MICHIGAN STATE
AIRPORT SYSTEM PLAN

TECHNICAL REPORT

MICHIGAN AERONAUTICS COMMISSION
DEPARTMENT OF STATE HIGHWAYS
AND TRANSPORTATION
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William G. Milliken, Governor

MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

John P. Woodford, Director

MICHIGAN AERONAUTICS COMMISSION

Britton L. Gordon, Chairman — **Mario Fontana, Vice Chairman**

Lynn D. Allen — **E. V. Erickson**

Peter H. Burgher — **A. Gene Gazlay**

Ronald C. Heinlein — **John R. Plants**

James D. Ramsey, Director

CONTRACTORS

Prime Contractor: Stanford Research Institute

Sub-Contractors; Howard, Needles, Tammen and Bergendoff

Howard Bevis

American Academy of Transportation

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PREFACE

This report has been prepared jointly by the Michigan Aeronautics Commission staff and Stanford Research Institute to provide supporting detail on the methods and results of the Michigan Airport System Plan Study. Summary results of the study are contained in a companion report to this one, entitled, "Task Group 4 Report: Proposed System Plan."

The principal objective of Part One of this report is to document the methods that were used in the study. Forecasting methodology and planning techniques for both the air carrier system and general aviation system are described. The material expands upon and revises that of an earlier report: "Interim Report: Data Collection and Analysis Methods" (July, 1972).

The principal objective of Part Two of this report is to display projected activity and recommended development for each airport in the proposed system plan. While the material presented is quite detailed, it is emphasized that:

- The objective of the statewide study is to plan the general locations, aeronautical roles and facilities for a coordinated system of airports.
- The proposed plan is subject to modification or recasting as warranted by changing conditions.

The data in Part Two should not be interpreted as an adequate substitute for detailed airport master planning.

PART ONE: STUDY METHODS

I POPULATION AND ECONOMIC FORECASTS

Introduction

This section describes the forecasts of population and economic growth for Michigan that provide the basis for this study's projections of future aeronautical demand. First, the forecasts are summarized; second, the geographic zone structure for the study is described; and third, the model used to develop the population and economic forecasts is discussed.

For correspondence with other study elements, the population and economic forecasts were prepared for three planning periods, as follows:

Planning Period	Fiscal Years	Base for Forecasts
Short-range	1973-1977	1975
Intermediate	1978-1982	1980
Long-range	1983-1992	1990

Summary Forecasts

A summary of the population forecasts is given in Table I-1. Total Michigan population is shown by planning period and compared with projected total United States population.* For both Michigan and the United States as a whole, a slow but steady increase in population is indicated.

Table I-1 also summarizes this study's economic projections. The measure of economic activity adopted is "Economic Value Added." At the national level, Value Added corresponds to National Income. In turn, National Income corresponds to Gross National Product (GNP), except that GNP includes allowances for depreciation and for indirect taxes (such as sales and excise taxes). Value Added (National Income) is the aggregate earnings of labor and property which arise in the current production of goods and services. It is the sum of compensation of employees, proprietors' income, rental income, net interest, and corporate profits. As shown in Table I-1, economic growth for Michigan is projected to parallel that for the total United States (as it has in the past).

Population and economic forecasts are presented for geographic subdivisions of Michigan in Part Two of this report. It is emphasized that the forecasts were developed for this study and do not represent "official" forecasts for the State of Michigan.

*For the 48 contiguous United States.

TABLE I - 1

POPULATION AND ECONOMIC FORECASTS

	1970	Short-range Period Forecast	Intermediate Period Forecast	Long-Range Period Forecast	Average Annual Growth Rate*
Population (million persons)					
Michigan	8.9	9.5	10.2	11.8	1.2%
United States	201.3	215.7	230.4	261.7	1.3%
Economic Value Added (billion 1970 dollars)					
Michigan	42.3	49.5	58.1	80.1	3.2%
United States	800.7	960.0	1165.0	1615.3	3.3%

* Average annual compound rate, 1970 to 1990

Geographic Zones

The State of Michigan was divided into geographic subareas for purposes of analysis and aggregating study results. A basic division of the State is the 13 regions displayed in Figure I-1. These Planning and Development Regions were established in 1970 by the Michigan Bureau of Planning and Program Development, Office of Planning Coordination.

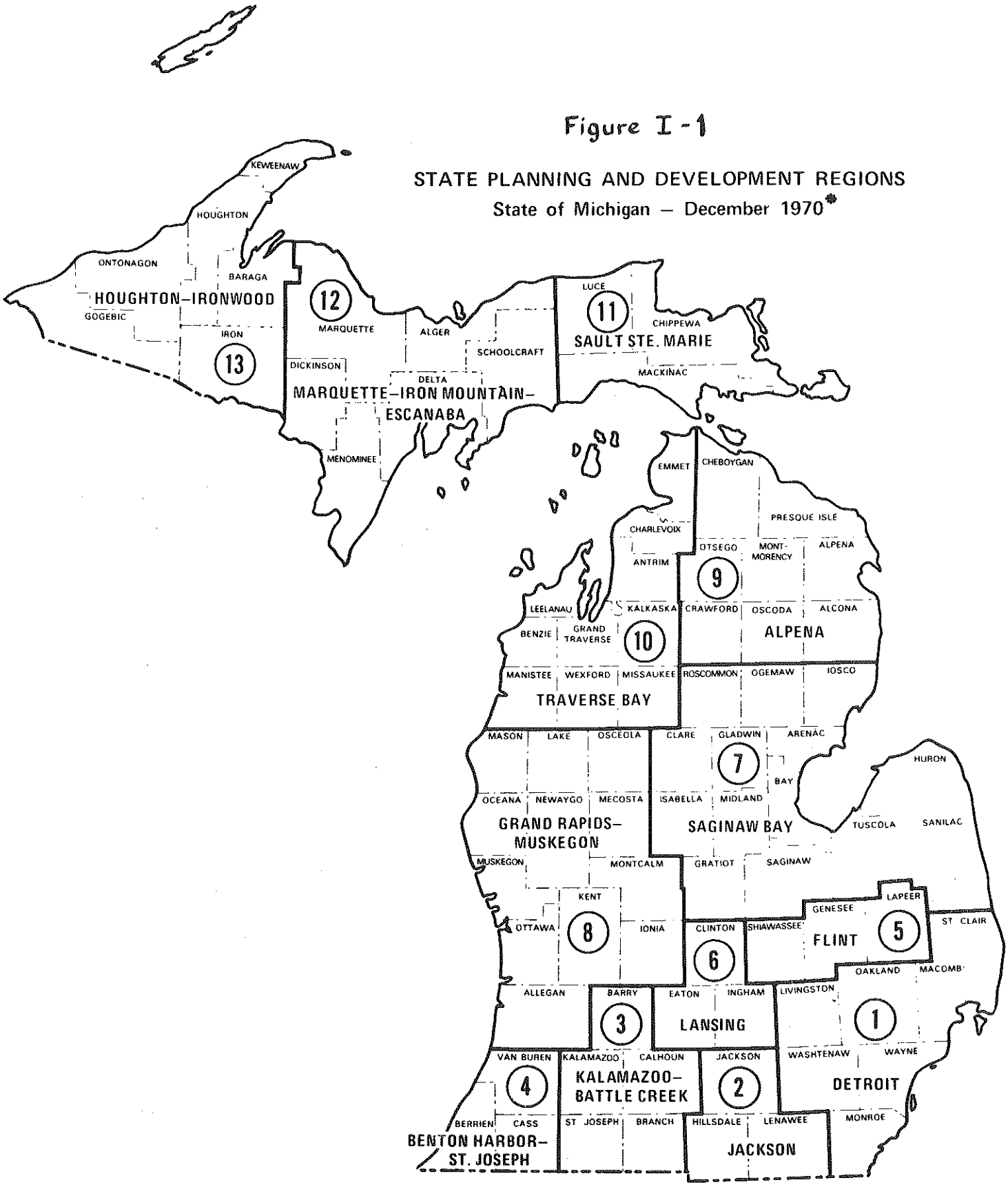
For some study purposes--principally to account for travel patterns in greater detail--the State was further divided into 27 travel zones. These travel zones are shown in Figure I-2.

Travel zones were also established for the remainder of the country. The principal basis for the subdivisions are air travel patterns to and from Michigan. The boundaries of the out-of-state zones are shown in the map of Figure I-3. In each of these zones, one city was chosen as representative and was used as the basis for measurement of travel times and costs. Generally, the representative city within each zone is the one with maximum traffic levels to and from Michigan.

Figure I-1

STATE PLANNING AND DEVELOPMENT REGIONS

State of Michigan – December 1970*

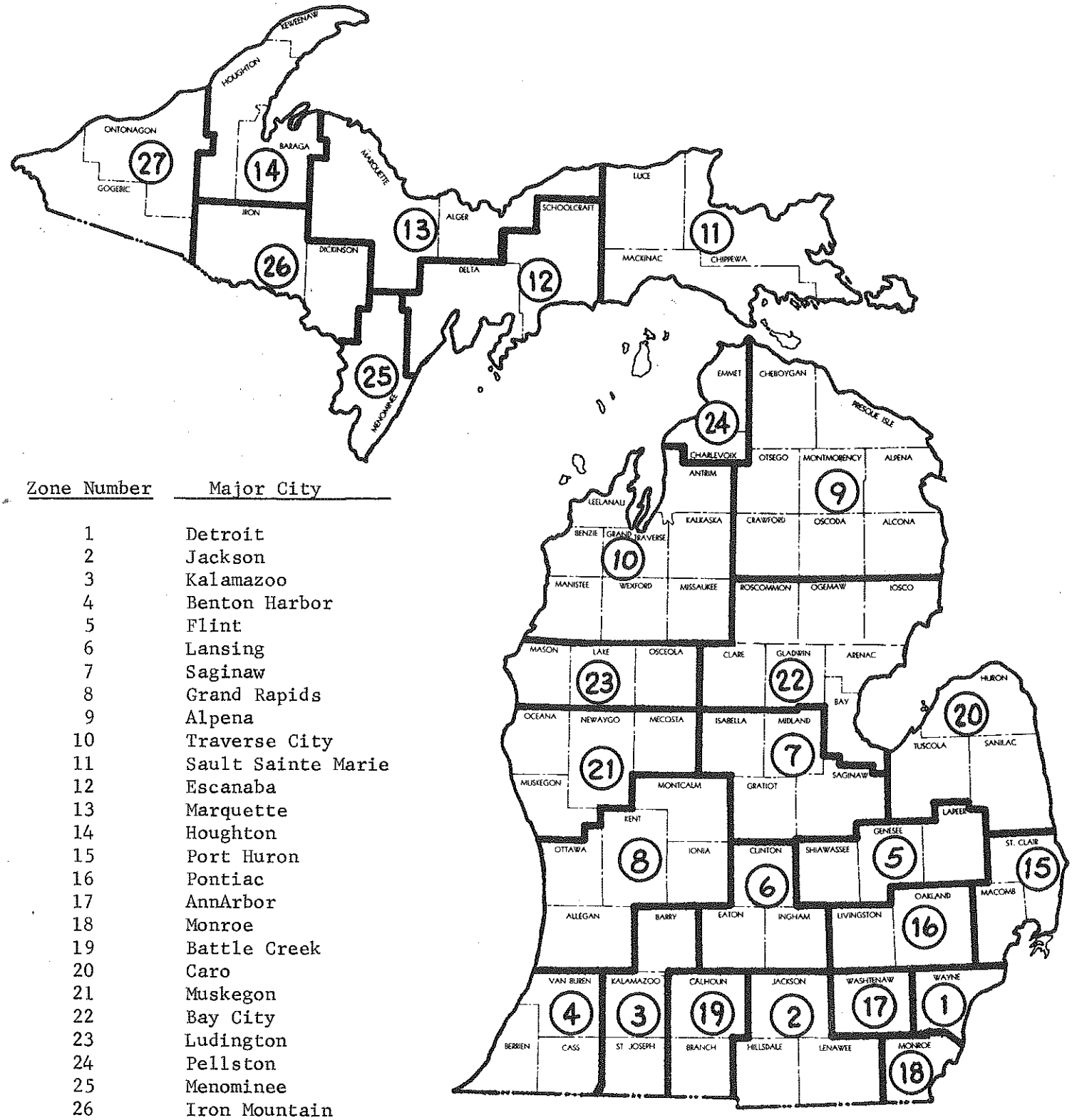


* NOTE:

ON MAY 25, 1973 - THE EXECUTIVE OFFICE OF THE STATE OF MICHIGAN ESTABLISHED REGION 14. DATA FOR THE REGION HAVE NOT BEEN PREPARED IN THIS STUDY.

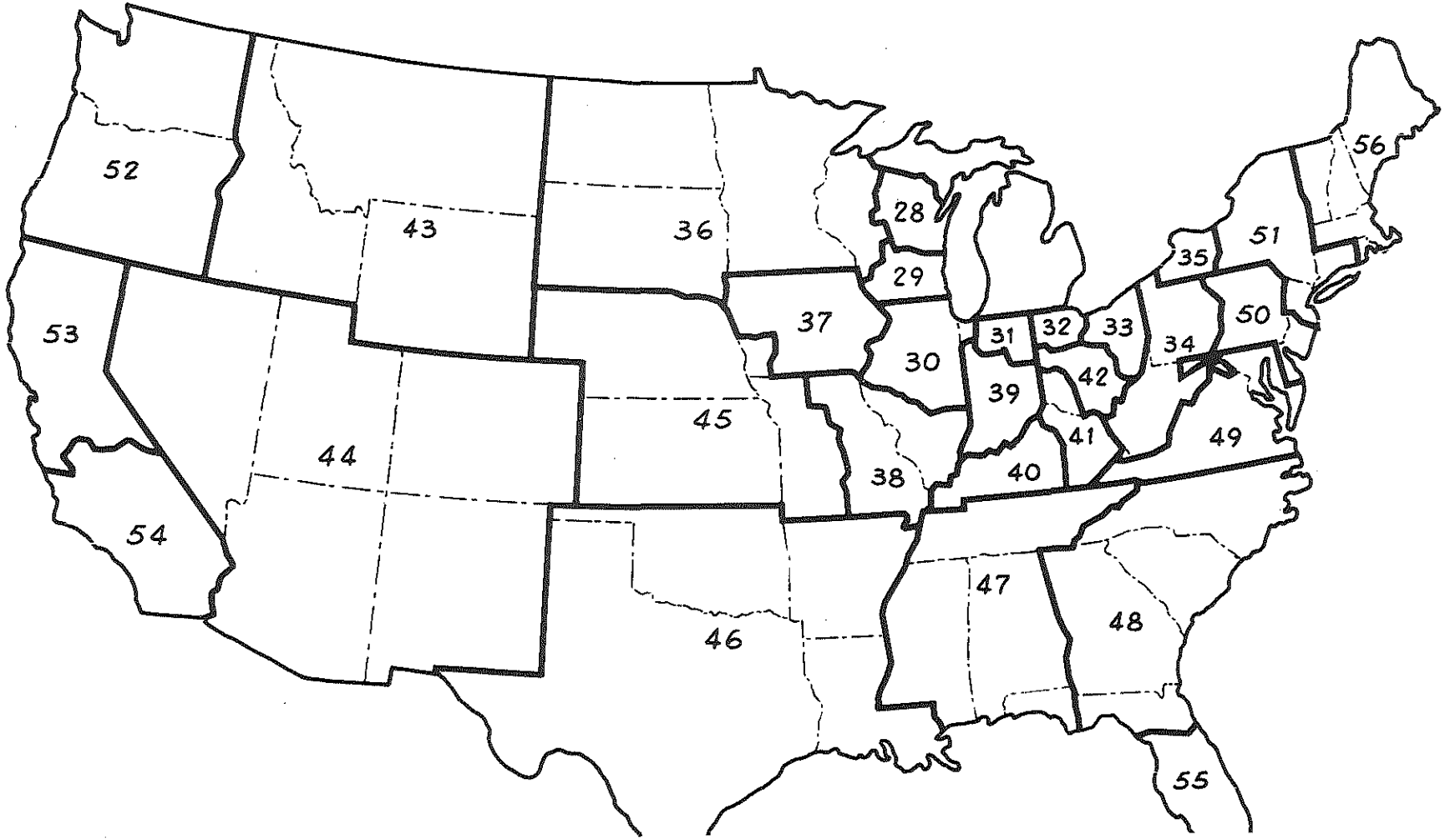
Figure I -2

MICHIGAN TRAVEL ZONES



Zone Number	Major City
1	Detroit
2	Jackson
3	Kalamazoo
4	Benton Harbor
5	Flint
6	Lansing
7	Saginaw
8	Grand Rapids
9	Alpena
10	Traverse City
11	Sault Sainte Marie
12	Escanaba
13	Marquette
14	Houghton
15	Port Huron
16	Pontiac
17	AnnArbor
18	Monroe
19	Battle Creek
20	Caro
21	Muskegon
22	Bay City
23	Ludington
24	Pellston
25	Menominee
26	Iron Mountain
27	Ironwood

Figure I-3 **STUDY ZONES OUTSIDE MICHIGAN**



Number	Representative City	Number	Representative City	Number	Representative City
28	Green Bay	38	St. Louis	48	Atlanta
29	Milwaukee	39	Indianapolis	49	Washington D.C.
30	Chicago	40	Louisville	50	Philadelphia
31	South Bend	41	Cincinnati	51	New York
32	Toledo	42	Columbus	52	Seattle
33	Cleveland	43	Billings	53	San Francisco
34	Pittsburgh	44	Denver	54	Los Angeles
35	Buffalo	45	Kansas City	55	Miami
36	Minneapolis	46	Dallas	56	Boston
37	Des Moines	47	Birmingham		

Economic Impact Model

The study subcontractor, Howard Bevis, developed and applied an economic impact model to forecast population and economic growth.

The economic impact model was developed in the following manner. First, both the State of Michigan and the rest of the United States were divided into a set of zones. Outside Michigan, the zones correspond to the travel zones described above. Inside Michigan, two different sizes of zones were used. For population data, the 27 travel zones were used. However, the 13 State Planning Regions were used to describe the level and structure of the economy. The State Planning Regions were used because they provide a more reliable basis for detailed description and analysis of the various industrial sectors constituting the Michigan economy.

Next, the Michigan economy was accurately described for the base year 1970 according to well-defined accounting rules. This description provided the basis from which projections of population and the level and structure of the economy were made. It also provided much of the necessary data input for the development and calibration of the economic impact model itself.

Finally, the impact model, which is of the econometric type, used these data in developing a set of equations relating economic and population growth to population and economic levels already existing. These equations were then used to provide the necessary forecasts.

Description of the Michigan Economy

For this study, the 1970 Michigan economy is divided into 29 industrial sectors. The initial description for each sector includes figures on employment, payroll and value added. Summary figures for the entire state are shown in Table I-2.

TABLE I-2

THE MICHIGAN ECONOMY, 1970

Industrial Sector	Employment (thousands)	Payroll (millions of dollars)	Value added (millions of dollars
1. Agriculture, forestry, and fisheries	58.7	$ 275.5	$ 308.0
2. Mining	10.5	86.2	118.4
3. Contract construction	107.5	1044.2	1434.7
Manufacturing industries			
4. Ordnance and accessories	7.6	94.6	191.9
5. Food and kindred products	50.1	386.3	1044.7
6. Textile mill products	3.5	26.6	48.6
7. Apparel and other textile products	20.7	153.8	286.9
8. Lumber and wood products	12.2	69.2	138.5
9. Furniture and fixtures	21.0	163.0	321.2
10. Paper and allied products	29.3	244.1	436.6
11. Printing and publishing	32.8	256.0	493.6
12. Chemicals and allied products	40.8	406.7	1363.1
13. Petroleum and coal products	2.5	25.3	113.1
14. Rubber and plastics products	25.0	188.1	362.5
15. Leather and leather products	4.0	21.9	54.9
16. Stone, glass and clay products	20.3	174.6	447.5
17. Primary metal industries	96.2	904.2	1681.9
18. Fabricated metal products	118.9	1034.4	1976.7
19. Machinery, except electrical	176.7	1783.9	3357.3
20. Electrical equipment/supplies	46.3	400.8	698.5
21. Transportation equipment	376.8	4001.3	8654.8
22. Instruments and related products	8.3	70.8	120.9
23. Miscellaneous manufactures	11.0	84.0	151.9
Total Manufacturing	1103.8	$ 10489.6	$ 21945.1
25. Transportation, Communication and Public Utilities	128.5	1113.2	1827.9
26. Wholesale Trade	149.9	1372.8	1801.2
27. Retail Trade	462.3	2042.9	3642.5
28. Finance, Insurance and Real Estate	119.2	840.8	3005.9
29. Other Services	410.6	2231.0	3696.7
30. Government	413.5	3659.0	4555.4
Total	2964.6	$ 22848.0	$ 42335.8

TABLE I-2 (Concluded)

Notes to Table I-2:

(1) The payroll for agriculture, forestry and fisheries sector includes that for both farm employees and proprietors. It is comparatively low considering the level of employment in that sector, because no estimates of income in kind are included nor do employees or proprietors in this sector receive as many monetary fringe benefits as those in other sectors.

(2) No split was made in the mining sector between liquid and gas mining and solid ore mining, because the size of the sector was too small to permit reliability in allocating the two different types of mining activities among the various regions within the State of Michigan.

(3) Tobacco manufacturing (SIC code 21) is included in the food and kindred products manufacturing sector.

(4) The government sector includes members of the armed forces, as well as civilian employees of the federal and local governments.

(5) Comparable study data, by Michigan Planning Region, are on file with the MAC.

Data from several sources were used in developing this description. These include:

(1) The Censi of Manufacturing, Retail Trade, Wholesale Trade and Selected Services for 1967 to provide basic relationships between employment, payroll and value added.

(2) County Business Patterns to provide a basis for 1970 employment and payroll from which the realtionships developed can be used for verification and provide estimates of 1970 value added.

(3) National income statistics, including both the supplement to the Survey of Current Business and more recent issues of the Survey of Current Business to (a) verify estimates in changes in worker productivity, (b) verify relationships between value added and gross output or sales so that value added can be reported for all sectors, and (c) provide a basis for which Michigan's share of the national economy may be determined.

(4) Price indices from Bureau of Labor Statistics publications to ensure that the transformation from 1967 to 1970 is measured accurately in constant dollars rather than current dollars.

These data provided the control totals for allocation of economic activity levels by sector among the State Planning Regions within Michigan. The initial estimates for allocation were obtained from the Censi of Manufacturing, Retail Trade, Wholesald Trade and Selected Services and County Business Patterns described above. Since these data are incomplete on a regional level (primarily because of disclosure problems) an iterative procedure was used to ensure compatibility within the various regions and the state control totals.

Finally, additional data were generated for each region to describe consumption demand, investment demand, and government demand by industry source within the region. These relationships were developed using data from the National Planning Association and the Input-Output Structure of the American Economy developed by the Department of Commerce. Net trade for each region is then defined as the difference between the dollar value of demand by industry within a region and that region's corresponding value added.

Economic Impact Model Structure

The impact model uses many of the accounting features and relationships developed in preparing the description of the economy. In equation form, the model takes the following structure for each industry sector:

Value Added = Consumption Demand + Investment Demand

+ Government Demand + Net Trade.

All values are positive with the possible exception of net trade. If net trade is positive for some sector, the region exports the goods of that sector; if negative, the region is an importer.

Sum (all sectors) Net Trade = Zero.

This holds for each region, and it states that, in total, for any outflow (inflow) of goods there is a corresponding inflow (outflow) of either goods or capital. Thus, over all sectors, if a region is a net importer of goods, for example, there must be a corresponding outflow of capital.

Consumption demand is estimated in a two-step process. First total consumption is estimated on a per capita basis as follows:

Total Consumption = a proportion of value added per capita

which accounts for the long term stability of consumption as a proportion of total income. Consumption by industry source is then estimated from a set of equations as follows:

$$\text{Consumption}_i = a_i \text{ total consumption } b_i$$

where: a and b are parameters; the subscript i denotes the i^{th} industry. To keep the model purely linear for computational efficiency, two things are done in estimating consumption. First, the consumption by industry source equations is substituted in the total consumption equation so that:

$$\text{Consumption} = \text{a function of value added}$$

Second, a scalar increase in per capita consumption is precomputed for each forecast year, and these constants, which change from forecast year to forecast year, are coded in matrix format and substituted as required when making projections.

Both government and investment demand are estimated as a constant proportion of value added. Thus,

$$\text{Government Demand} = A * \text{value added}$$

$$\text{Investment Demand} = B * \text{value added}$$

where A and B are parameters that vary from sector to sector so that, for the i^{th} industrial sector, by simple addition, we have:

$$\text{Government Demand} + \text{Investment Demand} = (A_i + B_i) \text{ value added}_i$$

Given these relations, net trade is readily determined by adding the various demand components (consumption, investment and government) and subtracting that total from the value added for the sector.

Net trade becomes the primary measure of a region's competitive position. If the sector is an exporting industry, i.e., net trade is positive, that region has a favorable competitive position for that industry. If the sector is an importing industry, the region has an unfavorable competitive position. Several factors determine this competitive position as follows:

- The presence of other industries supplying the industry being analyzed
- The cost of labor
- The accessibility of markets to the industry.

For this analysis, cost of capital is not considered because (1) data are insufficient or not sufficiently accurate to permit this variable to be included on a regional basis for each of the sectors analyzed and (2) it is assumed that capital is sufficiently mobile that its effect on locational decisions, particularly for larger companies, will be small. Thus, for each sector, an estimating equation is developed and parameters estimated so that net trade may be predicted as a function of the three variables cited above. The quantitative measure of the presence of industrial suppliers is measured by the value added of these suppliers in the region itself. Cost of labor is measured by dividing total payroll by total employment in a class of industries. For each manufacturing industry, for example, total manufacturing payroll is divided by total manufacturing employment and, similarly, for the trade and service industries. Market accessibility is measured using the travel conductance (W) values described elsewhere in this report* with a population in a destination zone being a surrogate measure of market size in that zone.

Given these sets of individual estimating equations for different sectors and different components of value added, what remains is to tie them together. This is accomplished by sets of equations describing the following:

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*See the next section.

(1) Value added per employee rises over time as productivity increases in the various sectors constituting the regional economy. Hence, for each sector an equation describes the change in real income per employee over time. A weighted average of these equations describes the change in real income for regional residents over time.

(2) A preliminary population estimate is made and provides a basis for an initial estimate labor force participation and employment for each region.

(3) The employment estimates so derived are multiplied by the value added per employee to obtain an initial estimate of regional income.

(4) The consumption, government demand and investment demand equations are then applied for each sector of the regional economy and the corresponding net trade estimates added to determine the level and structure of the economy corresponding to the preliminary population estimate.

(5) The sum of total value added for the region obtained from step (4) may not agree with the initial estimate implied in step (3). If it is larger, the region will grow more than implied by the population estimates; if smaller the region will grow less. Thus, an iterative procedure is used to bring the two estimates into balance.

Model Application

The initial application of the economic impact model was to develop "normative" forecasts of population and economic growth for the State, as summarized earlier in this section. Underlying these normative fore-

casts is the basic assumption that Michigan's competitive economic position will neither improve or worsen relative to other areas of the United States. Specifically, improvements to Michigan's air transportation system are assumed to parallel those for the rest of the United States in the normature forecasts.

Subsequent applications of the economic impact model sought to determine the relationship between (a) improvements to Michigan's air transportation service and (b) increased economic growth for (affected portions of) the State. In fact, much of the complexity of the model was based on the need for this type of investigation. Several changes in Michigan air service were tested with the model. However, after a thorough review of model results for these applications, it was reluctantly concluded that, at the present state-of-the-art, regional economic forecasting is not sufficiently precise to support quantative estimates of the economic impacts resulting from air service changes. This does not imply that air service improvements have little impact on regional economic growth--rather, the impact is difficult to measure. The model results were not rejected because predicted economic impacts were small. Instead, the model was judged to predict inordinately large economic impacts from relatively modest changes in overall transportation access.*

*For example, the model predicted a doubling of population and economic activity in Michigan's Upper Peninsula, given the postulated introduction of nonstop air service to Chicago and Detroit.

II AIR CARRIER SYSTEM ANALYSIS

Overview

This section describes the study methods that were used to identify, analyze and evaluate alternative air carrier systems for Michigan. The discussion includes description of the modeling procedures used in the analysis and data inputs.

In the study, a number of alternative air carrier systems were examined. The variations among alternatives included:

- Different airport locations
- Differences in the nature of airline service at each airport location (airline routes, flight frequencies).

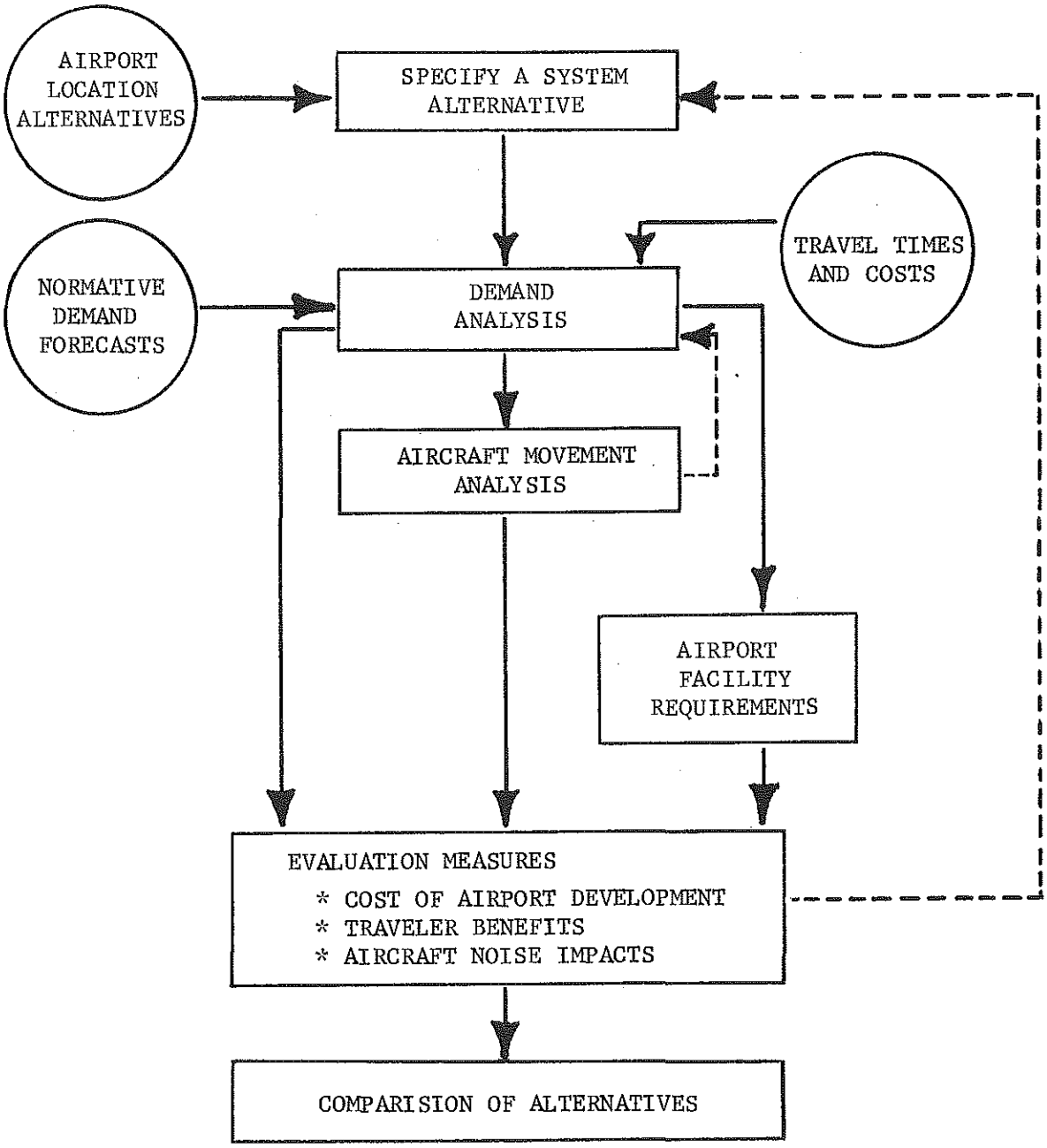
Because the number of possible variations was large, a systematic procedure was used to analyze a given alternative. Then, the results for that alternative were used to suggest a new alternative for study.

The steps that were followed in the analysis are outlined in Figure II-1. An overview of these steps is given below, followed later in this Section by more detailed descriptions of the methods.

The analysis of a system alternative began by establishing a set of airport locations within Michigan. The set of locations was obtained by choosing from a list of individual airport location alternatives established for the study. Activity at each airport in the alternative was then estimated on the basis of passenger and cargo demand and an analysis of aircraft movements. This process recognized the interrelationship of demand and service. Namely, demand levels were estimated on the basis of service (e.g., ground access distance, flight frequencies) and levels of air service were estimated on the basis of demand.

Figure II-1

ANALYSIS PROCEDURE FOR AIR CARRIER SYSTEM



Note: Inputs to Process Shown in Ovals;
Analysis Steps Shown in Rectangles;
and Feedback Process Shown in Dashed Lines

The measures of airport activity obtained (passengers, cargo, flights) were used to estimate the nature of facilities required at each airport. All of these data were then used to develop evaluation measures for the System Alternative--principally, airport development costs and traveler benefits.

The analysis procedure first examined alternatives for the study's long-range period (1990). After many system alternatives were examined, the evaluation measures were used to select a recommended system. Subsequently, with the long-range system as a goal, the analysis procedure was used to establish the timing of changes to Michigan's existing air carrier system (i.e., Short-range (1975), Intermediate (1980) and Long-range (1990).

Normative Passenger and Cargo Forecasts

Normative air travel demand forecasts were prepared for this study by comparing Michigan's projected population and economic growth with that for the United States as a whole. The forecasts are termed "normative" because they do not reflect the potential increases (or decreases) in demand brought about by substantial bettering (or worsening) of air service in the State. In Section I, it was shown that Michigan's population and economic growth is expected to parallel that for the United States. Therefore, it was concluded that the rates of growth in air passengers and air cargo for Michigan should follow nation trends during the 1970 to 1990 time period (as was generally the case in the 1960's).

To estimate normative passenger demand, the study subcontractor, Peat, Marwich, Mitchell & Co., (PMM), reviewed several existing projections of national air passenger growth. PMM also made independent projections of such underlying factors as:

- The ratio of airline passenger revenues to national income
- Airline revenue per enplaned passenger
- Enplanements per capita
- Air travel as a percentage of total intercity travel.

As a result of this analysis, the following normative forecast was adopted:

	Enplaned Passengers (millions)				
	1970	1975 Forecast	1980 Forecast	1990 Forecast	Average Annual Growth Rate 1970-1990
Michigan	4.5	6.1	9.7	18.3	7.3 %
United States	152	205	326	623	7.3 %

For perspective, it is noted that for the period 1962-1970, the average annual growth rate for Michigan air passengers was about 12 percent.

On the basis that air cargo growth for Michigan will follow national trends, several national air cargo projections were reviewed and the following air cargo projections were adopted for Michigan:

	Enplaned Cargo (millions of pounds)				
	1970	1975 Forecast	1980 Forecast	1990 Forecast	Average Annual Growth Rate 1970-1990
Air Freight and Express	257	540	1,134	4,205	15 %
Air Mail	29	37	48	79	5 %

It should be noted that considerable variation exists among the national forecasts used to project the magnitude of growth in Michigan air freight. In many cases, fairly small differences in percentage growth rates among the forecasts are magnified when compounded over fifteen or

more years. This leads to large uncertainties as to air freight volumes in more distant time periods. The differences arise, in part, because air freight has and will for the foreseeable future account for only a small fraction of total freight movement. Thus, high growth rates in the past have been achieved from a small base and at low levels of penetration into markets served by competing methods of transportation. Future air freight growth is dependent on continued improvement of air transportation relative to other modes. Important is the fact that even the most conservative air freight forecasts predict national rates of growth of at least 10 to 12 percent per year for the next fifteen or twenty years. It is also noted, for perspective, that between 1962 and 1970, Michigan's outbound air freight grew at an average annual rate of 16 percent.

A lower rate is projected for future growth in air transportation of mail (5 % per year) than for air freight. The lower rate for mail is attributable to the concerted efforts in the recent past toward the expanded shipment of mail by air. By 1970, for example, much first-class mail was transported by air to, from and within Michigan. There is considered to be little demand or other justification for air shipment of remaining segments of the mail (e.g., third-class or parcel post). Thus, the low growth rate accounts only for the expected increases in volume for the kinds of mail presently moving by air.

Airport Location Alternatives

The locations examined in this study as potential sites for air carrier service are displayed in Figure II-2. The potential sites include the 21 existing airports of 1970 and 11 new locations.

One factor underlying the choice of airport location alternatives was the "regional airport concept." In some areas of Michigan, existing

airports serving air carriers are located close to one another. The regional airport concept considers the possibility of combining traffic for such communities to yield improved air service. For example, the combined traffic of several communities might make possible more frequent airline flights to a wider variety of destinations than any one of the communities could support alone. Several means of combining air traffic are plausible:

- Service could be introduced at a new site between two existing airports, with service discontinued at the existing airports. An example in Figure II-2 is Site 104 between Kalamazoo and Battle Creek.

- An existing airport could be viewed as a "regional airport," with service at nearby airports discontinued or modified. For example, service at Muskegon might be discontinued, requiring air travelers to reach the Grand Rapids airport via surface transportation.

The regional airport concept was thoroughly examined in this study from the standpoint of both airport locations and airline service modifications. It was found that most of the plausible means of combining traffic in Michigan did not yield sufficient improvements to air service to justify their recommendation. (Site 104, however, has been recommended.)

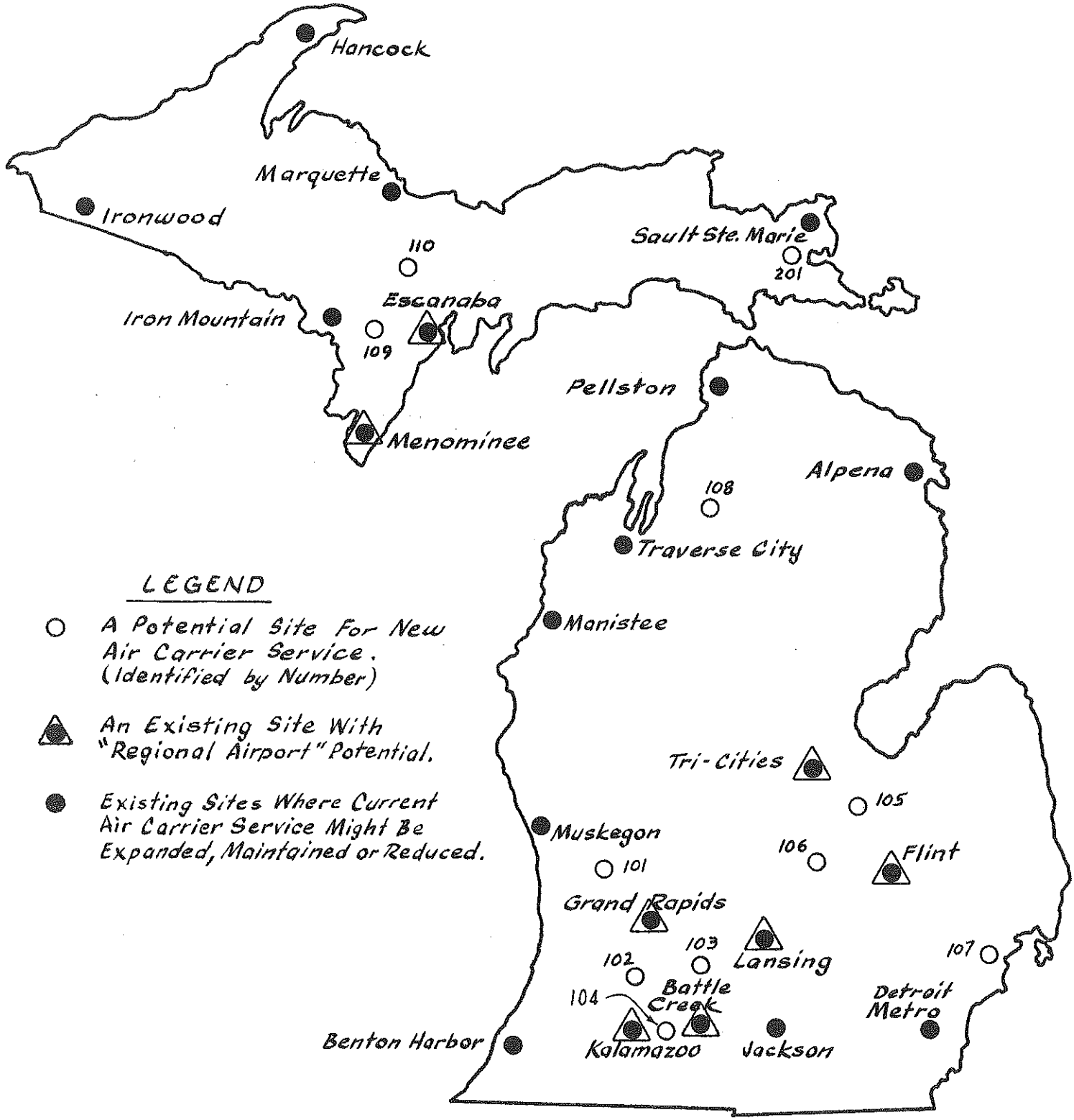
Other basis for the airport location alternatives examined in the study included:

- The possibility of new service to population centers located relatively far from existing airports (e.g., Site 107, north of Detroit).

