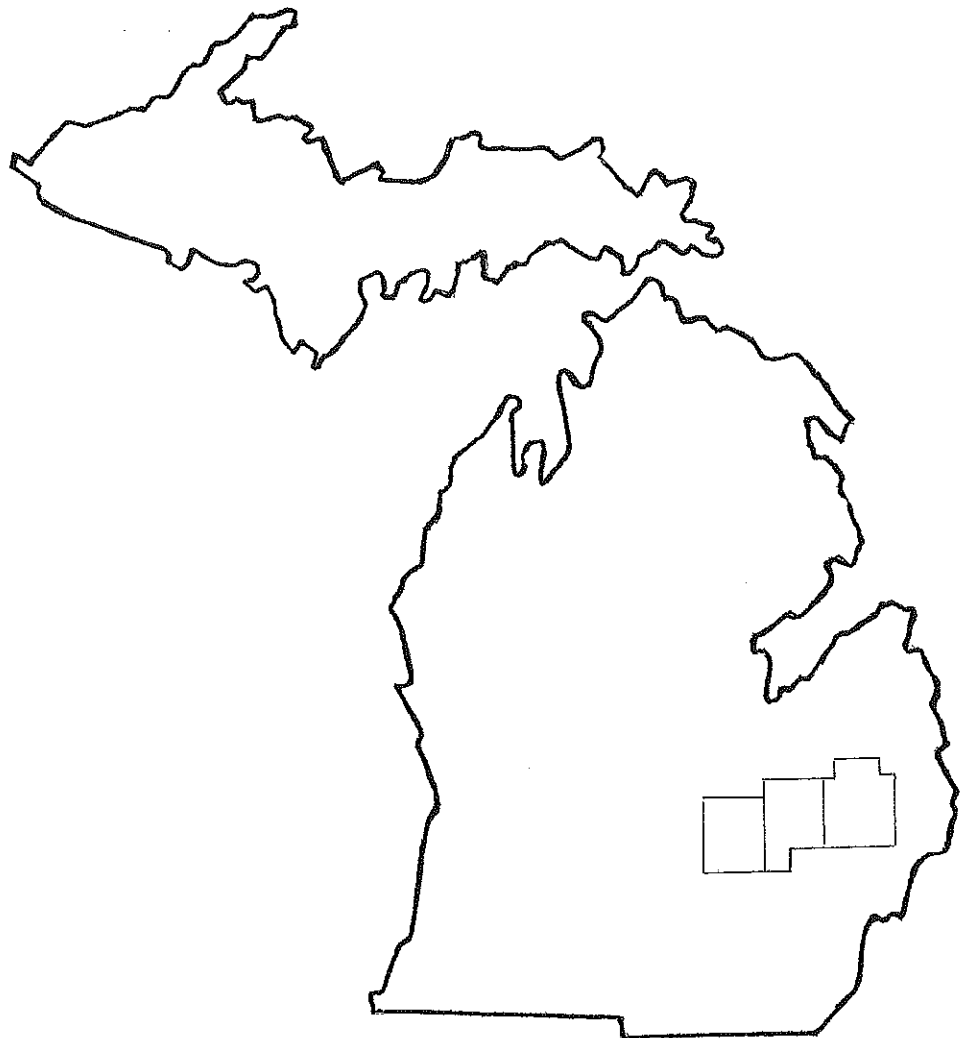


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GENESEE, LAPEER, SHIAWASSEE
REGION V
TRANSPORTATION STUDY



MICHIGAN DEPARTMENT OF TRANSPORTATION



MICHIGAN DEPARTMENT OF TRANSPORTATION

June, 1980

This report represents the findings
and/or professional opinions of the
Michigan Department of Transportation
staff and is not an official opinion
of the Michigan Transportation Commission.

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1 Introduction

The Constitution and Statutes of the State of Michigan make the Michigan Transportation Commission responsible for planning, building, and maintaining a transportation system for our state. To fulfill these responsibilities, the Michigan Department of Transportation has developed a planning process to guide the state and its governmental units in analyzing the adequacy of existing transportation systems and in preparing plans for future systems and facilities.

Traditionally, the planning process has been divided into two phases; systems planning and project planning (see diagram). Systems planning consists of analyzing transportation system needs and developing proposed networks designed to satisfy these needs. The process begins with the analysis of existing systems and facilities and their relationship to goals and objectives of the governmental units of the state and extends through establishment of a set of priorities for the improvement of the system by capital investment projects. Systems planning studies provide a general overview of how all modes of transportation interact in a given area. They address the physical and functional components of the various transportation systems and consider the probable general impacts to its users and nonusers. A detailed Environmental Impact Statement (E.I.S.) is not required at this stage due to the general nature of the study and the broad scope of issues. The contents of this report represent a system planning study as it relates to the Genesee Lapeer Shiawassee Region V (G.L.S. Reg. V).

Project planning is the process of analyzing the proposed construction

or improvements of specific transportation facilities to a point where all but one of the practical alternatives are eliminated. Because project planning deals with specific facility location and design, an E.I.S. may be required, depending on the extent of improvements and the intensity of impacts.

STUDY AREA

The geographic area considered in this transportation study coincides with the three county jurisdiction of the GLS Region Planning and Development Commission. This agency has been designated by the Governor's office as a multicounty regional planning agency for this area. In so doing, the Governor has requested all state agencies cooperate with the regional agency when planning various programs and to develop those programs to be consistent with regional goals and objectives. The GLS Region V Transportation Study represents the Department of Transportation's pledge to meeting this objective.

PURPOSE OF STUDY

The underlying purpose of this study is to identify current and future deficiencies and recommend improvements to various transportation systems operating in the 3-county region.

At the inception of the project, a plan was being developed only to facilitate the flow of one mode transportation - highway travel. However, the Governor charged the Department of Transportation with the task of providing adequate transportation by all modes of travel in the state. Consequently, the GLS Region V Transportation Study become a multimodal transportation

PLANNING

SYSTEMS PLANNING

Determines Need & Priorities
for General Project Location

PROJECT PLANNING

Deals with Specific Locations
and Types of Facility Designs

STATEWIDE SYSTEMS PLANNING

Deals with State & National
Transportation Needs – Results
in Broad Policy Determination

STATE MODAL PLANS

1. Airports
2. Busses
3. Highways
4. Railroads
5. Waterways

REGIONAL SYSTEMS PLANNING *

Relates Statewide Planning to
all Regions to Insure Consider-
ation of Local Goals

REGIONAL TRANSPORTATION STUDIES

1. Northeast Michigan Region
2. Northwest Michigan Region
3. East Central Michigan Region
4. etc.
5. etc.

CORRIDOR LOCATION STUDIES

Required When Facility must be
Relocated or Major Problems
Anticipated. Determines
General Corridor Location

DESIGN STUDIES

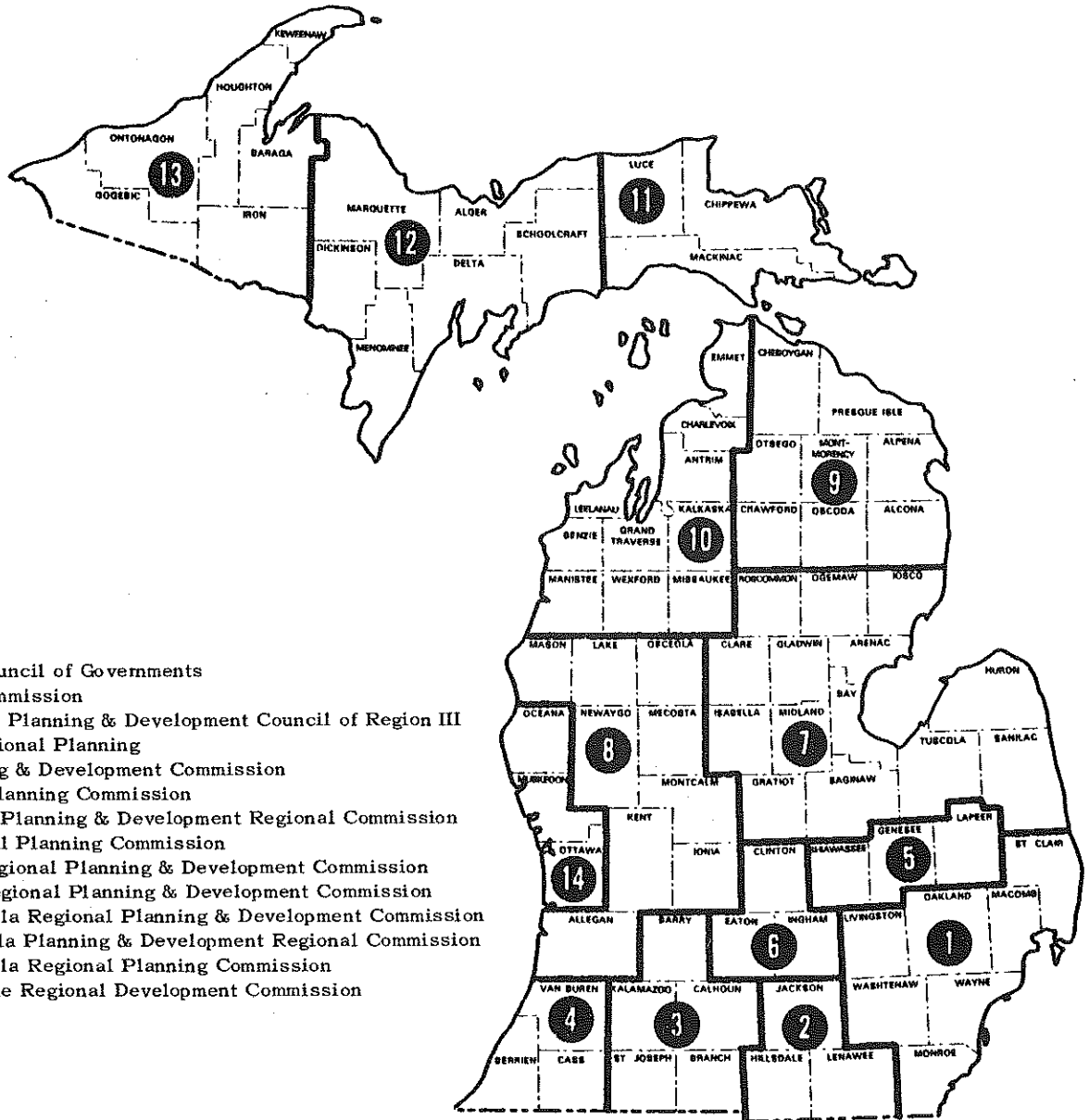
Evaluates Specific Locations
and Facility Types Within
the General Corridor



THE CONCERN OF THIS STUDY

STATE PLANNING AND DEVELOPMENT REGIONS

State of Michigan



LEGEND:

1. Southeast Michigan Council of Governments
2. Region II Planning Commission
3. South Central Michigan Planning & Development Council of Region III
4. MACOG, Michigan Regional Planning
5. GLS Region V Planning & Development Commission
6. Tri-County Regional Planning Commission
7. East Central Michigan Planning & Development Regional Commission
8. West Michigan Regional Planning Commission
9. Northeast Michigan Regional Planning & Development Commission
10. Northwest Michigan Regional Planning & Development Commission
11. Eastern Upper Peninsula Regional Planning & Development Commission
12. Central Upper Peninsula Planning & Development Regional Commission
13. Western Upper Peninsula Regional Planning Commission
14. West Michigan Shoreline Regional Development Commission

Regional Planning Commissions, as established under Public Act 281, Public Acts of 1945, as amended, exist in 14 multi-jurisdictional areas throughout Michigan. The state regions are funded by money from local, state, and federal sources and work in the program areas of land use, environmental protection, transportation, housing, economic development, water resources, law enforcement, waste management, recreation, manpower, and other programs.

planning effort and the scope of the project expanded to include integrated planning of rail, air, public transportation, water and nonmotorized, as well as highway facilities.

PLANNING METHODOLOGY

This study is being conducted by a multidisciplinary planning team called a "study team." A multidisciplinary team is one made up of people who have diverse educational backgrounds. The reason for using a multidisciplinary team is to bring together people with varying perspectives, who can provide a wide variety of ideas that can be applied to problem identification and solution. Typical membership of this study team includes engineers, planners, social scientists, economists, and environmentalists. In addition, the study team also has members representing the GLS Region V Planning and Development Commission and the Federal Highway Administration.

A key element of this document is the requirement to encourage the general public to become involved in the early planning stages for major transportation facilities. To accomplish this task, a 3-step meeting process has been established. It consists of prestudy meetings, public hearings, and post-decision meetings. These meetings are generally required for both the systems and project level planning steps. Thus, the general public will have several opportunities to review and comment on transportation proposals affecting their area. The contents of this report were assembled in preparation for the public hearing on the GLS Region V Transportation Study.

In addition to the prescribed public meetings, the study team has utilized many other sources to obtain public input into the planning process. These sources include questionnaires, travel surveys, correspondence, newspaper articles, interviews with local officials, public information meetings, special interest groups, citizen advisory groups, and local planning organizations. Information gathered from these sources has assisted in identifying many important transportation related issues. Within these issues are two key factors that will define much of the character of the region's future transportation system. These are the availability of energy and growth trends. Therefore, the current planning efforts will illustrate how various multimodal transportation networks can be developed to satisfy a range of alternative future growth and energy situations. By analyzing these future networks, the study team will be in a better position to advance planning efforts on those projects which show the greatest need and are common to most future conditions.

2 Social and Economic Inventory

Region V is located between the Saginaw and Detroit Standard Metropolitan Statistical Areas (SMSAs) to the north and south, respectively. The Lansing SMSA is near the western border of Shiawassee County, while Region V itself contains the Flint SMSA. The region, due in part to its location with respect to activity in other major areas nearby, is a major trading area. The regional economy is centered on the city of Flint, which is the major center of population in the region and which possesses a wide range of economic activities and land uses. The majority of land uses in the region, however, are rural in nature and include natural, agricultural, and other intensive land uses.

The region is experiencing expansion in population, industry, commerce, and urban growth. Automobile

manufacturing in Flint, and trailer and mobile home manufacturing in the area play an important role in this expansion.

The largest communities in the region are:

1. Flint, which is the dominant center in the region and is the county seat of Genesee County.
2. Owosso, which services Shiawassee County.
3. Lapeer, which services Lapeer County.

These areas contain the heaviest concentration of people, commercial establishments, health facilities, and job opportunities. The smaller communities in the region function primarily as convenience shopping centers for residents.

POPULATION

	<u>1970 Census</u>	<u>1975</u>	<u>1980</u>	<u>2000</u>	<u>% Change 1975-2000</u>
Michigan	8,875,000	9,110,000	9,358,000	10,505,000	15.3
Region V	560,000	577,000	587,000	644,000	11.6
Genesee Co.	444,300	446,600	444,100	449,500	0.6
Lapeer Co.	52,300	61,300	69,400	102,100	66.6
Shiawassee Co.	63,100	69,000	73,900	92,600	34.2

SOURCE: Michigan Department of Management and Budget

Regional growth is not expected to occur as rapidly as for the state of Michigan, although Lapeer and Shiawassee Counties are projected to grow at a much greater rate than the state. However, Genesee County, which contains the bulk of the region's population, is not expected to grow substantially in the future.

As for the economy of the region, the unemployment rate for the first eight months of 1978 is 7.9 percent compared to 7.2 percent for the state. This is an improvement over the unemployment rate for the region in 1977. Economic activity within the region is geared to manufacturing, especially the production of transportation equipment and the metal industries associated with auto production. General Motors is the primary employer in the region, as evidenced by the fact that one out

of every three persons in the active labor force of Genesee County is employed in the auto industry by General Motors.

There are four sectors which contribute over 90 percent of the total employment in the region. They are manufacturing, trade, public administration, and services, in that order.

Manufacturing firms such as General Motors employ substantial numbers of employees in the region. Typical of the Flint area are manufacturing plants which employ several thousand people. Among these plants are AC Sparkplug, Buick, Chevrolet, and Fisher Body. Wholesale and retail trade has grown in importance while the services sector has declined. Employment in public administration has increased and can be expected to continue to do so.

POPULATION DISTRIBUTION

<u>Age Group</u>	<u>1970 Census</u>	<u>1976</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>
Under 5	10.0%	8.5%	8.4%	8.6%	7.4%
5 - 19	33.0	31.9	28.6	23.9	26.6
20 -24	7.5	9.0	10.4	8.2	6.6
25 - 44	25.0	25.4	27.0	32.2	29.7
45 - 64	17.4	18.4	18.4	18.8	18.7
65 & Over	6.8	6.9	7.1	8.3	11.0

SOURCE: Bureau of the Budget, State of Michigan

TRANSPORTATION IMPLICATIONS

Existing and future manufacturers may benefit from transportation system improvements. A major criterion for manufacturing plant site location is accessibility to a freeway interchange. Highway improvements can improve this accessibility to freeways. In some instances, it is doubtful that a regional economy would benefit significantly by transportation improvements, especially where a well developed system exists. However, local economies or individual businesses may derive some economic benefits.

In summation, it should be pointed out that, in order to have a strong regional economy, an efficient transportation system should be developed which promotes the movement of

materials, goods, and people while avoiding the unnecessary disruption of social and economic activity.

Many of the region's residents are employed in manufacturing. Thus, there is a need to provide adequate transit and highway facilities if the people are to have maximum access to these places of employment.

Secondly, the population of the region is getting older. In 1976, 6.9 percent of the region's residents were 65 years or older. By the year 2000, this proportion is expected to increase to 11 percent. Persons in this age group have different travel needs than persons in younger age brackets. There tend to be more trips to doctors or hospitals with elderly people than younger people.

3 Natural Environment

Region V has a total of 1,184,640 acres. Of this total acreage, 0.6 percent is inland water (2.4 percent of the total state acreage is inland water). A breakdown of the regional land surface reveals the following percentages: 15.2 percent forest, 57.4 percent agriculture, 4.5 percent transportation, 1.8 percent recreation, 5.0 percent urbanized, and 16.2 percent other. These percentages may be compared to the state's 52 percent, 32.7 percent, 3.2 percent, 1.7 percent, 3.0 percent, and 7.4 percent, respectively.

Climatic conditions in the region are continental in character: cool and humid with frequent weather changes. With the potential moisture evaporation exceeding the average precipitation (30") during the growing season, soil moisture replenishment during the fall and winter is important to the success of agriculture and forests in the region. The average snowfall, 40 inches, for a winter season is generally uniform throughout the area and most often in the form of snow showers with occasional heavy snowfalls.

Sedimentary bedrock underlying the region is exposed in central Shiawassee County and northwestern Genesee County and is at shallow depths (20 feet) in some areas of Lapeer County. A shale outcropping in Shiawassee County is mined for use in brick production. At greater depths, the sandstone, limestone, and shale formation have produced low to moderate yields of oil in the northern portions of each county. In addition, natural sealines and low volumes of natural gas have been produced from bedrock underlying northern Lapeer County. For most of the region, the bedrock is far enough below the surface that it doesn't limit urban development,

except for its groundwater limitations discussed below.

Overlying most of the bedrock in the region is a mantle of unconsolidated rock debris (drift) ranging in thickness from a few to a few hundred feet. The regional slope of the land surface is northward; locally, the surface varies from level to steep. Among the more prominent surface features are a series of moderately rough or rolling ridgelike structures, called end moraines, which are aligned east-west across southern Shiawassee County, northeast-southwest across Genesee County, and vary from northeast-southwest to northwest-southeast in Lapeer County. These topographic divisions are separated by relatively thinner and more gently rolling ground moraines, outwash planes, and lake beds.

Land use constraints are associated with each geologic feature. For example: high relief and rough topography tend to limit agriculture in morainic areas. However, the ground moraines and lake beds are generally favored for agriculture. Lake beds around the cities of Flint and Lapeer and in northern Lapeer County present severe development limitations due to surface drainage and soil stability. Outwash areas frequently have agriculture limitations due to excessive drainage, but these areas often possess sand and gravel resources and groundwater recharge potential.

Very little publicly owned land exists within Region V; those public lands that are present (1 State Game Area and 2 State Recreation Areas in Lapeer and a Wildlife Research Center in Shiawassee Counties) are generally experiencing high demand for a multiplicity of uses. As a

result, maintenance of wildlife populations is largely influenced by man's use of private lands (i.e. the future of wildlife in the region depends upon factors such as attitudes and land-use trends). Shrinking hunter access to private land is a problem in that wildlife habitat is expected to decrease while gross hunter demand is expected to increase.

Expanding urban areas continue to consume and/or degrade valuable wetlands, open space areas, wildlife habitat, and prime agricultural land in the region. A major problem will be the preservation of outstanding resources in the region, such as wetlands, unique glacial formations, and wildlife areas.

Several nonmetallic resources are extracted from the glacial drift of the region: sand and gravel operations primarily occur in northeast and northwest Genesee County, southern Lapeer County, and are scattered throughout Shiawassee County. Peat is extracted from areas primarily in western Shiawassee County and southeastern Lapeer County. Clay is mined in central Shiawassee County. In addition, regional areas of known clay reserves are mainly located in Shiawassee and Genesee Counties, but some areas are located in western Lapeer County.

Groundwater availability in the region is extremely variable. Bedrock sources often produce small yields and/or water is saline or highly mineralized. Surface formations which are primarily sand and gravel tend to yield larger supplies, but as the percent of clay increases, yields tend to decrease. Water development in glacial lake plains is generally difficult except where underlain by sand and gravel.

Most smaller communities are dependent on groundwater for domestic and municipal supplies. As a result, the lack of suitable groundwater supplies is a deterrent to economic development. To meet water demands, Flint, the largest city in the region, had to pipe water from Lake Huron. Nevertheless, with populations increasing and economic activities in major water using industries increasing, the demand for water supplies continues to increase.

