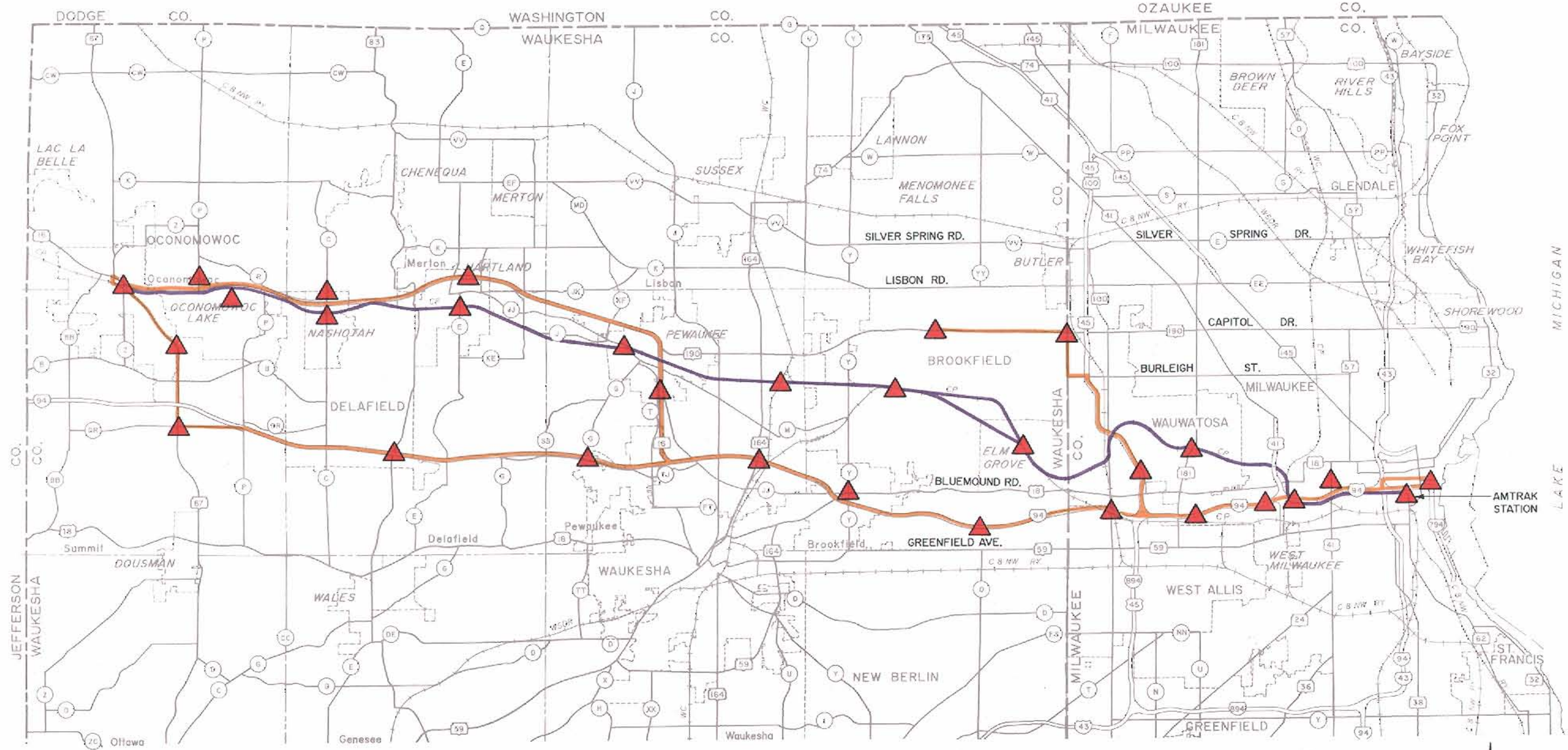

A major investment study will be required attendant to a Northridge light-rail line, which would extend a distance of about 12 miles from the Milwaukee central business district to a terminal near the Northridge Shopping Center.

*Source: SEWRPC.*

will be required in the east-west travel corridor for the proposed commuter-rail passenger line extending from the Milwaukee AMTRAK station west to the City of Oconomowoc, a distance of about 32 miles (see Map 158). Historically, commuter-rail passenger service was provided on the line in this corridor, the former Chicago, Milwaukee, St. Paul & Pacific Railroad, until its termination in 1972. Because this major investment study will follow the current study in the east-west travel corridor, the future study should be designed to accept as committed decisions those major transportation facilities which ultimately are recommended for implementation through the Wisconsin Department of Transportation East-West Corridor Transit Study.

Map 158

## TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A FUTURE EAST-WEST TRAVEL CORRIDOR MAJOR INVESTMENT STUDY




LEGEND

COMMUTER RAIL LINE TO OCONOMOWOC

PROPOSED RAPID SERVICE BUS ROUTE

PROPOSED RAPID TRANSIT STATION

A major investment study will be required attendant to commuter-rail passenger service in the East-West travel corridor between the Milwaukee central business district and the City of Oconomowoc. It is necessary to conduct an additional study in this corridor because the scope of the current Wisconsin Department of Transportation East-West corridor study did not include consideration of commuter-rail passenger service. The commuter-rail line would extend a distance of about 32 miles.

*Source: SEWRPC.*

10. Burlington-Antioch, Illinois, Corridor Major Investment Study[17]
A major investment study will be required for the proposed commuter-rail passenger line extending from the City of Burlington in Racine County through the Village of Silver Lake in Kenosha County to Antioch, Illinois, and on into Chicago. This commuter-rail line would represent an extension of Chicago-oriented service of Metra, which is scheduled to begin in 1996. The extension from Antioch to Burlington would represent about 17 miles of additional service, with the Antioch terminal located about 1.5 miles south of the Wisconsin-Illinois state line (see Map 159). It is recommended that this major investment study begin with a limited-scope feasibility analysis and, depending upon the findings and recommendations of that analysis, be expanded to complete the requirements for a major investment study.

11. Walworth-Fox Lake, Illinois, Corridor Major Investment Study[18]
A major investment study is required for the proposed commuter-rail passenger line extending from the Village of Walworth in Walworth County to Fox Lake, Illinois, and on into Chicago. This commuter-rail line would represent an extension of the current Chicago-oriented service of Metra. The extension from Fox Lake to Walworth would represent about 26 miles of additional service, about nine of which would be located within Walworth County (see Map 160). A major investment study would be required even though Walworth County is outside of the Milwaukee Transportation Management Area because the two counties in Illinois through which the extension would run, McHenry and Lake, lie within a Chicago-based transportation management area. It is recommended that this major investment study begin with a limited scope feasibility analysis and, depending upon the findings of that analysis, be expanded to complete the requirements for a major investment study.

[17] *This major investment study is proposed to be initiated in 1995.*

[18] *This major investment study is proposed to be initiated in 1995.*

The only other project identified in the recommended regional transportation system plan that might require a major investment study and that lies within the six-county Milwaukee Transportation Management Area is the extension of the STH 16 freeway to bypass Oconomowoc. That project will not require the conduct of a new major investment study. An abbreviated study of this proposed improvement, completed by the Wisconsin Department of Transportation in 1994, meets the requirements of the Federal regulations implementing the Intermodal Surface Transportation Efficiency Act of 1991. The work included a final Environmental Impact Statement (EIS). A formal record of decision by the Federal and State governments concerned was pending late in 1994. The only other freeway improvement projects included in the recommended regional transportation system plan lie in Walworth County, where the major investment study requirements do not apply and where, therefore, the normal preliminary engineering-environmental impact statement process will be used as a decision making mechanism. The recommended regional transportation system plan does not call for the construction of any expressways.

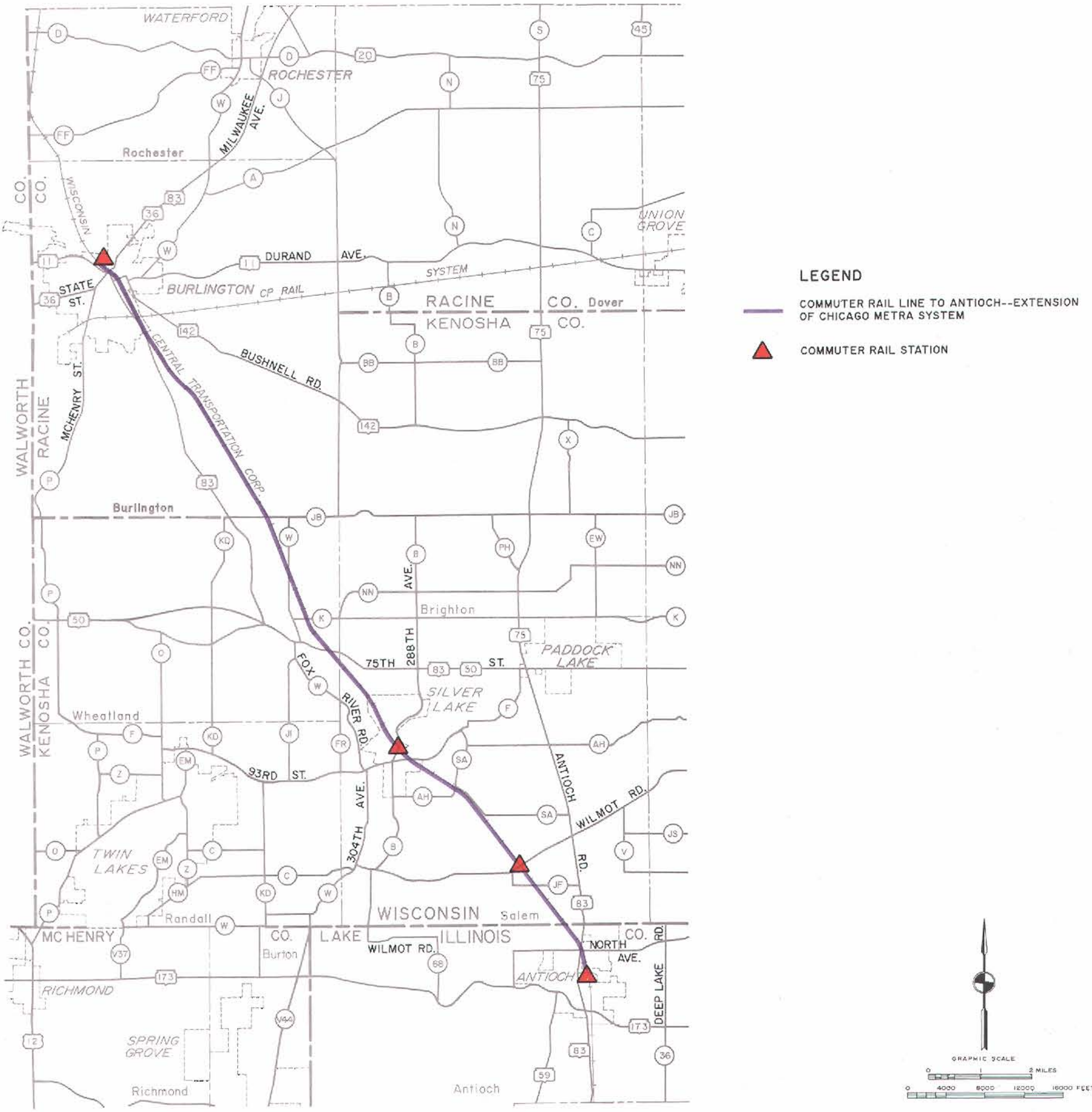
The Federal rules attendant to major investment studies envision a cooperative and collaborative process involving the Federal and State Departments of Transportation; affected local public works agencies; transit operators, both public and private; environmental agencies and interest groups; and the Regional Planning Commission as the Metropolitan Planning Organization. A major investment study can be initiated by the affected public transit operator, the Regional Planning Commission, or the Wisconsin Department of Transportation. Regardless of sponsorship, upon completion of a major investment study, the Regional Planning Commission must formally act to either confirm or revise the adopted regional transportation system plan if the transportation facilities identified for implementation in the major investment study are to be eligible for inclusion in the regional transportation improvement program.

Transit Development Planning

In addition to the major investment studies identified above, it is recommended that each of the public transit operators in the Region undertake the preparation of transit development plans and programs as a basis for refining and detailing the recommendations of the regional

## Map 159

## TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A BURLINGTON-ANTIOCH TRAVEL CORRIDOR MAJOR INVESTMENT STUDY

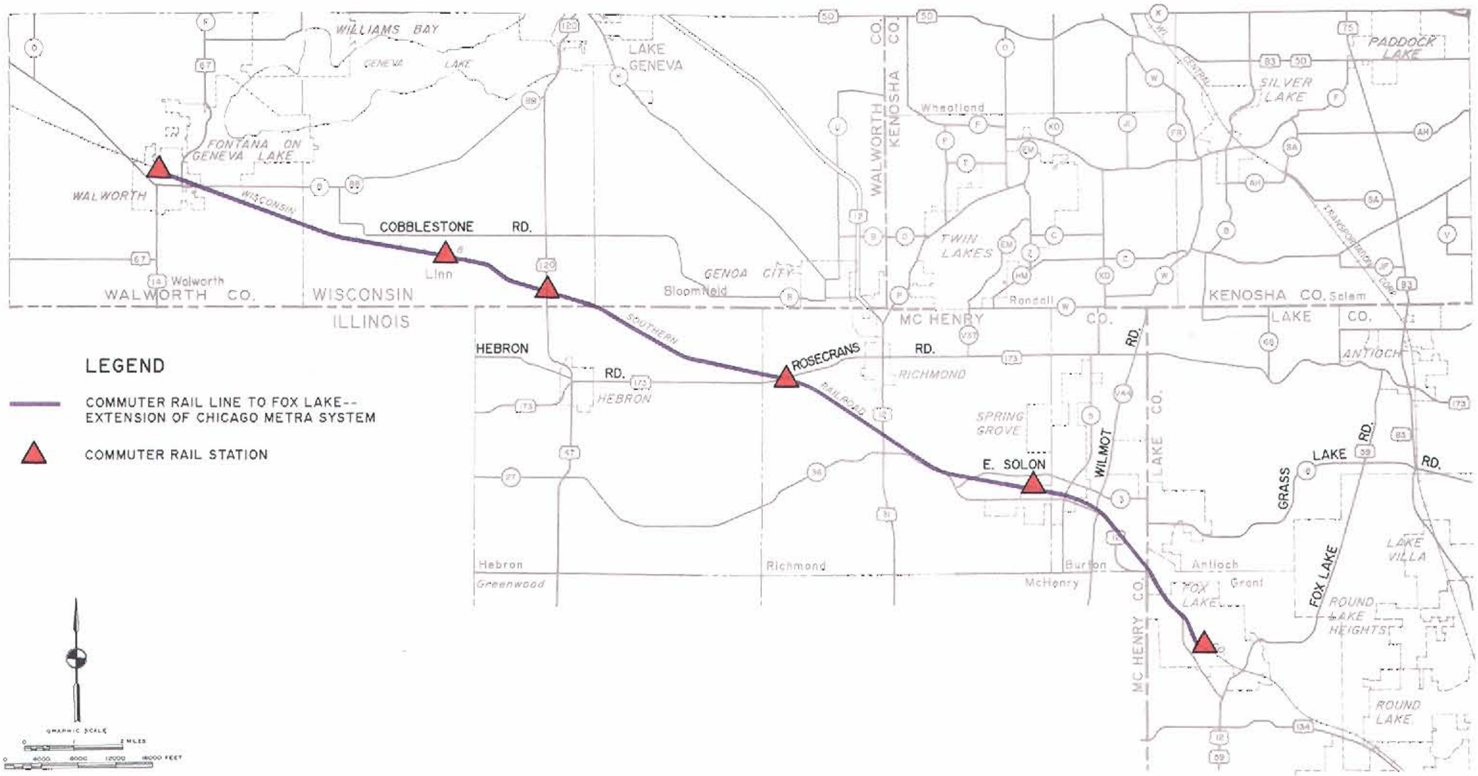



A major investment study will be required attendant to commuter-rail passenger service from the City of Burlington in Racine County through the Village of Silver Lake in Kenosha County to Antioch, Illinois, and on to Chicago. It is recommended that this major investment study begin with a limited-scope feasibility analysis and, depending upon the findings and recommendations of that analysis, be expanded to complete the requirements of a major investment study. This major investment study is proposed to be initiated in 1995.

*Source: SEWRPC.*

Map 160

TRANSPORTATION FACILITIES PROPOSED TO BE CONSIDERED IN A WALWORTH-FOX LAKE TRAVEL CORRIDOR MAJOR INVESTMENT STUDY




A major investment study is required attendant to commuter-rail passenger service from the Village of Walworth in Walworth County to Fox Lake, Illinois, and on to Chicago. It is recommended that this major investment study begin with a limited-scope feasibility analysis and, depending upon the findings of that analysis, be expanded to complete the requirements of a major investment study. This major investment study is proposed to be initiated in 1995.

*Source: SEWRPC.*

plan and for programming projects to implement that plan. Typically, such plans and programs are prepared with a relatively short-term, five-year, time horizon. These plans and programs provide the basis for day-to-day decision making on new transit system starts and on modifications to existing transit services. These plans provide the basis, then, for the programming of transit projects by each operator in terms of their individual agency budgets, as well as for submittal of projects to be included in the regional transportation improvement program.

In carrying out the transit development planning, it is further recommended that each transit operator give attention to the need to identify ways to improve nonmotorized access to and from transit stops and stations, to the desirability of encouraging the development of multi-purpose land use activity centers at major transit stations, to improve transit signage and route information materials, and to the feasibility of offering an Employee Commute Options (ECO) Pass program, whereby major employers would be encouraged to purchase, at discounted rates, transit passes for use by all its employees. It also recommended that each transit operator explore the desirability of providing neighborhood-based transit vans to "shuttle" individuals between their homes and major transit stations and activity centers. Finally, it is further recommended that each transit operator continue to plan for improved paratransit services to elderly and disabled individuals, looking in particular toward the improved coordination of service delivery.

Arterial Street and Highway Planning
County and local public works agencies may also undertake detailed implementation planning attendant to the recommended regional arterial street and highway system. Such planning can serve as a basis for amendment of the regional transportation system plan, but more frequently is used as a basis for refining and detailing that plan and, in particular, for identifying recommended urban and rural arterial street and highway cross-sections and for the determination of right-of-way requirements attendant to such sections.[19] It is recommended that each county and public works agency consider preparing a plan that would refine and detail the arterial street and highway element of the regional transportation system plan.

Upon completion of any needed detailing and refinement of the arterial street and highway element of the system plan, including preliminary engineering studies, it is recommended that, as appropriate, the Wisconsin Department of Transportation, each county highway and public works agency, and each local public works agency take steps to reserve the required future rights-of-way by means of official mapping, building setback line ordinances, land division ordinances, and private deed restrictions. Such prior reservation of right-of-way serves as an expression of governmental intent to acquire land for highway purposes in advance of actual facility construction and thereby not only achieves economies in right-of-way acquisition, but also permits land adjacent to the right-of-way to be privately purchased and developed or redeveloped with full knowledge of the future highway development proposals. The most effective and efficient means of prior reservation of right-of-way is the use of official mapping powers granted to the Wisconsin Department of Transportation, as well as to counties, cities, villages, and towns, in Wisconsin.

## MANAGEMENT SYSTEMS

The Intermodal Surface Transportation Efficiency Act requires the State of Wisconsin to develop six transportation management systems: pavement, bridge, safety, congestion, public transportation, and intermodal management. These management systems, as defined by the applicable Federal rules, are intended to assist decision makers in identifying cost effective actions to improve the efficiency and safety of the transportation infrastructure. The congestion, public transportation, and intermodal management systems, in particular, are important to the successful implementation of metropolitan transportation system plans. These latter three management systems must be integrated and incorporated into the ongoing regional planning process conducted within Southeastern Wisconsin. The objective of such integration is to ensure the provision of the information necessary to implement and to periodically review and revise, as may be found necessary, recommended areawide plans throughout the implementation periods.

The management systems are viewed by the Federal government as ongoing processes. The congestion, public transportation, and intermodal management systems are to be designed to include: 1) the continuing collection of data concerning congestion levels, public transit assets, and the use of intermodal facilities and services, 2) the analyses of alternatives to address problems associated with traffic congestion, transit assets, and intermodal transportation, 3) the selection and implementation of preferred alternatives to achieve the resolution of existing and future potential problems, and 4) monitoring to ascertain if the preferred alternatives have been implemented and the identified problems resolved. It is envisioned that the analyses and conclusions drawn from the management systems will provide the basis for periodically reevaluating and, as may be necessary, amending the regional transportation system plan.

The State of Wisconsin may enter into agreements with local units of government, as well as with the Regional Planning Commission, to implement parts of any management system, but the State is ultimately responsible for overseeing and coordinating the implementation of all of the required management systems. The Federal regulations require that the State of Wisconsin develop a work program identifying the major activities attendant to each of the required management systems and the parties to be responsible for such activities. The manage-

[19]*For an example of this type of implementation planning, see SEWRPC Community Assistance Planning Report No. 210, City of West Bend Transportation System Plan: 2010, Washington County, Wisconsin, March 1994.*

ment systems within the Southeastern Wisconsin Region are to be fully operational by October 1, 1995.

It is recommended that the Regional Planning Commission be assigned a significant role in carrying out the requirements of the congestion management system. Indeed, the transportation system planning process employed by the Commission was designed to meet the requirements of a congestion management system; the new required transportation system plan is intended to comprise a congestion management plan for Southeastern Wisconsin. As described in Chapter IX of this report, the plan design process explicitly addressed existing and anticipated future traffic congestion problems in a disciplined way so as to ensure that highway capacity expansions were proposed only as a last resort to resolve traffic congestion problems. The Commission has the capability to monitor traffic congestion problems within the Region and to evaluate the effectiveness of implemented measures proposed to resolve such problems.

It is important to note that requirements relating to the congestion management system extend to the project level of transportation planning. In this regard, the Federal regulations require that, where the provision of additional highway capacity is determined to be an appropriate measure to relieve traffic congestion, noncapacity improvements which would serve to maintain the functional integrity of expanded highway capacity must be considered. It is recommended, therefore, that the Wisconsin Department of Transportation, in its preparation of the congestion management system work program, include land use planning and detailed site design among the demand management and facility operational measures that must be incorporated into facility design.

It is also likely that the Regional Planning Commission will have a role in fulfilling the requirements of the public transportation management system. The Commission, in its preparation of public transit development plans within the Region, is involved in the collection and analysis of data concerning, among other things, the quantity of transit capital stock and transit ridership. The Commission will not have as great a role in the intermodal management system, since the State Department of Transportation has historically dealt with intercity passenger and freight movements and seaport and other terminal and intermodal facilities, though the Commission does conduct airport system planning within the Region.

## SPECIAL STUDIES

During the conduct of the third-generation regional transportation system planning program, and in particular through the work of the Commission's Advisory Committees and through the extended public participation process, a number of proposals were advanced that require, for their proper consideration, additional work efforts. From among many proposals, the following five were found by the Advisory Committee to have significant potential to enhance and improve the regional transportation system plan and its implementation potential over time:

1. <u>USH 14 Study</u>
   USH 14, from Chicago to Janesville, traverses the extreme southwest corner of Walworth County. The new regional transportation system plan recommends that four travel lanes be provided on this facility within the Region. Because this facility is interregional in character, it is recommended that the Wisconsin Department of Transportation specifically reexamine facility improvement needs on this arterial highway route and confirm the need for four through travel lanes before proceeding to program an improvement project.

2. <u>Oversize Truck Routing Study</u>
   One of the issues raised through the public hearing process involved the need for a designated route for oversized truck movements through the Southeastern Wisconsin Region. Because of the interregional and interstate nature of this matter, it is recommended that the Wisconsin Department of Transportation conduct a special study that would identify a network of arterial highway facilities that could be designated for oversized truck movements and that would connect important intermodal terminal facilities, such as the Port of Milwaukee, with important industrial areas.

3. <u>Kenosha Area Commuter Study</u>
   It is recommended that a special study of the daily commuting patterns between the Kenosha area and Northeastern Illinois be undertaken. This study, which would be

coordinated with the Northeastern Illinois Planning Commission and the Chicago Area Transportation Study, would have as its objective a detailed examination of daily travel habits and patterns across the Wisconsin-Illinois state line, which are perceived as becoming increasingly important over time. The study may lead to an amendment to the regional transportation system plan that would, for example, propose special transit services to accommodate daily tripmaking from homes in the Kenosha area to jobs in northeastern Illinois.

4. State Transit Capital Program
As noted earlier in this chapter, there is a substantial funding deficit in terms of implementing the transit element of the regional transportation system plan. One way to address in part that deficit is to institute a State transit capital matching fund program. Under such a program, the State would participate in the funding of transit capital projects, with participation ranging from 50 to 100 percent of the nonFederal share of such projects, depending upon whether the projects were local, express, or rapid transit in nature. Capital transit projects that are rapid in nature, such as major transit stations, busways, and commuter fail facilities, serve an areawide function much like the State trunk highway system, help to relieve traffic on State trunk highways, and are deserving of 100 percent State funding of the nonFederal share of such projects.

   This particular recommendation was first made by the SEWRPC Regional Transportation Authority Study Committee in November 1990 and documented in SEWRPC Memorandum Report No. 38, A Regional Transportation Authority Feasibility Study for Southeastern Wisconsin. It is recommended that, as the Wisconsin Department of Transportation completes its TRANSLINKS 21 Intermodal Transportation Plan, this particular funding recommendation be considered and that an appropriate State capital grant program be established. It is further suggested that the Wisconsin Department of Transportation examine the feasibility and desirability of funding this new program, from among a number of options, through the transfer of the present sales tax revenue on motor vehicles from the State's general fund to the State's transportation fund and/or through the establishment of a dedicated one cent motor fuel tax for this purpose.

5. Reduction of Reliance on Property Tax to Fund Arterial Streets and Highways and Transit
It is recommended that the counties comprising the Region take the lead in seeking legislation that would be directed at enabling county and local governments to reduce or eliminate reliance on property taxes to fund the costs of building, maintaining, and operating arterial streets and highways and public transit systems. More specifically, it is recommended that a State-level study be undertaken and consider, perhaps among a number of alternatives, the feasibility and desirability of providing enabling legislation that would permit a county to impose a county motor fuel tax or a county sales tax, or a combination of such taxes. The revenue received from such a tax should be used to reduce or eliminate the use of property taxes for arterial streets and highway and transit purposes. The legislation should also provide a means by which such a county tax would be fairly and equitably shared between the county imposing the tax and the municipalities within the county which are also levying property taxes for arterial street and highway and transit purposes.

6. Linking of Enhanced General Transportation Aids to Implementation of the Regional Land Use Plan
It is recommended that the Wisconsin Department of Transportation undertake a study that would seek to bring about a greater degree of implementation of the regional land use plan by linking the level of general transportation aids provided to implementation of that plan by individual counties and local units of government. At present, general transportation aids are provided to counties and local units of government and provide reimbursement for about 25 percent of the transportation costs incurred. It is specifically proposed that the study examine the desirability of raising that reimbursement level to

50 percent for those counties and local units of government that formally adopt the regional land use plan and enact appropriate local land use controls found to implement that plan substantially by providing for an appropriate distribution and density of new urban land use development, the protection and preservation of primary environmental corridors, and the preservation of prime agricultural lands.

A number of other proposals were advanced during the planning process but were not specifically endorsed by the Advisory Committee. These included such proposals as the enactment of State legislation to create a parking "cash out" program, legislation to enable local governments to place an excise tax on parking spaces, a broad policy study to comprehensively examine other transportation pricing issues, legislation to require that public transit facilities and services be required concurrently with the development of major land use projects, legislation that would limit the tax incremental financing technique to geographic areas served by public transit, legislation that would explore how State tax and other policies might be changed so as to encourage infill and redevelopment of urban areas, State policies that would withhold economic development grants and loans for projects at variance with regional plans, the creation of light-rail development corporations, and mandatory State policies to locate new government buildings within geographic areas publicly served by public transit. The Advisory Committee concluded that while some of these proposals may have merit, the recommended regional transportation plan was not the proper vehicle for their promotion. Moreover, in some cases the proposals would be contrary to the recommended plan, which does not include pricing mechanisms specifically intended to modify travel behavior.

## SUMMARY AND CONCLUSIONS

This chapter has described the various means available, and has recommended specific procedures, for implementation of the recommended regional transportation system plan. The most important recommended plan implementation actions are summarized in the following paragraphs by level of government and responsible agency or unit of government.

### Local Level

County Boards of Supervisors: It is recommended that the county boards of the seven counties comprising the Region, upon recommendation of the appropriate highway, transit, and public works committees:

1. Adopt the recommended regional transportation system plan as that plan affects each respective county.

2. Work cooperatively with the Wisconsin Department of Transportation and the cities, villages, and towns in the county in effecting changes in jurisdictional responsibility for portions of the arterial street and highway system as recommended in the plan.

3. Act to expand, improve, and maintain the arterial street and highway facilities designated in the plan for county jurisdiction in accordance with the functional plan recommendations, including undertaking, as may be appropriate, detailed planning, preliminary engineering, and official mapping work efforts.

4. Cooperate with the Wisconsin Department of Transportation, the Regional Planning Commission, and adjoining counties as necessary to conduct the major investment studies attendant to freeways and fixed-guideway transit facilities identified in the plan, and carry out, as appropriate, detailed countywide transit planning programs to refine and detail the transit element of the regional transportation plan.

5. Take the lead in working through the State legislative delegation from the Region to secure enabling legislation that would permit the counties to impose either a transportation user fee or a general sales tax, or some combination thereof, at a level sufficient to raise the revenue required to fund the anticipated plan implementation shortfall attendant to county and local arterial streets and highways and transit, as well as to provide property tax relief.

6. Continue to provide public transit services in accordance with the recommendations set forth in the transit element of the plan including entering into agreements with

adjoining counties to provide transit services that cross county lines (Milwaukee and Waukesha Counties).

7. Enter into agreements with adjoining counties to effect the provision of recommended transit services which cross county lines (Kenosha, Ozaukee, Racine, Washington, and Walworth Counties).

8. Conduct studies to explore the transfer of the public transit function from the city to the county level of government (Kenosha, Racine, and Waukesha Counties).

Common Councils, Village Boards, and Town Boards: It is recommended that the common councils, village boards, and town boards in the Region, upon recommendations, as appropriate, of their plan commissions, boards of public works, and transit commissions:

1. Adopt the recommended regional transportation system plan as that plan affects each respective civil division.

2. Work cooperatively with the Wisconsin Department of Transportation and their respective counties in effecting changes in jurisdictional responsibility for portions of the arterial street and highway system as recommended in the plan.

3. Act to expand, improve, and maintain any arterial street or highway facility designated in the plan for local jurisdiction in accordance with the functional recommendations, including undertaking, as may be appropriate, detailed planning, preliminary engineering, and official mapping work efforts.

4. As appropriate, and upon consideration by, and recommendation of, local plan commissions and traffic engineering staffs, restrict curb-lane parking during peak travel periods on those arterial streets designated in the recommended plan as candidates for such restriction.

5. As appropriate, and upon consideration by and recommendation of the local plan commissions, integrate into the local planning and development practices and ordinances transit- and pedestrian-friendly land use development concepts.

6. As appropriate, cooperate with the Wisconsin Department of Transportation, the Regional Planning Commission, and any concerned counties in conducting major investment studies attendant to freeways and fixed-guideway transit facilities identified in the plan.

7. Support the efforts of the seven counties to secure State enabling legislation whereby either a transportation user fee or a general sales tax, or some combination thereof, is imposed at the county level to raise the revenue required to fund the anticipated plan implementation shortfall for county and local arterial streets and highways and transit.

8. Participate in studies attendant to the potential transfer over time of the public transit function to the county level of government (Cities of Kenosha, Racine, and Waukesha).

9. Continue to provide demand-responsive public transit services and cooperate with counties in developing detailed plans to consider the expansion of such services (Cities of Hartford, Port Washington, West Bend, and Whitewater).

10. Cooperate with the Regional Planning Commission in conducting a detailed study of Kenosha area commuting patterns, focusing on daily work-purpose travel between the Kenosha area and job locations in Northeastern Illinois (City of Kenosha, Village of Pleasant Prairie, and Town of Somers).

Areawide Level

Regional Planning Commission: It is recommended that the Southeastern Wisconsin Regional Planning Commission:

1. Adopt the recommended regional transportation system plan, acting not only in its capacity as a regional planning agency but also as the Federally recognized Metropolitan Planning Organization for the Kenosha, Milwaukee, and Racine urbanized areas.

2. Conduct a continuing regional transportation planning program to review, revise

and amend, and update and extend the adopted regional transportation system plan from time to time.

3. Work cooperatively with the county and local governments concerned, the Wisconsin Department of Transportation and the U. S. Department of Transportation, Federal Highway and Transit Administrations, in conducting the major investment studies attendant to freeways and fixed-guideway transit facilities identified in the plan.

4. Cooperate with the Wisconsin Department of Natural Resources in assuring the continued conformity of the regional transportation system plan to the State Implementation Plan for air quality.

5. Provide assistance upon request to county and local governments in conducting highway and transit plan implementation efforts, including the preparation of detailed county and local highway and transit development plans and such implementation devices as official mapping.

6. Prepare a local planning guide designed to illustrate transit- and pedestrian-friendly land use development practices and provide assistance upon request to county and local governments in incorporating those practices into county and local plans and ordinances.

7. Provide assistance, upon request, to the Wisconsin Department of Transportation and county and local governments in carrying out cooperative efforts to effect changes in jurisdictional responsibility for portions of the arterial street and highway system as recommended in the plan.

8. Work cooperatively with the Wisconsin Department of Transportation as that Department discharges its responsibilities attendant to the development and operation, over time, of the transportation management systems called for in the Federal Intermodal Surface Transportation Efficiency Act, with particular focus on joint work efforts attendant to the congestion, public transportation, and intermodal management systems.

9. Undertake a special study of daily commuting patterns between the Kenosha area and Northeastern Illinois, working cooperatively with the City of Kenosha, the Village of Pleasant Prairie, and the Town of Somers.

<u>State Level</u>

<u>Wisconsin Department of Transportation</u>: It is recommended that the Wisconsin Department of Transportation:

1. Adopt the recommended regional transportation system plan and integrate that plan into the Wisconsin TRANSLINKS 21 intermodal transportation plan as a functional and jurisdictional guide to transit and highway system development within the Region.

2. Work cooperatively with the counties, cities, villages, and towns in the Region in effecting changes in jurisdictional responsibility for portions of the arterial street and highway system as recommended in the plan.

3. Act to expand, improve, and maintain any arterial street or highway facility designated in the plan for State jurisdiction in accordance with the functional recommendations, including undertaking necessary preliminary engineering and official mapping efforts.

4. Cooperate with the Regional Planning Commission and the concerned counties and local governments in the Region in conducting the major investment studies related to freeways and fixed-guideway transit facilities identified in the plan.

5. Provide financial support for the preparation by the Regional Planning Commission of a local planning guide designed to illustrate transit- and pedestrian-friendly land use development practices.

6. Develop and carry out in a cooperative manner with the Regional Planning Commission the congestion, public transportation, and intermodal management systems called for in the Federal Intermodal Surface Transportation Efficiency Act of 1991.

7. Continue to develop and operate the Milwaukee area freeway traffic management system so as to achieve the highest possible level of service on the freeways and help encourage travel and transit and carpools and vanpools.

8. Undertake an expanded transportation demand management program, including ridesharing promotion, assistance to transportation management associations, promotion of employee-based transportation demand management strategies, promotion of travel by bicycle and walking, and construction of telecommuting centers and carpool lots.