- Cases where prior studies had identified severe site restrictions at existing airports (e.g., Sault Ste. Marie).

Figure II-2

AIRPORT LOCATION ALTERNATIVES



Air Passenger Demand

A multimodal intercity passenger demand model was used in the study to predict air passenger demand. The model is basically the one that Stanford Research Institute developed and applied in prior studies for the Michigan Interagency Transportation Council.* However, the model was modified (to extend its capabilities) and recalibrated for use in this study. The model makes possible the prediction of traveler choices among modes and among airports. The model also allows for forecasts of passenger demand at potential new airport locations.

Demand Model Formulation

The demand model is a system of equations. For travel between two zones** by mode m, a measure of travel "conductance," w_m, is calculated as:

$$w_m = a_m t_m^{\alpha_m(1)} \cdot c_m^{\alpha_m(2)} \left[1 - \exp(-0.12 f_m)\right]^{\alpha_m(3)} \quad (1)$$

where

t_m = the travel time between zones by mode m

c_m = cost of travel

f_m = daily frequency of service.

These three measures--time, cost and frequency--are termed "travel impedance measures" and reflect a sum for the access, line-haul and egress portions of the traveler's trip (i.e., "portal to portal" travel).

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*Billheimer, John W., The Michigan Intercity Passenger Demand Model, Final Report No. 2, project MSH-8476, Stanford Research Institute, June 1971.

**The travel zones used in the analysis are described in Section I.

When transportation service is poor between zones, travel impedance is high and travel conductance is low.

The remaining terms in equation 1 are calibration parameters. The α values are weightings for the impedance measures to account for the traveler's perceived importance of each measure. The α values do not vary among zone paris and do not vary appreciably among modes.* The a_m values do not vary by zone pair, but do vary by mode, such that the model's predicted allocation of traffic among modes properly replicates observed (actual) allocations. The calibrated (1970) values of the mode specific parameters are given in Table II-1.

Table II-1

VALUES FOR MODE SPECIFIC CALIBRATION PARAMETERS

Mode m	a_m	$\alpha_m(1)$	$\alpha_m(2)$	$\alpha_m(3)$
Auto	13.76	-1.6	-1.6	0
Bus	1.50	-1.5	-1.5	0.3247
Rail	1.50	-1.5	-1.5	0.3247
Air--except Detroit-Chicago	1.50	-1.5	-1.5	0.3247
Air--Detroit-Chicago	0.75	-1.5	-1.5	0.3247

As indicated in Table II-1 and discussed later, different air modes (routings) are treated, depending on a traveler's available choice among airports. The other modes considered are auto, bus and rail.

A measure of total travel conductance between two zones, W, is obtained by summation of the w_m values for all modes of travel considered:

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*The exception is the α value for frequency of service by automobile--the formulation implies an infinite frequency of service.

$$W = \sum_{\text{all } m} w_m \quad . \tag{2}$$

Total predicted passenger travel, D, between two zones is treated as a function of the W value calculated in equation 2.

$$D = \beta_i \beta_j (P_i P_j) W^{0.9} \tag{3}$$

where

P_i = the population of zone i

P_j = the population of zone j.

The (β_i and β_j) coefficients are called "zone specific constants." They are included to compensate for factors that are not explicitly included in the model but affect the amount of passenger travel originating and terminating in a zone. Thus, the β values help to correct for unexplained differences in travel for two seemingly similar zones. For the external zones, and especially for those larger zones located farthest from Michigan, the zone specific constants also adjust travel to allow for the use of a single airport in each such zone to represent several major airports at different locations (cities) within that zone. In addition, the β coefficients serve as scale factors for the demand equation. Table II-2 lists the zone specific calibration coefficients.

The fourth and last equation of the demand model allocates total passenger demand for a zone pair (as calculated in equation 3) among the

Table II-2

VALUES FOR ZONE SPECIFIC CONSTANTS
(multiplied by 10,000)

Michigan Zone	Zone Specific Constant β_i	External Zone	Zone Specific Constant β_i
1	10.38	28	5.62
2	2.00	29	10.04
3	5.20	30	9.34
4	2.42	31	3.55
5	3.24	32	2.26
6	8.66	33	2.48
7	7.22	34	3.44
8	8.43	35	5.50
9	6.65	36	11.02
10	16.97	37	4.39
11	27.20	38	11.68
12	36.38	39	5.89
13	30.50	40	12.15
14	47.70	41	4.99
15	8.94	42	3.47
16	10.75	43	6.67
17	10.60	44	40.52
18	4.57	45	9.09
19	5.50	46	10.21
20	4.14	47	2.05
21	10.30	48	3.95
22	7.92	49	10.06
23	5.20	50	9.12
24	40.00	51	13.09
25	37.02	52	56.32
26	40.00	53	73.75
27	39.48	54	77.90
		55	119.69
		56	12.65

available modes of travel. The travel "conductance" measures calculated in equations 1 and 2 are used:

$$D_m = \frac{w_m}{W} D \qquad (4)$$

It can be observed from the formulation of the passenger demand model that its predictions of air passenger travel depend on a number of factors:

- The competitive position of the air modes, versus other modes, as measured by travel time, cost and frequency. To the extent that air service improves, passengers will be diverted from surface to air transportation (i.e., different w_m values in equation 1).
- Zone population changes--as they influence total passenger demand (equation 3).
- Increased total traffic as air service improves (i.e., larger values for W in equations 2 and 3).

There is another influence on air passenger growth that requires treatment. Demand for air service has exhibited a "natural" growth in the past--a growth in excess of that accounted for by service improvements and population increases. The approach taken to account for this effect was to calibrate the model separately for each study time period. Specifically, the a_m values for air travel in equation 1 were adjusted for each period's base case* until total air passengers predicted by the model agreed with the normative forecasts of Michigan air passenger travel described earlier in this section.

Transportation Network and Impedance Values

Required input data for the model includes system operating characteristics (e.g., times, costs, distances, speeds, frequencies of service,

*The "base case" for each time period, represented little improvement in air service over that of 1970. It included 1970 airport locations and airline routes, but increased flight frequencies.

fares) for each of the four basic modes of travel. The development of these data are described below.

Highway System

The first step was to identify a highway network connecting all study zones. This network was coded in terms of links and nodes--the links representing highway routes and the nodes representing the junction of two or more highways. This network, closely following the major structure of the Michigan highway system, consisted of 272 one-way links and 93 nodes. Centroids were determined for each zone, and access links were specified from these centroids to appropriate nodes on the auto network.

Distances were assigned to each link representing the lengths of the corresponding segments in the highway network. Intercity highway links were then coded as either (1) two-lane highway, (2) four-lane divided highway with free access, or (3) four-land freeway, depending on the predominant facility type. Speeds and operating costs were assumed for each of these three types of links, as shown in Table II-3. The Table also shows access link data. The operating costs consist of the costs that can be directly related to mileage such as gas, oil, times, maintenance and a small amount of depreciation. The value of 5 cents per mile represents the most recent estimate available and varies less than five percent (on the average) for most intercity auto travel.* Travel times were determined for individual links based on the assigned distances and speeds.

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*Curry, David A. and Dudley G. Anderson, Procedures for Estimating Highway User Costs, Air Pollution, and Noise Effects, NCHRP Project 7-8, Stanford Research Institute, April 1972.

Finally, zone-to-zone auto times and costs were generated by summing the link values along the minimum time path between each pair of zones.

Table II-3

ACCESS AND HIGHWAY LINK CHARACTERISTICS

Facility Type	Distance (miles)	Speed (mph)	Cost (cents per mile)
Access Link			
Michigan zone	variable	20-30	5¢
External zone	20	30	5
2-Lane highway	variable	50	5
4-Lane divided--free access	variable	55	5
4-Lane freeway	variable	60	5

Bus System

The bus network was generally assumed to contain the same links as those in the auto network. Times, costs, distances and frequencies of service were developed for all zone pairs using bus schedules.* Access times and costs were determined from each zone centroid to the nearest appropriate bus terminal and added to the intercity fare and time values. The access costs were assumed to include all direct "out-of-pocket" costs (fares, running, parking costs) associated with access to the nearest bus terminal. Delay times of 30 minutes and 15 minutes were assumed at the origin and destination bus terminals, respectively.

*The major data collection effects for both bus and rail networks were conducted by the Michigan Aeronautics Commission staff. Data collected under Contract 1-1970 to the Michigan Interagency Transportation Council were also used.

Rail System

Matrices of time, cost, distances and frequency of service were developed to approximate rail service between zone pairs. Instead of determining all individual terminal-to-terminal fares for Michigan--external zone pairs, fare-per-mile data were established for different regions of the United States. An approximate rail fare matrix was then readily obtained. Access times and costs were determined as for the bus system--from the zone centroid to the nearest appropriate rail terminal--and delay times of 30 and 15 minutes were assumed at the origin and destination rail terminals, respectively.

Air System

The total air system network for the study consisted of the 32 airport location alternatives within Michigan and 29 external airports (one for each out-of-state zone). Thus, for example, only the Denver airport in zone 44 was included in the analysis. To have included all major airports within each zone in the analysis, such as Pheonix, Las Vegas, Salt Lake City and Albuquerque for zone 44, would have unduly expanded the data and computational requirements of the study.

Airport-to-airport flight times and air fares (tourist or standard) were obtained from data in the Official Airline Guide.* For the airport pairs without nonstop service in 1970, time and fare data were imputed from published data for comparable routes.

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*The November 1, 1970 Domestic Quick Reference Edition of the Official Airline Guide.

In operation of the passenger demand model, nonstop flights were not considered for all airport pairs.* In these cases, it was necessary to fashion impedance measures by specifying one or more intermediate connecting airports. Connections between airlines flights were allowed at all airports within Michigan and at the Green Bay and Chicago airports. The total cost of the air portion of the journey was assumed to be the sum of the individual flight segments for connecting flights, and the air travel time was considered to be the sum of the individual flight times plus a transfer delay time for the enroute stop or for changing planes.

After airport-to-airport impedance measures were obtained, the remaining steps in establishing zone-to-zone air travel impedance measures were to:

- Establish impedance measures to surface travel between zone centroids and airports
- Establish alternative air modes (routings) in recognition of the potential competition among airports for a zone's air travelers.

These developments are described in the paragraphs that follow.

On the basis of a passenger survey conducted during the study, surface access to Michigan airports was assumed to take place in the following manner:

Private auto--parked at airport	25%
Private auto--driven away by others	60
Rental auto	7
Taxi	5
Other (e.g., bus, courtesy car)	3

*Nonstop flights were derived in the analysis of a particular system alternative in a given time period on the basis of projected passenger levels. Thus, because nonstop flights depend on demand, and demand depends in part on whether nonstop flights are offered, an iterative ("trial and error") approach was followed.

The direct effect of this assumption is on airport access costs and times. Access times are assumed to be roughly the same for all modes and are based on those of the private auto. An average access cost is determined by assuming that the cost of access by rental auto is roughly twice that of the private auto (assuming that the primary reason for renting the auto was not solely for access to the airport, hence only marginal costs are relevant), the cost of a taxi is roughly four times that of private auto, and the cost of the other modes are about the same as the private auto. Then, the total access cost will be about 1.22 times that of the private auto. Assuming the above, a private auto cost of 5 cents per mile results in an average airport access cost of 6.1 cents per mile. Parking costs per passenger trip was obtained from data on average parking revenues per enplaned passenger by size of airport.*

Zone-to-airport distance and time measures were calculated in a manner similar to that described above for highway network access, but the investigation was more detailed. First, access times and costs were calculated directly for trips from many individual Michigan counties to nearby airports.** These times and costs were then weighted by county populations to obtain average times and costs for access to an airport from a zone. In cases not covered by county data, access times and costs were calculated from the auto network.

Additional values included in airport access impedance measures were delay times of 30 minutes at the origin airport--for parking, ticketing and check-in--and 15 minuted at the destination airport--for baggage pickup.

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*Developed by the study subcontractor, Howard, Needles, Tammen and Bergendoff.

**These access data for each county were generated by staff of the Michigan Aeronautics Commission and Interagency Transportation Council.

The competitive interrelationships of relatively close airports were included in the analysis by treating airport-to-airport routes as separate air modes. For intra-Michigan air travel, each traveler is allowed the opportunity to depart from either of the two airports nearest his origin zone and to arrive at either of the two airports nearest his distination zone--a total of four separate air mode possibilities as shown in Figure II-3.

Air trips including zone external to Michigan are forced to use the one airport designated for the external zone, thus reducing the number of basic air modes to two. However, an additional air mode concerning auto access (egress) to the nearest of the Chicago or Detroit airports was allowed for trips between Michigan and external zones, thus adding a third air mode to the Michigan-external zone analysis. Figure II-4 depicts these three air modes.

Air Cargo Demand

The normative cargo forecasts described earlier in this section have been assumed to account for three significant factors in air cargo growth:

- Diversions among modes because of changes relative to service quality
- Diversions among modes because of changes in the way that shippers and consignees perceive transportation costs as a part of total distribution costs
- Future demands placed on the air system by new product movements.

It remains to describe the methods for allocating total Michigan air cargo traffic among the airports constituting the state system.

Figure II-3

ALTERNATIVE AIR MODES FOR FLIGHTS WITHIN MICHIGAN

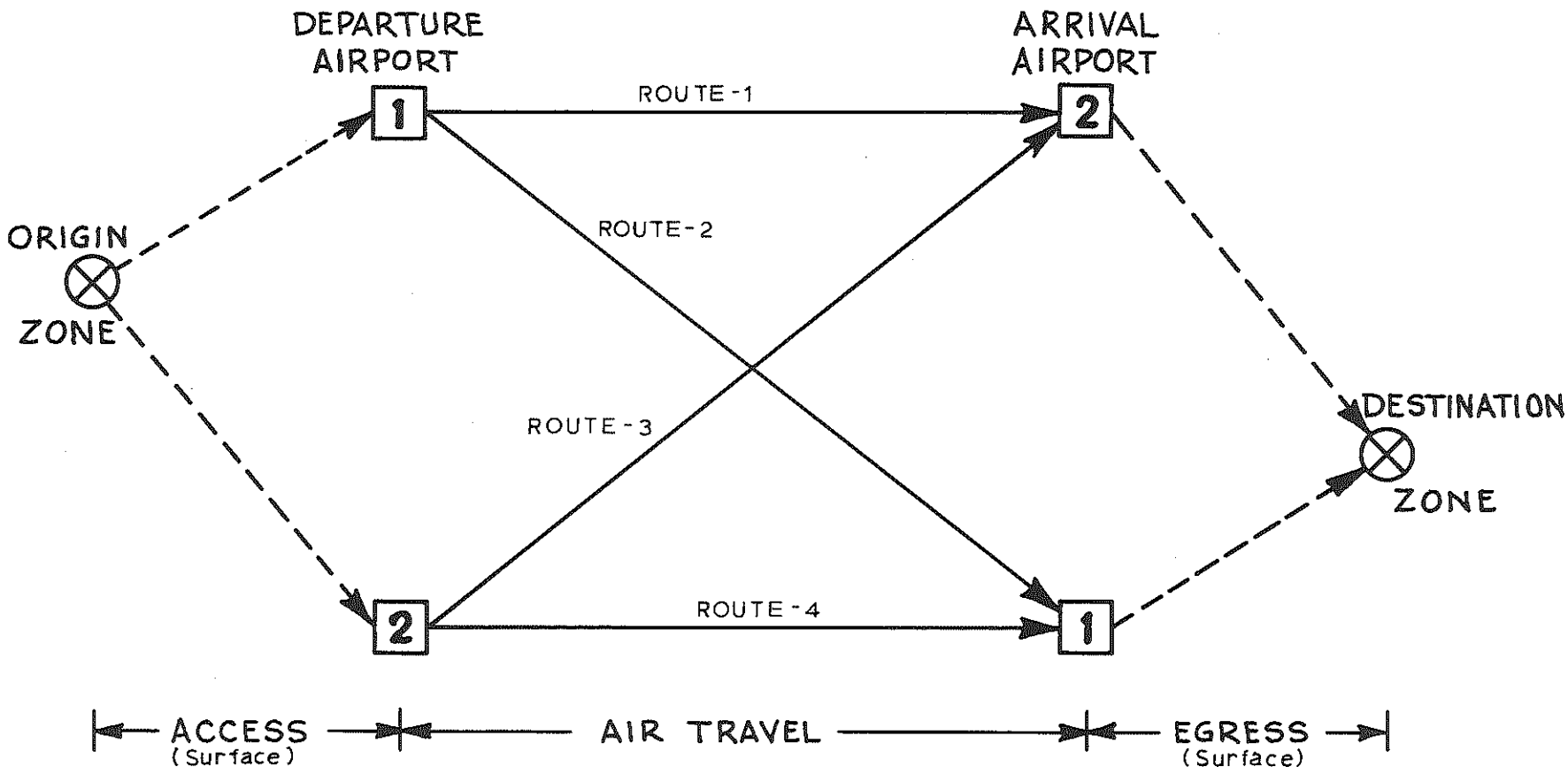
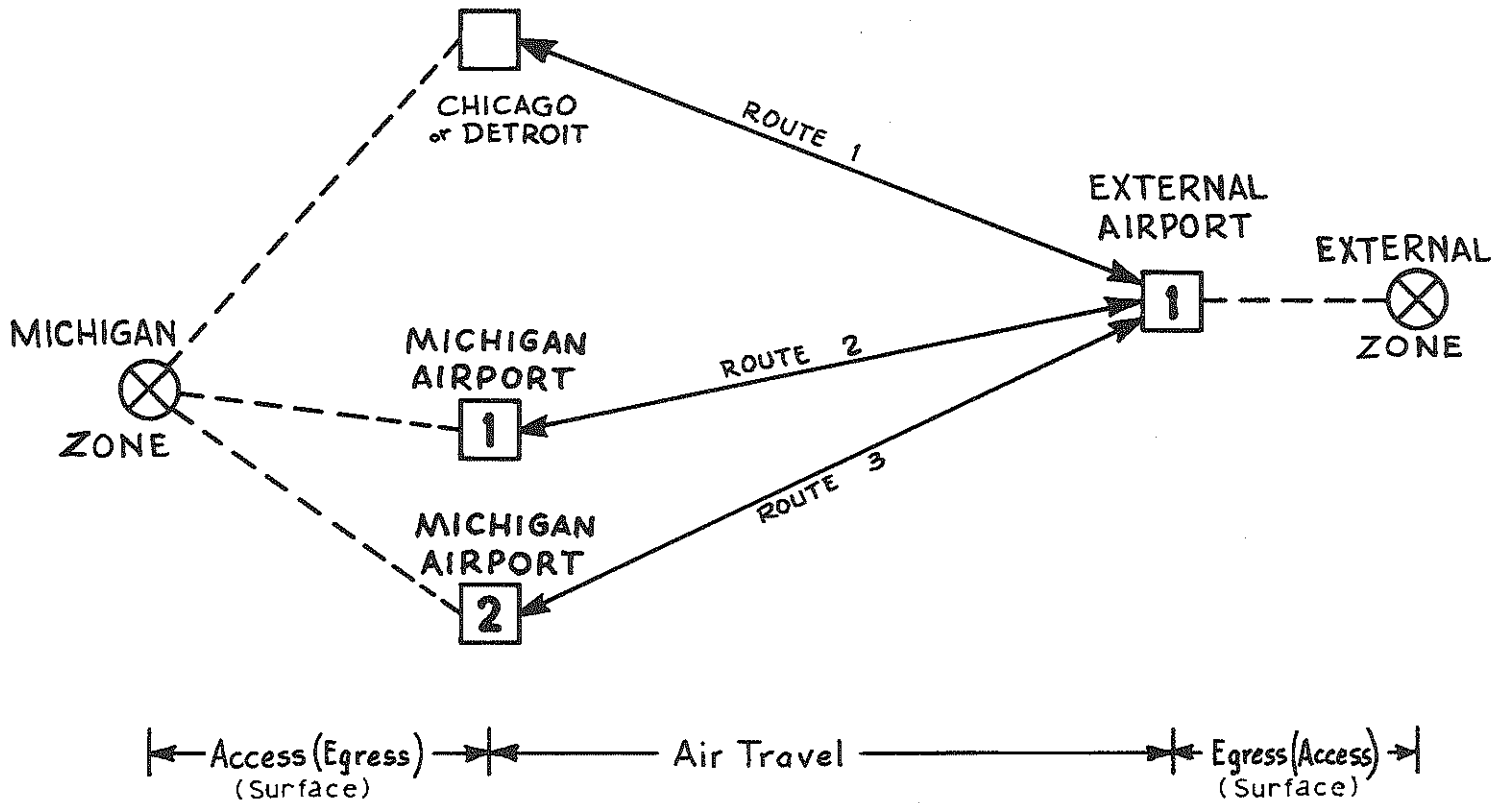


Figure II - 4

ALTERNATIVE AIR MODES FOR FLIGHTS TO (FROM) EXTERNAL ZONES



Air Freight

In Michigan, the routing of air freight shipments is complex. Air freight shipments originating or terminating in a Michigan community frequently are not routed through that community's airport. Instead, surface movement to or from a more distant large airport is used. An understanding of this "local airport diversion" was judged critical to the cargo demand analysis.

The American Academy of Transportation (AAT) was retained by the Michigan Aeronautics Commission to gather data on the nature and extent of local airport diversion. The AAT sent mail questionnaires to a carefully selected sample of Michigan companies. In addition, numerous field interviews were conducted with:

- Airport managements
- Airlines
- Air freight forwarders
- Motor carriers handling air freight shipments
- Postal officials

The principal results of AAT's work are portrayed in Tables II-4 and II-5. Table II-4 deals with air freight originating in Michigan during the study base year (1970) and Table II-5 deals with terminations. The unit of measure is millions of pounds. The columns of the tables represent Michigan's airports with an additional column for Chicago's O'Hare Airport. The rows of the tables list all Michigan study zones. An additional row, "Other," portrays air freight volumes that, for example, are shipped by surface from an origin outside the state for loading at a Michigan airport. Entries within the tables represent surface movements of air freight between zones and airports. For example, Table II-4 shows that an estimated 11.24 million pounds of air freight originated in the Lansing zone in 1970. Of this, 1.22 million pounds was enplaned at the Lansing Airport. The

substantial remainder moved by truck to Detroit Metropolitan and Willow Run for subsequent air movement.

The format of Tables II-4 and II-5 facilitates discussion of the steps that were followed in the air freight demand analysis for each planning period (and each system alternative). The total Michigan air freight volume of the normative forecast was entered in the lower right-hand cell of each table. The state total was then allocated among Michigan zones (i.e., among the cells of the right-most column) according to projected economic activity. The final step was to allocate each zone's total air freight among airports in the system alternative.

The measure of economic activity used to allocate total Michigan air freight among study zones was regional economic value added. (Projections of economic value added for the State are described in Section I.) Table II-6 is a summary of regional valued added measures. As shown in the table, the projected regional shares of total Michigan economic activity are essentially the same for 1990 as they were for 1970. Thus, the study allocations of total freight among zones for each planning period are essentially the same as the 1970 distributions shown in Tables II-4 and II-5. For example, the Saginaw zone (zone 7, Region 7) originated about four percent (10.37 of 257.15) of Michigan's outbound air freight in 1970, and is projected to originate this same percentage of total Michigan air freight in the future.

In allocating a zone's total air freight among airports, consideration was given to future prospects regarding "local airport diversion." It was judged that the factors which caused freight to bypass local airports in 1970 will persist. That is, it is assumed that large airports at Chicago

Table II-4

1970 OUTBOUND AIR FREIGHT & EXPRESS (Millions of Lbs.)

AIRPORT (ORIGIN)

ZONE		Detroit Metro	Willow Run	Detroit City	Jackson	Kalamazoo	Benton Harbor	Flint	Lansing	Saginaw	Grand Rapids	Battle Creek	Muskegon	Alpena	Traverse City	Manistee	Pellston	Sault Ste. Marie	Escanaba	Marquette	Hancock	Menominee	Iron Mountain	Ironwood	Chicago	TOTAL
Detroit	1	114.41	32.76	0.80																						147.97
Port Huron	15	4.19	2.05																							6.24
Pontiac	16	9.78	10.24	0.09																						20.11
Ann Arbor	17	4.76																								4.67
Monroe	18	2.52																								2.52
Jackson	2	1.80			0.13				0.01																0.14	2.08
Kalamazoo	3	2.40				1.24																			1.18	4.82
Benton Harbor	4						0.49																		0.60	1.10
Flint	5	10.35	15.01					1.63	0.03																	27.02
Lansing	6	4.56	5.46						1.22																	11.24
Saginaw	7	6.79	2.04						0.01	1.53																10.37
Grand Rapids	8	0.89	0.68						0.05		5.47		0.65												0.19	7.93
Battle Creek	19	0.91										0.17													0.42	1.50
Caro	20																									
Muskegon	21										0.11		1.96													2.07
Bay City	22	0.98								0.51																1.49
Alpena	9													0.29			0.07									0.36
Traverse City	10														0.53	0.09										0.62
Ludington	23															0.01										0.01
Pellston	24																0.19									0.19
Sault Ste. Marie	11																0.01	0.03								0.04
Escanaba	12																		0.10						0.01	0.11
Marquette	13																			0.19					0.01	0.20
Houghton	14																				0.23					0.23
Menominee	25																					0.17			0.03	0.20
Iron Mountain	26																						0.13			0.13
Ironwood	27																							0.02		0.02
Other		3.83					0.01											0.01				0.06	0.01			3.91
TOTAL		168.08	68.24	0.89	0.13	1.24	0.50	1.63	1.32	2.04	5.58	0.17	2.61	0.29	0.53	0.10	0.27	0.04	0.10	0.19	0.23	0.23	0.14	0.02	2.58	257.15

Table II-5

1970 INBOUND AIR FREIGHT & EXPRESS (Millions of Lbs.)

AIRPORT (DESTINATION)

ZONE		Detroit Metro	Willow Run	Detroit City	Jackson	Kalamazoo	Benton Harbor	Flint	Lansing	Saginaw	Grand Rapids	Battle Creek	Muskegon	Alpena	Traverse City	Manistee	Pellston	Sault Ste. Marie	Escanaba	Marquette	Hancock	Menominee	Iron Mountain	Ironwood	Chicago	TOTAL
Detroit	1	113.60	15.36	1.27																						130.23
Port Huron	15	2.11																								2.11
Pontiac	16	10.54	0.85	0.14				0.06																		11.59
Ann Arbor	17	3.60	0.51																							4.11
Monroe	18	1.39																								1.39
Jackson	2	1.21			0.46				0.02																0.12	1.81
Kalamazoo	3	1.41				1.47																			0.26	3.14
Benton Harbor	4						0.65																		0.96	1.61
Flint	5	6.65	0.34					2.95	0.04																	9.98
Lansing	6	3.14							2.00																	5.14
Saginaw	7	2.16						0.06		1.14																3.36
Grand Rapids	8	0.71							0.11		5.60		0.31												0.10	6.83
Battle Creek	19	1.16										0.65													0.23	2.04
Caro	20																									
Muskegon	21										0.11		0.92													1.03
Bay City	22	1.21								0.49																1.70
Alpena	9													0.24			0.06									0.30
Traverse City	10														0.53	0.10										0.63
Ludington	23															0.03										0.03
Pellston	24																0.17									0.17
Sault Ste. Marie	11																0.01	0.13								0.14
Escanaba	12																		0.22						0.01	0.23
Marquette	13																			0.37						0.37
Houghton	14																				0.39					0.39
Menominee	25																					0.15			0.01	0.16
Iron Mountain	26																						0.55			0.55
Ironwood	27																				0.02			0.13		0.15
Other		4.31					0.01											0.02				0.05	0.03	0.01		4.43
TOTAL		153.20	17.06	1.41	0.46	1.47	0.66	3.07	2.17	1.63	5.71	0.65	1.23	0.24	0.53	0.13	0.24	0.15	0.22	0.37	0.41	0.20	0.58	0.14	1.69	193.62

Table II-6

REGIONAL ECONOMIC DATA

Planning Region*	Percent of Michigan's Economic Value Added 1970	1990 Forecast
1	59.7 %	57.7 %
2	2.6	2.4
3	5.0	4.8
4	2.5	2.6
5	7.1	9.2
6	4.5	5.0
7	6.4	6.3
8	9.1	9.1
9	0.6	0.6
10	1.0	1.0
11	0.2	0.1
12	0.9	0.9
13	0.4	0.3
Total:	100.0 %	100.0 %

*See Section I for a map of the planning regions.

and Detroit will continue to enjoy advantages over local airports in the capability to consolidate shipments to achieve rate savings and in offering specialized air freight services (e.g., containers, freighter aircraft).

Based on the above, a zone's freight was allocated among airports in each planning period using the data in Tables II-4 and II-5. In the case of outbound air freight from the Saginaw zone, for example, it is projected that 15 percent of the zone total (1.53 of 10.37) will continue to be enplaned at Tri-City Airport. It is recognized, however, that actions by airport authorities, airlines, freight forwarders and cargo interests (shippers and receivers) could substantially increase the percentages of total freight that will be enplaned at local airports.

Mail by Air

The AAT survey efforts for mail--both air mail and "first-class airlift" mail--disclose that routing patterns were changing during the 1970 base year. In addition to the long established method of using the services of certificated airlines as common carriers, the U.S. Postal Service (USPS) was implementing "Air Taxi Service" in Michigan--companies operating under contract to the USPS and restricted exclusively to hauling mail.

Although it was not possible to obtain sufficient data for preparation of tables on mailing routings like those for air freight (Tables II-4 and II-5), the AAT work did provide some significant insights:

- Mail transported by air to and from Michigan tends to be enplaned at the airport closest to true origin and deplaned at the airport closest to ultimate destination. Very little "local airport diversion" occurs.

- For planning purposes, it can be assumed that the predominant use of Air Taxi Service in Michigan will be to and from the following nine postal Section Centers: Detroit, Flint, Grand Rapids, Iron Mountain, Jackson, Kalamazoo, Lansing, Saginaw and Traverse City.

These insights, together with Michigan Aeronautics Commission data on airport mail volumes for various years, were used to develop the adjusted estimate of base year mail traffic in Table II-7.*

A simplified approach for predicting future mail volumes at Michigan airports was judged adequate for purposes of this study. In general, the normative projections of growth in mail transportated by air were applied directly to the airport volumes in Table II-7. In instances where system alternatives called for discontinuance of air carrier services at a Sectional Center city, it was assumed that air taxi services would be expanded to handle the total projected volume. That is, the mail service would not be transferred in such cases to another airport. In instances where it was postulated that air carrier service would be discontinued at a non-Sectional Center city, transfer of the affected volume to the next closest airport with air carrier service was assumed.

Aircraft Movement Analysis

The study method used to predict the frequency of nonstop flights between a pair of airports is the "triggering approach" described in the 1969 report: A.T.A. Airline Airport Demand Forecasts, Industry Report. Table II-8 summarizes the relationship between air travel demand and nonstop flights obtained from the method. Underlying the data in Table II-8 are assumptions regarding passenger load factors and sizes of aircraft in use by air carriers. In particular, the "triggering approach" assumes the availability of a 50 seat aircraft for air carrier service between airports less than 350 miles apart.

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*Although 1970 was a year of transition, large fluctuations have occurred in the volumes of mail transported by air in more "normal" years. This results from differing allocations of first-class mail between surfact and air transport.

Table II-7

ESTIMATED BASE YEAR MAIL TRAFFIC
(Thousands of Pounds)

Airport	Inbound	Outbound
Alpena	10	15
Battle Creek	100	500
Benton Harbor	50	210
Detroit Metro	25,000	25,000
Excanaba	30	40
Flint	250	380
Grand Rapids	820	820
Houghton	30	30
Iron Mountain	125	20
Ironwood	3	15
Jackson	250	100
Kalamazoo	520	500
Lansing	700	600
Manistee	3	15
Marquette	95	80
Menominee	15	25
Muskegon	140	300
Pellston	15	15
Tri-City	700	600
Sault Sainte Marie	60	40
Traverse City	120	50
Total	29,036	29,355

Table II-8

PASSENGER TRAFFIC VS. SERVICE FREQUENCY

Number of Nonstop Flights	Distance Between Airports (miles)			
	Less than 350	350-799	800-1599	Over 1600
	(Minimum daily one-way passengers required)			
1	20	60	90	90
2	36	81	116	116
3	56	105	151	151
4	81	123	176	186
5	110	136	201	226
●				
●				
●				
10	216	320	455	972
●				
●				
●				
15	400	614	2062	2220
●				
●				
●				
20	1480	1075	2778	2965

In application of the "triggering approach," study methods accounted for the interrelationship between amount of passenger demand and number of flights offered. That is, passenger demand increases in response to increased nonstop flights. Thus, in the investigation of a system alternative, a step by step procedure was followed:

1. A preliminary (optimistic) estimate of airport-to-airport demand was prepared and used to determine service frequencies.
2. New demand estimates were made using the service frequencies calculated in Step 1. The new demand estimates were then used to calculate new service frequencies.

The procedure was continued until demand and service frequencies were in agreement.

Airport Facility Estimates

Methods prepared by the study subcontractor, Howard, Needles, Tammen and Bergendoff, allow for calculation of airport facility requirements at a given level of airport activity.* The principal bases for the facility estimates are Federal Aviation Administration advisory materials and engineering standards that are well documented elsewhere.** Selected examples of some of the methods for estimating facility requirements are shown in Table II-9 to illustrate the parametric nature of the methods. While the methods

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*An exception is Detroit Metropolitan Airport, where the scale of activity is much greater than that anticipated at other Michigan airports. Therefore, separate data supplied by the airport authority were used to estimate facility needs for Detroit Metropolitan.

**See, for example, Appendix 2 of the FAA report; "Aviation Demand and Airport Facility Requirement Forecasts for Medium Air Transportation Hubs Through 1980," January 1969.

Table II-9

AIRPORT FACILITY ESTIMATING METHODS
(selected examples)

Type of Development	Unit of Measure	Basis for Facility Estimate	Example
Parking apron for air carrier aircraft	Square yards of pavement	Number of airline gates determined from peak hour aircraft operations and turnaround time. Apron area per gate determined by size of aircraft.	An average of about 8 airline gates are required when annual airline operations total 19,000. A medium-sized airline aircraft (e.g., a DC-9) requires 4,000 sq.yds. of parking and by-pass apron.
Parking apron for general aviation aircraft	Square yards of pavement	Number of outdoor parking spaces determined from number of based aircraft and peak hour itinerant operations.	170 sq.yds. of parking and by-pass apron are required per peak hour general aviation aircraft operation.
Terminal space for airline passengers	Square feet of building space	Determined from "typical peak hour passengers" which in turn is derived from annual enplaned passengers.	Typical peak hour passengers (TPHP) average 0.26 percent of annual enplaned passengers when annual enplanements range from 50,000 to 250,000. Average space per passenger averages 170 sq.ft. for TPHP in the range of 200 to 1,000.
Terminal space for air cargo	Square feet of building space	Determined from average busy day tons of air cargo (1/264 times annual tonnage).	Each ton of daily air cargo requires 97 sq.ft. of building space.
Terminal space for general aviation	Square feet of building space	Determined from peak hour aircraft operations.	Peak hour operations (PHO) average 0.06 percent of annual operations when annual operations range from 100,000 to 250,000. Average space per PHO is 72 sq.ft. when PHO is over 100.
Public vehicular parking area for airline passengers	Number of parking spaces (at 35.5 sq.yds. per space)	Determined from "typical peak hour passengers" (TPHP).	1.65 parking spaces required per TPHP.

are judged to be accurate enough for purposes of this study, they do not account for unusual operating conditions at a specific airport. Even more generalized methods were used to estimate runway and taxiway facility requirements and approach aid requirements, as discussed below.

Runways

The bases for study estimates of needed runway facilities are shown in Table II-10. Five types of runways were considered, each with a different justification criterion. The generalized dimensions also differ among the different runway types. Two features of Table II-10 are particularly noteworthy--the lengths of primary air carrier runways, and the basis for recommending a parallel runway.

The primary runway lengths used in this study are shown in Tabel II-11. As indicated in the table, required length was related to an airport's airline service operational role.* This method follows Federal Aviation Administration guidance, except that the Federal Aviation Administration would generally recommend the longest length listed for a role. For example, a 7,000 foot length would be selected for a C3 airport rather than the 5,000 foot (uncorrected) length used in this study. It is noted, however, that all study lengths fall within the range suggested by the Federal Aviation Administration and generally conform with the lengths to which primary runways have been built in Michigan. Moreover, it is expected that detailed airport master planning will refine the runway lengths that have been recommended in this statewide study.

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*Airline service roles are shown by airport in Part Two of this report.

Table II-10

RUNWAY FACILITIES

Type of Runway	Basis for Need	Runway Length (uncorrected)*	Runway Width	Remarks
Air carrier, primary	Any air carrier aircraft operations	Based on airline service operational role (see Table II-11)	150 ft.	In this study, "capacity" generally equals 80 percent of practical annual capacity (PANCAP). PANCAP is determined from the FAA Advisory Circular, AC 150/5060-3A, "Airport Capacity Criteria Used in Long-Range Planning," Dec. 1969. The 80 percent value is discussed in text. The study approach assumes that a requirement does not exist for simultaneous aircraft instrument operations at Michigan airports other than Detroit.
Air carrier, parallel	Air carrier operations exceed the "capacity" of one runway	85 percent of primary runway length	150 ft.	
General aviation, parallel	Total aircraft operations (air carrier plus general aviation) exceed the "capacity" of one runway	Sufficient to accommodate basic transport aircraft nominally 4700 ft.)	75 ft.	
Air carrier, crosswind	Crosswinds greater than 15 miles per hour more than 5 percent of the time.	85 percent of primary runway length	150 ft.	It is assumed that only one crosswind runway is sufficient to provide required wind coverage. It is further assumed that general aviation aircraft larger than basic transport (i.e., general transport) can be accommodated by air carrier facilities.
General aviation, crosswind	Crosswinds greater than 12 miles per hour more than 5 percent of the time	80 percent of parallel general aviation runway requirement	75 ft.	

* Uncorrected runway lengths are multiplied by a factor (greater than one) to account for airport elevation and mean maximum temperature. Elevation and temperature data were obtained for each airport location alternative in the study. Correction factors were then obtained from FAA Order 5090.3, Appendix 15, Change 1.