The Saginaw River basin dominates the surface drainage of Region V. Two components of this basin, the Shiawassee and Flint River systems, drain most of the region and ultimately flow into Saginaw Bay. Five other drainage basins influence the remaining surface drainage in the region: The Grand River system drains the western half of Shiawassee County toward Lake Michigan; the Cass, the Black, the Belle, and Clinton River systems drain the eastern portions of Lapeer County toward Lake Huron. In all, there are approximately 1250 miles of streams in the region.

Water quality of the surface waters generally decreases downstream from population centers. The Flint River has heavy organic waste loads, low dissolved oxygen levels, and high nutrient and bacteria levels; the Shiawassee River is degraded by excessive nutrients, high bacteria and low dissolved oxygen. Poor water quality has led to designation of "water Quality Limited" segments on the Flint River from Flint to the Genesee-Shiawassee County Line and on the Shiawassee River from Owosso to 10 miles downstream and from Linden to the Genesee-Shiawassee County Line. The poor quality of these segments is mainly attributed to municipal and industrial dis-

charges. Resulting fish populations are composed of a few highly tolerant species.

Flood plains along the watercourses function as natural water-storage areas. However, encroachment of developments on flood plains decreases this storage capacity and increases damage potential. Flooding of urban areas, such as Corunna and Owosso, is aggravated by encroachments. In rural areas, flooding causes loss of agricultural production.

Genesee and Lapeer Counties each have approximately 5,000 acres of inland lakes; Shiawassee County has less than 1,000 acres. There are only nine bodies of water over 200 acres in size Region V: six in Genesee, three in Lapeer, and none in Shiawassee Counties. Due to the relative lack of lakes and the proximity to urban centers, most all large lakes in the region are intensively developed.

Multitiered shoreline developments and septic tank systems have contributed to nutrient enrichment problems in many lakes. Water pollution has diminished fishing quality. In addition, boating activity is at or near capacity.

Forested areas in the region originally were deciduous (beech-maple and oak-hickory) with small areas of conifers. Today, however, only a few native woodlots remain mostly along major streams and in farm woodlots. Thus, the woodlots in the region are primarily second-growth hardwoods. Most of the woodlots are woodlot pasture, saw and pole timber, state owned, or in residential holdings.

No endangered species on federal or

state registers are known to inhabit the region; however, Kirtland's Warbler and the American Peregrine Falcon may migrate through the region.

Many of the state's classified "threatened and rare" species are common to southern Michigan and are undoubtedly found in these counties. However, all the critical habitats of these species have not yet been identified by the Michigan Department of Natural Resources (DNR).

The white-tail deer is the only large game species common to the region. While found throughout all three counties, this large mammal reaches greater numbers in areas that have been least affected by urbanization. Small game species such as the ring-necked pheasant, cottontail rabbit, and fox squirrel are common throughout all three counties and have adapted well to man's activities.

Waterfowl also generate considerable interest among hunters and bird watchers. While migratory and resident waterfowl are common throughout the region, they reach greater numbers along major streams and in "potholes." One of the largest waterfowl species--the Canada goose--is common in the eastern portion of the region (Lapeer County) where a refuge has been established to protect a major concentration of these birds.

While classified as a "rare" Michigan bird by the DNR, the sandhill crane is also unique due to its large size (three feet or more in height). As a result, this species generates considerable interest among local residents, particularly in southwest Shiawassee County where several nest sites are located.

4 Transportation Goals and Objectives

What are the values in the GLS Region? How should issue and problems be resolved? What overall parameters should the planners and engineers use in the study to develop alternative solutions? The goals and objectives provide the answer to these questions.

Three different sets of transportation goals and objectives already exist which will affect this region and the study: State Transportation Draft Goals have been developed; the Flint-Genesee County Land Use-Transportation Study Goals and Objectives, and the Lapeer County Transportation Goals and Objectives. All of these goals are listed below followed by a draft set of Regional Transportation Goals and Objectives.

State Transportation Goals

Statement of Purpose: To ensure a level of mobility for Michigan citizens, visitors, and commerce that is reasonable in terms of the social, economic, and environmental values of the state.

Aviation Goals

1. Provide a reasonable level of aviation services to all Michigan citizens, visitors, and commerce.
2. Reduce the number and severity of accidents and promote the personal safety of air travelers.
3. Maximize economic benefits through aviation program investments.
4. Minimize environmental impacts in the planning, development, and operation of airport facilities.

Commercial Harbor Development Goals

1. Provide and maintain an efficient commercial harbor system to meet the needs of Michigan's economic structure.
2. Promote fiscal integrity, stability, and efficiency within the commercial harbor system.
3. Minimize environmental and social impacts resulting from port improvements or expansion.

Highway Goals

1. Develop a highway transportation system which will provide accessibility to existing and anticipated patterns of development throughout the state and effectively serve existing and projected travel demands.
2. Develop a functional statewide highway transportation system which will provide for appropriate types and levels of highway service commensurate with the needs of the various areas and activities in the state.
3. Alleviate traffic congestion and reduce travel time.
4. Provide for increased travel safety.
5. Provide a system which is both economical and efficient, satisfying all other objectives at the lowest possible cost.
6. Coordinate highway planning with land use planning for the development and preservation of resources.

7. Develop a system which is compatible with the aesthetic qualities of the landscape.
8. Develop a system which is integrated with other modes of transportation. Attention should be given to existing and planned terminal locations and their expected levels of activity.

Nonmotorized Goals

1. Make bicycling safer through the provision of bicycle facilities and improvements to appropriate streets and roads.
2. Promote the use of bicycle transportation for utilitarian purposes by improving bicycle accessibility and mobility.
3. Encourage the use of bicycle transportation for recreational purposes by developing long-distance touring routes and routes of shorter duration to and through aesthetically pleasing areas.
4. Provide recreational horseback riding opportunities in cooperation with other state and local agencies.

Public Transportation Goals

1. Provide a reasonable level of public transportation service for all Michigan citizens.
2. Maximize economic benefits through public transportation investments.
3. Maximize positive environmental impacts achievable through the provision of public transportation services.

Railroad Goals

1. Provide and maintain an adequate efficient railroad network within Michigan and maintain links to the regional and national networks.
2. Promote present and future financial viability, stability, and efficiency within the Michigan railroad system.
3. Minimize adverse social and economic impacts of changes in railroad service.
4. Promote and maintain safe railroad freight operations consistent with public need and carrier capability.

Flint-Genesee County Land Use-Transportation Goals and Objectives

Transportation Policy Statement - That a balanced transportation system involving all delivery modes be effectuated throughout the county.

Goal #1 -- That an efficient transportation system be provided.

Objective:

- I. Minimize Congestion
- II. Minimize Indirection of Travel
- III. Maximize Choice of Travel Mode

Goal #2 -- That an economical transportation system be provided.

Objective:

- I. Minimize Operational Cost
- II. Minimize Travel Time
- III. Minimize Parking Deficiencies
- IV. Minimize Implementation Cost
- V. Minimize Energy Cost
- VI. Minimize Costs and Maximize Benefits

Goal #3 -- That a safe transportation system be provided.

Objective:

- I. Minimize Accidents
- II. Minimize Fatalities

Goal #4 -- That environmental values be enhanced.

Objective:

- I. Minimize Air Pollution
- II. Minimize Noise Pollution
- III. Minimize Disruption of Natural Resources

Goal #5 -- That sociological values be enhanced.

Objective:

- I. Minimize Disruption of Developed Land Uses
- II. Maximize Preservation of Existing Historical Sites
- III. Minimize Disruption of Established Neighborhoods

Goal #6 -- That aesthetic values of the land use and transportation system be enhanced.

Objective:

- I. Preserve and Maintain Existing Visual Vistas Encountered During Travel
- II. Create and Enhance Visual Vistas During Travel

Goal #7 -- That desirable existing and future lane uses be maintained and promoted.

Objective:

- I. Provide Accessibility Between Selected Major Traffic Generators
- II. Provide for the Greatest Number of Options Available for the Location of Developments which Maximizes Existing and Future Public Investments

Lapeer County Transportation Goals

The county has the primary responsibility for providing a well-planned, effective transportation and circulation network. THE BASIC OBJECTIVE OF THE COUNTY IS TO PROVIDE A SAFE AND EFFECTIVE TRANSPORTATION SYSTEM WHICH WILL PROMOTE THE ECONOMIC GROWTH OF LAPEER COUNTY. Specific transportation goals are:

Complete System and Classification of Roadways - To create a well-coordinated system of local, county, state, and federal highways throughout the region, as well as the development of attractive roadways which will take advantage of scenic vistas. A detailed system of roadway classification and standards is required to provide sufficient roadway widths to accommodate the varied modes of travel which are present in the county.

Traffic Separation - To provide for a clear separation between local and regional traffic as well as separating automobile and truck traffic through the provision of industrial access roads specifically designed for this purpose. Furthermore, to provide for the separation of vehicular and pedestrian traffic, especially that which is present during the seasonal months.

Air Facilities - To investigate the development of an airport as a first-class county facility, including the improvement of existing and new landing strips which provide modern, efficient air service.

Intersection Improvement - To eliminate the hazardous curves and intersections throughout the county through better intersection design which would maximize roadway safety.

REGIONAL TRANSPORTATION GOAL
AND OBJECTIVES

GOAL: Ensure a network of transportation facilities and services to meet the land use, economic, and social goals and be consistent with the environmental goals.

OBJECTIVES:

1. Maintain the system of roadways, railways, bikeways, airports, and pedestrian ways to minimum standards for quality of ride and safety respective to the specific fixed facility function and serve (make accessible) all points of need.
 - * Particular attention is needed where the different fixed facilities intersect, such as a roadway crossing a railway and sidewalks meeting streets.
 - * Adequate design and maintenance of sidewalk and street ramps and curbs and entranceways to buildings clean of debris, is needed for many of the handicapped using walkers, wheelchairs, canes, and just for walking.
 - * A similar transition problem exists with separate bikepaths and streets for bicyclists, particularly for safety.
 - * Minimize the number of accidents and the severity of accidents in loss of life, injuries, and property.
2. Maintain an economical and efficient system of roads, railways, bikeways, airports, and pedestrian ways to meet the travel demand consistent with revenues.
 - * Minimize congestion and travel distance due to nondirect routes.
 - * Minimize travel time.
 - * Minimize the total travel cost (covering operating, maintenance, and capital cost) including the negative environmental impacts of air pollution and noise, the losses of other natural resources, and the losses of opportunities foregone.
 - * Minimize parking deficiencies for all transport vehicles.
 - * Minimize the use of limited resources such as energy and maximize the travel production per unit of energy.
3. Provide alternative modes to the private automobile which can maximize the travel opportunities to the general public and those desiring alternatives to the automobile and meet the needs of senior citizens, handicapped, those not able to make use of a private automobile, and other citizens with special transport needs.
 - * Barrier free transportation services should be available.
4. The transportation services and facilities should promote desirable existing and future land use patterns.

- * Preserving social values.
 - * Minimize disruption of existing land use.
 - * Maximize public and private investments.
 - * Preserve historical sites.
 - * Create, preserve, and enhance visual vistas along transport routes.
 - * Preserve the prime agricultural land and rural service areas.
5. An express legislative statement of intent to adjust the market forces should be made when public financing mechanisms and regulations are to be utilized for transportation facilities and services to favor one mode of travel.
- * Reanalysis of existing programs is needed on a periodic basis, and if found to be adjusting the market not consistent with previous intent, the program should be terminated or express legislative intent be enacted.

This is not to say that other values such as safety, mobility, aesthetics, and reducing energy consumption will be overlooked, what is said is that when planners and engineers address these values they will also keep in mind the social, economic, and environmental factors for each alternative with emphasis on the later three.

The deficiencies identified through the Regional System Process (those identified by the study team and the citizens of Region V) will lead to the development of alternatives on the regional system level. These alternatives will then be tested based on the goals and objectives mentioned above to determine solutions for each deficiency identified.

The goals and objectives mentioned above put great emphasis on the social, economic, and environmental values in the region. These values are expressed by the state, Genesee County, and GLS-Region V. It can be noted there is an overlap between the various levels of government regarding their primary responsibilities. This is ideal from the planner's standpoint because it gives him direction in developing alternative solutions which will be consistent with all levels of government.

5 Existing Transportation Services

Aviation

The department's role in air transportation is to ensure an orderly and timely development of the state's aviation system. To assist in this task, the Michigan Aeronautics Commission, in 1974, adopted a Michigan State Airport System Plan (MSASP) for the years, 1975, 1980, and 1990.

A major purpose of the plan is to show various communities their projected level of aviation demand for future time periods. This will enable them to begin an assessment of potential community and environmental impacts associated with airport development. Depending upon the extent of these improvements, these considerations can be addressed in more detail as local airport master plans are prepared or updated.

The accompanying map illustrates the 1990 recommended airport system for the Region V - Genesee, Lapeer, Shiawassee area as contained in the MASP. These airports are classified into two basic service-related categories: Air Carrier Airports and General Aviation Airports.

Air Carrier System

An Air Carrier Airport is an airport used by certificated scheduled airline service. At present, Republic and United are the certificated carriers providing passenger service to Flint's Bishop International Airport, the sole air carrier airport in the region. As of October 15, 1978, both airlines served Bishop with numerous flights each day. These flights provided direct (same plane) service to Alpena, Atlanta, Chicago, Cleveland, Denver, Detroit, Fort Lauderdale, New Orleans, New York,

Pittsburgh, Saginaw, Salt Lake City, San Francisco/Oakland, and South Bend.

Of these destinations, nonstop service, on a daily basis, was available to/from Chicago, Cleveland, Detroit, Pittsburgh, and Saginaw.

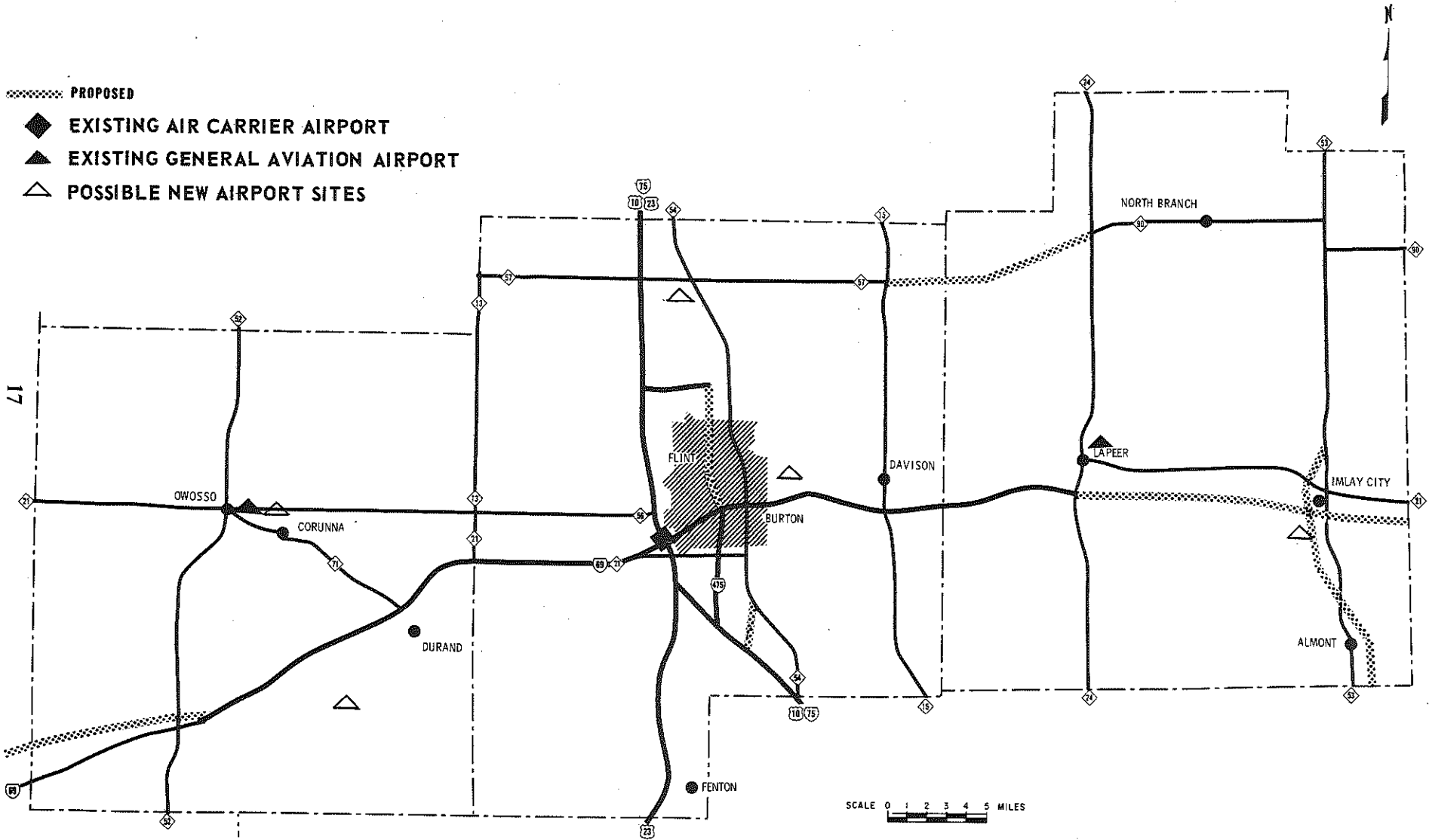
Bishop International Airport possess excellent facilities to handle the larger commercial aircraft. The main north-south runway is 7,850 feet long, while the east-west crosswind runway is 7,200 feet long. Additionally, a 4,550-foot long northeast/southwest runway connects the other two. The airport is capable of servicing the 727, 737, and DC-9 jets currently being operated by Republic and United. Many smaller, general aviation aircraft are served at the Bishop facility, including business jets and single- and multi-engine propeller craft. The precision instrument landing systems at Bishop allow all-weather operations by both commercial and general aviation aircraft.

For Region V, as for most of the state, the recommended air carrier system of airports for 1990 will remain about the same as that in service today. The steadily increasing level of passengers at Bishop, however, and the likelihood of ever-increasing passenger loads in the future, necessitate that planning for future improvements and/or expansion remains a high priority for local airport officials. Additionally, the trend of the commercial aviation industry to the use of new, and larger, types of jet aircraft may well add to the need for improved airfield facilities at Bishop. No new air carrier airports are currently planned for Region V, but continual improvement, modernization, or expansion of present Bishop facilities may be required to properly serve increasing numbers of passengers.

AIRPORT SYSTEM PLAN
REGION 5
1970-1990

PROPOSED

- ◆ EXISTING AIR CARRIER AIRPORT
- ▲ EXISTING GENERAL AVIATION AIRPORT
- △ POSSIBLE NEW AIRPORT SITES



In 1977, a study of Michigan's Air Carrier Airports was conducted under the auspices of the Department of State Highways and Transportation. Results from that study indicate that passenger service to and from Region V was generally perceived to be satisfactory by residents of the area. Chicago was the predominant destination for air travelers from the region, with New York, Cleveland, Tampa, Los Angeles, and Washington, D.C. also attracting larger numbers of air travelers. Philadelphia, Milwaukee, Minneapolis, San Francisco, Boston, and Detroit round out the primary destinations from Bishop. Detroit's relatively low ranking was undoubtedly due to the large number of air travelers that drive to Detroit and enplane there, or conduct their business in the Motor City. The short distance from Flint to Detroit, the cheaper cost of driving, the more frequent service available from Detroit, and better air connections account for the high incidences of automobile use between the two cities.

Service problems at Flint's Bishop Airport primarily involve the need for increased service frequencies to Detroit. Other needs that were cited during the course of the above study indicated some demand from Flint to northern Michigan, e.g. Alpena, Sault Ste. Marie, and Traverse City.

In 1978, over 280,000 passengers flew in and out of Bishop Airport, a 7.0 percent increase over 1977. Only four airports in Michigan accommodate more passengers than Bishop Airport, making it one of the vital links in Michigan's air transportation system.

General Aviation System

General aviation airports provide a basic level of air service for local communities. These airports offer such communities, and businesses, the ability to access the vast market area provided by the entire air transportation system. Nearly 500 general aviation aircraft are based at the relatively few airports in Region V, both public and private.

Primary runway lengths of the largest public general aviation airports in the region range as high as 3,000 feet for the Owosso City Airport and 2,925 feet for the Dupont-Lapeer Airport. A wide variety of aviation-related services are available.

In general, the basic measures used to determine the need for new airports, or the expansion/improvement of existing ones are:

1. To provide aviation capacity sufficient to accommodate forecasted levels of general aviation activity in a given geographical area.
2. To provide a reasonable geographic distribution of airports throughout the state.

The MSASP lists 162 general aviation airports, of which 56 are recommended as new airports. Three existing Region V airports are in the MSASP. One is an air carrier airport and the other two are general aviation airports.

Four new airports in the MSASP are proposed for Region V. Two airports are designated to become basic transport airports in the future.

Funding

Although the MSASP is a product of local, state, and federal planning efforts, it is the responsibility of the local community, or airport authority, to initiate airport development projects. After these projects have been approved by state and/or federal officials, various financial arrangements are pursued to fund the projects. The present financial sources include:

- Federal Funds, through the Airport Development Aid Program (ADAP), Upper Great Lakes Regional Commission, and Federal Aviation Administration (FAA) Facility and Equipment Funds.
- State Funds, through Michigan Aeronautics Commission revenues from a tax imposed on the sale of aviation fuel in the state. The recent series of bills passed by the Michigan Legislature, and popularly called the "Transportation Package" will not affect the collection or distribution of these tax funds.
- Local Funds, primarily through long-term borrowing.