9. Advise the Governor to designate Kenosha and Racine Counties as recipients of Federal transit funds for the Kenosha and Racine urban areas upon the transfer of the transit function to the county level in those areas.

10. Conduct a special study of the USH 14 travel corridor in the southwest corner of Walworth County.

11. Conduct a special study to identify an oversize truck route through the Region.

12. Work with the Governor and the Wisconsin Legislature to secure, over time, the supplemental State funding outlined in the Wisconsin TRANSLINKS 21 Intermodal Transportation Plan so as to help provide an adequate level of financial support for implementation of the regional transportation system plan.

13. Support the efforts of the seven counties to secure State enabling legislation whereby either a transportation user fee or a general sales tax, or some combination thereof, is imposed at the county level to raise the revenue required to fund the anticipated plan implementation shortfall for county and local arterial streets and highways and transit.

14. Consider the establishment of a State transit capital aid program to fund at least 50 percent of the nonFederal share of capital transit projects.

15. Undertake a study that would seek to help implement the regional land use plan by linking a greater amount of general transportation aids to a finding that a local unit of government has taken appropriate steps to implement that plan.

16. Endorse the recommended changes to the proposed National Highway System within the Region and seek Federal approval of such changes.

Wisconsin Department of Natural Resources: It is recommended that the Wisconsin Natural Resources Board endorse the regional transportation system plan and direct its staff to complete the State air quality implementation plan in a manner consistent with the transportation plan.

Wisconsin Department of Administration: It is recommended that the Wisconsin Department of Administration endorse the regional transportation system plan and use that plan as a basis for reviewing and commenting on Federally funded transportation projects.

Wisconsin Department of Development: It is recommended that the Wisconsin Department of Development endorse the regional transportation system plan and consider that plan as it makes economic development-related decisions.

University of Wisconsin-Extension: It is recommended that the University of Wisconsin-Extension acknowledge the regional transportation system plan and promote implementation of the plan in its ongoing educational programs.

Federal Level

U. S. Department of Transportation, Federal Highway Administration: It is recommended that the Federal Highway Administration endorse the regional transportation plan, find that the plan meets the requirements of the Intermodal Surface Transportation Efficiency Act of 1991 and is consistent with the State implementation plan for air quality, and use the plan in the administration of its various Federal grant programs.

U. S. Department of Transportation, Federal Transit Administration: It is recommended that the Federal Transit Administration endorse the regional transportation plan, find that the plan meets the requirements of the Intermodal Surface Transportation Efficiency Act of 1991 and is consistent with the State Implementation Plan for air quality, and use the plan in the administration of its various Federal grant programs.

U. S. Environmental Protection Agency: It is recommended that the U. S. Environmental Protection Agency endorse the regional transportation plan and use the plan as it carries out its day-to-day regulatory activities.

General Considerations

Several particularly significant aspects of regional transportation system plan implementation warrant restatement here in summary form. First, the recommended regional transportation plan presented in this report, like the companion recommended regional land use plan documented in a separate report, is intended to comprise a guide to certain important aspects of the sound physical development of the Region. As such, the plan is advisory to the local, State, and Federal units and agencies of government concerned as these public bodies consider transportation facility development matters in the Region. The regional transportation system plan is not to be considered as an inflexible mold to which all future transportation system development within the Region must precisely conform. Rather, the regional transportation system plan is to be regarded as a point of departure against which transportation system development proposals can be evaluated as they arise and in the light of which better development decisions can be made by all parties concerned. The regional plan is intended to be used as a framework for more detailed county and local planning. As such, the plan is subject to refinement, detailing, and amendment as plan implementation proceeds, over time, within the Region.

Second, the adoption or endorsement of the recommended regional transportation plan as a guide to the sound development of the Region by the local units of government and the various State and Federal agencies concerned is highly desirable. Indeed, in some cases, that adoption or endorsement is essential in order to ensure a common understanding of the areawide development objectives and to permit the necessary plan implementation work to be cooperatively programmed and jointly executed. Moreover, the Federal Intermodal Surface Transportation Efficiency Act of 1991 envisions the appropriate incorporation of metropolitan transportation plans and programs into Statewide transportation plans and programs.

Third, plan implementation action policies and programs should not only be preceded by plan adoption or endorsement, but should also emphasize the most important and essential elements of the plan and those areas of action which will have the greatest impact on guiding and shaping transportation system development in accordance with the recommended plan. Regional transportation system plan implementation should focus on those facilities and activities having areawide significance. Implementation of the regional transportation plan will be largely achieved if the transportation management measures recommended in the plan are implemented, particularly the proper implementation of the Milwaukee area freeway system traffic management system and the promotion of demand management activities by the Wisconsin Department of Transportation, if the freeway system serving the greater Milwaukee area is appropriately rehabilitated and modernized, if improvements to the major surface arterials, particularly those identified on the recommended National Highway System, are implemented, and if the rapid and express transit expansion and improvement recommendations are carried out.

Fourth, the importance of close coordination and cooperation between the local units of government and between those units of government and the State and Federal agencies concerned to plan implementation cannot be overemphasized. Responsibilities for achieving such coordination and cooperation on a voluntary basis within the traditional framework of government in Wisconsin have been assigned to the Commission by the State Legislature through the regional planning enabling act. In addition, the Federal Intermodal Surface Transportation Efficiency Act further provides a basis for coordinating planning and plan implementation efforts by the Commission as the designated Metropolitan Planning Organization. In its capacity as the coordinating agency under both State and Federal law, advisory review of proposed transportation facilities by the Commission is essential for the effective development over time of the regional transportation plan. That system must be put in place to properly serve and promote the desired regional land use pattern. The proper vehicle for the review of proposed transportation facilities is the regional transportation improvement program compiled annually by the Commission in accordance with the requirements of the Federal transportation legislation.

Fifth, implementation of the regional transportation plan will not be brought about by a single massive action on the part of one unit or agency of government. Rather, implementation of that plan will be brought about through many individual development decisions made on a day-to-day basis over a period of many years by public administrators and elected officials operating at the local, areawide, State, and Federal levels of government. It is extremely important that the individuals and agencies making these decisions be aware of and understand the development proposals set forth in the recommended regional transportation plan so that those proposals receive proper consideration as development decisions are made.

Finally, regional transportation plan implementation can only be achieved within the context of a continuing, comprehensive, areawide planning effort wherein the planning inventories and forecasts on which the regional plans are based are updated, monitored, and revised; the plans are reappraised and, as necessary, revised to accommodate changing conditions; and through which the plans are interpreted on a day-to-day basis to the local, State, and Federal units and agencies of government concerned as the need to make development decisions arises. In this respect, planning does not and cannot concern itself with future decisions; that is, with "things that should be done in the future." Rather, it must be recognized that decisions exist only in the present and that planning is necessary just because decisions can be made only in the present, yet cannot be made for the present alone. The question, therefore, that faces elected officials and concerned citizens throughout the Region concerning implementation of the recommended regional transportation system plan is not what should be done tomorrow to bring about that plan, but, rather, what must be done today in light of the plan to get ready for an uncertain tomorrow.

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# Chapter XIII

# SUMMARY AND CONCLUSIONS

## INTRODUCTION

Because of its important impacts on daily life and on regional development, transportation is one of the principal areas of public policy determination facing public officials and concerned citizens within the Region. Although large amounts of public capital are expended for improving transportation facilities and services within the Region, there are never enough funds for all projects proposed. Precisely how this capital should be invested, how much should be allocated to transit facilities and how much to highway facilities and what the spatial location and capacities of these facilities should be, involves public policy determinations that are as difficult as they are important.

Recognizing the foregoing, and in light of Federal legislation set forth in the Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991, the Southeastern Wisconsin Regional Planning Commission undertook a multi-year planning effort to prepare a third-generation regional transportation system plan. That plan builds upon two earlier regional transportation system plans, one adopted in December 1966 and documented in SEWRPC Planning Report No. 7, Land Use-Transportation Study, and a second adopted in June 1978 and documented in SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin: 2000. As conceived by the Commission, the regional planning process requires a periodic review of the major elements of the comprehensive regional plan, including transportation. Such major reviews should occur at about 10-year intervals. The review process of major regional plan elements is intended to take into account changes which may have occurred since the preparation of the prior plan with respect to, for example, population, household, and employment levels and land use patterns, and in light of any changes in regional development objectives. Given the cyclical nature of the planning process, a new regional transportation system plan would also take into account decisions concerning transportation facility development made by State, county, and local implementing agencies since the preparation of the prior plan.

Significant trends affecting the movement of people and goods have taken hold in the Region since completion of the second-generation regional transportation plan. The Southeastern Wisconsin Region has witnessed many changes in recent years, including substantial increases in employment and households with little change in resident population; increasing participation in the labor force, particularly by females; declining costs of automobile operation; increasing per capita and per household vehicle ownership; continuing local land development policies and practices that foster urban sprawl and automobile dependency; and reductions in transit service. The effects of these and related socioeconomic trends have included increasing trip lengths, declining ridesharing and transit use, increasing highway traffic, and more severe traffic congestion. The regional transportation plan reappraisal and updating process needs to reflect appropriately and respond to these trends.

The new regional transportation system plan was designed to serve and help implement a new companion regional land use plan. That plan is set forth in SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin—2010, and was adopted by the Commission in September 1992 and by each county within the Region shortly thereafter. Like the new regional transportation plan, the companion regional land use plan was a third-generation plan, prepared in light of the changes that have occurred since preparation of a second-generation regional land use plan and its adoption in December 1977.

This report describes the findings and recommendations coming out of the regional transportation plan reappraisal process. That process was guided by a Technical Coordinating and Advisory Committee on Regional Transportation System Planning. The report presents, in summary form, the results of reinventories of the factors influencing sound long-range, areawide transportation system planning and development in Southeastern Wisconsin, including information on the implementation status of the second-generation transportation plan, on existing transportation facilities and services, and on travel habits and patterns. This report also presents a set of revised regional transportation system development objectives, principles, and standards formulated as a part of the plan reevaluation effort; summarizes the forecasts of future growth and change in the Region in terms of resident population, household, and economic activity levels as reflected in the companion regional land use plan; presents the results of the evaluation of alternative regional transportation system plans; and presents a recommended regional transportation system plan for a new plan design year 2010, together with specific plan implementation recommendations.[1]

## INVENTORY FINDINGS

In the process of preparing the third-generation regional transportation system plan, three major inventory efforts were undertaken: 1) an inventory of the implementation status of the second-generation regional transportation system plan, 2) inventories of the existing arterial street and highway and transit facilities and services, and the degree of utilization of those facilities and services, and 3) a major reinventory of regional travel to ascertain current travel habits and patterns and provide the basis for determining any changes in those habits and patterns that have occurred since the last major inventory of travel in 1972.[2] The results of these three inventories are set forth in Chapters III, IV, and V, respectively.

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[1] *The new regional transportation system plan presented in this report includes elements related to transportation demand management, arterial street and highway facility development and management, and transit system development and management. The new regional plan also includes plan elements attendant to the bicycle and pedestrian modes of transportation. For these latter modal elements, the reader is referred to SEWRPC Planning Report No. 43, A Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin: 2010.*

[2] *In a companion work effort, a new inventory of land use in the Region was undertaken in 1990.*

### Year 2000 Regional Plan Implementation

The following briefly summarizes the findings and conclusions from the inventory efforts related to the status of implementation of the second-generation regional transportation system plan, which had a plan design year of 2000:

- There has been modest implementation of the year 2000 regional transportation system plan. At the time of the preparation of the third-generation regional transportation plan, about halfway through the design period of the year 2000 plan, plan implementation should have approximated 50 percent. The adopted plan envisioned an expanded and improved public transit system within the Region that would serve a variety of trips and provide an attractive alternative to the automobile. In particular, the plan envisioned a doubling of transit service, as measured by transit vehicle-miles provided and by the average speed of a transit trip. The number of transit vehicle-miles provided on an average weekday in the Region increased from 1972 through 1980 by about 22 percent, but by 1991 had returned to slightly less than the level recorded in 1972. The average speed of a transit trip has remained about the same as in 1972.

- Public transit plan recommendations included the provision of rapid transit service in the northwest corridor of Milwaukee County, the expansion of freeway flyer service throughout the Milwaukee metropolitan area to 24 routes, and, depending upon the results of detailed corridor studies, the provision of light-rail transit in five Milwaukee-area travel corridors. The plan also identified three travel corridors for the provision of demonstration commuter-rail passenger service within the Region and recommended the expansion of express and local bus service within the Kenosha, Milwaukee, and Racine urbanized areas. On the basis of the findings of a corridor facilities planning study, Milwaukee County decided to provide express bus rapid transit service in the northwest corridor instead of light-rail service. Freeway flyer service has been expanded to 15 routes serving 25 transit stations. Provision of light-rail transit in the east-west and northeast corridors is currently being considered.

No action has been taken to implement the recommended demonstration commuter-rail service. Local and express transit routes have since 1972 been provided and expanded within the urbanized areas of the Region. Local shared-ride taxicab service has been initiated in the Cities of Whitewater, Hartford, and West Bend.

- The transportation system management element of the adopted plan was aimed at managing traffic demand and enlarging existing arterial capacity with minimal cost and disruption of traffic. To these ends the plan recommendations included the following: the expansion of freeway traffic management, the provision of carpool parking lots in outlying metropolitan areas and a program to market carpooling to Milwaukee-area commuters, studies to determine the effect of parking policies on commuter mode choice, the prohibition of curb-lane parking on arterial streets, and the use of traffic engineering and access management. As of 1991, significant progress had been made in the provision of carpool parking lots, with 12 lots constructed between 1978 and 1991. The program to promote carpooling, however, has not operated since 1981. The Wisconsin Department of Transportation has begun the installation of new on-ramp metering equipment and corresponding traffic detectors as part of freeway traffic management efforts.

- The plan recommended three types of improvements to the arterial street and highway system: system expansion and system improvement, both aimed at increasing arterial capacity, and system preservation. By 1991, work on 192 miles, or 30 percent, of the mileage planned for system expansion and improvement had been completed. Work on 706 miles, or 24 percent, of the mileage planned for system preservation had been completed.

- Several factors have contributed to the lack of more complete plan implementation. Inadequate funding has been a substantial impediment. Federal funding for highway improvement has declined and no significant replacement State program funding has been forthcoming. The necessary reliance on the property tax to fund county and local arterial improvement and preservation work has resulted in lower levels of implementation than planned. Federal funding for transit improvements has also declined, but this decline has been in part offset by increased State funding. It is apparent that without such State funding the level of transit service would be even lower than it is. The lack of public transit plan implementation may also be attributed to escalating transit unit costs, declining costs of motor fuel and the attendant decline in public interest in transit, increasing transit fares, and the lack of more complete land use plan implementation.

- Under existing transportation funding methods, to implement only the arterial street and highway and transit capital improvements contained in the current plan, the Region would face an annual shortfall of about $57.3 million. A new transportation system plan must recognize this financially constrained context. This means that plan recommendations must be scaled to fit reasonable expectations of future available revenue and/or that methods to finance transportation improvements, as well as the operating and maintenance costs of the existing system, must be proposed in the plan.

Regional Transportation
System Facilities and Use

The following briefly summarizes the findings of the reinventories of the arterial street and highway and transit systems in the Region and of the use of those systems:

- In 1991, the arterial street and highway system consisted of 3,274 miles, representing 29 percent of the total street and highway mileage within the Region. Use of the arterial system has increased over time. In 1963, approximately 13 million vehicle-miles were traveled on the arterial system. Vehicle-miles increased to 20 million in 1972 and to about 33 million by 1991. The significant increase in arterial utilization increased traffic congestion. In both 1963 and 1972, about 10 percent of the arterial mileage was operating at or over design capacity. In 1991, about 17 percent of arterial mileage, or 543 miles, was operating at or over design capacity.

- Between 1963 and 1991, the number of public transit round-trip route-miles provided increased by about 171 percent, from 847 in 1963 to 2,296 in 1991. As a result, about 47 additional square miles were brought into the boundaries of local transit service areas between 1963 and 1991. This expansion did not, however, increase the number of people served by local transit. In fact, regionwide, in 1991, 56,700 fewer persons were served by local transit than were served in 1963. In providing service to smaller, less concentrated populations over greater route-mileage, transit operators within the Region provided fewer vehicle-miles of service. Average daily transit vehicle-miles provided within the Region decreased by about 25 percent between 1963 and 1991.

- Public transit ridership within the Region declined by nearly 47 percent between 1963 and 1991 and by 7 percent between 1972 and 1991. Between 1972 and 1991, ridership within the Kenosha and Racine urbanized areas increased more than twofold and threefold, respectively, but did not attain levels set in 1963. Unlike in the smaller urbanized areas, the ridership level in the Milwaukee area in 1991 was significantly, some 5.6 million, below the level set in 1972. Public transit travel within the Region on an average weekday has decreased as a proportion of total tripmaking from 9 percent of total regional travel in 1963 to 4 percent in 1972 and to 3 percent in 1991.

Travel Habits and Patterns

The following briefly summarizes the findings and conclusions of the major reinventory of travel in the Region conducted in 1991 and of an analysis of the changes in those habits and patterns compared to similar travel inventories conducted by the Commission in 1963 and 1972:

- On an average weekday in 1991, nearly 5.9 million person-trips were made within the Region. This represents increases of 26 percent between 1972 and 1991 and of 56 percent between 1963 and 1991. Growth in regional tripmaking reflects increases in the number of households within the Region of 26 percent from 1972 to 1991 and of 46 percent from 1963 to 1991 and of increases in employment of 31 percent from 1972 to 1991 and of 56 percent from 1963 to 1991.

- On an average weekday in 1991, about 4.9 million vehicle-trips were made within the Region, resulting in 33 million vehicle-miles of travel. About half the increase in vehicle-miles of travel between 1972 and 1991 may be attributed to the concurrent 26 percent increase in person-trips. The other half of the increase in vehicle-miles of travel may be attributed primarily to two factors: an 11 percent decline in automobile occupancy and a 15 percent increase in average trip length. Accordingly, about half the growth in highway traffic over the past 20 years may be attributed to factors that influence increased tripmaking: growth in the number of households and of employment.

- Increased tripmaking in the Region between 1963 and 1991 is in part linked to household and employment growth in the suburban and exurban portions of the Region. The increase in tripmaking within the suburban areas of the Region accounted for 38 percent of the increase in total regional tripmaking. Nearly 44 percent of regional household growth and 53 percent of regional employment growth occurred in suburban locations. The increase in tripmaking within the exurban area accounted for 13 percent of the regional growth in tripmaking. Nearly 22 percent of regional household growth and 14 percent of regional employment growth occurred in exurban locations. Should the growth in households and employment continue to occur in a highly dispersed pattern among the suburban and exurban subareas of the Region, tripmaking within and between these areas may be expected to increase further, as will the demand for investments in new transportation services and infrastructure in those areas.

## OBJECTIVES, PRINCIPLES, AND STANDARDS

In preparing the third-generation regional transportation system plan, the Advisory Committee reviewed and modified, as found to be necessary, the set of transportation system development objectives, principles, and standards that had been formulated in the first-generation regional transportation system planning effort and modified once before in the second-generation regional transportation system planning effort. A total of nine transportation system development objectives were recommended by the Advisory Committee to guide the design of the 2010 regional transportation system plan. These objectives and their supporting planning principles and sets of design standards are set forth in Chapter VIII and are concerned primarily with the provision of a flexible, multi-modal regional transportation system, alleviating traffic congestion, reducing travel time and accident exposure, and minimizing costs and disruptive effects upon communities and the natural environment. The objectives and standards were used both to identify problems and to evaluate alternative plans proposed to resolve those problems, providing the basis for the selection of a recommended plan that best achieved the specified objectives.

## ANTICIPATED REGIONAL GROWTH AND CHANGE

The recommended system of transportation facilities and services included in the new regional transportation system plan was based upon, and indeed was designed to serve, the adopted regional land use plan for the year 2010. Thus, the transportation system plan was designed to accommodate the travel and transportation demands anticipated to be generated by the pattern of land use development identified in the regional land use plan. The land use plan contains the following three important recommendations:

- The creation of a relatively compact, centralized regional settlement pattern by encouraging the placement of new urban development generally in concentric rings along the full periphery of, and outward from, existing urban centers. To accomplish this centralized settlement pattern will require modification of existing development trends toward decentralization of urban land uses in a highly diffused, low-density pattern throughout the Region. Under the land use plan, new urban development would occur only in areas covered by soils suitable for urban development, which are not subject to such special hazards as flooding, and which can be readily and efficiently provided with essential facilities and services, including, particularly, public sanitary sewerage, water supply, and transit.

- The preservation in essentially open, natural uses of the remaining primary environmental corridors in the Region. Those corridors contain most of the remaining important natural resources of the Region, such as wetlands, woodlands, and wildlife habitat. The preservation of these corridors is essential to maintaining a high level of environmental quality in the Region, protecting its natural heritage and beauty, and providing scientific, educational, and recreational opportunities. The exclusion of urban development from these corridors will also help to prevent the creation of such serious and costly problems as air and water pollution, wet and flooded basements, building and pavement foundation failures, and excessive infiltration and inflow of clear water into sanitary sewerage systems.

- The preservation in agricultural and related uses of most of the remaining prime farmlands in the Region, keeping those lands relatively free from intrusion by urban land uses.

Changes in population and economic activity levels within the Region envisioned under the regional land use plan are as follows:

- The population of the Region would be expected to increase by about 6 percent, from 1.81 million persons in 1990 to 1.91 million persons by 2010.

- The number of households would be expected to increase by about 15 percent, from 676,000 in 1990 to 774,300 by 2010.

- The number of jobs would be expected to increase by about 11 percent, from 990,300 in 1990 to 1.10 million in 2010.

The planned distribution of households within the Region based upon the regional land use plan is especially critical to the determination of transportation system needs, since the place of residence is the generator of about 80 percent of all trips made within the Region.

## DESIGN AND EVALUATION OF ALTERNATIVE PLANS

Given the regional land use plan and the underlying forecasts of population, households, and economic activity, as well as the set of transportation system development objectives and supporting design standards, alternative regional transportation system plans were designed, tested, and evaluated. This involved the application of the full battery of Commission travel simulation models to estimate the magnitude and pattern of future travel and traffic. These models were first developed by the Commission in 1963 on the basis of an initial comprehensive regional travel survey, and include trip generation, trip distribution, modal split, and traffic assignment models. In 1972, these models were validated and, as found necessary, recalibrated using data from a second comprehensive regional travel survey conducted in that year. The models were again validated and recalibrated based upon data collected in the third comprehensive regional travel survey conducted in 1991. The models were demonstrated to accurately simulate travel conditions on the regional transit and arterial street and highway systems, and to have a demonstrated ability to simulate future travel and traffic conditions even given significant changes in lifestyles accompanied by changing land use development and travel habits and patterns within the Region.

The methodology used to design alternative regional transportation system plans was explicitly structured to ensure that before any proposal was brought forward to widen existing arterial streets and highways or to build new arterial streets and highways, full and adequate consideration was given to resolving existing and anticipated future transportation problems through demand management, traffic management, and public transit measures. This approach to plan design, which is the same basic approach followed in the two prior Commission regional transportation planning efforts, is fully consistent with the planning approach envisioned under the Federal Intermodal Surface Transportation Efficiency Act of 1991.

More specifically, the approach to designing alternative regional transportation system plans consisted of the following steps:

1. Definition of a "no-build" highway and transit transportation system and the assignment of forecast future travel demand to that system in order to identify potential problems and deficiencies under a scenario where no significant additional capital investment would be made in new and improved transportation facilities. The no-build alternative plan consisted of the arterial street and highway and public transit systems open to traffic and operating as of January 1, 1994, together with those arterial street and highway and transit facility and service improvements identified for implementation in calendar years 1994 and 1995 in the regional transportation improvement program.

2. Based upon the results of the analysis of the no-build option, the postulation of a series of alternative plans that included only actions that by definition were of a transportation system management nature. These actions included measures to manage and reduce vehicular travel demand, measures to manage traffic flow, and public transit service improvements.

3. The assignment of forecast future travel demand to a range of alternative transportation system management plans, with the range based upon the demand management measures considered in the second step, in order to ascertain the extent to which such actions would meet current and future transportation needs, and alone resolve traffic congestion problems.

4. Based upon the findings of the analyses conducted under the third step, the postulation of arterial street and highway improvements to resolve, to the extent considered feasible, identified remaining transportation system deficiencies.

In following this process, it was determined to fully evaluate the no-build alternative as well as two alternative regional transportation system plans that would provide improved public transit and arterial street and highway systems. The two alternative improvement plans had a number of common elements, including: 1) implementation of the long-planned Milwaukee-area freeway traffic management system, 2) placing curb-lane parking restrictions during peak periods on key arterial street facilities, 3) widespread application of traffic engineering techniques to improve traffic flow, 4) aggressive promotional efforts attendant to ridesharing, bicycle use, transit use, telecommuting, and the establishment of private transportation management associations, 5) detailed attention to land use planning at the community and neighborhood levels to provide appropriate mixtures of land uses, efficient and direct pedestrian and bicycle pathways, and clustering of higher-density land uses along transit lines and at transit stations and stops, and 6) the potential, depending upon the results of forthcoming major transportation investment studies, to provide light-rail and commuter-rail transit services in selected travel corridors found to have potential to support such services.

The two alternative improvement plans also had the following two significant differences:

1. Under one alternative, termed Alternative Plan 1, it was assumed that the perceived cost of automobile operation would be doubled from about 5.5 cents per mile to 11 cents per mile. While this cost increase could be achieved by a variety of measures, it was equivalent to an increase in the motor fuel tax of $1.10 per gallon, representing a significant increase intended to reduce automobile travel. No such significant increase in the perceived cost of operating an automobile was assumed under the second alternative improvement plan evaluated, termed Alternative Plan 3.

2. Public transit service under Alternative Plan 1 would, in terms of revenue vehicle-miles of service, be increased by nearly 125 percent over the level of base year 1991. This was assumed in order to provide an effective alternative mode of transportation for those who would choose not to use the automobile under the assumed increased cost. By contrast, transit service improvements under Alternative Plan 3 represented a 53 percent increase in revenue vehicle-miles of service over the base-year level.

In carrying out the plan design process described above, the transportation simulation models were applied to Alternative Plans 1 and 3 prior to incorporating any improvements to the arterial street and highway system. This step was undertaken to determine the extent to which the assumed transportation demand management and public transit improvement measures might resolve existing and anticipated future transportation system problems. Upon completion of that analysis, the residual transportation system problems were addressed by proposing the construction of new arterial streets and the widening of existing arterial streets and highways where necessary and feasible to resolve the identified residual traffic congestion problems. This resulted in the following:

1. The number of route-miles of proposed new arterial streets and highways under Alternative Plan 1, which sought to decrease automobile travel by doubling the perceived cost of automobile use and which provided a significantly greater increase in transit service than Alternative Plan 3, was only about 10 percent less than under Alternative Plan 3: 112 new route-miles under Alternative Plan 1, as opposed to 124 new route-miles under Alternative Plan 3.

2. The number of route-miles of needed widening of arterial streets and highways under Alternative Plan 1 was only about 7 percent less than under Alternative Plan 3: 382 route-miles of widened facilities under Alternative Plan 1, as opposed to 410 route-miles of widened facilities under Alternative Plan 3.

One of the major findings of the evaluation of the alternative plans, then, was that an assumed doubling of the perceived cost of automobile use, when combined with a significantly better regional transit system, only modestly reduced the need for new and widened arterial streets and highways. While total travel in the Region on an average weekday in the design year 2010 under Alternative Plan 1, as measured by the number of person-trips generated, was about 1 percent less than under Alternative Plan 3, and as measured by vehicle-miles of travel was about 10 percent less than under Alternative Plan 3, and while transit ridership under Alternative Plan 1 was about 45 percent greater than under Alternative Plan 3, those changes in travel behavior did not result in particularly significant reductions in the need for arterial street and highway extensions and improvements. Consequently, while travel demand management and public transit measures represent legitimate public policy options, neither one nor both in combination can be viewed in isolation as the solution to existing and probable future transportation problems in the Region. New arterial street and highway construction and the widening of existing arterial streets and highways will also be required if the transportation needs of the Region are to be met. Moreover, the magnitude of transportation pricing changes needed to bring about a significant change in travel behavior so that the substantial addition of capacity in the arterial system could be avoided is such that, barring any major social or economic upheavals, such changes can only be brought about over a long period of time, if at all, and through a national, not local, approach to demand management. A full performance comparison of the alternative plans considered is set forth in Chapter X.

## PRELIMINARY RECOMMENDED PLAN AND PUBLIC PARTICIPATION

Based upon the performance evaluations of the alternative plans considered, a modified version of Alternative Plan 3 was developed and taken to public hearing as a preliminary recommended new regional transportation system plan. That preliminary recommended plan was prepared and fully evaluated in terms of its performance relative to the transportation system development objectives and standards. The preliminary recommended plan is fully described in Chapter XI, and includes three basic elements: 1) transportation systems management, 2) public transit system maintenance and improvement, and 3) arterial street and highway system maintenance and improvement.

The following efforts were made to secure effective public participation in the review of, and comment on, the preliminary recommended plan:

1. The preliminary plan was described in an issue of the widely distributed Commission Newsletter. This issue, together with two previous issues of the Newsletter, one presenting the results of the inventory findings and the other presenting a description and evaluation of the alternative plans, provided in-depth descriptions of the plan and the alternatives thereto for consideration by all who seriously desired to learn about and react to the preliminary plan.

2. The preliminary recommended plan was the subject of a Regional Planning Conference well attended by elected officials, key local and State agency staff members, and concerned citizens.

3. The preliminary plan was presented to nine Commission advisory committees dealing with subregional transportation matters, including six county jurisdictional highway system planning committees and the three intergovernmental coordinating and advisory committees on transportation system planning and programming for the Kenosha, Racine, and Milwaukee urbanized areas. These committees reviewed the preliminary plan and made numerous recommendations for changes to the plan.

4. Seven formal public hearings were held on the preliminary plan, one in each of the seven counties of the Region. Each public hearing was preceded by a staffed "open house" at which individuals could examine and discuss the preliminary recommended plan with Commission staff and submit comments without attending the formal hearings.

Full documentation of the public participation process was provided in published Conference proceedings and the record of the public informational meetings and public hearings. The record of the public informational meetings and public hearings is referenced in Chapter XI, which also includes a summary of the public reaction to the preliminary plan.

Following the intensive period of public participation in the planning process, the Advisory Committee reviewed the reaction to the plan and guided the Commission staff in the preparation of a final recommended regional transportation system plan.

## FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

The final recommended regional transportation system plan, briefly described below, like the preliminary plan, has three major elements: transportation systems management, public transit maintenance and improvement, and arterial street and highway maintenance and improvement. A more complete description of the plan is contained in Chapter XI.

Transportation Systems Management Element
The transportation systems management element of the plan consists of the following seven measures:

1. Freeway Traffic Management
Full implementation of the Milwaukee-area freeway traffic management system, including an operational control strategy that would seek to provide, through restricted access of single-occupancy vehicles at ramp meters, for average operating speeds of about 35 miles per hour on all freeway segments during peak periods. Buses and high-occupancy vehicles would receive preferential access at the ramps.

2. Arterial Curb-Lane Parking Restrictions
Restrictions of curb-lane parking during peak periods along 442 miles, or about 12 percent, of the planned 3,607-mile arterial street and highway system in order to reduce congestion and help provide good transit service. Local governmental units will need to carefully review the recommended curb-lane parking restrictions for feasibility and desirability in light of local conditions.

3. Traffic Engineering
The use of state-of-the-art traffic engineering practices to assist in achieving efficient traffic flow on arterial facilities and to facilitate pedestrian and bicycle movements as arterial streets and highways are constructed, reconstructed, and widened.

4. Traffic Management Technology
The application of advanced traffic management technology, known as Intelligent Transportation Systems (ITS), as such technology becomes practicable and available over the plan implementation period. The Milwaukee-area freeway traffic management system is an example of the application of such technology. Other technologies with the potential for application in the Region include systems that provide real-time transit-vehicle location and arrival information to transit users, as well as systems that provide real-time route-specific traffic-condition information to drivers.

5. Travel Demand Management Promotion
A regionwide program to promote travel through ridesharing, transit use, bicycle use, and pedestrian movement, together with telecommuting and work-time rescheduling as may be found feasible. In addition, it is recommended that State and local governments promote and support private-sector transportation management associations to help achieve reductions in single-occupancy-vehicle travel.

6. Detailed Land Use Planning and Site Design
The preparation and implementation by local governmental units of detailed, site-specific neighborhood land use plans to facilitate travel by transit, bicycle, and pedestrian movement.

7. Transit Systems Management and Service Enhancement Measures
The undertaking by the transit agencies in the Region of a range of activities to enhance the quality of transit services and to facilitate transit use. These activities include steps to improve transit information systems, including use of real-time vehicle locators to help maintain schedules; improvement of facilities for transfers and waiting; improvement of bicycle storage at stops and consideration of the use of onboard carriers as appropriate; working with local governments to provide transit-only street connections to facilitate through movement of transit vehicles; conduct of marketing/public education activities to promote the use of transit; improvement of transit security; improvement of vehicle design, which includes low-floor vehicles, alternative fuels, improved noise and vibration control, and comfort enhancements; investigation of methods for increased bus speeds through priority systems and signal preemption; and promotion of innovative fare-payment systems, such as the UPASS, commuter check, smart card, employer treatment of transit as a fringe benefit, and other means of providing alternative ways to pay for transit services.

Public Transit Maintenance and Improvement Element
The recommended plan calls for significant improvements to the public transit system in the

Region. The improvements would include both expansion of the geographic extent of public transit service provided in the Region and improvement in the frequency of service on many of the transit routes in the system. Altogether, service on the regional transit system would be increased by about 75 percent from the 1991 level, measured in terms of revenue vehicle-miles of service provided.

More specifically, the public transit element of the plan consists of the following measures:

1. Rapid Transit Service
   A significant expansion of the freeway flyer bus service in the Region to provide a truly areawide rapid transit system is proposed, including extending such service south to Racine and Kenosha, southwest to Mukwonago, west to Waukesha and Oconomowoc, northwest to West Bend, and north to Cedarburg, Grafton, Saukville, and Port Washington. A total of 30 such rapid transit routes are envisioned, 27 of which would be oriented to the Milwaukee central business district and three to the University of Wisconsin-Milwaukee campus. The rapid transit system would be served by 73 transit stations. Service would be provided in both directions during peak periods.

   Initially, all service would be provided over the regional freeway system, with service extensions on selected surface arterial streets and highways. Ultimately, depending upon the results of major transportation investment studies recommended in Chapter XII, the rapid transit routes could operate over exclusive busway facilities in the most congested freeway travel corridors in the Region. One of those busway facilities, along the east-west freeway from the Marquette interchange in the City of Milwaukee to the STH 164 interchange in the City of Waukesha, has been included in the final recommended plan subject to confirmation upon completion of an east-west corridor major investment study now under way, sponsored by the Wisconsin Department of Transportation.