Table II-11

PRIMARY RUNWAY LENGTHS

Airline Service Operational Role				
Code	Typical (Existing) Aircraft Served	Length of Haul	Suggested Range in Runway Length (Uncorrected, in feet)*	Length Used in This Study (Uncorrected, in feet)**
A1	B-747, DC-8 B-707	Over 1500 miles	10,000 - 13,000	11,500
A2		500 to 1500 miles	8,000 - 11,000	9,500
A3		Under 500 miles	7,000 - 9,000	8,000
B2	B-727, DC-9	500 to 1500 miles	7,000 - 9,000	8,000
B3		Under 500 miles	6,000 - 8,000	6,000
C3	CV-580	Under 500 miles	5,000 - 7,000	5,000
C5	Small (e.g. 15 passenger)	Under 500 miles	not available	5,000 (corrected)

* From FAA Order 5090.3, "Formulation of 1972 National Airport System Plan," as ammended through February 1972.

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

The study criterion for recommending a parallel runway--generally, aircraft operations at 80 percent of airport capacity--also differs from Federal Aviation Administration guidance. Federal Aviation Administration advisory material* suggests the need for a parallel runway when operations reach 60 percent of airport capacity. Several factors underly the 60 percent value, including:

- Recognition of the time lag that occurs between the planning and construction of a runway (e.g., as much as five years)
- Anticipated growth in aviation activity during and after runway construction
- The effects of congestion when an airport is operating at or near calculated capacity

This study's approach does not consider the first of these factors on the assumption that when the need for a parallel runway is indicated for a particular study planning period, there is the clear implication that detailed planning and construction arrangements should be completed beforehand. Therefore, in this study, and 80 percent of capacity criterion was used for the Short-range and Intermediate-range planning periods, and a 90 percent value for the Long-range period. These criterial were selected after consideration of two factors:

- The forecasted overall rate of growth of aircraft operations at Michigan airports--about 4.5 percent per year
- The placement of the selected base years for aeronautical forecasts within the study planning periods. The year 1975 is the base year for the 1973-1977 period; 1980 for the 1978-1982 period; and 1990 for the 1983-1992 period.

The selected criteria for recommendation of a parallel runway ensure that projected aircraft operations do not exceed calculated airport capacity for the duration of any study planning period.

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*Summarized in FAA Order 5090.3.

Taxiways

Taxiway development was estimated in this study on the basis of runway lengths. Figure II-5 is an example of the procedure. The figure indicates, for instance, that about 79,000 square yards of taxiway are generally required for an air carrier runway that is 8,000 feet long. Assumptions underlying the relationship between taxiway area and runway length are listed in the figure. In particular, it is assumed that all Michigan airports which serve airlines should have a full parallel taxiway system.*

It is noted that there are considerable variations in the layouts of Michigan airports which serve air carriers. Therefore, it is anticipated that future airport master plans may call for different amounts of taxiway area than estimated in this study.

Approach Aids

A highly simplified approach was adopted to estimate air traffic control and navigational aid facility needs for Michigan airports in the air carrier system. Three categories (sizes) or airports were established, and a generalized set of facilities was specified for each type of airport. These facilities are summarized in Table II-12. Although the estimating procedure is judged sufficient for purposes of this study, it is recognized that detailed criteria are employed in establishing actual needs for approach aids.**

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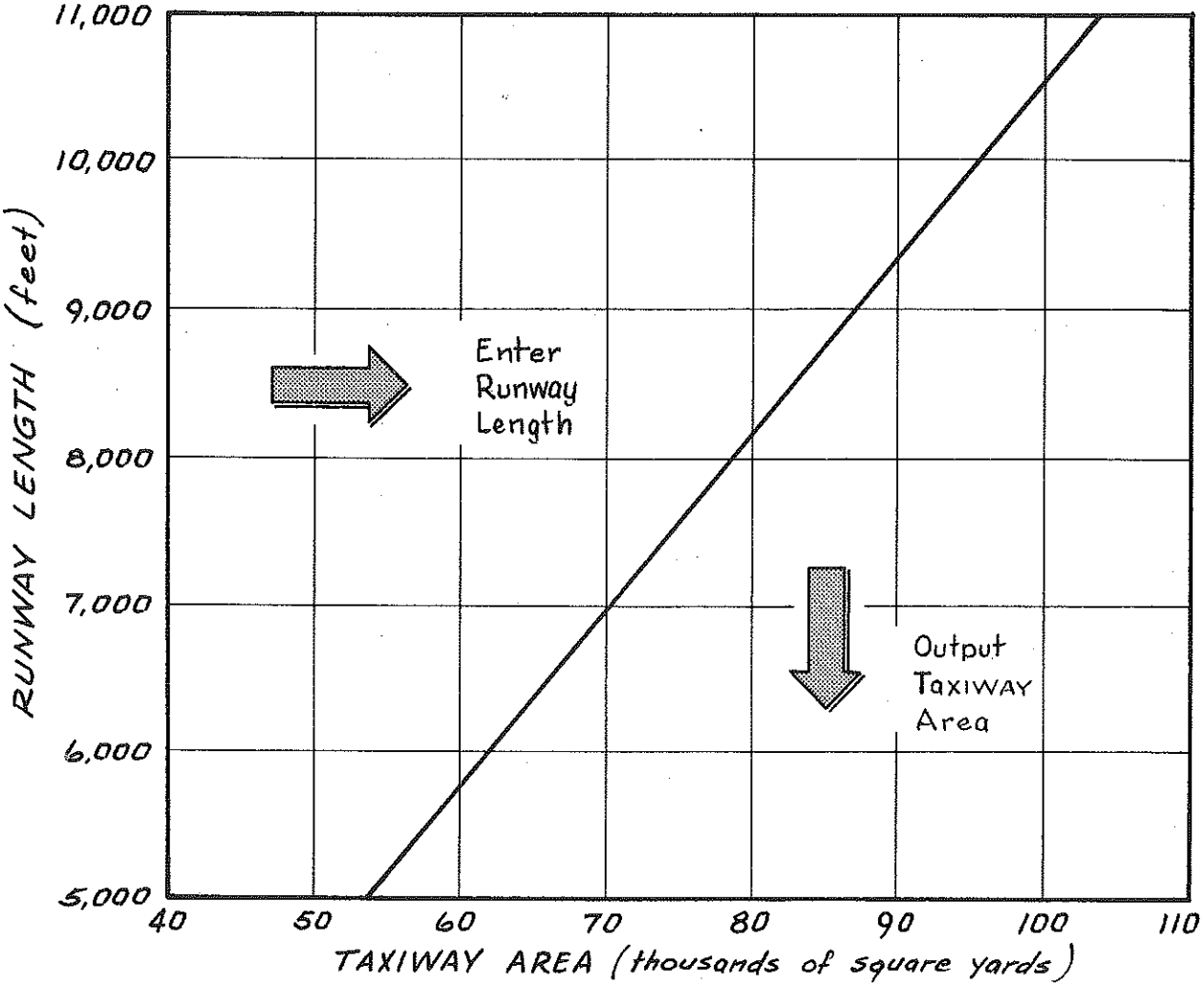
*This assumption is in agreement with FAA Advisory Circular 150/5335-1A.

**See for example, the DOT/FAA Handbook 7031.2A, "Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services," December 1969.

Figure II-5

AIR CARRIER RUNWAY LENGTH VS. TAXIWAY AREA*



*Assumptions:

a) 5 runway exits (including end exits)
b) Full parallel taxiway
c) Design Features
   (1) Runway width = 150 feet
   (2) Taxiway width = 75 feet
   (3) Runway to taxiway line-center separation = 400 feet

Source: Howard, Needles, Tammen and Bergendoff

Table II-12

GENERALIZED APPROACH AID REQUIREMENTS

Type of Facility	Primary Airport (over 1 million annual enplanements)	Secondary Airport (50 thousand to 1 million annual enplanements)	Feeder Airport (under 50 thousand annual enplanements)
Control Tower Facilities	yes	yes	no
Radar	yes	no	no
Radio Beacon	yes	yes	yes
Terminal VOR	yes	yes	yes
DME (Distance Measuring Equipment)	no	yes	yes
ILS (Instrument Landing System)	One Category I System & one Category II System	A Category I System	A single Mark I unit
VASI (Visual Approach Slope Indicators)	no	6-Box	4-Box
REIL (Runway End Identifier Lights)	Six Units	Four Units	Two Units

Note: Enplanement levels that establish airport categories include both air carrier and general aviation enplanements.

Source: HNTB Analysis

Application of Methods

As a test, the methods to estimate facility requirements were first used to estimate 1970 facility needs on the basis of actual 1970 airport activity levels. The estimates obtained were then compared with actual 1970 facilities. For most airports, and for most categories of development, estimated facilities agreed with actual facilities. Overall, however, estimated facilities exceeded actual facilities at most airports. The prinicpal variations were related to:

- The estimated need for full parallel taxiway systems
- Estimated needs for longer (e.g., by 500 feet) or wider runways (e.g., 150 feet rather than 100 feet)
- The estimated need for larger than existing passenger terminal facilities

The results of the test were not used to modify the estimating methods. Instead, it was concluded that, while Michigan airports have demonstrated the ability to operate with less extensive facilities than are desirable, the standards underlying the estimating methods are a proper basis for planning.

In Task Group 4 of this study, the facility estimating methods were made sequentially by study planning period.* For example, predicted airport activity in the Short-range period was used to estimate facility needs for that period. Where estimated Short-range facilities exceeded actual 1970 facilities, it was assumed that construction would occur. Then, facility needs for the Intermediate-range period were estimated. Development in the Intermediate-range period was calculated as the difference between that period's facility needs and those previously calculated for the Short-range period.

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*In Task Group 3 of the study, the facility estimating methods were employed in the analysis of a number of alternative 1990 air carrier systems.

on the basis of the facility estimates for each planning period, Michigan Aeronautics Commission personnel estimated land acquisition requirements.

Evaluation Criteria

Two principal measures of impact were obtained for each air carrier system alternative that was analyzed:

- estimated time and cost of travel for passenger users of the air carrier system
- estimated cost of development for Michigan airports in the system alternative

A third measure--aircraft noise exposure--was also quantified in the analysis. The noise exposure results were not used to choose between alternative systems but did influence the nature of recommended development at some airports in the proposed air carrier system.

Although this subsection addresses the three measures quantified in the analysis, it is noted that other potential evaluation criteria were considered in the study, including impacts on:

- airport operating costs and revenues
- airline operations
- air cargo users
- community economic activity
- other modes of travel

It was found that some of these measures did not vary significantly among air carrier system alternatives (e.g., amount of travel by other modes). Other measures proved difficult to quantify and were assumed to be otherwise accounted for in the choice among alternative air carrier systems (e.g., (1) improved airline service is an indicator of favorable economic impact on a community; (2) feasibility of airline operations was treated

in the aircraft movement analysis of each alternative). Where possible, the potential criteria were included in the analysis qualitatively.

Airport Development Costs

To obtain system cost of airport development, unit cost factors were applied to estimate facility requirements. The study subcontractor, Howard, Needles, Tammen and Bergendoff, developed the unit costs used in the analysis. Unit costs for airfield and terminal development are displayed in Table II-13.* Costs for air traffic control and navigation aids are given in Table II-14.

It should be noted that the unit costs were intended to represent statewide averages. Thus, they do not reflect unusual conditions at a specific site. Also, the unit costs are expressed in 1970 dollars for compatibility with other portions of the analysis. Since 1970, cost increases have been substantial. For example, statistics in the Engineering News Record" (for Detroit) indicate that costs rose by 34 percent between 1970 and early 1973.

Land acquisition costs were estimated by Michigan Aeronautics Commission staff. These estimates were made separately by airport and cost per acre ranged from under $400 to over $4,000 (in 1970 dollars).

Traveler Benefits

The term "traveler benefits" is used to describe the study treatment of travel times and travel costs in the analysis of air carrier system alternatives. Travel times and costs were calculated for passenger users of the air carrier system and, in a given study planning period, differences between alternatives were measured.

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*Other unit costs were included in portions of the analysis, but were not used in final estimates of air carrier system costs. For example, the final estimates do not include costs of aircraft fueling facilities or general aviation hangers.

TABLE II-13

UNIT COSTS FOR AIRPORT DEVELOPMENT
(1970 Prices)

Item	Construction Costs	
	Existing Airport	New Airport
Air Carrier Runway	$22.00/S.Y.	$20.00/S.Y.
General Aviation Runway	15.00/S.Y.	14.00/S.Y.
Air Carrier Taxiway	22.00/S.Y.	20.00/S.Y.
General Aviation Taxiway	22.00/S.Y.	20.00/S.Y.
Air Carrier Apron	22.00/S.Y.	20.00/S.Y.
General Aviation Apron	15.00/S.Y.	14.00/S.Y.

	Existing or New Airport
Terminal Building, Air Carrier	$35.00/S.F.
Terminal Building, General Aviation	25.00/S.F.
Cargo Facility	20.00/S.F.
Vehicular Parking	6.50/S.Y.

S.Y. = square yard

S.F. = square foot

Source: HNTB analysis

Table II-14

APPROACH AID COSTS*
(Thousands of 1970 dollars for facilities and equipment)

Type of Facility	Primary Airport	Secondary Airport	Feeder Airport
Control Tower Facilities+	$ 472	$334	-
Radar	2,454	-	-
Radio Beacon	85	46	12
TVOR	91	91	91
DME	-	50	50
ILS	885	354	217
VASI	-	30	20
REIL	60	40	20

* See Table II-12 for description of airport categories and facilities.

+ Excludes cost of building

Source: HNTB Analysis

Travel time and travel cost expenditures were first measured for a "base case" in each planning period. Each base case included the 21 Michigan air carrier airports of 1970, essentially the same airline routes as 1970, and flight frequencies appropriate to passenger demand levels. Times and costs were accumulated for each Michigan travel zone to and from all other travel zones in the study. All elements of a trip were accounted for, including:

- airport surface access
- terminal time and parking cost at the originating airport
- air fares
- enroute delays (except in the case of nonstop flights)
- terminal activity and surface egress from the destination airport.

Comparable amounts of time and cost expended for air travel were then calculated for alternatives to the base case. On a zone to zone basis, the times and costs of an air trip could vary among alternatives because of differences in:

- predicted traveler choice of airports (because of new airports or relative changes in the quality of air service at existing airports)
- differences in air service between airport pairs (e.g., postulated introduction of nonstop service or increased frequency of flights)

Moreover, the number of air travelers between a pair of zones could differ among alternatives. When air service was better in one alternative than another:

- some travelers were predicted to switch to air travel from other modes of transportation
- some induced air travel was predicted (e.g., travel by air rather than use of time and money for other (non-travel) activities)

These predictions were based on the output of the study's Passenger Demand Model, described earlier in this Section.

For use in the analysis, differences in travel time between system alternatives were first measured in minutes and then converted to dollar equivalents. The conversion requires an estimate of the value that travelers place on their time. This value was derived from the Passenger Demand Model. Since the model represents a best estimate of travelers' behavior and values, it provides for a reasonably accurate assessment of the value that travelers place on their time. The nominal value of time obtained from the model averaged $12 per hour, statewide.

Benefits to air travelers in both alternatives being compared were calculated directly from time and cost improvements. Benefits to new air travelers (those diverted from other modes of travel and to those induced to travel because of improved air service) were calculated according to the economic theory of consumer surplus. On the basis of this theory, average per traveler benefits for new air travelers are calculated to be about one-half those accruing to persons who traveled by air in both alternatives.*

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*The first "new" passenger benefits nearly as much as the average "old" passenger. The last "new" passenger is at the borderline of not traveling and benefits very little.

As an example of the magnitudes of various elements of traveler benefits, the total annual traveler benefit calculated for the Recommended System relative to the Base Case was $54.6 million in 1990. This total includes the following elements, in millions of dollars:

Travelers in both alternatives	
Travel cost savings	$ 5.9
Dollar value of time savings	$ 36.7
New traveler benefits	$ 21.0

Aircraft Noise Exposure

Noise exposure forecast (NEF) contours were used in the study to investigate potential conflicts between aircraft noise from air carrier activity and land use in areas adjacent to airports. The contours were prepared using an approximate method outlined in a recent report for the Federal Department of Housing and Urban Development.* The approximate method is judged sufficient for purposes of this study in view of the state-of-the-art in measuring the impacts of airport-related noise.

To construct NEF contours for an airport, estimates of daily aircraft operations by type of aircraft and time of day are required. The estimates used in the study are shown in Table II-15.**

Calculated noise contours are compared for 1970 and 1990 in Figure 11-6 at the 30 NEF (effective perceived noise decibals) level. This level is currently accepted as a proper one for estimating airport noise conflicts with such land uses as schools, hospitals and residences. However, a more acceptable criteria for residential areas may be 25 NEF.*

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*Wilsey and Ham, "Aircraft Noise Impact-Planning Guidelines for Local Agencies," 1972.

**The activity values overstate projected 1990 activity at most Michigan airports. However, the resulting noise contours would not be appreciably smaller at lower levels of activity.

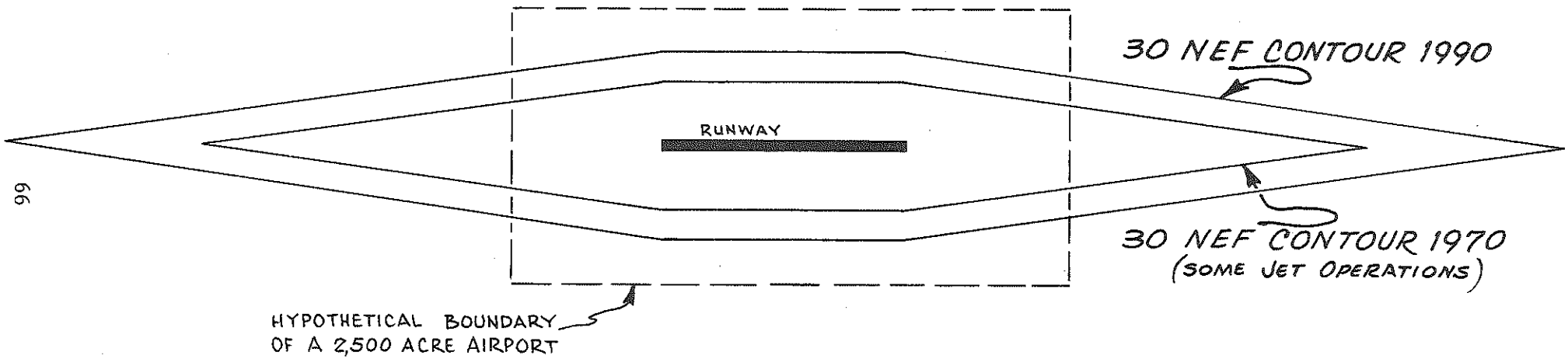
Table II-15

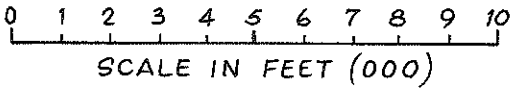
AIRPORT ACTIVITY ESTIMATES FOR CONSTRUCTING NOISE CONTOURS

	1970 Activity	1990 Activity
Total daily air carrier operations (takeoffs p us landings)	36	80
Percent of operations by aircraft type		
Type B (i.e., DC-9)	37%	75
Type C (i.e., CV-580)	67	25
	100%	100%
Percent of operations by time of day		
Day (7:00 a.m. to 10:00 p.m.)	92%	92%
Night	8	8
	100%	100%

Figure II-6

APPROXIMATE NOISE CONTOURS





For many commercial, industrial and agricultural land uses an NEF of 40 may be appropriate. For these reasons, Figure II-7 displays 25, 30 and 40 NEF contours.

Comparision of Alternatives

In the study, the principal basis for recommending elements of one air carrier system alternative over those of another was the comparison of calculated traveler benefits and estimated airport development costs.

For proper comparison with development costs, it is desirable to express annual traveler benefits as a single value, even though the benefits occur over the economic life of the airport development. Discounted cash flow techniques were used to convert traveler benefits to a single value. An economic life of 25 years for airport developments was assumed, together with a discount rate for the opportunity cost of capital of seven percent.* For most of the comparisons, two simplifying assumptions were also made:

- It was assumed that traveler benefits calculated for the year 1990 were representative of the average year's traveler benefits over a 25 year economic life (rather than separately discounting each year's benefits).
- It was assumed that airport development costs were incurred as one lump sum at the beginning of the economic life of the improvements (rather than spread over several years).

On this basis, the calculated traveler benefits for 1990 were multiplied by the factor, 11.6, for comparison with airport development costs.

Table II-16 is an example of the cost benefit procedure, comparing elements of two air carrier system alternatives:

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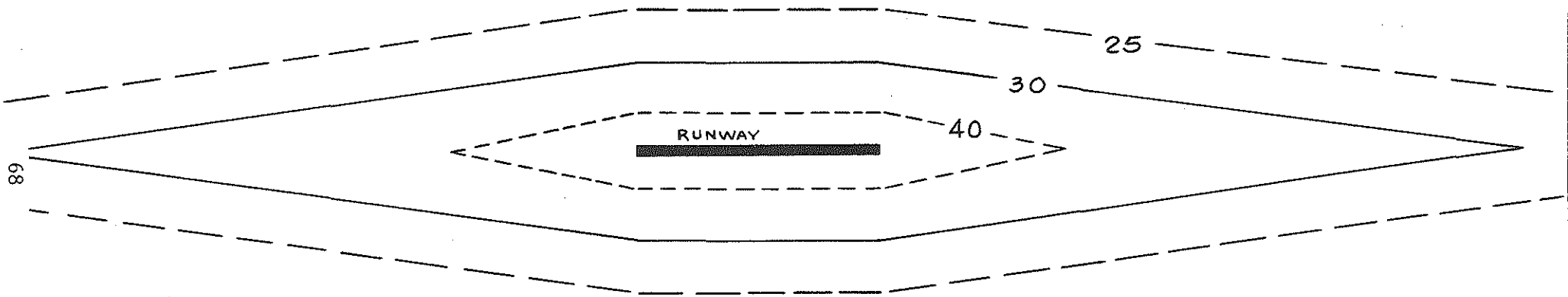
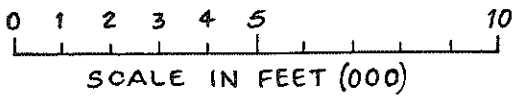
*Current federal government guidelines suggest the use of a discount rate of ten percent, with future cash flows expressed in then current dollars. In this study, future cash flows are expressed in 1970 dollars. A seven percent discount rate implies an annual rate of inflation of about three percent.

Figure II - 7

APPROXIMATE NEF CONTOURS FOR A MEDIUM-SIZED MICHIGAN AIRPORT - 1990





DIMENSIONS (Miles)

NEF CONTOUR	LENGTH	MAXIMUM WIDTH
25	12.2	1.4
30	7.7	0.9
40	3.1	0.4

Table II-16

COMPARISON OF SITE 105 WITH BASE CASE
($ million)

	System that includes Site 105 between Tri-City and Flint
1990 traveler benefits by zone relative to base case (See Section I for map of zones)	
Flint	-0.2
Sagnaw	0.5
Bay Cities	-0.3
Annual Total	-2.7
Discounted Total over 25 years	-31.4
Estimated costs of airport development relative to base case*	
Flint	-12.6
Site 105	27.2
Tri-City	- 9.6
Total	5.0
Net Benefit of Site 105 relative to Base Case (Traveler benefits minus extra development cost)	-36.4

*Estimated costs of airport development in Base Case (between 1970 and 1990) are $15.4 million for Flint and $11.8 million for Tri-Cities. All of these costs would not be avoided by constructing an airport at Site 105, because it is assumed that Flint and Tri-Cities would continue to serve general aviation.

- In one of the alternatives, it is assumed that air service would be introduced at a new location (Site 105) between the existing Flint and Tri-City airports. The existing airports would continue to serve general aviation but would not have air carrier service. Travelers would access Site 105 by surface transportation.

- The other alternative (the "base case") assumes continued air carrier (and general aviation) service at Flint and at the Tri-City airport.

In the example, travelers would disbenefit with the introduction of Site 105. Longer airport access trips would not be counterbalanced by better air service at the new site. Also, the estimated cost of constructing a new airport is larger than that for developing each of the existing airports.

In the analysis of system alternatives, sufficient data were developed to perform cost-benefit comparisons for each of the airport location alternatives described earlier in this section. Moreover, in cases where changes to Michigan's existing air carrier system appeared desirable or necessary, working papers of the analysis were prepared and discussed with interested local area representatives. As a result of these procedures, a recommended disposition of each location alternative was developed. These recommendations are summarized in Table II-17.

As indicated in Table II-17, three location alternatives are recommended:

- Site 104, between Battle Creek and Kalamazoo
- Site 107, a new airport north of Detroit
- Site 201, a new (replacement) airport for Sault Ste. Marie.

Each of these recommended alternatives should be investigated in detail at the master planning level before development occurs.

Table II-17

DISPOSITION OF LOCATION ALTERNATIVES

A. Location alternatives that employ the "regional airport concept" at existing sites.

Alternative	Introduce "Regional Airport Service" at	Affected Airports**	Disposition
10	Grand Rapids	Muskegon	Not recommended, Muskegon passenger inconvenience.
20*	Kalamazoo	Battle Creek	Not recommended because of site constraints and other factors.
30*	Battle Creek	Kalamazoo	Not recommended. Kalamazoo passenger inconvenience.
40	Tri-City	Flint	Not recommended. Flint passenger inconvenience.
50	Flint	Tri-City	Not recommended. Inconvenience for Saginaw and Bay City passengers.
60	Lansing	None identified	Not recommended. Consolidation of traffic not feasible.
70	Escanaba	Iron Mountain, Menominee	Not recommended. Traveler inconvenience for Iron Mountain and Menominee passengers.

*A working paper provides details of the analysis of this alternative.
**As determined in the Task Group 3 analysis.

Table II-17, concluded

B. Location alternatives that introduce air carrier service at new locations.

Location Alternative (site number)	Site for New Air Carrier Service	Affected Airports**	Disposition
101	Ottawa County	Muskegon, Grand Rapids	Not recommended. Advantages to Muskegon outweighed by Grand Rapids passenger inconvenience.
102	Allegan County	Muskegon, Grand Rapids, Kalamazoo, Benton Harbor	Not recommended. Passengers in all areas adversely affected relative to other alternatives.
103	Barry County	Grand Rapids, Kalamazoo, Battle Creek	Not recommended. Passengers in all areas adversely affected.
104*	Kalamazoo County	Kalamazoo, Battle Creek	Recommended.
105	Saginaw County	Tri-City, Flint, Lansing	Not recommended. Inconvenience to Flint and Bay City passengers.
106	Shiawassee County	Tri-City, Flint, Lansing	Not recommended. Passengers in all areas adversely affected.
107*	Northern Oakland County or Macomb County	Flint	Provisionally recommended pending a site location study.
108	Kalkaska County	Traverse City, Pellston	Not recommended. Passengers in both areas adversely affected relative to other alternatives.
109*	Menominee County	Escanaba, Iron Mountain, Menominee	Not recommended.
110	Northern Delta County or Southern Marquette County	Escanaba, Marquette	Not recommended. Passengers inconvenienced in both areas.
201*	Chippewa County	Sault Ste. Marie	Provisionally recommended pending a site location study because of restrictions at existing site.

*A working paper for the area provides details of the analysis of this alternative.
**As determined in the Task Group 3 analysis.

III GENERAL AVIATION SYSTEM ANALYSIS

The Michigan Aeronautics Commission has undertaken responsibility for planning general aviation airport development in the current statewide study. This development was planned for the short-term period (0-5 years), intermediate period (6-10 years) and long-range period (11-20 years).

For each study period, a four step approach was used as follows:

1. Define and describe existing airports.
2. Forecast number of based aircraft.
3. Forecast number of aircraft operations.
4. Identify deficiencies of existing airport facilities and plan improvements.

In applying the planning method, emphasis was placed on refining and expanding the plan for general aviation facility improvements that were developed in the 1970-75 Michigan State Airport Plan. The steps of the planning method are discussed below.

Define and Describe Existing Airports

The principal purpose of this step was to describe the existing system which was used as a benchmark for future planning. For the short-range planning period (0-5 years), the existing airports are those of 1970. Similarly, the "existing" airports for the intermediate planning period (6-10 years) are those in the short-term period, plus those for which development is justified for the intermediate period.

Descriptions of existing airports for 1970 was based on information maintained by the Michigan Aeronautics Commission and the Federal Aviation Administration. Federal Aviation Administration and Michigan Aeronautics Commission facility record forms were used to define the existing airport

activity throughout the state. Other sources of information were the State Aeronautical Charts, Airport Directory and activity estimates from the Traffic Counter Program.

Michigan's 1970 airport system was comprised of 294 licensed or approved airports, six seaplane bases, two heliports and four military fields. In addition, there were some 467 personal use landing strips throughout the state which were not licensed, approved or charted on the State Aeronautical Chart.

Following is a condensed summary of the type of airport facilities existing in 1970:

Lighted airports	107
Paved airports	96
Lighted and paved airports	84
Airports with 4000' runways or longer	32
Airports with published instrument approach procedures	65
Publicly owned airports (open to public)	118
Privately owned airports (open to public)	176
Airports with commercial air carrier service	21
Airports with scheduled commuter service	12
Airports with FAA control towers	12

Section II of Part 2 of this report describes the existing features of the airports that are included in the system plan.

General Aviation Based Aircraft Forecasts

Throughout the state system plan, the state's 13 planning and economic development regions were used for analysis and forecasting purposes. (See Figure I-1 for the regional boundries.)

The method used for forecasting the number of based general aviation aircraft at the region level was to project based aircraft as a function of a region's population.

The population figures used for the based aircraft forecasts were developed by Howard Bevis, a sub-contractor of Stanford Research Institute. Previous population projections made by the State of Michigan were also considered in the analysis.*

For each planning region, 1970 per capita aircraft factors were calculated. These factors are displayed in Table III-1. The table also displays factors for 1975, 1980 and 1990. The growth in per capita ownership reflected by these data are a consensus of several predicted growth rates (net of population effects) for the United States. The National Growth rates were adopted because the past growth in Michigan's general aviation aircraft fleet parallels that of the United States.

After analyzing past aircraft growth, it was determined that four sets of growth factors were needed to project future based aircraft for the state. Table III-1 lists the growth factors used for each planning region.

Table III-1

PLANNING FACTORS FOR FORECASTING BASED GENERAL AVIATION AIRCRAFT

State Planning Region	Based Aircraft Factor (to be multiplied by region population in thousands)			
	1970	1975	1980	1990
1	0.47	0.59	0.70	0.94
2, 3, 4, 5, 6, 7, 8	0.77	0.96	1.16	1.54
9, 10	0.88	1.10	1.32	1.76
11, 12, 13	0.60	0.75	0.90	1.20

*Population data used for calculations are shown in Part 2 of this report on the "Regional Summary Sheets"

As an example of the use of the Table III-1 factors, the Flint Region (Region 5) population in 1970 was 559,000. On this basis, predicted aircraft would be:

(559) (0.77) = 430 based aircraft

This compares with an actual number of 1970 based aircraft of 468, according to Michigan Aeronautics Commission records. This method is judged to be sufficiently accurate for planning purposes.

Estimating Process

The process used to develop based aircraft estimates for the individual airports that are included in the system plan incorporate the following steps:

1. Multiply each planning regions population for the short, intermediate and long-range periods by the factors shown in Table III-1. The product was total based aircraft for each zone by time period.
2. The next step was to distribute aircraft to each county within the region. To do this, the incremental increase in based aircraft for each time period was calculated. The incremental increase in based aircraft was then distributed to each county within the region in proportion to each counties percent of estimated population for the region.

   As an example: If a region was projected to have an increase of 200 aircraft between 1970 and the end of the first time period and if a county within the region had 40 percent of the regions population, then that county had 80 aircraft (40% of 200) added to their 1970 based aircraft count.

These same calculations were made to determine the incremental increase in based aircraft between the short and intermediate time periods and between the intermediate and long-range periods. In each case, the increase for a county was added to the based aircraft estimate for the previous time period. This process was used to take into account the existing distribution of based aircraft in the 1970 base year.

3. Projection of based aircraft at a level of detail finer than the region and county levels is properly the function of an individual airport master plan. However, for subsequent steps of the statewide planning process, it was necessary to estimate the number of based aircraft for small geographic areas. Therefore, an allocation of based aircraft to communities within each region was made in this study.

   This allocation of based aircraft to the airports within the counties considered such factors as geographic distribution of population, highway networks and locations of existing and proposed airports within the county. The allocation process also considered the effects that population and airport distribution of adjacent counties would have on a particular county.

Table III-2 lists the existing and projected based aircraft for the 13 state planning regions. Part 2 of this report entitled, "Study Results," lists, by region, the estimates for each airport included in the state plan.

Table III-2

State Planning and Development Regions

GENERAL AVIATION BASED AIRCRAFT

Region Number	1970	1975	1980	1990
1	710	2,960	3,710	5,700
2	234	270	360	520
3	422	470	600	910
4	246	290	380	600
5	468	610	830	1,340
6	338	400	530	850
7	498	710	940	1,450
8	788	1,030	1,370	2,120
9	94	130	150	230
10	166	190	240	360
11	45	50	60	80
12	102	140	170	270
13	51	70	80	120
Totals:	6,162	7,320	9,420	14,550

Individual Airport Estimate Limitations

A word of caution should be given when using the based aircraft and operational data for the individual airports. Since no airport can be viewed independently from other airports, the estimates shown assumes that all the airports will be developed according to the State Airport Plan recommendations for each time period. This is especially important in the urban areas where the development or lack of development of one airport will influence the activity at another airport. As an example, the plan calls for the development of a number of satelite airports in the Grand Rapids area. If an airport is not improved or enlarged according to the recommendations of the state plan, the activity levels at the other airports will be affected. This rational should be used when developing master plans for individual airports. Local sponsors and consultants should consider the extent to which the development or lack of development of adjacent airports will affect the state plan forecasts for a particular airport.

General Aviation Fleet Mix

In addition to knowing the total number of aircraft in use during the future planning periods, it is also necessary to know the types or sizes of aircraft that must be accommodated in the State of Michigan.

As a guide, the projections of Table III-3 were used for estimating the statewide fleet mix of aircraft.

Table III-3

A NATIONAL PROJECTION OF GENERAL AVIATION FLEET MIX

Type of Aircraft	Percentage of General Aviation Fleet 1970	1975	1980	1990
Single engine, reciprocating 1 - 3 Place	34%	29%	24%	19%
Single engine, reciprocating 4 + Places	48	51	55	59
Multiengine, reciprocating	13	13	12	12
Single and multiengine, turboprop	1	2	3	3
Multiengine, turbojet	1	1	2	2
Other (e.g., Rotocraft)	3	4	4	5
Total	100%	100%	100%	100%

Source: R. Dixon Speas Associates. Extrapolated to 1990 by Stanford Research Institute.

The significant feature of the projections in Table III-3 is that the state plan is estimating a decrease in the proportion of small single engine aircraft in the fleet. This decrease is due to the high attrition of small single engine aircraft built in the 1940' and early 1950's and the trend toward more sophisticated single and multi engine aircraft. The estimates show that there will be 2½ times as many single and multi turboprop and turbojets in 1990 as there was in 1970.

Forecasts of General Aviation Operations

Forecasts of general aviation aircraft operations* are required to analyze the adequacy of airport facilities. Numerous approaches to forecasting aircraft operations are suggested in aviation literature.

One braod approach is to forecast operations on the basis of total based aircraft, with different planning factors used depending on the type of airport (e.g., whether the airport is in a metropolitan area, whether the airport serves air carriers). Expamples of this "airport feature" method include:

*An operation is defined as a takeoff or landing.

1. The FAA planning approach--as described in "Formulation of the 1972 National Airport System Plan."
2. The approach described in "Transportation Predictive Procedures, Technical Report 9A" by the Michigan Aeronautics Commission.

An analysis has been conducted to develop revised factors for this approach in Michigan. Source data on airport operations included those from the Michigan Traffic Counter Program, FAA 5010-1 forms (for air carrier airports) and FAA control tower counts for 1970. The planning factors resulting from the analysis are displayed in Table III-4. As shown in the table, the state is again divided by planning regions and two types of airports are distinguished.

Table III-4

PLANNING FACTORS FOR GENERAL AVIATION OPERATIONS

State Regions	Airport Type	Annual Operations per Based Aircraft		
		Itinerant	Local	Total
1	Air Carrier and/or tower	350	350	700
	General Aviation only, no tower	275	550	825
2, 3, 4, 5, 6, 7, 8	Air Carrier and/or tower	450	450	900
	General Aviation only, no tower	250	500	750
9, 10	Air Carrier and/or tower	450	550	1,000
	General Aviation only, no tower	500	500	1,000
11, 12, 13	Air Carrier and/or tower	300	475	775
	General Aviation only, no tower	450	900	1,350

When the planning factors of Table III-4 are applied to individual airports, in an attempt to replicate 1970 operations, rather poor results are often obtained. The Kalamazoo Airport (Planning Region 3) is an example of one of the worst cases as shown below.

	Actual General Aviation Operations (1970 Tower Count)	Predicted Operations (195 based General Aviation Aircraft)
Local	63,000	88,000 (450 x 195)
Itinerant	63,000	88,000 (450 x 195)
Total	126,000	176,000

Although predictions of general aviation operations need not be extremely accurate for planning necessary airfield capacity (because capacity is added in large increments relative to aircraft operations), errors of this magnitude suggested that other forecasting approaches be examined. However, the examination suggested no alternative to the "airport features" approach that yielded consistently better results in replicating 1970 operations. These discrepancies appear to arise because of unique airport operating patterns--patterns that can be expected to continue in the future. Therefore, forecasts of operations were made on an incremental basis for airports whose 1970 operations are known. The Michigan Traffic Counter Program and the Federal Aviation Administration control tower statistics were the primary sources for determining 1970 general aviation operations.

In the incremental approach, the appropriate "airport features" planning factor was applied to the increase (or decrease) in based general aviation aircraft to determine the increase (or decrease) in operations. This calculated number of operations was added to (or subtracted from) 1970 operations. As a hypothetical example, consider a general aviation non-tower airport (Planning Region 6) for which 1970 operations are known:

Predicted 1975 aircraft	100
Less actual 1970 aircraft	-50
Increase in based aircraft	50

Predicted increase in total annual operations: 50 aircraft times 750 operations per aircraft* = 37,500.

Actual 1970 operations	55,500
Plus predicted increase	+ 37,500
Predicted 1975 operations	93,000

For airports where 1970 operations are not known, future operations were predicted by applying the planning factors to the total predicted based aircraft. Thus, in the hypothetical example posed above, predicted operations were calculated as:

Predicted 1975 aircraft	100
At 750 operations per aircraft	x 750
Predicted 1975 operations	75,000

This method is judged to be sufficiently accurate for generalized statewide planning purposes.

Table III-5 lists the estimated general aviation operations for the 13 state planning regions. Part 2 of this report lists the generalized estimated for each airport in the system plan.

During the more detailed master planning process for the individual airports, the generalized estimates shown in Section III-5 should be refined to take into account the individual peculiarities of an airport such as; percent of instructional activities; type and size of based aircraft; etc. Individual circumstances could change the total number of operations per based aircraft and have a definite influence on the ratio of local and itinerant operations.

Study Criteria for New and Existing Airports

There ar two basic measures as to whether a particular airport is included in the 1990 general aviation system plan:

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*From Table III-4.

Table III-5

State Planning and Development Regions
GENERAL AVIATION AIRCRAFT OPERATIONS
(by year, 000 operations)

Region Number	1970	1975	1980	1990
1	2,011	2,272	2,884	4,468
2	172	211	268	400
3	358	406	515	786
4	179	234	300	475
5	376	489	662	1,383
6	266	310	416	669
7	370	530	685	1,075
8	510	773	1,046	1,529
9	99	127	161	233
10	148	177	216	304
11	58	66	79	113
12	111	145	182	263
13	45	61	81	120
Totals:	4,703	5,801	7,490	11,818

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

Aviation Capacity

In some areas of Michigan, existing general aviation airports are sufficient in number to accommodate forecasted 1990 general aviation activity levels. However, in many of the major urban areas of the state (e.g., Detroit, Flint and Grand Rapids) activity is expected to exceed the capacity of existing airports. In these major urban areas, both existing and new airports are included in the plan to provide sufficient aviation capacity.