An example of an airport development project in Region V requested locally and programmed by the Michigan Aeronautics Commission is Flint's Bishop International Airport. A breakdown of estimated costs prorated between federal, state, and local monies accompany the project description.

<u>Project Description</u>		
Purchase of 7.5 acres of land; construct, light, and mark runway 9-27 extension; construct, light, and mark parallel taxiway extension; relocate navigation aids; enclose drain.	\$3,200,000	Federal
	250,000	State
	<u>550,000</u>	Local
TOTAL ESTIMATED COSTS	\$4,000,000	

Owosso City Airport is the only airport in Region V programmed for improvement/expansion. Improvements included extending runway 10-28 and the parallel taxiway 800 feet to the east and installing MITL, VASI and REIL. See Table II for a complete list of programmed and planned improvements for Region V airports.

Table I illustrates the actual and forecasted air passenger and aircraft operations for Flint's Bishop International Airport, the only air carrier facility in Region V. It is important to realize that these forecasts were based on aviation trends existing before the emergence of the "energy crises." In 1973-1974, the curtailment of oil imports had a significant impact on some of Michigan's airports. Aircraft operations (takeoffs

and landings) at Bishop International Airport, for example, totalled 150,700 in 1972. By 1974, that figure had decreased to 136,300. It is interesting to note, however, that passenger boardings during this same period increased from 182,200 to 203,200. In 1976 and 1977, both operations and passenger levels have increased tremendously. Because Bishop generally has "out performed" other Michigan air carrier airports in recent years, its present and future importance as an air transportation center is clearly established.

If future fuel sources do become limited, the aviation industry, along with other transportation modes, will be making some adjustments. However, such adjustments will not affect current plans for facility improvements/construction. If energy sources become "restricted"

over the long-term future, expansive construction projects will logically be curtailed. However, any reduction in energy sources in the near future, i.e. into the 1990's, will be offset by reducing numbers of flights, increasing passenger loads, and developing more fuel-efficient equipment. Because fuel costs constitute such a high portion of overall operating costs for commercial airlines, they have historically outpaced other modes of transportation in adjusting to changes in fuel availability/costs by changing operating efficiencies. Large increases in aviation activity in the future will justify long-range construction programs currently in existence. Large-scale decreases in aviation activity will not alter, or impact, existing fixed aviation facilities.

Benefits

The airport improvement projects shown in Table II, plus other MSASP recommendations, are expected to produce a wide range of benefits to a broad spectrum of Michigan residents and visitors. The benefits that will accrue from the Michigan

State Airport System Plan is summarized as follows:

USERS

- Reduce travel time and costs for air travelers and shippers.
- Expand recreational opportunities due to increased accessibility of recreation areas and wider opportunities for pleasure flying.

AIRLINES AND AIRPORT AUTHORITIES

- Improved safety and convenience of aircraft operations.

COMMUNITIES

- Enhance business and industrial growth in areas served both by air carrier and general aviation airports.
- Increase employment opportunities and tax base (from business and industrial growth).
- Improved emergency access to communities for medical supply and evacuation.

TABLE I

Flint Bishop Airport
Operational Forecasts

	Base Year 1970	Current Data 1978	Forecasted	
			1978-82	1983-92
Air Carrier Operations	11,800	10,449	16,100	19,000
General Aviation Operations	171,600	159,000	266,100	311,000
Air Carrier Passengers	157,000	280,144	416,000	460,000
General Aviation Passengers ¹	218,000	262,100	360,000	428,000

¹Estimated

TABLE II
PROGRAMMED AND PLANNED AIRFIELD IMPROVEMENTS
FOR REGION 5, MICHIGAN: 1980-2000

Associated City	Airport	System Recommendations
Almont/Imlay (1980-1985)	Proposed	None.
(1986-2000)		Purchase land; construct primary runway (3200'), partial parallel taxiway, connecting taxi; construct taxi streets and apron; construct turf crosswind runway (3200'), install airfield lighting, runway and taxi lighting, lighted wind cone and beacons, construct administration buildup; install VASI and REILS; install fencing and segmented circle; construct auto parking area and entrance road.
Durand (1980-1985)	Proposed	None
(1986-2000)		Purchase land; construct primary runway (3800') and crosswind runway (3200'); parallel taxiways to both primary and crosswind runways, and taxi streets, expand apron, install runway lighting, VASI, REIL, lighted wind cone, and beacon; construct administration building; install fencing and segmented circle; construct auto parking area and entrance road.
Flint (1980-1985)	Bishop Int'l.	Purchase land; extend runway 9L/27R (500') and parallel taxiway (1000'); extend runway 18/36 (800') and parallel taxiway (10,000); construct a new general utility runway (3800') and taxiway; relocate VASI for runway 9L/2R; install VASI, REIL and runway lights for new runway; install ILS for runway 18/36'.
(1986-2000)		Expand apron; construct new administration building; expand auto parking area.
Flint/Clio (1980-1985)	Proposed	None

PROGRAMMED AND PLANNED AIRFIELD IMPROVEMENTS
FOR REGION 5, MICHIGAN: 1980-2000

Associated City	Airport	System Recommendations
Flint/Clio (1986-2000)	Proposed	Purchase land; construct primary runway (3800'), crosswind runway (3000'), and parallel taxiway to both runways; construct connecting taxiways, taxi streets, and apron; install runway lights, lighted wind cone, and beacon; install VASI and REIL; construct administration building; install fencing and segmented circle; construct auto parking area and entrance road.
Flint/Davison (1980-1985) (1986-2000)	Proposed	None Purchase land; construct primary runway (3800'), crosswind runway (3000') and parallel taxiway to both runways; construct connecting taxiways, taxi streets, and apron; install runway and taxiway lights, lighted wind cone, and beacon; install VASI and REIL; construct administration building; install fencing and segmented circle; construct entrance road and auto parking area.
Lapeer (1980-1985) (1986-2000)	Dupont Lapeer	None Purchase existing airport and additional land; extend, widen, and strengthen runway 9/27 to 5000'; strengthen and widen runway 18136; construct parallel taxiways to both runways; construct connecting taxiways; strengthen and expand existing taxiways and aprons; install runway and taxiway lights, lighted wind cone and beacon; install VASI and REIL; construct new administration building; install ILS; install segmented circle; improve entrance road and auto parking area.

PROGRAMMED AND PLANNED AIRFIELD IMPROVEMENTS
FOR REGION 5, MICHIGAN: 1980-2000

Associated City	Airport	System Recommendations
Owosso (1980-1985)	Owosso City	Purchase land; extend runway 10/28 to 3800' and construct parallel taxiway and taxi streets; expand apron; install runway lights, MITL, VASI, and REIL; construct administration building; improve entrance road and auto parking area.
(1986-2000)		None.
Owosso (1980-1985)	Proposed	None
(1986-2000)		Purchase land; construct primary runway (5000'), crosswind runway, parallel taxiways to primary runway, connecting taxiways, taxi streets, and apron; install runway and taxiway lights, lighted wind cone, beacon, VASI, and REILS; construct administration building; install ILS; install fencing and segmented circle; construct entrance road and auto parking area.

SOURCE: Michigan Department of Transportation, Bureau of Aeronautics and Bureau of Transportation Planning, and the Michigan State Airport Plan as updated.

Airport Operational Roles

CLASSIFICATION OF AIRPORTS SERVING AIR CARRIERS

Type of Activity

<u>Code for Operational Role *</u>	<u>Length of Longest Flight</u>	<u>Typical Length of Longest Runway</u> (Uncorrected, in feet)**	<u>Examples of Largest Aircraft Accommodated</u>
A1	Over 1500 miles	11,500'	Large Jet Aircraft
A2	500 to 1500 miles	9,500'	(i.e., B-747, B-707 & DC-8)
A3	less than 500 miles	8,000'	
B2	500 to 1500 miles	8,000'	100-Passenger Jet
B3	less than 500 miles	6,000'	(i.e., DC-9, B-727)
C3	less than 500 miles	5,000'	50-Passenger Turbo-prop (i.e., CV-580)
C5	less than 500 miles	5,000' (corrected)	Small Aircraft (i.e., 15-passenger)

Airport Operational Roles

CLASSIFICATION OF AIRPORTS SERVING GENERAL AVIATION

<u>Code for Operational Role</u>	<u>Examples of Largest Aircraft Accommodated</u>	<u>Level of Activity</u>	<u>Percentage of GA Fleet Accommodated</u>	<u>Typical Length of Longest Runway</u>
BI-(Basic Utility) Stage I	Cessna-172 Piper Tri-pacer, etc.	Less than 10 aircraft based at airport	75%	2700'
BII-(Basic Utility) Stage II	Cessna-310 Beech Baron, etc.	More than 10 based air- craft. Less than 20,000 operations per year	95%	3200'
GU-(General Utility)	Beech King & Queen Airs, Piper Navajo, etc.	More than 20,000 opera- tions per year or 500 operations per year by general utility type aircraft	98%	3800'
BT-(Basic Transport)	Lear Jet, Sabliner Cessna Citation, etc.	500 or more operations per year by business jet aircraft	99+%	5000'
GT-(General Trans- port)	Convair 580, Boeing 727, DC-9, etc.	Substantial operations by very large general aviation aircraft (over 60,000 pounds gross weight)	100%	5000'+

* Includes those roles applicable only to Michigan.

** Selected values are based primarily on Michigan experience; namely, corrected lengths of 6,500 feet for B3 role and 5,500 feet for C3 role.

Airport Classification

	<u>1973-77</u>	<u>1978-82</u>	<u>1983-92</u>
*Almont/Imlay City	---	B-II	B-II
*Durand	---	---	B-II
Flint Bishop	B2	B2	B2
*Flint/Clio	---	GU	GU
*Flint/Davison	---	GU	GU
Lapeer	B-II	B-II	GU
Owosso	B-II	B-II	B-II
*Owosso	---	GU	BT

*Recommended new airports

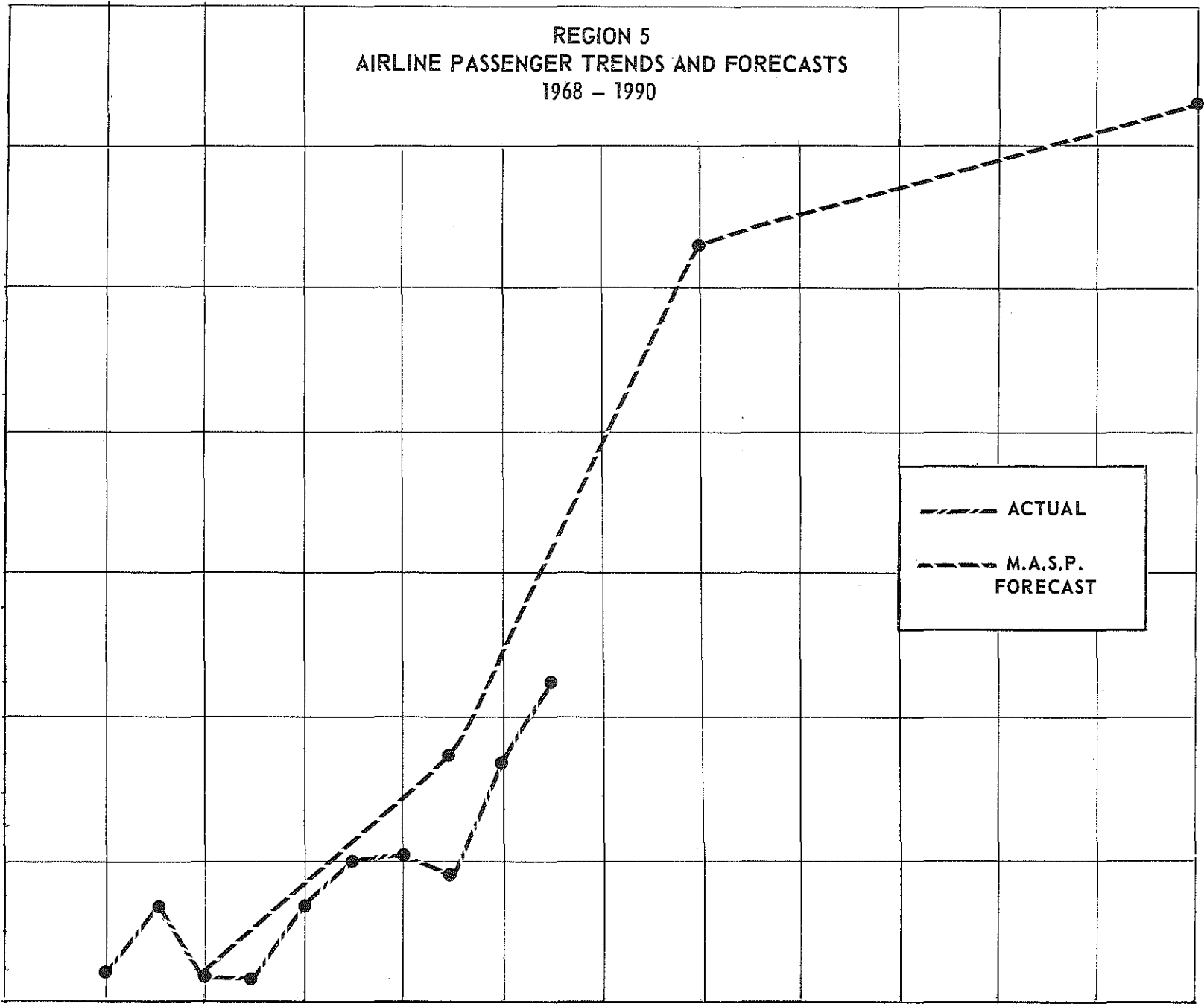
REGION 5
AIRLINE PASSENGER TRENDS AND FORECASTS
1968 - 1990

ANNUAL PASSENGERS (THOUSANDS)

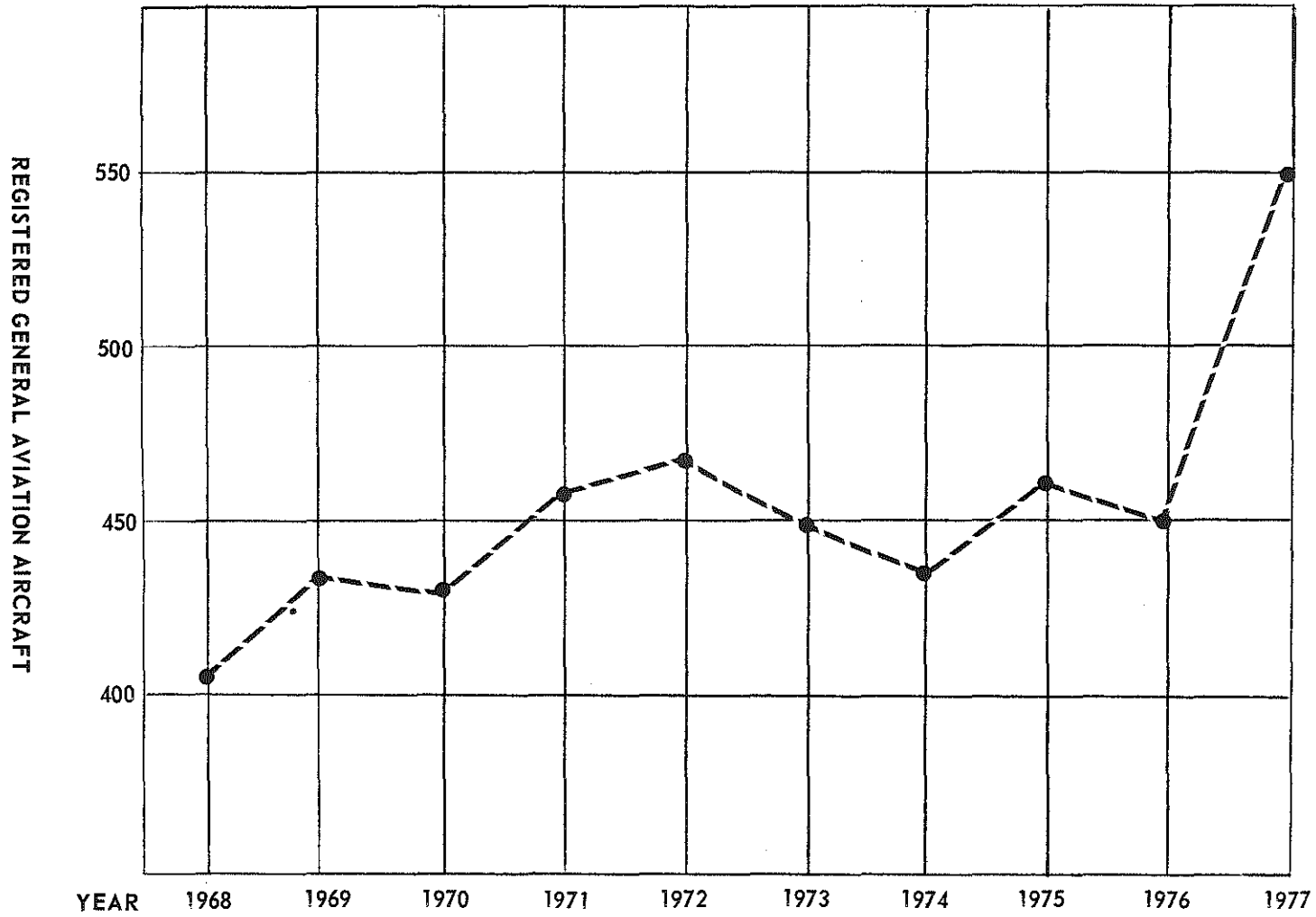
450
400
350
300
250
200
150

--- ACTUAL
--- M.A.S.P. FORECAST

YEAR 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990



REGION 5
REGISTERED GENERAL AVIATION AIRCRAFT
1968 - 1977



HIGHWAYS

How the Department Became Involved

Defense and stagecoach travel stimulated the first roads in Michigan. In fact, the first road of statewide importance was built around 1819 by the Army, extending from Detroit to Saginaw. The demand for lumber gave further emphasis to road construction in order to move logs and lumber from regions not accessible by boat.

Many of the state's early roads were actually constructed along routes formerly used as overland indian trails. Although the trails have long since disappeared, their replacement highways have remained. Some of these have evolved into such roads as US-12, I-94, I-96, I-75, and US-23. Thus, many of today's major state highways merely duplicate statewide travel patterns established long before the invention of the automobile.

From those early days, responsibility for the state's highways has shifted among several agencies. Townships assumed earliest responsibility, followed by a brief attempt of private enterprises to establish toll roads. Since monies collected were grossly inadequate to meet maintenance needs, and due to the expanding popularity of the automobile, the State Legislature allowed the establishment of county road commissions to develop and maintain major roads. It soon became apparent that a state organization would be required to administer the more important trans-state highways. This led to legislation in 1905 establishing the State Highway Department.

Since that time, numerous events have led to the expansion of the

highway system in Michigan. Accessibility to rural areas, national defense, and public demand for personal transportation have all contributed to expansion and improvement of the highway network.

Department's Function

One of the department's foremost functions is to provide sufficient right-of-way throughout the state to permit a reasonable level of accessibility. By virtue of these continuous strips of public land, essentially every area of the state is made accessible to the general public.

The Constitution and Statutes of the State of Michigan charge the department with the responsibility for planning, designing, and maintaining highway facilities within these rights-of-way. Construction, although supervised by the department, is carried out by private contractors. This system of highways, now totaling 9,454 miles (15,221 kilometers) offers virtually unlimited toll free usage by public and private vehicles alike.

The Purpose of Highways

Public highways in Michigan have two basic service functions:

1. Provide access to property.
2. Accommodate the movement of through traffic.

Local rural roads and local residential streets serve the first function and major highways and freeways primarily serve the latter. Between these two extremes are a substantial number of highways, roads, and streets that serve dual functions.

A major highway whose primary function is to accommodate long-

distance traffic will often be designed with a limited number of access opportunities and with safety features commensurate with higher traveling speeds. Local residential streets and roads, on the other hand, are designed with numerous access points for adjacent properties and often incorporate numerous curves and stops to discourage high speeds and through traffic.

Highway Classification

In order to properly plan and develop a state highway system, the department has established a State Trunkline Highway Plan. From this plan, various highway segments have been classified according to their service characteristics and functional usage. (See Exhibit 1).

The major classifications include:

- a. Interstate
- b. Other statewide arterials
- c. Regional arterials
- d. Local arterials

Highway classifications are also derived from a system of ranking the cities or areas of special interest which these highways connect. The evaluation of socioeconomic data for all municipalities produces an ascending scale of classes representing marked differences in importance as traffic attractors. The accompanying exhibit depicts the classifications of various highways and places in the region according to the current State Highway Trunkline Plan.

It should be noted that many streets and roads exist which are not shown on the exhibit. This exhibit is not intended to indicate all important roads, but merely those under state jurisdiction. All roads and streets regardless of their jurisdictional

responsibility fulfill key roles in the total highway network. State trunklines are the only concern of this study with emphasis placed upon the interstate and major arterial routes. However, local road and street improvements initiated by local government agencies should be integrated with improvements resulting from this study.

Department's New Approach

On November 16, 1977, Michigan's State Highway Commission approved a revised approach to highway development. The significance of this revision is to shift emphasis from new highway route development to management of the existing system. Reconstruction and rehabilitation of existing highways has become the top priority.

This does not mean, however, that expansion or relocation of existing highways will not be pursued. Where monitoring of the highway system clearly indicated a need, and where a detailed planning process defines that need, relocations of existing highways or addition of new highways will be undertaken.

