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**MICHIGAN STATE  
AIRPORT SYSTEM PLAN**

**TASK GROUP 4**

\* \*  
*proposed  
system plan*

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**MICHIGAN AERONAUTICS COMMISSION  
DEPARTMENT OF STATE HIGHWAYS  
AND TRANSPORTATION**

**In Conjunction With  
STANFORD RESEARCH INSTITUTE  
under a system planning grant issued by the  
FEDERAL AVIATION ADMINISTRATION**



STANFORD RESEARCH INSTITUTE  
Menlo Park, California 94025 · U.S.A.

January 1974

Task Group 4 Report: Proposed System Plan

STATE AIRPORT SYSTEM PLAN STUDY

Prepared for the Interagency Transportation Council, and the Michigan Aeronautics Commission, State of Michigan, under Contract Number 2-1971.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Interagency Transportation Council, the Michigan Aeronautics Commission or the State of Michigan.

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## PREFACE

This report contains the general description of a proposed airport system for Michigan. The proposed system is a result of the Michigan Airport System Plan Study.

Supporting detail for the proposed system is contained in a companion report, entitled, "Technical Supplement." The technical report describes study methods and provides detail on projected activity and recommended development for each airport in the system plan.

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## I INTRODUCTION

### Purpose of Study

The Michigan Airport System Plan Study has been a two-year effort sponsored by the Michigan Aeronautics Commission (MAC) and made possible by a grant from the Federal Aviation Administration (FAA). The purpose of the study is to develop a plan for the orderly and timely development of a system of airports adequate to meet the air transportation needs of Michigan. Upon completion of the study and approval by its sponsors, the resulting airport system plan is expected to serve many important uses:

- Applicable portions of the plan will be integrated into the National Airport System Plan. An airport must be included in this plan to qualify for federal participation in the funding of development.
- The plan will provide a basis for coordination of airport planning with planning by state, regional and metropolitan agencies in such areas as transportation, land use and the environment, economic development, and resource utilization.
- The plan will provide a framework to assist in the development of individual airport master plans (and airport system plans at the regional or metropolitan level, if needed).

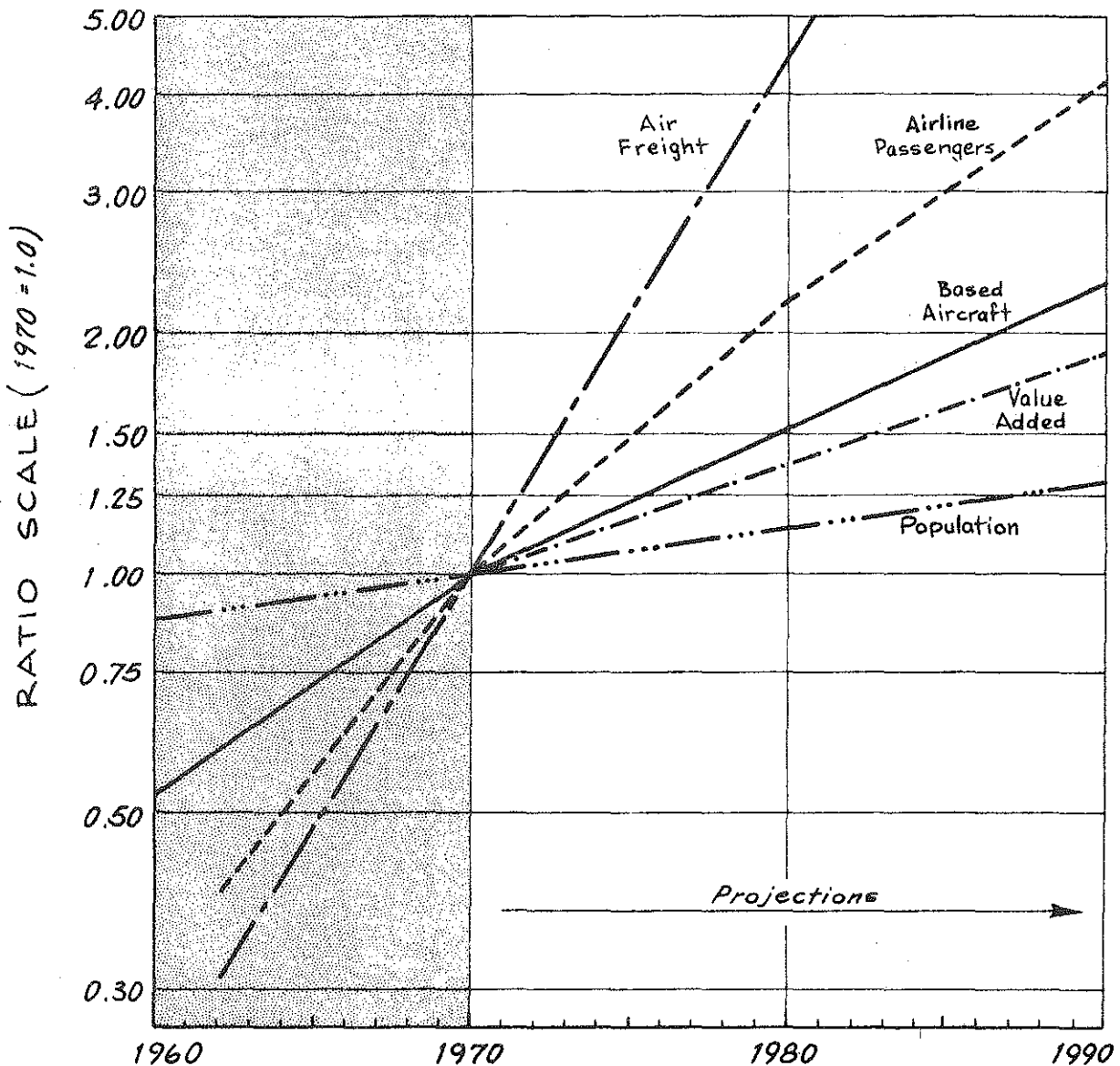
The state system plan is not intended to present detailed, unalterable design specifications for existing airports; nor is it intended to identify the specific location of new airports. Instead, the plan identifies general locations and aeronautical roles for a coordinated system of airports. Airport development is examined to the extent necessary for determination of approximate system costs.

### Context of Plan

The basic study approach has been to project future aviation activity and to investigate alternative means of accommodating this activity. Figure 1 displays selected aeronautical projections, together with study projections of Michigan population and economic growth. As shown in the figure, continued large increases in Michigan aviation activities are projected. For example, a twofold increase in airline passengers is

FIGURE 1

# PROJECTED POPULATION, ECONOMIC AND AERONAUTIC TRENDS FOR MICHIGAN\*



\* Five Separate Projections Are Plotted:

- ..... Population, (1970 = 8.9 Million)
- · - · - Economic Value Added, (1970 = \$42.3 Billion (Pre-1970 Data Not Available))
- Based General Aviation Aircraft, (1970 = 6,093)
- Airline Passengers, (1970 = 4.5 Million Enplanements)
- - - - - Air Freight, (1970 = 127,000 Enplaned Tons)

See text for sample interpretations of these projections.

projected between 1970 and 1980, as is a 50-percent increase in the number of general aviation aircraft based in the State. These projections compare with more modest increases in population (1.1) and economic value added\* (1.3) over the same time period.

Because aviation forecasts of the kind shown in Figure 1 provide the basis for much of this study, it must be noted that the projects were prepared and used before the emergence of this winter's "energy crisis." Recent events, such as the curtailment of oil imports from the Middle East, have brought to full federal attention the possibility of national fuel shortages for an undetermined period. There is now, also, the prospect of substantial increases in the cost of transportation, arising from increases in fuel costs. It is judged too early to assess potential effects of such factors on future aviation activity levels in Michigan--much depends on the methods by which available fuel supplies will be priced and allocated among competing uses. For example, demand for air travel may increase if federal restrictions are imposed on automobile travel. On the other hand, high prices may curtail travel demand, including the demand for air transportation. In light of these uncertainties, the projections of this study can be viewed in several ways:

- The forecasts may significantly overstate future aviation activity.
- Projected activity may occur, but at a later date than indicated (e.g., 1980 projections may not be reached until 1985 or 1990).
- The projections may turn out to be accurate or even understated because of changes in travel patterns.

In the absence of reliable information on the pattern of future federal responses to the energy crisis, and considering that aviation is a small part of the overall energy picture, it is most reasonable to assume that past patterns will tend to persist (extreme government responses to the present crisis are likely to be temporary). If a change should occur, it is most likely to be in the direction of deferred growth. It must be emphasized that much of the recommended development of Michigan's airport system does not appear to be critically dependent on rapid growth in aviation activity.†

---

\* "Economic value added" is roughly the state-level equivalent of the Gross National Product.

† As noted in Sections II and III, a large fraction of the improvements proposed for Michigan's airports are planned for the short term, even though greater growth in activity occurs later.

The most significant effect of the present "energy crisis," therefore, is that it highlights the need for continuing surveillance of Michigan aviation activity levels so that the State Airport System Plan can be modified to reflect changing conditions. The results of this study provide a framework for such efforts.

### Study Approach

The System Plan Study has been conducted as a joint effort of the MAC and a contractor team led by Stanford Research Institute. Guidance to the study team has been provided by an Advisory Committee representing a wide range of interests. (Participants in the study and Advisory Committee members are listed in Appendix A.)

Study efforts were organized into five interrelated task groups, as displayed in Figure 2. Meetings with the Advisory Committee and other interested organizations (Task Group 1) have been held at appropriate points throughout the study. Task Group 5 activities (on general aviation) and those of Task 2 and 3 (on the air carrier system) were conducted in parallel:

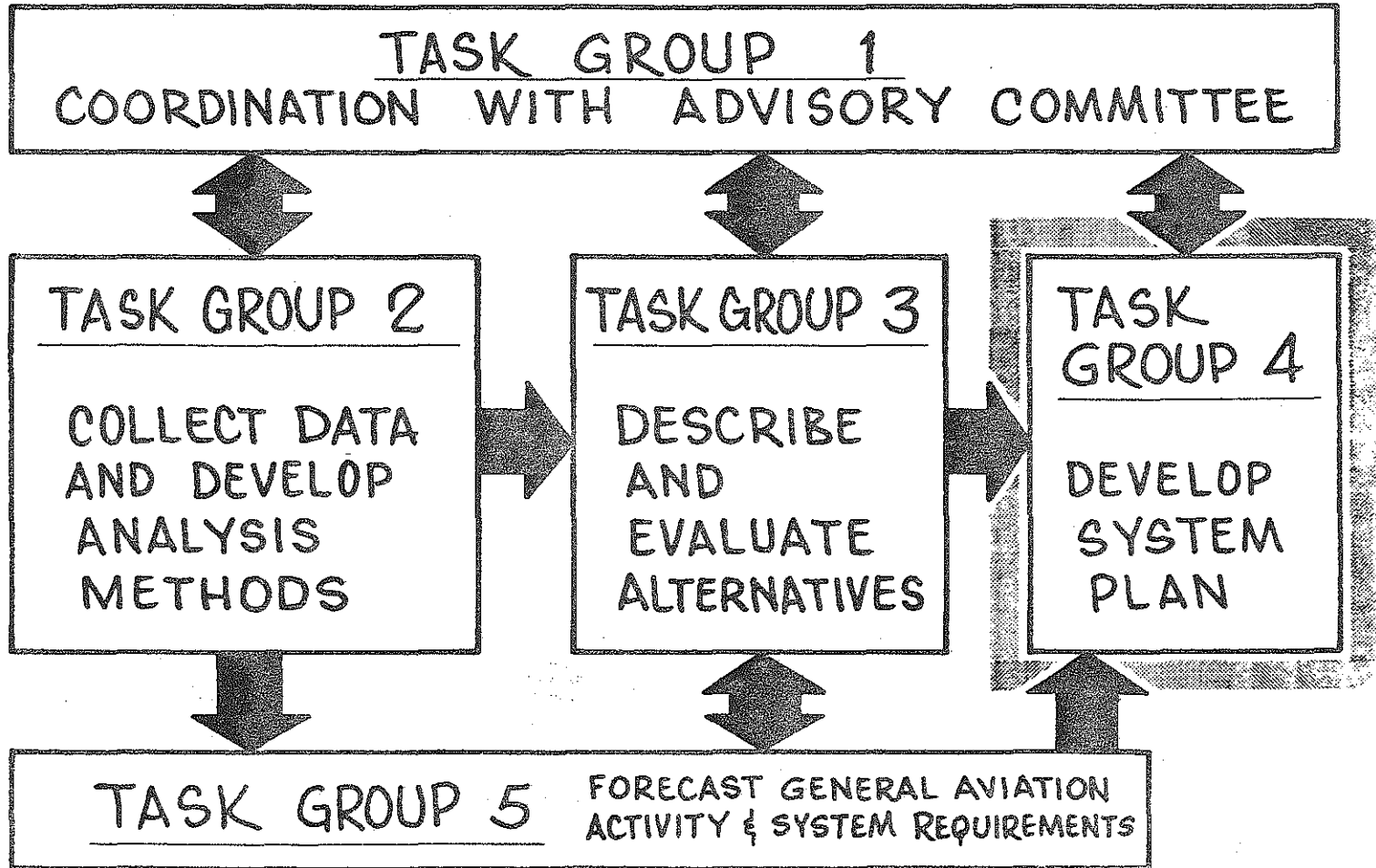
- In addition to the forecasts of aviation activity described above, initial study efforts included the collection of data on existing airport facilities and surveys of freight and passenger movements.
- Task Group 3 focused on long-range (1990) needs and a number of airport system alternatives were examined. Included in this analysis was a study of eleven potential new airport locations and assessment of new service patterns (including possible discontinuance of service) for most airports in the existing air carrier system. It was found that most of the potential major changes would not yield sufficient benefits to justify their recommendation.
- In Task Group 5, emphasis was placed on revising and extending a short-range (1975) general aviation plan that had been completed by the MAC before this study began.

The principal study reports for Task Groups 2, 3, and 5 are listed in Appendix A (Table A-3).

FIGURE 2

# TASK GROUPS

## MICHIGAN AIRPORT SYSTEM PLANNING STUDY



## Summary of this Report

This report describes the results of Task Group 4, in which the principal objective has been to integrate prior study results into one system plan.

Section II describes the proposed (recommended) system plan, including the number and location of airports in the system, the nature of services provided by each airport, and the timing of recommended development. Three new airports are proposed for air carrier service and 28 new airports are proposed to serve general aviation needs at communities that do not now have airports. Substantial development is also recommended for over 100 existing Michigan Airports. In the long-range period, the plan includes 21 airports serving air carriers and 162 airports for general aviation only.

Section III describes estimated costs of the proposed airport system and presents estimates of the resources available to finance its development. Total cost of airport development is expected to approximate \$685 million, with more than half of the total (\$370 million) required in the near term (by 1977). Available financing is estimated to total about \$610 million, but only \$220 million is expected in the near term. Shortages are anticipated for both the air carrier and general aviation systems, with the largest shortfall expected for airports that serve general aviation. Unless new sources of funds can be made available for airport development, substantial delays in implementing the general aviation system and some delays for the air carrier system can be expected.

Section IV describes implementation procedures for the plan and relevant institutional and environmental considerations. Benefits of the proposed aviation plan should provide sufficient inducement for its implementation. Nevertheless, it is clear that the initiative for implementing the plan rests with local airport authorities.

## II PROPOSED AIRPORT SYSTEM

### Introduction

This section describes the proposed Michigan Airport System Plan (MASP), including the number and location of airports in the system, the general nature of service provided by each airport, and the timing of recommended development. Costs of the plan are presented in the next section.

By way of background, a recommended 1990 air carrier system was described in the Task Group 3 report of this study: "Evaluation of Air Carrier System Alternatives." As indicated by the title, a number of alternative means of meeting projected air transportation needs were examined and a preferred system for 1990 was identified. Similarly, the Task Group 5 report: "General Aviation Plan," described an airport system to accommodate anticipated long-range general aviation needs. In Task Group 4, the two system plans have been integrated, and the time-phasing of system improvements to meet projected needs has been identified. The planning horizons for the analysis are as follows:

<u>Planning Period</u>	<u>Fiscal Years</u>	<u>Base for Aeronautical Activity Forecasts</u>
Short range	1973-1977	1975
Intermediate range	1978-1982	1980
Long range	1983-1992	1990

In the process of integrating the planned air carrier and general aviation systems, a number of refinements have been made to Task Group 3 and Task Group 5 results. However, the long-range portion of the proposed system plan is basically unchanged from that reported earlier.

### Number of Airports

The planned number of airports in the MASP is shown by airport category and time period in Table 1. In total, there are a large number

Table 1

## NUMBER OF AIRPORTS IN PROPOSED STATE SYSTEM

	<u>Short Range</u> <u>(1973-1977)</u>	<u>Intermediate</u> <u>Range</u> <u>(1978-1982)</u>	<u>Long Range</u> <u>(1983-1992)</u>
A. Airports in both State and National System Plans			
1. Airports serving air carriers and general aviation			
Existing*	20	18	20
New†	<u>0</u>	<u>2</u>	<u>1</u>
Subtotal	20	20	21
2. Airports serving general aviation only			
Existing*	79	112	130
New†	<u>26</u>	<u>5</u>	<u>0</u>
Subtotal	105	117	130
B. General Aviation Airports in State (but not National) System Plan			
Existing*	25	35	32
New†	<u>18</u>	<u>10</u>	<u>0</u>
Subtotal	<u>43</u>	<u>46</u>	<u>32</u>
Total Airports in State Plan	168	182	183

\* An airport is categorized as "existing" if it was planned for the prior period. For the short-range period, the "prior period" is 1970.

† In some cases, a detailed site selection study might find that an existing airport location is suitable.



(44) of new\* airports proposed for the short-range period, fewer (17) in the intermediate-range period, and only one new airport in the long-range period.

Most of the airports in the MASP are included to meet general aviation needs and these airports are divided into two categories: airports that are large enough to be eligible for entry in the National Airport System Plan (and are thus eligible for federal funding of development) and smaller airports that will appear only in the State Plan. Of the latter, some are expected to grow in importance over time. For example, six airports in the "state plan only" category for the short-range period are expected to qualify for the national plan in the intermediate period.

### Airline Service

A basic means of describing the nature of air carrier<sup>†</sup> service at airports in the MASP is the "airline service operational role." Operational role codes have been developed by the FAA (Federal Aviation Administration), recognizing differences in the general type of aircraft used for service and distance flown (lengths of haul). Both of these factors influence the nature of airport development required to accommodate air carrier service. Codes for airline roles that are applicable to Michigan are shown in Table 2.

Although the airline roles are general, a detailed analysis of air passenger demand has been conducted (in Task Group 3 and 4) to identify suitable roles for airports in the Michigan air carrier system. The analysis has sought to balance projected demand for airline service with levels of service that can be economically provided by airlines. Moreover, a cost-effective air carrier system has been sought, in the sense that benefits<sup>‡</sup> of the service to air travelers and others are expected to outweigh the costs of related airport development.