   The plan also recognizes the potential to establish commuter-rail passenger service as an alternative form of rapid transit service to bus-on-freeway or bus-on-busway service in four major travel corridors, from Milwaukee through St. Francis, Cudahy, South Milwaukee, Oak Creek, Racine, and Kenosha to a connection with existing Chicago-oriented service; from Milwaukee through Wauwatosa, Elm Grove, Brookfield, Pewaukee, Hartland, Delafield, and Nashotah to Oconomowoc; from Milwaukee through Germantown and Jackson to West Bend; and from Milwaukee through Brown Deer, Cedarburg, and Grafton to Saukville. In addition, two potential extensions of Chicago-oriented commuter-railway passenger train service to termini in the Region are recommended to be studied: from Walworth in Walworth County through Fox Lake, Illinois, to Chicago, and from Burlington through Silver Lake and Antioch, Illinois, to Chicago. The plan recommends that the commuter-rail passenger service potential be evaluated through the conduct of major investment studies for the travel corridors concerned. Those studies, as appropriate, should begin with feasibility analyses and, depending upon the results of those analyses, proceed to complete the requirements of a major investment study. Through these corridor studies, then, final decisions would be made as to whether to provide the rapid transit service through bus-on-freeway, bus-on-busway, or commuter-rail passenger service. Pending the conduct of these studies, all rapid transit service would be provided by the bus-on-freeway mode.

2. Express Transit Service
   The plan recommends that a total of 12 express transit bus routes be provided in a grid pattern largely within Milwaukee County in major travel corridors. The express routes would provide a high-quality transit service, accommodating shorter trips than those made on the rapid transit system. Initially, all service would be provided by buses operating in mixed traffic over surface arterial streets and highways with limited stops. Ultimately, depending upon the results of major transportation investment studies recommended in Chapter XII, certain of the express transit service could be provided by buses operating over reserved lanes on arterial

streets, as well as in mixed traffic, or could be converted to the light-rail transit mode. With respect to two such express routes, from the Milwaukee central business district west to the Milwaukee Regional Medical Center and the Milwaukee County Research Park and from the Milwaukee central business district north to the University of Wisconsin-Milwaukee campus and Glendale, light-rail transit lines have been included in the final recommended plan subject to confirmation upon completion of the aforereferenced east-west corridor major investment study presently being conducted by the Wisconsin Department of Transportation. The other express transit service corridors identified in the plan as having potential for light-rail service include the corridors running from the central business district of Milwaukee to General Mitchell International Airport, from the central business district of Milwaukee to the Northridge Shopping Center, and along the 27th Street crosstown corridor from about W. Florist Avenue south and west to the Southridge Shopping Center. Pending the conduct of major investment studies for each of the potential light-rail transit lines, all express transit service would be provided by buses operating in mixed traffic over arterial streets.

3. <u>Local Transit Service</u>
   The plan recommends the continued operation of local bus transit service over arterial and collector streets with frequent stops throughout the Kenosha, Milwaukee, and Racine urbanized areas. The plan calls for substantial improvements, however, in the frequency of local transit service provided, particularly on the major local routes. In addition, the plan holds open the potential to restructure local transit services to provide for transit-center-oriented local systems to replace grid route systems, depending upon detailed local plan implementation studies. The plan also recommends the continuation of local transit services through shared-ride taxis in the smaller urban areas of the Region. Finally, the plan recommends the continuation of appropriate paratransit services to help meet the transportation needs of disabled individuals in the Region.

<u>Arterial Street and Highway</u>
<u>Maintenance and Improvement Element</u>
The recommended plan calls for extensions and improvements to the arterial street and highway system in the Region. In 1991, there were 3,274 route-miles and 8,420 lane-miles of arterial streets and highways open to traffic in the Region. Under the plan, that system would, by the year 2010, total 3,607 route-miles and 10,303 lane-miles. Of the total increase of 1,883 arterial lane-miles, 692 lane-miles, or 37 percent, represent a reclassification of existing nonarterial facilities to arterial status as urban growth continues. The remaining 1,191 lane-miles, or 63 percent, represent proposals for new capacity in terms of widening of existing arterial facilities and construction of new facilities. The true increment in arterial capacity, measured in lane-miles of new construction, then, is about 1,191 lane-miles, or 14 percent, over 1991 conditions. The plan identifies the number of through travel lanes to be provided on each link in the arterial street and highway system. More detailed studies by the implementing agencies are required to determine the precise cross-section to be selected for a given improvement project, which would in turn define right-of-way requirements.

More specifically, the arterial street and highway element of the plan consists of the following:

1. <u>New Arterial Streets and Highways</u>
   The plan recommends that 131 route-miles of new arterial streets and highways be constructed. These new facilities would provide an additional 337 arterial lane-miles. Included are the Lake Arterial Parkway south from the Daniel Webster Hoan Memorial Bridge to E. Layton Avenue; the STH 16 freeway bypass of Oconomowoc; the USH 12 freeway in Walworth County, including the Whitewater bypass; the STH 36 bypass of Burlington; and the completion of the western leg of the Waukesha circumferential arterial facility.

2. <u>Widening and Improving Existing</u>
   <u>Arterial Streets and Highways</u>
   The plan recommends that widening and other improvements be undertaken along a total of 448 route-miles of existing arterial streets and highways. Such projects would provide an additional 854 arterial lane-miles. Among the proposed improvement projects are: the widening of STH 36 in Milwaukee, Waukesha, and Racine Coun-

ties; Pewaukee Road (CTH J) in Washington and Waukesha Counties; Cleveland Avenue (CTH D) and Racine Avenue (CTH Y) in Waukesha County; STH 31 and CTH Y in Kenosha and Racine Counties; Northwestern Avenue (CTH K) and Spring Street (CTH C) in Racine County; STH 57 and Port Washington Road (CTH W) in Ozaukee County; STH 33 in Ozaukee and Washington Counties; and Rawson Avenue (CTH BB) in Milwaukee County; and the completion of the widening of STH 50 in Kenosha and Walworth Counties.

3. Maintaining Existing Arterial Streets and Highways
   The plan recommends that all other arterial streets and highways in the proposed regional system be maintained over the plan implementation period through resurfacing and reconstruction to provide the same essential capacity. This particular proposal applies to 3,028 route-miles of existing arterial facilities. This particular plan recommendation incorporates a proposal to reconstruct and modernize to current freeway design standards the Milwaukee-area freeway system, coordinating any such freeway rehabilitation and modernization efforts with the results of major investment studies that are to examine the potential for providing busways and high-occupancy-vehicle lanes in the most congested corridors.

Performance and Costs of Recommended Plan

A detailed evaluation of the final recommended regional transportation system plan was undertaken and is reported in Chapter XI. Among the findings of that evaluation are the following:

1. Travel Characteristics
   Under the recommended plan, automobile and light truck availability may be expected to increase by about 15 percent, from 1.13 million vehicles in 1991 to 1.30 million by 2010. Over that same period, the number of person-trips internal to the Region may be expected to increase by about 10 percent, from 5.54 million in 1991 to 6.10 in 2010. The number of vehicle-trips on an average weekday internal to the Region may be expected to increase by about 15 percent, from 4.58 million in 1991 to 5.27 million by 2010. Average weekday highway travel in the Region may be expected to increase by about 28 percent, from 33.07 million vehicle-miles in 1991 to 42.42 million by 2010. Transit ridership over the same period is expected to increase by about 14 percent, from 172,200 to 196,400 passengers per average weekday. The share of travel by transit may be expected to increase slightly, from 3.1 percent of all trips made on an average weekday in 1991 to 3.2 percent in 2010.

2. Traffic Congestion
   In 1991, nearly 12 percent of the arterial street and highway system in the Region, or 385 route-miles, was found to be operating under congested conditions during peak periods, most of which was found to be operating under the "severely congested" and "extremely congested" conditions. If the transit and highway improvements recommended in the plan are carried out, the number of miles of congested facilities in 2010 may be expected to total less than 5 percent of the arterial street and highway system.

3. Environmental Assessment
   A complete environmental assessment of the final recommended plan is set forth in Appendix D. Furthermore, a demonstration of the conformity of the final recommended plan to the State Air Quality Implementation Plan is set forth in SEWRPC report Assessment of Conformity of the New Year 2010 Regional Transportation System Plan and the 1995 through 1997 Transportation Improvement Program with Respect to the State of Wisconsin Air Quality Implementation Plan. In terms of air pollutant emissions from vehicles operating over the arterial street and highway system, significant reductions in the emission of volatile organic compounds, nitrogen oxides, and carbon monoxide are expected, these reductions being approximately 77 percent, 39 percent, and 72 percent, respectively. These significant reductions are expected to come about largely because of Federally mandated requirements for "cleaner" vehicles and fuels and only marginally because of improvements to the transit and highway systems.

The total estimated cost of implementing the recommended plan on an average annual basis

Table 283

FUNDING IMPLEMENTATION OF THE MAJOR ELEMENTS OF THE RECOMMENDED REGIONAL TRANSPORTATION PLAN FOR SOUTHEASTERN WISCONSIN: 2010[a]

| Major Plan Element | Average Annual Plan Implementation Costs and Revenues: 1995-2010 (millions of dollars) | | | | Anticipated Additional Average Annual Revenue from Federal and State TRANSLINKS 21 Programs[b] | | Required Supplemental Average Annual Revenue from County/Local Sources | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimated Costs[c] | Existing Trend Revenues[d] | Shortfall: Amount | Shortfall: Equivalent Motor Fuel Tax (cents per gallon) | Amount (millions of dollars) | Equivalent Motor Fuel Tax (cents per gallon) | Amount (millions of dollars) | Equivalent Motor Fuel Tax (cents per gallon) | Equivalent Sales Tax (percent) |
| State Trunk Highway . . . | 229.2 | 144.0 | 85.2 | 10.0 | 85.2 | 10.0 | - - | - - | - - |
| County and Local Trunk Highways . . . . . . | 114.2 | 73.0 | 41.2 | 4.8 | 13.1 | 1.5 | 28.1 | 3.3 | 0.2 |
| Transit . . . . . . . . . . . . . | 178.5 | 82.9 | 95.6 | 11.2 | 78.3 | 9.2 | 17.3 | 2.0 | 0.1 |
| Total | 521.9 | 299.9 | 222.0 | 26.0 | 176.6 | 20.7 | 45.4 | 5.3 | 0.3 |

*[a]All figures are expressed in constant 1994 dollars.*

*[b]Includes a State transit capital funding program not proposed in TRANSLINKS 21 documents. The regional plan recommends that a study be conducted to examine the desirability and feasibility of such a program. Pending the results of that study, the plan tentatively includes revenue from such a program.*

*[c]Includes capital and operation and maintenance costs; transit costs are net after subtracting farebox revenue.*

*[d]Based upon currently available revenue sources and funding levels, modified as necessary to reflect a "fair share" of State revenues made available to the Region.*

*Source: SEWRPC.*

over the 16-year plan implementation period 1995 through 2010 is $522 million (see Table 283). All figures in that table and in this discussion are expressed in constant 1994 dollars. Of the total estimated cost, about $229 million, or 44 percent, would be required for the State trunk highway system; about $114 million, or 22 percent, for the county and local trunk highway systems; and the remaining $179 million, or 34 percent, for the recommended transit systems. Existing revenues at Federal, State, county, and local levels approximate $300 million annually, resulting in a shortfall of about $222 million annually (see Table 283). This shortfall approximates 26 cents per gallon in terms of an equivalent motor fuel tax.

Given anticipated increases in Federal funding, in part through reservations made in the current Federal transportation legislation and in part through assumed additional reservations in forthcoming Federal transportation legislation, and further given the additional State revenue proposed to be sought under the State transportation plan, about $177 million annually would be made available for Southeastern Wisconsin to help fund the shortfall. This represents the equivalent of an increase of nearly 21 cents per gallon in the motor fuel tax in the Region. Given these supplemental Federal and State funding assumptions, there would remain, then, a shortfall of about $45 million annually. This represents the additional revenue that would need to be secured from within the Region if the plan is to be fully implemented within the 16-year plan implementation period. In terms of a motor fuel tax, this would be the equivalent of about five cents per gallon. In terms of a retail sales tax, this would be the equivalent of 0.3 percent. The plan recommends that the county and local governments in the Region seek enabling legislation to be able to impose the additional fees and taxes required to fund this shortfall, as well as to relieve the property tax burden currently associated with funding the local share of building and maintaining arterial streets and highways and providing transit services.

## PLAN IMPLEMENTATION

Specific plan implementation recommendations directed at the concerned Federal, State, county, and local units and agencies of government operating within the Region are set forth in

Chapter XII. The following summarizes the major implementation recommendations made:

1. Formal Plan Adoption
Formal adoption or endorsement of the recommended regional transportation system plan is highly desirable by all levels, units, and agencies of government concerned to assure a common understanding between the governmental levels and agencies as to the policies and directions to be pursued in building an integrated regional transportation system. It is important that the new regional plan be integrated into the detailed transportation planning and project implementation programs to be conducted by the many agencies concerned over the next two decades.

2. Arterial Street and Highway Jurisdictional and Functional Improvements
The Wisconsin Department of Transportation, the seven counties, and many of the cities, villages, and towns in the Region need to work cooperatively to effect changes in jurisdictional responsibility for portions of the arterial street and highway system as recommended in the plan. Upon assumption of the proper jurisdiction, the implementing agencies concerned should program the necessary arterial street and highway improvement and maintenance activities.

3. Transit Jurisdiction and Functional Improvements
Given the demonstrated lack of political support for a regional transportation authority in Southeastern Wisconsin, it is recommended that, over time, each of the counties in the Region assume responsibility for providing public transit services in accordance with the plan recommendations. This will facilitate not only the development of the functional rapid and express transit systems which provide services across county lines, but also the development of expanded local transit systems which cross municipal lines.

4. Major Investment Studies
A number of major investment studies of freeways and fixed-guideway transit facilities identified in the plan need to be undertaken. By Federal law, these studies are to be collaborative in nature, with initiation of a particular study possible by either the Wisconsin Department of Transportation, the Regional Planning Commission, or a transit operator. Such major investment studies are envisioned to lead to final decisions as to whether or not to move forward with a particular freeway expansion or major transit project. Upon completion of each major investment study, the Regional Planning Commission is to formally act to either confirm or revise the adopted regional transportation system plan with respect to such major transportation facilities.

5. Transportation System and Demand Management
The Wisconsin Department of Transportation has been assigned particularly important responsibilities regarding the transportation system and demand management elements of the plan. Not only does the Department need to complete installation, and begin operation, of the Milwaukee-area freeway management system in accordance with the plan recommendations; the plan also calls for the Department to take the lead in creating an expanded areawide demand management program, including ridesharing promotion, assistance to transportation management associations, promotion of employee-based demand management strategies, and promotion of travel by bicycle and walking. In addition, the urban local governments in the Region need to prepare, adopt, and implement detailed land use plans that facilitate travel by bicycle and pedestrian movement and promote transit use through higher-density development along transit lines.

6. Funding of Plan Implementation
Collectively, the Wisconsin Department of Transportation and the county and local units of government in the Region need to work toward securing additional financial resources for transportation during the plan implementation period if any significant level of plan implementation is to be achieved. Not only will it be necessary for the Wisconsin Department of Transportation to work closely with the Governor and the Wisconsin Legislature in obtaining the additional Federal and State revenues required, as outlined in the State Intermo-

dal Transportation Plan, but the counties in the Region will need to take the lead in seeking enabling legislation to permit them to raise additional revenues for transportation through dedicated nonproperty-tax-based fees or taxes, and to share those resources fairly with local units of government that also have plan implementation responsibilities. If there is not sufficient support for creating an areawide authority for the purposes of raising sufficient revenue to fund county and local transportation improvements, then the county and local governments will have to individually assume that responsibility, after working collectively for the needed permissive enabling legislation. Over the long run, the alternative to not securing additional revenue for transportation will be to significantly scale back the planned county and local arterial street and highway and transit improvements now included in the recommended regional transportation system plan.

## CONCLUSION

This report has described the recommended regional transportation system plan for the year 2010. The plan has been carefully crafted to meet the transportation needs of the Region over approximately the next two decades. It is anticipated that person-trip generation within the Region will increase over this time by about 10 percent; that internal vehicle-trip generation will increase by about 15 percent; and that vehicle-miles of travel will increase by about 28 percent. During this period of time, transit ridership may be expected to increase by about 14 percent if the recommended extent and frequency of service is provided, although the share of travel by transit, about 3 percent, is not expected to change significantly. If implemented, the plan would meet these changing travel needs in the Region while reducing congestion on the arterial street and highway system from about 12 percent of the total of arterial mileage within the Region to about 5 percent.

To meet the future travel and transportation demands, the plan seeks to expand arterial street and highway system capacity, as measured in newly constructed arterial lane-miles, by about 14 percent, while expanding the transit system, as measured by vehicle-miles of revenue service, by about 75 percent. To accomplish these improvements to the transportation system will require not only additional financial resources, but the expenditure of a greater share of those resources for the transit mode. In 1991, about 22 percent of the total resources available for the combined arterial street and highway and transit systems in the Region were allocated to transit; under the plan, about 34 percent of the resources would be allocated to transit.

Thus, implementation of the recommended plan may be expected to provide the Region with an integrated transportation system that will effectively serve and promote a desirable regional land use pattern, meeting anticipated future travel demand at an adequate level of service through transportation system management measures, as well as transit and highway improvements. In terms of modes, the plan is as balanced as is practicable, with appropriate types of both highway and transit facilities provided for the various subareas of the Region. Implementation of the plan would abate traffic congestion, reduce travel time and costs, and reduce accident exposure. As such, implementation of, or the failure to implement, the recommended plan will affect not only the efficiency of the regional transportation system, and thereby directly affect the cost of living and doing business in the Region, but will also affect the overall quality of life in the Region for many years. It is critical, therefore, that government, business and industry, labor, and concerned citizens in the Region take an active interest in securing implementation of the plan recommendations.

Planning is, by definition, expected to deal with an uncertain future. As the governmental agencies concerned consider the recommended plan and its implementation, however, a number of these uncertainties need to be kept specifically in mind. First, there is uncertainty over the future levels of population and economic activity within the Region. A more vigorous economy could lead to greater-than-anticipated levels of growth and change in the Region. Alternatively, a less vigorous economy could return the Region to periods of modest changes in population and employment levels. The variables which relate to this uncertainty need to be closely monitored as plan implementation proceeds.

Second, there is an uncertainty with respect to the degree to which county and local governments in the Region will take appropriate and effective steps to implement the regional land use plan. The recommended regional transportation system plan is robust in the sense that analyses have shown that the recommended system will serve well not only the regional settlement pattern identified in the adopted regional land use plan, but a more decentralized pattern as well. Significant deviations from the recommended land use pattern, however, could prove to be more problematic. Accordingly, this is another variable which bears close scrutiny as plan implementation proceeds.

Third, there is great uncertainty over the feasibility of fully implementing the recommended regional transportation system plan owing to the substantial additional financial resources that will be required. Monitoring activities over the past two decades have demonstrated that it has become increasingly difficult for county and local governments to discharge fully their transportation responsibilities relying totally upon the property tax as the source of needed local revenue for that purpose. This has led to less-than-expected implementation of prior regional transportation system plans with respect to county and local arterial highways and public transit systems. At the State level, the monitoring has demonstrated substantially less fiscal uncertainty, since a single State agency exists with dedicated nonproperty-tax revenue sources available to foster more complete plan implementation. While the State has moved in recent years to provide greater revenues to county and local governments for both transit and highway plan implementation, and while even greater efforts are proposed in the new State Intermodal Transportation Plan, the level of uncertainty with respect to plan implementation remains far greater at the county and local level than at the State level. Inevitably, it would appear that Southeastern Wisconsin must, like most large metropolitan areas in the Nation, come to grips with this uncertainty by identifying and securing a dedicated nonproperty-tax revenue source for county and local transportation purposes. This uncertainty is perhaps the greatest of all in terms of plan implementation and will need to be carefully monitored as the implementation period proceeds.

Fourth, there is uncertainty with respect to plan implementation that derives from the Federal Clean Air Act Amendments of 1990 and the Federal rulemaking attendant thereto. This particular uncertainty can only be addressed by the Wisconsin Department of Natural Resources as it prepares and submits to the Federal government its State Implementation Plan for air quality. From a technical perspective, there is no reason why air quality considerations should delay implementation of the regional plan. The rulemaking by the Federal government attendant to the air quality legislation may operate, however, to effectively delay plan implementation if the State Air Quality Implementation Plan is not submitted in a complete and timely manner. This represents an additional uncertainty which must be addressed and monitored as plan implementation proceeds.

Finally, all these uncertainties need to be taken into account in a continuing regional land use-transportation planning program. As the Federally recognized Metropolitan Planning Organization, and as the regional planning agency for Southeastern Wisconsin, the Regional Planning Commission bears the responsibility for conducting that planning process. The process must include efforts to monitor all the foregoing uncertainties, and others as well. The process must continually survey and monitor many factors, must provide for amendment of the regional plan over time, and must provide for the extension of the plan to provide a continual 20-year planning horizon. Consequently, it should be anticipated that the Commission will work collaboratively with the Federal, State, county, and local units and agencies of government concerned and move forward with a work program designed to discharge its continuing planning responsibilities properly.

# APPENDICES

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## Appendix A

## URBAN SPRAWL REGIONAL LAND USE PLAN ALTERNATIVE: 2010

### INTRODUCTION

At its meeting on September 14, 1993, the SEWRPC Technical Coordinating and Advisory Committee on Regional Transportation System Planning directed that the Commission staff prepare, as a companion to the adopted year 2010 Regional Land Use Plan, a regional land use alternative that would be differentiated from the adopted plan in two important respects:

1. The alternative plan would provide for a greater level of decentralization of regional population, household, job, and attendant land use than envisioned under the adopted regional land use plan.
2. The alternative plan would provide for a greater degree of "urban sprawl" in the Region, reflecting land use development trends made possible by the accommodation of urban development served by onsite sewage disposal systems, which are evident in portions of the Region.

The Committee reasoned that, in view of the continuing uncertainty surrounding future social and economic conditions in the Region, it would be imprudent to dismiss the possibility that future growth and change in the Region could occur in a manner at variance with that envisioned under the adopted 2010 land use plan. Accordingly, the Committee requested that the Commission staff prepare an existing trends urban sprawl land use alternative that was consistent with the adopted plan in terms of the overall population, household, and employment levels envisioned within the Region by 2010 but that would differ with respect to the manner in which such households and jobs would be accommodated in the Region. This alternative plan was intended to supplement the adopted 2010 land use plan and thereby broaden the framework within which planning and decision making regarding transportation system development and redevelopment within the Region could be carried out. It was intended within this framework, for example, that proposals for major public facilities, especially transportation facilities, be evaluated to determine how well they would perform under a land use pattern different from that envisioned in the adopted regional land use plan. Through such sensitivity analyses, more "robust" plan elements which could be expected to remain viable under greatly varying land use development conditions could be identified.

### ASSUMPTIONS USED IN PREPARING AN EXISTING TRENDS URBAN SPRAWL LAND USE PLAN ALTERNATIVE

Unlike the adopted 2010 regional land use plan, which is a "normative" land use plan, setting forth a regional development pattern that seeks to modify historic development trends in order to promote public health, safety, and general welfare and a more efficient and economical development pattern, the existing trends urban sprawl alternative sets forth one possible regional development pattern that could evolve, assuming historic development trends in the Region were to continue. In this respect, it should be understood that since such land use development under this alternative would be almost entirely market driven, a large number of somewhat different patterns could evolve.

Thus, while the number of persons, households, and jobs under both the existing trends urban sprawl alternative and the adopted regional land use plan are essentially the same, the resultant development patterns are significantly different because of the following assumptions utilized in the preparation of the existing trends urban sprawl alternative.

1. Under the existing trends urban sprawl alternative, the number of persons, households, and jobs within each county and each subcounty planning analysis area was determined by examining the existing trends in each county and planning analysis area over the period from 1970 to 1990. Such trends were then projected to 2010, with the results adjusted as necessary to match regional control totals.

2. The existing trends urban sprawl alternative, insofar as land use distribution is concerned, assumed the proportion of new households created over the design period within the Region that would occur on scattered locations utilizing onsite sewage disposal system would be similar to the proportion experienced within the Region in the 1970 to 1985 period.

3. The existing trends urban sprawl alternative further assumed that the location of development utilizing onsite sewage disposal systems would be spatially distributed within each county and planning analysis area on the basis of the historic distribution pattern of onsite sewage disposal system development which occurred in that county between 1970 and 1985.

4. The existing trends urban sprawl alternative also assumed that the distribution of new residential development within each county and planning analysis area would not be constrained by withholding such development from the upland portions of the primary environmental corridor. Rather, the design process would assume only that the lowland portions of the environmental corridors, the floodlands and wetlands, would be protected and preserved.

5. Finally, the existing trends urban sprawl alternative did not constrain new development from occurring within the prime agricultural areas since a significant amount of the urban development historically occurred on such lands.

Utilization of the foregoing assumptions resulted in significantly greater decentralization of urban activity and significantly higher levels of urban development occurring in outlying areas of the Region than envisioned in the adopted regional land use plan. Such development relied heavily on the utilization of onsite sewage disposal systems, encroached into the upland portions of the primary environmental corridors, and converted significantly greater areas of prime agricultural lands. A summary of the key findings of the existing trends urban sprawl regional land use plan alternative, illustrated on Maps A-1 and A-2, compared to the adopted 2010 regional land use plan, are presented in the following section.

## COMPARISON OF THE EXISTING TRENDS URBAN SPRAWL REGIONAL LAND USE PLAN ALTERNATIVE AND THE YEAR 2010 ADOPTED REGIONAL LAND USE PLAN

### Population

The population of the Region under the existing trends urban sprawl alternative is envisioned to increase by 170,000 persons, or about 10 percent, from 1,742,700 in 1985 to 1,912,700 by 2010. While the increase in population levels under this alternative is identical to that envisioned under the 2010 adopted land use plan, the envisioned distribution of this incremental population is significantly different.

As indicated in Table A-1, when compared to the adopted land use plan, the existing trends urban sprawl alternative plan would, as a result of assumed continuation of past development trends, accommodate about 36,000 fewer persons in the highly urbanized Kenosha, Milwaukee, and Racine Counties and significantly more persons in the outlying counties of the Region, especially Washington and Waukesha Counties.

### Households

Household levels under the existing trends urban sprawl alternative are envisioned to increase by about 128,800, or about 20 percent, from 643,800 in 1985 to 772,600 in 2010. As indicated in Table A-2, the existing trends urban sprawl alternative would, by the year 2010, accommodate about 2,300 fewer households than the adopted plan as a result of the assumed larger household size in the outlying counties, where higher population levels were envisioned to occur. Similar to the distribution of population, the existing trends urban sprawl alternative, when compared to the adopted land use plan, would accommodate about 19,000 fewer households in the urbanized Kenosha, Milwaukee, and Racine Counties and more households in the outlying counties of the Region, especially Washington and Waukesha Counties.

**Table A-1**

**TOTAL POPULATION IN THE REGION BY COUNTY: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE**

| County | 1985 | 2010 Adopted Plan: Planned Increment 1985-2010 Number | 2010 Adopted Plan: Planned Increment 1985-2010 Percent | 2010 Adopted Plan: Total | 2010 Existing Trends Urban Sprawl Alternative: Planned Increment 1985-2010 Number | 2010 Existing Trends Urban Sprawl Alternative: Planned Increment 1985-2010 Percent | 2010 Existing Trends Urban Sprawl Alternative: Total | 2010 Existing Trends Urban Sprawl Alternative Compared to 2010 Adopted Plan (number) |
|---|---|---|---|---|---|---|---|---|
| Kenosha | 121,100 | 26,800 | 22.1 | 147,900 | 18,900 | 15.6 | 140,000 | -7,900 |
| Milwaukee | 939,600 | -10,300 | -1.1 | 929,300 | -33,600 | -3.6 | 906,000 | -23,300 |
| Ozaukee | 67,500 | 12,300 | 18.2 | 79,800 | 17,500 | 25.9 | 85,000 | 5,200 |
| Racine | 169,200 | 16,800 | 9.9 | 186,000 | 11,800 | 7.0 | 181,000 | -5,000 |
| Walworth | 72,200 | 15,100 | 20.9 | 87,300 | 14,800 | 20.5 | 87,000 | -300 |
| Washington | 87,200 | 24,500 | 28.1 | 111,700 | 32,800 | 37.6 | 120,000 | 8,300 |
| Waukesha | 285,900 | 84,800 | 29.7 | 370,700 | 107,800 | 37.7 | 393,700 | 23,000 |
| Region | 1,742,700 | 170,000 | 9.8 | 1,912,700 | 170,000 | 9.8 | 1,912,700 | 0 |

*Source: SEWRPC.*

**Table A-2**

**TOTAL HOUSEHOLDS IN THE REGION BY COUNTY: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE**

| County | 1985 | 2010 Adopted Plan: Planned Increment 1985-2010 Number | 2010 Adopted Plan: Planned Increment 1985-2010 Percent | 2010 Adopted Plan: Total | 2010 Existing Trends Urban Sprawl Alternative: Planned Increment 1985-2010 Number | 2010 Existing Trends Urban Sprawl Alternative: Planned Increment 1985-2010 Percent | 2010 Existing Trends Urban Sprawl Alternative: Total | 2010 Existing Trends Urban Sprawl Alternative Compared to 2010 Adopted Plan (number) |
|---|---|---|---|---|---|---|---|---|
| Kenosha | 44,200 | 14,900 | 33.7 | 59,100 | 11,800 | 26.7 | 56,000 | -3,100 |
| Milwaukee | 368,200 | 30,800 | 8.4 | 399,000 | 16,800 | 4.6 | 385,000 | -14,000 |
| Ozaukee | 22,900 | 7,600 | 33.2 | 30,500 | 10,100 | 44.1 | 33,000 | 2,500 |
| Racine | 61,200 | 12,700 | 20.8 | 73,900 | 10,800 | 17.6 | 72,000 | -1,900 |
| Walworth | 25,600 | 10,000 | 39.1 | 35,600 | 10,400 | 40.6 | 36,000 | 400 |
| Washington | 28,500 | 13,100 | 46.0 | 41,600 | 16,500 | 57.9 | 45,000 | 3,400 |
| Waukesha | 93,200 | 42,000 | 45.1 | 135,200 | 52,400 | 56.2 | 145,600 | 10,400 |
| Region | 643,800 | 131,100 | 20.4 | 774,900 | 128,800 | 20.0 | 772,600 | -2,300 |

*Source: SEWRPC.*

## Employment

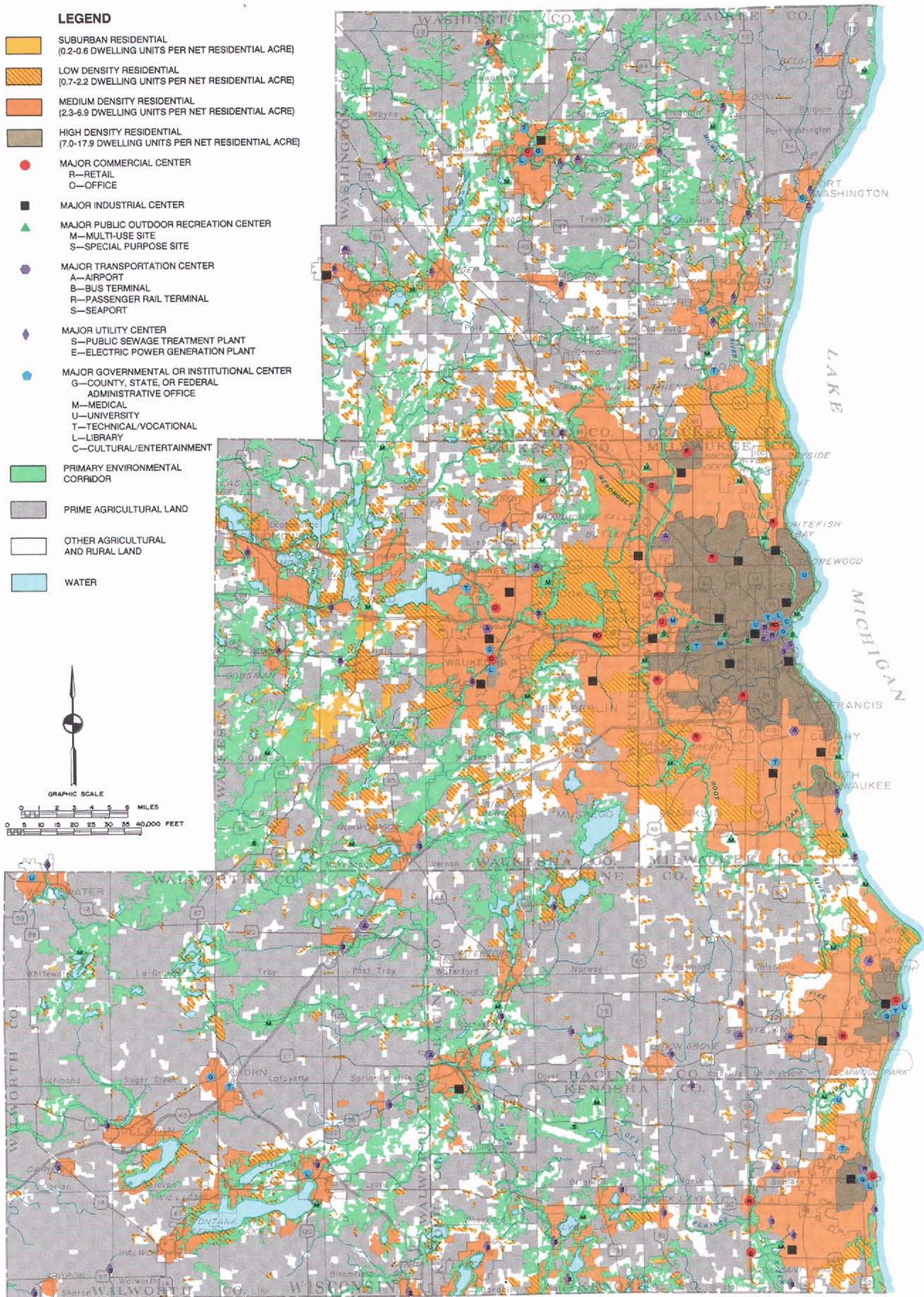
Employment levels under the existing trends urban sprawl alternative are envisioned to increase by about 230,200 jobs, or about 26 percent, from 871,900 jobs in 1985 to 1,102,100 jobs in the year 2010. As indicated in Table A-3 and as a result of the assumed continuation of the decentralization of economic activity levels, the existing trends urban sprawl alternative, when compared to the adopted land use plan, would accommodate significantly more jobs in the outlying areas of the Region, especially in Washington and Waukesha Counties. In this regard, Waukesha County would accommodate almost 21,000 more jobs under the existing trends plan than it would under the adopted plan.