REGION V STATE HIGHWAY CLASSIFICATION

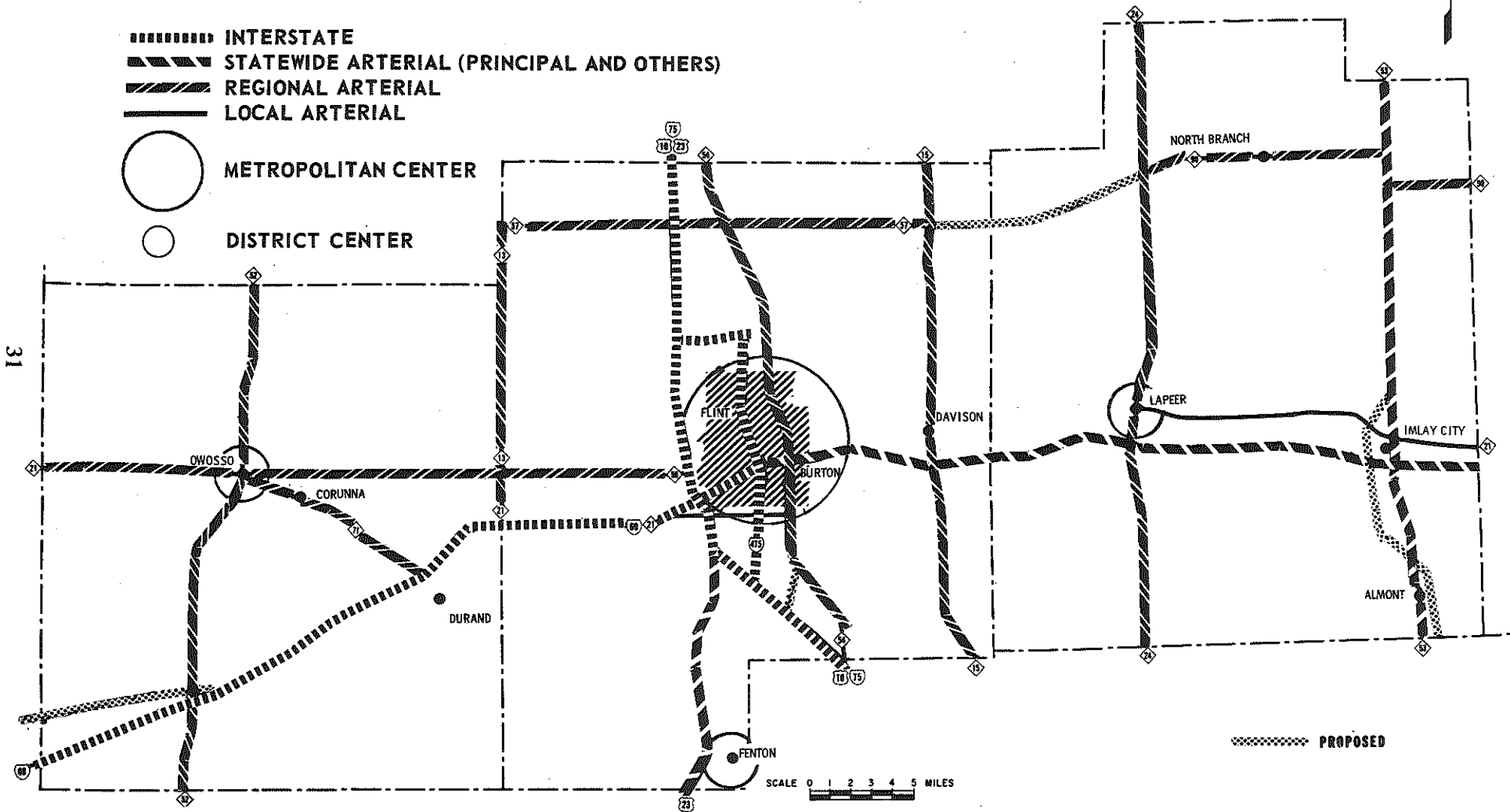


EXHIBIT 1

RAILROADS

The 1970 bankruptcy of the Penn Central Railroad caused widespread concern about the financial condition of the nation's railroads. The Ann Arbor Railroad also declared bankruptcy in 1973. Together, these bankrupt companies represented a possible loss of 2,100 miles (3,387 kilometers) of trackage that served a large number of community and industrial interests in Michigan's lower peninsula.

Although these bankruptcies were perceived as a sudden occurrence by the general public, those persons working closer to the railroad industry knew that rail service had been declining for many years. A major reason for this decline was attributed to the development of competing transportation modes.

At the beginning of this century, the railroads offered the principal means of intercity freight and passenger travel. Then, during the early 1920's and 30's, the automobile and airline industries began their development. After World War II, these new industries greatly expanded their services and caused the competitive position of the railroad to deteriorate. Revenue passenger miles declined 80 percent from 1947 to 1976 in spite of explosive growth in passenger travel. During the same period, the railroad's share of intercity freight declined from nearly 66 percent to 39 percent. Although the railroad still continues to be the largest carrier of freight in terms of ton miles, the industry can no longer compete with the level of service offered by the trucking industry in transporting commodities over short and medium distances. The railroads are still very competitive carrying bulk cargoes over long distances.

Many communities in the region are faced with the prospect of losing railroad service. The Penn Central and Ann Arbor Railroads have already gone bankrupt and their operations are currently being maintained on a year-to-year basis through government subsidy. The Grand Trunk Western, a solvent carrier, has a segment in the region in Category 1 on their system diagram, which the carrier will seek to abandon within three years.

In recognizing the potential social-economic impacts associated with rail abandonments, the federal and state governments have enacted legislation to provide financial assistance for certain rail operations. At the federal level, the Regional Rail Reorganization (3R Act) of 1973 provided comprehensive legislation for preserving and improving rail service. A major item in this legislation was the plan for reorganization of seven Midwest/Northeast bankrupt railroad lines into a new Consolidated Railroad Corporation (Conrail). However, the resulting Conrail system did not include all of the 2,100 miles (3,387 kilometers) of Penn Central and Ann Arbor trackage located in Michigan. Responding to this critical situation, the Michigan Legislature enacted the State Transportation Preservation Act of 1975 with these main features:

1. Identifying the MDOT Commission as being responsible for state railroad plans and programs.
2. Permitting the state to subsidize rail service continuation.
3. Permitting the state to acquire abandoned rights-of-way for recreational or future transportation purposes.

4. Permitting the state to contract with a person, firm, or corporation to provide rail or ferry service deemed to be in the best interest of the state.

The passage of the Michigan Act was significant in that it represented the state's initial commitment to maintain an adequate statewide rail network. The legislation also represents the first time that the Michigan Department of Transportation has become actively involved in the operations of the railroad business.

In 1976, the federal government amended its earlier legislation by passing the Rail Revitalization and Regulatory Reform Act (4R Act). This legislation provided federal dollars to those states like Michigan that were attempting to bear the financial burden of supporting light-density rail lines abandoned by solvent carriers and also extended the provision of the 3R Act. Although these federal funds will extend through 1981, the amount allocated to Michigan may decrease each year. Therefore, the department prepares an annual update of the Michigan Railroad Plan in order to assess its rail subsidy program. In making recommendations concerning the feasibility of continuing rail subsidy, the Michigan Rail Plan has adopted the following set of goals:

- To provide and maintain an adequate and efficient railroad network within Michigan and maintain links to the regional and national networks.
- To promote present and future financial development, stability, and efficiency within the Michigan railroad system.

- To promote the integration of the different modes of transportation into a balanced system and avoid inequitable government support of particular modes.
- To provide service for existing economic base activities and subsequently encourage desirable patterns of social and economic development within Michigan.
- To minimize adverse social and economic impacts of changes in railroad service.
- To improve the energy efficiency of transportation services.
- To promote the ecological and aesthetic quality of the environment.
- To maintain and promote railroad competition in the provision of transport services.

Although these state and federal rail programs have only been in effect for a short time, their impacts have been significant. In Region V, these actions have enabled the state to maintain the rail operations of approximately 20 miles of the region's track miles.

Status of the Region's Railroad System

The three principal railroads now operating in Region V are the Chessie System, Grand Trunk Western, and the Ann Arbor Railroad (Michigan Interstate). These railroads provide freight services that range from one trip per week to nine through freights per day, plus two

locals per day. The Grand Trunk Western Railroad line from Port Huron to Durand via Flint offers Amtrak passenger service.

Ann Arbor Railroad

The continuation of rail service over the entire length of the Ann Arbor Railroad and car ferry route receives the state's highest priority in its rail subsidy program. This priority is based in part on the need for continuation of economic development efforts in the area it serves.

Michigan owns portions of the Ann Arbor between Cadillac and Ashley, and between Toledo, Ohio and Ann Arbor. Existing lease arrangements with the Ann Arbor trustees and the Grand Trunk Western Railroad allow the Ann Arbor to be operated as an integral unit from Toledo to Frankfort and, using the car ferry, to Kewaunee, Wisconsin.

Conrail had been the operator of the Ann Arbor from the beginning of the subsidy program in April of 1976 until October of 1977. There were concerns that Conrail, a large national carrier, was not always able to satisfy local rail interests. Therefore, in an effort to satisfy local needs, the department has recently contracted with the Michigan Interstate Railroad Company (MIRC) of Owosso to become the principal rail carrier. It is anticipated that this company will offer the best opportunity for restoring the Ann Arbor Railroad as a solvent carrier.

Chessie System

This railroad operates as a solvent carrier and receives no state subsidy. The Wixom Subdivision of the Chessie runs from Wixom to Saginaw via Flint. It carries an excess of 20 million tons per year of freight.

Service is provided by five to nine through freights per day in addition to two local freights per day. The Chessie's Port Huron Subdivision passes through the northeast corner of this region. This line runs from Port Huron to Saginaw and provides one through freight per day in addition to three local freights per week. These lines are an integral part of the Chessie System and are not subject to abandonment.

Grand Trunk Western

This railroad is a solvent carrier and receives no state subsidies. The Grand Trunk operates two lines in Region V. The Flint Subdivision runs from Port Huron to Durand and carries over 11 million tons of freight per year as well as one passenger train per day. Service is provided by four through freights a day, one local freight per day, and one Amtrak passenger train per day. This is the main line of the Grand Trunk Railroad and is not threatened by abandonment.

The second line is the Cass City Subdivision which runs from Pontiac to Caseville. The segment from Lapeer to Caseville is currently under study by the Grand Trunk Railroad for possible abandonment within the next three years.

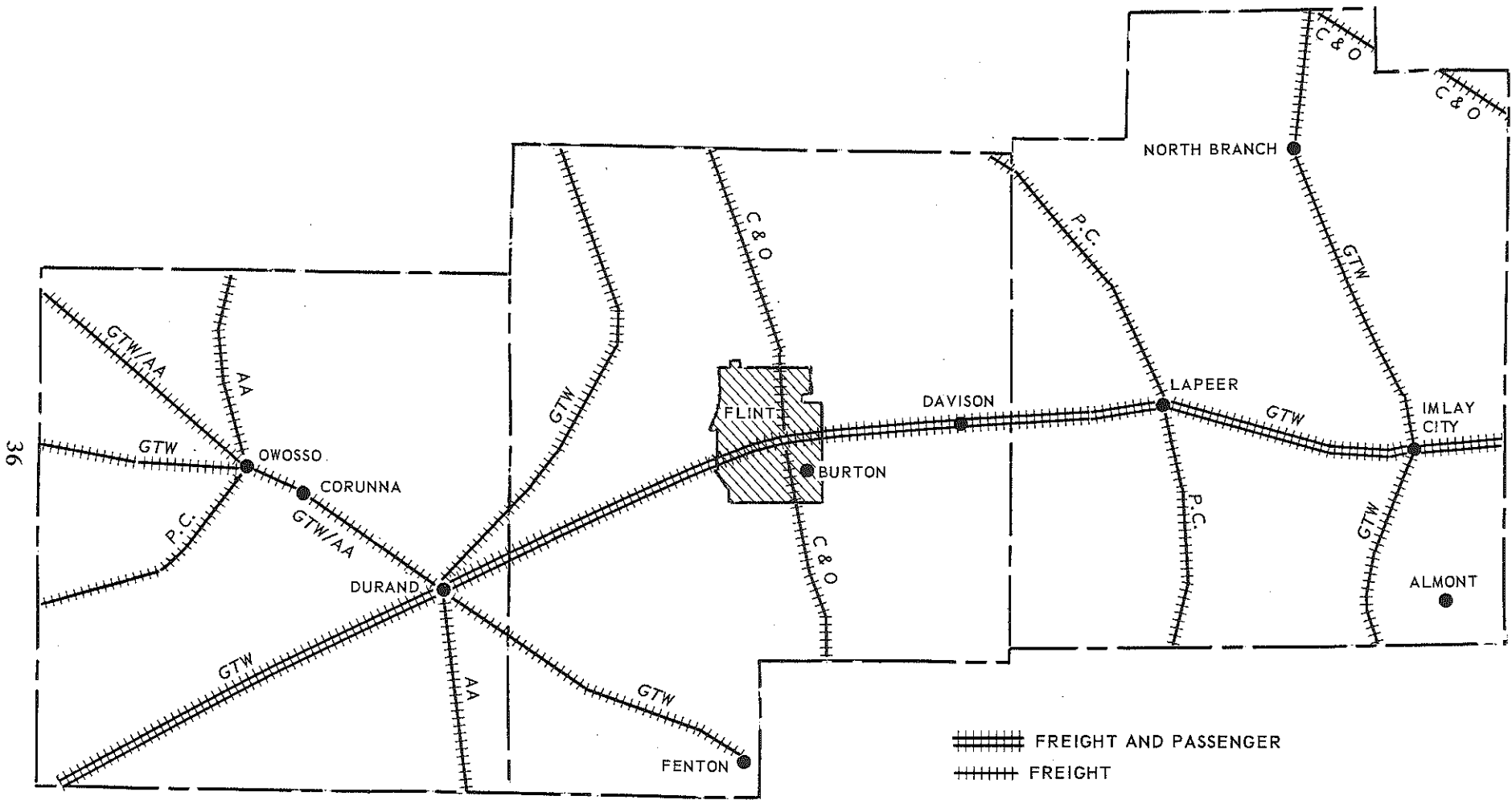
STCC Commodity Description

01	Farm Products
11	Coal
20	Food & Kindred Products
25	Furniture, Fixtures
26	Pulp Paper, Etc.
28	Chemicals, Etc.
29	Refined Petroleum, Coal Products
32	Clay, Concrete, Glass, Stone Products
33	Primary Metal Products
37	Transportation Equipment
42	Empty Containers



RAILROAD LINE SUBDIVISIONS

<u>Carrier</u>	<u>Line Segment</u>	<u>Freight Tonnage Density</u>	<u>Service Frequency</u>	<u>Major STCC</u>	<u>Passenger Service</u>	<u>Under Subsidy</u>
Ann Arbor	Ann Arbor - Owosso	4.5	1 Frt./Day	25,42	No	Yes
Ann Arbor	Owosso - Frankfort	2.0	1 Frt./Day	32,01,37	No	Yes
Ann Arbor	Owosso - Swan Creek	N.A.	1 Local Turn/Wk.	01,28	No	Yes
C&O	Wixom - Flint	20.7	9 Thru Frt./Day 2 Local Frt./Day	37,11,33	No	No
C&O	Flint - Saginaw	20.7	5 Thru Frt./Day 2 Local Frt./Day	37,11,33	No	No
C&O	Saginaw - Port Huron	3.5	1 Thru Frt./Day 3 Local Frt./Day	28,29,37	No	No
GTW	Durand - Port Huron	11.2	4 Thru Frt./Day 1 Local Frt./Day 1 Pass./Day	26,37,01	Yes	No
GTW	Pontiac - Caseville	0.2	3 Local Frts./Wk.	01,28	No	No
GTW	Battle Creek - Durand	22.4	8 Thru Frt./Day 1 Local Frt./Day 1 Pass./Day	27,37,01	Yes	No
GTW	Durand - Penn. Junct.	1.5	1 Local/Day	01,28	No	No
GTW	Durand - Bay City	1.1	1 Local Frt./Day 5 Unit Coal Trains/Wk.	11,28	No	No

REGION V EXISTING RAILROAD SYSTEM



36

 FREIGHT AND PASSENGER
 FREIGHT

- AA - ANN ARBOR RAILROAD (OPERATED BY MICHIGAN INTERSTATE RAILWAY, A SUBSIDIZED OPERATOR)
- C & O - CHESSIE SYSTEM
- GTW - GRAND TRUNK WESTERN
- GTW-AA - GRAND TRUNK WESTERN OWNED ANN ARBOR R.R. TRACKAGE RIGHTS
- P.C. - PENN CENTRAL TRANSPORTATION CO. (ABANDONED)

NONMOTORIZED TRANSPORTATION

The State Legislature directed the Highway Commission to begin planning and building facilities for nonmotorized transportation when it passed a package of transportation bills late in 1972. All planned highway projects now are routinely reviewed to determine whether nonmotorized facilities are warranted. In addition to highway projects, the Department of Transportation is also actively considering the acquisition of abandoned railroad rights-of-way for possible use as combination hiking, bicycle, and equestrian trails.

Since the nonmotorized transportation program was initiated, most of the projects have been built to accommodate bicycle travel. The use of the bicycle for both transportation and recreation has been increasing continuously since the late 1960's. Today it is estimated that there are over 3,500,000 bicyclists in Michigan. A recent survey by the Michigan Department of Natural Resources indicated that bicycling is the most popular outdoor recreation activity in the state in terms of hours of participation.

In the Genesee, Lapeer, and Shiawassee County Region, the pursuit of recreational activities of both its residents and visitors is becoming increasingly popular. Therefore, it is becoming a common occurrence to see many bicycle travelers enjoying the natural beauty of the area. All of the region's roads and streets, with the exception of limited access highways, can be legally utilized for bicycle travel. Paved roads are, of course, the most suitable for riding. Some roads are more desirable for riding than others if they have characteristics such as

low traffic volumes, paved shoulders, low speed limits, and special bicycle lanes.

Bicycle Safety

In 1977, there were 204 car-bicycle accidents reported in the region resulting in bicyclist injuries or fatalities. Four fatalities and 200 injuries were reported. This illustrates a central problem associated with the nonmotorized transportation mode. Whenever motorists and cyclists share a given roadway, a tense and potentially hazardous safety condition can develop. Although a lack of knowledge and respect of the basic rules of the road (on the part of both motorists and cyclists) contributes significantly to this problem, special facilities for bicycle riding - placed in strategic areas - can alleviate much of the problem.

Safety problems can be alleviated through a variety of basic approaches, some of which are the responsibility of local governmental agencies. School systems should emphasize the respective responsibilities of the different modes in their driver education programs and special safety classes. Licensing of drivers and the possible licensing of bicyclists provide another opportunity to acquaint motorists and potential cyclists of vital safety precautions. The ever-increasing number of bicyclists on our streets and highways should, in itself, increase a mutual awareness between the modes as drivers and riders gain experience in dealing with each other.

Enforcement of traffic laws is another factor relevant to minimizing safety problems. State and local vehicle codes should be reviewed and

altered, if necessary, to better accommodate the mix between motorized and nonmotorized vehicles. State and local police should have training programs to instruct officers on the rights and responsibilities of both the motorized and nonmotorized roadway users.

Michigan road agencies can also contribute to safe operation by providing nonmotorized facilities, in the form of roadway additions, where they are warranted. These facilities can consist of lane striping, shoulder paving, paths, curb ramps, widening of right-hand lanes, and special bridges. Such modifications, or additions, to the existing highway system greatly enhance leisure and work-related travel by bicycle.

Bikeway Selection

In addition to the department's review of its proposed highway construction program, many requests for nonmotorized projects are received from local governments, school districts, and other local interest groups or agencies. Such projects, however, must be on the state highway system to warrant the department's involvement. Of course, many projects are initiated by local governmental units without state involvement.

A preliminary policy plan has been adopted by the department which guides the selection of projects and subsequent development. In general, the selection of bicycle path locations is based on the following criteria:

1. Overall traffic safety.
2. Interconnection of recreational, school, and residential areas.

3. Additions to locally developed pathway systems which involve a state highway.
4. Long distance routes.

Bikeway Classification

After a bikeway location has been determined, there are several physical characteristics to consider when designing the actual bicycle facility.

Bikeways have been classified according to the "degree of exclusiveness" to which the facility is preserved for bicycle use. The classification system is illustrated in the accompanying photographs.

Where cross-flows of motor vehicle travel can be minimized, probably the most desirable bikeway design is that of a Class I facility. Unfortunately though, the construction of such an exclusive facility is both complex and expensive. In some cases, special drainage structures and small bridges must be built in order to ensure a route's continuity. A nonmotorized project of this design was constructed in southeast Michigan along 40 miles (65 kilometers) on I-275 for \$3 million.

Class II bikeways are usually located adjacent to existing motor vehicle traffic lanes. In urban areas, they are established as bikeway lanes by the use of special pavement markings. In rural areas, Class II bikeways are generally paved highway shoulders.

Many local communities are in the process of establishing Class III bikeways. These are usually inexpensive to implement since they utilize existing low volume residential streets and only require installation

of a few "Bike Route" signs. In some locations, sidewalk bikeways are utilized when it has become necessary to route bicycles off the street. The bicyclist must be prepared to share rights-of-way with both the motorist and pedestrian in these instances.

Funding

Whereas the I-275 pathway was a unique project, funded with 90 percent federal interstate funds, most of the department's nonmotorized facilities are being funded out of the state's Motor Vehicle Highway Fund. These funds provide the primary source of road construction dollars for all highway agencies - city, county, and state. Recent legislation (Public Act 444 of 1978) requires that highway agencies spend 1 percent of their Motor Vehicle Highway Fund revenues on projects which facilitate nonmotorized transportation. In addition to special bicycle facilities, lane widening and shoulder paving have been defined as appropriate nonmotorized improvements.