Geographic Distribution

Not all of the airports in the 1990 Plan are included by reason of aviation capacity. Some airports are included to achieve a general aviation system that is convenient to all areas within Michigan.

To establish a convenient aviation system that is also cost-effective, the cost and time of airport ground access for general aviation users have been considered in realtion to costs of airport development. Table III-6 illustrates this concept. The table is an example of the levels of expenditure that can be justified for a new airport in terms of the ground access cost savings. For instance, if the new airport would save an average of 20 minutes per trip to the airport, and if 20 aircraft are expected for the new site, then an expenditure of approximately $1 million (table value is $1080 thousands) would be cost-effective (under the assumptions noted). This amount of money represents the total discounted savings in user ground access costs during

*The preceeding section described activity forecasting methods.

Table III-6

JUSTIFIABLE EXPENDITURE FOR A NEW GENERAL AVIATION AIRPORT

($ 000)

Average time saved per ground access trip to new site (minutes, one way)	Based Aircraft at New Site 2	5	10	20	50
5	$ 27	$ 68	$ 135	$ 270	$ 672
10	$ 55	$ 135	$ 270	$ 540	$ 1,350
20	$ 107	$ 270	$ 540	$ 1,080	$ 2,700
30	$ 162	$ 405	$ 810	$ 1,620	$ 4,050
60	$ 324	$ 810	$ 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

Discount rate for the opportunity cost of capital = 7 percent

Source: "Public Investment in General Aviation Airport: An Application of Cost Benefit Economics," by Mathematica, 1967.

the economic life of the airport. A sample calculation of the annual cost savings that lead to the values in Table III-6 is displayed in Table III-7.

Other Considerations

In addition to providing sufficient aviation capacity at a geographically balanced set of airport locations, other factors have been considered in the general aviation airport plan for 1990. These factors relate to the economic value of a general aviation airport to the community it serves.

Throughout the United States, many communities have discovered that among the many factors vital to the economic health of their area is the availability of adequate general aviation airport facilities--their industries are dependent on general aviation aircraft.

The number of general aviation aircraft used by business is (according to a 1970 estimate by the National Business Aircraft Association) 25,000. Nearly 375 of the companies listed in Fortune Magazine's top 500 industries operate business aircraft. These aircraft, according to Federal Aviation Administration estimates, are used to fly more than seven million hours a year, which compares with fewer than five million revenue hours flown in scheduled domestic service of the passenger/cargo certificated route air carriers.

In Michigan, some examples of airports which have been improved or established to stimulate or keep pace with business are Mt. Pleasant, Galdwin and Cheboygan. In the case of Cheboygan, justification for the development of a new airport consisted of statements of potential use by business, which would account for over 800 operations per year.

In many parts of the State of Michigan, recreation is a major industry and must be considered in airport planning. Examples of airports which serve resort areas may be found at Bellaire, Charlevoix and Mackinac Island. At

Table III-7

CALCULATION OF ANNUAL GROUND ACCESS COST SAVINGS
FOR A NEW GENERAL AVIATION AIRPORT

1. Assume, for purposes of illustration, that the average time saved by users of the new site would be 20 minutes per trip (as opposed to accessing other airports). This implies that the new site is approximately 13 miles closer than other airports (40 miles per hour).

2. Assume that the average ganeral aviation user values his time at $10 per hour.

3. Assume an average of 2.5 persons per flight and further, that all persons in the party travel to and from the airport in one automobile.

4. From Items 1 and 2, the value of time savings per person-trip is:
   20 minutes x $10/hour = $3.33

5. From Items 1 and 3, the vehicle cost savings per person are calculated as: 13 miles x 7 cents/mile ÷ 2.5 persons = $0.36

6. From Items 4 and 5, the cost savings per one-way airport access person trip totals $3.33 + $0.36 = $3.69

7. Assume, for purposes of illustration, that 10 aircraft would be based at the new site.

8. Assume that the average aircraft makes 400 annual itinerant operations--each of which implies trips to or from the airport.

9. Assume that the average aircraft also makes 500 annual local operations and that each five local operations generates one trip to or from the airport.

10. From Item 3 and Items 7 through 9, the annual number of person-trips to and from the airport is calculated as:

$$2.5 \times 10 \times \left(400 + \frac{500}{5}\right) = 12{,}500$$

11. From Items 6 and 10, the savings in annual ground access costs totals $3.69 x 12,500 = $\underline{46 thousand}$.

all three of these airports, traffic for the resort area has justified the expenditure of funds for improvements to serve large aircraft, including charter flights.

The demand for both business and recreational flying is expected to increase and the Michigan Aeronautics Commission is attempting to provide adequate general aviation facilities to meet these future demands.

Airport Classifications

Once an airport was included in the plan, it was then necessary to estimate the role of the airport for each time period in the plan. The planning periods used for analysis are as follows:

Planning Periods	Fiscal Years	Base for Aeronautical Activity Forecasts
Short Range	1973 - 1977	1975
Intermediate	1978 - 1982	1980
Long Range	1983 - 1992	1990

In order to keep the Michigan State Airport System Plan compatible with the Federal Aviation Administration's National Airport System Plan, we have used the Federal Aviation Administration's method of classifying general aviation airports as "Utility" or "Transport" airports. A Utility airport is designed to accommodate general aviation aircraft weighing under 12,500 pounds and a transport airport is designed to accommodate aircraft over 12,500 pounds including business jets.

Tabel III-8 lists the general aviation classification. Shown on this table are the activity levels used for assigning classifications to each airport, the percentage of aircraft that each catagory will accommodate and the average length of the longest runway.

Table III-8

GENERAL AVIATION AIRPORT CLASSIFICATION
(Operational Role)

Airport Type	Code	Activity Level	Percentage of General Aviation Fleet Accommodated	Average Length of Longest Rwy
Basic Utility, State I	BI	Less than 10 aircraft based at airport.	75%	2700'
Basic Utility,	BII	More than 10 based aircraft. Less than 20,000 operations per year	95%	3200'
General Utility	GU	More than 20,000 operations per year, or 500 operations per year by General Utility type aircraft.	98%	3800'
Basic Transport	BT	500 or more operations per year by business jet aircraft	99+%	5000'
General Transport	GT	Substantial operations by very large general aviation aircraft (over 60,000 pounds gross weight)	100%	6500' + -

Basic Utility Stage I (B-I) - This size airport is primarily intended to serve low activity aircraft locations, such as communities with small populations and remote recreational areas. Having less than 10 based aircraft, it is assumed that the airport would not qualify for federal funds and, therefore, construction costs would have to be derived from state and local funds.

Basic Utility Stage II (B-II) - Having over 10 based aircraft this type airport would normally qualify for federal funds, but the activity levels would be less than that of the General Utility classification.

General Utility (G.U.) - These airports are primarily intended to serve (1) communities located on the fringe of a metropolitan area and, (2) relatively large communities remote from a metropolitan area. The Federal Aviation Administration requires 500 operations per year by General Utility type aircraft (e.g., King Air, Twin Beech, etc.) before they will provide funds to expand or construct an airport to this size. Past experience has shown that in Michigan, an airport usually has 500 operations per year by general utility type aircraft when their total operations exceeds 20,000 per year.

Basic Transport (B.T. or Business Jets) - As with the General Utility airports, the Federal Aviation Administration requires 500 operations per year by this type aircraft (business jets) in order to qualify for expansion to this classification. But, unlike the general utility classification, there is no total operational level that will adequately indicate when an airport will have 500 operations per year by business jets. In the absence of an operational indicator, the Michigan Aeronautics Commission takes the general position that each county should have a basic transport airport (in some cases, a basic transport airport near the county line can serve the business jet needs of two or more counties).

Business jet runway requirements vary in length from 4600' to 7000' based on the type of jets and their trip lengths. Since it is beyond the scope of the statewide planning study to determine exactly which business jets will use each airport, 5000 foot runways are recommended for planning purposes (5000' lengths are sufficient for most business jets).

General Transport (G.T.) - The general transport airports accommodate airplanes up to 175,000 pounds gross weight. In planning the general aviation system, it is assumed that the general transport type aircraft will primarily be accommodated at the Michigan airports that currently have air carrier service.

Recommended Development

Table III-9 lists the type of development that would typically be associated with each of the general aviation airport classifications discussed in the previous section. Figure III-1 shows what an airport would look like, given the development listed in Table III-9.

It should be emphasized that the recommended development shown represents typical airport layouts and a detailed master plan is required for each airport in the plan to develop more detailed construction estimates.

At the time of actual airport construction, it is likely that the airport layout would not look like the diagrams in Figure III-1 as a result of a particular sites soils, topography, wind conditions, adjacent land uses, etc. In any event, the total amount of development would be similar to that shown in the diagrams.

For planning purposes, the acre of land shown is the average amount that would be required to construct the runway(s), taxiways and apron and to provide clear zones for each runway.

Table III-9

TYPICAL PLANNED DEVELOPMENT
BY TYPE OF GENERAL AVIATION AIRPORT

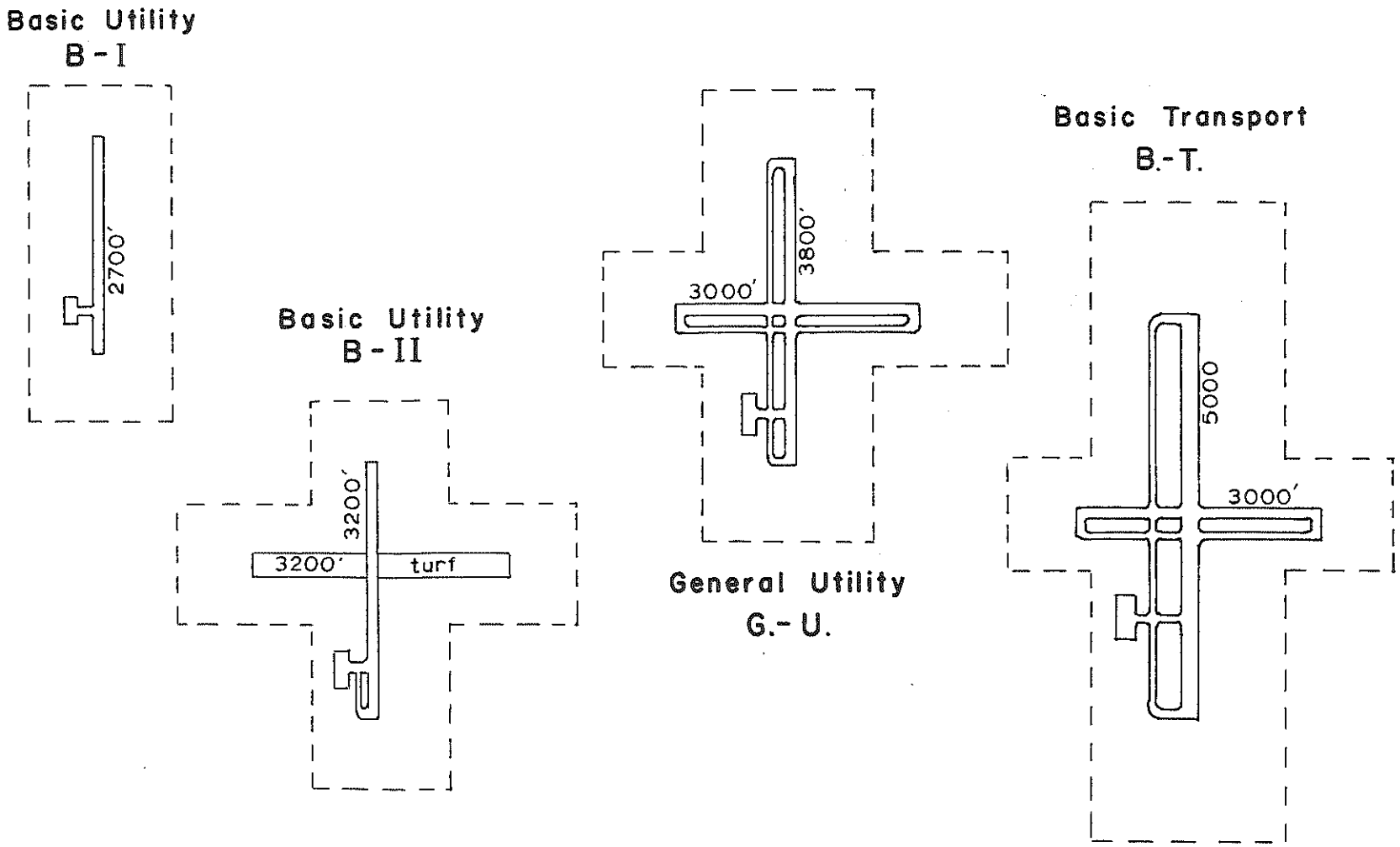
Type	Basic Utility-Stage I (B-I)	Basic Utility-Stage II (B II)	General Utility (GU)	Basic Transport (BT)
Land	180 acres	300 acres	450 acres	800 acres
Airfield Paving				
Primary Runway	2,700' x 60'	32,00' x 60'	3,800' x 75'	5,000' x 100'
Crosswind Runway	--	3,200' x 100' (turf)	3,000' x 75'	3,000' x 75'
Parallel Taxiway	--	800' x 30' (partial)	7,600' x 40'	10,000' x 40'
Other: Taxiways	400' x 30'	1,200 x 30'	800' x 30' 400' x 40'	800' x 30' 800' x 40'
Apron	2,200 sq. yards	2,800 sq. yards	5,600 sq. yards	5,600 sq. yards
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 indentifier 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 Building

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

Figure - III-1

TYPICAL AIRPORT LAYOUT



Part 2, Section V, of this report entitled, "Airport Activity and Development," lists the state plan's generalized airport development recommendations for each airport in the state plan by planning periods.

PART TWO: STUDY RESULTS

IV AIRSPACE AND NAVIGATIONAL AIDS

Airspace Analysis

The scope of this analysis was designed to project where airspace problems are likely to exist and if it is reasonable to assume that these problems can be resolved. The three major tasks of this investigation were to: (1) examine the interaction of an airport at Site 107 (approximately in the Mount Clemens - Utica area) with other airports projected to be located near it in 1990, (2) examine the airspace problems which may arise with the construction of an airport at Site 104 (located approximately midway between Battle Creek and Kalamazoo) by 1990 and (3) perform a brief examination of possible airspace problems affecting IRF general aviation and air carrier operations that may arise as the proposed general aviation system is implemented.

Site 107

The Airport System Plan proposes the introduction of short-haul air carrier service in the general area of northern Oakland County or Macomb County by 1990. Reference has been made to the possible use of Selfridge Air National Guard Base for this service. Due to the number of other air carrier and general aviation airports projected to operatie in close proximity to this site, a brief examination of airspace compatibility was performed. A simple graphical analysis of various alternative arrival and departure routes, corresponding to projected origin-destination patterns, was performed to determine areas of congestion and points of conflict. This technique required that possible arrival and departure routes be drawn to scale and examined for intersections of the projected routes. The nature and intensity of congestion and traffic conflicts were then examined and a judgemental determination made as to whether the congestion and points of conflict could be eliminated, or

acceptably minimize through the implementation of various air traffic control procedures, or by anticipated technological advances in the ATC system.

Because of the many uncertainties regarding future airport location and operation, certain assumptions had to be made to conduct this analysis. Site 107's location was assumed to be on the present site of Selfridge AFB with a north-south primary runway orientation. The air traffic using this airport is projected to be primarily short-haul air carrier operations of less than 600 miles. Detroit Metropolitan Airport will be the region's primary air carrier airport. Detroit City Airport will operate exclusively as a general aviation airport. Information on the use of Canadian airspace was not immediately available but it was assumed that there would be very few restrictions placed on the use of this airspace as there are no major Canadian terminal air traffic hubs in this area. The scope of this analysis was further limited in that noise, air pollution and other community or environmental factors which may constrain airspace usage were not considered.

The primary runway orientation of the region's major airports was found to be generally north-south though most do have secondary runway capabilities for east or west operations. For a south traffic flow it was found that considerable interaction can occur between Site 107 departures to the southwest and arrivals at Detroit City, Detroit Metropolitan and Willow Run. There is also a large amount of interaction between Detroit Metropolitan and Willow Run traffic. However, it is believed that standard arrival and departure procedures can be implemented which would eliminate most points of conflict. Flint traffic should generally be compatible with Site 107 operations. North traffic flows can cause interaction between Site 107 arrivals from the west and southwest and traffic at the other three major Detroit airports. Again, it is believed that this problem can be reduced to an acceptable level

through the use of standard traffic structuring procedures. If generally east or west flows were initiated at all four airports the major problem encountered would be the interaction of Willow Run and Detroit Metropolitan air traffic. However, the simple graphical analysis technique which was used was not considered sensitive enough to determine if this problem could be resolved. In all likelihood, east or west instrument operations at Willow Run and Detroit Metropolitan would be interdependent. Site 107 traffic should present no major problems according to these east or west flow scenarios.

In addition to the airports mentioned above, there are five general utility airports, Romeo, Berz Macomb, McKinley, Marine City and a new general aviation airport in the Mt. Clemens area, which would be located near Site 107. It was determined that Romeo and Marine City operations would cause generally little interaction with Site 107 assuming a low percentage of instrument operations. Site 107 operations would, however, restrict departures to and arrivals from the east at McKlinley, Berz Macomb and the new Mt. Clemens airport.

This limited analysis indicates that a short-haul air carrier airport could probably be operated in the assumed location at the traffic levels projected for 1990. The introduction of terminal air carrier traffic into this area, together with the projected growth patterns of both general aviation and air carrier traffic throughout the entire region, will cause a significant increase in air traffic congestion in certain parts of the region's airspace. This congestion can be reduced to a tolerable level by strict structuring of the region's arrival and departure routes. In addition, general aviation traffic would be restricted and structured more than at present. It is not at all unlikely that a Terminal Control Area (TCA) would be established in the area by 1990, with Detroit Metropolitan designated as the primary airport. Congestion and points of conflict will probably be even further reduced by the introduction

of technological innovations such as Computer Assisted Approach Sequencing (CAAS), R-Nav approaches, steep approaches and curved MLS approaches.

Site 104

The state plan recommends that a regional airport be developed in the area between Battle Creek and Kalamazoo to serve the air carrier needs of both communities. This regional airport would also serve a fairly large general aviation population. In addition, it is proposed that the existing airports at Battle Creek and Kalamazoo would continue to serve general aviation.

It is difficult to evaluate the airspace impact of an airport whose exact location and runway configuration is uncertain. The major airspace impact of an airport located midway between Kalamazoo and Battle Creek would be an affect on IFR operations. IFR operations at the new regional airport would interact with the IFR operations of at least one, if not both, of the other airports.

The degree of interaction is dependent on the exact location and configuration of the airport and is, therefore, difficult to predict. The intensity of this interaction is also influenced by the amount of IFR air traffic using each of the airports. Based on the current percentages of IFR traffic in this area, there would be about 13,000 annual IFR operations at Kalamazoo, 10,000 at Battle Creek and 24,000 at the projected regional airport in 1990. (These figures do not take into account the trend of an increasing percentage of general aviation aircraft using IFR services. As such, they should be considered more of a lower bound than an actual projection). Assuming the installation of appropriate air traffic control facilities, this level of IFR traffic could be handled safely, if not always expeditiously. In particular,

operation of this proposed system of airports would lead to some congestion delays to IFR traffic. No estimate of the magnitude or acceptability of these delays was made due to the uncertainty of so many factors. In addition, a regional airport in this area could restrict VFR air traffic and require strict airspace structuring.

After this brief examination of the use of Site 104 for a regional airport, it was determined that this site appears feasible for the level of operations projected for 1990. An exact determination of feasibility will depend critically on precise site locations.

General Aviation Airport System

The third task of this analysis was to complete a brief examination of the General Aviation System in an effort to determine possible airspace problems which may develop as the plan is implemented. This examination was limited to the proposed new airport sites of General Utility and Basic Transport airports. This was felt to be sufficient since the existing general aviation airports had previously been examined and because it was felt that the traffic activity generated by Stage I and II Basic Utility airports would rarely cause even moderate airspace problems because they would not have significant IFR traffic, if any at all. The airport specifications for General Utility and Basic Transport airports used in this examination process are those detailed in Part 1, Section III of this report.

In Planning Region 1 there were not any major problems evident, with the exception of Mount Clemens, as discussed above. The interaction of Farmington with other airports is highly dependent upon its runway orientation. Airspace problems for this airport should be averted by proper design.

For the remainder of the lower half of the Lower Peninsula*, some problem areas were identified. The Battle Creek/Kalamazoo area was discussed above. Another problem may exist between East Lansing/Williamston and Holt/Mason airports. This does not appear to be a major problem, however, since both airports are projected to serve light to moderate traffic. Another problem may arise between Flint and Flint/Davidson since Flint/Davison is projected to be located near the final approach course to Flint. Again, this problem is related to the final location and orientation of the runway system and might be resolved by proper design. The exact location of Grand Rapids West also deserves serious consideration.

No major airspace problems due to the projected use of the new airports is readily apparent for the rest of the state.

It should be emphasized that there may be unforseen airspace problems because of the uncertainty of actual airport location and runway orientation. Just as most of the airspace problems mentioned could probably be resolved through relocation and reorientation of the airports, so could new problems arise in other areas if airports are relocated. For example, if Grand Ledge Airport were to be located even a few miles north or east of its proposed location, it may affect operations at Lansing. If relocated south, it may affect Charlotte - Fitch H. Beach Airport

Instrument Landing Systems

At the present time, the Federal Aviation Administration has installed 18 conventional VHF/UHF instrument landing systems (ILS) in the State. These precision landing aids provide electronic guidance to the pilot during an instrument approach to a runway during adverse weather conditions.

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*Planning Regions 2, 3, 4, 5, 6, 7, and 8.

As equipment and funding is available, the Federal Aviation Administration's policy is to install a VHF/UHF ILS at all air carrier airports and those busy general aviation airports that meet the installation requirements.

The Federal Aviation Administration is currently developing a new type of precision landing system called a microwave landing system (MLS). There are many reasons for converting the national system from the convential ILS system to the MLS system but the prime reasons are: (1) lack of available VHF raido frequencies to meet the projected demand for conventional ILS's, (2) MLS systems are less expensive to install and maintain and, (3) the microwave systems will provide the same information as the current VHF/UHF ILS but utilize a higher radio frequency which permits complete signal formation within their antenna and, thus, eliminate the terrain, snow accumalation, monitoring and multi path problems which are associated with the lower frequency conventional system.

The Federal Aviation Administration plans to continue to install the conventional ILS system until a fully developed microwave system is available in the late 1970's or early 1980's. The state plan assumes that the Federal Aviation Administration will install a conventional ILS system at the air carrier airports that do not currently have such a system.

Since a fully developed Federal microwave system will not be available for about another 10 years, the Federal Aviation Administration will announce, in early 1974, standards for an interim microwave landing system (IMLS). It is anticipated that the IMLS will be eligible for federal funding under the Federal Aviation Administration's Airport Development Aid Program (ADAP).

The state airport plan recommends the installation of microwave landing systems at general aviation airports that are anticipated to have consistant

use by jet aircraft. (There is currently a microwave system installed at Antrim County Airport, Bellaire, Michigan that is being used for test purposes.) Initial installations would use the interim standards and later in the 1980's change to the fully developed national standard.

It is anticipated that when the interim microwave standards are finalized, the State of Michigan will initiate a program to install microwave landing systems to supplement the national system. This program would be similar to the current VOR program, in that the state would consider the installation of a microwave system, on a state/local funding basis, at locations that demonstrate a need, but fall short of the justification needed for federal funding.

Figure IV-1 shows the location of current and proposed ILS's and proposed MLS's.

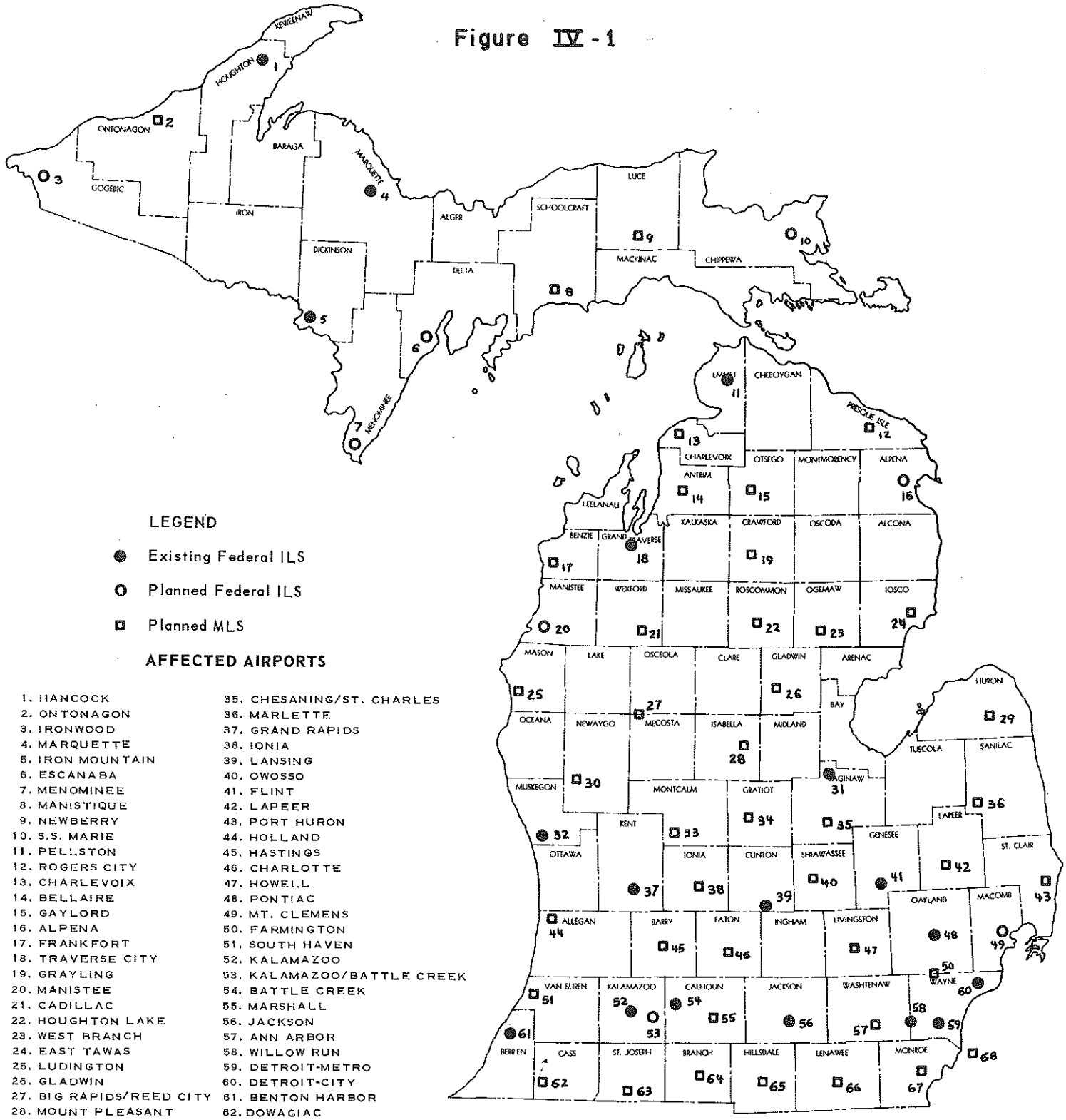
VOR Coverage

At present, extensive VOR coverage is provided in Michigan by a combination of federal and state-owned facilities. Coverage is adequate over essentially all the state at reasonable altitudes. Associated DME facilities (VOR/DME or VORTAC) are less extensive but cover the most heavily traveled air routes in the state.

At the present time, there are 30 federal (including two military) and seven state-owned VOR's in the state. 27 of the federal VOR's have DME capability and the state is planning to install DME on all their VOR facilities starting with the one at Mount Pleasant. It is not anticipated that additional VOR's will be needed during the 20 year planning period. Figure IV-2 shows the location of the federal and state-owned VOR's.

PROPOSED 1990
INSTRUMENT LANDING SYSTEMS

Figure IV-1



LEGEND

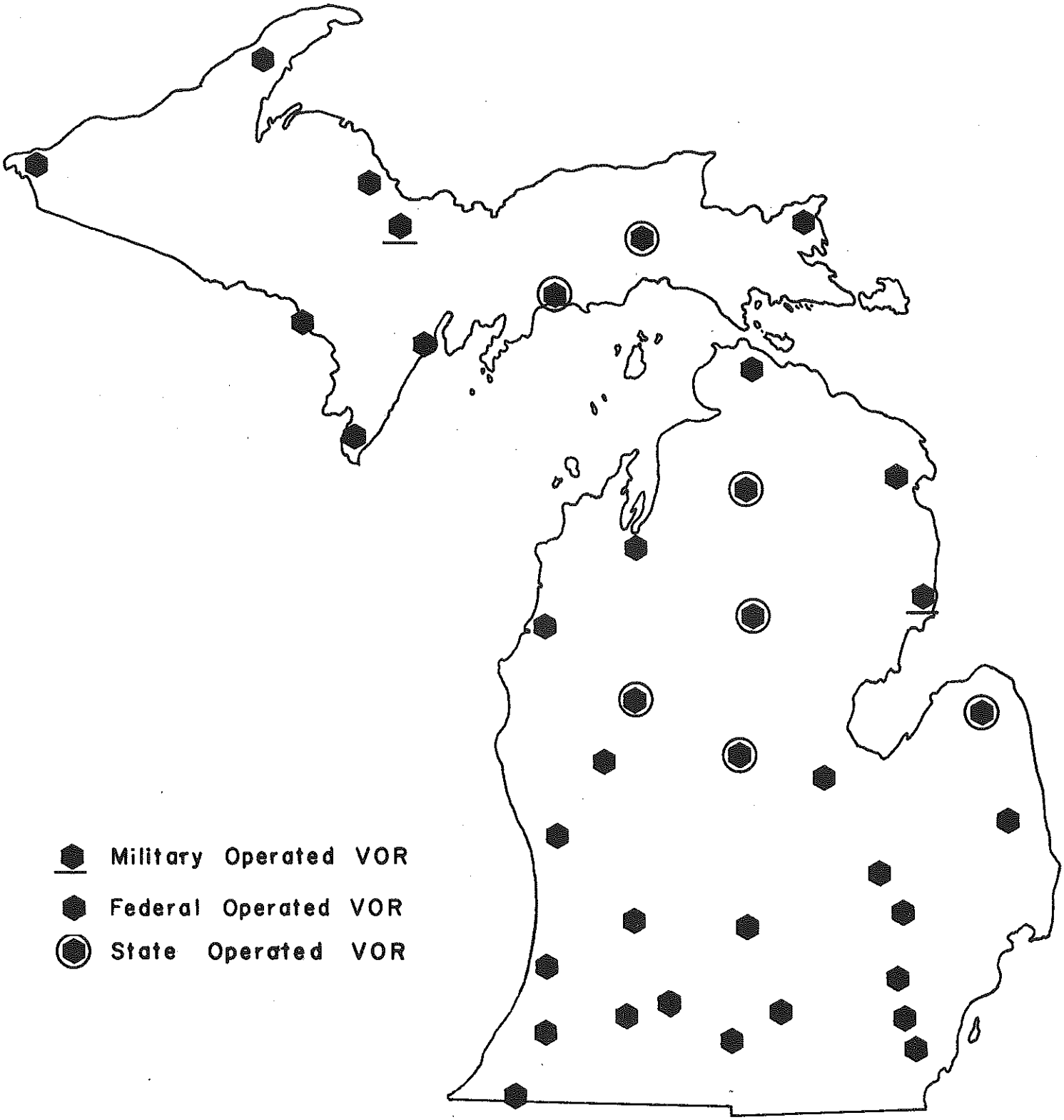
- ● Existing Federal ILS
- O Planned Federal ILS
- □ Planned MLS

AFFECTED AIRPORTS

1. HANCOCK
2. ONTONAGON
3. IRONWOOD
4. MARQUETTE
5. IRON MOUNTAIN
6. ESCANABA
7. MENOMINEE
8. MANISTIQUE
9. NEWBERRY
10. S.S. MARIE
11. PELLSTON
12. ROGERS CITY
13. CHARLEVOIX
14. BELLAIRE
15. GAYLORD
16. ALPENA
17. FRANKFORT
18. TRAVERSE CITY
19. GRAYLING
20. MANISTEE
21. CADILLAC
22. HOUGHTON LAKE
23. WEST BRANCH
24. EAST TAWAS
25. LUDINGTON
26. GLADWIN
27. BIG RAPIDS/REED CITY
28. MOUNT PLEASANT
29. BAD AXE
30. FREMONT
31. SAGINAW
32. MUSKEGON
33. GREENVILLE
34. ALMA
35. CHESANING/ST. CHARLES
36. MARLETTE
37. GRAND RAPIDS
38. IONIA
39. LANSING
40. OWOSSO
41. FLINT
42. LAPEER
43. PORT HURON
44. HOLLAND
45. HASTINGS
46. CHARLOTTE
47. HOWELL
48. PONTIAC
49. MT. CLEMENS
50. FARMINGTON
51. SOUTH HAVEN
52. KALAMAZOO
53. KALAMAZOO/BATTLE CREEK
54. BATTLE CREEK
55. MARSHALL
56. JACKSON
57. ANN ARBOR
58. WILLOW RUN
59. DETROIT-METRO
60. DETROIT-CITY
61. BENTON HARBOR
62. DOWAGIAC
63. STURGIS
64. COLDWATER
65. HILLSDALE
66. ADRIAN
67. MONROE
68. GROSSE ILE

Figure IV-2

EXISTING VOR's



V AIRPORT ACITIVTY AND DEVELOPMENT

This section contains the following for each of the state's Planning and Development Regions:

1. A summary data sheet for the region.
2. A map showing the locations of the airports that are included in the state plan.
3. Individual data sheets for each airport.

Summary Data Sheets

The summary data sheets lists regional totals for items that were used during the system planning process. These sheets include estimates for population, value added, general aviation based aircraft and general aviation operations.

The derivations of the population and economic estimates and an explaination of their use is explained in Part 1 of this report. In addition to their use in the air carrier airport analysis, the population estimates were also used as the basis for estimating future based general aviation aircraft.

The procedures used to estimate general aviation based aircraft and operations is explained in Part 1, Section III of this report.

Planning Region Maps

Following each Regional Data Sheet is a map for that region showing each airport that is included in the plan.

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 period.

One symbol is used in the figure to identify airports that serve both air carrier 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.

Individual Airport Data Sheets

Listed alphabetically by planning region are individual data sheets for each airport in the plan. The principal objective of these sheets is to display operational forecasts and recommended development for each airport in the proposed system plan. Selected items appearing on the work sheet are explained below.

Airport Name. In cases where a "new" airport is listed, the city name shown refers to a general location and does not mean that the new airport would be located immediately adjacent to the city shown.

Operations - (takeoff and landings). The operations are shown in two catagories--total annual and itinerant. The difference between these two is local operations--in general, aircraft not departing the immediate vicinity of the airport.

Functional Role. Is a means of catagorizing airports according to a combination of total operation and enplaned passengers. See Table V-1 for functional role designations.

Operational Roles. Are a means of catagorizing the nature and extent of activity accommodated by a given airport. Operational roles are shown in Table V-2. For airports serving both air carrier aircraft and general aviation aircraft, a dominant and subordinate role are given. Either the air carrier or general aviation role is dominant, depending on

which enplanes the most passengers. For example, if there are more air carrier operations, then the air carrier role is dominant and the general aviation subordinate.

Recommended Development. Based on the objectives of a system plan, the recommended development is generalized in nature. This development should not be interpreted as an adequate substitute for detailed airport master planning.

Table V-1

Airport Functional Roles

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

*Total of air carrier and general aviation activity.

Table V-2

Airport Operational Roles
CLASSIFICATION OF AIRPORTS SERVING AIR CARRIERS

Code for Operational Role*	Type of Activity: Length of Longest Flight	Type of Activity: Examples of Largest Aircraft Accommodated
A1	Over 1500 miles	Large Jet Aircraft (i.e., B-747, B-707 and DC-8)
A2	500 to 1500 miles	
A3	less than 500 miles	
B2	500 to 1500 miles	100 Passenger Jet (i.e., DC-9)
B3	less than 500 miles	
C3	less than 500 miles	50 Passenger Turbo-prop (i.e., CV-580) Small (i.e., 15 passenger) Aircraft
C5	less than 500 miles	

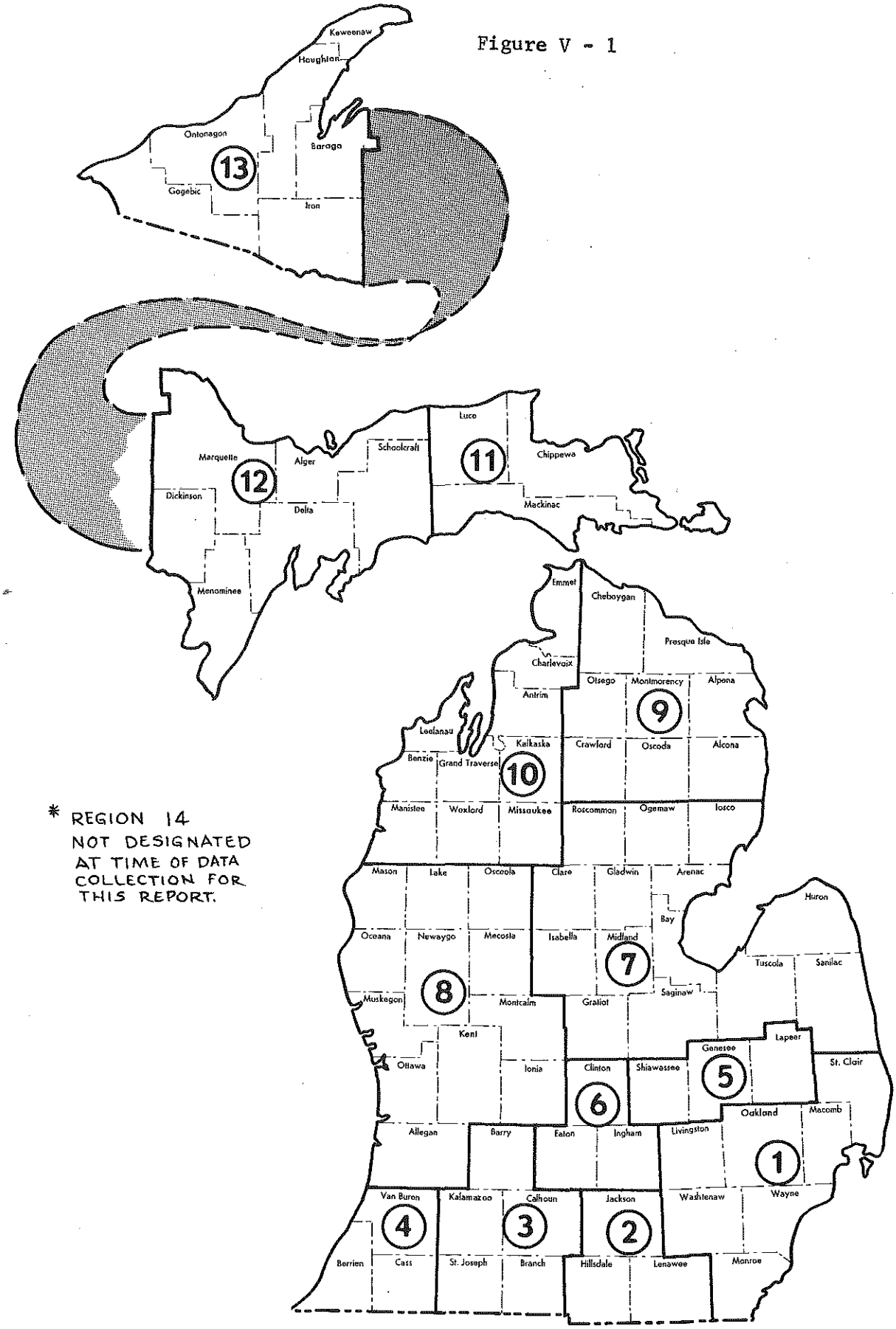
Airport Operational Roles
CLASSIFICATION OF AIRPORTS SERVING GENERAL AVIATION

Code for Operational Role	Airport Type	Level of Activity
BI	Basic Utility, Stage I	Less than 10 aircraft based at airport
BII	Basic Utility, Stage II	More than 10 based aircraft. Less than 20,000 operations per year
GU	General Utility	More than 20,000 operations per year or 500 operations per year by general utility type aircraft
BT	Basic Transport	500 or more operations per year by business jet aircraft
GT	General Transport	Substantial operations by very large general aviation aircraft (over 60,000 pounds gross weight)

*Includes those roles applicable only to Michigan

INDEX TO STATE PLANNING AND DEVELOPMENT REGIONS *

Figure V - 1



* REGION 14 NOT DESIGNATED AT TIME OF DATA COLLECTION FOR THIS REPORT.