---

\* A "new" airport in the MASP need not be a new airport location. A site selection study might find that a "new" airport should be located at an existing airport site that is not included in the plan.

<sup>†</sup> Scheduled, commercial airline service.

<sup>‡</sup> Benefits are described briefly in Section IV.

Table 2

CLASSIFICATION OF AIRPORTS SERVING AIR CARRIERS  
(Operational Role)

Code for Operational Role*	Type of Activity	
	Typical Aircraft Accommodated	Length of Longest Flight
A1	{ Large jets (e.g., B-747, B-707, DC-8) }	Over 1500 miles
A2		500 to 1500 miles
A3		Less than 500 miles
B2	{ 100 passenger jet (e.g., DC-9) }	500 to 1500 miles
B3		Less than 500 miles
C3	50 passenger turboprop (e.g., CV-580)	Less than 500 miles
C5	Small aircraft (e.g., 15 passenger)	Less than 500 miles

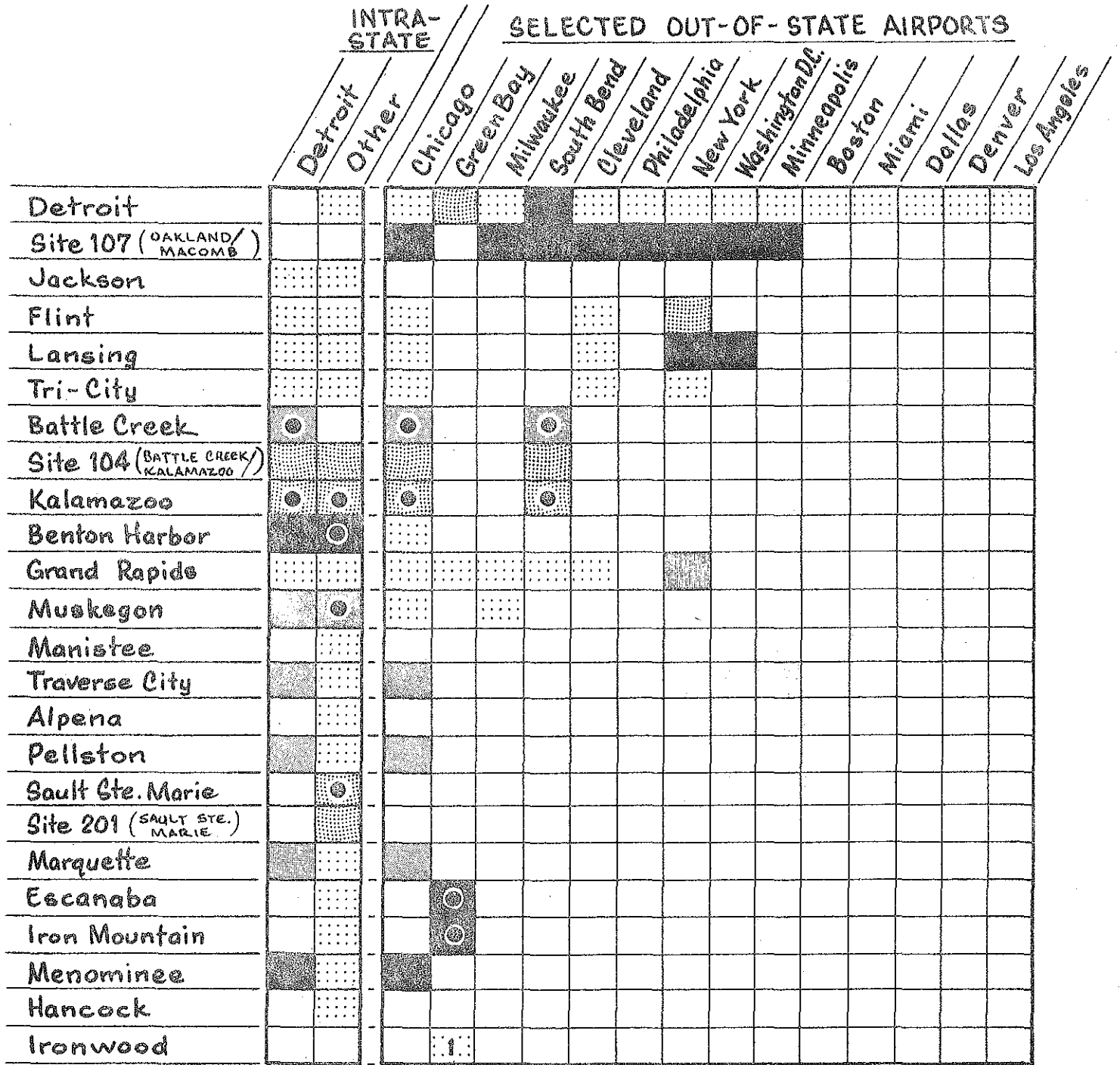
\* Includes only those roles applicable to Michigan.

Results of the air carrier system analysis are summarized in Figure 3, and indicate the following major changes proposed for airline service over time:







- Introduction of airline service at a new airport between Battle Creek and Kalamazoo, together with termination of air carrier service at Battle Creek in the short-range period and termination at Kalamazoo as soon as the new airport can be constructed. With a well-coordinated effort, the new airport (Site 104) might be operational late in the short-range period but has been planned, conservatively, for the intermediate-range period.
- Introduction of nonstop airline flights for Traverse City, Marquette, and Pellston to and from Chicago and Detroit. Anticipated

FIGURE 3

# PATTERN OF NONSTOP AIRLINE FLIGHTS



LEGEND

-  Throughout Study Time Frame
-  Introduced in Short-Range Time Period
-  Introduced in Intermediate Period
-  Introduced in Long-Range Period
-  = DELETED (in time period Indicated.)
-  = One Intermediate Stop

growth in air passenger demand\* is expected to make such service viable in the short-range period.

- Termination of airline service at the existing Sault Ste. Marie Airport, coinciding with the development of a new airport (Site 201) for the airline service needs of the community.
- Introduction of nonstop flights between the East Coast and Grand Rapids in the short-range period, Flint in the intermediate-range period, and Lansing in the long-range period.
- Introduction of nonstop flights linking Menominee with Detroit and Chicago in the long-range period. To achieve this service, most service from Escanaba and Iron Mountain would be routed through Menominee instead of Green Bay.
- Development of a new airport (Site 107) to provide air carrier service for Oakland and Macomb Counties in the long-range period. While large benefits to travelers are expected to result from such service, the planned development is critically dependent on the identification of an acceptable airport site. (Environmental considerations may preclude the development of a new airport location and institutional considerations may preclude the use of Selfridge Air National Guard Base.) There is need for a detailed site selection study and Site 107 is included in the MASP to facilitate such planning.

The above changes in airline service have been included in the MASP because each is expected to yield significant benefits.† Nevertheless, extensive cooperative efforts by local communities, the MAC, airlines, and federal agencies (FAA, CAB) will be required to effect the planned changes.

Airline service operational roles for the proposed Michigan air carrier system are displayed in Table 3. In addition to incorporating the changes in airline service described above, the table points out two other features of the air carrier portion of the MASP:

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\* Together with minor changes in intrastate routes (e.g., routing Hancock traffic through Marquette).

† Working Papers issued during Task Group 3 describe anticipated effects for many of the proposed changes.

Table 3

## OPERATIONAL ROLES FOR AIRPORTS SERVING AIR CARRIERS

Airport	Calculated		
	Airline Service Operational Role		
	Short-Range Period	Intermediate Period	Long-Range Period
Detroit	A1	A1	A1
Site 107 (Oakland/Macomb)	--	--	A2
Grand Rapids	B2	B2	B2-A3
Tri-City	B2	B2	B2
Flint	B3	B2	B2
Lansing	B3	B3	B2
Muskegon	}	B3 Throughout	}
Traverse City			
Pellston			
Marquette			
Escanaba			
Iron Mountain	B3	(Gen. Av.)	(Gen. Av.)
Kalamazoo			
Site 104 (Battle Creek/ Kalamazoo)	--	B3	B3
Benton Harbor	C3	C3	B3
Menominee	C3	C3	B3
Hancock	C3	C3	B3
Sault Ste. Marie	C3	--	--
Site 201 (Sault Ste. Marie)	--	C3	C3
Jackson	}	C3 Throughout	}
Alpena			
Ironwood			
Manistee	C3	C5	C5

- Service with small aircraft (e.g., 15 passenger) is planned for Manistee to (1) increase frequency of airline service (from 1 to 3 flights per day) and (2) avoid costly airport development that is estimated to be necessary for continued accommodation of large aircraft.
- For some airports--Site 201, Jackson, Alpena and Ironwood--planned airline service (and airport development) is based on the continued operation of Type "C" aircraft by airlines. This aircraft type (50 passengers, operable from a runway about 5,500

feet long) may be retired from service and replaced by jet aircraft. Should this occur, revisions to the MASP will be required. Additional development of the affected airports (to accommodate large aircraft) would have to be assessed relative to the alternative of small aircraft service (like that proposed for Manistee).

#### Airports Serving General Aviation

Airports included in the MASP to serve general aviation (only) are described by the five operational roles listed in Table 4. These role designations are generally compatible with the classification system developed by the FAA. A "Transport" classification describes airports that are planned to accommodate large aircraft (e.g., business jets) and "Utility" airports are planned to serve the more numerous small\* general aviation aircraft. Further distinction of an airport's role is based on estimated aircraft activity. For example, it is expected that a Michigan airport will qualify as a "general" utility airport--as opposed to "basic" utility--when annual aircraft operations† exceed 20,000.

One important extension of the FAA system of operational roles for general aviation has been adopted in this study: The basic utility role has been further divided into two stages‡--BI and BII. A BI airport is planned to serve small communities and remote recreational areas. While low activity levels at such airports would not qualify them for entry into the national airport system, the airports are viewed as a vital element of Michigan's aviation system.

The proposed number of airports to serve general aviation needs in Michigan is displayed in Table 5 by operational role and time period. Through the short and intermediate periods, the number of utility airports in the MASP is projected to remain relatively stable. However, the plan includes increasing numbers of BT (basic transport) airports to meet anticipated growth in the "business," "corporate," and "executive" segments of general aviation.

---

\* Under 12,500 pounds gross weight.

† An aircraft operation is a takeoff or a landing.

‡ At one time, the FAA made a similar distinction.

Table 4

GENERAL AVIATION AIRPORT CLASSIFICATION  
(Operational Roles)

<u>Airport Type</u>	<u>Code</u>	<u>Level of Activity</u>	<u>Percentage of General Aviation Fleet Accommodated</u>	<u>Eligible for Federal Funding of Development?</u>
Basic Utility, Stage I	BI	Less than 10 aircraft based at airport	75%	no
Basic Utility, Stage II	BII	More than 10 based aircraft. Less than 20,000 operations per year.	95%	yes
General Utility	GU	More than 20,000 operations per year.	98%	yes
Basic Transport	BT	500 or more operations per year by business jet aircraft.	99+%	yes
General Transport	GT	Substantial operations by very large general aviation aircraft (over 60,000 pounds gross weight)	100%	yes

Table 5

GENERAL AVIATION AIRPORTS IN  
PROPOSED SYSTEM BY OPERATIONAL ROLE\*

<u>Operational Role</u>	<u>Short-Range Period</u>	<u>Intermediate-Range Period</u>	<u>Long-Range Period</u>
BI (Basic Utility, Stage I)	43	45	32
BII (Basic Utility, Stage II)	39	29	33
GU (General Utility)	46	52	46
BT (Basic Transport)	18	33	48
GT (General Transport)	<u>3</u>	<u>3</u>	<u>3</u>
Total	148	162	162

---

\* Does not include airports that serve both air carriers and general aviation.

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#### Airport Locations

The locations of the airports included in the MASP are displayed by State Planning Region in Figures 4-16\*, following.

For airports serving general aviation, various symbols are used to designate the planned operational role of each airport in the long-range period. Adjacent to this symbol are codes designating the planned operational role for each study time period. A listing of general aviation airports in the MASP, including the basis for including new airports, is given in Appendix B.

---

\* The thirteen 1970 Michigan Planning Regions were adopted for this study. A fourteenth region (Muskegon) was established in May, 1973. Separate data for this new region have not been prepared.



One symbol is used in the figures to identify airports that serve both air carriers and general aviation. Because of this dual role, yet another code--an airport functional role--is portrayed beside the symbol for airports serving air carriers to denote total activity, by time period. Airport functional roles have been developed by the FAA and are defined as follows:

<u>Functional Role</u>	<u>Annual Enplaned Passengers*</u>	<u>Annual Aircraft Operations*</u> (thousands)	<u>Representative Michigan Airport</u> (short-range)
P1	} Over 1 million }	Over 350	Detroit
P2		250 to 350	
P3		Under 250	
S1	} 50,000 to 1 million }	Over 250	Flint Pellston
S2		100 to 250	
S3		Under 100	
F1	} Under 50,000 }	Over 100	Escanaba Ironwood
F2		20 to 100	
F3		Under 20	

\* Total of air carrier and general aviation activity.

FIGURE 4

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 1

**LEGEND**

- = Basic Utility - Stage I = B-I.
- = Basic Utility - Stage II = B-II.
- △ = General Utility = G.U.
- = Basic Transport = B.T.
- ◇ = General Transport = G.T.
- △ = Air Carrier Service, Code is Airport Functional Role.

- = Solid Symbol - Existing Airport
- = Open Symbol - New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role.  
 Classifications Are Shown for Short,  
 Medium & Long-Range Time Periods.

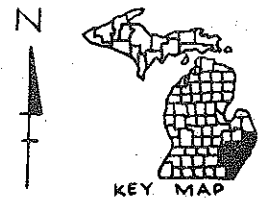
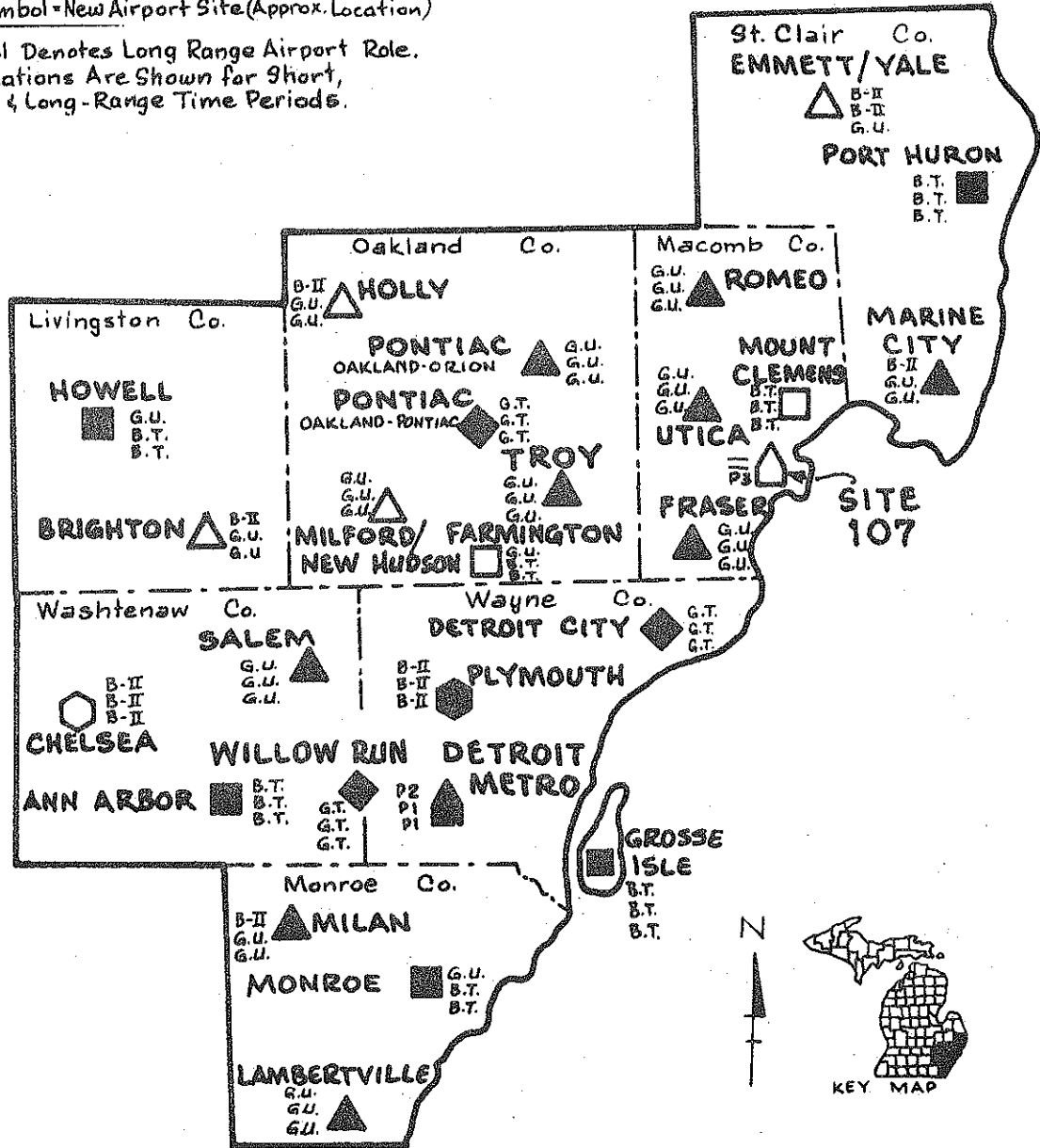


FIGURE 5

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 2

**LEGEND**

- Basic Utility - Stage I - B-I
- Basic Utility - Stage II - B-II
- △ General Utility - G.U.
- Basic Transport - B.T.
- △ Air Carrier Service, Code is Airport Functional Role.
- Solid Symbol - Existing Airport
- Open Symbol - New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role.  
 Classifications Are Shown For Short,  
 Medium & Long-Range Time Periods.

