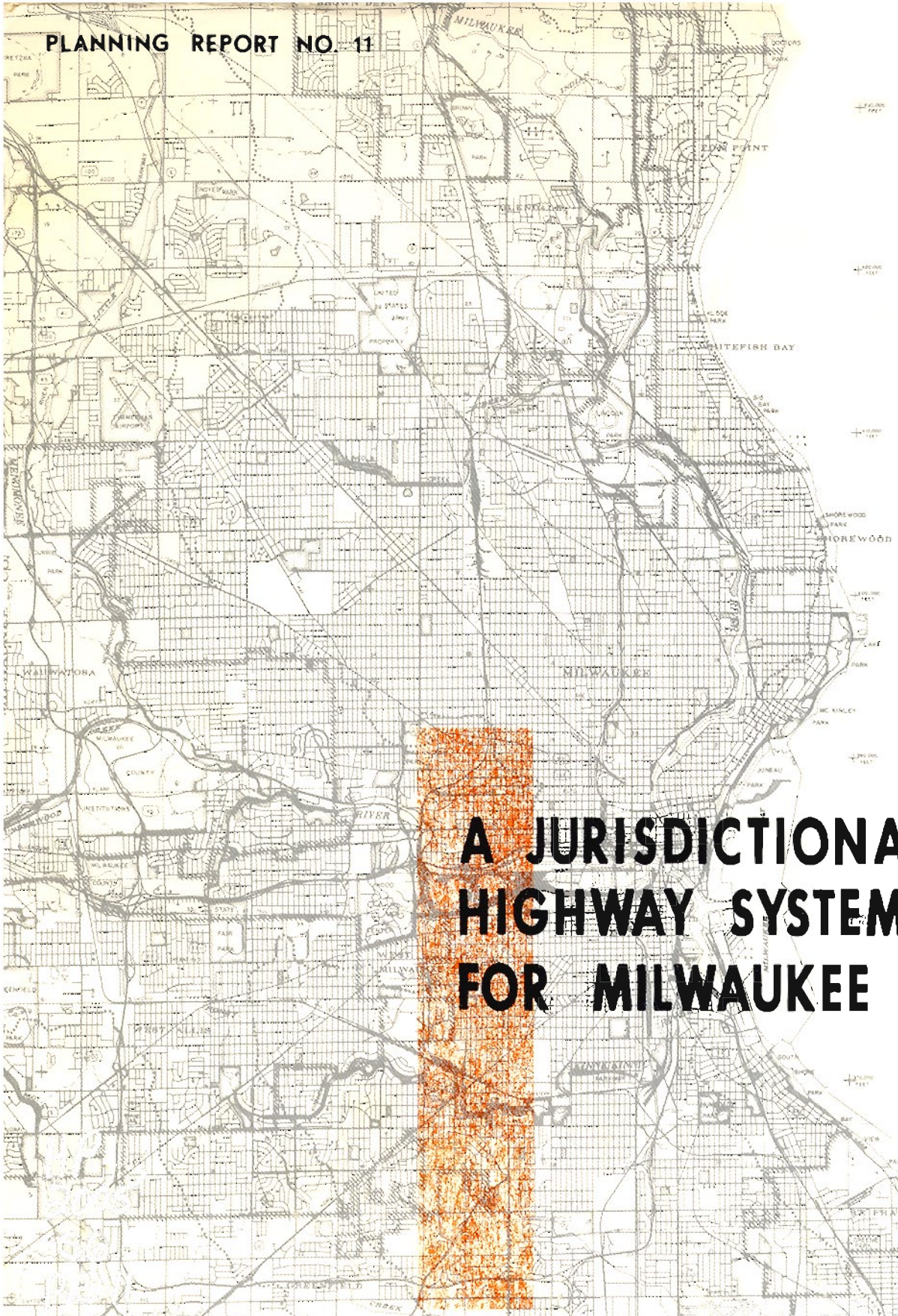
PLANNING REPORT NO. 11

A JURISDICTIONAL HIGHWAY SYSTEM PLAN FOR MILWAUKEE COUNTY



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SEWRPC Planning Report No. 11

A JURISDICTIONAL HIGHWAY SYSTEM PLAN FOR MILWAUKEE COUNTY, WISCONSIN

The preparation of this report was financed in part through a joint planning grant from the State Highway Commission of Wisconsin; the U.S. Department of Transportation, Bureau of Public Roads; and the U.S. Department of Housing and Urban Development under the provisions of the Federal Aid Highway legislation and Section 701 of the Housing Act of 1954, as amended. The necessary local financing was provided by Milwaukee County.

March, 1969

Cost: $5.00

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DEPARTMENT OF PUBLIC WORKS
ADMINISTRATION DIVISION
Milwaukee County

H. B. WILDSCHUT • County Highway Commissioner and Director of Public Works
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25 February 1969

TO: Milwaukee County Board of Supervisors
Southeastern Wisconsin Regional Planning Commission
State Highway Commission of Wisconsin

The Milwaukee County Board of Supervisors on April 10, 1962, with due recognition of need, directed that a comprehensive study be made of the jurisdictional responsibility for the construction, maintenance, and operation of arterial streets and highways in Milwaukee County and that such study culminate in the recommendation of an integrated County Trunk Highway system. This system was intended to supplement the State Trunk Highway system and the existing and proposed freeway network. The initiation of this study was later deferred until completion of the Regional Land Use-Transportation Study. Upon completion of the regional study, the Southeastern Wisconsin Regional Planning Commission and the State Highway Commission of Wisconsin cooperated with the county in this study through the formation of an interagency planning staff.

In order to actively involve the local units of government within the county in this important planning process, a Technical Advisory Committee was formed to assist and advise the interagency staff. Membership on the Committee included knowledgeable and experienced engineers and planners from the U. S. Department of Transportation; the State Department of Transportation; the Southeastern Wisconsin Regional Planning Commission; Milwaukee County; the Cities of Milwaukee, Wauwatosa, and West Allis; and two technical representatives each from the North Shore and South Shore suburban communities. The study represents a sequential continuation of the comprehensive, areawide transportation planning process being cooperatively conducted within the Southeastern Wisconsin Region by the federal, state, and local units of government, being based upon the regional transportation plan prepared by the Southeastern Wisconsin Regional Planning Commission and subsequently unanimously adopted by the Milwaukee County Board of Supervisors.

This report contains the findings and recommendations of two years of intensive work by a most competent interagency staff and by the Technical Advisory Committee. The report constitutes an integrated state trunk highway, county trunk highway, and local trunk highway system plan for Milwaukee County and contains specific recommendations for implementation. The findings and recommendations contained in this report were most carefully reviewed and unanimously approved by the Technical Advisory Committee. Adoption and implementation of the recommended plan would, in the Committee's opinion, provide the county with an integrated highway transportation system which will effectively serve and promote a desirable land use pattern, abate traffic congestion, reduce travel time and costs, and reduce accident exposure. It would also serve to concentrate appropriate resources and capabilities on corresponding areas of need, assuring the most effective use of the total public resources in the provision of highway transportation and providing a sound basis for the establishment of long-range fiscal policies and for the systematic programming of arterial street and highway improvements within Milwaukee County.

This report, and the plan it represents, is the result of a most unusual intergovernmental planning effort without precedent within the United States. The report and plan are hereby respectfully submitted for your careful consideration and approval. Favorable action on the report and plan is respectfully urged by the interagency staff and by the Intergovernmental Technical Advisory Committee.

Respectfully submitted,

Henry B. Wildschut

Henry B. Wildschut, Chairman
Technical Coordinating and Advisory
Committee on Jurisdictional Highway Planning
County Highway Commissioner and Director of Public Works

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Chapter I

INTRODUCTION

On December 1, 1966, the Southeastern Wisconsin Regional Planning Commission, pursuant to its statutory responsibilities and after four years of intensive study, adopted two of the key elements of a comprehensive plan for the physical development of the Region: a regional land use plan and a regional transportation plan. On March 17, 1967, in accordance with its advisory role, the Commission certified these plans to the constituent counties, cities, villages, and towns, as well as to certain state and federal agencies, for adoption and implementation. On May 25, 1967, after careful consideration and upon the recommendation of the Milwaukee County Highway Committee and the Milwaukee County Park Commission, the Milwaukee County Board of Supervisors adopted the recommended land use and transportation plans as guides to be used in making decisions concerning the physical development of the county.

The adopted regional land use and transportation plans, as well as the salient findings and recommendations of the comprehensive regional land use-transportation study, upon which the plans are based, are set forth in SEWRPC Planning Report No. 7, Volume 1, Inventory Findings—1963; Volume 2, Forecasts and Alternative Plans—1990; and Volume 3, Recommended Regional Land Use and Transportation Plans—1990. The regional transportation plan recommends a threefold approach to the solution of the growing transportation problems of the rapidly urbanizing Region. First, it recommends the development of an expanded, fully integrated, regional freeway system which would serve to remove heavy volumes of fast, through traffic from the existing surface arterial street and highway system. Second, it recommends the development of an integrated regional modified rapid transit and rapid transit system, designed to complement and supplement the transportation services provided by the regional freeway and standard arterial systems and to provide, efficiently and economically, a high level of transit service to the most intensely urbanized areas of the Region. Third, and of direct concern to this report, it recommends improvements and additions to the existing surface arterial street and highway system in order to provide an areawide system of standard arterials properly related to the recommended freeway and modified rapid transit and rapid transit systems.

The regional transportation plan thus contains, as an integral element, a functional arterial street and highway system plan. This functional plan consists of recommendations concerning the general location, type, capacity, and service levels of the arterial street and highway facilities required to serve the rapidly developing Southeastern Wisconsin Region to the year 1990. Except for freeways the functional plan does not, however, contain recommendations as to which levels and agencies of government should assume responsibility for the construction, operation, and maintenance of each of the various facilities included in the functional plan.[1]

As a logical sequel to the adoption of the Recommended Regional Land Use and Transportation Plans, the Milwaukee County Board of Supervisors directed that the County Highway Committee, in cooperation with the U. S. Department of Transportation, Bureau of Public Roads; the Highway Commission of the Division of Highways, Wisconsin Department of Transportation;[2] the Southeastern Wisconsin Regional Planning Commission; and the local units of government concerned, proceed with the conversion of the functional highway plan contained within the adopted regional transportation plan to a jurisdictional highway plan,

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[1] *The regional transportation plan recommends that the State Department of Transportation, Division of Highways assume jurisdictional responsibility for all proposed freeway facilities shown on the regional transportation plan outside Milwaukee County and that the Milwaukee County Expressway Commission assume such jurisdictional responsibility for all proposed freeway facilities shown within Milwaukee County.*

[2] *References throughout this report to the "Highway Commission" are intended to refer to the former State Highway Commission of Wisconsin (SHCW), which, pursuant to Chapter 75 (Kellett Bill) of the Laws of 1967, has been renamed the Highway Commission of the Division of Highways, Wisconsin Department of Transportation.*

which would contain specific recommendations as to the level and agency of government which should assume responsibility for the construction, maintenance, and operation of each segment of the total arterial street and highway system. Such a plan would also contain concomitant recommendations for the realignment of the federal aid highway systems, as well as of the state and county trunk highway systems and, if warranted, propose necessary changes in the various state and federal aid formulae. Earlier, on July 26, 1963, the Milwaukee County Board, motivated by numerous requests from municipalities within Milwaukee County for revision and expansion of the county trunk highway system, had adopted a statement of policy, which indicated that "only after completion of the Regional Land Use-Transportation Study could a realistic and orderly revision of the State Trunk and County Trunk Highway System be accomplished."

The conversion of the functional highway plan to a jurisdictional highway plan is one of the first and most important steps necessary to implementation of the regional transportation plan. The Southeastern Wisconsin Regional Planning Commission has recommended that this conversion be accomplished within the Region on a county-by-county basis under the aegis of the respective county boards working in close cooperation with the Highway Commission; the Southeastern Wisconsin Regional Planning Commission; and the local units of government concerned. The Milwaukee County Board of Supervisors considered it appropriate to proceed at once with the study necessary to convert the functional highway plan to a jurisdictional plan and to determine which arterial streets and highways within Milwaukee County and along its boundaries should, logically and properly, be under the jurisdiction of the county. The Board, therefore, on November 17, 1966, through the County Highway Commissioner and Director of Public Works, requested the Regional Planning Commission to cooperate with the county and the state in such a study. The Highway Commission also considered it appropriate to proceed at once with such a study in order to reevaluate, in a comprehensive and coordinated manner, the location and extent of the state trunk highway system within Milwaukee County and agreed to request U. S. Department of Transportation, Bureau of Public Roads, participation in the study.

NEED FOR A COMPREHENSIVE REVISION OF HIGHWAY JURISDICTION

Although implementation of the adopted regional transportation plan is an important reason for proceeding with a jurisdictional highway planning study, other reasons exist. Among the most important of these is the fact that the location and extent of the state and county trunk highway systems within Milwaukee County, as well as of the related federal aid highway systems, all of which were slowly evolved on an empirical basis over a period of many years, have become increasingly obsolete in light of changing areawide land use development patterns and accompanying areawide changes in traffic demand. The rapid development of automotive transportation within Milwaukee County and the Region, of which Milwaukee County is a part, has placed new and greatly increased demands on the existing arterial street and highway system in the county. The county and its constituent municipalities have become aware of the fact that the existing arterial street systems are no longer able to carry the increasing traffic volumes at an adequate and acceptable level of service and that available resources will have to be reallocated to meet the increasing demand. The regional land use-transportation study indicated that over 42 percent of the total arterial street and highway mileage within the county was in 1963 operating at or over design capacity; that is, was exhibiting severe congestion. As further documented by the regional land use-transportation study, Milwaukee County can expect to continue to experience substantial population and industrial growth during the two decades ahead; and this growth will be accompanied by still greater increases in the demand for transportation services and facilities. Moreover, a rapidly changing regional land use pattern has brought about, and will continue to bring about, important changes in the manner in which the increased traffic demand is effected upon the total street and highway system, so that the existing jurisdictional highway systems can no longer function as effective subsystems on their present alignment and in their present extent.

Another reason for proceeding with a jurisdictional highway planning study at this time is the fact that poor land use development has in some cases severely affected the ability of the existing jurisdictional subsystems to perform

their intended functions on their existing alignment. As traffic patterns developed over the years within Milwaukee County, those arterial streets and highways which carried the heaviest volumes of traffic became lined with extensive "strip" commercial land use development. Thus, altogether too often, a poor relationship was established between the arterial street network and the adjacent land uses, which served not only to increase traffic demand and impede the capacity of the existing arterials but at the same time to make major capacity improvements in the existing facilities extremely difficult and expensive. Consequently, arterial traffic is in many locations within the county confined to facilities which were originally constructed to provide for a much lower level of traffic demand and which are difficult and expensive to improve. Under these circumstances, either re-routing of the arterial traffic is required or the necessary resources must be made available to adequately improve the existing facilities. Realignment of the jurisdictional highway systems is necessary to achieve subsystems which will adequately serve the daily demand for the movement of persons and goods without adversely affecting desirable land use patterns.

In some instances, localized improvements, such as adjustments in vertical and horizontal alignment, provision of additional pavement width, control of access, signalization of intersections, and the signing and marking of intersections for channelization of traffic, may provide temporary relief from growing traffic congestion. The proper integration of these improvements into a broad, areawide, and long-range effort to improve traffic operations and service also demands realignment of the existing jurisdictional highway systems into more fully integrated subsystems.

Another very important reason for proceeding with a jurisdictional highway planning study at this time is that fragmented deletions from the original county trunk highway network made over a period of many years, as large portions of the county were converted from rural to urban use and concomitantly incorporated, have complicated the construction, operation, and maintenance of the remaining portions of the network and have destroyed the necessary system continuity. This destruction of system continuity, moreover, has taken place during a period of increasing traffic demand; and an urgent need, therefore, exists to recreate an integrated county trunk highway system to serve the growing urban transportation needs of the county.

Finally, the construction of an areawide freeway system within the Region has radically altered traffic patterns on certain parallel and cross arterials in and near freeway corridors. Adjustment of the jurisdictional street and highway network to these changes is essential if both the freeway and the surface arterial systems are to function properly and will require the realignment of jurisdictional subsystems.

In summary, a jurisdictional highway planning effort is required at this time in order to: cope with the growing and changing traffic demands, adjust the existing jurisdictional subsystems to changes in land use development along their alignment, reestablish an integrated network of county trunk highways which will function as a system, and adjust the jurisdictional subsystems to reflect the major changes in traffic patterns resulting from freeway utilization. The need for such a jurisdictional planning effort is, consequently, urgent within Milwaukee County.

STUDY ORGANIZATION

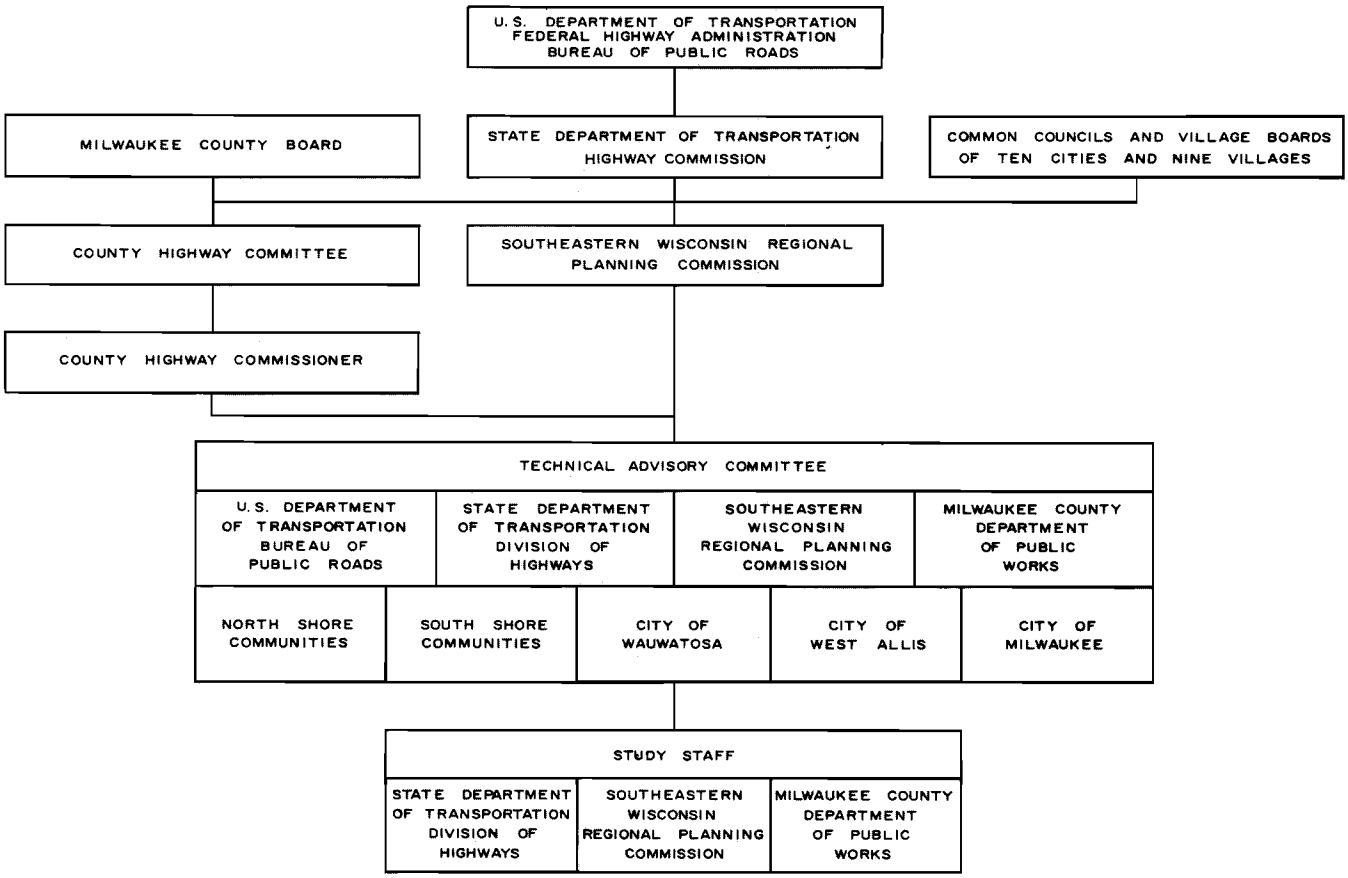
Staff Requirements

The organization created for the necessary jurisdictional highway planning study is shown in Figure 1. Since the necessary jurisdictional highway planning effort was preceded by an intensive, comprehensive, areawide functional highway planning study, a large staff was not required to carry out the effort. This preceding study provided almost all of the necessary basic planning and engineering data, as well as the traffic simulation models essential to any meaningful jurisdictional highway system planning effort. Only a very small staff of experienced state, regional, and county transportation engineers closely associated with the development of the functional highway plan was, therefore, required. With a thorough understanding of the regional land use and transportation plans, and of the data and simulation models incorporated in these plans, the conversion of the functional highway plan to a meaningful jurisdictional plan could thus be readily accomplished from a technical standpoint.

Since the development of the regional land use and transportation plans involved the direct assign-

Figure 1

ORGANIZATIONAL STRUCTURE FOR JURISDICTIONAL HIGHWAY PLANNING STUDY MILWAUKEE COUNTY, WISCONSIN



Source: SEWRPC

ment of technical staff to the regional study by the state and county, as well as participation by these agencies and the local units of government in the Technical Advisory Committee structure established for the initial study effort, and since a continuing, comprehensive, areawide transportation planning effort had been established by the Regional Planning Commission in cooperation with the county boards, the local units of government, and the state and federal governments, a successful jurisdictional study could be efficiently attained by utilizing the same interagency staff which participated in the initial land use-transportation study. The study staff, therefore, consisted of personnel drawn from the Highway Commission; the Milwaukee County Department of Public Works; and the Southeastern Wisconsin Regional Planning Commission.

Advisory Committee Structure

Because any realignment in the jurisdictional highway systems would affect the local units of government concerned in many ways, it was considered essential to actively involve these local units of government in the planning process. Such participation had been previously obtained within the county in connection with highway needs determination studies through use of a Technical Advisory Committee with technical representation from the Cities of Milwaukee, Wauwatosa, and West Allis and with representation from the North Shore and South Shore suburbs, as well as from the state and county. Consultation with the elected heads of the local units of government indicated that a similar arrangement for the jurisdictional highway planning effort would be considered desirable and that the technical, not policy-making, local officials should be represented on the advisory committee. A Technical Advisory Committee was, therefore, incorporated into the jurisdictional highway planning study organization to provide guidance and assistance to the staff during the course of the study. Specifically, this Committee was charged with assisting

and advising the study staff on technical methods, procedures, and interpretations; assisting in the assembly and evaluation of planning and engineering data; assisting in the establishment, definition, and review of criteria; appraising alternative plans; and resolving any conflicts which might arise in plan preparation and selection. The Committee was intended to be a working committee and to actively involve the local technical officials in the planning process, an objective which it has fully met.

Membership on the advisory committee was drawn to include representation from the U. S. Department of Transportation, Bureau of Public Roads; the Highway Commission; the Southeastern Wisconsin Regional Planning Commission; the Milwaukee County Department of Public Works; the Cities of Milwaukee, Wauwatosa, and West Allis; two representatives from the North Shore Communities; and two representatives from the South Shore Communities.

A complete committee membership list is set forth on page 130 of this report. The committee was responsible for the detailed review and ultimate approval of the completed work of the study staff and for transmittal of the recommended jurisdictional plan to the constituent and cooperating agencies for adoption and implementation.

STUDY PURPOSE AND PLAN OBJECTIVES

The primary purpose of the jurisdictional highway planning study was to identify, and subsequently group into subsystems, classes of arterial streets and highways serving similar functions and providing similar levels of service, utilizing criteria established for this purpose, and, further, to assign jurisdictional responsibility over the subsystems so established to the appropriate level of government having the greatest basic interest so as to achieve the following objectives:

1. Promote implementation of the adopted regional transportation plan.

2. Provide a sound basis for the efficient multi-jurisdictional management of the total arterial street and highway system and for the attainment of the necessary intergovernmental coordination in that management; and thereby to avoid conflicts over, and duplication in, the administration, financing, design, construction, maintenance, and operation of the individual facilities which must comprise the total arterial street and highway system.

3. Provide a sound basis for the efficient design and improvement of the total arterial street and highway system by combining into subsystems those facilities which, because of the type and level of service provided, should have similar standards for design, construction, operation, and maintenance.

4. Provide a basis for the establishment of a sound long-range fiscal policy and for the systematic programming of arterial street and highway improvements; and thereby to assure the most effective use of the total public resources in the provision of highway transportation, focusing the appropriate resources and capabilities on corresponding areas of need.

5. Provide a basis for the more equitable distribution of highway system development costs and revenues among the levels and agencies of government concerned.

FORMAT OF PRESENTATION

The findings and recommendations of the jurisdictional highway study, as presented in this Report, have been unanimously approved by the Technical Coordinating and Advisory Committee on Jurisdictional Highway Planning for Milwaukee County established for the study. The Report traces the history of the present state trunk, county trunk, and federal aid highway systems; describes the techniques and procedures used to prepare a plan for the realignment of these systems; and presents the recommended jurisdictional highway system plan so prepared. Existing financing formulae are described, proposals advanced for the revision of these formulae, and the financial feasibility of the recommended plan determined and documented. Finally, means for implementation of the study findings are provided, together with recommended staging of major improvements.

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Chapter II
THE JURISDICTIONAL HIGHWAY PLANNING PROCESS

INTRODUCTION

The establishment, proper improvement, and efficient operation and maintenance of an arterial highway system are important to the orderly growth and development of any area. Such a system is particularly important to the orderly growth and development of a large metropolitan region and to the orderly growth and development of a county, such as Milwaukee County, which comprises the urban core of such a large metropolitan region (see Map 1). A well-conceived arterial highway system, delineated on the basis of sound planning and engineering principles, will provide a framework upon which good land use development can progress and, if properly improved and maintained, will stimulate and foster the social and economic, as well as the physical, development of the county and of the entire region.

The arterial highways of an urbanizing region must function as a single, integrated, areawide system, even though various levels and agencies of government are responsible for the design, construction, maintenance, and operation of various parts of the total system. The identification of jurisdictional subsystems within the total arterial highway system is, therefore, essential to the attainment of an efficient, workable, and fully integrated system and to the avoidance of inefficiencies and duplication of effort. The planning of the total arterial highway system and the identification of the various jurisdictional subsystems on an objective, rational basis are highly complex, technical processes requiring not only the prerequisite planning and engineering skills and data but also the active participation of the several levels and agencies of government concerned with the provision of highway transportation services within the urbanizing region.

BASIC CONCEPTS

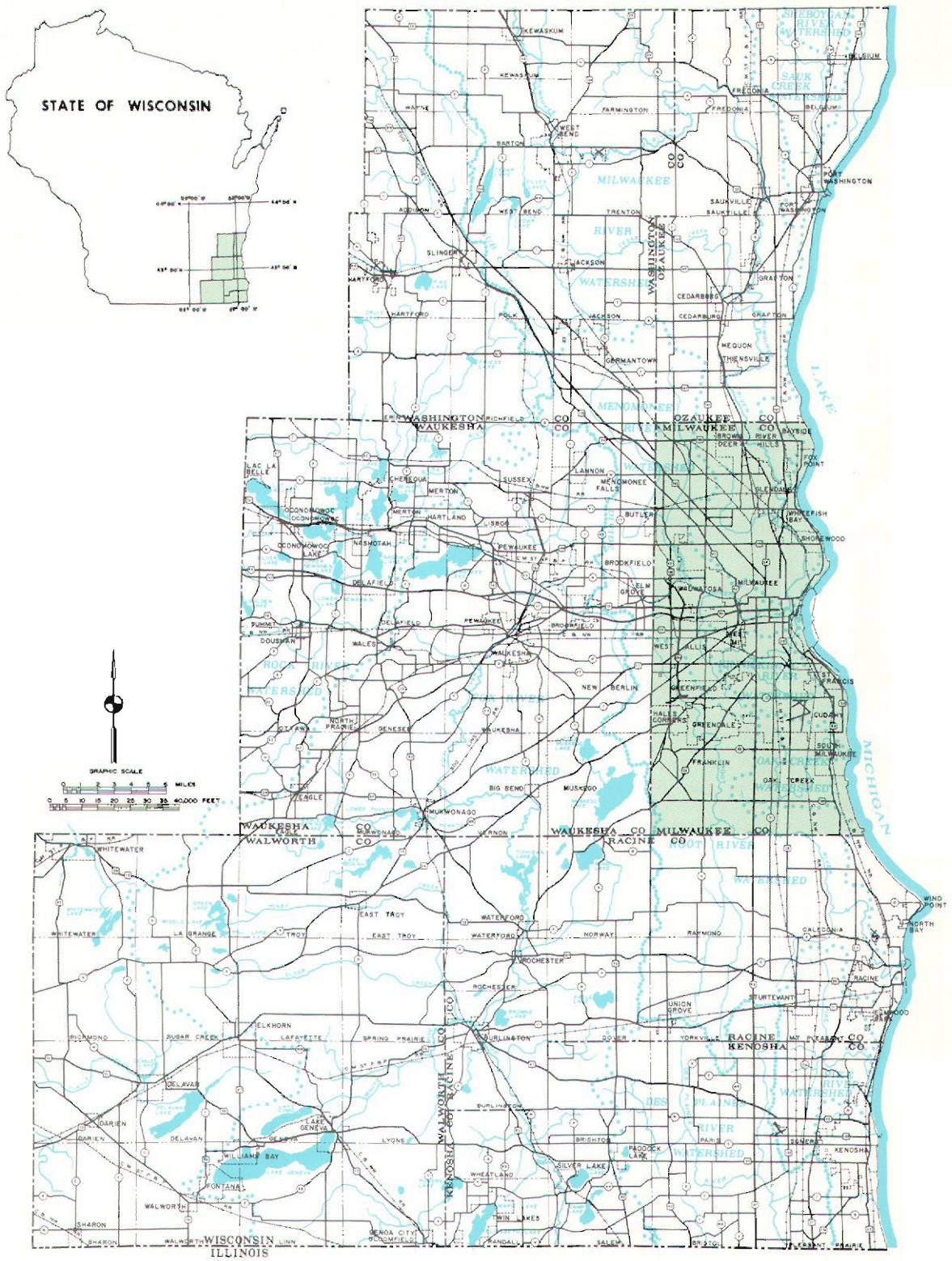
Any planning for coordinated highway system development must involve a comprehensive determination of the character of the individual facilities needed to provide an adequate highway transportation system. Such planning cannot be done effectively on an uncoordinated, "one-road-at-a-time" basis since individual streets and highways do not serve travel independently in any significant way. Rather, most travel involves movement through a total system of highway facilities. Consequently, the planning of highway system development must begin with a consideration of the trips to be served by the facilities and the land uses which generate these trips.

Since it is impossible to provide direct-line highway connections for all travel desires existing within an urban area, the trips must be channelized into an actual system of streets and highways in a logical and efficient manner. The functional classification of highway facilities defines the nature of this traffic channelization process by identifying the function which each particular street or highway should serve in the total highway system. The functional classification of the total arterial street and highway system thus becomes one of the important elements of the comprehensive transportation planning process. It provides the means for defining travel paths through the total highway network and thereby provides the basis for estimating the amount and character of traffic which each facility in the total system may be expected to carry. The functional classification also provides the means for establishing desirable levels of service to be provided by each of the facilities comprising the total system and a basis for determining the predominant travel distances served by various segments of the total system.

The singularly most important basic concept underlying the jurisdictional highway planning process, therefore, is that the jurisdictional highway planning process must be preceded by a functional highway planning process; that is, a jurisdictional highway system plan must be based upon, and derived from, a prior functional highway system plan. The development of a sound and viable jurisdictional highway system plan, therefore, can properly proceed only within the context of a comprehensive areawide transportation planning process which has identified the transportation needs of the entire urbanizing region to a selected design year and which has provided definitive recommendations for meeting those needs through the improvement of both arterial highway and mass transit facilities in the form of a functional transportation plan.

Map I

LOCATION OF MILWAUKEE COUNTY WITHIN THE SOUTHEASTERN WISCONSIN REGION



The seven-county Southeastern Wisconsin Region encompasses only 5 percent of the total area of the state but contains about 40 percent of the state's population, over one-half of all tangible wealth in the state, and employs about 42 percent of the state's labor force. Milwaukee County forms the urbanized center of this Region.

The functional arterial street and highway network established in the initial regional land use-transportation study effort for the Southeastern Wisconsin Region, accordingly, became the point of departure for the preparation of the jurisdictional highway system plan within Milwaukee County. The jurisdictional highway planning problem was thus one of identifying jurisdictional subsystems within the total arterial system on an objective and rational basis, with the character of the trips served, the character of the land use activities served, and the service level of each subsystem becoming the basis for the subclassification.

Functional Classifications

In the initial regional land use-transportation study effort, all of the existing streets and highways within the Region were classified on the basis of existing function into two categories: arterial and all other. The latter category included the collector and minor (land access) street subcategories. This classification was based primarily upon the function which the facilities were actually performing at the time of the classification in the considered opinion of experienced, knowledgeable state and local public works engineers responsible for the construction, maintenance, and operation of the total street and highway system.

An arterial facility was defined, in the initial regional land use-transportation study effort, as a facility which is intended to serve the movement of heavy volumes of through traffic. Its primary function is, therefore, to facilitate the expeditious movement of vehicular traffic. A secondary function may be the provision of access to abutting land, but this function should always be subordinate to the primary function of traffic movement. Arterial facilities include freeways, expressways, certain types of parkways, and standard surface arterial streets and highways. Freeways and expressways do not provide direct access to abutting land uses and are intended to provide safe, convenient, economical, and expeditious movement of the heaviest volumes of traffic involving the longest trip lengths. The standard arterials and certain parkways are intended to serve through traffic, the volumes and trip length characteristics of which do not warrant the use of freeways or expressways.

The collector street, which was not categorized as an arterial in the initial land use-transportation study, provides the transitional connection from the arterial network to the local land access street network. As the name implies, the function of collector streets is to collect and distribute traffic, as well as to provide access to abutting land uses. Since arterial routes serve longer trip lengths with a higher level of service, traffic on a collector street will usually turn onto an arterial wherever the collector intersects an arterial, if the trips comprising the traffic are of significant length. In a rectangular grid street pattern it may be difficult to distinguish clearly between the arterial and collector function as these relate to existing facilities. Straight and continuous collector streets, several miles in length, may carry significant volumes of traffic, thus appearing to serve as arterials even though the predominant use of the street may be to carry traffic to the next junction with an arterial so that the major portion of the trip can be made over an arterial facility. Collector streets, moreover, may serve industrial and commercial, as well as residential, land uses. In industrial and commercial areas, the collector streets may properly be used by both trucks and buses serving tributary land uses. In residential areas collector streets may properly be used by buses serving tributary land uses. In some instances, roadway widths of some collector streets may, in response to the character and volume of traffic, be wider than the roadway widths of some arterials. Traffic control devices may be installed to protect or facilitate traffic movement on collectors, as well as on arterials.

Functional Classification Criteria

In the process of establishing an arterial network in an urbanized area, it is extremely important to protect, to the extent feasible and possible, existing desirable forms of community development, as well as to promote sound future land use development or redevelopment. The proper spacing and location of arterial facilities, existing and proposed, are most important to the attainment of this end. The penetration of a residential neighborhood by heavy volumes of fast, through vehicular traffic is one of the surest means of destroying the desirable characteristics of a neighborhood. It has, therefore, become a well-accepted planning principle that the most desirable location for arterial routes is on the periphery of residential neighborhoods. To this end, the Regional Planning Commission in establishing regional development objectives, principles, and standards has recommended the following minimum spacings for arterial routes:

1. High-density[1] urban development—one-half mile spacing.

2. Medium-density[2] urban development—one mile spacing.

3. Low-density[3] urban development—two mile spacing.

Accepting the premise that a well-planned and properly maintained arterial highway system should serve the demands of through traffic with minimal disruption of residential development, the location and spacing of the arterial facilities becomes unusually important. The arterial network should also be clearly identifiable so that it is readily apparent which routes should be carrying the heaviest volumes of through traffic in a given corridor and so that these routes can provide boundaries between planned development units. The component parts of the arterial network should be properly spaced so that the number of intersections with other arterials allows for good traffic progression and efficient system operation.

FUNCTIONAL NETWORK REFINEMENT

As a prerequisite to the actual jurisdictional highway planning process, the functional arterial street and highway network prepared under the initial regional land use-transportation planning effort was refined and updated to reflect changes in traffic patterns and to better accommodate future land use development. This refinement and updating of the functional arterial network included a careful review of the existing and desirable future functions of each route included in the original network. This review was made in cooperation with local planning and engineering staffs and included consideration of existing and proposed land uses along the facilities, as well as of the location, spacing, and operational characteristics of the facilities themselves.

The review indicated that the original functional arterial network for Milwaukee County included some facilities which were now acknowledged to serve collector rather than true arterial functions. It indicated also that the original classification had placed too much emphasis upon the functions actually being served by the various components of the total street and highway system at the time of the original classification and too little emphasis upon the desirable changes in these functions over time. Just because a given street or highway functions as an arterial at the present time does not necessarily mean that it should continue to perform this function in the future.

Accordingly, facilities which did not meet the functional classification standards recommended by the Regional Planning Commission were deleted from the functional network. These constituted a total of 121 miles of facilities throughout the entire county. The revised functional network was once more reviewed by experienced public works engineers most intimately acquainted with the construction, maintenance, and operation of the total street and highway system; and the revised functional arterial street and highway network was then adopted as a basis for the jurisdictional highway planning effort.

THE JURISDICTIONAL HIGHWAY PLANNING PROCESS

Based upon the preceding basic concepts, a seven-step planning process was employed in the development of a jurisdictional highway system plan for Milwaukee County. The seven steps constituting the process were: 1) study design; 2) formulation of objectives and standards; 3) inventory of existing systems, aid formulae, and financial resources; 4) jurisdictional systems analyses; 5) plan design; 6) plan test and evaluation; and 7) plan adoption. A brief description of each of these seven steps follows (see Figure 2):

Study Design

Every planning program must embrace a formal structure or study design so that the program can be carried out in a logical, consistent, and efficient manner. A statement of policy and procedure, setting forth the routine for the conduct of the study, was, therefore, prepared as the initial work element of the Milwaukee County jurisdictional highway planning study. This statement provided a sequential overview of the major work elements of the study; provided for the establish-

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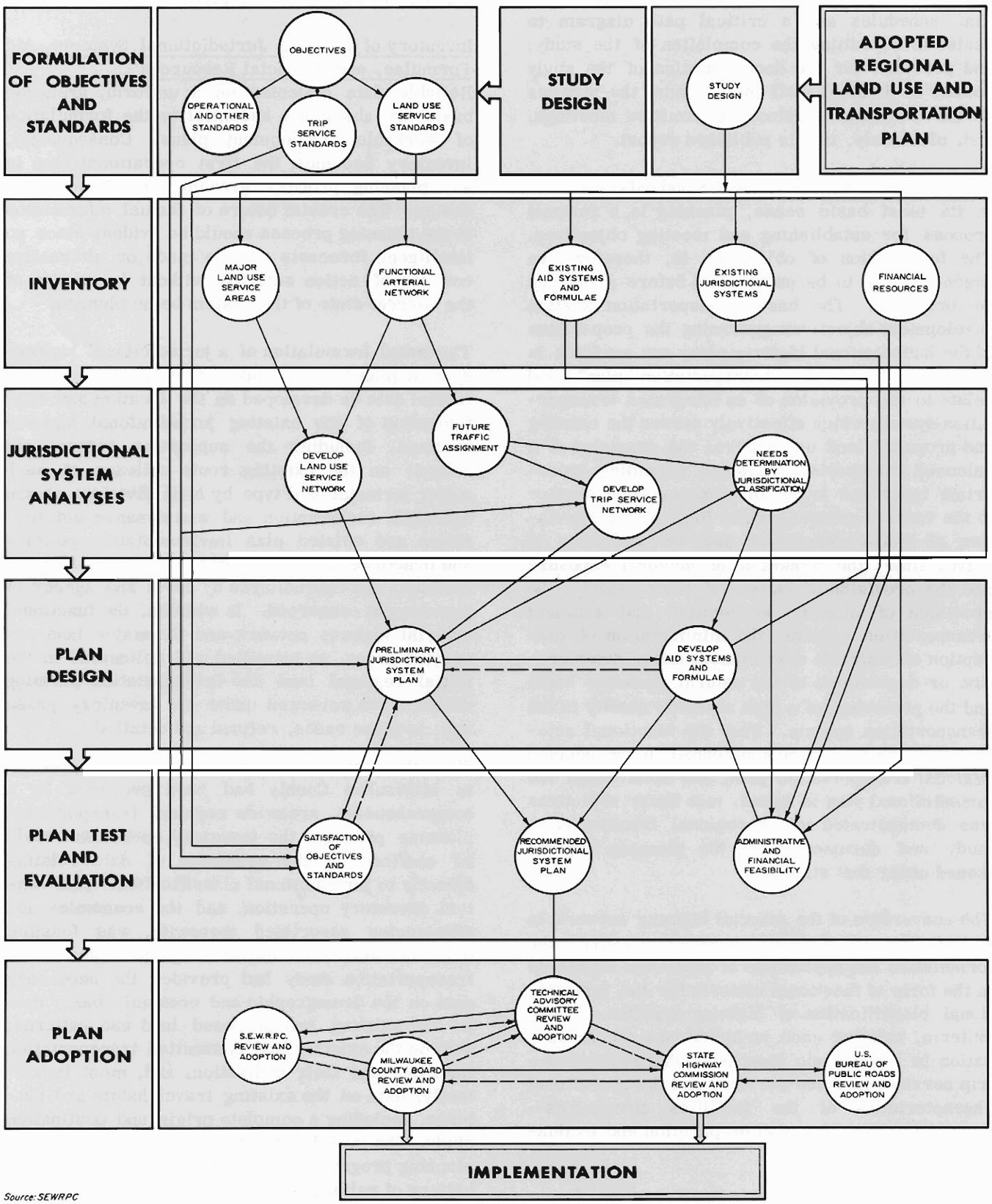
[1] *High-density urban development is defined as development at a gross density ranging from 10,000 to 25,000 persons per square mile (4.8 to 11.8 dwelling units per gross acre).*

[2] *Medium-density urban development is defined as development at a gross density ranging from 3,500 to 9,999 persons per square mile (1.8 to 4.7 dwelling units per gross acre).*

[3] *Low-density urban development is defined as development at a gross density ranging from 350 to 3,499 persons per square mile (0.2 to 1.7 dwelling units per gross acre).*

Figure 2

THE JURISDICTIONAL HIGHWAY PLANNING PROCESS FOR MILWAUKEE COUNTY



Source: SEWRPC

ment of the Technical Advisory Committee necessary to assist in the conduct of the study and the provision of technical policy guidance; established time schedules and a critical path diagram to assist in expediting the completion of the study; and provided for the documentation of the study results in detailed staff memoranda, the minutes of the Technical Advisory Committee meetings, and, ultimately, in this published report.

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 basic transportation system development objectives governing the preparation of the jurisdictional highway plans are set forth in the adopted regional transportation plan[4] and relate to the provision of an integrated transportation system which effectively serves the existing and proposed land use pattern; the provision of a balanced transportation system, providing appropriate types and levels of transportation service to the various subareas of the Region; the alleviation of traffic congestion and the reduction of travel time; the reduction of accident exposure and the provision of increased travel safety; the provision of a more economical and efficient transportation system; the minimization of disruption of desirable development and of deterioration or destruction of the natural resource base; and the promotion of a high aesthetic quality in the transportation system. That the functional arterial highway system recommended in the adopted regional transportation plan, and upon which the jurisdictional plan is based, met these objectives was demonstrated in the regional transportation study and documented in the planning reports issued under that study.

The conversion of the arterial highway network to a jurisdictional network, however, required the formulation and application of additional standards in the form of functional criteria for the jurisdictional classification of highway systems. These criteria, relating each jurisdictional subclassification to three basic functional characteristics—trip service, land use service, and the operational characteristics of the facilities themselves—formed the basis for plan preparation and evaluation by providing a rational and objective basis for the classification of the total arterial street and highway network into jurisdictional subsystems.

Inventory of Existing Jurisdictional Systems, Aid Formulae, and Financial Resources

Reliable data collected on a uniform, areawide basis are absolutely essential to the formulation of workable 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 formulation of a jurisdictional highway system plan for Milwaukee County required that factual data be developed on the location and configuration of the existing jurisdictional highway systems, including the supporting federal aid routes; on the existing route mileage of each major jurisdictional type by civil division; on the attendant construction and maintenance aid formulae and related plan implementation policies and practices; and on historic patterns of highway revenues and expenditures by level and agency of government concerned. In addition, the functional arterial highway network and the major land use service areas, as identified and delineated in the initial regional land use-transportation planning effort, were reviewed under the inventory phase and, in some cases, refined and detailed.

Since the jurisdictional highway planning process in Milwaukee County had been preceded by a comprehensive, areawide regional transportation planning process, the inventory operations could be confined to the collection of data relating directly to jurisdictional classification. This limited inventory operation, and the economies and efficiencies associated therewith, was feasible only because the initial regional land use-transportation study had provided the necessary data on the demographic and economic base; data on the existing and proposed land use patterns; data on the existing and committed transportation facilities and their utilization; and, most importantly, data on the existing travel habits and patterns, including a complete origin and destination study. The initial regional land use-transportation planning program had, moreover, provided a full battery of calibrated and operable traffic simulation models, without which the analyses of traffic

[4] *See SEWRPC Planning Report No. 7, Volume Two, Chapter II.*

flows essential to the jurisdictional highway planning process could not have been accomplished.

Jurisdictional Systems Analyses

Inventories provide factual information about the existing state of the system being planned, but analyses and forecasts are necessary to provide estimates of future needs. These future needs are determined by a sequence of interlocking forecasts. Economic activity and population forecasts set the general scale of future growth, which can, in turn, be translated into future demand for land use and travel. These future demands can then be scaled against the existing supply of land and transportation system capacity and plans formulated to meet any deficiencies. The necessary economic activity, population, land use, and travel demand forecasts were all prepared under the initial regional land use-transportation planning effort. Under the jurisdictional highway planning study, it remained only to utilize these forecasts in the application of the jurisdictional criteria (see Figure 3). This required analyses of the lengths and volumes of trips to be served by each link in the total arterial street and highway system, an identification of the land use areas to be served by each jurisdictional facility type, and an investigation of the operational characteristics of the arterial facilities themselves. Essential to these analyses were the availability of the battery of traffic simulation models formulated and maintained by the Regional Planning Commission.

Plan Design

Plan design forms the heart of the planning process. The outputs of each of the previously described planning operations become inputs to the design problem of plan synthesis. No substitute for intuition and professional judgment in plan design has so far been found, much less developed to a practical level. Means do exist, however, for reducing the gap between the necessary intuitive and integrative grasp of the problem and its magnitude; and these were fully applied in the Milwaukee County jurisdictional highway planning study. They center primarily on the application of systems engineering techniques to the quantitative test of the jurisdictional highway system plans evolved from the functional highway network through the application of intuition and professional judgment. These quantitative tests assure the technical adequacy of the plan design but are of limited usefulness in actual plan synthesis. Consequently, it was still necessary to develop the jurisdictional highway subsystem plans by traditional graphic and analytical "cut and try" methods, then to quantitatively test the resulting design by application of the simulation model techniques and make necessary adjustments in the design until a workable plan was evolved.

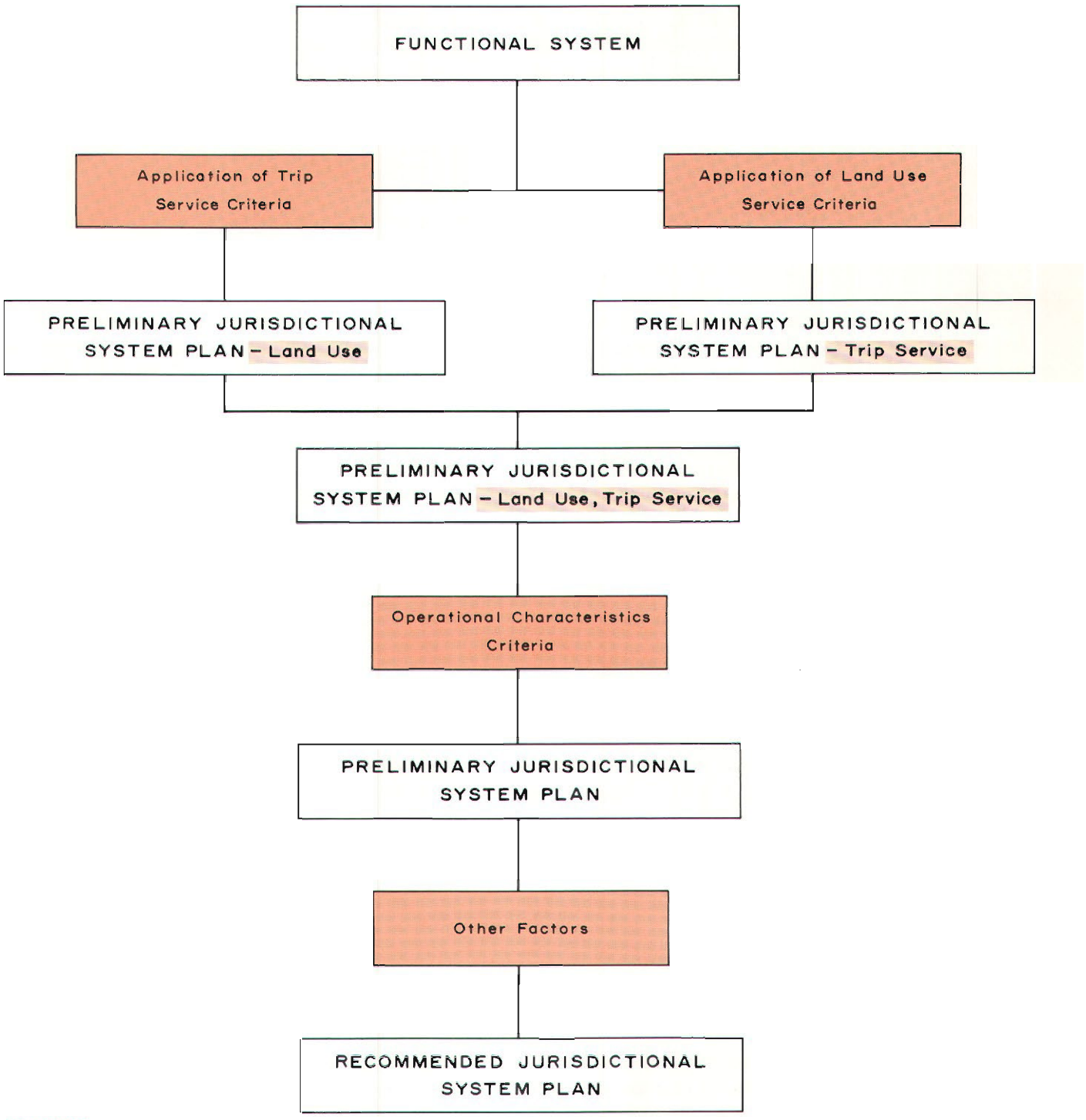
In order to overcome the limitations of individual intuitive grasp of the design problem, maximum resort was made to team effort in the actual plan synthesis; and the knowledge and experience of federal, state, and local highway engineers familiar with the geographic and functional areas concerned was applied to the plan synthesis process through careful Technical Advisory Committee review, interagency staff assignments, and interagency staff conferences. Final determination, with respect to the inclusion or exclusion of any facilities in a jurisdictional subsystem which met only marginally the criteria established for that subsystem, was made by the Technical Advisory Committee. The plan design procedure thus provided for careful review of the application of the criteria by local, county, regional, state, and federal technical staffs and thereby provided a practical jurisdictional highway system delineation, as well as a practical estimate of plan implementation costs and feasible proposals for plan implementation.

Plan Test and Evaluation

If the plans developed in the design stage of the planning process are to be realized in terms of actual transportation system development, some measures must be applied to quantitatively and qualitatively test the plans in advance of their adoption and implementation. The plan test and evaluation process must ascertain whether or not the plans are realistic in scope; consistent with the desirable advancement of the public interest; technically, legally, and financially feasible; and readily comprehendible by knowledgeable elected public officials, engineers, and technicians who will be ultimately charged with implementation.

As already noted, simulation procedures were used to test and verify the technical workability and efficiency of the proposed total arterial highway network. Satisfaction of objectives could be ascertained through application of the jurisdictional criteria in concert with the simulation techniques. These simulation techniques also permitted the determination of future link capacity and accompanying right-of-way and curb-to-curb pavement widths and improvement standards. A total plan implementation cost could then be

Figure 3
PROCEDURE FOR THE
APPLICATION OF CRITERIA IN DEVELOPMENT
OF A JURISDICTIONAL HIGHWAY PLAN



Source: SEWRPC

assigned to the resulting system configuration by the application of unit construction and maintenance costs. From a composite summary of all existing highway aids and revenues prepared under the planning study, a forecast of the public financial resources available for arterial highway improvements could be provided. By comparing the forecast revenues with the forecast needs, the financial feasibility of the proposed plan could be determined.

Plan Adoption

In a practical sense, any plan is not complete until the steps required for its implementation—that is, the steps necessary to convert the plan into action policies and programs—are specified. Plan implementation must begin with plan adoption by the responsible implementing agencies, including particularly the Milwaukee County Board of Supervisors, the Highway Commission of the Wisconsin Department of Transportation, and the U. S. Bureau of Public Roads. All other implementation recommendations, including the schedule for realignment of jurisdictional responsibilities, proposals for capacity protection and right-of-way reservation, staged construction, and capital improvements programming, must follow and flow from such plan adoption.