PUBLIC TRANSPORTATION

Public transportation in Michigan and in the United States has recently emerged for a long period of decline. Ever since World War II, public transportation ridership has been steadily decreasing. This decrease was mainly attributed to a shift in travel habits towards the automobile and airline transportation modes. As transit ridership decreased, the corresponding loss in revenues caused many private and public transit operations to either cut back on services or else go out-of-business entirely. The only public transportation service available in Region V during most of 1971 was the intercity bus operations. During

most of 1971, bus service in the Flint metropolitan area was interrupted because of the demise of the Flint Transit Authority. There were no urban public transit systems operating at that time.

As a result of this condition, many social groups were experiencing a transportation disadvantage in not being able to gain reasonable access to such community opportunities as employment, education, shopping, health care, and other basic human service needs. Initially, these social groups were usually made up of the poor, the young, the elderly, and the handicapped, who were either unable or else could not afford to own and operate an automobile. However, since the 1973-74 Mideast oil embargo, it has become apparent that future energy supplies may cause public transportation to take on a more active role for all of our society.

In recognition of these public transportation needs, the Michigan Legislature passed Act 327 in 1972 and Act 195 in 1975. These acts have provided new funding sources for various public transportation improvements and directed the Michigan Department of Transportation to be the state agency responsible for administering these programs. The state legislature also passed new public transportation legislation in 1978. This recent state legislation along with the federal Surface Transportation Act of 1978 will provide additional funds to implement and expand public transportation service throughout the state especially in the urban and rural areas.

One of the department's objectives in developing public transit plans is to ensure that an adequate level of

public transit service will exist for both residents and visitors of Region V. In most cases this means developing an overall system of public transportation services that offer a balanced mix of metropolitan, urban, regional, and intercity operations. The following information will illustrate how these various services are operating in Region V.

Metropolitan Public Transportation

SERVES: Flint Metropolitan Area

The Metropolitan Transportation Authority (MTA) has provided public transportation service to the Flint area since 1971. The system predominately operates on a fixed time schedule over predetermined bus route and provides peak/off peak headways of 15 to 30 minutes respectively. Other services provided by the MTA are oriented to school children and the elderly and handicapped. Ridership and the level of service provided have steadily increased since 1971. The state provides the required 20 percent match to apply for federal capital grants and also pays for up to one-third of the operating cost of the system.

Urban Public Transportation

SERVES: Davison

This level of service normally operates within the larger communities of 2,000 to 50,000 population. The service is generally characterized by a dial-a-ride transportation (DART) system. This service utilizes the smaller 10-15 passenger van-type vehicle and is not limited to any fixed route operation. A person desiring this type service merely calls on the telephone and the van will soon arrive to pick them up and take them to their destination. In

an effort to assist communities interested in this type of service, the department has a Small Vehicle Program to fund the initial cost of implementing a system. This program provides for a 2-year demonstration period during which the state provides all capital and operating costs. After the demonstration period, the state will continue to provide all capital costs and from one-third to one-half of the operating cost depending upon the availability of federal operating assistance. The remaining costs are provided through fare revenues and local contributions. As a program, 25 urban areas throughout the state are now operating this service. Several urban areas within Region V have sufficient population to warrant this type of service. Each community could apply for a public transportation service. A more efficient organizational arrangement, however, would be to have a county-wide public transportation system that operates all services within the county including metropolitan, urban, and rural services.

Rural Public Transportation

Rural transit systems are intended to provide a basic level of public transportation service to the rural and small urban areas within a county. These systems also utilize van-type vehicles and operate on a demand responsive (DART) basis. However, the service provided to rural areas is not usually as frequent as that in the urban areas. For example, some systems may only provide services one or two days a week and 24-hour advance notification is generally required. The rural areas of all three counties comprising Region V are eligible for rural public transportation service. Service in each of these areas could be provided as part of a countywide public transportation system.

OPERATING STATUS OF REGION'S
PUBLIC TRANSPORTATION SYSTEMS

<u>System</u>	<u>Number of Vehicles</u>	<u>Annual Ridership</u>	<u>Annual Operating Cost</u>	<u>Farebox Revenue</u>
Flint	47	3,090,668	\$2,307,776	\$531,456
Davison	4	71,996	\$ 56,940	\$ 19,200

1/ Annual ridership, operating cost, and revenue are estimated figures based upon October-December 1977 quarterly data.

Another type of countywide service is the state and federal senior citizen and handicapper transportation programs. These programs provide monies for the purchase and operation of vehicles in areas where public transportation services are nonexistent. Lapeer and Shiawassee Counties have countywide senior citizen and handicapper service. These are basic service systems with one to three vans serving the entire county. Some of these vehicles are equipped with wheelchair lifts. The services are generally operated by private, nonprofit, or social service organizations. Although this type of service is recognized as a specialized form of transportation, the department would like to see it incorporated into a countywide service that is available to everyone.

Regional Public Transportation

A major function of regional public transportation is to connect the various urban areas within a region. The regional service utilizes a larger intercity type of vehicle and must adhere to a predetermined time schedule over a fixed route. Regional service can provide more comprehensive routing and more convenient schedules than the larger intercity carriers. There are no existing regional services within Region V.

Intercity Public Transportation

SERVES: Major urban destinations located within and beyond the region.

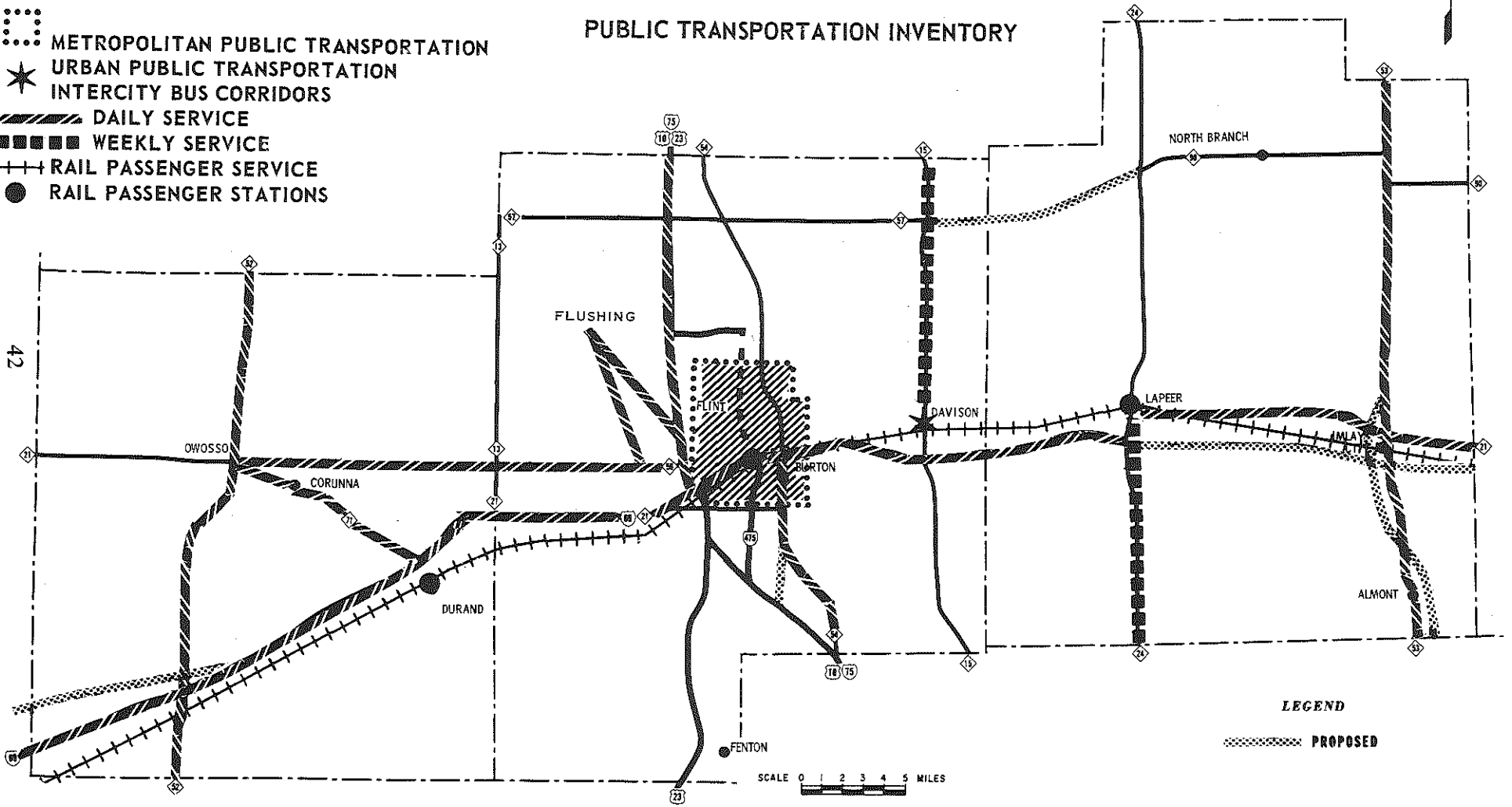
Intercity systems connect major urban areas of the region with the remainder of the state and nation. Region V is served by both intercity bus and rail passenger systems. The intercity bus is designed for long distance travel and can comfortably seat 47 persons. In addition to passenger service, these buses also offer package shipments. Although intercity bus companies are privately owned, their operations are regulated by Michigan's Public Service Commission. They are required to operate over certain highway routes and abide by their advertised time schedules.

Intercity bus carriers providing service in the region are Indian Trails, Inc., Greyhound Lines-East, Valley Coach Lines, Inc., and the Bee Line, Inc. Major corridors served by the intercity bus industry include Detroit-Flint-Saginaw-Bay City and points north (five daily round trips) and Bay City-Saginaw-Flint-Lansing-Chicago (six daily round trips). One daily round trip is provided between Flint and Port Huron and between Detroit-Imlay City and points north.

REGION V

PUBLIC TRANSPORTATION INVENTORY

- ⋯ METROPOLITAN PUBLIC TRANSPORTATION
- ★ URBAN PUBLIC TRANSPORTATION
- INTERCITY BUS CORRIDORS
- ▨ DAILY SERVICE
- ▣ WEEKLY SERVICE
- +++ RAIL PASSENGER SERVICE
- RAIL PASSENGER STATIONS



LEGEND

⋯ PROPOSED

SCALE 0 1 2 3 4 5 MILES

6 Future Transportation Alternatives

A major objective of this study is to ensure that an adequate regional transportation system is developed to meet current and future needs of the region. To accomplish this objective, the study team has recognized two principal factors that will significantly affect the character of future transportation systems. They are:

1. The availability of liquid fuels, and
2. The continuing changes in settlement patterns of the population.

Both factors fundamentally lie outside the control of transportation planning and policymaking. In any event, both will proceed independently unless conscious public policy tries to relate them to a greater degree that has been the case in the past.

ENERGY AVAILABILITY

The availability of liquid fuels, either in the form of synthetic substitutes or in the discovery of new resources, will define the costs and much of the character of future transport services. Today, the fuel supplies are apparently adequate to meet the current travel demands. However, these supplies were severely limited during the 1973-74 Mideast oil embargo.

The embargo had a significant impact on the various transportation systems. Service stations were closed on weekends in some areas of the country and many motorists waited in long lines to fill their gasoline tanks. Commuters discovered that car pools provide a substantial economic savings in making their

daily work trip and others shifted to local transit services. In some cases, the number of work trips were reduced due to employers experimenting with 4-day work weeks.

Another impact of the embargo was felt by the commercial airline industry. The fuel shortages caused many flight schedules to be reduced and advance reservations were required to ensure a seat on a fully loaded flight.

Although the oil embargo lasted only a few months, some of its effects are still with us. For example, most everyone has now become more energy conscious. The Environmental Protection Agency (EPA) has required that the automobile fleet must average 27.5 miles per gallon by 1985. Because of this, gasoline mileage has become a prime consideration in selecting a new or used automobile. The federal government is in the process of developing a comprehensive energy policy and the maximum speed limit on the nation's freeway is still 55 mph (88 kilometers/hour).

The possibility of reduced fuel supplies can have major effects on future transportation actions. Should we continue expanding the highway system? Should we be considering more transit options? Are we going to need additional airports or will the existing facilities be adequate? Should the railroads be permitted to abandon their service? Will Michigan's ports be involved in transporting western coal into the Midwest? It is because of these kinds of questions that the study team has identified the "energy" issue as a central concern of future planning efforts.

GROWTH AND DEVELOPMENT

Changes in settlement patterns will also significantly define the character of the demand for future transportation services. These population shifts, including declining urban densities, suburbanization and rural migration, are often accompanied by changes in lifestyle. As communities begin to grow and develop, various social and economic activities require an increase in many public services. In order to accommodate this growth, some local communities are faced with the prospect of extending water, sewer, gas, and electric power lines. In addition, some transportation systems will have to be expanded or improved to accommodate increased travel demand.

While some communities are experiencing "growing pains," others are struggling economically due to a lack of growth. These areas are sometimes characterized by a high unemployment rate, low tax base, low income, etc. Thus, in order to improve these conditions, government assistance programs are often implemented to stimulate private investment. These programs provide the dollars for such facilities as industrial parks, port development, airport improvements, education and convention centers, plus low interest loans for various housing and industrial projects.

From an economic standpoint, a growing community establishes a favorable business climate that can attract additional private investments. Socially, these investments can be beneficial by providing increased personal income and employment. In addition, a broader tax base can be used to support better educational and cultural facilities.

However, from an environmental standpoint, a growing community can sometimes cause significant increases in air and water pollution levels. Land use changes can occur that will detrimentally affect environmentally sensitive areas such as parks, forests, lakes, and primary agricultural lands.

After many decades of disordered development, we are now witnessing a nationwide countermovement of public pressure that is attempting to check, if not reverse, past growth trends. Some communities are starting to fashion new master plans calling for a ceiling on future growth and prescribing precise definition of settlement patterns. In view of the potential for future energy shortages, these growth management policies may not only be a desirable option, they may also become a mandatory planning action. Therefore, the future of transportation development will also depend on the rate of growth that is permitted to occur.

FUTURE TRANSPORTATION DEVELOPMENT STRATEGY

Numerous factors, other than energy availability and population change, will also influence the region's future transportation system needs. Economic conditions, governmental influence, incentive programs, available leisure time, and desirable lifestyles will all play an important part. Though considered in developing descriptions of the various futures, energy and population were selected as the dominant factors.

The study team has developed a planning strategy based upon these two dominant factors. It considered the possible occurrence of several

future conditions based upon variations of energy supply and population growth. The alternative energy supply futures are identified as "Abundant," "Conserved," and "Restricted." The population growth futures are described as "Low," "Medium," and "High." Combinations of these factors yield nine possible situations, or futures, which are conceptually illustrated on the following pages.

Following is a brief explanation of the variations within the energy and growth futures.

Growth Futures

A key indicator of the region's growth potential is often expressed in its forecasted population levels. Since 1960, the region's population has increased 19 percent, from 486,660 to an estimated 577,000 persons in 1975.

Transportation facility development is directly related to the expected mobility requirements of current and future population levels. The 1970 Census established the region's permanent population at 560,000 persons. Forecasts for the year 2000 have been derived by two different sources including the Michigan Department of Management and Budget and the GLS Region V Planning and Development Commission. These forecasts vary considerably, ranging from 644,000 to 690,000 persons. Because of this wide range of forecasts, the study team has established three possible growth levels from which to base its future planning efforts:

HIGH GROWTH - This future assumes that the region's year 2000 population will reach approximately 690,000 persons, a 23 percent increase since 1970.

MEDIUM GROWTH - This future assumes that the region's year 2000 population will reach approximately 655,000 persons, a 17 percent increase since 1970.

LOW GROWTH - This future assumes that the region's year 2000 population will reach approximately 644,000 persons, a 15 percent increase since 1970.

Energy Futures

The study team found that defining three energy futures was a more difficult task. While fuel availability was considered the determining factor, both the fuel cost per gallon and cost per vehicle mile of travel will also certainly affect its future use. The three possible energy futures are described as follows:

ABUNDANT ENERGY - This future assumes that there is no energy crisis. Adequate fuels are available for transportation either through the discovery of new resources or through the development of synthetic fuels. The automobile remains the dominant mode of transportation, reinforcing urban expansion. This future is most typical of recent past and present conditions reflecting today's relatively affluent suburban lifestyle.

CONSERVED ENERGY - This future assumes that energy shortages are a long-term reality. Fuel conservation is stressed but still based on voluntary efforts. The price of fuel has risen significantly enough so that it begins to make a real impact on everyday driving habits. The automobile is still the dominant mode but certain trip purposes, like work trips, are shifting to car pools or public transit.

RESTRICTED ENERGY - This future assumes that energy for transpor-

tation purposes is in very critical supply. Gasoline rationing would be in effect. Strong government programs would be implemented to ensure proper utilization of the various modal transportation systems. Public transit development would be very extensive.

FUTURE TRANSPORTATION NETWORKS

There are nine multimodal regional transportation networks illustrated on the fold out. These networks were developed by the study team and are based on the previously described energy and growth futures. In addition, these networks were derived from the premise that:

1. The availability of future "energy supplies" determines the type of transportation mode to be developed, and
2. The amount and location of future "growth" determines the extent of transportation system development.

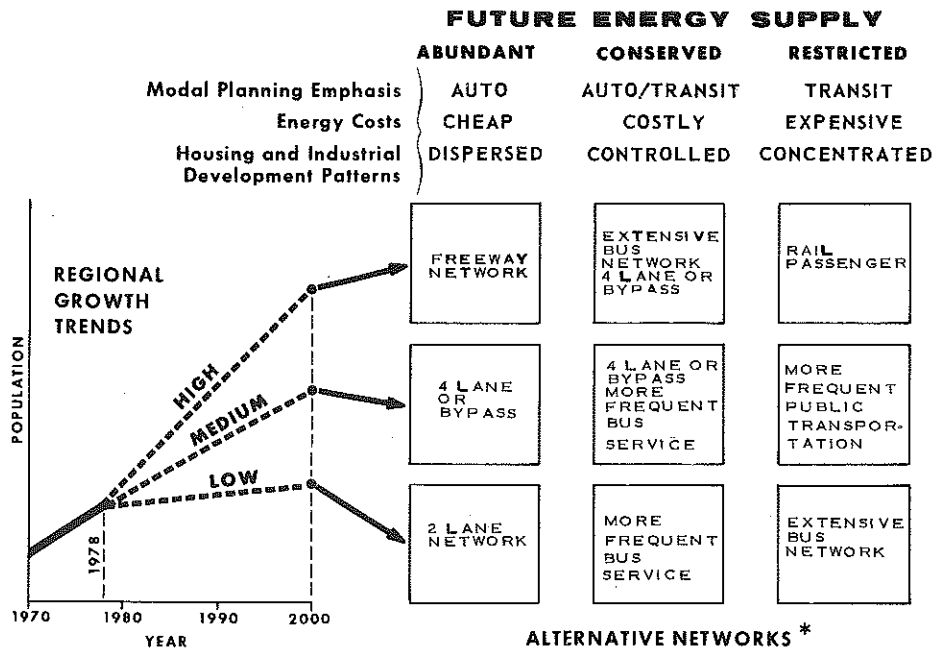
The future multimodal networks are displayed so they can be compared with the existing transportation services in operation today. The purpose of the symbols is to indicate those areas that show the greatest potential need for a major transportation system improvement. Some of the remaining areas may also require future transportation improvements, but of a lesser magnitude (Minor System Improvements). Typical examples of Major and Minor System Improvements are listed on Page 52. This analysis affords the study team an opportunity to focus its attention on those areas that show a common transportation need - regardless of the future conditions.

In reviewing these different transportation networks, several key items are worthy of special attention. These are:

1. All future networks show a potential need for some major highway improvements.
2. All future networks show a potential need for some major transit improvements.
3. All future networks propose rural bus service in every county of the region.
4. All future networks propose that the existing rail freight service to major communities be retained.
5. All future networks propose that the existing system of air carrier airports be retained.
6. Additional general aviation airport facilities are only proposed for the abundant energy futures.
7. The most extensive amount of highway development is proposed for the high growth - abundant energy future.
8. The least amount of highway development is proposed for the low growth - restricted energy future.
9. The most extensive amount of transit development is proposed for the high growth - restricted energy future.
10. The least amount of transit development is proposed for the low growth - abundant energy future.