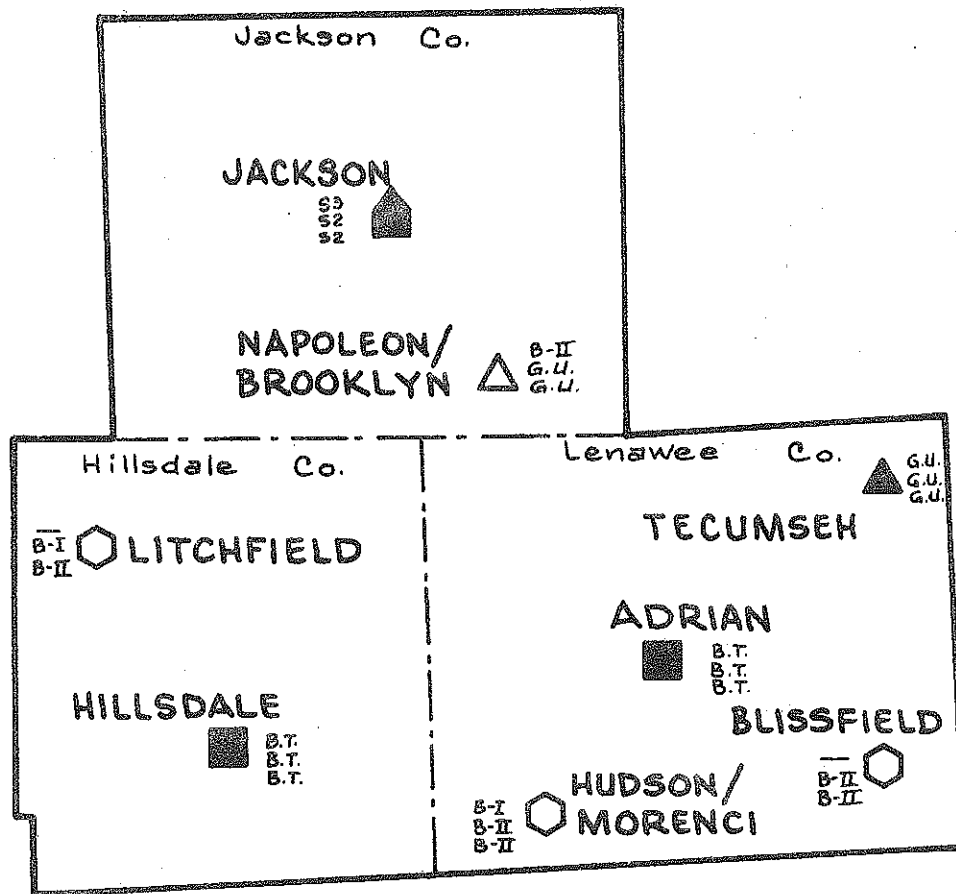
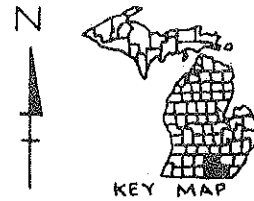


FIGURE 6

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 3

**LEGEND**

- Basic Utility - Stage I - B-I
- Basic Utility - Stage II - B-II
- △ General Utility - G.U.
- Basic Transport - B.T.
- △ Air Carrier Service, Code is Airport Functional Role.
- Solid Symbol - Existing Airport
- Open Symbol - New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role. Classifications Are Shown For Short, Medium & Long-Range Time Periods.

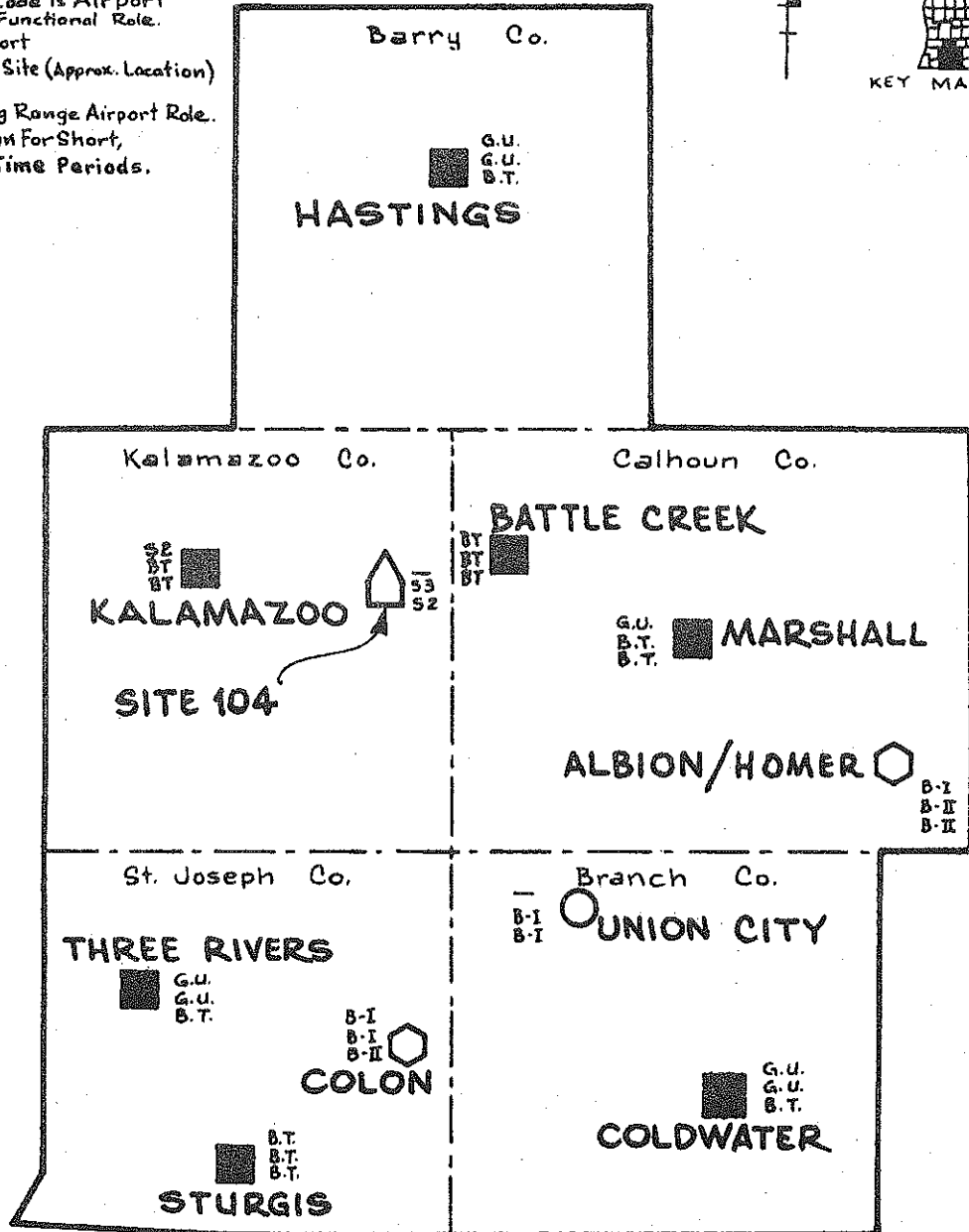
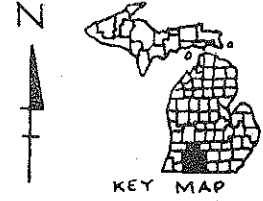


FIGURE 7

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 4

**LEGEND**

- • Basic Utility - Stage I • B-I
- • Basic Utility - Stage II • B-II
- △ • General Utility = G.U.
- • Basic Transport = B.T.
- △ • Air Carrier Service, Code is Airport Functional Role.
- • Solid Symbol • Existing Airport
- • Open Symbol • New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role.  
 Classifications Are Shown For Short,  
 Medium & Long-Range Time Periods.

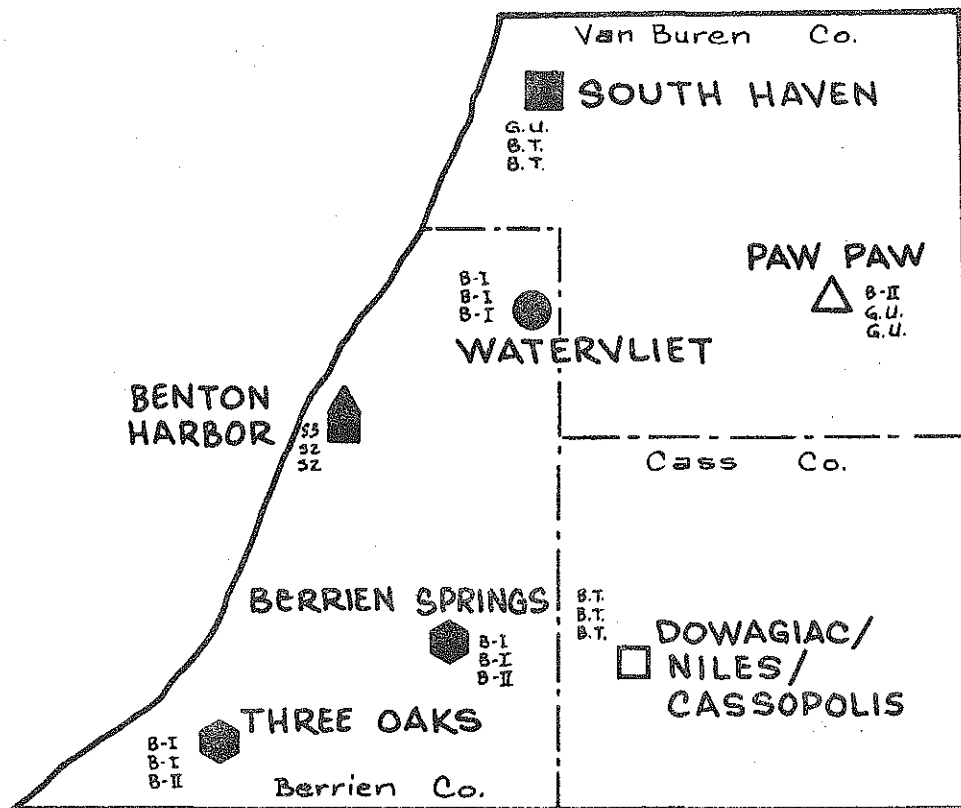
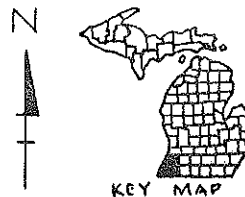


FIGURE 8

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 5

### LEGEND

- Basic Utility - Stage I - B-I
- Basic Utility - Stage II - B-II
- △ General Utility - G.U.
- Basic Transport - B.T.
- △ Air Carrier Service, Code is Airport Functional Role.
- Solid Symbol - Existing Airport
- Open Symbol - New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role.  
 Classifications Are Shown For Short,  
 Medium & Long-Range Time Periods.

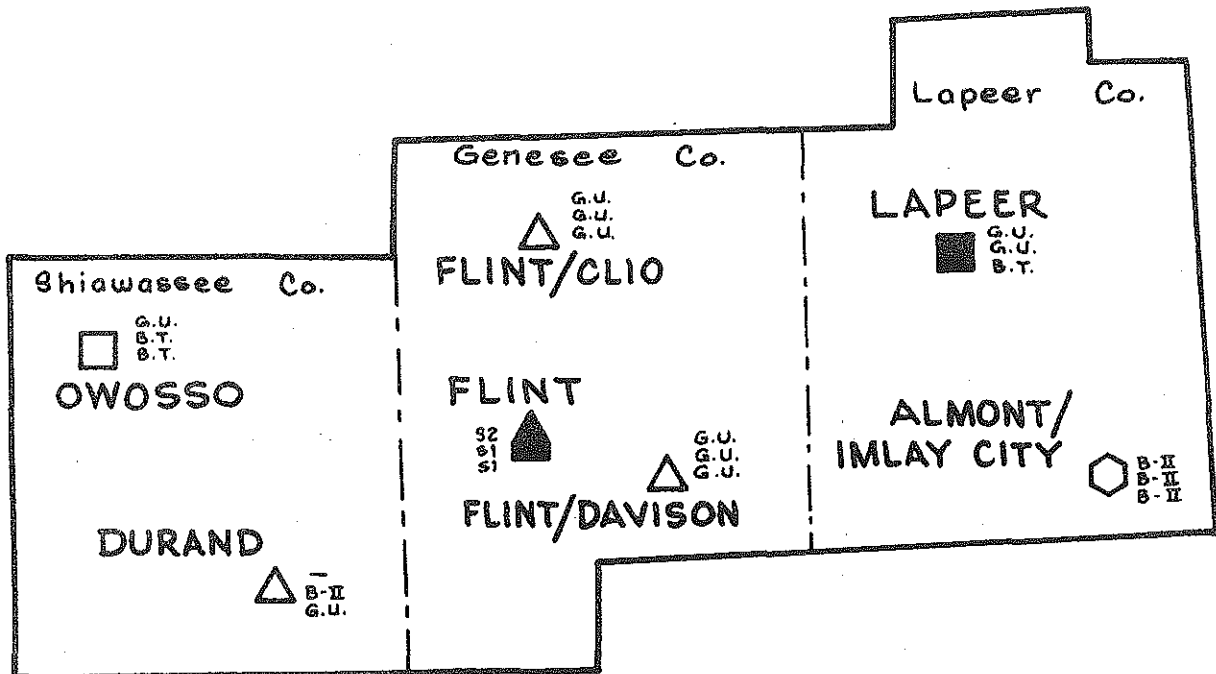
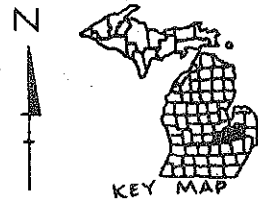


FIGURE 9

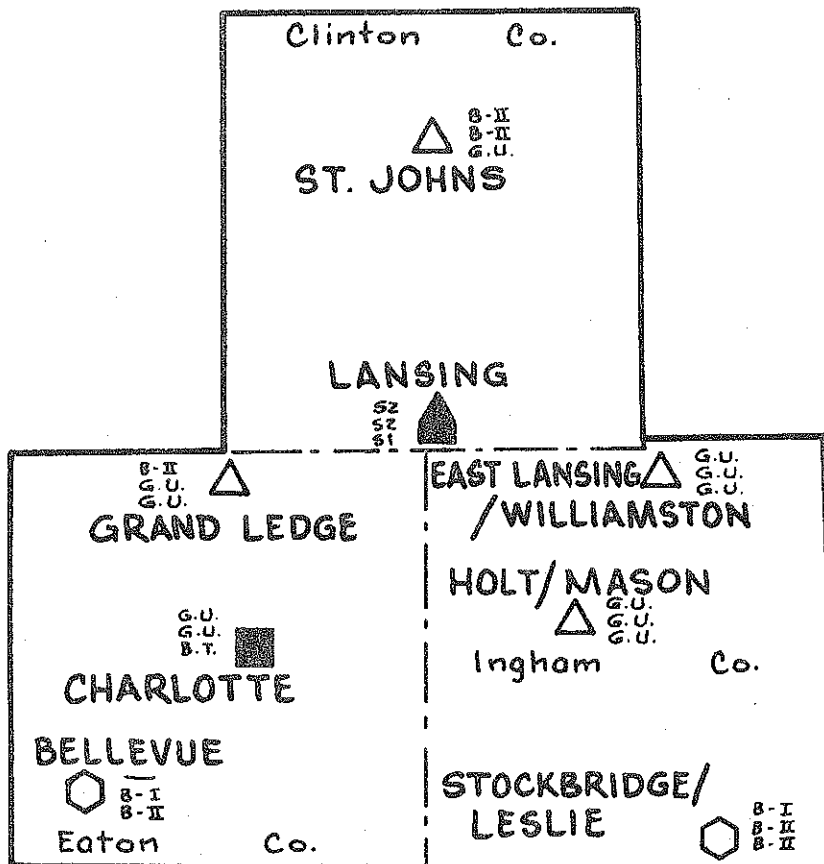
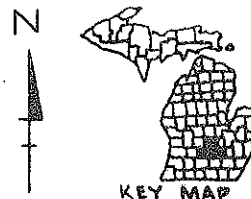
# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 6

**LEGEND**

- Basic Utility - Stage I - B-I
- Basic Utility - Stage II - B-II
- △ General Utility - G.U.
- Basic Transport - B.T.
- △ Air Carrier Service, Code is Airport Functional Role.
- Solid Symbol - Existing Airport
- Open Symbol - New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role.  
 Classifications Are Shown For Short,  
 Medium & Long-Range Time Periods.