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Chapter III

HISTORIC DEVELOPMENT AND PRESENT STATE OF THE JURISDICTIONAL HIGHWAY SYSTEMS

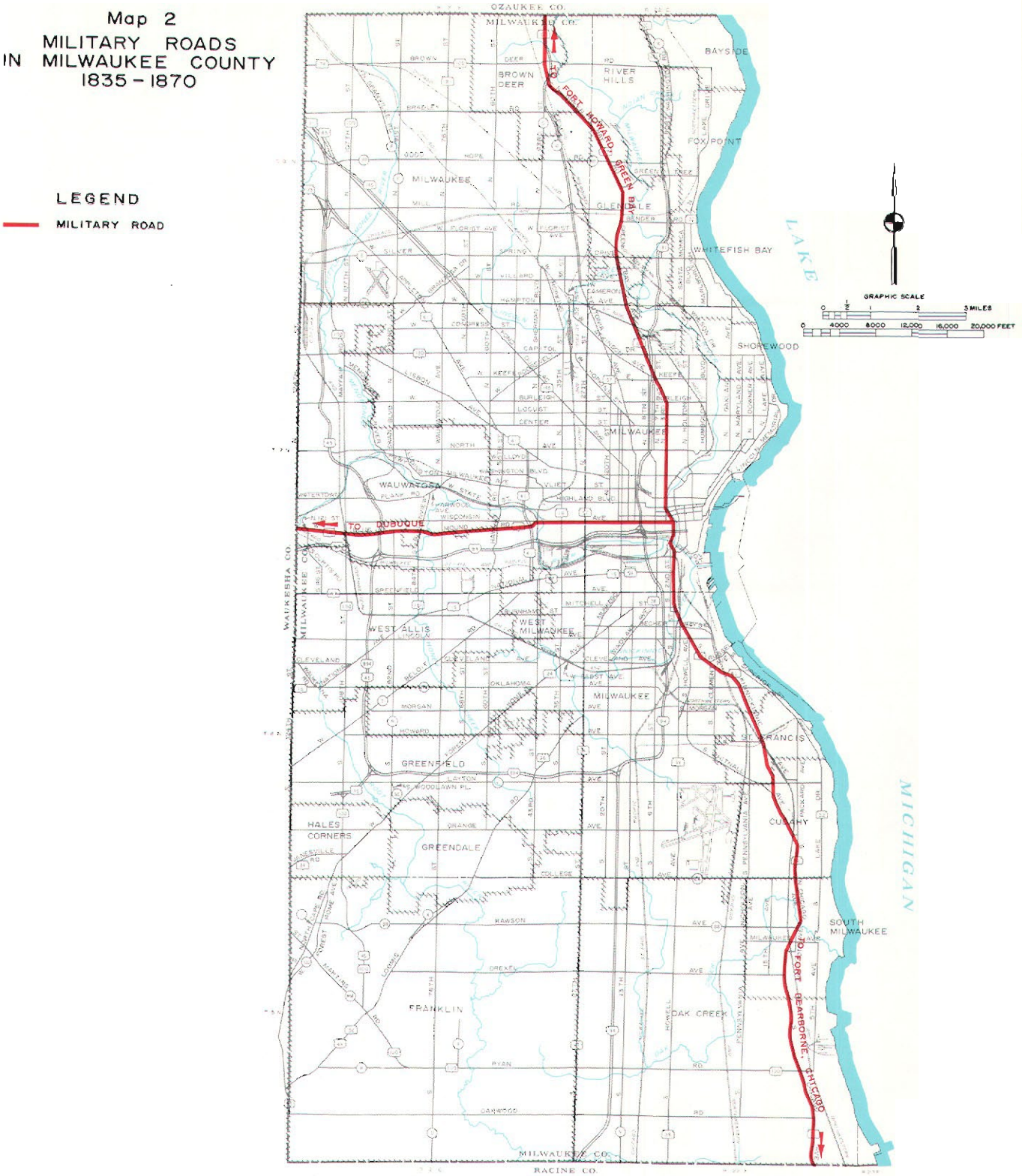
HISTORIC DEVELOPMENT

The earliest European settlers in southeastern Wisconsin traveled "highways" consisting of a network of Indian trails and rivers, which connected the many Indian villages in the territory. It was near these Indian villages at strategic points along the trails and rivers that trading posts were established by the settlers, and many of the present cities and villages within the Region were built on or near the sites of these trading posts and nearby Indian villages. As settlement became more widespread, several forts were constructed for frontier defense against hostile Indians within the territory of which southeastern Wisconsin was then a part. In order to facilitate the transportation of troops and supplies between these forts, the U. S. Army developed and constructed a system of military roads. Map 2 depicts the two military roads that traversed Milwaukee County. The north-south route comprised part of the road from Fort Howard, at what is now Green Bay, to Fort Dearborn, at what is now Chicago. Portions of this road within Milwaukee County are now STH 32 and STH 57. The east-west route comprised part of the road between Milwaukee and Dubuque, Iowa, via Madison, portions of which are now USH 18. Thus, the earliest roads within the Region were federal roads. In 1836 the Territorial Legislature established a system of territorial roads. Although these roads were surveyed and located by commissions appointed by the Legislature, construction costs were assumed by the towns or by local private interests. A road tax was levied on real estate to finance construction of these territorial roads. Map 3 depicts the territorial roads that traversed Milwaukee County. Since many of these territorial roads were poorly constructed and did not provide the transportation service required, demand soon developed for the construction of plank roads. About the time Wisconsin attained statehood in 1848, a number of plank roads were chartered by the territorial and state governments. These roads were to be constructed with private capital as toll roads. The receipts from the tolls were expected to recover the capital investment in construction, keep the roads in repair, and pay a profit to the road building company. The first of these roads in Wisconsin was the Milwaukee to Lisbon Plank Road chartered in 1846. Map 4 depicts the early plank roads constructed in Milwaukee County. A combination of high maintenance costs, low profits, and competition from railroads caused the eventual abandonment of these plank roads. In 1869 the State Legislature authorized and directed town supervisors to declare the remaining plank roads public highways.

After Wisconsin became a state in 1848, all public roads laid out and opened by authorization of the State Legislature were designated as state roads. Commissions were appointed by the State Legislature to establish such roads and were authorized, in addition to opening new roads, to adopt any part of previously established town, county, or territorial roads as state roads. State roads so laid out and opened were a direct charge to the towns through which the roads traversed because of the constitutional provision prohibiting the state government from participation in works of internal improvement. The State Statutes required that the right-of-way for all state roads be established at a width of four rods (66 feet). Later legislation also required all county roads to be laid out with a right-of-way width of not less than four rods. Town roads could be laid out with right-of-way widths of three rods (49.5 feet). The maintenance of the state, county, and town roads was made the responsibility of the towns. The success of the steam railroad in the late 1800's caused highway transportation to be neglected. Private road building companies passed out of existence; and since the state could not directly participate in road construction, very little progress in highway improvement was realized.

About the turn of the century, the motor vehicle became a practical means of transportation and revived the demand for improved highways to connect and serve the growing population centers. As a result the Legislature enacted the first county aid highway laws in 1907. One of the important provisions of these laws provided that any town could, by making an appropriation for highways, secure a similar amount of money from the county for highway improvements. The counties were

Map 2
MILITARY ROADS
IN MILWAUKEE COUNTY
1835 - 1870

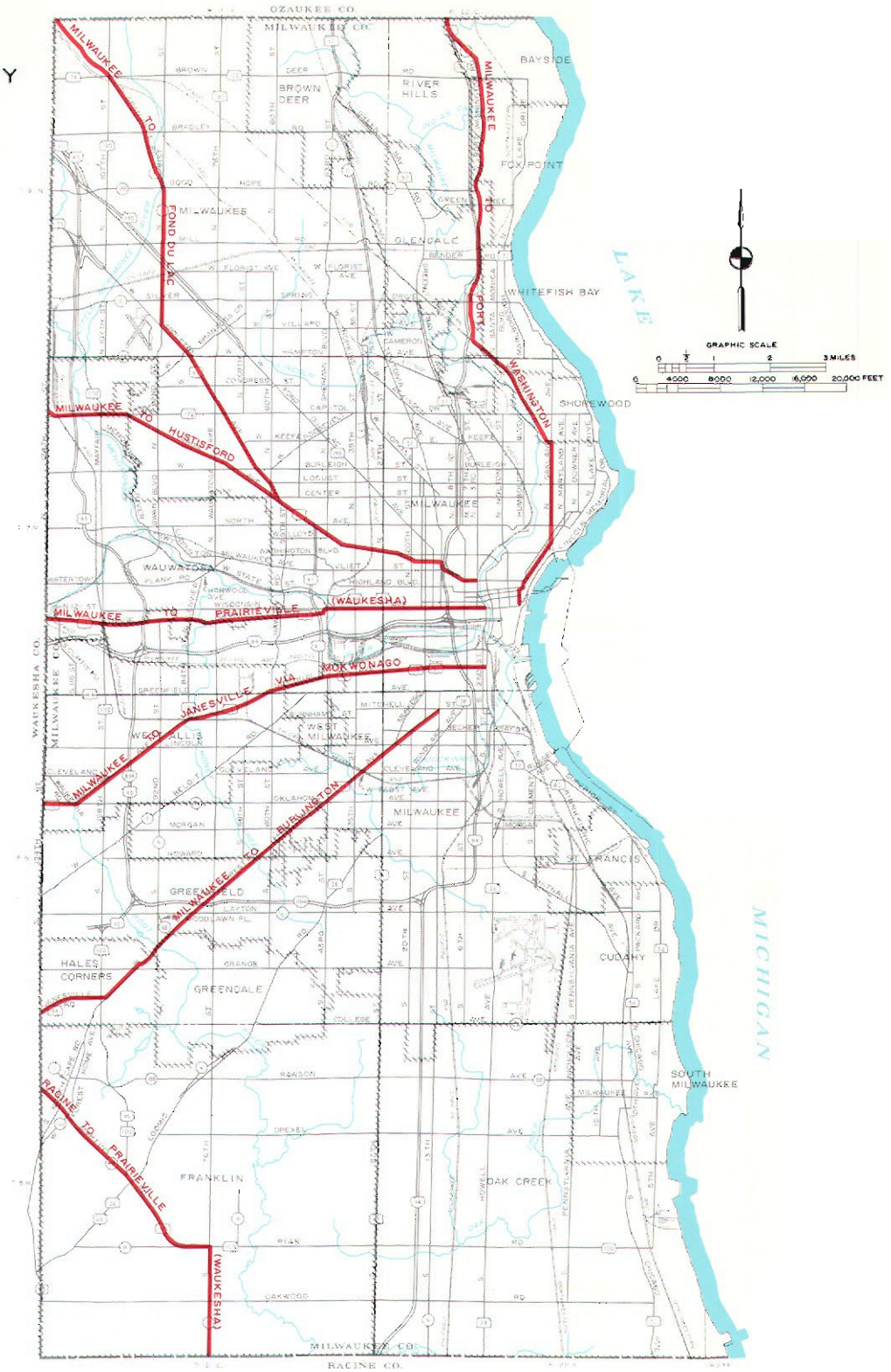


Military roads were constructed in the 1830's to link the forts in territorial Wisconsin. Two of these traversed Milwaukee County. The north-south road connected Fort Howard at Green Bay with Fort Dearborne at Chicago. Another military road was constructed westerly from Milwaukee to Dubuque, Iowa, via Madison. The permanence of highways as a feature of the land and city scopes is illustrated by the fact that today state trunk highways still follow portions of these original military roads.

Map 3
TERRITORIAL ROADS
IN MILWAUKEE COUNTY
1838 – 1848

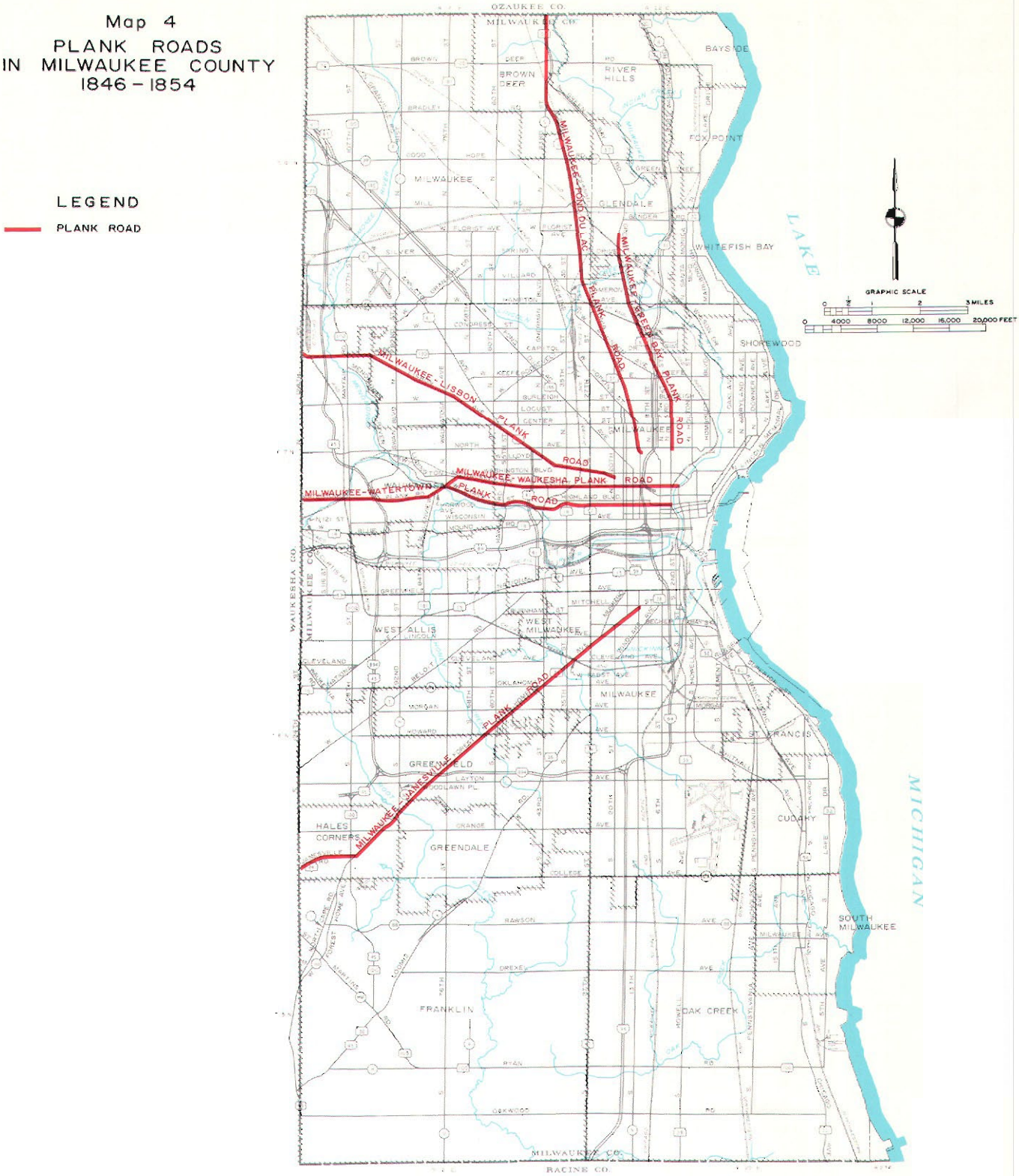
LEGEND

TERRITORIAL ROAD



Approximately 60 miles of territorial roads were constructed in part of the road system established by the Territorial Legislature to connect important settlements. Today state and county trunk highways still follow portions of these territorial roads.

Map 4
PLANK ROADS
IN MILWAUKEE COUNTY
1846 – 1854



The poor construction standards of the territorial roads soon led to the demand for the construction of plank roads. The first of the 135 turnpike and plank roads chartered in Wisconsin was the Lisbon-Milwaukee Plank Road, chartered in 1846. In 1847 the well-known Milwaukee-Watertown Plank Road was chartered and constructed. Part of this road still traverses this original alignment and carries the same name today.

required to select systems of highways upon which improvements were to be made and to elect a County Highway Commissioner to carry out the improvements. The counties were also authorized to levy taxes for highway improvements.

In the general election of 1908, the people of the state approved a constitutional amendment which provided: "That the State may appropriate money in the treasury or to be raised thereafter by taxation for the construction and improvement of public highways." In the period between 1907, when the county aid highway laws were enacted, and 1911, when the first state aid highway law was passed, it had become increasingly apparent that local units of government alone would not be able to construct and maintain the highway facilities which were needed and being demanded. In addition, public opinion was becoming crystalized in favor not only of a much higher level of highway improvement but also of a more centralized regulation and financing of highway construction and maintenance.

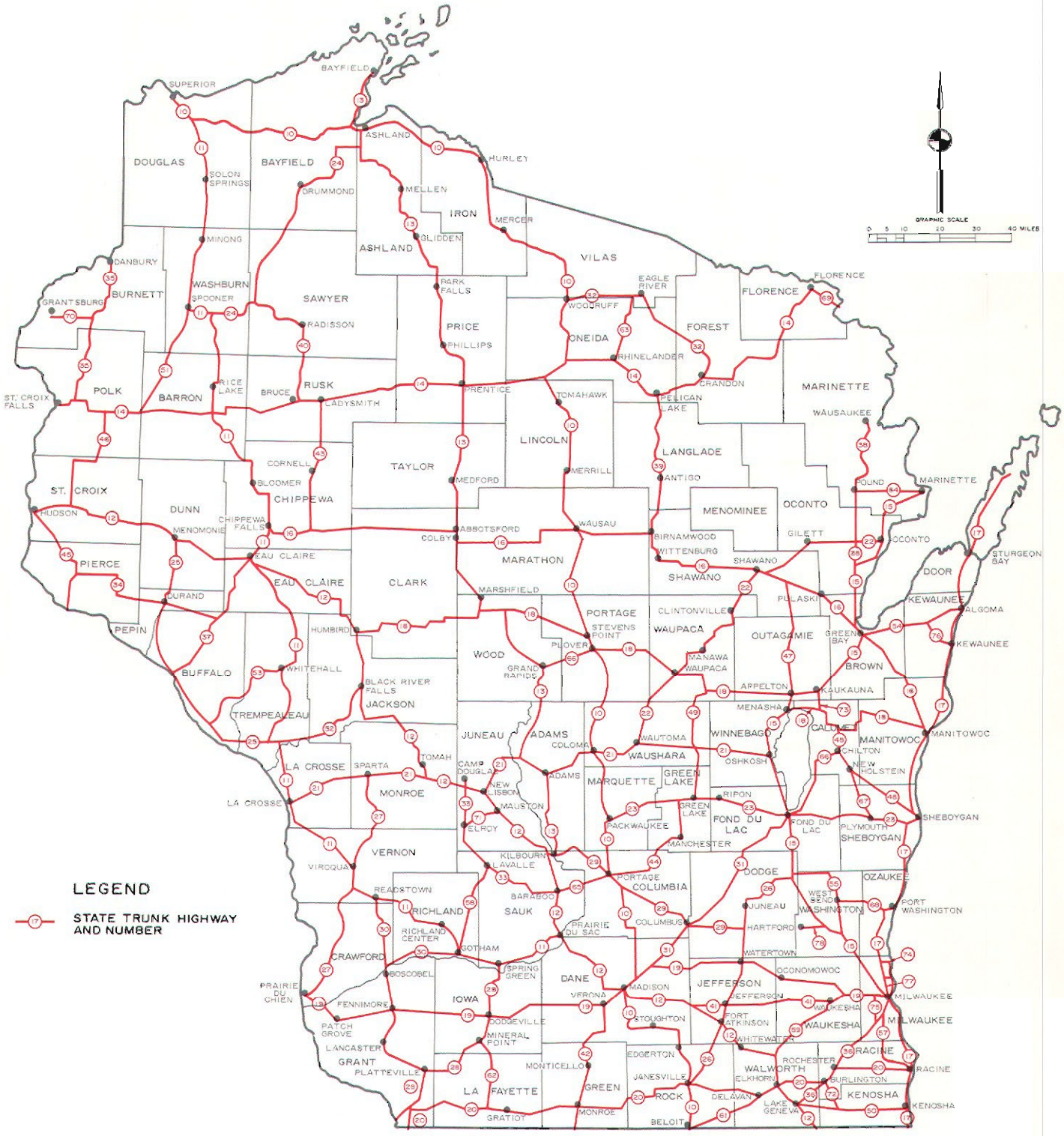
Under Chapter 52, Statutes of 1911, the State Legislature created the State Highway Commission, which was given authority over all matters pertaining to the expenditure of the state highway fund for the improvement of public highways and bridges in the state. The Highway Commission, in turn, organized a State Highway Department to provide the engineering staff necessary to the proper performance of its duties and functions. The chief engineer was designated the State Highway Engineer; and within two years several division offices were established throughout the state, including one at Milwaukee.

In 1916 the United States Congress, realizing the necessity of a national system of highways for interstate transportation and national economic development, passed the first federal aid highway law. The benefits accruing to Wisconsin under this law made it possible for the Highway Commission, already a well-established department, to proceed with the development of an integrated system of state highways, a vast improvement over the aggregation of the discontinuous and often illogical county highway systems then existing. One requirement of the federal aid highway law was that the state assent to the provisions of the federal act and provide for the maintenance of the highways improved with state and federal aid.

The State Legislature of 1917 directed the Highway Commission to establish a state trunk highway system not to exceed 5,000 miles, which would interconnect every county seat and every city with a population of 5,000 or more. The system was laid out after due investigation and public hearings by the Highway Commission. The new law also provided for the proper marking and signing of the system by the Highway Commission and for the publication and sale of maps for the guidance of travel. Maintenance of this system was assigned to the counties under the general supervision of the State Highway Commission. Map 5 depicts the location and numbering of the original state trunk highway system as established statewide in 1918, and Map 6 depicts this system as established in Milwaukee County in 1918. The 1921 Federal Aid Highway Act provided that the states could designate a system of highways, comprising not more than 7 percent of the total road mileage of the state at that time, which would be eligible for federal aid. Wisconsin acted to designate a federal aid system in 1921. This system consisted of a total of 5,516 route miles of facilities. The Federal Aid Highway Act of 1921 provided that this total mileage be divided into two classes of routes, one known as primary or interstate highways and the second known as secondary or intercounty highways. The former were not to exceed three-sevenths of the total federal aid route mileage designated within the state; and the latter, the remaining four-sevenths of that mileage. The primary routes were selected by the State Highway Commission as an integrated system of major intercity traffic carriers totaling 2,364 route miles of facilities. The secondary system was selected by the State Highway Commission in cooperation with local officials and consisted of, in addition to farm-to-market roads, rural mail routes, rural public school bus routes, and county trunk highways and totaled 3,152 route miles of facilities. The total original designation of 5,516 route miles of federal aid primary and secondary highways under the 1921 Federal Aid Highway Act basically comprises the federal aid primary system within Wisconsin today.

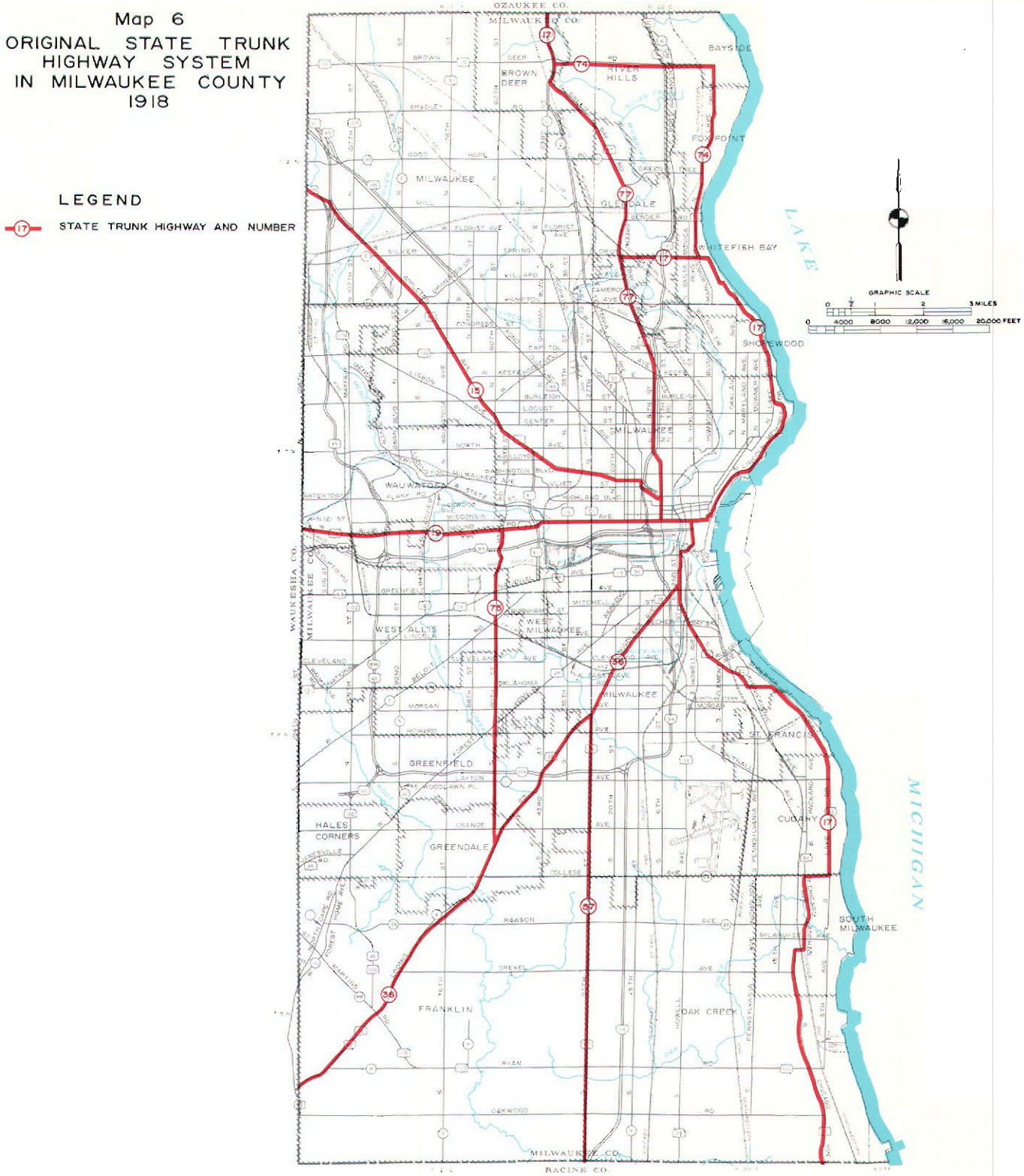
Beginning in 1933 federal aids were made available for the ad hoc improvement of farm-to-market roads not on any federal aid system. The Federal Aid Highway Act of 1944, recognizing the need to improve farm-to-market roads but also recognizing the need to integrate these roads into

Map 5
ORIGINAL STATE TRUNK HIGHWAY SYSTEM IN WISCONSIN
1918



The original 5,000-mile Wisconsin state trunk highway system of 1918 established an integrated, numbered, state-wide network of roads interconnecting every county seat and every community of over 5,000 population in the state.

Map 6
ORIGINAL STATE TRUNK HIGHWAY SYSTEM IN MILWAUKEE COUNTY 1918



Within Milwaukee County the original system of state trunk highways consisted of approximately 70 route miles of facilities. The location of these early state trunk highways again illustrates the permanence of highways as a feature of the urban area.

a system of secondary highways, provided for the creation of a new federal aid secondary system. This federal aid secondary system in Wisconsin was selected by the State Highway Commission in cooperation with local officials and consisted of approximately 14,000 miles of secondary state trunk highways and major county trunk highways. This 14,000 miles was designated, in addition to the original federal aid highways which now became the federal aid primary system, as the federal aid secondary system.

The 1944 Federal Aid Highway Act also provided for the establishment of a third system of highways known as the federal aid urban system. This system was not a true continuous highway system but, rather, consisted of the extensions of federal aid primary and federal aid secondary routes into urban areas having populations of 5,000 or more.

During the period from 1918 to 1924, in addition to the state trunk highway system which the counties were required by law to maintain under the supervision of the Highway Commission, each county voluntarily assumed the responsibility for the improvement and maintenance of an additional number of miles of highway. This was done through the broad statutory general powers of the counties to construct and improve any highway within the county boundaries. The facilities so established were called county trunk highways. The 1925 Legislature validated and confirmed as county trunk highways those highways previously selected by the county boards. These highways were to be marked, maintained, and signed by the counties. The county highway systems were also required to join and be continuous between counties. A map of the selected county system was to be filed with the county clerk and copies forwarded to the State Highway Commission for review and approval. After this initial system was approved, the system could be altered only by the county board through its highway committee with the approval of the State Highway Commission. Allotments were also provided to be set aside for the improvement of the county trunk highway system, including construction, repair, and maintenance of highways and bridges under supervision of the county highway committee. Map 7 depicts the original Milwaukee County trunk highway system as validated by the State Legislature in 1925.

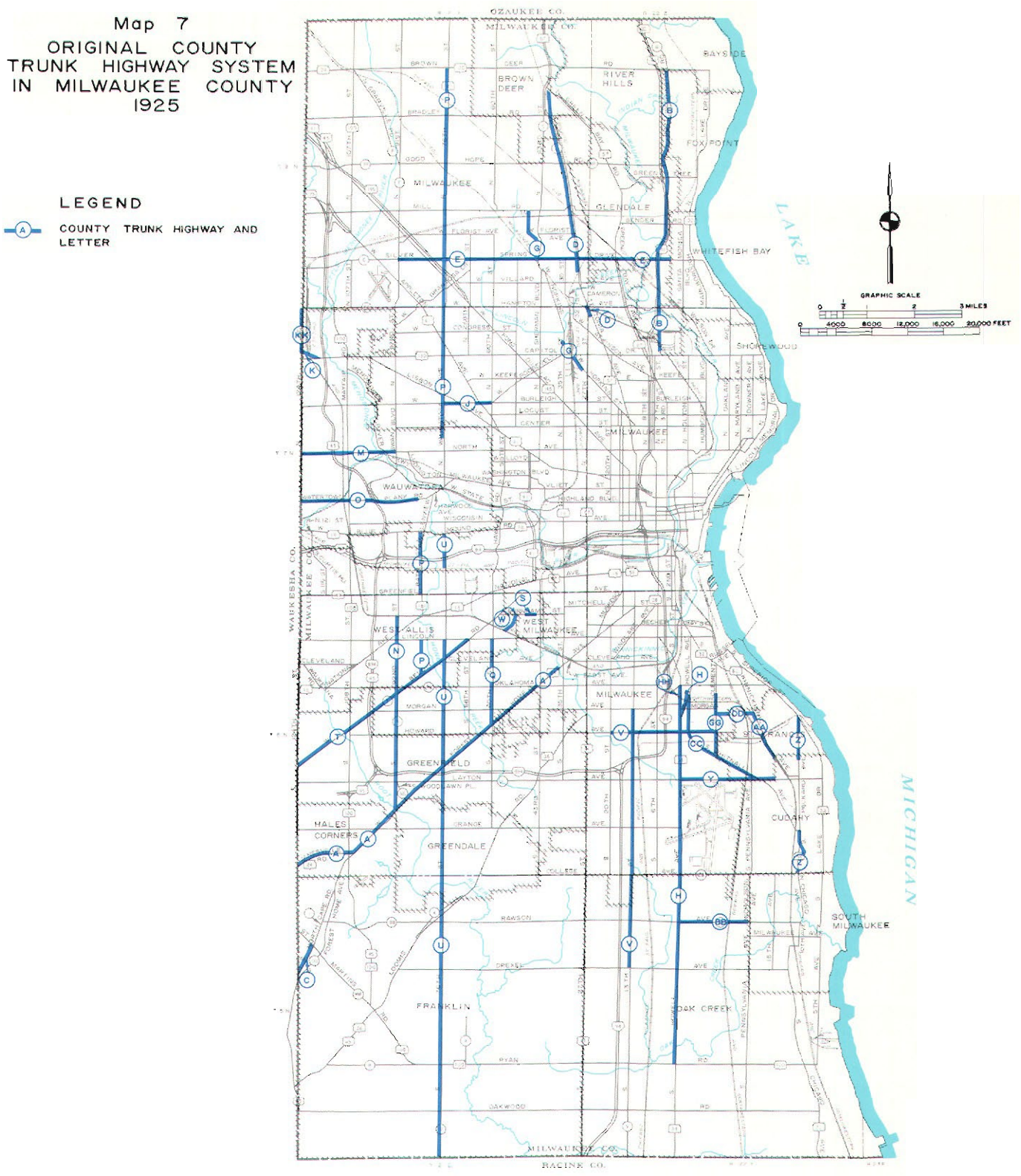
With the establishment of the county trunk highway system in 1925, the original jurisdictional classification of highways in Milwaukee County was completed. The state trunk highway system, which by 1923 had been increased to 10,000 miles statewide, became the primary system of highways; the county trunk highway system, the secondary system; and other roads, more local in nature, the tertiary system.

The statutes specified that the state trunk highway system was to exclude streets or highways in all incorporated areas having a population of 2,500 or more by the last federal census, except that those portions of any such streets or highways along which houses were spaced at an average distance of more than 200 feet could be included at the option of the State Highway Commission. This provision of the statutes permitted the projection of the state trunk highway system into the more thinly developed areas of cities of over 2,500 population to points known as "construction limits." The streets over which the state trunk highway system was routed between the construction limits were designated "connecting streets" and were not legally a part of the state trunk highway system. The cities and villages were assigned the maintenance responsibility for the connecting streets. The same maintenance allotment was provided to the cities and villages for the connecting streets as was provided the counties for state trunk highways of like classification. In 1943 the Legislature changed the definition of the construction limits to those points on the state trunk highways where development had assumed "a predominantly urban characteristic." From these beginnings the highway network in Wisconsin and in Milwaukee County developed over the years, with minor additions and revisions, to the present state and county trunk systems.

Table 1 sets forth highway and street mileages in Milwaukee County at various periods of time from 1918 to 1967. The state trunk highway mileage shown includes connecting streets. Figure 4 indicates that the mileage of each of these three jurisdictional systems has steadily increased to accommodate the rapid growth in motor vehicle registrations and vehicle miles of travel within the county. The only exception to this general trend is the decrease in county trunk highway mileage in the 1950's, when about 30 miles of the existing county trunk highway system became city or village streets upon the action of the newly incorporated municipalities concerned as permitted by State Statute.

Map 7

ORIGINAL COUNTY TRUNK HIGHWAY SYSTEM IN MILWAUKEE COUNTY 1925



The original county trunk highway system in Milwaukee County consisted of 82 route miles of facilities. Highways were designated by letter. Even with the state trunk highways, the early county trunk highways did not form a well integrated system of arterial facilities.

Table 1

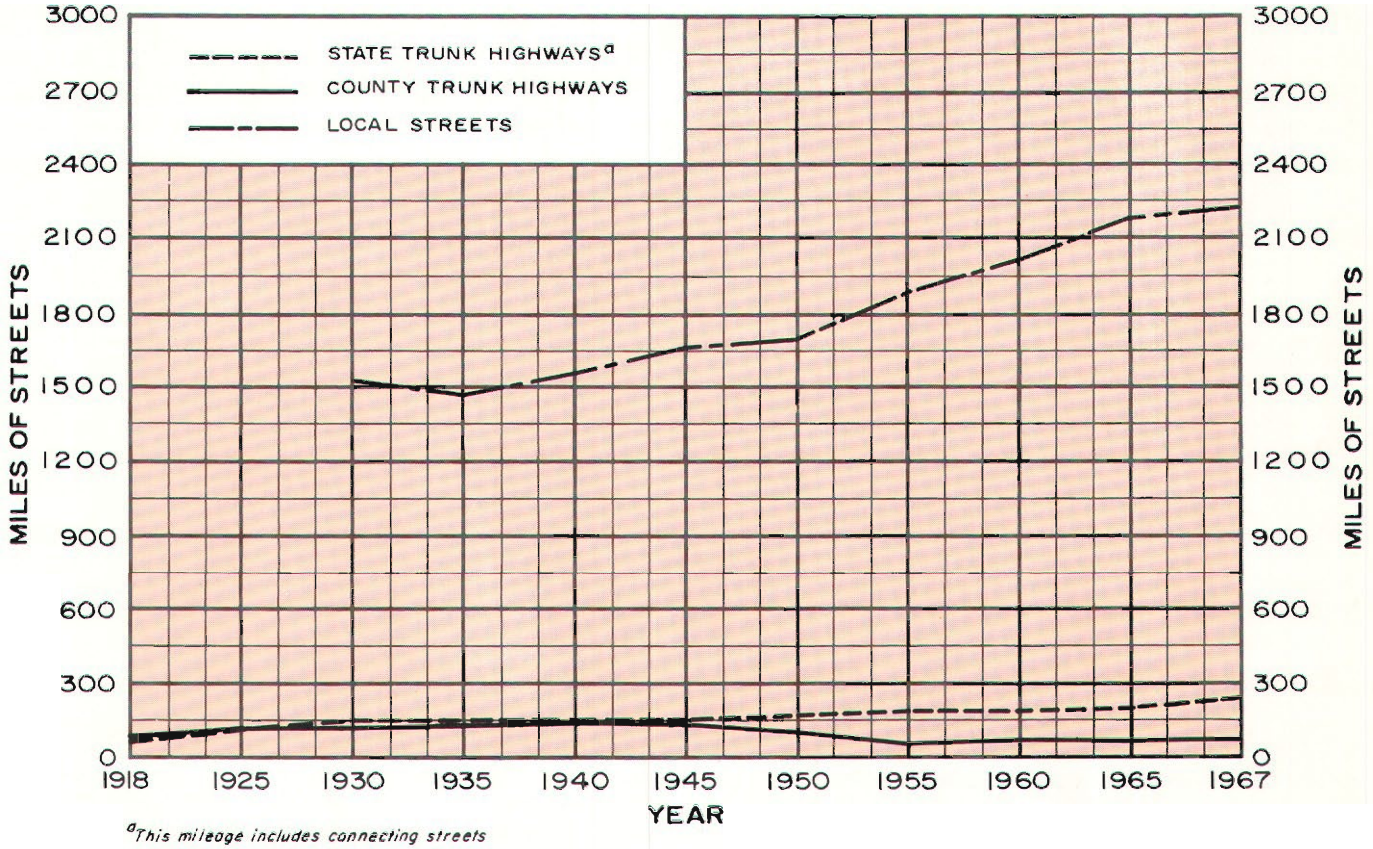
STREET AND HIGHWAY MILEAGE IN MILWAUKEE COUNTY: 1918 - 1967

Year	State Trunk Highways (Including Connecting Streets)		County Trunk Highways		Local Streets		Total
	Mileage	Percent of Total	Mileage	Percent of Total	Mileage	Percent of Total	Mileage
1918	70	--	82	--	--	--	--
1925	101	--	113	--	--	--	--
1930	150	8.4	109	6.1	1,520	85.5	1,779
1935	155	8.8	121	6.9	1,475	84.3	1,751
1940	156	8.5	139	7.5	1,546	84.0	1,841
1945	161	8.3	138	7.1	1,630	84.6	1,929
1950	193	9.7	107	5.4	1,689	84.9	1,989
1955	200	9.2	66	3.0	1,896	87.8	2,162
1960	200	8.7	76	3.3	2,017	88.0	2,293
1965	218	8.8	77	3.1	2,178	88.1	2,473
1967	235	9.4	77	3.1	2,202	87.5	2,513

Source: Wisconsin Department of Transportation and SEWRPC.

Figure 4

TOTAL HIGHWAY AND STREET MILEAGES IN MILWAUKEE COUNTY: 1918 - 1967



[a] *This mileage includes connecting streets*

Source: Wisconsin Department of Transportation and SEWRPC

After World War II, the large increase in motor vehicle utilization brought about a public demand for further improvements in highway system development. To improve the safety and level of service on heavily traveled routes, the State Legislature in 1949 authorized the Highway Commission to designate, as controlled access highways, rural portions of the state trunk highway system on which the average traffic potential was found to be in excess of 2,000 vehicles per day. Once a highway had been so designated, the Highway Commission could, in the public interest, limit the number of driveways and other access points to abutting land. The total statewide controlled-access highway mileage was limited by statute to 1,500 miles. To date, 371 miles have been so designated, 24.0 miles within Milwaukee County (see Map 8).

In 1955 the State Legislature created the state arterial system as an integrated, statewide, interregional, and intercommunity network of highways. The purpose of the act was to facilitate the improvement of the most important portions of the total state trunk highway system. The act specifically designated the arterial system by route description and limited it to 2,200 miles. Routes designated in Milwaukee County totaled 42.4 miles in length (see Map 9). Aside from the requirements of public hearings for changes, no differences significant to jurisdictional highway system planning or plan implementation exist between ordinary state trunk highways and state arterial highways; and throughout the remainder of this report, state arterial highways will be treated as integral and ordinary parts of the total state trunk highway system.

In 1961 the Legislature authorized the designation of 300 miles of state trunk highways as freeways or expressways. Those highway segments carrying sufficient traffic to warrant ultimate construction of four or more moving lanes could be so designated. To date, 236 miles have been designated as freeways or expressways, of which 13.4 miles have been so designated within Milwaukee County (see Map 10). In addition, the federal system of interstate and national defense highways, established in 1956, now provides for 458 miles of interstate highways within Wisconsin,[1] which are constructed to freeway standards. Of this total, 35.81 miles are located within Milwaukee County (see Map 11).

Subject to certain statutory limitations, changes to the state trunk highway system may be made by the Highway Commission if the Commission deems that the public interest is best served by the changes. Procedures for making changes to the state trunk highway system are specified in the State Statutes. The requirements vary, depending on: 1) the mileage involved, 2) whether or not federal aid systems are involved, and 3) whether the proposed changes are on the state trunk highway system or the state arterial system. Table 2 summarizes these requirements.

In Milwaukee County, a County Transportation Director and staff have been provided to assist the Milwaukee County Highway Commissioner in administering the county highway program. In addition, Milwaukee County has, pursuant to Section 59.965 of the Wisconsin Statutes, created a County Expressway and Transportation Commission charged with developing an expressway (freeway) system and a rapid transit system for the county. The position of Transportation Director was created and engineering staff provided to carry out this work under the direction of the County Highway Commissioner. The Milwaukee County Board has, upon recommendation of the County Expressway and Transportation Commission, designated a 58.4-mile system of expressways, which has become a part of the state trunk highway system (see Map 12).

The county board is authorized under Section 83 of the Wisconsin Statutes to designate as controlled-access highways those rural portions of the county trunk highway system having an average traffic potential of 2,000 vehicles per day. By cooperative agreement with city or village governing bodies, this authority may be extended into incorporated areas. The total mileage of such designated controlled-access highways in any county is limited to 10 percent of the county trunk mileage. The Milwaukee County Board has not chosen to designate any portions of the county trunk highway system as controlled-access facilities.

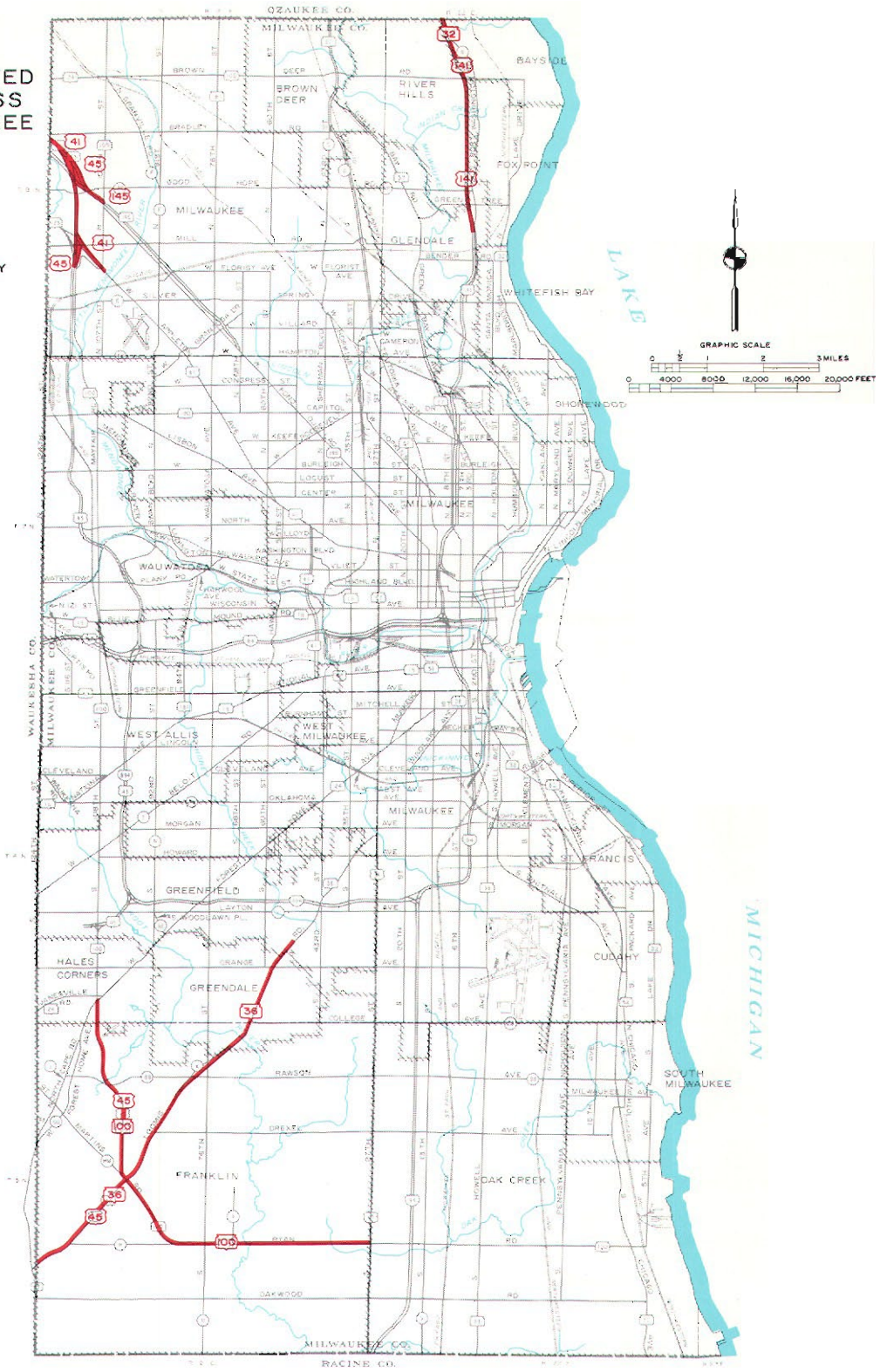
Streets within corporate areas not on the state trunk or county trunk highway systems are under local jurisdiction for planning, design, construction, maintenance, and operation. Responsibility for administration of the municipal programs gen-

[1] *This total does not include the additional 104 miles of interstate highway allotted to Wisconsin by the Federal Highway Administration in December 1968. At this writing it is not known how this additional interstate highway mileage will affect Milwaukee County.*

Map 8
STATE HIGHWAY COMMISSION DESIGNATED CONTROLLED – ACCESS HIGHWAYS IN MILWAUKEE COUNTY 1967

LEGEND

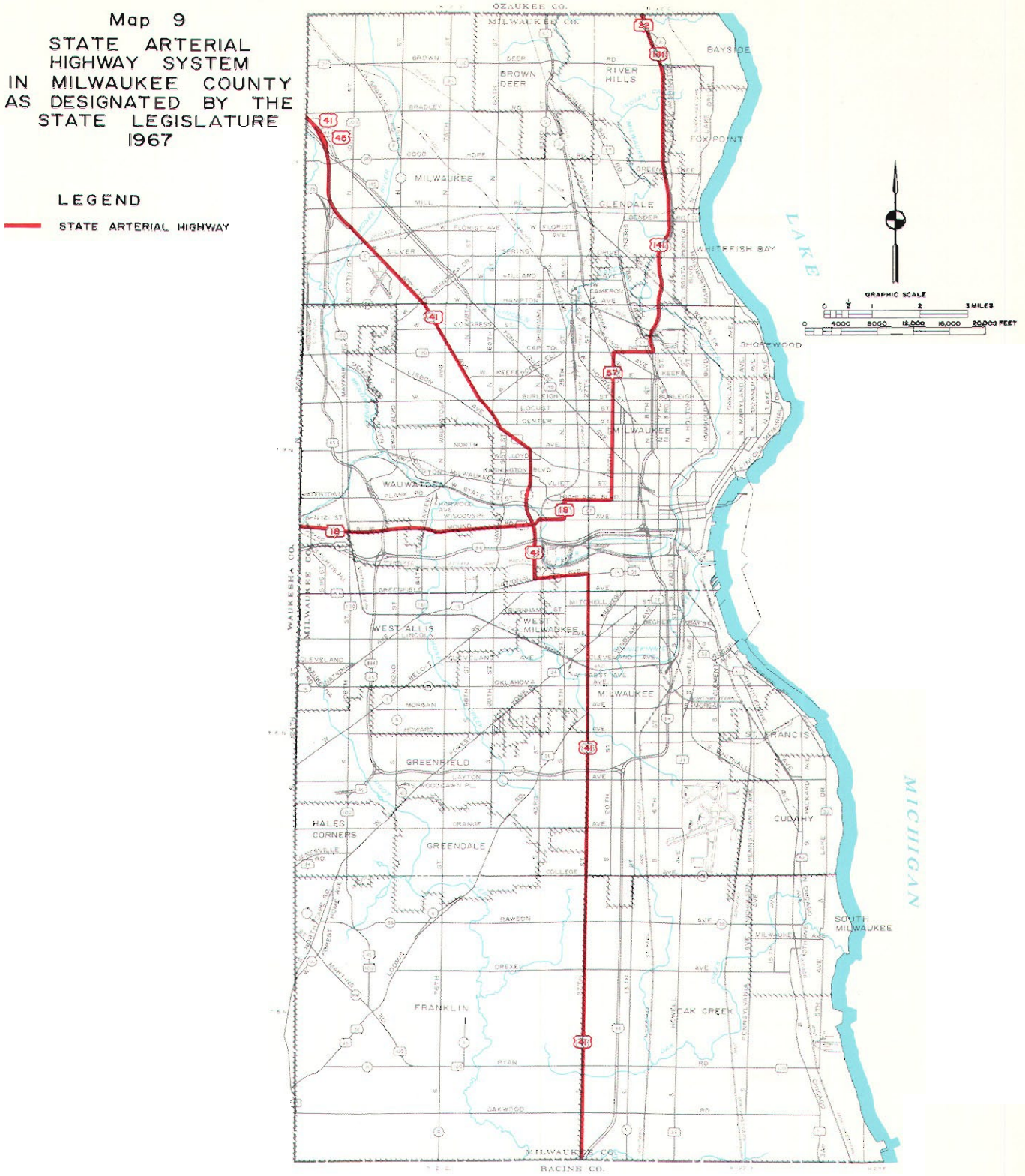
CONTROLLED - ACCESS HIGHWAY



To improve safety and provide a higher level of service on heavily traveled routes, the State Highway Commission has designated 24 miles of the state trunk highway system as controlled-access highways within Milwaukee County.

Map 9

STATE ARTERIAL HIGHWAY SYSTEM IN MILWAUKEE COUNTY AS DESIGNATED BY THE STATE LEGISLATURE 1967



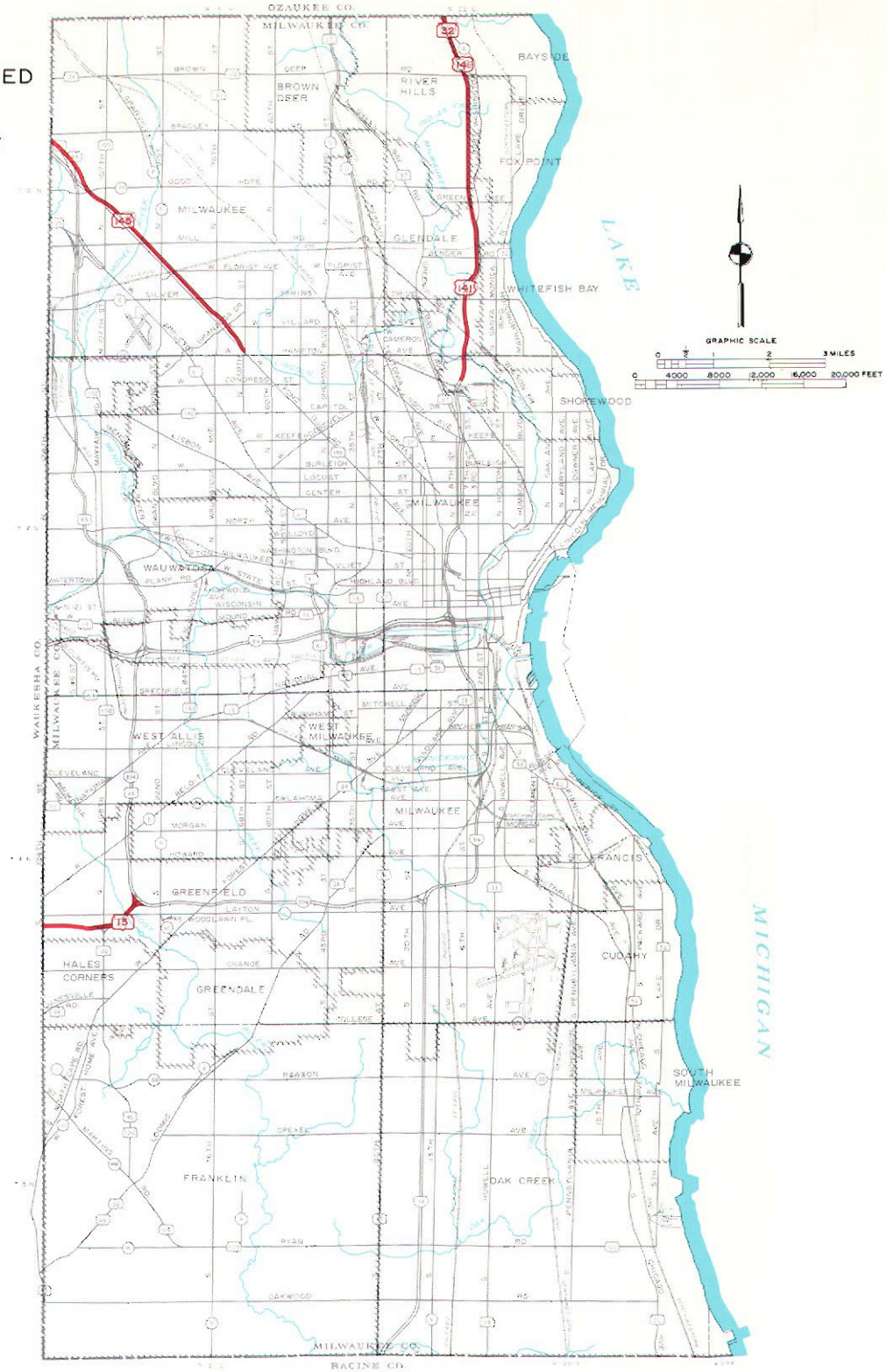
The state arterial system is a 2,200-mile integrated, interregional, and intercommunity network of highways created in 1955 by the State Legislature for the purpose of facilitating improvements on the most important portions of the entire state trunk highway system. Within Milwaukee County there are 42.4 miles of highways on this system.