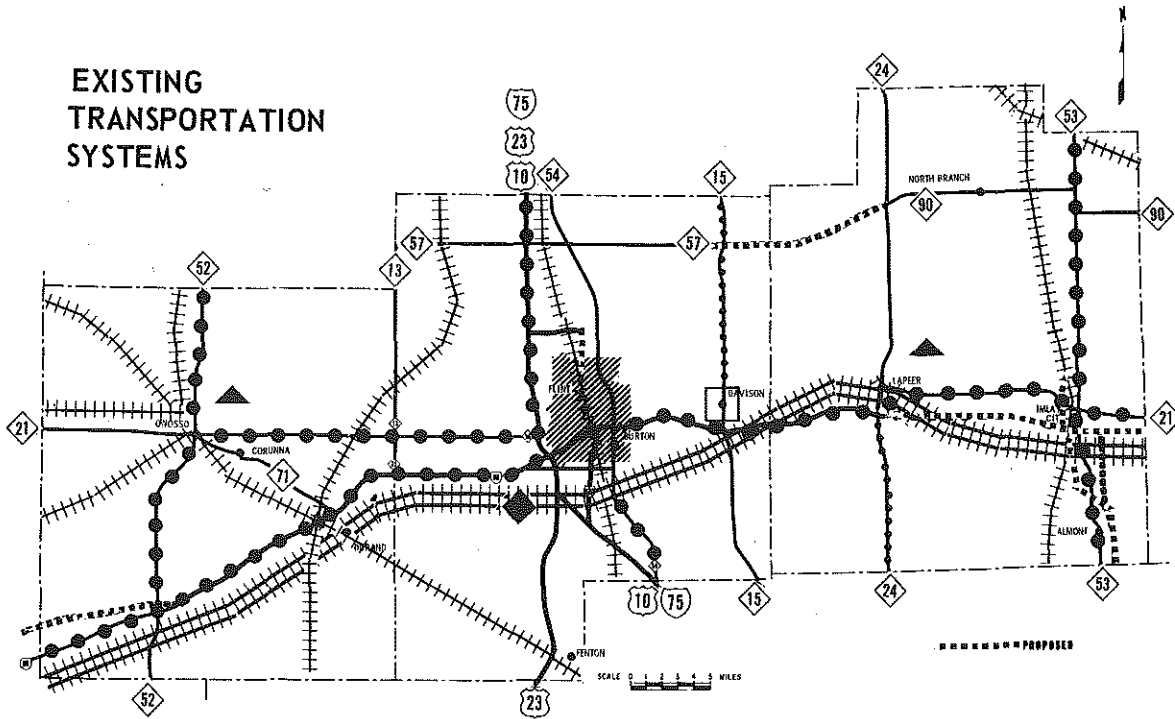
ENERGY AND GROWTH FUTURES

(PLANNING CONCEPT)



* FOR ILLUSTRATIVE PURPOSES ONLY. DOES NOT REPRESENT ACTUAL ALTERNATIVES CONSIDERED

THE THREE CHARTS ON THE FOLDOUT LABELED, LOW GROWTH, MEDIUM GROWTH AND HIGH GROWTH, REFLECT THE TRANSPORTATION IMPROVEMENTS FOR THE YEAR 2000. THE KEY FOR THE EXISTING SYSTEM ON THIS PAGE ALSO APPLIES TO FUTURE SYSTEMS ON THE FOLDOUT.

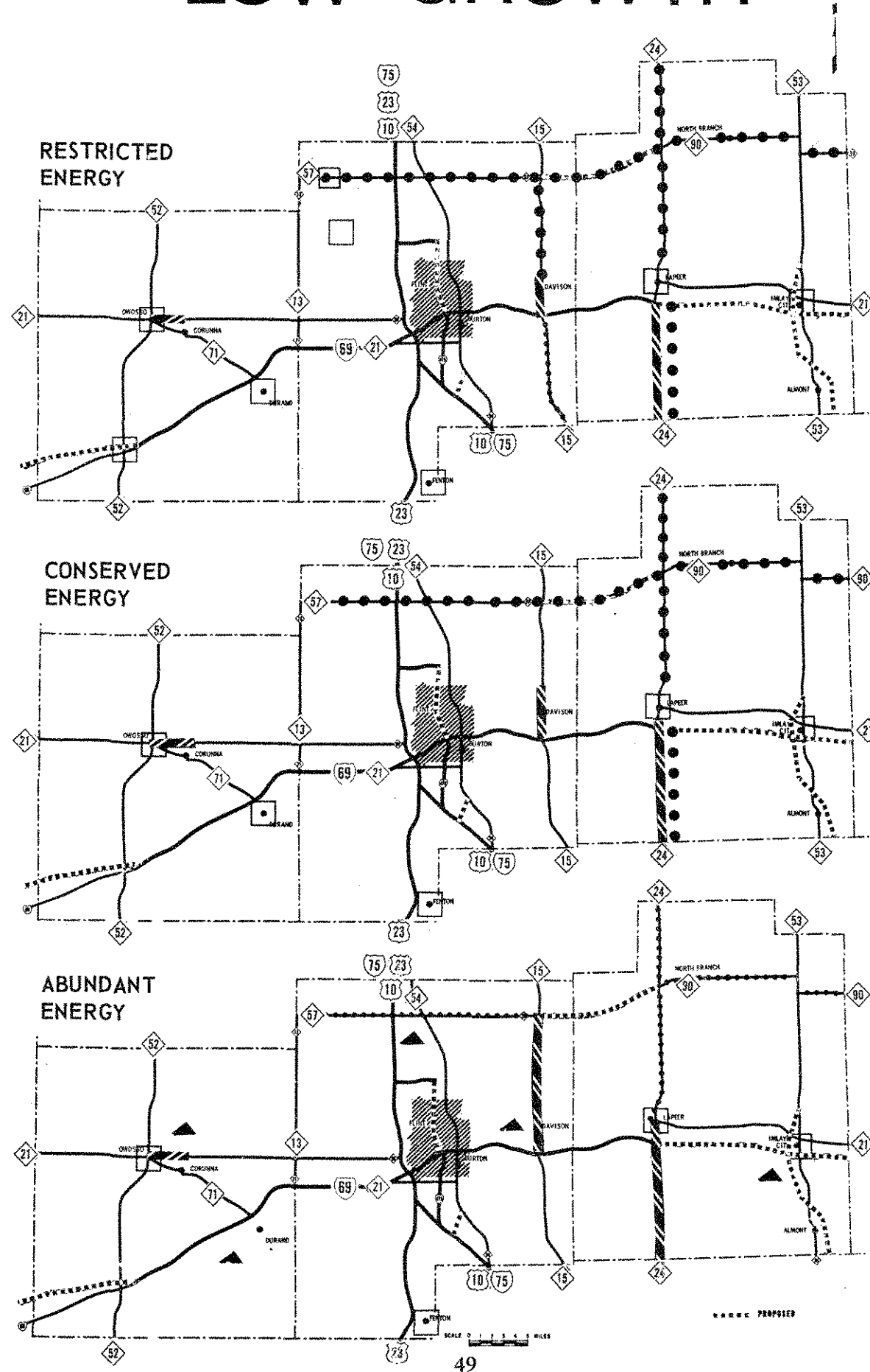


**EXISTING
TRANSPORTATION
SYSTEMS**

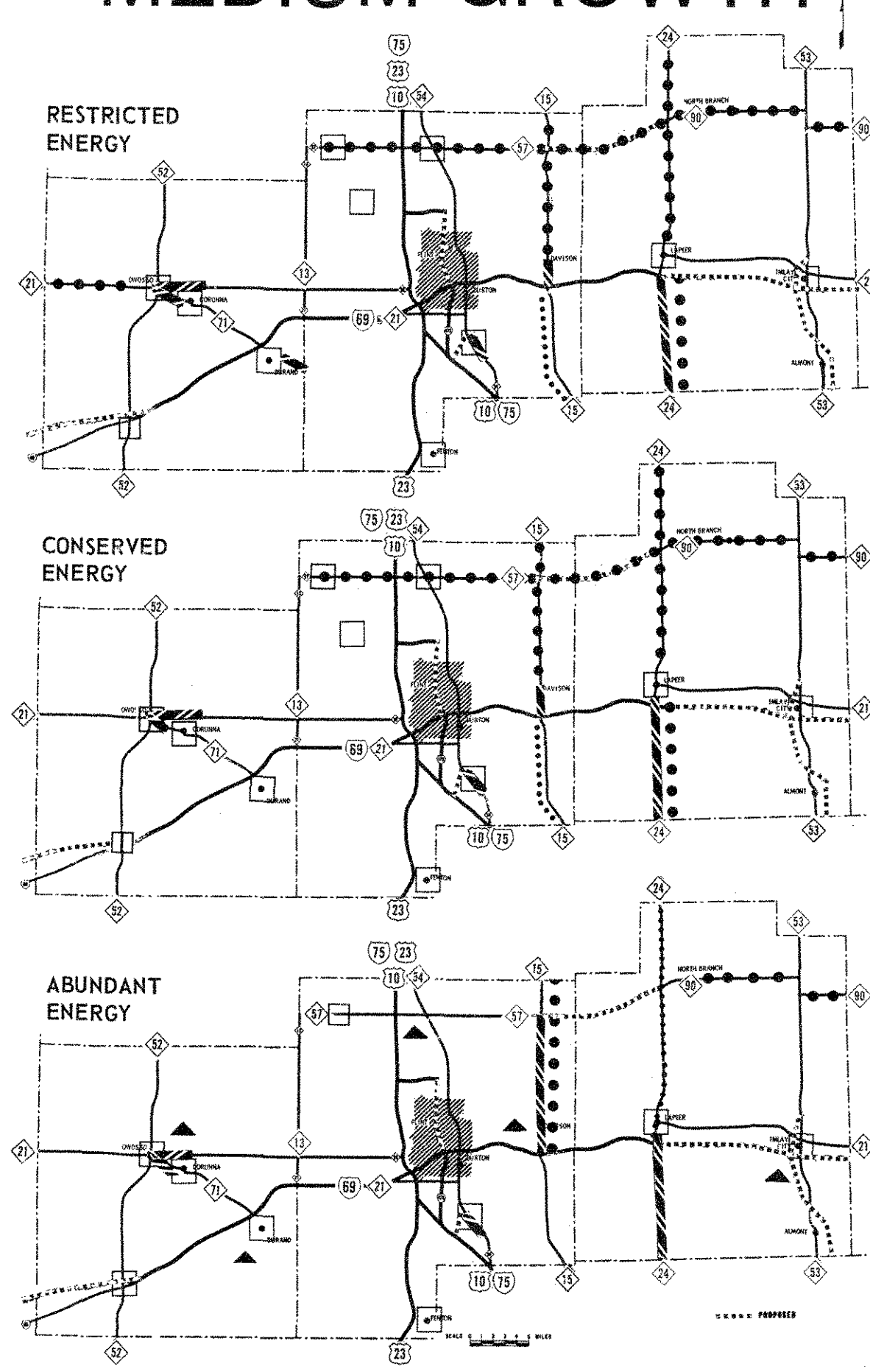
KEY

- | | | | |
|------------------------------------|--------------------|-------------------------------|-------------------------------|
| AIRPORTS | | PUBLIC TRANSPORTATION | |
| ◆ AIR CARRIERS | ▲ GENERAL AVIATION | □ METROPOLITAN TRANSPORTATION | ▨ URBAN PUBLIC TRANSPORTATION |
| RAILROADS | | INTER CITY BUS | |
| +++++ FREIGHT | PASSENGER | ● ● ● ● DAILY | ● ● ● ● ● WEEKLY |
| ▨ DEFICIENT (need for improvement) | | | |

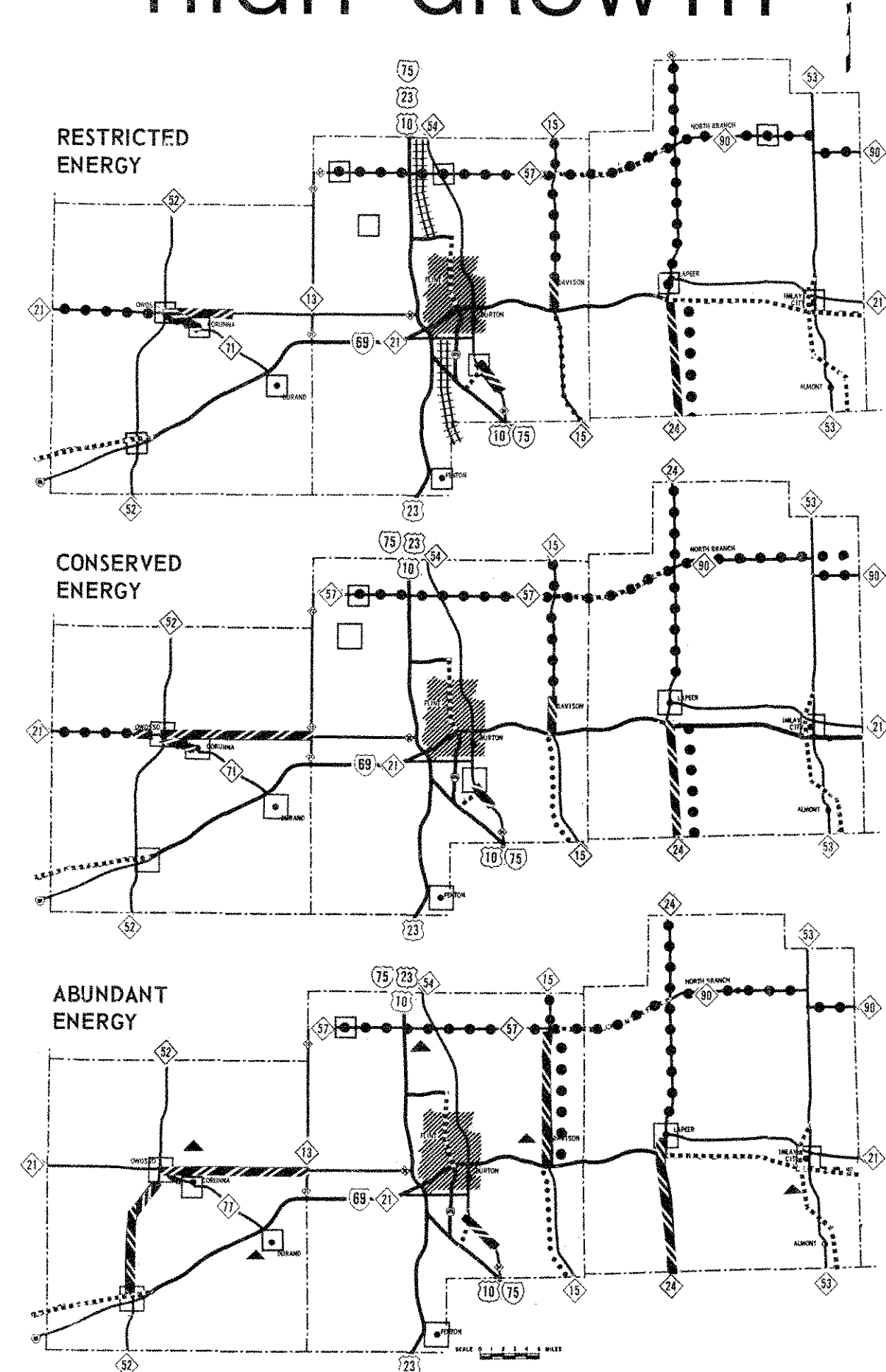
LOW GROWTH



MEDIUM GROWTH



HIGH GROWTH



MODAL IMPROVEMENT OPTIONS

The accompanying table indicates three categories of transportation improvements. These are:

1. Do Nothing
2. Minor System Improvements
3. Major System Improvements

A few examples are listed beneath each heading. These in no way represent the entire array of options available but should be helpful in associating a category with familiar improvement types.

It should be understood that these three categories of transportation improvements should not be considered interchangeable. Each is intended to satisfy a transportation problem of a certain magnitude. Minor problems should be resolved with minor system improvements. But major problems should warrant improvement alternatives of greater proportions which will solve the problem. And, of course, there exists the option of doing nothing. But, if a transportation problem exists, doing nothing would generally be considered as an irresponsible option toward solving the identified problem. This alternative would also indicate that people have decided to accept or tolerate the probable impacts associated with this option. On the other hand, the do nothing option would be the proper recommendation for those areas not anticipating transportation problems.

As an example, assume a highway transportation problem where the capacity of the existing 2-lane roadway is clearly inadequate to meet existing and future traffic demands. No amount of work of the type under

the category of "Minor System Improvements" will solve the problem because additional lanes are required. Therefore, those options should be ruled out as alternatives for further consideration. But, each of the highway options identified as "Major System Improvements" would become logical candidates for serious consideration.

Likewise, situations may exist where a minor highway capacity deficiency could be resolved by an "up-to-standard" 2-lane roadway. Only those improvement types, such as those listed under the "Minor System Improvements" category, should then be considered as alternatives to solve the problem.

The point/ is this - transportation problems should first be identified according to their magnitude. Then, only those options which could solve that particular problem should be considered as realistic alternatives. To seriously consider alternatives which involve either more or less than is conceivably needed would be irresponsible.

See appendix for social, economic, and environmental implications.

MODAL IMPROVEMENT OPTIONS--EXAMPLES

Transportation Mode	Do Nothing/No Change	Minor System Improvements	Major System Improvements
Aviation	Maintain existing airport facilities (may cause an increase in funds for adequate maintenance).	Resurface runways. Construct new taxiways, utility buildings, and emergency equipment. Install landing systems. Lengthen runways for safety.	Construct new airport. Extend runways. Construct new runways. Implement scheduled passenger service. Protect future airport/runways from improper land uses.
Highways	Maintain existing highway facilities (may cause an increase in funds for adequate maintenance).	Resurface roadways. Construct passing lanes. Intersection improvements Minor realignment. Carpool and vanpool programs. Install traffic controls.	Widen existing roads with new lanes. Construct new 2 or 4 lane roads. Buy access rights on existing road. Protect road capacity by restricting development.
Non-Motorized	Maintain existing bicycle, pedestrian, and equestrian facilities (may cause an increase in funds for adequate maintenance).	Pave shoulders. Add pavement markings. Install signs. Make curb-cuts. Expand safety & education programs.	Construct bike paths or trails. Starting special safety & education programs.
Public Transportation	Maintain existing levels of transit service (may cause an increase in subsidy level).	Provide low interest loans for private firm equipment. Add a new line, bus, or increase frequency. Decrease frequency, remove a line.	Starting new intercity service (with subsidy). Starting new rural or urban system (with subsidy). Large expansion to existing intercity or rural/urban system. Cancel a subsidy now existing. Construct new terminal facilities.
Railroads	Maintain existing level of rail service (may cause an increase in subsidy level).	Provide low interest loan for private firm equipment. Rehabilitated tracks. Increase/decrease service.	Construct a parallel second track. Start new subsidy carrier or increase service level. Cancel subsidy now existing. Locate industry along railroad to increase freight loads.

7 Transportation Issues, Needs, and Problems

Numerous conclusions have been reached during the course of this study. Obviously, they vary considerable in the degree to which they could affect transportation related decisions. While many of these findings are stated directly within the body of this report, others are less obvious. The issues, needs, and problems listed below are the results of this study. Many of these issues were identified by the citizens of Genesee, Lapeer, and Shiawassee Counties at the time of the prestudy meetings which were held in January of 1978. Some issues are considered to be minor and others major; it is our intention to list all the issues which are felt to be most pertinent.

The transportation and related issues and problems identified in the GLS Region ranged from inequity in the distribution of public funds between the state and local units for highway operations, to the need for a flasher at the M-21 and Brooks Street intersection school crossing in Owosso. The preponderance of issues and problems related to public transportation and highway but included bicycling, car pooling, air transportation, and rail transportation. Energy conservation and protecting rural areas, particularly prime agricultural land, were raised.

Funding Inequity

Five basic funding inequity issues were identified by representatives of local governments and concerned citizens within the region. Each of the issues assumes there is an imbalance in program allocations, thereby creating an economic disadvantage.

The first issue raised claims an inequitable distribution of the high-

way funds between the state trunkline systems and local road systems, specifically to rural county roads. Arguments used are: (1) A minimum amount of expense is necessary to maintain a road irrespective of traffic volume, (2) the heavy emphasis on the trunkline is no longer needed as the system is nearly in place, (3) the low volume and rural road are part of the total road network and these roads are used to reach the trunkline system, and (4) all roads need to meet minimum standards irrespective of traffic volumes, particularly if transit vehicles (dial-a-rides, school busses, etc.) are to use the roads.

The federal and/or state allocation of funds between Amtrak and intercity bus companies works an economic hardship on the intercity carriers is the second issue raised. The claim is that the Amtrak rate, lowered due to the financial assistance, is diverting passengers from the intercity bus companies. This would affect Valley Coach from Port Huron to Flint and Indian Trails, Inc. from Flint to Chicago. Three suggestions were offered to "correct" the problem: (1) subsidize the bus operations or eliminate the rail subsidy, (2) substitute subsidized bus service in lieu of rail service or at least, (3) treat all intercity travel (bus, rail, air) modes fairly by the state and federal government programs.

Promotion of big regional airports working against energy efficiency is the third issue. Claimed is that smaller craft, typically those available for charter and commuter service, are much more energy efficient than the jets of commercial air carriers. These smaller craft are purported to do better than three passenger miles for each gallon of fuel.

The fourth issue identified is not an allocation of funds issue, but a negative allocation--taxation. Claimed is that the property taxation of the rail right-of-way and tracks has heavily disadvantages the rail industry in its competition with truck, water, and air freight carriers. A suggested action would be to exempt the railroad property or increase road and air "user" taxes and institute waterway "user" taxes. The philosophy proposed is that total government action should not create a benefit for one mode over another but let the natural benefits determine the level of survival.

The fifth issue relates to the utilization of public funds to create new transportation services rather than using or contracting with private carriers or even other publicly operated/supported carriers. The initial reaction by the public agency is that either: (1) The carriers do not, at present, meet our service needs or, (2) the cost is too high or, (3) there is no existing service. Some of the counter claims include (1) "the new transportation service will reduce my source of customers," (2) the new source of revenues, with some guarantee of continuity, will allow services to be expanded and in some cases reduce the trip cost, (3) new operators would try to provide service if they knew the funds would be available, and (4) private enterprise could compete, through contracts, to provide service cheaper than a government agency. Also noted is that many of the bus and taxicab rates are set by local ordinance or the Public Service Commission. One counter claim is that some public agencies can utilize CETA (Comprehensive and Employment Training Act) funds for part of the labor cost, thus reducing the operating costs on the basic source of funds.

Public Transportation

Public transportation is presently saddled with conflicting definitions used by various sectors of the public. The basic problem is the word "public." Originally, public transportation meant publicly available; i.e., taxicabs, buses, jitneys, limousines, trolleys, passenger trains, and airlines. Today many people, but not everyone, imply public transportation means publicly owned or operated and/or publicly supported. Others mean transportation by bus. For the purpose of this report, the term "public transportation" will mean transportation available to the general public irrespective of type of vehicle, ownership, operator, or whether receiving public financial support.

