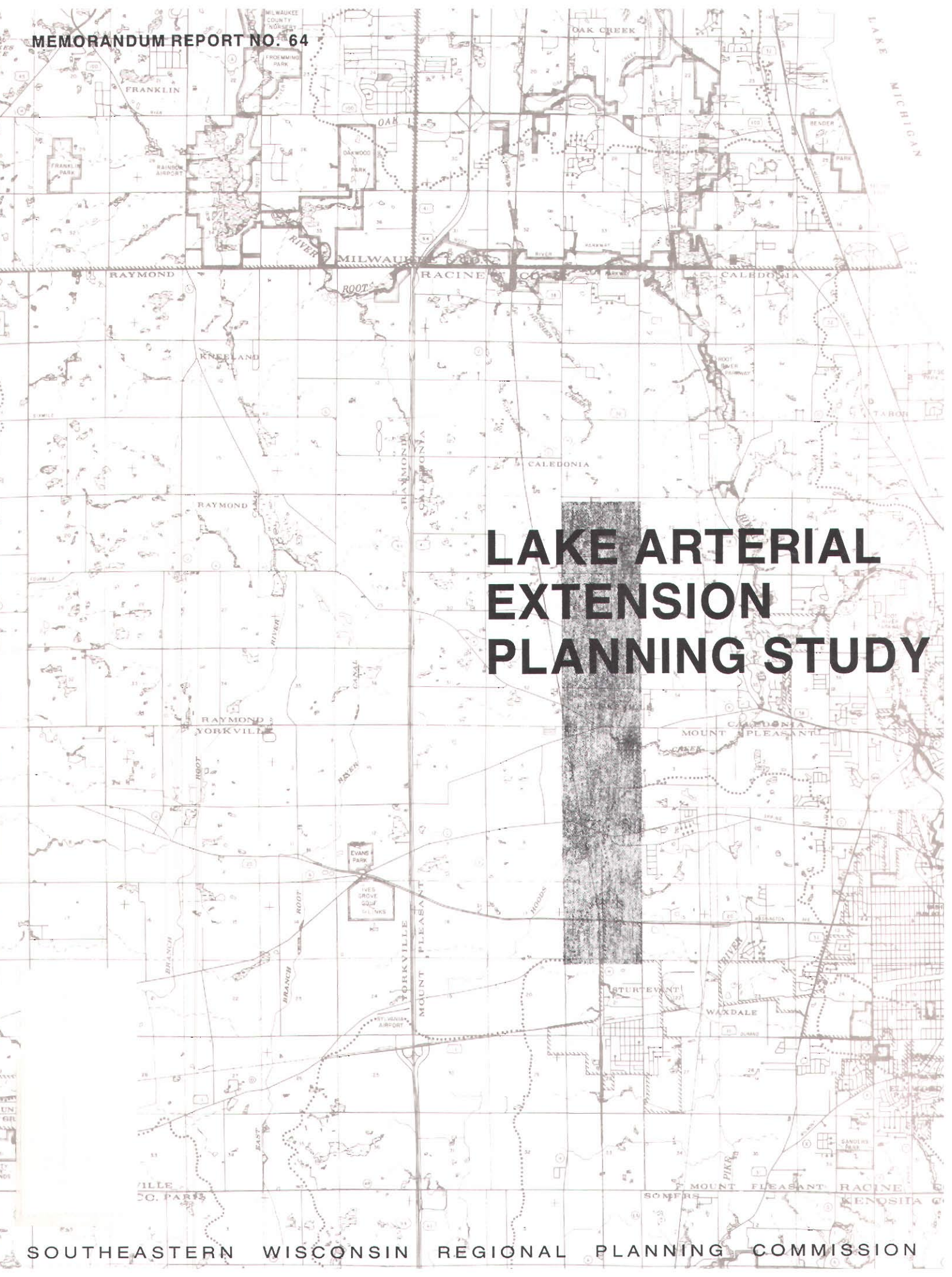




LAKE ARTERIAL EXTENSION PLANNING STUDY

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**MEMORANDUM REPORT
NUMBER 64**

LAKE ARTERIAL EXTENSION PLANNING STUDY

Prepared by the
Southeastern Wisconsin Regional Planning Commission
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Old Courthouse
916 N. East Avenue
Waukesha, Wisconsin 53187-1607

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Southeastern Wisconsin Regional Planning Commission
Memorandum Report

LAKE ARTERIAL EXTENSION PLANNING STUDY

INTRODUCTION

At the request of each of the concerned and affected local units of government, the Wisconsin Department of Transportation is conducting a preliminary engineering study of additional north-south arterial capacity in southeastern Milwaukee County and eastern Racine County. This study is being conducted in two phases. In the first phase, the need for this additional north-south arterial capacity is to be reviewed and reevaluated as may be found necessary. This need has long been identified in adopted regional transportation system plans and adopted county jurisdictional highway system plans. Also in the first phase of the study, a wide range of alternatives to provide this additional north-south arterial capacity are to be identified and evaluated, including the alternative which has been long recommended in the adopted regional transportation system plan and county jurisdictional highway system plans--specifically, the provision of the Lake Arterial along the Chicago & North Western railway right-of-way. A small number of the wide range of alternatives will be subsequently considered in the second phase of the study--the preliminary engineering study.

This memorandum report is intended to document the findings of the first, or facility planning, phase of the Lake Arterial extension study. An Advisory Committee has been appointed by the Wisconsin Department of Transportation, District 2 Director to guide the conduct of the first phase of the study. The membership of the Committee is listed in Table 1.

The study area is shown on Map 1. It should be noted, however, that much of the data presented in the first phase of the study will be for an expanded study area, also shown on Map 1, which will include other portions of Milwaukee, Racine, and Kenosha Counties which, while lying outside the study area proper, significantly contribute to traffic within the study area.

The first section of this report reviews the existing and planned land use pattern within the expanded study area, and attendant population, household, and employment levels. In the next section of the report, the amount of travel generated within the study area under existing and planned conditions is identified. The amount of this total travel currently utilizing, and which may in the future be expected to utilize, public transit is reviewed in the next section of the report. The amount of this total travel currently utilizing, and which may in the future be expected to utilize, the automobile is then reviewed and attendant existing and anticipated future traffic volumes on arterial streets presented. Traffic problems on the study area street system are then reviewed, including existing and potential future traffic congestion in the study area in the absence of additional north-south arterial capacity.

Table 1

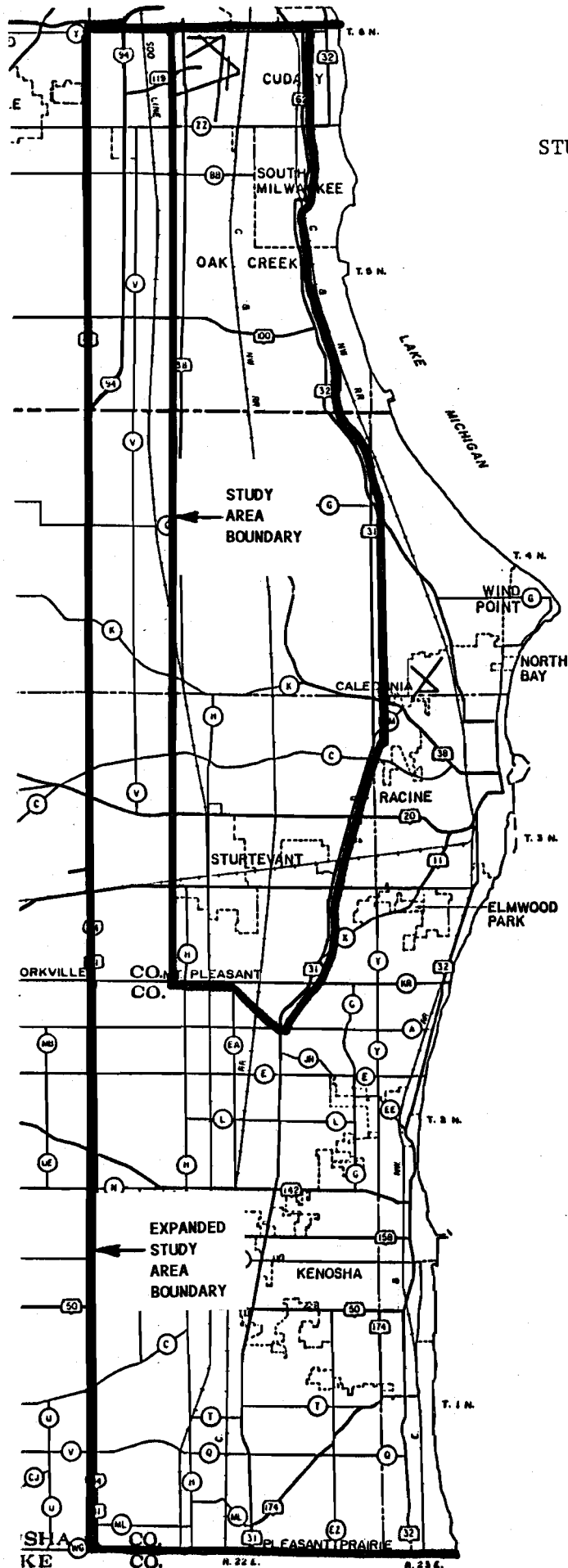
LAKE ARTERIAL ADVISORY COMMITTEE

Christine B. Bastian.....	Mayor, City of Oak Creek
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Gene A. Scharfenorth.....	Highway Commissioner, Kenosha County
Norbert S. Theine.....	City Administrator, City of South Milwaukee

-1b-

Map 1

STUDY AREA



Source: SEWRPC.

Alternatives to provide additional capacity are then identified and evaluated in the last section of this report.

It is important to note that this planning study is conducted within the context of the adopted regional land use plan and the adopted regional transportation system plan. It is also conducted within the context of adopted county jurisdictional highway system plans, including the Racine County jurisdictional highway system plan which was amended and reaffirmed by the Racine County Board of Supervisors on October 9, 1990. The original regional land use and transportation system plans were completed in 1966 with a design year of 1990. These regional plans were subsequently amended in 1978 and extended to a design year of 2000. These plans are currently being again reevaluated and extended to a design year of 2010. A brief description of the adopted regional land use and transportation system plans, as well as of the regional employment, household, and population forecasts which underlie those plans, is provided in Southeastern Wisconsin Regional Planning Commission Newsletter, Volume 30, No. 3 (May-June 1990). Presented along with a description of the adopted plans in the newsletter is an analysis of the degree to which these plans have been implemented.

The adopted regional transportation system plan has three major components: public transit facilities and services; arterial streets and highways; and transportation system management measures. The regional transportation system plan emphasizes public transit improvements and transportation system management measures to reduce the need for highway facilities. All three components of the plan--arterial highway, public transit, and transportation systems management--must be implemented if an efficient transportation system is to be achieved, as no one component can be designed to provide all the needed transportation service.

Additional north-south arterial capacity was first recommended in the Kenosha-Milwaukee corridor by a consultant to the Wisconsin State Highway Commission in 1960. The roadway facility recommended was a limited access highway. The original regional transportation system plan, completed in 1966, reaffirmed the need for such a facility between Milwaukee and Kenosha, recommending that the facility be constructed as a freeway. The reevaluation of the regional transportation system plan completed in 1978 again reaffirmed the need for a freeway connecting Milwaukee, Racine, and Kenosha. In 1981 the regional transportation system plan was amended to replace the proposed freeway facility with a less costly and disruptive surface arterial facility--termed the Lake Arterial. In 1990, as part of the reevaluation of the Racine County jurisdictional highway system plan, the need for the Lake Arterial in Racine County was again reaffirmed.

EXISTING AND PLANNED CONDITIONS WITHIN THE STUDY AREA

Households, Population, and Employment

Presented in Table 2 are existing 1985 and planned design year 2010 household, population, and employment levels for the expanded study area as a whole and for subareas of the study area, as shown in Map 2.

The total number of households within the expanded study area may be expected to increase from approximately 107,000 in 1985 to approximately 124,000 by the

Table 2

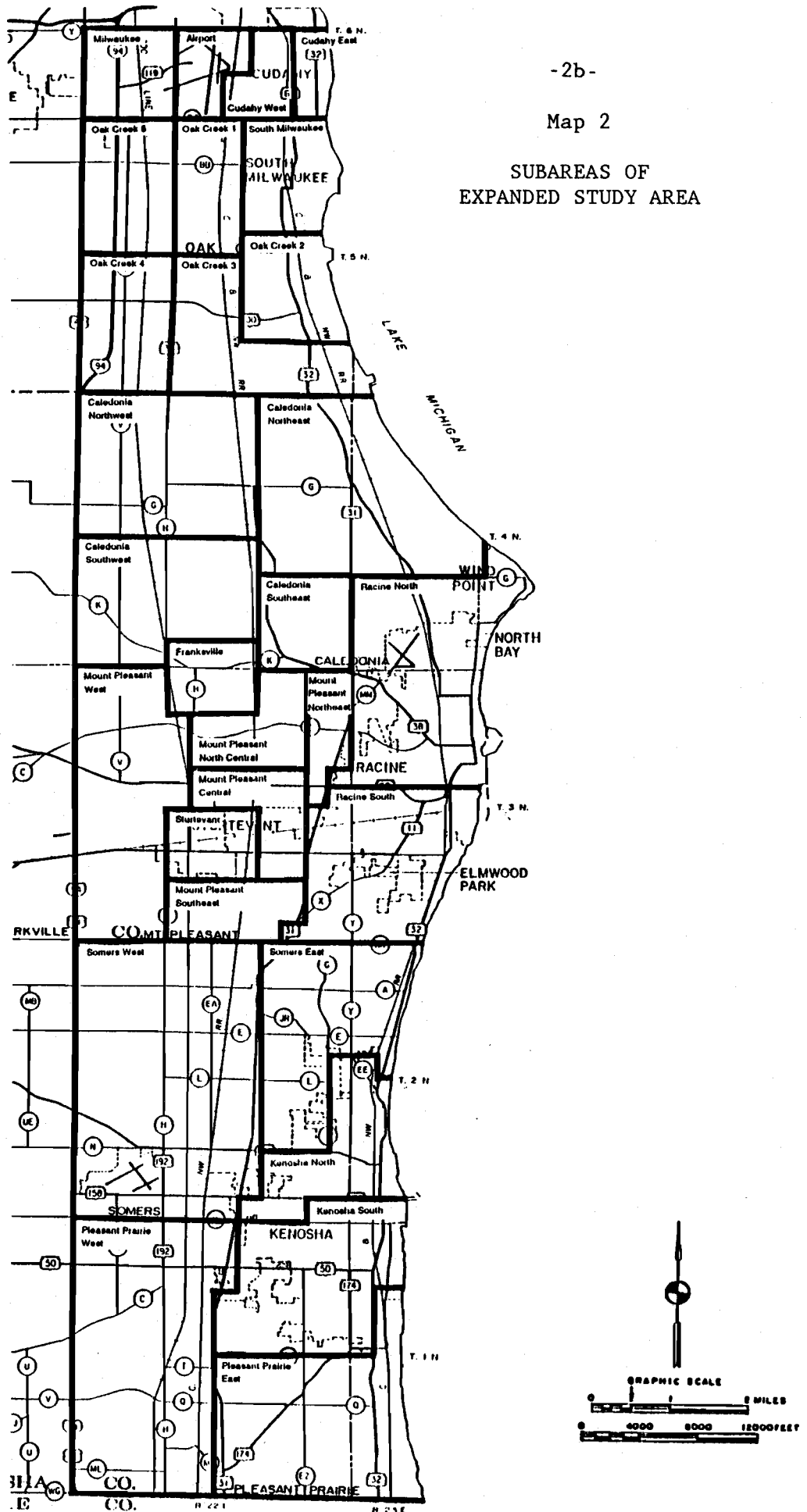
EXISTING AND PLANNED EMPLOYMENT, HOUSEHOLDS, AND
POPULATION WITHIN THE EXPANDED STUDY AREA: 1985 AND 2010