Map 10

STATE HIGHWAY COMMISSION DESIGNATED FREEWAYS AND EXPRESSWAYS IN MILWAUKEE COUNTY 1967

LEGEND

FREEWAY OR EXPRESSWAY

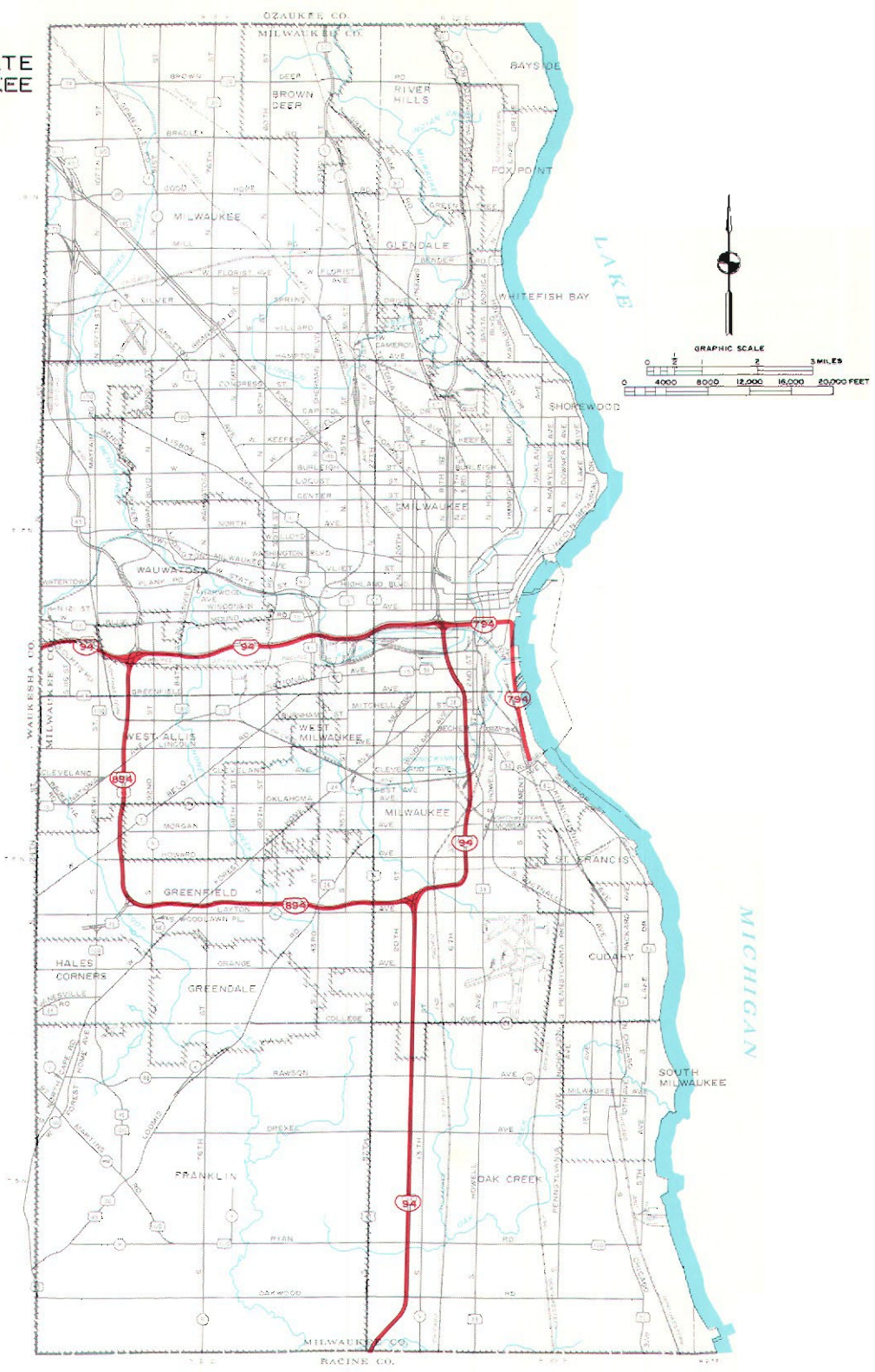


The State Highway Commission has designated 13.4 miles of freeways or expressways within Milwaukee County to complement the Milwaukee County freeway system designated by the Milwaukee County Board of Supervisors. The latter system is shown on Map 12.

Map 11
DESIGNATED INTERSTATE HIGHWAYS IN MILWAUKEE COUNTY 1967

LEGEND

INTERSTATE HIGHWAY



Within Milwaukee County there are 35.8 miles of interstate highways, which are part of the federal system of interstate and defense highways established in 1956 to connect principal metropolitan and industrial centers of the United States.

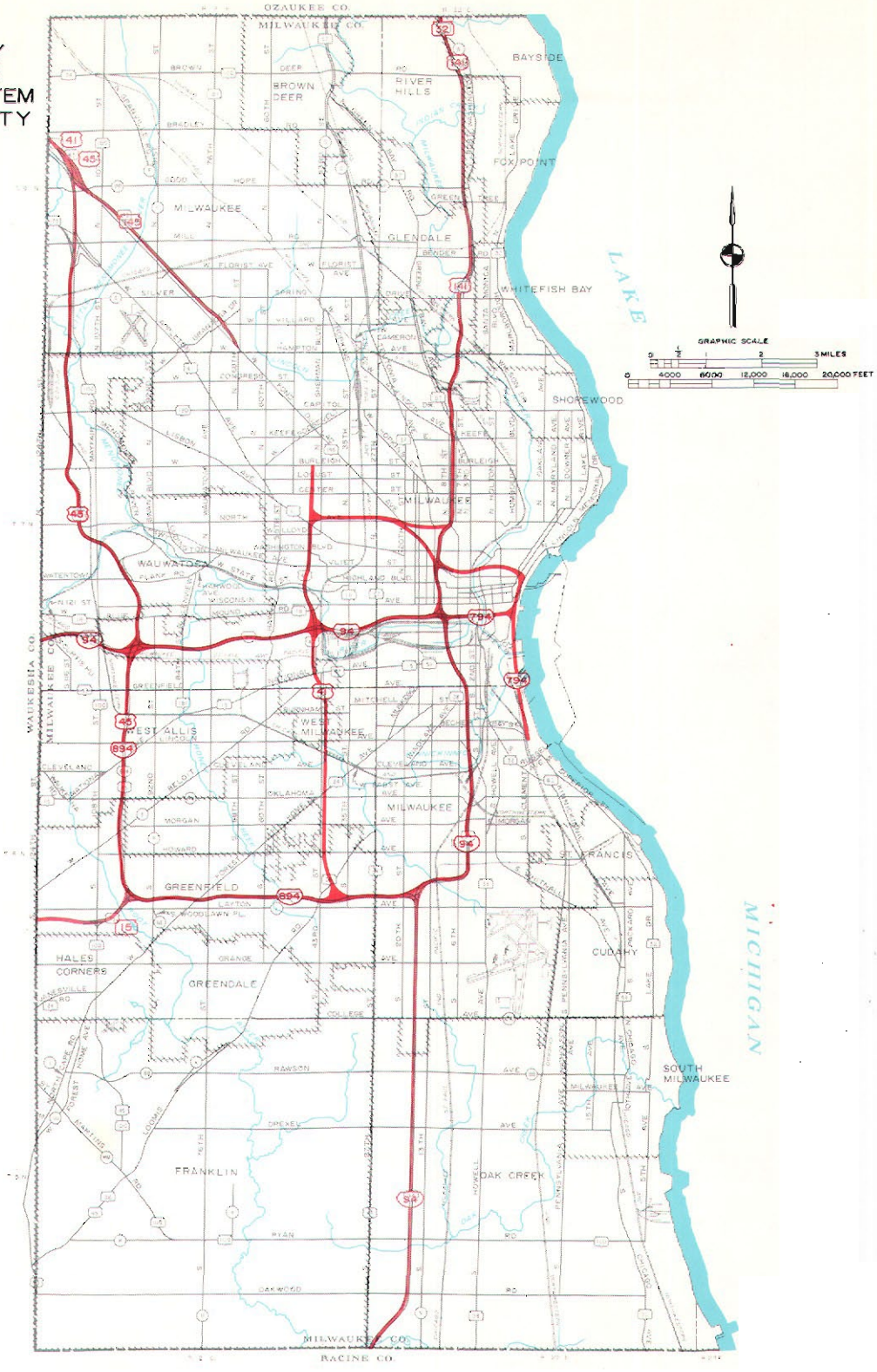
Map 12

MILWAUKEE COUNTY BOARD DESIGNATED COUNTY FREEWAY SYSTEM IN MILWAUKEE COUNTY 1967

LEGEND

DESIGNATED FREEWAY

OTHER FREEWAY



The Milwaukee County Board of Supervisors has designated a 58.4-mile system of freeways to facilitate the safe and rapid transportation of people and goods throughout Milwaukee County.

Table 2

LEGAL CONSTRAINTS GOVERNING CHANGES TO THE STATE TRUNK AND STATE ARTERIAL SYSTEMS: JANUARY 1, 1968

System	Statutory Reference	Length Constraint	Public Hearing Required	County Board Approval Required
S T H System	84.02(3)(a)	Less than 2 1/2 miles	No	No
S T H System or State Arterial System	Federal Aid Sec. 128a Title 23	Less than 2 1/2 miles	Yes	No
S T H System	84.02(3)(a)	2 1/2 miles or more	Yes	Yes
State Arterial System	84.025(3) alone	Less than 5 miles	No	No
State Arterial System	84.025(3)	More than 5 miles but no removal from State Trunk Highway System	Yes	No
State Arterial System	84.025(3)	More than 5 miles and any removal from State Trunk Highway System	Yes	Yes

Source: Wisconsin Department of Transportation.

erally is assigned to the City or Village Engineer or to an engineering consultant acting in this capacity.

CURRENT STATUS

Current Jurisdictional Highway Mileage

As of January 1, 1967, in Wisconsin there were 11,745.30 miles of state trunk highways, of which 321.89 miles consisted of interstate highways and 493.34 miles consisted of connecting streets. In Milwaukee County there were 145.67 miles of state trunk highways, of which 27.51 miles consisted of interstate highways and 19.77 miles of other freeways currently open to travel. In addition, there were 89.15 miles of connecting streets over which state trunk highways were routed (see Map 13); and also there were, as of January 1, 1967, in Milwaukee County, 76.51 miles of county trunk highways (see Map 14).

There were, as of January 1, 1967, a total of 2,513.11 miles of streets and highways open to traffic in Milwaukee County. Of this total 671.43 miles, or 26.7 percent, were determined to comprise the functional arterial street and highway network, and these 671.43 miles were jurisdictionally categorized as shown in Table 3. The configuration of the arterial system within Milwaukee County is shown on Map 15. Table 4 summarizes existing mileages by municipality.

Current Federal Aid Mileage

As of January 1, 1967, there was a total of 356.06 miles of federal aid routes designated within Milwaukee County. Of this total, 35.81 miles were located on the federal aid interstate system; 179.33 were located on the federal aid primary system; and 140.92 were located on the federal aid secondary system. The total federal aid system mileage open to traffic as of January 1967 was 329.51. Of this mileage, 27.51 miles consisted of federal aid interstate system mileage; 163.09 miles consisted of federal aid primary system mileage; and 138.91 miles consisted of federal aid secondary system mileage. The difference between the designated mileage on the federal aid systems and the miles open to travel is accounted for by new routes, primarily freeways which have been officially designated as being on federal aid systems and which are in various stages of planning, preliminary design, or construction but are not yet open to traffic. The configurations of these federal aid systems within Milwaukee County are shown on Map 16, the sections on the federal aid systems which are not open to traffic being indicated by broken lines. Table 5 sets forth the designated federal aid system mileages by municipality.

SUMMARY

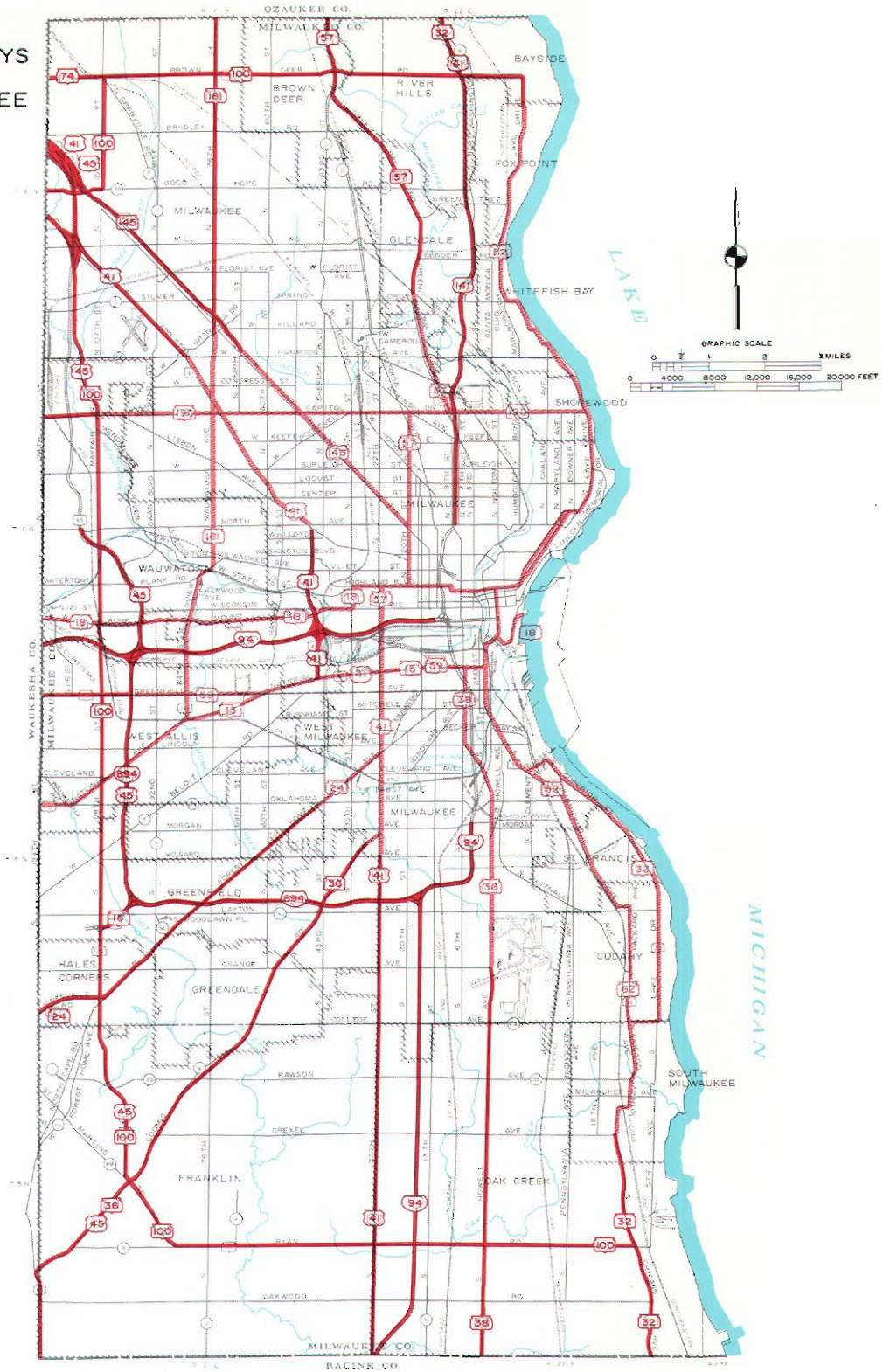
As of January 1, 1967, there was a total of 2,513.11 miles of streets and highways open to

Map 13
STATE TRUNK HIGHWAYS AND CONNECTING STREETS IN MILWAUKEE COUNTY 1967

LEGEND

STATE TRUNK HIGHWAY

CONNECTING STREET

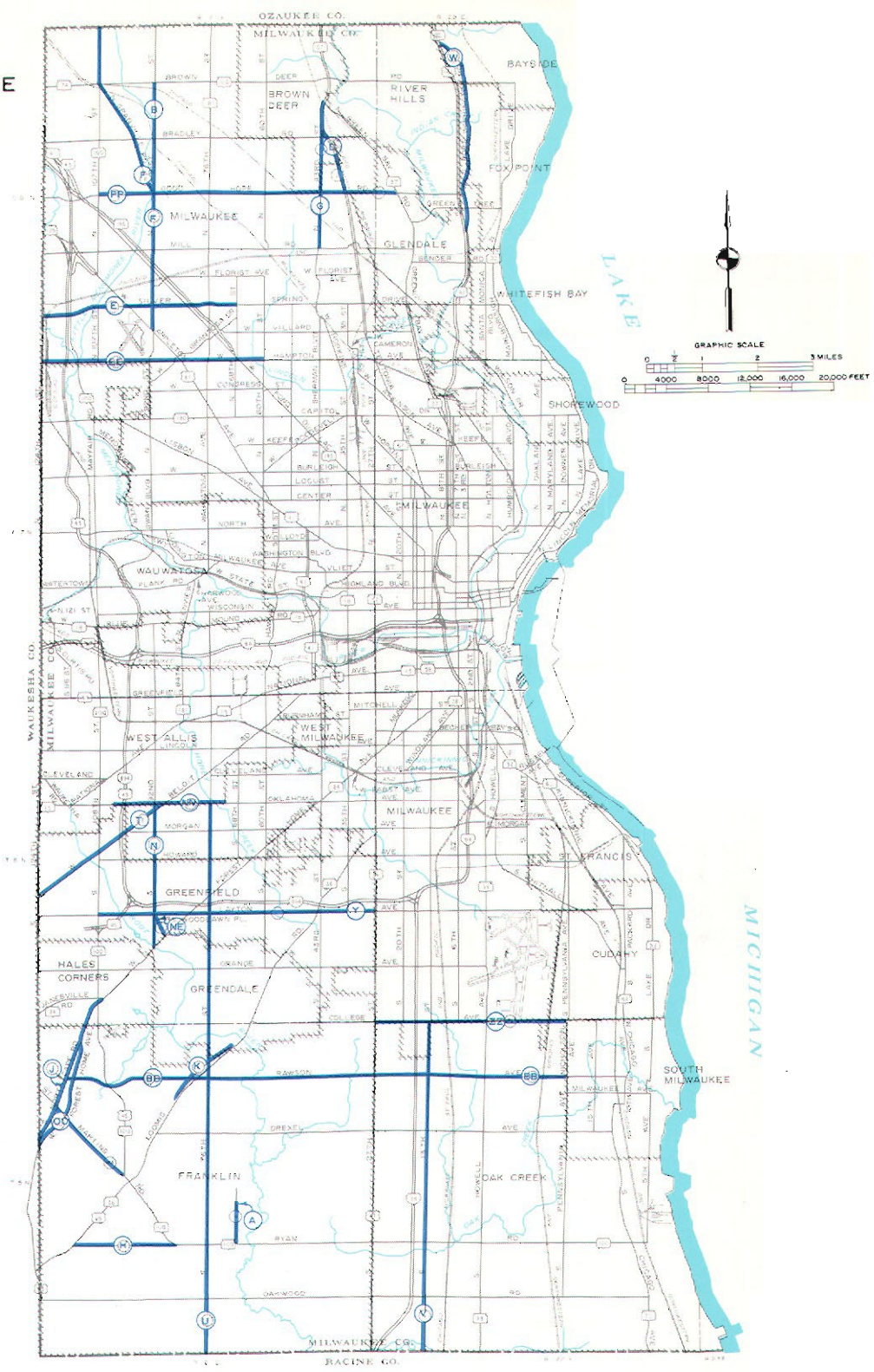


The existing system of state trunk highways and connecting streets, over which state trunk highways are routed, consists of approximately 235 route miles of facilities in Milwaukee County and is part of the 11,745 statewide network mileage of state trunk highways.

Map 14
COUNTY TRUNK HIGHWAYS IN MILWAUKEE COUNTY
1967

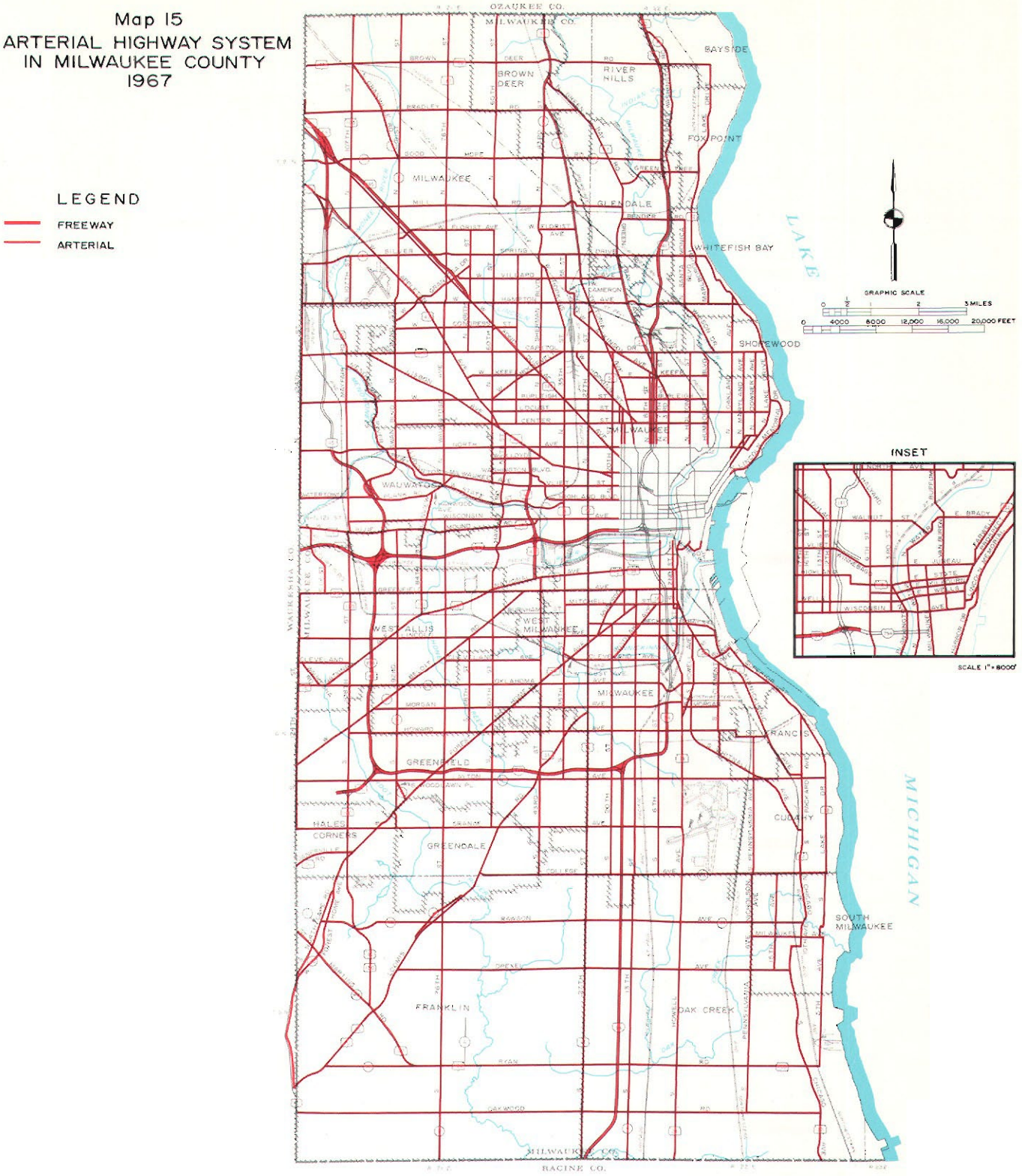
LEGEND

(A) COUNTY TRUNK HIGHWAY AND LETTER



The 76.5 miles of existing county trunk highways in Milwaukee County, a total route mileage less than the original 1925 system of 82 miles, no longer form an integrated network of highways. Several routes included in the system no longer function as arterials, while other arterials having areawide importance are not included in the system. An integrated county trunk highway system, properly related to present-day land use and trip service patterns must be recreated if an efficient and viable highway transportation system is to be provided within Milwaukee County.

Map 15
ARTERIAL HIGHWAY SYSTEM
IN MILWAUKEE COUNTY
1967



The 671 miles of streets and highways shown on this map were identified in this study as comprising the existing arterial street and highway system within Milwaukee County.

Table 3

PERCENTAGE DISTRIBUTION OF EXISTING ARTERIAL HIGHWAY MILEAGE[a] IN MILWAUKEE COUNTY BY JURISDICTIONAL CATEGORY: JANUARY 1, 1967

Jurisdictional Category	Mileage	Percent of Total
Interstate Highways, State Trunk Highways	145.67	21.7
Connecting Streets	89.15	13.3
County Trunk Highways	76.51	11.4
Local Arterial Streets and Highways	360.10	53.6
Total	671.43	100.0

[a]*There are 6.3 miles of existing county trunk highway which are not included in the functional arterial street and highway system and, therefore, in any of the proposed jurisdictional systems. These are: CTH J, S. North Cape Rd. from W. Forest Home Ave. to the Waukesha County line, 1.7 miles; CTH A, S. 68th St. within the County House of Correction Work Farm, 0.8 mile; CTH K, Old W. Loomis Rd. from New W. Loomis Rd. to New W. Loomis Rd., 1.3 miles; CTH NE, S. Woodlawn Pl. from W. Layton Ave. to W. Forest Home Ave., 0.4 mile; and CTH F, N. Granville Rd. from W. Good Hope Rd. to W. Brown Deer Rd., 2.1 miles.*

Source: Milwaukee County and SEWRPC.

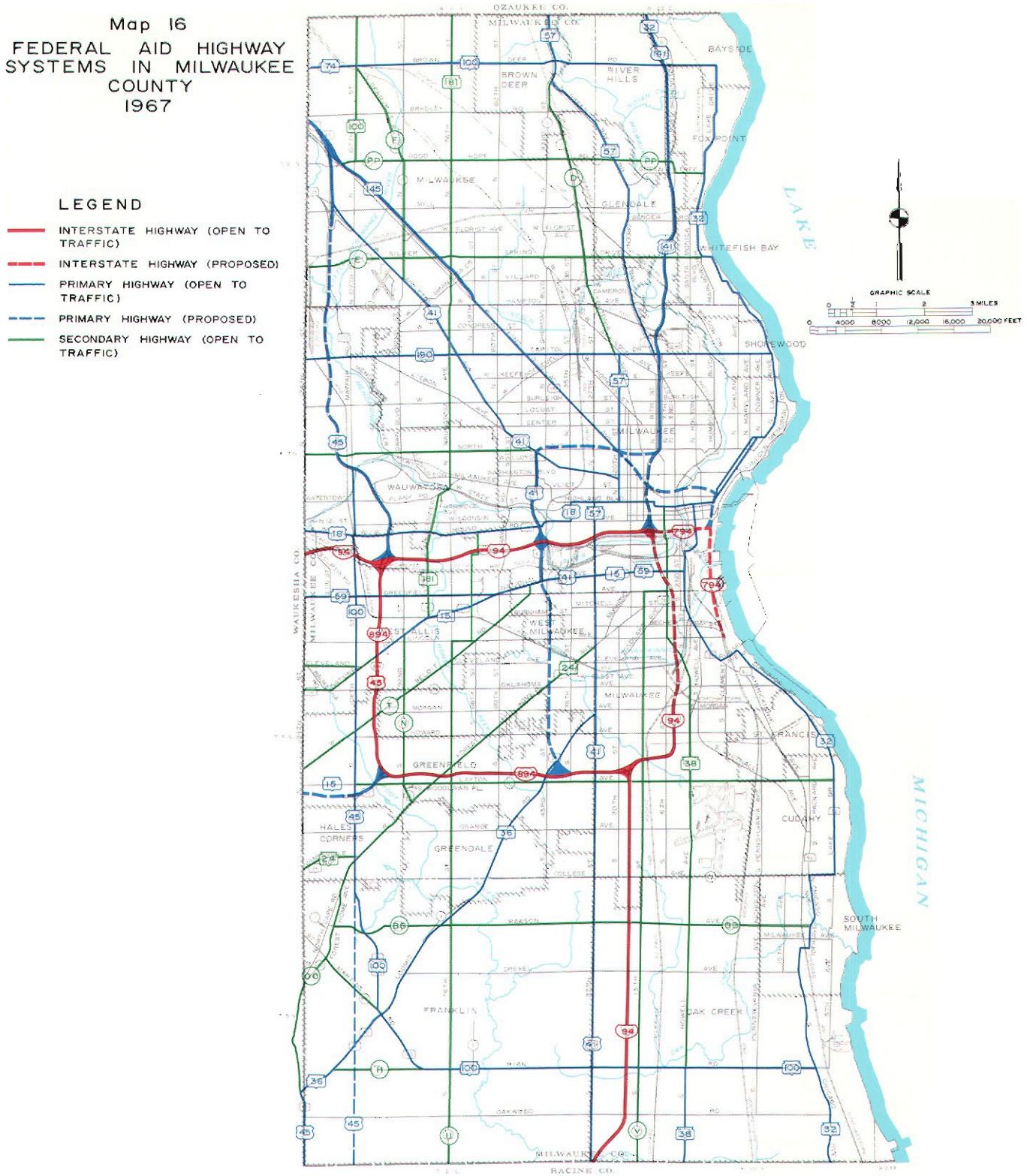
Table 4

EXISTING JURISDICTIONAL HIGHWAY SYSTEM MILEAGE IN MILWAUKEE COUNTY BY CIVIL DIVISION: JANUARY 1, 1967

Civil Division	Interstate Highway	State Trunk Highway		County Trunk Highway	Connecting Street	Local Arterials Existing	Other Local Streets Existing	Total All Miles
		Freeway	Non-Freeway					
Bayside	--	0.58	2.29	0.92	--	--	20.63	24.42
Brown Deer	--	--	3.78	2.50	--	4.20	35.72	46.20
Cudahy	--	--	--	0.19	5.56	9.80	37.70	53.25
Fox Point	--	--	--	1.45	2.66	1.30	32.09	37.50
Franklin	--	--	16.92	20.90	--	14.20	54.43	106.45
Glendale	--	3.53	2.85	1.83	0.11	9.20	40.38	57.90
Greendale	--	--	2.35	2.11	--	6.20	43.50	54.16
Greenfield	6.32	1.13	8.27	10.29	--	10.60	72.81	109.42
Hales Corners	--	--	3.93	0.59	--	2.60	30.92	38.04
Milwaukee	11.94	10.36	25.54	25.16	56.67	203.00	1,013.05	1345.72
Oak Creek	5.57	--	17.32	10.57	--	22.10	47.91	103.47
River Hills	--	1.92	2.51	--	--	4.10	13.18	21.71
St. Francis	--	--	--	--	2.78	4.10	18.93	25.81
Shorewood	--	--	--	--	2.45	3.30	23.74	29.49
South Milwaukee	--	--	--	--	3.08	11.80	48.51	63.39
Wauwatosa	0.37	2.25	5.90	--	5.31	19.60	133.38	166.81
West Allis	3.31	--	6.73	--	6.45	25.60	135.17	177.26
West Milwaukee	--	--	--	--	1.06	3.70	8.01	12.77
Whitefish Bay	--	--	--	--	3.02	4.70	31.62	39.34
Subtotal	*27.51*	*19.77*	*98.39*	*76.51*	*89.15*	*360.10*	*1,841.68*	*2,513.11*
Total	145.67			76.51	449.25		1,841.68	
Total Existing Arterial Mileage 671.43								
Total Existing Mileage All Streets								2,513.11

Source: SEWRPC and Wisconsin Department of Transportation.

Map 16
FEDERAL AID HIGHWAY SYSTEMS IN MILWAUKEE COUNTY 1967



Highways designated as part of the federal aid highway systems are eligible for federal aids in partial support of improvements. There are currently 356 miles of federal aid routes designated within Milwaukee County.

Table 5

FEDERAL AID ROUTE MILEAGE[a] IN MILWAUKEE COUNTY BY CIVIL DIVISION: JANUARY 1, 1967

Civil Division	Federal Aid Interstate Route Mileage	Federal Aid Primary Route Mileage					Federal Aid Secondary Route Mileage				Total Federal Aid Miles
		State Trunk Highway		Connecting Street	County Trunk Highway	Local Street	State Trunk Highway	Connecting Street	County Trunk Highway	Local Street	
		Freeway	Non-Freeway								
Bayside	0	0.58	2.29	0	0	0	0	0	0	0	2.87
Brown Deer	0	0	3.78	0	0	0	0	0	1.58	0	5.36
Cudahy	0	0	0	2.77	0	0	0	0	0	3.26	6.03
Fox Point	0	0	0	2.66	0	0	0	0	0	1.34	4.00
Franklin	0	0	16.26	0	0	0	0.66	0	16.75	0	33.67
Glendale	0	3.53	2.85	0.11	0	0	0	0	0.87	1.93	9.29
Greendale	0	0	2.01	0	0	0	0.34	0	1.86	0	4.21
Greenfield	6.32	2.82	5.78	0	0	0	2.50	0	9.68	0	27.10
Hales Corners	0	0	1.53	0	0	0	2.39	0	0.59	0	4.51
Milwaukee	20.24	21.20	13.27	44.65	0	1.96	11.07	10.59	16.05	21.09	160.12
Oak Creek	5.57	0	13.31	0	0	0	4.01	0	9.13	0.50	32.52
River Hills	0	1.92	2.51	0	0	0	0	0	0	5.11	9.54
St. Francis	0	0	0	1.67	0	0	0	0	0	0.48	2.15
Shorewood	0	0	0	2.45	0	0	0	0	0	0	2.45
South Milwaukee	0	0	0	3.08	0	0	0	0	0	1.52	4.60
Wauwatosa	0.37	5.39	2.51	2.72	0	0	0	2.60	0	3.76	17.35
West Allis	3.31	0	4.88	5.48	0	0	1.84	0.98	0	7.29	23.78
West Milwaukee	0	1.28	0	1.06	0	0	0	0	0	0.70	3.04
Whitefish Bay	0	0	0	3.02	0	0	0	0	0	0.45	3.47
Subtotal	*35.81*	*36.72*	*70.98*	*69.67*	*0*	*1.96*	*22.81*	*14.17*	*56.51*	*47.43*	*356.06*
Total	35.81	179.33					140.92				356.06

[a] *Includes mileage on officially designated routes not yet constructed.*

Source: Wisconsin Department of Transportation, Bureau of Public Roads.

traffic within Milwaukee County. Of this total, 671.43 miles, or 26.7 percent, comprised the functional arterial street and highway network. The responsibility for the design, construction, operation, and maintenance of this arterial street and highway network rested with three levels of government: the state, the county, and the local municipalities. Approximately 235 miles, or 35 percent of the arterial street and highway network, was under state jurisdiction, being comprised of interstate highways, state trunk highways, and connecting streets. About 77 miles, or 11 percent, was under county jurisdiction, being comprised of county trunk highways; and about 360 miles, or 54 percent, was under city or village jurisdiction, being comprised of local arterial streets and highways.

Superimposed on the state, county, and local trunk highways and arterial streets were 356.06 miles of federal aid routes, of which about 36 miles, or 10 percent, consisted of federal aid interstate routes; 179 miles, or 50 percent consisted of federal aid primary routes; and 141 miles, or 40 percent, consisted of federal aid secondary routes.

The location and configuration of these jurisdictional highway systems and supporting aid routes were the result of a long process of historic evolution influenced by many complex political, administrative, financial, and engineering considerations and constraints. The state trunk and county trunk highway networks were originally conceived by the State Legislature as integrated highway systems and were originally so delineated and mapped. The state trunk highway network, however, was last studied and revised as an integrated system by the State Legislature in 1923; and the county trunk highway system, by the State Highway Commission of Wisconsin and the Milwaukee County Board in 1925. Many piecemeal additions and deletions have been made to these two jurisdictional highway networks since 1923 and 1925. Consequently, these two important networks no longer represent fully integrated and continuous arterial highway systems capable of serving, in the most efficient manner possible, the areawide land use and traffic service functions originally intended. Moreover, since the federal aid highway networks are intended to assist in implementing the state and county trunk highway systems and, therefore, reflect the pattern of these systems, these federal aid networks are also in need of revision.

It is, therefore, appropriate at this time to study and analyze the jurisdictional highway systems within Milwaukee County and, guided by the functional transportation system plan prepared by the Southeastern Wisconsin Regional Planning Commission and adopted by the Highway Commission of Wisconsin and the Milwaukee County Board, to recommend changes necessary to reclassify and regroup these networks into complete, fully coordinated, and continuous systems able to meet the present and expected future arterial highway traffic demands within Milwaukee County.

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Chapter IV
FUNCTIONAL CRITERIA FOR JURISDICTIONAL CLASSIFICATION

INTRODUCTION

A total street and highway system must serve several important functions. It must provide for the free movement of traffic throughout the area served; provide for the access of this traffic to the various land uses to be served; provide integral parts of the urban storm water drainage system; provide rights-of-way for various utility facilities; and provide space for the admittance of light and air to individual building sites. Because the two most important of these functions—traffic movement and land access—are basically conflicting, street and highway systems are, for planning purposes, divided into functional subsystems according to the primary character of service which the individual facilities comprising the subsystems are expected to provide. This functional subdivision of street and highway systems is done on an areawide basis without regard to governmental jurisdiction or fiscal responsibility. Such a functional grouping or classification is essential to sound transportation planning, not only because it identifies the primary function which any particular facility should serve but also because it provides a means for defining travel paths for the flow of trips through the total system. The definition of such paths is essential to any traffic assignment made to determine the ability of the system to carry existing and probable future traffic loads.

Three functional groups of street and highway facilities are normally recognized in functional classification for planning purposes: arterial, collector, and minor (land access). Only the first of these groups is of direct concern in areawide planning. The primary function of the arterial facilities is to expedite the movement of vehicular traffic. Access to abutting property may be a secondary function of some types of arterials but should always be subordinate to the primary function of traffic movement. Freeways, expressways, and certain parkways, as well as "standard" surface arterial streets and highways, are all types of facilities which may be included in an arterial system. Together the individual arterial facilities must form an integrated areawide system, the geographic configuration and capacity of which is adequate to carry the traffic loads generated by the land use pattern to be served.

Since the arterial street and highway facilities must form an integrated system over relatively large areas comprised of many local units of government and since the areawide importance of the individual facilities comprising the total system varies, several levels, as well as many units of government, have interests in, and responsibilities for, the planning, construction, maintenance, and operation of the total arterial street and highway system. It, therefore, becomes necessary to assign jurisdictional responsibility for the various facilities comprising the total system to the various levels and units of government involved.

Just as a functional classification of highway facilities is essential to transportation plan preparation, the jurisdictional classification of such facilities is essential to plan implementation. In addition, the proper assignment of jurisdictional responsibility for the various portions of the total arterial street and highway system is essential to achieving the important objectives already set forth in Chapter I of this report.

As previously noted, the preparation of an areawide plan for the physical development of the total transportation system must necessarily precede any assignment of jurisdictional responsbility. A plan for the physical improvement of the transportation system is required to identify the existing arterial street and highway system, determine its existing deficiencies, and recommend specific additions and improvements required to serve existing and forecast traffic demands. Such a transportation plan having been prepared, it then becomes necessary, as the first step toward plan implementation, to specify the governmental level and unit which should have responsibility for acquiring, constructing, maintaining, and operating each of the existing and proposed facilities which comprise the total physical system. That is, the functional highway plan must be converted to a jurisdictional plan if plan implementation is to be achieved. It, therefore, becomes necessary to develop a set of criteria which may be used as

a basis for the assignment of jurisdictional responsibility for the various facilities comprising the total arterial street and highway system. Functional variations within the total arterial system provide a logical basis for the establishment of such criteria.

PURPOSE AND OBJECTIVE OF THE CRITERIA

The purpose of jurisdictional criteria is to provide an objective and rational basis for the assignment of jurisdictional responsibility for the various segments of an existing and proposed arterial street and highway system to the various levels of government concerned. The total arterial system to be classified is represented by an adopted functional highway plan. The objective of the recommended criteria is to identify subsystems within the total arterial street and highway system which are integral parts of the overall system and which are within themselves continuous or are continuous in conjunction with other "higher" subsystems, but which vary with respect to the degree of traffic mobility provided, the types of land use areas served, and the types of trips served.

The network maps prepared by the Southeastern Wisconsin Regional Planning Commission under the recently completed regional land use-transportation study were reviewed and updated to represent the necessary definition of the total arterial street and highway system within Milwaukee County to which the jurisdictional criteria were to be applied.

ARTERIAL SUBCLASSIFICATION

Three levels of government—state, county, and local (city and village)—have direct jurisdictional responsibility for the planning, design, construction, operation, and maintenance of highway facilities within Milwaukee County. On this basis it is proposed that all segments of the total (existing and proposed) arterial street and highway system be classified into three subcategories: Type I (state trunk), Type II (county trunk), and Type III (local trunk) arterials.

1. Type I (State Trunk) Arterials

   Type I arterials shall include all those routes which are intended to provide the highest level of arterial traffic mobility; that is, the highest speeds and lowest degree of traffic congestion, the minimum degree of land access service, and which must have regional or interregional system continuity. Ideally, these Type I arterials, because of their function and state- and region-wide importance, should comprise the state trunk highway system of an area.

2. Type II (County Trunk) Arterials

   Type II arterials shall include all those routes which are intended to provide an intermediate level of arterial traffic mobility, an intermediate level of land-access service, and which must have intercommunity system continuity. Ideally, these Type II arterials, because of their function and subregional importance, should comprise the county trunk highway system of an area.

3. Type III (Local Trunk) Arterials

   Type III arterials shall include all those routes which are intended to provide the lowest level of arterial traffic mobility, the highest degree of arterial land-access service, and which must possess intracommunity system continuity. Ideally, these Type III arterials should comprise the local arterial system of an area.

Although the three arterial subclassification types should ideally correspond with jurisdictional responsibility by the state, county, and local levels of government, as noted above, it should not be assumed that such correspondence can be rigidly applied in all cases, since certain factors, including legal and administrative constraints, boundary line facility coordination, and financial resource capabilities, may influence the assignment of jurisdictional responsibility for certain arterials regardless of type classification.

CRITERIA

The criteria deemed most significant to a functional subclassification of the total arterial system can be related to three basic characteristics of the facilities: 1) the trips served, 2) the land uses served, and 3) the operational characteristics of the facilities themselves. Criteria related to each of these basic characteristics and adopted for the Milwaukee County jurisdictional highway planning study are presented below.

Trip Service Criteria

Trip service criteria for a functional subclassification of arterials could include specific criteria

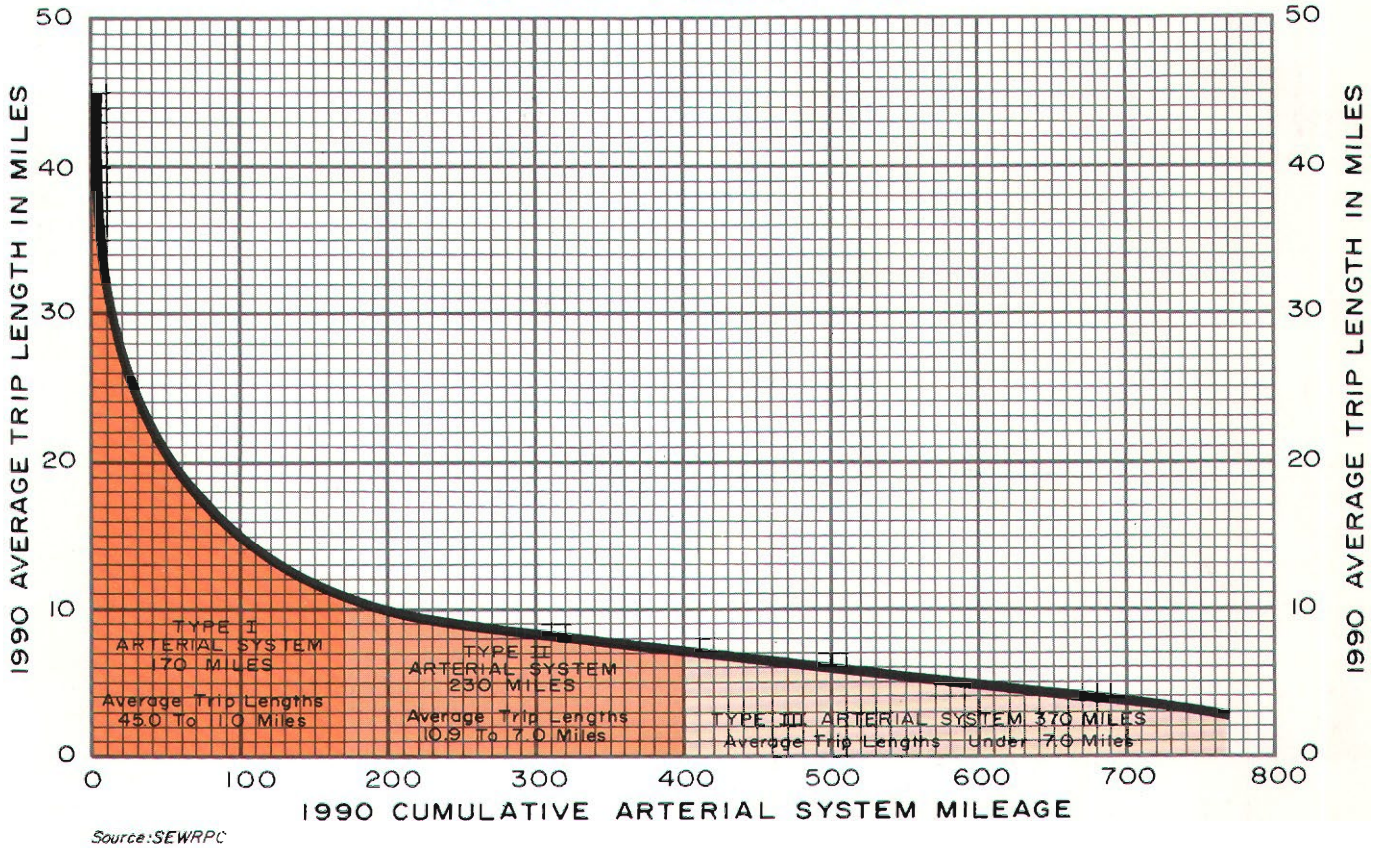
concerning trip length, trip purpose, and trip peaking. Trip length was selected for use as being the most significant of these three. Moreover, it was believed that trip purpose and trip peaking were reflected in other criteria adopted and should, therefore, not be explicitly considered under criteria relating to trip service. The following average trip length ranges were adopted as criteria for the arterial subclassification:

Type I Arterials	Over 11 Miles
Type II Arterials	7 to 11 Miles
Type III Arterials	Under 7 Miles

The following procedure was used to develop the recommended values for the trip service criteria. An interzonal trip table of trip distance volumes (TDV) was produced by multiplying the Regional Land Use-Transportation Study 1990 interzonal trip table by the interzonal over-the-road distances as measured along the least time paths between the trip origins and destinations. The resulting TDV table was assigned to the 1990 arterial network on a least-time-path basis. The assigned TDV for each link was then divided by the previously assigned link volume to obtain average trip lengths in miles for each link of the arterial network. From the array of these link average trip lengths, a curve was plotted to provide a graphical representation of the relationship existing between the link average trip lengths and cumulative arterial system mileage (see Figure 5). Break points were identified on this curve and used to select trip length ranges representative of each jurisdictional classification type. The break points identified the trip length ranges which should be served by each facility type and did so because they marked the points beyond which a

Figure 5

AVERAGE TRIP LENGTH VERSUS CUMULATIVE ARTERIAL MILEAGE FOR THE MILWAUKEE COUNTY JURISDICTIONAL HIGHWAY SYSTEM 1990



Source: SEWRPC

relatively high increase in facility type mileage would accommodate only a relatively small increase in trip length range.

Land Use Service Criteria

Land use service criteria for a functional subclassification of arterials should relate to the land use activities to be connected and served by the various arterial subclassifications. For the purpose of such criteria, the term "connect and serve" was defined as follows for each of the three arterial types:

Type I Arterials

A Type I arterial facility shall be considered to "connect and serve" given land uses when direct access from the facility to roads serving the land use is available within a maximum over-the-road distance of one mile from a main vehicular entrance to the land use to be served.

Type II Arterials

A Type II arterial facility shall be considered to "connect and serve" given land uses when direct access from the facility to roads serving the land use is available within a maximum over-the-road distance of one-half mile from a main vehicular entrance to the land use to be served.

Type III Arterials

A Type III arterial facility shall be considered to "connect and serve" given land uses when direct access from the facility to roads serving the land use is available within a maximum over-the-road distance of one-quarter mile of a main vehicular entrance to the land use to be served.

The land use activities to be considered as properly influencing jurisdictional classification of arterial highway systems should be those which through either their individual or aggregate effects interact strongly with the need for transportation facilities and which by their nature are normally grouped into concentrations which form major traffic generators. These include major transportation terminals, major recreational facilities, regional commercial centers, major industrial centers, and certain types of institutional uses. The following criteria, with respect to each of these land use classifications, were adopted for the Milwaukee County jurisdictional highway planning study:

1. Transportation Terminals[1]

   Type I Arterials

   Type I arterial facilities shall connect and serve interregional rail, bus, and major truck terminals;[2] airports; and seaports.

   Type II Arterials

   Type II arterial facilities shall connect and serve freeway interchanges, noncommercial airports, pipeline terminals, major intra-regional truck terminals,[3] and rapid transit and modified rapid transit system loading and unloading points not served by Type I arterials.

   Type III Arterials

   Type III arterial facilities shall connect and serve truck terminals generating 250 or more truck trips per average weekday and offstreet parking facilities having a minimum of 500 parking spaces not served by Type I and II arterials.

2. Recreational Facilities

   Type I Arterials

   Type I arterial facilities shall connect and serve state fair grounds and state parks having a gross area of 500 acres or more.

   Type II Arterials

   Type II arterial facilities shall connect and serve regional parks[4] and special recreational use areas, such as zoological and botanical gardens and arena and stadia seating a minimum of 10,000 persons not served by Type I arterials.

[1] *A transportation terminal shall be defined as a complex of contiguous, concentrated land uses, the purpose of which is to effect a change of transportation mode or a transshipment of goods.*

[2] *A major interregional truck terminal shall be defined as a complex of contiguous, concentrated land uses generating 500 or more interregional truck trips per average weekday.*

[3] *A major intra-regional truck terminal shall be defined as a complex of contiguous, concentrated land uses generating 500 or more intra-regional truck trips per average weekday.*

[4] *A regional park shall be defined as an outdoor recreation area having a broad range of recreational facilities on one site having a minimum gross size of 250 acres serving a multi-community population.*

Type III Arterials

Type III arterial facilities shall connect and serve community parks[5] not served by Type I and II arterials.

3. Commercial Centers

Type I Arterials

Type I arterial facilities shall connect and serve major[6] retail and service (regional shopping) centers.

Type II Arterials

Type II arterial facilities shall connect and serve community[7] retail and service centers not served by Type I arterials.

Type III Arterials

Type III arterial facilities shall connect and serve neighborhood[8] retail and service commercial centers not served by Type I and II arterials.

4. Industrial Centers

Type I Arterials

Type I arterial facilities shall connect and serve major regional[9] industrial centers.

Type II Arterials

Type II arterial facilities shall connect and serve major community[10] industrial centers not served by Type I arterials.

Type III Arterials

Type III arterial facilities shall connect and serve community industrial centers not served by Type I and II arterials.[11]

5. Institutional

Type I Arterials

Type I arterial facilities shall connect and serve universities, county seats, and major medical[12] centers.

Type II Arterials

Type II arterial facilities shall connect and serve county institutions; accredited, degree-granting colleges; public vocational

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[5] *A community park shall be defined as an outdoor recreation area having a broad range of recreational facilities on one site having a gross size ranging from 30 to 250 acres and which is intended to serve the basic outdoor recreation needs of a surrounding community of 10,000 to 25,000 population, consisting of two to five residential neighborhoods.*

[6] *A major retail and service center shall be defined as an existing or officially designated concentration of retail and service uses having a minimum gross site area of 60 acres, intended to serve areawide retail and service needs for a multi-community population ranging from 75,000 to 150,000 persons located within a ten-mile radius. The term "officially designated," as applied to concentrations of various land uses, shall be defined as an area shown on adopted regional or local land use plans or recognized in local zoning district maps.*

[7] *A community retail and service center shall be defined as an existing or officially designated concentration of retail and service uses having a gross site area ranging in size from 20 to 60 acres, intended to serve the retail and service use needs of a community of 10,000 to 25,000 population, consisting of two to five residential neighborhoods.*

[8] *A neighborhood retail and service commercial center shall be defined as an existing or officially designated concentration of retail and service uses having a gross site area ranging in size from 5 to 20 acres, intended to serve the retail and service needs of the population of one residential neighborhood.*

[9] *A major regional industrial center shall be defined as an existing or officially designated concentration of manufacturing, wholesaling, and related-use establishments having a minimum gross site area of 640 acres or providing employment for over 5,000 persons.*

[10] *A major community industrial center shall be defined as an existing or officially designated concentration of manufacturing, wholesaling, and related-use establishments having a gross site area ranging in size from 200 to 640 acres or providing employment for 1,500 to 5,000 persons.*

[11] *A minor community industrial center shall be defined as an existing or officially designated concentration of manufacturing, wholesaling, and related-use establishments ranging in size from 20 to 100 acres or providing employment for 300 to 1,500 persons.*

[12] *A major medical center shall be defined as an existing or officially designated complex of buildings and services for the provision of the highest level of health services within a region, including one or more in-patient facilities; one or more out-patient facilities; facilities for specialized services, such as mental health and long-term care and rehabilitation; and educational facilities, clinical research facilities, laboratory research facilities, and living quarters.*

schools; and community hospitals not served by Type I arterials.

Type III Arterials
Type III arterial facilities shall connect and serve high schools not served by Type I and II arterials.

Criteria Relating to Operational Characteristics
Criteria relating to operational characteristics for a functional subclassification of arterials include consideration of system continuity, facility spacing, traffic volume, traffic mobility, and land access.

1. System Continuity

The various arterial subsystems shall form integrated systems within themselves or in conjunction with the other "higher" subsystems. The individual facilities comprising any given subsystem shall be as directly routed as practicable between facility termini so as to provide the shortest travel paths practicable through the arterial network. The following criteria, with respect to system continuity, were adopted for the Milwaukee County jurisdictional highway planning study:

Type I Arterials
Type I arterial facilities shall have interregional or regional continuity comprising an integrated system at the regional and state level.

Type II Arterials
Type II arterial facilities shall have intercommunity continuity comprising an integrated system at the county level.

Type III Arterials
Type III arterial facilities shall have intramunicipal continuity comprising an integrated system at the city or village level.

2. Spacing
The location and geometric configuration of highway systems must be related to the land uses to be served and should be determined primarily from areawide traffic analyses which consider both existing and probable future traffic loadings derived from existing and proposed land use patterns. Nevertheless, some general criteria may be established with respect to the minimum spacing of various types of facilities based upon good land use planning principles, as well as upon operational characteristics and engineering constraints. With respect to minimum spacing, the following criteria were adopted for the Milwaukee County jurisdictional highway planning study:

Type I Arterials
Type I arterial facilities shall generally be located no closer than two miles to, and approximately parallel with, another Type I facility.

Type II Arterials
Type II arterial facilities shall generally be located no closer than one mile to, and approximately parallel with, a Type I facility or another Type II facility.

Type III Arterials
Type III arterial facilities shall generally be located no closer than one-half mile to, and approximately parallel with, a Type I, Type II, or another Type III facility.

3. Volume
Although traffic volume alone provides little indication of the function of an arterial facility, it can, in conjunction with other criteria, become an important jurisdictional criteria. It is important when considering volume as a criteria for a jurisdictional subclassification of arterials to recognize that both existing and probable future traffic volumes must be considered, with the latter being given the most weight in the classification process. The following criteria, with respect to future traffic volume, were adopted for the Milwaukee County jurisdictional highway planning study:

Type I Arterials
Type I arterial facilities shall have a minimum potential 1990 traffic volume of 19,000 vehicles per average weekday.

Type II Arterials
Type II arterial facilities shall have a minimum potential 1990 traffic volume of 10,000 vehicles per average weekday.

Type III Arterials

Type III arterial facilities shall have a minimum potential 1990 traffic volume of 7,500 vehicles per average weekday.

Future potential traffic volumes shall be derived from a systemwide traffic assignment, based on an areawide land use plan or projection. Such a traffic assignment exists for the adopted southeastern Wisconsin regional transportation plan and reflects anticipated 1990 average weekday traffic volumes.