The following needs or problems were identified:

*Better mass transit needed in Flint to conserve energy. Light rail (trolleys) could be installed.

*The Huckleberry Railroad should be financed and extended to the downtown (Flint) cultural area.

*An auto-train is needed from Detroit to Sault Ste. Marie.

*Public transit needed from Byron to Flint.

*Dial-a-ride needed in Flint.

*More bus service between Davison and Flint and Lapeer and Shiawassee Counties.

*Public transportation schedules should correspond to the times people go to work.

*The train from Lapeer to Chicago should depart in the evening, after 5 p.m.

*Parking lots are needed in the outlying areas and busses available to transport people in.

*Lapeer County needs better public transportation. It is furnished for senior citizens, but others need cheaper transport too.

*Public transportation connecting Lapeer (city) to other cities should be retained.

*Dial-a-ride is needed in Lapeer (city).

*More frequent connecting air passenger service may be commuter airlines, is needed out of Bishop Airport; Flint via Detroit, Cleveland and Chicago.

*Rail and bus transport should serve more areas of the state.

*Increase rail transport subsidies.

Highways

Two issues were raised in this area. One related to the consequence of extending the expressway on M-53. The other is about the road standards for farm to market roads as compared to commuter roads.

The question was raised - Is M-53 extension (all the way through Lapeer County) really needed due to the consequences of urbanization, loss of farmland, expense of the project, and less maintenance on other roads? Others, particularly in the Romeo area, are pushing at least for the extension to the new M-21 expressway. Their primary arguments relate to reducing the number of accidents and saving lives.

The main issue is whether the same standards are necessary for farm to market roads and commuter roads.

Farm to market roads do not have the constant daily traffic and do not receive the same wear and tear, nor require the same level of taxes for maintenance. Once nonfarm families live along these roads a community level of roadway demand is created. If this commuter roadway demand occurs all across the county, the maintenance money can no longer handle the problem. Two suggestions were also offered--officially designate roads as farm to market with the appropriate road standards and/or charge an additional fee for each nonfarm residence for commuter road standards.

Additional highway needs or problems were identified:

*The section of M-24 in Lapeer County from Beaver Road and M-21 expressway should be four lanes.

*The M-21 freeway completion (Lapeer County) should be speeded up to reduce accident problems on the present route.

*First correct the M-21 (Shiawassee County) traffic congestion and accident problem between Owosso (east city limits) to State Road and then to M-13 (Genesee County line).

*There should be a bypass around Owosso for those living on the west side of the city and commuting to Flint.

*County primary right-of-way standards should be expanded from 66 feet to 100 feet for safety and less maintenance.

*More effort is needed to examine the need for left-turn signals at intersections to conserve fuel.

*The speed at Reid Road and Linden Road (Genesee County) should be

reduced due to the children and bicycles. Caution signs should be used.

*North Baldwin Road is now like a ditch because it has not been graded in 20 years.

*County and township roads need more attention in the spring.

*Flashers are needed at the M-21 and Brooks Street and M-52 and Prindle Street school crossing. Another said it was a state law that flashers for 25 mph are required for all elementary schools.

*Lapeer County roads need repair.

*Insufficient financing and maintenance is causing the roads in Shiawassee County to deteriorate faster than ever.

In addition to these issues, the following needs or problems were identified:

*Definite need for bike pathways.

*Bike trails needed six feet off major streets.

*M-21 and M-24 too dangerous for bicycling and horse riding. More trails needed.

*Bike rights-of-way should be in all road widening efforts.

*Parents and bicyclists should be trained on the rules of the road as they affect bicycling.

*The edges of street should be kept clear of debris, potholes, and parallel bar grates so bicyclists will not need to swerve into the motorist.

Bicycling and Bikeways

Bicycle travel is heavy with controversy--should highway funds be used for bikeways, should bicycles use the streets or be forced on separate paths. The issues do not stop there.

Those bicyclists, who are also motorists, contribute funds to the federal and state trust funds, and expect to receive benefits for better bicycle transportation. On the other hand, many people consider bike paths as a waste of money and others are even stronger in their views and feel public funds should not be spent on bicycle or horse riding paths.

Separate paths or one of existing streets is one major issue. On one side, the existing street system already has the shortest routes. Education of bicyclists on the "proper" way to ride a bicycle and to follow the rules of the road and education of the motorist that a bicycle is to be expected will produce a safe coexistence. These same advocates feel that separate but parallel bike paths create special traffic and safety hazards at every intersection. The bicyclist will be reaching the intersection at a non-typical point and will have problems crossing and an even more difficult time making turning movements. Another side claims that bicycles on the street cause traffic congestion and safety problems to the motorists. They also assert that bicyclists violate the rules of the road by riding on the wrong side and not using the shoulder. Separate paths such as sidewalks would be better.

Railroads

Four areas of concern were raised for rail transportation, other than those covered under Public Transportation.

The need for the Grand Trunk Western track from Imlay City to Caseville is questioned. Presently, the Interstate Commerce Commission has turned down GTW RR abandonment application, but the issue is not dead.

The action by the Grand Trunk Western on removing the old Ann Arbor track between Owosso and Durand is in question. Michigan Interstate Railways feels this action has damaged the potential for Michigan Interstate profitability and placed Michigan Interstate operations second to GTW operations.

A third issue is the use of the rail right-of-way and tracks. One side wants public ownership with all interest given the opportunity to use the tracks. This approach would place the railroad tracks in the same position as the highways and streets are today. Others oppose any public takeover.

The fourth area is a concern that the railroads should be rebuilt, right-of-way preserved, and the U.S. Rail System rejuvenated.

Airports

Just three concerns were identified.

*Just expand the Owosso airport rather than build a new airport and take 640 acres of prime farmland. Buy land at the end of the runways for improvements.

*Build a new (regional) airport to serve Flint, Lansing, and the tri-cities.

*Public monies should not be spent on airports.

Other

There were a number of other concerns expressed that did not fit into any of the above categories.

*Plan ahead for commuters to Flint and Port Huron when M-21 is completed.

*Car pools should be emphasized.

*Transportation should not be a barrier to obtaining health care or gaining employment nor to participation in society by the handicapped. Transportation should be provided at public expense to those individuals who are without.

*The public should be informed before the first expenditure of funds on a project, no matter how small.

SUMMARY OF DEFICIENCIES

Thirty-two deficiencies with variations were identified on the nine alternative futures. Not all futures included all of the problems with 23 deficiencies shown on the High Growth-Restricted Energy alternative. Fourteen deficiencies are common to all futures:

- * Highway capacity on M-24 from Lapeer south to Lapeer County line.
- * Highway capacity on M-15 from M-21 through Davison.
- * Highway capacity on M-21 from Owosso to Corunna.

- * Intercity bus on M-24 north of Lapeer.
- * Local urban transit in Lapeer.
- * Local urban transit in Owosso.
- * Local urban transit in Durand.
- * Local urban transit in Imlay City.
- * General rural transit in Lapeer County.
- * General rural transit in Genesee County.
- * General rural transit in Shiawassee County.
- * Bicycle facilities in Lapeer County.
- * Bicycle facilities in Genesee County.
- * Bicycle facilities in Shiawassee County.

Figure 1 lists all the deficiencies with variations. (See fold out for the deficiencies by alternative future.)

The analysis to date would indicate the principal areas to address in Phase II are the above listed common deficiencies. Phase II would include detailed study for an accurate problem definition and alternative solutions development.

Figure 1

REGION V TRANSPORTATION DEFICIENCIES
(All Futures)

1. Highway capacity on M-24 -- Lapeer to South Lapeer County line.
2. Highway capacity on M-15 --
 - A. M-21 through Davison
 - B. M-21 into Richfield Township
 - C. M-21 to M-57
3. Highway capacity on M-54 -- around Grand Blanc.
4. Highway capacity on M-21 -- Owosso to State Road (Corunna)
-- Owosso to East Shiawassee County line.
5. Intercity transit on M-24 -- Daily; through Lapeer County
-- Weekly; Lapeer to North Lapeer County.
6. Intercity transit on M-24 -- Daily; M-21 to North Genesee County line
-- Weekly; M-21 to South Genesee County line.
7. Intercity transit on M-57/M-90 -- Daily; through Genesee and Lapeer Counties
-- Weekly; through Genesee and Lapeer Counties.
8. Intercity transit on M-21 -- Daily; Owosso to West Shiawassee County line.
9. Local urban transit in North Branch.
10. Local urban transit in Imlay City.
11. Local urban transit in Lapeer.
12. Local urban transit in Clio.
13. Local urban transit in Montrose.
14. Local urban transit in Flushing.
15. Local urban transit in Grand Blanc.
16. Local urban transit in Fenton.
17. Local urban transit in Durand.
18. Local urban transit in Corunna.
19. Local urban transit in Owosso.
20. Local urban transit in Perry.
21. General transit in Lapeer County.
22. General transit in Genesee County.
23. General transit in Shiawassee County.
24. Local general aviation in Imlay City-Almont.
25. Local general aviation in Flint-Davison.
26. Local general aviation in Flint-Clio.
27. Local general aviation in Durand.
28. Airport capacity in Owosso.
29. Bicycle Facilities in Lapeer County.
30. Bicycle Facilities in Genesee County.
31. Bicycle Facilities in Shiawassee County.
32. Passenger Rail -- Detroit through Flint to Saginaw.

8 Future Planning Activities

As previously indicated, an objective of the GLS Region V Transportation Study is to identify deficiencies and recommend necessary changes to the region's various transportation systems. However, in order for this objective to be fully realized, some additional planning steps are required. These remaining planning steps are illustrated in the accompanying diagram and discussed below.

PUBLIC HEARINGS

Purpose

The GLS Region V Transportation Study has now reached the public hearing stage. The formal public hearing represents a crucial phase in the study since it occurs prior to a decision-making point in the planning process. It is conducted at this time because flexibility still exists to make alterations, adopt new proposals, or proceed towards plan implementation. The public hearing will ensure that all interested agencies, political jurisdictions, groups, and individuals will have the opportunity to make or submit public statements, ask questions, voice disagreement, offer support, or make suggestions concerning the Regional Study. Questions and statements will be answered or discussed and a public record made of these proceedings. In order to permit greater public understanding of the issues considered, this report is being made available for public review before the hearing.

The previous section of this report summarizes the primary findings of the study. This brings us to a major decision point. Before any further action can be taken, the options available to us must be thoroughly discussed with federal,

state, and local public and private interests. A public hearing offers this opportunity.

Decision Point

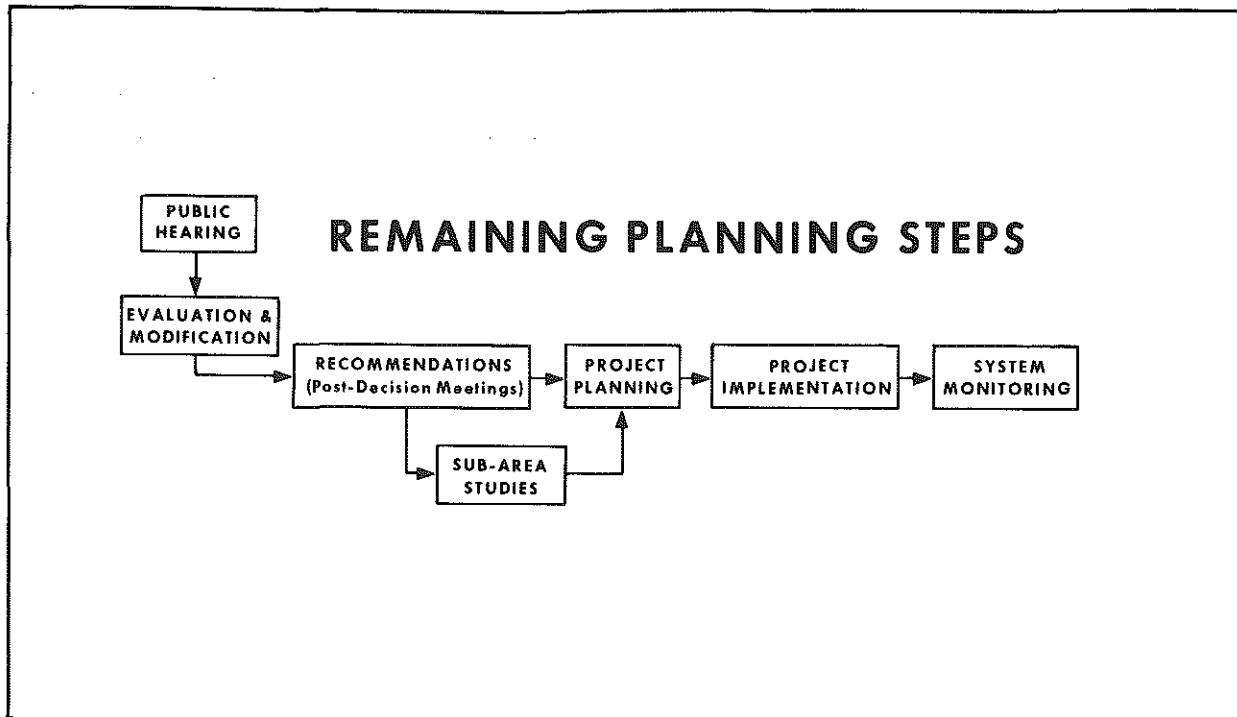
As mentioned, we have two choices available to us:

1. Do something to correct identified deficiencies.
2. Do nothing.

Both options will have advantages and disadvantages, as pointed out in the impact assessment section of this study. Although the option of doing something to eliminate deficiencies implies obvious benefits, it may also cause certain unavoidable impacts. Likewise, the do-nothing alternative may appear to be devoid of negative impacts because nothing would be done to disrupt an area. But in reality, doing nothing could result in a continuing or worsening travel condition, thereby producing undesirable results.

If a decision is made to do something, we will continue our efforts to resolve those deficiencies which are common to all futures, thus ensuring the highest degree of probability for sound investment. As shown on page 52, numerous alternatives are available for satisfying deficiencies of a certain type (minor or major). The department's efforts would then be directed toward obtaining more detailed information that will assist in selecting alternatives which represent the most desired course of action.

If a decision is made to do nothing, planning efforts will be focused on other areas having identified transportation deficiencies.



But for now, the decision is centered around the question: Shall we do something -- or nothing?

Your assistance in making this decision is needed.

EVALUATION AND MODIFICATION

After the public hearings have been conducted, the study team will evaluate the public comments received. They will be looking for new transportation related issues or concerns that have not fully been identified in the current planning efforts. Upon completion of this review, necessary process modifications will be made to ensure that proper considerations will be given to all pertinent issues before making recommendations.

Modifications to the planning process have been made before. In fact, the current planning process, reflecting future energy and growth concerns, is the result of modifications brought about by past public meetings.

RECOMMENDATIONS

Post-decision meetings will be held in the region to present the recommendations derived from the Regional Transportation Study. These meetings, a requirement of the Michigan Action Plan, are important to the public involvement process since they provide an opportunity to view and understand exactly what has been recommended. They also illustrate the logical sequence of the planning process, making key decisions only after extensive studies have been completed. Because of the general nature of the Regional Study, these recommendations will be geared toward intensifying planning activities in areas having identified transportation problems.

As illustrated in the preceding diagram, recommendations can be made to initiate a Sub-Area Study or begin detailed Project Planning. This decision is dictated by the degree of complexity of the problems identified in the Regional Study. These two planning phases are further explained in the following sections.

Sub-Area Studies

One possible recommendation of the Regional Study is to concentrate planning efforts in one or more geographic area of the region. These Sub-Area Studies are necessary when an area, identified at the regional level, contains several potential modal projects that can influence one another. In these instances, a sub-area analysis is performed to test alternative solutions and identify specific parts of each modal network which will require project initiation.

Sub-area Studies interrelate with regional studies but usually emphasize the special transportation needs of a particular community. Therefore, a stronger community involvement is reflected in the multimodal transportation plans developed for the area.

These studies also include a refinement of various social, economic, and environmental impacts associated with various transportation alternatives. And, in some ways, they lay the groundwork for subsequent project planning stages.

Project Planning

As shown in the diagram, project planning can be recommended from either the Sub-Area Study or directly from the Regional Study. The

first situation was discussed under Sub-Area Studies. The latter situation would occur when project needs are identified which would not likely involve another mode or another facility of the same mode.

Project planning consists of performing detailed studies on a specific part of a transportation system. Realistic alternatives for solving an identified problem are analyzed, with the most appropriate alternative being recommended for implementation.

Highway projects represent the most complex form of project planning, especially where new locations are being considered. As a result, additional highway corridor, alignment and design studies are required as a logical sequence in the project planning stage.

Project planning efforts for other transportation modes are usually not as involved since they have fewer alternatives to consider. At the present time, several modal projects in the region are being planned. The Regional Study will lend support to these projects since they conform with identified transportation problem areas.

The Regional Study will also recommend initiation of some new project planning efforts where it has been determined that these projects will be in the best interest of the region and will not significantly affect other transportation proposals.

Listed below are examples of project planning recommendations which could evolve either directly from the Regional Study or through a Sub-Area Study.

1. Reconstructing M-21 in Shiawassee County

2. Starting a dial-a-ride service in Lapeer
3. Constructing a bikeway in Lapeer
4. Improving rail service to Chicago
5. Increasing intercity bus service to Flint
6. Constructing a highway bypass around Owosso
7. Build a new (regional) airport to serve Flint, Lansing, and the tri-cities
8. Relocate or improve M-24 from the Oakland County line north to M-21
9. Etc.

PROJECT IMPLEMENTATION

Recommendations from project planning efforts involve all modes of transportation. Individual projects will be programmed for implementation based upon recommended priorities and available funding. Projects identified at the regional level will compete for construction priority with other projects throughout the state.

SYSTEM MONITORING

In addition to specific project recommendations, the findings of the Regional Study will also be used to guide development of statewide modal transportation plans. The study represents an ongoing planning process, continually monitoring the changes in the region's social, economic, and environmental conditions. As these changes begin to affect various transportation systems, the Regional Study will initiate new proposals to adjust these systems accordingly.

9 Appendix

A. SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPLICATIONS

Alternative investment strategies for transportation improvements are not only based on, but will also affect, the social, economic, and environmental conditions, activities, values, and attributes of a region. Analysis of these factors must, therefore, be a major element in the process of determining the best transportation improvement option(s) for a region. Transportation, while an important item among the many factors which have a long-term affect on the region's social, economic, and environmental attributes, is only one of many factors which influence, and are influenced by, social and economic conditions. At the regional level of analysis, the total range of factors involved in this interaction is so great that it is not currently possible to clearly identify specific cause and effect relationships between transportation improvements on the one hand and changes or shifts in social, economic, and environmental variables on the other. We can only attempt to generalize from past experience to illustrate broad potential impact areas which may result from the various modal improvement options available. These generalizations will help in considering the implications of planned system improvements, particularly in the sub-area and project level studies which will follow the Regional Systems Study.

The following discussion is based on the two matrices titled, "Modal Improvement Options," (page 52) and "Potential Environmental Impacts." The two matrices provide a description of issues to be considered when assessing alternative courses of action. The level of detail will vary, based upon our

ability to draw assumptions from the character of improvements proposed. It should be recognized at the outset that the overall level of transportation services provided to the public is as much affected by decision-making in the private sector as in the public sector.

1. The Do-Nothing Alternative

The baseline, or benchmark, alternative for all transportation modes is the do-nothing or maintenance alternative. This alternative is a minimal program which can involve nothing more than normal maintenance and upkeep of existing transportation facilities, services, or programs. Analysis of the probable positive and negative impacts that would result from the do-nothing alternative provides a baseline from which the tradeoffs involved in the selection of other options can be compared.

The social, economic, and natural environments of the region are not static. Both internal and external factors will impact on the region and will modify the social, economic, and environmental conditions and affect the ability of its transportation infrastructure to meet the demands placed upon it. Shifts in population levels, density, and location; changes in the service requirements of regional facilities, such as health care and social service centers and educational institutions; and changes in types and levels of economic activities (including agriculture) are examples of internal factors. Examples of factors external to the region are changes in the

national and world economy , statewide or national energy considerations, and changes in social values such as recreation and resource conservation. Maintenance of the existing transportation system, even at a high level, does not ensure that the system will continue to meet the social and economic needs of the region. These dynamics all influence in one manner or another the natural environment. And it is the natural base that supports all other activities, providing through its outstanding attributes the impetus of many of the social and economic activities.

2. Minor System Improvements Alternative

Minor system improvement options are those which can accommodate changes in the type and level of social and economic activities by means of transportation improvements which permit the basic transportation infrastructure to meet new or modified demands. This option normally involves improvements of only a local nature. In some cases, monetary expenditures may be substantial. Generally, however, the capital investment will be less than that needed to provide major improvements to existing transportation systems or to provide an entirely new system. The social, economic, and environmental implications of the minor system improvement option will vary by mode, by the specific types of improvements which could be considered under this option, and by the specific locations of those improvements.

3. Major System Improvement Alternative

Investment strategies which include major system improvements have the greatest potential for social, economic, and environmental effects. The purpose of such major improvements is to provide new or improved services, to relate existing systems, increase the capacity of existing systems, or to provide services to areas not presently serviced by the particular mode. The social and economic value of such improvements is difficult to determine in an area presently served by a modern transportation system. Changes in social and economic activity caused by the alteration of transportation delivery systems are marginal and difficult to isolate from other factors. The same problems are encountered when attempting to identify secondary and tertiary social, economic, and environmental impacts. Primary impacts are more easily determined but even these are relative.