## Land Use

As indicated in Table A-4, urban land uses under the existing trends urban sprawl alternative are envisioned to increase by about 144 square miles, or almost 24 percent, from about 606 square miles in 1985 to about 750 square miles by the year 2010. As further indicated in Table A-4, the existing trends urban sprawl alternative, when compared to the adopted land use plan, would convert about 58 more square miles of lands from rural to urban use. Almost all of this envisioned increase in urban

**Map A-1**

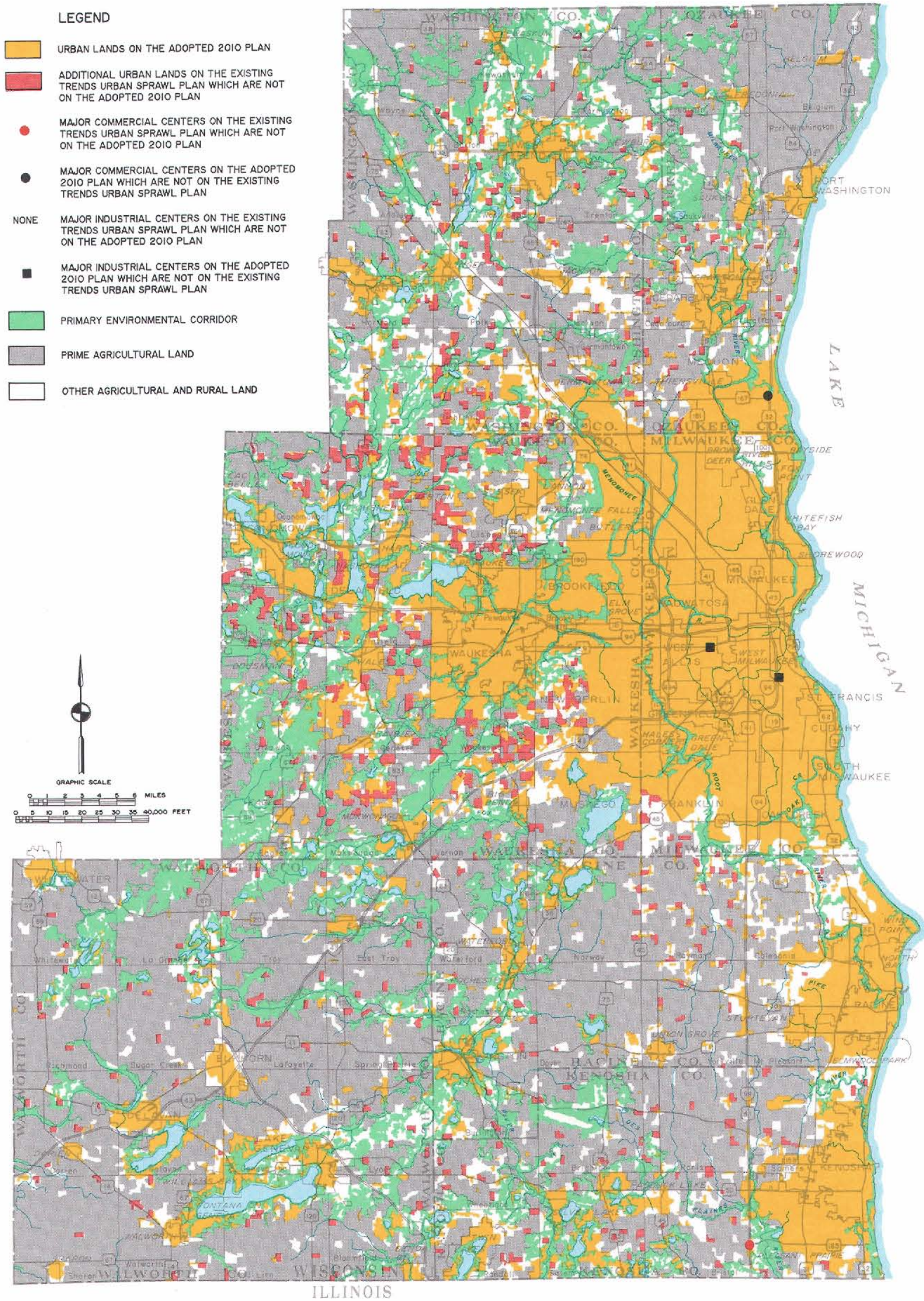
**EXISTING TRENDS URBAN SPRAWL LAND USE PLAN FOR SOUTHEASTERN WISCONSIN: 2010**




*Source: SEWRPC.*

## Map A-2

## COMPARISON OF 2010 ADOPTED LAND USE PLAN AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE




Source: SEWRPC.

## Table A-3

### TOTAL EMPLOYMENT IN THE REGION BY COUNTY: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE

| County | Total Employment | | | | | | | 2010 Existing Trends Urban Sprawl Alternative Compared to 2010 Adopted Plan (number) |
|---|---|---|---|---|---|---|---|---|
| | 1985 | 2010 Adopted Plan | | | 2010 Existing Trends Urban Sprawl Alternative | | | |
| | | Planned Increment 1985-2010 | | Total | Planned Increment 1985-2010 | | Total | |
| | | Number | Percent | | Number | Percent | | |
| Kenosha . . . . . . | 42,500 | 20,500 | 48.2 | 63,000 | 17,500 | 41.2 | 60,000 | -3,000 |
| Milwaukee . . . . | 527,300 | 85,400 | 16.2 | 612,700 | 52,700 | 10.0 | 580,000 | -32,700 |
| Ozaukee . . . . . . | 26,900 | 11,800 | 43.9 | 38,700 | 15,100 | 56.1 | 42,000 | 3,300 |
| Racine . . . . . . . | 74,500 | 17,600 | 23.6 | 92,100 | 18,500 | 24.8 | 93,000 | 900 |
| Walworth . . . . . | 28,100 | 12,400 | 44.1 | 40,500 | 15,900 | 56.6 | 44,000 | 3,500 |
| Washington . . . . | 31,300 | 16,600 | 53.0 | 47,900 | 23,700 | 75.7 | 55,000 | 7,100 |
| Waukesha . . . . . | 141,300 | 65,900 | 46.6 | 207,200 | 86,800 | 61.4 | 228,100 | 20,900 |
| Region | 871,900 | 230,200 | 26.4 | 1,102,100 | 230,200 | 26.4 | 1,102,100 | 0 |

*Source: SEWRPC.*

## Table A-4

### TOTAL LAND USE IN THE REGION BY COUNTY: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE

| Land Use Category | Existing 1985 | | 2010 Adopted Plan | | | | 2010 Existing Trends Urban Sprawl Alternative | | | | 2010 Existing Trends Urban Sprawl Alternative Compared to 2010 Adopted Plan (acres) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Planned Increment 1985-2010 | | | | Planned Increment 1985-2010 | | | | |
| | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total | Acres | Percent | Acres | Percent of Total | |
| Urban | | | | | | | | | | | |
| Residential | | | | | | | | | | | |
| Urban High-Density . . . . . . | 27,797 | 1.6 | 1,817 | 6.5 | 29,614 | 1.7 | 572 | 2.1 | 28,369 | 1.6 | -1,245 |
| Urban Medium-Density . . . . | 54,153 | 3.1 | 30,802 | 56.9 | 84,955 | 4.9 | 28,695 | 53.0 | 82,848 | 4.8 | -2,107 |
| Urban Low-Density . . . . . . | 94,618 | 5.5 | 3,128 | 3.3 | 97,746 | 5.7 | 30,216 | 31.9 | 124,834 | 7.3 | 27,088 |
| Suburban-Density . . . . . . . | 8,035 | 0.5 | 1,338 | 16.7 | 9,373 | 0.5 | 3,650 | 45.4 | 11,685 | 0.7 | 2,312 |
| Subtotal | 184,603 | 10.7 | 37,085 | 20.0 | 221,688 | 12.8 | 63,133 | 34.2 | 247,736 | 14.4 | 26,048 |
| Commercial . . . . . . . . . . . . | 8,714 | 0.5 | 1,444 | 16.6 | 10,158 | 0.6 | 1,757 | 20.2 | 10,471 | 0.6 | 313 |
| Industrial . . . . . . . . . . . . . . . | 12,080 | 0.7 | 5,385 | 44.6 | 17,465 | 1.0 | 5,896 | 48.8 | 17,976 | 1.0 | 511 |
| Transportation, Communication, and Utilities[a] . . . . . . . . . . . | 120,279 | 7.0 | 14,819 | 12.3 | 135,098 | 7.8 | 20,385 | 16.9 | 140,664 | 8.2 | 5,566 |
| Governmental and Institutional . . . . . . . . . . . . | 17,240 | 1.0 | 1,044 | 6.1 | 18,284 | 1.1 | 797 | 4.6 | 18,037 | 1.0 | -247 |
| Recreational[b] . . . . . . . . . . . . | 25,564 | 1.5 | 4,185 | 16.4 | 29,749 | 1.7 | 3,934 | 15.4 | 29,498 | 1.7 | -251 |
| Unused Urban Land . . . . . . . | 19,215 | 1.1 | -8,397 | -43.7 | 10,818 | 0.6 | -3,554 | -18.5 | 15,661 | 0.9 | 4,843 |
| Subtotal | 387,695 | 22.5 | 55,565 | 14.3 | 443,260 | 25.6 | 92,348 | 23.8 | 480,043 | 27.8 | 36,783 |
| Rural | | | | | | | | | | | |
| Residential[c] . . . . . . . . . . . . . | - - | - - | 721 | - - | 721 | - -[d] | 1,368 | - - | 1,368 | 0.1 | 647 |
| Agricultural[e] . . . . . . . . . . . . | 989,180 | 57.5 | -56,014 | -5.7 | 933,166 | 54.3 | -92,821 | -9.4 | 896,359 | 52.1 | -36,807 |
| Other Open Lands[f] . . . . . . . . | 344,238 | 20.0 | -272 | -0.1 | 343,966 | 20.1 | -895 | -0.3 | 343,343 | 20.0 | -623 |
| Subtotal | 1,333,418 | 77.5 | -55,565 | -4.2 | 1,277,853 | 74.4 | -92,348 | -6.9 | 1,241,070 | 72.2 | -36,783 |
| Total | 1,721,113 | 100.0 | 0 | 0.0 | 1,721,113 | 100.0 | 0 | 0.0 | 1,721,113 | 100.0 | 0 |

[a] *Includes off-street parking areas.*

[b] *1985 data includes net site area of public and nonpublic recreation sites while 2010 data includes only that net site area recommended for public recreation use.*

[c] *Included in 1985 land use inventory as part of urban residential land use.*

[d] *Less than 0.1 percent.*

[e] *Includes agricultural and unused rural land.*

[f] *Includes woodlands, water, wetlands, landfill sites, and quarries.*

*Source: SEWRPC.*

Table A-5

TOTAL URBAN LANDS IN THE REGION BY COUNTY: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE

| County | Total Urban Lands | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1985 Total (acres) | 2010 Adopted Plan | | | 2010 Existing Trends Urban Sprawl Alternative | | | 2010 Existing Trends Urban Sprawl Alternative Compared to 2010 Adopted Plan (acres) |
| | | Planned Increment 1985-2010 | | Total (acres) | Planned Increment 1985-2010 | | Total (acres) | |
| | | Acres | Percent | | Acres | Percent | | |
| Kenosha | 31,971 | 7,533 | 23.6 | 39,504 | 8,248 | 25.8 | 40,219 | 715 |
| Milwaukee | 116,795 | 6,081 | 5.2 | 122,876 | 8,051 | 6.9 | 124,846 | 1,970 |
| Ozaukee | 27,292 | 5,163 | 18.9 | 32,455 | 6,912 | 25.3 | 34,204 | 1,749 |
| Racine | 40,341 | 6,179 | 15.3 | 46,520 | 6,804 | 16.9 | 47,145 | 625 |
| Walworth | 38,080 | 4,675 | 12.3 | 42,755 | 7,711 | 20.2 | 45,791 | 3,036 |
| Washington | 33,671 | 6,659 | 19.8 | 40,330 | 15,328 | 45.5 | 48,999 | 8,669 |
| Waukesha | 99,545 | 19,275 | 19.4 | 118,820 | 39,294 | 39.5 | 138,839 | 20,019 |
| Region | 387,695 | 55,565 | 14.3 | 443,260 | 92,348 | 23.8 | 480,043 | 36,783 |

*Source: SEWRPC.*

Table A-6

TOTAL PRIME AGRICULTURAL LANDS IN THE REGION BY COUNTY: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE

| County | Total Prime Agricultural Lands | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1985 Total (acres) | 2010 Adopted Plan | | | 2010 Existing Trends Urban Sprawl Alternative | | | 2010 Existing Trends Urban Sprawl Alternative Compared to 2010 Adopted Plan (acres) |
| | | Planned Increment 1985-2010 | | Total (acres) | Planned Increment 1985-2010 | | Total (acres) | |
| | | Acres | Percent | | Acres | Percent | | |
| Kenosha | 76,471 | -2,042 | -2.7 | 74,429 | -4,636 | -6.1 | 71,835 | -2,594 |
| Milwaukee | 1,351 | 0 | 0.0 | 1,351 | -132 | -9.8 | 1,219 | -132 |
| Ozaukee | 73,335 | -1,425 | -1.9 | 71,910 | -3,049 | -4.2 | 70,286 | -1,624 |
| Racine | 98,626 | -526 | -0.5 | 98,100 | -1,452 | -1.5 | 97,174 | -926 |
| Walworth | 208,941 | -917 | -0.4 | 208,024 | -2,125 | -1.0 | 206,816 | -1,208 |
| Washington | 108,256 | -1,463 | -1.4 | 106,793 | -5,952 | -5.5 | 102,304 | -4,489 |
| Waukesha | 103,078 | -4,543 | -4.4 | 98,535 | -20,478 | -19.9 | 82,600 | -15,935 |
| Region | 670,058 | -10,916 | -1.6 | 659,142 | -37,824 | -5.6 | 632,234 | -26,908 |

*Source: SEWRPC.*

lands would occur in the low-density residential category as a result of the assumed proliferation of scattered, low-density residential subdivisions in the outlying counties of the Region. As indicated in Table A-5, the increment in urban lands under the existing trends urban sprawl alternative was significantly higher in the outlying counties compared to the 2010 adopted plan. In this regard, the envisioned increase of about 61 square miles in urban lands in Waukesha County under the existing trends urban sprawl alternative is more than double that of about 30 square miles envisioned under the adopted plan.

Prime Agricultural Lands

Prime agricultural lands under the existing trends urban sprawl alternative are envisioned to decrease by about 59 square miles, or almost 6 percent, from 1,047 square miles in 1985 to about 988 square miles in 2010. As indicated in Table A-6, this envisioned decrease in prime agricultural lands is significantly higher than that envisioned under the adopted plan, only about 17 square miles, during the period from 1985 to 2010. It is interesting to note that the loss of prime agricultural lands under the existing trends urban sprawl alternative is greater in every county than under the adopted plan.

Table A-7

TOTAL PRIMARY ENVIRONMENTAL CORRIDOR AREA IN THE REGION BY COUNTY: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE

| County | Total Primary Environmental Corridor Area | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2010 Adopted Plan | | | 2010 Existing Trends Urban Sprawl Alternative | | | 2010 Existing Trends Urban Sprawl Alternative Compared to 2010 Adopted Plan (acres) |
| | | Planned Increment 1985-2010 | | | Planned Increment 1985-2010 | | | |
| | 1985 Total (acres) | Acres | Percent | Total (acres) | Acres | Percent | Total (acres) | |
| Kenosha . . . . . . | 28,600 | 300 | 1.0 | 28,900 | -160 | -0.6 | 28,440 | -460 |
| Milwaukee . . . . | 9,800 | 500 | 5.1 | 10,300 | 460 | 4.7 | 10,260 | -40 |
| Ozaukee . . . . . . | 19,900 | 0 | 0.0 | 19,900 | -550 | -2.8 | 19,350 | -550 |
| Racine . . . . . . . | 23,600 | 200 | 0.8 | 23,800 | -230 | -1.0 | 23,370 | -430 |
| Walworth . . . . . | 65,200 | 300 | 0.5 | 65,500 | -900 | -1.4 | 64,300 | -1,200 |
| Washington . . . . | 60,300 | 600 | 1.0 | 60,900 | -1,340 | -2.2 | 58,960 | -1,940 |
| Waukesha . . . . . | 92,200 | 1,700 | 1.8 | 93,900 | -930 | -1.0 | 91,270 | -2,630 |
| Region | 299,600 | 3,600 | 1.2 | 303,200 | -3,650 | -1.2 | 295,950 | -7,250 |

*Source: SEWRPC.*

Table A-8

POPULATION DENSITY IN THE REGION: SELECTED YEARS 1850-1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE

| Year | Urban Population | | Rural Population | | Total Population | Area (square miles) | | Persons per Square Mile | |
|---|---|---|---|---|---|---|---|---|---|
| | Number | Percent of Total | Number | Percent of Total | | Urban | Total | Urban | Total |
| 1850 | 28,623 | 25.2 | 84,766 | 74.8 | 113,389 | 4 | 2,689 | 7,156 | 42 |
| 1880 | 139,509 | 50.3 | 137,610 | 49.7 | 277,119 | 18 | 2,689 | 7,751 | 103 |
| 1900 | 354,082 | 70.6 | 147,726 | 29.4 | 501,808 | 37 | 2,689 | 9,570 | 187 |
| 1920 | 635,376 | 81.1 | 148,305 | 18.9 | 783,681 | 56 | 2,689 | 11,346 | 291 |
| 1940 | 991,535 | 92.9 | 76,164 | 7.1 | 1,067,699 | 90 | 2,689 | 11,017 | 397 |
| 1950 | 1,179,084 | 95.0 | 64,534 | 5.0 | 1,243,618 | 146 | 2,689 | 8,076 | 462 |
| 1963 | 1,634,200 | 97.6 | 40,100 | 2.4 | 1,674,300 | 282 | 2,689 | 5,795 | 623 |
| 1970 | 1,728,946 | 98.5 | 27,137 | 1.5 | 1,756,083 | 338 | 2,689 | 5,115 | 653 |
| 1980 | 1,749,238 | 99.1 | 15,558 | 0.9 | 1,764,796 | 444 | 2,689 | 3,940 | 656 |
| 1985 | 1,730,500 | 99.3 | 12,200 | 0.7 | 1,742,700 | 477 | 2,689 | 3,628 | 648 |
| 2010 Adopted Land Use Plan | 1,904,500 | 99.6 | 8,200 | 0.4 | 1,912,700 | 670 | 2,689 | 2,843 | 711 |
| 2010 Existing Trends Urban Sprawl Land Use Plan | 1,904,500 | 99.6 | 8,200 | 0.4 | 1,912,700 | 743 | 2,689 | 2,563 | 711 |

*Source: SEWRPC.*

Primary Environmental Corridor

Primary environmental corridor lands, under the existing trends urban sprawl alternative, were envisioned to decrease by about six square miles, or by about 1.2 percent, from about 468 square miles in 1985 to about 462 square miles in the year 2010. As indicated in Table A-7, every county in the Region, with the exception of Milwaukee County, was envisioned to lose some environmental corridor lands during the 25-year period. This is in marked contrast to the adopted plan, which envisioned no change or an actual gain in primary environmental corridor lands during the plan design period. The gain in primary environmental corridor lands under the adopted plan was envisioned to occur primarily as a result of protection of floodplain areas and restoration of such areas to natural conditions, thereby increasing primary environmental corridor lands. The envisioned loss of primary environmental corridor lands under the existing trends urban sprawl alternative would occur primarily as a result of the conversion of the upland portions of such corridors to urban residential uses.

Table A-9

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE

| | | | 2010 Adopted Plan | | | | 2010 Existing Trends Urban Sprawl Alternative | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1985 Existing Service | | Planned Increment 1985-2010 | | Total Service | | Planned Increment 1985-2010 | | Total Service | |
| Area and Population | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply | Public Sanitary Sewer | Public Water Supply |
| Developed Area | | | | | | | | | | |
| Total Square Miles | 476.5 | 476.5 | 193.9 | 193.9 | 670.4 | 670.4 | 266.9 | 266.9 | 743.4 | 743.4 |
| Square Miles Served | 319.8 | 262.9 | 253.1 | 312.4 | 572.9 | 575.3 | 255.0 | 314.3 | 574.8 | 577.2 |
| Percent of Total Served | 67.1 | 55.2 | - - | - - | 85.5 | 85.8 | - - | - - | 77.3 | 77.6 |
| Population | | | | | | | | | | |
| Total Population | 1,742,700 | 1,742,700 | 170,000 | 170,000 | 1,912,700 | 1,912,700 | 170,000 | 170,000 | 1,912,700 | 1,912,700 |
| Population Served | 1,507,800 | 1,389,700 | 232,400 | 353,900 | 1,740,200 | 1,743,600 | 165,800 | 286,800 | 1,673,600 | 1,676,500 |
| Percent of Total Served | 86.5 | 79.7 | - - | - - | 91.0 | 91.2 | - - | - - | 87.5 | 87.7 |

*Source: SEWRPC.*

## Population Density

As indicated in Table A-8, the population density, measured in persons per square mile, is envisioned to decrease under the existing trends urban sprawl alternative, from about 3,630 persons per square mile in 1985 to about 2,560 persons per square mile in the year 2010. This again is in contrast to the adopted plan, in which the envisioned 2010 population density approximated 2,840 persons per square mile. The envisioned decrease in population density under the existing trends urban sprawl alternative is due to the increase in urban lands, primarily as low-density residential development in outlying areas of the Region.

## Urban Services

It is envisioned that public sanitary sewer and public water supply services would be extended to about 77 percent of the total developed area of the Region by the year 2010 under the existing trends urban sprawl alternative (see Table A-9). In addition, about 88 percent of the total population would be served by such facilities under this alternative. The adopted 2010 land use plan envisions about the same area to be served with such public services, about 575 square miles, but because the adopted plan envisions more compact development and thus fewer total square miles of land being used for urban purposes, about 86 percent of the total developed area of the Region would be provided with public sanitary sewer and water supply and over 91 percent of the population would be so served under the adopted plan.

## Major Centers

There were 14 existing major retail or office centers in the Region in 1985. Between 1985 and the year 2010, it is envisioned that five additional major retail or office centers would be provided under both the adopted regional plan, and the existing trends urban sprawl alternative. As indicated in Table A-10, the adopted regional plan and the existing trends urban sprawl alternative both envision the provision of a new retail center at the intersection of IH 94 and STH 50 in Kenosha County; the provision of two new office centers in Milwaukee County, one at Milwaukee County Research Park and the other at Park Place, in the northwest portion of Milwaukee County; and a new office center in the Town of Pewaukee, at the intersection of IH 94 and CTH J. As indicated in Map A-2, the existing trends urban sprawl alternative envisioned a new office complex at the intersection of IH 94 and CTH Q in Kenosha County, not so identified under the adopted land use plan, while the adopted land use plan envisioned an additional office center to be located in the City of Mequon, not so identified under the existing trends urban sprawl alternative.

Table A-10

EXISTING AND PROPOSED MAJOR COMMERCIAL CENTERS IN THE REGION: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE

| County | Major Commercial Center | Existing 1985 | | 2010 Adopted Plan | | 2010 Existing Trends Urban Sprawl Alternative | |
|---|---|---|---|---|---|---|---|
| | | Retail | Office | Retail | Office | Retail | Office |
| Kenosha | Kenosha CBD | - - | X | - - | X | - - | X |
| | Kenosha-southwest | - - | - - | - - | - - | - - | X |
| | Kenosha-west | - - | - - | X | - - | X | - - |
| Milwaukee | Bay Shore | X | - - | X | - - | X | - - |
| | Capitol Court | X | - - | X | - - | X | - - |
| | Mayfair | X | X | X | X | X | X |
| | Milwaukee CBD | X | X | X | X | X | X |
| | Milwaukee County Research Park | - - | - - | - - | X | - - | X |
| | Northridge | X | - - | X | - - | X | - - |
| | Park Place | - - | - - | - - | X | - - | X |
| | Southgate-Point Loomis | X | - - | X | - - | X | - - |
| | Southridge | X | - - | X | - - | X | - - |
| | West Allis | X | - - | X | - - | X | - - |
| Ozaukee | Mequon | - - | - - | - - | X | - - | - - |
| Racine | Racine CBD | - - | X | - - | X | - - | X |
| | Regency Mall | X | - - | X | - - | X | - - |
| Washington | West Bend | - - | X | - - | X | - - | X |
| Waukesha | Blue Mound Road | X | X | X | X | X | X |
| | Pewaukee | - - | - - | - - | X | - - | X |
| | Waukesha CBD | - - | X | - - | X | - - | X |

NOTE: To qualify as a major retail center, a site must accommodate at least 2,000 retail jobs. To qualify as a major office center, a site must accommodate at least 3,500 office and service-related jobs.

*Source: SEWRPC.*

There were 22 existing major industrial centers in the Region in 1985. It is envisioned that three new industrial centers will be provided in the Region under both the existing trends urban sprawl alternative and the 2010 adopted plan. As indicated in Table A-11, these three new centers would be located in the Village of Pleasant Prairie, Kenosha County; in the City of Burlington, Racine County; and in the City of Hartford, Washington County. It should be noted that two of the major industrial centers which existed in the Region in 1985 were envisioned under the existing trends urban sprawl alternative, unlike the adopted land use plan, to decline in importance so as to not meet the criteria as a major industrial center by the year 2010. These two centers, Milwaukee-south and West Allis-east, are both located in Milwaukee County (see Map A-2).

There were 27 existing major outdoor recreation centers and seven special-use outdoor recreation centers in the Region in 1985. As indicated in Table A-12, it is envisioned that four additional major outdoor recreation centers would be provided in the Region under both the existing trends urban sprawl alternative and the adopted 2010 regional land use plan. These centers would be located in the Village of Pleasant Prairie in Kenosha County, in the Town of Sugar Creek in Walworth County, in the Town of West Bend in Washington County, and in the City of Brookfield in Waukesha County.

## Table A-11

**EXISTING AND PROPOSED MAJOR INDUSTRIAL CENTERS IN THE REGION: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE**

| County | Major Industrial Center | Existing 1985 | 2010 Adopted Plan | 2010 Existing Trends Urban Sprawl Alternative |
|---|---|---|---|---|
| Kenosha | Kenosha | X | X | X |
| | Pleasant Prairie | - - | X | X |
| Milwaukee | Cudahy-South Milwaukee | X | X | X |
| | Milwaukee-Glendale | X | X | X |
| | Milwaukee-Granville | X | X | X |
| | Milwaukee-Menomonee Valley east | X | X | X |
| | Milwaukee-Menomonee Valley west | X | X | X |
| | Milwaukee-near north | X | X | X |
| | Milwaukee-near south | X | X | X |
| | Milwaukee-north | X | X | X |
| | Milwaukee-south | X | X | - - |
| | Oak Creek | X | X | X |
| | West Allis-east | X | X | - - |
| | West Allis-west | X | X | X |
| | West Milwaukee | X | X | X |
| Racine | Burlington | - - | X | X |
| | Mt. Pleasant | X | X | X |
| | Racine-east | X | X | X |
| Washington | Hartford | - - | X | X |
| | West Bend-north | X | X | X |
| Waukesha | Butler | X | X | X |
| | New Berlin | X | X | X |
| | Pewaukee | X | X | X |
| | Waukesha-north | X | X | X |
| | Waukesha-south | X | X | X |

NOTE: To qualify as a major industrial center, a site must accommodate at least 3,500 industrial jobs.

*Source: SEWRPC.*

## Table A-12

**EXISTING AND PROPOSED MAJOR OUTDOOR RECREATION CENTERS IN THE REGION: 1985, 2010 ADOPTED LAND USE PLAN, AND 2010 EXISTING TRENDS URBAN SPRAWL ALTERNATIVE**

| County | Major Outdoor Recreation Center | Existing 1985 | | 2010 Adopted Plan | | 2010 Existing Trends Urban Sprawl Alternative | |
|---|---|---|---|---|---|---|---|
| | | Park | Special-Use Site | Park | Special-Use Site | Park | Special-Use Site |
| Kenosha | Bong Recreation Area | - - | X | - - | X | - - | X |
| | Brighton Dale | X | - - | X | - - | X | - - |
| | Petrifying Springs | X | - - | X | - - | X | - - |
| | Pleasant Prairie | - - | - - | X | - - | X | - - |
| | Silver Lake | X | - - | X | - - | X | - - |
| Milwaukee | Bender | X[a] | - - | X | - - | X | - - |
| | Brown Deer | X | - - | X | - - | X | - - |
| | Dretzka | X | - - | X | - - | X | - - |
| | Greenfield | X | - - | X | - - | X | - - |
| | Lake Michigan-north | X | - - | X | - - | X | - - |
| | Lake Michigan-south | X | - - | X | - - | X | - - |
| | Lincoln | X | - - | X | - - | X | - - |
| | Maier Festival Park | - - | X | - - | X | - - | X |
| | Milwaukee County Stadium | - - | X | - - | X | - - | X |
| | Milwaukee County Zoo | - - | X | - - | X | - - | X |
| | Mitchell Conservatory | - - | X | - - | X | - - | X |
| | Oakwood | X | - - | X | - - | X | - - |
| | State Fair Park | - - | X | - - | X | - - | X |
| | Whitnall | X | - - | X | - - | X | - - |
| Ozaukee | Harrington Beach | X | - - | X | - - | X | - - |
| | Hawthorne Hills | X | - - | X | - - | X | - - |
| | Mee-Kwon | X | - - | X | - - | X | - - |
| Racine | Cliffside | X | - - | X | - - | X | - - |
| | Ela | X[a] | - - | X | - - | X | - - |
| | Johnson | X | - - | X | - - | X | - - |
| Walworth | Big Foot Beach | X | - - | X | - - | X | - - |
| | Sugar Creek | - - | - - | X | - - | X | - - |
| | Whitewater Lake | X | - - | X | - - | X | - - |
| Washington | Paradise Valley | - - | - - | X | - - | X | - - |
| | Pike Lake | X | - - | X | - - | X | - - |
| Waukesha | Menomonee | X | - - | X | - - | X | - - |
| | Minooka | X | - - | X | - - | X | - - |
| | Mitchell | - - | - - | X | - - | X | - - |
| | Monches | X[a] | - - | X | - - | X | - - |
| | Mukwonago | X | - - | X | - - | X | - - |
| | Naga-Waukee | X | - - | X | - - | X | - - |
| | Old World Wisconsin | - - | X | - - | X | - - | X |
| | Ottawa Lake | X | - - | X | - - | X | - - |

[a]*Site substantially acquired but not yet developed for recreational use in 1985.*

*Source: SEWRPC.*

# Appendix B

## CONSIDERATION IN THE REGIONAL TRANSPORTATION SYSTEM PLANNING PROCESS FOR SOUTHEASTERN WISCONSIN OF THE FIFTEEN SPECIFIC METROPOLITAN PLANNING CONSIDERATIONS SET FORTH IN THE FEDERAL INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT (ISTEA)

| Federal ISTEA Metropolitan Planning Consideration | | |
|---|---|---|
| Number | Description | Consideration in SEWRPC Planning Process |
| 1 | Preservation of existing transportation facilities and, where practical, ways to meet transportation needs by using existing transportation facilities more efficiently | The planning process emphasized the full and efficient use of existing transportation facilities and also explicitly identified the resources needed to preserve existing transportation facilities. In addressing existing and potential future traffic congestion, full consideration was given to strategies to obtain greater efficiency from existing transportation facilities, including intersection improvement and channelization, traffic signalization and signal progression, removal of on-street parking during peak travel periods, and freeway traffic management, including ramp metering and high-occupancy vehicle (HOV) bypasses of ramp meters. These transportation system management actions were incorporated in the regional transportation system plan prior to consideration of any highway system capacity improvement and expansion. With respect to consideration of the costs attendant to the preservation of the existing transportation system, the financial analysis of the recommended plan explicitly estimated the costs associated with the resurfacing and reconstruction of existing highway facilities and the rehabilitation and replacement of existing transit facilities |
| 2 | The consistency of transportation planning with applicable Federal, State, and local energy conservation programs, goals, and objectives | The energy use implications of the transportation system were explicitly considered in the planning process. An objective and standard utilized in the design and evaluation of alternative transportation system plans was the minimization of the energy use attendant to transportation systems. The recommended transportation system plan may be expected to result in a reduction in energy use compared to a "no-build" alternative. The plan recommends actions expected to result in an increase in carpooling, vanpooling, and transit use, including significantly improved and expanded transit services and actions such as freeway ramp meter HOV bypasses, which provide preferential treatment to high-occupancy vehicles. In addition, the transportation system plan is designed to serve an adopted regional land use plan, which proposes a compact, energy-efficient, urban development pattern |
| 3 | The need to relieve congestion and avoid congestion where it does not yet occur | The planning process explicitly addressed the need to relieve existing and potential future traffic congestion. One of the planning objectives and standards utilized in the design and evaluation of alternative transportation system plans was the need to facilitate traffic flow by relieving existing and future traffic congestion. Inventories and analyses were conducted to identify existing levels of traffic congestion and historic trends in levels of traffic congestion. One of the measures utilized in the evaluation of alternative transportation system plans was the level of traffic congestion under each plan. The development of the recommended transportation system plan explicitly considered the potential for land use, travel demand management, traffic management, and public transit measures to reduce traffic congestion prior to any consideration of highway improvement and expansion. Highway capacity improvement and expansion was considered as a measure of last resort in addressing traffic congestion problems. The final recommended transportation system plan included travel demand management, traffic management, land use, public transit, and highway capacity improvement and expansion actions as measures to address identified existing and projected future traffic congestion. The recommended transportation system plan is projected to provide substantial reduction in traffic congestion with respect to both existing levels of traffic congestion and projected future traffic congestion under a "no-build" transportation system plan alternative |

| Federal ISTEA Metropolitan Planning Consideration | | |
|---|---|---|
| Number | Description | Consideration in SEWRPC Planning Process |
| 4 | The probable effect of transportation policy decisions on land use and development and the consistency of transportation plans and programs with the provisions of all applicable short- and long-term land use and development plans | The planning process results in a transportation system plan which is fully consistent with land use and development plans as the transportation system plan is designed to serve the adopted regional land use plan and not to forecast land use trends. The transportation system plan therefore serves to promote the implementation of the adopted long-range regional land use plan, which is cooperatively developed with local units of government within Southeastern Wisconsin. The planning process also provides for the assessment of the probable effect of the transportation system plan on land use through the evaluation under the recommended plan and all alternative plans of the relative accessibility provided by the plans throughout Southeastern Wisconsin and the comparison of that accessibility to the proposed development pattern contained within the adopted regional land use plan. The accessibility as provided by the transportation system plan is reviewed with respect to both highway and transit elements of the transportation system |
| 5 | The programming of expenditures on transportation enhancement activities | The bicycle and pedestrian system element of the regional transportation system plan is documented in SEWRPC Planning Report No. 43, A Regional Bicycle and Pedestrian Facilities System Plan for Southeastern Wisconsin: 2010. This plan element provides recommendations for the development of bicycle ways and routes and pedestrian facilities which would provide transportation system enhancement and as well assist in meeting future transportation needs |
| 6 | The effects of all transportation projects to be undertaken within the metropolitan area, without regard to whether such projects are publicly funded | The transportation planning process has identified and considered the implications of all transportation projects which may affect the regional transportation system within Southeastern Wisconsin, including all arterial highway capacity improvement and expansion projects, all urban transit improvement and expansion projects, all travel demand management, and all traffic management projects |
| 7 | International border crossings and access to ports, airports, intermodal transportation facilities, major freight distribution routes, national parks, recreation areas, monuments and historic sites, and military installations | The planning process and the recommended transportation system plan explicitly considered the need to provide appropriate transportation service to, and the transportation system implications of, these facilities as appropriate to Southeastern Wisconsin, including ports, particularly the City of Milwaukee Port; airports, particularly General Mitchell International Airport, but also general aviation airports, including both public and privately-owned airports; intermodal transportation facilities for freight and passenger travel; regional parks and recreation areas, historic sites, and military installations. The plan also addressed the needs of freight distribution with respect to both intraregional freight travel and interregional freight traffic |
| 8 | The need for connectivity of roads within the metropolitan area with roads outside the metropolitan area | The planning process and the recommended plan provide for the connectivity of arterial facilities both within Southeastern Wisconsin and between Southeastern Wisconsin and adjacent areas. For such connections along the southern boundary of the Region coordination was achieved by coordinating the regional transportation system plan in Southeastern Wisconsin with that plan as prepared by the Chicago Area Transportation Study, which is the Metropolitan Planning Organization for those counties lying to the south of Southeastern Wisconsin in the State of Illinois. Connectivity of the arterial street system with respect to counties to the west and north of the Southeastern Wisconsin Region boundary was addressed by coordinating the regional system plan of Southeastern Wisconsin with the Wisconsin Department of Transportation to provide for the connectivity of the State trunk highway system, including proposed improvements on that system at the region boundary, including the STH 16 bypass and the USH 12 freeway and the USH 41 freeway. The Wisconsin Department of Transportation also provided coordination with respect to arterial county trunk highway connections across the Region boundary |

| Federal ISTEA Metropolitan Planning Consideration | | |
|---|---|---|
| Number | Description | Consideration in SEWRPC Planning Process |
| 9 | Transportation needs identified through use of the management systems required by ISTEA | The planning process has been designed to provide those elements of the congestion management system for Southeastern Wisconsin which would provide the definition of performance indicators to measure congestion, the identification of existing and future congestion problems, the definition and evaluation of alternative congestion resolution actions, and the recommendation of strategies to address existing and future congestion. The planning process explicitly considered highway capacity improvement and expansion as a last resort in addressing such congestion problems. The other management systems of pavement, bridges, safety, public transportation and intermodal transportation will be developed in the future by the Wisconsin Department of Transportation in cooperation with the Regional Planning Commission and will be incorporated, as appropriate, into future regional transportation system plans |
| 10 | Preservation of rights-of-way for construction of future transportation projects, including identification of unused rights-of-way which may be needed for future transportation corridors and identification of those corridors for which action is most needed to prevent destruction or loss | The recommended transportation system plan identifies the conceptual design and alignment of proposed new arterial street and highway and public transit facilities. Such recommended conceptual design and alignment provides sufficient information for local units of government and State government to preserve rights-of-way for such future projects in advance of the conduct of preliminary engineering studies for such highway and transit facilities |
| 11 | Methods to enhance the efficient movement of freight | The recommended transportation system plan considered in great detail the intraregional movement of freight, which is largely by truck. Inventories were conducted of intraregional truck travel through a survey of registered trucks within Southeastern Wisconsin and analyses were conducted of truck trip characteristics, travel patterns, and facility utilization. In addition, the transportation system plan included actions to address existing congestion problems and potential future congestion problems, which actions should enhance the movement of both freight and passenger travel. In addition, with respect to interregional freight movement, the SEWRPC plan is fully coordinated with the Statewide transportation system plan being developed by the Wisconsin Department of Transportation with respect to inventories and forecasts of interregional freight traffic |
| 12 | The use of life-cycle costs in the design and engineering of bridges, tunnels, or pavement | The planning process considered both capital costs and operating and maintenance costs of both highway and transit system elements of the regional transportation system plan. The costs of constructing new highway system projects were considered, along with the necessary costs of resurfacing and reconstructing existing pavements. In addition, annual operating and maintenance costs attendant to both the highway system and the transit system were considered in preparing the estimated costs of the recommended plan and its alternatives |
| 13 | The overall social, economic, energy, and environmental effects of transportation decisions | The planning process explicitly considered the overall social, economic, energy, and environmental effects of transportation decisions and alternatives. A number of the objectives and standards developed to guide the design and evaluation of the alternative transportation system plans addressed the social, economic, energy, and environmental implications of transportation actions. The alternative transportation system plans which were defined as part of the planning process were each evaluated according to their achievement of the defined objectives and standards, which included their social, economic, energy and environmental impacts. A systems-level environmental assessment of the recommended regional transportation system plan was also conducted, which addressed its social, economic, energy, and environmental impacts |

| Federal ISTEA Metropolitan Planning Consideration | | |
|---|---|---|
| Number | Description | Consideration in SEWRPC Planning Process |
| 14 | Methods to expand and enhance transit services and to increase the use of such services | The planning process considered alternative means to expand and enhance transit services and to increase the use of such services. Alternatives considered a wide range of potential transit service improvement and expansion, including expansion of rapid, express, and local transit services. In addition, the potential of travel demand management measures, including preferential treatment for freeway access, reserved street lanes, fixed guideways, and pricing measures to increase transit use, were all evaluated under the planning process. The recommended regional transportation system plan includes a 75 percent expansion in transit vehicle-miles of service, including the development of rapid and express transit services and the expansion of existing local transit service. Service improvement and expansion includes extension of service to areas not currently served, improvement of existing service through increased frequency of service and improved speed of service by limiting service stops and through development of fixed guideways and preferential treatment of transit |
| 15 | Capital investments that would result in increased security in transit systems | The recommended transportation system plan does not explicitly include any capital investments which would result in increased security in transit systems. The Advisory Committee guiding the preparation of the plan, which includes existing transit operators in the Region and existing local units of government served by public transit, could not identify specific measures to provide such increased security which should be incorporated in the transit system. The transit element of the recommended transportation system plan, however, does include a number of measures which should enhance system security, including improved frequency of transit service; the development of limited-stop transit service, which should concentrate transit activity at a more limited number of stops; and an increase in transit ridership |