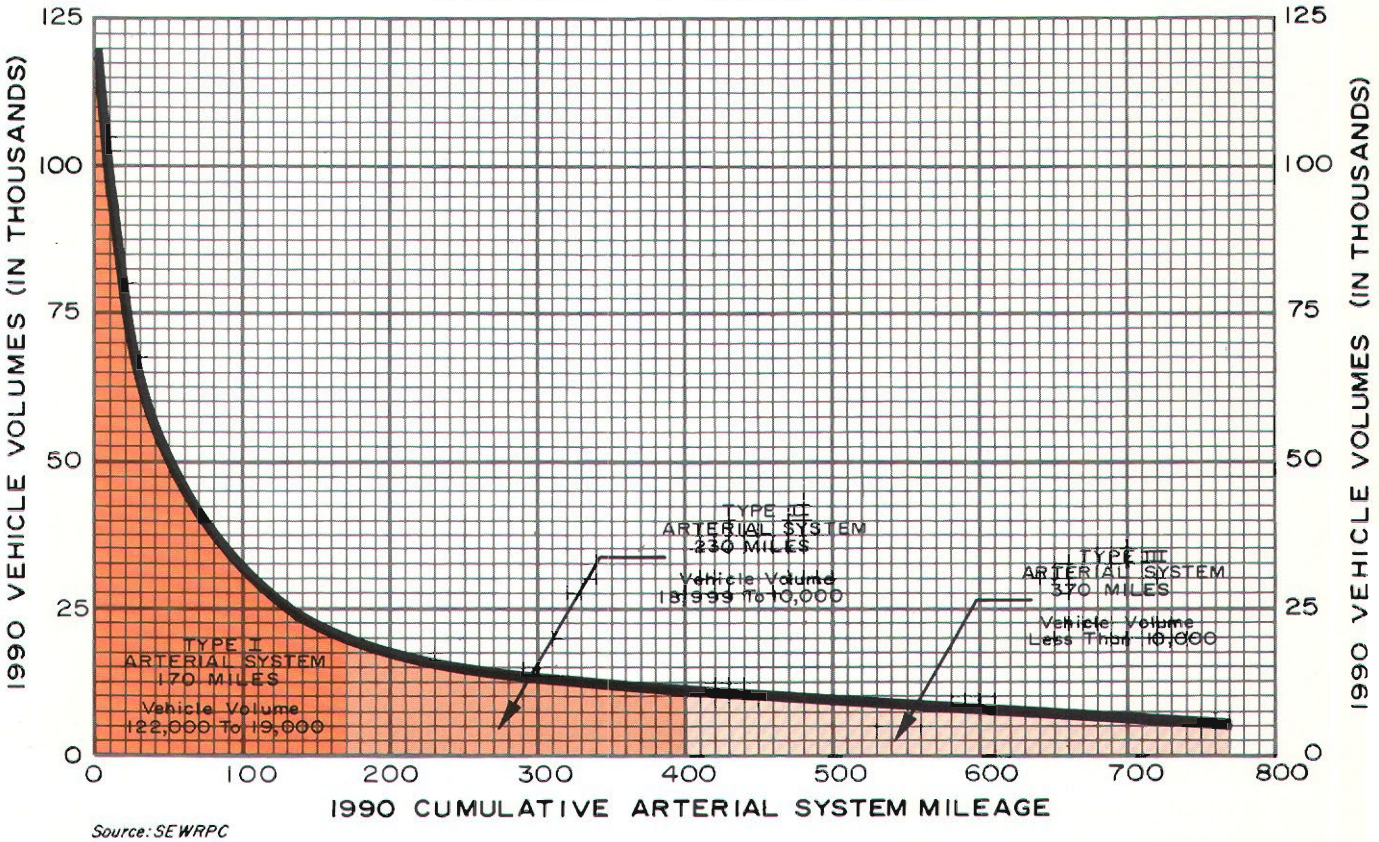
The following procedure was used to develop the recommended values for the traffic volume criteria. The Regional Land Use-Transportation Study traffic assignment link volumes for 1990 were first arrayed in descending rank order, and a cumulative sum of link length computed for each link place in the descending rank order. From this data a curve was plotted to provide a graphical representation of the relationship existing between traffic volume and cumulative arterial system mileage (see Figure 6). Break points were identified on this curve and used to select traffic volume ranges representative of each jurisdictional classification type. The break points identified on the traffic volume curves tended to substantiate, in terms of cumulative jurisdictional subsystem mileage, the trip length criteria previously established.

4. Traffic Mobility

Traffic mobility criteria for a functional subclassification of arterials could be

Figure 6

AVERAGE WEEKDAY VEHICLE VOLUME VERSUS CUMULATIVE ARTERIAL MILEAGE FOR THE MILWAUKEE COUNTY JURISDICTIONAL HIGHWAY SYSTEM 1990



Source: SEWRPC

established in terms of speed, volume-to-capacity ratios, or other measures of traffic density. In recognition of the fact that the longer the trip the more critical the time of travel, however, it is accepted practice to provide higher speeds on the routes of highest arterial function. As a result, the following criteria, with respect to traffic mobility, were adopted for the Milwaukee County jurisdictional highway planning study:

Type I Arterials

In areas beyond the outer limits of the 1963 urban growth ring,[13] average overall travel speeds[14] on Type I arterial facilities shall range from 30 to 70 miles per hour. In areas within the outer limits of the 1963 urban growth ring, these speeds shall range from 30 to 60 miles per hour.

Type II Arterials

In areas beyond the outer limits of the 1963 urban growth ring, average overall travel speeds on Type II arterial facilities shall range from 25 to 60 miles per hour. In areas within the outer limits of the 1963 urban growth ring, these speeds shall range from 20 to 40 miles per hour.

Type III Arterials

Average overall travel speeds on Type III arterial facilities shall be 25 miles per hour or less.

5. Land Access Control

It has already been noted that two of the basic functions performed by street systems namely, traffic mobility and land access, are basically conflicting and that the land access function of arterials must be subordinate to the traffic mobility function. Therefore, arterials should be characterized by a degree of access control, which is related to the subclassification of the arterial facility by some restriction of direct access. The following criteria, with respect to land access control, were adopted for the Milwaukee County jurisdictional highway planning study:

Type I Arterials

All Type I arterials shall have full or partial control of access.[15]

Type II Arterials

All Type II arterials shall have at least partial control of access.[16]

Type III Arterials

All Type III arterials shall have at least minimum control of access.[17]

Table 6 summarizes the functional criteria used for the jurisdictional classification of arterial highways in Milwaukee County.

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[13] *The 1963 urban growth ring is shown in SEWRPC Planning Report No. 7, Volume One, Inventory Findings - 1963, page 81.*

[14] *Average overall travel speed shall be defined as the summation of the distances traveled by all vehicles using a given section of highway during an average weekday divided by the summation of the actual travel times, including traffic delays. Average overall travel speeds have the following approximate relationships to average operating speeds:*

Equivalent Average Operating Speed	*Average Overall Travel Speed*
20 mph	*10 mph*
30 mph	*21 mph*
40 mph	*32 mph*
50 mph	*43 mph*
60 mph	*54 mph*
70 mph	*65 mph*

[15] *Full control of access shall be defined as the exercise of the police power to control access so as to give preference to the movement of through traffic by providing access connections only at selected public roads via grade-separated interchanges.*

[16] *Partial control of access shall be defined as the exercise of the police power to control access so as to give preference to the movement of through traffic to a degree that, in addition to access connections at selected public roads, there may be some direct access to abutting land uses with generally one reasonable point of access to each parcel of abutting land as these parcels existed at the time of an official declaration that partial control of access shall be exercised.*

[17] *Minimum control of access shall be defined as the exercise of the police power to regulate the placement and geometrics of direct-access roadway connections as necessary for safety without regulation of the number of access points.*

Table 6

SUMMARY OF FUNCTIONAL CRITERIA FOR THE JURISDICTIONAL CLASSIFICATION OF ARTERIAL HIGHWAYS IN MILWAUKEE COUNTY

Criteria	Type I - State Trunk Highways	Type II - County Trunk Highways	Type III - Local Trunk Highways
Trip Service Trip Length	Average trip length over 11 miles	Average trip length 7 to 11 miles.	Average trip length under 7 miles.
Land Use Service Transportation Terminals	Connect and serve[a] inter-regional rail, bus, and major truck terminals; airports; and seaports.	Connect and serve[a] freeway interchanges, noncommercial airports, pipline terminals, major intra-regional truck terminals, and rapid transit loading points.	Connect and serve[a] major off-street parking facilities and minor truck terminals.
Recreational Facilities	State fairgrounds and state parks.	Regional parks and special recreational use areas.	Community parks.
Commercial Centers	Regional retail and service centers.	Community retail and service centers.	Neighborhood retail and service centers.
Industrial Centers	Major regional industrial areas.	Major community industrial areas.	Minor community industrial areas.
Institutional	Universities, county seats, and major medical centers.	County institutions, colleges, vocational schools, and community hospitals.	High schools.
Operational Characteristics System Continuity	Interregional continuity comprising integrated system at state level.	Intercommunity continuity comprising integrated system at county level.	Intra-community continuity comprising integrated system at city, village, or town level.
Spacing	Minimum 2 miles.	Minimum 1 mile.	Minimum 0.5 mile.
Volume	Minimum 19,000 vehicles per average weekday (1990 forecast).	Minimum 10,000 vehicles per average weekday (1990 forecast).	Minimum 7,500 vehicles per average weekday (1990 forecast).
Traffic Mobility	Average overall travel speed[b] 30 to 60 miles per hour within the 1963 urban growth ring; 30 to 70 miles per hour outside the 1963 urban growth ring.	Average overall travel speed[b] 20 to 40 miles per hour within the 1963 urban growth ring; 25 to 60 miles per hour outside the 1963 urban growth ring.	Average overall travel speed[b] 25 miles per hour or less.
Land Access Control	Full or partial control[c] of access.	Partial control[d] of access.	Minimum control[e] of access.

[a] *Arterial facilities shall be considered to connect and serve given land uses when direct access from the arterial facility to roads serving the land use is available within the following maximum on the road distances from the main vehicular entrance to the land use served: Type I Arterial Facility 1 mile; Type II Arterial Facility 0.5 mile; Type III Arterial Facility 0.25 mile.*

[b] *Average overall travel speed is defined as the summation of the distances traveled by all vehicles using a section of highway during an average weekday divided by the summation of actual travel times. Average overall travel speeds range from 7 to 10 mph below equivalent average operating speeds.*

[c] *Full control of access is defined as exercise of the police power so as to prohibit direct access except at selected public roads via grade-separated interchanges.*

[d] *Partial control of access is defined as exercise of the police power so as to permit some direct access in addition to connections at selected public roads, with generally one point of access being permitted to each abutting parcel of land.*

[e] *Minimum control of access is defined as exercise of the police power to regulate the placement and geometrics of direct connections without regulation of the number of access points.*

OTHER FACTORS

In the application of the foregoing criteria to the delineation of a jurisdictional highway system, several other factors must be considered, particularly legal and financial constraints. Federal, state, county, and local legislative and financial resource limitations limit the mileage allotment available for state trunk, county trunk, and related federal aid routes and must, therefore, be considered as important constraints on any jurisdictional classification scheme. Evaluation of these legal and financial constraints may show that the jurisdiction for certain facility types must be assumed by a different level of government than might otherwise be indicated by type classification alone. It must also be recognized that certain intergovernmental coordination requirements necessitated by road location along or across civil division boundaries may require, as practical plan implementation measures, the assumption of jurisdictional responsibility for certain facilities by a higher level of government than might otherwise be indicated by type classification alone.

Chapter V

APPLICATION OF FUNCTIONAL CRITERIA TO DEVELOP JURISDICTIONAL SYSTEMS

INTRODUCTION

In Chapter II of this report, it was indicated that the development of a jurisdictional highway system plan for Milwaukee County involved a seven-step planning process. The fourth step in this process consisted of the application of functional criteria specifically developed for this purpose in order to divide the total functional arterial street and highway system into rational jurisdictional subsystems. The criteria were applied to the total arterial street and highway system for Milwaukee County as proposed in the adopted regional transportation plan and refined through a careful review of the arterial network by experienced public works engineers responsible for the design, construction, operation, and maintenance of arterial highway facilities within the county. The total system of arterial street and highway facilities forming the bases for the application of the criteria is shown in Map 17.

The application of the criteria, set forth in the previous chapter, required an analysis of the trip lengths and traffic volumes to be served by each link in the total arterial system, an inventory of the land uses to be served by each of the jurisdictional subsystems, and an investigation of the operational characteristics of the arterial facilities themselves. The procedure developed to establish the jurisdictional classification of each arterial street and highway facility in Milwaukee County involved three major steps.

In the first step, each arterial facility was classified in terms of the trip service criteria previously established. Three trip service subsystems were thus identified, each related to a jurisdictional classification. In the second step, each arterial facility was classified in terms of the land use service criteria previously established. Three land use service subsystems were thus identified, each related to a jurisdictional classification. Finally, these two sets of jurisdictional subsystems were combined and refined through the application of system continuity and facility spacing criteria to produce a preliminary jurisdictional highway system plan. The preliminary jurisdictional classification of the arterial facilities was further refined by the consideration and evaluation of administrative, financial, and legal factors. This entire process is illustrated in Figure 3.

TRIP SERVICE JURISDICTIONAL SUBSYSTEMS

It was stated earlier that the functional arterial street and highway system proposed in the adopted regional transportation plan was refined and updated in order both to incorporate any changes in the arterial network which had occurred within Milwaukee County since the adoption of the plan and to incorporate certain changes in the proposed plan indicated to be desirable since its adoption. For this reason it was first necessary to modify the computer description of that portion of the regional arterial network affected by these changes before average trip lengths could be determined for each link[1] in the functional system. Both the structure and the operational characteristics of the arterial network description were analyzed by plotting and checking the minimum time travel paths connecting selected major trip generators located both inside and outside Milwaukee County with all traffic analysis zone[2] centroids affected by the network modification. Once this network editing was completed and the computer description of the system deemed satisfactory, the effect of the forecast 1990 travel demand on the network was simulated by a computer traffic assignment of the matrix of 1990 interzonal trips,[3] developed in

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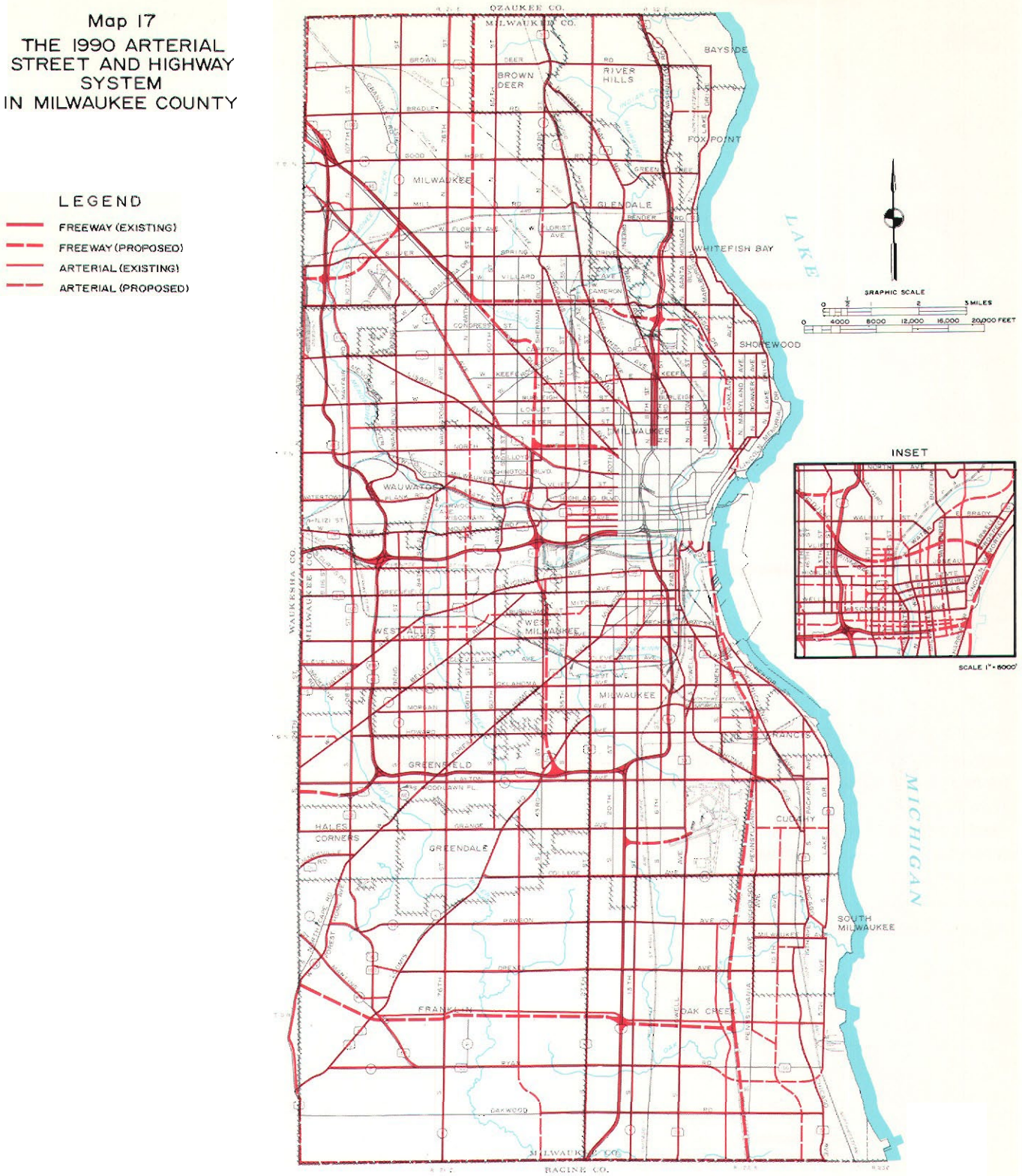
[1] *A link consists of a section of the arterial street and highway network, defined at each end by a node point located at the intersection of two arterials. A link is the smallest arterial segment used to describe the total arterial system to the computer.*

[2] *A traffic analysis zone consists of a homogeneous grouping of trip generation activities, such as a residential neighborhood unit, a regional shopping center, or a contiguous industrial area. Such a zone is shown on the arterial network diagram by a centroid representing the point where trips generated within the zone are assumed to enter and leave the arterial network.*

[3] *The matrix of 1990 interzonal trips is a table of the zone-to-zone trip movements showing the quantity of 1990 trips by direction between each pair of zones.*

Map 17
THE 1990 ARTERIAL STREET AND HIGHWAY SYSTEM IN MILWAUKEE COUNTY



This proposed 771-mile system of arterial streets and highways required to serve the existing and forecast travel demand within Milwaukee County forms the basic arterial highway network to which the functional criteria for the jurisdictional classification were applied.

the regional land use-transportation study, to the 1990 interzonal least-time-travel paths through the arterial network. The accumulated forecast 1990 volumes on each section of the arterial system resulting from the traffic assignment were then analyzed on a link-by-link basis for reasonableness by comparison with existing traffic volumes and previous assignments of forecast traffic volumes.

In preparation for the calculation of the average trip length which could be expected to occur on each link of the network, an interzonal matrix of trip distance volumes (TDV) was produced by multiplying the matrix of 1990 interzonal trips by the matrix of interzonal over-the-road distances as measured via the least-time path connecting each pair of traffic analysis zones. The resulting TDV matrix was assigned to the least-time-travel paths through the arterial network, and the 1990 trip distance volumes were accumulated for each link in the entire arterial system. The average length of the 1990 trips using each link in the network was then calculated by dividing the 1990 trip distance volume accumulated on each link by the assigned 1990 traffic volume for that link. Using the calculated trip length data, each link was classified as a Type I, II, or III arterial facility in accordance with the previously established trip service criteria. The resulting subsystems are shown in Map 18, the jurisdictional classification for each link being indicated by color code. Continuous segments or lengths of the same color tended to focus attention to routes of similar function which could be combined to form jurisdictional subsystems.

The subsystems delineated by the application of the trip service criteria were found generally to parallel the stratification of the total arterial system into subsystems by relative levels of service. For example, the arterial facilities providing the highest levels of service, characterized by free-flow traffic conditions, that is, the freeways, exhibited the longest average trip lengths, ranging from 11.0 miles up to 45.0 miles, and were, therefore, classified into the highest trip service facility type. Similarly, the facilities providing the lowest level of service, that is, the at-grade arterials in areas with high land use intensities, exhibited the shortest average trip lengths, less than 7.0 miles and were, therefore, classified into the lowest trip service facility type.

LAND USE SERVICE JURISDICTIONAL SUBSYSTEMS

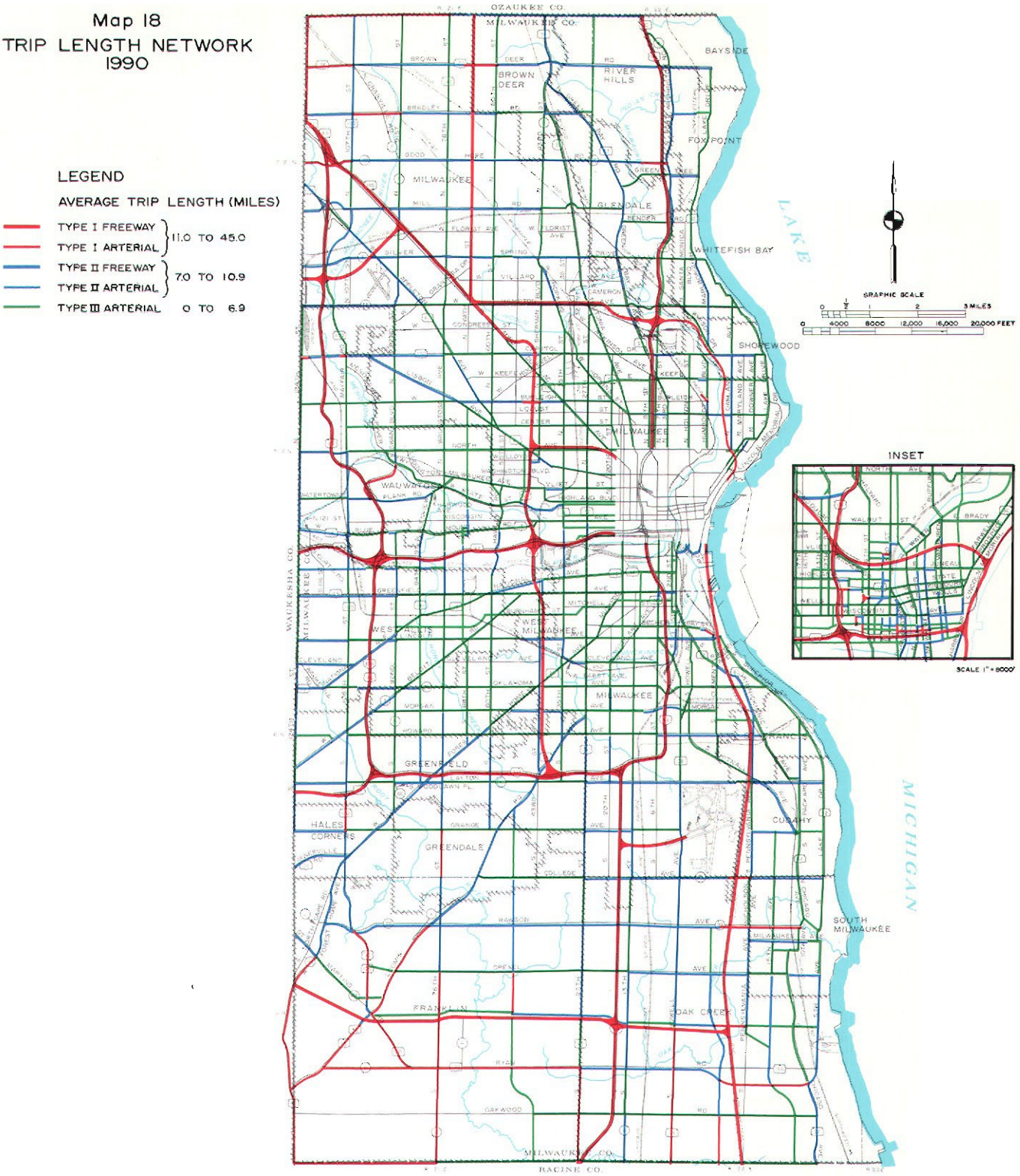
In preparation for the development of the land use service jurisdictional subsystems, the Type I, II, and III land use areas, as defined in the previously established criteria, were delineated on a series of maps. The existing transportation terminals, recreational facilities, commercial centers, industrial centers, and institutional land uses were identified and categorized, through application of the criteria, by the study staff and reviewed by knowledgeable local planners and engineers. Future land use areas expected to be developed by the plan design year 1990 were delineated from the adopted 1990 regional land use plan, adopted community land use plans and zoning ordinances, and current planning data provided by local planners and engineers. The land use areas for Type I, Type II, and Type III jurisdictional categories, as delineated for the study, are shown in Map 19.

Utilizing the land use service criteria previously developed, the total arterial street and highway system was classified into three land use service subsystems. This was accomplished through a series of system classifications. First, those arterial facilities which best connected and served each of the Type I land use areas were carefully determined and delineated to form a continuous subsystem. The recommended freeway system for Milwaukee County served all of the Type I land use areas with only three exceptions—a part of the proposed major medical center for Milwaukee County and the regional industrial areas in the Cities of South Milwaukee and Cudahy. A second arterial subsystem was then established to interconnect with the Type I land use service subsystem and to provide the required service for all Type II land use areas not already served by Type I arterial highways. The remaining arterial facilities were classified into a third subsystem to serve the Type III land uses. The resulting jurisdictional subsystems are also shown in Map 19.

DEVELOPMENT OF THE JURISDICTIONAL HIGHWAY SYSTEM PLAN

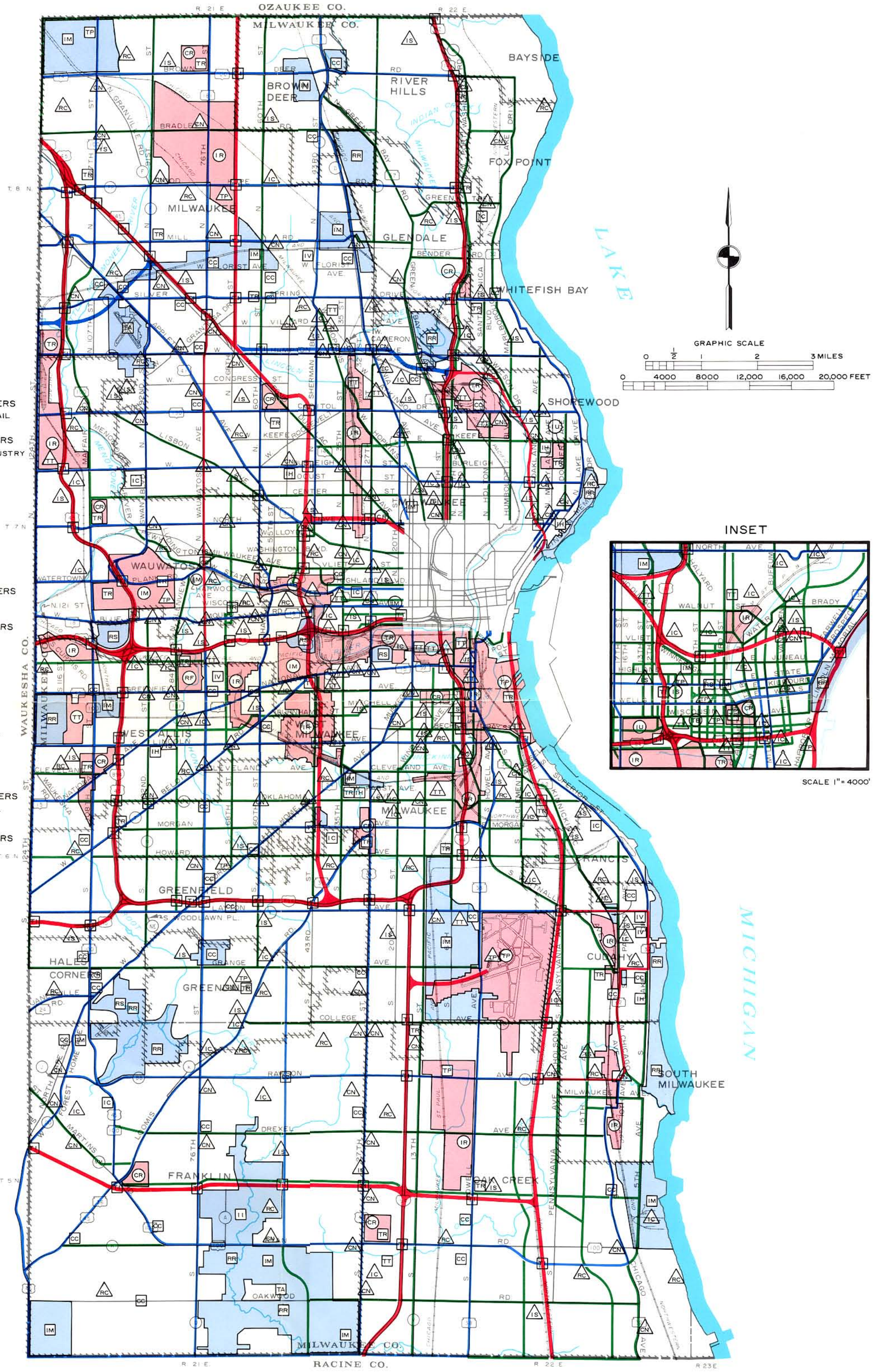
Through the procedures previously described, two separate groups of Type I, Type II, and Type III subsystems were established, one group developed by application of the trip service criteria and the other by application of the land use service criteria. Generally, the same individual facilities were found to be included within each of the corresponding subsystems.

Map 18
TRIP LENGTH NETWORK
1990



Application of the trip length criteria resulted in the classification of the total arterial highway network into the three subsystems shown on this map. The pattern illustrates the importance of the freeways in serving the longest trip lengths and may be described as dendritic, including all of the freeway system and branching from the freeway interchanges.

Map 19
LAND USE NETWORK
1990



LEGEND

- FREEWAY FACILITES CONNECTING AND SERVING TYPE I LAND USE FACILITIES
- ARTERIAL FACILITIES CONNECTING AND SERVING TYPE I LAND USE FACILITIES
- FREEWAY FACILITIES CONNECTING AND SERVING TYPE II LAND USE FACILITIES
- ARTERIAL FACILITIES CONNECTING AND SERVING TYPE II LAND USE FACILITIES
- ARTERIAL FACILITIES CONNECTING AND SERVING TYPE III LAND USE FACILITIES

TYPE I LAND USE FACILITIES

TYPE I LAND USE AREAS

TRANSPORTATION TERMINALS
- (TR) RAIL TERMINAL
- (TB) BUS TERMINAL
- (TT) TRUCK TERMINAL
- (TP) PORTS (AIR AND SEA)

RECREATIONAL AREAS
- (RF) STATE FAIR
- (RP) STATE PARK

COMMERCIAL CENTERS
- (CR) MAJOR REGIONAL RETAIL

INDUSTRIAL CENTERS
- (IR) MAJOR REGIONAL INDUSTRY

INSTITUTIONAL
- (IU) UNIVERSITY
- (IS) COUNTY SEAT
- (IM) MAJOR MEDICAL CENTER

TYPE II LAND USE FACILITIES

TYPE II LAND USE AREAS

TRANSPORTATION TERMINALS
- (TI) FREEWAY INTERCHANGE
- (TA) NON-COMMERCIAL AIRPORT
- (TP) PIPELINE TERMINAL
- (TT) TRUCK TERMINAL
- (TR) RAPID TRANSIT LOADING

RECREATIONAL AREAS
- (RR) REGIONAL PARK
- (RS) SPECIAL USE AREA

COMMERCIAL CENTERS
- (CC) COMMUNITY RETAIL

INDUSTRIAL CENTERS
- (IM) MAJOR COMMUNITY INDUSTRY

INSTITUTIONAL
- (II) COUNTY INSTITUTION
- (IC) COLLEGE
- (IV) VOCATIONAL SCHOOL
- (IH) COMMUNITY HOSPITAL

TYPE III LAND USE FACILITIES

TYPE III LAND USE AREAS

TRANSPORTATION TERMINALS
- (TT) TRUCK TERMINAL
- (TP) OFF STREET PARKING

RECREATIONAL AREAS
- (RC) COMMUNITY PARK

COMMERCIAL CENTERS
- (CN) NEIGHBORHOOD RETAIL

INDUSTRIAL CENTERS
- (IC) COMMUNITY INDUSTRY

INSTITUTIONAL
- (IS) HIGH SCHOOL

Application of the land use service criteria resulted in the classification of the total arterial highway network into the three subsystems shown on this map. The pattern is quite different from the trip length and trip volume network configurations and illustrates the close relationship which should exist between land use and arterial needs.

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Further refinement of the jurisdictional classification of the total arterial street and highway system was necessary, however, to establish a recommended jurisdictional plan. This refinement was accomplished through the application of the previously established criteria relating to the operational characteristics of each facility, including system continuity, facility spacing, traffic volume, traffic mobility, and land access, to the two groups of subsystems. Other factors considered in this combining process were the legal and financial constraints and the necessary intergovernmental coordination requirements.

In order to facilitate the application of the traffic volume criteria, a third group of subsystems, shown in Map 20, were identified by application of the traffic volume criteria previously established. This third group of subsystems, based only upon volume considerations, together with the system continuity and facility spacing criteria, were found to be most useful in the refinement of the application of the trip service and land use service criteria necessary to develop the final classification of the entire arterial system into recommended jurisdictional systems.

By comparing the three separate groups of subsystems—trip service, land use service, and volume—most of the arterial facilities were found to fall clearly into one of the three jurisdictional type categories—Type I, state trunk; Type II, county trunk; and Type III, local trunk—by virtue of meeting all of these criteria for a majority of the route length. Some judgment, however, had to be exercised in the case of a limited number of marginal facilities which did not fall clearly into one category or another because not all of the criteria were met for the majority of the route length. These marginal facilities are listed in Table 7, together with a summary of the manner

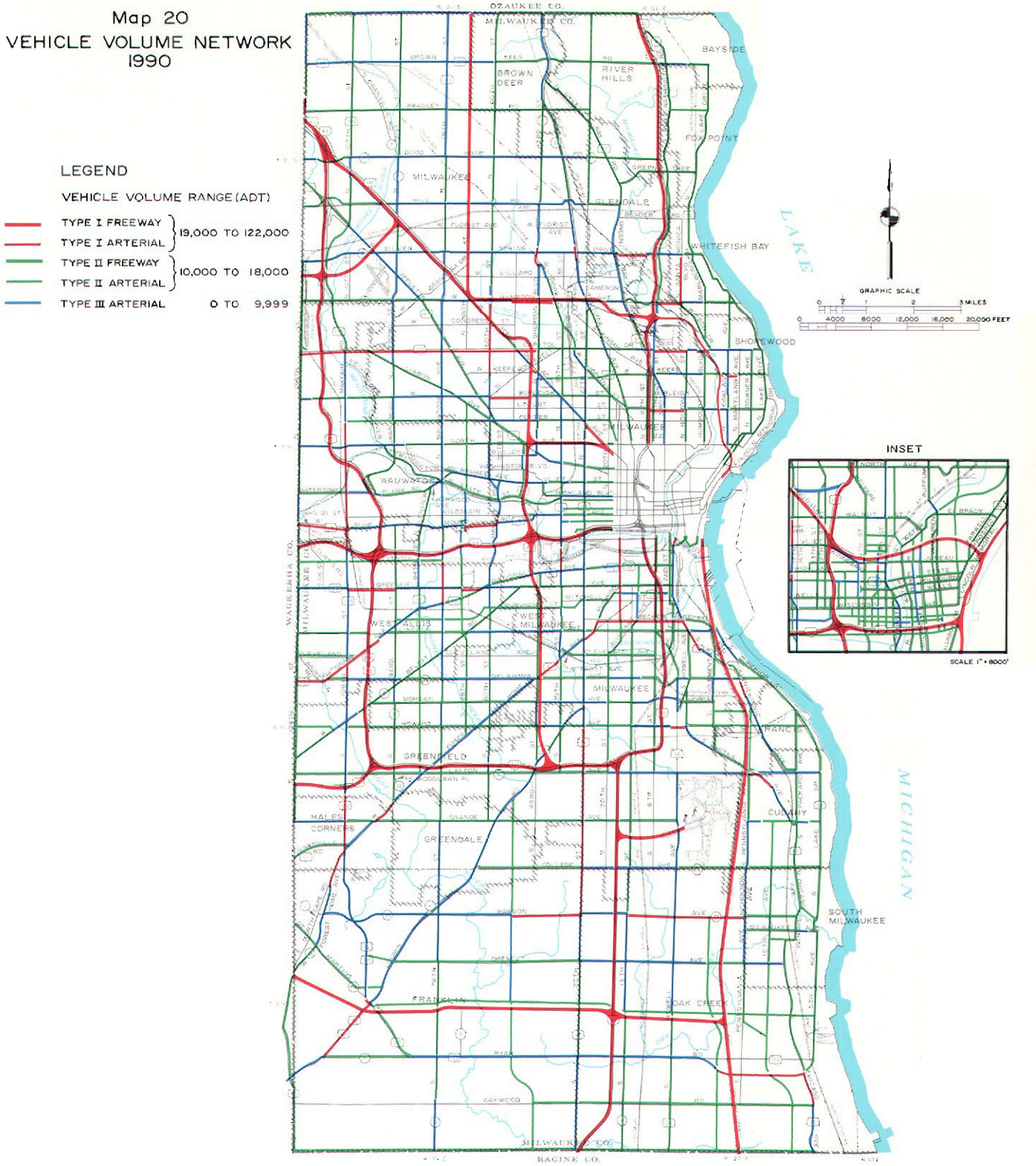
Table 7

SUMMARY OF TECHNICAL ADVISORY COMMITTEE ACTION CONCERNING MARGINAL FACILITIES AND SYSTEM MODIFICATIONS

Proposed Change	Considerations	Study Staff Action	TAC Action
1. Remove STH 32 as a Type I facility from the E. Wells St.-E. State St. one-way pair, N. Prospect Ave., and the N. Prospect Ave.-N. Farwell Ave. one-way pair to E. North Ave. Add STH 32 as a Type I facility to the N. Milwaukee St.-N. Broadway St. one-way pair, N. Water St., E. Kane Pl., N. Oakland Ave., and E. North Ave. to the N. Prospect Ave.-N. Farwell Ave. one-way pair.	The initial routing of STH 32 was so designated primarily in recognition of the need for a Type I surface arterial through the central business district and because this routing met the criteria for system continuity. This change provides good facility spacing and system continuity and has no appreciable effect on the system mileage.	Recommended approval	Unanimously approved
2. Remove E. and W. North Ave. as a Type II facility between the Stadium Freeway and N. Lake Dr. (STH 32) and replace with a Type II facility along W. Lisbon Ave., W. Walnut St. and E. Brady St. to the N. Prospect Ave.-N. Farwell Ave. one-way pair.	The North Ave. facility provides good route continuity with the freeway system and serves important land uses. The facility proposed by the City of Milwaukee provides equal service to the important land uses and either facility meets the trip length criteria equally well. Both facilities are about 3.7 miles in length.	Recommended approval	Unanimously approved
3. Reclassify as a Type II facility the route combination of W. Burleigh St., N. Hopkins St. and E. and W. Locust St. from the Waukesha County line to N. Lake Dr.	The percent of the 9.9 mile route length which meets the major Type II Criteria is: 39 percent for trip length; 65 percent for land use service; and 48 percent for vehicle volume. The facility provides cross-county continuity and does not violate the spacing criteria. Strict compliance with the criteria would require rejection of this facility as a Type II arterial.	Because the route nearly meets the Type II criteria the staff presented the proposed change to the Technical Advisory Committee.	Unanimously approved
4. Reclassify as a Type II facility W. State St. between N. 76th St. and N. 35th St.	The percent of the 2.7 mile route length which meets the major Type II criteria is: 45 percent for trip length; 57 percent for land use service; and 21 percent for vehicle volume. The facility provides arterial system continuity but a portion of the facility violates the spacing criteria.	Because the route nearly meets the Type II criteria the staff presented the proposed change to the Technical Advisory Committee.	Unanimously approved
5. Reclassify as a Type II facility N. 91st St.-N. 92nd St. from the Ozaukee County line to W. Watertown Plank Rd.	The percent of the 10.0 mile route length which meets the major Type II criteria is: 20 percent for trip length; 73 percent for land use service; and 43 percent for vehicle volume. While the spacing criteria is not violated the facility does not have good continuity in Ozaukee County.	Because the route nearly meets the Type II criteria the staff presented the proposed change to the Technical Advisory Committee.	Rejected the requested change.

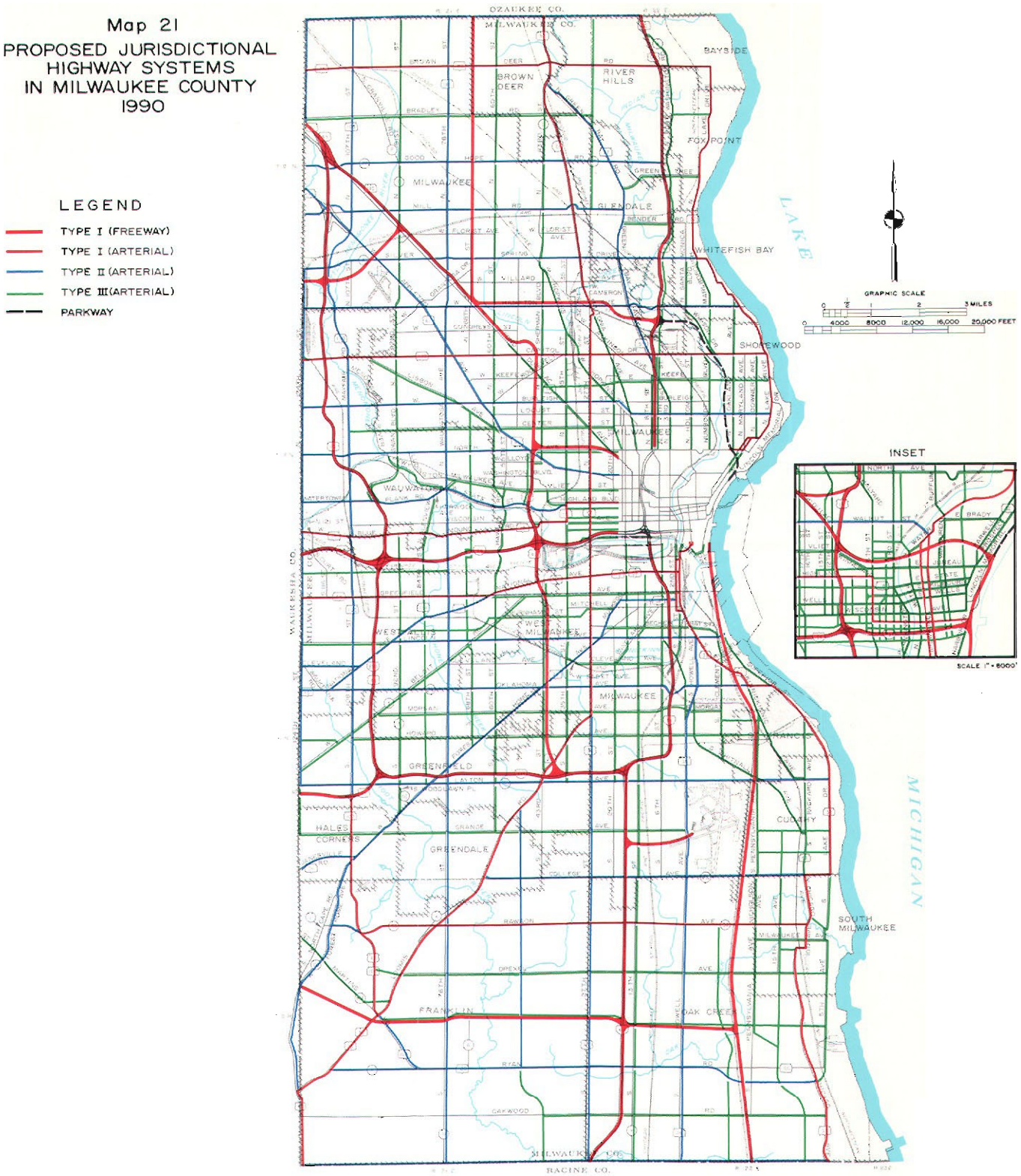
Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Map 20
VEHICLE VOLUME NETWORK
1990



Application of the vehicle volume criteria resulted in the classification of the total arterial highway network into the three subsystems shown on this map. The configuration of this system again illustrates the importance of the freeways in serving the highest traffic volumes. The pattern, like that for trip length, includes all of the freeway system and again branches from the freeway interchanges.

Map 21
PROPOSED JURISDICTIONAL HIGHWAY SYSTEMS IN MILWAUKEE COUNTY 1990



The recommended jurisdictional highway systems shown on this map represent a synthesis of the trip length systems, the land use systems, and the vehicle volume systems into a single fully integrated, continuous arterial highway system comprised of Type I, state trunk highways; Type II, county trunk highways; and Type III, local trunk highways.

in which they met the established criteria. Final determination with respect to the inclusion or exclusion of these marginal facilities was made by the Technical Advisory Committee, and this disposition is also noted in Table 7.

As shown in Map 21, the total arterial street and highway system was thus objectively and rationally classified into Type I, state trunk; Type II, county trunk; and Type III, local trunk subsystems, which are integral parts of the overall system and which are within themselves continuous but which vary with respect to the types of trip lengths served, the types of land use areas served, and the degree of traffic mobility provided.

Chapter VI

THE RECOMMENDED JURISDICTIONAL HIGHWAY SYSTEM PLAN

INTRODUCTION

Previous chapters of this report have described the jurisdictional highway planning process; the criteria developed in this process to group the various arterial routes comprising the total arterial street and highway network into subsystems having similar trip service, land use service, and operational characteristics; and the application of these criteria to develop a jurisdictional highway system plan for Milwaukee County. This chapter describes the resulting recommended jurisdictional highway system plan so developed. The plan provides for three jurisdictional highway systems—Type I, state trunk; Type II, county trunk; and Type III, local trunk—which together comprise the total arterial street and highway system required to serve the growing travel demands within Milwaukee County and its constituent cities and villages to the plan design year of 1990. The recommended jurisdictional highway system plan thus recommends an alignment of governmental responsibility for each of the various facilities comprising the total arterial street and highway system in the design year. The recommended plan also constitutes a refinement of the functional arterial street and highway system plan prepared by the Southeastern Wisconsin Regional Planning Commission under the initial regional land use-transportation study and, as such, is intended upon its adoption to constitute a functional, as well as a jurisdictional, arterial street and highway system plan for Milwaukee County to the design year 1990.

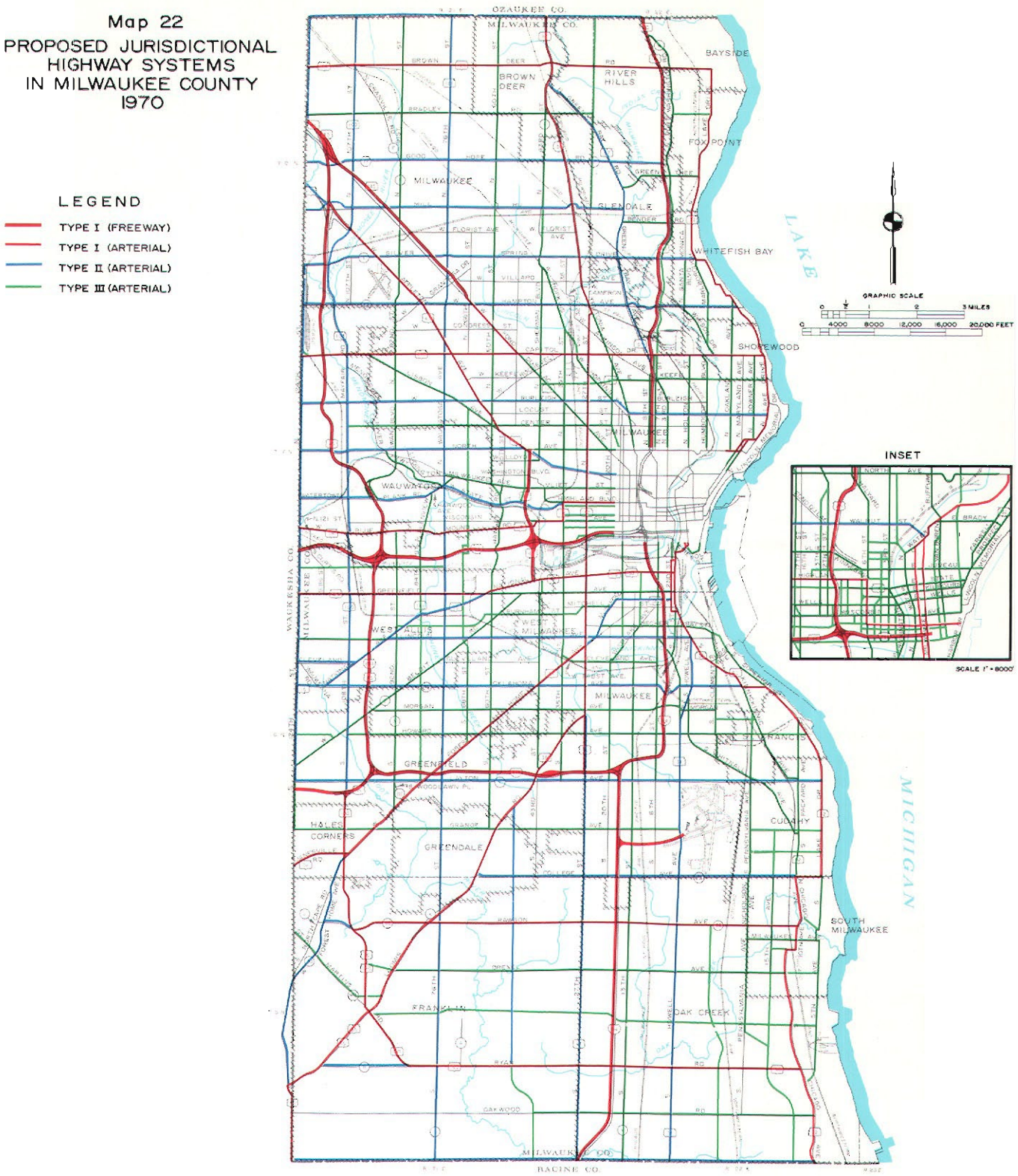
Because certain major arterial street and highway facilities proposed in the functional arterial street and highway system plan will not be constructed and operative until some time beyond the base year of the study, taken as 1970, the jurisdictional plan has been staged in two 10-year increments to the design year. The effect of this staging has been to retain temporarily on the proposed Type I (state trunk) arterial system certain routes ultimately proposed as Type II (county trunk) routes by 1990. These routes generally parallel proposed freeways, and the higher jurisdictional classification is recommended for the existing surface arterial until such time as the recommended paralleling freeways are constructed in the corridors served. The staging is thus intended to provide the best possible trip service, land use service, and system continuity during the interim period required to implement fully the functional highway system plan.

The jurisdictional highway systems within Milwaukee County, as these systems are anticipated to exist in the base year 1970, are shown on Map 22. The proposed configuration of these systems in 1980 is the same as in 1990, although the level of improvement differs. The recommended jurisdictional highway system plan for the year 1990 is shown on Map 23, contained in the pocket attached to the inside back cover of this report. The configurations of the three jurisdictional highway systems, as recommended for the years 1970, 1980, and 1990, are such that in each case the proposed Type I (state trunk) arterial system forms a complete and continuous arterial subsystem in and of itself; the proposed Type II (county trunk) arterial system complements the proposed Type I arterial system and with that system forms a continuous arterial subsystem, while the proposed Type III (local trunk) arterial system comprises the remainder of the total arterial street and highway system. Map 23 indicates this hierarchy of system and subsystem continuity.

THE RECOMMENDED TYPE I ARTERIAL HIGHWAY SYSTEM

The arterial street and highway system recommended to serve the arterial traffic demand in Milwaukee County through the design year 1990 totals 770.80 route miles of facilities, or about 21.5 percent of the estimated 3,581.8 route miles of facilities expected to comprise the total street and highway system within the county in 1990. Of this total arterial system, 220.0 route miles, or about 28 percent, are proposed to comprise the Type I (state trunk) arterial highway system. This represents a reduction of 14.82 miles in the existing state trunk highway and connecting street mileage within Milwaukee County. The recommended Type I system includes all of the existing, committed, and proposed freeways serving Milwaukee County through the plan design year 1990, as well as a limited number of miles of standard surface arterial facilities (see Table 8).

Map 22
PROPOSED JURISDICTIONAL HIGHWAY SYSTEMS IN MILWAUKEE COUNTY 1970



In order to implement the proposed jurisdictional highway plan, certain initial changes to existing highway jurisdictions should be made immediately. This map shows the recommended first stage of the realignment of highway jurisdiction recommended in this report.

Table 8

FUNCTIONAL COMPOSITION OF RECOMMENDED TYPE I (STATE TRUNK) HIGHWAY SYSTEM FOR MILWAUKEE COUNTY: 1990

Functional Facility Type	Miles	Percent of Total
Existing Freeways	47.28	21.5
Committed Freeways	30.59	13.9
Proposed Freeways	34.93	15.9
Existing Standard Surface Arterials	107.20	48.7
Committed Standard Surface Arterials	--	--
Proposed Standard Surface Arterials	--	--
Total	220.00	100.0

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

The proposed Type I (state trunk) arterial system for 1990 is shown on Map 23, contained in the pocket attached to the inside back cover of this report. In addition to all freeways, the recommended Type I arterial system includes the folowing standard surface arterials:

1. STH 100 over W. Brown Deer Road from N. 107th Street to N. Lake Drive (STH 32).
2. STH 74 over W. Brown Deer Road from the Waukesha County line to N. 107th Street.
3. STH 190 over E. and W. Capitol Drive from the Waukesha County line to N. Lake Drive (STH 32).
4. USH 18 over W. Bluemound Road, W. Wisconsin Avenue, N. 35th Street, W. Highland Avenue, N. 6th Street, and W. and E. Michigan Street, from the Waukesha County line to the Municipal Pier.
5. STH 59 over W. Greenfield and W. National Avenues from the Waukesha County line to S. 1st and S. 2nd Streets (STH 32).
6. W. Rawson Avenue from S. Lovers Lane Road to N. Chicago Avenue (STH 32).
7. STH 32 over S. Chicago Avenue, N. Chicago Avenue, E. College Avenue, S. Lake Drive, E. Oklahoma Avenue, S. Kinnickinnic Avenue, S. 1st and S. 2nd Streets, E. Pittsburgh Street, N. Broadway and N. Milwaukee Avenue, N. Water Street, E. Kane Place, N. Oakland Avenue, E. North Avenue, N. Farwell and No. Prospect Avenues, E. Bradford Avenue, N. Lake Drive and W. Brown Deer Road, from the Racine County line northerly through the Milwaukee Central Business District to the intersection of W. Brown Deer Road and USH 141.
8. STH 36 over W. Loomis Road from the Waukesha County line to S. 27th Street.
9. STH 57 over S. and N. 27th Street, N. Teutonia Avenue, and N. Green Bay Road, from its intersection with W. Loomis Road to the Ozaukee County line.
10. USH 45 over S. 100th Street and S. 108th Street from W. Loomis Road to the Rock Freeway.
11. USH 45 over S. 124th Street along the Milwaukee-Waukesha County line from the Racine County line to W. Loomis Road.
12. STH 145 over N. 124th Street along the Milwaukee-Waukesha County line from USH 41 northerly.

Although not all of the 19 municipalities comprising Milwaukee County have existing, committed, or proposed freeways located within their corporate limits, all municipalities have some portion of their surface arterial street systems included in the proposed Type I arterial system. The recommended mileages in the total Type I arterial system within each municipality for the years 1970, 1980, and 1990 are indicated in Table 9.