SUMMARY DATA SHEET

State Planning & Development Region - 1

Table V - 3

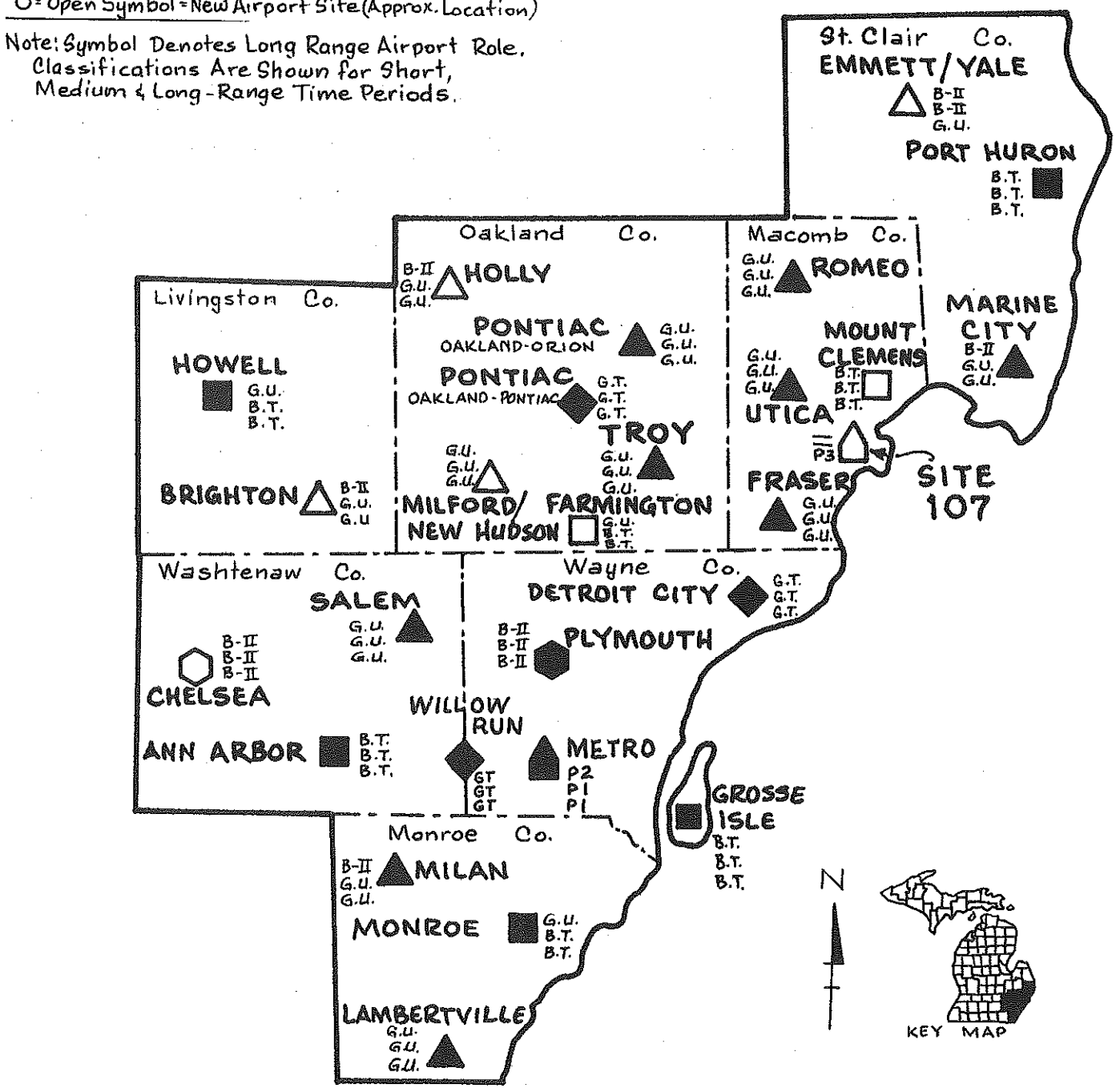
	1970	1975	1980	1990
POPULATION (000)	4,731	5,011	5,306	6,062
VALUE ADDED ($ Millions)	25,259	29,155	33,822	46,264
GENERAL AVIATION BASED AIRCRAFT	2,710	2,960	3,710	5,700
GENERAL AVIATION OPERATIONS (000)	2,011	2,272	2,884	4,468

Generalized Data Sheets Follow For Airports At: Ann Arbor, Troy, Birghton, Chelsea, Detroit-Metro, Detroit-City, Detroit-Grosse Ile, Detroit-Willow Run, Emmett/Yale, Farmington, Fraser, Holly, Howell, Lambertville, Marine City, Milan, Milford/New Hudson, Monroe, Mt. Clemens, Plymouth, Pontiac-Oakland, Pontiac-Oakland-Orion, Port Huron, Romeo, Salem, Utica, Site 107

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 1

Figure V - 2



CITY : Ann Arbor

PLANNING REGION: 1

AIRPORT NAME : Municipal

LOCATION : 4.0 mi. S

ELEVATION : 835'

EXISTING FACILITIES: Rwys 6/24 3500x75 paved; 12/30 2700x250 turf; lights; fuel; tower U-2

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	133	180	220	310
Total Aircraft Operations (100/year)	1097	1485	1815	2557.5
Itinerant Operations (100/year)	366	495	605	852.5
Enplaned Passengers (1000/year)	54.9	74.3	90.8	127.9
Functional Role	S2	S2	S2	S1
Operational Role – Dominant	B-II	B.T.	B.T.	B.T.
Operational Role – Subordinate				
Length of Longest Runway	3500'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 6/24 to 5000'
   Extend Taxiway to 6/24
   Construct Runway 12/30 to 3800'
   Construct Parallel Taxi to 12/30
   Extend Apron
   Strengthen Runway and Taxi 6/24
   Strengthen Existing Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and Taxi Marking
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Construct New Runway 6R/24L to 5000'
   Parallel Taxi to 6R/24L
   Construct Connecting Taxiways
   Construct Taxi Streets
   Extend Runway 12/30 to 5000'
   Extend Taxiway to 12/30
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install Precision Landing System
   Install and Relocate VASI
5. Other:
   Obstruction Removal
   Runway and Taxi Marking

Long-Range

1. No Development

CITY : Troy

PLANNING REGION: 1

AIRPORT NAME : Grand Prix

LOCATION : 1.5 mi. E

ELEVATION : 730'

EXISTING FACILITIES: Rwys 5/23 2950x35 and 9/27 3855x50 paved; lights; UNICOM; fuel

REMARKS: Recommend purchase and expansion of this privately-owned facility

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	204	180	200	200
Total Aircraft Operations (100/year)	1683	1485	1650	1650
Itinerant Operations (100/year)	561	495	550	550
Enplaned Passengers (1000/year)	84.2	74.3	82.5	82.5
Functional Role	S2	S2	S2	S2
Operational Role – Dominant	G.U.	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3855'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Existing Airport and Additional Land 2. Airfield Paving: Widen and Strengthen Runway 9/27 to 3800' Widen and Strengthen Runway 5/23 to 3200' Construct Parallel Taxiways to Both Runways Construct Taxi Streets Expand Apron 3. Airfield Lighting: Install Runway and Taxi Lights Lighted Wind Cone Beacon 4. Approach Aids: Install VASI and REILS 5. Other: Construct Entrance Road Runway and Taxi Marking Fencing Obstruction Removal Segmented Circle	1. No Development	1. No Development

CITY : Brighton

PLANNING REGION: 1

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Southwestern Livingston County. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	30	40	80
Total Aircraft Operations (100/year)	----	247.5	330	660
Itinerant Operations (100/year)	----	82.5	110	220
Enplaned Passengers (1000/year)	----	12.4	16.5	33
Functional Role	----	F2	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Runway to 3800'
   Pave Crosswind Runway 3000'
   Widen Existing Taxiways
   Expand Apron
   Complete Parallel Taxiway for Both Runways
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Enlarge Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Runway and Taxi Marking
   Obstruction Removal

Long-Range

1. No Development

CITY : Chelsea

PLANNING REGION: 1

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport for the Chelsea area

OPERATIONAL FORECASTS				
	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	15	20	25
Total Aircraft Operations (100/year)	----	124	165	206
Itinerant Operations (100/year)	----	41	55	69
Enplaned Passengers (1000/year)	----	6.2	8.3	10.4
Functional Role	----	F3	F3	F2
Operational Role – Dominant	----	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT		
Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct Primary Runway 3200' Partial Parallel Taxi Connecting Taxi Taxi Streets Apron Turf Crosswind Runway 3200'		
3. Airfield Lighting: Runway and Taxi Lighting Lighted Wind Cone Beacon		
4. Administration Building		
5. Approach Aids: Install VASI and REILS		
6. Other: Fencing Auto Parking Entrance Road Segmented Circle Runway and Taxi Marking Obstruction Removal		

CITY : Detroit

PLANNING REGION: 1

AIRPORT NAME : Metropolitan

LOCATION : 16.9 mi. W.S.W.

ELEVATION : 639'

EXISTING FACILITIES: Rwys 3L/21R 10,500x200; 3R/21L 8500x200; 9/27 8500x200 and 15/33 5815x200 paved; lights; NDB; ILS; ASR; TOWER; UNICOM; fuel; National Weather Station.

REMARKS: Extent of development depends in part upon allocation of activity among this airport, Willow Run Airport and Site 107.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	141	150	150	150
Total Aircraft Operations (100/year)	2716	3166	3876	4690
Itinerant Operations (100/year) — General Aviation	747	750	700	600
Itinerant Operations (100/year) — Air Carrier	1935	2406	3166	4080
Enplaned Passengers (1000/year) — General Aviation	112	112	112	133
Enplaned Passengers (1000/year) — Air Carrier	3640	5200	7960	12135
Enplaned Cargo (1000 tons/year)	90	200	410	1462
Functional Role	P-2	P-2	P-1	P-1
Operational Role – Dominant	A1	A1	A1	A1
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	10,500'	12,500'	12,500'	12,500'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Construct Rwys 9R/27L to 10,200' and 3R/27L to 11,500'
   Extend and Reconstruct Rwys 3L/21R to 12,500'; 9L/27R to 12,500' and 3C/21C to 11,500'
   Extend, Widen and Reconstruct Parallel and Connecting Taxiways for existing Runways
   Construct Parallel and Connecting Taxiways for New Runways
   Construct Apron for New Terminal
   Expand Cargo Apron
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Install Additional Instrument Landing System
5. Terminal Building:
   Begin New Terminal
6. Other:
   Access Road
   Expand Auto Parking
   Obstruction Removal
   Runway and Taxiway Marking

Intermediate

1. Acquire Additional Land
2. Airfield Paving
   Expand Terminal and Cargo Apron
3. Buildings:
   Expand Terminal
   Expand Cargo Building
4. Other:
   Expand Auto Parking

Long-Range

1. Acquire Additional Land
2. Airfield Paving:
   Expand Terminal and Cargo Apron
3. Buildings:
   Expand Terminal
   Expand Cargo Building
4. Other:
   Expand Auto Parking

CITY : Detroit

PLANNING REGION: 1

AIRPORT NAME : Detroit City

LOCATION : 5.5 mi. N.E.

ELEVATION : 625'

EXISTING FACILITIES: Rwys 7/25 4025x100 and 15/33 5090x100 paved; lights; VOR; ASR; Tower; Radar; DF; UNICOM; ILS; FSS; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	310	320	350	400
Total Aircraft Operations (100/year)	2007	2079	2287	2637
Itinerant Operations (100/year)	1147	1182	1287	1462
Enplaned Passengers (1000/year)	172	177.3	193	219.3
Functional Role	S2	S2	S2	S1
Operational Role – Dominant	G.T.	G.T.	G.T.	G.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5100'	5100'	5100'	5100'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land	1. No Development	1. No Development
2. Airfield Paving: Groove Runway 15/33 5100' Widen and Strengthen Taxiways Extend Parallel Taxi to 15/33		
3. Airfield Lighting: Install and Rehabilitate Runway Lights Install and Relocate Taxiway Lights		
4. Approach Aids: Install VASI and REILS		
5. Other: Obstruction Removal Runway and Taxiway Marking Service Road Fencing Fire Vehicle		

CITY : Detroit

PLANNING REGION: 1

AIRPORT NAME : Grosse Ile

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: Rwys 3/21 4980x150 and 17/35 4580x150 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	29	150	220	350
Total Aircraft Operations (100/year)	239	1237.5	1815	2887.5
Itinerant Operations (100/year)	80	412.5	605	962.5
Enplaned Passengers (1000/year)	12	61.9	90.8	144.4
Functional Role	F2	S2	S2	S1
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	4980'	4980'	4980'	4980'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct Parallel Taxiway to NW/SE and NE/SW Runways
   Strengthen Existing Runway, Taxiways and Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Lighted Wind Cone
   Beacon
4. New Administration Building
5. Approach Aids:
   Install REILS and VASI
6. Other:
   Runway and Taxiway Marking
   Fencing
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Approach Aids:
   Install Precision Landing System

Long-Range

1. Airfield Paving:
   Construct Parallel NE/SW Runway 3000'
2. Airfield Lighting:
   Runway Lights
3. Other:
   Runway Marking

CITY : Detroit

PLANNING REGION: 1

AIRPORT NAME : Willow Run

LOCATION : 4.1 mi. E of Ypsilanti

ELEVATION 716'

EXISTING FACILITIES: Rwys 5R/23L 7518x160; 5L/23R 6650x160; 14/32 6910x160; 9L/27R 7283x160 and 9R/27L 6502x160 paved; lights; UNICOM; ILS; ASR; DF; TVOR; TOWER; fuel

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	186	190	250	350
Total Aircraft Operations (100/year)	1745	1769	2193	2893
Itinerant Operations (100/year) — General Aviation	615	650	1186	2015
Itinerant Operations (100/year) — Air Carrier	----	----	----	----
Enplaned Passengers (1000/year) — General Aviation	92.3	97.5	125.9	178.4
Enplaned Passengers (1000/year) — Air Carrier	----	----	----	----
Enplaned Cargo (1000 tons/year)	33	67	142.5	487
Functional Role	S2	S2	S2	S1
Operational Role – Dominant	G.T.	G.T.	G.T.	G.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	7518'	11,500'	11,500'	11,500'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 5R/23L to 11,500'
   Strengthen Runway, Taxiways and Apron
   New Parallel Taxiway to Rwy 5R/23L and 9L/27R
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Install VASI
   Install ILS and RVR
5. Other:
   Fencing
   Runway and Taxiway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   New Runway 5R/23L 6500'
   Parallel Taxi to 5R/23L
   Strengthen Apron
   Connecting Taxiways
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install ILS Runway 5R/23L
5. Other:
   Obstruction Removal
   Marking
   Fencing

Long-Range

1. No Development

CITY : Emmet/Yale

PLANNING REGION: 1

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new publicly-owned airport for the Emmet/Yale area. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	15	20	35
Total Aircraft Operations (100/year)	----	124	165	289
Itinerant Operations (100/year)	----	41	55	96
Enplaned Passengers (1000/year)	----	6.2	8.3	14.4
Functional Role	----	F3	F3	F2
Operational Role – Dominant	----	B-II	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3200'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Rwy to 3800'
   Pave Crosswind Runway 3000'
   Widen Existing Taxiways
   Expand Apron
   Complete Parallel Taxiway for Both Runways
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Enlarge Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Runway and Taxi Marking
   Obstruction Removal

CITY : Farmington

PLANNING REGION: 1

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve South Central Oakland and Northern Wayne Counties

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	60	100	295
Total Aircraft Operations (100/year)	----	495	825	2433
Itinerant Operations (100/year)	----	165	275	811
Enplaned Passengers (1000/year)	----	24.8	41.3	121.7
Functional Role	----	F2	F2	S2
Operational Role – Dominant	----	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3800'
   Construct Crosswind Runway 3000'
   Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Runway and Taxi Marking
   Obstruction Removal
   Segmented Circle

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Primary Runway to 5000'
   Extend Parallel Taxi to Primary Rwy
   Extend Apron
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxi Marking

Long-Range

1. Airfield Paving:
   Expand Apron
   Taxi Streets

CITY : Fraser

PLANNING REGION: 1

AIRPORT NAME : McKinley

LOCATION : 1.3 mi. N.W.

ELEVATION : 620'

EXISTING FACILITIES: Rwys 9/27 2900x50 paved; 18/36 2600x300 turf; lights; UNICOM; fuel

REMARKS: Recommend purchase and expansion of this privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	118	100	140	200
Total Aircraft Operations (100/year)	973.5	825	1155	1650
Itinerant Operations (100/year)	324.5	275	385	550
Enplaned Passengers (1000/year)	48.7	41.3	57.8	82.5
Functional Role	F2	F2	S2	S2
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2900'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Existing Airport and Additional Land	1. No Development	1. No Development
2. Airfield Paving: New N/S Runway 3800' New E/W Runway 2200' Parallel Taxi to Both Runways Connecting Taxiways Taxi Streets Apron		
3. Airfield Lighting: Runway and Taxi Lights		
4. Approach Aids: Install REILS and VASI		
5. Administration Building		
6. Other: Obstruction Removal Access Road Runway and Taxiway Marking Fencing		

CITY : Holly

PLANNING REGION: 1

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Northwestern Oakland County

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	25	45	90
Total Aircraft Operations (100/year)	----	206	371	742.5
Itinerant Operations (100/year)	----	69	124	247.5
Enplaned Passengers (1000/year)	----	10.4	18.6	37
Functional Role	----	F2	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Runway to 3800'
   Pave Crosswind Runway 3000'
   Widen Existing Taxiways
   Expand Apron
   Complete Parallel Taxiway for Both Runways
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Enlarge Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Runway and Taxi Marking
   Obstruction Removal

Long-Range

1. No Development

CITY : Howell

PLANNING REGION: 1

AIRPORT NAME : Livingston County

LOCATION : 3.0 mi. W.N.W.

ELEVATION : 943'

EXISTING FACILITIES: Rwy 13/31 3000x75 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	38	50	65	112
Total Aircraft Operations (100/year)	313.5	412.5	536	924
Itinerant Operations (100/year)	104.5	137.5	179	308
Enplaned Passengers (1000/year)	15.7	20.6	26.9	46.2
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 13/31 to 3800'
   New NE/SW Runway to 3800'
   (Basic Transport Strengths)
   Parallel Taxi to Both Runways
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REIL
5. Other:
   Obstruction Removal
   Fencing
   Runway and Taxiway Marking

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend NE/SW Runway to 5000'
   Extend NE/SW Parallel Taxiway
   Strengthen Existing Taxiways and Apron
   Expand Apron
   Taxi Streets
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Fencing
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Lambertville

PLANNING REGION: 1

AIRPORT NAME : Wagon Wheel

LOCATION : 2.0 mi. S.W.

ELEVATION : 664'

EXISTING FACILITIES: Rwy 9/27 3975x50 paved; lights; fuel

REMARKS: This airport will serve Southern Monroe County and the Northern Toledo Metropolitan area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	45	50	80	105
Total Aircraft Operations (100/year)	371	412.5	660	866
Itinerant Operations (100/year)	124	137.5	220	289
Enplaned Passengers (1000/year)	18.6	20.6	33	43.4
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	G.U.	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3850'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Existing Airport and Additional Land 2. Airfield Paving: Construct Primary Runway to 3800' Construct Crosswind Runway to 3000' Parallel Taxi to Both Runways Connecting Taxiways Apron Taxiway Streets 3. Airfield Lighting: Runway and Taxiway Lights Lighted Wind Cone Beacon 4. Approach Aids: Install VASI and REILS 5. Other: Obstruction Removal Relocate Road Access Road Auto Parking Segmented Circle Runway and Taxiway Marking Fencing	1. No Development	1. No Development

CITY : Marine City

PLANNING REGION: 1

AIRPORT NAME : Marine City

LOCATION : 5.0 mi. W

ELEVATION : 616

EXISTING FACILITIES: Rwys 4/22 2100x100 and 13/31 1800x150 turf; lights; UNICOM; fuel

REMARKS: Recommend the purchase and expansion of this existing privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	22	36	41	80
Total Aircraft Operations (100/year)	181.5	297	338	660
Itinerant Operations (100/year)	60.5	99	113	220
Enplaned Passengers (1000/year)	9.1	14.9	17	33
Functional Role	F3	F2	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2100' (turf)	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Existing Airport and Additional
2. Airfield Paving:
   Construct Primary Runway to 3200'
   Construct Crosswind Runway to 3200'
   Partial Parallel Taxiway to Primary Rwy
   Turnarounds on Crosswind Runway
   Connecting Taxiway
   Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Segmented Circle
   Access Road
   Auto Parking
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Runway to 3800'
   Complete Parallel Taxi to Primary Rwy
   Construct Parallel Taxi to Crosswind Runway
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Relocate VASI
5. Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Milan

PLANNING REGION: 1

AIRPORT NAME : Milan

LOCATION : 3.8 mi. S.W.

ELEVATION : 705'

EXISTING FACILITIES: Rwys 9/27 2200x100 and 18/36 2500x100 turf; UNICOM; fuel

REMARKS: Recommend purchase and expansion of this existing privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	15	20	30	60
Total Aircraft Operations (100/year)	124	165	247.5	495
Itinerant Operations (100/year)	41	55	82.5	165
Enplaned Passengers (1000/year)	6.2	8.3	12.4	24.8
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2500' (turf)	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Existing Airport and Additional
2. Airfield Paving:
   Construct Primary and Crosswind Runway to 3200'
   Parital Parallel Taxiways to Both Rwys
   Connecting Taxiways
   Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI
5. Other:
   Obstruction Removal
   Access Road
   Auto Parking
   Fencing
   Runway and Taxiway Marking

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Runway to 3800'
   Complete Parallel Taxiways to Both Runways
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI
5. Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Milford/New Hudson

PLANNING REGION: 1

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommend new airport to serve Southwestern Oakland County. Site selection study might show that an existing airport is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	40	70	230
Total Aircraft Operations (100/year)	----	330	577.5	1897.5
Itinerant Operations (100/year)	----	110	192.5	632.5
Enplaned Passengers (1000/year)	----	16.5	28.9	94.9
Functional Role	----	F2	F2	S2
Operational Role – Dominant	----	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3800'
   Construct Crosswind Runway 3000'
   Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Runway and Taxi Marking
   Obstruction Removal
   Segmented Circle

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Monroe

PLANNING REGION: 1

AIRPORT NAME : Monroe County Custer

LOCATION : 2.5 mi. W.N.W.

ELEVATION : 614'

EXISTING FACILITIES: Rwy 2/20 3500x75 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	36	75	120	217
Total Aircraft Operations (100/year)	297	620	990	1790
Itinerant Operations (100/year)	99	207.5	330	597
Enplaned Passengers (1000/year)	14.9	31.1	49.5	89.5
Functional Role	F2	F2	F2	S2
Operational Role – Dominant	B-II	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 2/20 to 3800'
   Crosswind Runway to 3200'
   Extend Parallel Taxiway to Runway 2/20
   Construct Parallel Taxiway to Crosswind Runway
   Expand Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REIL
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Strengthen Runway 2/20 to 5000'
   Extend Taxiway to Runway 2/20
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI
5. New Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Auto Parking
   Fencing

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   New Runway 2/20 to 5000' (Use old Runway 2/20 as Taxiway
   Extend Crosswind Runway to 4000'
   Extend Taxiway for Crosswind Connecting Taxiway
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

CITY : Mt. Clemens

PLANNING REGION: 1

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: The recommendation of this new site is contingent on the results of a Master Plan study of the general aviation and air carrier needs of the area and their relationships to selfridge AFB

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	100	180	300
Total Aircraft Operations (100/year)	----	825	1485	2400
Itinerant Operations (100/year)	----	275	495	825
Enplaned Passengers (1000/year)	----	41.3	74.3	123.7
Functional Role	----	F2	S2	S2
Operational Role – Dominant	----	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	5500'	5500'	5500'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   New Primary Runway 5500'
   New Crosswind Runway 5000'
   Parallel Taxiway to Both Runways
   Apron
   Connecting Taxiways
   Taxiway Stubs
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
   Apron Lighting
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Obstruction Removal
   Access Road and Auto Parking
   Runway and Taxiway Marking
   Fencing
   Segmented Circle

Intermediate

1. Approach Aids:
   Install Precision Landing System

Long-Range

1. Airfield Paving:
   Parallel Runway to Primary Runway 5500'
   Parallel Taxiway for New Runway
2. Airfield Lighting:
   Runway and Taxiway Lights
3. Approach Aids:
   Install VASI and REILS
4. Other:
   Obstruction Removal
   Runway and Taxiway Marking

CITY : Plymouth

PLANNING REGION: 1

AIRPORT NAME : Plymouth Mettetal

LOCATION : 1.5 mi. S.S.E.

ELEVATION : 696'

EXISTING FACILITIES: Rwy 18/36 2600x50 paved; lights; UNICOM; fuel

REMARKS: Recommend purchase and expansion of the existing privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	188	140	140	200
Total Aircraft Operations (100/year)	983	1155	1155	1640
Itinerant Operations (100/year)	340	385	385	540
Enplaned Passengers (1000/year)	22.6	57.8	57.8	81
Functional Role	F2	F2	S2	S2
Operational Role – Dominant	B-II	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2600'	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Existing Airport and Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen N/S to 3200' usable Length
   Extend Parallel Taxiway to N/S
   New E/W Runway to 3200'
   Palallel Taxiway to E/W Runway
   Strengthen and Widen Existing Taxiways
   Expand Apron
   Connecting Taxiways
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
   Apron
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Obstruction Removal
   Access Road
   Auto Parking
   Segmented Circle
   Runway and Taxiway Marking
   Fencing

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Pontiac

PLANNING REGION: 1

AIRPORT NAME : Pontiac-Oakland

LOCATION : 6.4 mi. W.N.W.

ELEVATION : 980'

EXISTING FACILITIES: Rwys 4/26 2400x60, 9R/27L 5300x150 and 18/36 2100x60 paved; lights; UNICOM; VOR; Tower; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	472	400	425	550
Total Aircraft Operations (100/year)	2358	2400	2550	3300
Itinerant Operations (100/year)	1169	1200	1275	1650
Enplaned Passengers (1000/year)	175.4	180	191.3	247.5
Functional Role	S2	S2	S1	S1
Operational Role – Dominant	G.T.	G.T.	G.T.	G.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5300'	6200'	6200'	6200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Rehabilitate Runway 9R/27L to 6200'
   Extend Parallel Taxiway to 9R/27L
   Extend, Widen and Strengthen Runway 4/22 to 2700'
   New Parallel Taxiway to 4/22
   Widen and Strengthen Runway 18/36
   Parallel Taxiway to 18/36
   New Runway and Parallel Taxiway 4L/22R to 4400'
   Strengthen or Rehabilitate Existing Taxiways and Apron
   Apron Expansion
   Connecting Taxiways and Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Service Road
   Relocate Entrance Road
   Runway and Taxiway Marking
   Fencing

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Pontiac

PLANNING REGION: 1

AIRPORT NAME : Pontiac-Orion

LOCATION : 5.5 mi. N.N.E.

ELEVATION : 1020'

EXISTING FACILITIES: Rwys 3/21 2350x200 and 18/36 2400x200 turf; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	66	130	180	220
Total Aircraft Operations (100/year)	544.5	1072.5	1485	1815
Itinerant Operations (100/year)	181.5	357.5	495	605
Enplaned Passengers (1000/year)	27.2	53.6	74.3	90.8
Functional Role	F2	S2	S2	S2
Operational Role – Dominant	B-I	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2500'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen N/S Runway to 3800'
   New E/W Runway 3000'
   Parallel Taxiways to Both Runways
   Connecting Taxiways
   Expand Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Obstruction Removal
   Auto Parking and Entrance Road
   Runway and Taxiway Marking
   Segemented Circle
   Fencing

Intermediate

1. Airfield Paving:
   Expand Apron
   Taxiway Streets

Long-Range

1. No Development

CITY : Port Huron

PLANNING REGION: 1

AIRPORT NAME : St. Clair County

LOCATION : 6.4 mi. S.W.

ELEVATION : 649'

EXISTING FACILITIES: Rwys 4/22 5100x100 and 10/28 2450x75 paved; lights; UNICOM; NDB; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	42	60	80	150
Total Aircraft Operations (100/year)	346.5	495	660	1237.5
Itinerant Operations (100/year)	115.5	165	220	412.5
Enplaned Passengers (1000/year)	17.3	24.8	33	61.9
Functional Role	F2	F2	F2	S2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5100'	5100'	5100'	5100'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Additional Land For ILS	1. No Development	1. No Development
2. Airfield Paving: Extend Runway 10/28 to 5800' Parallel Taxiway to Runway 10/28 Expand and Strengthen Apron Connecting Taxiway		
3. Airfield Lighting: Runway and Taxiway Lights		
4. Approach Aids: Install VASI and REILS Install Precision Landing System		
5. Other: Obstruction Removal Runway and Taxiway Marking		

CITY : Romeo

PLANNING REGION: 1

AIRPORT NAME : Romeo

LOCATION : 2.0 mi. E

ELEVATION : 730'

EXISTING FACILITIES: Rwys 9/27 2100x50 and 18/36 3600x50 paved; lights; UNICOM; fuel

REMARKS: Recommend purchase and expansion of this existing privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	60	85	100	180
Total Aircraft Operations (100/year)	495	701	825	1485
Itinerant Operations (100/year)	165	234	275	495
Enplaned Passengers (1000/year)	24.8	35.1	41.3	74.3
Functional Role	F2	F2	F2	S2
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3600'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Existing Facility and Additional Land 2. Airfield Paving: New NE/SW to 3800' Widen and Strengthen Existing Runway 3600' Parallel Taxiways for Both Runways Connecting Taxiway Taxiway Streets Expand and Strengthen Existing Apron Rehabilitate Existing E/W Runway as a Taxiway 3. Airfield Lighting: Runway and Taxiway Lighting Beacon Lighted Wind Cone 4. Approach Aids: Install VASI and REILS 5. New Administration Building 6. Other: Obstruction Removal Runway and Taxiway Marking Auto Parking and Access Road Segmented Circle Fencing	1. No Development	1. No Development

CITY : Salem

PLANNING REGION: 1

AIRPORT NAME : Salem

LOCATION : Adjacent

ELEVATION : 960'

EXISTING FACILITIES: Rwys 18/36 2890x50 paved and 9/27 2200x60 turf; lights; UNICOM; fuel

REMARKS: Recommend purchase and expansion of this existing privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	35	80	125	250
Total Aircraft Operations (100/year)	289	660	1031	2062.5
Itinerant Operations (100/year)	96	220	344	687.5
Enplaned Passengers (1000/year)	14.4	33	51.6	103.1
Functional Role	F2	F2	S2	S2
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2840'	3900'	3900'	3900'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Existing Airport and Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen N/S Runway to 3900'
   New E/W Runway to 3800'
   Extend and Strengthen Parallel Taxiway to N/S Runway
   Parallel Taxiway to E/W Runway
   Connecting Taxiways
   New Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. New Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Access Road and Auto Parking
   Fencing

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Utica

PLANNING REGION: 1

AIRPORT NAME : Berz Macomb

LOCATION : 5.0 mi. N.E. (Utica)

ELEVATION : 610'

EXISTING FACILITIES: Rwy 4/22 4200x60 paved; lights; UNICOM; NDB; fuel

REMARKS: Recommend purchase and expansion of this privately-owned facility

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	0	60	100	200
Total Aircraft Operations (100/year)	----	495	825	1650
Itinerant Operations (100/year)	----	165	275	550
Enplaned Passengers (1000/year)	----	25	41	83
Functional Role	----	F3	F3	S2
Operational Role – Dominant	----	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	4200'	4200'	4200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Existing Airport and Additional Land
2. Airfield Paving:
   Widen and Strengthen Existing Rwy 4200'
   Crosswind Runway 3800'
   Parallel Taxiway to Crosswind
   Widen Existing Taxiway
   Strengthen Existing Taxiway and Apron
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Segmented Circle
   Fencing

Intermediate

1. Airfield Paving:
   Apron Expansion
   Taxiway Streets

Long-Range

1. No Development

CITY : Site 107

PLANNING REGION: 1

AIRPORT NAME : New

LOCATION : --

ELEVATION :

EXISTING FACILITIES: None

REMARKS: The recommendation of this new site is contingent on the results of a master planning (site selection) study

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	----	----	----	90
Total Aircraft Operations (100/year)	----	----	----	1780
Itinerant Operations (100/year) — General Aviation	----	----	----	315
Itinerant Operations (100/year) — Air Carrier	----	----	----	1150
Enplaned Passengers (1000/year) — General Aviation	----	----	----	47
Enplaned Passengers (1000/year) — Air Carrier	----	----	----	3070
Enplaned Cargo (1000 tons/year)	----	----	----	18
Functional Role	----	----	----	P3
Operational Role – Dominant	----	----	----	A2
Operational Role – Subordinate	----	----	----	B.T.
Length of Longest Runway	----	----	----	1100'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Land

Intermediate

1. No Development

Long-Range

1. Airfield Paving:
   Construct Primary Runway 11,000'
   Construct Crosswind General Aviation Runway 3800'
   Parallel Taxiways for both Runways
   Construct Apron
2. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
3. Approach Aids:
   Instrument Landing System
   VASI and REILS
4. Terminal Building:
   Construct Terminal
   Construct Fire/Crash Building
5. Other:
   Access Roads
   Auto Parking
   Obstruction Removal
   Runway and Taxiway Marking

SUMMARY DATA SHEET

State Planning & Development Region - 2

Table V - 4

	1970	1975	1980	1990
POPULATION (000)	262	281	299	328
VALUE ADDED ($ Millions)	1,090	1,272	1,480	1,934
GENERAL AVIATION BASED AIRCRAFT	234	270	360	520
GENERAL AVIATION OPERATIONS (000)	172	211	268	400

Generalized Data Sheets Follow For Airports At: Adrian, Blissfield, Hillsdale, Hudson/Morenci, Jackson, Litchfield, Napleon/Brooklyn, Tecumseh

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 2

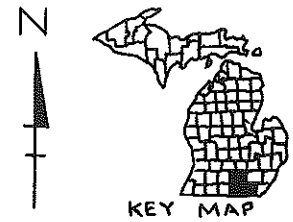
Figure V - 3

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.



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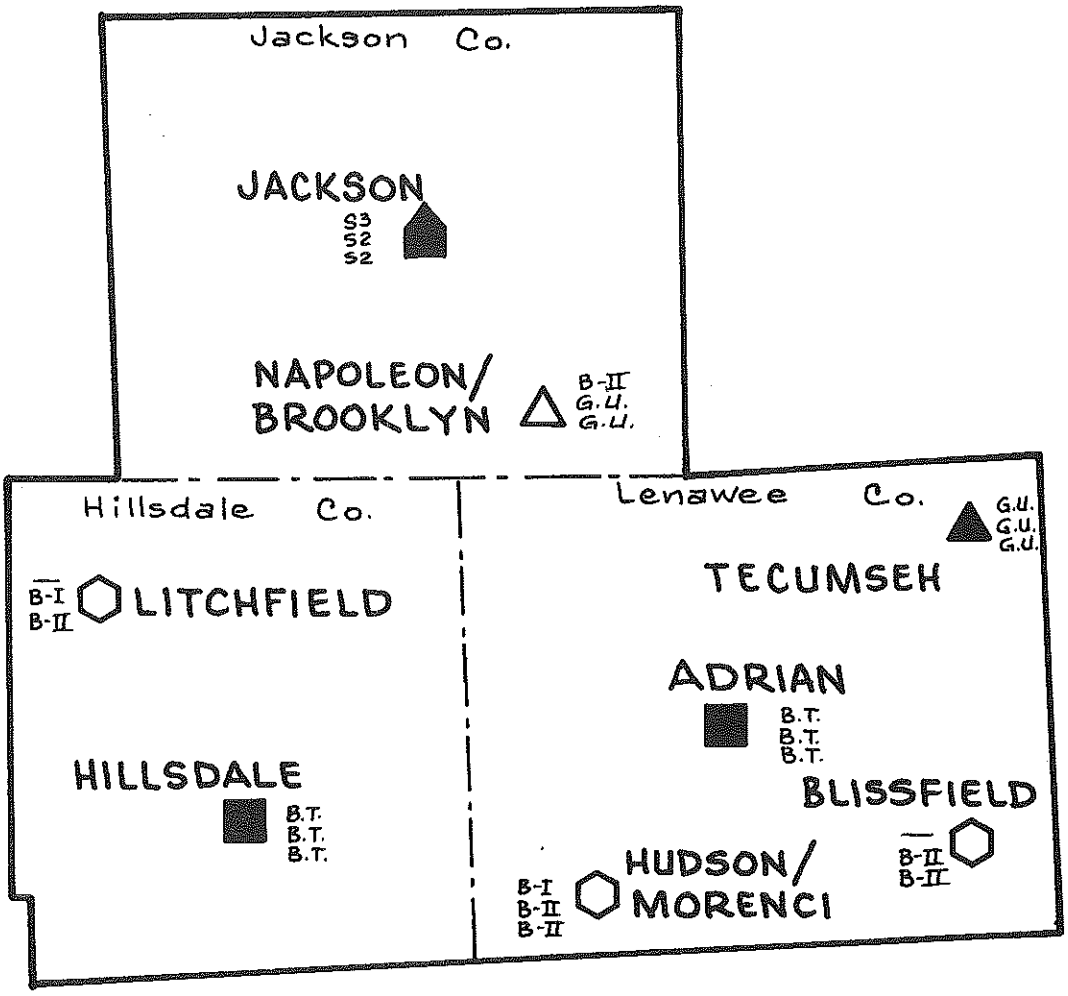


CITY : Adrian

PLANNING REGION: 2

AIRPORT NAME : Lenawee County

LOCATION : 3.0 mi. S.W.

ELEVATION : 800'

EXISTING FACILITIES: Rwy 5/23 3250x75 paved; Rwy 11/29 3200x300 turf; lights; UNICOM; NDB; fuel.