*Source: SEWRPC.*

# Appendix C

## ACCESSIBILITY PROVIDED TO EMPLOYMENT OPPORTUNITIES AND MAJOR ACTIVITY CENTERS THROUGH TRAVEL ON ARTERIAL STREETS AND HIGHWAYS AND PUBLIC TRANSIT IN THE REGION IN 2010 UNDER THE NO-BUILD ALTERNATIVE AND ALTERNATIVE PLANS 1 AND 3

### Table C-1

### URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON ARTERIAL STREETS AND HIGHWAYS: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLANS

| Urbanized Area and Activity Center | Urbanized Area Population | | Urbanized Area Population Meeting Travel Time Standard on Arterial Streets and Highways | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Base Year 1991 | | Proposed 2010 | | | | | |
| | | | | | No-Build Transportation System Plan | | Alternative Plan 1 | | Alternative Plan 3 | |
| | Existing 1991 | 2010 | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kenosha Urbanized Area | 94,300 | 107,300 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related[a] | - - | - - | 90,900 | 96.4 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Major Retail-Service[b] | - - | - - | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Medical Facility[c] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Major Park[d] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Higher-Education Facility[e] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Scheduled Air Transport[f] | - - | - - | 94,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 | 107,300 | 100.0 |
| Milwaukee Urbanized Area | 1,226,300 | 1,277,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 1,147,900 | 93.6 | 1,180,500 | 92.4 | 1,230,800 | 94.3 | 1,230,800 | 94.3 |
| Major Retail-Service | - - | - - | 1,161,400 | 94.7 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Medical Facility | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Major Park | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Higher-Education Facility | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Scheduled Air Transport | - - | - - | 1,226,300 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 1,277,100 | 100.0 |
| Racine Urbanized Area | 121,800 | 132,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Major Retail-Service | - - | - - | 32,200 | 86.4 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Medical Facility | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Major Park | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Higher-Education Facility | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |
| Scheduled Air Transport | - - | - - | 121,800 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 | 132,100 | 100.0 |

[a] *Standard: 30 minutes' overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes' overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

*Source: SEWRPC.*

Table C-2

**URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON TRANSIT: 1991 AND 2010 ALTERNATIVE TRANSPORTATION SYSTEM PLANS**

| Urbanized Area and Activity Center | Urbanized Area Population | | Urbanized Area Population Meeting Travel Time Standard on Transit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Proposed 2010 | | | | | |
| | | | Base Year 1991 | | No-Build Transportation System Plan | | Alternative Plan 1 | | Alternative Plan 3 | |
| | Base Year 1991 | 2010 | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kenosha Urbanized Area | 94,300 | 107,300 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related[a] | - - | - - | 58,000 | 61.5 | 51,400 | 47.9 | 97,700 | 91.1 | 53,200 | 49.6 |
| Major Retail-Service[b] | - - | - - | 0 | 0.0 | 1,400 | 1.3 | 9,500 | 8.9 | 1,400 | 1.3 |
| Medical Facility[c] | - - | - - | 60,600 | 64.3 | 53,300 | 49.7 | 63,600 | 59.3 | 53,300 | 49.7 |
| Major Park[d] | - - | - - | 12,600 | 13.4 | 20,700 | 19.3 | 77,500 | 72.2 | 24,700 | 23.0 |
| Higher-Education Facility[e] | - - | - - | 33,200 | 35.2 | 51,400 | 47.9 | 80,800 | 75.3 | 68,100 | 63.5 |
| Scheduled Air Transport[f] | - - | - - | 0 | 0.0 | 0 | 0.0 | 51,900 | 48.4 | 51,900 | 48.4 |
| Milwaukee Urbanized Area | 1,226,300 | 1,277,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 14,200 | 1.2 | 600 | 0.0 | 619,900 | 48.5 | 243,600 | 19.1 |
| Major Retail-Service[g] | - - | - - | 10,100 | 0.8 | 35,300 | 2.8 | 282,800 | 22.1 | 66,200 | 5.2 |
| Medical Facility | - - | - - | 700,400 | 57.1 | 648,000 | 50.7 | 870,200 | 68.1 | 728,900 | 57.1 |
| Major Park | - - | - - | 636,300 | 51.9 | 617,300 | 48.3 | 994,200 | 77.8 | 701,000 | 54.9 |
| Higher-Education Facility | - - | - - | 775,700 | 63.2 | 740,900 | 58.0 | 1,168,000 | 91.5 | 931,900 | 73.0 |
| Scheduled Air Transport | - - | - - | 338,600 | 27.6 | 316,800 | 24.8 | 776,800 | 60.8 | 569,400 | 44.6 |
| Racine Urbanized Area | 121,800 | 132,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | - - | 59,100 | 48.5 | 56,400 | 42.7 | 107,500 | 81.4 | 94,400 | 71.5 |
| Major Retail-Service | - - | - - | 21,500 | 17.7 | 18,300 | 13.9 | 52,500 | 29.7 | 32,100 | 24.3 |
| Medical Facility | - - | - - | 53,700 | 44.1 | 46,700 | 35.4 | 61,300 | 46.4 | 49,200 | 37.2 |
| Major Park | - - | - - | 24,000 | 19.7 | 37,000 | 28.0 | 59,800 | 45.3 | 38,300 | 29.0 |
| Higher-Education Facility | - - | - - | 79,600 | 65.4 | 88,400 | 66.9 | 110,700 | 83.8 | 102,700 | 77.7 |
| Scheduled Air Transport | - - | - - | 18,300 | 15.0 | 18,600 | 14.1 | 63,800 | 48.3 | 60,100 | 45.5 |

[a]*Standard: 45 minutes' overall travel time of 40 percent of urbanized area employment opportunities.*

[b]*Standard: 35 minutes' overall travel time of one major retail and service center.*

[c]*Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d]*Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e]*Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

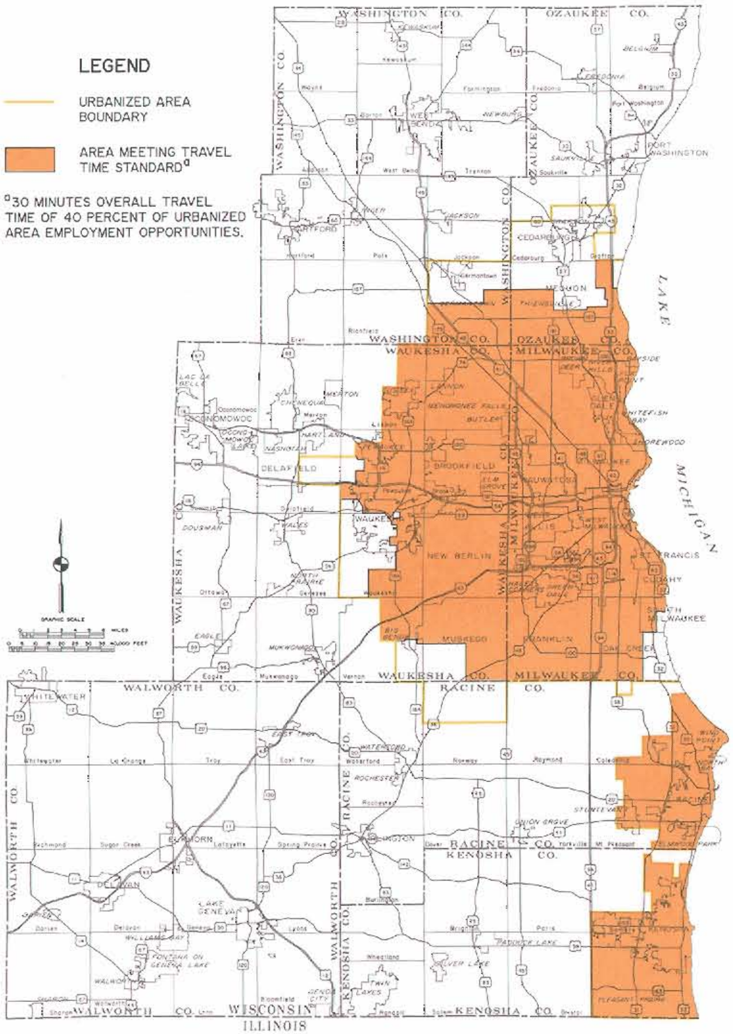
[f]*Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

[g]*Standard: 35 minutes' overall travel time of three major retail and service centers.*

*Source: SEWRPC.*

## Map C-1

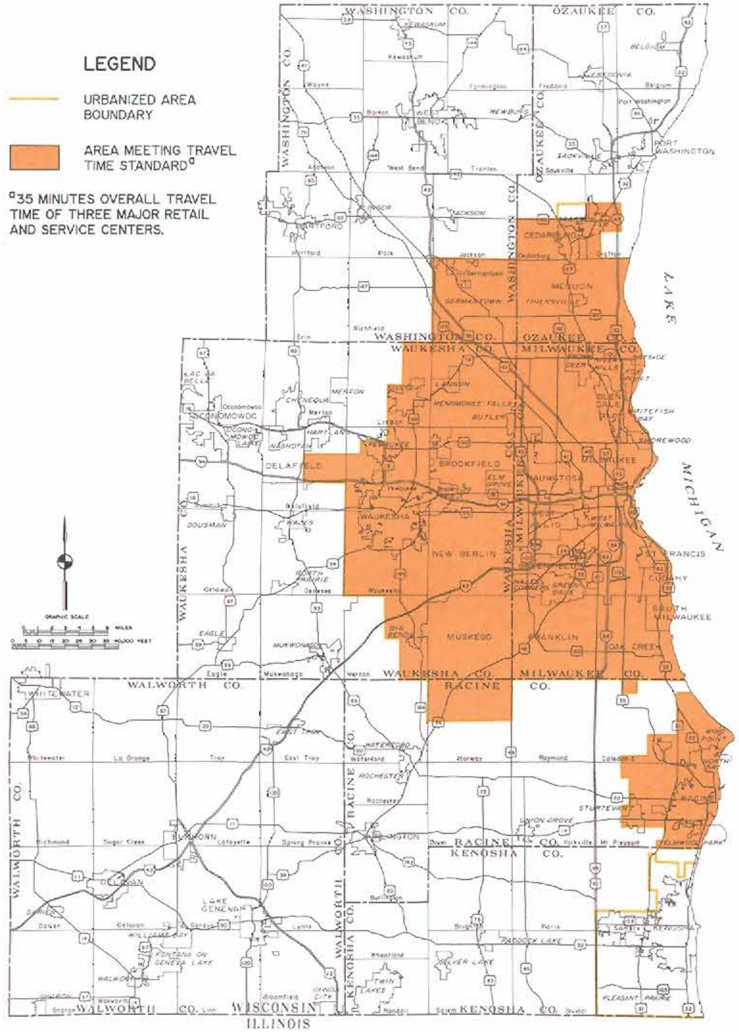
### AREAS MEETING THE TRAVEL TIME STANDARD FOR EMPLOYMENT BY ARTERIAL STREET AND HIGHWAY: 2010 NO-BUILD ALTERNATIVE PLAN




Source: SEWRPC.

## Map C-2

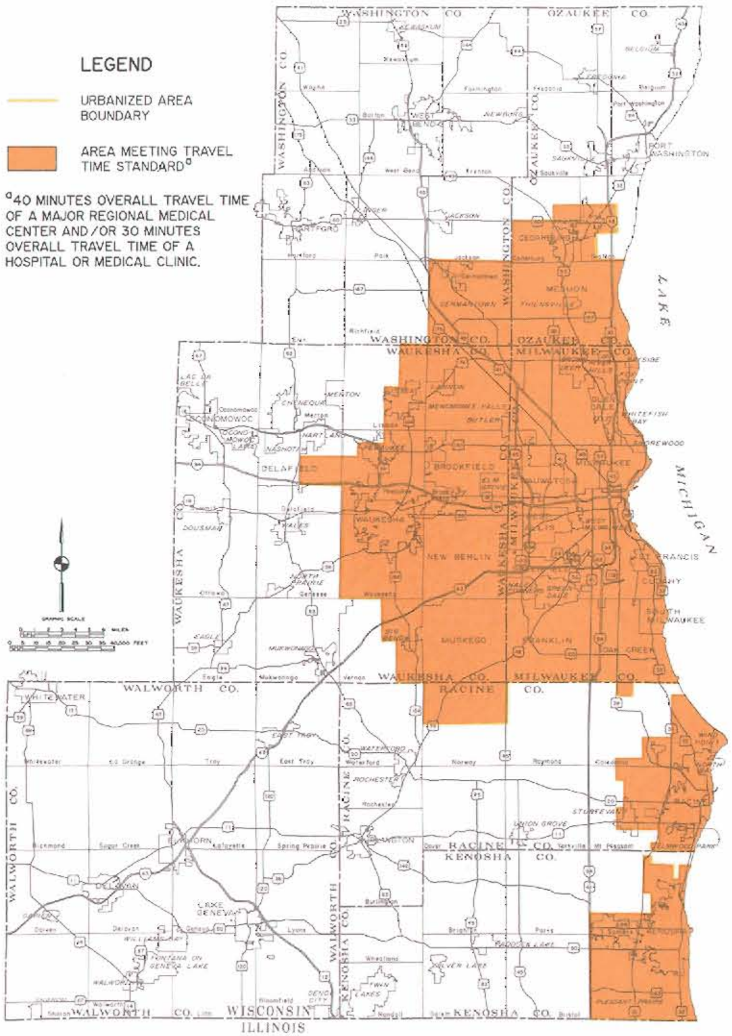
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RETAIL AND SERVICE CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 NO-BUILD ALTERNATIVE PLAN




Source: SEWRPC.

## Map C-3

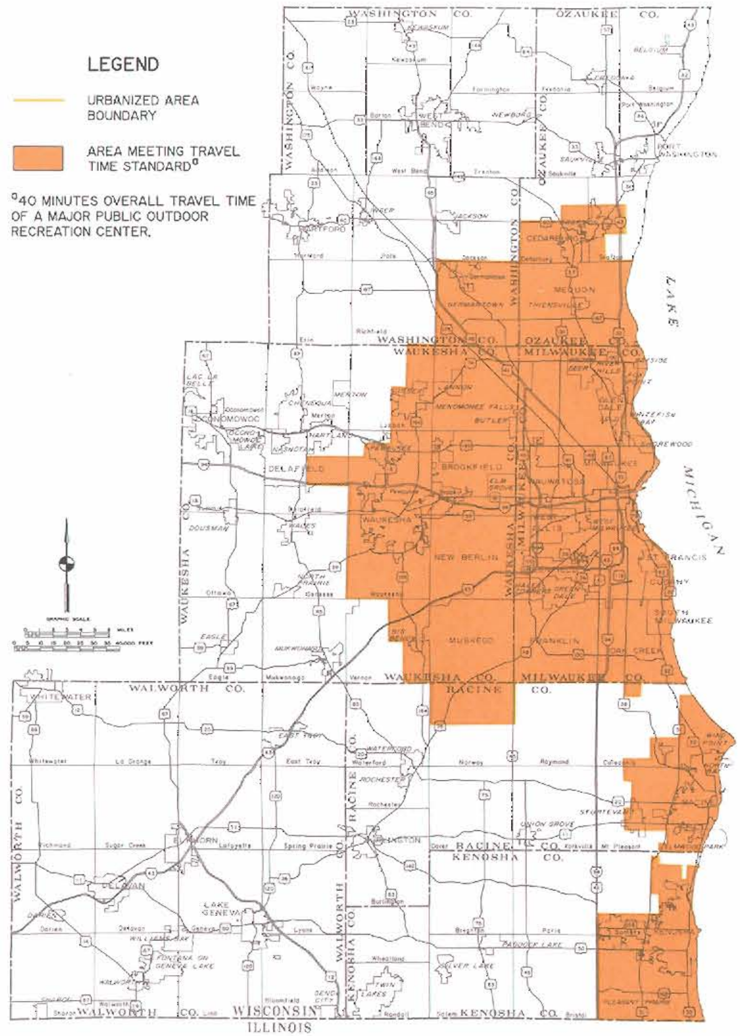
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR MEDICAL CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 NO-BUILD ALTERNATIVE PLAN




*Source: SEWRPC.*

## Map C-4

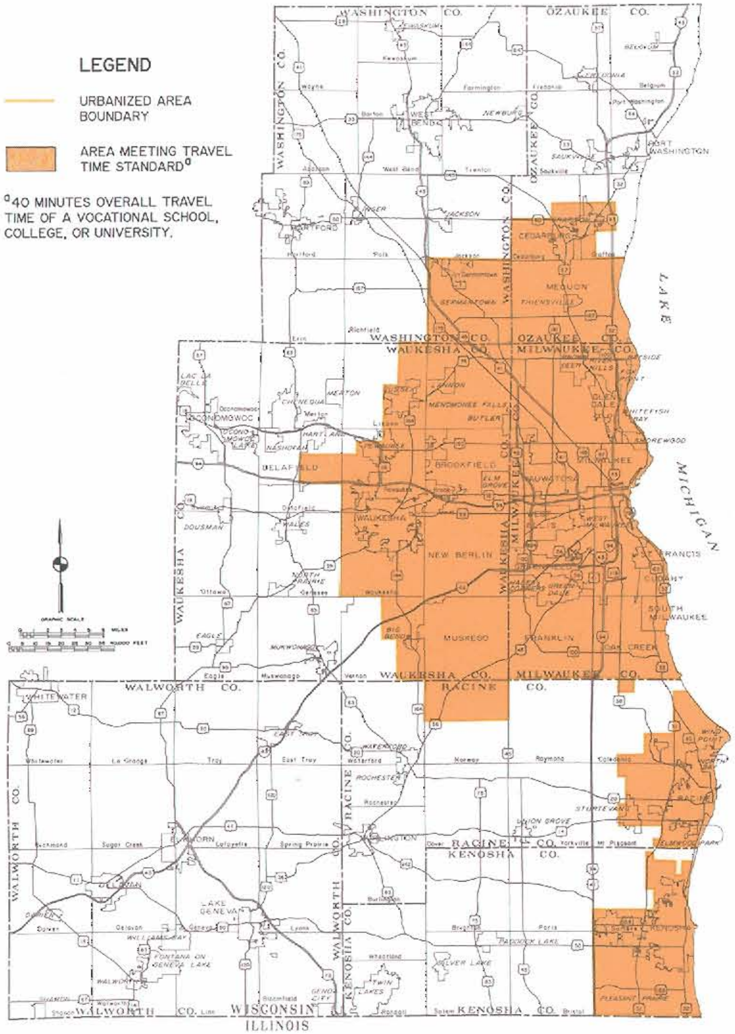
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RECREATION CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 NO-BUILD ALTERNATIVE PLAN




*Source: SEWRPC.*

## Map C-5

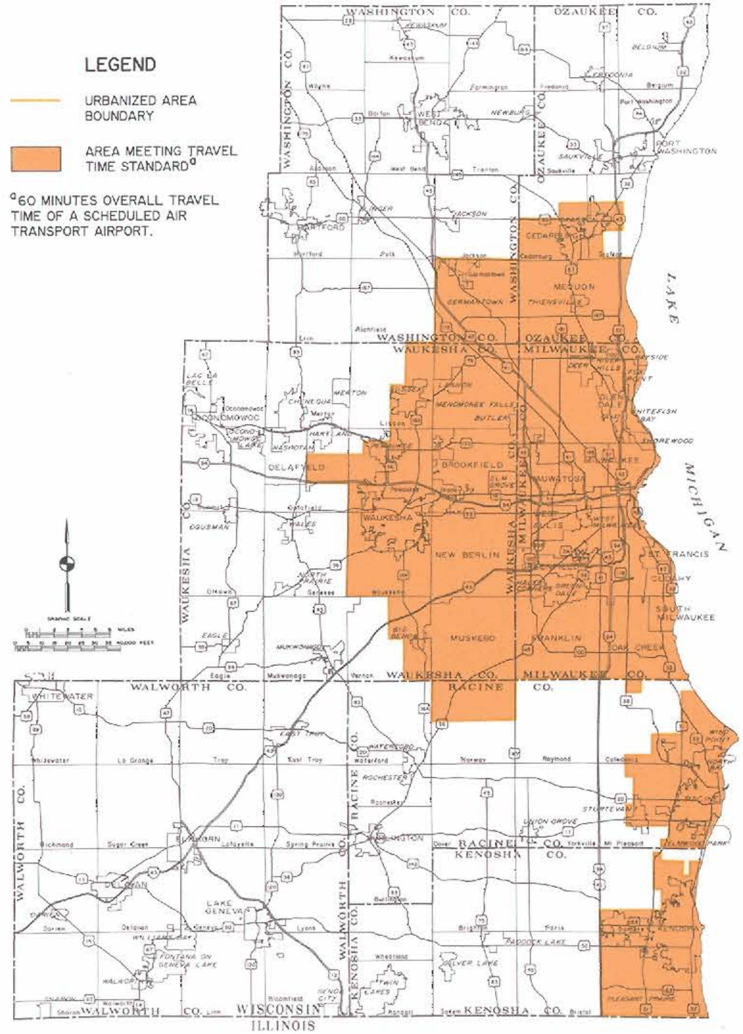
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR EDUCATIONAL CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 NO-BUILD ALTERNATIVE PLAN




Source: SEWRPC.

## Map C-6

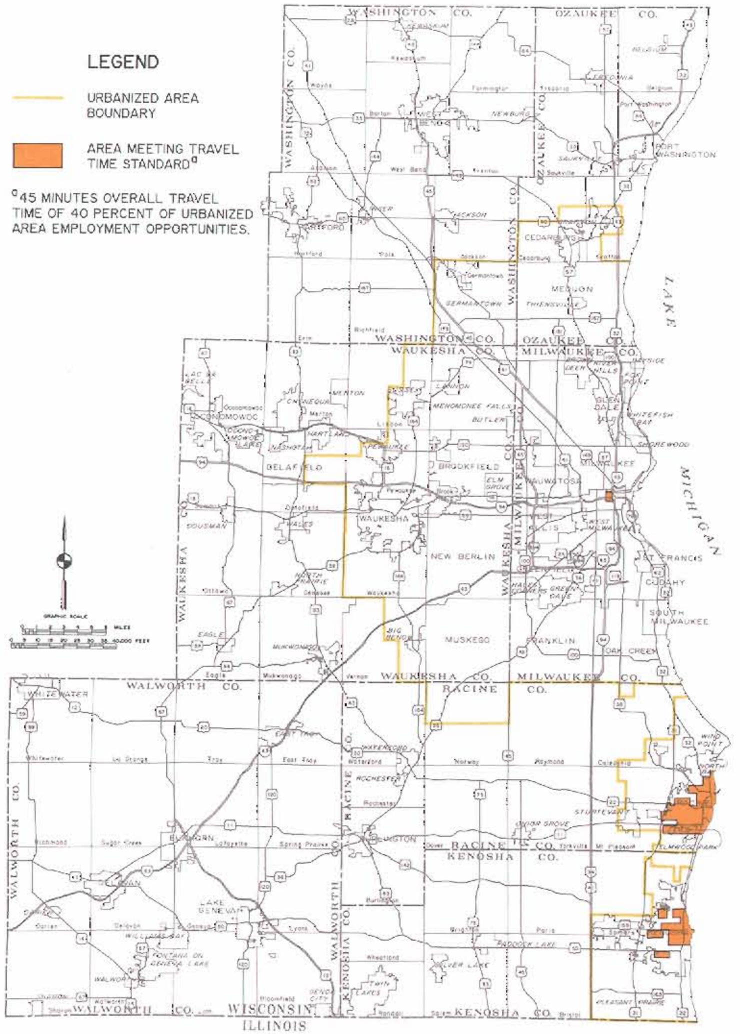
### AREAS MEETING THE TRAVEL TIME STANDARD FOR SCHEDULED AIR TRANSPORT TERMINALS BY ARTERIAL STREET AND HIGHWAY: 2010 NO-BUILD ALTERNATIVE PLAN




Source: SEWRPC.

## Map C-7

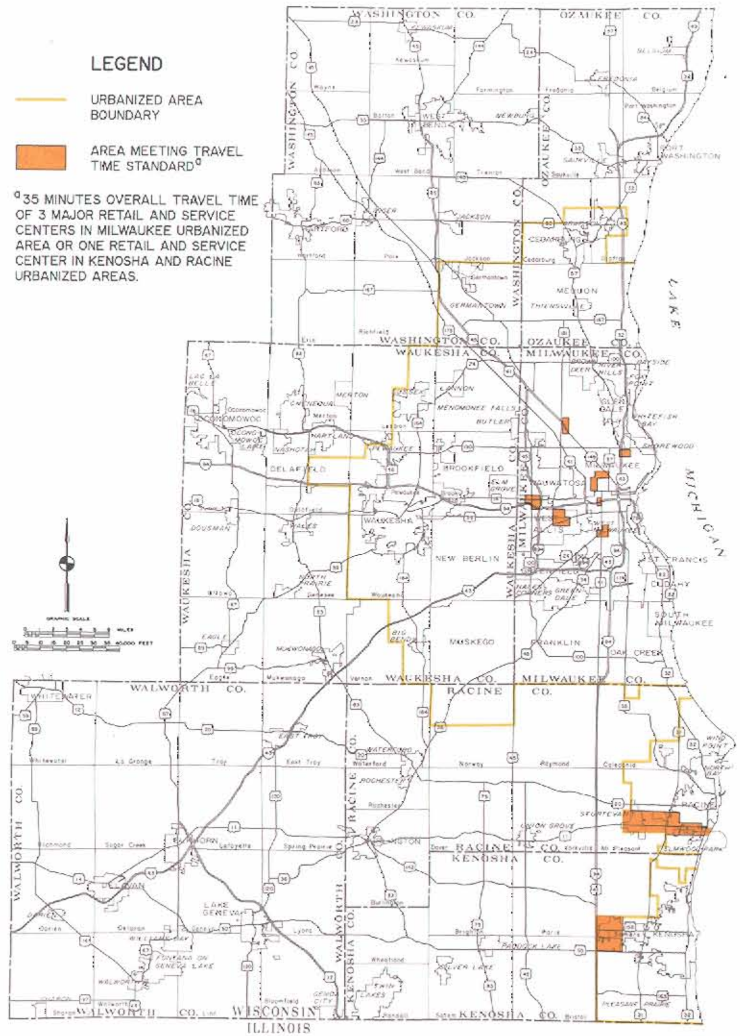
### AREAS MEETING THE TRAVEL TIME STANDARD FOR EMPLOYMENT BY TRANSIT: 2010 NO-BUILD ALTERNATIVE PLAN




Source: SEWRPC.

## Map C-8

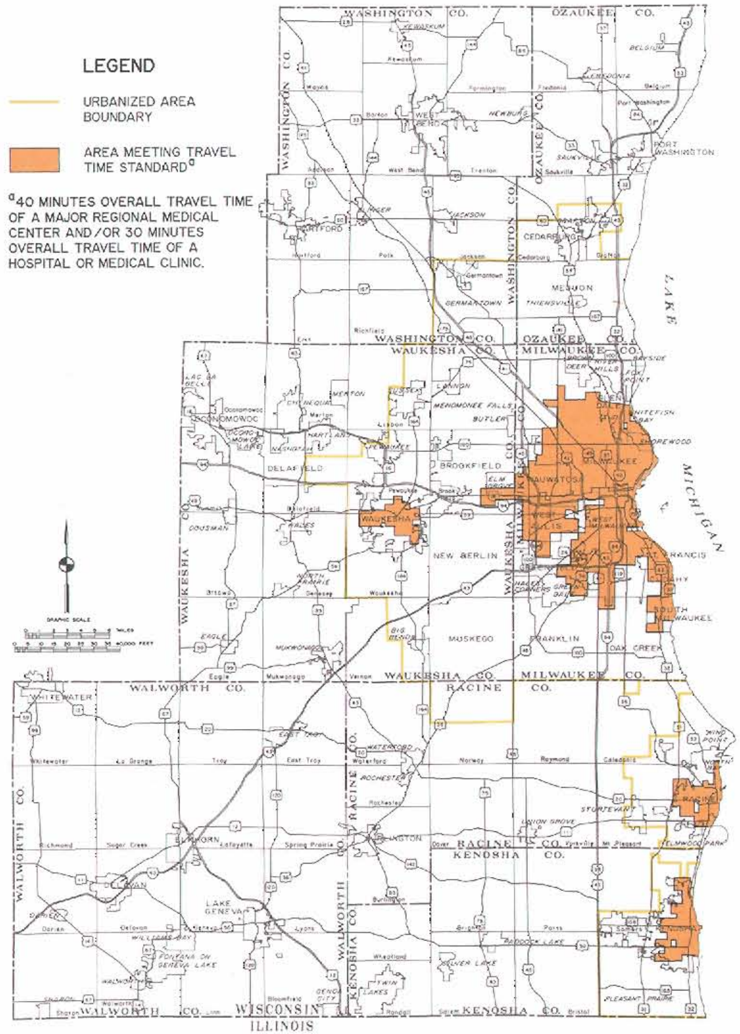
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RETAIL AND SERVICE CENTERS BY TRANSIT: 2010 NO-BUILD ALTERNATIVE PLAN




Source: SEWRPC.