Subareas	Employment					Households					Population				
	1985		2010		1985-2010	1985		2010		1985-2010	1985		2010		1985-2010
	Number	Percent of Total	Number	Percent of Total	Change (percent)	Number	Percent of Total	Number	Percent of Total	Change (percent)	Number	Percent of Total	Number	Percent of Total	Change (percent)
Milwaukee	6,000	4	6,400	4	6.7	4,600	4	4,600	4	0.0	13,400	5	11,900	4	-11.2
Airport	1,600	1	1,800	1	12.5	50	0	0	0	-100.0	100	0	100	0	0.0
Cudahy West	7,600	5	8,100	5	6.6	2,200	2	2,700	2	22.7	7,000	2	7,400	2	5.7
Cudahy East	3,800	3	3,800	2	0.0	3,200	3	3,300	3	3.1	7,700	3	6,900	2	-10.4
Oak Creek 1	900	1	1,800	1	100.0	1,400	1	3,200	3	128.6	4,900	2	9,100	3	85.7
Oak Creek 2	700	0	1,200	1	71.4	1,200	1	2,600	2	116.7	3,600	1	7,000	2	94.4
Oak Creek 3	1,000	1	1,300	1	30.0	1,300	1	2,500	2	92.3	4,400	2	7,100	2	61.4
Oak Creek 4	1,700	1	3,000	2	76.5	500	0	1,500	1	200.0	1,300	0	3,900	1	200.0
Oak Creek 5	12,500	9	15,500	9	24.0	1,800	2	2,900	2	61.1	5,000	2	7,300	2	46.0
South Milwaukee	6,200	4	6,400	4	3.2	7,400	7	8,000	6	8.1	20,200	7	19,500	7	-3.5
Racine North	24,500	17	26,100	15	6.5	21,900	20	23,100	19	5.5	54,600	19	51,900	17	-4.9
Racine South	23,800	17	26,700	16	12.2	16,000	15	16,700	14	4.4	41,700	14	39,100	13	-6.2
Franksville	400	0	500	0	25.0	400	0	700	1	75.0	1,100	0	1,900	1	72.7
Sturtevant	4,400	3	6,500	4	47.7	1,300	1	1,400	1	7.7	4,000	1	3,800	1	-5.0
Caledonia Northwest	400	0	500	0	25.0	800	1	900	1	12.5	2,600	1	2,500	1	-3.8
Caledonia Northeast	1,000	1	1,200	1	20.0	2,500	2	2,800	2	12.0	8,400	3	8,600	3	2.4
Caledonia Southwest	700	0	1,500	1	114.3	400	0	400	0	0.0	1,300	0	1,200	0	-7.7
Caledonia Southeast	200	0	400	0	100.0	700	1	1,200	1	71.4	2,400	1	3,700	1	54.2
Mt. Pleasant West	400	0	900	1	125.0	400	0	400	0	0.0	1,100	0	1,000	0	-9.1
Mt. Pleasant North Central	100	0	200	0	100.0	500	0	1,000	1	100.0	1,700	1	2,700	1	58.8
Mt. Pleasant Northeast	2,200	2	2,400	1	9.1	2,100	2	2,900	2	38.1	5,500	2	6,900	2	25.5
Mt. Pleasant Central	3,300	2	4,000	2	21.2	800	1	1,300	1	62.5	2,200	1	3,100	1	40.9
Mt. Pleasant Southeast	20	0	500	0	2400.0	100	0	100	0	0.0	300	0	300	0	0.0
Kenosha North	7,800	6	8,400	5	7.7	10,100	9	10,700	9	5.9	26,800	9	25,300	8	-5.6
Kenosha South	22,900	16	21,700	13	-5.2	19,000	18	20,600	17	8.4	49,500	17	48,300	16	-2.4
Somers West	900	1	3,000	2	233.3	1,100	1	1,300	1	18.2	3,300	1	3,200	1	-3.0
Somers East	3,600	3	4,000	2	11.1	2,600	2	3,200	3	23.1	5,600	2	6,500	2	16.1
Pleasant Prairie West	1,600	1	11,200	7	600.0	900	1	1,400	1	55.6	2,500	1	3,700	1	48.0
Pleasant Prairie East	900	1	1,300	1	44.4	1,900	2	2,300	2	21.1	5,400	2	6,100	2	13.0
Total	141,120	100	170,300	100	20.7	107,150	100	123,700	100	15.4	287,600	100	300,000	100	4.3

Source: SEWRPC.

Map 2

SUBAREAS OF
EXPANDED STUDY AREA



Source: SEWRPC.

year 2010, an approximately 15 percent increase. More substantial increases may be expected in a number of subareas of the expanded study area, including the communities of Oak Creek, Mt. Pleasant, and Pleasant Prairie. For example, the number of households in Oak Creek is anticipated to increase from approximately 6,200 households to 12,700 households, over a 100 percent increase.

With respect to population, an increase from 287,600 persons to 300,000 persons, or 4 percent, within the expanded study area is planned. More substantial increases may be expected in the communities of Oak Creek, Mt. Pleasant, and Pleasant Prairie.

With respect to employment, the number of jobs in the expanded study area may be expected to increase from 141,000 in 1985 to approximately 170,000 by the year 2010, approximately a 21 percent increase. The portions of the expanded study area which are envisioned to accommodate the urban development attendant to these increases by the year 2010 are shown on Map 3.

These year 2010 forecasts of population, households, and employment are based upon the Commission's design year 2010 land use plan for the Region, currently under preparation. The regional land use plan envisions modest total regional employment growth of about 10 percent to the year 2010, which is well below historic levels of increase of 10 to 20 percent per decade. The regional land use plan also envisions a modest growth in households in the Region of about 15 percent, which is also less than historic levels of increase of about 10 to 20 percent per decade. The regional land use plan envisions modest population growth of about 5 percent to year 2010, which is a modest departure from the trend of a stable regional population level since 1970. It should be noted that household and employment levels have a more direct influence on land use and transportation development than does population, as it is the levels of employment and the number of households that determine the demand for business- and housing-related land development, as well as travel and traffic demand. Thus, the anticipated potential future growth in land development and traffic generation in the expanded study area and Region may be considered conservative.

Total Travel Generation

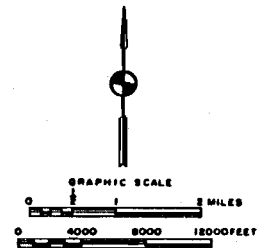
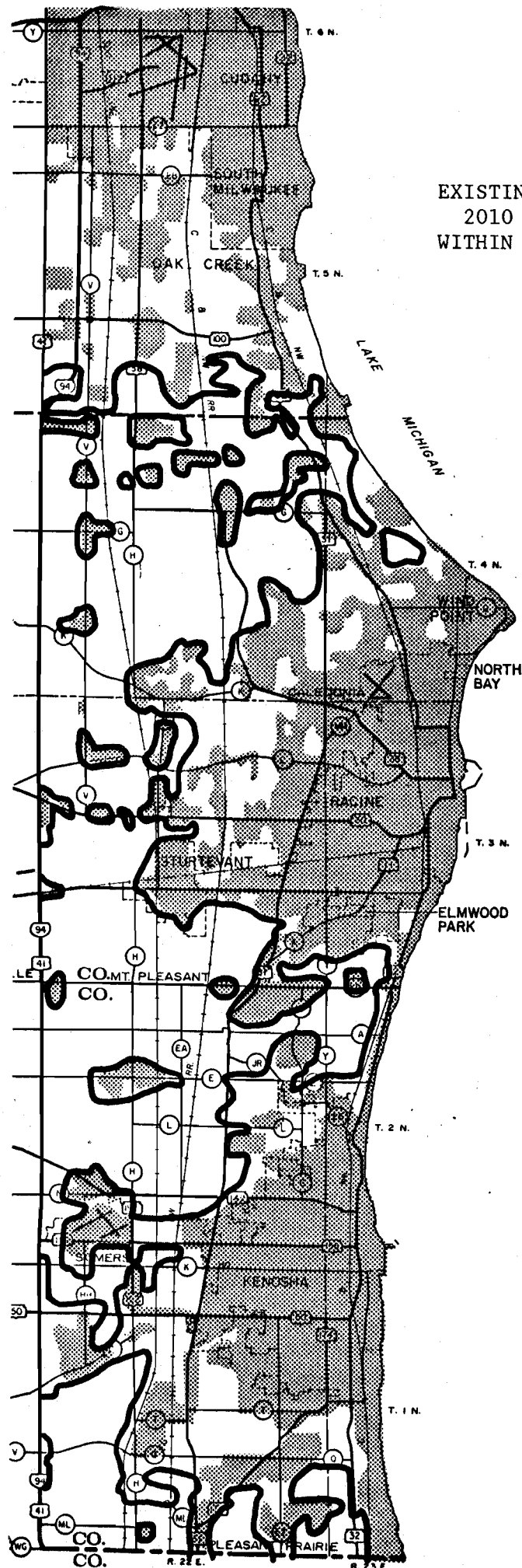
The existing 1985 and design year 2010 person travel which may be expected to be generated within the expanded study area is shown on Map 4. It is estimated that the resident population, households, and employment within the expanded study area generated approximately 1.91 million person trip ends on an average weekday in 1985--that is, trip origins and destinations made by personal vehicle or public transit for the purpose of work, shopping, personal business, and other reasons. Based upon the previously discussed planned population, household, and employment levels in the expanded study area, the level of weekday travel generation in the expanded study area may be expected to increase to about 2.37 million person trips per average weekday by the year 2010, an approximately 25 percent increase.

Public Transit Travel

The number and percentage of the existing 1985 total person trips which currently use public transit are shown on Map 5. Approximately 31,800 of the total 1.91 million person trip ends, or less than 2 percent, are currently made on public transit. The adopted regional transportation system plan pro-

Map 3

EXISTING 1990 AND PLANNED
2010 URBAN DEVELOPMENT
WITHIN EXPANDED STUDY AREA

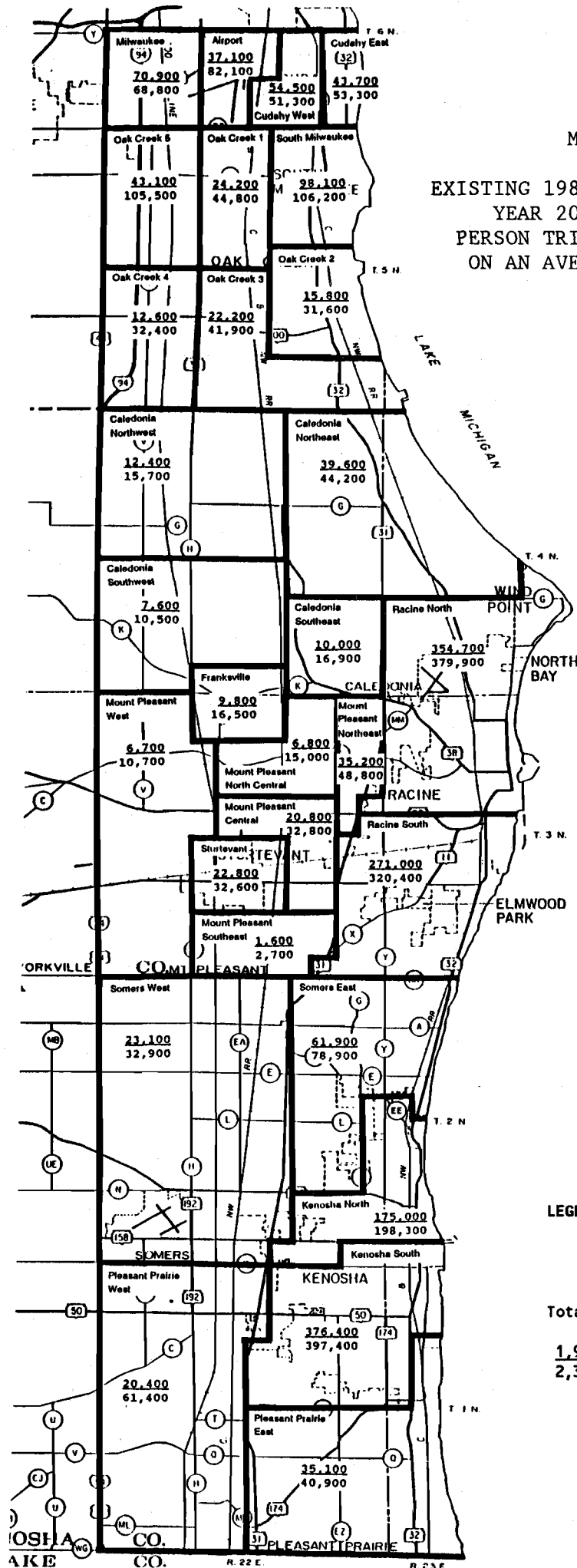


LEGEND

-  EXISTING URBAN DEVELOPMENT: 1990
-  BOUNDARY PLANNED URBAN DEVELOPMENT: 2010

Map 4

EXISTING 1985 AND FORECAST
YEAR 2010 TOTAL
PERSON TRIPS GENERATED
ON AN AVERAGE WEEKDAY



LEGEND

<u>70,900</u>	1985 Person Trips
68,800	2010 Person Trips

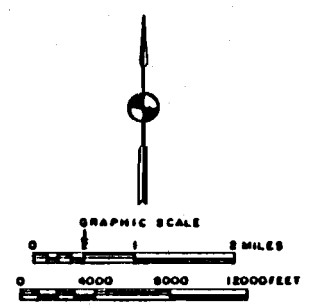
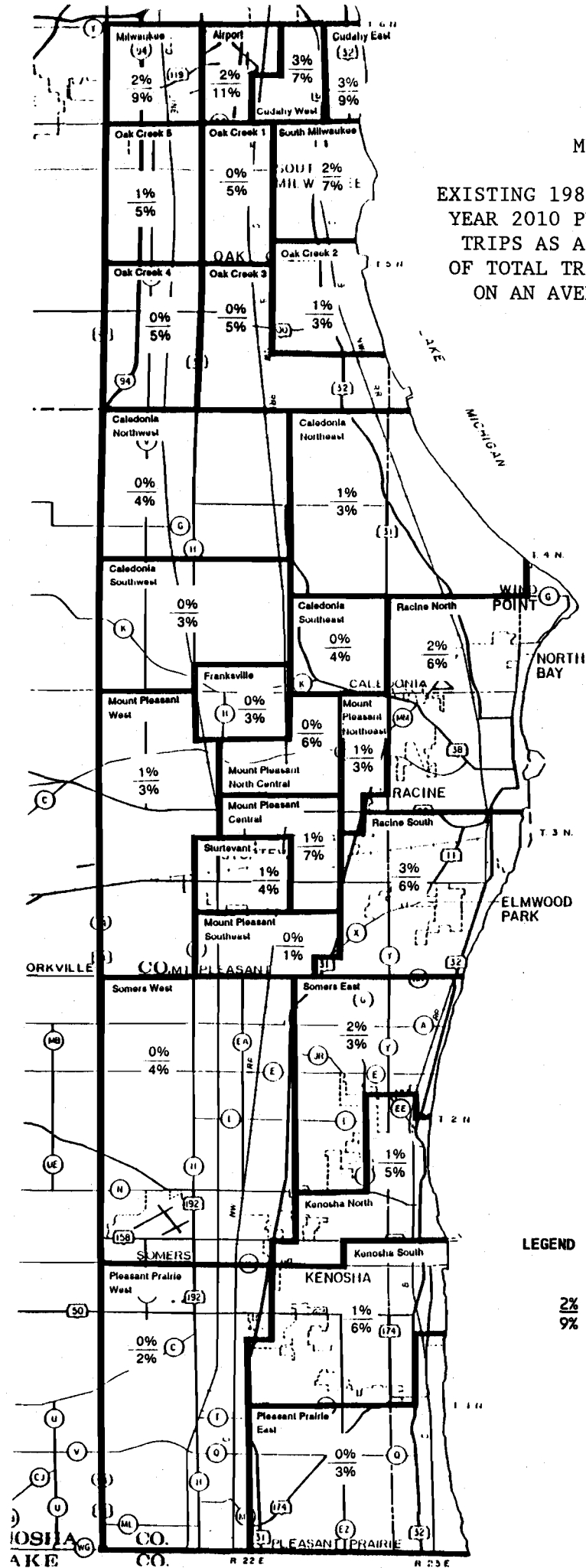
Total Trips

<u>1,913,100</u>	1985 Person Trips
2,374,400	2010 Person Trips

Source: SEWRPC.