Table 9

PROPOSED DISTRIBUTION OF TYPE I ARTERIAL (STATE TRUNK) SYSTEM MILEAGE IN MILWAUKEE COUNTY BY CIVIL DIVISION: 1970, 1980, AND 1990

Civil Division	1970			1980			1990		
	Freeway	Standard Arterial	Mileage Total	Freeway	Standard Arterial	Mileage Total	Freeway	Standard Arterial	Mileage Total
Bayside	1.2	1.7	2.9	1.2	1.7	2.9	1.2	1.7	2.9
Brown Deer	--	4.6	4.6	1.1	4.6	5.7	1.1	4.6	5.7
Cudahy	--	2.9	2.9	2.1	2.9	5.0	2.1	2.9	5.0
Fox Point	--	2.7	2.7	--	2.7	2.7	--	2.7	2.7
Franklin	--	18.8	18.8	6.7	13.9	20.6	6.7	13.9	20.6
Glendale	3.5	--	3.5	3.5	--	3.5	3.5	--	3.5
Greendale	--	2.3	2.3	--	2.0	2.0	--	2.0	2.0
Greenfield	8.5	5.5	14.0	9.4	2.7	12.1	9.4	2.7	12.1
Hales Corners	--	3.9	3.9	--	1.5	1.5	--	1.5	1.5
Milwaukee	33.8	64.1	97.9	60.3	45.1	105.4	60.3	45.1	105.4
Oak Creek	5.6	11.8	17.4	14.7	7.1	21.8	14.7	7.1	21.8
River Hills	1.9	2.0	3.9	1.9	2.0	3.9	1.9	2.0	3.9
St. Francis	--	1.7	1.7	1.5	1.7	3.2	1.5	1.7	3.2
Shorewood	--	2.5	2.5	--	2.5	2.5	--	2.5	2.5
South Milwaukee	--	4.1	4.1	--	4.1	4.1	--	4.1	4.1
Wauwatosa	5.8	6.9	12.7	5.8	3.9	9.7	5.8	3.9	9.7
West Allis	3.3	4.7	8.0	3.3	4.7	8.0	3.3	4.7	8.0
West Milwaukee	--	1.1	1.1	1.3	1.1	2.4	1.3	1.1	2.4
Whitefish Bay	--	3.0	3.0	--	3.0	3.0	--	3.0	3.0
Total	63.6	144.3	207.9	112.8	107.2	220.0	112.8	107.2	220.0

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

The recommended Type I arterial system provides the basic framework of the total arterial street and highway system required to serve the existing and probable future traffic demand within Milwaukee County to the plan design year of 1990. The relative degree of efficiency with which each link in the proposed Type I arterial system accomplishes the intended function will significantly affect the total operation of the entire arterial street and highway network.

Code numbers indicating minimum cross sections having right-of-way and pavement widths adequate to serve the forecast 1990 traffic demand for each link in the recommended Type I arterial system are shown on the plan map enclosed with this report. The cross sections related to each code number are set forth in Appendix A and contain, in addition to recommended dimensions, estimated representative construction and maintenance unit costs and capacity ranges at various levels of service. The minimum cross sections recommended on the plan are based upon analyses of forecast traffic volumes, desirable levels of service, and preliminary assessment of the probable development cost, including cost of right-of-way acquisition. As such, the suggested cross sections will provide the capacity required to meet the forecast travel demand at the level of service indicated in the cross section code shown on the plan map and will thus provide a workable arterial subsystem able to carry the existing and probable future traffic demand, while meeting regional transportation system development objectives. Consideration and refinement of the suggested cross sections will be required as each facility link in the system is considered for actual improvement.

The proposed Milwaukee River Parkway, which extends from the Juneau Interchange at the intersection of the Park and Lake Freeways to the North-South Freeway in the vicinity of W. Hampton Avenue, although an integral and vital part of

the total arterial street and highway system required to serve the growing travel demand within Milwaukee County to the plan design year, was not assigned a jurisdictional classification in this study; and the length of this facility is not included in any of the mileage or cost tables presented in this report. The reason for this exclusion is that the adopted Regional Transportation Plan recommends that the Milwaukee County Park Commission assume jurisdictional responsibility for this facility. Application to this facility of the criteria established in the study for jurisdictional classification indicates that the proposed parkway would fully meet the Type I trip service, land use service, and operational criteria for its entire length of 4.5 miles. It is expected that this unique facility will have to receive separate and special consideration and attention in its design, financing, construction, operation, and maintenance, particularly as to how it is to be integrated into the jurisdictional subsystems, including federal aid route allocation and state or county trunk highway designation.

THE RECOMMENDED TYPE II ARTERIAL HIGHWAY SYSTEM

The proposed Type II (county trunk) arterial highway system includes 217.4 route miles of facilities, or an additional 28 percent of total arterial mileage proposed to serve Milwaukee County in the plan design year of 1990. The proposed Type II arterial system is comprised entirely of standard surface arterials since all freeways are included in the proposed Type I arterial system. The total of 217.4 miles of county trunk highway proposed, represents an increase of 140.9 miles over the existing county trunk mileage. The proposed system is shown on Map 23, and the distribution of the system mileage by municipality for the years 1970, 1980, and 1990 is indicated in Table 10.

As shown in Map 19, most surface arterials connecting to freeway interchanges are included in either the Type I or Type II arterial systems. The adequate improvement, maintenance, and operation of these routes are essential to the efficient

Table 10

PROPOSED DISTRIBUTION OF TYPE II ARTERIAL (COUNTY TRUNK) SYSTEM MILEAGE IN MILWAUKEE COUNTY BY CIVIL DIVISION

Civil Division	1970 Standard Arterial	1980 Standard Arterial	1990 Standard Arterial
Bayside	--	--	--
Brown Deer	1.6	1.6	1.6
Cudahy	2.0	2.0	2.0
Fox Point	--	--	--
Franklin	20.8	25.8	25.8
Glendale	7.0	7.0	7.0
Greendale	4.5	4.8	4.8
Greenfield	11.8	14.9	14.9
Hales Corners	--	2.8	2.8
Milwaukee	78.8	97.6	97.6
Oak Creek	13.9	18.6	18.6
River Hills	1.9	1.9	1.9
St. Francis	0.4	0.4	0.4
Shorewood	--	--	--
South Milwaukee	0.5	0.5	0.5
Wauwatosa	17.4	19.7	19.7
West Allis	17.6	17.6	17.6
West Milwaukee	0.4	0.4	0.4
Whitefish Bay	1.8	1.8	1.8
Total	180.4	217.4	217.4

Source: Milwaukee County, Wisconsin Department of Transportation

operation of the freeway system. In addition, certain routes of county-wide significance, formerly designated as state trunk highways but which have, with the construction of paralleling freeways in the corridors served, assumed lesser importance as arterials, are recommended for inclusion in the proposed Type II system. Also included in the Type II system are certain county and municipal boundary line roads. These inclusions are intended to reduce the number of governmental agencies having primary responsibility for the improvement, maintenance, and operation of these facilities and thereby to reduce the problems involved in achieving the intergovernmental coordination necessary to the cooperative development of the total arterial system.

The recommended Type II arterial system complements the recommended Type I system and is intended, together with the Type I system, to include all major arterials having areawide significance. Code numbers indicating minimum cross sections with right-of-way and pavement widths adequate to serve the forecast 1990 traffic demand for each link in the recommended Type II arterial system are shown on the plan map enclosed with this report. The cross sections related to each code number are set forth in Appendix A and contain, in addition to recommended dimensions, estimated representative construction and maintenance unit costs and capacity ranges at various levels of service. The minimum cross sections suggested on the plan are based upon analyses of forecast traffic volumes, desirable levels of service, and preliminary assessment of the probable development cost, including cost of right-of-way acquisition. As such, the suggested cross sections will provide the capacity required to meet the forecast travel demand at the level of service indicated in the cross section code shown on the plan map and thus will provide a workable arterial subsystem able to carry the existing and probable future travel demand, while meeting regional and county transportation system development objectives. Reconsideration and refinement of the suggested cross sections will be required as each facility link in the system is considered for actual improvement.

THE RECOMMENDED TYPE III ARTERIAL HIGHWAY SYSTEM

The proposed Type III (local trunk) arterial highway system includes 333.40 route miles of facilities, or about 43 percent of the total arterial mileage proposed to serve Milwaukee County in the plan design year of 1990. The proposed system is shown on Map 23, and the distribution by municipality for the years, 1970, 1980, and 1990 is indicated in Table 11. The proposed Type III arterial system is intended to serve the lowest level of arterial traffic demand within Milwaukee County and, as such, to complement the proposed Type I and Type II subsystems. Even though the Type III system is intended to serve primarily local arterial street and highway needs, this subsystem must, nevertheless, perform efficiently as an integral part of the total arterial street and highway system if that total system is to serve properly the growing traffic demand within the County.

Code numbers indicating minimum cross sections with right-of-way and pavement widths adequate to serve the forecast 1990 traffic demand for each link in the recommended Type III arterial system are shown on the plan map enclosed with this report. The cross sections related to each code number are set forth in Appendix A and contain, in addition to recommended dimensions, estimated representative construction and maintenance unit costs and capacity ranges at various levels of service. The minimum cross sections suggested on the plan are based upon analyses of forecast traffic volume, desirable level of service, and preliminary assessment of the probable development cost, including cost of right-of-way acquisition. As such, the suggested cross sections will provide the capacity required to meet the forecast travel demand at the level of service indicated in the cross section code shown on the plan map and thus will provide a workable arterial subsystem able to carry the existing and probable future traffic demand, while meeting regional, county, and local transportation system development objectives. The consideration and refinement of the suggested cross sections will be required as each facility link in the system is considered for improvement.

EVALUATION OF THE PROPOSED JURISDICTIONAL HIGHWAY SYSTEMS

One of the most important objectives of the jurisdictional highway planning program is to attain the most effective use of the total public resources in the provision of highway transportation by focusing the appropriate resources and capabilities on corresponding areas of need. That the recommended jurisdictional highway plan accomplishes this objective is indicated by the fact that the proposed

Table 11

PROPOSED DISTRIBUTION OF TYPE III ARTERIAL (LOCAL TRUNK) SYSTEM MILEAGE IN MILWAUKEE COUNTY BY CIVIL DIVISION: 1970, 1980, and 1990

Civil Division	1970 Standard Arterial	1980 Standard Arterial	1990 Standard Arterial
Bayside	0.92	0.92	0.92
Brown Deer	4.22	4.22	4.22
Cudahy	10.74	10.74	10.74
Fox Point	2.59	2.59	2.59
Franklin	13.21	13.21	13.21
Glendale	7.19	7.19	7.19
Greendale	3.03	3.03	3.03
Greenfield	12.51	12.51	12.51
Hales Corners	2.33	2.33	2.33
Milwaukee	184.38	184.38	184.38
Oak Creek	31.86	31.86	31.86
River Hills	2.99	2.99	2.99
St. Francis	6.36	6.36	6.36
Shorewood	3.42	3.42	3.42
South Milwaukee	10.02	10.02	10.02
Wauwatosa	11.76	11.76	11.76
West Allis	19.35	19.35	19.35
West Milwaukee	3.43	3.43	3.43
Whitefish Bay	3.09	3.09	3.09
Total	333.40	333.40	333.40

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Type I arterial system may be expected to carry approximately 8.7 million of the 13.3 million arterial vehicle miles of travel anticipated to occur daily within Milwaukee County by the year 1990. Thus, approximately 28 percent of the total arterial street and highway mileage within the county may be expected to carry approximately 65 percent of the total arterial travel demand. The proposed Type II arterial system may be expected to carry an additional 2.7 million arterial vehicle miles of travel. Thus, an additional 28 percent of the total arterial street and highway mileage may be expected to carry an additional 21 percent of the total arterial travel demand. The remaining 1.9 million arterial vehicle miles of travel, or 14 percent of the total demand, would be carried on the proposed Type III arterial system. Thus, the proposed Type I and Type II systems combined may be expected to carry approximately 86 percent of the total arterial vehicle miles of travel expected to take place within the County by the year 1990, leaving only 14 percent to be carried by Type III local arterials. This concentration of travel demand on the various arterial subsystems is indicated in Figure 7.

Similarly, the total estimated vehicle miles of travel which may be expected to occur daily on all streets and highways within Milwaukee County by the year 1990 is 15.4 million vehicle miles. The proportionate share of this total load which each of the recommended jurisdictional subsystems may be expected to carry by 1990 is summarized in Table 12 and in Figure 8.

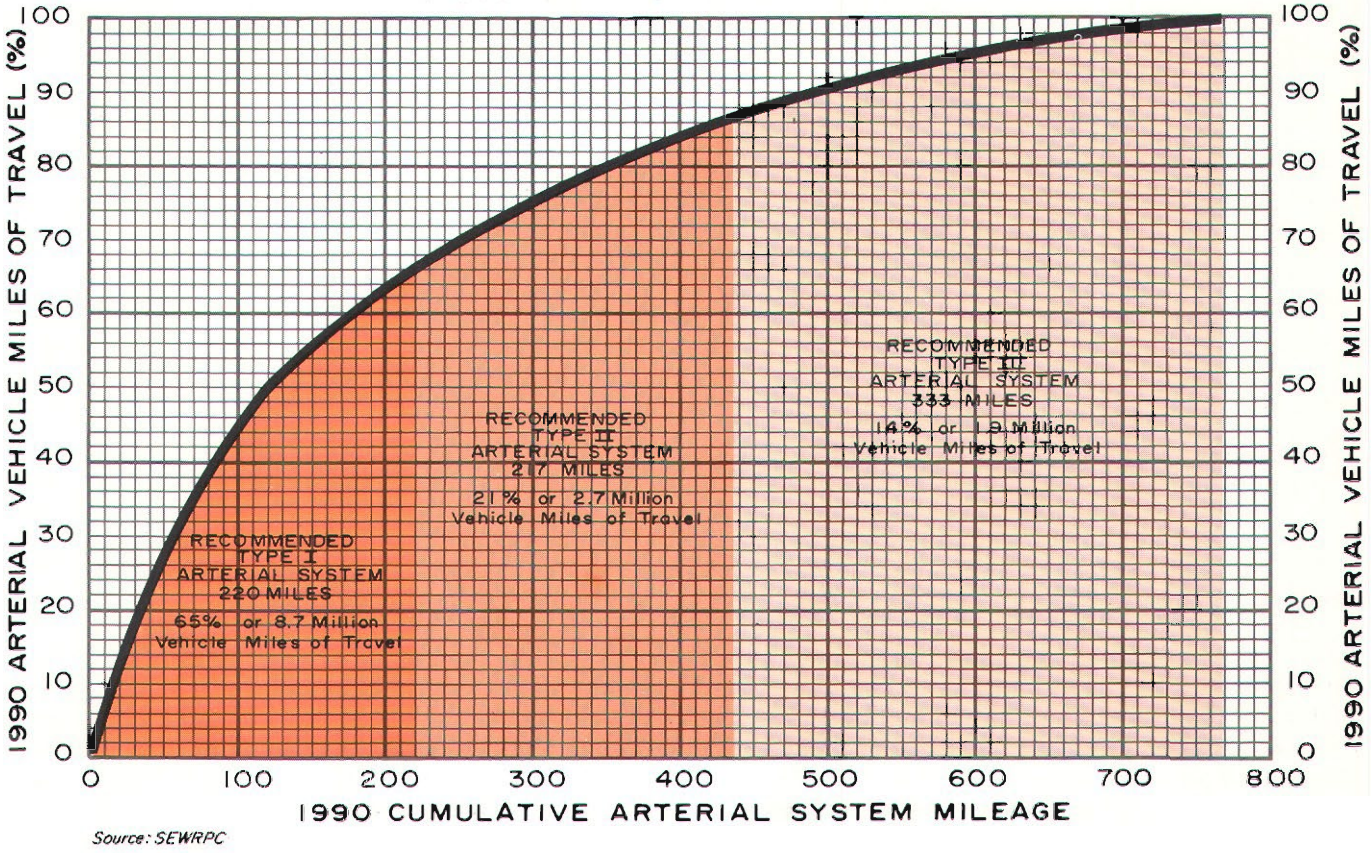
The proposed systems thus clearly focus the available resources on the areas of greatest need; and their adoption and improvement should serve to relieve the local units of government of much of the cost attendant to the movement of heavy volumes of fast, through traffic of areawide importance within the County.

STAGING OF THE PROPOSED JURISDICTIONAL HIGHWAY SYSTEMS

As indicated earlier, not all of the arterial facilities comprising the functional system considered in the jurisdictional classification will be open to traffic by 1970. In order to accommodate traffic demand in corridors to be served by freeways proposed to be constructed after 1970, it is recommended that certain arterial facilities, which should ultimately be designated as Type II routes, be maintained as Type I routes until such time as the paralleling freeways intended to serve the corridors are constructed. Upon completion of

Figure 7

ARTERIAL VEHICLE MILES OF TRAVEL (%)
VERSUS
CUMULATIVE ARTERIAL MILEAGE
FOR THE MILWAUKEE COUNTY JURISDICTIONAL
HIGHWAY SYSTEM 1990



Source: SEWRPC

Table 12

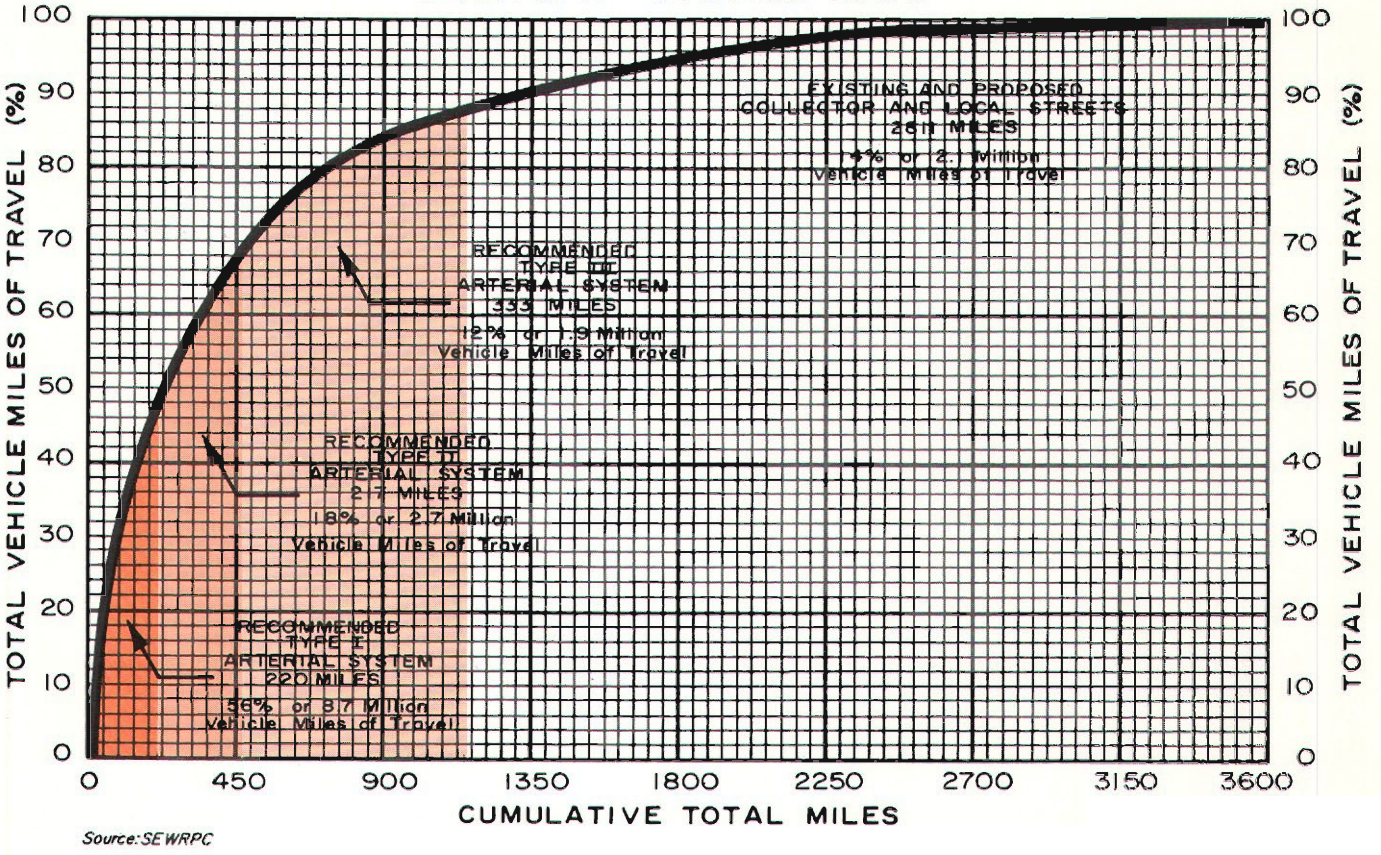
MILEAGE AND TRAVEL DEMAND SERVED BY PROPOSED JURISDICTIONAL STREET AND HIGHWAY CATEGORIES
FOR MILWAUKEE COUNTY: 1990

Jurisdictional Category	Mileage	Percent of Total Mileage	Travel Demand Served (Millions of Vehicle Miles Per Day)	Percent of Total Travel Demand Served
Type I Arterial (State Trunk)	220.00	6.2	8.7	56
Type II Arterial (County Trunk)	217.40	6.1	2.7	18
Type III Arterial (Local Trunk)	333.40	9.3	1.9	12
Existing and Proposed Collector and Minor Streets	2,811.00	78.4	2.1	14
Total	3,581.80	100.0	15.4	100

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Figure 8

TOTAL VEHICLE MILES OF TRAVEL (%) VERSUS CUMULATIVE TOTAL MILEAGE FOR THE MILWAUKEE COUNTY JURISDICTIONAL HIGHWAY SYSTEM 1990



Source: SEWRPC

these freeways, the interim Type I facilities would revert to Type II facilities. This staged development, in addition to providing improved traffic service, would facilitate system continuity and arterial route marking during the interim plan implementation period.

A summary of the proposed freeway construction, as set forth in the adopted regional transportation plan, is presented in Table 13, together with a listing of the corresponding surface arterials temporarily fulfilling the Type I needs in the corridor. The proposed Type I system is recommended to include 207.9 route miles of facilities in 1970; and the proposed Type II system, 180.4 route miles. Thus, the total mileage for the combined Type I and Type II systems in 1970 is 388.3 miles, somewhat less than the proposed 1990 equivalent mileage of 437.4. Since most of the freeways proposed for Milwaukee County are scheduled for completion by 1980, the system mileages for 1980 are approximately the same as those for 1990.

SUMMARY

This chapter has described the recommended jurisdictional highway plan developed for Milwaukee County. The plan provides for three jurisdictional highway systems—Type I, state trunk; Type II, county trunk; and Type III, local trunk—which together comprise the total arterial street and highway system required to serve the growing travel demands in Milwaukee County and its constituent cities and villages to the plan design year 1990. The recommended plan also constitutes a refinement of the functional arterial street and highway system plan prepared by the Southeastern Wisconsin Regional Planning Commission under

Table 13

PROPOSED FREEWAYS AND TEMPORARY ALTERNATE ROUTING OVER STATE TRUNK HIGHWAYS WITHIN MILWAUKEE COUNTY: 1970 TO 1990

Proposed Freeway	Temporary Alternate Routing
1. Stadium Freeway from the Park Freeway to W. Hampton Ave.	USH 41 over W. Lisbon Ave., W. Appleton Ave. from the Stadium Freeway to the Zoo Freeway
2. Stadium Freeway from W. Hampton Ave. to the Ozaukee County Line.	STH 181 over N. Glenview Ave., W. Harwood Ave., and N. 76th St. from the East-West Freeway to the Ozaukee County Line.
3. Belt Freeway from the Lake Freeway to the Waukesha County Line.	STH 100 over E. and W. Ryan Road from STH 32 to approximately S. 84th St. and thence over W. St. Martins Rd. to W. Loomis Road.
4. Rock Freeway from Janesville, Wis., to IH-894.	STH 24 over W. Forest Home Ave. from S. 27th St. to the Waukesha County Line.
5. Stadium Freeway from W. National Ave. to the Airport Freeway.	USH 41 over S. 27th St. from the Airport Freeway to W. Loomis Road.
6. Lake Freeway from E. Layton Ave. to the Racine County Line.	Alternate routing will not be over STH routes.
7. Bay Freeway from the North-South Freeway to the Fond du Lac Freeway.	Alternate routing will not be over STH routes.
8. Bay Freeway from the Fond du Lac Freeway to the Waukesha County Line.	Alternate routing will not be over STH routes.

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

the initial regional land use-transportation study and, as such, is intended upon its adoption to constitute a functional, as well as a jurisdictional, arterial street and highway system plan for Milwaukee County to the design year 1990.

The arterial street and highway system recommended to serve the traffic demand within Milwaukee County through the design year 1990 totals 770.8 route miles of facilities, or about 22 percent of the estimated 3,581.8 route miles of facilities expected to comprise the total street and highway system within the County in 1990. Of this total arterial system, 220.0 route miles, or about 28 percent is proposed to comprise the Type I, or state trunk highway, system, a reduction of 15.0 route miles over the present system. This Type I system is anticipated to carry approximately 65 percent of the arterial travel demand and approximately 56 percent of the total travel demand expected to be generated in the County by the year 1990. The Type I system is recommended to include all of the existing, committed, and proposed freeway facilities within Milwaukee County, as well as certain important standard surface arterials and, as such, to comprise the basic framework of the total highway transportation system for the County.

The recommended plan further proposes a Type II, or county trunk highway, system consisting of 217.4 route miles of arterial facilities, or an additional 28 percent of the total arterial mileage required to serve Milwaukee County in the plan design year 1990. This Type II system represents an increase of 140.9 route miles over the present

system; would serve to complement the recommended Type I, or state trunk, system; and is intended, together with that system, to include all major arterial facilities having areawide significance. The Type II system could be expected to carry an additional 21 percent of the arterial travel demand and an additional 18 percent of the total travel demand expected to be generated within Milwaukee County by the year 1990.

Finally, the plan recommends a Type III, or local trunk highway, system consisting of the remaining 333.4 route miles of arterial facilities, or about 43 percent of the total arterial mileage proposed to serve Milwaukee County in the plan design year 1990. This Type III system is intended to serve primarily local arterial street and highway needs, while comprising an integral part of the total arterial street and highway system.

Adoption and implementation of the jurisdictional highway system plan recommended in this report would serve to concentrate appropriate resources and capabilities on corresponding areas of need, assuring a more effective use of the total public resources in the provision of highway transportation, and to provide a sound basis for the establishment of long-range fiscal policies and for the systematic programming of arterial street and highway improvements within Milwaukee County. It would also provide a basis for the more efficient planning and design of the total arterial street and highway system by combining into subsystems those facilities which should, because of the type and extent of service provided, have similar standards for design, construction, operation, and maintenance. The adoption and implementation of the jurisdictional highway system plan recommended in this report should provide a sounder basis for the efficient multi-jurisdictional management of the total arterial street and highway system and for the attainment of intergovernmental coordination necessary to the cooperative development of this system. Finally, it should, as demonstrated in a following chapter of this report, provide a more equitable distribution of highway improvement, maintenance, and operating costs among the various levels and agencies of government concerned.

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Chapter VII

FINANCIAL EVALUATION

INTRODUCTION

To be practical and acceptable, any plan must be evaluated on the basis of financial feasibility. Such an evaluation may show that the attainment of the objectives expressed through one or more of the criteria used to prepare the plan are beyond the financial reach of the implementing agencies and, therefore, require that the criteria be either reduced or eliminated. Accordingly, a careful evaluation was made of the financial feasibility of the jurisdictional highway system plan as produced by the application of the functional criteria. Total plan construction and maintenance costs were estimated and compared to anticipated revenues over the 20-year plan implementation period. As a necessary part of this analysis of financial feasibility, the existing structure of highway revnues and expenditures was examined; and construction and maintenance formulae and policies were analyzed.

EXISTING HIGHWAY AID STRUCTURE

Federal Highway Aids

Federal aids for highway construction are derived from federal highway-user excise taxes and the federal motor fuel tax, presently established at 4 cents per gallon, and are administered under the 1968 Federal Aid Highway Act by the U. S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads, as a segregated fund which can be used only for highway and highway-related purposes. Federal aids are provided for approved construction projects on the interstate system, the federal aid primary and secondary systems, and extensions of these latter two systems through urban areas of over 5,000 population, known as the federal aid urban system. The latter three categories of federal aid systems—primary, secondary, and urban—are commonly called the "ABC" systems.

Federal aid primary funds, or "A" funds, are apportioned to the states on the basis of the folowing formula:

> One-third in the ratio which the area of each State bears to the total area of all the States; one-third in the ratio which the population of each State bears to the total population of all the States as shown by the latest available Federal census; one-third in the ratio which the mileage of rural delivery routes and star routes[1] in each State bears to the total mileage of rural delivery and star routes in all the States at the close of the next preceding calendar year, as shown by a certificate of the Postmaster General, which he is directed to make and furnish annually to the Secretary. No state shall receive less than one-half of 1 per centum of each year's apportionment.

Federal aid secondary funds, or "B" funds, are apportioned to the states on the basis of the following formula:

> One-third in the ratio which the area of each State bears to the total area of all the States; one-third in the ratio which the rural population of each State bears to the total rural population of all the States as shown by the latest available Federal census; and one-third in the ratio which the mileage of rural delivery and star routes, certified as above provided, in each State bears to the total mileage of rural delivery and star routes in all the States. No State shall receive less than one-half of 1 per centum of each year's apportionment.[2]

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[1] *A "star route" is defined by Title 23, United States Code, 104, as any route, usually in a thinly populated region, other than railroad, steamboat, and rural service routes, over which mail is carried under contract; so-called from the star or asterisk used to designate these routes in postal publications.*

[2] *Ibid., footnote 1.*

Federal aid urban funds, or "C" funds, are apportioned to the states for extensions of the federal aid primary and federal aid secondary systems within urban areas on the basis of the following formula:

> In the ratio which the population in municipalities and other urban places, of five thousand or more, in each State bears to the total population in municipalities and other urban places of five thousand or more in all the States, as shown by the latest available Federal census.[3]

Federal aid interstate funds are apportioned to the states on the basis of the following formula:

> For the Interstate System, for the fiscal years ending June 30, 1957, June 30, 1958, and June 30, 1959:
>
> One-half in the ratio which the population of each State bears to the total population of all the States as shown by the latest available Federal census, except that no States shall receive less than three-fourths of 1 per centum of the funds so apportioned; and one-half in the manner provided in paragraph (1) of this subsection. The sums authorized by section 108(b) of the Federal-Aid Highway Act of 1956 for the fiscal years ending June 30, 1958, and June 30, 1959 shall be apportioned on a date not less than six months and not more than twelve months in advance of the beginning of the fiscal year for which authorized.[4]
>
> For the Interstate System for the fiscal years 1960 through 1971:
>
> For the fiscal years 1960 through 1966, in the ratio which the estimated cost of completing the Interstate System in such State, as determined and approved in the manner provided in this paragraph, bears to the sum of the estimated cost of completing the Interstate System in all of the States. For the fiscal years 1967 through 1971, in the ratio which the Federal share of the estimated cost of completing the Interstate System in such State, as determined and approved in the manner provided in this paragraph, bears to the sum of the estimated cost of the Federal share completing the Interstate System in all of the States.[5]

Federal Aid Revenues: Federal aid funds are actually received from the U. S. Bureau of Public Roads and administered by the State Division of Highways as reimbursements for previously expended funds on approved federal aid projects. Federal aid may be used for preliminary engineering surveys, design, right-of-way acquisition, and construction. Federal funds may not be used for maintenance or administration. Table 14 indicates federal aid apportionments to Wisconsin during the 10-year period extending from fiscal year 1958 through fiscal year 1967.

Federal Aid Disbursements: The federal aids received into the State Highway Fund are administered by the State Department of Transportation, Division of Highways. Federal aid interstate funds received by Wisconsin are distributed throughout the state on the basis of the interstate highway construction schedule established by the Highway Commission. Milwaukee County has received about one-half of the interstate highway system funds each year. Construction of the interstate highway system is financed with 90 percent federal aid interstate funds and 10 percent state funds. Prior to 1966 Milwaukee County contributed the 10 percent for interstate routes which were also on the Milwaukee County Expressway System. Federal aid primary funds received are distributed in Wisconsin on the basis of state-wide construction needs as determined by the Highway Commission. Milwaukee County, therefore, receives varying annual amounts.

Federal aid secondary funds received by Wisconsin are apportioned to the 72 counties on the basis of the following formula: 40 percent on the basis of the number of motor vehicles registered within the county as compared with the total in the state, and 60 percent on the basis of the rural federal aid secondary miles in the county as compared with the total statewide federal aid secondary mileage. Since Milwaukee County has no rural federal aid secondary mileage, only the number of

[3] *Ibid., footnote 1.*

[4] *Ibid., footnote 1.*

[5] *Ibid., footnote 1.*

Table 14

FEDERAL HIGHWAY AID APPORTIONMENTS TO WISCONSIN BY AID CATEGORY: FISCAL YEARS 1958-1967

Fiscal Year	Interstate	Percent of Total	Primary	Percent of Total	Secondary	Percent of Total	Urban	Percent of Total	Total
1958	$38,719,243	66.6	$ 8,968,694	15.4	$ 6,263,258	10.8	$ 4,185,524	7.2	$ 58,136,719
1959	49,734,830	63.2	13,332,038	17.0	9,312,993	11.8	6,256,742	8.0	78,636,603
1960	26,193,375	56.2	9,409,770	20.2	6,572,828	14.1	4,409,572	9.5	46,585,545
1961	18,764,460	49.8	8,651,381	23.0	5,957,388	15.8	4,298,531	11.4	37,671,760
1962	22,804,031	54.6	8,688,009	20.8	6,034,452	14.4	4,264,732	10.2	41,791,224
1963	21,164,100	51.4	9,109,799	22.1	6,431,738	15.6	4,471,619	10.9	41,177,256
1964	22,927,775	52.5	9,484,657	21.7	6,690,955	15.3	4,588,651	10.5	43,692,038
1965	23,689,058	53.0	9,592,323	21.4	6,770,585	15.1	4,685,560	10.5	44,737,526
1966	24,691,450	52.6	10,230,422	21.8	7,207,143	15.3	4,849,228	10.3	46,978,243
1967	24,733,350	52.3	10,390,974	22.0	7,313,176	15.5	4,836,951	10.2	47,274,451
Total	$273,421,672	56.2	$97,858,067	20.1	$68,554,516	14.1	$46,847,110	9.6	$486,681,365
Ten Year Average	$ 27,342,167		$ 9,785,807		$ 6,855,452		$ 4,684,711		$ 48,668,137

Source: Wisconsin Department of Transportation.

motor vehicles registered in Milwaukee County affects the federal aid secondary apportionment. Based on this formula, Milwaukee County receives about $550,000 annually in federal aid secondary funds, or about 9 percent of the total federal aid secondary funds received annually by the state. If a county does not utilize its federal aid secondary apportionment, the funds revert to the Highway Commission and may be apportioned to other counties which apply for such funds or may be used by the Highway Commission at its discretion on the federal aid secondary system anywhere in the state. Milwaukee County, along with other populous counties, has been the recipient of reverted funds.

Federal aid urban funds are distributed throughout the state by the Highway Commission on the basis of need. Milwaukee County, therefore, receives varying annual amounts. Table 15 indicates the amounts of federal aid funds received and used in Milwaukee County by all levels of government involved during the 10-year period extending from fiscal year 1958 through fiscal year 1967.

Table 15

FEDERAL HIGHWAY AID ALLOTTED TO MILWAUKEE COUNTY BY AID CATEGORY: FISCAL YEARS 1958-1967

Fiscal Year	Interstate	Percent of Total Allotted to Milwaukee County	Primary	Percent of Total Allotted to Milwaukee County	Secondary	Percent of Total Allotted to Milwaukee County	Urban	Percent of Total Allotted to Milwaukee County	Totals	Percent of Total Federal Aid Received By State
1958	$ 1,657,900	28.5	$ 366,000	6.3	$ 423,500	7.3	$ 3,377,600	58.0	$ 5,825,000	10.0
1959	6,864,732	71.4	340,381	3.5	577,550	6.0	1,827,249	19.0	9,609,912	11.8
1960	4,245,527	72.3	94,000	1.6	547,000	9.3	986,000	16.8	5,872,527	12.6
1961	11,676,419	65.9	314,773	1.8	547,000	3.1	5,186,804	29.3	17,724,996	47.0
1962	8,625,302	53.2	2,305,877	14.2	609,530	3.8	4,683,141	28.9	16,223,850	38.8
1963	26,981,414	79.5	727,000	2.1	2,682,180	7.9	3,561,052	10.5	33,951,646	82.4
1964	10,343,457	62.7	1,268,000	7.7	722,490	4.4	4,159,433	25.2	16,493,380	37.8
1965	16,406,590	73.4	1,770.929	7.9	299,553	1.3	3,862,617	17.3	22,339,689	49.9
1966	13,428,828	63.4	279,000	1.3	419,896	2.0	7,039,577	33.3	21,167,301	46.2
1967	9,179,439	93.9	-216,859[a]	-2.2	1,465,988	15.0	-648,598[a]	-6.6	9,779,970	20.3
Total	$109,409,608	68.8	7,249,101	4.6	$8,294,687	5.2	$34,034,875	21.4	$158,988,271	
Ten Year Average	$ 10,940,961		$ 724,910		$ 829,469		$ 3,403,488		$ 15,898,827	

[a] *Minus figures indicate reversion of funds.*

Source: Wisconsin Department of Transportation.

State Highway Aids

State Highway Revenues: State aids for highway construction, operation, and maintenance are derived from the state motor vehicle fuel taxes, motor vehicle registration and drivers' license fees, and motor carrier fees and are administered by the Wisconsin Department of Transportation, Division of Highways, as a segregated fund which can be used only for highway and highway-related purposes. The state motor fuel tax was initiated in 1925 at two cents per gallon, increased to four cents in 1931, to six cents in 1955, and to seven cents per gallon in 1966. The motor fuel tax accounts for almost two-thirds of the total state motor vehicle tax revenues. The second largest source of motor vehicle tax revenues, motor vehicle registrations and operators' license fees, contributes almost all of the remaining one-third of the revenues, while motor carrier fees, imposed on owners of trucks and buses for regulatory purposes, amount to less than 1 percent of the state motor vehicle revenues. Table 16 indicates the state motor vehicle revenues in Wisconsin during the 10-year period extending from fiscal year 1958 through fiscal year 1967.

Table 16

WISCONSIN MOTOR VEHICLE REVENUES: FISCAL YEARS 1958-1967

Fiscal Year	License Fees	Fuel Taxes	Carrier Fees	Total Gross Revenues Less Refunds	Total Net Revenues[a]
1958	$ 39,419,664	$ 66,766,223	$ 439,546	$ 106,627,221	$ 100,009,618
1959	40,562,168	69,363,068	467,963	110,393,199	103,390,896
1960	42,891,073	72,240,756	498,724	115,630,553	107,783,055
1961	44,151,641	75,185,674	555,014	119,928,635	111,607,597
1962	44,049,978	75,905,152	476,666	120,433,316	112,015,442
1963	47,955,404	78,527,005	594,285	127,076,694	117,317,129
1964	48,714,763	81,009,598	571,404	130,295,765	119,723,280
1965	51,697,611	84,934,763	600,815	137,233,239	125,832,518
1966	54,762,427	90,054,602	580,363	145,397,392	134,258,165
1967	60,304,239	108,385,059	622,176	169,312,014	153,319,292
Total	$474,508,968	$802,371,900	$5,406,956	$1,282,328,028	$1,185,256,992
Ten Year Average	$ 47,450,897	$ 80,237,190	$ 540,696	$ 128,232,803	$ 118,525,699

[a] *Net motor vehicle revenues are defined as gross revenues minus the collection and Enforcement costs.*

Source: Wisconsin Department of Transportation.

State Highway Disbursements: The total annual net motor vehicle revenues are distributed by the Wisconsin Division of Highways in accordance with the provisions of Section 20.420 and Chapters 83, 84, and 86 of the Wisconsin Statutes. Table 17 indicates the statewide distribution of net motor vehicle revenues for the 10-year period extending from fiscal year 1958 through fiscal year 1967. It may be noted from this table that about 50 percent of the net motor vehicle revenues is allocated to state trunk highways, and about 50 percent is returned to the counties and local units of government. Table 18 indicates the state funds expended in Milwaukee County for construction of state trunk highways and connecting streets during the 10-year period extending from fiscal year 1958 through fiscal year 1967.

In urban areas construction expenditures on state trunk highways and connecting streets, which are also either federal aid primary or federal aid secondary routes, may be funded with 50 percent federal, 35 percent state, and 15 percent city or village monies. Construction expenditures on state trunk highways and connecting streets, which are not also federal aid routes, may be funded with 85 percent state and 15 percent city or village monies. The amount of the local contribution is

determined as 15 percent of the construction costs, which costs are, in turn, determined for each individual project on the basis of the cost of a list of "participating" or "eligible" items negotiated and agreed upon between the Wisconsin Division of Highways and the local unit of government. These participating items usually, but not always, include right-of-way acquisition; grading; construction of the pavement base and surface, culverts and bridges, curb and gutter, and inlets for surface water drainage with connections to storm sewers; and engineering services. The

Table 17

PERCENTAGE DISTRIBUTION OF NET MOTOR VEHICLE REVENUES BY THE STATE OF WISCONSIN: FISCAL YEARS 1958-1967

Item	Year										
	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	Amount 1967
1. Returned to Local Units:											
Towns	15.1	15.1	15.0	15.0	15.0	15.1	15.1	15.1	15.0	13.5	$ 20,740,661
Counties	14.2	14.2	14.2	14.1	14.1	14.2	14.1	14.1	14.0	12.5	19,224,022
Cities	16.4	16.6	16.7	16.7	16.7	16.8	17.0	17.1	17.1	15.5	23,739,587
Villages	2.8	2.9	2.9	3.1	3.1	3.2	3.2	3.2	3.2	3.0	4,546,129
Flood Damage Aid	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	---
Subtotal	*48.5*	*48.8*	*48.8*	*49.0*	*49.0*	*49.4*	*49.4*	*49.5*	*49.6*	*44.7*	*$ 68,622,254[a]*
2. Allocated to Miscellaneous Use:											
Administration, Park Roads	4.3	4.3	4.9	5.1	5.3	5.1	5.5	5.8	5.8	5.5	$ 8,838,850
Subtotal	*52.8*	*53.1*	*53.7*	*54.1*	*54.3*	*54.5*	*54.9*	*55.3*	*55.4*	*50.2*	*77,011,104*
3. Allocated to:											
Counties for County Bond Retirement and Improvement of State Trunk Highways[b]	8.0	7.8	7.5	7.2	7.2	6.9	6.7	6.4	6.0	5.2	$ 8,052,167
Cities and Villages for Improvement of State Trunk Highways and Connecting Streets	3.8	3.7	3.5	3.4	3.4	3.2	3.2	3.0	2.8	2.5	3,800,000
Subtotal	*11.8*	*11.5*	*11.0*	*10.6*	*10.6*	*10.1*	*9.9*	*9.4*	*8.8*	*7.7*	*$ 11,852,167*
4. Functional Distribution by Highway Commission:[c]											
Construction - Statewide	22.2	20.8	19.0	19.9	17.3	19.3	20.4	19.5	20.1	25.2	$ 38,607,185
Maintenance and Traffic Service	9.2	10.5	11.2	12.1	11.6	11.6	11.3	11.2	11.1	10.7	16,400,000
Snow Removal	4.0	4.1	5.1	3.3	6.2	4.5	3.5	4.6	3.7	4.7	7,200,000
Safety Improvement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.4	2,248,836
Subtotal	*35.4*	*35.4*	*35.3*	*35.3*	*35.1*	*35.4*	*35.2*	*35.3*	*35.8*	*42.0*	*$ 64,456,021*
Total to State Trunk Highways	47.2	46.9	46.3	45.9	45.7	45.5	45.1	44.7	44.6	49.8	$ 76,308,188
5. Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	$153,319,292

[a] *Includes $371,855 supplemental privilege tax allotment.*

[b] *Pursuant to Section 84.03(3) of the state statutes.*

[c] *Pursuant to Section 20.420(1) and (3) of the state statutes.*

Source: Wisconsin Department of Transportation.

Table 18

EXPENDITURES FOR CONSTRUCTION OF STATE TRUNK HIGHWAYS AND CONNECTING STREETS IN MILWAUKEE COUNTY: FISCAL YEARS 1958-1967

Fiscal Year	Engineering	Right-of-Way	Construction	Total
1958	$ 40,900	$ 558,000	$ 1,265,000	$ 1,863,900
1959	21,500	24,600	1,047,500	1,093,600
1960	69,800	72,000	483,800	625,600
1961	104,100	46,700	2,135,100	2,285,900
1962	133,400	717,500	1,533,200	2,384,100
1963	311,900	51,400	1,182,300	1,545,600
1964	366,100	469,000	3,059,400	3,894,500
1965	265,700	492,600	8,332,600	9,090,900
1966	286,900	1,080,800	14,301,500	15,669,200
1967	944,700	880,400	13,201,300	15,026,400
Total	$2,545,000	$4,393,000	$46,541,700	$53,479,700
Ten Year Average	$ 254,500	$ 439,300	$ 4,654,170	$ 5,347,970

Source: Wisconsin Department of Transportation.

Wisconsin Division of Highways will, in addition, place and maintain signs and markers for approved detours and maintain such detours during the construction period. The city or village must bear all utility relocation and storm sewer construction costs not required for purely highway drainage purposes. Therefore, the total contribution by the city or village to a state trunk highway or connecting street improvement project may vary from 15 percent to 50 percent, depending on the relative costs of the various items in the project and the agreement arrived at between the state and local unit of government concerning the definition of participating items.

Maintenance: Maintenance expenditures on the state trunk highway system have increased steadily over the past ten years and now exceed 15 percent of the net state motor vehicle revenues. Maintenance costs for the state trunk highway system are borne entirely by the state, although most of the maintenance work is actually performed by county forces under contract to the state. On the connecting street system, maintenance is performed by the local municipalities. The state partially reimburses the municipalities for this maintenance at the rate of $500 per mile per year, much less than the actual maintenance costs incurred, which in Milwaukee County average $7,500 per mile for arterial streets and highways.

County Highway Funds

County Highway Revenues: Counties in Wisconsin receive highway revenues from three principal sources: federal aids, state aids, and county property taxes. Local property taxes for highway purposes may not exceed two mills (0.002 percent of the assessed valuation) and are paid into a county road and bridge fund. Although the proportion of county highway revenues from federal aids, state aids, and local sources varies greatly from county to county and from year to year, an average county within Wisconsin receives about 10 percent of its total highway revenues from federal aid, about 36 percent from state aid, and about 54 percent from local sources. Table 19 indicates the Milwaukee County revenues for highway purposes during the five-year period extending from calendar year 1962 through 1966. Table 20 indicates Milwaukee County Expressway Commission revenues for freeway construction over this same five-year period.

County Highway Expenditures: Total construction expenditures on the county trunk highway system consist of: 1) direct expenditures of county funds by the respective counties administered through the county highway committees of the county boards, and 2) federal aid funds matched by county funds administered by the Highway Commission on those county trunk highways which are also federal

Table 19

HIGHWAY REVENUES RECEIVED BY MILWAUKEE COUNTY: 1962-1966

Calendar Year	Federal Aids	Percent of Total	State Aids	Percent of Total	County Sources	Percent of Total	Total
1962	$ 547,000	26.8	$1,090,336	53.4	$ 403,275	19.8	$2,040,611
1963	547,000	24.1	1,152,596	50.8	569,393	25.1	2,268,989
1964	542,700	31.9	1,158,799	67.9	2,843	0.2	1,704,342
1965	542,700	30.7	1,217,431	68.8	8,338	0.5	1,768,469
1966	537,400	20.5	1,285,454	49.0	797,772	30.5	2,620,626
Total	2,716,800	26.1	$5,904,616	56.8	$1,781,621	17.1	$10,403,037
Five Year Average	$ 543,360	26.1	$1,180,923	56.8	$ 356,324	17.1	$ 2,080,607

Source: Milwaukee County Department of Public Works and Wisconsin Department of Transportation.

Table 20

HIGHWAY REVENUES RECEIVED BY MILWAUKEE COUNTY EXPRESSWAY COMMISSION: 1962-1966

Calendar Year	Federal Aids	Percent of Total	State Aids	Percent of Total	County Sources	Percent of Total	Total
1962	$19,295,338	74.2	$ 795,829	3.1	$ 5,898,835	22.7	$ 25,990,002
1963	11,099,339	60.1	1,557,253	8.4	5,820,817	31.5	18,477,409
1964	15,361,278	72.3	88,394	0.4	5,799,209	27.3	21,248,881
1965	22,978,247	68.8	1,644,570	4.9	8,796,213	26.3	33,419,030
1966	20,455,760	54.8	5,054,934	13.5	11,857,324	31.7	37,368,018
Total	$89,189,962	65.3	$9,140,980	6.7	$38,172,398	28.0	$136,503,340
Five Year Average	$17,837,992	65.3	$1,828,196	6.7	$ 7,634,480	28.0	$ 27,300,668

Source: Milwaukee County Expressway and Transportation Commission and Wisconsin Department of Transportation.

aid secondary routes. Construction expenditures on county trunk highways which are also federal aid secondary routes may be financed with 50 percent federal funds and 50 percent county funds. The amount of the county contribution is determined as 50 percent of the construction costs, which costs are, in turn, determined by the cost of the "participating" or "eligible" items. These participating items are set by federal policy and generally include: right-of-way acquisition; grading; construction of the pavement base and surface, culverts and bridges, curb and gutter, outlets for surface drainage, storm sewer mains adequate for drainage of the pavement surfaces and right-of-way; replacement of walks and private driveways; repair of damages to other roads by reason of their use in hauling materials needed for the improvement; and engineering services. Construction expenditures on county trunk highways which are not on the federal aid secondary system are usually financed entirely with county funds. Because of the limited local funds available for county trunk highway construction, the policy in Milwaukee County in recent years has been to limit county construction projects to federal aid secondary routes.

Table 21 indicates the county highway funds expended by the Milwaukee County Department of Public Works for highway construction, maintenance, and operation during the five-year period extending from calendar year 1962 through 1966. Table 22 indicates the funds expended by the Milwaukee County Expressway Commission for freeway design and construction in Milwaukee County during the same five-year period.

Maintenance and operation costs for the county trunk highway system are paid for by the county, and maintenance is performed by county forces. All maintenance and operation costs, except certain safety lighting costs, for the Milwaukee County Expressway System, all of which is located on the state trunk highway system, are paid for by the state, although the work is performed by county forces.

Table 21

HIGHWAY FUNDS EXPENDED BY MILWAUKEE COUNTY: 1962-1966

Calendar Year	Construction	Maintenance	Operations	Total
1962	$ 628,885	$ 504,403	$ 290,598	$1,423,886
1963	129,827	539,498	418,666	1,087,991
1964	145,792	494,301	291,488	931,580
1965	246,032	444,584	216,829	907,444
1966	846,154	542,746	487,287	1,876,188
Total	$1,996,690	$2,525,532	$1,704,868	$6,227,090
Five Year Average	$ 399,338	$ 505,106	$ 340,974	$1,245,418

Source: Milwaukee County Department of Public Works.

Table 22

HIGHWAY FUNDS EXPENDED BY MILWAUKEE COUNTY EXPRESSWAY COMMISSION: 1962-1966

Calendar Year	Expenditures (All for Construction)
1962	$ 5,898,835
1963	5,820,817
1964	5,799,209
1965	8,796,213
1966	11,857,324
Total	$38,172,398
Five Year Average	$ 7,634,480

Source: Milwaukee County Expressway and Transportation Commission.

Local Roads and Streets

Local Road and Street Revenues: Like counties, cities and villages in Wisconsin receive highway revenues from three principal sources; federal aids, state aids, and local property taxes. Although the proportion of highway revenues received from each source will vary from community to community and from year to year, the average city or village in Wisconsin receives about 17 percent of its total highway revenues from federal aids, about 43 percent from state aids, and about 40 percent from local revenues. The local revenues are derived from several sources, with average proportions being about 77

percent from local receipts and 23 percent from bonding. Local receipts include special assessments, monies from the general fund, and miscellaneous sources. Table 23 indicates the highway and highway-related revenues for all cities and villages in Milwaukee County for the five-year period extending from calendar year 1962 through 1966.

Table 23

HIGHWAY AND HIGHWAY RELATED REVENUES RECEIVED BY CITIES AND VILLAGES IN MILWAUKEE COUNTY: 1962-1966

Calendar Year	Revenue Category					
	State Aids[a]	Percent of Total	Local Receipts	Percent of Total	Total[b]	Bonds[c]
1962	$ 7,076,310	22.1	$ 24,895,467	77.9	$ 31,971,777	$ 8,294,419
1963	6,809,911	20.2	26,844,123	79.8	33,654,034	4,034,523
1964	6,780,596	21.8	24,393,471	78.2	31,174,067	7,139,475
1965	6,892,439	20.1	27,450,302	79.9	34,342,741	13,060,137
1966	7,287,360	20.8	27,800,395	79.2	35,087,755	7,061,250
Total	$34,846,616	21.0	$131,383,758	79.0	$166,230,374	$39,589,804
Five Year Average	$ 6,969,323		$ 26,276,752		$ 33,246,075	$ 7,917,961

[a] *Federal aids are not included.*

[b] *State Aids and Local Receipts = Total Expenditures.*

[c] *Bond Issues are not included in Total Expenditures.*

Source: Wisconsin Department of Administration, Wisconsin Department of Transportation, and SEWRPC.

Local Road and Street Expenditures: Maintenance and operation costs for local streets are paid for by the cities and villages, and maintenance is performed by city or village forces. Unless a local street is on a federal aid route, construction costs are also paid entirely by the cities and villages. Table 24 provides a summary of local expenditures for streets and highways by all of the cities and villages in Milwaukee County for the five-year period extending from calendar year 1962 through 1966.

Table 24

HIGHWAY AND HIGHWAY RELATED EXPENDITURES BY CITIES AND VILLAGES IN MILWAUKEE COUNTY: 1962 - 1966

Calendar Year	Expenditure Category				
	Construction	Percent of Total	Operation and Maintenance	Percent of Total	Total
1962	$15,152,917	56.5	$11,661,251	43.5	$26,814,168
1963	18,006,816	63.0	10,572,480	37.0	28,579,296
1964	15,775,909	60.7	10,199,839	39.3	25,975,748
1965	17,135,953	59.4	11,729,979	40.6	28,865,932
1966	17,810,262	62.0	10,897,328	38.0	28,707,590
Total	$83,881,857	60.4	$55,060,877	39.6	$138,942,734
Five Year Average	$16,776,372	60.4	$11,012,175	39.6	$ 27,788,547

Source: Wisconsin Department of Administration, Wisconsin Department of Transportation, and SEWRPC.