## Map C-9

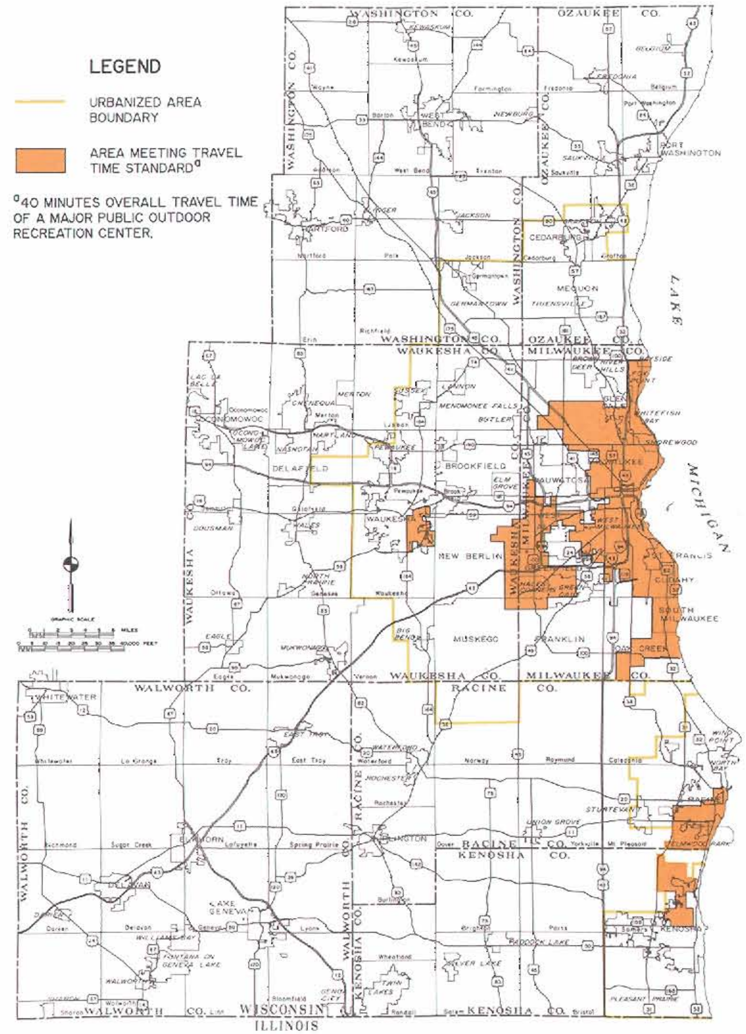
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR MEDICAL CENTERS BY TRANSIT: 2010 NO-BUILD ALTERNATIVE PLAN




*Source: SEWRPC.*

## Map C-10

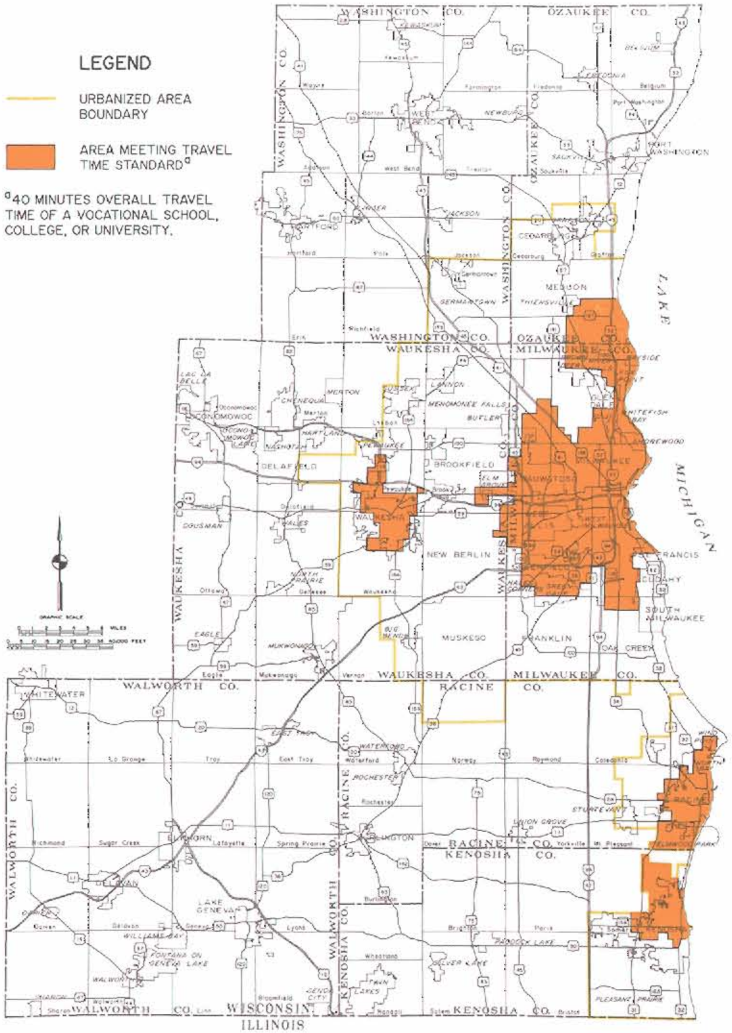
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RECREATION CENTERS BY TRANSIT: 2010 NO-BUILD ALTERNATIVE PLAN




*Source: SEWRPC.*

## Map C-11

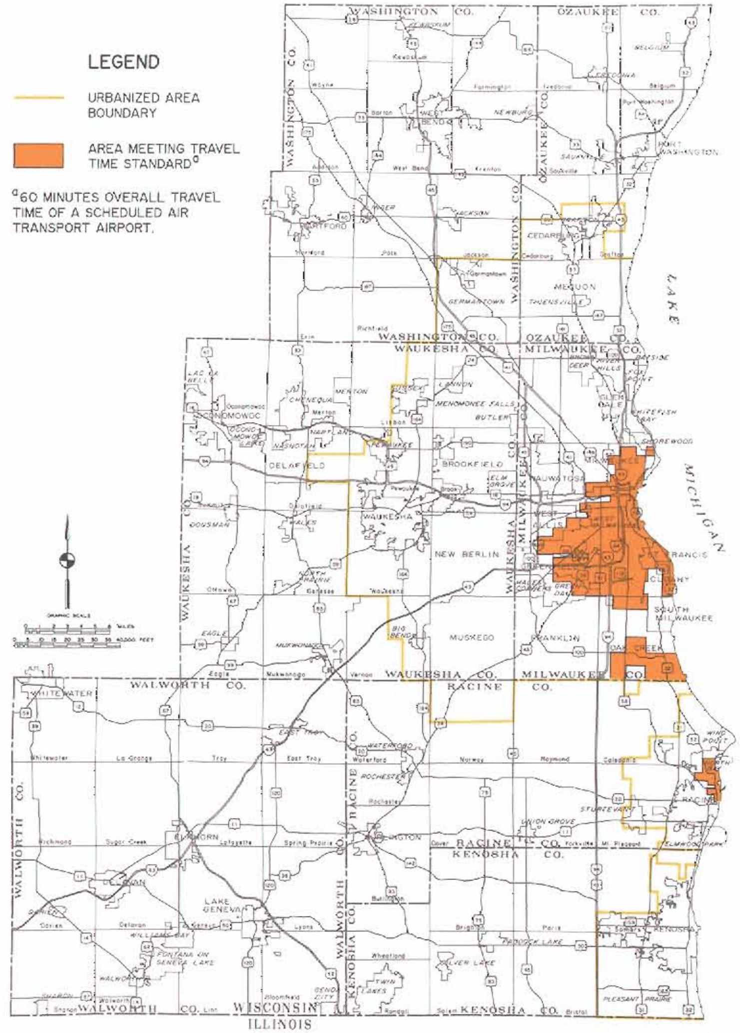
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR EDUCATIONAL CENTERS BY TRANSIT: 2010 NO-BUILD ALTERNATIVE PLAN




*Source: SEWRPC.*

## Map C-12

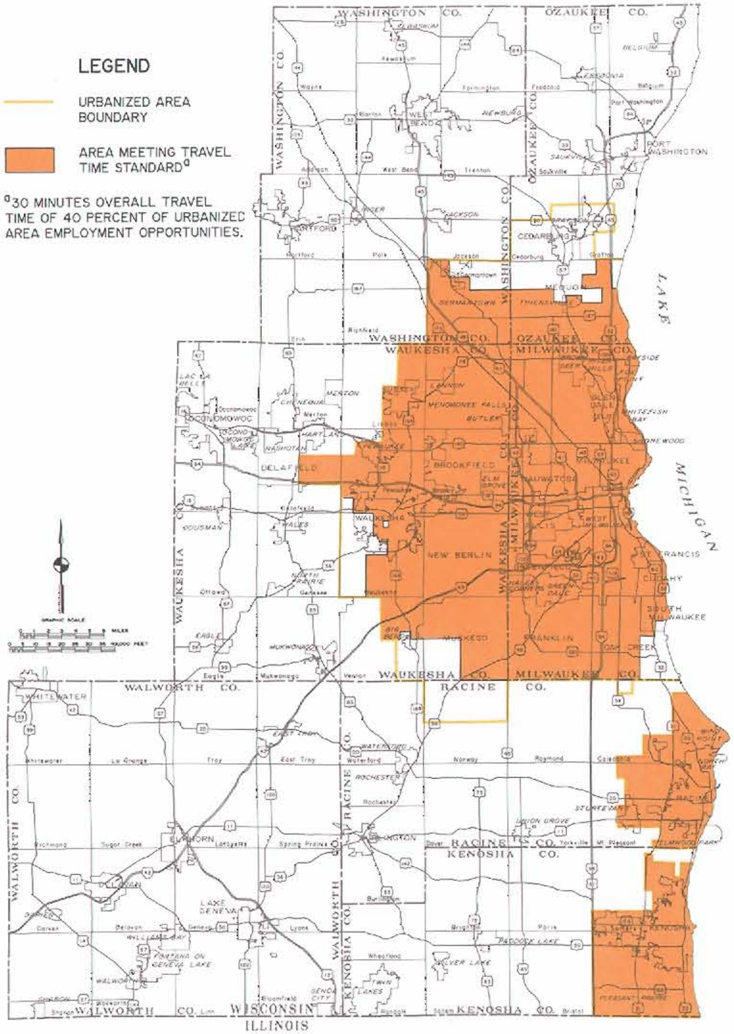
### AREAS MEETING THE TRAVEL TIME STANDARD FOR SCHEDULED AIR TRANSPORT TERMINALS BY TRANSIT: 2010 NO-BUILD ALTERNATIVE PLAN




*Source: SEWRPC.*

## Map C-13

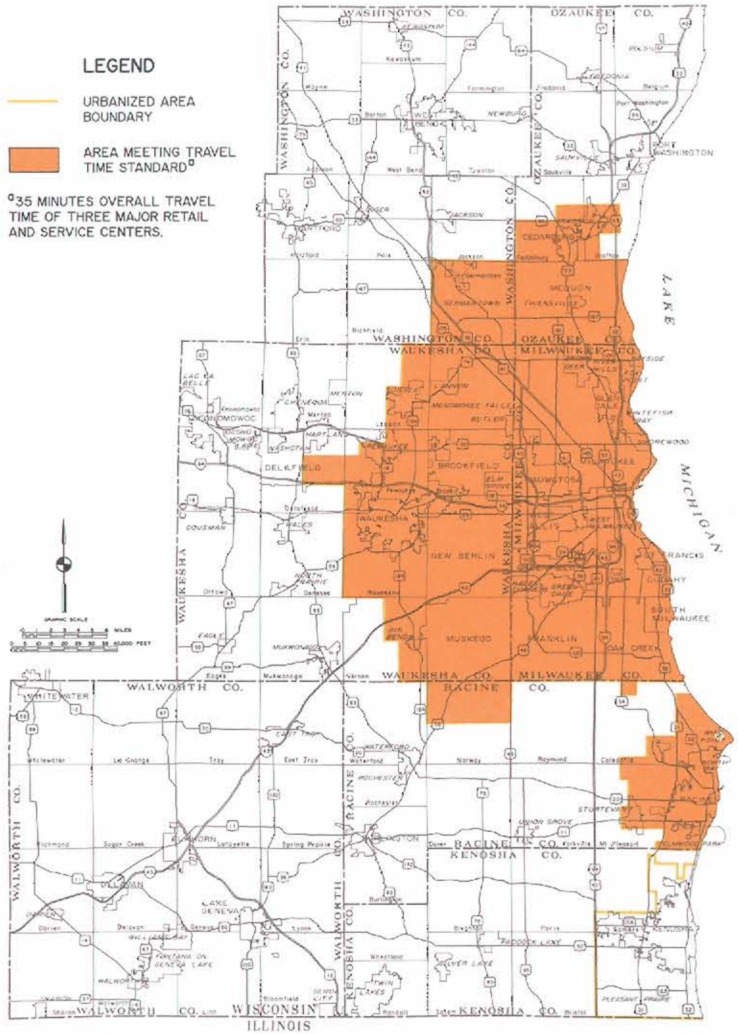
### AREAS MEETING THE TRAVEL TIME STANDARD FOR EMPLOYMENT BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 1




*Source: SEWRPC.*

## Map C-14

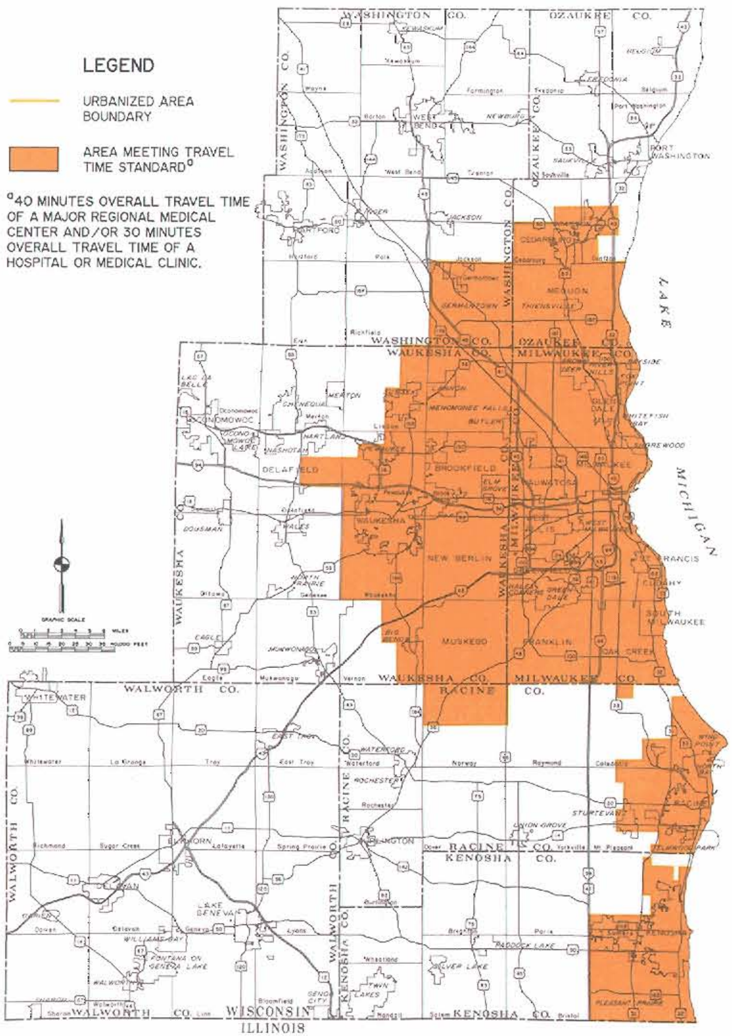
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RETAIL AND SERVICE CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 1




*Source: SEWRPC.*

## Map C-15

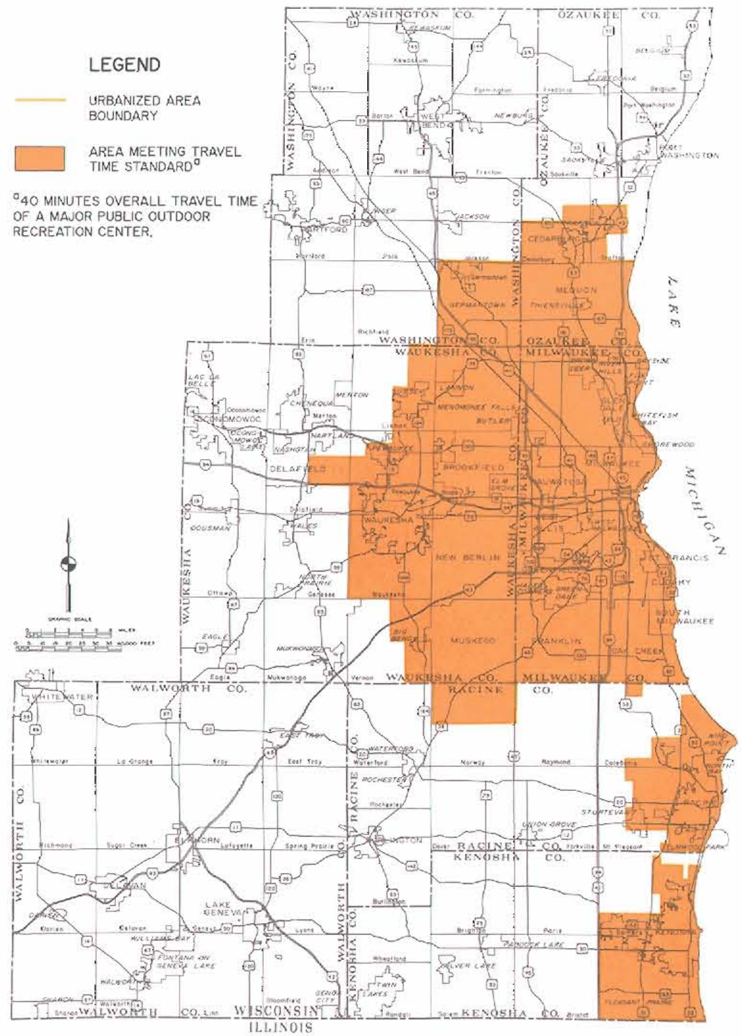
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR MEDICAL CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 1




Source: SEWRPC.

## Map C-16

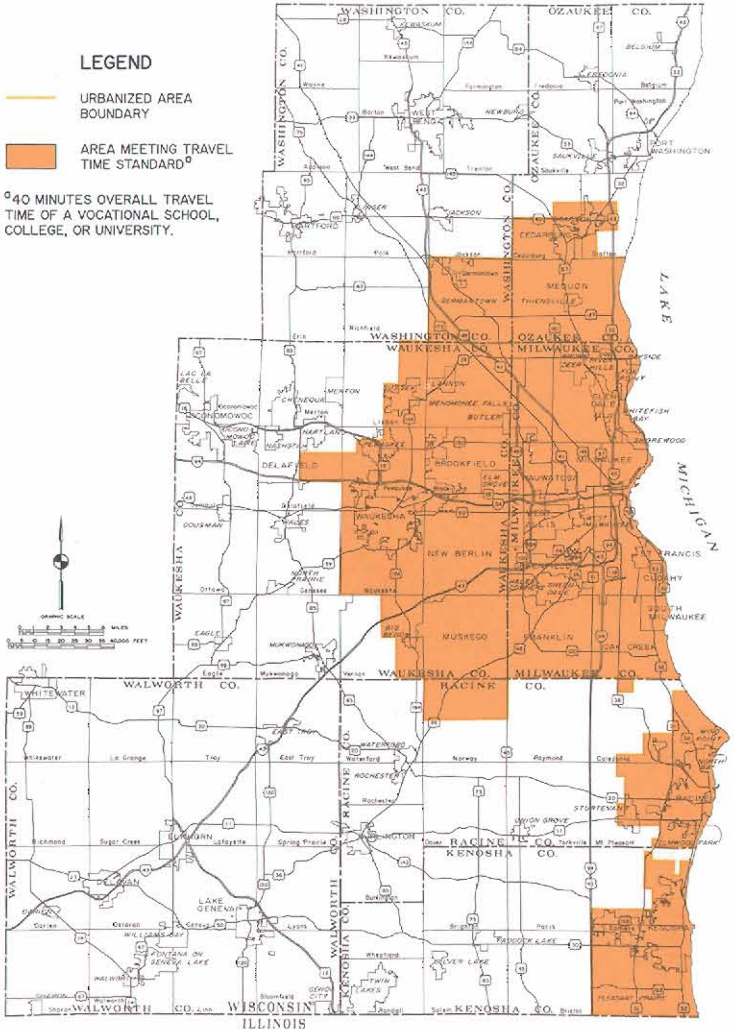
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RECREATION CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 1




Source: SEWRPC.

## Map C-17

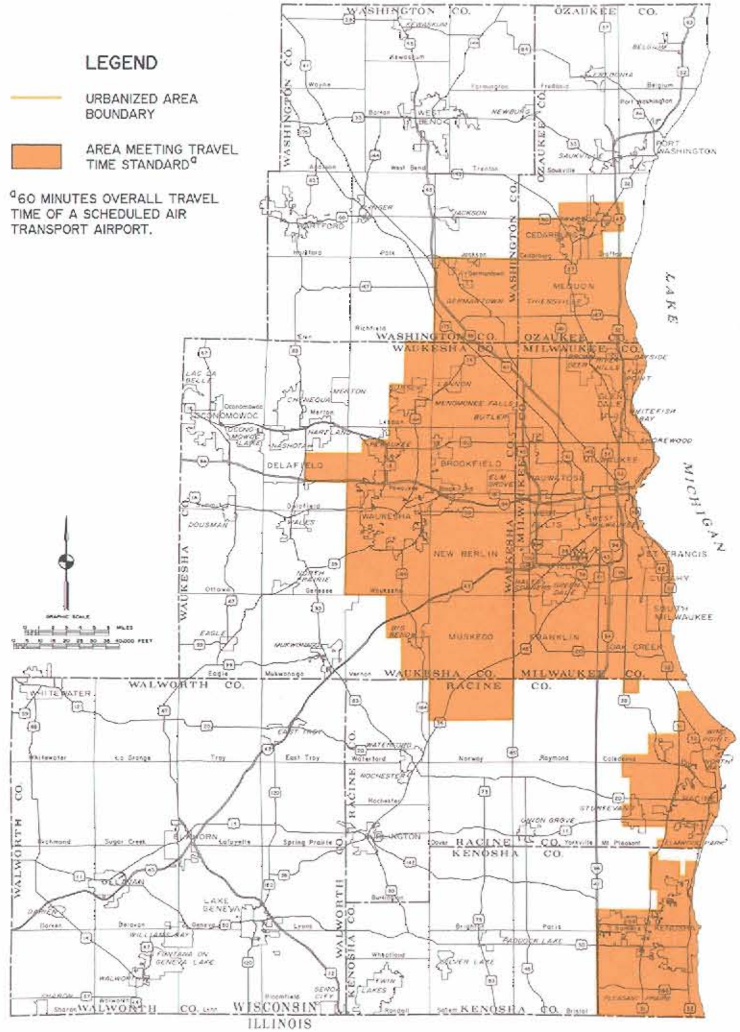
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR EDUCATIONAL CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 1




*Source: SEWRPC.*

## Map C-18

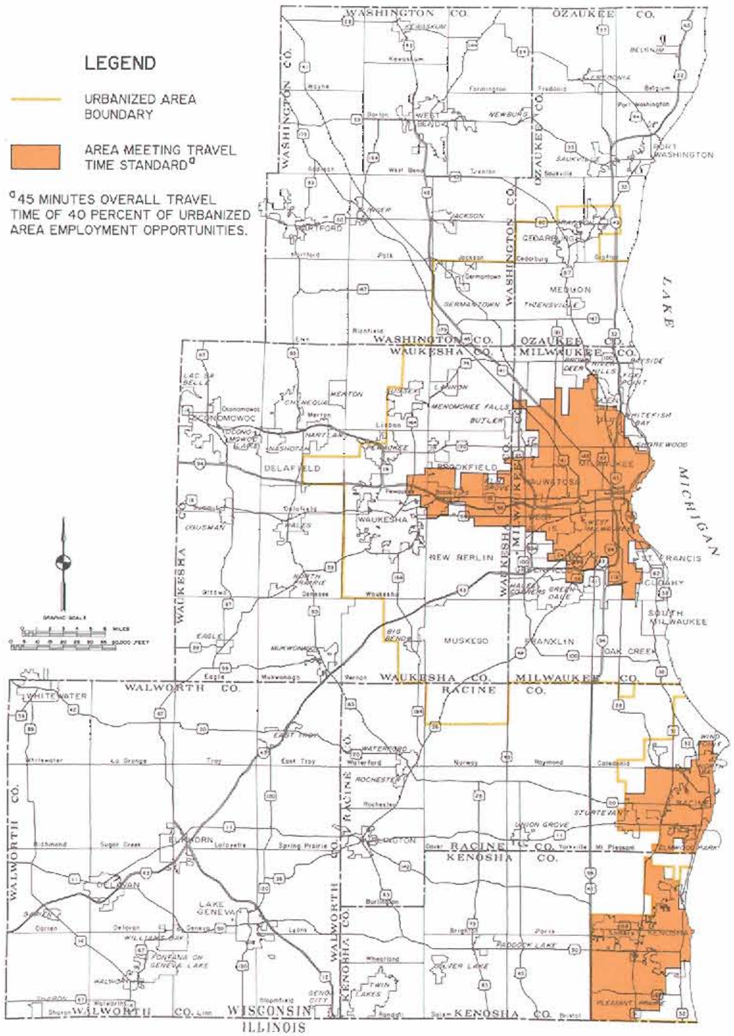
### AREAS MEETING THE TRAVEL TIME STANDARD FOR SCHEDULED AIR TRANSPORT TERMINALS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 1




*Source: SEWRPC.*

## Map C-19

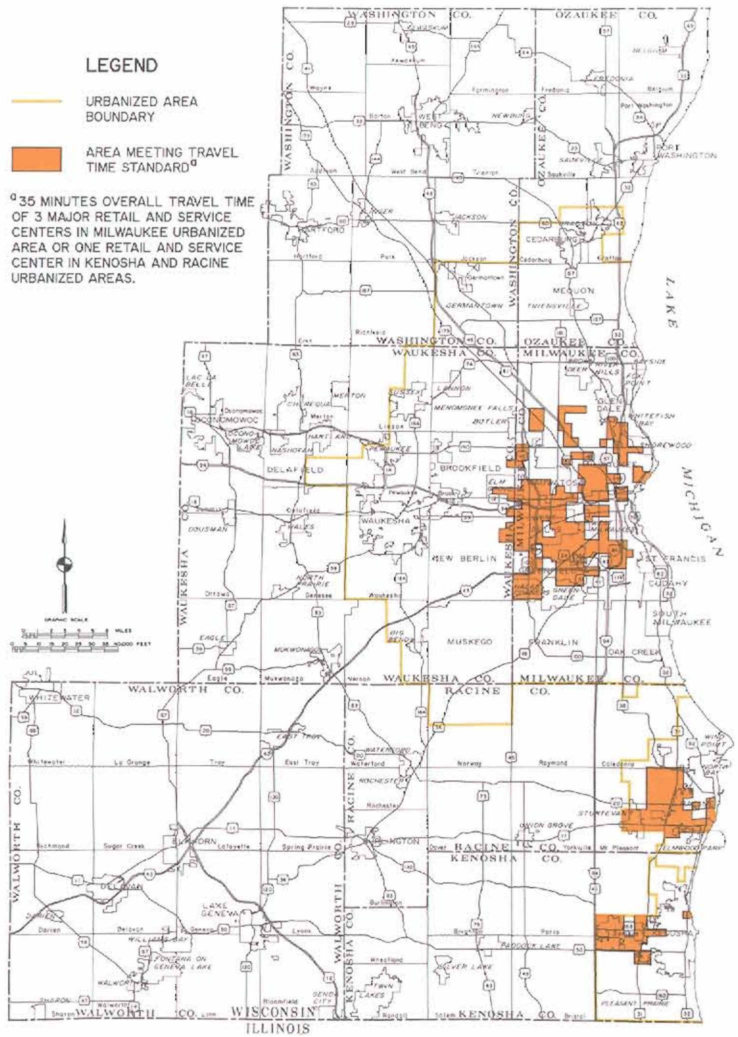
### AREAS MEETING THE TRAVEL TIME STANDARD FOR EMPLOYMENT BY TRANSIT: 2010 ALTERNATIVE PLAN 1




*Source: SEWRPC.*

## Map C-20

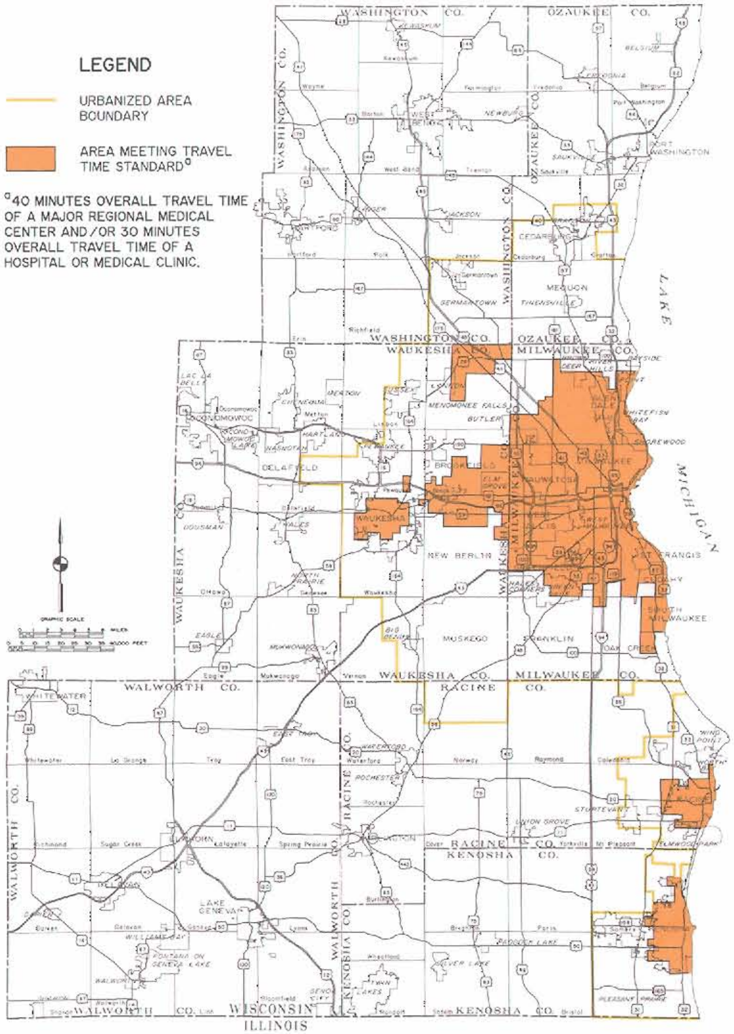
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RETAIL AND SERVICE CENTERS BY TRANSIT: 2010 ALTERNATIVE PLAN 1




*Source: SEWRPC.*

## Map C-21

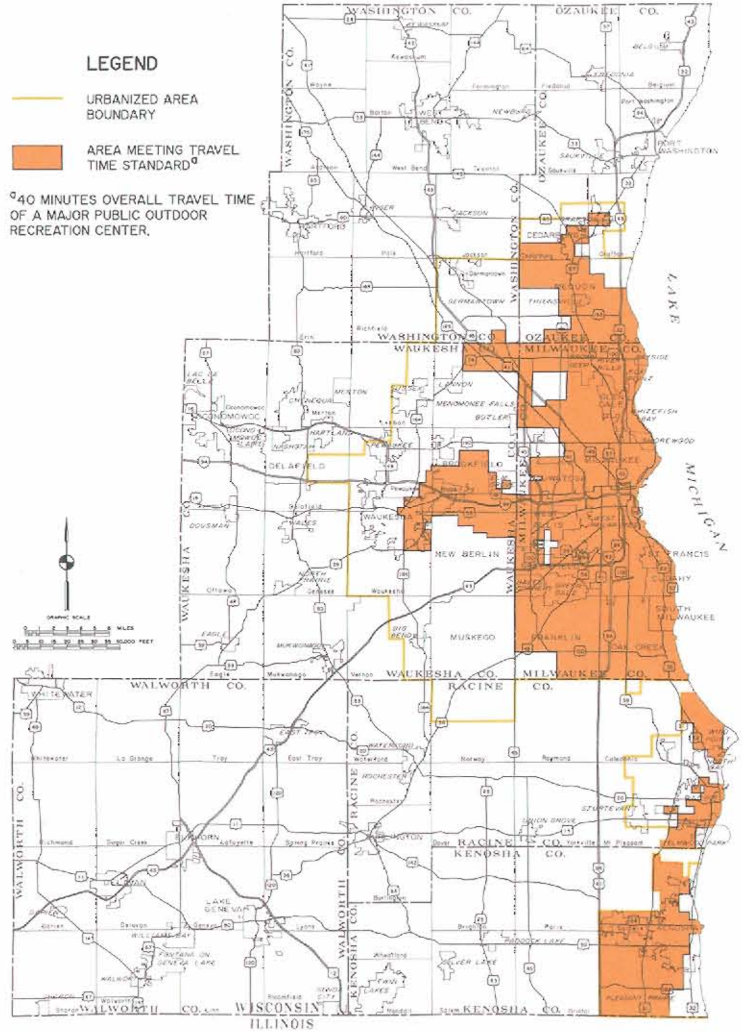
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR MEDICAL CENTERS BY TRANSIT: 2010 ALTERNATIVE PLAN 1




Source: SEWRPC.

## Map C-22

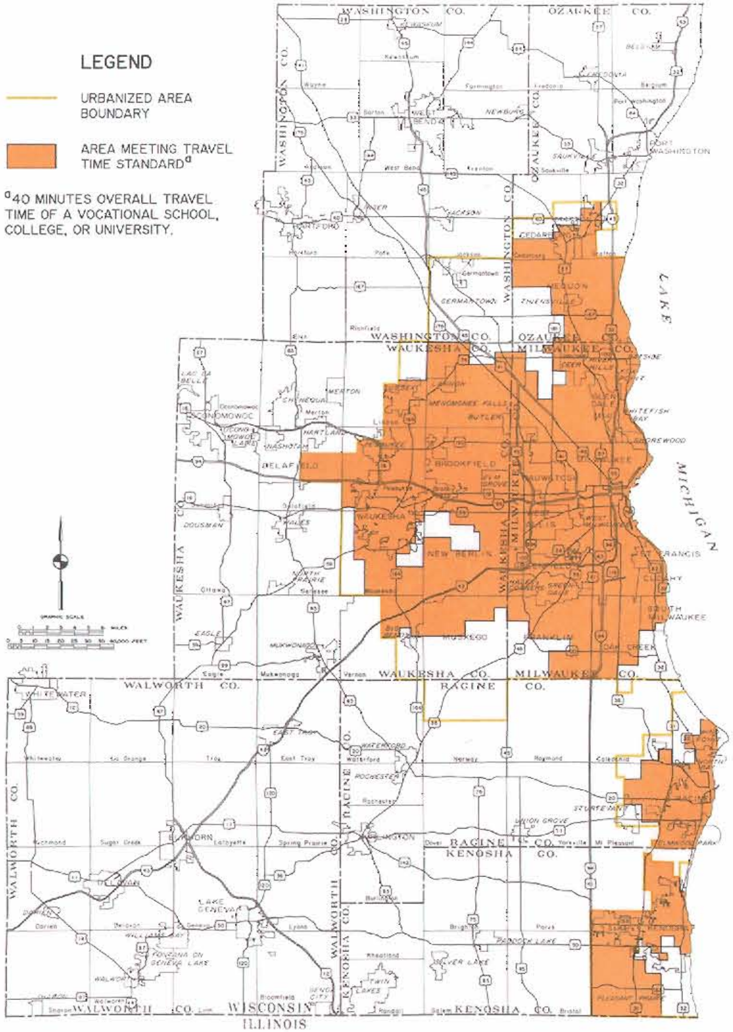
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RECREATION CENTERS BY TRANSIT: 2010 ALTERNATIVE PLAN 1




Source: SEWRPC.

## Map C-23

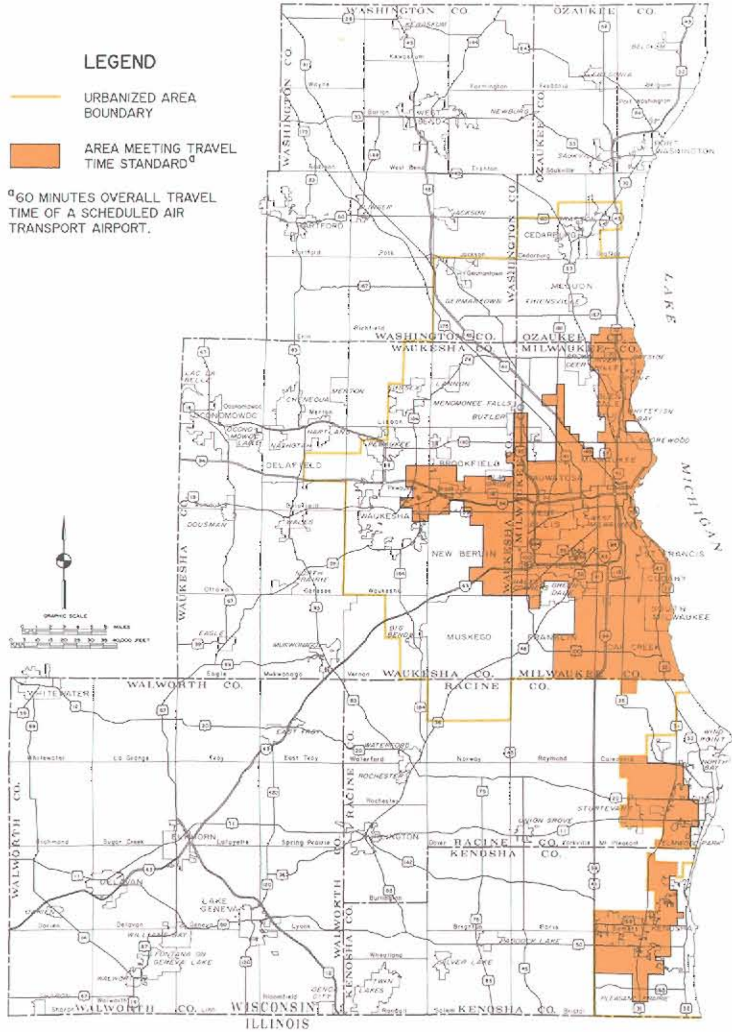
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR EDUCATIONAL CENTERS BY TRANSIT: 2010 ALTERNATIVE PLAN 1




Source: SEWRPC.