# FIGURE 10 PROPOSED MICHIGAN AIRPORT SYSTEM PLAN STATE PLANNING REGION No. 7

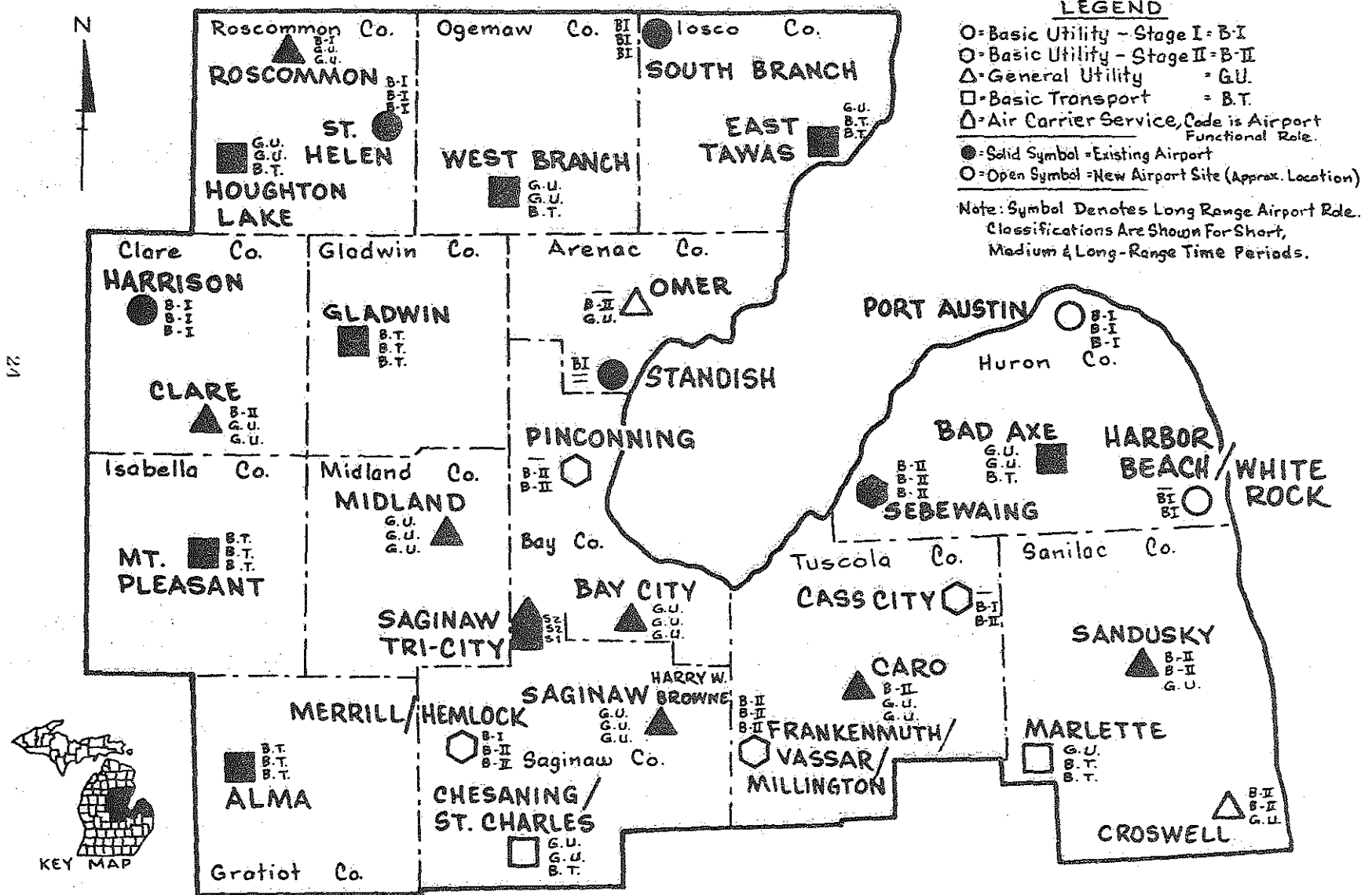




FIGURE 11

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 8

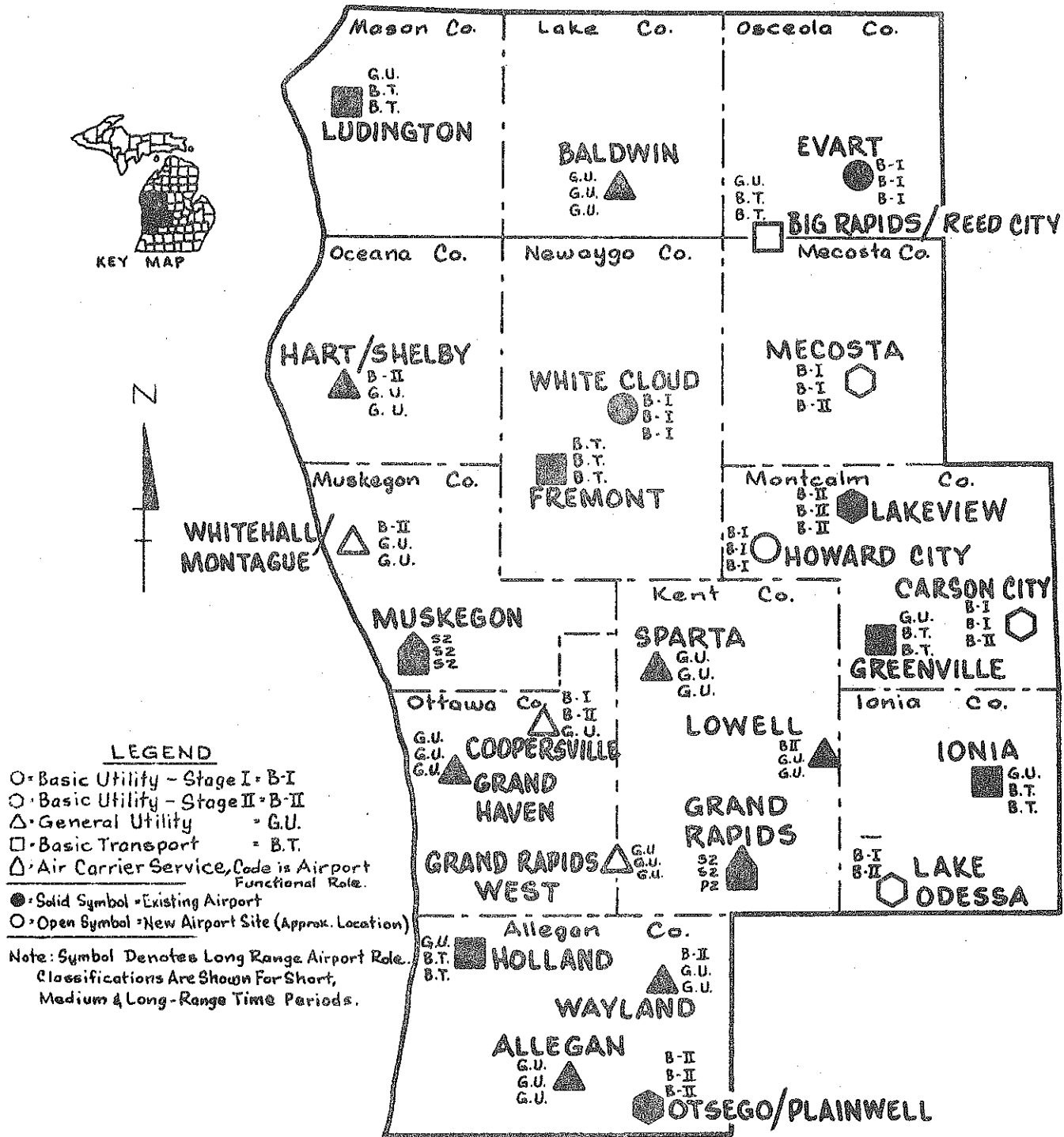


FIGURE 12

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 9



**LEGEND**

- Basic Utility - Stage I - B-I
- Basic Utility - Stage II - B-II
- △ General Utility - G.U.
- Basic Transport - B.T.
- △ Air Carrier Service, Code is Airport Functional Role.
- Solid Symbol - Existing Airport
- Open Symbol - New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role. Classifications Are Shown For Short, Medium & Long-Range Time Periods.



FIGURE 13

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 10

**LEGEND**

- • Basic Utility - Stage I • B-I
- • Basic Utility - Stage II • B-II
- △ • General Utility • G.U.
- • Basic Transport • B.T.
- △ • Air Carrier Service, Code is Airport Functional Role.
- • Solid Symbol • Existing Airport
- • Open Symbol • New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role.  
 Classifications Are Shown For Short, Medium & Long-Range Time Periods.

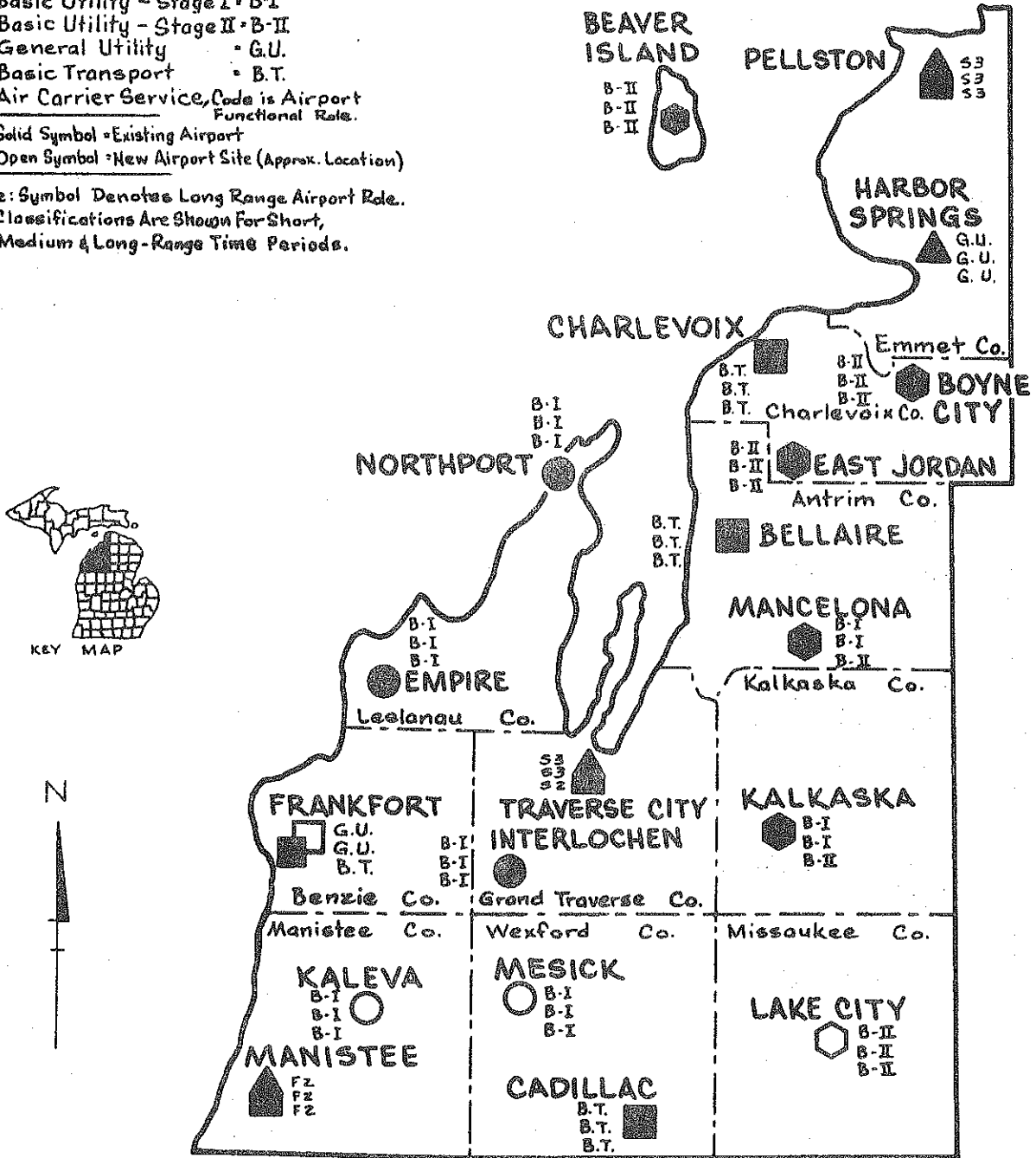


FIGURE 14

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 11

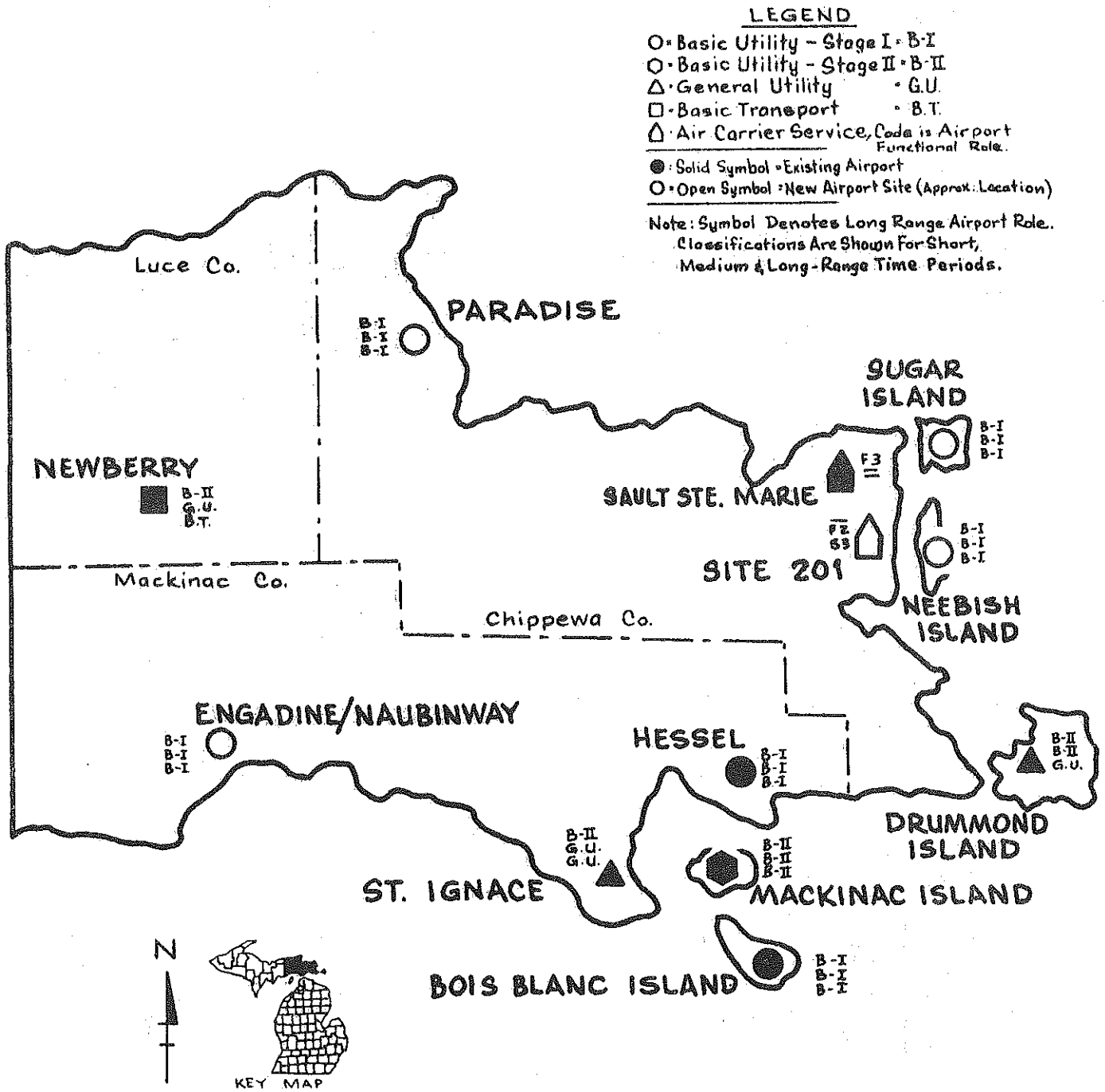


FIGURE 15

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

## STATE PLANNING REGION No. 12

**LEGEND**

- Basic Utility - Stage I - B-I
- Basic Utility - Stage II - B-II
- △ General Utility - G.U.
- Basic Transport - B.T.
- △ Air Carrier Service, Code is Airport Functional Role.
- Solid Symbol - Existing Airport
- Open Symbol - New Airport Site (Approx. Location)

Note: Symbol Denotes Long Range Airport Role.  
 Classifications Are Shown For Short,  
 Medium & Long-Range Time Periods.

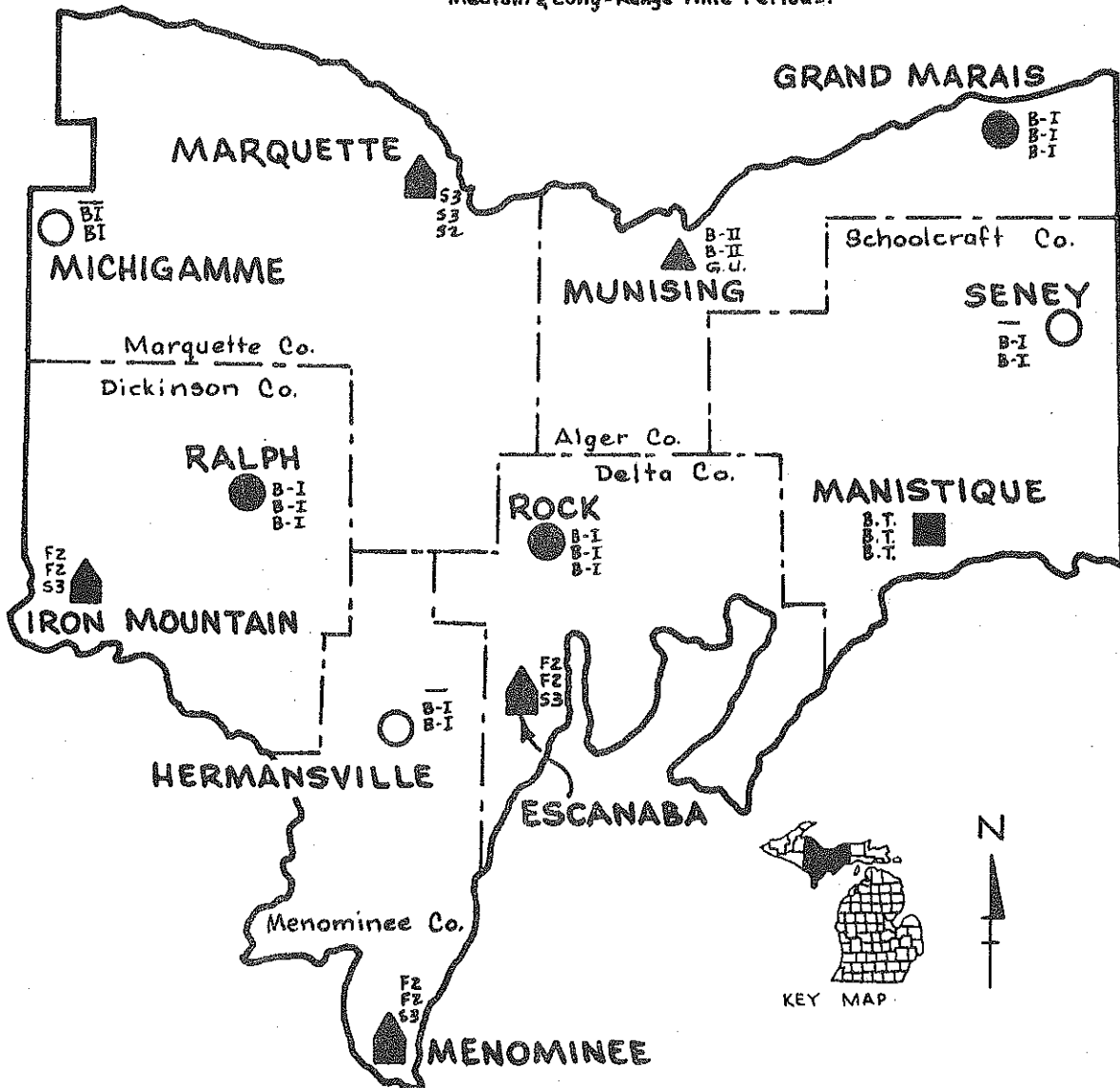
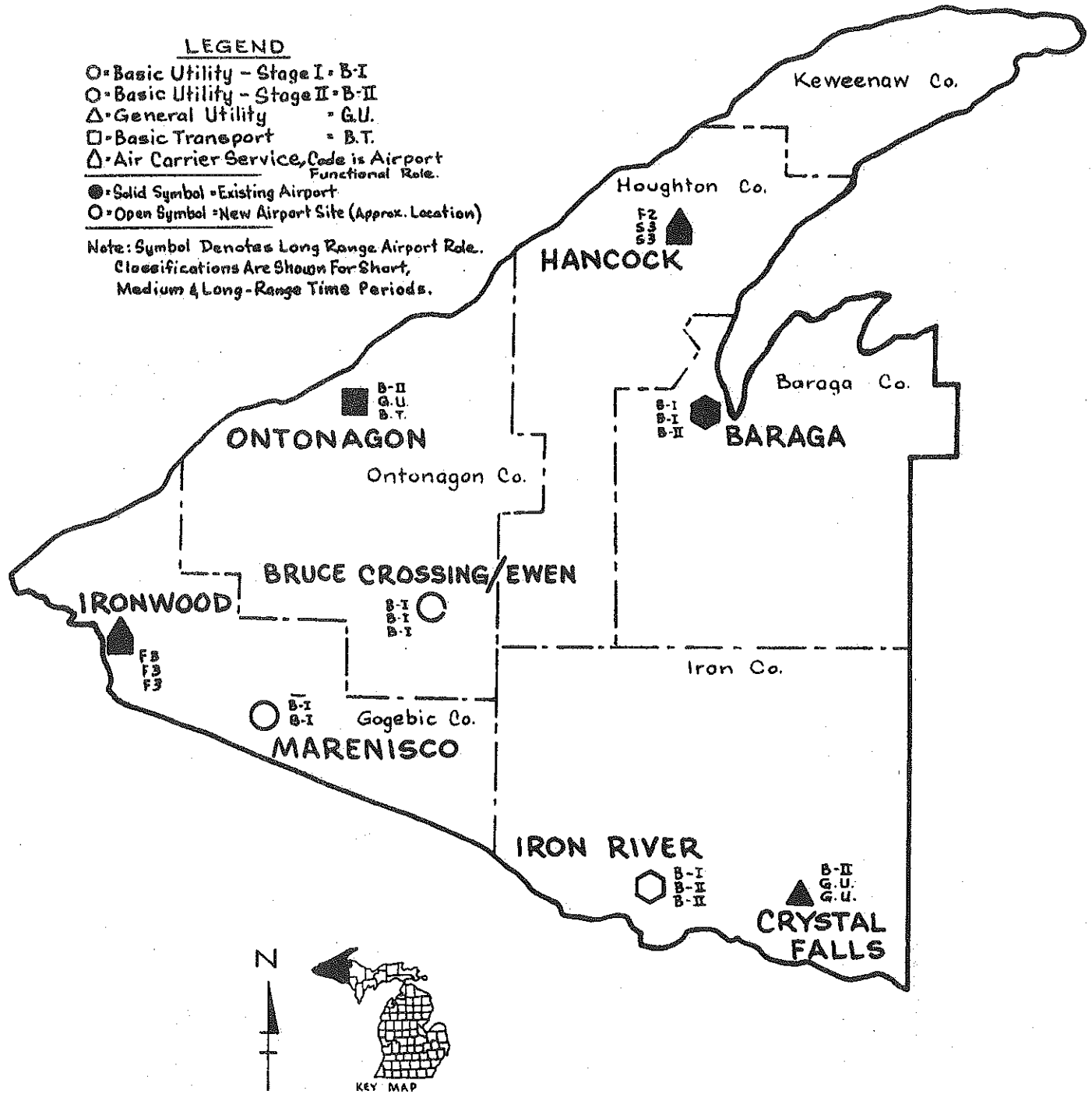


FIGURE 16

# PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 13



## Airport Development

For statewide planning purposes, generalized specifications have been used to estimate airport development requirements for each airport in the MASP. (Specific development recommendations are within the scope of an airport master plan, not a state system plan.)