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	40	45	62	94
Total Aircraft Operations (100/year)	416	453.5	581	821
Itinerant Operations (100/year)	144	156.5	199	279
Enplaned Passengers (1000/year)	21.6	23.5	29.9	41.9
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3200'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct New N/S Runway to 5000'
   Construct Parallel N/S Taxi and Connecting Taxi
   Expand Apron
   Extend Runway 5/23 to 3900'
   Construct Parallel Taxi to 5/23
3. Airfield Lighting:
   Install Runway and Taxiway Lights
   Install Apron Lights
4. Construct New Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Obstruction Removal
   Ruuway and Taxiway Marking
   Construct Entrance Road and Auto Parking
   Fencing

Intermediate

1. Approach Aids:
   Install Precision Landing System

Long-Range

1. Airfield Paving:
   Additional Taxi Streets

CITY : Blissfield

PLANNING REGION: 2

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate time period to serve Southwestern Lenawee County. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	15	20
Total Aircraft Operations (100/year)	----	----	112.5	150
Itinerant Operations (100/year)	----	----	37.5	50
Enplaned Passengers (1000/year)	----	----	5.6	7.5
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct Primary Runway 3200' Partial Parallel Taxi Connecting Taxi Taxi Stubs Apron Turf Crosswind Runway 3200' 3. Airfield Lighting: Runway and Taxi Lighting Lighted Wind Cone Beacon 4. Administration Building 5. Approach Aids: Install VASI and PEILS 6. Other: Fencing Auto Parking Entrance Road Segmented Circle Runway and Taxi Marking Obstruction Removal	1. No Development	

CITY : Hillsdale

PLANNING REGION: 2

AIRPORT NAME : Municipal

LOCATION : 2.3 mi. E

ELEVATION : 1182'

EXISTING FACILITIES: Rwy 9/27 3200x75 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	22	29	35	52
Total Aircraft Operations (100/year)	124	154	262.5	390
Itinerant Operations (100/year)	43	60.5	87.5	130
Enplaned Passengers (1000/year)	6.5	9.1	13	19.5
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	B-II	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3200'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Strengthen Runway 9/27 to 5000'
   Strengthen Existing Taxiway and Apron
   New N/S Runway to 4800'
   Extend Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REIL
5. Other:
   Obstruction Removal
   Fencing
   Runway and Taxiway Marking
   Relocate Road - East

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   New E/W Runway to 5000' (Use old E/W as Taxiway)
   Connecting Taxiway E/W
   Parallel Taxiway to N/S
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

CITY : Hudson/Morenci

PLANNING REGION: 2

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Southwestern Lenawee and Southeastern Hillsdale Counties. Site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	4	12	20
Total Aircraft Operations (100/year)	----	30	90	150
Itinerant Operations (100/year)	----	10	30	50
Enplaned Passengers (1000/year)	----	1.5	4.5	7.5
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

1. No Development

CITY : Jackson

PLANNING REGION: 2

AIRPORT NAME : Reynolds Municipal

LOCATION : 2.5 mi. W.N.W.

ELEVATION 1000'

EXISTING FACILITIES: Rwys 5/23 5275x150 and 13/31 3350x150 paved; lights; U-Z; VORTAC; ILS; NDB; TOWER; fuel; FSS

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	97	119	140	213
Total Aircraft Operations (100/year)	657	847	1036	1693
Itinerant Operations (100/year) — General Aviation	356	455	549	878
Itinerant Operations (100/year) — Air Carrier	29	29	29	29
Enplaned Passengers (1000/year) — General Aviation	53	68	82	132
Enplaned Passengers (1000/year) — Air Carrier	6	8	11	22
Enplaned Cargo (1000 tons/year)	< 1	< 1	< 1	1
Functional Role	S-3	S-3	S-2	S-2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	C3	C3	C3	C3
Length of Longest Runway	5275'	5900'	5900'	5900'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend Runway 5/23 to 5900'
   Extend Runway 13/31 to 3800'
   Parallel Taxiway to both Runways
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
   Relocate ALS and Glide Slope
5. Buildings:
   Construct Fire/Crash Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Expand Auto Parking

Intermediate

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

CITY : Litchfield

PLANNING REGION: 2

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate time period

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	5	10
Total Aircraft Operations (100/year)	----	----	37.5	75
Itinerant Operations (100/year)	----	----	12.5	25
Enplaned Passengers (1000/year)	----	----	1.9	3.8
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Rwy 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

CITY : Napoleon/Brooklyn

PLANNING REGION: 2

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Southeastern Jackson County. Site selection study might show that an existing airport is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	27	37	52
Total Aircraft Operations (100/year)	----	202.5	277.5	390
Itinerant Operations (100/year)	----	67.5	92.5	130
Enplaned Passengers (1000/year)	----	10.1	13.9	19.5
Functional Role	----	F2	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Tecumseh

PLANNING REGION: 2

AIRPORT NAME : Tecumseh Products

LOCATION : 1.8 mi. N.N.E.

ELEVATION : 815'

EXISTING FACILITIES: Rwys 6/24 3300x75 and 13/31 3300x75 paved; lights; fuel

REMARKS: A site selection study might determine that Tecumseh Airport would be better for expansion

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	28	31	35	40
Total Aircraft Operations (100/year)	210	232.5	262.5	300
Itinerant Operations (100/year)	70	77.5	87.5	100
Enplaned Passengers (1000/year)	10.5	11.6	13.1	15
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3300'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Existing Airport and Additional Land 2. Airfield Paving: Extend Runway 6/24 to 3800' Parallel Taxiway to Both Runways Expand Apron 3. Airfield Lighting: Runway and Taxiway Lights Beacon Lighted Wind Cone 4. Approach Aids: Install VASI and REILS 5. Administration Building 6. Other: Obstruction Removal Access Road Auto Parking Runway and Taxiway Marking Relocate Road Fencing	1. No Development	1. No Development

SUMMARY DATA SHEET

State Planning & Development Region - 3

Table V - 5

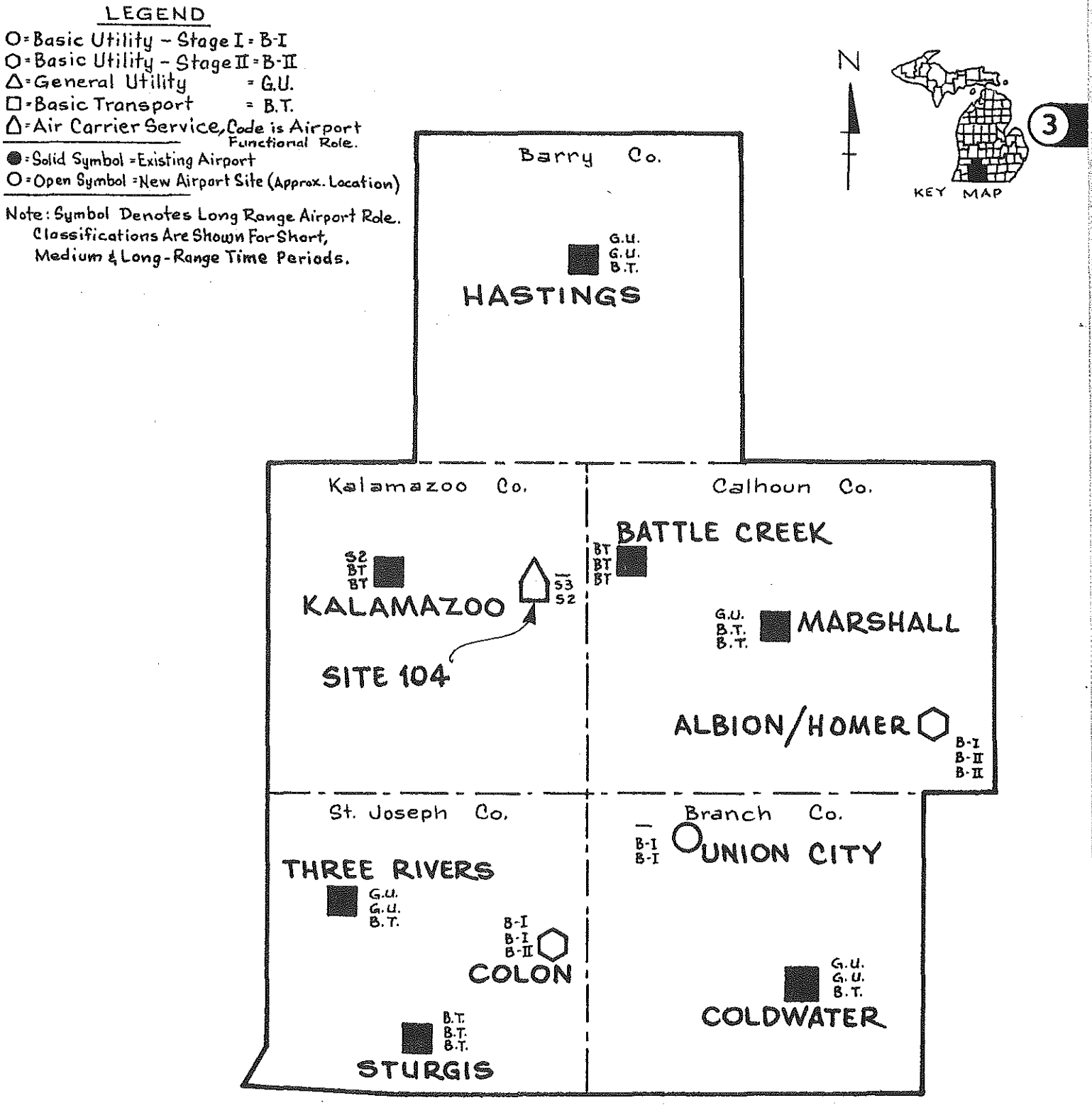
	1970	1975	1980	1990
POPULATION (000)	467	500	539	620
VALUE ADDED ($ Millions)	2,124	2,457	2,586	3,831
GENERAL AVIATION BASED AIRCRAFT	422	470	600	910
GENERAL AVIATION OPERATIONS (000)	358	406	515	786

Generalized Data Sheets Follow For Airports At: Albion/Homer, Battle Creek, Battle Creek/Kalamazoo, Coldwater, Colon, Hastings, Kalamazoo, Marshall, Sturgis, Three Rivers, Union City

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 3

Figure V - 4



CITY : Albion/Homer

PLANNING REGION: 3

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended New Airport to serve the Albion/Homer area. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	5	10	15
Total Aircraft Operations (100/year)	----	37.5	75	112.5
Itinerant Operations (100/year)	----	12.5	25	37.5
Enplaned Passengers (1000/year)	----	1.9	3.8	5.6
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Remova
   Marking

Long-Range

1. No Developm.t

CITY : Battle Creek

PLANNING REGION: 3

AIRPORT NAME : W. K. Kellogg Regional

LOCATION : 3.0 mi. W

ELEVATION : 941'

EXISTING FACILITIES: Rwys 4/22 7000x150; 9/27 4802x150; 13/31 4865x150 and 18/36 3700x150 paved; lights; TOWER; VORTAC; ILS; UNICOM: fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	90	95	103	147
Total Aircraft Operations (100/year)	675	705	837	1233
Itinerant Operations (100 'year)	225	322.5	381	579
Enplaned Passengers (1000/year)	33.8	48.4	57.2	86.9
Functional Role	F2	F2	S3	S2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	7000'	7000'	7000'	7000'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additonal Land	1. No Development	1. No Development
2. Airfield Paving: Parallel Taxi to Runway 13/31 4700' Parallel Taxi to Runway 4/22 5000' Rehabilitate Runway 13/31 4750' Rehabilitate Runway 18/36 4730' Connecting Taxiways		
3. Airfield Lighting Install Runway and Taxi Lights Rehabilitate Runway Lights		
4. Approach Aids: Install VASI and REILS		
5. Other: Fencing Runway and Taxi Marking Relocate Helmer Road		

CITY : Battle Creek/Kalamazoo

EXISTING FACILITIES: None

PLANNING REGION: 3

AIRPORT NAME : Regional - New

REMARKS: New regional airport to serve air carrier and general aviation

LOCATION : --

ELEVATION --

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	----	----	55	189
Total Aircraft Operations (100/year)	----	----	634	1920
Itinerant Operations (100/year) — General Aviation	----	----	247	855
Itinerant Operations (100/year) — Air Carrier	----	----	138	219
Enplaned Passengers (1000/year) — General Aviation	----	----	37	128
Enplaned Passengers (1000/year) — Air Carrier	----	----	167	330
Enplaned Cargo (1000 tons/year)	----	----	4	13
Functional Role	----	----	S-3	S-2
Operational Role – Dominant	----	----	B3	B3
Operational Role – Subordinate	----	----	B.T.	B.T.
Length of Longest Runway	----	----	7000'	7000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Land
2. Airfield Paving:
   Construct Primary Runway to 7000'
   Construct Crosswind Runway to 6000'
   Parallel Taxiways to both Runways
   Construct Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install Instrument Landing System
   Install VASI and REILS
   Construct Control Tower
5. Buildings:
   Construct Terminal and Fire/Crash Buildings
6. Other:
   Obstruction Removal
   Auto Parking and Entrance Road
   Runway and Taxiway Marking

Intermediate

1. No Development
   (Complete development begun in short term, as required)

Long-Range

1. Airfield Paving:
   Construct Parallel Primary Rwy to 4800'
   Parallel Taxi to New Runway
   Expand Apron
2. Airfield Lighting:
   Runway and Taxiway Lights
3. Terminal Building:
   Expand Terminal
4. Other:
   Obstruction Removal
   Expand Auto Parking
   Runway and Taxi Marking

CITY : Coldwater

PLANNING REGION: 3

AIRPORT NAME : Branch County Memorial

LOCATION : 2.7 mi. W.S.W.

ELEVATION : 956'

EXISTING FACILITIES: Rwys 3/21 3500x50 paved; 9/27 2100x300 and 16/34 2600x300 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	47	51	56	83
Total Aircraft Operations (100/year)	352.5	382.5	420	622.5
Itinerant Operations (100/year)	117.5	123	140	207.5
Enplaned Passengers (1000/year)	17.6	18.5	21	31.1
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3500'	3800'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Parallel Taxi to Runway 3/21
   Expand Apron
3. Airfield Lighting:
   Install Taxiway Lights
   Lighted Wind Cone
4. Other:
   Obstruction Removal
   Taxiway Marking
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Construct E/W Runway 3800'
   Parallel Taxi to E/W Runway
   Connecting Taxiway
   Tant Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REIL
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Strengthen and Widen E/W Runway to 5000'
   Extend Parallel Taxi to E/W
   Strengthen Existing Taxi and Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

CITY : Colon

PLANNING REGION: 3

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the Colon Area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	5	9	15
Total Aircraft Operations (100/year)	----	37.5	67.5	112.5
Itinerant Operations (100 /year)	----	12.5	22.5	37.5
Enplaned Passengers (1000/year)	----	1.9	3.4	5.6
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

1. No Development

CITY : Hastings

PLANNING REGION: 3

AIRPORT NAME : Hastings Municipal

LOCATION : 3.2 mi. W.N.W.

ELEVATION : 813'

EXISTING FACILITIES: Rwys 12/30 3000x60 paved 9/27 2400x185 and 18/36 2500x200 turf; light UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	18	22	32	57
Total Aircraft Operations (100/year)	346	376	451	638.5
Itinerant Operations (100/year)	86	96	121	183.5
Enplaned Passengers (1000/year)	12.9	14.4	18.2	27.5
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3900'	3900'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Runway 12/30 to 3900'
   N/S Runway to 3000'
   Partial Parallel Taxi to 12/30
   Expand Apron
   Connecting Taxiways
3. Airfield Lighting:
   Runway and Taxiway Lights
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REIL
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing
   Relocate Road - North

Intermediate

1. Airfield Development:
   Complete Parallel Taxiway to 12/30
2. Airfield Lighting:
   Install Taxiway Lights
3. New Administration Building
4. Other:
   Taxiway Marking
   Auto Parking

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 12/30 to 5000'
   Strengthen Existing Taxiway and Apron
   Extend Parallel Taxiway to 12/30
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Runway and Taxiway Marking
   Obstruction Removal
   Relocate Road - West

CITY : Kalamazoo

PLANNING REGION: 3

AIRPORT NAME : Kalamazoo Municipal

LOCATION : 4.0 mi. S.S.E.

ELEVATION 874'

EXISTING FACILITIES: Rwys 5/23 4000x150; 9/27 3500x150 and 17/35 5300x150 paved; lights; UNICOM; VOR; ILS; TOWER; fuel

REMARKS: Existing Air Carrier Airport to serve General Aviation after the Battle Creek/Kalamazoo Regional Airport is developed

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	151	192	201	225
Total Aircraft Operations (100/year)	1341	1744	1704	1920
Itinerant Operations (100/year) — General Aviation	629	714	854	962
Itinerant Operations (100/year) — Air Carrier	153	102	----	----
Enplaned Passengers (1000/year) — General Aviation	94	107	128	144
Enplaned Passengers (1000/year) — Air Carrier	87	121	----	----
Enplaned Cargo (1000 tons/year)	1	2	0	0
Functional Role	S-2	S-2	S-2	S-2
Operational Role – Dominant	B.T.	B3	B.T.	B.T.
Operational Role – Subordinate	B3	B.T.	----	----
Length of Longest Runway	5300'	5300'	5300'	5300'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 5/23 to 3900' usable Length
   Extend Parallel Taxi to Runway 5/23
   Parallel Taxi to Runway 9/27
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Marking
   Fencing
   Service Road

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Marshall

PLANNING REGION: 3

AIRPORT NAME : Brooks Field

LOCATION : 1.3 mi. S

ELEVATION : 940'

EXISTING FACILITIES: Rwy 10/28 3500x75 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	24	28	39	50
Total Aircraft Operations (100/year)	180	256	343.5	421
Itinerant Operations (100/year)	60	88	120.5	143
Enplaned Passengers (1000/year)	9	13.2	18.1	21.5
Functional Role	F3	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3900'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct New N/S Runway to 3900'
   Extend E/W Runway to 3900'
   Parallel Taxiway to Both Runways
   Expand Apron
   Connecting Taxiways
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Apron Lighting
4. Approach Aids:
   Install VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Access Road and Auto Parking
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Strengthen and Widen N/S Runway to 5000'
   Extend Parallel Taxi to N/S Runway
   Strengthen Existing Apron and Taxiway
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI
5. Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. Approach Aids:
   Install Precision Landing System

CITY : Sturgis

PLANNING REGION: 3

AIRPORT NAME : Kirsch

LOCATION : 1.0 mi. N.W.

ELEVATION : 924'

EXISTING FACILITIES: Rwy 6/24 4450x75 paved; lights; UNICOM; L/F Beacon; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	29	30	39	59
Total Aircraft Operations (100/year)	312	319.5	387	537
Itinerant Operations (100/year)	108	110.5	133	183
Enplaned Passengers (1000/year)	16.2	16.6	20	27.5
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	4450'	5700'	5700'	5700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Airfield Paving: Complete Parallel Taxiways to Runways 6/24 to 18/36 Strengthen Runway 6/24 Expand Apron 2. Airfield Lighting. Taxiway Lights 3. Approach Aids: Install Precision Landing System	1. No Development	1. No Development

CITY : Three Rivers

PLANNING REGION: 3

AIRPORT NAME : Dr. Haines

LOCATION : 2.3 mi. N.E.

ELEVATION : 830'

EXISTING FACILITIES: Rwys 5/23 2800x50 paved; 9/27 3700x200 and 14/32 2890x300 turf; light UNICOM; L/F BEACON; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	19	20	25	37
Total Aircraft Operations (100/year)	133	150	187.5	277.5
Itinerant Operations (100/year)	46	50	62.5	92.5
Enplaned Passengers (1000/year)	6.9	7.5	9.4	13.9
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2800'	3800'	3800'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New E/W and N/S Runways to 3800'
   Partial Parallel Taxiways for Both Rwys
   Apron Expansion
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen N/S Runway to 5000'
   Complete Parallel Taxiway to N/S and E/W Runways
   Strengthen Existing Runway, Taxiway and Apron
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI - North
5. New Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking

CITY : Union City

PLANNING REGION: 3

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Union City and Southwestern Calhoun County

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	8	11
Total Aircraft Operations (100/year)	----	----	60	82.5
Itinerant Operations (100 'year)	----	----	20	27.5
Enplaned Passengers (1000/year)	----	----	3	4.1
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	

SUMMARY DATA SHEET

State Planning & Development Region - 4

Table V - 6

	1970	1975	1980	1990
POPULATION (000)	263	293	321	377
VALUE ADDED ($ Millions)	1,042	1,261	1,505	2,096
GENERAL AVIATION BASED AIRCRAFT	246	290	380	600
GENERAL AVIATION OPERATIONS (000)	179	234	300	475

Generalized Data Sheets Follow For Airports At: Benton Harbor, Berrien Springs, Dowagiac, Niles, Paw Paw, South Haven, Three Oaks, Watervliet.

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

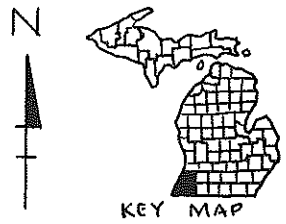
STATE PLANNING REGION No. 4

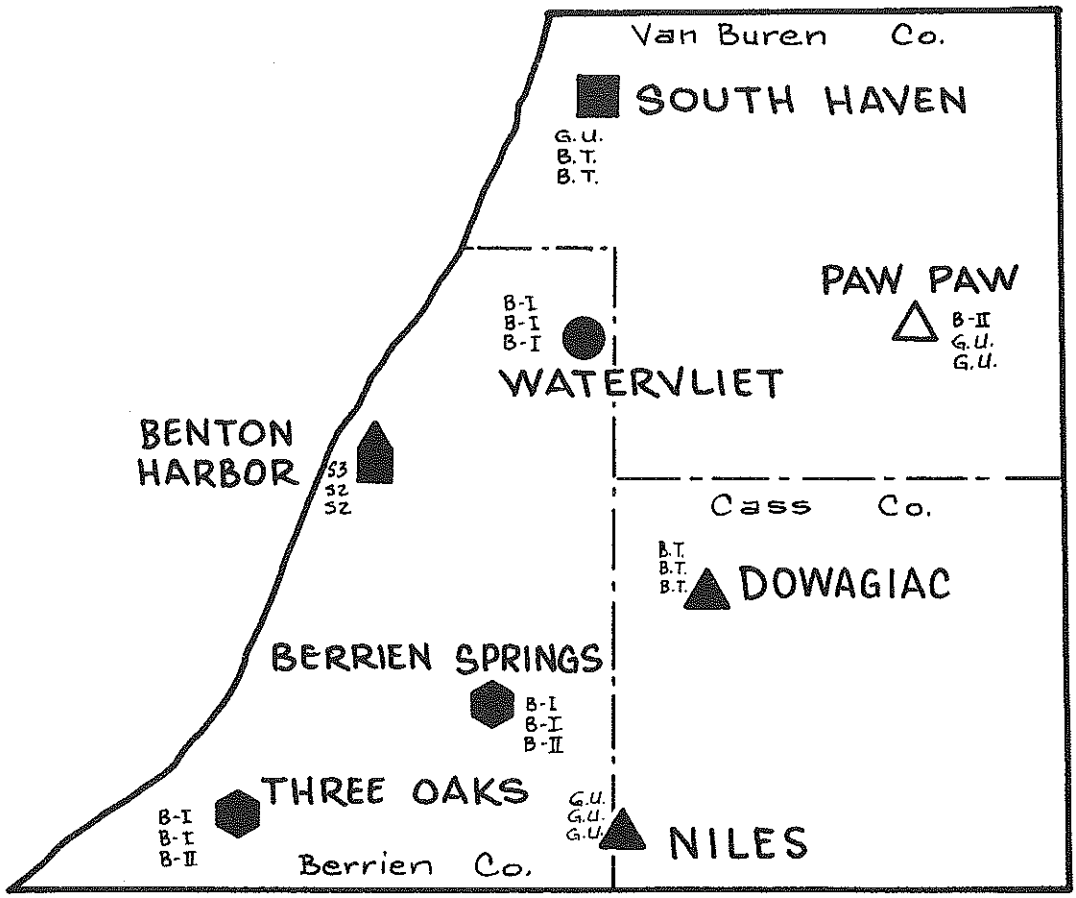
Figure V - 5

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.





CITY : Benton Harbor

PLANNING REGION: 4

AIRPORT NAME : Ross Field

LOCATION : 1.5 mi. N.N.E.

ELEVATION : 642'

EXISTING FACILITIES: Rwys 9/27 5100x100; 13/31 3750x100 and 18/36 3200x100 paved; lights; UNICOM; ILS; VOR; TOWER; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	92	91	115	190
Total Aircraft Operations (100/year)	741	879	1021	1693
Itinerant Operations (100/year) — General Aviation	230	414	481	810
Itinerant Operations (100/year) — Air Carrier	51	51	58	73
Enplaned Passengers (1000/year) — General Aviation	34.5	62.1	72.2	121.5
Enplaned Passengers (1000/year) — Air Carrier	23	28	46	100
Enplaned Cargo (1000 tons/year)	< 1	1	1	4
Functional Role	F-2	S-3	S-2	S-2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	C3	C3	C3	B3
Length of Longest Runway	5100'	5700'	5700'	6800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Lengthen and Widen Rwy 9/27 to 5700'
   Lengthen and Widen Rwy 13/31 to 4900'
   Extend Taxiway to Both Runways
   Expand Apron
3. Airfield Lighting:
   Runway and Txwy Lights
4. Approach Aids:*
   Upgrade to "Secondary"
5. Terminal Building:
   Expand Terminal
6. Other:
   Obstruction Removal
   Relocate Road
   Runway and Taxiway Marking

Intermediate

1. Acquire Additional Land
2. Airfield Paving:
   Expand Apron
3. Terminal Building:
   Expand Terminal
4. Other:
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Extend Runway 9/27 to 6800'
   Extend Runway 13/31 to 5800'
   Extend Taxiway to Both Runways
   Expand Apron
2. Airfield Lighting:
   Runway and Taxiway Lighting
3. Approach Aids:
   Relocate ILS and VASI
4. Terminal Building:
   Expand Terminal
5. Other:
   Obstruction Removal
   Expand Auto Parking
   Runway and Taxiway Marking

*See Table II-12 in Part One.

CITY : Berrien Springs

PLANNING REGION: 4

AIRPORT NAME : Andrews University

LOCATION : 1.5 mi. W.N.W.

ELEVATION : 665'

EXISTING FACILITIES: Rwys 13/31 3100x60 paved; 3/21 2500x200 turf; UNICOM; fuel; lights

REMARKS: Recommend purchase and expansion of the privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	4	4	9	19
Total Aircraft Operations (100/year)	30	30	67.5	142.5
Itinerant Operations (100/year)	10	10	22.5	47.5
Enplaned Passengers (1000/year)	1.5	1.5	3.4	7.1
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-I	B-I	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3100'	3100'	3100'	3100'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Existing Airport	1. No Development	1. Widen Existing Runway
2. Administration Building		2. Airfield Lighting: Install Runway Lights
		3. Approach Aids: Install VASI and REILS
		4. Other: Runway Marking

CITY : DOWAGIAC

PLANNING REGION: 4

AIRPORT NAME : Cass County Memorial

LOCATION : 1 mi. N.W.

ELEVATION : 750'

EXISTING FACILITIES: Rwy 9/27 3800' x 75' paved, Rwys 14/32 2500' x 300' + 4/22 2800' x 300' turf; lights fuel, unicom (Rwy 14, closed for take-offs)

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	32	38	52	89
Total Aircraft Operations (100/year)	240	285	390	667
Itinerant Operations (100/year)	80	95	130	222
Enplaned Passengers (1000/year)	12	14.2	19.5	33.3
Functional Role	F-2	F-2	F-2	F-2
Operational Role – Dominant	BT	BT	BT	BT
Operational Role – Subordinate	–	–	–	–
Length of Longest Runway	3800	5000	5000	5000

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land.
2. Airfield Paving:
   Extend, widen and strengthen runway 9/27 to 5000'
   Construct crosswind runway to 3000'
   Construct Parallel Taxiways to both runways.
   Expand Apron
   Taxiway Streets
3. Airfield Lighting
   Runway and taxiway lights
   Apron lighting
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and taxiway marking

Intermediate

1. New Administration Building
2. Approach Aids:
   Install Precision Landing System
3. Other:
   Auto Parking
   Entrance Road

Long-Range

1. No Development

CITY : NILES

PLANNING REGION: 4

AIRPORT NAME : Jerry Tyler Memorial

LOCATION : 1.5 N.E.

ELEVATION : 743'

EXISTING FACILITIES: Rwys 14/32 4100'x75' and 3/21 3300'x75' paved, lights, unicom, fuel.

REMARKS: It is assumed that the larger business jets will use the airport in South Bend, approximately 13 miles from Niles.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	50	71	81	101
Total Aircraft Operations (100/year)	375	532	607	757
Itinerant Operations (100 'year)	125	177	202	252
Enplaned Passengers (1000/year)	18.7	26.5	30.3	37.8
Functional Role	F-2	F-2	F-2	F-2
Operational Role – Dominant	GU	GU	GU	GU
Operational Role – Subordinate	-	-	-	-
Length of Longest Runway	4100	4100	4100	4100

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase additional land.
2. Airfield Paving:
   Construct Parallel taxiways to both runways.
   Expand Apron
   Construct taxiway streets
3. Airfield Lighting:
   Install taxiway lights
   Extend runway lights on 14/32
   Apron lighting
4. Approach Aids:
   Install VASI and REILS
5. New Administration Building
6. Other:
   Obstruction Removal
   Taxiway Marking
   Auto Parking
   Access Road

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Paw Paw

PLANNING REGION: 4

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Western Van Buren County

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	15	35	65
Total Aircraft Operations (100/year)	----	112.5	262.5	487.5
Itinerant Operations (100/year)	----	37.5	87.5	162.5
Enplaned Passengers (1000/year)	----	5.6	13.1	24.4
Functional Role	----	F3	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3300'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct Primary Runway to 3300'
   Construct Crosswind Runway to 3300'
   Partial Parallel Taxi to Primary Rwy
   Turnarounds on Crosswind Runway
   Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
   Apron Lighting
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Auto Parking and Access Road
   Segmented Circle
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Runway to 3800'
   Extend Parallel Taxiway to Primary Rwy
   Construct Parallel Taxiway To Crosswind Runway
   Extend Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : South Haven

PLANNING REGION: 4

AIRPORT NAME : South Haven

LOCATION : 4.0 mi. S

ELEVATION : 663'

EXISTING FACILITIES: Rwys 4/22 3485x50 paved; 9/27 2550x175; 14/32 3100x175 and 18/36 2600x300 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	33	40	48	76
Total Aircraft Operations (100/year)	200.5	300	360	570
Itinerant Operations (100/year)	129.5	200	240	380
Enplaned Passengers (1000/year)	19.4	30	36	57
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3485'	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New Runway 4/22 3800'
   Extend Existing Runway 4/22 as Taxiway
   New Crosswind Runway to 3200'
   Parallel Taxiway to Crosswind
   Extend Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Obstruction Removal
   Auto Parking
   Access Road
   Runway and Taxiway Marking
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 4/22 to 5000'
   Extend Parallel Taxiway to 4/22
   Strengthen Existing Taxiways and Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Three Oaks

PLANNING REGION: 4

AIRPORT NAME : Oselka

LOCATION : 2.5 mi. S.W.

ELEVATION : 660'

EXISTING FACILITIES: Rwy 8/26 2770x60 paved; UNICOM; fuel

REMARKS: Recommend purchase and expansion of this privately-owned facility

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	5	5	9	19
Total Aircraft Operations (100/year)	37.5	37.5	67.5	142.5
Itinerant Operations (100/year)	12.5	12.5	22.5	47.5
Enplaned Passengers (1000/year)	1.9	1.9	3.4	7.1
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-I	B-I	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2770'	2770'	2770'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Existing Airport and Additional Land
2. Airfield Paving:
   Strengthen Existing Runway, Taxiway and Apron
3. Airfield Lighting:
   Runway Lights
4. Other:
   Obstruction Removal
   Fencing
   Auto Parking
   Runway and Taxiway Marking
   Relocate Road

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend E/W Runway to 3200'
   New N/S Runway to 3200'
   Turnaround to Both Runways
3. Airfield Lighting:
   Runway Lights
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Obstruction Removal
   Marking

CITY : Watervliet

PLANNING REGION: 4

AIRPORT NAME : Watervliet Municipal

LOCATION : 0.5 mi. N.E.

ELEVATION : 655'

EXISTING FACILITIES: Rwys 2/20 3075x200 and 7/25 2000x200 turf; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	8	15	25	35
Total Aircraft Operations (100/year)	60	112.5	187.5	262.5
Itinerant Operations (100/year)	20	37.5	62.5	87.5
Enplaned Passengers (1000/year)	3	5.6	9.4	13.1
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2900' (turf)	2500'	2500'	2500'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land 2. Airfield Paving: Pave Runway 2/20 - 2500' Connecting Taxiway Apron 3. New Administration Building 4. Other: Obstruction Removal Auto Parking Entrance Road Runway and Taxiway Marking Segmented Circle Fencing	1. Airfield Paving: Apron Expansion Taxi Streets	1. No Development

SUMMARY DATA SHEET

State Planning & Development Region - 5

Table V - 7

	1970	1975	1980	1990
POPULATION (000)	559	647	726	884
VALUE ADDED ($ Millions)	3,029	3,874	4,865	7,354
GENERAL AVIATION BASED AIRCRAFT	468	610	830	1,340
GENERAL AVIATION OPERATIONS (000)	376	489	662	1,383

Generalized Data Sheets Follow For Airports At : Almont/Imlay City, Durnad, Flint-Bishop, Flint/Clio, Flint/Davison, Lapeer, Owosso

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 5

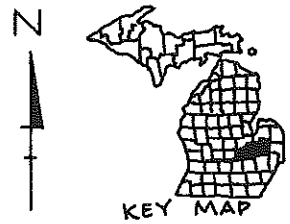
Figure V - 6

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.



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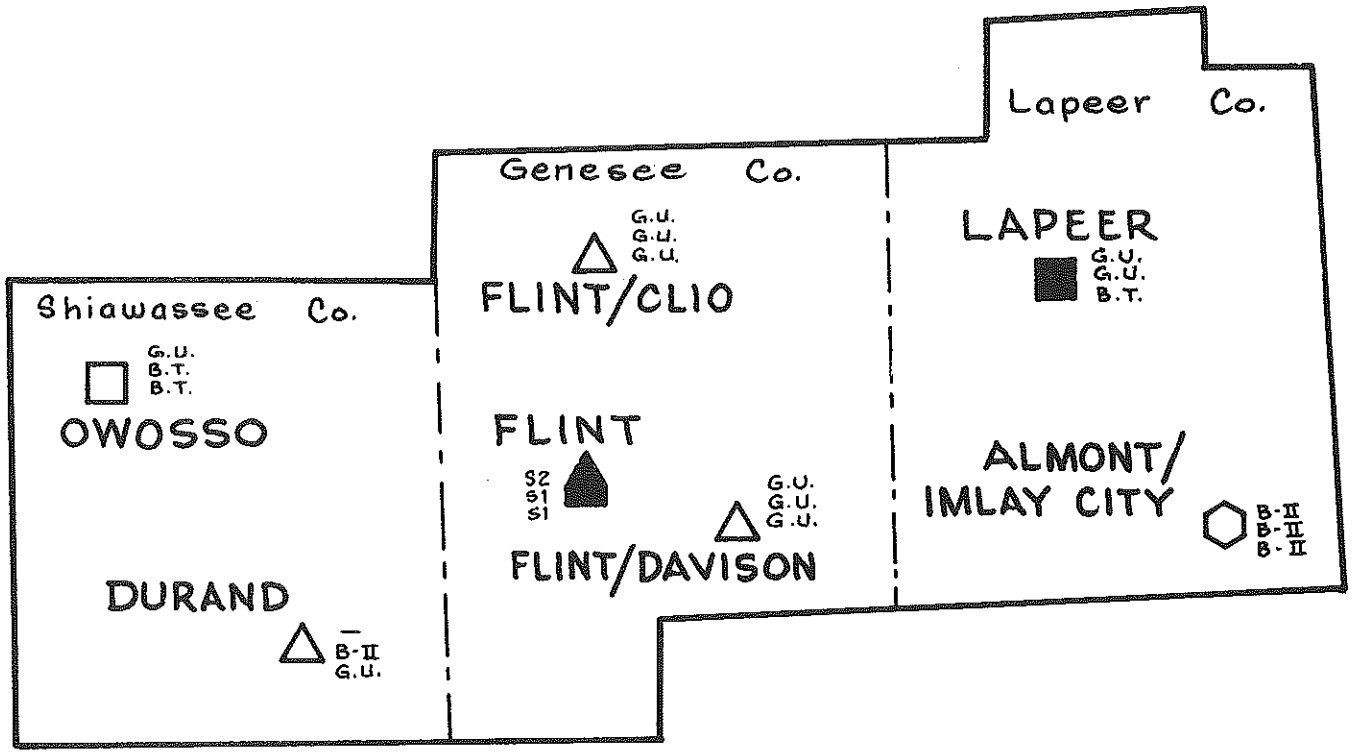


CITY : Almont/Imlay City

PLANNING REGION: 5

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended New Airport to serve the Almont/Imlay City area. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	10	13	25
Total Aircraft Operations (100/year)	----	75	97.5	187.5
Itinerant Operations (100/year)	----	25	32.5	62.5
Enplaned Passengers (1000/year)	----	3.8	4.9	9.4
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct Primary Runway 3200' Partial Parallel Taxi Connecting Taxi Taxi Streets Apron Turf Crosswind Runway 3200'		
3. Airfield Lighting: Runway and Taxi Lighting Lighted Wind Cone Beacon		
4. Administration Building		
5. Approach Aids: Install VASI and REILS		
6. Other: Fencing Auto Parking Entrance Road Segmented Circle Runway and Taxi Marking Obstruction Removal		

CITY : Durand

PLANNING REGION: 5

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate time period to serve Durand and also Western Genesee County in the long-range period. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	25	60
Total Aircraft Operations (100/year)	----	----	187.5	450
Itinerant Operations (100/year)	----	----	62.5	150
Enplaned Passengers (1000/year)	----	----	9.4	22.5
Functional Role	----	----	F3	F2
Operational Role – Dominant	----	----	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	3200'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

Intermediate

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Rwy to 3800'
   Pave Crosswind Runway to 3000'
   Extend Parallel Taxiway to Primary Rwy
   Construct Parallel Taxiway to Crosswind
   Connecting Taxiways
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and MALS
5. Enlarge Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

CITY : Flint

PLANNING REGION: 5

AIRPORT NAME : Bishop

LOCATION : 4.0 mi. S.S.W.

ELEVATION 781'

EXISTING FACILITIES: Rwys 5/23 5000x150; 9/27 7200x150 and 18/36 7850x150 paved; lights; ILS; TOWER; VOR; UNICOM; ASR-7; Fuel; National Weather Station

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	195	241	321	379
Total Aircraft Operations (100/year)	1833	2180	2822	3301
Itinerant Operations (100/year) — General Aviation	730	896	1202	1427
Itinerant Operations (100/year) — Air Carrier	117	131	161	190
Enplaned Passengers (1000/year) — General Aviation	109.5	134.4	180.3	214
Enplaned Passengers (1000/year) — Air Carrier	80	117	208	230
Enplaned Cargo (1000 tons/year)	1	3	6	19
Functional Role	S-2	S-2	S-1	S-1
Operational Role – Dominant	B.T.	B.T.	B2	B2
Operational Role – Subordinate	B3	B3	B.T.	B.T.
Length of Longest Runway	7,850'	7,850'	9,200'	9,200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Construct Runway 9R/27L to 4700'
   Parallel Taxiway to Runway 9R/27L
   Complete Parallel Taxiways for Existing Runways
   Expand General Aviation Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. Other:
   Expand Auto Parking
   Obstruction Removal
   Runway and Taxiway Marking

Intermediate

1. Acquire Additional Land
2. Airfield Paving:
   Extend and Widen 9R/27L to 9200'
   Extend Parallel Taxiways to 9R/27L
   New Air Carrier Apron
3. Airfield Paving:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate Instrument Landing Aids
5. Terminal Building:
   Construct New Terminal Building
6. Other:
   New Auto Parking
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

CITY : Flint/Clio

PLANNING REGION: 5

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Northern Genesee County. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	60	110	265
Total Aircraft Operations (100/year)	----	450	825	1987.5
Itinerant Operations (100/year)	----	150	275	662.5
Enplaned Passengers (1000/year)	----	22.5	41.3	99.4
Functional Role	----	F2	F2	S2
Operational Role – Dominant	----	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving Construct Primary Runway 3800' Construct Crosswind Runway 3000' Parallel Taxi to Both Runways Connecting Taxiways Taxi Streets Apron 3. Airfield Lighting: Install Runway and Taxi Lights Lighted Wind Cone Beacon 4. Approach Aids: Install VASI and REILS 5. Administration Building 6. Other: Fencing Auto Parking Entrance Road Runway and Taxi Marking Obstruction Removal Segmented Circle	1. No Development	1. No Development

CITY : Flint/Davison

PLANNING REGION: 5

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Eastern Genesee County. A site selection study might show that an existing airport is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	50	100	225
Total Aircraft Operations (100/year)	----	375	750	1687.5
Itinerant Operations (100/year)	----	125	250	562.5
Enplaned Passengers (1000/year)	----	18.8	37.5	84.4
Functional Role	----	F2	F2	S2
Operational Role – Dominant	----	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3800'
   Construct Crosswind Runway 3000'
   Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Runway and Taxi Marking
   Obstruction Removal
   Segmented Circle

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Lapeer

PLANNING REGION: 5

AIRPORT NAME : Dupont Lapeer

LOCATION : 2.4 mi. E.N.E.