Map 5

EXISTING 1985 AND FORECAST
YEAR 2010 PUBLIC TRANSIT
TRIPS AS A PERCENTAGE
OF TOTAL TRIP GENERATION
ON AN AVERAGE WEEKDAY



LEGEND

2%
9%
Percent of 1985
Total Person Trips
Percent of 2010
Total Person Trips

poses a substantial and ambitious expansion and improvement of the public transit system in southeastern Wisconsin, including within the expanded study area. This long recommended expansion and improvement of public transit facilities and services within southeastern Wisconsin, which is intended in part to lessen the need to improve arterial street and highway facilities, envisions nearly a doubling of the amount of transit service provided and a doubling of the average speed of a transit trip; and is forecast to result in slightly more than a doubling of transit travel in the Region by the year 2010. The plan will require a substantial increase in the commitment of public resources to transit, that is, approximately a doubling of public capital investment in, and operating subsidies for, transit.

Within the expanded study area, as shown on Map 5, it is forecast that, given the expansion and improvement of the public transit system recommended under the regional transportation system plan, the number of trips made on public transit may be expected to increase by more than a factor of four from 31,800 trips in 1985 to 137,200 trips in the year 2010. This increase in trips is a result of the proposed significant expansion and improvement of the transit system including expansion of local transit service and institution of new rapid transit services. The percentage of total trips made on public transit rather than by automobile under the plan would thus increase from currently under 2 percent in 1985 to approximately 6 percent by the year 2010, about a tripling in the percentage of trips which would use public transit rather than the private automobile. Recommended transit improvements in the study area which are key to this projected increase in transit use are the addition of a commuter rail line linking Milwaukee, Racine, and Kenosha; development of an extensive system of express bus and light rail lines in Milwaukee County; and the addition of new local bus service serving local trips as well as connecting to the rapid transit lines. The recommended transit plan is shown on Map 6.

It is important to note that, even with the very substantial expansion and improvement of public transit service envisioned by the year 2010, and as well the forecast increase in transit ridership, the contribution of public transit toward resolving existing and forecast street and highway congestion on an areawide basis is relatively modest. This is because the proportion of total trips which are made on public transit is relatively small. As already noted, the 31,800 transit trips currently made within the study area on an average weekday in 1985 represent less than 2 percent of the 1.91 million total trips, with the remaining 1.88 million trips, or 98 percent, made by automobile. With the significant fourfold increase in study area transit ridership to 137,200 trips per average weekday forecast to the year 2010, the proportion of total trips made using public transit would be expected to increase to about 6 percent; and the proportion of trips using the automobile, accordingly, would be expected to decrease from 98 to 94 percent. Total person trips within the area are forecast to increase by the year 2010 to about 2.37 million trips per average weekday, about a 25 percent increase. Thus, the number of automobile trips may be expected to increase by the year 2010 to about 2.24 million trips per average weekday, about a 21 percent increase. The envisioned substantial increases in transit ridership serve to reduce the growth of study area automobile travel to the year 2010 by nearly 20 percent, that is, from a potential 25 percent increase in automobile travel over the next 20 years to a 20 percent increase.

Map 6

RECOMMENDED PUBLIC TRANSIT
ELEMENT OF THE
ADOPTED REGIONAL
TRANSPORTATION SYSTEM PLAN

LEGEND

Transit Routes

Express Bus/
Light Rail Transit

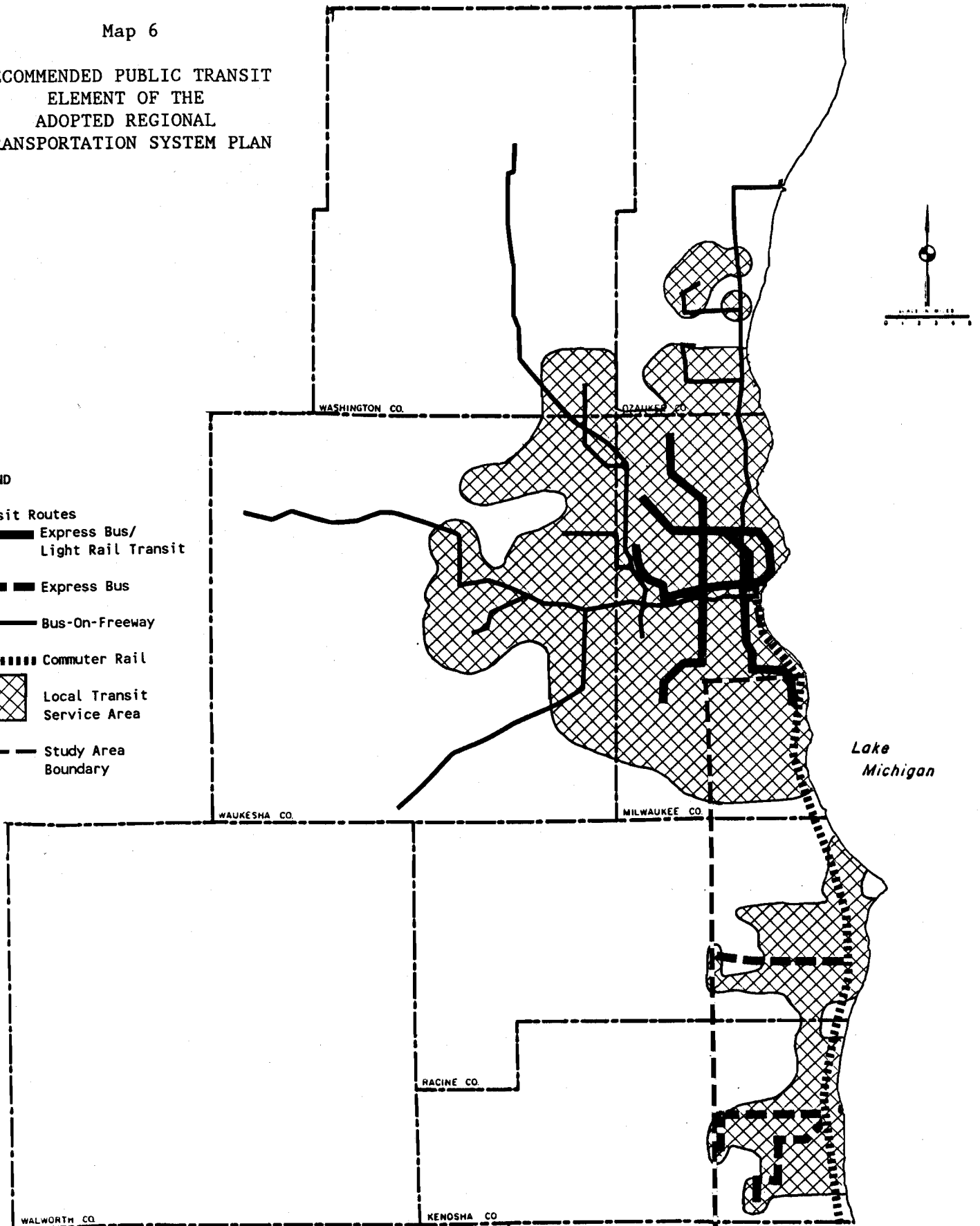
Express Bus

Bus-On-Freeway

Commuter Rail

Local Transit
Service Area

Study Area
Boundary



The forecasts of an areawide doubling of transit ridership may be considered optimistic in light of recent trends in transit ridership and transit service provision. As shown in Figure 1, between 1980 and 1989, the number of bus miles of transit service provided in southeastern Wisconsin has declined--from 23.5 million to 20.3 million annual bus miles. Also, as shown on Figure 2, the level of ridership on the public transit systems in the Region has declined from 61.7 million to 52.8 million annual revenue passengers. These trends represent substantial departures from the adopted transit elements of the plan.

In conclusion, with respect to potential total travel and the proportion of that travel made on public transit, the following findings can be made:

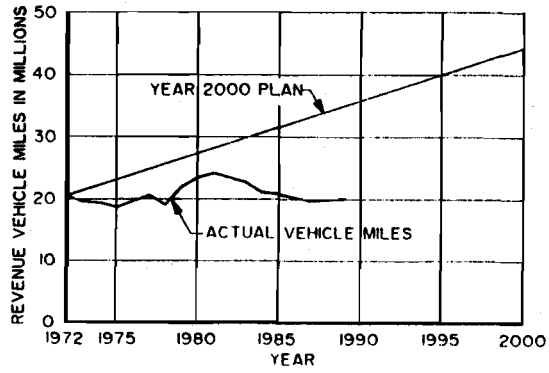
- o The adopted regional transportation system plan recommends the substantial improvement and expansion of public transit services within southeastern Wisconsin and the expanded study area. The study area recommended improvements include provision of a true rapid transit service through a commuter rail line and express bus and light rail lines and expanded local bus service.
- o The planned transit service improvement and expansion may be expected to result in a significant increase in the number of transit trips and proportion of total trips using transit within the expanded study area. Within this area, transit trip ends are forecast to increase from about 31,800 trips per average weekday in 1985 to about 137,200 transit trips per average weekday by the year 2010. The proportion of total trips made using public transit is forecast to increase from under 2 percent in 1985 to approximately 6 percent in the year 2010.
- o Despite the significant increases forecast for transit ridership, a substantial increase in automobile travel in the expanded study area may still be expected. This is due to the very small proportion of total trips carried by public transit--an existing 2 percent and a forecast 6 percent. A substantial increase of about 25 percent in total travel generation by the year 2010 is forecast. The result is that trips by automobile may be expected to increase from 1.88 million trips per average weekday to 2.24 million trips per average weekday, or by 20 percent from 1985 to 2010. Without the improved and expanded transit service, the increase in automobile travel would, however, be expected to be even larger--that is, a potential 25 percent increase rather than a 20 percent increase.
- o The substantial increases in transit service and transit ridership which are envisioned for the year 2010 under the adopted regional transportation system plan represent a departure from current trends within the study area and southeastern Wisconsin, which have seen a decline in transit service and transit ridership since 1980. In light of these trends, the forecast transit ridership increase under the adopted plan must be considered optimistic; and the forecast increase in automobile travel considered conservative.

Arterial Highway Traffic

The existing arterial street system within the expanded study area is shown on Map 7. The traffic carrying capacity of the arterial street system is basi-

Figure 1

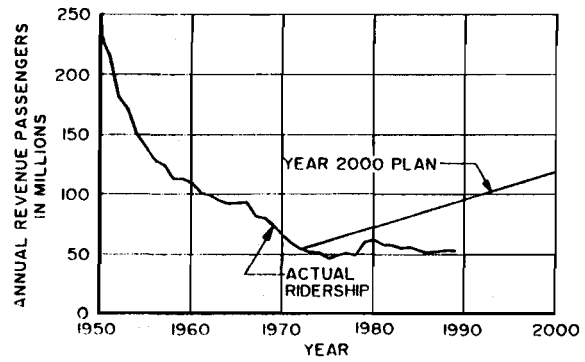
**SOUTHEASTERN WISCONSIN URBAN
PUBLIC TRANSIT SYSTEM VEHICLE MILES
OF SERVICE PROVIDED: 1972 TO 2000**



Source: SEWRPC.

Figure 2

**SOUTHEASTERN WISCONSIN
URBAN PUBLIC TRANSIT SYSTEM
RIDERSHIP: 1950-2000**

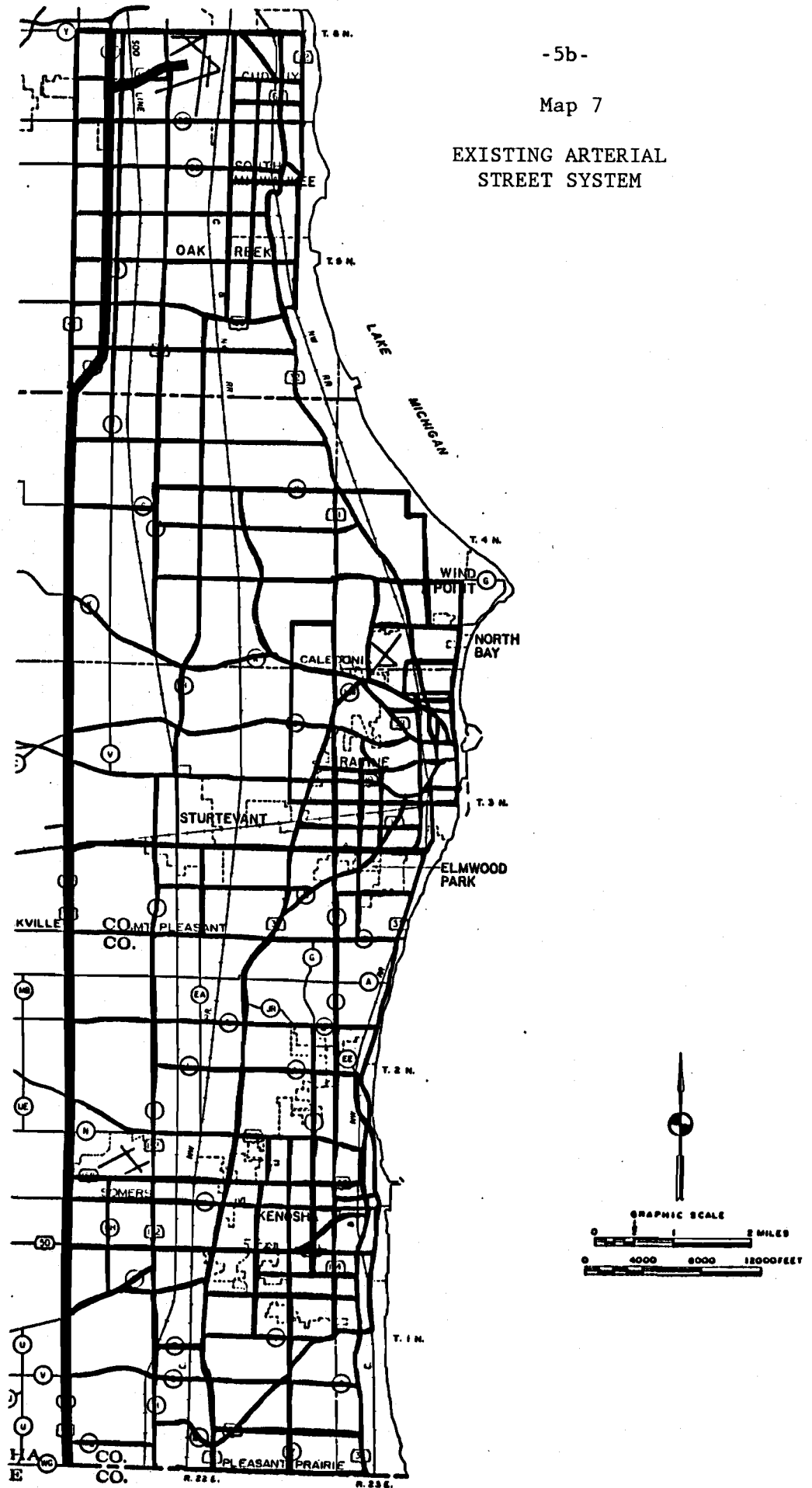


Source: SEWRPC.

-5b-

Map 7

EXISTING ARTERIAL
STREET SYSTEM



Source: SEWRPC.

cally a function of the number of traffic lanes provided on each arterial street segment. As shown in Table 3, a two-lane urban arterial generally has a design capacity of about 13,000 vehicles per average weekday; a four-lane undivided urban arterial has a design capacity of about 17,000 vehicles per average weekday; a four-lane divided urban arterial has a design capacity of about 25,000 vehicles per average weekday; and a six-lane divided urban arterial has a design capacity of about 35,000 vehicles per average weekday. The design capacities cited are for urban arterials typically having urban cross-sections with curb and gutter and auxiliary parking lanes which can also serve as distress lanes and, importantly, serve as bypass lanes at intersections. The traffic capacities of urban arterials are established by the capacity of the intersections with other arterial streets, which are typically controlled by traffic signals.

The comparable capacities for rural highways typically having cross-sections with shoulders and roadside ditches are also given in Table 3. The shoulders of rural highways generally are not paved, and may not accommodate the full width of a vehicle. Thus, no full auxiliary lanes are provided. This reduces the volume of traffic which can safely and efficiently be accommodated, particularly on two-lane rural highways in areas where turning movements are frequent, and where multiple points of ingress and egress to abutting lands may be permitted along the highway. Rural highways also typically have higher speed limits than do urban highways, generally exceeding 35 miles per hour and ranging up to 55 miles per hour. Less traffic can generally be safely and efficiently accommodated on two-lane highways with higher speed limits. Also, the design capacity of stop sign-controlled arterial intersections is less than the capacity of traffic signal-controlled arterial intersections. Stop sign-controlled intersections are more typical of rural arterial highway intersections, while signalized intersections are more typical of urban arterial highway intersections.