## Map C-24

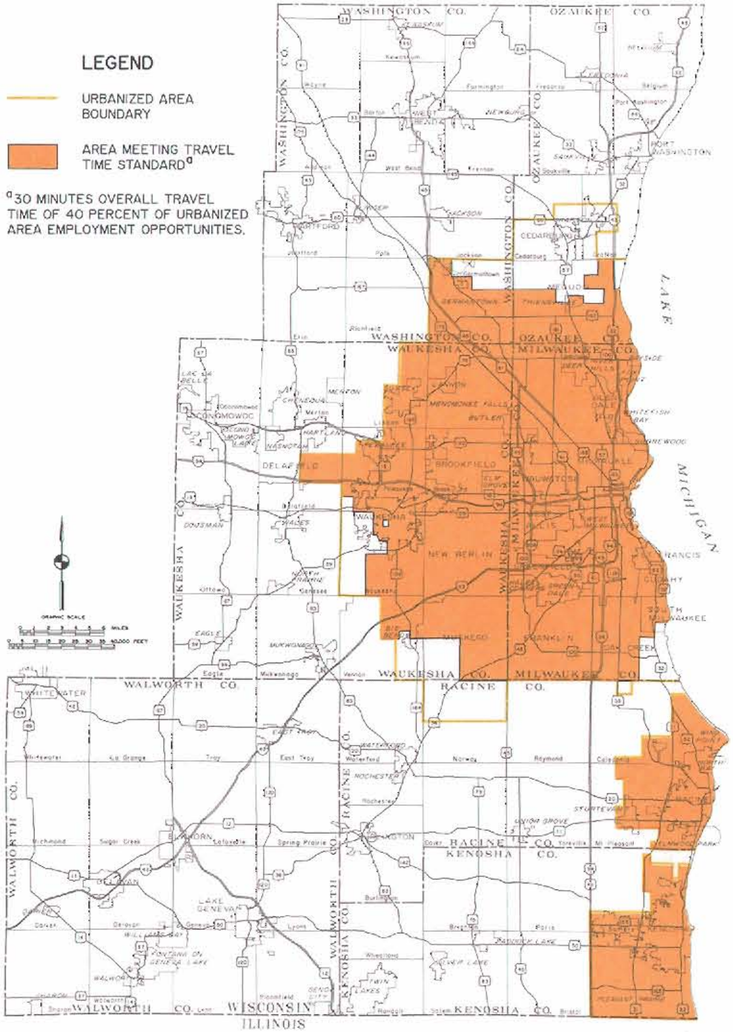
### AREAS MEETING THE TRAVEL TIME STANDARD FOR SCHEDULED AIR TRANSPORT TERMINALS BY TRANSIT: 2010 ALTERNATIVE PLAN 1




Source: SEWRPC.

## Map C-25

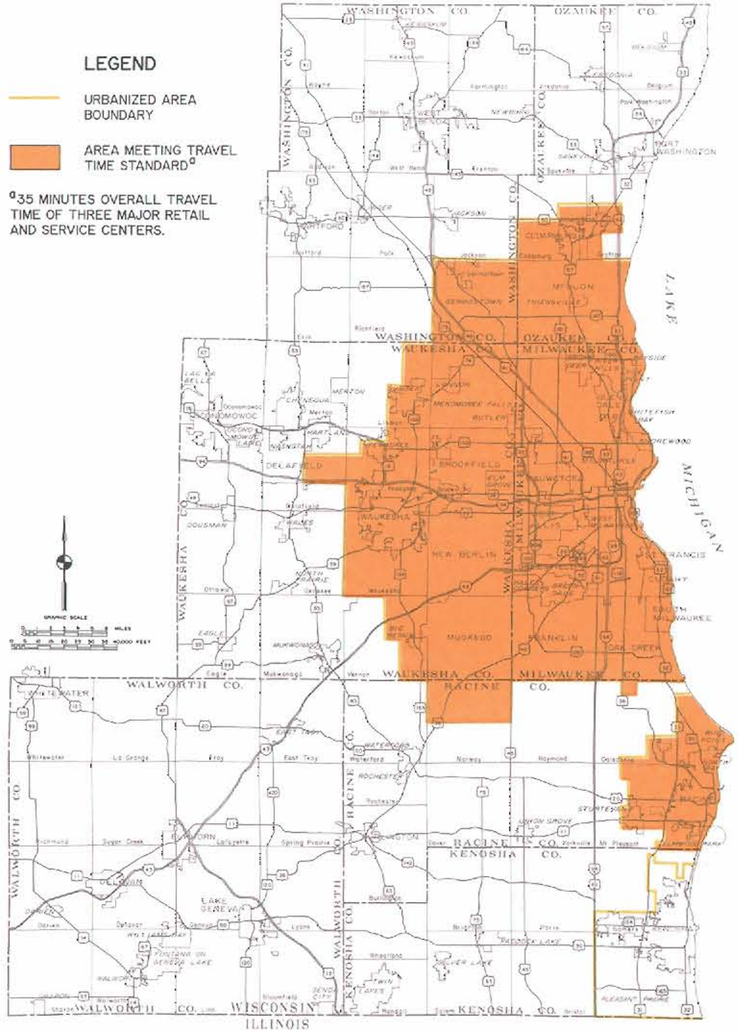
### AREAS MEETING THE TRAVEL TIME STANDARD FOR EMPLOYMENT BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 3




*Source: SEWRPC.*

## Map C-26

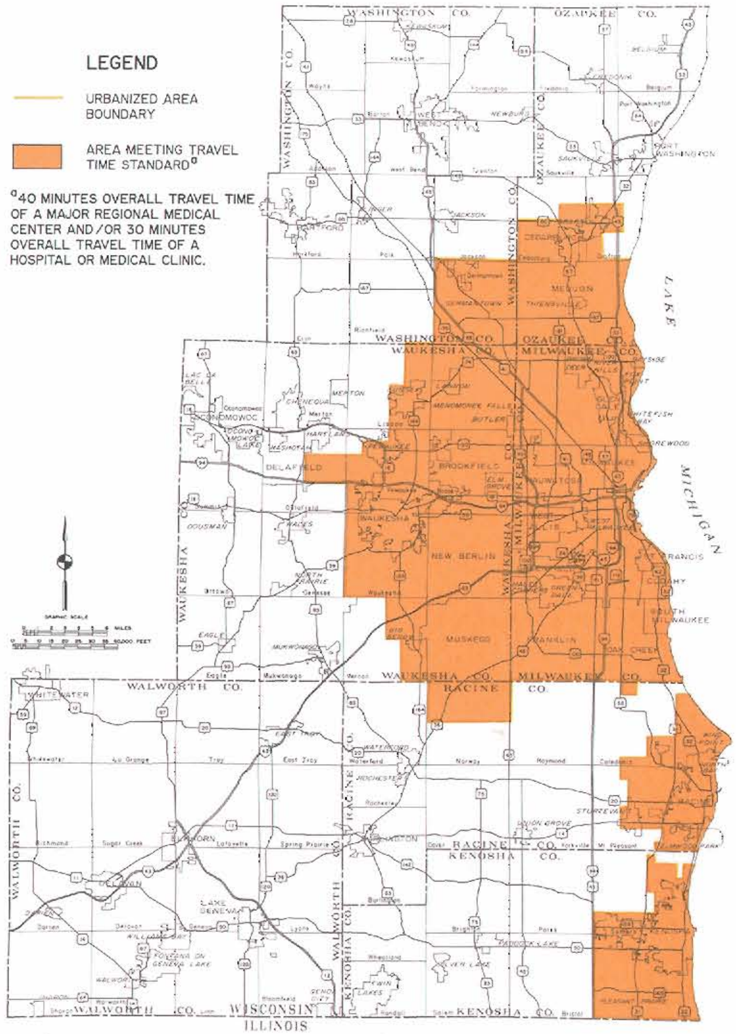
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RETAIL AND SERVICE CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 3




*Source: SEWRPC.*

## Map C-27

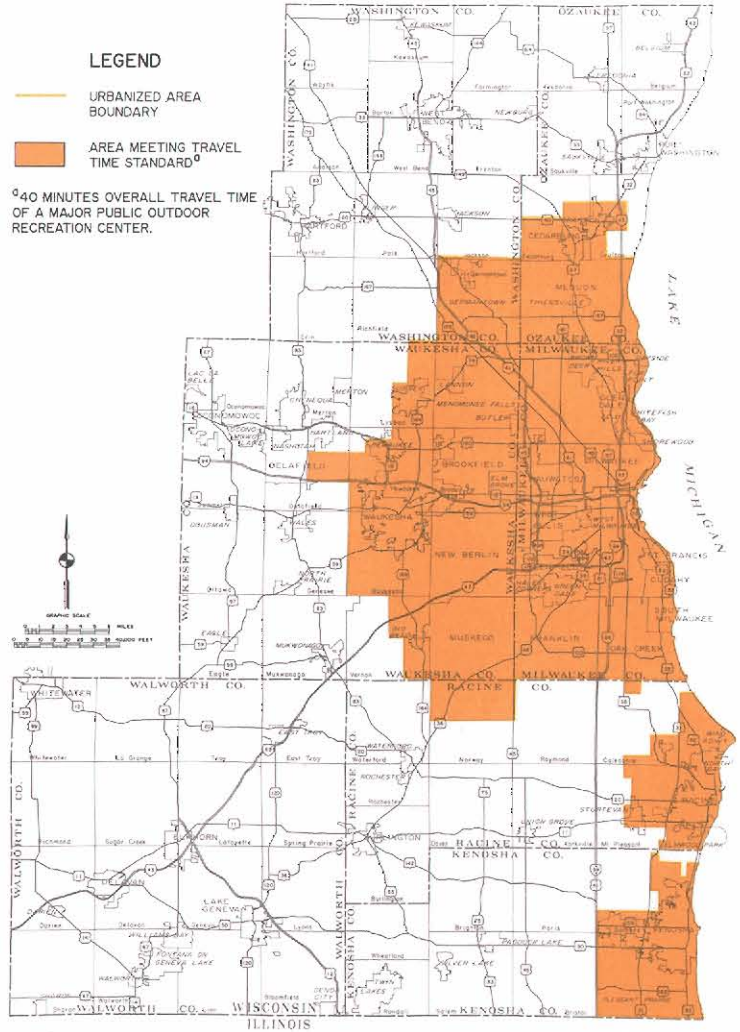
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR MEDICAL CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 3




*Source: SEWRPC.*

## Map C-28

### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RECREATION CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 3




*Source: SEWRPC.*

## Map C-29

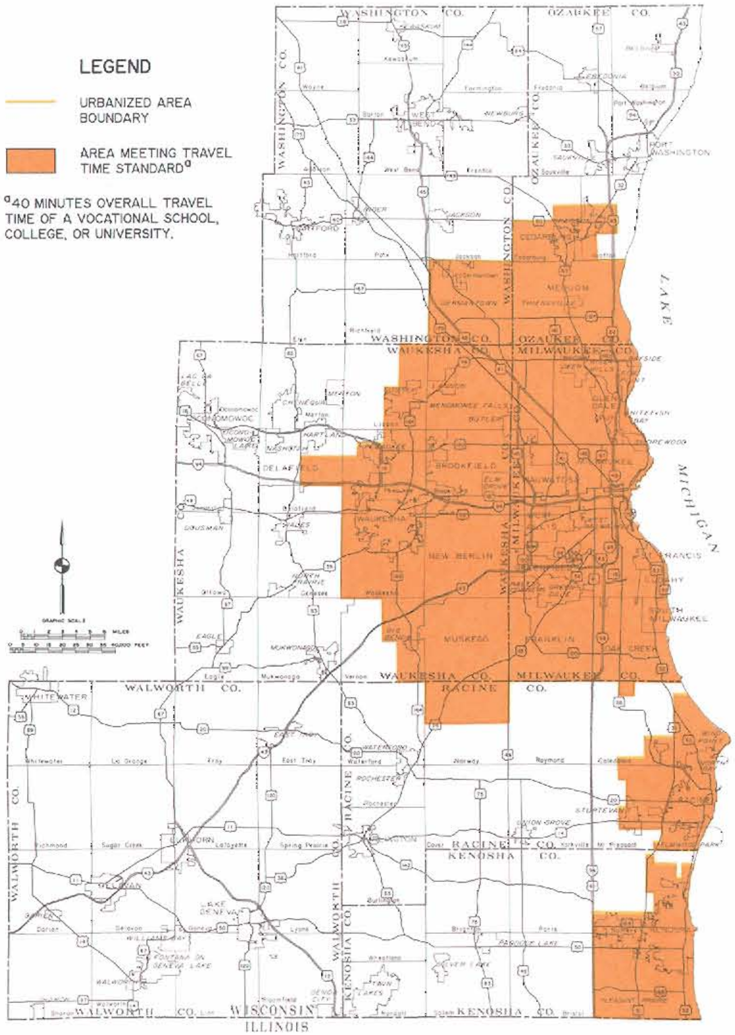
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR EDUCATIONAL CENTERS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 3

LEGEND

URBANIZED AREA BOUNDARY

AREA MEETING TRAVEL TIME STANDARD[a]

[a] 40 MINUTES OVERALL TRAVEL TIME OF A VOCATIONAL SCHOOL, COLLEGE, OR UNIVERSITY.




*Source: SEWRPC.*

## Map C-30

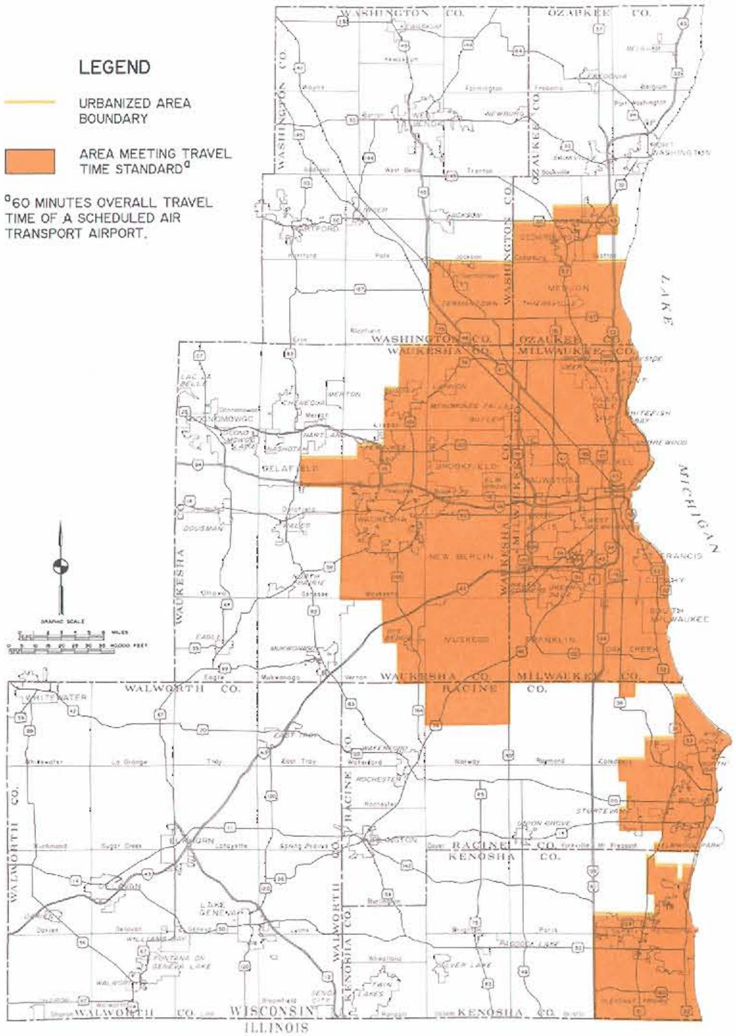
### AREAS MEETING THE TRAVEL TIME STANDARD FOR SCHEDULED AIR TRANSPORT TERMINALS BY ARTERIAL STREET AND HIGHWAY: 2010 ALTERNATIVE PLAN 3

LEGEND

URBANIZED AREA BOUNDARY

AREA MEETING TRAVEL TIME STANDARD[a]

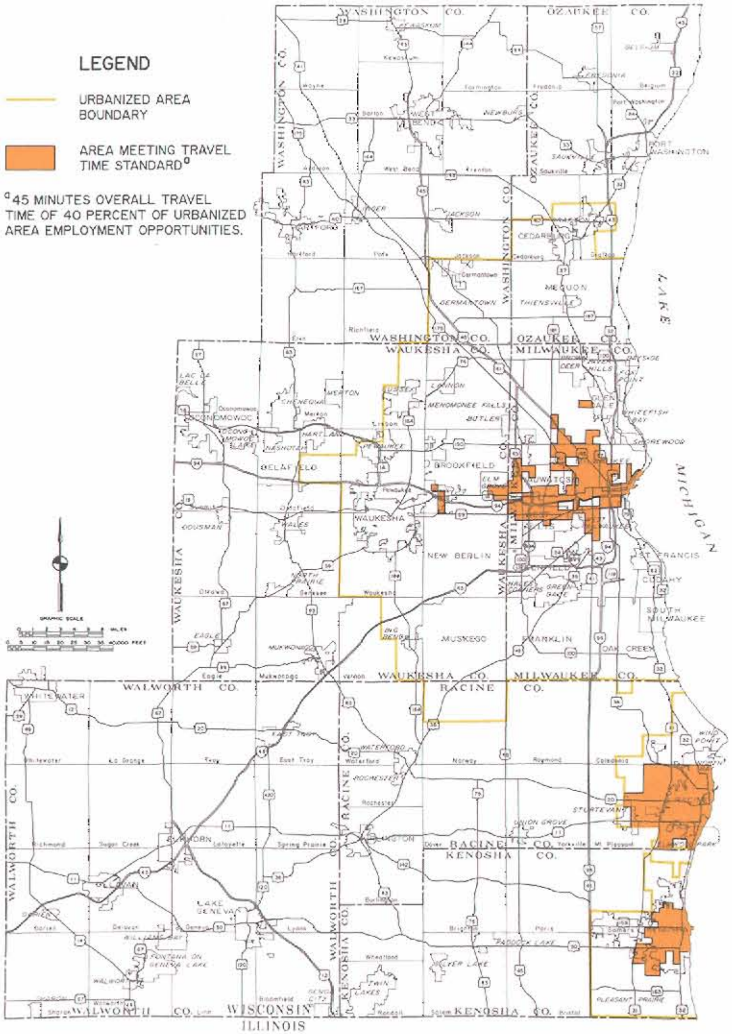
[a] 60 MINUTES OVERALL TRAVEL TIME OF A SCHEDULED AIR TRANSPORT AIRPORT.




*Source: SEWRPC.*

## Map C-31

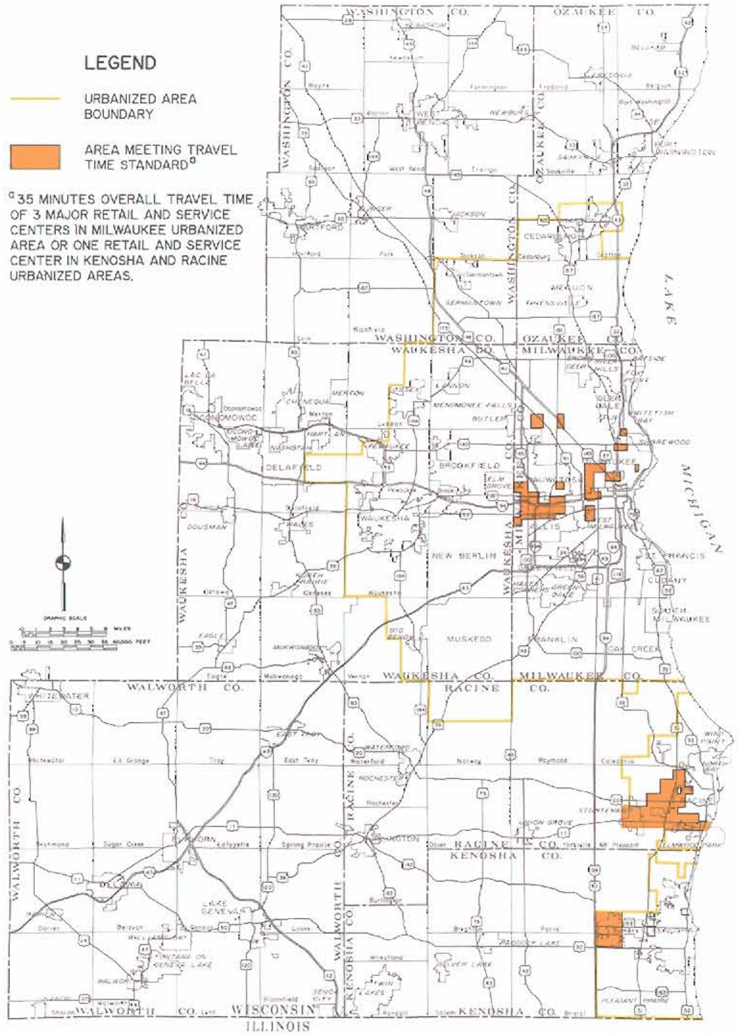
### AREAS MEETING THE TRAVEL TIME STANDARD FOR EMPLOYMENT BY TRANSIT: 2010 ALTERNATIVE PLAN 3




*Source: SEWRPC.*

## Map C-32

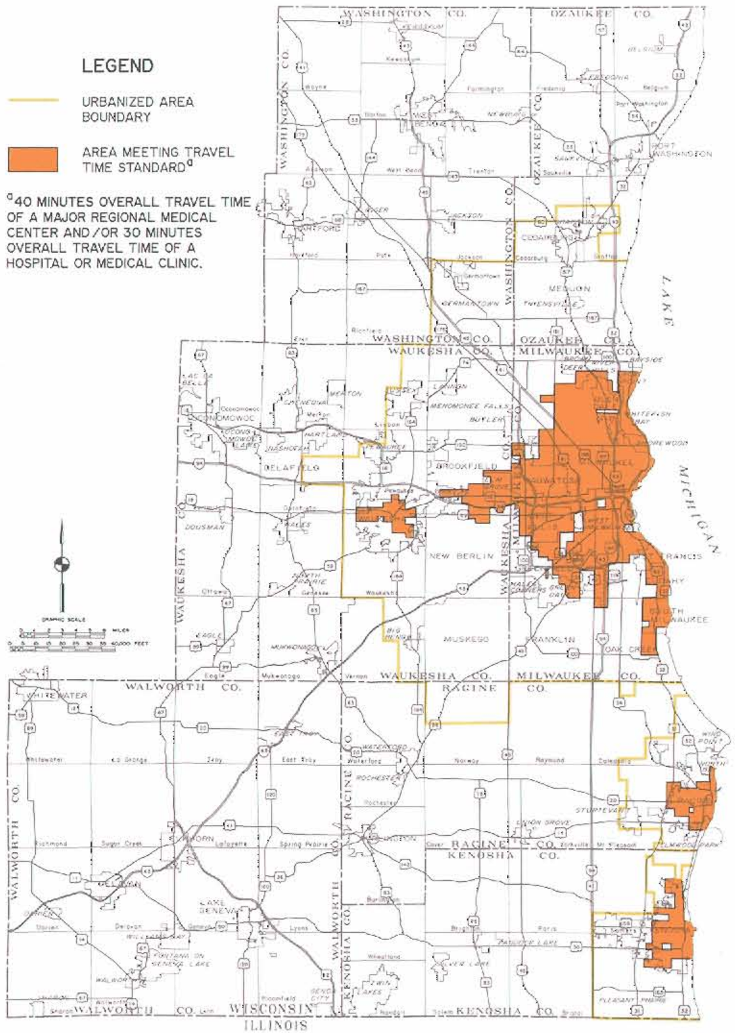
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RETAIL AND SERVICE CENTERS BY TRANSIT: 2010 ALTERNATIVE PLAN 3




*Source: SEWRPC.*

## Map C-33

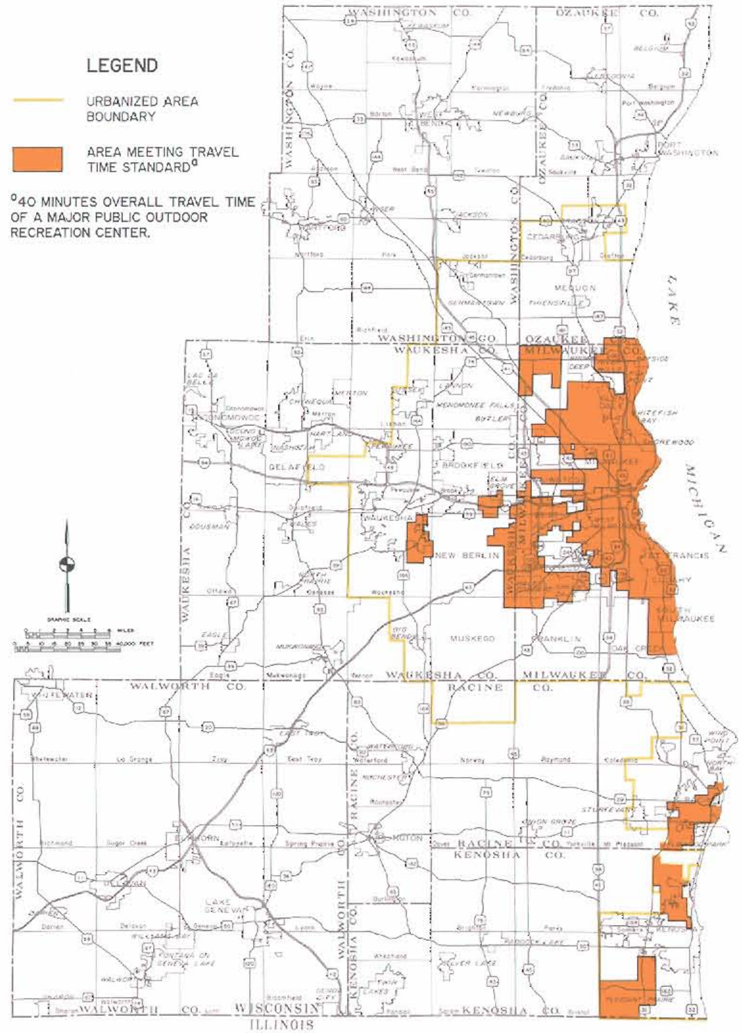
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR MEDICAL CENTERS BY TRANSIT: 2010 ALTERNATIVE PLAN 3




Source: SEWRPC.

## Map C-34

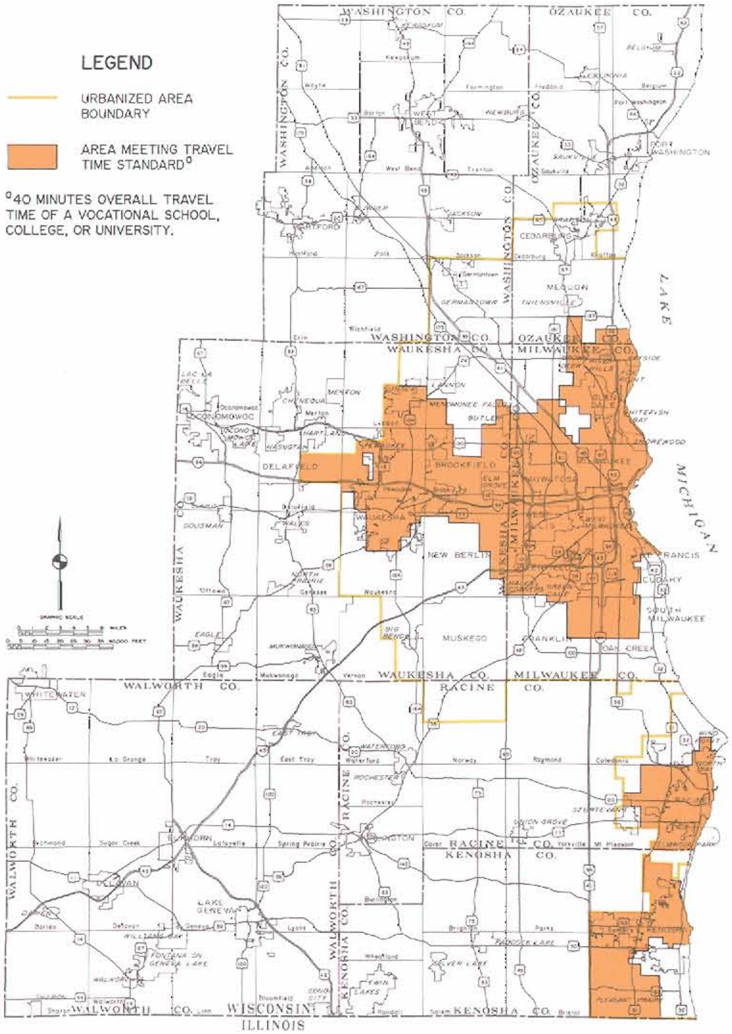
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR RECREATION CENTERS BY TRANSIT: 2010 ALTERNATIVE PLAN 3




Source: SEWRPC.

## Map C-35

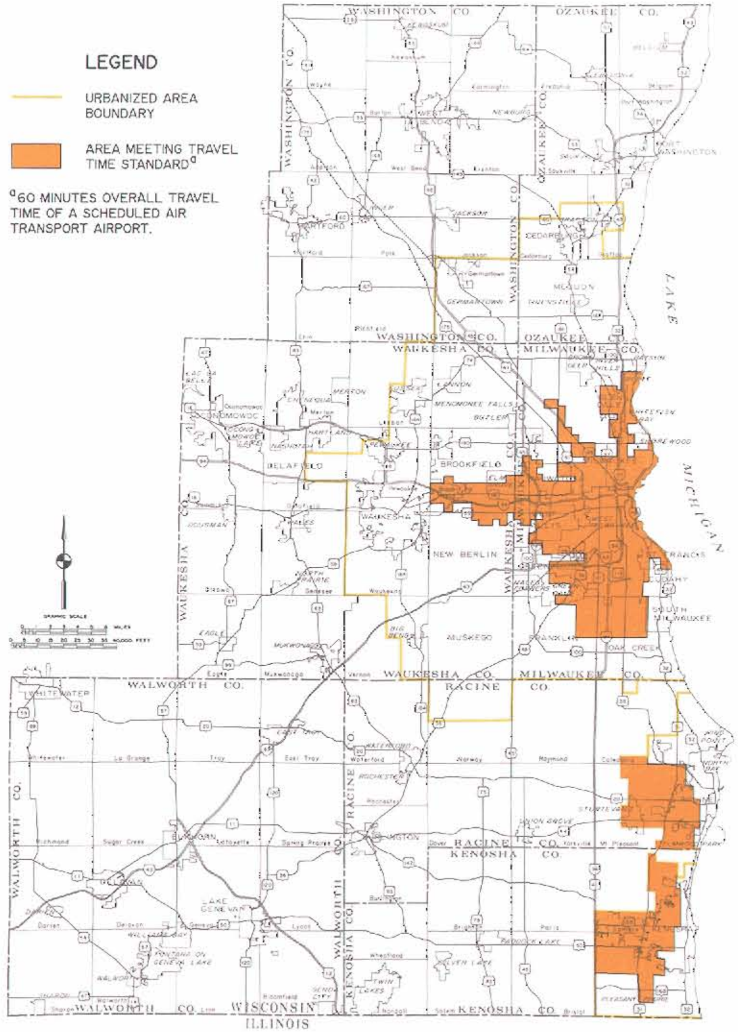
### AREAS MEETING THE TRAVEL TIME STANDARD FOR MAJOR EDUCATIONAL CENTERS BY TRANSIT: 2010 ALTERNATIVE PLAN 3




Source: SEWRPC.

## Map C-36

### AREAS MEETING THE TRAVEL TIME STANDARD FOR SCHEDULED AIR TRANSPORT TERMINALS BY TRANSIT: 2010 ALTERNATIVE PLAN 3




Source: SEWRPC.

## Appendix D

## ENVIRONMENTAL ASSESSMENT OF THE RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN

### INTRODUCTION

Federal planning guidelines issued jointly by the Federal Highway Administration and the Federal Transit Administration of the U. S. Department of Transportation call for the preparation of environmental assessments in connection with the development of areawide transportation plans. These guidelines envision that the environmental assessments provide the basis, in part, for the preparation of any Federally required environmental impact statements by State and Federal implementing agencies. The Commission believes that the inventory data, analyses, alternative plans, and recommended plans presented in this planning report constitute, in effect, a comprehensive environmental assessment. However, in response to explicit Federal planning guidelines, a separate section of the planning report, termed "environmental assessment," has been prepared. In so doing, the Commission has attempted to bring together all the data and analyses concerning the potential environmental impacts of full implementation of the recommended regional transportation system plan for convenient reference purposes. Accordingly, this appendix sets forth an environmental assessment of the recommended regional transportation system plan.

In considering the material included in this appendix, which has largely been drawn from data previously presented in this report, it should be kept in mind that the regional transportation plan is an areawide, system level plan. As such, an environmental assessment can only be done at a systems level; consequently, done in a relatively generalized manner. More detailed project level planning designed to implement the regional transportation plan will result in more specific environmental assessments. In this report, however, it might be agreed that the more generalized areawide systems level assessment is in fact more meaningful than the more detailed project level assessments limited to isolated corridors of the overall system.

### TRANSPORTATION SYSTEM PLAN ASSESSMENT

One of the necessary considerations in the regional transportation system plan reevaluation process is the environmental impact of the recommended regional transportation plan. The importance of environmental considerations in the development of the recommended transportation system plan is reflected by the following, one of the seven basic principles guiding the system planning process, as stated in Chapter II of this report.

> Transportation system planning must recognize the existence of a limited natural resource base to which urban and rural development must be properly adjusted to ensure a pleasant and habitable environment. Land, water, and air resources are limited and subject to great misuse through improper land use and transportation system development. Such misuse may lead to serious environmental problems that may be difficult or impossible to correct.

The importance of the consideration of environmental impacts in the planning of transportation facilities and services and in other public actions is further reflected by the National Environmental Policy Act and the Wisconsin Environmental Policy Act, which require the assessment of public projects which may significantly affect the quality of the human environment and involve Federal and State agencies of government. Because past public actions at the project level have in many cases been drawn from long-range systemwide plans and future public actions can be expected to be precipitated by future systemwide long-range planning efforts, there is a need, also, to include an environmental assessment of the recommended transportation plan in the transportation plan reevaluation process.