Table 25 provides a summary of all expenditures for highway construction, operation, and maintenance in Milwaukee County for the five-year period extending from calendar year 1962 through 1966. The present participation of the various levels of government in highway construction and

Table 25

FEDERAL, STATE, COUNTY, AND LOCAL GOVERNMENTAL EXPENDITURES FOR HIGHWAY CONSTRUCTION, MAINTENANCE, AND OPERATION IN MILWAUKEE COUNTY: 1962-1966

Unit of Government	Calendar Year	Expenditure Category		
		Construction[a]	Operation and Maintenance[b]	Total
Federal	1962	$ 16,223,850	$ --	$ 16,223,850
	1963	33,951,646	--	33,951,646
	1964	16,493,380	--	16,493,380
	1965	22,339,689	--	22,339,689
	1966	21,167,301	--	21,167,301
Total		$110,175,866		$110,175,866
Five Year Average		$ 22,035,173		$ 22,035,173
State	1962	$ 2,384,100	$ 1,013,483	$ 3,397,583
	1963	1,545,600	1,140,780	2,686,380
	1964	3,894,500	1,211,989	5,106,489
	1965	9,090,900	1,364,527	10,455,427
	1966	15,669,200	1,329,017	16,998,217
Total		$ 32,584,300	$ 6,059,796	$ 38,644,096
Five Year Average		$ 6,516,860	$ 1,211,959	$ 7,728,819
County	1962	$ 6,527,720	$ 795,001	$ 7,322,721
	1963	5,950,644	958,164	6,908,808
	1964	5,945,000	785,789	6,730,789
	1965	9,042,244	661,413	9,703,657
	1966	12,703,478	1,030,033	13,733,511
Total		$ 40,169,086	$ 4,230,400	$ 44,399,486
Five Year Average		$ 8,033,817	$ 846,080	$ 8,879,897
Local	1962	$ 15,152,917	$11,661,251	$ 26,814,168
	1963	18,006,816	10,572,480	28,579,296
	1964	15,775,909	10,199,839	25,975,748
	1965	17,135,953	11,729,979	28,865,932
	1966	17,810,262	10,897,328	28,707,590
Total		$ 83,881,857	$55,060,877	$138,942,734
Five Year Average		$ 16,776,372	$11,012,175	$ 27,788,547

[a] *Construction includes such items as expenditures for engineering costs, right of way acquisition, roads and streets outlay, bridges and culverts outlay, curb and gutter, sidewalks, storm sewers, and interest on bond proceeds used for construction purposes.*

[b] *Operation and Maintenance includes such items as expenditures for road and street expense; bridge and culvert expense; street cleaning, oiling, and sprinkling; snow and ice removal; street machinery; general administration; signs and guide boards; and traffic control and regulation devices.*

Source: Wisconsin Department of Administration, Wisconsin Department of Transportation, and SEWRPC.

maintenance costs is summarized in Table 26. It should be noted that the actual city or village share of the construction cost of state trunk highways and connecting streets, although nominally set at 15 percent of the cost, may vary considerably depending on the definition of eligible work items. Local participation in past construction projects within Milwaukee County has varied from nothing to as high as 50 percent of the total cost.

PLAN RECOMMENDATIONS AFFECTING FINANCIAL ANALYSIS

Analysis of the existing highway aid policies and formulae indicated that two major revisions in these policies and formulae would be desirable in order to meet the basic objectives of the jurisdictional highway planning effort; namely, abolition of the connecting street concept and establishment of uniform construction and formulae and policies. These revisions would affect the financial analysis and, therefore, are considered here.

Proposed Abolition of Connecting Streets

If each of the jurisdictional highway systems is to function as an integrated subsystem, then the responsibility for the operation and maintenance of each of the individual facilities comprising the subsystem, as well as the design and construction

Table 26

RELATIONSHIP BETWEEN JURISDICTIONAL HIGHWAY CLASSIFICATION AND AID FORMULAE FOR CONSTRUCTION AND MAINTENANCE IN MILWAUKEE COUNTY: 1967

Jurisdictional Classification	1967 Mileage	Percent of Total Mileage	Participation in Construction Cost	Participation in Maintenance Cost
State trunk highways (Except connecting streets).	145.67	5.80	1. 85 percent state, 15 percent city or village. 2. If on federal aid system, 50 percent federal, 35 percent state, 15 percent city or village.	100 percent state, under contract with the county. County is reimbursed on basis of actual machine rental, labor, and material costs incurred.
Connecting streets (Portions of the state trunk system in urban municipalities).	89.15	3.50	1. 85 percent state, 15 percent city or village. 2. If on federal aid system, 50 percent federal, 35 percent state, 15 percent city or village.	State aid provided at flat rate of $500 per mile to the municipality which maintains the facility.
County trunk highways	76.51	3.00	1. 100 percent county. 2. If on federal aid system, 50 percent federal, 50 percent county.	Basic state aid of $65 per mile. Supplemental aid apportioned, 40 percent on motor vehicle registrations and 60 percent on total street mileage.
Local Streets	2,201.78	87.70	1. 100 percent municipal funds. 2. If on federal aid system, 50 percent federal, 50 percent local.	State aid provided at variable rate based on size and class of municipality.
Total Mileage	2,513.11	100.00		

Table 26 (continued)

DISTRIBUTION OF COSTS ON FEDERAL AID ROUTES				
Interstate highway routes (Includes 15.3 percent of the state trunk highway system in Milwaukee County).	35.81	1.40	1. 90 percent federal, 10 percent state. 2. On Milwaukee County Expressway System, 90 percent federal, 10 percent county, prior to June 30, 1966; state now reimburses Milwaukee County for this 10 percent.	100 percent state, under contract with the county. County is reimbursed on basis of actual machine rental, labor, and material costs incurred.
Federal aid primary routes include 76.3 percent of state trunk highway mileage in Milwaukee County.	179.33	7.10	1. On freeways on the Milwaukee County Expressway System, 50 percent federal, 20 percent state funds, 30 percent county.[a] 2. On other freeways, 50 percent federal, 50 percent state.[a] 3. On other highways, 50 percent federal, 35 percent state, 15 percent local.[a]	If state trunk highway: 100 percent state, under contract with the county; if county trunk highway, 100 percent county.
Federal aid secondary routes include 74 percent of all county trunk highway mileage in Milwaukee County as well as 15.7 percent of state trunk highway mileage and 2.2 percent of the local street mileage.	140.92	5.60	1. 50 percent federal. 2. 50 percent county, state, city or village.	100 percent county, state, city or village.

[a]*Percentages apply when federal aid funds are utilized. Construction on such routes may be financed without federal aid and in such cases, the state participation is increased accordingly.*

Source: Wisconsin Division of Transportation.

of these facilities, must ultimately rest with the level and agency of government having the greatest basic interest. It was, therefore, considered essential that the state and county trunk highway systems each be made continuous throughout the county and its incorporated municipalities. The attainment of this subsystem continuity and the attendant unification of operation and maintenance, as well as design and construction responsibilities, dictated the need for abandoning the connecting street concept. In addition to introducing undesirable discontinuities into the state trunk highway system and thereby violating sound system management principles, the connecting street concept creates inequities in the distribution of maintenance costs. These inequities result in a shift, from the state to the local units of government, of nearly the full burden of maintaining arterial highway facilities designed to serve heavy volumes of fast, through traffic.

The concept of a connecting street dates back to 1917 when a special committee of the State Legislature was appointed by the Governor to establish a state trunk highway system. At this time the law required "the system to be laid out exclusive of any street and road in a municipality having a population of 2,500 or more by the last federal census, except that portion of any such street or highway along which the houses averaged more than 200 feet apart." Through this provision the state trunk highway system was made continuous through cities and villages with a population of less than 2,500 but was made discontinuous through cities and villages having a population greater than 2,500, extending into such cities and villages only to the point where the houses exist at an average spacing of less than 200 feet. Thus, arterial streets in the more densely populated portions of cities and villages in Milwaukee County are not a part of the state trunk highway system even though state trunk highways may be routed over such arterial streets and be accordingly marked and signed. Those streets which form the connections between state trunk highways through cities and villages are entitled to receive certain allotments from the net motor vehicle revenues. These allotments were originally intended to reimburse the cities and villages for maintenance expenditures on the connecting streets.

In 1929 the amount of the allotment for the maintenance of connecting streets was established by the State Legislature at $500 per mile for any portion of a connecting street on the original 1921 federal aid primary system, $400 per mile for any portion of a connecting street on the original 1921 federal aid secondary system, and $300 per mile for all other connecting streets. In 1943 the Legislature established the present allotment rate of $500 per mile for all connecting streets regardless of federal aid classification. While the cost of maintaining connecting streets has increased markedly over the past 25 years, as already noted, to an average of $7,500 per mile within Milwaukee County, the maintenance allotment rate per mile has remained the same. Thus, a major portion of the burden of maintaining facilities of areawide importance has been shifted to the local units of government. All municipalities in Milwaukee County presently have some state trunk highway mileage, connecting street mileage, or a combination of both within their corporate limits. Table 27 indicates the present distribution of state trunk highway and connecting street mileage within Milwaukee County by municipality. State trunk highways within Milwaukee County are maintained by the county under a maintenance contract with the state, and all maintenance costs actually incurred are reimbursed by the state. All connecting streets within Milwaukee County are maintained by the local municipality; and, as already noted, upon submittal of proper evidence of maintenance expenditures, an allotment of $500 per mile is paid to the municipality by the state.

In the previous chapter, the establishment within Milwaukee County of a Type I, state trunk, highway system, totaling 220 route miles, has been recommended. Of this total approximately 113 miles are freeways, the remaining 107 miles being standard arterials. It is proposed that all freeways remain and become state trunk highways and be maintained by Milwaukee County for the Wisconsin Division of Highways. The remaining proposed Type I arterials should be constructed and maintained so that adequate capacity, desirable operating conditions, and responsible control of access are provided and preserved. Toward this end and in order to ensure a continuous, uniformly desirable cross-section and operating conditions along all Type I arterials, it is recommended that the ultimate responsibility for the maintenance and operation of the Type I arterials rest with the Wisconsin Division of Highways. All operations or actions that will have a long-term effect on the traffic capacity and level of service should be encompassed within this responsibility.

Several alternate proposals for the assignment of operation and maintenance responsibilities for the Type I subsystem and for the reimbursement of attendant expenses were examined in the study. After careful review of these alternatives, the Technical Advisory Committee unanimously recommended that the state trunk highway system be made continuous through all incorporated areas within the county and that the connecting street concept be abandoned. Under this proposal the Highway Commission would continue to contract with the county for maintenance of Type I facilities, with the added option of contracting directly with the cities and villages concerned for Type I non-freeway facility maintenance. It was further recommended that the state reimburse the county, city, or village on a contractual basis for the cost of the following "eligible" maintenance items on the Type I, state trunk, highway facilities:

1. Physical maintenance of the roadway pavement surfaces and structures, including crack sealing, patching, resurfacing, and curb and gutter repair.

Table 27

STATE TRUNK HIGHWAY AND CONNECTING STREET MILEAGE IN MILWAUKEE COUNTY BY CIVIL DIVISION: 1967

Municipality	State Trunk Highway Mileage	Connecting Street Mileage
Bayside	2.87	--
Brown Deer	3.78	--
Cudahy	--	5.56
Fox Point	--	2.66
Franklin	16.92	--
Glendale	6.38	0.11
Greendale	2.35	--
Greenfield	15.72	--
Hales Corners	3.93	--
Milwaukee	47.84	56.67
Oak Creek	22.89	--
River Hills	4.43	--
Saint Francis	--	2.78
Shorewood	--	2.45
South Milwaukee	--	3.08
Wauwatosa	8.52	5.31
West Allis	10.04	6.45
West Milwaukee	--	1.06
Whitefish Bay	--	3.02
Total	145.67	89.15

Source: Wisconsin Department of Transportation.

2. Physical maintenance of storm sewers located within the highway right-of-way, including cleaning.

3. Snow plowing and ice control between curbs, including removal of snow at bus stops, intersections, and at other locations as required to maintain traffic service.

4. Physical maintenance of traffic control devices, including signing, signaling, safety lighting, and pavement marking. The cost of maintaining safety lighting shall be determined by a proration of costs based upon the proportion of fixtures installed for traffic service at intersections of two Type I facilities or at intersections of Type I with Type II facilities to the total fixtures along the Type I route.

5. Physical maintenance of existing trees located within the highway right-of-way and mowing grass on the median.

The state would not participate in the maintenance of sidewalks or driveways, the care of new trees planted under permit, the care of ornamental flowers and shrubs, nor sprinkler systems or attendant water service.

It was also recommended that the state assume or continue direct administration of the following operational control devices on Type I, state trunk, highway facilities:

1. Issuance of driveway permits.

2. Control of advertising signs.

3. Maintenance of route signing.

4. Establishment of speed zoning.

5. Issuance of special permits.

6. Prohibition of parking as required to provide necessary traffic capacity.

7. Installation of traffic control signals.

The state may at its option delegate the administration of the aforelisted operational controls to the local municipalities concerned. Such delegation would normally parallel the contracting for maintenance service.

Implementation of these recommendations would not only provide for a more equitable distribution of the burden of maintaining high-type arterial facilities of areawide importance but would also place the operational control of these facilities in the level and agency of government that has the greatest interest in, and the resources available for, these facilities. In all cases, the decision to delegate operational and maintenance responsibilities authority on the Type I arterial (state trunk highway) system should rest with the Highway Commission.

Because of the close parallel which exists between the function of the Type I, state trunk, highway system and the Type II, county trunk, highway system, it was recommended that county trunk highways also be made continuous through all incorporated areas. The county would continue to maintain the Type II facilities with the option of contracting with the cities and villages concerned for such maintenance on a full-cost reimbursement basis. Eligible maintenance items and operational control devices would be identical to those set forth above for the Type I arterials, with the decision to delegate responsibilities and authority on the Type II arterial system resting with the county.

Proposed Revision of Construction Aid Formulae and Policies

Analysis of the existing aid policies and formulae also revealed certain inconsistencies and inequities in the financing of state and county trunk highway construction projects. As noted previously, these inconsistencies and inequities relate to the definition of construction items eligible for federal and state aids and, in effect, serve to create varying local cost participation rates, ranging from 0 to 50 percent for identical facility type construction projects. It was, therefore, considered desirable to modify existing construction aid policies in order to obtain a uniform, as well as more equitable cost-sharing between the various levels and units of government concerned. Recognizing that a local municipality receives some benefit from the construction or reconstruction of Type I or Type II highway facilities within its boundaries, it was considered equitable to require the local units of government to participate in the cost of both state and county trunk highway improvements. It was further considered desirable, in the interest of equity and sound management practices, to establish the local participation rate at the same fixed percentage level for both state trunk non-freeway and county trunk facility construction and to determine eligible work items on a uniform basis throughout the county. These modifications would not only result in a more equitable distribution of construction costs but would also serve to simplify programming, scheduling, and financing of improvements and assist local units of government in budgeting for major highway improvements.

Thus, after careful consideration of alternatives, the Technical Advisory Committee recommended that a uniform policy of construction aid be adopted for both the Type I, state trunk, highway facilities (non-freeway) and the Type II, county trunk, highway facilities. This policy should provide for a fixed local contribution of 15 percent of the cost of all state and county trunk highway construction projects, with the cost of the construction project being determined on the basis of the following participating work items:

1. Right-of-way acquisition.
2. Grading.
3. Construction of pavement base and surface, curb and gutter, and culverts and bridges.
4. Construction of inlets for surface water drainage, together with connections to storm sewer mains.
5. Construction of storm sewer mains necessary for pavement and right-of-way drainage.
6. Engineering services.

FINANCIAL ANALYSIS AND FEASIBILITY

Financial Analysis

Having determined upon the two basic changes in the highway aid policies and formulae necessary to achieve the basic objectives of the jurisdictional highway planning effort, a detailed financial analysis of the recommended jurisdictional highway system plan was made. This analysis included consideration of the effects of the proposed plan

on highway aids and allotments to municipalities comprising Milwaukee County, as well as consideration of the costs of plan implementation and the total revenues which may be expected to become available over the plan implementation period.

The Wisconsin Statutes provide for the payment of certain basic aids and allotments to counties and municipalities for street and highway purposes. These are apportioned on the basis of formulae, involving the type of incorporated area, population, jurisdictional and total street and highway mileage, and motor vehicle registration. The proposed realignment of the jurisdictional highway systems in Milwaukee County will affect the mileage of state trunk and county trunk facilities within each municipality in Milwaukee County and will, consequently, result in changes in the basic aids and allotments for street and highway purposes paid to each municipality and to the county itself.

The effect of the proposed realignment of the jurisdictional highway systems within Milwaukee County on highway aids and allotments is summarized in Table 28. This table indicates the recommended change in jurisdictional highway mileage within each incorporated area of the county, corresponding changes in basic aids and allotments, and the changes resulting from the proposed abandonment of the connecting street concept. It should be noted that the table provides comparative data for the existing (1967) situation and for the first (1970) stage in the implementation of the recommended jurisdictional highway system plan. The table also shows comparative figures for the final (1990) stage in the implementation of the recommended jurisdictional highway system plan and includes estimates of the probable effects of anticipated increases in local street mileage resulting from new land use development within the county and of anticipated increases in motor vehicle registrations.

Table 28 indicates that, as a result of the recommended jurisdictional realignment for 1970, a reduction in the local street aids and allotments paid to municipalities in Milwaukee County of approximately $252,000 per year may be expected. This reduction in aids and allotments is due to a 54.9-mile reduction in local street mileage, the net result of a recommended 103.9-mile increase in the county trunk highway system mileage, and a recommended 26.7-mile decrease in the state trunk highway system mileage and a reduction of the amount of money available for supplemental aids and allotments due to the statewide effect of abolishing the connecting street concept and the corresponding increase in state maintenance cost. The proposed abolition of the connecting street system would result in the elimination of the connecting street allotment of $500 per mile, or a

Table 28

STREET AND HIGHWAY AIDS AND ALLOTMENTS FOR MUNICIPALITIES IN MILWAUKEE COUNTY: 1967, 1970, AND 1990

AIDS AND ALLOTMENTS RETURNED TO MUNICIPALITIES IN 1967

	Existing Jurisdictional Highway Systems and Formulae								
Municipality	State Trunk Highway		Connecting Street	County Trunk	Local Street Mileage 1967	Local Street Aids and Allotments and Local Bridge Allotments (Does Not Include Privilege Highway Tax Allotments)	Privilege Highway Tax Allotments	Connecting Street Allotments	State Trunk Maintenance
	Freeway	Non-Freeway							
Bayside	0.58	2.29	--	0.92	20.63	$ 31,788.10	$ 5,724.16	--	
Brown Deer	--	3.78	--	2.50	39.92	61,511.45	13,967.18	--	
Cudahy	--	--	5.56	0.19	47.50	78,152.95	40,083.00	$ 2,780.00	
Fox Point	--	--	2.66	1.45	33.39	51,449.57	13,953.85	1,330.00	
Franklin	--	16.92	--	20.90	68.63	112,918.66	24,997.08	--	
Glendale	3.53	2.85	0.11	1.83	49.58	81,630.23	26,826.84	55.00	
Greendale	--	2.35	--	2.11	49.70	76,591.13	15,767.24	--	
Greenfield	7.45	8.27	--	10.29	83.41	137,236.56	31,408.61	--	
Hales Corners	--	3.93	--	0.59	33.52	51,649.88	13,149.58	--	
Milwaukee	22.30	25.54	56.67	25.16	1,216.05	4,054,635.31	1,272,075.17	30,165.00	
Oak Creek	5.57	17.32	--	10.57	70.01	115,189.22	25,914.45	--	
River Hills	1.92	2.51	--	--	17.28	26,626.21	2,899.99	--	
St. Francis	--	--	2.78	--	23.03	39,281.84	13,379.05	1,390.00	
Shorewood	--	--	2.45	--	27.04	41,665.06	30,361.07	1,225.00	
South Milwaukee	--	--	3.08	--	60.31	101,764.55	32,087.14	1,540.00	
Wauwatosa	2.62	5.90	5.31	--	152.98	380,207.76	103,862.90	2,655.00	
West Allis	3.31	6.73	6.45	--	160.77	400,003.40	127,085.36	3,225.00	
West Milwaukee	--	--	1.06	--	11.71	18,043.56	28,160.33	530.00	
Whitefish Bay	--	--	3.02	--	36.32	55,964.32	24,318.94	1,510.00	
Subtotal	*47.28*	*98.39*	*89.15*		*2,201.78*	*$5,916,309.76*	*$1,846,021.94*	*$ 46,405.00*	
Milwaukee County				76.51		$1,312,243.81			$1,182,941.00
Total	47.28	98.39	89.15	76.51	2,201.78	$7,228,553.57	$1,846,021.94	$.46,405.00	$1,182,941.00

Table 28 (continued)

AIDS AND ALLOTMENTS RETURNED TO MUNICIPALITIES IN 1970

Proposed 1970 Jurisdictional Highway Systems and Existing Aid Formulae							
Municipality	Proposed Type I		Proposed Type II	Local Street Mileage 1970	Local Street Aids and Allotments and Local Bridge Allotments (Does Not Include Privilege Highway Tax Allotments)	Privilege Highway Tax Allotments	Estimated Maintenance Receipts[a]
	Freeway	Non-Freeway					
Bayside	1.2	1.7	--	21.5	$ 32,368.45	$ 5,724.16	County Maintenance
Brown Deer	--	4.6	1.6	40.0	60,167.30	13,967.18	County Maintenance
Cudahy	--	2.9	2.0	48.4	78,659.00	40,083.00	County Maintenance
Fox Point	--	2.7	--	34.8	52,379.60	13,953.85	County Maintenance
Franklin	--	18.8	20.8	67.7	109,878.80	24,997.08	County Maintenance
Glendale	3.5	--	7.0	48.6	78,924.80	26,826.84	County Maintenance
Greendale	--	2.3	4.5	47.2	70,962.00	15,767.24	County Maintenance
Greenfield	8.5	5.5	11.8	84.9	137,851.60	31,408.61	County Maintenance
Hales Corners	--	3.9	--	33.5	50,395.80	13,149.58	County Maintenance
Milwaukee	33.8	64.1	78.8	1,180.6	3,886,286.00	1,272,075.17	$ 480,975.00
Oak Creek	5.6	11.8	13.9	74.5	120,966.60	25,914.45	County Maintenance
River Hills	1.9	2.0	1.9	16.3	24,476.20	2,899.99	County Maintenance
St. Francis	--	1.7	0.4	23.6	39,752.80	13,379.05	County Maintenance
Shorewood	--	2.5	--	27.0	40,652.60	30,361.07	County Maintenance
South Milwaukee	--	4.1	0.5	58.8	97,012.60	32,087.14	County Maintenance
Wauwatosa	5.8	6.9	17.4	141.5	347,204.20	103,862.90	46,500.00
West Allis	3.3	4.7	17.6	152.1	373,553.30	127,085.36	35,250.00
West Milwaukee	--	1.1	0.4	11.3	17,004.15	28,160.33	County Maintenance
Whitefish Bay	--	3.0	1.8	34.5	51,898.80	24,318.94	County Maintenance
Subtotal	*63.6*	*144.3*		*2,146.8*	*$5,670,394.60*	*$1,846,021.94*	*$ 562,725.00*
Milwaukee County			180.4		$1,306,038.00		$1,340,550.00
Total	63.6	144.3	180.4	2,146.8	$6,976,432.60	$1,846,021.94	$1,903,275.00

Table 28 (continued)

AIDS AND ALLOTMENTS RETURNED TO MUNICIPALITIES IN 1990

Proposed 1990 Jurisdictional Highway Systems and Existing Aid Formulae									
Municipality	Proposed Type I		Proposed Type II	Local Mileage			Local Street Aids and Allotments and Local Bridge Allotments (Does Not Include Privilege Highway Tax Allotments)	Privilege Highway[c] Tax Allotments	Estimated Maintenance Receipts[a]
	Freeway	Non-Freeway		Existing	New[b]	Total			
Bayside	1.2	1.7	--	21.5	3.1	24.6	$ 37,951.58	$ 6,671.59	County Maintenance
Brown Deer	1.1	4.6	1.6	40.0	14.4	54.4	83,854.02	26,152.21	County Maintenance
Cudahy	2.1	2.9	2.0	48.4	16.0	64.4	106,041.20	58,232.24	County Maintenance
Fox Point	--	2.7	--	34.8	1.8	36.6	56,457.40	15,278.22	County Maintenance
Franklin	6.7	13.9	25.8	67.7	256.7	324.4	533,710.57	173,855.66	County Maintenance
Glendale	3.5	--	7.0	48.6	14.8	63.4	104,335.71	43,505.33	County Maintenance
Greendale	--	2.0	4.8	47.2	31.1	78.3	120,649.94	31,457.91	County Maintenance
Greenfield	9.4	2.7	14.9	84.9	53.1	138.0	227,071.33	70,451.96	County Maintenance
Hales Corners	--	1.5	2.8	33.5	5.7	39.2	60,432.84	19,168.79	County Maintenance
Milwaukee	60.3	45.1	97.6	1,180.6	301.5	1,482.1	4,929,948.29	1,624,355.51	$ 339,750.00
Oak Creek	14.7	7.1	18.6	74.5	220.7	295.2	485,708.77	179,786.27	County Maintenance
River Hills	1.9	2.0	1.9	16.3	11.9	28.2	43,421.65	6,724.51	County Maintenance
St. Francis	1.5	1.7	0.4	23.6	10.0	33.6	56,722.28	27,231.91	County Maintenance
Shorewood	--	2.5	--	27.0	0.1	27.1	41,819.16	23,923.14	County Maintenance
South Milwaukee	--	4.1	0.5	58.8	10.4	69.2	115,407.95	42,692.86	County Maintenance
Wauwatosa	5.8	3.9	19.7	141.5	28.4	169.9	421,926.76	131,237.85	29,250.00
West Allis	3.3	4.7	17.6	152.1	16.5	168.6	419,253.69	134,719.06	35,250.00
West Milwaukee	1.3	1.1	0.4	11.3	1.0	12.3	18,968.08	26,597.80	County Maintenance
Whitefish Bay	--	3.0	1.8	34.5	0.4	34.9	53,807.10	33,539.10	County Maintenance
Subtotal	*112.8*	*107.2*		*2,146.8*	*997.6*	*3,144.4*	*$7,917,488.32*	*$2,675,581.92*	*$ 404,250.00*
Milwaukee County			217.4				$1,327,757.66		$2,655,750.00
Total	112.8	107.2	217.4	2,146.8	997.6	3,144.4	$9,245,245.98	$2,675,581.92	$3,060,000.00

[a] *Estimated maintenance receipts provided for a continuous state trunk highway system through incorporated areas. They further provide that the Division of Highways have the option to contract maintenance with either the county or the municipality within respective limits. For the purpose of this analysis the following maintenance rates were used: Freeways - - - $11,500 per mile and Standard Arterial - - $7,500 per mile.*

[b] *Estimated mileage in newly developed areas.*

[c] *Includes estimated increase in motor vehicle registration.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

further reduction of aids and allotments paid to municipalities in Milwaukee County of approximately $46,000 per year. The proposed jurisdictional realignment would thus result in a total decrease in state aids paid to municipalities of about $298,000 per year.

The abandonment of the connecting street concept and the establishment of a continuous state trunk highway system through incorporated areas, however, would allow the state to reimburse the maintaining agencies for the actual costs incurred in the maintenance of state trunk highways. Table 28 indicates that the increase in maintenance aids, which may be expected to accrue to municipalities in Milwaukee County as a result, would be approximately $720,000 per year. Thus, implementation of the recommended jurisdictional highway system plan could be expected to result in a net increase of highway aids and allotments paid to municipalities within Milwaukee County of approximately $422,000 per year in the base year 1970.

It was recognized that policy change affecting the status of the connecting streets would have to be administratively feasible on a statewide basis. In order for the state to reimburse the maintaining agencies for actual maintenance costs on all state trunk highways, sufficient monies for this purpose would have to be withheld prior to the allotment of supplemental aids. Figure 9 provides a graphic summary of the distribution of total motor vehicle revenues in Wisconsin as provided by the state statutes. It is evident from the summary diagram that with the exception of a portion of the supplemental motor fuel tax[6], the supplemental aids are apportioned after all other disbursements from the total highway fund have been made. Thus, the portion of the supplemental aids affected by changes in the connecting street concept actually consist of the remainder of highway revenues after all other statutory disbursements have been made and, as such, are shown as disbursements from the bottom of the pooled revenue depository. It is further evident from the diagram that, as changes in other statutory disbursements are made, the resulting remainder available for distribution will change. The effect of such changes on the aids and allotments available to municipalities in Milwaukee County may be expected to result in a reduction of $298,000 per year.

Because this process of re-distribution provides for the withholding of sufficient funds to reimburse actual maintenance costs accrued on all state trunk highways, the net effect of the plan recommendations on Milwaukee County would be to increase aids by $422,000 per year, as previously stated.

Financial Feasibility

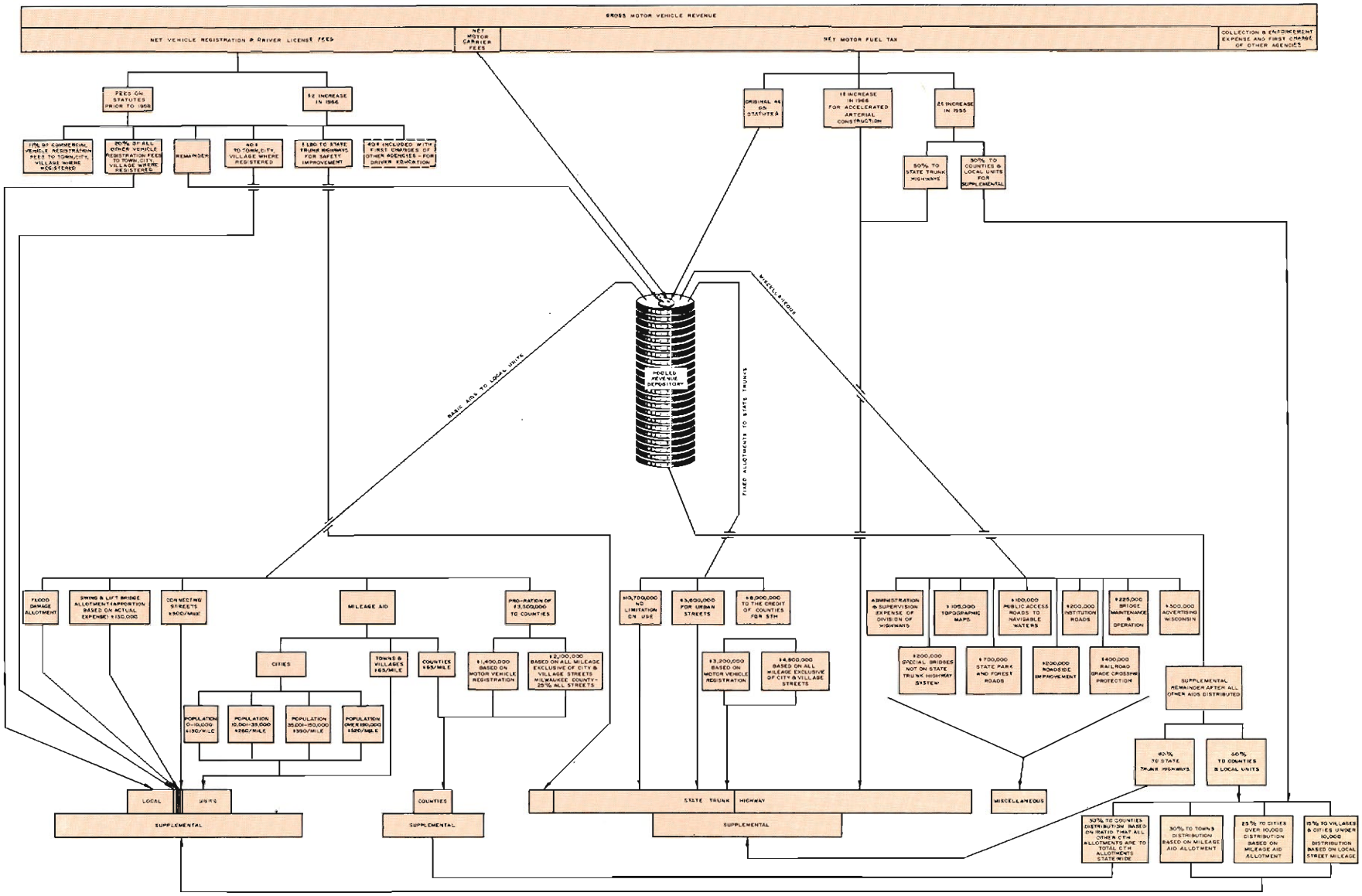
The financial feasibility of the recommended jurisdictional highway system plan was evaluated by comparing estimated plan implementation costs with anticipated highway revenues. The evaluation was based upon three assumptions: 1) that the preceding recommendations concerning the abandonment of the connecting street concept will be adopted and implemented, 2) that the preceding recommendations concerning the adoption of uniform construction aid formulae and policies will be adopted and implemented, and 3) that the recommendations concerning the realignment of the federal aid systems set forth in Chapter VI of this report will be adopted and implemented.

Estimates of the cost of constructing and maintaining the total street and highway network within Milwaukee County through the plan design year of 1990 were prepared by applying unit improvement and maintenance costs to the existing and proposed arterial, collector, and minor land-access street mileage. These cost estimates were then compared with a forecast of highway revenues which could reasonably be expected to be received over the plan implementation period. The revenue forecasts were based upon an extrapolation of historic highway expenditures within Milwaukee County. Because the historic record of highway expenditures at the local level did not permit accurate separation of the costs attendant to the construction and maintenance of arterial facilities from those attendant to nonarterial facilities, construction and maintenance costs for nonarterial facilities were estimated and included in the total plan implementation cost.

Estimated Cost of Arterial System: As described in Chapter VI of this report, the jurisdictional highway system plan recommends a typical cross section for each link in the total arterial street and highway system. Representative unit construction and maintenance costs were prepared

[6] *Section 20.420 of the Wisconsin Statutes provides that 50 percent of the net receipts of the 2 cents per gallon supplementary motor fuel tax enacted in 1955 be apportioned to local units of government as a part of the supplemental aids.*

Figure 9
DISTRIBUTION OF TOTAL MOTOR VEHICLE REVENUE



Source: Wisconsin Department of Transportation

for each typical cross section used, as shown in Appendix A of this report. The jurisdictional highway system plan, by incorporation of recommendations on typical cross sections, reflects estimated arterial highway needs through the plan design year of 1990. The total cost of plan implementation could thus be calculated by totaling from the coded network maps the route mileage of each typical cross section included in the plan, multiplying this mileage by the unit construction and maintenance costs attendant to the typical cross sections, and adding special costs for major railroad or highway grade separation and river crossing structures coded into the arterial network.

The unit cost data for each typical cross section were developed from analyses of actual cost data provided by local units of government within the county and by the District Office of the Division of Highways and reflect recent experience in southeastern Wisconsin. The resulting total arterial plan implementation costs are summarized by jurisdictional subsystem in Table 29. These plan implementation costs are expressed in terms of 1968 unit prices and total approximately $747 million for the entire arterial system, including approximately $602 million for construction and $145 million for maintenance costs. Appreciating these costs at the rate of 4 percent per year to 1990 in order to allow for rising land, labor, and material costs results in a total estimated arterial plan implementation cost of $1,023.7 million, including construction costs of $809.9 million and maintenance costs of $213.8 million. The local share of these plan implementation costs are further summarized by municipality in Appendix Table A-1.

Estimated Cost of Nonarterial System: Construction and maintenance needs for collector and minor land-access streets over the plan implementation period were also estimated, utilizing unit construction and maintenance cost data devel-

Table 29

MILWAUKEE COUNTY JURISDICTIONAL HIGHWAY SYSTEM PLAN
ESTIMATED IMPLEMENTATION COSTS: 1970 – 1990

Facility Type	Construction Costs	Maintenance Costs	Total Cost
Arterials			
Type I--State Trunk Highways			
Freeway	$300,523,000	$ 39,958,000	$ 340,481,000
Surface Arterials	39,034,300	20,126,100	59,160,400
Total (Type I)	$339,557,300	$ 60,084,100	$ 399,641,400
Type II--County Trunk Highways			
Surface Arterials	$126,392,000	$ 39,901,100	$ 166,293,100
Milwaukee River Parkway	--	--	--
Type III--Local Trunk Highways			
Surface Arterials	$136,225,300	$ 45,156,000	$ 181,381,900
Total Arterials	$602,174,600	$145,141,800	$ 747,316,400
Other Streets			
New Collector	$ 25,524,000	$ 5,127,302	$ 30,651,302
New Minor[a]	38,921,000	29,763,408	68,684,408
Existing Collector	22,828,250	21,260,125	44,088,375
Existing Minor	45,755,800	127,417,212	173,173,012
Total Other Streets	$133,029,050	$183,568,047	$ 316,597,097
Total	$735,203,650	$328,709,847	$1,063,913,497

[a] *Cost shown represents only 15 percent of total cost of construction. It is assumed that 85 percent of this total cost will be borne by private land developers.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

oped from information provided by the local units of government. These unit cost data were expressed separately for collector and minor land-access streets, as shown in the typical cross sections shown in Appendix A. The mileage of new collector and minor land-access street facilities was calculated by applying appropriate factors representing the proportion of land normally devoted to collector and minor land-access streets in urban areas under good land subdivision practice[7] to the total land area to be converted from rural to urban use within each municipality in Milwaukee County over the plan design period.

The construction cost estimates for new streets were based on the following assumptions: that all new collector and minor land-access streets would be constructed with curb and gutter; that one-half of the total collector and minor land-access street mileage would be constructed with concrete pavement and the other half with bituminous pavement; and that only 15 percent of the construction cost of the minor land-access streets would be paid with public funds, the remainder being paid by land developers under good public land subdivision regulations governing the installations of improvements. The construction cost estimates for existing streets were based on the following assumptions: that one-half of the existing collector street mileage would have to be reconstructed during the plan implementation period and the remaining one-half resurfaced and that 10 percent of the existing minor land-access street mileage would have to be reconstructed over the plan implementation period, 40 percent resurfaced, and the remaining 50 percent routinely maintained.

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[7] *Collector streets were assumed to occupy 23 percent of high-density and 1.5 percent of medium- and low-density fully developed urban areas and have a recommended right-of-way width of 80 feet. Accordingly, a factor of 1.5 miles per square mile was applied to anticipated new high-density and 1.0 mile per square mile to anticipated new medium- and low-density development to obtain corresponding collector street mileage.*

Minor land access streets were assumed to occupy 17.8 percent of high-density, 17.0 percent of medium-density, and 14.2 percent of low-density fully developed urban areas and have a recommended right-of-way width of 60 feet. Accordingly, a factor of 15.7 miles per square mile was applied to anticipated new high-density, 15.0 miles per square mile to anticipated new medium-density, and 12.5 miles per square mile to anticipated new low-density proposed development to obtain corresponding minor land access street mileage.

The estimated construction and maintenance costs for the new and existing collector and minor land-access streets through the plan design year of 1990 are also summarized in Table 29 and are shown by municipality in Appendix Table A-1. Expressed in terms of 1968 prices, these costs total approximately $317 million, of which $133 million is for construction and $184 million for maintenance. Appreciating these costs at the rate of 4 percent per year to 1990 in order to allow for rising land, labor, and material costs results in a total estimated collector and minor land-access improvement implementation cost of $463.2 million, including construction costs of $190.7 million and maintenance costs of $272.5 million.

Thus, the total cost of full plan implementation over the 20-year plan implementation period extending from 1970 to 1990 was estimated at approximately $1,064 million, based upon 1968 prices, of which $735 million was for construction and $329 million for maintenance. The corresponding inflated total construction cost is $1.487 billion, of which approximately $1 billion is for construction and $487 million for maintenance.

In reference to Appendix Table A-1, it is important to note that the costs shown in this table by municipality for the Type I, state trunk, highway and Type II, county trunk, highway construction represent only the recommended local cost of the participating work items. An estimate of this proportion, computed at 15 percent of the total eligible participating work elements, was provided in order to allow each municipality within the county to quickly and conveniently evaluate its proportion of the total estimated plan implementation cost.

Estimated Revenues: Anticipated revenues available for highway purposes within Milwaukee County over the plan implementation period were estimated from an analyses of the historic rate of expenditure for highway and highway-related purposes within Milwaukee County. A summary of the five-year expenditures for highway construction and maintenance within Milwaukee County was presented in Table 25 of this chapter. The five-year average for the period extending from 1962 through 1966 was $53.4 million for construction and $13.1 million for maintenance and operation. Assuming that no new revenue sources would become available for highway purposes, the anticipated revenues available each year for highway improvement over the plan implementation period were estimated as equal to the average annual

expenditure over the five-year period analyzed. It was thus estimated that a total of $1.329 billion could be expected to become available for highway purposes over the plan implementation period, $1.067 billion for construction, and $261 million for maintenance and operation (see Table 30). Since the total costs were less than anticipated revenues, it was concluded that the plan was financially feasible.

It should be noted that neither appreciated plan implementation costs nor appreciated revenues were used in the comparison, a valid procedure since any inflation of implementation costs may be expected to be offset by a corresponding inflation in revenues. The amount of monies available for highway expenditures may be expected to increase, not only because of the effects of inflation per se but also with increasing motor vehicle registrations and motor vehicle utilization.

It should also be noted that the estimated costs for maintenance and operation exceed the revenues which may be expected to become available for this purpose. This is to be expected since the forecasts of revenues available for maintenance and operation were based upon historic expenditures for maintenance and operation on the existing total highway mileage within Milwaukee County, while the plan costs estimated for maintenance and operation reflected an expected over 1,000-mile increase in this total highway mileage.

Table 30

MILWAUKEE COUNTY JURISDICTIONAL HIGHWAY SYSTEM PLAN REVENUE – COST COMPARISON

	Construction	Maintenance and Operations	Total
Anticipated Highway Revenues	$1,067,244,440	$261,404,280	$1,328,648,720
Estimated Cost of Plan	735,203,650	328,709,847	1,063,913,497

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

SUMMARY

This chapter has explored the financial feasibility of the recommended jurisdictional highway plan for Milwaukee County. This exploration has required a description of the existing highway aid structure and of two major revisions in this structure being recommended in order to meet the basic objectives of the jurisdictional highway planning effort; namely, the abandonment of the connecting street concept and the adoption of uniform construction aid formulae and policies for state and county trunk highways. The analysis clearly indicated that the recommended plan is financially feasible without new sources of highway revenues.

Total plan implementation costs, including construction and maintenance of collector and minor land-access, as well as of arterial, facilities was estimated at $1.064 billion over the 20-year plan implementation period. Anticipated revenues for highway purposes over this same period were estimated at $1.329 billion, leaving $265 million for other street and highway purposes, such as: mass transit system development, construction of the proposed Milwaukee River Parkway, highway landscaping and beautification programs, safety improvement programs, automated and computerized traffic operation, communication and control systems, lighting, parking, and administrative costs, none of which could, as a practical matter, be included in the plan implementation cost estimates.

It should be further noted in this respect that it is extremely difficult to forecast revenues which may become available for highway purposes over the 20-year plan implementation period. This difficulty is due not only to the length of the forecast period involved, and the unpredictable changes which may occur during this period in such important factors affecting highway revenues as the general level of economic activity, but also to major changes in the structure of highway aid formulae which will come about upon expiration of the massive interstate highway construction program. Because of these difficulties, past expenditures for highway purposes within Milwaukee County had to be used to project future revenues. These expenditures over the recent past have been somewhat higher than "normal" due to an accelerated freeway construction program. It should be noted in this connection that, if the anticipated revenues are to be actually received over the plan

implementation period, the Federal Government will either have to continue to participate in the financing of freeway construction as it has in the past, that is, to the extent of 90 percent of the cost of some new freeways as under the interstate highway construction program, or additional federal aids equivalent to those expended on freeway construction within the county over the recent past will have to be made available and reallocated for the improvement of surface arterials on the federal aid primary and secondary systems.

It should also be noted that the financial analysis indicates that the plan is feasible, considering the county as a whole. Some apparent disparity in the distribution of resources may exist within the individual municipalities comprising the county, but these would relate primarily to the Type III arterial system. In order to assist the individual municipalities in reviewing the financial feasibility of the recommended plan at the local level, the local share of the construction and maintenance costs has been set forth in Appendix Table A-1. This table is intended to provide a point of departure for the development of detailed capital improvements programs related to street and highway system development within each of the municipalities comprising the county.

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Chapter VIII
PLAN IMPLEMENTATION

INTRODUCTION

Implementation of the recommended jurisdictional highway system plan described in the preceding chapters of this report would provide Milwaukee County with integrated state, county, and local trunk highway systems able to meet existing and anticipated future travel demands effectively at an adequate level of service. It would, in addition, assist in achieving a more efficient design, construction, maintenance, and operation of the total arterial street and highway system; a more equitable distribution of highway improvement and maintenance costs; and the intergovernmental coordination necessary to the efficient and effective provision of highway transportation facilities and services within Milwaukee County.

In a practical sense, the recommended plan is not complete until the steps required for its implementation are specified. This chapter is, therefore, presented as a guide for use in the implementation of the recommended jurisdictional highway system plan. Basically, it outlines the actions which must be taken by the various levels and agencies of government concerned if the recommended jurisdictional highway system plan is to be fully carried out. Those units and agencies of government which have plan adoption and plan implementation powers applicable to the recommended plan are identified, necessary formal plan adoption actions are specified, and specific implementation actions are recommended with respect to development of the jurisdictional subsystems comprising the total arterial street and highway network within Milwaukee County.

The plan implementation recommendations are, to the maximum extent possible, based upon, and related to, existing governmental programs and predicated upon existing state enabling legislation. Certain changes in the state enabling legislation, however, as well as in national legislation, are recommended as deemed necessary to implement fully the recommended plan. Because of the ever present possibility of unforeseen changes in economic conditions, state and federal enabling legislation, and governmental and fiscal policies, it is not possible to declare once and for all time exactly how a process as complex as highway plan implementation should be administered and financed. It will, therefore, be necessary to update periodically not only the recommended jurisdictional highway system plan itself but the recommendations contained herein for implementation of this plan.

BASIC PRINCIPLES AND CONCEPTS

It is important to recognize that plan implementation measures must grow out of adopted plans. Thus, action policies and programs must be preceded by plan adoption and should emphasize the most important and essential elements of the plan and those areas of action which will have the greatest impact on achieving the objectives expressed in the plan. With respect to the recommended jurisdictional highway system plan, primary attention in plan implementation should accordingly be focused upon coordinated development of the Type I, state trunk highway, and Type II, county trunk highway, networks. These two arterial subsystems together provide the basic framework for the provision of essential highway transportation services within Milwaukee County, not only satisfying almost three-quarters of the total traffic demand within the County but also providing the highest level of highway transportation service and accommodating the longest trips. Plan implementation, therefore, should focus primarily on these two subsystems, particularly with respect to the attainment of the recommended location, capacity, and timing of improvements, leaving implementation of the Type III, local trunk, system to the local units of government. This is not to be interpreted as meaning, however, that improvement of the Type III, local trunk, facilities need not be fully coordinated with development of the Type I, state trunk, and Type II, county trunk, highway systems but only that primary attention in plan implementation should be focused on facilities of areawide importance—the state and county trunk highways—leaving greater flexibility for the improvement of facilities of primarily local importance.

PLANNING IMPLEMENTATION ORGANIZATIONS

Full implementation of the recommended jurisdictional highway system plan will be dependent upon coordinated action by 22 agencies of government:

the U. S. Department of Transportation, Bureau of Public Roads; the Wisconsin Department of Transportation; the Milwaukee County Board; and the governing bodies of the 19 cities and villages located within Milwaukee County. Substantial implementation of the recommended plan, however, in the form of integrated state and county trunk highway system development, will involve only three agencies of government: the U. S. Department of Transportation, Bureau of Public Roads; the Wisconsin Department of Transportation; and the Milwaukee County Board. A brief discussion of the duties and functions of these three agencies, as they relate to the jurisdictional highway system plan implementation, follows. Although the three agencies are for convenience discussed separately, the interdependence between the various levels of government represented and the need for close interagency cooperation cannot be overemphasized.

U. S. Department of Transportation, Bureau of Public Roads

The U. S. Department of Transportation, Bureau of Public Roads, administers all federal highway aid programs, working through the Wisconsin Department of Transportation, Division of Highways. The Bureau of Public Roads must approve all changes in the federal aid systems and will, in this respect, have an important role in implementation of the recommended jurisdictional highway system plan for Milwaukee County.

Wisconsin Department of Transportation

The Highway Commission of the Wisconsin Department of Transportation, Division of Highways, is broadly empowered to provide the state with a highway transportation system. The Highway Commission is charged with responsibility for administering all state and federal aid for highway improvements; for the planning, design, construction, and maintenance of all state trunk highways; and for planning, laying out, revising, constructing, reconstructing, and maintaining the national system of interstate and defense highways, the federal aid primary system, and the federal aid secondary system, the latter three functions all being subject to federal review and regulation. The Highway Commission is also responsible for reviewing county trunk highway routes in order to assure that these routes form an integrated system of county trunk highways between adjoining counties. The Highway Commission is authorized to enter into cooperative agreements with the governing bodies of any county, city, or village or with the Federal Government respecting the financing, planning, establishment, improvement, maintenance, use, regulation, or vacation of highways within their respective jurisdiction.

Specifically, three sections of the Wisconsin Statutes, when considered together, provide the basis for what might be considered a master plan for the state trunk highway system. One of these sections directs the preparation of county maps showing the official layout of the state trunk highway system. The second permits marked and traveled locations to differ from the official locations and thereby allows the official layout maps, in some instances at least, to function as plans. Indeed, it appears that these official layout maps were originally regarded as master plans for the state trunk highway system. Special legislative committees, whose function was to periodically study and revise the entire state trunk highway system, apparently functioned in 1917, 1919, 1923, and for the last time in 1934; and their work is reflected on the official layout maps. Since 1934 all consideration of changes in the system has been on a piecemeal, ad hoc basis by the Highway Commission, acting pursuant to the provisions of Chapter 84 of the Wisconsin Statutes, or by the State Legislature itself as provided by Chapter 518, Laws of 1947; Chapter 475, Laws of 1949; Chapter 75, Laws of 1953; Chapters 369 and 371, Laws of 1955; Chapters 596, 597, and 598, Laws of 1961; and Chapter 348, Laws of 1967. The third permits the Highway Commission to establish locations and right-of-way widths for future freeways or expressways and to protect the rights-of-way for these facilities from development. It is also apparent that the various federal aid systems in and of themselves constitute long-range plans insofar as they tend to coordinate the expenditure of federal highway aid monies.

The planning and programming procedure developed by the Highway Commission within this legislative framework determines when and where the various improvement projects will be accomplished on the existing state trunk highway system and establishes standards for such determination. The procedure provides an orderly and effective device whereby the many complex and highly interrelated tasks involved in the final accomplishment of modern highway improvement projects—tasks such as route location, including necessary mapping; preliminary engineering; implementation of legal changes in the

state trunk highway routes, including necessary public hearings; detailed design and final engineering; acquisition of right-of-way; preparation of construction plans, specifications, and cost estimates; letting of contracts; and actual construction, including layout, inspection, and final surveys—can be carried out and, as such, constitutes an effective current planning program.

The Highway Commission is also empowered to review and regulate subdivision plats along state trunk highways outside the corporate limits of the City of Milwaukee and, as previously noted, is empowered to prepare official maps of future freeway and expressway routes. The Wisconsin Division of Highways, through its administration of federal and state highway aids to local units of government and through its highway design and engineering functions, exerts a powerful influence on street and highway system planning and development within Wisconsin and is probably the single most important agency to highway system plan implementation.

Milwaukee County Board

At the county level of government within Wisconsin, county highway committees, operating under the aegis of the county boards, are made responsible for the administration and expenditure of all county funds for highway construction and maintenance and are empowered to establish and change the county trunk highway system, subject to the approval of the state Highway Commission, to cooperate with the state Highway Commission in the selection of a system of federal aid secondary roads, and to acquire land for county highway purposes by purchase or condemnation. In addition to a county highway committee, Milwaukee County has established a County Expressway and Transportation Commission, which is empowered to plan a county expressway (freeway) system; to coordinate all freeway planning and construction within the county; to acquire land for, and construct, such an expressway system; and to cooperate with public and private agencies in mass transit development.

PLAN ADOPTION

Adoption or endorsement of the recommended jurisdictional highway system plan by the three major plan implementation agencies is essential, not only to assure a common understanding between the several governmental agencies and to enable their staffs to program the necessary implementation work but also to meet certain statutory requirements. In addition to adoption or endorsement of the jurisdictional highway system plan by the implementing agencies, plan adoption by the Southeastern Wisconsin Regional Planning Commission, in accordance with Section 66.945(10) of the Wisconsin Statutes, will be essential in order to continue to qualify the implementing agencies for federal grants in partial support of highway improvement projects within Milwaukee County.

It is extremely important to understand that adoption or endorsement of the recommended jurisdictional highway system plan by any unit or agency of government pertains only to the statutory duties and functions of the adopting or endorsing agency, and such adoption or endorsement does not and cannot in any way preempt action by another unit or agency of government within its jurisdiction. Thus, adoption or endorsement of the jurisdictional highway system plan by the state and county would make the plan applicable as a guide to state and county highway system development and not to local trunk highway system development. To make the plan applicable as a guide to local highway system development would require its adoption by the municipalities concerned.

The following specific plan adoption actions are hereby recommended:

1. That the Milwaukee County Board, upon recommendation of the Milwaukee County Highway Committee, formally adopt the recommended jurisdictional highway system plan as a guide to future highway facility development within the county. It is further recommended that upon approval of the recommended jurisdictional highway system plan by the Milwaukee County Board, the Milwaukee County Expressway and Transportation Commission adopt and integrate the recommended jurisdictional highway system plan into the county expressway plan, as authorized by Section 59.965(5) of the Wisconsin Statutes.

2. That, upon approval of the recommended jurisdictional highway system plan by the Milwaukee County Board, the Highway Commission formally act to endorse and integrate the recommended jurisdictional highway system plan, including the recommendations for the staged construction

thereof, into the state long-range highway system plans, as authorized by Sections 84.01, 84.02, 84.025, 84.29, and 84.295 of the Wisconsin Statutes, as a guide to highway system development within Milwaukee County.

3. That the U. S. Department of Transportation, Bureau of Public Roads, through the Wisconsin Division of Highways, formally acknowledge the recommended jurisdictional highway system plan as a guide to the realignment of the various federal aid systems and to the administration and granting of federal aids for highway improvement within the county.

4. That the Southeastern Wisconsin Regional Planning Commission, in accordance with Sections 66.945(9) and (10) of the Wisconsin Statutes, act to formally adopt the recommended jurisdictional highway system plan as an integral part of the master plan for the Region, constituting an amendment to the regional transportation plan adopted by the Commission on December 1, 1966.

It is suggested that, to supplement the aforelisted recommended federal, state, regional, and county actions, the ten city common councils and nine village boards within Milwaukee County act to adopt the recommended jurisdictional highway system plan, as authorized by Section 66.945(12) of the Wisconsin Statutes, as a guide to highway system development within their area of jurisdiction. It is also suggested that the respective local planning agencies, by resolution, adopt and integrate the recommended jurisdictional highway system plan, as this plan affects their area of jurisdiction, into the local master plans, pursuant to Section 62.23(3)(b) of the Wisconsin Statutes, and certify such adoption to their local governing body.

Subsequent Adjustment of the Plan

No long-range plan can be permanent in all of its aspects or precise in all of its elements. Amendments to the recommended jurisdictional highway system plan will be forthcoming, not only from the work of the Southeastern Wisconsin Regional Planning Commission under its continuing areawide transportation planning responsibilities but also from the state, county, and local agencies as these agencies adjust and refine the plan during implementation and as new highway improvement programs are created or existing programs are expanded or curtailed. Any such adjustment, however, will require, on a continuing basis, the same close cooperation between the local, areawide, state, and federal agencies concerned as has been evidenced in the preparation of the jurisdictional highway system plan itself. To achieve this necessary coordination between local, state, and federal programs and thereby assure the timely adjustment of the recommended plan, it is recommended that the Technical Advisory Committee on Jurisdictional Highway Planning for Milwaukee County, created for the jurisdictional highway planning study, be retained and that all agencies having highway planning and plan implementation powers advise and transmit any subsequent proposed changes in the plan to the Committee, from time to time, for review and possible integration into an amended jurisdictional highway system plan. In order to achieve full intergovernmental coordination in highway system development within Milwaukee County, it is further recommended that the Committee annually review and comment on highway construction project priorities and other major plan implementation actions as proposed by the various implementing agencies.