For general aviation airports, planning specifications are summarized in Table 6. As indicated by the table, the planned amount of development for a general aviation airport has been related to its operational role. Thus, for example, the recommendation of a new BII airport for the MASP implies the airport development shown for that airport type in Table 6. If the same airport is recommended in a later time period as a General Utility airport, the following major items of additional development are implied, by comparison of the "GU" and "BII" columns in Table 6:

- Land acquisition of 150 acres
- Lengthening and widening of the primary runway
- Construction of a paved crosswind runway
- Taxiway and apron expansion.

Additional development would also include such items as expansion of the terminal building and automobile parking area to accommodate increased activity.

Planned development for airports in the MASP to serve both air carriers and general aviation is summarized in Table 7. The data are displayed separately by airport and type of development. In the case of Muskegon, for example, the table indicates the following major items of development:

- A new runway in the intermediate time period (a parallel primary runway to serve increased general aviation activity). Associated with this development is land acquisition in the short-range period and taxiway and apron expansion in the intermediate-range period.
- Expansion of terminal and auto parking facilities in each study planning period.

A variety of engineering design standards were employed in formulating the airport development shown in Table 7. These standards allow for calculation of airport facility requirements at a given level of airport activity. The activity measures used in the study include:

Table 6

## TYPICAL PLANNED DEVELOPMENT BY TYPE OF GENERAL AVIATION AIRPORT

Item	Basic Utility-Stage I (B-I)	Basic Utility-Stage II (B-II)	General Utility (GU)	Basic Transport (BT)
Land	180 acres	300 acres	450 acres	800 acres
Airfield paving				
Primary runway	2,700' x 60'	3,200' x 60'	3,800' x 75'	5,000' x 100'
Crosswind runway	--	3,200' x 100' (turf)	3,000' x 75'	3,800' x 75'
Parallel taxiway	--	800' x 30' (partial)	7,600' x 40'	10,000' x 40'
Other taxiway	400' x 30'	1,200' x 30'	800' x 30' 400' x 40'	800' x 30' 800' x 40'
Apron	2,200 sq. yds.	2,800 sq. yds.	5,600 sq. yds.	5,600 sq. yds.
Airfield lighting	--	Runway and taxiway Lighted wind cone Rotating beacon	Runway and taxiway Lighted wind cone Rotating beacon	Runway and taxiway Lighted wind cone Rotating beacon
Approach aids	--	Visual approach slope indicators Runway end identifier lights	Visual approach slope indicators Runway end identifier lights	Visual approach slope indicators Runway end identifier lights Instrumented landing system
Other	Wind Cone	*	*	*

\* Development items common to all airport types include:

- Fencing
- Entrance road
- Marking of airfield pavement
- Automobile parking area
- Segmented circle
- Obstruction removal
- Administration and terminal building

Note: Deviations from the generalized specifications of this table have been planned for some airports to achieve compatibility with existing airport development.



Table 7

## SUMMARY OF PLANNED DEVELOPMENT BY TIME PERIOD FOR AIRPORTS SERVING AIR CARRIERS\*

Airport	Land Acquisition	Runway Development		Taxiway and Apron Development <sup>†</sup> (New or Expansion)	Terminal/Auto Parking Development <sup>‡</sup> (New or Expansion)	Other (Approach Aids, Fire and Crash Facilities, Roads, Utilities)
		New Runway (s)	Other (Lengthen, Widen)			
Detroit	S, M, L	S	S	S, M, L	S, M, L	S, M, L
Site 107 (Oakland/Macomb)	S	L		L	L	L
Jackson				S	±	
Flint	S, M	S	M	S, M	M	
Lansing	S, M	M	S, L	M, L	S, M, L	
Tri-City	S, M	M	S	S, M	S	
Site 104 (Battle Creek/Kalamazoo)	S	M, L		M, L	M, L	M
Benton Harbor	S, M		S, L	L	M, L	S
Grand Rapids	S		S	S		L
Muskegon	S	M		M	S, M, L	
Manistee		S				
Traverse City	S			S	L	S
Alpena				S	±	S
Pellston					S, L	S
Site 201 (Sault Ste. Marie)	S	M		M	M, L	M, L
Marquette			S		S, M, L	S
Escanaba			S	S	±	L
Iron Mountain	S			S	±	L
Menominee	S	S	L	S	L	L
Hancock				S	±	M
Ironwood		S	S	S	L	

\* S = Short-range, M = Intermediate period, L = Long-range

Development with an estimated cost of less \$500,000 in a time period is not shown.

<sup>†</sup> Includes development for general aviation needs.

<sup>‡</sup> Total of development for all time periods exceeds \$500,000.

- Airport operational role (both airline and general aviation).
- Enplaned passenger and cargo levels
- Numbers of aircraft operations by aircraft type.

Other data used in calculating development included weather information (temperature variations, wind conditions) for each airport.

### III COST AND FUNDING OF THE PLAN

#### Introduction

This section contains a description of estimated costs and funding sources for the Michigan Airport System Plan (MASP). Table 8 summarizes estimated MASP costs\* and resources (available funds) for the three planning periods of the study and illustrates the following general conclusions:

- Most of the costs of implementing the MASP for air carrier airports (airports that serve both air carriers and general aviation) can be funded by prospective resources by fiscal year (FY) 1992, although the excess of costs over available funds in the first planning period may cause delays in implementation.
- For airports serving only general aviation, estimated costs for the short-range period, alone, exceed the total of estimated financing available for all three planning periods.

Options for coping with these anticipated funding shortages are discussed later in this section.

#### MASP Funding Sources

Funds for Michigan's airport development program will come from three principal sources: federal, through FAA's Airport Development Aid Program (ADAP); the State of Michigan, through the MAC; and the balance from local or regional sources, chiefly through long-term borrowing.

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\* Throughout this section, dollar values are expressed in millions of constant (1970) dollars.

Table 8

## SUMMARY OF ESTIMATED MASP COSTS AND FINANCING

	Short-Range Period (FY73-77)	Inter- mediate Range Period (FY78-82)	Long-Range Period (FY83-92)	Total
<b>Air Carrier Airports*</b>				
Costs	\$294	\$123	\$139	\$556
Resources	<u>200</u>	<u>126</u>	<u>212</u>	<u>538</u>
Surplus (shortage)	(\$ 94)	\$ 3	\$ 73	(\$ 18)
<b>General Aviation Airports</b>				
Costs	\$ 79	\$ 29	\$ 21	\$129
Resources	<u>17</u>	<u>18</u>	<u>40</u>	<u>75</u>
Surplus (shortage)	(\$ 62)	(\$ 11)	\$ 19	(\$ 54)

---

\* Includes reliever airports--namely, airports which serve only general aviation but relieve congestion at airports serving air carriers.

---

Current policies governing federal and state funding are summarized in Table 9, and the three sources are discussed in turn below.

- The FAA may make grants under the ADAP, subject to availability of funds, up to 75 percent of the cost of land acquisition and airfield development. (At large hub airports, such as Detroit Metropolitan Airport, the FAA contribution may not exceed 50 percent of such costs.) The Agency may also fund up to full cost of certain navigational and landing aids, using Facility and Equipment funds, rather than ADAP funds. The FAA has no authority at present to make grants for the financing of terminals and other buildings, except those required for safety. For the nation, current annual appropriations for ADAP grants are \$310 million, of which \$275 million is for air carrier airports and \$35 million is for general aviation airports. The air carrier airport funds are allocated to states in response to specific grant requests on the following basis: one-third on

Table 9

## FUNDING POLICIES FOR AIRPORT DEVELOPMENT

Type of Development And Funding Source	Type of Airport		
	Large Hubs (e.g., Detroit)	Other Airports Included in National Airport System Plan	General Aviation Airports Included in the Michigan Plan But not the National Plan
Land Acquisition			
Federal*	50%	75%	0
Michigan†	0	0	0
Airfield Development (paving, lighting, etc.)			
Federal*	50%	75%	0
Michigan†	25%	12.5%	50%
Terminals (public use space) and Automobile Parking			
Federal*	0	0	0
Michigan†	50%	50%	50%

\* Federal limits for ADAP funds.

† Limit of state funding. In addition, an upper limit on state grants has been imposed, limiting individual airports to \$250,000 within a three-year period.

relative area and population, one-third on relative enplaned passengers at air carrier airports, and one-third at the discretion of the Secretary of Transportation. The general aviation airports fund allocations are based on area/population ratios and the discretion of the Secretary.

- In Michigan, state airport development grants are typically awarded to local governments on a matching (50-50) basis, subject to the availability of state monies and compliance

with state requirements.\* A limitation on state grants to individual airports of \$250,000 within a three-year period has been imposed in prior periods of fund shortages and it is assumed this limit will remain in force.

- Local funds for substantial airport capital outlays in Michigan are usually obtained through long-term bonds. Revenue bonds are used by large airports with assured revenues from airport users, and general obligation bonds by smaller airports. Funds required for current outlays, which include bond interest and amortization payments, are typically derived from current airport revenues, consisting of landing fees and other user charges, together with revenues derived from concessions and service-related activities. Small levels of capital outlay may be financed by reserves or out of general funds. In some cases, regional commissions such as the Upper Great Lakes Regional Commission have underwritten portions of the cost of airport development when such development was deemed essential to the region's economic development. The practice of financing airport improvement through the issuing of general obligation bonds by the parental governmental unit has been reduced in the past two decades, as has the related practice of supporting airport operations partly through local taxation. Future use of these approaches in the financing of Michigan airports is expected to be limited to smaller airports for which revenue from user charges is inadequate.

Availability of local matching funds has been a serious problem for some local airport authorities in the past, especially since firm evidence of the availability of the local funds must be provided with the ADAP grant application.

#### MASP Cost and Funding Estimates

Data have been developed in the study on estimated cost of recommended development for the MASP. The cost estimates were prepared by type of airport (e.g., air carrier, general aviation), type of development (e.g., land acquisition, terminal expansion), and by study planning period. The cost estimates are presented in Table 10, organized by potential source of funding (using the data from Table 9 on funding policies). For

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\*The MAC also manages a \$250,000 state loan fund for airport development that makes loans up to 10 years and \$25,000 at 4.5 percent interest. About \$100,000 is currently available for such loans; requests generally exceed available loan funds.

Table 10

ESTIMATED COST OF MASP DEVELOPMENT  
ARRANGED BY POTENTIAL SOURCES OF FUNDS\*

<u>Potential Funding Source</u>	<u>Short-Range Period</u>	<u>Intermediate- Range Period</u>	<u>Long-Range Period</u>	<u>Total</u>
A. Air Carrier and Reliever Airports				
ADAP	\$159	\$ 49	\$ 38	\$246
State	11	5	9	25
Local	116	67	83	267
FAA F&E	<u>7</u>	<u>2</u>	<u>9</u>	<u>18</u>
Total	\$294	\$123	\$139	\$556
B. General Aviation Airports				
ADAP	\$ 50	\$ 19	\$ 16	\$ 84
State	10	5	2	16
Local	<u>19</u>	<u>6</u>	<u>3</u>	<u>29</u>
Total	\$ 79	\$ 29	\$ 21	\$130

---

\* In millions of constant (1970) dollars. Detail may not add to total because of rounding.

---

example, the "potential ADAP" values in Table 10 were obtained by multiplying the development costs eligible for ADAP funds by the maximum allowable federal participation rate. The cost estimates by funding source in Table 10 are "unconstrained," in the sense that limits on available funds are not considered.

In a separate analysis, estimates of federal and state resources to fund the MASP have been developed. These estimates are summarized on Table 11 and described below:

- Future ADAP grants to Michigan are estimated to total \$12 million per year. This estimate presumes that Michigan will continue to attract more than its proportional share of the discretionary

Table 11

ESTIMATED AVAILABILITY OF FEDERAL AND STATE  
FUNDS TO FINANCE MASP DEVELOPMENT  
(Millions of 1970 Dollars)

<u>Funding Source</u>	<u>Short-Range Period</u>	<u>Intermediate-Range Period</u>	<u>Long-Range Period</u>	<u>Total</u>
A. Air Carrier and Reliever Airports				
ADAP	\$51	\$51	\$102	\$204
State	5	7	17	29
FAA F&E	7	2	9	18
B. General Aviation Airports				
ADAP	\$ 9	\$ 9	\$ 18	\$ 36
State	3	4	12	19

portion of the ADAP allocations among states.\* If Michigan were to receive a proportional share of all ADAP funds, annual grants would average \$9.5 million. The proportion of ADAP funds estimated for general aviation airports is 15 percent of Michigan's total, somewhat higher than the 11.3 percent that general aviation funds constitute of the national ADAP total (\$35 million out of \$310 million). This reflects approximately Michigan's recent experience in obtaining ADAP grants for air carrier and general aviation airports.

- State resources are the estimated revenues from Michigan aviation taxes and fees less MAC operating expenses. Currently (FY1974) at a level of about \$1.6 million per year, total State resources are projected by the MAC to increase at about \$100,000 per year in constant dollars. Of the total, 40 percent is estimated to be prospectively available to general aviation

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\* Alternatively, total ADAP allocations to states might rise at a rate faster than inflation. The estimated constant dollar total of \$12 million per year assumes a gradual increase in ADAP appropriations to account for inflationary effects.



airports and the balance to air carrier and reliever airports. This distribution is based on State grants to airports in recent years.

- FAA resources for F&E (facilities and equipment) expenditures are presumed to be sufficient to meet needed development. Thus, the estimated availability of FAA F&E funds corresponds to estimated needs (Table 10).

#### Comparison of Costs and Resources by Source

The Federal ADAP and State costs of Table 10 and the resources of Table 11 are compared in Figure 17. The issues portrayed by the figure are as follows:

- For air carrier and reliever airports, there is a severe shortage of ADAP resources in the short-range period to fund the recommended MASP development that is eligible for these funds. In the later planning periods, resources are in excess of estimated needs.
- For general aviation airports, there are shortages of ADAP resources in the first and second planning periods and a shortage of State resources in the first period. The excess of costs over resources is substantial in the first planning period.

In addition to anticipated shortages of Federal and State funds to finance the MASP, there are likely to be shortages of local funds. In Table 12, average annual local funding requirements implied by the MASP cost estimates are compared with recently programmed levels of local funding for airport development in Michigan. The table indicates that if sufficient ADAP and State funds were available to finance eligible development, then:

- In the first planning period, the average annual level of local funds required to match federal and State funds would exceed recently programmed levels.
- Requirements for local matching funds would decrease in subsequent planning periods.

FIGURE 17

COMPARISON OF MASP COSTS AND RESOURCES  
(ADAP and STATE)

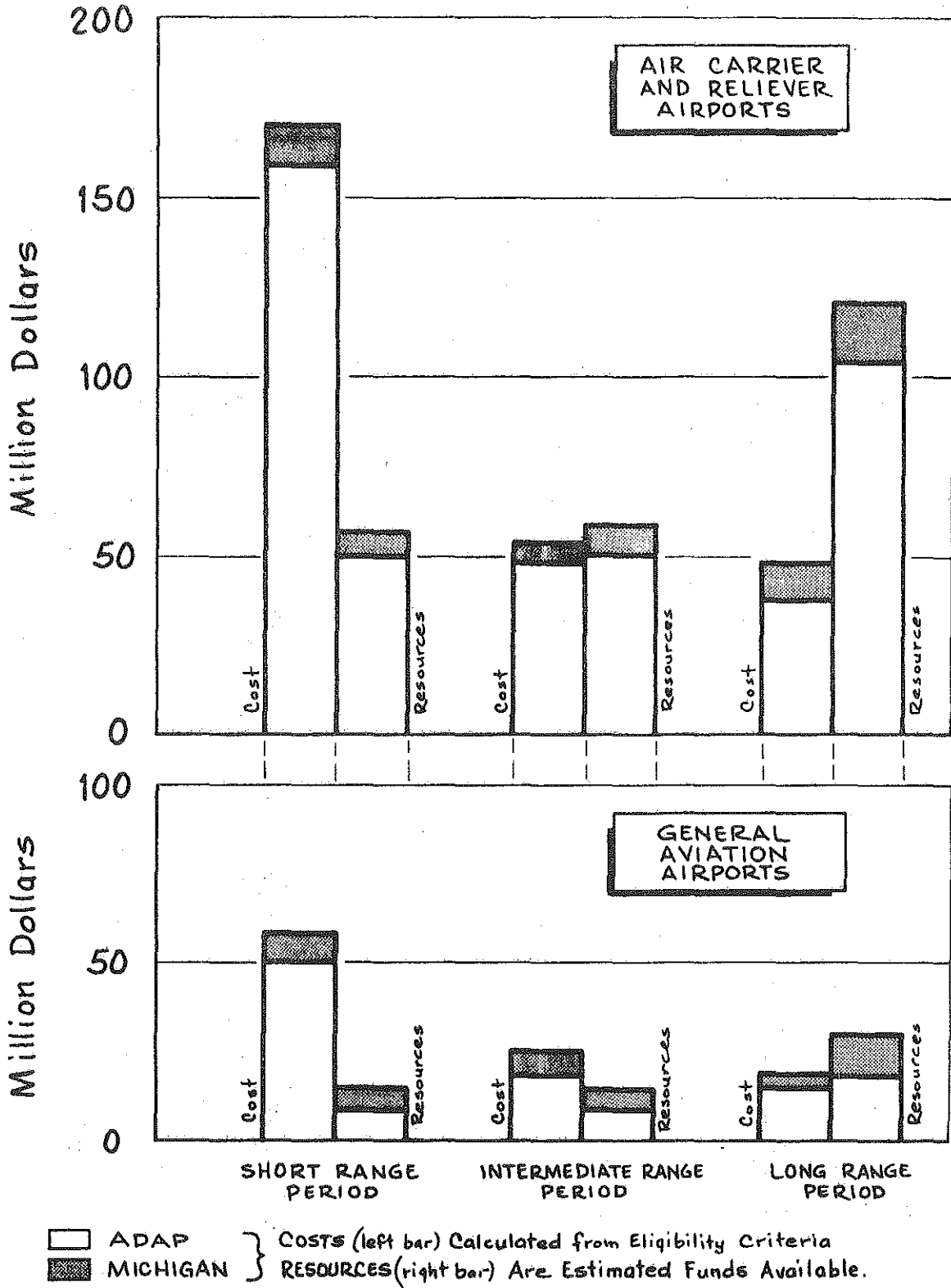


Table 12

LOCAL FUNDING TO MATCH POTENTIAL  
ADAP AND STATE RESOURCES

	Programmed* (Average of Fiscal Years 1974-75)	Average Annual Local Matching Funds <sup>†</sup>		
		Short- Range Period	Intermediate- Range Period	Long- Range Period
Air Carrier and Reliever Airports	\$19	\$23	\$15	\$8
General Aviation Airports	<u>1</u>	<u>4</u>	<u>1</u>	<u>&lt;1</u>
Total	\$20	\$27	\$16	\$9

\* From MAC data. Money figures in millions of dollars.