This report has provided nearly all the information necessary for a regional environmental assessment of the recommended transportation system plan. The regional framework within which the transportation plan was developed was presented through extensive descriptions of the existing characteristics of the Region, including the previously adopted regional land use and transportation plans; the regional demographic and economic base; the regional natural resource and public utility base; the land use pattern of the Region; and the transportation facilities and travel habits and patterns of the Region. Also in this report, this regional framework was expanded upon thorough analyses and presentation of the anticipated growth and change in the Region to the year 2010. The adopted regional land use plan which the recommended regional transportation system plan was designed to serve was described. Also presented were a number of alternative regional transportation system plans, one of which, with some refinement, became the recommended transportation plan and another of which was a "no-build" option. As documented in Chapter X of this report, the plan alternatives were compared and evaluated against a comprehensive set of transportation system planning objectives and their supporting principles and standards. The objectives, principles, and standards against which the plans were measured included a wide range of considerations directly related to the development of a systems level environmental assessment, as well as considerations related to accessibility, cost, mobility, safety, and system flexibility.

A summary environmental assessment of the recommended regional transportation plan is provided in the following sections of this appendix. The environmental assessment includes a description of the recommended plan and the no-build plan and a summary of their principal environmental impacts. The environmental implications of the recommended and no-build transportation plans to be summarized include land use impacts, energy impacts, vehicle air pollutant emission impacts, and community and local government impacts. Particular attention is given to adverse environmental effects and to the resource commitments attendant to the recommended and no-build plans. The regional framework within which the recommended plan was developed and the characteristics and impacts of transportation plan alternatives other than the no-build plan are not repeated in this section, having been fully described in the body of the report.

<u>The Recommended and the No-Build Transportation System Plans</u>

The recommended regional transportation system plan consists of three basic elements: transportation system management, public transit system maintenance and improvement, and arterial street and highway system maintenance and improvement. A regional bicycle way and pedestrian facilities system plan constitutes a supplementary element of the plan. The no-build transportation system plan represents the alternative of maintaining and preserving the existing transportation system with no improvement to, or expansion of, that system.

<u>Transportation System Management Recommendations</u>: The recommended regional transportation system plan for the year 2010 includes significant transportation system management recommendations. The plan recommends the implementation of the long-planned greater Milwaukee area freeway traffic management system. In general, this system would constrain access by single-occupancy vehicles to the freeway system during peak periods while providing preferential access to high-occupancy vehicles, including transit vehicles, to help ensure high rates of traffic flow at reasonable speeds. The plan recommends that local units of government restrict curb-lane parking on about 442 route-miles of arterial streets during peak periods to accommodate increased traffic flow without investing in the expansion of arterial street capacity. Finally, the plan recommends that local units of government apply traffic engineering techniques to help ensure efficient use of the existing arterial street system and to provide safe and efficient travel ways for bicyclists and pedestrians.

The plan also proposes areawide promotional measures, including an aggressive effort by the Wisconsin Department of Transportation to promote travel through ridesharing, transit use, and bicycle use, as well as telecommuting and work-time rescheduling to reduce personal travel by automobile, particularly during peak periods. This recommendation also includes promoting the creation, and supporting the efforts, of private-sector transportation management associations at major employment centers throughout the Region to help employers meet the requirements of the Employee Commute Options program mandated by the Federal government in the Clean Air Act Amendments of 1990.

The plan also recommends that local units of government facilitate travel by transit, bicycle, and pedestrian modes through detailed, site-specific land use planning as land use development and redevelopment take place within the Region and as communities review private-sector development proposals. The plan recommends that attention be given to ensuring that appropriate mixes of land uses and higher densities of urban development are provided along transit lines and around transit stops and stations. The plan recommends that efficient and direct pedestrian and bicycle pathways to transit stops and stations be provided and that careful attention should be given to the location and orientation of proposed buildings on development sites to facilitate convenient transit use.

Public Transit System Maintenance and Improvement: Transit system development proposals for the year 2010 were prepared for the Region under the recommended and no-build transportation system plans. As shown in Table D-1, under the recommended plan, the regional transit system would, by the year 2010, provide 3,640 round-trip route-miles of service, which would be about 1,344 miles, or 59 percent, greater than that provided in 1991. The transit system would operate 779 vehicles during peak periods by the plan design year 2010. On an average weekday, the recommended plan would provide about 110,600 revenue vehicle-miles and 7,600 revenue vehicle-hours of service, about 75 percent and 46 percent, respectively, greater than provided in 1991. In 1991, the transit system provided 530 buses during peak periods and 63,300 revenue vehicle-miles and 5,220 revenue vehicle-hours of service per average weekday.

Under the no-build plan, the transit system would provide 2,440 round-trip route-miles of service, a 6 percent increase over that provided in 1991, operating 527 vehicles during peak periods. On an average weekday, the system would provide 65,900 revenue vehicle-miles and 5,650 revenue vehicle-hours of service, about 4 percent and 8 percent greater than provided in 1991, respectively.

Rapid Transit Service: Under the recommended plan, a total of 30 rapid transit routes would be provided, of which 27 would be focused on the Milwaukee central business district (CBD) and three on the University of Wisconsin-Milwaukee campus. Rapid transit service would be extended from the City of Milwaukee to the Cities of Racine and Kenosha to the south, to the Village of Mukwonago to the southwest, to the Cities of Waukesha and Oconomowoc to the west; to the Village of Germantown and the City of West Bend to the northwest, and to the City of Cedarburg, the Villages of Saukville and Grafton and the City of Port Washington to the north. Service would be initially provided by buses operating over the freeway system, with route extensions over surface arterial streets for the provision of collector and distributor service. A total of 73 transit stations would be served.

The plan recommends conducting major investment studies to determine the feasibility of eventually upgrading the planned bus rapid transit to bus-on-exclusive-busway or commuter-rail passenger service. The plan explicitly recommends that rapid transit service in the East-West Corridor between N. 4th Street in the City of Milwaukee to STH 164 in the City of Waukesha be provided over a busway and high-occupancy vehicle facility, pending the outcome of current studies being conducted by the Wisconsin Department of Transportation.

Express Transit Service: Under the recommended plan, a total of 12 regular express transit bus routes would be provided. Within Milwaukee County, the routes would be oriented to the Milwaukee CBD, connecting that district to other major trip generators and to provide needed crosstown service. Within the Kenosha and Racine areas, express service would provide direct connections from the central business district to major employment concentrations and between such concentrations. The plan also identifies a potential 15-mile-long light-rail express transit line connecting the City of Glendale, the University of Wisconsin-Milwaukee, the Milwaukee CBD, and the Milwaukee Regional Medical Center and Research Park. These facilities would serve heavily traveled corridors in Milwaukee County. The ultimate decision concerning the inclusion of such facilities in the regional transportation system plan would be made following the completion of the major investment study now underway for the east-west travel corridor.

Three other travel corridors are identified in the plan as having potential for light-rail express transit service. These include the corridors that extend from the Milwaukee CBD to the General Mitchell

**Table D-1**

**TRANSIT SYSTEM OPERATING CHARACTERISTICS, FACILITIES, AND PERFORMANCE: 1991 AND 2010 NO-BUILD AND RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN**

| Transit Service | Base Year 1991 | No-Build Plan: Planned Increment Number | No-Build Plan: Planned Increment Percent Change | No-Build Plan: 2010 | Recommended Plan: Planned Increment Number | Recommended Plan: Planned Increment Percent Change | Recommended Plan: 2010 |
|---|---|---|---|---|---|---|---|
| Round-Trip Route Length (miles) | | | | | | | |
| Rapid Routes | 449 | 70 | 15.6 | 519 | 911 | 202.9 | 1,360 |
| Express Routes | 393 | -16 | -4.1 | 377 | 27 | 6.9 | 420 |
| Local Routes | | | | | | | |
| Kenosha Urbanized Area | 171 | 21 | 12.3 | 192 | 39 | 22.8 | 210 |
| Milwaukee Urbanized Area | 1,112 | 68 | 6.1 | 1,180 | 338 | 30.4 | 1,450 |
| Racine Urbanized Area | 171 | -3 | -1.8 | 168 | 29 | 17.0 | 200 |
| Subtotal | 1,454 | 86 | 5.9 | 1,540 | 406 | 27.9 | 1,860 |
| Total | 2,296 | 140 | 6.1 | 2,436 | 1,344 | 58.5 | 3,640 |
| Average Weekday Vehicle Requirements[a] | | | | | | | |
| Peak Period | 530 | -3 | -0.6 | 527 | 249 | 47.0 | 779 |
| Midday Off-Peak Period | 285 | 6 | 2.1 | 291 | 65 | 22.8 | 350 |
| Service Provided on Average Weekday | | | | | | | |
| Revenue Vehicle-Miles | | | | | | | |
| Rapid | 3,400 | -300 | -8.8 | 3,100 | 13,500 | 397.1 | 16,900 |
| Express | 3,300 | 2,700 | 81.8 | 6,000 | 18,100 | 548.5 | 21,400 |
| Local | 56,600 | 200 | 0.4 | 56,800 | 15,700 | 27.7 | 72,300 |
| Total | 63,300 | 2,600 | 4.1 | 65,900 | 47,300 | 74.7 | 110,600 |
| Revenue Vehicle-Hours | | | | | | | |
| Rapid | 170 | -10 | -5.9 | 160 | 530 | 311.8 | 700 |
| Express | 170 | 190 | 111.8 | 360 | 930 | 547.1 | 1,100 |
| Local | 4,880 | 250 | 5.1 | 5,130 | 920 | 18.9 | 5,800 |
| Total | 5,220 | 430 | 8.2 | 5,650 | 2,380 | 45.6 | 7,600 |
| Seat-Miles | 2,975,000 | 53,300 | 1.8 | 3,028,300 | 2,098,600 | 70.5 | 5,073,600 |
| Service Utilization | | | | | | | |
| Ridership | | | | | | | |
| Average Weekday Revenue Passengers | 172,200 | -4,200 | -2.4 | 168,000 | 24,200 | 14.1 | 196,400 |
| Annual Revenue Passengers | 50,222,900 | -1,224,900 | -2.4 | 48,998,000 | 7,126,100 | 14.2 | 57,349,000 |
| Revenue Passengers per Revenue Vehicle-Hour | 33.0 | -3.3 | -9.9 | 29.7 | -7.1 | -21.7 | 25.8 |
| Average Weekday Passenger-Miles | 609,100 | 119,700 | 19.7 | 728,800 | 342,300 | 56.2 | 951,400 |

*Source: SEWRPC.*

International Airport; along the 27th Street crosstown corridor from W. Silver Spring Drive to the Southridge Shopping Center; and from the Milwaukee CBD to the Northridge Shopping Center. The feasibility of effectively providing light-rail service in these corridors would be determined through Federally required major investment studies.

Local Transit Service: The local transit service included in the recommended plan represents an expansion and improvement of existing services. The local transit service element of the plan assumes the continued operation and extension of the present grid system of local bus routes in Milwaukee County. That system would extend across the Milwaukee-Waukesha county line to provide service to the eastern tier of urban communities in Waukesha County. The plan also provides for extensions of the systems of local bus routes in the Cities of Waukesha, Racine, and Kenosha. The plan recommends that the local transit operators undertake more detailed implementation studies to identify the best means of providing the needed local service extensions, holding open the possibility of a transit-center-based route system to replace, in some areas, the grid route system.

The recommended plan also recognizes the need to provide transit service in the smaller urban communities of the Region. Explicitly incorporated into the plan are the continuation of the shared-ride taxi services now being provided in the Hartford, Port Washington, West Bend, and Whitewater areas of the Region. The plan also recognizes that it may be desirable to establish such demand-responsive services in other smaller urban areas of the Region.

Table D-2

**ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2010 FINAL RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN**

| County | System Preservation (miles) | System Improvement (miles) | System Expansion (miles) | Total (miles) |
|---|---|---|---|---|
| Kenosha | | | | |
| Freeway | 12.0 | 0.0 | 0.0 | 12.0 |
| Standard Arterial | 288.9 | 44.8 | 9.4 | 343.1 |
| Subtotal | 300.9 | 44.8 | 9.4 | 355.1 |
| Milwaukee | | | | |
| Freeway | 69.2 | 0.0 | 0.0 | 69.2 |
| Standard Arterial | 666.3 | 50.2 | 11.3 | 727.8 |
| Subtotal | 735.5 | 50.2 | 11.3 | 797.0 |
| Ozaukee | | | | |
| Freeway | 27.4 | 0.0 | 0.0 | 27.4 |
| Standard Arterial | 222.6 | 48.5 | 5.9 | 277.0 |
| Subtotal | 250.0 | 48.5 | 5.9 | 304.4 |
| Racine | | | | |
| Freeway | 12.0 | 0.0 | 0.0 | 12.0 |
| Standard Arterial | 330.5 | 62.2 | 19.1 | 411.8 |
| Subtotal | 342.5 | 62.2 | 19.1 | 423.8 |
| Walworth | | | | |
| Freeway | 50.0 | 0.0 | 16.7 | 66.7 |
| Standard Arterial | 359.5 | 38.2 | 19.7 | 417.4 |
| Subtotal | 409.5 | 38.2 | 36.4 | 484.1 |
| Washington | | | | |
| Freeway | 21.6 | 21.1 | 0.0 | 42.7 |
| Standard Arterial | 354.1 | 48.9 | 22.6 | 425.6 |
| Subtotal | 375.7 | 70.0 | 22.6 | 468.3 |
| Waukesha | | | | |
| Freeway | 57.6 | 2.0 | 5.7 | 65.3 |
| Standard Arterial | 556.3 | 132.1 | 20.5 | 710.0 |
| Subtotal | 613.9 | 134.1 | 26.2 | 774.2 |
| Region | | | | |
| Freeway | 249.8 | 23.1 | 22.4 | 295.3 |
| Standard Arterial | 2,778.2 | 424.9 | 108.5 | 3,311.6 |
| Total | 3,028.0 | 448.0 | 130.9 | 3,606.9 |

*Source: SEWRPC.*

Arterial Streets and Highways Maintenance and Improvement: Summary data on the arterial street and highway systems under the recommended regional transportation system plan is given by county and arterial facility type in Table D-2. The arterial street improvements have been categorized as system preservation, system improvement, or system expansion. System preservation includes all arterial improvement projects of resurfacing and reconstruction which are required to maintain structural adequacy and serviceability and do not significantly increase existing capacity. System improvement includes all projects which would significantly increase capacity through street widening or relocation. System expansion includes all projects involving construction of new facilities.

Under the recommended plan for the year 2010, the standard arterial system would increase from 3,274 miles of streets and highways in 1991 to approximately 3,607 miles. This additional mileage consists primarily of the addition of existing nonarterial facilities to the arterial system. The

Table D-3

COMPARISON OF LAND-TAKING REQUIREMENTS FOR TRANSPORTATION SYSTEM IMPROVEMENTS IN THE REGION BY COUNTY: 2010 NO-BUILD AND RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLANS

| County and Taking | No-Build Plan | Recommended Plan |
|---|---|---|
| Kenosha County | | |
| Number of Residential Units | - - | 80 |
| Number of Nonresidential Structures | - - | 33 |
| Acquisition, Demolition, and Relocation Cost | $ 198,000 | $ 17,064,000 |
| Milwaukee County | | |
| Number of Residential Units | 11 | 87 |
| Number of Nonresidential Structures | 8 | 95 |
| Acquisition, Demolition, and Relocation Cost | $1,768,000 | $ 22,470,000 |
| Ozaukee County | | |
| Number of Residential Units | 9 | 56 |
| Number of Nonresidential Structures | 1 | 5 |
| Acquisition, Demolition, and Relocation Cost | $1,210,000 | $ 15,071,000 |
| Racine County | | |
| Number of Residential Units | - - | 202 |
| Number of Nonresidential Structures | - - | 27 |
| Acquisition, Demolition, and Relocation Cost | $ 68,000 | $ 27,578,000 |
| Walworth County | | |
| Number of Residential Units | - - | 53 |
| Number of Nonresidential Structures | - - | 7 |
| Acquisition, Demolition, and Relocation Cost | $ 92,000 | $ 53,358,000 |
| Washington County | | |
| Number of Residential Units | 8 | 146 |
| Number of Nonresidential Structures | 1 | 3 |
| Acquisition, Demolition, and Relocation Cost | $ 369,000 | $ 22,462,000 |
| Waukesha County | | |
| Number of Residential Units | 11 | 164 |
| Number of Nonresidential Structures | 4 | 45 |
| Acquisition, Demolition, and Relocation Cost | $ 999,000 | $ 43,286,000 |
| Southeastern Wisconsin Region | | |
| Number of Residential Units | 39 | 788 |
| Number of Nonresidential Structures | 14 | 215 |
| Acquisition, Demolition, and Relocation Cost | $4,704,000 | $201,289,000 |

*Source: SEWRPC.*

construction of new surface arterial facilities would total only about 131 miles under the recommended plan. More specifically, under the plan, about 3,028 miles, or 84 percent, of the arterial street and highway system is recommended for system preservation only; 448 miles, or 12 percent, for system improvement; and the remaining 131 miles, or 4 percent, for system expansion.

Under the no-build plan for the year 2010, the arterial street and highway system would increase by about 6 percent, from 3,274 miles in 1991 to 3,480 miles. The additional 206 miles consist of three miles of new arterial facilities opened to traffic by January 1, 1994, 11 miles of committed new facilities scheduled for construction in 1994 and 1995, and 192 miles of existing nonarterial streets which could be expected to function as arterials by 2010. More than 98 percent of the arterial system, or about 3,422 miles, would be in the system preservation category; only 47 miles would be in the system improvement category. The improvement and expansion categories would be composed entirely of committed projects.

## Land Use Impacts

Direct land use impacts of the recommended regional transportation system plan and the no-build plan include the acquisition of land for proposed transportation system development, the dislocation of residential and nonresidential structures by proposed improvement and expansion projects, and the penetration of primary environmental corridors by proposed transportation facilities.

The recommended regional transportation system plan would require significantly more land for system development than would the no-build plan. As shown in Table D-3, the cost of land for new or widened transportation facilities for terminals under the recommended plan, including acquisition, demolition and relocation, would approximate $201.3 million. The no-build plan would only require $4.70 million for this purpose. The recommended plan would also entail substantially more dislocation of households, businesses, and industries than would the no-build plan, as shown in Table D-3. Under the recommended plan, the reconstruction of existing, and the construction of new, transportation facilities would displace about 788 residential units and 215 nonresidential structures. Under the no-build plan, about 39 residential units and 14 nonresidential structures would be displaced.

Implementation of the recommended transportation system plan would also require the location of nearly 47.5 miles of new or improved arterial facilities in or through primary environmental corridors. The no-build plan would require the location of about 3.2 miles of arterial facilities in environmental corridors.

Primary environmental corridors contain the best remaining park lands, open space, woodlands, wetlands, wildlife habitat areas, and surface water resources of the Region, and the location of transportation facilities through such environmentally sensitive areas generally should be avoided. However, total avoidance of the penetration or crossing of environmental corridors by transportation facilities is impossible, because both transportation facilities and environmental corridors comprise linear components of the landscape and inevitably must cross at some locations. Under the recommended plan, about 199 acres of environmental corridor may be lost as a result of the construction of proposed new transportation facilities and about 306 acres may be lost as a result of the reconstruction for additional capacity of existing facilities.

It should be noted that this estimate of environmental corridor penetration has been made at the regional system planning level and is necessarily general in nature. More detailed examination during project planning and design phases may indicate that the planned new or improved transportation facilities could be placed outside of environmental corridor lands. This is particularly true, of course, where transportation facilities are proposed to be constructed approximately parallel to the primary environmental corridors.

An indirect land use impact of the recommended and no-build transportation system plans is the relative accessibility to subareas of the Region provided by each plan. Accessibility provides an overall measure of the relative ease with which work, shopping, social, and recreational activities within the Region can be reached from the various subareas of the Region. The accessibility provided under each plan thus influences the relative attractiveness of subareas within the Region with respect to supporting existing land use development and inducing new land use development. The recommended and no-build arterial street and highway plan elements provide nearly the same degree of accessibility to all parts of the Region, and as a consequence, may be expected to support the recommended land use plan to the same degree. The recommended transit plan element provides a higher level of accessibility than the no-build transit plan element to, and within, the central urban areas of the Region. As a consequence, it may be expected to support the regional land use plan to a higher degree than the no-build transit plan element.

<u>Energy Impacts</u>

Another potential environmental impact of the recommended and no-build regional transportation system plans is the fuel consumption by motor vehicles under each plan. The recommended plan may be expected to result in the annual consumption of about 444.3 million gallons of motor fuel. The no-build plan may be expected to result in the annual consumption of 468.1 million gallons of motor fuel (see Table D-4).

As shown in Table D-5, the reasons the recommended plan will result in a lower level of motor fuel consumption than the no-build plan include: a lower level of automobile availability and tripmaking owing primarily to the improved transit service envisioned in the plan and the accommodation of a larger proportion of total travel on more fuel-efficient transportation facilities, transit and uncongested arterial streets and highways.

## Noise Impacts

While noise is a transportation-related impact, a proper assessment of this impact cannot be made at the systems level of planning. Although anticipated traffic volumes on the arterial street and highway system may indicate the relative magnitude of transportation-related noise, such volumes cannot be relied upon alone as an accurate measure of potential noise impacts. Transportation-related noise impacts are properly estimated at the facilities level of planning and preliminary engineering, since the degree to which noise may present a problem depends largely upon the horizontal and vertical location and alignment of the facility, the type and location of the land uses adjacent to the facility, pavement types, the use of such noise abatement measures as walls and plantings, and upon the volume, speed, and type of vehicular traffic on the facility.

**Table D-4**

**COMPARISON OF MOTOR FUEL CONSUMPTION BY VEHICLES TRAVELING IN THE REGION BY FUEL TYPE: 2010 NO-BUILD AND RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLANS**

| Vehicle Type | Annual Motor Fuel Consumption (millions of gallons) | |
|---|---|---|
| | No-Build Plan | Recommended Plan |
| Street and Highway | | |
| Gasoline | 429.5 | 404.0 |
| Diesel | 32.8 | 30.9 |
| Subtotal | 462.3 | 434.9 |
| Transit (diesel) | 5.8 | 9.4 |
| Total | 468.1 | 444.3 |

*Source: SEWRPC.*

## Vehicle Air Pollutant Emission Impacts

Significant reductions in three air pollutant emissions from motor vehicles operating on the arterial street and highway system, volatile organic compounds, nitrogen oxides, and carbon monoxide, may be expected by the year 2010. These reductions in emissions, which reflect estimates of tons emitted on an average summer weekday, are expected to come about, in fact, through Federally mandated changes in vehicle emission standards, through the required use of cleaner-burning motor fuels, and through travel and traffic management measures, the arterial street and highway and transit improvements included in the plan. As compared to the no-build alternative, the emissions expected under the preliminary recommended plan are, in all three cases, somewhat less. These smaller quantities are, in part, the direct result of the fewer vehicle-miles of travel anticipated under the preliminary recommended plan, compared with the no-build alternative.

As shown in Table D-6, the amount of air pollutant emissions will be reduced as a result of the implementation of the final recommended regional transportation system plan. Under the no-build plan, 29.8 tons of organic compounds, 81.4 tons of nitrogen oxide, and 248.4 tons of carbon monoxide may be expected to be generated on an average summer weekday in 2010. Under the final recommended plan, a total of 27.7 tons of volatile organic compounds, 78.9 tons of nitrogen oxides, and 226.0 tons of carbon monoxide may be expected to be generated on an average summer weekday in 2010.

## Community and Local Government Impacts

The recommended and no-build regional transportation system plans also have significant social, economic, and environmental impacts on the communities and local governments within the Region. Community-level impacts include the penetration of neighborhoods by new or improved transportation facilities and the provision of greater accessibility to areas outside the community. Impacts on local government include the reduction of the property tax base and the increase of the local share of transportation system costs envisioned under the plans.

Neighborhood Penetration: The penetration of neighborhood units and neighborhood facility service areas by arterial streets and highways and rapid transit routes may be a community impact of both the recommended and no-build transportation plans. However, the extent of this impact is dependent to a large degree upon project level planning. It is only in such planning that the precise alignments and cross-sections of new transportation facilities would be determined, and the impact on neighborhoods quantitatively determined. It should be noted, however, that the regional land use plan is structured so that arterial streets and highways are to form the exterior boundaries of both existing

Table D-5

**CHARACTERISTICS OF THE NO-BUILD AND RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLANS WHICH RELATE TO ENERGY CONSUMPTION**

| Year 2010 Characteristic | No-Build Plan | Recommended Plan |
|---|---|---|
| Automobile and Light Truck Availability | 1,310,000 | 1,300,000 |
| Average Weekday Internal Trip Production | | |
| Vehicle | 5,330,000 | 5,270,000 |
| Transit Person | 168,000 | 196,400 |
| Total Person | 6,120,000 | 6,100,000 |
| Average Weekday Vehicle-Miles of Travel | | |
| Freeway | 17,290,000 | 15,400,000 |
| Standard Arterial | 27,230,000 | 27,020,000 |

*Source: SEWRPC.*

Table D-6

**AIR POLLUTANT EMISSIONS FROM VEHICLES ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1991 AND 2010 NO-BUILD AND RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLANS**

| Transportation System | Air Pollutant Emissions (tons per average weekday) | | |
|---|---|---|---|
| | Volatile Organic Compounds | Nitrogen Oxides | Carbon Monoxide |
| Base Year 1991 | 119.2 | 129.8 | 815.1 |
| No-Build Alternative 2010 | 29.8 | 81.4 | 248.4 |
| Recommended Plan 2010 | 27.7 | 78.9 | 226.0 |

*Source: SEWRPC.*

and proposed urban neighborhoods; the penetration of such neighborhoods by transportation facilities should, therefore, be minimized.

Property Tax Base Impacts: The reconstruction of existing transportation facilities and the construction of new transportation facilities under the recommended and no-build regional transportation system plans may be expected to impact the property tax base within the Region. An estimate of the property tax base reduction under both plans is shown in Table D-3 as the total value of land consumed and buildings acquired for proposed new and improved transportation facilities. The impact of the recommended plan, $181.6 million, is substantially greater than that of the no-build plan, $3.70 million. It should be noted, however, that the relocation of property owners displaced by new or improved transportation facilities to communities within the Region, possibly even within the same local unit of government, will correspondingly lessen any regional tax base loss.

Transportation System Costs: The recommended and no-build regional transportation system plans also have an impact on the Region in terms of the attendant construction, maintenance, and operation costs of the proposed facilities and services. As shown in Table D-7, the recommended regional plan has a total system construction, operation, and maintenance cost of nearly $522 million per year over the 16-year plan implementation period, about 45 percent greater than the total annual cost of the no-build alternative. This difference in total cost is primarily the result of the greater degree of transportation system improvement envisioned under the plan.

Accessibility Impacts: Another important impact of the recommended and no-build transportation plans is the accessibility which the plans propose to provide. Regionwide, the recommended plan provides a higher level of accessibility than the no-build plan. Passenger-hours per average weekday in the year 2010 would total 1.41 million under the recommended plan and 1.85 million under the no-build plan, indicative of the greater level of accessibility provided by the recommended plan. Implementation of the recommended plan would result in only 162 miles of congested arterial facilities within the Region, or 550 miles fewer than under the no-build plan.

**Table D-7**

**TRANSPORTATION SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION OVER THE PERIOD 1994-2010: NO-BUILD AND RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLANS**

| Cost Element | No-Build Plan | Recommended Plan |
|---|---|---|
| Arterial Streets and Highways | | |
| Capital . . . . . . . . . . . . . . | 190 | 277 |
| Operating . . . . . . . . . . . . | 67 | 66 |
| Subtotal | 257 | 343 |
| Public Transit | | |
| Capital . . . . . . . . . . . . . . | 19 | 77 |
| Operating . . . . . . . . . . . . | 84 | 102 |
| Subtotal | 103 | 179 |
| Total | 360 | 522 |

*Source: SEWRPC.*

Further social, economic, and environmental implications of the regional transportation system plans are indicated by the impact of accessibility under each plan on subareas of the Region. Accessibility by public transit is a measurement of the availability of transit service. Table D-8 identifies the urbanized area and population that may be expected to be served by the regional transit system. The total transit service area is composed of the area within one-quarter mile of a local or express transit route plus the land outside of this local/express service area which is located within a three-mile radius of a rapid transit station.

As shown in Table D-8, the transit service area for the Milwaukee urbanized area under the recommended plan is larger than the service area under the no-build plan. More than 98 percent of the resident population of the Milwaukee urbanized area would be served by transit under the recommended plan, compared to 92 percent under the no-build plan. In the Kenosha and Racine urbanized areas, 79 and 82 percent of the population, respectively, would be served by transit under the no-build plan. The recommended plan would serve larger proportions of the population in these areas as well. By the year 2010, about 88 percent of the Kenosha urbanized area and 95 percent of the Racine urbanized area would be served by transit.

Accessibility to the major employment, retail service, medical, outdoor recreation centers; higher education facilities; and to the General Mitchell International Airport was also analyzed. As shown in Table D-9, the recommended and no-build plans are very similar with respect to meeting accessibility standards within the urbanized area through travel on arterial streets and highways. Nearly all of the population within the Kenosha, Milwaukee, and Racine urbanized areas may be expected to have access to employment opportunities and to two or more of each of the various types of activity centers in a timely manner through use of the arterial street and highway system. In the Milwaukee urbanized area in particular, the recommended plan provides access by arterial streets and highways under 30 minutes' travel time to 40 percent of the employment opportunities within the urbanized area for 1,230,800 persons, or 94 percent of urbanized area population. The no-build plan would provide such access to 92 percent of the Milwaukee urbanized area population. The relative achievement of the other arterial street and highway travel time standards by the recommended and no-build plans is shown in Table D-9.

Also, as shown in Table D-9, the recommended plan provides for better accessibility to employment opportunities and activity centers through use of the transit system than the no-build plan. In the Milwaukee urbanized area, in particular, implementation of the recommended plan would provide access by transit to 40 percent of urbanized area jobs within 45 minutes for 277,500 persons, or 22 percent of urbanized area population. The no-build plan would provide such access to only 600 persons, or less than one percent of the Milwaukee urbanized area population. The relative achievement of the other transit travel time standards by the recommended and no-build plans is shown in Table D-9.

## Table D-8

### TOTAL POPULATION SERVED BY PUBLIC TRANSIT BY AREA: 1991 AND 2010 NO-BUILD AND RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLANS

| Area | Base Year 1991 | | | 2010 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | No-Build Plan | | | Recommended Plan | | |
| | Total Population | Population Served | Percent of Total | Total Population | Population Served | Percent of Total | Total Population | Population Served | Percent of Total |
| Kenosha Urbanized Area | 94,300 | 87,400 | 92.7 | 107,300 | 84,900 | 79.1 | 107,300 | 94,100 | 87.7 |
| Milwaukee Urbanized Area | 1,226,300 | 1,114,500 | 90.9 | 1,277,100 | 1,176,700 | 92.1 | 1,277,100 | 1,255,100 | 98.3 |
| Racine Urbanized Area | 121,800 | 114,300 | 93.8 | 132,100 | 108,800 | 82.4 | 132,100 | 125,900 | 95.3 |
| Subtotal | 1,442,400 | 1,316,200 | 91.2 | 1,516,500 | 1,370,400 | 90.4 | 1,516,500 | 1,475,100 | 97.3 |
| Nonurbanized Area[a] | 368,000 | 43,900 | 11.9 | 394,500 | 66,100 | 16.8 | 394,500 | 128,900 | 32.7 |
| Region | 1,810,400 | 1,360,100 | 75.1 | 1,911,000 | 1,436,500 | 75.2 | 1,911,000 | 1,604,000 | 83.9 |

NOTE: The population served by transit is defined as the population located within a quarter-mile walking distance of a local or express transit route and the population located within three miles driving distance of a rapid transit station.

[a] *Does not include population served by local demand-responsive shared-ride taxi service.*

*Source: SEWRPC.*

## Table D-9

### COMPARISON OF URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO EMPLOYMENT OPPORTUNITIES AND SELECTED ACTIVITY CENTERS THROUGH TRAVEL ON TRANSIT AND ON ARTERIAL STREETS AND HIGHWAYS: 2010 NO-BUILD AND RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLANS

| Urbanized Area and Activity Center | Anticipated Area Population | Urbanized Area Population Meeting Travel Time Standards | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | By Arterial Streets | | | | By Transit | | | |
| | | No-Build Plan | | Recommended Plan | | No-Build Plan | | Recommended Plan | |
| | | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Kenosha Urbanized Area | 107,300 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related[a] | - - | 107,300 | 100.0 | 107,300 | 100.0 | 51,400 | 47.9 | 93,100 | 86.7 |
| Major Retail Service[b] | - - | 0 | 0.0 | 0 | 0.0 | 1,400 | 1.3 | 6,700 | 6.2 |
| Medical Facility[c] | - - | 107,300 | 100.0 | 107,300 | 100.0 | 53,300 | 49.7 | 57,400 | 53.5 |
| Major Park[d] | - - | 107,300 | 100.0 | 107,300 | 100.0 | 20,700 | 19.3 | 24,700 | 23.0 |
| Higher-Education Facility[e] | - - | 107,300 | 100.0 | 107,300 | 100.0 | 51,400 | 47.9 | 68,100 | 63.5 |
| Scheduled Air Transport[f] | - - | 107,300 | 100.0 | 107,300 | 100.0 | 0 | 0.0 | 51,900 | 48.4 |
| Milwaukee Urbanized Area | 1,277,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | 1,180,500 | 92.4 | 1,230,800 | 94.3 | 600 | 0.0 | 277,500 | 21.7 |
| Major Retail-Service | - - | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 35,300 | 2.8 | 78,600 | 6.2 |
| Medical Facility | - - | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 648,000 | 50.7 | 747,000 | 58.5 |
| Major Park | - - | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 617,300 | 48.3 | 759,900 | 59.5 |
| Higher-Education Facility | - - | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 740,900 | 58.0 | 959,700 | 75.1 |
| Scheduled Air Transport | - - | 1,277,100 | 100.0 | 1,277,100 | 100.0 | 316,800 | 24.8 | 630,100 | 49.3 |
| Racine Urbanized Area | 132,100 | - - | - - | - - | - - | - - | - - | - - | - - |
| Employment-Related | - - | 132,100 | 100.0 | 132,100 | 100.0 | 56,400 | 42.7 | 105,900 | 80.2 |
| Major Retail-Service | - - | 132,100 | 100.0 | 132,100 | 100.0 | 18,300 | 13.9 | 32,100 | 24.3 |
| Medical Facility | - - | 132,100 | 100.0 | 132,100 | 100.0 | 46,700 | 35.4 | 53,000 | 40.1 |
| Major Park | - - | 132,100 | 100.0 | 132,100 | 100.0 | 37,000 | 28.0 | 57,000 | 43.1 |
| Higher-Education Facility | - - | 132,100 | 100.0 | 132,100 | 100.0 | 88,400 | 66.9 | 102,700 | 77.7 |
| Scheduled Air Transport | - - | 132,100 | 100.0 | 132,100 | 100.0 | 18,600 | 14.1 | 60,100 | 45.5 |

[a] *Standard: 30 minutes' overall travel time of 40 percent of urbanized area employment opportunities (45 minutes by transit).*

[b] *Standard: 35 minutes' overall travel time of three major retail and service centers in the Milwaukee urbanized area and one major retail and service center in the Kenosha and Racine urbanized areas.*

[c] *Standard: 40 minutes' overall travel time of a major regional medical center and/or 30 minutes' overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes' overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes' overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes' overall travel time of a scheduled air transport airport.*

*Source: SEWRPC.*