The most current available existing average weekday traffic volumes on the major arterial streets within the study area--the state and county trunk highways and selected local trunk highways--are shown on Map 8. Forecast year 2010 average weekday traffic volumes are shown on Map 9. These traffic volume forecasts are based upon the year 2010 planned levels of population, households, and employment and the adopted regional land use and transportation system plans, including the Lake Arterial extension. Year 2010 forecast traffic volumes under the adopted regional land use and transportation system plans, but without the Lake Arterial, are shown on Map 10. Comparison of Maps 9 and 10 illustrate the future traffic implications of not completing the Lake Arterial extension or some other similar addition of north-south arterial capacity in southeastern Milwaukee County and eastern Racine County.

STUDY AREA ARTERIAL TRAFFIC PROBLEMS AND DEFICIENCIES

An adequate level of arterial transportation service is essential to promote and support sound land use and related economic development. Arterial service is considered inadequate and deficient when arterial streets carry traffic volumes exceeding their design capacity and, consequently, experience traffic congestion. Arterials carrying average weekday traffic volumes exceeding their design capacity may be expected to experience significant delays at controlled intersections; reduced speeds between intersections; increased accident rates;

Table 3

AVERAGE WEEKDAY DESIGN CAPACITIES
FOR URBAN AND RURAL ARTERIALS

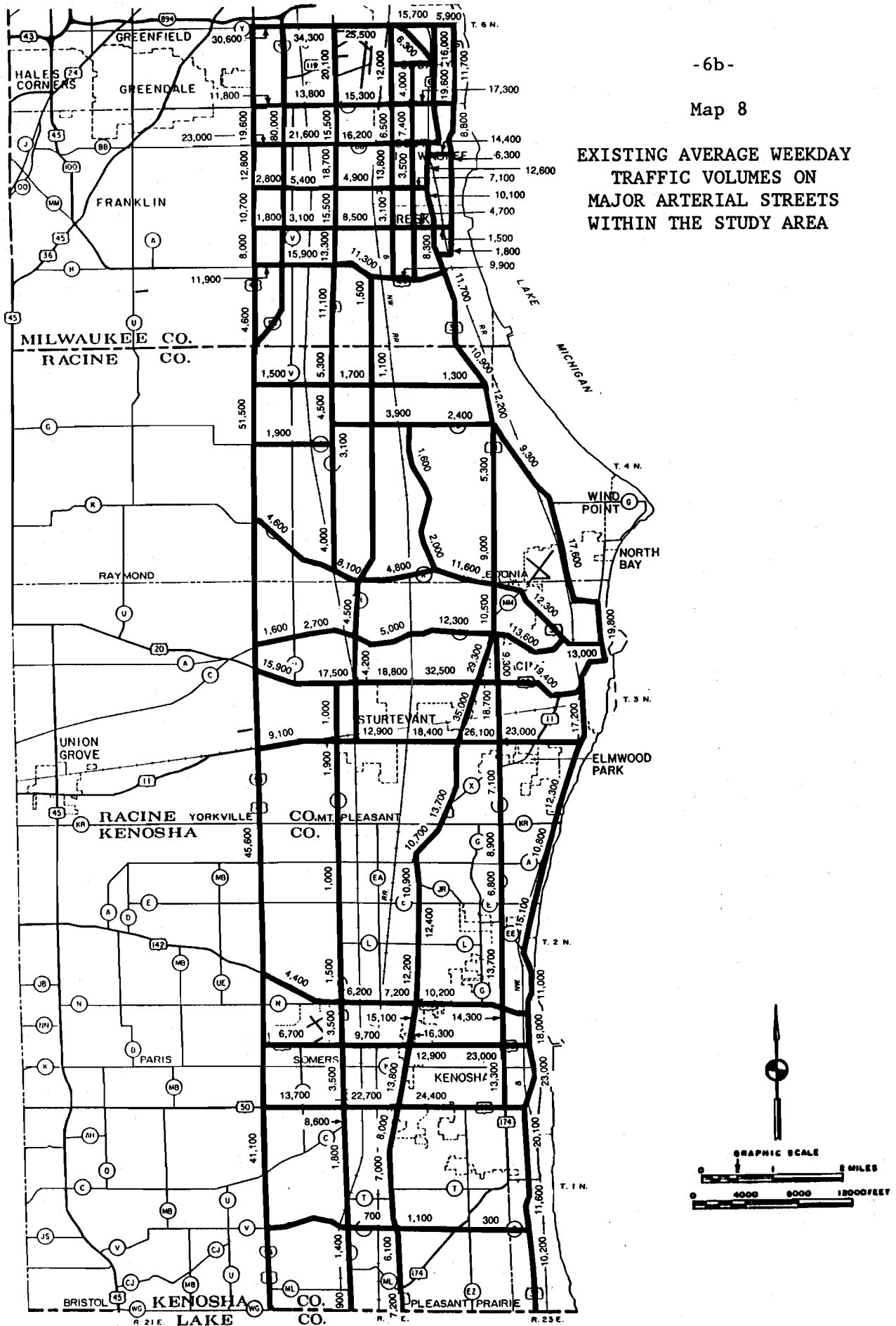
		Urban Arterials	Rural Arterials
Average Weekday Design Capacities (vehicles per average weekday)	Two-lane arterials.....	13,000	7,000
	Four-lane undivided arterials...	17,000	--
	Four-lane divided arterials.....	25,000	22,000
	Six-lane divided arterials.....	35,000	--

Source: SEWRPC.

-6b-

Map 8

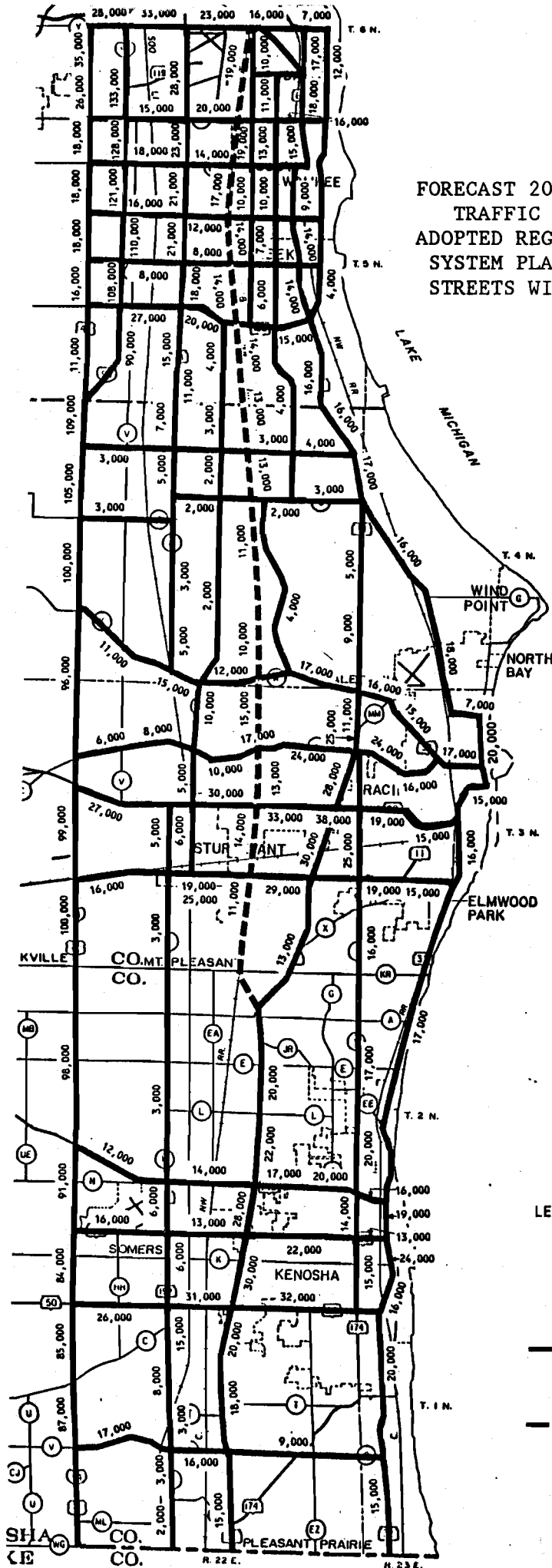
EXISTING AVERAGE WEEKDAY
TRAFFIC VOLUMES ON
MAJOR ARTERIAL STREETS
WITHIN THE STUDY AREA



Source: SEWRPC.

Map 9

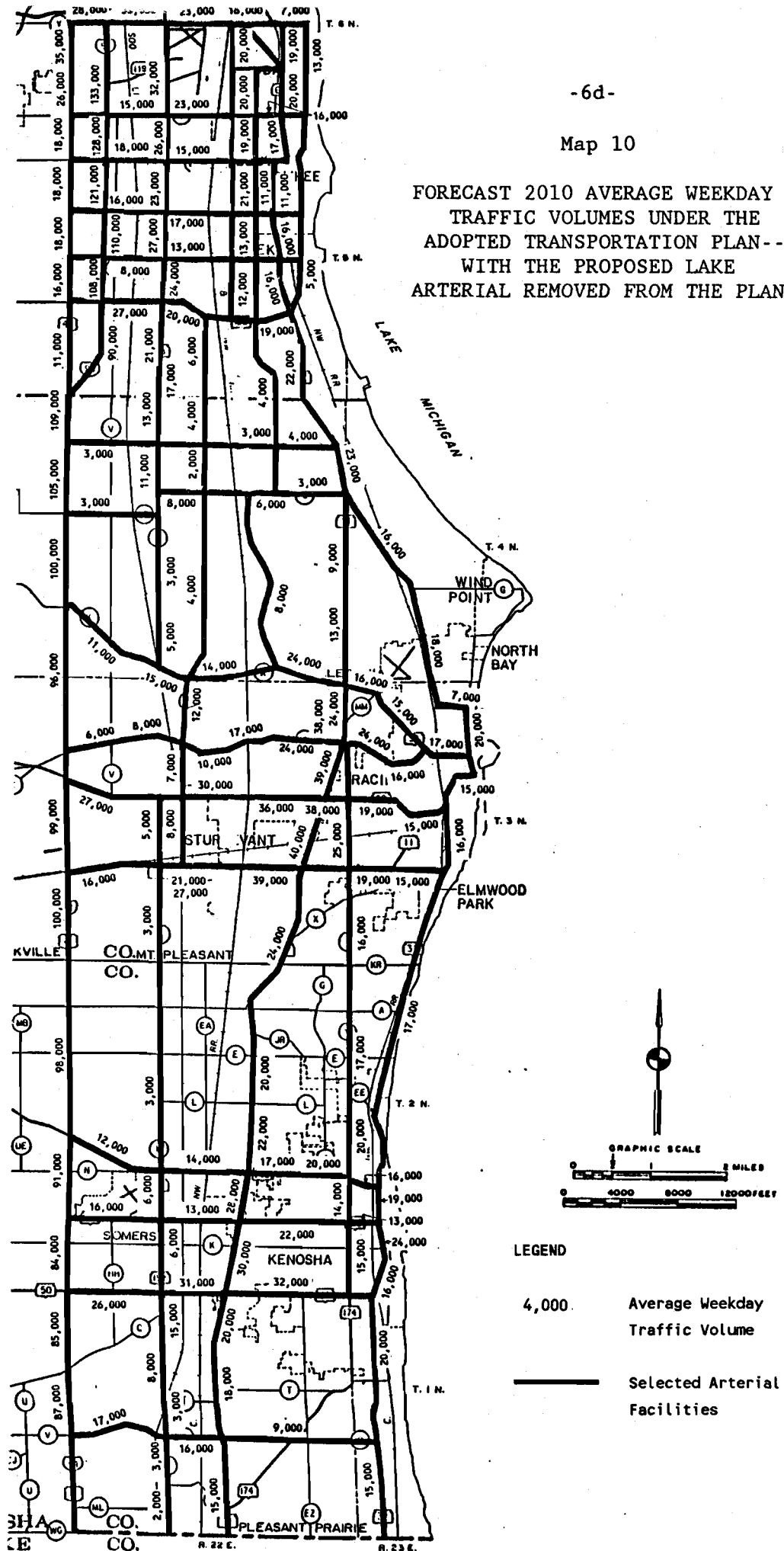
FORECAST 2010 AVERAGE WEEKDAY
TRAFFIC VOLUMES UNDER THE
ADOPTED REGIONAL TRANSPORTATION
SYSTEM PLAN ON MAJOR ARTERIAL
STREETS WITHIN THE STUDY AREA



Source: SEWRPC.

Map 10

FORECAST 2010 AVERAGE WEEKDAY
TRAFFIC VOLUMES UNDER THE
ADOPTED TRANSPORTATION PLAN--
WITH THE PROPOSED LAKE
ARTERIAL REMOVED FROM THE PLAN



Source: SEWRPC.

increased fuel consumption; and increased air pollutant emissions. The reduced speeds and intersection delays on arterials carrying average weekday traffic volumes equaling or exceeding their design capacity will generally occur only during the morning and evening peak traffic hours, or, in some cases, during the three-hour morning and evening peak traffic periods. During midday, evening, and early morning hours of weekdays, there will generally be little, if any, traffic congestion and delay. Also, on most arterial highways, weekend traffic peaks will be less than weekday traffic.

Generally, arterials carrying weekday traffic volumes exceeding their design capacity will have average vehicle delays at signalized intersections of at least 35 seconds during peak traffic periods, and delays to some vehicles may approach 120 seconds. Vehicles may nearly always have to wait through more than one traffic signal red phase to clear the intersection. Arterials carrying weekday traffic volumes equaling their design capacities will typically have average vehicle delays at signalized intersections during peak traffic periods of about 20 to 30 seconds, and delay to some vehicles may approach 60 seconds. Arterials operating under their design capacity will have little vehicle back-up at signalized intersections, and no vehicles will have to wait through more than one red traffic signal phase. The average delay to each vehicle at signalized intersections will be 5 to 15 seconds.

Also, between controlled intersections, arterials carrying traffic volumes greater than their design capacity may be expected to experience severe restrictions on operating speed and on the ability to maneuver. On two-lane highways, the ability to pass slower vehicles will be severely restricted. Overall, the average travel speeds on arterials operating over design capacity will be reduced by 25 to 50 percent, as compared to speeds on arterials operating at or under design capacity. Arterials operating over design capacity may result in motor fuel consumption which is 10 to 25 percent higher and air pollutant emissions which are about 40 percent higher than for arterials operating at or under design capacity.