<sup>†</sup> Derived from Table 10. To the extent that Federal and State funds are not available, local matching requirements would be lessened.

The local funding estimates in Table 12 are displayed by State Planning Region in Table 13. It is emphasized that the estimates do not reflect the lower matching requirements that would be a likely result of anticipated shortages of ADAP and State funds in the short-range planning period. On the other hand, the estimates do not reflect the possibility of increased local funding to compensate for ADAP and State funding shortages. These options are discussed below.

Options for Coping with Resource Shortages

There are two obvious approaches to dealing with the anticipated shortage of resources to fund estimated MASP costs: additional funds could be sought or planned development could be delayed (or deleted). More specific options are outlined below, and those that appear promising

Table 13

## LOCAL FUNDING BY PLANNING REGION\*

Planning Region <sup>†</sup>	Short-Range Period			Intermediate-Range Period			Long-Range Period		
	A.C.‡	G.A.	Total	A.C.‡	G.A.	Total	A.C.‡	G.A.	Total
1	\$ 95.8	\$ 4.1	\$ 99.9	\$47.3	\$1.1	\$48.4	\$74.6	\$0.3	\$74.9
2	0.2	1.0	1.2	0.1	0.5	0.6	0.3	0.2	0.5
3	2.4	1.3	3.7	6.0	0.5	6.5	0.7	0.5	1.2
4	1.3	1.4	2.7	0.8	0.2	1.0	0.5	0.1	0.6
5	1.9	1.0	2.9	5.6	0.2	5.8	0.2	0.2	0.4
6	1.6	1.1	2.7	2.2	0.3	2.5	1.9	0.3	2.2
7	3.2	3.0	6.2	0.5	1.1	1.6	0.2	0.8	1.0
8	2.1	2.7	4.8	1.2	1.0	2.2	0.4	0.3	0.7
9	0.3	0.6	0.9	0.1	0.1	0.2	0.2	0.2	0.4
10	1.5	1.5	3.0	0.2	0.4	0.6	1.3	0.1	1.4
11	0.3	1.0	1.3	2.1	--	2.1	0.4	0.1	0.5
12	4.3	0.2	4.5	0.7	0.6	1.3	2.2	0.1	2.3
13	1.7	0.5	2.2	0.3	0.2	0.5	0.6	0.1	0.7
Total, all Regions	\$116.4	\$19.3	\$135.8	\$67.0	\$6.2	\$73.2	\$83.4	\$3.3	\$86.8

\* Local funding level to match potential ADAP and State resources. Millions of 1970 dollars.

<sup>†</sup> See the maps of Section II for region boundaries.

<sup>‡</sup> Air Carrier and Reliever Airports.

or likely are later incorporated in overall comparisons of MASP resources and costs.\*

1. Seek to Increase State Funding

Although State resources are a small fraction of the total required to fund the MASP (see Table 10 and Figure 17), an increase in these funds might encourage some vital airport development.

A tax on aviation fuel provides the bulk of the funds for State contribution to airport development.† The present tax of 3¢ per gallon is comparable to that levied in surrounding states. For air carriers, one-half of the tax is refunded. Without the refund, out-of-state purchases of fuel would be encouraged. A concerted effort by several states to raise fuel taxes would, if successful, avoid this problem, but such an effort does not appear to be in prospect. The possibility of sharply increased federal taxes on general aviation, as recommended by a current federal airport cost allocation study,‡ would cause resistance to further state taxes on general aviation--and may also slow the growth of general aviation compared with this study's projections.

2. Seek to Increase the Contribution of Local Funds to Airport Development

Increases in local funds are outside the State's ability to influence, except by encouragement. To the extent that local funding takes place through issuance of revenue bonds, selective state insurance of such bonds might achieve a lower interest rate and thereby offer encouragement to grant applications. In most cases, however, it seems unlikely that local airports authorities will be eager to use local funds for improvements that are eligible for ADAP funds. Even to reach the

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\* For reasons discussed later, study estimates of ADAP resources for Michigan are considered to be fixed at \$12 million per year. (See "Sensitivity" subsection).

† The State loan fund offers a limited, but valuable, additional means of encouraging airport development. The MAC is understood to be seeking a \$1 million increase of the loan fund (from \$250,000) and an increase of the loan maximum to \$50,000 (from \$25,000).

‡ Airport and Airway Cost Allocation Study, U.S. Department of Transportation.

local cost levels implied by the MASP (Table 10) would require strenuous efforts, and to then substitute local funds for some items eligible for ADAP will be regarded as an added burden.

Because of its size, Detroit Metropolitan Airport may elect to compensate for shortages in ADAP funds by increased local resources. Detroit has greater financial ability (through airport fees and charges) and more incentive than other Michigan airports to use local funds.

3. Anticipate a Slower Rate of Grant Submissions than Planned

The state plan can only be implemented on the initiative of locally owned and controlled airports, and it is not certain at what rate future ADAP grant requests will be submitted. Local enthusiasm for implementing the MASP is questionable in light of anticipated shortages of ADAP funds.

4. Defer Noncritical Airport Improvements

Planned airport improvements that are not closely related to safety or to achieving needed capacity could in theory be deferred until more urgent improvements are funded. The authority to defer airport improvements currently rests with the FAA and not the MAC. This authority has not been exercised because grant requests have not yet exceeded available funds at the national level.

In the event that Michigan grant applications do exceed available funds at some point, the MAC may wish to share with the FAA the difficult judgment as to which grants should be deferred. These decisions will require assessment of the relative merits of each grant request received.

It is beyond the scope of the present study to identify specific airport development that have been planned but might be deferred. However, those new airports included in the MASP solely by reason of convenient ground access are obvious candidates. (See Appendix B, and the discussion of Site 107 on Page 54.)

Overall Comparison of Costs and Resources

Based on the above discussion, the figures that follow display overall comparisons of MASP resources and costs. Each of the figures provides:

- An estimate of airport development costs by planning period (these data are unchanged from those of Table 10).
- Two estimates--labeled "best" and "more conservative"--of available resources to fund the MASP. The "best estimate" generally assumes that local resources will compensate in some measure for shortages of ADAP funds. The "more conservative" estimate generally assumes that local and State resources would be limited to matching federal contributions. More detail on the basis for the estimates is given in Table 14.

The cumulative relationship between costs and resources for air carrier and reliever airports is shown in Figure 18. For example, by the end of the intermediate planning period, recommended development costs total \$417 and the "best estimate" of available resources to fund the MASP is \$326 million. The difference between costs and resources at this date (and others) on the graph can be interpreted in two ways:

- The vertical gap between costs and resources is an indication of the additional resources that would be required for MASP development to be completed (funded) on schedule.
- The horizontal gap between costs and resources is an indication of the time lag that is expected to occur in airport development if additional funds do not materialize. For example, the "best estimate" of available resources lags development costs by about 4 years during the intermediate planning period.

For air carrier and reliever airports the gap between estimated development costs and expected ("best estimate") resources widens to a maximum in the intermediate and early long-range planning periods. However, by the middle of the long-range period, the gap begins to narrow considerably. Alternatively, the gap between costs and the more conservative estimate of resources remains large throughout the long-range planning period (8 years or \$120 million dollars).

Relationships between estimated costs and resources for general aviation airports are displayed in the graph of Figure 19. Measured in dollars, the gap between costs and expected resources corresponds roughly to that for air carrier and reliever airports.\* Measured in time, however, the gap is much more severe. The difference between estimated development costs and expected ("best estimate") resources suggests that recommended general aviation airport development might

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\* The vertical scale of Figure 19 is different from that of Figure 18.

FIGURE 18  
 COMPARISON OF CUMULATIVE RESOURCES AND COSTS  
 FOR  
 AIR CARRIER AND RELIEVER AIRPORTS

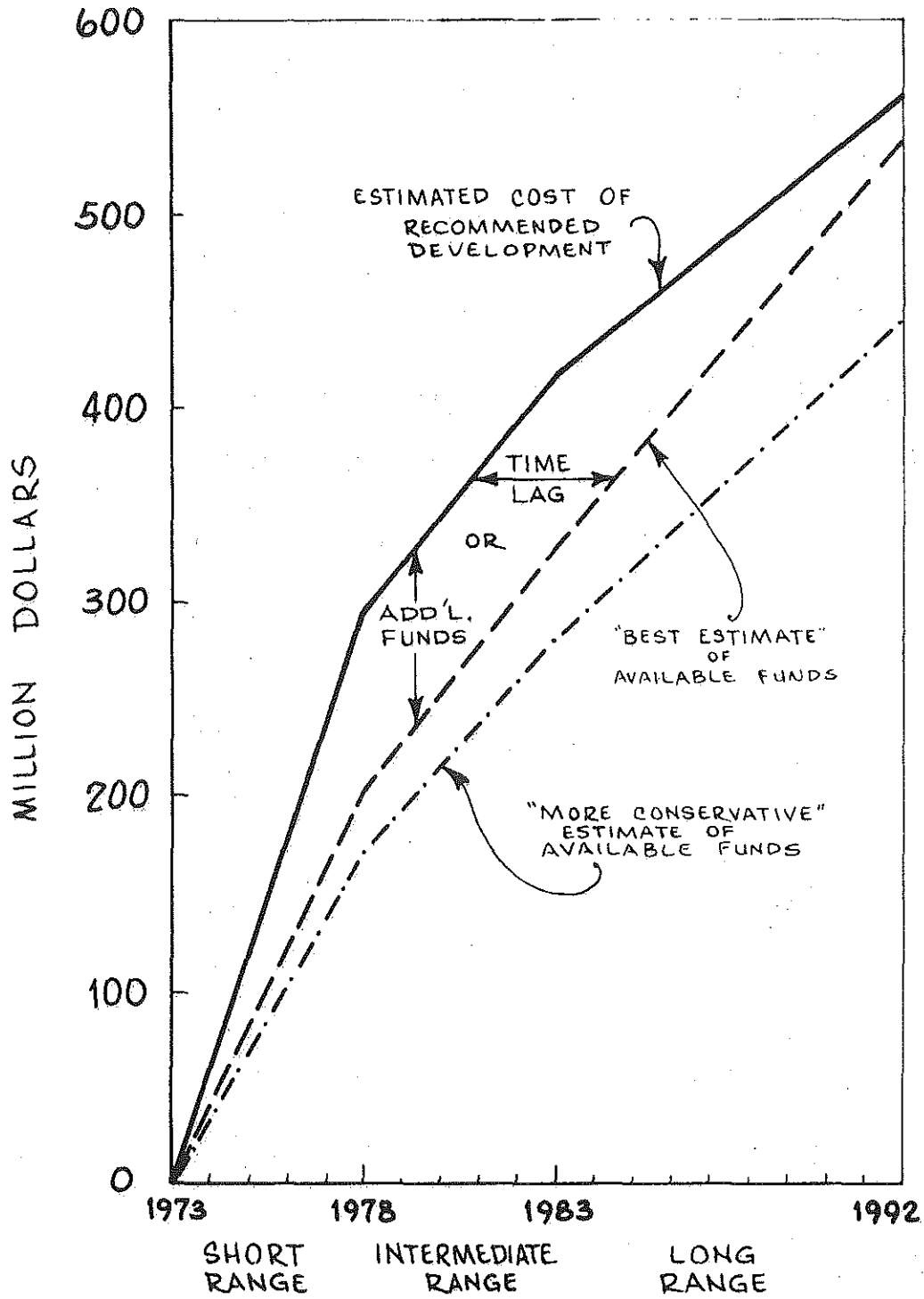




FIGURE 19  
 COMPARISON OF CUMULATIVE RESOURCES AND COSTS  
 FOR  
 GENERAL AVIATION AIRPORTS

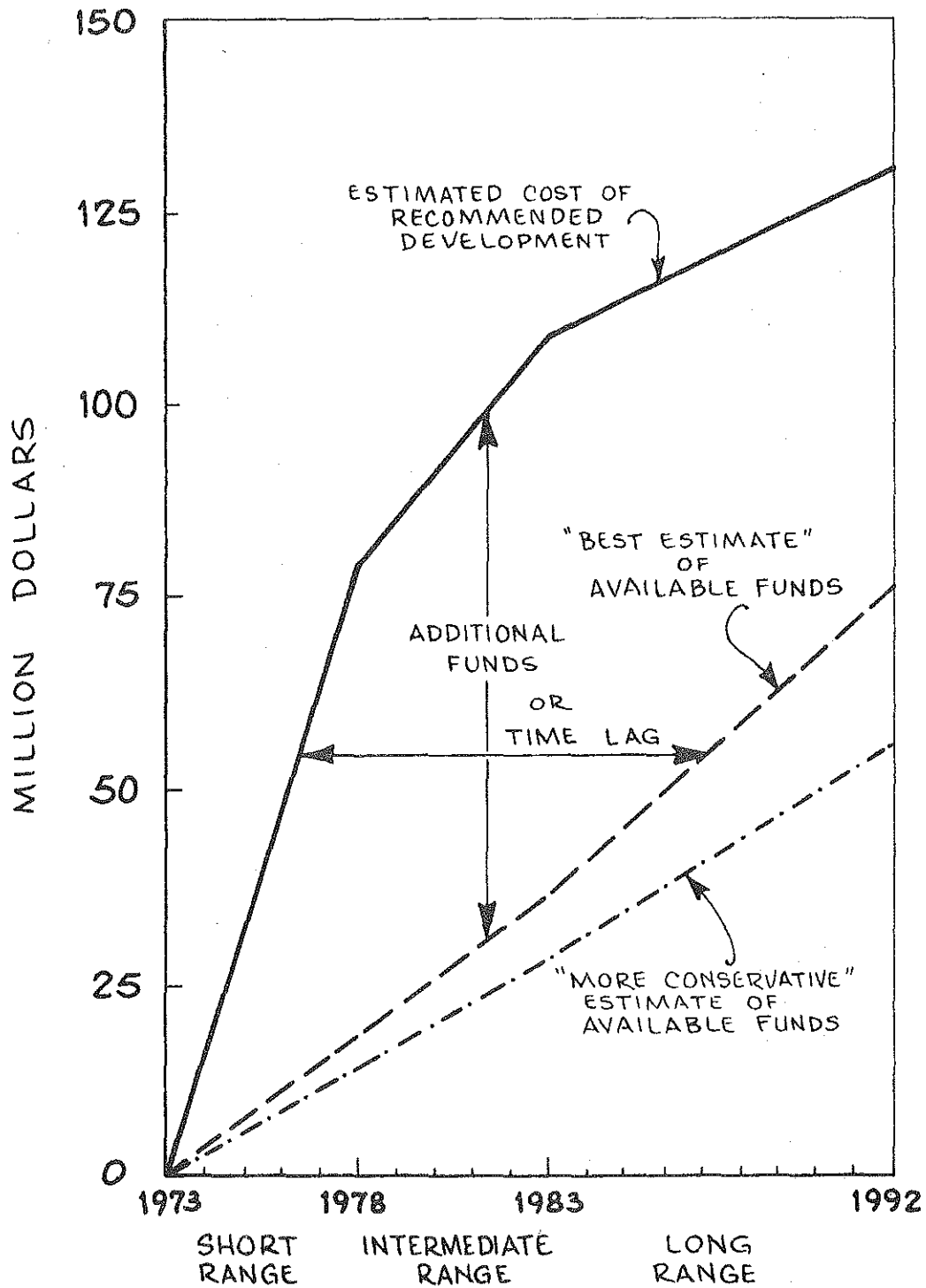


Table 14

## BASES FOR RESOURCE ESTIMATES

Funding Source	"Best Estimate" of Resources		"More Conservative" Estimate of Resources	
	Air Carrier and Reliever	General Aviation	Air Carrier and Reliever	General Aviation
ADAP	From Table 11. (Total* of \$204 million)	From Table 11. (Total of \$36 million)	Detroit - Same as "Best Estimate" Others - Short-range: estimated availability of \$12 million Other periods: constrained to 60% of total funding to "match" local funds. (Total of \$158 million)	Same as "Best Estimate" (Total of \$36 million)
State	From Table 11. (Total of \$29 million)	From Table 11. (Total of \$19 million)	Constrained to 8% <sup>†</sup> of each period's total funding to "match" local funds. (Total of \$15 million)	Constrained to 11% <sup>‡</sup> of each period's total funding to "match" local funds. (Total of \$6 million)
Local	From Table 10. In addition, it is assumed that Detroit would augment ADAP shortages with local funds. This amounts to \$20 million in short-range period. (Total of \$287 million)	Local funding resources estimated at \$1 million per year, in line with recent trends (Total of \$20 million)	Detroit - Same as "Best Estimate" Others - Short-range: constrained to 32% of total funding to "match available ADAP funds." <sup>†</sup> Intermediate: limited to \$15 million, based on recent trends. Long-range: limited to \$30 million (Total of \$249 million)	Constrained to 24% <sup>‡</sup> of each period's total funding to "match" available ADAP funds. (Total of \$14 million)

\* All "totals" refer to the sum over all planning periods to 1992.

<sup>†</sup> Based on potential funding data for air carrier and reliever airports other than Detroit; ADAP is 60%, State 8%, local 32%.

<sup>‡</sup> These percentages are derived from the potential funding data for general aviation in Table 10.

lag anticipated needs by more than 10 years. Concerted effort by the MAC and others to narrow the gap is clearly indicated.