The impacts must be viewed first from the standpoint of the specific actions proposed and secondly with regard to the particular future being considered. This is because, while the impact will be modified by the nature of the future conditions within which the action is framed, our present understanding of impacts is tied most directly to the action and the cause/effect relationship. Thus, it is difficult to spell out precisely the character impact which would result from various

POTENTIAL ENVIRONMENTAL IMPACTS

	AGRICULTURE	WETLANDS	VEGETATION	WILDLIFE	NOISE	AIR QUALITY	WATER QUALITY	CULTURAL RESOURCES
AVIATION								
DO NOTHING	0	0	0	0	0	0	0	0
MINOR IMPROVEMENT	-	-	-	-	?	?	-	?
MAJOR IMPROVEMENT	-	-	-	-	?	?	-	-
HIGHWAYS								
DO NOTHING	0	0	0	0	?	-	0	0
MINOR IMPROVEMENT	-	-	-	-	+	+	-	-
MAJOR IMPROVEMENT	-	-	-	-	?	?	-	-
NON-MOTORIZED								
DO NOTHING	0	0	0	0	0	0	0	0
MINOR IMPROVEMENT	0	0	0	0	0	0	-	0
MAJOR IMPROVEMENT	-	-	-	-	+	+	?	?
PUBLIC TRANSPORTATION								
DO NOTHING	0	0	0	0	-	-	0	0
MINOR IMPROVEMENT	0	0	0	0	+	+	0	0
MAJOR IMPROVEMENT	?	?	?	?	+	+	+	?
RAILROADS								
DO NOTHING	0	0	0	0	0	0	0	0
MINOR IMPROVEMENT	0	0	0	0	?	?	0	0
MAJOR IMPROVEMENT	?	-	-	-	?	+	-	-

0 = NO IMPACT
 + = POSITIVE IMPACT
 - = NEGATIVE IMPACT
 ? = NEEDS FURTHER STUDY

major improvements until specific improvements were proposed. However, general impact areas can be hypothesized to help understand the implications of systems proposals and to guide the more specific sub-area and project impact analysis.

B. HIGHWAY DEFICIENCIES

Within this framework, it is imperative that problem areas be carefully defined and analyzed to determine the degree of improvement necessary. Many miles of the state's system are considered deficient for various reasons. However, many of these deficient sections can be remedied with minimal improvements involving only the existing roadway. But a few areas exist where the problems go beyond the remedial benefits of minor reconstruction and will require additional laneage. Whether these new lanes should be added to the existing facility or built on a new location is the concern of more detailed, project level studies. The first step, and the concern of this study, is to determine where the major problem areas are located, and the degree of magnitude they represent.

The department has conducted research in an effort to develop an impartial method of identifying highway deficiencies. The method currently used is a sufficiency rating. These ratings are used to evaluate individual segments of the entire highway system. This information indicates which sections will require attention within a given time period and their relative urgency.

The sufficiency rating (evaluation score) is comprised of four categories: surface, base, safety, and capacity. Each section of highway is

evaluated in terms of these categories and given a score, or rating, based upon its adequacy, or sufficiency. If a highway segment is rated below a predetermined level, it is considered critically deficient in that category. A segment of roadway can be rated critically deficient in one or more of the four categories.

The surface rating represents the adequacy of the surface and shoulders or curbs. This category is perhaps the most noticeable to the motorists because of its visibility. The year of construction or improvement, width and surface type, along with the condition and estimated surface life are also included in this category.

The base rating represents the adequacy of everything under the surface to support the surface. It considers the average base and soil conditions, taking into account the average drainage conditions.

The safety rating calls attention to excessive or extraordinary conditions creating potential hazards. Existence of fixed objects (trees, utility poles, sign posts, abutments, etc.) in proximity to the pavement edge constitutes such a condition. Accident frequency, type, and severity are also considered in this evaluation.

The capacity rating represents the ability of a section of roadway to carry existing volumes of traffic. Several factors used to determine this rating include: practical hourly capacity, sight restriction, lane width, amount of commercial traffic, and peak hour volumes.

The accompanying exhibits indicate the sufficiency evaluation of the highways in the region. These

evaluations are based upon existing conditions and traffic volumes. It is intended that these exhibits will help to determine where problems exist; where minor improvements are needed; and where more extensive, or major highway improvements, are required to eliminate critical deficiencies.

To accomplish this separation of major and minor improvement types, an attempt has been made to separate capacity deficient segments from all others. The main reason for this distinction is that capacity deficient highways sometimes require a major transportation improvement. And major improvements usually become a controversial issue when the anticipated benefits and impacts are evaluated. Thus, it becomes important to identify these areas early in the planning process so that these issues can be resolved.

Exhibit A depicts those sections of state highway in the region that are critically deficient in one or more of the rated categories; surface, base safety, and capacity. Totally, there are 348 miles (556 kilometers) of state highways in the 3-county region. Of these 222 miles, (355 kilometers) or 64 percent are rated critically deficient in one or more categories.

Exhibit B shows the highway segments which are rated critical in capacity. These segments may also be critically deficient in one or more of the other categories. Of the 222 deficient miles in the region, 134 miles (214 kilometers) or 60 percent are presently rated critical in at least capacity. These critical capacity segments represent 39 percent of the total miles of state highways in the three counties.

Exhibit C indicates that highway segments which are scheduled for improvement according to the department's December 1978 Letting Schedule. These improvements are programmed for initiation within the next five years. The projects range from resurfacing to minor reconstruction and are specifically related to the determined deficiencies. It is expected that their completion will resolve some of the deficiencies depicted on Exhibit A. Totally, 40 miles (64 kilometers) of state highway in the region are programmed for improvement.

Exhibit D shows those sections of highway which are now critically deficient in capacity, but are not programmed for improvement within the next five years. These segments totaling 102 miles (163 kilometers) will require specific attention since most will likely require additional lanes to accommodate existing traffic volumes. It is possible, however, that some sections that are now less than 24 feet (7.5 meters) in width (standard for 2-lane state highways) can be brought up to sufficient capacity through minor widening projects. These and other decisions regarding the remaining critical segments should be addressed in greater detail at a subsequent level of planning.

REGION V
DEFICIENT IN SAFETY, SURFACE, CAPACITY, BASE

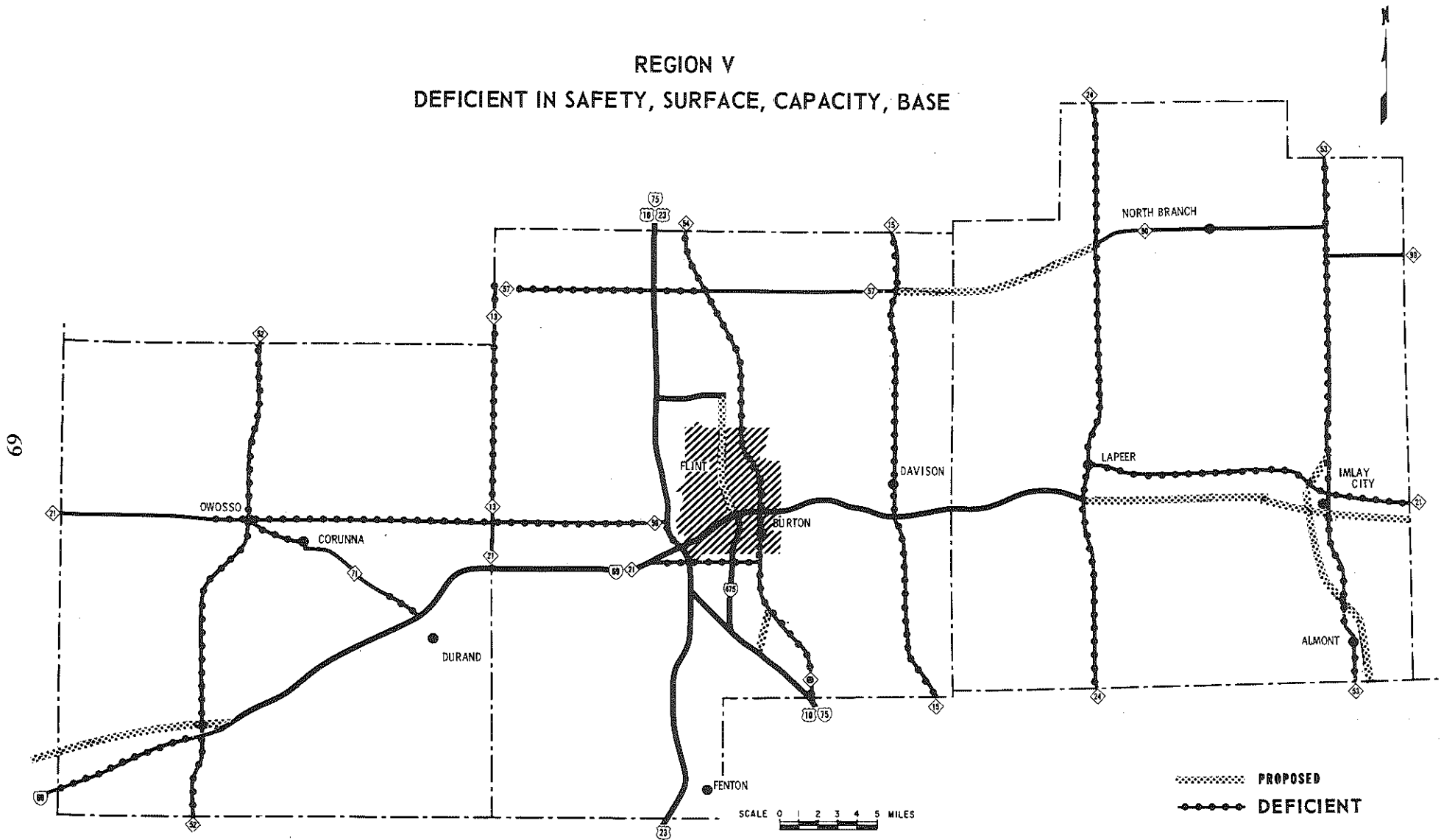


EXHIBIT A

REGION V DEFICIENT IN AT LEAST CAPACITY

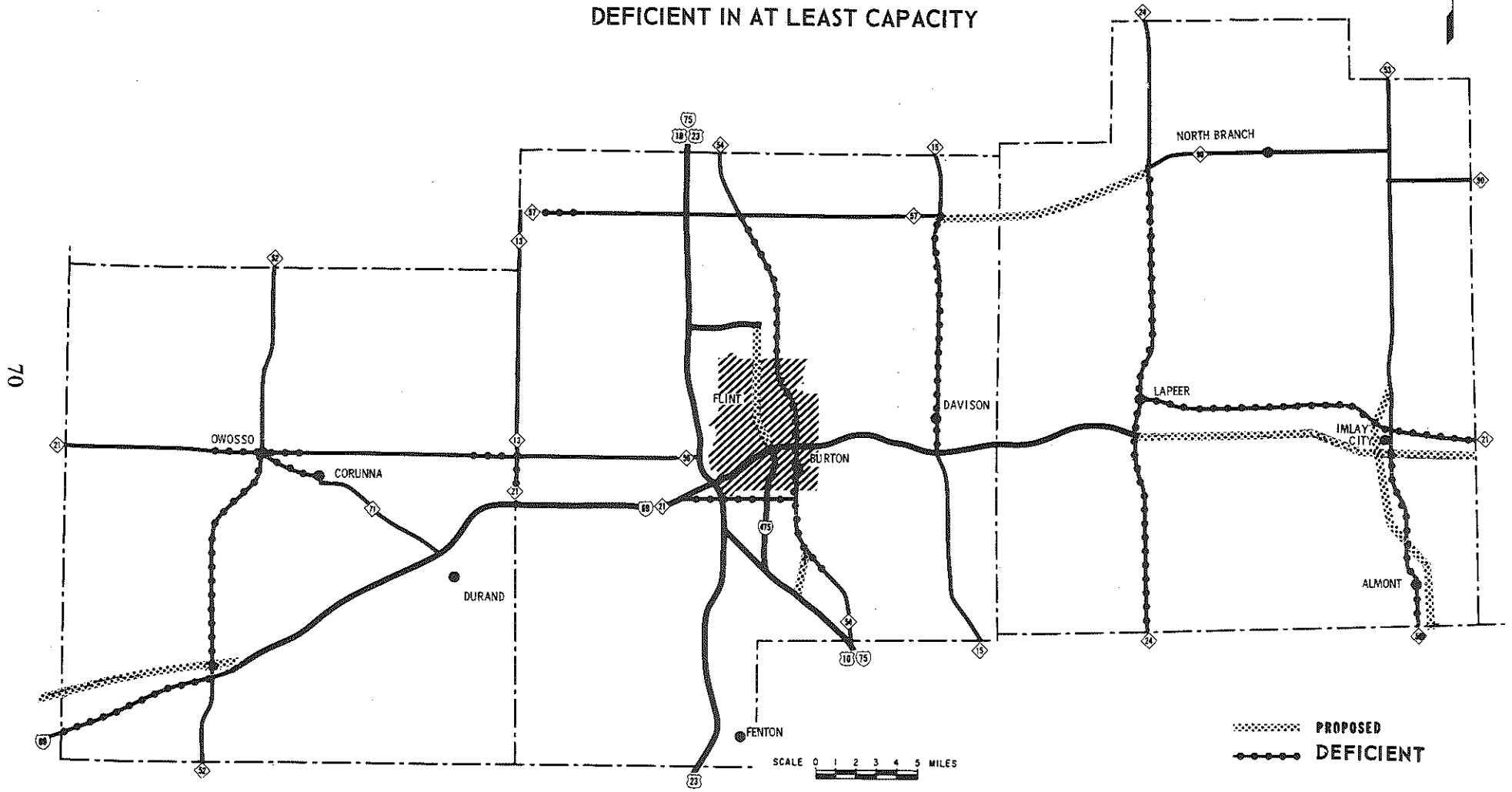


EXHIBIT B

REGION V
HIGHWAY IMPROVEMENTS PROGRAMMED WITHIN 5 YEARS
SPECIFICALLY RELATED TO DEFICIENT SEGMENTS

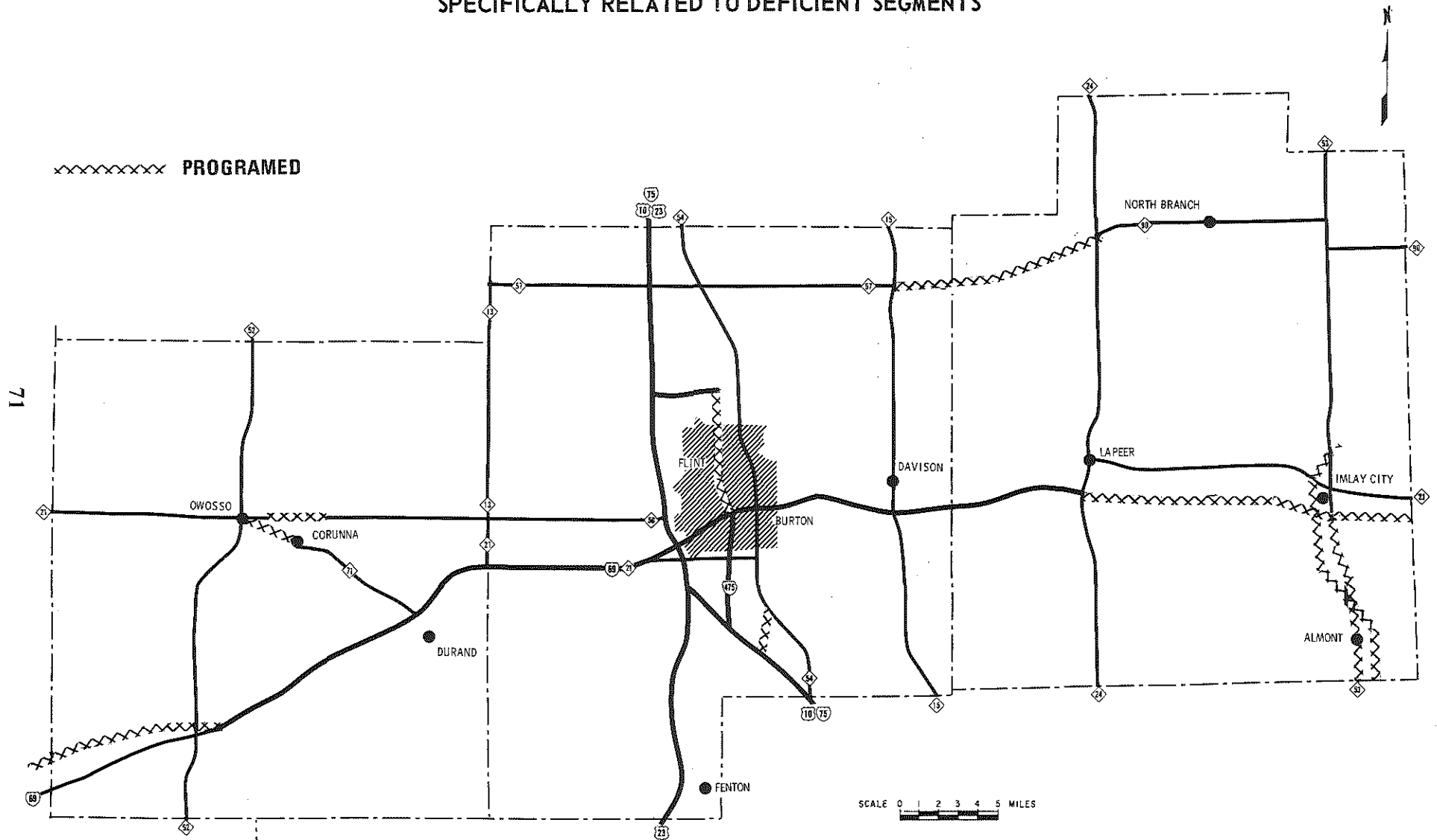


EXHIBIT C

REGION V
CAPACITY DEFICIENT HIGHWAY SEGMENTS
NOT PROGRAMMED IN 5 YEARS

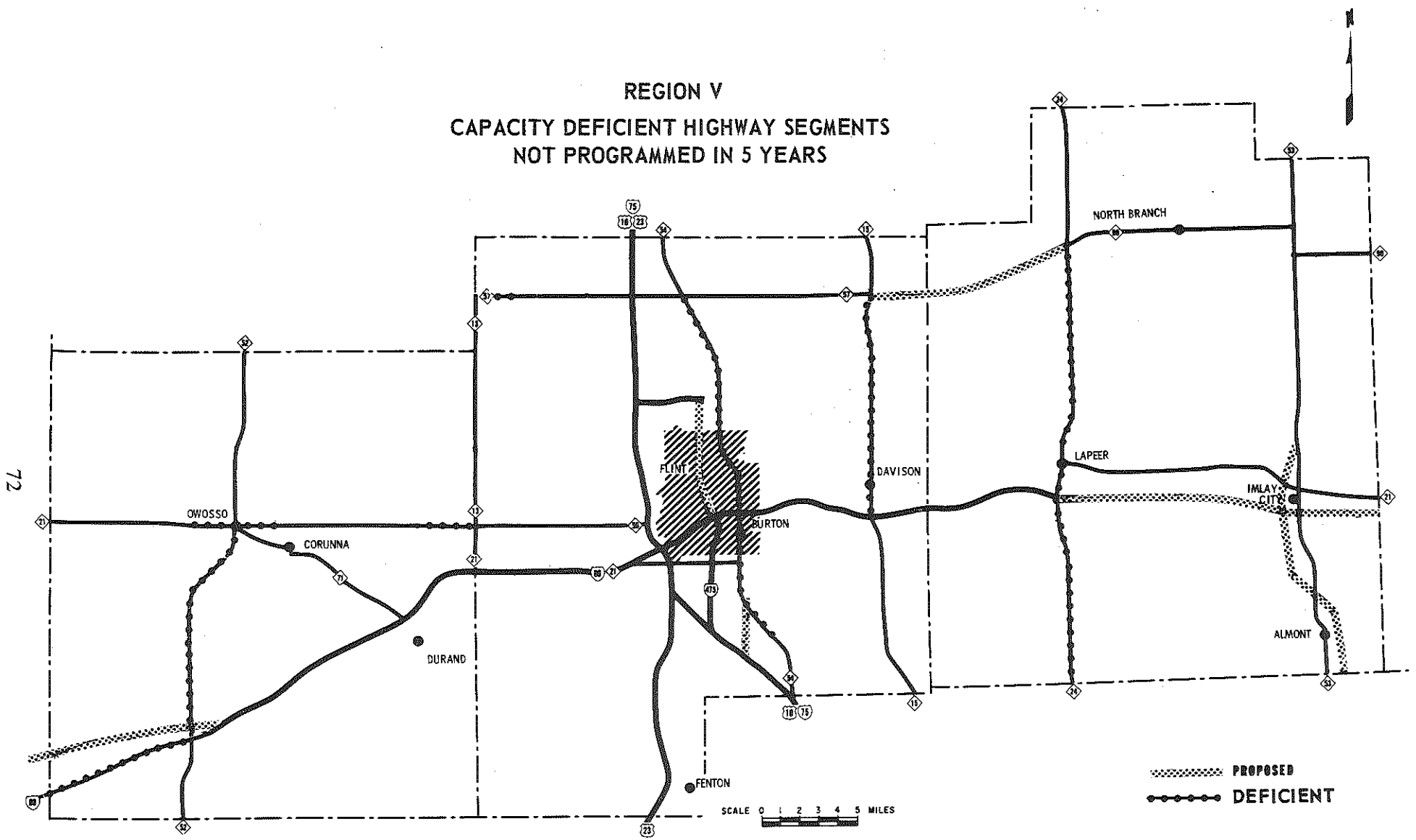


EXHIBIT D