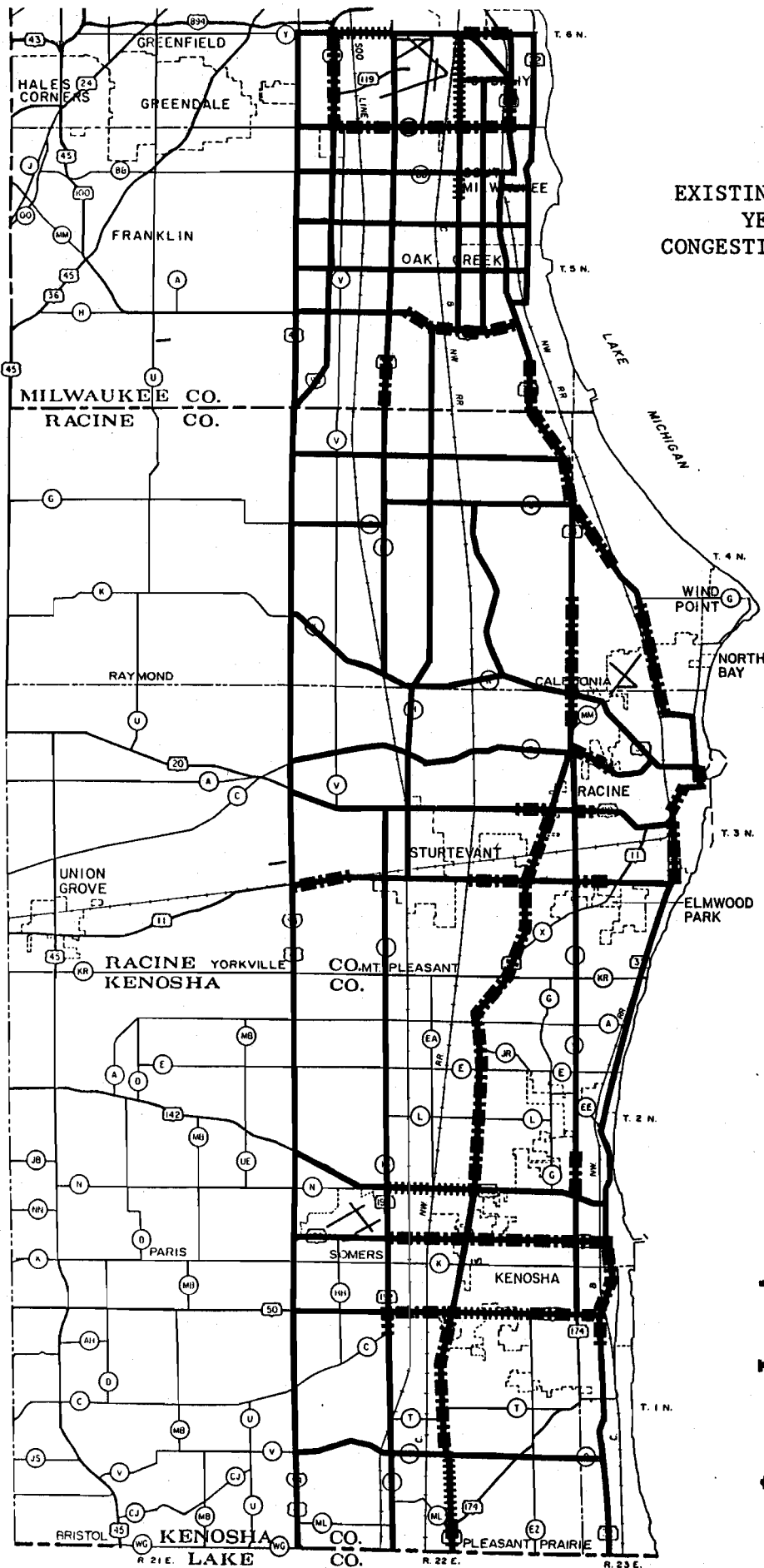
Map 11 identifies those segments of arterial streets in the expanded study area which currently experience traffic congestion; and those segments of arterial streets which may be anticipated to experience traffic congestion by the year 2010 under the adopted regional land use and transportation plans and in the absence of the long proposed Lake Arterial facility. Traffic congestion currently occurs on STH 31 in Racine County; and on Pennsylvania Avenue in Milwaukee County. Additional north-south arterial capacity would resolve these existing problems. By the year 2010, traffic congestion may be anticipated on Pennsylvania Avenue in Milwaukee County in the absence of the Lake Arterial; and on STH 31, STH 38, and CTH H in Racine County. This congestion may result not only in traffic delay and increased accidents, but also unnecessary motor fuel consumption and air pollutant emissions.

Another potential arterial system deficiency is lack of provision of adequate spacing of arterials. Adopted regional transportation system planning standards recommend one-half mile spacing of arterials in high density urban areas; one mile spacing in medium density urban areas; and two mile spacing in low density urban areas. Those areas of the expanded study area which currently have inadequate spacing, or in the future may be anticipated to have such problems under the adopted regional land use and transportation system

Map 11

EXISTING 1990 AND FORECAST
YEAR 2010 TRAFFIC
CONGESTION IN THE STUDY AREA^a

Existing 1990



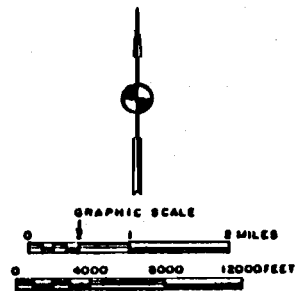
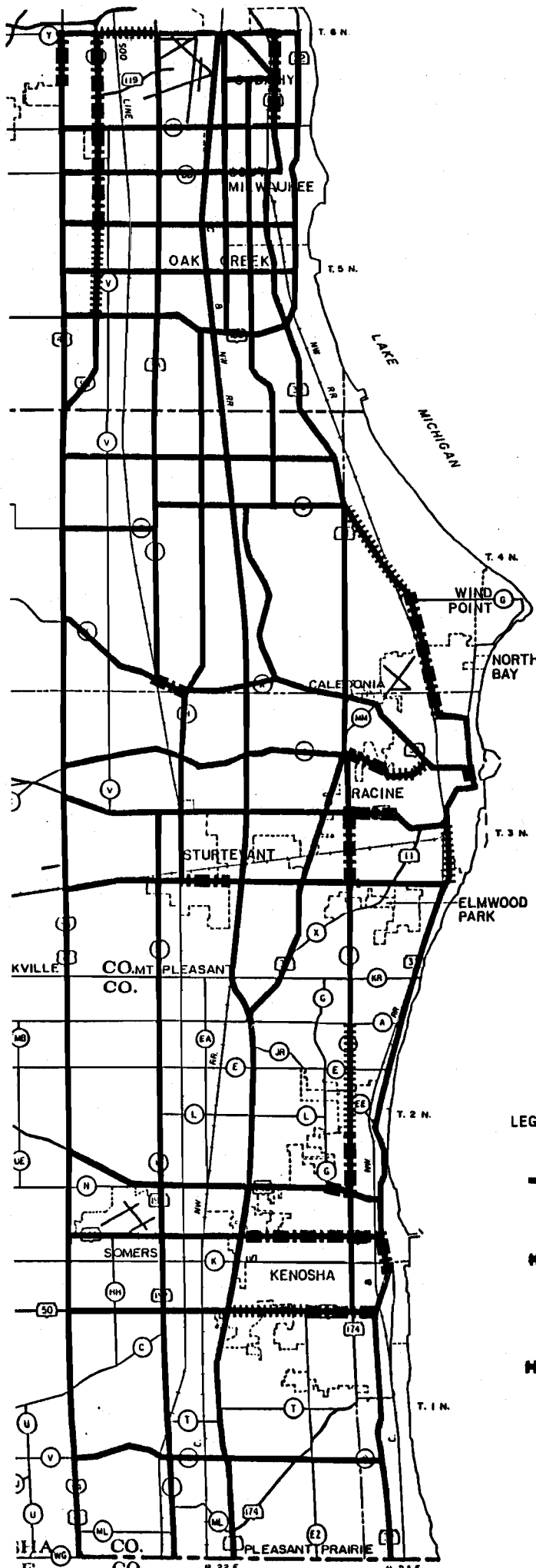
LEGEND

-  Arterial Streets
And Highways
-  Arterial Streets
And Highways At
Design Capacity
-  Arterial Streets
And Highways Over
Design Capacity

-7b-

Map 11 (continued)

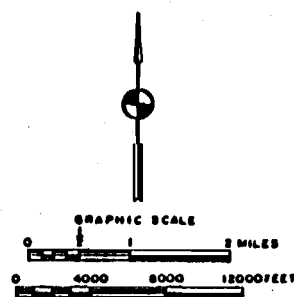
Forecast Year 2010
Under Adopted Plan
With Lake Arterial



LEGEND

-  Arterial Streets
And Highways
-  Arterial Streets
And Highways At
Design Capacity
-  Arterial Streets
And Highways Over
Design Capacity

Forecast Year 2010
Under Adopted Plan
Without Lake Arterial



	Arterial Streets And Highways
	Arterial Streets And Highways At Design Capacity
	Arterial Streets And Highways Over Design Capacity

plans--in the absence of the long planned Lake Arterial extension--include an area in Oak Creek bounded by Rawson Avenue on the north, Pennsylvania Avenue on the east, Ryan Road on the south, and Howell Avenue on the west, where north-south arterial spacing should be 1.0 mile rather than 1.5 miles. Also, an area in Racine County with inadequate north-south arterial spacing--2.5 to 3.0 miles rather than 1.0 mile--is bounded on the north by CTH K, on the east by STH 31 and Emmertsen Road, on the south by STH 11, and on the west by CTH H. The long planned Lake Arterial addresses both of these spacing problems.

A third deficiency is indirection in the arterial street and highway system. Indirection in the existing arterial street system and, in the future based on the adopted regional land use and transportation system plans--in the absence of the long planned Lake Arterial extension--includes a lack of direct north-south movement in the central portion of Racine County within the study area between STH 11 and CTH K; and a lack of direct north-south movement between this part of the study area and Milwaukee County. The long planned Lake Arterial extension addresses both these arterial system indirection problems.

Conclusion--Existing and Future Arterial System Deficiencies

In the absence of the Lake Arterial extension, traffic congestion may be expected on selected Milwaukee County and Racine County arterials; and arterial spacing and system indirection problems will exist in Milwaukee and Racine Counties.

ALTERNATIVES FOR ADDRESSING ARTERIAL TRAFFIC DEFICIENCIES

Potential alternatives for addressing the identified transportation deficiencies are identified and evaluated in this section of the report. The potential alternatives include the following:

1. The "status quo" alternative, which would not include the Lake Arterial extension and not provide any alternative additional north-south arterial capacity. All alternatives are compared to this status quo alternative. It should be noted that this alternative, along with all the other alternatives, is analyzed within the context of the adopted regional transportation system plan and county jurisdictional highway system plans. Therefore, this and other alternatives assume full implementation of the transit element of the plan as described earlier in this report, and also assume implementation of all highway improvements recommended in the plan, with the exception of the Lake Arterial. These highway improvements are shown on Map 12.
2. The Lake Arterial extension, as long proposed, from E. Layton Avenue to STH 31 at the Racine-Kenosha County line along the Chicago & North Western railway right-of-way. This alternative is shown on Map 13. Two major subalternatives under this alternative have been identified which would utilize existing highway facilities rather than location on new alignment. The subalternatives include:
 - a. The use of STH 38 between CTH G and CTH C, rather than new location; and

Map 12

RECOMMENDED ARTERIAL
HIGHWAY ELEMENT OF THE
ADOPTED REGIONAL TRANSPORTATION
SYSTEM PLAN AND COUNTY
JURISDICTIONAL HIGHWAY SYSTEM
PLANS^a

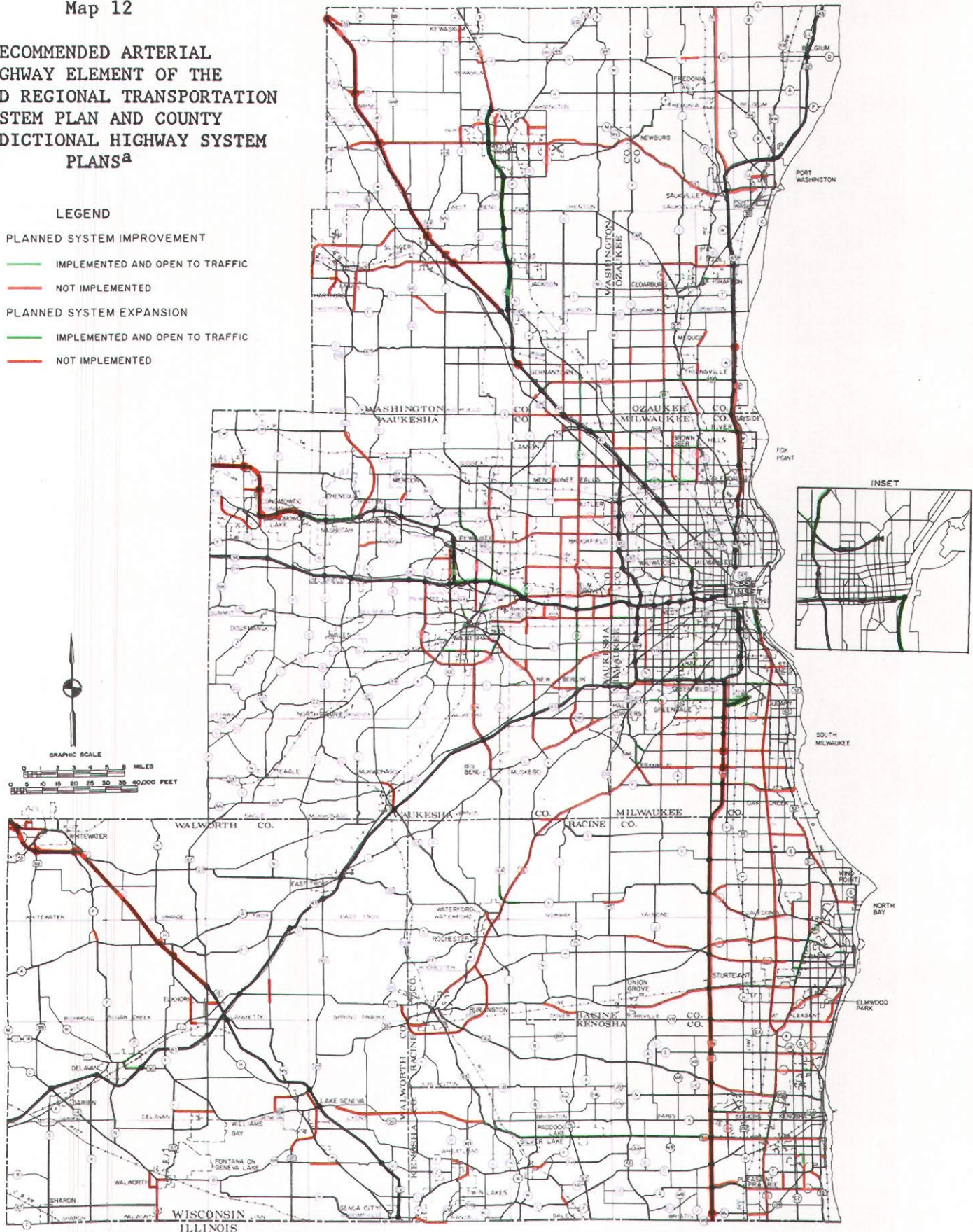
LEGEND

PLANNED SYSTEM IMPROVEMENT

- IMPLEMENTED AND OPEN TO TRAFFIC
- NOT IMPLEMENTED

PLANNED SYSTEM EXPANSION

- IMPLEMENTED AND OPEN TO TRAFFIC
- NOT IMPLEMENTED

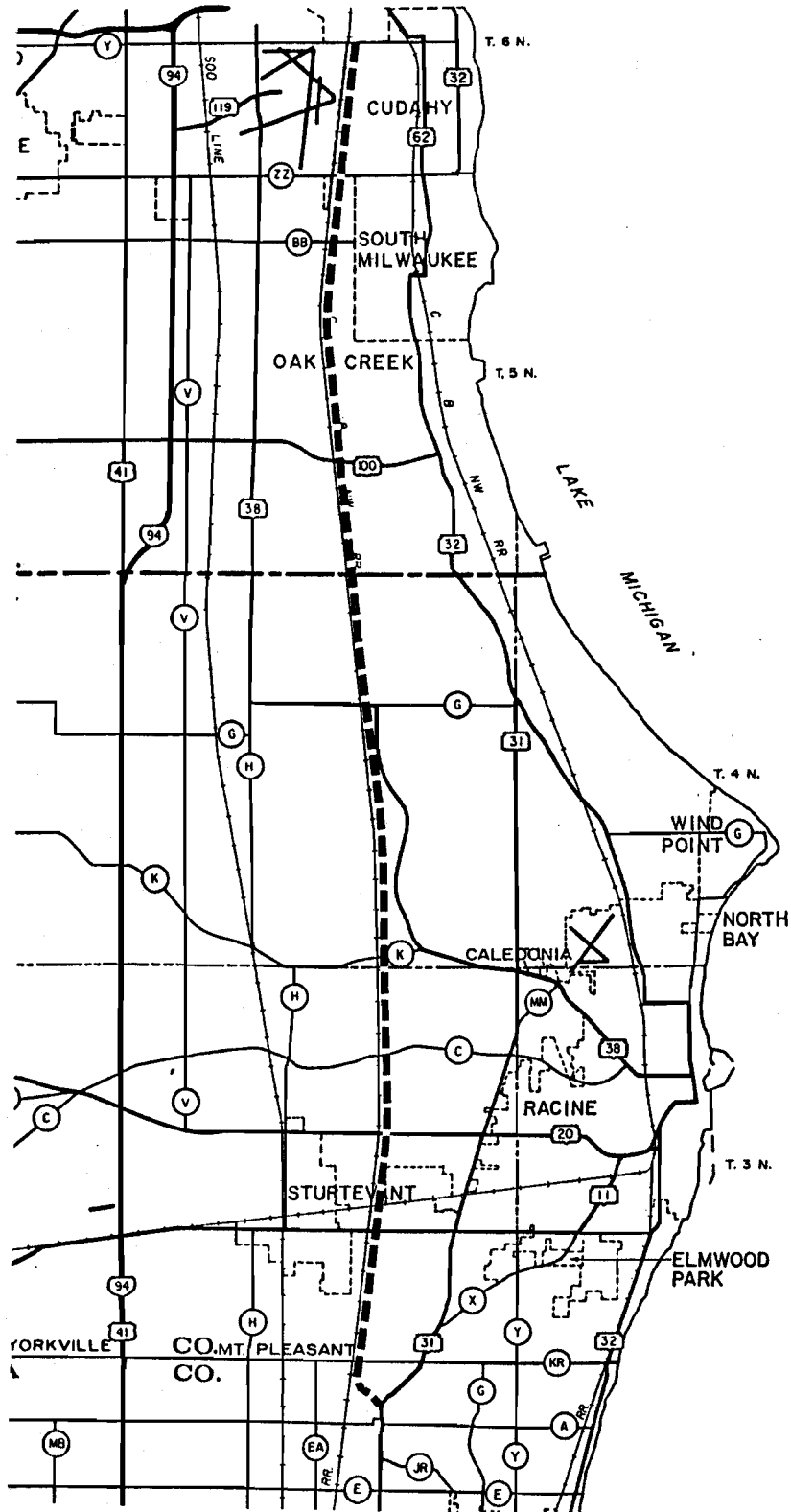


Source: SEWRPC.