PLAN IMPLEMENTATION

Implementation of the recommended jurisdictional highway system plan may be considered under four distinct but interrelated areas of action by the three major implementing agencies concerned: 1) realignment of state and county jurisdictional responsibilities, 2) realignment of the federal aid systems, 3) realignment of state and county operational responsibilities, and 4) right-of-way reservation and acquisition and facility construction. Major implementation efforts of a system-wide nature will be necessary in the first three areas to bring the existing jurisdictional systems, federal aid routes, and operational responsibilities into alignment with the 1970 staging of the recommended plan. Subsequent actions in these three areas can be on an individual route basis, as developing events dictate, to reach the 1990 staging of the recommended plan. All implementation efforts in the fourth area can be part of the normal construction programming efforts of two of the major implementing agencies.

Realignment of Jurisdictional Responsibilities

In Wisconsin realignment of the state trunk highway system is made a joint state-county function, pursuant to Sections 84.02(3) and 84.025(3) of the Wisconsin Statutes. It is accordingly recom-

mended that, upon adoption of the recommended jurisdictional highway system plan by the Milwaukee County Board and the state Highway Commission, the Highway Commission act in cooperation with the Milwaukee County Board to effect the realignment of the state trunk highway system within Milwaukee County.

It is recommended that the initial action include all of the specific additions to, and deletions from, the state trunk highway system set forth in Table 31, in order to achieve the first (1970) stage of plan implementation. Subsequent actions should effect the specific additions to, and deletions from, the state trunk highway system set forth in Table 32 by the design year (1990) of the recommended plan. It is recommended that all of the initial changes in the state trunk highway system be effected by one inclusive action of the Highway Commission of Wisconsin supported by the Milwaukee County Board. Such action may require public hearing prior to action, as specified by Sections 84.02(3) and 84.025(3) of the Wisconsin Statutes. Subsequent realignments can be effected on a route-by-route basis as dictated by developing circumstances.

In Wisconsin realignment of the county trunk highway system is, like realignment of the state trunk highway system, made a joint state-county function, pursuant to Section 83.025 of the Wisconsin Statutes. It is accordingly recommended that, upon adoption of the recommended jurisdictional highway system plan by the Milwaukee County Board and endorsement by the state Highway Commission, the Milwaukee County Board act in cooperation with the Highway Commission to effect the realignment of the county trunk highway system within Milwaukee County.

It is recommended that the initial action include all of the specific additions to, and deletions from, the county trunk highway system set forth in Table 33 in order to achieve the first (1970) stage of plan implementation. Subsequent actions should effect the specific additions to, and deletions from, the county trunk highway system set forth in Table 34 by the design year (1990) of the recommended plan. It is recommended that all of the initial changes in the county trunk highway system be effected by one inclusive action of the Milwaukee County Board supported by the state Highway Commission. Subsequent realignments can be effected on a route-by-route basis as dictated by developing circumstances.

In order to achieve the desired continuity of the state and county trunk highway systems through

Table 31

PROPOSED TYPE I (STATE TRUNK) ARTERIAL HIGHWAY SYSTEM
ADDITIONS AND DELETIONS IN MILWAUKEE COUNTY BY 1970

Additions To State Trunk Highway System		
Route	Limits	Miles[a]
USH 18 W. Highland Avenue	N. 9th Street to N. 6th Street	0.2
USH 18 N. 6th Street	W. Highland Avenue to W. Michigan Street	0.5
USH 18 (W. and E. Michigan Street)	N. 6th Street to Harbor Drive	1.1
STH 32 (N. Milwaukee Street)	E. State Street to N. Water Street	0.5
STH 32 (S. Broadway)	N. Water Street to E. Pittsburgh Avenue	1.3
STH 32 (N. Water Street)	N. Broadway Street to E. Kane Place	0.6
STH 32 (E. Kane Place)	N. Water Street to N. Oakland Avenue	0.4
STH 32 (N. Oakland Avenue)	E. Kane Place tc E. North Avenue	0.4
STH 32 (E. North Avenue)	N. Oakland Avenue to N. Prospect Avenue	0.2
STH 32 (W. Virginia Street)	S. 1st Street to S. 2nd Street	0.1
STH 32 (S. 2nd Street)	W. Virginia Street to W. Maple Street	1.1
STH 32 (W. Maple Street)	S. 2nd Street to S. Kinnickinnic Avenue	0.1
STH 32 (E. Oklahoma Avenue)	S. Lake Drive to S. Kinnickinnic Avenue	0.5
STH 32 (S. Kinnickinnic Avenue)	E. Oklahoma Avenue to E. Russell Avenue (Change from STH 62 to STH 32)	--
USH 41 I-94, (North-South Freeway)	Racine County line to Interchange with I-894	--
USH 41 I-894, (Airport Freeway)	Interchange with I-94 to S. 27th Street	--
STH 57 (N. Teutonia Avenue)	N. Green Bay Road to N. 27th Street	4.8
STH 57 (N. 27th Street)	N. Teutonia Avenue to W. Highland Boulevard	4.1
STH 181 (N. 76th Street)	N. Harwood Avenue to W. Blue Mound Road	1.0
E. Rawson Avenue	USH 45 to N. Chicago Avenue	9.4

Table 31 (continued)

Deletions from State Trunk Highway System		
Route	Limits	Miles[a]
STH 15 (W. National Avenue)	W. Greenfield Avenue to S. 1st Street	--
STH 15 (W. National Avenue)	W. Oklahoma Avenue to W. Greenfield Avenue	4.0
STH 15 (W. Oklahoma Avenue)	W. National Avenue to the Waukesha County line	0.5
USH 18 (N. 17th Street)	W. Highland Avenue to W. Wells Street	0.3
USH 18 (W. and E. Wells Street)	N. 17th Street to N. Milwaukee Street	1.4
USH 18 (N. Milwaukee Street)	E. Wells Street to S. Erie Street	0.8
USH 18 (S. Erie Street)	N. Milwaukee Street to E. Polk Street	0.2
USH 18 (E. Polk Street)	S. Erie Street to Harbor Drive	0.1
USH 18 (Harbor Drive)	E. Polk Street to the Municipal Pier	0.6
USH 18 (N. Milwaukee Street)	E. Wells Street to E. State Street	0.2
USH 18 (E. and W. State Street)	N. Milwaukee Street to N. 9th Street	0.8
USH 18 (N. 9th Street)	W. State Street to W. Highland Avenue	0.1
STH 32 (E. Wells Street)	N. Milwaukee Street to N. Prospect Avenue	0.4
STH 32 (N. Prospect Avenue)	E. Wells Street to E. North Avenue	1.4
STH 32 (N. Farwell Avenue)	E. North Avenue to N. Prospect Avenue	1.1
STH 32 (E. State Street)	N. Prospect Avenue to N. Milwaukee Street	0.4
STH 32 (S. Superior Street)	E. Oklahoma Avenue to E. Russell Avenue	1.1
STH 32 (E. Russell Avenue)	S. Superior Street to S. Kinnickinnic Avenue	0.4
STH 38 (S. Howell Avenue)	Racine County line to S. Chase Avenue	9.3
STH 38 (S. Chase Avenue)	S. Howell Avenue to S. 6th Street	1.9
STH 38 (S. 6th Street)	S. Chase Avenue to W. National Avenue	1.4
USH 41 (S. 27th Street)	Racine County line to the Airport Freeway (I-894)	8.2
STH 57 (N. Green Bay Road)	N. Teutonia Avenue to W. Capitol Drive	6.3
STH 57 (W. Capitol Drive)	N. Green Bay Road to N. 20th Street	--
STH 57 (N. 20th Street)	W. Capitol Drive to W. Highland Avenue	3.1
STH 57 (W. Highland Avenue)	N. 20th Street to N. 27th Street	--
STH 62 (S. Packard Avenue)	E. College Avenue to E. Plankinton Avenue	2.1
STH 62 (E. Plankinton Avenue)	S. Packard Avenue to S. Kinnickinnic Avenue	0.2
STH 62 (S. Kinnickinnic Avenue)	E. Plankinton Avenue to E. Russell Avenue	3.0
STH 100 (S. 108th Street)	Rock Freeway (STH 15) to W. Blue Mound Road	5.5
STH 100 (W. Blue Mound Road)	S. 108th Street to N. Mayfair Road	--
STH 100 (N. Mayfair Road)	W. Blue Mound Road to W. Silver Spring Drive	5.8
STH 100 (W. Silver Spring Drive)	N. Mayfair Road to Zoo Freeway (USH 45)	0.1
STH 100 (Zoo Freeway)	W. Silver Spring Drive to W. Good Hope Road	--
STH 100 (W. Good Hope Road)	Zoo Freeway (USH 45) to N. 107th Street	0.5
STH 100 (N. 107th Street)	W. Good Hope Road to W. Brown Deer Road	2.0
STH 145 (N. 20th Street)	W. Highland Avenue to W. Fond du Lac Avenue	--
STH 145 (W. Fond du Lac Avenue)	N. 20th Street to W. Capitol Drive	2.9
STH 175 (W. Appleton Avenue)	Zoo Freeway (USH 45) to the Waukesha County line	1.1
STH 181 (S. 84th Street and Glenview Avenue)	W. National Avenue to W. Blue Mound Road	1.8
STH 181 (N. Glenview Avenue)	W. Blue Mound Road to Harwood Avenue	0.8
STH 181 (Harwood Avenue)	N. Glenview Avenue to N. 76th Street	0.3

[a] *Where no mileage is shown there is concurrent routing with other state trunk highways, or there is an addition of one route and a deletion of another route.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

incorporated municipalities, it is recommended that the Milwaukee County Board and the state Highway Commission jointly sponsor amendments to Section 84.02(11) of the Wisconsin Statutes to abolish the connecting street concept and to Section 83.025(1) to prohibit the governing body of any city or village from unilaterally removing a street or highway from the county trunk system.

Aid System Adjustment

Upon realignment of the state and county trunk highway systems, pursuant to the foregoing recommendations, it will be necessary to adjust the federal aid system, as established under Title 23, U. S. Code, Section 103, to the resulting state and county trunk highway systems. In Wisconsin the state Highway Commission is, pursuant to Section

Table 32

PROPOSED TYPE I (STATE TRUNK) ARTERIAL HIGHWAY SYSTEM

ADDITIONS AND DELETIONS IN MILWAUKEE COUNTY: 1970 TO 1990

Additions to State Trunk Highway System		
Route	Limits	Miles[a]
USH 41 (Stadium Freeway)	I-894 (Airport Freeway) to W. National Avenue	4.2
USH 41 (Stadium Freeway)	W. Lisbon Avenue to STH 145 (Fond du Lac Freeway)	3.5
USH 41 (Fond du Lac Freeway)	Stadium Freeway to USH 45 (Zoo Freeway)	--
STH 57 (S. 27th Street)	W. National Avenue to W. Loomis Road	--
STH 74 (W. Brown Deer Road)	N. 107th Street to USH 141	--
Bay Freeway	USH 141 to Fond du Lac Freeway	4.0
Bay Freeway	Fond du Lac Freeway to the Waukesha County line	2.4
Belt Freeway	Lake Freeway to the Waukesha County line	9.5
Lake Freeway	E. Russell Avenue to the Racine County line	10.9
Park Freeway	Stadium Freeway to I-794	5.3
Stadium Freeway	Bay Freeway to the Ozaukee County line	6.0
Deletions from State Trunk Highway System		
Route	Limits	Miles[a]
STH 24 (W. Janesville Road)	Waukesha County line to S. 108th Street	1.0
STH 24 (W. Forest Home Avenue)	S. 108th Street to S. 27th Street	6.9
USH 41 (S. 27th Street)	I-894 (Airport Freeway) to W. Loomis Road	1.2
USH 41 (S. 27th Street)	W. Loomis Road to W. National Avenue	--
USH 41 (W. National Avenue)	S. 27th Street to Stadium Freeway	--
USH 41 (W. Lisbon Avenue)	Stadium Freeway to W. Appleton Avenue	0.8
USH 41 (W. Appleton Avenue)	W. Lisbon Avenue to USH 45 (Zoo Freeway)	6.0
STH 100 (W. Brown Deer Road)	N. 107th Street to USH 141	--
STH 100 (E. and W. Ryan Road)	STH 32 (S. Chicago Road) to STH 36 (W. Loomis Road)	10.0
STH 145 (W. Fond du Lac Avenue)	W. Capitol Drive to N. 68th Street	1.5
STH 181 (N. 76th Street)	W. Blue Mound Road to the Ozaukee County line	10.9

[a] *Where no mileage is shown there is concurrent routing with other state trunk highways, or there is an addition of one route and a deletion of another route.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

84.01(17) of the Wisconsin Statutes, charged with the responsibility for laying out and revising the national system of interstate and defense highways and the federal aid primary system, subject to federal review. The state Highway Commission and the county board acting through its Highway Committee are charged with the joint responsibility of laying out and revising the federal aid secondary system, also subject to federal review and approval, pursuant to Section 83.026 of the Wisconsin Statutes.

It is accordingly recommended that, upon realignment of the state and county trunk highway systems, the state Highway Commission act to effect the realignment of the federal aid primary system within Milwaukee County. It is recommended that the initial action include all of the specific additions to, and deletions from, the federal aid primary system set forth in Table 35 in order to achieve the first stage (1970) of plan implementation. Subsequent actions should effect the specific additions to, and deletions from, the federal aid primary system set forth in Table 36 by the design year (1990) of the recommended plan. It is recommended that all of the initial changes in the federal aid primary system be effected by one inclusive action of the state Highway Commission supported by the Milwaukee County Board. Subsequent realignments can be effected on a route-by-route basis as dictated by developing circumstances. It is further recommended that the state Highway Commission and the U. S. Bureau of Public Roads give due consideration to the jurisdictional highway system plan in the allocation of any additional interstate highway mileage within Milwaukee County.

Table 33

PROPOSED TYPE II (COUNTY TRUNK) ARTERIAL HIGHWAY SYSTEM
ADDITIONS AND DELETIONS IN MILWAUKEE COUNTY BY 1970

Additions to County Trunk System		
Route	Limits	Miles
W. County Line Road	N. 124th Street to USH 141	6.9
N. 124th Street	Ozaukee County line to STH 145 (Fond du Lac Freeway)	1.7
N. 107th Street	W. Brown Deer Road to USH 41	3.5
W. Good Hope Road	N. 124th Street to N. 107th Street	1.3
W. Appleton Avenue	N. 124th Street to USH 45 (Zoo Freeway)	0.7
W. Mill Road	N. 124th Street to N. Green Bay Avenue	6.6
N. Green Bay Avenue	W. Capitol Drive to N. Teutonia Avenue	6.4
N. Mayfair Road	W. Appleton Avenue to W. Blue Mound Road	6.5
N. and S. 124th Street	W. Silver Spring Drive to W. Layton Avenue	10.6
W. Silver Spring Drive	N. 107th Street to N. Lake Drive	7.2
W. Hampton Avenue	N. 92nd Street to N. Lake Drive	7.0
W. Burleigh Street	N. 124th Street to W. Hopkins Street	6.4
W. Hopkins Street	W. Burleigh Street to W. Locust Street	0.4
W. Locust Street	W. Hopkins Street to N. Lake Drive	2.8
W. North Avenue	N. 124th Street to W. Lisbon Avenue	4.7
W. Lisbon Avenue	W. North Avenue to W. Walnut Street	1.6
W. Walnut Street	W. Lisbon Avenue to N. Water Street	1.7
W. Watertown Plank Road	N. 124th Street to N. Glenview Avenue	2.4
Harwood Avenue	W. Watertown Plank Road to W. State Street	0.4
W. State Street	Harwood Avenue to N. 35th Street	2.5
S. 108th Street	W. Blue Mound Road to Rock Freeway	5.0
W. Cleveland Avenue	S. 124th Street to W. National Avenue	1.5
W. Oklahoma Avenue	W. National Avenue to S. Kinnickinnic Avenue	8.8
W. National Avenue	Waukesha County line to W. Greenfield Avenue	4.4
S. 76th Street	W. Blue Mound Road to W. Oklahoma Avenue	3.2
S. Muskego Avenue	W. Forest Home Avenue to W. Lapham Street	0.9
W. Lapham Avenue	S. Muskego Avenue to S. Kinnickinnic Avenue	1.2
W. Lincoln Avenue	W. National Avenue to S. Howell Avenue	6.1
S. Howell Avenue	E. Lincoln Avenue to Racine County line	10.6
W. Layton Avenue	S. 124th Street to S. 108th Street	1.0
E. and W. Layton Avenue	S. 27th Street to S. Lake Drive	5.0
W. College Avenue	W. Loomis Road to S. 27th Street	2.1
E. College Avenue	S. Pennsylvania Avenue to N. Chicago Avenue	1.6
S. 51st Street	W. Loomis Road to W. Ryan Road	5.3
S. 27th Street	Airport Freeway (I-894) to Racine County line	8.2
E. and W. County Line Road	USH 45 to N. Chicago Road (STH 32)	10.8
W. Forest Home Avenue	S. Muskego Avenue to S. 27th Street	0.3

It is further recommended that, upon realignment of the state and county highway systems, the state Highway Commission act in cooperation with the Milwaukee County Board to effect the realignment of the federal aid secondary system within Milwaukee County. It is recommended that the initial action include all of the specific additions to, and deletions from, the federal aid secondary system set forth in Table 37 in order to achieve the first stage (1970) of plan implementation. Subsequent actions should effect the specific additions to, and deletions from, the federal aid secondary system set forth in Table 38 by the design year (1990) of the recommended plan. It is recommended that all of the initial changes in the federal aid secondary system be effected by one inclusive action of

Table 33 (continued)

Deletions from County Trunk System		
Route	Limits	Miles
N. Granville Road	N. 107th Street to N. 91st Street	2.1
N. 91st Street	W. Brown Deer Road to W. Appleton Avenue	6.2
N. Teutonia Avenue	N. Green Bay Road to W. Good Hope Road	0.7
N. Sherman Boulevard	N. Teutonia Avenue to W. Mill Road	3.0
N. Port Washington Road	Ozaukee County line to E. Daphne Road	3.8
W. Beloit Road	S. 124th Street to W. Oklahoma Avenue	2.5
S. 92nd Street	W. Oklahoma Avenue to W. Forest Home Avenue	2.5
S. Woodlawn Avenue	S. 92nd Street to W. Forest Home Avenue	0.4
S. North Cape Road	Waukesha County line to W. Forest Home Avenue	1.7
St. Martins Road	S. North Cape Road to USH 45	1.7
CTH K (Old Loomis Road)	W. Loomis Road to W. Loomis Road	1.3
W. Rawson Avenue	USH 45 to S. Nicholson Avenue	8.1
S. 13th Street	W. College Avenue to Racine County line	5.9
S. 68th Street	W. Ryan Road to a point 0.8 mile North	0.8

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Table 34
PROPOSED TYPE II (COUNTY TRUNK) ARTERIAL HIGHWAY SYSTEM
ADDITIONS[a] IN MILWAUKEE COUNTY: 1970 to 1990

Additions to County Trunk System		
Route	Limits	Miles
E. and W. Ryan Road	S. Chicago Avenue to STH 100	8.2
STH 100	W. Ryan Road to W. Loomis Road	1.4
W. Janesville Road	S. 108th Street to Waukesha County line	1.1
W. Forest Home Avenue	S. 108th Street to S. 27th Street	6.6
N. 76th Street	W. Blue Mound Road to Ozaukee County line	10.6
W. Appleton Avenue	W. North Avenue to USH 45 (Zoo Freeway)	6.6
E. Lincoln Avenue	S. Kinnickinnic Avenue to Lake Freeway	0.7
S. 27th Street	Airport Freeway (I-894) to W. Loomis Road	1.2

[a]*There are no proposed deletions from the Type II system between 1970 and 1990.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

the state Highway Commission supported by the Milwaukee County Board. Subsequent realignments can be effected on a route-by-route basis as dictated by developing circumstances.

It is recommended that the U. S. Department of Transportation, Bureau of Public Roads, cooperate in, and approve, the above recommended revisions in the federal aid systems.

The realignment of the federal aid systems will be one of the major benefits of the jurisdictional highway planning program in Milwaukee County. The present designation of federal aid routes does not, in all cases, coincide with major arterial routes. Yet, the selective transfer of federal aid designations for given routes has been discouraged in recent years without the benefit of comprehensive study. By correlating jurisdictional respon-

Table 35
PROPOSED FEDERAL AID PRIMARY SYSTEM ADDITIONS
AND DELETIONS IN MILWAUKEE COUNTY BY 1970

Additions to Federal Aid Primary System			
Route		Limits	Miles[a]
FAP 1	STH 32 (E. Oklahoma Avenue)	S. Lake Drive to S. Kinnickinnic Avenue	0.5
	STH 32 (S. Kinnickinnic Avenue)	E. Oklahoma Avenue to E. Russell Avenue	0.9
	STH 32 (N. Milwaukee Street)	E. State Street to N. Water Street	0.5
	STH 32 (N. Water Street)	N. Milwaukee Street to E. Kane Place	0.6
	STH 32 (E. Kane Place)	N. Water Street to N. Oakland Avenue	0.4
	STH 32 (N. Oakland Avenue)	E. Kane Place to E. North Avenue	0.4
	STH 32 (E. North Avenue)	N. Oakland Avenue to N. Prospect Avenue	0.2
	USH 45 (S. 124th Street)	Racine County line to W. Loomis Road	1.6
	USH 45 (W. Loomis Road)	S. North Cape Road to STH 100	--
	USH 45 (S. 100th Street)	W. Loomis Road to a point south of College Avenue	--
FAP 59	USH 45 (S. 108th Street)	STH 15 (Rock Freeway) to a point south of College Avenue	2.0
	USH 45 (Rock Freeway)	S. 108th Street to I-894 (Zoo Freeway)	--
	USH 45 (Zoo Freeway)	Rock Freeway to STH 145 (Fond du Lac Freeway)	--
	USH 45 (Zoo Freeway)	STH 145 (Fond du Lac Freeway) to Waukesha County line	--
FAP 2	STH 57 (N. Teutonia Avenue)	N. Green Bay Road to N. 27th Street	4.8
	STH 57 (N. 27th Street)	N. Teutonia Avenue to W. Highland Boulevard	4.1
FAP 16	USH 18 (W. Highland Avenue)	N. 9th Street to N. 6th Street	0.2
	USH 18 (N. 6th Street)	W. Highland Avenue to W. Michigan Street	0.5
	USH 18 (W. and E. Michigan Street)	N. 6th Street to Harbor Drive	1.1
FAP 63	STH 59 (W. National Avenue)	W. Greenfield Avenue to S. 1st Street	2.9
	STH 145 (W. Fond du Lac Avenue)	USH 41 to Waukesha County line	0.5
	STH 145 (County Line Road)	Fond du Lac Avenue to a point 0.7 miles north	0.7
	W. and E. Rawson Avenue	USH 45 to STH 32 (S. Chicago Road)	9.4
	Airport Spur	I-94 to General Mitchell Field	1.1
	Bay Freeway	USH 141 to Fond du Lac Freeway	4.0
	Bay Freeway	Fond du Lac Freeway to Waukesha County line	2.4
	Belt Freeway	Lake Freeway to Waukesha County line	9.5
	Lake Freeway	E. Russell Avenue to Racine County line	10.9
	Stadium Freeway	W. Lisbon Avenue to Ozaukee County line	9.5

sibility with federal aid importance, implementation of the recommended jurisdictional highway system plan will achieve the alignment of the federal aid interstate and federal aid primary systems with the Type I, state trunk, highway system and the alignment of the federal aid secondary system with the Type II, county trunk, highway system.

It is further recommended that the Milwaukee County Board and the state Highway Commission jointly seek and support national legislation which would establish a true federal aid urban system; make all Type III, local trunk, facilities eligible for placement on this true federal aid urban system; and thereby make federal aids, including "TOPICS"[1] funds available for the improvement of the Type III, local trunk, system.

[1] *The acronym "TOPICS" stands for the compound term "Traffic Operations Program To Increase Capacity and Safety." The objective of this program, initiated by the U. S. Bureau of Public Roads, is to focus more attention on raising the efficiency of the existing street and highway system in urban areas through the application of traffic engineering principles. Under this program the states are permitted a wider range of choice in the application of federal aid highway funds to the improvement of the total street and highway system in urban areas. Specifically, the states may add to the federal aid primary systems, without charge against the total mileage limitation, additional streets and highways in urban areas on which federal highway funds may be expended for traffic operation improvements.*

Table 35 (continued)

Deletions from Federal Aid Primary System		
Route	Limits	Miles[a]
FAP 1 STH 32 (S. Superior Street)	E. Oklahoma Avenue to E. Russell Avenue	1.1
STH 32 (E. Russell Avenue)	S. Superior Street to S. Kinnickinnic Avenue	0.4
STH 32 (E. State Street)	N. Milwaukee Street to N. Prospect Avenue	0.4
STH 32 (N. Prospect Avenue)	E. State Street to E. North Avenue	1.3
FAP 2 STH 57 (N. Green Bay Road)	N. Teutonia Avenue to W. Capitol Drive	6.3
STH 57 (W. Capitol Drive)	N. Green Bay Road to N. 20th Street	--
STH 57 (N. 20th Street)	W. Capitol Drive to W. Highland Avenue	3.1
STH 57 (W. Highland Boulevard)	N. 27th Street to N. 35th Street	--
USH 41 (S. 27th Street)	I-894 to Racine County line	8.2
FAP 3 N. 27th Street	W. Highland Boulevard to W. Lisbon Avenue	0.6
W. Lisbon Avenue	N. 27th Street to Stadium Freeway	1.3
FAP 15 STH 15 (W. National Avenue)	I-894 (Zoo Freeway) to S. 1st Street	6.9
FAP 16 USH 13 (N. 9th Street)	W. Highland Avenue to W. State Street	0.1
USH 18 (W. State Street)	N. Milwaukee Street to N. 9th Street	0.8
FAP 27 STH 145 (W. Fond du Lac Avenue)	N. 20th Street to W. Capitol Drive	2.9
FAP 58 STH 100 (N. Mayfair Road and S. 108th Street)	Zoo Freeway (South of W. North Avenue) to Racine County line	14.9
FAP 74 STH 38 (S. Howell Avenue)	Racine County line to Ryan Road	2.0

[a]*Where no mileage is shown, there is concurrent routing with other Federal Aid Primary routes, or there is an addition of one route and a deletion of another route.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Table 36

PROPOSED FEDERAL AID PRIMARY SYSTEM DELETIONS[a]
IN MILWAUKEE COUNTY: 1970 to 1990

Deletions from Federal Aid Primary System		
Route	Limits	Miles
FAP 2 USH 41 (S. 27th Street)	I-894 (Airport Freeway) to W. Loomis Road	1.2
FAP 3 USH 41 (W. Lisbon Avenue)	Stadium Freeway to W. Appleton Avenue	0.8
FAP 3 USH 41 (W. Appleton Avenue)	W. Lisbon Avenue to USH 45 (Zoo Freeway)	6.0
FAP 27 W. Fond du Lac Avenue	N. 68th Street to W. Capitol Drive	1.5
FAP 59 STH 100 (E. and W. Ryan Road and St. Martins Road)	STH 32 (S. Chicago Road) USH 45 and STH 36 (W. Loomis Road)	9.9

[a]*There are no proposed additions to the Federal Aid Primary System between 1970 and 1990.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Table 37

PROPOSED FEDERAL AID SECONDARY SYSTEM ADDITIONS AND DELETIONS IN MILWAUKEE COUNTY BY 1970

Additions to Federal Aid Secondary System		
Route	Limits	Miles
S. Howell Avenue	Racine County line to E. Ryan Road	2.0
S. 27th Street	Racine County line to Airport Freeway	8.2
S. 51st Street	W. Ryan Road to W. Loomis Road	5.3
W. College Avenue	W. Loomis Road to N. Chicago Avenue	3.7
STH 100	Rock Freeway to W. Appleton Avenue	12.5
W. Oklahoma Avenue	W. National Avenue to S. Kinnickinnic Avenue	7.0
W. Lincoln Avenue	W. National Avenue to I-794	5.0
S. Howell Avenue	S. Chase Street to E. Lincoln Avenue	2.0
W. Forest Home Avenue	S. 27th Street to S. Muskego Avenue	0.2
S. Muskego Avenue	W. Forest Home Avenue to W. Lapham Street	0.9
W. Lapham Street	S. Muskego Avenue to S. Kinnickinnic Avenue	1.2
S. 76th Street	W. Lincoln Avenue to W. Blue Mound Road	2.2
N. and S. 124th Street	W. Layton Avenue to W. Silver Spring Drive	10.6
W. State Street	N. 35th Street to Harwood Avenue	2.5
W. and E. Hampton Avenue	N. Lake Drive to N. 124th Street	9.0
W. Mill Road	N. Green Bay Road to Waukesha County line	6.6
N. 124th Street	USH 145 to Ozaukee County line	1.7
W. County Line Road	USH 141 to N. 124th Street	6.9
N. Green Bay Avenue	W. Capitol Drive to N. Teutonia Avenue	6.4
N. 107th Street	W. Good Hope Road to W. Appleton Avenue	1.3
W. Burleigh Street	N. 124th Street to W. Hopkins Street	6.4
W. Hopkins Street	W. Burleigh Street to W. Locust Street	0.4
W. Locust Street	W. Hopkins Street to N. Lake Drive	2.8
W. Lisbon Avenue	Stadium Freeway (USH 41) to W. Walnut Street	1.5
W. Walnut Street	W. Lisbon Avenue to N. Water Street	1.8
E. and W. County Line Road	N. Chicago Avenue to USH 45	10.8
W. Good Hope Road	Zoo Freeway to Waukesha County line	0.7
W. Watertown Plank Road	N. Glenview Boulevard to N. 124th Street	2.4
W. National Avenue	I-894 to W. Greenfield Avenue	2.8
N. 76th Street	W. Blue Mound Road to Harwood Avenue	1.0
W. Layton Avenue	Waukesha County line to S. 108th Street	1.0

Deletions from Federal Aid Secondary System			
Route		Limits	Miles
FAS 834	S. Chase Avenue	S. Howell Avenue to S. 6th Street	1.8
FAS 834	S. 6th Street	W. Lincoln Avenue to W. Michigan Avenue	2.4
FAS 834	N. 6th Street	W. Michigan Avenue to W. Highland Avenue	0.4
FAS 347	W. Beloit Road	Waukesha County line to W. National Avenue	5.9
FAS 819	St. Martins Rd.	STH 100 to W. Forest Home Avenue	1.5
FAS 833	S. 13th Street	Racine County line to S. 6th Street	12.5
FAS 833	W. Greenfield Avenue	N. 13th Street to N. 6th Street	0.5
FAS 832	S. 92nd Street	W. Forest Home Avenue to W. National Avenue	3.5
FAS 836	S. Pennsylvania Avenue	E. Rawson Avenue to E. Layton Avenue	3.0
FAS 352	N. 84th Street	W. National Avenue to Harwood Avenue	2.4
FAS 353	N. 91st Street	W. Appleton Avenue to W. Good Hope Road	2.4
FAS 353	N. Granville Road	W. Good Hope Road to STH 100	2.1
FAS 824	N. Range Line Road	W. Brown Deer Road to N. Green Bay Avenue	1.1
FAS 827	N. River Road	W. Good Hope Road to W. Dean Road	1.5
FAS 825	W. Dean Road	N. Lake Drive to N. Range Line Road	2.4
FAS 823	N. Teutonia Avenue	W. Capitol Drive to N. Green Bay Avenue	5.9
FAS 351	W. Rawson Avenue	USH 45 to STH 32 (N. Chicago Road)	9.4
FAS 344	S. 70th Street	W. Blue Mound Road to W. Lincoln Avenue	2.4
FAS 344	W. Lincoln Avenue	S. 70th Street to S. 76th Street	0.3

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Table 38

PROPOSED FEDERAL AID SECONDARY SYSTEM ADDITIONS[a]
IN MILWAUKEE COUNTY: 1970 to 1990

Additions to Federal Aid Secondary System		
Route	Limits	Miles
FAP 2 S. 27th Street	Airport Freeway to W. Loomis Road	1.2
FAP 3 W. Appleton Avenue	USH 45 to W. Lisbon Avenue	5.7
W. Lisbon Avenue	W. Appleton Avenue to Stadium Freeway	0.8
FAP 59 STH 100	W. Loomis Road to Chicago Avenue	9.9
E. Lincoln Avenue	S. Kinnickinnic Avenue to Lake Freeway	0.7

[a]*There are no proposed deletions from the Federal Aid Secondary System between 1970 and 1990.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Realignment of Operational Responsibilities

Following the realignment of the state and county trunk highway systems, as recommended in this report, the state Highway Commission shall assume full operational and maintenance responsibilities as hereinafter defined, over the recommended state trunk highway system and shall mark and maintain all state trunk highways within Milwaukee County, including those facilities within incorporated cities and villages. The Milwaukee County Board shall similarly assume full operational and maintenance responsibilities, as hereinafter defined, over the recommended county trunk highway system and shall mark and maintain all county trunk highways within Milwaukee County, including those facilities within incorporated cities and villages.

It is recommended that the state Highway Commission continue to contract with the Milwaukee County Board, pursuant to Section 84.07 of the Wisconsin Statutes for maintenance of the Type I, state trunk, highway facilities, with the added option of contracting on an annual basis directly with the cities and villages concerned for maintenance of these facilities. It is similarly recommended that the Milwaukee County Board, at its option, contract with the cities and villages concerned for maintenance of the Type II, county trunk, highway facilities. It is recommended that the state Highway Commission and the Milwaukee County Highway Committee establish, respectively, standards for such contractual maintenance, relating these standards to the recommended eligible maintenance items set forth in Chapter VII of this report; namely: physical maintenance of roadway surface pavements and structures and physical maintenance of storm sewers, snow and ice control between curbs, traffic control devices, and pavement marking. It is similarly recommended that the state and county assume direct administration of the operational control devices on the state and county trunk highway systems, respectively, as recommended in Chapter VII of this report, namely: issuance of driveway permits, control of advertising signs, maintenance of signals and route signing, establishment of speed zoning, issuance of special permits, and prohibition of parking.

It is further recommended that the state Highway Commission, pursuant to Section 84.25 of the Wisconsin Statutes, review the status of controlled access highways within Milwaukee County and declare all such Type I, state trunk, highway facilities within the county as are found to meet the statutory requirements and provisions as controlled-access highways. It is similarly recommended that the Milwaukee County Board, pursuant to Section 83.027 of the Wisconsin Statutes, review the status of controlled-access highways within Milwaukee County and declare all such county trunk highway facilities within Milwaukee County as are found to meet the statutory requirements and provisions as controlled-access highways.

Facility Construction and Right-of-Way Acquisition

It has already been noted that the planning and programming procedure developed by the state Highway Commission provides an orderly and

effective device whereby the many complex and highly interrelated tasks involved in the final accomplishment of modern highway improvement projects—tasks such as route location, including necessary mapping; preliminary engineering; implementation of legal changes in the state trunk highway routes; detailed design and final engineering; acquisition of right-of-way; preparation of construction plans, specifications, and cost estimates; letting of contracts; and actual construction, including layout, inspection, and final surveys—can be carried out and, as such, constitutes an effective current planning and plan implementation program. The Milwaukee County Department of Public Works has developed similar planning and programming procedures for highway facility improvement. It is accordingly recommended that the recommended jurisdictional highway system plan be integrated into the state and county highway construction planning and programming procedures as necessary to meet the staged completion dates recommended in the jurisdictional highway system plan. In order to assist in such integration, the priority list of Type I, state trunk, and Type II, county trunk, highway facility improvement projects set forth in Tables 39 and 40 have been prepared. The list of recommended highway improvements is arranged in order of priority of need, based upon a systems analysis of the existing and probable future traffic demand and on consideration of necessary system continuity, of existing structural condition, and of feasible project limits.

Facility Construction: In connection with facility construction, it is recommended that the state Highway Commission and the Milwaukee County Board adopt common, uniform construction aid formulae and policies providing for a fixed local contribution of 15 percent of the cost of all state and county trunk highway construction projects, except interstate highway and other freeway projects, with the cost of the construction project being determined on the basis of the participating work items set forth in Chapter VII of this report, namely: right-of-way acquisition; grading; construction of pavement base and surface and curb and gutter; construction of inlets for surface water drainage, together with connections to storm sewer mains; construction of storm sewer mains necessary for pavement and right-of-way drainage; and engineering services. Interstate highway projects are financed by 90 percent federal and 10 percent state funds. Other freeway projects on federal aid routes are financed by 70 percent federal and state funds, and 30 percent county funds.

Right-of-Way Reservation: A considerable interval necessarily exists between the time a long-range plan for a given highway facility is formally adopted and the time when actual construction of the facility can begin. If maximum economies are to be effected and future disruption to urban development minimized, the conversion of open land to urban use and the redevelopment of land for urban use within required future right-of-way lines must be avoided. This is particularly true in a rapidly urbanizing area, such as Milwaukee County, where urban development and redevelopment, if allowed to proceed in the path of needed highway facilities, will not only make the eventual construction of the proposed facilities extremely costly and difficult but will also require expensive and agonizing readjustment of the urban development itself to the ultimate highway development.

It is, therefore, recommended that prior reservation of right-of-way for the required highway facilities be accomplished in accordance with the recommended jurisdictional highway system plan, utilizing statutory devices made available for this purpose, including official mapping, building setback line ordinances, and land subdivision control ordinances. 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 can not only achieve great economies in ultimate right-of-way acquisition but also permits land adjacent to the required right-of-way to be privately purchased and developed with full knowledge of the future highway development proposals. Such action can serve to reduce greatly public misunderstanding of proposed highway improvements and should thereby assist in avoiding and overcoming opposition to the actual construction of the recommended facilities. Such prior reservation of right-of-way also serves to assure that lands needed for future highways will be available when needed at the price of unimproved land. This serves not only to effect great economies but also to avoid in the future the disruption, dislocation, discontent, and great expense involved in the acquisition and clearance of developed areas for street and highway purposes.

The most effective and efficient means of prior reservation of right-of-way for highway purposes is the use of the official mapping powers granted by the State Legislature to the state Highway Commission, counties, cities, villages, and towns

Table 39

RECOMMENDED STAGING OF TYPE I (STATE TRUNK) ARTERIAL HIGHWAY SYSTEM IMPROVEMENTS IN MILWAUKEE COUNTY: 1969 to 1990

Period	Facility	Limits	Miles
1969-1970	Rock Freeway	S. 108th Street to Waukesha County line	1.0
	STH 100 (E. and W. Ryan Road)	S. 13th Street to S. Howell Avenue	1.0
	STH 100 (W. Brown Deer Road)	N. 43rd Street to N. 91st Street	3.0
	Subtotal		*5.0*
1971-1975	Airport Spur Freeway	I-94 (North-South Freeway) to General Mitchell Field	1.1
	Stadium Freeway	I-94 (East-West Freeway) to I-894 (Airport Freeway)	5.0
	Park and Lake Freeway	USH 41 (Stadium Freeway) to I-794 (East-West Freeway)	5.0
	USH 141 (North-South Freeway)	E. Lexington Boulevard to E. Silver Spring Drive	0.4
	STH 100 (S. 108th Street)	W. Rawson Avenue to W. Forest Home Avenue	1.5
	STH 15 (W. National Avenue)	S. 84th Street intersection with STH 181	0.2
	USH 41 (S. 27th Street)	W. Oklahoma Avenue to W. Lincoln Avenue	1.0
	STH 24 (W. Forest Home Avenue)	S. 35th Street to S. 27th Street	0.6
	N. 115th Street	W. Silver Spring Drive to W. Florist Avenue	0.6
	STH 100 (N. Mayfair Road)	W. Watertown Plank Road to USH 45 (Zoo Freeway)	0.7
	USH 18 (W. Blue Mound Road)	STH 100 (N. Mayfair Road) intersection with USH 18	0.5
	STH 32 (N. Lake Drive)	E. Dean Road to E. School Road	2.5
	USH 18 (W. Highland Avenue)	N. 27th Street to N. 9th Street	1.3
	STH 175 (W. Appleton Avenue)	Waukesha County line to USH 41 interchange with the Zoo Freeway	0.5
	STH 59 (W. Greenfield Avenue)	Waukesha County line to S. 110th Street	0.9
	STH 100 (W. Ryan Road)	W. Loomis Road to S. 27th Street	5.0
	STH 100 (E. Ryan Road)	S. Howell Avenue to S. Chicago Road	3.0
	USH 45	W. Loomis Road to W. Rawson Avenue	1.7
	W. Rawson Avenue	S. 27th Street to USH 45	4.8
	STH 100 (E. Brown Deer Road)	Milwaukee River to USH 141	2.0
	STH 100 (S. Brown Deer Road)	N. 107th Street to N. 91st Street	1.0
	N. Teutonia Avenue	W. Ruby Avenue to W. Lancaster Avenue	0.7
	STH 181	W. National Avenue to East-West Freeway	1.0
	Subtotal		*41.0*
1976-1980	Lake Freeway	East-West Freeway to Racine County line	13.7
	Stadium Freeway	Park Freeway to Ozaukee County line	9.7
	USH 141 (North-South Freeway)	W. Silver Spring Drive to W. Good Hope Road	2.0
	Bay Freeway	USH 141 to Waukesha County line	6.5
	Belt Freeway	Lake Freeway to Waukesha County line	9.5
	STH 36 (W. Loomis Road)	Interchange with S. 76th Street	0.4
	STH 36 (W. Loomis Road)	Waukesha County line to STH 100	2.2
	STH 181 (N. 76th Street)	W. North Avenue to W. Wisconsin Avenue	1.5
	STH 32 (S. Chicago Road)	Racine County line to E. Forest Hill Avenue	3.7
	STH 74 (W. Brown Deer Road)	N. 107th Street to Waukesha County line	1.0
	STH 32	E. Kilbourn Avenue over the N. Milwaukee-N. Broadway one-way pair, N. Water Street, E. Kane Place, N. Oakland Avenue, and E. North Avenue to the N. Prospect-N. Farwell one-way pair	2.2
	USH 18 (W. Highland Avenue)	N. 9th Street to N. 6th Street	0.2
	STH 32 (S. Lake Drive)	Cudahy City Limits to S. Kinnickinnic Avenue	2.5
	STH 59 (W. National Avenue)	S. 27th Street to S. 16th Street	0.8
	E. Rawson Avenue	S. Nicholson Avenue to STH 32	1.0
	Subtotal		*56.9*

Table 39 (continued)

1981-1985	N. 27th Street	W. State Street to W. Fond du Lac Avenue	1.6
	N. 27th Street	W. State Street to W. St. Paul Avenue	0.6
	27th Street Viaduct	Mitchell Park to W. St. Paul Avenue	0.6
	N. 27th Street	W. Fond du Lac Avenue to N. Teutonia Avenue	2.5
	STH 32 (N. Lake Drive)	E. Bradford Avenue to E. Kenwood Boulevard	0.9
	Subtotal		*6.2*
1988-1990	STH 32 (S. Chicago Avenue)	E. Forest Hill Avenue to E. College Avenue	2.8
	S. 27th Street	W. National Avenue to W. Lincoln Avenue	1.3
	E. Rawson Avenue	S. Howell Avenue to S. Nicholson Avenue	1.5
	USH 45	W. Loomis Road to Racine County line	1.6
	Subtotal		*7.2*
	Total		116.3

Note: This list includes staged improvements on facilities which will temporarily remain Type I (State Trunk) Highways until certain freeways are constructed.

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

Table 40
RECOMMENDED STAGING OF TYPE II (COUNTY TRUNK) ARTERIAL HIGHWAY SYSTEM IMPROVEMENTS IN MILWAUKEE COUNTY: 1969 to 1990

Period	Facility	Limits	Miles
1969-1970	S. 76th Street	W. Grange Avenue to W. Layton Avenue	1.0
	N. 91st Street	W. Appleton Avenue to W. Fond du Lac Avenue	1.1[a]
	Subtotal		*2.1*
1971-1975	W. Good Hope Road	N. 43rd Street to N. 76th Street	2.0
	W. Oklahoma Avenue	W. National Avenue to N. 76th Street	2.5
	E. College Avenue	S. Pennsylvania Avenue to S. Chicago Avenue	1.0
	E. Layton Avenue	S. Packard Avenue to S. Howell Avenue	2.5
	S. 76th Street	W. Lincoln Avenue to W. Greenfield Avenue	1.0
	N. 124th Street	W. North Avenue to W. Capitol Drive	1.0[b]
	W. Mill Road	N. 91st Street to N. 60th Street	2.0
	W. College Avenue	S. 27th Street to S. 20th Street	0.5
	W. Hampton Avenue	STH 100 to N. 92nd Street	1.3
	W. Appleton Avenue - W. Lisbon Avenue	W. Burleigh Street to W. North Avenue	1.4
	W. Burleigh Street	N. 60th Street to N. 43rd Street	1.0
	W. State Street	N. 76th Street to the Stadium Freeway	1.8
	W. State Street	N. 40th Street to N. 35th Street	0.3
	W. Burleigh Street - N. Hopkins Street	N. 27th Street to N. Teutonia Avenue	1.0
	Subtotal		*19.3*

in Wisconsin. These powers are thoroughly discussed and illustrated in SEWRPC Planning Guide No. 2, Official Mapping Guide, February 1964. It is recommended that, upon adoption of the jurisdictional highway system plan by the Milwaukee County Board and endorsement by the state Highway Commission, the Milwaukee County Board, in cooperation with the ten cities and nine villages within Milwaukee County, adopt an Official Map, pursuant to Section 80.64 of the Wisconsin Statutes, encompassing all of the recommended Type I, state trunk, and Type II, county trunk, highway facilities shown on the recommended jurisdictional highway system plan and providing for the reservation of at least the right-of-way widths indicated on that plan. Such a County Official Map will serve to establish street and highway widths in excess of the widths in use and likewise to establish the location and width of proposed future arterial streets or highways. It is important to

Table 40 (continued)

1976-1980	S. 76th Street	W. Grange Avenue to W. Rawson Avenue	2.0
	W. Rawson Avenue	S. North Cape Road to USH 45	0.7
	E. and W. College Avenue	S. 13th Street to S. Pennsylvania Avenue	2.5
	W. Layton Avenue	S. 76th Street to W. Loomis Road	2.0
	S. Howell Avenue	E. Oklahoma Avenue to E. Lincoln Avenue	1.0
	W. National Avenue	W. Lincoln Avenue to W. Greenfield Avenue	2.3
	E. Oklahoma Avenue	S. Chase Avenue to S. Kinnickinnic Avenue	1.3
	W. Forest Home Avenue - S. Muskego Avenue	S. 27th Street to W. Lapham Street	1.2
	W. Lapham Street	S. 6th Street to S. Muskego Avenue	0.9
	W. Lincoln Avenue	S. 27th Street to S. 35th Street	0.5
	S. 76th Street	W. Greenfield Avenue to W. Blue Mound Road	1.3
	W. Lisbon Avenue - W. Walnut Street	Stadium Freeway to N. 11th Street	2.4
	E. and W. Walnut Street	N. 6th Street to N. Water Street	0.7
	W. North Avenue	N. Menomonee River Parkway to N. 49th Street	2.9
	E. Locust Street	N. Holton Street to N. Lake Drive	1.7
	W. Mill Road	N. 60th Street to N. Green Bay Avenue	2.7
	W. Good Hope Road	N. 76th Street to N. 107th Street	2.0
	N. 124th Street	W. Silver Spring Drive to W. Capitol Drive	0.9[b]
	N. and S. 124th Street	W. North Avenue to W. National Avenue	2.5[b]
	Subtotal		*31.5*
1981-1985	S. 76th Street	W. Rawson Avenue to W. Ryan Road	3.0
	S. 51st Street	W. Loomis Road to W. Ryan Road	5.4
	W. College Avenue	W. Loomis Road to S. 27th Street	2.2
	S. 27th Street	W. Loomis Road to the Airport Freeway	1.2
	E. Lincoln Avenue	S. Kinnickinnic Avenue to E. Bay Street	0.4
	E. Hampton Avenue	East of N. Port Washington Road to N. Santa Monica Boulevard	0.4
	W. Watertown Plank Road	STH 100 to N. 124th Street	1.0
	W. Watertown Plank Road	Zoo Freeway to N. 76th Street	1.5
	E. Silver Spring Drive	N. Port Washington Road to N. Lake Drive	0.6
	W. Mill Road	Waukesha County line to N. 91st Street	2.2
	N. 107th Street	W. Florist Avenue to W. Good Hope Road	1.5
	N. Green Bay Avenue	W. Silver Spring Drive to N. Teutonia Avenue	4.2
	W. County Line Road	USH 141 to N. 60th Street	1.5[b]
	S. 124th Street	W. Layton Avenue to W. National Avenue	1.0[b]
	N. 107th Street	W. Florist Avenue to W. Appleton Avenue	0.5
	Subtotal		*26.6*
1986-1990	E. and W. County Line Road	STH 32 (S. Chicago Road) to USH 45	5.5[b]
	S. 76th Street	W. Ryan Road to the Racine County line	2.0
	W. Forest Home Avenue	USH 45 to the Waukesha County line	2.8
	S. Howell Avenue	E. Ryan Road to the Racine County line	2.0
	W. Ryan Road	USH 45 to STH 100	1.8
	S. 27th Street	W. Layton Avenue to the Racine County line	8.0
	W. Layton Avenue	S. 108th Street to S. 84th Street	1.5
	W. Good Hope Road	N. 115th Street to the Waukesha County line	0.5
	N. 107th Street	W. Good Hope Road to the Ozaukee County line	3.0[b]
	W. County Line Road	N. 60th Street to the Waukesha County line	2.0[b]
	N. 124th Street	STH 145 to the Ozaukee County line	0.9[b]
	Subtotal		*30.0*
	Total		107.4

[a] *The mileage for the 1969-1970 improvements is not included in the total of 107.4 miles because action has already been taken to improve these facilities.*

[b] *Where a recommended improvement is to be made on a county boundary road, only one-half the mileage is shown.*

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

note, however, that, to become effective, such a County Map must be approved by the governing body of the municipality in which a mapped street or highway or any part thereof is located and, therefore, actually becomes a joint county and city or village map. It is, therefore, recommended that the governing bodies of the ten cities and nine villages within the county approve the County Map once prepared, in accordance with the adopted jurisdictional highway system plan.

It is further recommended that the County Official Map be augmented by the preparation and adoption of local official maps and ordinances, which would include, in addition to the recommended state and county mapped routes, all of the Type III, local trunk, highway facilities shown on the recommended jurisdictional highway system plan. In accordance with Section 62.23(6) of the Wisconsin Statutes, such official mapping may be supplemented in certain intensely developed areas by the establishment of building setback lines, pursuant to Section 62.23(11) of the Wisconsin Statutes, in order to protect portions of the recommended street and highway rights-of-way.

It is recommended that the planning agencies of all of the ten cities and nine villages within the county recommend to their respective governing bodies, pursuant to Section 236.45(4) of the Wisconsin Statutes, the adoption of the subdivision regulations similar to those contained in the SEWRPC Model Land Division Ordinance set forth in SEWRPC Planning Guide No. 1, Land Development Guide, November 1963, so as to assure dedication of required rights-of-way for the arterial streets and highways included on the recommended jurisdictional highway system plan. It is further recommended that the respective governing bodies adopt such ordinances or amendments thereto, pursuant to Section 236.45 of the Wisconsin Statutes.

Finally, it is recommended that the plan commissions of the ten cities and nine villages within the county formulate and recommend to their respective governing bodies new zoning ordinances or amendments to their existing ordinances, pursuant to Section 62.23(7) of the Wisconsin Statutes, to provide for traffic, parking, and access restrictions, exclusive highway service districts, sign controls, and conditional use regulations similar to those provided in the SEWRPC Model Zoning Ordinance, as set forth in SEWRPC Planning Guide No. 3, Zoning Guide, April 1964, and apply these provisions properly to the lands abutting the proposed Type I, II, and III arterial subsystems. It is further recommended that their respective governing bodies adopt such ordinances or amendments, pursuant to Section 62.23(7) of the Wisconsin Statutes.

SUMMARY

This chapter has set forth specific procedures for implementation of the recommended jurisdictional highway system plan. The most important of the recommended plan implementation actions are summarized in the following paragraphs by level of government concerned.

Federal Level

U. S. Department of Transportation, Bureau of Public Roads: It is recommended that the U. S. Department of Transportation, Bureau of Public Roads:

1. Acknowledge the recommended jurisdictional highway system plan for Milwaukee County and utilize the plan as a guide in the realignment of the various federal aid systems and in the administration and granting of federal aids for highway improvement within the county.

2. Cooperate in, and approve the adjustment of, the federal aid systems to the recommended jurisdictional highway system plan.

State Level

Highway Commission of the Wisconsin Department of Transportation, Division of Highways: It is recommended that the Highway Commission:

1. Endorse and integrate the recommended jurisdictional highway system plan into the state long-range highway system plan.

2. Seek, in cooperation with the Milwaukee County Board, realignment of the state trunk, county trunk, and federal aid systems to the recommended jurisdictional highway system plan.

3. Assume full operational and maintenance responsibilities for all state trunk highways within Milwaukee County.

4. Review the status of controlled-access highways within Milwaukee County and declare all such state trunk highways within

Milwaukee County as are found to meet the statutory requirements and provisions as controlled-access highways.

5. Proceed with right-of-way acquisition and facility construction to meet the staged facility completion dates included in the recommended jurisdictional highway system plan.

6. Adopt uniform construction aid formulae and policies for all state trunk highways consistent with similar formulae and policies for all county trunk highways in Milwaukee County.

Regional Level

Southeastern Wisconsin Regional Planning Commission: It is recommended that the Southeastern Wisconsin Regional Planning Commission act to formally adopt the recommended jurisdictional highway system plan as an integral part of the master plan for the Region, constituting an amendment to the regional transportation plan adopted by the Commission on December 1, 1966.

County Level

Milwaukee County Board: It is recommended that the Milwaukee County Board, upon recommendation of the Milwaukee County Highway Committee:

1. Adopt the recommended jurisdictional highway system plan as a guide to future highway facility development within the county.

2. Seek, in cooperation with the state Highway Commission, realignment of the state trunk, county trunk, and federal aid systems to the recommended jurisdictional highway system plan.

3. Assume full operational and maintenance responsibilities for all county trunk highways within Milwaukee County.

4. Review the status of controlled-access highways and declare all such county trunk facilities as are found to meet the statutory requirements and provisions as controlled-access highways.

5. Proceed with right-of-way acquisition and facility construction as necessary to meet the staged facility completion dates included in the recommended jurisdictional highway system plan.

6. Adopt uniform construction aid formulae and policies for all county trunk highways consistent with similar formulae and policies for state trunk highways in Milwaukee County.

7. Establish an Official Map including the proposed Type I, state trunk, highway and Type II, county trunk, highway facilities.

Milwaukee County Expressway and Transportation Commission: It is recommended that the Milwaukee County Expressway and Transportation Commission, upon approval of the recommended jurisdictional highway system plan by the Milwaukee County Board:

1. Adopt and integrate the recommended jurisdictional highway system plan into the county expressway plan.

Local Level

1. It is suggested that, to supplement recommended federal, state, regional, and county plan adoption actions, the ten city common councils and nine village boards within Milwaukee County act to adopt the recommended jurisdictional highway system plan as a guide to highway system development within their area of jurisdiction. It is further suggested that the respective local planning agencies adopt and integrate the recommended jurisdictional highway system plan into the local master plans and certify such adoption to their local governing body.