As another means of summarizing results, cost and resource data are shown by Michigan Planning Region in Table 15. In the table, results are combined for all time periods and all types of airports (air carrier, reliever, general aviation). The intent is to portray anticipated resource shortages (last column) relative to estimated local funding capability.\* The comparison of these local resources with the additional resources required to fund the MASP is an indication of the stress that would be placed on local funding sources to develop the MASP. To the extent that the allocations are accurate, additional required resources for airport development are large relative to estimated funding capability. However, from another perspective--namely, the authority of local governments to levy taxes to obtain funds for airport development--the additional needs are not large. The Michigan Community Airport Authority Act of 1957 (Act 206) authorizes a one mil tax rate on equalized valuation (S.E.V.), subject to approval by a vote of the people. Table 16 portrays the substantial amount of financing that might be obtained, relative to needs. It must be noted, however, that only one effort has been made to employ Act 206 (Battle Creek/Kalamazoo), and that effort was not successful.

#### Sensitivity of Plan to Variations in Estimates

The primary sources of potentially significant changes affecting the foregoing financial analysis are believed to be the following:

- Changes in estimated airport development requirements from the levels estimated in the MASP. Changes in airport development plans and cost estimates will certainly occur over time (because of such factors as differences between forecast and actual airport activity). The changes are expected to be incorporated in updated versions of MASP, as described in Section IV.
- Changes in the amount of ADAP resources. There is reasonable assurance of total annual ADAP funding remaining near the present nationwide level of \$310 million, and possibly increasing if airport grant requests considerably exceed available

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\* For purposes of illustration, total resources (Federal, State, and the "best estimate" of local resources) have been allocated among Planning Regions on the basis of needs (costs).

Table 15

## SUMMARY OF FUNDING ESTIMATES BY PLANNING REGION\*

Planning Region <sup>†</sup>	Total Estimated MASP Cost	Anticipated Federal and State Resources <sup>‡</sup>	Estimate of Local Funds Needed <sup>§</sup>	Estimate of Local Resources <sup>**</sup>	Additional Resources Required to Fund MASP <sup>††</sup>
1	\$406	\$145	\$261	\$241	\$19
2	10	5	5	2	3
3	42	24	18	11	7
4	18	11	7	4	3
5	29	16	13	9	5
6	25	14	11	7	4
7	35	17	18	7	11
8	34	19	15	7	9
9	7	4	3	1	2
10	21	13	8	4	4
11	14	9	5	4	2
12	30	21	9	8	2
13	<u>14</u>	<u>9</u>	<u>5</u>	<u>3</u>	<u>1</u>
Total	\$685	\$306	\$379	\$307	\$72

\* Millions of 1970 dollars. Detail may not add to total because of rounding.

<sup>†</sup> See maps of Section II for Region boundaries.

<sup>‡</sup> Based on an allocation of estimated Federal and State funds according to needs by region.

<sup>§</sup> Total cost minus Federal and State resources.

\*\* Region's proportional share of total estimated local resources ("Best Estimate" allocated to regions according to needs).

<sup>††</sup> Estimated local needs minus estimated local resources.

Table 16

## FUNDS OBTAINABLE BY USE OF ACT 206

Planning Region	Approximate Equalized Valuation (S.E.V.)*†	Funds Obtainable by a 1 mil Tax for 20 Years*	Additional Resources Required to Fund MASP*‡	Tax Rate That Yields Additional Funds Required (mils)§
1	\$19,551	\$391	\$19	0.05
2	912	18	3	0.17
3	1,777	36	7	0.19
4	910	18	3	0.17
5	2,286	46	5	0.11
6	1,355	27	4	0.15
7	2,946	59	11	0.19
8	3,388	68	9	0.13
9	455	9	2	0.22
10	695	14	4	0.29
11	147	3	2	0.67
12	436	9	2	0.22
13	251	5	1	0.20

\* Millions of 1970 dollars.

† Anticipated increases in equalized valuation are not considered.

‡ From Table 15.

§ Annual Rate for 20 years.

funds. However, it is unlikely that increases would be sufficient for ADAP resources to meet potential ADAP funding levels in Michigan. In the short-range period, for example, a threefold increase in ADAP resources would be required (\$209 million of cost eligible for ADAP funding; estimated ADAP resources of \$60 million). While ADAP funds for Michigan might increase, they might also decrease. There is no assurance that Michigan can continue to receive more than its proportional share of discretionary ADAP funds,

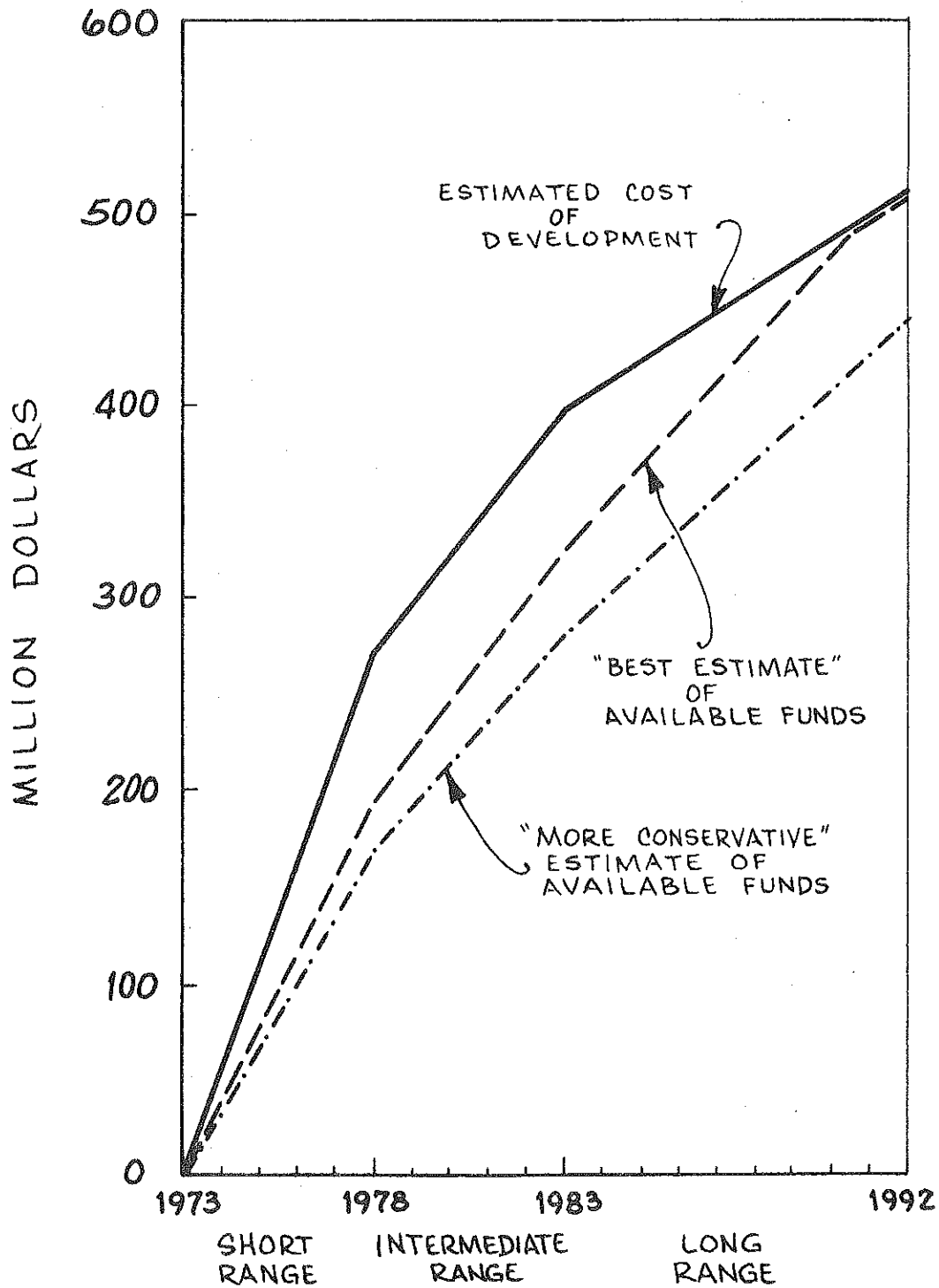
should competition for these funds increase. (As previously noted, Michigan's proportional share of ADAP funds is about \$9.5 million per year; this study assumes ADAP grants to Michigan of \$12 million per year.)

- Changes in proportion of ADAP funds available for general aviation. If grants to general aviation airports in Michigan increased or decreased 5 percent from the estimated proportion of 15 percent of ADAP grants (to 20 percent or 10 percent, that is), it would make a difference of about \$12 million in ADAP funds available for general aviation airports over the total study time frame. This change would not make a substantial difference in the anticipated shortage of funds for general aviation airport improvements.
- Nonapproval of Site 107. The MASP cost estimates include an airport at Site 107, to serve Oakland and Macomb Counties. Specifically, land acquisition is planned for the short-range period and airport development in the long-range period. Estimated costs for Site 107 are distributed as follows:

Short-range period	\$20.0 million
Long-range period	\$50.2 million.

It could happen that either (1) a new location for Site 107 cannot be found due to environmental or other reasons or (2) Selfridge Air National Guard Base does not become available for civilian use in place of a new location. In these events, the portion of Site 107 costs that will not then be required for expanding Detroit in place of Site 107 would be saved. Estimates of available funds for the MASP would also change slightly because ADAP funding policies are different for Detroit (a large hub) than they would be for Site 107. The changes in cost and resource estimates are shown in Figure 20. It is noteworthy that deletion of Site 107 from the MASP would not substantially reduce the gap between costs and resources in the short- and intermediate-range periods. (Compare Figure 20 with Figure 18.)

FIGURE 20  
**COMPARISON OF RESOURCES AND COSTS  
 FOR AIR CARRIER AND RELIEVER AIRPORTS  
 ( SITE 107 EXCLUDED )**



## IV IMPLEMENTATION CONSIDERATIONS

### Introduction

This section describes expected benefits of the MASP, implementation procedures, and the institutional and environmental considerations that are relevant to the plan's implementation. The main issues regarding implementation of the Michigan Airport System Plan appear to be four in number:

- Have reasonable steps been taken to consider benefits and costs to all concerned groups in developing the MASP?
- How can local airport authorities for all airports scheduled for capital improvements under the plan be encouraged to proceed with such improvements on a timely basis?
- How should questions of priority between different airports be resolved when the combined local requests exceed FAA or state funds?
- How can aircraft noise and any other community impacts of increased airport activity and development be kept within acceptable limits?

These issues are considered in turn below, but briefly, our conclusions on each issue are as follows. First, a high degree of institutional and public participation and consultation was built into development of the plan, and benefits to affected groups were one of the primary criteria in devising the plan. These benefits, together with federal and state participation in funding many types of capital improvements, should provide encouragement for the airport development planned in this study. In regard to the third issue, since local requests may exceed available federal and state funds for several years, a priority rating system for airport improvements may be necessary to serve as a guide to funding decisions. Suggestions for such a system are included. Fourth, while aircraft noise is not expected to be a problem at most Michigan airports, it would be advisable to refine the present MAC noise guidelines and clarify the legislative charter for zoning around airports to achieve compatible land uses.



## Concerned Organizations and Groups

A number of organizations and groups are interested in or affected by a state aviation plan, including:

Airport authorities

Airlines

Users (travelers, shippers, general aviation pilots)

Communities (regional and local planning agencies, community residents, persons engaged in noise-sensitive activities near airports).

The Michigan Aeronautics Commission, through meetings of its Advisory Committee and other contacts, has attempted to keep in touch with interested groups and to see that their views are appropriately represented in the development of the MASP. Public meetings have been sponsored and attended by the MAC in communities that are likely to be most affected by the MASP. Since the interests of diverse groups and geographical areas do not always coincide, it has not been possible to answer all of the objections to the plan. However, modifications in the MASP have been made in response to many requests, both in its initial formulation and after the public meetings, and it is believed that the final plan will secure the maximum feasible benefits from improved and safer air travel in the State of Michigan.

## Benefits of Plan

The type of benefits expected from the MASP are summarized in Table 17 according to several of the interest groups listed above, and discussed below.

### Traveler Benefits

By far the largest benefits expected are the value of reduced travel time and costs for air travelers, due to improved airline schedules, changes in airport location, and new airports for both air carrier service and general aviation.

Table 17

EXPECTED BENEFITS OF MASP

Users

Reduced travel time and costs for air travelers and shippers.

Expanded 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

Enhanced business and industrial growth in areas served by both air carrier and general aviation airports.

Increases in employment opportunities and tax base (from business and industrial growth).

Improved emergency access to communities for medical supply and evacuation.

Preservation of environmental amenities.

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Total annual benefits for airline passengers were calculated in Task Group 3 for the MASP relative to the 1990 Base Case.\* The calculated benefits of the MASP are very large, considering both actual travel cost reductions and the dollar value of traveler time savings. These benefits more than offset the estimated cost of airline system changes encompassed by the MASP: a new airport at Site 107 (Macomb County), new airports for

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\* The Base Case includes only the 21 airports providing air carrier service in 1970, the same airline routes as 1970, and only enough added flights to accommodate 1990 traffic levels. It provides a lower-cost benchmark against which other 1990 system alternatives were compared.

Battle Creek/Kalamazoo and Sault Ste. Marie, and facilities for expanded service at Marquette and Menominee (less reduced costs at Detroit and Manistee).

The remainder of costs for the airline portion of the MASP are for improvements to (1) meet FAA and other airport planning standards, which are determined by general safety and engineering considerations and (2) provide terminals, parking, and other features necessary to accommodate increased air passenger levels. It is assumed that the air carrier airport standards are rationally derived, in the sense that they represent a level of quality that users of the U.S. air system are willing to pay for through the fees and charges of Airport and Airways Trust Fund.

Overall traveler benefit data have not been calculated for general aviation airport development in the MASP, but the time and cost of airport ground access were considered for general aviation users in relation to costs of airport development. Table 18 illustrates this concept. The table is an example of the levels of expenditure that can be justified for a new airport in terms of ground access savings. (Calculations leading to the values in Table 18 were described in the Task Group 5 Report.)

Table 18  
JUSTIFIABLE EXPENDITURE FOR A NEW GENERAL  
AVIATION AIRPORT

(\$ 000)

Average time saved per ground access trip to new site (minutes, one-way)	Number of Based Aircraft at New Site		
	10	20	50
10	\$ 270	\$ 540	\$1,350
20	\$ 540	\$1,080	\$2,700
60	\$1,620	\$3,240	\$8,100

Major Assumptions: Value of time for general aviation users =  
\$10.00 per hour.

Economic life of airport development = 25 years.

## Economic Benefits

Dollar values have not been assigned to the other benefits arising from airport development, but the benefits are expected to be substantial in many cases. For example, the value of aviation to Michigan's economic development and growth is attested to by the rapid historical and projected growth of air travel and air freight shipments, which are in large part attributable in turn to increased business travel and shipping. A 1970 MAC publication, "Aviation and Economic Development," indicates that adequate general aviation airports or air carrier service are important considerations in industry location decisions. The report documents many cases of Michigan firms that depend on existing airports and where operations would benefit from improved airport facilities or expanded air carrier service. MASP development plans also recognize that in many parts of the State of Michigan, recreation and tourism is a major industry. The benefits of industrial growth and tourism are observed to spread quickly to a community in the form of new job opportunities and an expanded tax base.

## Implementation Procedures

The MASP is the product of a cooperative local, state, and federal planning effort, at federal and state initiative. Implementation of the MASP will also require cooperative effort by local, state and federal interests, but the initiative will rest with local governments and airport authorities to carry out the following steps (typical time requirements for each step are listed in parentheses) in accomplishing airport development:

- Application through the MAC under FAA's PGP (planning grant program) for matching funds to develop master plans for airport improvements (about 12 months).
- Completion of master plan (about 12 months).
- Application for matching ADAP and state funds to finance airport improvements (15-24 months; deadline for submission to MAC is March 31 of each year for grants to be made the following calendar year).
- Condemnation or purchase of (or option to purchase) all property interests required for clear zones, approach requirements, and airport construction, plus submission of certificates on the availability of local funds (by August 1.) State legislative approval of the total ADAP program occurs about the following May, and FAA approval of ADAP funding depends on Congressional action; timing ranges from prior to state approval to after the summer construction period.)

- Execution and monitoring of airport construction contracts (time varies with size of project).

At any point in these steps, the need for variations from planned development in the MASP may arise. It is expected that such variations will be reviewed and acted on by the MAC staff; if the variations are substantial, they may also be considered at regular meetings of the Commission. State airport planning is regarded both by the FAA\* and the MAC as a continuous process; the current plan is a blueprint, but should not become a strait jacket.

One important element of the MASP is the priority of construction that is implied by the three planning periods: short-range (FY 73-77); intermediate-range (FY 78-82); and long-range (FY 83-92). The desire of a local airport authority to accelerate the planned sequence of construction will be considered by the MAC and FAA, but will only be approved if (1) federal funds are expected to cover all requests of higher time priority, or (2) if there is clear evidence of a more rapid growth rate of air travel demand or safety problems at the airport in question.

It is anticipated that the state plan resulting from this study will require revision approximately every three years as the result of cumulative modification, and it may require a complete recasting after five or six years. Some factors that may affect the plan are the actual rate of airport development, the influence of unanticipated shifts in populations or economic growth, changes in the expected rate of air travel and air freight demand, constraints on air travel imposed by fuel shortages, or improvements in intercity rail, bus or auto travel relative to air travel (e.g., cost).

#### Funding Priorities

Priorities for allocating matching state funds to ADAP grant applications are currently handled on an ad hoc basis, taking into account both local need and local fund-raising ability. In view of the prospect of projected increases in applications for state grants, beyond available funds, it may be necessary for the MAC to adopt a formal system for ranking the priority of competing airport projects. Ideally, thorough cost-benefit comparisons of prospective projects would be made (such as those prepared for various airports in Task Group 3 of this study) on a

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\* See the FAA Planning Chart Handbook, Section 6, page 25, and FAA Advisory Circular 150/5900-1, Chapter 4, Item 25.

continuing basis. In practice, a simpler priority system might be employed. This system could take into account the expected benefits of the improvement (see Table 17) by judgmentally assigning rating numbers to each type of benefit and establishing percentage values for the relative importance of each type of benefit. For example, the following rating scale might be used for the estimated benefits per dollar of investment cost:

3	High
2	Medium
1	Low
0	Zero,

and the following benefits ratings and relative importance might be assigned to each type of benefit for lengthening the runway at a particular airport:

<u>Benefits</u>	<u>Benefit/Cost Rating</u>	<u>Relative Importance</u>
Reduced travel time and costs (from use of larger, faster aircraft	3	60%
Enhanced business growth potential	1	30%
Increased airport maintenance costs	-1	10%

Then, an overall rating of the project would be obtained by multiplying and summing the individual ratings, e.g.,

$$\begin{aligned}
 & 3 \times 60 = 180 \\
 & 1 \times 30 = 30 \\
 & -1 \times 10 = \underline{-10} \\
 & \text{Total rating} \quad 200
 \end{aligned}$$

A comparison of ratings for different airport improvements obtained in this manner should give an indication of priorities in terms of relative benefits expected from the improvements. At a minimum, a formal priority procedure would serve as a basis for discussing priorities and determining the need for further analysis of competing projects.