^aIncludes improvements considered by, and given approval by, the Advisory Committee to the IH 94-South corridor land use-transportation study.

Map 13

ALTERNATIVE 2:
LONG PROPOSED LAKE ARTERIAL ALIGNMENT



Source: SEWRPC.

- b. The use of Airline Road, Stuart Road, and Willow Road between CTH K and STH 11 rather than new location.

These subalternatives are shown on Map 14. As they vary only modestly from the long proposed Lake Arterial alignment on new location and may not be expected to have substantially different traffic impacts compared to the long proposed Lake Arterial alignment alternative. These subalternatives may, however, be expected to differ with respect to impacts of cost and disruption.

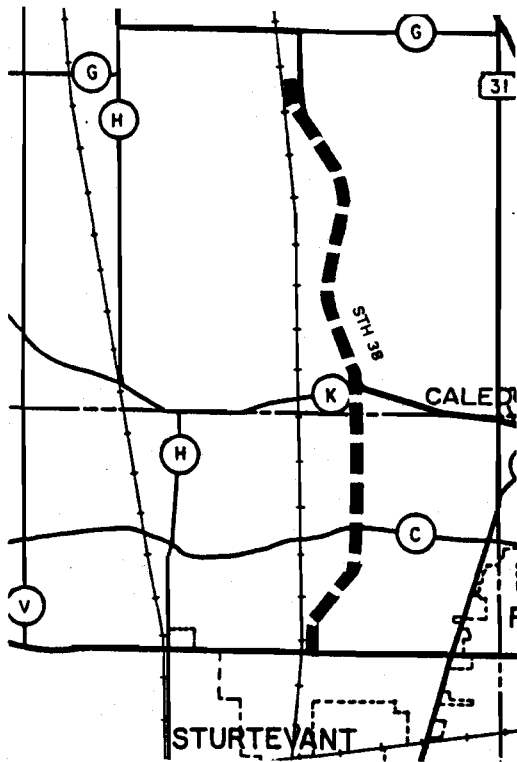
3. An alternative using existing arterial facilities rather than new location, specifically, along S. Pennsylvania Avenue, STH 100, STH 32, and STH 31. This alternative is shown on Map 15. This alternative would require improvements to S. Pennsylvania Avenue and STH 31 not recommended in the adopted regional plans, specifically, the improvement of S. Pennsylvania Avenue to four traffic lanes; improvement of STH 31 between STH 32 and Four Mile Road to four traffic lanes; and the improvement of STH 31 between CTH MM and STH 11 to eight traffic lanes. In addition, this alternative would require the improvement of STH 32 between STH 100 and STH 31 beyond the undivided four-lane arterial envisioned under the adopted regional transportation system plan to a four-lane arterial with a center two-way left-turn lane.
4. An alternative using existing facilities rather than new location, specifically a route along E. Layton Avenue between the to-be-constructed Lake Arterial terminus and STH 38; STH 38 between E. Layton Avenue and CTH G; CTH H between CTH G and CTH K; new location and Borgardt Road between CTH K and STH 20; and West Road and CTH H between STH 20 and CTH KR; and CTH KR to STH 31. This alternative is shown on Map 16. This alternative would require improvements not recommended in the adopted regional plan, specifically, the widening of STH 38 between Oakwood Road and CTH G to four lanes and the widening of CTH H and construction of its extension to four traffic lanes between STH 38 and CTH KR.
5. An alternative using existing S. Pennsylvania Avenue for the routing of the Lake Arterial between E. Layton Avenue and STH 100, and using the long proposed Lake Arterial alignment for the remainder of the route. This alternative is shown on Map 17 and would require the improvement of existing S. Pennsylvania Avenue to four traffic lanes, an improvement not recommended in the adopted regional plan.
6. An alternative using existing E. Layton Avenue and STH 38 for the routing of the Lake Arterial between E. Layton Avenue and CTH G, and using the long proposed Lake Arterial alignment for the remainder of the route. This alternative is shown on Map 18, and would require an improvement of existing STH 38 between Oakwood Road and CTH G to four traffic lanes, an improvement not recommended in the adopted regional plan.

The six alternatives are further described in Table 4 and are evaluated and compared in Table 5. The two subalternatives are evaluated and compared to the long proposed Lake Arterial alignment in Table 6. The comparison of Alternative 2, which is the long proposed Lake Arterial facility, to the four other alternatives indicates that Alternative 2 generally has a higher capital cost

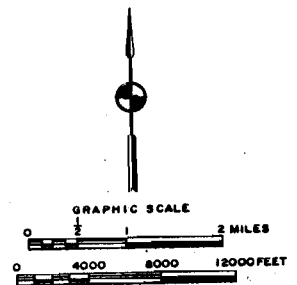
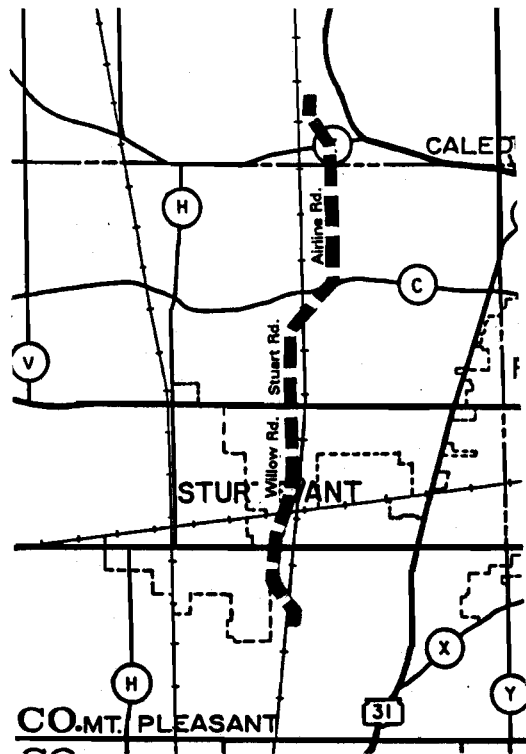
Map 14

SUBALTERNATIVES TO SEGMENTS OF THE
LONG PROPOSED LAKE ARTERIAL ALIGNMENT

Subalternative 1

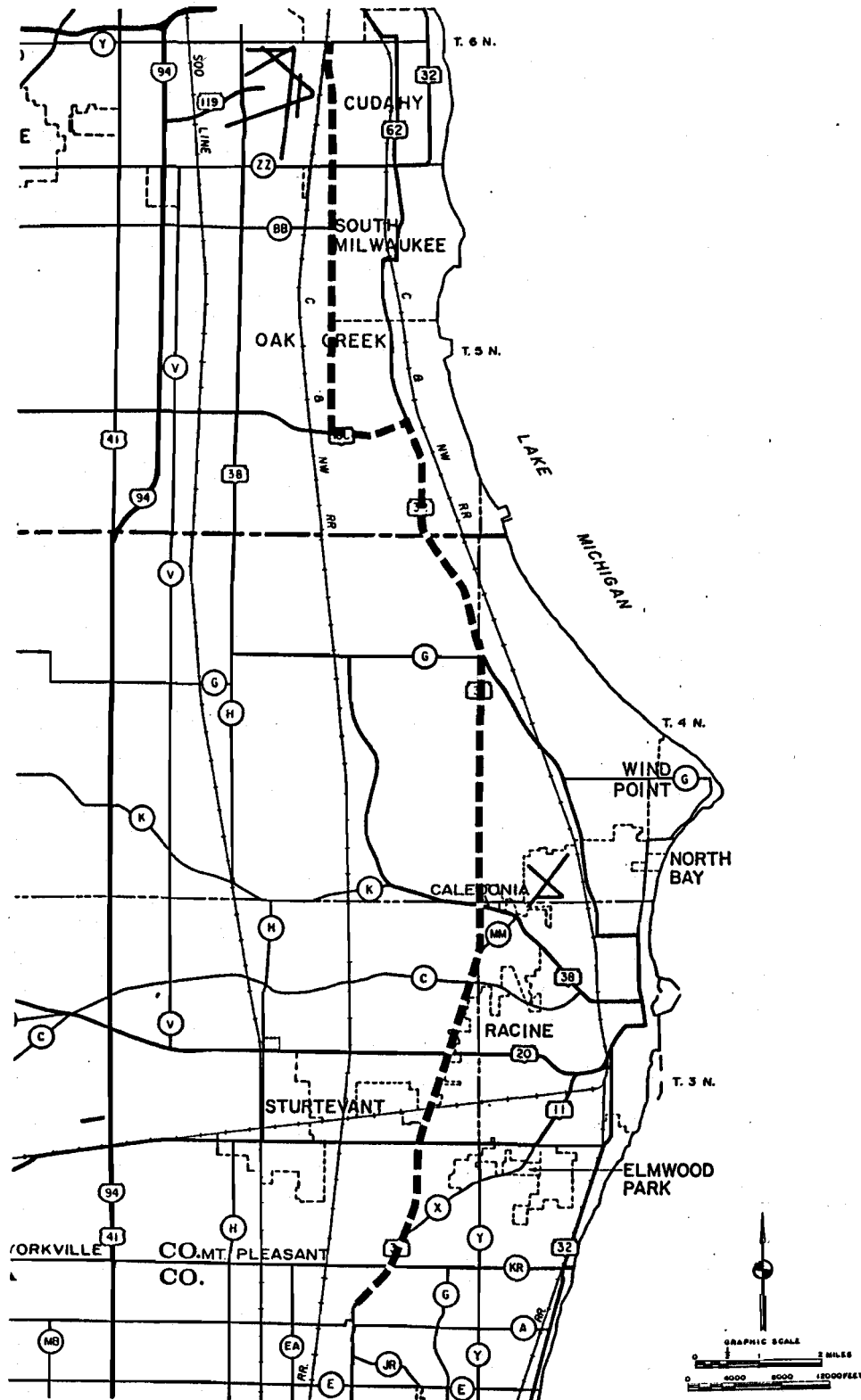


Subalternative 2



Map 15

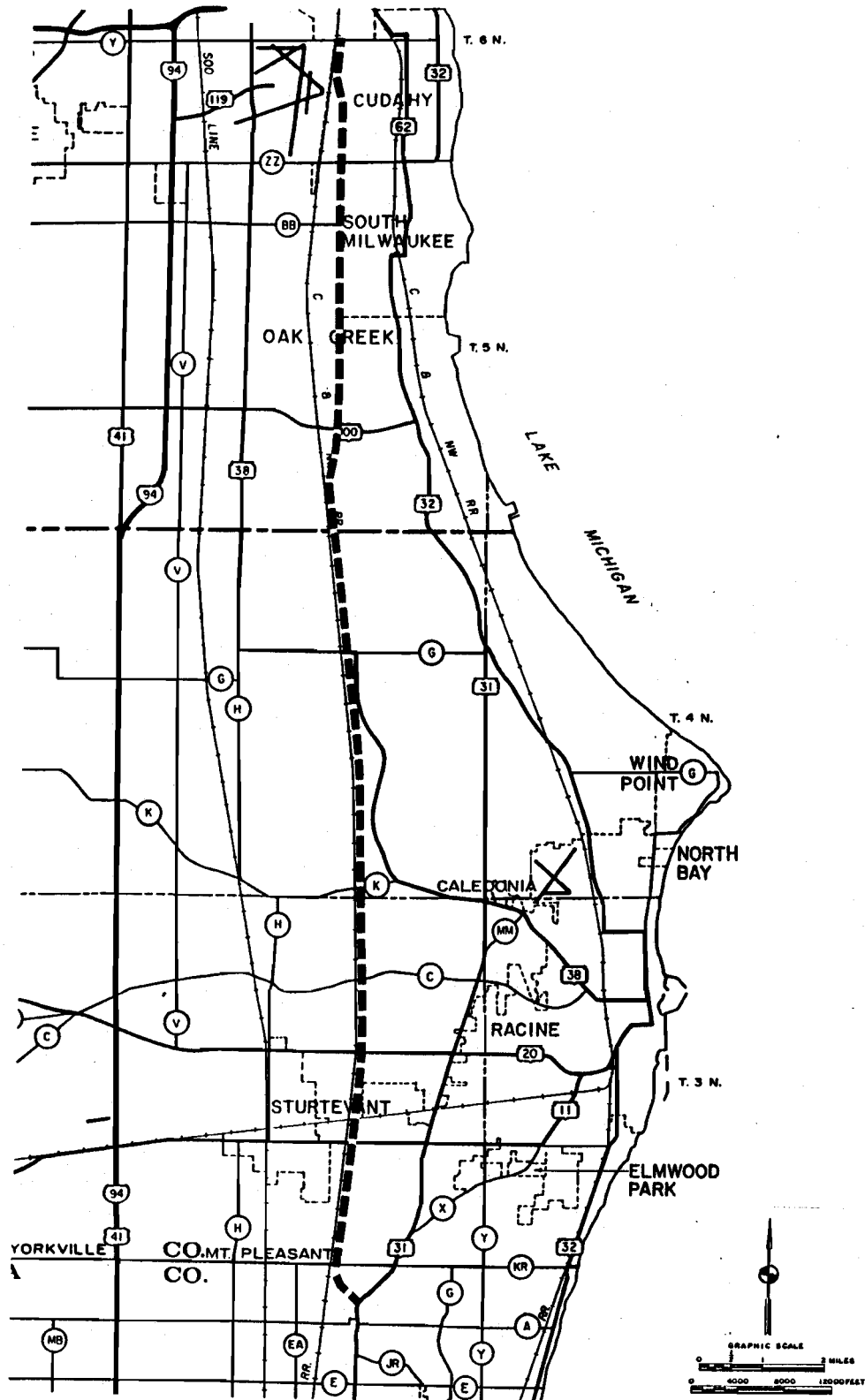
ALTERNATIVE 3: ALIGNMENT
ALONG EXISTING PENNSYLVANIA AVENUE,
STH 100, STH 32, AND STH 31



Source: SEWRPC.