2. It is recommended that the ten city common councils and nine village boards within Milwaukee County act to approve a County Official Map prepared in conformance with the recommended jurisdictional highway system plan and establish local official maps including the proposed local trunk highway facilities.

3. It is recommended that the ten city common councils and nine village boards within Milwaukee County adopt, pursuant to the recommendation of their local planning agencies, subdivision control ordinances and zoning regulations necessary to assure the integrity of the recommended jurisdictional highway system plan.

In addition, it is recommended that the state Highway Commission and the Milwaukee County Board cooperatively sponsor state legislation to abolish the connecting street concept and assure the full continuity of state and county trunk highway systems through incorporated municipalities and seek and support national legislation establishing a true federal aid urban system providing federal aid for the improvement of the Type III, local trunk, highway system.

Chapter IX
SUMMARY AND CONCLUSIONS

INTRODUCTION

On December 1, 1966, the Southeastern Wisconsin Regional Planning Commission, pursuant to its statutory responsibilities and after four years of intensive study, adopted a comprehensive regional transportation plan for the seven-county Southeastern Wisconsin Region. On March 17, 1967, in accordance with its advisory role, the Commission certified this plan to the constituent counties, cities, villages, and towns, as well as to certain state and federal agencies for adoption and implementation. Subsequently, all of the counties concerned, as well as the state Highway Commission, adopted or endorsed the recommended transportation plan as a guide to the development of transportation facilities within the Region. The Milwaukee County Board of Supervisors adopted the plan on May 25, 1967, after careful consideration and upon the recommendation of the Milwaukee County Highway Committee and the Milwaukee County Park Commission. Southeastern Wisconsin thus became the first large urbanizing region in the United States to have completed and adopted an official transportation plan in accordance with the spirit and intent of the 1962 Federal Aid Highway Act.

The adopted regional transportation plan contains, as an integral element, a functional arterial street and highway system plan. This functional plan consists of recommendations concerning the general location, type, capacity, and service levels of the arterial street and highway facilities required to serve the rapidly developing Region to the year 1990. Except for freeways, however, the functional plan does not contain recommendations as to which levels and agencies of government should assume responsibility for the construction, operation, and maintenance of each of the various facilities included in the functional plan.

As a logical sequel to the adoption of the regional transportation plan, and as recommended in that plan, the Milwaukee County Board of Supervisors directed that the County Highway Committee, in cooperation with the U. S. Department of Transportation, Bureau of Public Roads; the State of Wisconsin Department of Transportation, Division of Highways; the Southeastern Wisconsin Regional Planning Commission; and the local units of government concerned, proceed with the conversion of the functional highway system plan contained within the adopted regional transportation plan to a jurisdictional plan. This plan would contain specific recommendations as to the level and agency of government which should assume responsibility for the construction, maintenance, and operation of each segment of the total arterial street and highway system within Milwaukee County. Such a plan would also contain concomitant recommendations for the realignment of the federal aid highway systems, as well as of the state and county trunk systems, and, if warranted, propose necessary or desirable changes in the various federal, state, and county highway aid formulae, policies, or programs.

Although implementation of the adopted regional transportation plan was an important reason for proceeding with the jurisdictional highway planning program, other equally important reasons existed. The jurisdictional highway planning effort was also required in order to: cope with the growing traffic demands within Milwaukee County; adjust the existing jurisdictional highway systems to changes in land use development along their alignment; re-establish an integrated county trunk highway system; and adjust the jurisdictional highway systems to better serve the major changes in traffic patterns within the county that have resulted from freeway construction and use.

Accordingly, an interagency study staff, consisting of planning and engineering personnel drawn from the Wisconsin Department of Transportation, Divisions of Highways and Planning; Milwaukee County Department of Public Works; and the Southeastern Wisconsin Regional Planning Commission, was organized to carry out the necessary jurisdictional highway planning effort. Because any realignment of the existing jurisdictional highway systems would affect the local units of government within the county in many ways, it was considered essential to involve actively these local units of government in the planning process. This was done by the formation of a Technical

Advisory Committee on Jurisdictional Highway System Planning, with representation from the U. S. Department of Transportation, Bureau of Public Roads; the Wisconsin Department of Transportation, Division of Highways; the Southeastern Wisconsin Regional Planning Commission; the Milwaukee County Department of Public Works; the Cities of Milwaukee, Wauwatosa, and West Allis; two representatives from the North Shore communities of Shorewood, Whitefish Bay, Glendale, Fox Point, Bayside, River Hills, and Brown Deer; and two representatives from the South Shore communities of St. Francis, Cudahy, South Milwaukee, Franklin, Greenfield, Greendale, Oak Creek, Hales Corners, and West Milwaukee.

STUDY PURPOSE AND PLAN OBJECTIVES

The primary purpose of the jurisdictional highway planning study was to identify and subsequently group into subsystems classes of arterial streets and highways serving similar functions and providing similar levels of service and, further, to assign jurisdictional responsibility over the subsystems so established to the appropriate level of government having the greatest basic interest. This was intended to achieve the following objectives:

1. Promote implementation of the adopted regional transportation plan.
2. Provide a sound basis for the efficient multi-jurisdictional management of the total arterial street and highway system and for the attainment of the necessary intergovernmental coordination in that management.
3. Provide a sound basis for the efficient design and improvement of the total arterial system by combining into subsystems those facilities which, because of the type and level of service provided, should have similar standards for design, construction, operation, and maintenance.
4. Provide a basis for the establishment of a sound long-range fiscal policy and for the systematic programming of arterial street and highway improvements and thereby to assure the most effective use of the public resources in the provision of highway transportation, focusing the appropriate resources and capabilities in corresponding areas of need.
5. Provide a basis for the more equitable distribution of highway system development costs and revenues among the levels and agencies of government concerned.

THE JURISDICTIONAL HIGHWAY PLANNING PROCESS

The singularly most important basic concept underlying the jurisdictional highway planning process applied in Milwaukee County was that the jurisdictional highway planning process must be preceded by, and grow out of, a functional highway planning process; that is, that a jurisdictional highway system plan must be based upon, and derived from, a prior functional highway system plan. The development of a sound and viable jurisdictional highway system plan, therefore, can properly proceed only within the context of a comprehensive, areawide transportation planning process which has identified the transportation needs of the entire urbanizing region to a selected design year and which has provided definitive recommendations for meeting those needs through the improvement of both arterial highway and mass transit facilities in the form of a functional transportation plan.

Based upon this basic concept, a seven-step planning process was employed in the development of a jurisdictional highway system plan for Milwaukee County: 1) study design; 2) formulation of objectives and standards; 3) inventory of existing systems, aid formulae, and financial resources; 4) jurisdictional systems analyses; 5) plan design; 6) plan test and evaluation; and 7) plan adoption. One of the most important steps in this process was the formulation of a set of criteria which could be used as a basis for the objective and rational assignment of jurisdictional responsibility to the various facilities comprising the total arterial street and highway system. Functional variations within the total system provided the basis for the establishment of the criteria.

Since three levels of government—state, county, and local—have direct responsibilities for the planning, design, construction, operation, and maintenance of highway facilities within southeastern Wisconsin, criteria were prepared to classify all segments of the total arterial street and highway systems into three subsystems: Type I, state trunk, highway facilities; Type II, county trunk, highway facilities; and Type III, local trunk, highway facilities. The Type I, state trunk, highway facilities include all those routes which are

intended to provide the highest level of traffic mobility; that is, the highest speeds and lowest degree of traffic congestion, the minimum degree of land-access service, and which must have regional or inter-regional continuity. The Type II, county trunk, highway facilities include all those routes which are intended to provide an intermediate level of traffic mobility, an intermediate level of land-access service, and which must have intercommunity system continuity. The Type III, local trunk, highway facilities include all those routes which are intended to provide the lowest level of arterial traffic mobility, the highest degree of arterial land-access service, and which must possess intra-community continuity.

The criteria deemed most significant to a functional subclassification of the total arterial system were related to three basic characteristics of the facilities: 1) the trips served, 2) the land uses served, and 3) the operational characteristics of the facilities themselves. Detailed criteria related to each of these basic characteristics were prepared as a part of the jurisdictional highway planning study and have been fully described in Chapter IV of this report.

The criteria were applied to the total arterial street and highway system for Milwaukee County, as proposed in the adopted regional transportation plan, and subsequently refined through a careful review of the arterial network by experienced public works engineers responsible for the design, construction, operation, and maintenance of arterial highway facilities within the county. The application of the criteria required a careful analysis of the trip lengths and traffic volumes to be served by each link in the total arterial system, an inventory of the land uses to be served by each of the jurisdictional subsystems, and an investigation of the operational characteristics of the arterial facilities themselves. This application has been fully described in Chapter V of this report.

PRESENT STATE OF THE JURISDICTIONAL HIGHWAY SYSTEMS

The study found that as of January 1, 1967, there were a total of 2,513 miles of streets and highways open to traffic within Milwaukee County. Of this total, 672 miles, or approximately 27 percent, comprised the functional arterial street and highway network. Responsibility for the design, construction, operation, and maintenance of this arterial street and highway network rested with three levels and 21 units of government—the state, the county, and 19 local municipalities. Approximately 235 miles, or 35 percent, of the arterial network were under state jurisdiction, being comprised of interstate highways, state trunk highways, and connecting streets. About 77 miles, or 11 percent, were under county jurisdiction, being comprised of county trunk highways; and about 360 miles, or 54 percent, were under city and village jurisdiction, being comprised of local arterial streets and highways.

Superimposed on the state, county, and local trunk highways were 356 miles of federal aid routes, of which about 36 miles, or 10 percent, consisted of federal aid interstate routes; 179 miles, or 50 percent, of federal aid primary routes; and 141 miles, or 40 percent, of federal aid secondary routes.

The location and configuration of these jurisdictional highway systems and supporting aid routes were the result of a long process of historic evolution influenced by many complex, political, administrative, financial, and engineering considerations and constraints. The state trunk and county trunk networks were originally conceived by the State Legislature as integrated highway systems and were originally so delineated and mapped. The state trunk highway network, however, was last studied and revised as an integrated system by the State Legislature in 1923; the county trunk systems, by the state Highway Commission and the Milwaukee County Board in 1925. Many piecemeal additions and deletions have been made to these two jurisdictional highway networks since 1925. Consequently, these two important networks no longer represent fully integrated, continuous arterial highway systems capable of serving in the most efficient manner possible the areawide land use and traffic service functions originally intended. Moreover, since the federal aid highway networks are intended to assist in implementing the state and county trunk highway systems and, therefore, reflect the pattern of these systems, these federal aid networks were also found to be in need of revision.

It was, therefore, considered most appropriate at this time to study and analyze the jurisdictional highway systems within Milwaukee County and, guided by the functional transportation system plan prepared by the Southeastern Wisconsin Regional Planning Commission and endorsed by the state Highway Commission and adopted by the

Milwaukee County Board, to recommend changes necessary to reclassify and regroup these networks into complete, fully coordinated, and continuous systems able to meet the present and expected future arterial highway traffic demands within Milwaukee County at an adequate level of service.

THE RECOMMENDED PLAN

The jurisdictional highway system plan prepared for Milwaukee County provides for three jurisdictional highway systems—Type I, state trunk; Type II, county trunk; and Type III, local trunk—which together, comprise the total arterial street and highway system required to serve the growing travel demands within Milwaukee County and its constituent cities and villages to the plan design year of 1990. Thus, the recommended jurisdictional highway system plan recommends an alignment of governmental responsibility for each of the various facilities comprising the total arterial street and highway system in the design year. The recommended plan also constitutes a refinement of the functional arterial street and highway system plan prepared by the Southeastern Wisconsin Regional Planning Commission and, as such, is intended upon its adoption to constitute a functional, as well as a jurisdictional, highway system plan for Milwaukee County to the design year of 1990. As a functional plan, the plan recommends minimum cross sections having right-of-way and pavement widths adequate to serve the forecast traffic demand at a desirable level of service while meeting state and regional transportation system development objectives.

Type I, State Trunk, Highway System

The arterial street and highway system recommended to serve the growing traffic demand within Milwaukee County through the design year 1990 totals approximately 771 route miles of facilities, or about 22 percent of the estimated 3,582 route miles of facilities expected to comprise the total street and highway system within the county in 1990. Of this total arterial system, 220 route miles, or about 28 percent, are proposed to comprise the Type I, or state trunk, system, a reduction of 15 route miles over the present system. This Type I system may be expected to carry approximately 65 percent of the arterial travel demand and approximately 56 percent of the total travel demand expected to be generated within Milwaukee County by the year 1990. The Type I system, as recommended, includes all of the committed and proposed freeway facilities within the county, as well as certain important surface arterials and, as such, comprises the basic framework of the total highway transportation system in the county.

Type II, County Trunk, Highway System

The recommended plan further proposes a Type II, county trunk, highway system consisting of 217 route miles, or an additional 28 percent, of the total arterial mileage required to serve the county in the plan design year of 1990. This Type II system represents an increase of 141 route miles over the present system and is intended to complement the recommended Type I, state trunk, highway system and, together with that system, to include all major arterial facilities having areawide significance. The county trunk highway system may be expected to carry 21 percent of the arterial travel demand and 18 percent of the total travel demand expected to be generated within Milwaukee County by the year 1990.

Type III, Local Trunk, Highway System

Finally, the plan recommends a Type III, or local trunk, highway system consisting of the remaining 333 route miles of arterial facilities, or about 43 percent of the total arterial mileage proposed to serve Milwaukee County in the plan design year 1990. This Type III system, comprising an integral part of the total arterial street and highway system, represents a reduction of 27 route miles over the present system and is intended to serve primarily local arterial street and highway needs.

Financial Feasibility

In order to determine the practicality and acceptability of the recommended jurisdictional highway system plan, a careful analysis was made of the financial feasibility of the plan. Total plan construction and maintenance costs were estimated and compared to anticipated revenues over a 20-year plan implementation period. As a necessary part of this analysis, the existing structure of highway revenues and expenditures was carefully examined and construction and maintenance formulae and policies analyzed. The analysis indicated that the recommended plan is financially feasible. Total plan implementation costs, including construction and maintenance of collector and minor land-access, as well as of arterial, facilities was estimated at $1.064 billion over the 20-year plan implementation period.

It is extremely difficult to forecast the revenues which may become available for highway purposes over the 20-year plan implementation period. This difficulty is due not only to the length of the forecast period involved and the unpredictable changes which may occur during this period, in such important factors affecting highway revenues as the general level of economic activity, but also to major changes in the structure of highway aid formulae which will come about upon expiration of the massive interstate highway construction program. Utilizing rate of expenditure for highway purposes within Milwaukee County over the recent past, however, anticipated revenues for highway purposes over the plan implementation period were estimated at $1.329 billion. This leaves $265 million for other street and highway purposes, such as: mass transit system development, the construction of the proposed Milwaukee River Parkway, landscaping and beautification programs, safety improvement programs, automated and computerized traffic operation, communication and control systems, lighting, parking, and administrative costs, none of which could, as a practical matter, be included in the plan implementation cost estimates. It should be further noted in this respect that the expenditures for highway purposes within Milwaukee County over the past five years, used to estimate future revenues, were high due to an accelerated freeway construction program. It should be noted in this connection that, if the anticipated revenues are to be actually received over the plan implementation period, the Federal Government will either have to continue to participate in the financing of freeway construction as it has in the past, that is, to the extent of 90 percent of the cost of some new freeways as under the interstate highway construction program, or additional federal aids equivalent to those expended on freeway construction within the county over the recent past will have to be made available and reallocated for the improvement of surface arterials on the federal aid primary and secondary systems.

It should also be noted that the financial analysis indicates that the plan is feasible, considering the county as a whole. Some apparent disparity in the distribution of resources may exist within the individual municipalities comprising the county, but these would relate primarily to the Type III arterial system. In order to assist the individual municipalities in reviewing the financial feasibility of the recommended plan at the local level, the local share of the construction and maintenance costs has been set forth in Appendix Table A-1. This table is intended to provide a point of departure for the development of detailed capital improvements programs related to street and highway system development within each of the municipalities comprising the county.

The financial analysis also carefully explored the effect of the changes in the jurisdictional highway systems on supplemental aids and allotments, as well as on other construction and maintenance aids, and incorporated two major recommended revisions of the aid structure. These two revisions, namely, the abandonment of the connecting street concept and the adoption of common, uniform construction aid formulae and policies for state and county trunk highways, were recommended in order to meet certain basic objectives of the jurisdictional highway planning effort.

Implementing Recommendations

Specific procedures for implementation of the recommended jurisdictional highway system plan have been set forth in Chapter VIII of this report. The most important of these include formal plan adoption by the Milwaukee County Board and by the Southeastern Wisconsin Regional Planning Commission and endorsement by the Highway Commission of the Wisconsin Division of Highways; realignment of the state trunk, county trunk, and federal aid systems to conform with the recommended jurisdictional highway system plan through the cooperative actions of the Milwaukee County Board, Highway Commission, and the U. S. Bureau of Public Roads; assumption of full operational and maintenance responsibilities by the state for all state trunk highways and by the county for all county trunk highways; integration of the recommended plan into the construction, planning, and programming procedures of both the Highway Commission and the Milwaukee County Department of Public Works; and adoption of common, uniform construction aid formulae and policies for all state and county trunk highways within Milwaukee County. Additional recommendations include the establishment of an Official Map for the protection of the rights-of-way of all Type I, state trunk, and Type II, county trunk, highway facilities through the cooperative action of the Milwaukee County Board and the governing bodies of the 19 municipalities comprising the County.

It was also recommended that the Highway Commission and the Milwaukee County Board cooperatively sponsor state legislation to abolish the

connecting street concept and assure the full continuity of the state and county trunk highway systems through incorporated municipalities and cooperatively seek national legislation establishing a true federal aid urban system providing federal aid for the improvement of the Type III, local trunk, highway system.

CONCLUSION

Adoption and implementation of the jurisdictional highway system plan recommended in this report would provide the county with an integrated highway transportation system which will effectively serve and promote a desirable land use pattern, meet the anticipated future travel demand at an adequate level of service, abate traffic congestion, reduce travel time and costs between component parts of the Region, and reduce accident exposure. It would serve to concentrate appropriate resources and capabilities on corresponding areas of need, assuring a more effective use of the total public resources in the provision of highway transportation, and provide a sound basis for the establishment of long-range fiscal policies and for the systematic programming of arterial street and highway improvements within Milwaukee County. It would also provide a basis for the more efficient planning and design of the total arterial street and highway system, for the efficient multi-jurisdictional management of that system, and for the attainment of intergovernmental coordination necessary to the cooperative development of the system. Finally, it should provide a more equitable distribution of highway improvement, maintenance, and operating costs among the various levels and agencies of government concerned.

APPENDICES

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Appendix A

MILWAUKEE COUNTY JURISDICTIONAL HIGHWAY STUDY

INTRODUCTION

The recommended jurisdictional highway system plan for Milwaukee County is depicted on Map 23, the large fold-out map contained in the pocket attached to the back cover of this report. This plan map, as a jurisdictional highway system plan, recommends an alignment of governmental responsibilities for each of the various facilities comprising the total arterial street and highway system in the plan design year. This plan map, however, is also intended to constitute a functional, as well as a jurisdictional, arterial street and highway system plan for Milwaukee County to the design year 1990. The purpose of this Appendix is to explain the rather complex legend used to graphically summarize on Map 23 both the salient jurisdictional and functional recommendations of the plan.

JURISDICTIONAL CODE

The plan map depicts the recommended jurisdictional classification by color code, namely: all state trunk highways are shown by red, all county trunk highways are shown by blue, and all local trunk highways are shown by green bands.

EXPLANATION OF PLAN MAP LEGEND

The functional plan recommendations, which include the proposed type of improvement, the cross section required to provide the necessary traffic capacity, and the link of the total arterial highway system, are indicated by a three-place code, consisting of two digits and a letter. The first digit of the code identifies the proposed type of improvement recommended for each link of the total arterial highway system by 1990, as follows:

Code Number	Type of Improvement
1	Resurfacing Only
2	Construction of New Facility
3	Reconstruction with Same Capacity
4	Reconstruction for Additional Capacity
5	Special Facilities (Major Bridges) (●)
6	No Work Required

The second digit of the code assigns to each link in the total arterial highway system one of nine typical arterial cross sections recommended to carry the 1990 forecast traffic volumes. The nine typical cross sections are depicted on the following pages of this Appendix and are identified on the map by a code number as follows:

Code Number	Typical Cross Section
1	Two-Lane Arterial (Minimum)
2	Two-Lane Arterial (Desirable)
3	Four-Lane Arterial (Minimum)
4	Four-Lane Arterial (Desirable)

5	Six-Lane Arterial (Minimum)
6	Six-Lane Arterial (Desirable)
7	Four-Lane Freeway (Desirable)
8	Six-Lane Freeway (Desirable)
9	Eight-Lane Freeway (Desirable)

In addition, typical cross sections are included for collector streets and minor streets, primarily for use in preparing cost estimates for the construction and improvement of these local facilities.

Typical Cross Section for Collector Street

Typical Cross Section for Minor Street

The cross sections carry with them a recommended right-of-way width, a recommended pavement width and concomitant unit construction costs, annual unit maintenance costs, unit resurfacing costs, and a capacity range for levels of Service A, B, C, D, E, and F. Only levels C, D, and E were used in the plan.

The letter following the first two digits of the code identified the level of service at which each link in the total arterial highway system can be expected to operate in 1990, if improved to the recommended cross section, as follows[1]:

Letter Code	Level of Service
A	Level of Service A describes a condition of free flow, with low volumes and high speeds. Traffic density is low, with speeds controlled by driver desires, speed limits, and physical roadway conditions. There is little or no restriction in maneuverability due to the presence of other vehicles, and drivers can maintain their desired speeds with little or no delay.
B	Level of Service B is in the zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation. Reductions in speed are not unreasonable, with a low probability of traffic flow being restricted. The lower limit (lowest speed, highest volume) of this level of service has been associated with service volumes used in the design of rural highways.
C	Level of Service C is still in the zone of stable flow, but speeds and maneuverability are more closely controlled by the higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass. A relatively satisfactory operating speed is still obtained, with service volumes perhaps suitable for urban design practice.

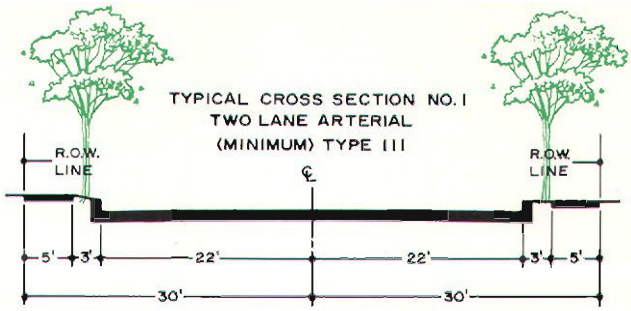
[1] *See Highway Research Board Special Report 87, Highway Capacity Manual 1965, pages 78-81.*

D — Level of Service D approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver, and comfort and convenience are low, but conditions can be tolerated for short periods of time.

E — Level of Service E cannot be described by speed alone, but represents operations at even lower operating speeds than in level D, with volumes at or near the capacity of the highway. At capacity, speeds are typically, but not always, in the neighborhood of 30 mph. Flow is unstable, and there may be stoppages of momentary duration.

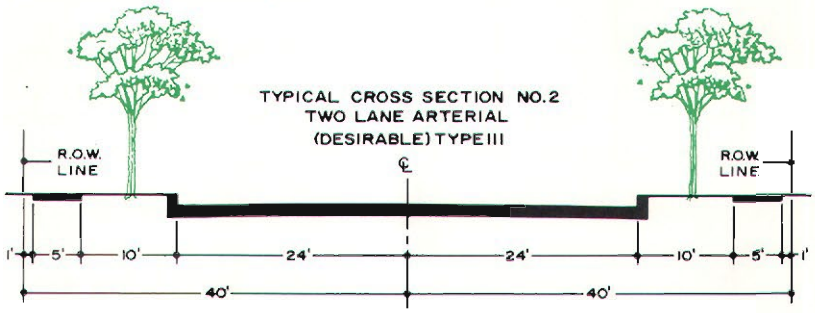
F — Level of Service F describes forced flow operation at low speeds, where volumes are below capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. The section under study will be serving as a storage area during parts or all of the peak hour. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of the downstream congestion. In the extreme, both speed and volume can drop to zero.

Figure A-1
TYPICAL URBAN STREET AND HIGHWAY CROSS SECTIONS



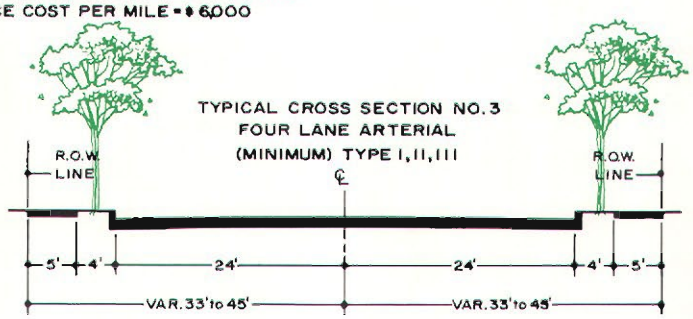
6" GRAVEL BASE
44' HIGH TYPE PAVEMENT
60' R.O.W.
ESTIMATED CONSTRUCTION COST PER MILE = $360,000
ANNUAL MAINTENANCE COST PER MILE = $ 6,000

ESTIMATED COST PER MILE (RESURFACE) = $ 28,700
CAPACITY RANGE: LEVEL OF SERVICE C 8,600-9,400 VEH./DAY
D 9,400-10,800 VEH./DAY
E 10,800-12,000 VEH./DAY



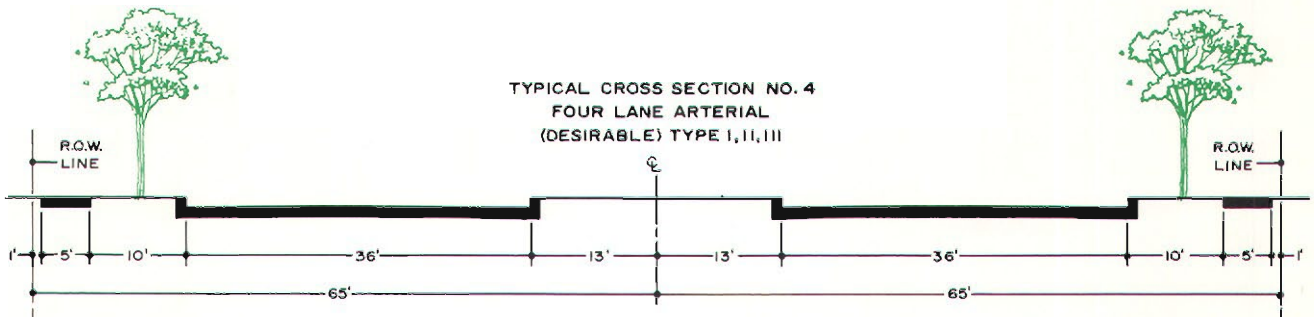
6" GRAVEL BASE
48' HIGH TYPE PAVEMENT
80' R.O.W. (ADDITIONAL R.O.W. MAY BE RESERVED IN UNDEVELOPED AREAS)
ESTIMATED CONSTRUCTION COST PER MILE = $ 560,000
ANNUAL MAINTENANCE COST PER MILE = $ 6,000

ESTIMATED COST PER MILE (RESURFACE) = $ 31,000
CAPACITY RANGE: LEVEL OF SERVICE C 10,400-11,400 VEH./DAY
D 11,400-13,000 VEH./DAY
E 13,000-14,400 VEH./DAY



6" GRAVEL BASE
48' HIGH TYPE PAVEMENT
66'-90' R.O.W.
ESTIMATED CONSTRUCTION COST PER MILE = $ 420,000
ANNUAL MAINTENANCE COST PER MILE = $ 6,000

ESTIMATED COST PER MILE (RESURFACE) = $ 31,000
CAPACITY RANGE: LEVEL OF SERVICE C 15,000-16,600 VEH./DAY
D 16,600-18,900 VEH./DAY
E 18,900-21,000 VEH./DAY



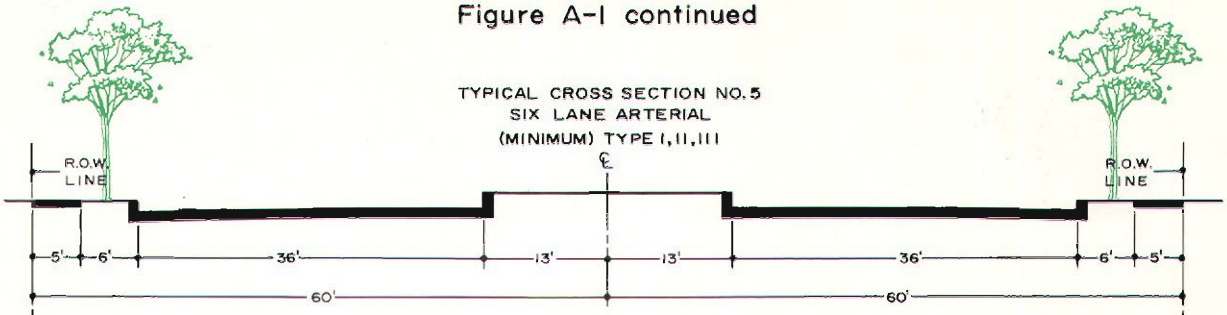
6" GRAVEL BASE
DUAL 36' HIGH TYPE PAVEMENT
130' R.O.W.
ESTIMATED CONSTRUCTION COST PER MILE = $ 1,120,000
ANNUAL MAINTENANCE COST PER MILE = $ 9,000

ESTIMATED COST PER MILE (RESURFACE) = $ 46,500
CAPACITY RANGE: LEVEL OF SERVICE C 15,800-17,400 VEH./DAY
D 17,400-19,800 VEH./DAY
E 19,800-22,000 VEH./DAY

Source: SEWRPC

Figure A-1 continued

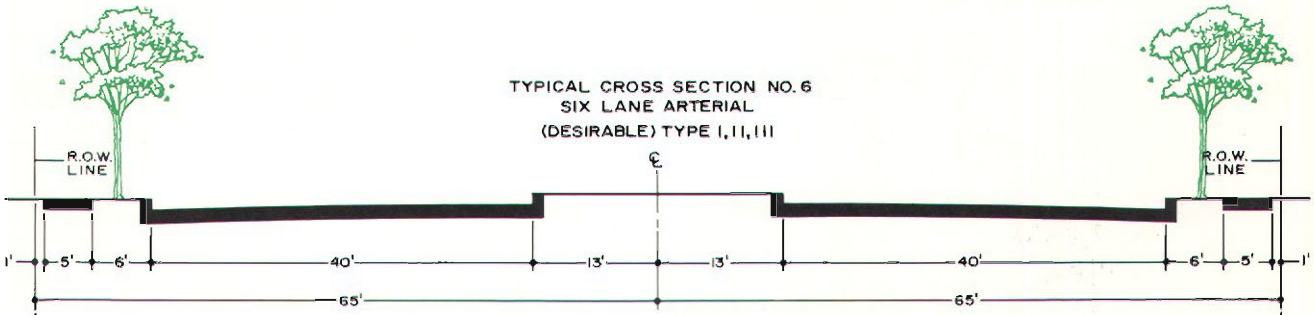
TYPICAL CROSS SECTION NO. 5
SIX LANE ARTERIAL
(MINIMUM) TYPE I, II, III



6" GRAVEL BASE
DUAL 36' HIGH TYPE PAVEMENT
120' R.O.W.
ESTIMATED CONSTRUCTION COST PER MILE = $940,000
ANNUAL MAINTENANCE COST PER MILE = $12,000

ESTIMATED COST PER MILE (RESURFACE) = $46,500
CAPACITY RANGE: LEVEL OF SERVICE C 23,300-25,700 VEH./DAY
D 25,700-29,200 VEH./DAY
E 29,200-32,500 VEH./DAY

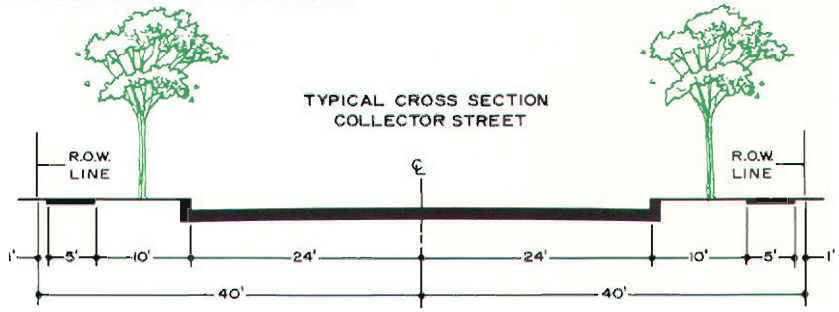
TYPICAL CROSS SECTION NO. 6
SIX LANE ARTERIAL
(DESIRABLE) TYPE I, II, III



6" GRAVEL BASE
DUAL 40' HIGH TYPE PAVEMENT
130' R.O.W.
ESTIMATED CONSTRUCTION COST PER MILE = $1,170,000
ANNUAL MAINTENANCE COST PER MILE = $12,000

ESTIMATED COST PER MILE (RESURFACE) = $51,700
CAPACITY RANGE: LEVEL OF SERVICE C 26,100-28,700 VEH./DAY
D 28,700-32,500 VEH./DAY
E 32,500-36,300 VEH./DAY

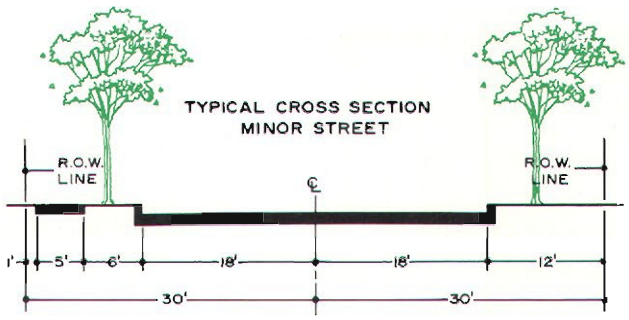
TYPICAL CROSS SECTION
COLLECTOR STREET



6" GRAVEL BASE
48' HIGH TYPE PAVEMENT
80' R.O.W.

ESTIMATED CONSTRUCTION COST PER MILE: $360,000
ANNUAL MAINTENANCE COST PER MILE = $5,900 (AV.)
ESTIMATED COST PER MILE (RESURFACE) = $25,000

TYPICAL CROSS SECTION
MINOR STREET



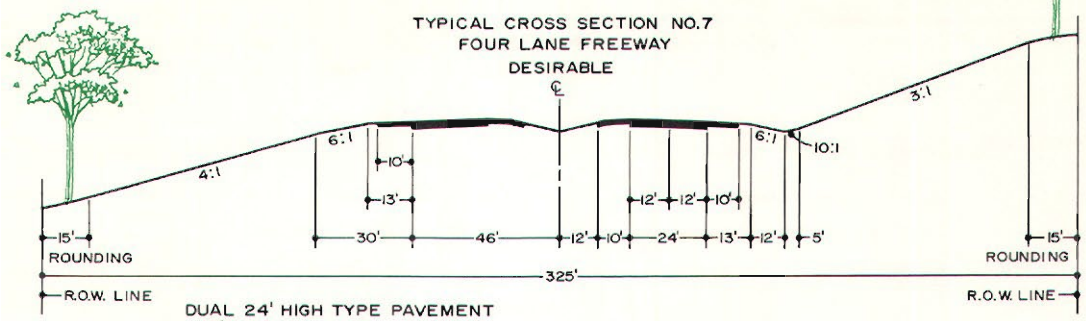
6" GRAVEL BASE
36' HIGH TYPE PAVEMENT
60' R.O.W.

ESTIMATED CONSTRUCTION COST PER MILE = $ 280,000
ANNUAL MAINTENANCE COST PER MILE = $3,900 (AV.)
ESTIMATED COST PER MILE (RESURFACE) = $18,750

Source: SEWRPC

Figure A-1 continued

TYPICAL CROSS SECTION NO. 7
FOUR LANE FREEWAY
DESIRABLE

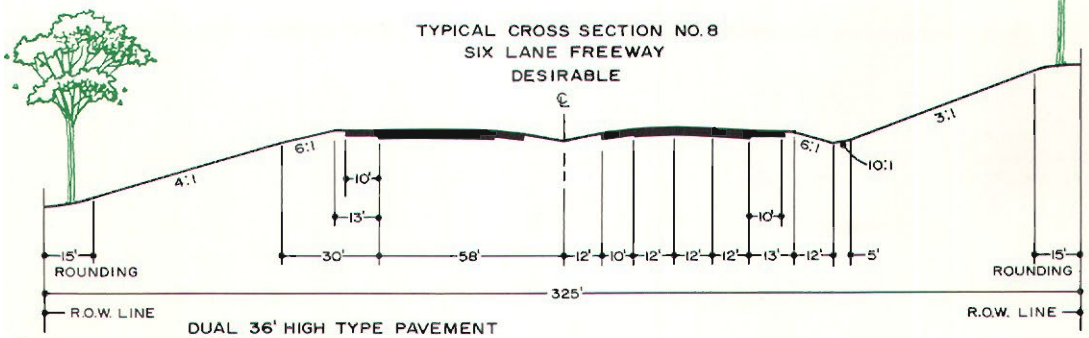


DUAL 24' HIGH TYPE PAVEMENT
325' R.O.W.
ESTIMATED CONSTRUCTION COST PER MILE:

	R.O.W.	CONSTRUCTION	TOTAL
DEVELOPED AREA	$3,000,000	$2,500,000	$5,500,000
UNDEVELOPED AREA	$ 750,000	$1,750,000	$2,500,000

ANNUAL MAINTENANCE COST PER MILE = $14,000
ESTIMATED COST PER MILE (RESURFACE) = $31,000
CAPACITY: LEVEL OF SERVICE: C 55,000 VEH./DAY

TYPICAL CROSS SECTION NO. 8
SIX LANE FREEWAY
DESIRABLE

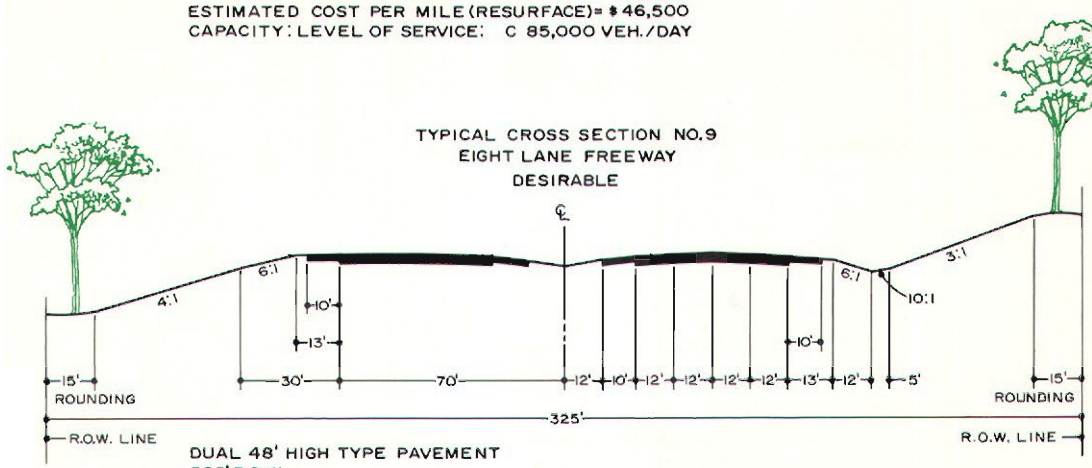


DUAL 36' HIGH TYPE PAVEMENT
325' R.O.W.
ESTIMATED CONSTRUCTION COST PER MILE:

	R.O.W	CONSTRUCTION	TOTAL
DEVELOPED AREA	$3,000,000	$3,500,000	$6,500,000
UNDEVELOPED AREA	$ 750,000	$2,000,000	$2,750,000

ANNUAL MAINTENANCE COST PER MILE = $20,000
ESTIMATED COST PER MILE (RESURFACE) = $46,500
CAPACITY: LEVEL OF SERVICE: C 85,000 VEH./DAY

TYPICAL CROSS SECTION NO. 9
EIGHT LANE FREEWAY
DESIRABLE



DUAL 48' HIGH TYPE PAVEMENT
325' R.O.W.
ESTIMATED CONSTRUCTION COST PER MILE:

	R.O.W.	CONSTRUCTION	TOTAL
DEVELOPED AREA	$3,000,000	$4,500,000	$7,500,000

ANNUAL MAINTENANCE COST PER MILE = $23,000
ESTIMATED COST PER MILE (RESURFACE) = $63,000
CAPACITY: LEVEL OF SERVICE: C 115,000 VEH./DAY

Source: SEWRPC

Table A-1

CONSTRUCTION AND MAINTENANCE COST ESTIMATES FOR MILWAUKEE COUNTY JURISDICTIONAL HIGHWAY PLAN FOR EACH MUNICIPALITY

Municipality	Construction							Total Construction
	Arterial			Other				
				New		Existing		
	Type I (Non-Freeway)	Type II	Type III	Collector	Minor[a]	Collector	Minor	
Bayside	$ 8,206	$ --	$ 28,520	$ 180,000	$ 728,000	$ 263,500	$ 515,000	$ 1,723,226
Brown Deer	57,588	179,670	1,910,430	360,000	3,752,000	451,800	901,600	7,613,088
Cudahy	12,695	271,468	6,531,000	396,000	4,172,000	476,900	949,200	12,809,263
Fox Point	10,461	--	1,450,400	--	504,000	405,365	812,000	3,182,226
Franklin	1,998,360	4,024,890	8,536,800	6,480,000	66,836,000	683,975	1,372,000	89,932,025
Glendale	--	420,831	2,492,490	360,000	3,864,000	519,570	1,043,000	8,699,891
Greendale	--	587,782	1,892,800	792,000	8,092,000	554,710	1,113,000	13,032,292
Greenfield	15,415	875,238	8,366,640	1,332,000	13,832,000	908,620	1,824,480	27,154,393
Hales Corners	10,463	20,925	1,450,400	180,000	1,456,000	391,560	785,960	4,295,308
Milwaukee	2,069,390	6,205,598	54,512,619	7,596,000	78,512,000	12,550,000	25,163,040	186,608,647
Oak Creek	676,620	2,557,446	25,306,000	5,580,000	57,456,000	539,500	1,073,800	93,189,366
River Hills	335,205	99,375	1,674,400	360,000	3,052,000	163,150	335,720	6,019,850
St. Francis	67,541	38,076	3,788,730	360,000	2,520,000	213,350	440,520	7,428,217
Shorewood	12,485	--	752,029	--	28,000	301,200	594,160	1,687,874
South Milwaukee	236,106	85,950	4,877,389	360,000	2,632,000	614,950	1,228,920	10,035,315
Wauwatosa	93,926	2,244,381	3,969,303	756,000	7,364,000	1,631,500	3,268,160	19,327,270
West Allis	234,825	1,310,670	7,780,585	432,000	4,284,000	1,669,150	3,343,760	19,054,990
West Milwaukee	3,534	2,093	193,988	--	280,000	100,400	198,240	778,255
Whitefish Bay	12,327	34,327	710,810	--	112,000	389,050	793,240	2,051,754
Subtotal	*$ 5,855,147*	*$18,958,720*	*$136,225,333*	*$ 25,524,000*	*$259,476,000[a]*	*$22,828,250*	*$ 45,755,800*	*$ 514,623,250*
Milwaukee County		$44,237,200						$ 44,237,200
Total	$ 5,855,147	$63,195,920	$136,225,333	$ 25,524,000	$259,476,000	$22,828,250	$ 45,755,800	$ 558,860,450

[a]*Cost shown is the total cost of construction. Plan implementation costs set forth in Chapter VII include only 15 percent of this total, it being assumed that 85 percent of the total cost will be borne by private land developers.*

Table A-1 (continued)

Municipality	Maintenance							Total Maintenance	Total Construction and Maintenance
	Arterial			Other					
				New		Existing			
	Type I (Non-Freeway)	Type II	Type III	Collector	Minor	Collector	Minor		
Bayside			$ 110,400	$ 55,905	$ 129,196	$ 313,068	$ 1,835,570	$ 2,444,139	$ 4,167,365
Brown Deer			559,200	61,230	364,614	293,904	1,752,324	3,031,272	10,644,360
Cudahy			1,408,800	81,114	488,273	373,616	2,221,806	4,573,609	17,382,872
Fox Point			310,800	--	52,686	283,659	1,697,660	2,344,805	5,527,031
Franklin			1,664,400	782,730	4,614,071	315,991	1,894,340	9,271,532	99,203,557
Glendale			862,800	93,225	571,734	514,602	3,086,535	5,128,896	13,828,787
Greendale			527,400	94,446	551,412	253,001	1,516,860	2,943,119	15,975,411
Greenfield			1,690,800	179,987	1,068,028	469,586	2,817,519	6,225,920	33,380,313
Hales Corners			295,200	27,743	128,232	230,818	1,384,413	2,066,406	6,361,714
Milwaukee			24,850,200	2,258,861	13,341,432	14,274,000	85,518,389	140,242,882	326,851,529
Oak Creek			4,467,600	1,070,430	6,297,588	395,944	2,353,923	14,585,485	107,774,851
River Hills			358,800	87,300	422,920	151,320	1,031,304	2,051,644	8,071,494
St. Francis			852,000	74,775	299,160	169,490	1,036,423	2,431,848	9,860,065
Shorewood			410,400	--	3,091	222,576	1,311,820	1,947,887	3,635,761
South Milwaukee			1,277,400	62,550	261,320	408,660	2,440,284	4,450,214	14,485,529
Wauwatosa			2,053,800	110,156	613,053	909,220	5,441,486	9,127,715	28,454,985
West Allis			2,674,200	86,850	492,048	1,283,450	7,681,094	12,217,642	31,272,632
West Milwaukee			411,600	--	52,930	127,024	749,489	1,341,043	2,119,298
Whitefish Bay			370,800	--	11,620	270,196	1,645,973	2,298,589	4,350,343
Subtotal			*$45,156,600*	*$5,127,302*	*$29,763,408*	*$21,260,125*	*$127,417,212*	*$228,724,647*	*$743,347,897*
Milwaukee County		$39,901,100						$ 39,901,100	$ 84,138,300
Total		$39,901,100	$45,156,600	$ 5,127,302	$29,763,408	$21,260,125	$127,417,212	$268,625,747	$827,486,197

Source: Milwaukee County, Wisconsin Department of Transportation, and SEWRPC.

MEMBERSHIP OF THE TECHNICAL COORDINATING AND ADVISORY COMMITTEE
FOR JURISDICTIONAL HIGHWAY PLANNING IN MILWAUKEE COUNTY

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Roger Harris . . . . . Director of Public Works, City of Cudahy

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James E. Meier . . . . . Regional Engineer, Division of Highways, Wisconsin Department of Transportation

Robert H. Paddock . . . . . Division Engineer, Bureau of Public Roads, U. S. Department of Transportation

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Gerald Schwerm . . . . . Village Manager, Village of Brown Deer

Walter H. Tacke . . . . . Deputy Commissioner of Public Works, City of Milwaukee

INTER AGENCY STAFF -
MILWAUKEE COUNTY JURISDICTIONAL HIGHWAY STUDY

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Dallas R. Behnke. . . . . .Chief Planning Illustrator, Southeastern Wisconsin Regional Planning Commission

William E. Creger, P. E. . . . . Chief Transportation Planning Engineer, Southeastern Wisconsin Regional Planning Commission

Eugene E. Molitor . . . . . Chief Land Use Planner, Southeastern Wisconsin Regional Planning Commission

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Ernest R. Vogel . . . . . Traffic Engineer, Milwaukee County Expressway and Transportation Commission

Thomas A. Winkel . . . . . District Urban Planning Supervisor, Milwaukee Metropolitan District, Division of Highways, Wisconsin Department of Transportation

PROPOSED JURISDICTIONAL HIGHWAY SYSTEM PLAN 1990

LEGEND

JURISDICTIONAL CLASSIFICATION

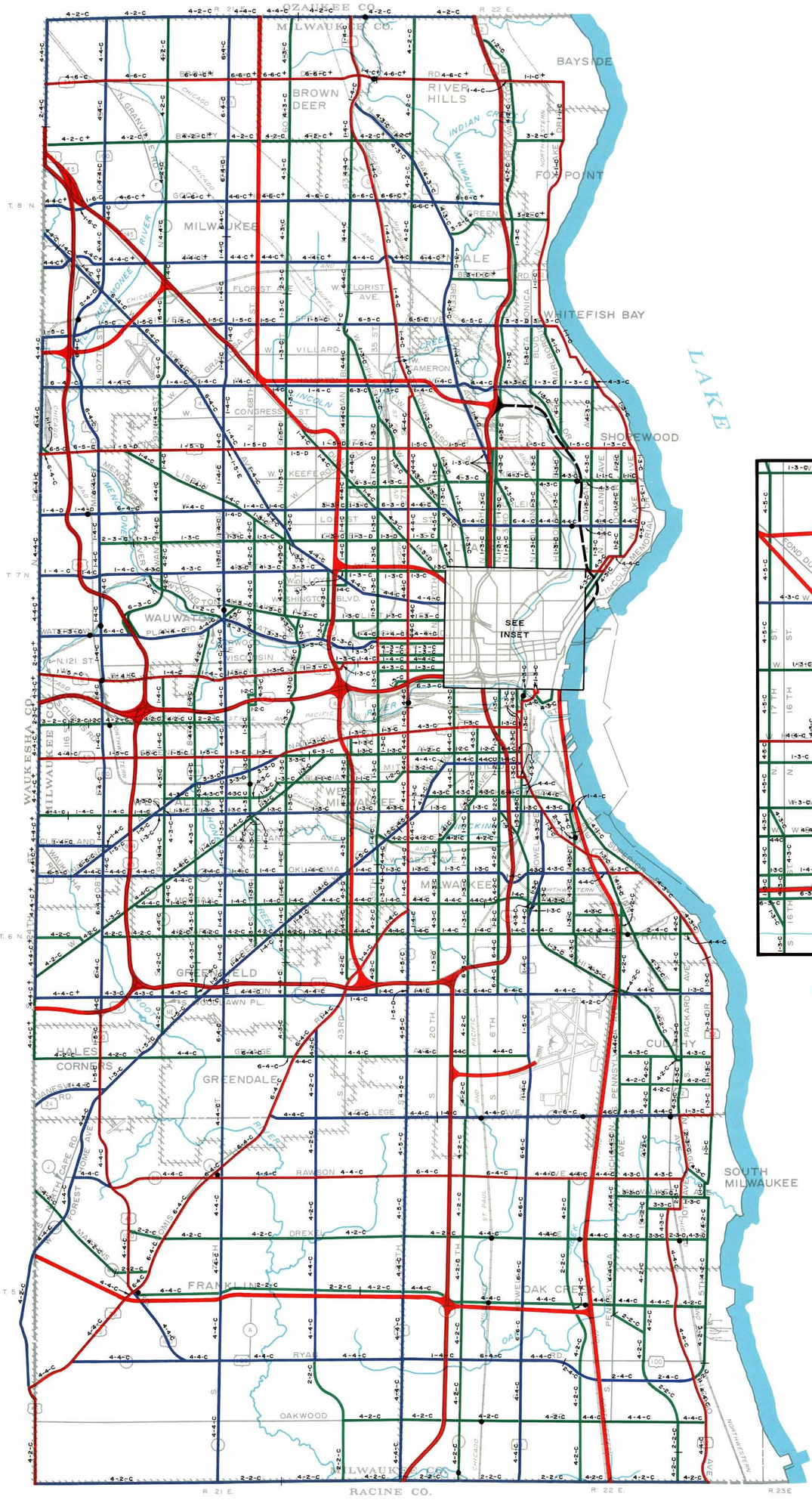
- TYPE I ARTERIAL (FREEWAY – STATE TRUNK HIGHWAY)
- TYPE I ARTERIAL (STATE TRUNK HIGHWAY)
- TYPE II ARTERIAL (COUNTY TRUNK HIGHWAY)
- TYPE III ARTERIAL (LOCAL TRUNK HIGHWAY)
- ARTERIAL PARKWAY (MILWAUKEE COUNTY PARK COMMISSION)

ARTERIAL CODE

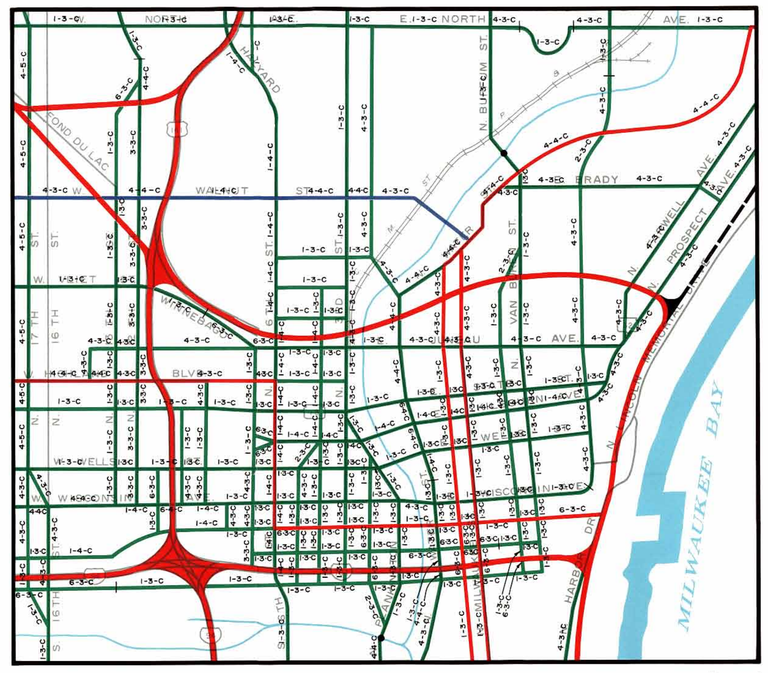
4 – 4 – C

- LEVEL OF SERVICE
- CROSS SECTION NUMBER
- TYPE OF IMPROVEMENT

SEE APPENDIX A OF SEWRPC PLANNING REPORT NO. 11, A JURISDICTIONAL HIGHWAY SYSTEM PLAN FOR MILWAUKEE COUNTY, FOR FULL EXPLANATION OF ARTERIAL CODES



INSET



SCALE 1" = 1000'

GRAPHIC SCALE

0 1/2 1 2 3 MILES

0 4,000 8,000 12,000 16,000 20,000 FEET

MILWAUKEE COUNTY BOARD OF SUPERVISORS

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

STATE HIGHWAY COMMISSION OF WISCONSIN

This map was prepared by an interagency staff with the assistance and cooperation of a Technical Advisory Committee having representation from the following agencies: U.S. Bureau of Public Roads; State Highway Commission of Wisconsin; Southeastern Wisconsin Regional Planning Commission: Milwaukee County; City of Milwaukee; City of West Allis; City of Wauwatosa; Seven North Shore Communities; Nine South Shore Communities.

PROPOSED JURISDICTIONAL HIGHWAY SYSTEM PLAN FOR MILWAUKEE COUNTY, WISCONSIN — 1990

The preparation of this plan was financed in part through a joint planning grant from the State Highway Commission of Wisconsin; the U.S. Department of Transportation, Bureau of Public Roads; and the U.S. Department of Housing and Urban Development under the provisions of the Federal Aid Highway Legislation and Section 701 of the Housing Act of 1954, as amended. The necessary local financing was provided by Milwaukee County.

MILWAUKEE COUNTY

JURISDICTIONAL HIGHWAY PLANNING STUDY

MARCH, 1960