A related consideration in determining priorities is the possibility of split-funding, or postponing completion of those parts of an airport master plan that are not essential to safety (e.g., extend the runway first, defer construction of full parallel taxiways). This practice has sometimes been followed by local airport authorities in Michigan, but has not been used by the FAA in making ADAP grants. Split funding of the state matching portion is possible, but would tend to increase the complexity of priority decisions among airports.

#### Environmental Considerations

The last "benefit" listed in Table 17, preservation of environmental amenities, involves the requirement to avoid degrading the community environment through excessive noise or pollution (air, water, or visual) from an airport or from aircraft. Both federal and state policy recognize environmental criteria as being highly important in airport planning in Michigan. Indeed, it is virtually certain that all major future analyses relating to airport development in the state will include some version of the critical question, "What environmental costs, as well as economic costs, are required to provide the indicated benefits to travelers, shippers and others?" It is also highly likely that both federal and state funds will be withheld from any airport development projects that are in clear violation of environmental and related social goals.

During Task Group 2 of the study, it was determined that aircraft noise impacts are the principal environmental consideration bearing on statewide air carrier system planning. Other potential environmental and community relations impacts of airport development (e.g., air and water pollution, aesthetics) can be best treated in more detailed planning studies, such as airport master plans.

Potential aircraft noise impacts of air carrier airports in the MASP were examined in Task Group 3. The effort focused on existing airports included in the 1990 system\* and sought to identify conflicts with existing and planned land use.

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\* Potential conflicts between land use and aircraft noise were not investigated at the new sites recommended for 1990 (Macomb County, Battle Creek/Kalamazoo, Sault Ste. Marie), primarily because this study is concerned with only the general location of these sites. For each of the new sites it has been assumed (without detailed investigation) that an environmentally acceptable site for the airport could be found during detailed planning. Also, no investigation of noise impacts was made for Detroit.

The principal findings of the noise analysis for existing airports in the MASP are as follows:

- No case was found where 1970 noise conflicts were severe enough to suggest moving the airport. Nevertheless, visual inspection of air carrier airports in the state reveals instances where local land use and zoning authorities have allowed the encroachment of residential and other urban development into areas too close to airports, and some airports are already experiencing noise complaints.
- In general, increased noise exposure resulting from higher 1990 airport activity should not result in severe conflicts with land use if 1990 land use in the vicinity of the airports remains essentially like that of 1970. But, comprehensive land-use plans have not yet been prepared for many of the locales near airports in the system. Moreover, for those airports where land-use plans have been prepared, it is not clear that adherence can be ensured.

Some alleviation of airport noise problems may be possible in the form of a change in flight approach procedures (as distinct from changes in airport design). The prospective procedures require a steeper approach to the runway, which reduces ground noise by keeping aircraft higher longer. The procedures are being tried experimentally at a number of locations. It is too early to determine whether they will prove workable on a large scale.

The noise problems created by propeller-driven general aviation aircraft are minor in comparison to air carrier aircraft, and are generally no more obtrusive than noise from highways. Business jets, however, currently generate noise levels comparable to, or exceeding, some commercial jets. The problem in 1990 in Michigan may be alleviated by noise reduction regulations for business jets that are now being formulated by EPA and FAA.

With the important proviso that improved land-use controls in the vicinity of airports may be required, it has been concluded that potential noise impacts would not preclude implementation of the MASP. However, effective land use controls around airports may require changes in state authorizing legislation. At present, the MAC recommends a "model zoning ordinance" for local implementation that includes guidelines for land-use compatibility zoning administered by joint zoning boards. The joint zoning boards are continuing bodies, appointed by the MAC with local and state representation, that supervise temporary zoning commissions to prepare and hold hearings on an airport area zoning ordinance for adoption by the board. Until recently, the boards have concerned themselves only with height



restrictions around airports rather than noise-compatible uses, but some boards have begun to include such uses in their ordinances.

The authority of joint zoning boards to prescribe zoning other than for height restrictions is not clear under present law and hinges on a liberal interpretation of the authorizing legislation. It is not certain that courts will sustain such an interpretation. Amendment of the authorizing legislation--for example, in line with the stronger Wisconsin statute--would strengthen the law. In addition, MAC could usefully promote an increased rate of developing local airport land-use compatibility controls through (a) activating, reactivating, or reconstituting the joint boards and (b) urging and helping them to extend their coverage from height restrictions to compatible land uses.

Appendix A

STUDY PARTICIPANTS AND REPORTS

Table A-1

STUDY PARTICIPANTS

Organization	Principal Contributions
<b>Sponsor</b>	
MAC (Michigan Aeronautics Commission Staff)	General Aviation Planning, Data Collection and Analysis
<b>Contractors</b>	
SRI (Stanford Research Institute)	Prime Contractor, Analysis of Air Carrier System
AAT (American Academy of Transportation)	Analysis of Air Cargo
Howard Bevis	Economic Projections
HNTB (Howard, Needles, Tammen and Bergendoff)	Methods for Estimating Airport Development and Costs
PMM (Peat, Marwick, Mitchell & Co.)	Development of System Alternatives, Air Passenger Forecasts

Table A-2

STUDY ADVISORY COMMITTEE

Advisory Council for Environmental Quality, Mark Mason, Executive Secretary  
Air Transport Association of America, Paul C. Leonard, Director  
Berrien County Planning Commission, C. Winslow Henkle, Vice Chairman  
Calhoun County Metropolitan Planning Commission, Sam J. Stellrecht, Planning Director  
Central Upper Peninsula Planning & Development District, Royce Downey, Chairman  
Civil Aeronautics Board, Cornelius S. Ryan, Bureau of Operating Rights  
East Central Michigan Economic Development District, David Gay, Acting Director  
Eastern Upper Peninsula Economic Development District, Frank Pingatore, Treasurer  
Environmental Concerns, Dr. William Cooper, Professor of Zoology  
Federal Aviation Administration, James F. Popp, Chief of Planning, Great Lakes Region  
General Aviation Manufacturer's Association, Stanley J. Green, Vice President  
Genesee County Metropolitan Planning Commission, Thomas H. Haga, Director-Coordinator  
Jackson Metropolitan Area Regional Planning Commission, Frederick Barkley, Executive Director  
Kalamazoo Metropolitan County Planning Commission, William Hendrick  
Kent-Ottawa County Planning Commission, David Needham, Transportation Planner  
Michigan Association of Airport Executives, Robert VanAartsen, Airport Manager Kalamazoo  
Michigan Aviation Trades Association, Richard J. Nelson, President  
Michigan Department of Commerce, John H. Reurink, Deputy Director  
Michigan Department of State Highways & Transportation, Richard Lilly, Manager, Advance Planning  
Michigan Department of State Highways & Transportation, James Roach, Supervisor, Urban Transit  
Michigan Office of Management and Budget, Donald Bailey, Community Planning Specialist  
Michigan State Chamber of Commerce, Harry J. Hall, Assistant to the President  
National Business Aircraft Association, Eugene J. Zepp, Chairman - Technical Committee  
Northeast Michigan Regional Planning Commission, Harry E. Travis, Executive Director  
Northwest Michigan Economic Development District, Bill Rowden, Executive Director  
Saginaw, City of, Cleve Orler, Urban Renewal Coordinator, Community Development  
Southeast Michigan Council of Governments, Gary Krause, Program Manager, Transportation and Land Use  
Tri-County Regional Planning Commission, Herbert D. Maier, Executive Director  
Wayne County Planning Commission, Gordon Ruttan, Urban Planner  
West Michigan Shoreline Regional Planning Commission, Robert Dickson, Planner  
Western Upper Peninsula Regional Planning Commission, Jeffrey Mirate, Planner in Charge

Table A-3

## MICHIGAN AIRPORT SYSTEM PLANNING REPORTS

Title	Prepared by	Date
Michigan State Airport Plan (1970-1975)	MAC	April 1971
Bibliography, Michigan Airport System Plan	HNTB	January 1972
Michigan Air Freight Data Collection Program	AAT	May 1972
Airline Passenger Survey at Selected Michigan Airports	MAC/SRI	June 1972 (addendum in November 1972)
Interim Report - Data Collection and Analysis Methods	SRI/PMM/Bevis	June 1972
Technological Trends Affecting the Michigan Airport System	SRI	August 1972
Analysis of Air Service for/at		
<ul style="list-style-type: none"> <li>• Manistee</li> <li>• Escanaba, Iron Mountain and Menominee</li> <li>• Jackson</li> <li>• Battle Creek and Kalamazoo</li> <li>• Site 107</li> <li>• Sault Ste. Marie</li> </ul>	SRI (Working Papers)	June through October 1973
Task Group 5 Report: General Aviation Plan		
Task Group 3 Report: Evaluation of Air Carrier System Alternatives	SRI	September 1973

Appendix B

GENERAL AVIATION AIRPORTS

GENERAL AVIATION AIRPORTS  
Planning Region 1

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Ann Arbor	Municipal	BT	BT	BT		
Troy	Grand Prix	GU	GU	GU		
Brighton	New*	BII	GU	GU	X	X
Chelsea	New	BII	BII	BII		X
Detroit	City	GT (R)	GT (R)	GT(R)		
Detroit	Grosse Ile	BT (R)	BT (R)	BT (R)		
Detroit	Willow Run	GT (R)	GT (R)	GT (R)		
Emmett/Yale	New*	BII	BII	GU		X
Farmington	New	GU (R)	BT (R)	BT (R)	X	X
Fraser	McKinley	GU (R)	GU (R)	GU (R)		
Holly	New	BII	GU	GU		X
Howell	Livingston County	GU	BT	BT		
Lambertville	Wagon Wheel	GU	GU	GU		
Marine City	Marine City	BII	GU	GU		
Milan	Milan	BII	GU	GU		
Milford/New Hudson	New*	GU	GU	GU	X	

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.

GENERAL AVIATION AIRPORTS  
 Planning Region 1 (concluded)

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Monroe	Custer	GU	BT	BT		
Mt. Clemens	New	BT (R)	BT (R)	BT (R)	X	X
Plymouth	Plymouth Mettetal	BII (R)	BII (R)	BII (R)		
Pontiac	Oakland - Pontiac	GT (R)	GT (R)	GT (R)		
Pontiac	Oakland - Orion	GU (R)	GU (R)	GU (R)		
Port Huron	St. Clair County	BT	BT	BT		
Romeo	Romeo	GU	GU	GU		
Salem	Salem	GU	GU	GU		
Utica	Berz Macomb	GU (R)	GU (R)	GU (R)		

\* Site selection study might show that an existing airport location is suitable.  
 -- Not included in System  
 R = Designated Reliever Airport for planning purposes.

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GENERAL AVIATION AIRPORTS  
Planning Region 2

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Adrian	Lenawee County	BT	BT	BT		
Blissfield	New*	--	BII	BII		X
Hillsdale	Hillsdale	BT	BT	BT		
Hudson/Morenci	New*	BI	BII	BII		X
Litchfield	New	--	BI	BII		X
Napoleon/Brooklyn	New*	BII	GU	GU		X
Tecumseh	Tecumseh Products	GU	GU	GU		

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.

GENERAL AVIATION AIRPORTS  
Planning Region 3

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Albion/Homer	New*	BI	BII	BII		X
Battle Creek	W.K. Kellogg Regional	BT	BT	BT		
Coldwater	Branch County Memorial	GU	GU	BT		
Colon	New	BI	BI	BII		X
Hastings	Municipal	GU	GU	BT		
Kalamazoo	Municipal	(AC)	BT	BT (R)		
Marshall	Brooks Field	GU	BT	BT		
Sturgis	Kirsch	BT	BT	BT		
Three Rivers	Dr. Hains	GU	GU	BT		
Union City	New	--	BI	BI		X

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.

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GENERAL AVIATION AIRPORTS  
 Planning Region 4

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Berrien Springs	Andrews University	BI	BI	BII		
Dowagiac/Niles/Cassopolis	New*	BT	BT	BT		X
Paw Paw	New	BII	GU	GU		X
South Haven	South Haven	GU	BT	BT		
Three Oaks	Oselka	BI	BI	BII		
Watervliet	Watervliet	BI	BI	BI		

\* Site selection study might show that an existing airport location is suitable.  
 -- Not included in System  
 R = Designated Reliever Airport for planning purposes.

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GENERAL AVIATION AIRPORTS  
Planning Region 5

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Almont/Imlay City	New*	BII	BII	BII		X
Durand	New*	--	BII	GU	X	X
Flint/Clio	New*	GU (R)	GU (R)	GU (R)	X	X
Flint/Davison	New*	GU	GU	GU (R)	X	X
Lapeer	Dupont Lapeer	GU	GU	BT		
Owosso	New*	GU	BT	BT		X

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.

GENERAL AVIATION AIRPORTS  
Planning Region 6

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Bellevue	New	--	BI	BII		X
Charlotte	Fitch H. Beach	GU	GU	BT		
East Lansing/Williamston	New*	GU	GU	GU		X
Grand Ledge	New*	BII	GU	GU		X
Holt/Mason	New*	GU	GU	GU (R)	X	X
St. Johns	New*	BII	BII	GU		X
Stockbridge/Leslie	New	BI	BII	BII		X

\* Site selection study might show that an existing airport location is suitable.  
 -- Not included in System  
 R = Designated Reliever Airport for planning purposes.

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GENERAL AVIATION AIRPORTS  
Planning Region 7

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Alma	Gratiot County	BT	BT	BT		
Bad Axe	Huron County	GU	GU	BT		
Bay City	James Clemens Municipal	GU	GU	GU		
Caro	Caro Municipal	BII	GU	GU		
Cass City	New	--	BI	BII		X
Chesaning/St. Charles	New*	GU	GU	BT		X
Clare	Municipal	BII	GU	GU		
Croswell	New*	BII	BII	GU		X
East Tawas	Iosco County	GU	BT	BT		
Frankenmuth/Vassar/ Millington	New*	BII	BII	BII		X
Gladwin	Municipal	BT	BT	BT		
Harbor Beach/White Rock	New*	--	BI	BI		X
Harrison	Clare County	BI	BI	BI		
Houghton Lake	Roscommon County	GU	GU	BT		
Marlette	New*	GU	BT	BT		X
Merrill/Hemlock	New	BI	BII	BII		X

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.

GENERAL AVIATION AIRPORTS  
Planning Region 7 (concluded)

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Midland	Jack Barstow	GU	GU	GU		
Mt. Pleasant	Municipal	BT	BT	BT		
Omer	New	--	BII	GU		X
Pinconning	New*	--	BII	BII		X
Port Austin	New	BI	BI	BI		X
Roscommon	Conservation	BI	GU	GU		
Saginaw	Harry W. Browne	GU	GU (R)	GU (R)		
Sandusky	Sandusky	BII	BII	GU		
Sebewaing	Sebewaing	BII	BII	BII		
South Branch	Timbers Sky Ranch	BI	BI	BI		
St. Helen	St. Helen	BI	BI	BI		
Standish	Standish	BI	--	--		
West Branch	Community	GU	GU	BT		

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.

GENERAL AVIATION AIRPORTS  
Planning Region 8

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Allegan	Padgham Field	GU	GU	GU		
Baldwin	Baldwin	GU	GU	GU		
Big Rapids/Reed City	New*	GU	BT	BT		X
Carson City	New	BI	BI	BII		X
Coopersville	New*	BI	BII	GU		X
Ewart	Ewart	BI	BI	BI		
Fremont	Fremont	BT	BT	BT		
Grand Haven	Memorial	GU	GU	GU		
Grand Rapids West	New*	GU (R)	GU (R)	GU (R)	X	X
Greenville	Greenville	GU	BT	BT		
Hart/Shelby	Hart Shelby	BII	GU	GU		
Holland	Tulip City	GU	BT	BT		
Howard City	New	BI	BI	BI		X
Ionia	Ionia County	GU	BT	BT		
Lake Odessa	New	--	BI	BII		X
Lakeview	Lakeview	BII	BII	BII		

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.



GENERAL AVIATION AIRPORTS  
 Planning Region 8 (concluded)

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Lowell	Lowell	BII	GU (R)	GU (R)		
Ludington	Mason County	GU	BT	BT		
Mecosta	New*	BI	BI	BII		X
Plainwell	Otsego Plainwell	BII	BII	BII		
Sparta	Sparta	GU	GU	GU		
Wayland	Wayland	BII	GU	GU		
White Cloud	White Cloud	BI	BI	BI		
Whitehall/Montague	New*	BII	GU	GU		X

\* Site selection study might show that an existing airport location is suitable.  
 -- Not included in System  
 R = Designated Reliever Airport for planning purposes.

GENERAL AVIATION AIRPORTS  
Planning Region 9

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Atlanta	Atlanta	BII	BII	BII		
Cheboygan	Cheboygan	BII	GU	BT		
Gaylord	Otsego County	BT	BT	BT		
Grayling	Grayling Area Airport	GU	BT	BT		
Harrisville	Harrisville	BI	BI	BII		
Indian River	Campbell	BI	BI	BI		
Mio	Mio	BI	BI	BI		
Onaway	Onaway	BI	BI	BI		
Rogers City	Presque Isle County	BII	GU	BT		

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

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GENERAL AVIATION AIRPORTS

Planning Region 11

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CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Bois Blanc Island	Bois Blanc	BI	BI	BI		
Drummond Island	Drummond Island	BII	BII	GU		
Engadine/Naubinway	New*	BI	BI	BI		X
Hessel	Hessel	BI	BI	BI		
Mackinac Island	Mackinac Island	BII	BII	BII		
Neebish Island	New	BI	BI	BI	X	X
Newberry	Luce County	BII	GU	PT		
Paradise	New	BI	BI	BI		X
St. Ignace	Mackinac County	BII	GU	GU		
Sugar Island	New	BI	BI	BI	X	X

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.

GENERAL AVIATION AIRPORTS  
Planning Region 12

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Grand Marais	Grand Marais	BI	BI	BI		
Hermansville	New	--	BI	BI		X
Manistique	Schoolcraft County	BT	BT	BT		
Michigamme	New	--	BI	BI		X
Munising	Munising	BII	BII	GU		
Ralph	Ralph	BI	BI	BI		
Rock	Bonnie Field	BI	BI	BI		
Seney	New	--	BI	BI		X

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.

GENERAL AVIATION AIRPORTS  
Planning Region 13

CITY	AIRPORT NAME	OPERATIONAL ROLE BY THE PERIOD			BASIS FOR INCLUDING NEW AIRPORT IN SYSTEM PLAN	
		Short- range	Inter- mediate	Long- range	Provide Needed Capacity	Convenient Ground Access
Baraga	Carleson	BI	BI	BII		X
Bruce's Crossing/Ewen	New	BI	BI	BI		X
Crystal Falls	Iron County	BII	GU	GU		
Iron River	New*	BI	BII	BII		X
Marenisco	New	--	BI	BI		X
Ontonagon	Ontonagon County	BII	GU	BT		

\* Site selection study might show that an existing airport location is suitable.

-- Not included in System

R = Designated Reliever Airport for planning purposes.