Map 17

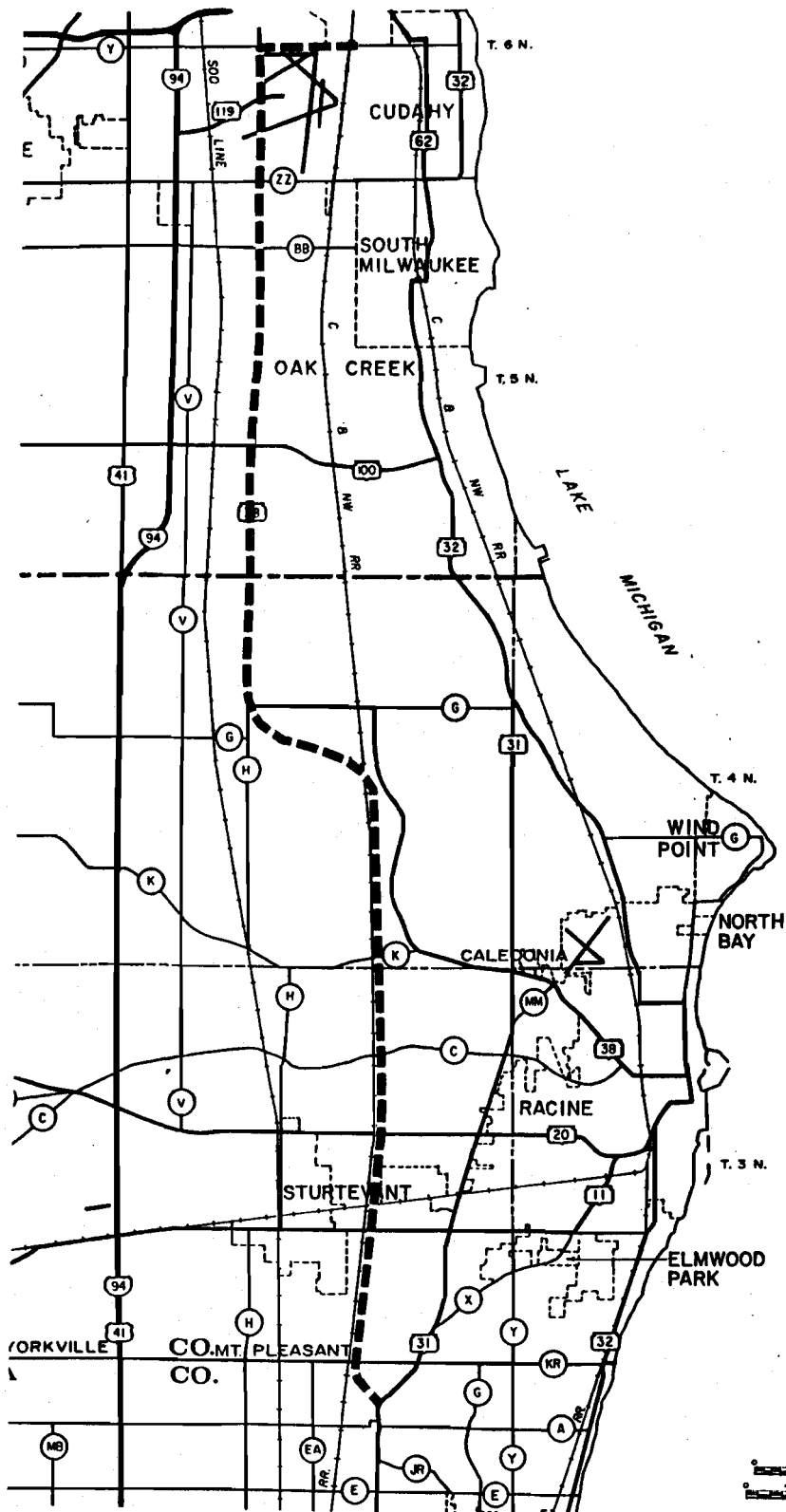
ALTERNATIVE 5: ALIGNMENT ALONG EXISTING
PENNSYLVANIA AVENUE IN MILWAUKEE COUNTY AND LONG
PROPOSED LAKE ARTERIAL ALIGNMENT IN RACINE COUNTY



Source: SEWRPC.

Map 18

ALTERNATIVE 6: ALIGNMENT ALONG EXISTING STH 38 IN
MILWAUKEE COUNTY AND ALONG
LONG PROPOSED LAKE ARTERIAL ALIGNMENT IN RACINE COUNTY



Source: SEWRPC.

Table 4

DESCRIPTION OF EACH IMPROVEMENT ALTERNATIVE IN THE LAKE ARTERIAL CORRIDOR

Alternative	Segment	Description	Capital Cost
2. Long Proposed Lake Arterial	Layton Avenue to STH 31 in Kenosha County	New four-traffic-lane divided arterial (130 feet of right-of-way--as recommended in adopted regional plan) ^a	\$37 million
		Total	\$37 million
3. Route on Existing Pennsylvania Avenue, STH 100, STH 32, STH 31	<u>New Transition Roadway</u> Layton Avenue to Pennsylvania Avenue	New four-traffic-lane divided arterial (130 feet of right-of-way--represents addition to adopted regional plan)	\$ 2 million
	<u>Pennsylvania Avenue</u> Transition roadway to STH 100	Improve to four-traffic-lane divided arterial (100 feet of right-of-way--represents addition to adopted regional plan)	\$11 million
	<u>STH 100</u> Pennsylvania Avenue to STH 32	Improve to four-traffic-lane divided arterial (130 feet of right-of-way--already recommended in adopted regional plan at \$2.7 million capital cost)	--
	<u>STH 32</u> STH 100 to STH 31	Improve to four-traffic-lane arterial with two-way left-turn lane (90 feet of right-of-way--represents an incremental improvement over the four-lane undivided arterial recommended under the adopted plan at \$8.0 million capital cost)	\$ 1 million
	<u>STH 31</u> STH 32 to Four Mile Road	Improve to four-traffic-lane divided arterial (110 feet of right-of-way--represents an addition to adopted regional plan)	\$ 4 million

-continued-

Alternative	Segment	Description	Capital Cost
3. Route on Existing Pennsylvania Avenue (continued)	<u>STH 31</u> Four Mile Road to CTH MM	Improve to four-traffic-lane divided arterial (110 feet of right-of-way-- already recommended in adopted regional plan at \$6.6 million capital cost)	--
	<u>STH 31</u> CTH MM to STH 11	Improve to eight-traffic-lane divided arterial (160 feet of right-of-way-- represents addition to adopted regional plan	\$11 million
	<u>STH 31</u> STH 11 to 56th Avenue in Kenosha County	Improve to four-traffic-lane divided arterial (130 feet of right-of-way-- already recommended in adopted regional plan at \$6.4 million capital cost)	--
		Total	\$29 million
4. Route on Existing Layton Avenue, STH 38, CTH H and Its Extension, and CTH KR	<u>Layton Avenue</u> Lake Arterial terminus to STH 38	Improve terminus at Layton Avenue to provide additional turning lanes. Auxiliary/distress lanes on Layton Avenue needed to carry traffic	\$ 3 million
	<u>STH 38</u> Layton Avenue to Oakwood Road	Auxiliary/distress lanes needed to carry traffic	--
	<u>STH 38</u> Oakwood Road to CTH H	Improve to four-traffic-lane divided arterial (130 feet of right-of-way-- represents addition to adopted regional plan)	\$ 4 million
	<u>CTH H/Borgardt Road/West Road</u> CTH G to CTH KR	Improve, and construct extensions, to provide four-traffic-lane divided arterial (130 feet of right-of-way-- represents addition to adopted regional plan)	\$12 million

-continued-

Alternative	Segment	Description	Capital Cost
4. Route on Existing Layton Avenue (continued)	<u>CTH KR</u> CTH H to STH 31	Improve to four-traffic-lane divided arterial (130 feet of right-of-way--already recommended in adopted regional plan at \$3.7 million capital cost)	--
	<u>STH 31</u> CTH KR to 56th Avenue in Kenosha County	Improve to four-traffic-lane divided arterial (130 feet of right-of-way--already recommended in adopted regional plan at \$2.0 million capital cost)	--
		Total	\$19 million
5. Route on Existing Pennsylvania Avenue in Milwaukee County and Long Planned Lake Arterial in Racine County	<u>New Transition Roadway</u> Layton Avenue to Pennsylvania Avenue	New four-traffic-lane divided arterial (130 feet of right-of-way--represents addition to long range plan)	\$ 3 million
	<u>Pennsylvania Avenue</u> Transition roadway to STH 100	Improve to four-traffic-lane divided arterial (100 feet of right-of-way--represents addition to long range plan)	\$13 million
	<u>Transition Roadway</u> STH 100 to the long planned Lake Arterial alignment	New four-traffic-lane divided arterial (130 feet of right-of-way--represents addition to adopted regional plan)	\$ 2 million
	<u>Long Planned Lake Arterial</u> Transition roadway to STH 31 in Kenosha County	New four-traffic-lane divided arterial (130 feet of right-of-way--as recommended in adopted regional plan)	\$23 million
		Total	\$41 million
6. Route on Existing Layton Avenue and STH 38 in Milwaukee County and the Long Planned Lake Arterial in Racine County	<u>Layton Avenue</u> Lake Arterial terminus to STH 38	Improve terminus at Layton Avenue to provide additional turning lanes. Auxiliary/distress lanes on Layton Avenue needed to carry traffic	\$ 3 million

-continued-

Alternative	Segment	Description	Capital Cost
6. Route on Existing Layton Avenue and STH 38 (continued)	<u>STH 38</u> Layton Avenue to Oakwood Road	Auxiliary/distress lanes needed to carry traffic	--
	<u>STH 38</u> Oakwood Road to CTH G	Improve to four-traffic-lane divided arterial (130 feet of right-of-way--represents addition to adopted regional plan)	\$ 4 million
	<u>New Transition Roadway</u> CTH G to long proposed Lake Arterial	New four-traffic-lane divided arterial (130 feet of right-of-way--represents addition to adopted regional plan)	\$ 3 million
	<u>Long Planned Lake Arterial Alignment</u> Transition roadway to STH 31 in Kenosha County	New four-traffic-lane divided arterial (130 feet of right-of-way--as recommended in adopted regional plan)	\$19 million
		Total	\$29 million

^aThe proposed Lake Arterial is envisioned to be a divided four-lane arterial on 130 feet of right-of-way constructed at-grade with at-grade intersections. Other options could be identified--as they could for the other alternatives under study--which could include a wider right-of-way, greater access control, or other characteristics such as a different alignment or cross-section, which may increase capital cost.

Source: SEWRPC.

Table 5

EVALUATION OF ALTERNATIVES WITH RESPECT TO LAKE ARTERIAL EXTENSION

-9j-

Evaluation Measures	Alternative 1: Do-Nothing Alternative	Alternative 2: Long Proposed Lake Arterial	Alternative 3: Route Along and Improve Existing Facilities o Pennsylvania Avenue o STH 100 o STH 32 o STH 31	Alternative 4: Route Along and Improve Existing Facilities o STH 38 o CTH H o CTH KR	Alternative 5: Long Proposed Lake Arterial with Routing over Pennsylvania Avenue in Milwaukee County	Alternative 6: Long Proposed Lake Arterial with Routing over STH 38 in Milwaukee County and Northern Racine County
Traffic Impacts						
o Traffic and Traffic Congestion on Arterial Streets.....	Substantial increase in traffic and congestion, particularly Pennsylvania Avenue, STH 31, and STH 38	Lake Arterial may be expected to abate existing and future traffic congestion in corridor	Some traffic congestion may be expected to remain--STH 32 and STH 38 in Racine County	Major improvement of existing facilities may be expected to only modestly reduce severity of existing and future traffic congestion in corridor. Congested facilities include Pennsylvania Avenue, STH 31, and STH 38	Lake Arterial may be expected to abate existing and future traffic congestion in corridor, with the exception of the northern portion of Pennsylvania Avenue	Existing and future traffic congestion may be expected to be abated in Racine County, but not in Milwaukee County on Pennsylvania Avenue
Average Weekday Traffic Volume (awdt)						
Street	Existing (1987-1990)	Existing Design Capacity	Year 2010	Planned Design Capacity	Year 2010	Planned Design Capacity
Pennsylvania Avenue (Layton Avenue to STH 100)...	3,100 to 13,800	13,000	12,000 to 21,000	13,000	6,000 to 13,000	13,000
STH 31 (CTH MM to CTH X).....	13,700 to 35,000	7,000 to 35,000	24,000 to 40,000	25,000 to 35,000	13,000 to 30,000	25,000 to 35,000
STH 38 (Layton Avenue to Oakwood Road).....	11,100 to 20,100	25,000 to 35,000	21,000 to 32,000	25,000 to 35,000	15,000 to 28,000	25,000 to 35,000
STH 38 (Oakwood Road to CTH K).....	2,000 to 5,300	7,000	8,000 to 13,000	7,000	2,000 to 7,000	7,000
Packard Avenue and Chicago Avenue (Layton Avenue to STH 100).....	8,300 to 19,600	13,000	16,000 to 20,000	13,000 to 17,000	9,000 to 18,000	13,000 to 17,000
STH 32 (Layton Avenue to STH 31).....	10,900 to 12,200	7,000 to 13,000	22,000	17,000	16,000	17,000
Lake Arterial (Layton Avenue to STH 31).....	--	--	--	--	11,000 to 19,000	25,000
o Travel Indirection.....	Continued indirection of travel in central portion of eastern Racine County between northeastern Racine County and southeastern Milwaukee County	Existing travel indirection is eliminated	Continued indirection of travel in central portion of eastern Racine County and between northeastern Racine County and southeastern Milwaukee County	Continued indirection of travel in central portion of eastern Racine County and between northeastern Racine County and southeastern Milwaukee County	Existing travel indirection is eliminated	Continued indirection of travel between northeastern Racine County and southeastern Milwaukee County
o Through Traffic on Local Streets.....	As arterial congestion increases, more traffic on land access and collector streets may occur, including Stuart, Willow, and Airline Roads	Existing through traffic on local streets is eliminated	As arterial congestion increases and arterial indirection continues, more traffic on land access and collector streets may occur, including Stuart, Willow, and Airline Roads	As arterial congestion increases and arterial indirection continues, more traffic on land access and collector streets may occur, including Stuart, Willow, and Airline Roads	Existing through traffic on local streets is eliminated	Thorough traffic may be expected to increase on selected local arterials, including Nicholson Road in Milwaukee and Racine Counties
Traffic Impacts (continued)						
o Other Traffic Impacts.....	--	--	This alternative proposes these additional major improvements of the following streets to reduce need for the Lake Arterial: o Improve Pennsylvania Avenue to four-lane divided arterial o Improve STH 32 between STH 100 and STH 31 to four-lane arterial with center two-way left-turn lane o Improve STH 31 between Four Mile Road and STH 32 to four-lane divided arterial o Improve STH 31 between CTH MM and STH 11 to eight-lane divided arterial	This alternative proposes these additional major improvements to resolve need for the Lake Arterial: o Improve STH 38 and CTH H between Oakwood Road and Adams Road to four-lane divided arterial o Construct CTH H on new alignment as four-lane divided arterial between Adams Road and Kraut Road o Improve Borgardt Road to four-lane divided arterial between Kraut Road and CTH C o Construct CTH H to four-lane divided arterial on new alignment between CTH C and STH 20 o Improve West Road and CTH H between STH 20 and CTH KR to four-lane divided arterial	This alternative proposes routing the Lake Arterial in Milwaukee County over Pennsylvania Avenue and entails its improvement to a four-lane divided arterial; and the construction of transition roadways to the long planned Lake Arterial alignment	This alternative proposes routing the Lake Arterial over STH 38 in Milwaukee County and entails the following additional major improvements: o Improve STH 38 to a four-lane divided arterial between Oakwood Road and CTH G o Construct a four-lane divided arterial on new alignment between STH 38 at CTH G and the Lake Arterial at Five Mile Road
Capital Costs						
Construction.....	--	\$34 million	\$22 million	\$18 million	\$36 million	\$27 million
Right-of-Way.....	--	\$ 3 million	\$ 7 million	\$ 1 million	\$ 5 million	\$ 2 million
Total Cost.....	--	\$37 million	\$29 million	\$19 million	\$41 million	\$29 million
Disruption						
o Right-of-Way Acquisition.....	None	20.5 miles of new 130-foot-wide right-of-way east of the Chicago & North Western Transportation Company right-of-way through predominantly agricultural and open lands	1.3 miles of a new 130-foot-wide right-of-way through predominantly open land; and 14.4 miles of additional 24-foot to 44-foot-wide right-of-way along existing roadway facilities to be widened. Adjacent lands to the existing facilities include agricultural, residential, and commercial land uses	3.2 miles of new 130-foot-wide right-of-way through predominantly agricultural land; and 10.0 miles of an additional 64 feet of right-of-way along existing roadway facilities through predominantly agricultural land, but including some residential lands	15.4 miles of new 13-foot-wide right-of-way east of Chicago & North Western Transportation Company right-of-way through predominantly agricultural and open lands; and 5.7 miles of an additional 64 feet of right-of-way along S. Pennsylvania Avenue through residential and agricultural lands	12.2 miles of new 130-foot-wide right-of-way located through predominantly agricultural lands (10.1 miles along railway right-of-way); and 3.0 miles of an additional 64 feet of right-of-way along STH 38 through predominantly agricultural and open lands
o Property Acquisition.....	None	5 residences 6 businesses	48 residences 8 businesses	7 residences 1 business	26 residences 5 businesses	5 residences 4 businesses
o Environmental Corridor Acquisition.....	None	30 acres primary 10 acres secondary -- acres isolated natural area 29 acres wetland (included in above)	3 acres primary 1 acre secondary 1 isolated natural area 2 acres wetland (included in above)	4 acres primary 2 acres secondary 2 acres isolated natural area 6 acres wetland (included in above)	21 acres primary 3 acres secondary -- acres isolated natural area 21 acres wetland (included in above)	4 acres primary 2 acres secondary 1 acres isolated natural area 4 acres wetland (included in above)
o Number of Residential Structures Within 500 Feet of Roadway Centerline.....	--	72 residences	1,031 residences	137 residences	599 residences	86 residences