ELEVATION : 840'

EXISTING FACILITIES: Rwys 18/36 3000x40 paved; 5/23 2000x120; 9/27 2100x250 and 14/32 2580x250 turf; lights; UNICOM; fuel

REMARKS: Recommend purchase and expansion of this existing privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	55	65	79	111
Total Aircraft Operations (100/year)	412.5	487.5	592.5	832.5
Itinerant Operations (100/year)	137.5	162.5	197.5	277.5
Enplaned Passengers (1000/year)	20.6	24.4	29.6	41.6
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3800'	3800'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Existing Airport and Additional Land
2. Airfield Paving:
   Construct E/W Runway to 3800'
   Widen and Strengthen N/S Runway to 3000'
   Parallel Taxiways to Both Runways
   Expand Apron
   Connecting Taxiways
   Strengthen Existing Apron and Taxiways
3. Airfield Lighting:
   Runway and Taxiway Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. New Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Access Road
   Auto Parking
   Segmented Circle

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen E/W Runway to 5000'
   Extend E/W Parallel Taxiway
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Extend Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Lights

CITY : Owosso

PLANNING REGION: 5

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to replace existing Owosso Airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	76	85	139
Total Aircraft Operations (100/year)	----	570	637.5	1042.5
Itinerant Operations (100/year)	----	190	212.5	347.5
Enplaned Passengers (1000/year)	----	28.5	31.9	52.1
Functional Role	----	F2	F2	S2
Operational Role – Dominant	----	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3800'
   Construct Crosswind Runway 3000'
   Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Runway and Taxi Marking
   Obstruction Removal
   Segmented Circle

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Primary Runway to 5000'
   Extend Parallel Taxi to Primary Runway
   Extend Apron
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Other:
   Obstruction Removal
   Runway and Taxi Marking

Long-Range

1. Purchase Land for Instrument Landing System
2. Approach Aids:
   Install Precision Landing

SUMMARY DATA SHEET

State Planning & Development Region - 6

Table V - 8

	1970	1975	1980	1990
POPULATION (000)	378	408	452	543
VALUE ADDED ($ Millions)	1,898	2,247	2,748	4,007
GENERAL AVIATION BASED AIRCRAFT	338	400	530	850
GENERAL AVIATION OPERATIONS (000)	266	310	416	669

Generalized Data Sheets Follow For Airports At: Bellevue, Charlotte, East Lansing/Williamston, Grand Ledge, Holt/Mason, Lansing, St. Johns, Stockbridge/Leslie

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 6

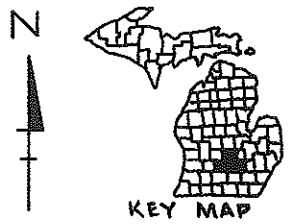
Figure V - 7

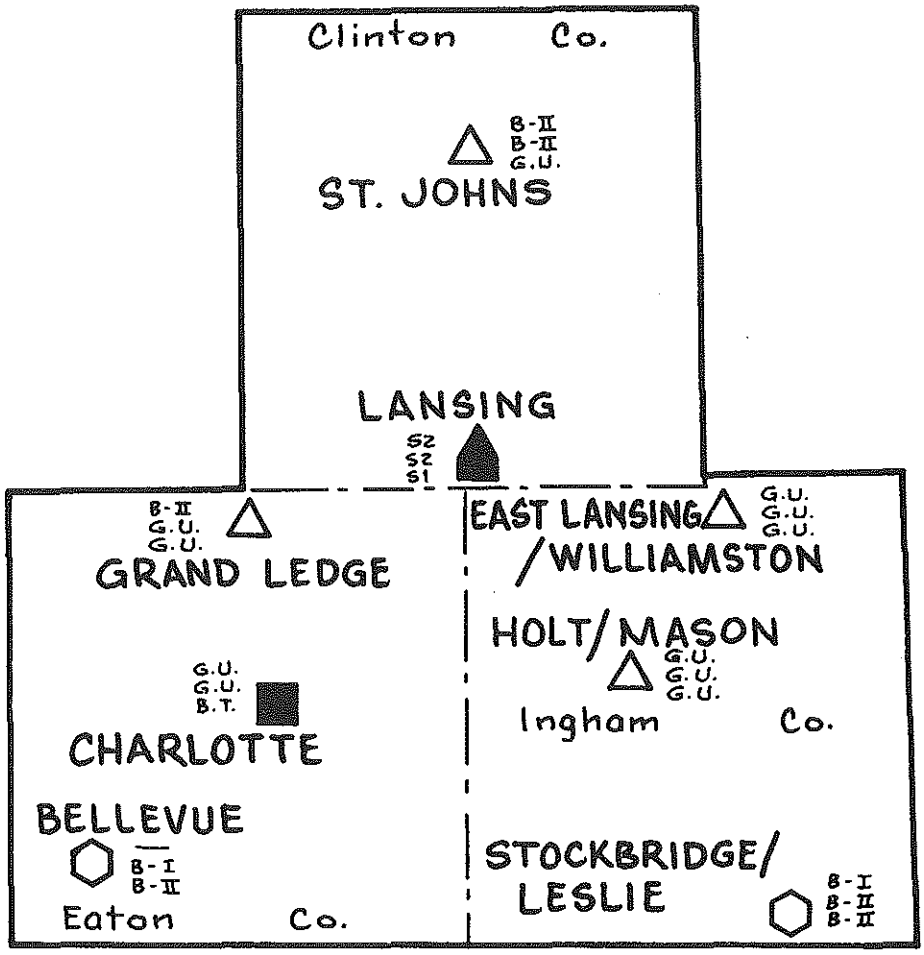
LEGEND

○ = 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.





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CITY : Bellevue

PLANNING REGION: 6

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES:

REMARKS: Recommended New Airport in the intermediate time period for Southwestern Eaton and Southeastern Berry Counties

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	6	16
Total Aircraft Operations (100/year)	----	----	45	120
Itinerant Operations (100/year)	----	----	15	40
Enplaned Passengers (1000/year)	----	----	2.3	6
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and SEIL
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

CITY : Charlotte

PLANNING REGION: 6

AIRPORT NAME : Fitch H. Beach

LOCATION : 1.8 mi. E.N.E.

ELEVATION : 889'

EXISTING FACILITIES: Rwys 2/20 3000x75 paved; 6/24 2200x100 and 14/32 2300x100 turf; lights UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	75	80	90	140
Total Aircraft Operations (100/year)	562.5	600	675	1050
Itinerant Operations (100/year)	187.5	200	225	350
Enplaned Passengers (1000/year)	28	30	33.8	52.5
Functional Role	F2	F2	F2	F1
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3900'	3900'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct New NW/SE Runway 3900'
   Parallel Taxi to NW/SE and Runway 2/20
   Extend Apron
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Lighted Wind Cone
4. Approach Aids:
   Install REILS and VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing
   Segmented Circle

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend NW/SE Runway to 5000'
   Strengthen and Widen NW/SE Runway
   Extend Parallel Taxi to NW/SE
   Strengthen Existing Taxiway
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Administration Building
5. Approach Aids:
   Install Precision Landing System
6. Other:
   Obstruction Removal
   Runway and Taxi Marking
   Auto Parking
   Entrance Road
   Fencing

CITY : East Lansing/Williamston

PLANNING REGION: 6

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Northeastern Ingham County. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	25	50	95
Total Aircraft Operations (100/year)	----	187.5	375	712.5
Itinerant Operations (100/year)	----	62.5	125	237.5
Enplaned Passengers (1000/year)	----	9.4	18.8	35.6
Functional Role	----	F3	F2	F2
Operational Role – Dominant	----	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3800'
   Construct Crosswind Runway 3000'
   Partial Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking and Entrance Road
   Runway and Taxiway Marking
   Obstruction Removal
   Segemented Circle

Intermediate

1. Airfield Paving:
   Complete Full Parallel Taxiway to both Runways
2. Airfield Lighting:
   Taxiway Lights
3. Other:
   Taxiway Marking

Long-Range

1. No Development

CITY : Grand Ledge

PLANNING REGION: 6

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: The site selection process of the current airport master planning grant might determine that Abrams Municipal Airport should be expanded rather than a new airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	33	52	106
Total Aircraft Operations (100/year)	----	247.5	390	795
Itinerant Operations (100/year)	----	82.5	130	265
Enplaned Passengers (1000/year)	----	12.4	19.5	39.8
Functional Role	----	F2	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct Primary Runway 3800' Construct Crosswind Runway 3000' Parallel Taxi to Both Runways Connecting Taxiways Taxi Streets Apron		
3. Airfield Lighting: Install Runway and Taxi Lights Lighted Wind Cone Beacon		
4. Approach Aids: Install VASI and REILS		
5. Administration Building		
6. Other: Fencing Auto Parking Entrance Road Runway and Taxi Marking Obstruction Removal Segmented Circle		

CITY : Holt/Mason

PLANNING REGION: 6

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the Holt/Mason area. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	30	50	105
Total Aircraft Operations (100/year)	----	225	375	787.5
Itinerant Operations (100/year)	----	75	125	272.5
Enplaned Passengers (1000/year)	----	11.3	18.8	40.9
Functional Role	----	F2	F2	F2
Operational Role – Dominant	----	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3800'
   Construct Crosswind Runway 3000'
   Partial Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking and Entrance Road
   Runway and Taxiway Marking
   Obstruction Removal
   Segmented Circle

Intermediate

1. Airfield Paving:
   Complete Full Parallel Taxiway to Both Runways
2. Airfield Lighting:
   Taxiway Lights
3. Other:
   Taxiway Marking

Long-Range

1. No Development

CITY : Lansing

PLANNING REGION: 6

AIRPORT NAME : Capital City

LOCATION : 3.8 mi. N.W.

ELEVATION 859'

EXISTING FACILITIES: Rwys 6/24 5000x120; 9/27 6500x150 and 14/32 3300x75 paved; lights; VOR; ILS; TOWER; 2 UNICOM; DF; fuel; FSS

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	166	165	207	280
Total Aircraft Operations (100/year)	1550	1550	1964	2694
Itinerant Operations (100/year) — General Aviation	759	759	948	1276
Itinerant Operations (100/year) — Air Carrier	183	183	219	292
Enplaned Passengers (1000/year) — General Aviation	114	114	142	191
Enplaned Passengers (1000/year) — Air Carrier	118	166	244	478
Enplaned Cargo (1000 tons/year)	1	2	3	12
Functional Role	S-2	S-2	S-2	S-1
Operational Role – Dominant	B3	B3	B3	B2
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	6900'	6900'	9200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend Runway 9/27 to 6900'
   Lengthen and Widen Rwy 6/24 to 5900'
   Extend Taxiways to both Runways
3. Airfield Lighting:
   Extend Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. Buildings:
   Expand Terminal
   Construct Fire/Crash Building
6. Other
   Obstruction Removal
   Expand Auto Parking
   Runway and Taxiway Marking

Intermediate

1. Acquire Additional Land
2. Airfield Paving:
   Construct Runway 9L/27R to 4700'
   Parallel Taxiway to Rwy 9L/27R and Connecting Taxiways
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. Terminal Building:
   Expand Terminal
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Extend and Widen Rwy 9L/27R to 9200'
   Extend Runway 6/24 to 7800'
   Extend Taxiways to both Runways
   Expand Apron
2. Airfield Lighting:
   Extend Runway and Taxiway Lights
3. Approach Aids:
   Relocate ILS
4. Terminal Building:
   Expand Terminal

CITY : St. Johns

PLANNING REGION: 6

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the St. Johns area. Site selection study might show that an existing airport is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	15	25	40
Total Aircraft Operations (100/year)	----	112.5	187.5	300
Itinerant Operations (100/year)	----	37.5	62.5	100
Enplaned Passengers (1000/year)	----	5.6	9.4	15
Functional Role	----	F3	F3	F2
Operational Role – Dominant	----	B-II	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3200'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Runway to 3800'
   Pave Crosswind Runway 3000'
   Widen Existing Taxiways
   Expand Apron
   Complete Parallel Taxiway For Both Rwys
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Enlarge Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Runway and Taxi Marking
   Obstruction Removal

CITY : Stockbridge/Leslie

EXISTING FACILITIES: None

PLANNING REGION: 6

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

REMARKS: Recommended new airport to serve Southwestern Ingham County

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	6	12	25
Total Aircraft Operations (100/year)	----	45	90	187.5
Itinerant Operations (100/year)	----	15	30	62.5
Enplaned Passengers (1000/year)	----	2.3	4.5	9.4
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

1. No Development

SUMMARY DATA SHEET

State Planning & Development Region - 7

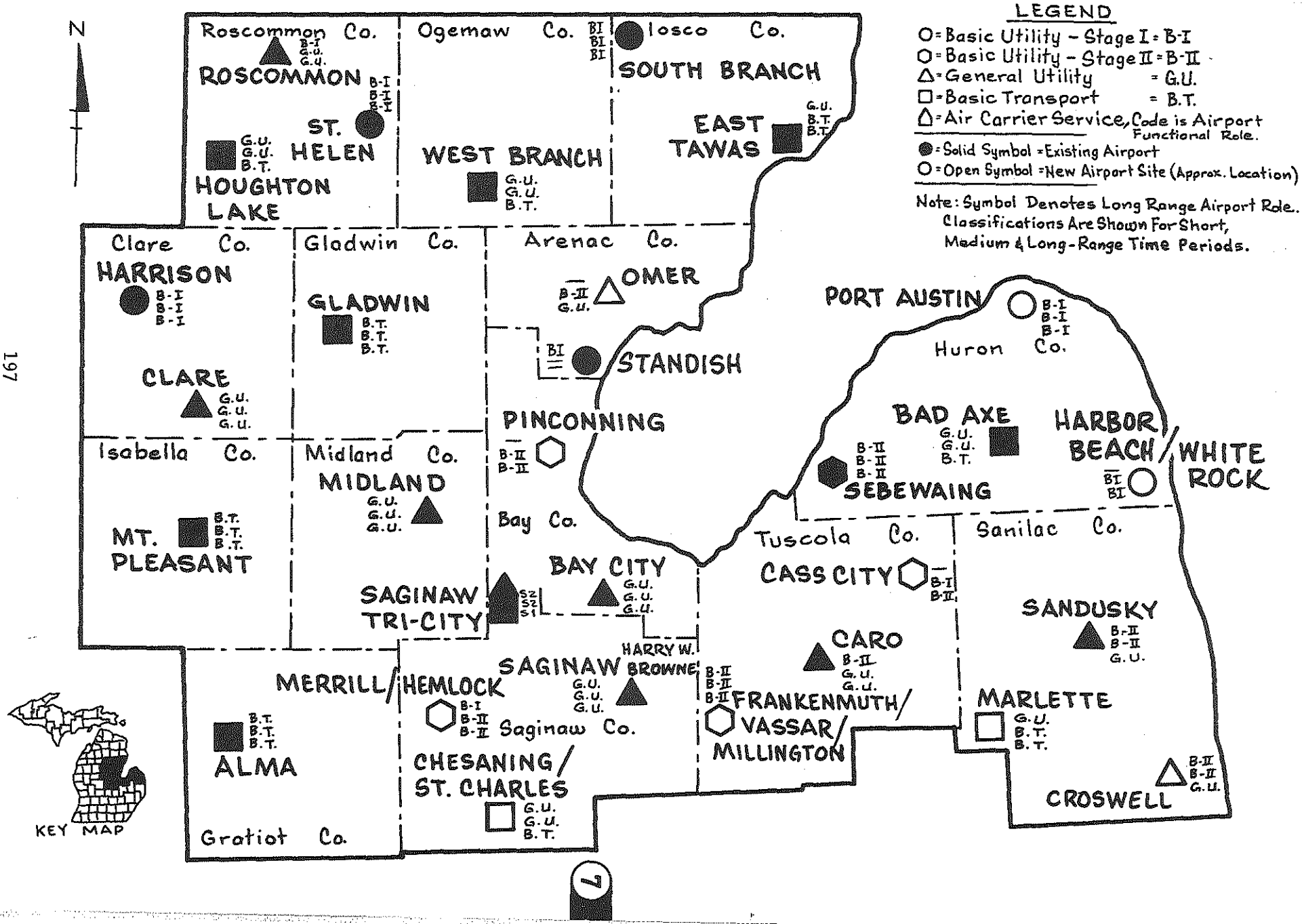
Table V - 9

	1970	1975	1980	1990
POPULATION (000)	691	746	816	937
VALUE ADDED ($ Millions)	2,700	3,157	3,706	5,054
GENERAL AVIATION BASED AIRCRAFT	498	710	940	1,450
GENERAL AVIATION OPERATIONS (000)	370	530	685	1,075

Generalized Data Sheets Follow For Airports At: Alma, Bad Axe, Bay City, Caro, Cass City, Chesaning/St. Charles, Clare, Crosswell, East Tawas, Frankenmuth/Vasser/Millington, Gladwin, Harbor Beach/White Rock, Harrison, Houghton Lake, Marlette, Merrill/Hemlock, Midland, Mt. Pleasant, Omer, Pinconning, Port Austin, Roscommon, Saginaw-Tri City, Saginaw-Harry W. Browne, Sandusky, Sebewaing, South Branch, St. Helen, Standish, West Branch

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 7



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.

CITY : Alma

PLANNING REGION: 7

AIRPORT NAME : Gratiot County

LOCATION : 3.5 mi. S.W.

ELEVATION : 754'

EXISTING FACILITIES: Rwys 9/27 5000x75 and 18/36 3200x75 paved; lights

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	28	39	48	68
Total Aircraft Operations (100/year)	176	258.5	326	476
Itinerant Operations (100/year)	61	88.5	111	161
Enplaned Passengers (1000/year)	9	13	16.7	24
Functional Role	F3	F2	F2	F2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5000'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Widen Runway 9/27 – 5000'
   Extend Runway 18/36 to 4000'
   Parallel Taxiway to 9/27 and 18/36
   Expand Apron
   Connecting Taxi
   Taxi Streets
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Apron Lighting
4. Approach Aids:
   Install VASI
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Fencing
   Runway and Taxi Marking

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Bad Axe

PLANNING REGION: 7

AIRPORT NAME : Huron County

LOCATION : 1.2 mi. S.S.E.

ELEVATION : 763'

EXISTING FACILITIES: Rwys 3/21 3200x75 paved; 9/27 2000x200 and 15/33 2400x200; turf; lights; Radio; UNICOM; TVOR; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	22	26	31	41
Total Aircraft Operations (100/year)	137.5	152.5	232.5	307.5
Itinerant Operations (100/year)	47.5	52.5	77.5	102.5
Enplaned Passengers (1000/year)	7	7.9	11.6	15.4
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3200'	3800'	3800'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 3/21 to 3800'
   Partial Parallel Taxi to 3/21
   Construct Crosswind Runway 3000'
   Construct Connecting Taxiways
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and Taxi Marking
   Fencing
   Relocate Road

Intermediate

1. Administration Building

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct New Runway 3/21 to 5000'
   Extend Existing 3/21 as Taxiway
   Parallel Taxi to Crosswind Taxiway
   Construct Taxi Streets
   Extend Apron
   Strengthen Taxi and Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install Precision Landing System
   Relocate VOR
5. Other:
   Obstruction Removal
   Runway and Taxi Marking
   Relocate Road

CITY : Bay City

PLANNING REGION: 7

AIRPORT NAME : James Clements Municipal

LOCATION : 3.8 mi. S

ELEVATION : 585'

EXISTING FACILITIES: Rwys 5/23 2600x100 and 18/36 3200x70 paved; 9/27 2650x100 turf; UNICOM; fuel; lights

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	50	73	91	150
Total Aircraft Operations (100/year)	257	429.5	564.5	1007
Itinerant Operations (100/year)	89	146.5	191.5	339
Enplaned Passengers (1000/year)	13.4	21.9	28.7	50.9
Functional Role	F2	F2	F2	F1
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3200'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land	1. No Development	1. No Development
2. Airfield Paving: Extend Runway 18/36 to 3800' Construct Parallel Taxi to Runway 18/36 Construct Parallel Taxi to 5/23 3100' Construct Taxi Streets		
3. Airfield Lighting: Install Runway and Texiway Lights		
4. Approach Aids: Install VASI and REILS		
5. Other: Runway and Taxi Marking Obstruction Removal		

CITY : Caro

PLANNING REGION: 7

AIRPORT NAME : Municipal

LOCATION : 2.8 mi. S.W.

ELEVATION : 700'

EXISTING FACILITIES: Rwys 5/23 3000x75 paved; 12/30 1850x 150 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	13	17	23	43
Total Aircraft Operations (100/year)	97.5	95.5	141.5	291.5
Itinerant Operations (100/year)	32.5	32	48	98
Enplaned Passengers (1000/year)	4.9	4.8	7.2	14.7
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	B-II	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct Crosswind Runway 2000'
   Connecting Taxiways
   Extend Apron
   Strengthen Runway 5/23 to 3200'
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install VASI and RFTLS
5. Other:
   Obstruction Removal
   Auto Parking
   Access Road
   Runway and Taxi Marking

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 5/23 to 3800'
   Taxiway Streets
3. Airfield Lighting:
   Extend Runway Lights
4. Administration Building
5. Other:
   Runway Marking
   Obstruction Removal
   Fencing

Long-Range

1. Airfield Paving:
   Parallel Taxiway for Both Runways
2. Airfield Lighting:
   Install Taxi Lights
3. Other:
   Taxiway Marking

CITY : Cass City

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate time period for the Cass City area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	7	14
Total Aircraft Operations (100/year)	----	----	52.5	105
Itinerant Operations (100/year)	----	----	17.5	35
Enplaned Passengers (1000/year)	----	----	2.6	5.3
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

Intermediate

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

CITY : Chesaning/St. Charles

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Southern Saginaw County. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	12	16	37
Total Aircraft Operations (100/year)	----	90	120	270
Itinerant Operations (100/year)	----	30	40	90
Enplaned Passengers (1000/year)	----	4.5	6	13.5
Functional Role	----	F3	F3	F2
Operational Role – Dominant	----	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	3800'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3800'
   Construct Crosswind Runway 3000'
   Partial Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking and Entrance Road
   Runway and Taxiway Marking
   Obstruction Removal
   Segmented Circle

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Primary Runway to 5000'
   Extend Parallel Taxiway to both Runways
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

CITY : Clare

PLANNING REGION: 7

AIRPORT NAME : Clare Municipal

LOCATION : 1.0 mi. N.E.

ELEVATION : 831'

EXISTING FACILITIES: Rwys 8/26 2500x75 paved 7/25 2400x200 and 13/31 2250x150 turf; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	11	14	18	28
Total Aircraft Operations (100/year)	82.5	105	135	210
Itinerant Operations (100/year)	27.5	35	45	70
Enplaned Passengers (1000/year)	4.1	5.3	6.8	10.5
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2500'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land	1. No Development	1. No Development
2. Airfield Paving: Extend Runway 9/27 to 3800' Construct Crosswind Runway 3000' Partial Parallel Taxi Expand Apron		
3. Airfield Lighting: Runway and Taxi Lights		
4. Approach Aids: Install VASI and REILS		
5. Administration Building: Construct Administration Building		
6 Other: Obstruction Removal Runway and Taxi Marking Auto Parking Entrance Road Fencing		

CITY : Croswell

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the Croswell area. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	10	13	21
Total Aircraft Operations (100/year)	----	75	97.5	172.5
Itinerant Operations (100/year)	----	25	32.5	57.5
Enplaned Passengers (1000/year)	----	3.8	4.9	8.6
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-II	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3200'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REIL
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Rwy to 3800'
   Pave Crosswind Runway 3000'
   Expand Apron
   Partial Parallel Taxiway to Crosswind
   Widen Existing Taxiways
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Enlarge Administration Building
6. Other:
   Fencing
   Runway and Taxiway Marking
   Additional Auto Parking
   Obstruction Removal

CITY : East Tawas

PLANNING REGION: 7

AIRPORT NAME : Iosco County

LOCATION : 4.0 mi. N.E.

ELEVATION : 604'

EXISTING FACILITIES: Rwy 8/26 3500x75 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	19	25	34	55
Total Aircraft Operations (100/year)	142.5	180	240	390
Itinerant Operations (100/year)	47.5	60	80	130
Enplaned Passengers (1000/year)	7	9	12	19.5
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	B-II	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3700'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New Crosswind Runway 3700'
   Partial Parallel Taxi to Crosswind and Primary Runway
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. Other:
   Obstruction Removal
   Runway and Taxi Marking
   Relocate Road
   Fencing

Intermediate

1. Purchase Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 8/26 to 5000'
   Complete Full Parallel Taxiway to Both Runways
   Strengthen Existing Taxiways & Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Frankenmuth/Vassar/Millington

EXISTING FACILITIES: None

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

REMARKS: Recommended new airport to serve the Frankenmuth/Vassar/Millington area. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	17	32	59
Total Aircraft Operations (100/year)	----	127.5	240	442.5
Itinerant Operations (100/year)	----	42.5	80	147.5
Enplaned Passengers (1000/year)	----	6.4	12	22
Functional Role	----	F3	F2	F2
Operational Role – Dominant	----	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REILS
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Gladwin

PLANNING REGION: 7

AIRPORT NAME : Gladwin Municipal

LOCATION : 0.25 mi. S.S.E.

ELEVATION : 780'

EXISTING FACILITIES: Rwys 7/25 3438x488; and 3538x488 turf; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	18	21	25	35
Total Aircraft Operations (100/year)	135	157.5	187.5	262.5
Itinerant Operations (100/year)	45	52.5	62.5	87.5
Enplaned Passengers (1000/year)	6.8	7.9	9.4	13
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	B-II	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3538'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen E/W Runway to 5000'
   Partial Parallel Taxi to E/W Runway
   New N/S Runway 3000'
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install and Relocate VASI
   Install REIL
5. New Administration Building
6. Other:
   Runway and Taxiway Marking
   Obstruction Removal
   Fencing

Intermediate

1. Approach Aids:
   Install Precision Landing System

Long-Range

1. Airfield Paving:
   Complete Parallel Taxiway E/W
   Construct Parallel Taxiway N/S
   Expand Apron
2. Airfield Lighting:
   Install Taxiway Lights
3. Other:
   Taxiway Marking

CITY : Harbor Beach/White Rock

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Southeastern Huron and Northeastern Sanilac Counties

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	0	0	2	4
Total Aircraft Operations (100/year)	----	----	15	30
Itinerant Operations (100/year)	----	----	5	10
Enplaned Passengers (1000/year)	----	----	.8	1.5
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
	1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development

CITY : Harrison

PLANNING REGION: 7

AIRPORT NAME : Clare County

LOCATION : 2.3 mi. N.N.W.

ELEVATION : 1140'

EXISTING FACILITIES: Rwys 4/22 3000x80; 9/27 2500x100 and 18/36 3050x100 turf; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	3	4	5	8
Total Aircraft Operations (100/year)	22.5	30	37.5	60
Itinerant Operations (100/year)	7.5	10	12.5	20
Enplaned Passengers (1000/year)	1	1.5	1.9	3
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	1. No Development

CITY : Houghton Lake

PLANNING REGION: 7

AIRPORT NAME : Roscommon County

LOCATION : 4.5 mi. N

ELEVATION : 1150'

EXISTING FACILITIES: Rwys 9/27 4000x75 paved; and 18/36 2500x80 turf; lights; UNICOM; NDB; VOR; fuel; National Weather Station

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	9	10	12	16
Total Aircraft Operations (100/year)	140	155	186	248
Itinerant Operations (100/year)	91.5	102	123	164
Enplaned Passengers (1000/year)	13.7	15.3	18.5	24.6
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2900'	4000'	4000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen E/W Runway to 4000'
   New NE/SW Runway to 3200'
   Partial Parallel Taxiway to Both Runways
   Extend Apron
   Taxi Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. New Administration Building
6. Other:
   Obstruction Removal
   Fencing
   Runway and Taxiway Marking
   Auto Parking
   Access Road

Intermediate

1. No Development

Long-Range

1. Purchase Additonal Land
2. Airfield Paving:
   Extend and Strengthen E/W Runway to 5000'
   Strengthen Existing Taxiway and Apron
   Complete Parallel Taxiway to Both Runways
   Extend Apron
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Runway and Taxiway Marking
   Obstruction Removal

CITY : Marlette

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport for the Marlette area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	18	27	44
Total Aircraft Operations (100/year)	----	135	202.5	330
Itinerant Operations (100/year)	----	45	67.5	110
Enplaned Passengers (1000/year)	----	6.8	10	16.5
Functional Role	----	F3	F2	F2
Operational Role – Dominant	----	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary and Crosswind Runway to 3800'
   Partial Parallel Taxiway to Primary Rwy
   Apron
   Connecting Taxiway
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Auto Parking
   Access Road
   Obstruction Removal
   Runway and Taxiway Marking
   Segmented Circle
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Strengthen and Widen Primary Runway to 5000'
   Extend Parallel Taxiway to Primary Rwy
   Expand Apron
   Strengthen Existing Taxiways and Apron
3. Airfield Lighting:
   Relocate VASI
4. Administration Building
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. Airfield Paving:
   Parallel Taxiway to Crosswind Runway
2. Airfield Lighting:
   Taxiway Lights
3. Approach Aids:
   Install Precision Landing System
4. Other:
   Taxiway Marking

CITY : Merrill/Hemlock

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the Merrill/Hemlock area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	8	12	30
Total Aircraft Operations (100/year)	----	60	40	22.5
Itinerant Operations (100/year)	----	20	30	75
Enplaned Passengers (1000/year)	----	3	4.5	11.3
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

1. No Development

CITY : Midland

PLANNING REGION: 7

AIRPORT NAME : Jack Barstow

LOCATION : 3.7 mi. N.W.

ELEVATION : 628'

EXISTING FACILITIES: Rwys 6/24 3000x75 and 18/36 3000x75 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	65	87	106	150
Total Aircraft Operations (100/year)	487.5	652.5	795	1100
Itinerant Operations (100/year)	162.5	217.5	265	350
Enplaned Passengers (1000/year)	24.4	32.6	39.8	52.5
Functional Role	F2	F2	F2	S2
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land 2. Airfield Paving: Extend Runways 6/24 and 18/36 to 3800' Parallel Taxiways to Both Runways Expand Apron Taxiway Streets 3. Airfield Lighting: Runway and Taxiway Lights 4. Approach Aids: Install VASI and REILS 5. Other: Obstruction Removal Runway and Taxiway Marking Fencing	1. No Development	1. No Development

CITY : Mt. Pleasant

PLANNING REGION: 7

AIRPORT NAME : Municipal

LOCATION : 2.2 mi. N.E.

ELEVATION : 755'

EXISTING FACILITIES: Rwys 9/27 3000x75 paved; 5/23 2850x250 and 13/31 2900x250 turf; lights; UNICOM; VOR; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	25	39	50	86
Total Aircraft Operations (100/year)	150	255	337.5	607.5
Itinerant Operations (100/year)	52	87	114.5	204.5
Enplaned Passengers (1000/year)	7.8	13	17.2	30.7
Functional Role	F3	F2	F2	F2
Operational Role – Dominant	B-II	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3200'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Strengthen Existing E/W Runway to 5000'
   Crosswind Runway to 3200'
   Parallel Taxiway to Crosswind
   Strengthen Existing Taxiways and Apron
   Expand Apron
   Widen Existing Taxiways
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Relocate Road
   Segmented Circle
   Runway and Taxiway Marking
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   New E/W Runway to 5000' (Existing E/W to Be Used as Parallel Taxi
   Connecting Taxiways
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
   Relocate REILS
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Omer

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate time period to serve Arenac County

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	15	23
Total Aircraft Operations (100/year)	----	----	112.5	172.5
Itinerant Operations (100 /year)	----	----	37.5	57.5
Enplaned Passengers (1000/year)	----	----	5.6	8.6
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	3200'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

Intermediate

1. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
2. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
3. Adminstration Building
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Long-Range

1. Airfield Paving:
   Extend and Widen Primary Runway to 3800'
   Pave Crosswind Runway 3000'
   Partial Parallel Taxiway to Crosswind Runway
   Widen Existing Taxiways
   Expand Apron
2. Airfield Lighting:
   Runway and Taxiway Lights
3. Approach Aids:
   Install VASI and REILS
4. Enlarge Administration Building
5. Other:
   Obstruction Removal

CITY : Pinconning

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate time period to serve Northern Bay County. This coincide with the recommendation to build a new airport at Omer to serve Arenac County in the intermediate time period

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	15	25
Total Aircraft Operations (100/year)	----	----	112.5	187.5
Itinerant Operations (100/year)	----	----	37.5	62.5
Enplaned Passengers (1000/year)	----	----	5.6	9.4
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
	1. Purchase Land 2. Airfield Paving: Construct Primary Runway 3200' Partial Parallel Taxi Connecting Taxi Taxi Streets Apron Turf Crosswind Runway 3200' 3. Airfield Lighting: Runway and Taxi Lighting Lighted Wind Cone Beacon 4. Administration Building 5. Approach Aids: Install VASI and REILS 6. Other: Fencing Auto Parking Entrance Road Segmented Circle Runway and Taxi Marking Obstruction Removal	1. No Development

CITY : Port Austin

PLANNING REGION: 7

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Northern Huron County

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	2	3	6
Total Aircraft Operations (100/year)	----	15	22.5	45
Itinerant Operations (100/year)	----	5	7.5	15
Enplaned Passengers (1000/year)	----	.8	1.1	2.3
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	1. No Development

CITY : Roscommon

PLANNING REGION: 7

AIRPORT NAME : Conservation

LOCATION : 2.5 mi. S.E.

ELEVATION : 1156'

EXISTING FACILITIES: Rwys 9/27 3600x75 paved and 18/36 2500x200 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	9	10	11	13
Total Aircraft Operations (100/year)	67.5	75	82.5	97.5
Itinerant Operations (100/year)	22.5	25	27.5	32.5
Enplaned Passengers (1000/year)	3.4	3.8	4.1	4.9
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-I	B-I	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3600'	3600'	3600'	3600'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New Apron
3. New Administration Building
4. Other:
   Auto Parking
   Entrance Road
   Obstruction Removal
   Fencing

Intermediate

1. Airfield Paving:
   Strengthen Existing Runway 3600'
   Expand Apron
2. Airfield Lighting:
   Runway Lights
   Beacon
   Lighted Wind Cone
3. Approach Aids:
   Install VASI
4. Other:
   Marking

Long-Range

1. No Development

CITY : Saginaw

PLANNING REGION: 7

AIRPORT NAME : Tri-City

LOCATION : 10.3 mi. N.W.

ELEVATION 667'

EXISTING FACILITIES: Rwys 5/23 6500x150 and 14/32 5475x150 paved; lights; VORTAC; TWR; UNICOM; DF; ILS; fuel; FSS

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	65	114	138	225
Total Aircraft Operations (100/year)	899	1355	1636	2514
Itinerant Operations (100/year) — General Aviation	434	654	762	1154
Itinerant Operations (100/year) — Air Carrier	146	161	226	321
Enplaned Passengers (1000/year) — General Aviation	65	98	114	173
Enplaned Passengers (1000/year) — Air Carrier	139	213	305	560
Enplaned Cargo (1000 tons/year)	1	3	5	17
Functional Role	S-3	S-2	S-2	S-1
Operational Role – Dominant	B2	B2	B2	B2
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	9100'	9100'	9100'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend Runway 5/23 to 9100'
   Extend Runway 14/32 to 7700'
   Extend Taxiway to both Runways
3. Airfield Lighting:
   Extend Runway and Txwy Lights
4. Approach Aids:
   Install VASI
5. Terminal Building:
   Expand Terminal
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Expand Auto Parking

Intermediate

1. Acquire Additional Land
2. Airfield Paving:
   Construct Runway 5R/23L 4700'
   Parallel and Connecting Taxiway to Rwy 5R/23L
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

CITY : Saginaw

PLANNING REGION: 7

AIRPORT NAME : Harry W. Browne

LOCATION : 4.5 mi. E

ELEVATION : 601'

EXISTING FACILITIES: Rwys 5/23 3300x100 and 14/32 3300x100 paved and 9/27 2550x50 turf; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	16	40	60	110
Total Aircraft Operations (100/year)	112	300	450	825
Itinerant Operations (100/year)	39	100	150	275
Enplaned Passengers (1000/year)	5.9	15	22.5	41.3
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3100'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New E/W Runway to 3800'
   New Crosswind Runway to 3200'
   Parallel Taxiway for Both Runways
   Connecting Taxiways
   Taxiway Streets
   Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. New Administration Building
6. Other:
   Obstruction Removal
   Auto Parking
   Access Road
   Runway and Taxiway Marking

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Sandusky

PLANNING REGION: 7

AIRPORT NAME : Sandusky

LOCATION : 2.5 mi. N

ELEVATION : 776'

EXISTING FACILITIES: Rwy 9/27 3000x40 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	10	13	17	25
Total Aircraft Operations (100/year)	59	81.5	111.5	171.5
Itinerant Operations (100/year)	38.5	46	56	76
Enplaned Passengers (1000/year)	5.8	6.9	8.4	11.4
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	B-II	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3200'	3200'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New E/W and N/S Runways 3200'
   Extend Existing E/W Runway as a Parallel Taxiway
   Partial Parallel Taxiway to N/S Rwy
   New Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend E/W Runway to 3800'
   Extend E/W Parallel Taxiway
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

CITY : Sebewaing

PLANNING REGION: 7

AIRPORT NAME : Sebewaing

LOCATION : 0.7 mi. W

ELEVATION : 584'

EXISTING FACILITIES: Rwys 18/36 2178x50 paved and 6/24 2100x300 turf; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	7	7	9	12
Total Aircraft Operations (100/year)	52.5	52.5	67.5	90
Itinerant Operations (100/year)	17.5	17.5	22.5	30
Enplaned Passengers (1000/year)	2.6	2.6	3.4	4.5
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2178'	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land	1. No Development	1. No Development
2. Airfield Paving: New N/S Runway 3200' Turnarounds South End of Runway Terminal Apron Taxiway Streets Connecting Taxiways		
3. Airfield Lighting: Runway Lights Beacon Lighted Wind Cone		
4. Approach Aids: Install VASI		
5. New Administration Building		
6. Other: Obstruction Removal Access Road and Auto Parking Segmented Circle Runway Marking Fencing		

CITY : South Branch

PLANNING REGION: 7

AIRPORT NAME : Timbers Sky Ranch

LOCATION : 0.2 mi. N.E.

ELEVATION : 950'

EXISTING FACILITIES: Rwys 5/23 1900x130 and 15/33 2200x130 turf; lights; fuel

REMARKS: Recommend the purchase and expansion of this privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	7	6	7	10
Total Aircraft Operations (100/year)	52.5	45	52.5	75
Itinerant Operations (100/year)	17.5	15	17.5	25
Enplaned Passengers (1000/year)	2.6	2.3	2.6	3.8
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2200' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : St. Helen

PLANNING REGION: 7

AIRPORT NAME : St. Helen

LOCATION : 0.9 mi. S.E.