Table 6

EVALUATION OF LAKE ARTERIAL ALIGNMENT
SUBALTERNATIVES WHICH UTILIZE EXISTING FACILITIES

Evaluation Measure	Subalternative 1		Subalternative 2	
	Lake Arterial Alignment on New Location	Alignment on STH 38 Between CTH G and CTH C	Lake Arterial Alignment on New Location	Alignment on Airline, Stuart, and Willow Roads Between CTH K and STH 11
Capital Cost				
Construction.....	\$ 9 million	\$10 million	\$ 9 million	\$11 million
Right-of-Way.....	\$ 1 million	\$ 1 million	\$ 2 million	\$ 2 million
Total Cost	\$10 million	\$11 million	\$11 million	\$13 million
Disruption				
o Right-of-Way Acquisition.....	5.6 miles of new 130-foot-wide right-of-way generally through agricultural and open lands adjacent to Chicago & North Western railway right-of-way and trackage	3.4 miles of new 130-foot-wide right-of-way generally through agricultural and open lands. Also, 2.9 miles of additional 64-foot-wide right-of-way centered on existing STH 38 between Five Mile Road and CTH K. Adjacent land uses to STH 38 include residential and agricultural land uses	5.1 miles of new 130-foot-wide right-of-way generally through agricultural and open lands adjacent to Chicago & North Western railway and trackage	3.3 miles of additional 64-foot-wide right-of-way along existing Airline, Stuart, and Willow Roads. Adjacent land uses are residential. 2.0 miles of new 130-foot-wide right-of-way to connect these existing roadways and the the Lake Arterial alignment through predominantly agricultural and open land uses
o Property Acquisition.....	2 residences 2 businesses	1 residence 1 business	3 residences 3 businesses	9 residences 4 businesses
o Environmental Corridors Acquisition.....	-- acres primary 1 acre secondary -- acres isolated natural area 1 acre of wetland (included in above)	1 acre primary 2 acres secondary 4 acres isolated natural area 4 acres of wetland (included in above)	-- acres primary 2 acres secondary -- acres isolated natural area 2 acres of wetland (included in above)	-- acres primary 1 acre secondary -- acres isolated natural area -- acres of wetland (included in above)
o Number of Residences Within 500 Feet of Roadway Centerline.....	13 residences	108 residences	16 residences	73 residences

-continued-

Evaluation Measure	Subalternative 1		Subalternative 2	
	Lake Arterial Alignment on New Location	Alignment on STH 38 Between CTH G and CTH C	Lake Arterial Alignment on New Location	Alignment on Airline, Stuart, and Willow Roads Between CTH K and STH 11
<u>Indirection</u>	No indirection	7,100 miles of indirection for 10,000 vehicles per average weekday - o 91,000 annual additional gallons of motor fuel - o 42.2 annual additional tons of carbon monoxide - o 3.2 annual additional tons of hydrocarbons	No indirection	3,000 miles of indirection for 15,000 vehicles per average weekday - o 58,000 annual additional gallons of motor fuel - o 42.9 annual additional tons of carbon monoxide - o 4.5 annual additional tons of hydrocarbons

Source: SEWRPC.

and requires the acquisition of more environmental corridors and wetlands than the other alternatives. However, Alternative 2 is the only alternative which may be expected to fully resolve existing and potential future traffic congestion problems and travel indirection problems. Moreover, the number of residences and businesses required to be acquired to construct Alternative 2 is about the same as, or significantly less than, the number required under the other alternatives. Also, the number of remaining residential structures which may be potentially affected by a new or improved roadway--as measured by the number of residential structures located within 500 feet of each alternative--is the least under Alternative 2 and is substantially greater under some of the other alternatives.

A comparison of Alternative 2--the long planned Lake Arterial facility--to Alternative 5--which would vary from the long planned Lake Arterial in that it would be routed over S. Pennsylvania Avenue in Milwaukee County--indicates that the Lake Arterial has only one disadvantage in that it would require the acquisition of 40 acres of environmental corridor as compared to 24 acres for Alternative 5. Alternative 2--the Lake Arterial--is superior with respect to the other evaluation criteria. Its capital cost of \$37 million is less than the \$41 million cost of Alternative 5. Alternative 2 would fully resolve all traffic congestion problems in the corridor, while traffic congestion would remain on the northern segment of S. Pennsylvania Avenue under Alternative 5. The total number of homes and businesses estimated to be acquired under Alternative 2 is 11, compared to 31 under Alternative 5; and the number of residential structures located within 500 feet of the centerline of Alternative 2 is estimated to be 72 compared to nearly 600 under Alternative 5.

Alternative 4 would route the Lake Arterial along existing E. Layton Avenue and STH 38, and then along CTH H and its extensions to CTH KR, and then along CTH KR to STH 31 in Kenosha County. This alternative has a substantially lower capital cost than Alternative 2--the long planned Lake Arterial--approximately \$19 million compared to \$37 million. Alternative 4 also may be expected to result in less disruption of environmental corridor, requiring acquisition of six acres of corridor compared to 40 acres under Alternative 2. Alternative 4, however, is estimated to result in approximately the same number of takings of residences and businesses, that is, about a total of about eight compared to 11 under Alternative 2. Also, approximately 137 residential structures would be located within 500 feet of the centerline of Alternative 4 compared to 72 under Alternative 2. The principal disadvantage of Alternative 4 is that it does not address the identified traffic indirection and congestion problems because the improved route is located substantially to the west of the identified existing and future traffic and development problems. Alternative 4 would not resolve the travel indirection problem in the central portion of eastern Racine County, and between northeastern Racine County and southeastern Milwaukee County. Moreover, it may not be expected to substantially abate existing and anticipated future traffic congestion problems on STH 31, S. Pennsylvania Avenue, and segments of STH 38 in Racine County.

Alternative 3 would also be largely routed over existing highway facilities and require improvement of those facilities. It would be routed over S. Pennsylvania Avenue, STH 100, STH 32, and STH 31. The capital cost of Alternative 3 is an estimated \$29 million, which is about 20 percent less than the

estimated cost of \$37 million of Alternative 2--the long planned Lake Arterial facility. The other advantage of Alternative 3 is that its required acquisition of environmental corridors is only about four acres compared to 40 acres under Alternative 2. Alternative 2, however, has several substantial advantages compared to Alternative 3. Alternative 3 does not address the identified travel indirection problem between northeastern Racine county and southeastern Milwaukee County, or the travel indirection problem in the central portion of eastern Racine County. Also, under Alternative 3, a traffic congestion problem would continue to exist on STH 32 between STH 31 and STH 100, and on STH 38 in Racine County. Also, the estimated 56 residences and businesses required to be acquired under Alternative 3 is substantially greater than the 11 required under Alternative 2--the long planned Lake Arterial. In addition, the number of residential structures within 500 feet of the proposed route centerline of Alternative 3 of over 1,000 residential structures is substantially greater than the 72 residential structures within 500 feet of Alternative 2.

Alternative 6 would provide a route over E. Layton Avenue and STH 38 in Milwaukee County and northern Racine County, and which would then connect STH 38 via a new roadway to the long proposed Lake Arterial facility over which it would be routed through central and southern Racine County. The advantages of Alternative 6 over Alternative 2 include its estimated capital cost of \$29 million compared to \$37 million under Alternative 2; and its required acquisition of environmental corridors of about six acres compared to 40 acres under Alternative 2. The required acquisition of residences and businesses is about the same under each of the alternatives, that is, about nine residences and businesses under Alternative 6 compared to a total of 11 under Alternative 2. The disadvantage of Alternative 6 is that its use of STH 38 in northern Racine County and Milwaukee County does not address the travel indirection problem between northeastern Racine County and southeastern Milwaukee County; and it does not address the anticipated future traffic congestion problem on S. Pennsylvania Avenue. The number of residential structures within 500 feet of the centerline of the proposed route of Alternative 6 is estimated to be 86, which is modestly more than the 72 estimated under Alternative 2.

Also, two subalternatives to Alternative 2--the long planned Lake Arterial alignment--which utilize existing highway facilities were evaluated. As shown in Table 6, comparison of the subalternatives to the originally proposed alignment indicates that the original alignment is more desirable, as it has a lower capital cost, a more direct alignment, and fewer residences in proximity to the roadway centerline. The original alignment is also more desirable in terms of traffic safety, as the potential to limit access to the facility exists. Both original and subalternative alignments are similar in terms of the estimated number of residences and businesses to be acquired and the estimated amount of environmental corridors to be traversed.

Thus, in summary, as shown in Table 7, Alternative 5 has only one advantage over Alternative 2, namely that of reduced acquisition of environmental corridor land. However, this disadvantage may potentially be mitigated as part of the construction of Alternative 2 through creation of additional wetlands and environmental corridors of a higher quality than those disturbed. Alternative 5 has significant disadvantages compared to Alternative 2, including higher capital cost, incomplete resolution of traffic congestion problems, a greater need for acquisition of residences and businesses, and greater number

Table 7

SUMMARY OF EVALUATION OF ALTERNATIVES

Alternative	Capital Cost (\$ million)	Traffic Congestion	Travel Indirection	Acquisition of Residences and Businesses	Acquisition of Primary and Secondary Environmental Corridors (acres)	Number of Residential Structures Within 500 Feet of Roadway Centerline
1. Do-Nothing Alternative	--	Substantial congestion expected--Pennsylvania Avenue, STH 31, and STH 38	Continued indirection of travel in central portion of eastern Racine County and between north-eastern Racine County and south-eastern Milwaukee County	--	--	--
2. Long Proposed Lake Arterial	\$37	Abatement of congestion expected	Existing travel indirection is eliminated	11	40	72
3. Route Along and Improve Existing Facilities: Pennsylvania Avenue; STH 100; STH 32; STH 31	\$29	Some congestion expected to remain--STH 32 and STH 38	Continued indirection of travel in central portion of eastern Racine County and between north-eastern Racine County and south-eastern Milwaukee County	56	4	1,031
4. Route Along and Improve Existing Facilities: STH 38; CTH H; CTH KR	\$19	Substantial congestion expected to remain--Pennsylvania Avenue, STH 31, and STH 38	Continued indirection of travel in central portion of eastern Racine County and between north-eastern Racine County and south-eastern Milwaukee County	8	6	137
5. Long Proposed Lake Arterial with Routing Over Pennsylvania Avenue	\$41	Some congestion expected to remain--northern portion of Pennsylvania Avenue	Existing travel indirection is eliminated	31	24	599
6. Long Proposed Lake Arterial with Routing over STH 38 in Milwaukee County	\$29	Some congestion expected to remain--Pennsylvania Avenue	Continued indirection of travel between northeastern Racine County and southeastern Milwaukee County	9	6	86

Source: SEWRPC.

of residences located within 500 feet of the route centerline. Alternative 4, while having a lower capital cost and impact on environmental corridors than Alternative 2, fails in that it does not address the problems, the resolution of which is the reason for the transportation improvements being proposed in this corridor. That is, it does not address the travel indirection problem or severe traffic congestion problems on key arterial facilities. Similarly, Alternative 3, while it has a modestly lower capital cost than Alternative 2 and a substantially lower need for acquisition of environmental corridors and wetlands, does not substantially address travel indirection problems and the traffic congestion problems. Perhaps, more importantly, the total number of residences and businesses required to be acquired under Alternative 3 and the number of residences within 500 feet of the route centerline is substantially greater than that for Alternative 2--the long proposed Lake Arterial facility. Thus, Alternatives 3, 4, and 5 are less desirable than Alternative 2, which is the long planned Lake Arterial facility. It may be noted that Alternative 6 compared to Alternative 2 has a modestly lower capital cost of \$29 million compared to \$37 million for Alternative 2; and has less acquisition required of environmental corridors and wetlands. However, it does not fully resolve the traffic indirection and traffic congestion problems. The estimated acquisition of residences and businesses and the estimated number of residential structures within 500 feet of the route centerline are similar between Alternatives 2 and 6. In addition, Alternative 6 may be expected to have reduced traffic safety due to the greater potential to control access on Alternative 2; to result in substantial additional traffic--about 3,000 to 5,000 vehicles per average weekday--on Nicholson Road; and to require improvement of S. Pennsylvania Avenue to four traffic lanes, at a cost of approximately \$11 million.

Conclusions

In conclusion, the evaluation of alternatives has indicated that Alternative 2--the long planned Lake Arterial--is the most desirable of the alternatives identified; and has thus confirmed its long standing recommendation in regional and local plans. Alternative 2 is the only alternative which may be expected to fully resolve the traffic indirection and congestion problems in the corridor. In addition, Alternative 2 may be expected to require generally less acquisition of residences and businesses as part of its implementation and fewer residential structures are located near its potential right-of-way. Also, Alternative 2 may be expected to be more desirable in terms of traffic safety due to the potential greater control of access which may be exercised and the expected full provision of auxiliary/distress lanes on the facility.

It is recommended that Alternative 2 be further considered in the preliminary engineering study of the Lake Arterial corridor. It is further recommended that the identified two subalternatives to the original Lake Arterial alignment that utilize existing facilities--STH 38 and Airline/Stuart/Willow Roads--be rejected as the original alignment was identified as more desirable in terms of capital cost, the number of residences in proximity to the alignment, directness of the alignment, traffic safety, and structure and environmental corridor acquisition.

It is also recommended that Alternative 3--routing along and improvement of existing facilities including Pennsylvania Avenue, STH 100, STH 32, and

STH 31--and Alternative 4--routing along and improvement of existing facilities including Layton Avenue, STH 38, CTH H and its extension, and CTH KR--be rejected and not receive further consideration in the preliminary engineering study. The evaluation of Alternative 4 indicated that it may not be expected to address the transportation problems in the corridor of traffic indirection and traffic congestion. The evaluation of alternatives also indicated that Alternative 3 also may not be expected to fully address the identified traffic problems in the corridor of traffic indirection and congestion and, compared to Alternative 2, would result in substantially greater disruption of residences and businesses.

It is further recommended that Alternative 5--a route following the long planned Lake Arterial in Racine County and Pennsylvania Avenue in Milwaukee County--and Alternative 6--a route following the long planned Lake Arterial in Racine County and STH 38 in Milwaukee County--be further considered in the preliminary engineering study. The estimated capital costs of these two alternatives are similar to that of Alternative 2--the long proposed Lake Arterial; and Alternatives 5 and 6 may be expected to address some, although not all, of the identified traffic congestion and indirection problems in the corridor. Consideration should be given in the preliminary engineering study to variations in the alignments of Alternatives 5 and 6, specifically with respect to the transition proposed in Alternative 6 between the long proposed Lake Arterial alignment and STH 38. The alignment examined in this planning study provided the transition approximately two miles south of the Milwaukee-Racine County line. Consideration should be given to providing that transition at other locations, particularly at STH 100 in Milwaukee County.

Thus, the recommendations for the preliminary engineering study are that it further consider Alternatives 2, 5, and 6, and variations of those alternatives, while rejecting Alternatives 3 and 4 and the subalternatives for Alternatives 2, 5, and 6 within Racine County. The alignments for the improvements in the corridor to be examined in the preliminary engineering study, therefore, include in Racine County the long proposed Lake Arterial alignment, and in Milwaukee County the long proposed Lake Arterial alignment, together with alternatives of Pennsylvania Avenue and STH 38.