ELEVATION : 1198'

EXISTING FACILITIES: Rwys 12/30 2800x120 and 18/36 2600x100 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	2	2	3
Total Aircraft Operations (100/year)	7.5	15	15	22.5
Itinerant Operations (100/year)	2.5	5	5	7.5
Enplaned Passengers (1000/year)	.4	.8	.8	1.1
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2800' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Standish

PLANNING REGION: 7

AIRPORT NAME : Standish

LOCATION : 0.5 mi. W

ELEVATION : 630'

EXISTING FACILITIES: Rwy 9/27 2800x250 turf; lights

REMARKS: Recommend that Standish be served by a new airport near Omer after the short-term period

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	6	8	----	----
Total Aircraft Operations (100/year)	45	60	----	----
Itinerant Operations (100/year)	15	20	----	----
Enplaned Passengers (1000/year)	2.3	3	----	----
Functional Role	F3	F3	----	----
Operational Role – Dominant	B-I	B-I	----	----
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2800'	2800'	----	----

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. No Development	1. No Development	1. No Development

CITY : West Branch

PLANNING REGION: 7

AIRPORT NAME : Community

LOCATION : 2.0 mi. S.E.

ELEVATION : 880'

EXISTING FACILITIES: Rwy 9/27 3200x75 paved; lights; UNICOM; NDB; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	17	21	25	33
Total Aircraft Operations (100/year)	71	101	131	191
Itinerant Operations (100/year)	24.5	34.5	44.5	64.5
Enplaned Passengers (1000/year)	3.7	5.2	6.7	9.7
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3200'	3800'	3800'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 9/27 to 3800'
   New N/S Runway 3200'
   Partial Parallel Taxiway to Both Rwys
   Expand Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Apron Lighting
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 9/27 to 5000'
   Extend E/W Parallel Taxiway
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

SUMMARY DATA SHEET

State Planning & Development Region - 8

Table V - 10

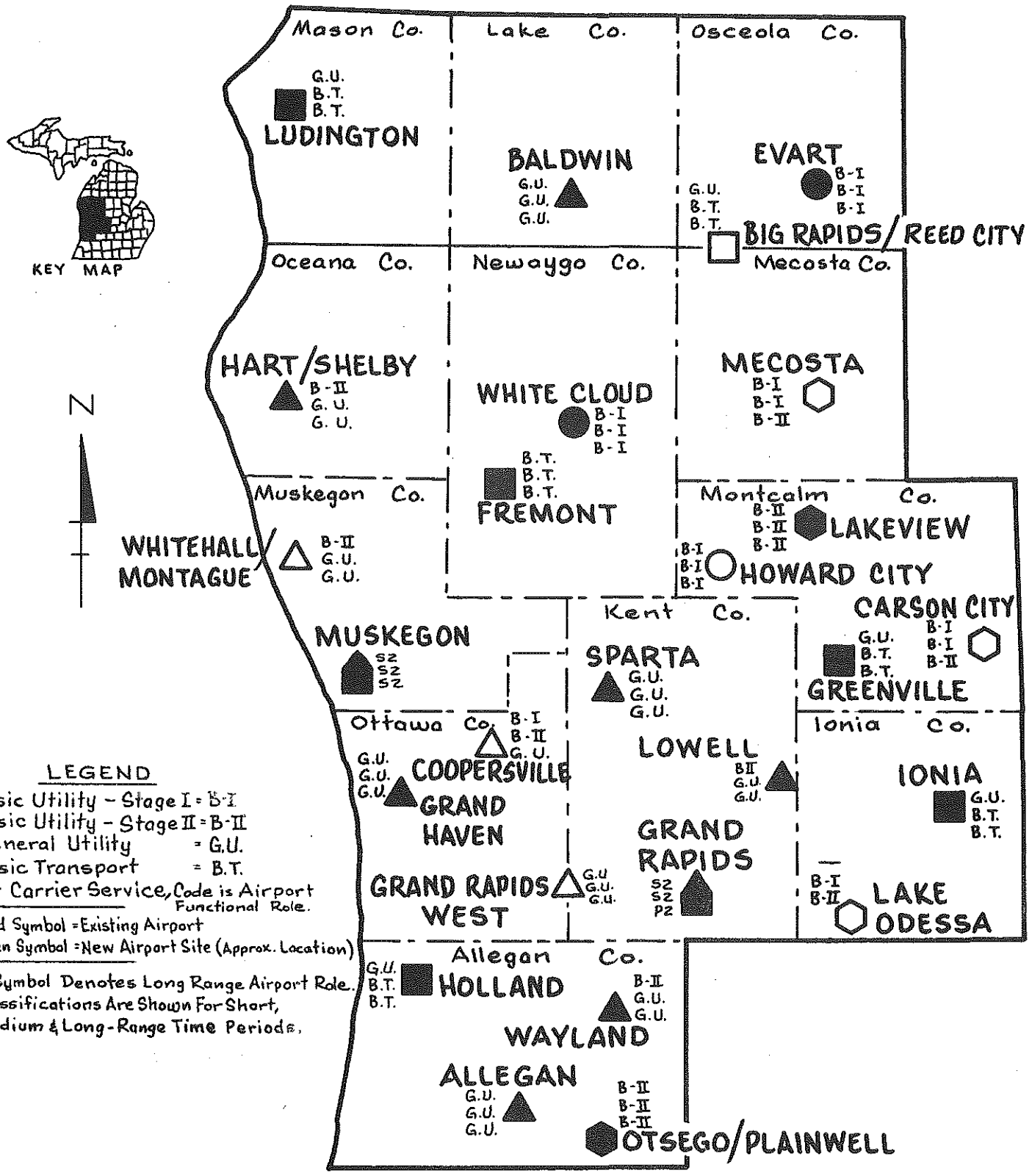
	1970	1975	1980	1990
POPULATION (000)	966	1,047	1,137	1,317
VALUE ADDED ($ Millions)	3,864	4,528	5,345	7,273
GENERAL AVIATION BASED AIRCRAFT	788	1,030	1,370	2,120
GENERAL AVIATION OPERATIONS (000)	510	773	1,046	1,529

Generalized Data Sheets Follow For Airports At: Allegan, Baldwin, Big Rapids/Reed City, Carson City, Coopersville, Evart, Fremont, Grand Haven, Grand Rapids-Kent County, Grand Rapids West, Greenville, Hart/Shelby, Holland, Howard City, Ionia, Lake Odessa, Lakeview,Lowell, Ludington, Mecosta, Muskegon, Plainwell, Sparta, Wayland, White Cloud, Whitehall/Montague

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 8

Figure V - 9



CITY : Allegan

PLANNING REGION: 8

AIRPORT NAME : Padgham Field

LOCATION : 1.9 mi. E

ELEVATION : 706'

EXISTING FACILITIES: Rwys 9/27 3500x75 paved; 14/32 1855x140 turf; lights; UNICOM; fuel.

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	26	30	35	45
Total Aircraft Operations (100/year)	195	225	262.5	337.5
Itinerant Operations (100/year)	65	75	87.5	112.5
Enplaned Passengers (1000/year)	9.8	11	13	16.9
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land 3. Airfield Paving: Extend Runway 9/27 to 3800' Expand Apron New Crosswind Runway 3000' 3. Airfield Lighting: Runway and Taxiway Lights 4. Approach Aids: Install VASI and REIL 5. Other: Obstruction Removal Marking Fencing	1. Airfield Paving: Construct Parallel Taxi 9/27 Expand Apron Taxiway Streets 2. Airfield Lighting: Install Taxiway Lights	1. Airfield Paving: Construct Parallel [illegible] 9/27 2. Airfield Lighting: Install Taxiway Lights

CITY : Baldwin

PLANNING REGION: 8

AIRPORT NAME : Baldwin

LOCATION : 1.3 mi. S.S.E.

ELEVATION : 820'

EXISTING FACILITIES: Rwys 9/27 3800x75 paved; 4/22 3375x60 turf; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	3	5	10
Total Aircraft Operations (100/year)	10	30	50	90
Itinerant Operations (100/year)	5	15	25	45
Enplaned Passengers (1000/year)	.8	2.3	3.8	6.8
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	G.U.	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3800'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Airfield Paving:
   Overlay Runway 9/27 3800'
   Construct Connecting Taxi Apron and Taxi Streets
2. Administration Building
3. Other:
   Fencing
   Auto Parking
   Entrance Road
   Runway Marking

Intermediate

1. Pruchase Additional Land
2. Airfield Paving:
   Construct Runway 18/36 3900'
   Parallel Taxi to Runway 18/36
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install REILS and VASI
5. Other:
   Obstruction Removal
   Runway and Taxi Marking

Long-Range

1. No Development

CITY : Big Rapids/Reed City

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new Airport to serve Big Rapids and Reed City. This airport would replace the existing airports in Big Rapids and Reed City

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	29	53	94
Total Aircraft Operations (100/year)	----	210	375	667.5
Itinerant Operations (100/year)	----	70	125	222.5
Enplaned Passengers (1000/year)	----	10.5	18.8	33.4
Functional Role	----	F2	F2	F2
Operational Role – Dominant	----	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 5800'
   Construct Crosswind Runway 3000'
   Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Runway and Taxi Marking
   Obstruction Removal
   Segmented Circle

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Primary Runway to 5000'
   Extend Parallel Taxi to Primary Runway
   Extend Apron
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxi Marking

Long-Range

1. No Development

CITY : Carson City

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the Carson City area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	9	11	17
Total Aircraft Operations (100/year)	----	67.5	82.5	127.5
Itinerant Operations (100/year)	----	22.5	27.5	42.5
Enplaned Passengers (1000/year)	----	3.4	4	6.4
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and PAPI
5. Other:
   Fencing
   Obstruction Removal
   Marking

CITY : Coopersville

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Coopersville and also Western Kent County in the long-range period. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	10	15	39
Total Aircraft Operations (100/year)	----	75	112.5	292.5
Itinerant Operations (100 'year)	----	25	37.5	97.5
Enplaned Passengers (1000/year)	----	3.8	5.6	14.6
Functional Role	----	F3	F3	F2
Operational Role – Dominant	----	B-I	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	3200'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

1. Purchase Land
2. Airfield Paving:
   Extend and Widen Primary Runway 3800'
   Pave Crosswind Runway 3000'
   Extend Parallel Taxiway to Primary Rwy
   New Parallel Taxi to Crosswind Runway
   Widen Taxiways
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Enlarge Administration Building
6. Other:
   Runway and Taxiway Marking
   Additional Auto Parking
   Obstruction Removal
   Fencing

CITY : Evart

PLANNING REGION: 8

AIRPORT NAME : Evart Municipal

LOCATION : 1.0 mi. W

ELEVATION : 1035'

EXISTING FACILITIES: Rwys 6/24 2200x50 paved; 12/30 2160x200 turf; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	3	4	6	9
Total Aircraft Operations (100/year)	30	40	60	90
Itinerant Operations (100 /year)	15	20	30	45
Enplaned Passengers (1000/year)	2.3	3	4.5	6.8
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-I	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2200'	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Rwy 6/24 to 2700'
   Extend Apron
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Auto Parking

Intermediate

1. No Development

Long-Range

1. No Development

CITY : Fremont

PLANNING REGION: 8

AIRPORT NAME : Fremont Municipal

LOCATION : 2.8 mi. S.W.

ELEVATION : 772'

EXISTING FACILITIES: Rwys 9/27 3500x75 and 18/36 5500x100 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	17	25	31	46
Total Aircraft Operations (100/year)	101.5	161.5	206.5	319
Itinerant Operations (100/year)	35	55	70	107.5
Enplaned Passengers (1000/year)	5.3	8.3	10.5	16
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5500'	5500'	5500'	5500'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land for Precision Approach System
2. Airfield Paving:
   Expand Apron
   Strengthen Runway 9/27 Connecting Taxiway And Apron
3. Airfield Lighting:
   Rehabilitate Runway Lights 9/27
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Runway and Taxiway Marking
   Fencing

Intermediate

1. Airfield Paving:
   Parallel Taxiway to both Runways
2. Airfield Lighting:
   Taxiway Lights
3. Approach Aids:
   Install Precision Landing System
4. Other:
   Taxiway Marking

Long-Range

1. No Development

CITY : Grand Haven

PLANNING REGION: 8

AIRPORT NAME : Grand Haven Memorial

LOCATION : 2.0 mi. S.S.E.

ELEVATION : 603'

EXISTING FACILITIES: Rwys 9/27 3750x75; 18/36 2060x60 paved and 13/31 3150x225 turf; light UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	36	45	63	93
Total Aircraft Operations (100/year)	162	229.5	364.5	589.5
Itinerant Operations (100/year)	56	78.5	123.5	198.5
Enplaned Passengers (1000/year)	8.4	11.8	18.5	29.8
Functional Role	F3	F2	F2	F2
Operational Role - Dominant	B-II	G.U.	G.U.	G.U.
Operational Role - Subordinate	----	----	----	----
Length of Longest Runway	3750'	3900'	3900'	3900'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land	1. No Development	1. No Development
2. Airfield Paving: Extend and Widen N/S Runway to 3900' Parallel Taxiway to N/S and E/W Expand Apron Taxiway Streets		
3. Airfield Lighting: Runway and Taxiway Lights Lighted Wind Cone		
4. Approach Aids: Install VASI and REIL		
5. Administration Building		
6. Other: Obstruction Removal Runway and Taxiway Marking Relocate Road Fencing		

CITY : Grand Rapids

PLANNING REGION: 8

AIRPORT NAME : Kent County

LOCATION : 9.5 mi. S.E.

ELEVATION : 793'

EXISTING FACILITIES: Rwys 8R/26L 7600x150; 18/36 3400x100 paved and 8L/26R 3918x75; lights; U-2; ILS; VOR; TOWER; fuel; National Weather Station

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	140	207	256	370
Total Aircraft Operations (100/year)	1360	2000	2455	3562
Itinerant Operations (100/year) — General Aviation	621	923	1143	1656
Itinerant Operations (100/year) — Air Carrier	248	285	299	380
Enplaned Passengers (1000/year) — General Aviation	93.2	138.5	171.5	248.4
Enplaned Passengers (1000/year) — Air Carrier	216	324	457	875
Enplaned Cargo (1000 tons/year)	3	6	13	47
Functional Role	S-2	S-2	S-2	P-2
Operational Role – Dominant	B3	B2	B2	B2/A3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	7600'	9200'	9200'	9200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend Runways 8R/26L to 9200', 8L/26R to 4700' and 18/36 to 3800'
   Extend Taxiways to all Runways
3. Airfield Lighting:
   Extend Runway and Taxiway Lights
4. Approach Aids:
   Install and Relocate VASI
   Install DME
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Intermediate

1. Other:
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Approach Aids:*
   Upgrade to "Primary"
3. Other:
   Expand Auto Parking

*See Table II-12 in Part One.

CITY : Grand Rapids/West

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Western Kent and Eastern Ottawa Counties. A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	53	95	210
Total Aircraft Operations (100/year)	----	397.5	712.5	1577
Itinerant Operations (100/year)	----	132.5	237.5	525
Enplaned Passengers (1000/year)	----	19.9	35.6	78.8
Functional Role	----	F2	F2	S2
Operational Role – Dominant	----	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct Primary Runway 3800' Construct Crosswind Runway 3000' Parallel Taxi to Both Runways Connecting Taxiways Taxi Streets Apron		
3. Airfield Lighting: Install Runway and Taxi Lights Lighted Wind Cone Beacon		
4. Approach Aids: Install VASI and REILS		
5. Administration Building		
6. Other: Fencing Auto Parking Entrance Road Runway and Taxi Marking Obstruction Removal Segmented Circle		

CITY : Greenville

PLANNING REGION: 8

AIRPORT NAME : Greenville

LOCATION : 2.5 mi. S

ELEVATION : 855'

EXISTING FACILITIES: Rwys 9/27 3000x50 paved and 18/36 1900x200 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	50	53	63	86
Total Aircraft Operations (100/year)	218	243	325.5	488
Itinerant Operations (100/year)	75.5	85.5	108	165.5
Enplaned Passengers (1000/year)	11.3	12.8	16.2	24.8
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Widen and Strengthen E/W Runway to 3800'
   Construct N/S Runway to 3800'
   Parallel Taxiways to Both Runways
   Expand Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Runway and Taxiway Marking
   Obstruction Removal
   Segmented Circle
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen E/W Runway to 5000'
   Extend Parallel Taxi to E/W
   Taxi Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Land Fill for Ravine

Long-Range

1. No Development

CITY : Hart/Shelby

PLANNING REGION: 8

AIRPORT NAME : Hart Shelby

LOCATION : 4.2 mi. S.S.E.

ELEVATION : 910'

EXISTING FACILITIES: Rwys 8/26 2020x50 paved and 14/32 2225x100 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	6	12	18	31
Total Aircraft Operations (100/year)	45	90	135	232.5
Itinerant Operations (100/year)	15	30	45	77.5
Enplaned Passengers (1000/year)	2.3	4.5	6.8	11.6
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	B-I	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	1800'	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New E/W Runway to 3200'
   New N/S Runway to 3200'
   Partial Parallel Taxi to Both Runways
   Connecting Taxiways
   Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REIL
5. Other:
   Obstruction Removal
   Relocate Road
   Runway and Taxiway Marking
   Fencing
   Segmented Circle

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen E/W Runway to 3800'
   Taxiway Streets
3. Airfield Lighting:
   Runway Lights
4. Approach Aids:
   Relocate VASI
5. Administration Building
6. Other:
   Runway Marking

Long-Range

1. No Development

CITY : Holland

PLANNING REGION: 8

AIRPORT NAME : Tulip City

LOCATION : 2.0 mi. S

ELEVATION : 680'

EXISTING FACILITIES: Rwys 8/26 3100x50 paved; 9/27 1865x100 and 18/36 2200x100 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	20	51	80	135
Total Aircraft Operations (100/year)	150	382.5	600	1012.5
Itinerant Operations (100/year)	50	127.5	200	337.5
Enplaned Passengers (1000/year)	7.5	19	30	50.6
Functional Role	F3	F2	F2	S2
Operational Role – Dominant	B-II	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3100'	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 8/26 to 3800'
   New N/S Runway to 3000'
   Parallel Taxi to Both Runways
   Connecting Taxiways
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REIL
5. New Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Auto Parking
   Access Road
   Segmented Circle

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Strengthen Runway 8/26 to 5000'
   Strengthen Existing Apron and Taxiways
   Extend Taxiway to 8/26
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Other:
   Obstruction Removal

Long-Range

1. Purchase Land for Instrument Landing System
2. Approach Aids:
   Install Precision Landing System

CITY : Howard City

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport near Howard City to serve Northwestern Montcalm and Southwestern Newaygo Counties

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	6	9	14
Total Aircraft Operations (100/year)	----	45	67.5	105
Itinerant Operations (100/year)	----	15	22.5	35
Enplaned Passengers (1000/year)	----	2.3	3.4	5.3
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Ionia

PLANNING REGION: 8

AIRPORT NAME : Ionia County

LOCATION : 3.0 mi. S

ELEVATION : 818'

EXISTING FACILITIES: Rwys 9/27 3700x75 paved; and 18/36 4200x400 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	28	37	42	59
Total Aircraft Operations (100/year)	280	347.5	385	512.5
Itinerant Operations (100/year)	97	119.5	132	174.5
Enplaned Passengers (1000/year)	14.6	17.9	19.8	26.2
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	G.U.	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3700'	3900'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New N/S Runway to 3900'
   Parallel Taxiway to N/S and E/W Runways
   Extend Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen N/S Runway to 5000'
   Strengthen Existing Taxiways and Apron
   Extend Parallel Taxi to N/S
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Lake Odessa

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport for the intermediate time period

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	8	15
Total Aircraft Operations (100/year)	----	----	60	112.5
Itinerant Operations (100/year)	----	----	20	37.5
Enplaned Passengers (1000/year)	----	----	3	5.6
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Rwy 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

CITY : Lakeview

PLANNING REGION: 8

AIRPORT NAME : Lakeview

LOCATION : 1.1 mi. N.N.E.

ELEVATION : 970'

EXISTING FACILITIES: Rwys 9/27 2500x60 paved; and 18/36 1150x100 turf; threshold; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	10	13	16	21
Total Aircraft Operations (100/year)	75	97.5	120	157.5
Itinerant Operations (100/year)	25	32.5	40	52.5
Enplaned Passengers (1000/year)	3.8	4.9	6	7.9
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2500'	3300'	3300'	3300'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Extend E/W Runway to 3300' Expand Apron Taxi Streets Turnaround both Runway Ends 3. Airfield Lighting: Runway Lights Beacon 4. Approach Aids: Install VASI 5. Other: Obstruction Removal Fencing Runway Marking	1. No Development	1. No Development

CITY : Lowell

PLANNING REGION: 8

AIRPORT NAME : Lowell

LOCATION : 1.0 mi. N

ELEVATION : 680'

EXISTING FACILITIES: Rwys 6/24 1675x100, 12/30 2360x100 and 15/33 2000x100 turf; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	7	20	32	60
Total Aircraft Operations (100/year)	52.5	150	240	450
Itinerant Operations (100/year)	17.5	50	80	150
Enplaned Passengers (1000/year)	2.6	7.5	12	22.5
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2360' (turf)	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New NE/SW Runway to 3200'
   New NW/SE Runway to 3200'
   Partial Parallel Taxiways to Both Rwys
   Apron
   Taxi Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. New Administration Building
6. Other:
   Fencing
   Auto Parking
   Access Road
   Obstruction Removal
   Runway and Taxiway Marking
   Segmented Circle

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend NW/SE Runway to 3800'
   Complete Parallel Taxiways to Both Rwys
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Ludington

PLANNING REGION: 8

AIRPORT NAME : Mason County

LOCATION : 1.7 mi. E.N.E.

ELEVATION : 642'

EXISTING FACILITIES: Rwys 7/25 3000x75, 18/36 3500x75 paved and 13/31 3200x250 turf; lights; UNICOM; NDB; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	25	32	39	52
Total Aircraft Operations (100/year)	250	320	390	520
Itinerant Operations (100/year)	125	160	195	260
Enplaned Passengers (1000/year)	18.8	24	29.3	39
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3800'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Strengthen Runway 7/25 to 3800'
   Parallel Taxiways to Both Runways
   Expand Apron
   Strengthen Existing Apron and Taxiways
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. Other:
   Obstruction Removal
   Fencing
   Runway and Taxiway Marking

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 7/25 to 5000'
   Extend Parallel Taxiway to 7/25
   Strengthen Existing Runway, Taxiway and Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install Precision Landing System
5. Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Mecosta

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport for the Mecosta area. Site selection study might show that an existing airport is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	4	8	17
Total Aircraft Operations (100/year)	----	30	60	127.5
Itinerant Operations (100/year)	----	10	20	42.5
Enplaned Passengers (1000/year)	----	1.5	3	6.4
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

CITY : Muskegon

PLANNING REGION: 8

AIRPORT NAME : Muskegon County

LOCATION : 3.5 mi. S

ELEVATION : 628'

EXISTING FACILITIES: Rwys 5/23 6500x150; 18/36 3461x100 and 14/32 5000x150 paved; lights; ILS; TOWER; DF; VORTAC; UNICOM; fuel; National Weather Station

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	99	137	177	262
Total Aircraft Operations (100/year)	900	1242	1625	2463
Itinerant Operations (100/year) — General Aviation	412	583	763	1146
Itinerant Operations (100/year) — Air Carrier	87	87	110	183
Enplaned Passengers (1000/year) — General Aviation	62	87	114	172
Enplaned Passengers (1000/year) — Air Carrier	63	100	148	276
Enplaned Cargo (1000 tons/year)	1	3	6	22
Functional Role	S-3	S-2	S-2	S-2
Operational Role – Dominant	B3	B3	B3	B3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	6800'	6800'	6800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend Runway 5/23 to 6800'
   Extend Txwys to Rwys 5/23 and 14/32
3. Airfield Lighting:
   Runway and Txwy Lights
4. Approach Aids:
   Install VASI and REILS
5. Buildings:
   Expand Terminal
   Construct Fire/Crash Building
6. Other:
   Obstruction Removal
   Runway and Txwy Marking
   Expand Auto Parking

Intermediate

1. Acquire Additional Land
2. Airfield Paving:
   Construct Parallel Rwy 5L/23R to 4700'
   Parallel Txwy to Runway 5L/23R
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Terminal Building:
   Expand Terminal
5. Other:
   Expand Auto Parking
   Obstruction Removal
   Runway and Txwy Marking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

CITY : Plainwell

PLANNING REGION: 8

AIRPORT NAME : Otsego Plainwell

LOCATION : 1.5 mi. N

ELEVATION : 727'

EXISTING FACILITIES: Rwys 9/27 2650x50 paved; 1/19 1900x250 turf; lights; UNICOM; fuel

REMARKS: Airport to serve Otsego Plainwell and small aircraft from the Northern Kalamazoo area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	21	35	43	60
Total Aircraft Operations (100/year)	157.5	262.5	322.5	450
Itinerant Operations (100/year)	52.5	87.5	107.5	150
Enplaned Passengers (1000/year)	7.9	13.1	16.1	22.5
Functional Role	F3	F2	F2	F2
Operational Role – Dominant	B-I	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2650'	2650'	2650'	2650'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. No Development	1. Airfield Paving: Parallel Taxi to E/W Runway Apron Expansion Taxiway Streets 2. Airfield Lighting: Taxiway Lights 3. Other: Taxiway Marking	1. No Development

CITY : Sparta

PLANNING REGION: 8

AIRPORT NAME : Sparta

LOCATION : 2.7 mi. S.E.

ELEVATION : 752'

EXISTING FACILITIES: Rwy 6/24 2465x55 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	30	50	75	132
Total Aircraft Operations (100/year)	225	375	562.5	990
Itinerant Operations (100/year)	75	125	187.5	330
Enplaned Passengers (1000/year)	11.3	18.8	28.1	49.5
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B-II	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2450'	3800'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 6/24 to 3800'
   Crosswind Runway to 3200'
   Parallel Taxiway to Both Runways
   Widen and Strengthen Taxiways and Apron
   Connecting Taxiway
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. New Administration Building
6. Other:
   Obstruction Removal
   Auto Parking
   Access Road
   Runway and Taxiway Marking
   Fencing

Intermediate

1. Airfield Paving:
   Taxiway Streets
   Expand Apron

Long-Range

1. No Development

CITY : Wayland

PLANNING REGION: 8

AIRPORT NAME : Wayland

LOCATION : 1.5 mi. N

ELEVATION : 740'

EXISTING FACILITIES: Rwys 9/27 1980x100 and 18/36 2250x100 turf; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	12	25	37	52
Total Aircraft Operations (100/year)	90	187.5	277.5	390
Itinerant Operations (100/year)	30	62.5	92.5	130
Enplaned Passengers (1000/year)	4.5	9.4	13.9	19.5
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	----	B-TT	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2300' (turf)	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Existing Airport and Additional Land
2. Airfield Paving:
   Construct Primary and Crosswind Runways to 3200'
   Partial Parallel Taxiway to Both Rwys
   Apron
   Connecting Taxiways
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
   Apron Lighting
4. Approach Aids:
   Install VASI and REILS
5. New Administration Building
6. Other:
   Obstruction Removal
   Access Road and Auto Parking
   Runway and Taxiway Marking
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Rwy to 3800'
   Complete Parallel Taxiway for Both Rwys
   Extend Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Relocate VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : White Cloud

PLANNING REGION: 8

AIRPORT NAME : White Cloud

LOCATION : 0.4 mi. W

ELEVATION : 910'

EXISTING FACILITIES: Rwy 17/35 2900x100 turf; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	5	7	9	15
Total Aircraft Operations (100/year)	37.5	52.5	67.5	112.5
Itinerant Operations (100/year)	12.5	17.5	22.5	37.5
Enplaned Passengers (1000/year)	1.9	2.6	3.4	5.6
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2900' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Whitehall/Montague

PLANNING REGION: 8

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Northern Muskegon County. A site selection study might show that an existing airport is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	20	30	50
Total Aircraft Operations (100/year)	----	150	225	375
Itinerant Operations (100/year)	----	50	75	125
Enplaned Passengers (1000/year)	----	7.5	11.3	18.8
Functional Role	----	F3	F2	F2
Operational Role – Dominant	----	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
4. Administration Building
5. Approach Aids:
   Install VASI and REIL
6. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen Primary Rwy to 3800'
   Pave Crosswind Runway 3000'
   Expand Apron
   Partial Parallel Taxiway to Crosswind
   Widen Existing Taxiways
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Enlarge Administration Building
6. Other:
   Fencing
   Runway and Taxiway Marking
   Additional Auto Parking
   Obstruction Removal

Long-Range

1. Airfield Paving:
   Complete Parallel Taxiways to Both Runways
2. Airfield Lighting:
   Taxiway Lights
3. Other:
   Taxiway Marking

SUMMARY DATA SHEET

State Planning & Development Region - 9

Table V - 11

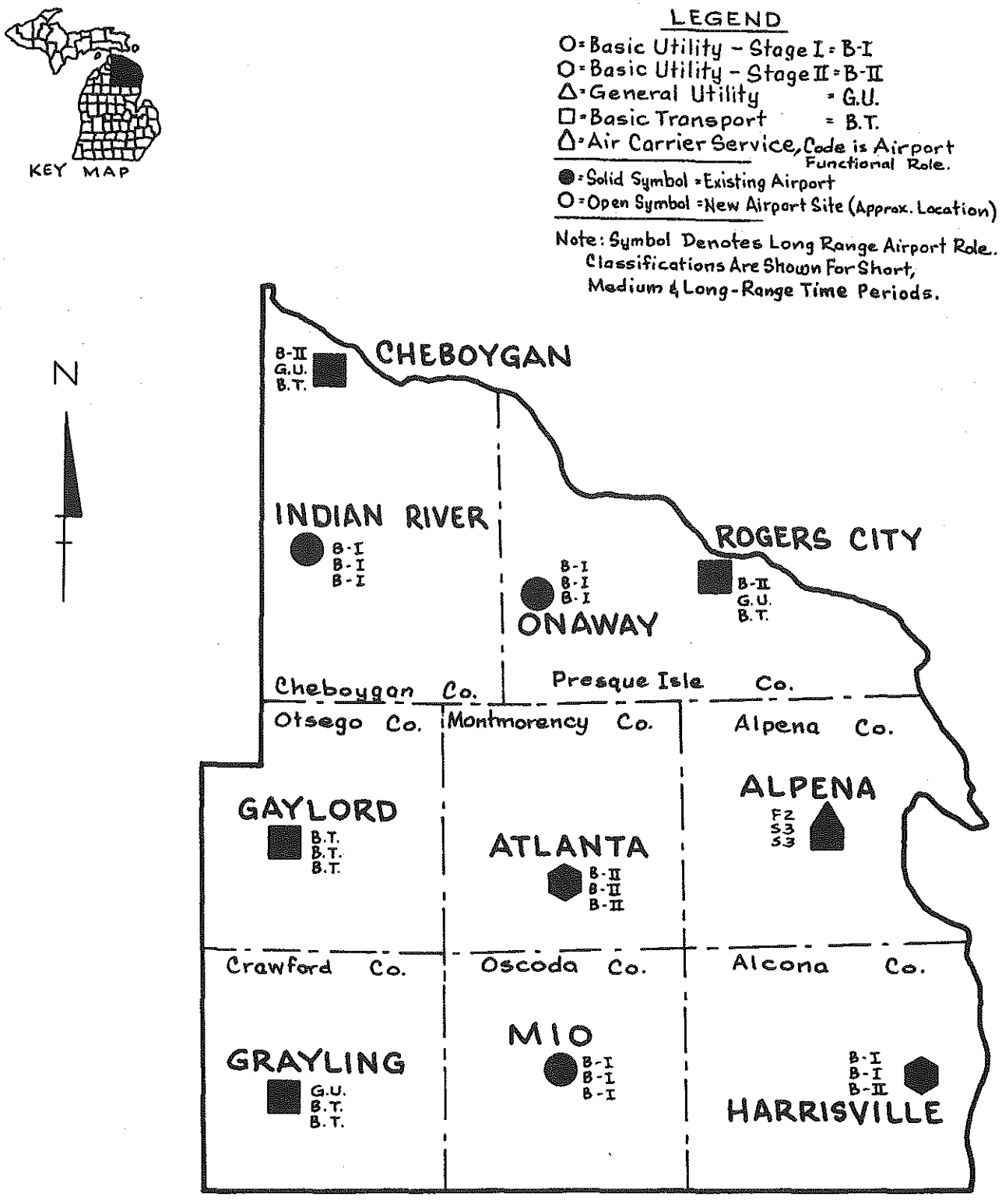
	1970	1975	1980	1990
POPULATION (000)	94	109	116	127
VALUE ADDED ($ Millions)	234	295	343	447
GENERAL AVIATION BASED AIRCRAFT	94	130	150	230
GENERAL AVIATION OPERATIONS (000)	99	127	161	233

Generalized Data Sheets Follow For Airports At: Alpena, Atlanta, Cheboygan, Gaylord, Grayling, Harrisville, Indian River, Mio, Onaway, Rogers City

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 9

Figure V - 10



CITY : Alpena

PLANNING REGION: 9

AIRPORT NAME : Phelps-Collins

LOCATION : 6.5 mi. W

ELEVATION : 685'

EXISTING FACILITIES: Rwys 6/24 5030x150; 12/30 5030x150; and 18/36 9000x150 paved; lights; UNICOM; TOWER; VORTAC; NDB; fuel; National Weather Station

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	37	45	55	76
Total Aircraft Operations (100/year)	392	465	565	782
Itinerant Operations (100/year) — General Aviation	166	202	247	342
Itinerant Operations (100/year) — Air Carrier	22	15	15	22
Enplaned Passengers (1000/year) — General Aviation	25	30.4	37	51
Enplaned Passengers (1000/year) — Air Carrier	6	10	15	27
Enplaned Cargo (1000 tons/year)	< 1	< 1	1	2
Functional Role	F-2	F-2	S-3	S-3
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	B3	C3	C3	C3
Length of Longest Runway	9000	9000	9000	9000

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Parallel Taxiway to Crosswind Runway
   Expand Apron
3. Airfield Lighting:
   Taxiway Lights
4. Approach Aids: *
   Upgrade to "Feeder"
5. Buildings:
   Construct Terminal and Fire/Crash Bldgs
6. Other:
   Obstruction Removal
   Taxiway Marking

Intermediate

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

*See Table II-12 in Part One.

CITY : Atlanta

PLANNING REGION: 9

AIRPORT NAME : Atlanta

LOCATION : 0.8 mi. E.S.E.

ELEVATION : 875'

EXISTING FACILITIES: Rwys 6/24 2600x75 and 13/31 3200x100; turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	7	9	10	13
Total Aircraft Operations (100/year)	70	90	100	130
Itinerant Operations (100/year)	35	45	50	65
Enplaned Passengers (1000/year)	5.3	6.8	7.5	9.8
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3200' (turf	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct Primary Runway 3200' Partial Parallel Taxi Connecting Taxi Taxi Streets Apron Turf Crosswind Runway 3200'		
3. Airfield Lighting: Runway and Taxi Lighting Lighted Wind Cone Beacon		
4. Administration Building		
5. Approach Aids: Install VASI and REILS		
6. Other: Fencing Auto Parking Entrance Road Segmented Circle Runway and Taxi Marking Obstruction Removal		

CITY : Cheboygan

PLANNING REGION: 9

AIRPORT NAME : Cheboygan

LOCATION : 1.0 mi. W

ELEVATION : 639'

EXISTING FACILITIES: Rwy 9/27 3500x75 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	13	16	21	31
Total Aircraft Operations (100/year)	130	160	210	310
Itinerant Operations (100/year)	65	80	105	155
Enplaned Passengers (1000/year)	9.7	12	15.7	23.2
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	B-II	B-II	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3500'	3800'	4500'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct N/S Runway 3000'
   Connecting Taxiway
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. Other:
   Obstruction Removal
   Fencing
   Runway and Taxiway Marking

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend E/W Runway to 5000'
   Widen and Strengthen E/W Runway
   Partial Parallel Taxi to E/W
   Strengthen Existing Apron and Taxiway
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

CITY : Gaylord

PLANNING REGION: 9

AIRPORT NAME : Otsego County

LOCATION : 1.0 mi. S.W.

ELEVATION : 1335'

EXISTING FACILITIES: Rwys 9/27 5000x75 paved and 18/36 3800x250 turf; lights; UNICOM; TVOR; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	14	17	21	36
Total Aircraft Operations (100/year)	171.5	201.5	241.5	391.5
Itinerant Operations (100/year)	59.5	74.5	94.5	169.5
Enplaned Passengers (1000/year)	8.9	11.2	14.2	25.4
Functional Role	F3	F2	F2	F2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5000'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New N/S Runway 4800'
   Strengthen E/W Runway 5000'
   Partial Parallel Taxi to E/W Runway
   Strengthen Existing Apron and Taxiway
   Extend Apron
   Taxi Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing
   Relocate County Road

Intermediate

1. Airfield Paving:
   Parallel Taxi to Both Runways
2. Airfield Lighting:
   Taxiway Lights
3. Approach Aids:
   Install Precision Landing System
4. Other:
   Taxiway Marking

Long-Range

1. No Development

CITY : Grayling

PLANNING REGION: 9

AIRPORT NAME : Grayling Area

LOCATION : 1.3 mi. N.W.

ELEVATION : 1152'

EXISTING FACILITIES: Rwys 5/23 5000x150 and 14/32 5000x150 paved; lights; UNICOM; NBD; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	9	11	14	20
Total Aircraft Operations (100/year)	90	110	140	200
Itinerant Operations (100/year)	45	55	70	100
Enplaned Passengers (1000/year)	6.8	8.3	10.5	15
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	G.U.	G.U.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5000'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Airfield Paving: Taxi Streets 2. Administration Building 3. Other: Auto Parking Pave Entrance Road	1. Airfield Paving: Expand Apron Strengthen Apron and Taxiway	1. No Development

CITY : Harrisville

PLANNING REGION: 9

AIRPORT NAME : Harrisville

LOCATION : 1.0 mi. N.N.W.

ELEVATION : 675'

EXISTING FACILITIES: Rwys 3/21 2200x240 and 14/32 1550x250 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	4	6	7	11
Total Aircraft Operations (100/year)	40	60	60	110
Itinerant Operations (100/year)	20	30	30	55
Enplaned Passengers (1000/year)	3	4.5	4.5	8.3
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2150' (turf)	2700'	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

CITY : Indian River

PLANNING REGION: 9

AIRPORT NAME : Campbell

LOCATION : 0.8 mi. S.E.

ELEVATION : 602'

EXISTING FACILITIES: Rwys 10/28 3000x150 and 17/35 1575x250 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	1	3	6
Total Aircraft Operations (100/year)	unknown	10	30	60
Itinerant Operations (100/year)	"	5	15	30
Enplaned Passengers (1000/year)	"	.8	2.3	4.5
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Mio

PLANNING REGION: 9

AIRPORT NAME : Mio

LOCATION : 1.6 mi. N

ELEVATION : 1050'

EXISTING FACILITIES: Rwy 9/27 3000x100 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	2	3	6
Total Aircraft Operations (100/year)	10	20	30	60
Itinerant Operations (100/year)	5	10	15	30
Enplaned Passengers (1000/year)	.8	1.5	2.3	4.5
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	1. No Development

CITY : Onaway

PLANNING REGION: 9

AIRPORT NAME : Onaway

LOCATION : 0.6 mi. N.N.E.

ELEVATION : 830'

EXISTING FACILITIES: Rwys 15/33 2600x60 paved; and 3/21 1330x150 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	3	4	6	8
Total Aircraft Operations (100/year)	30	40	60	80
Itinerant Operations (100/year)	15	20	30	40
Enplaned Passengers (1000/year)	2.3	3	4.5	6
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-I	B-I	B-I	B-I
Operational Role – Subordinate	---	---	---	---
Length of Longest Runway	2600'	2600'	2600'	2600'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Airfield Paving: Apron Connecting Taxiway 2. Administration Building 3. Other: Fencing Auto Parking and Entrance Road Segmented Circle Wind Cone	1. No Development	1. No Development

CITY : Rogers City

PLANNING REGION: 9

AIRPORT NAME : Presque Isle County

LOCATION : 0.7 mi. S.S.E.

ELEVATION : 673'

EXISTING FACILITIES: Rwy 9/27 3000x60 paved lights

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	4	6	8	12
Total Aircraft Operations (100/year)	40	60	80	120
Itinerant Operations (100/year)	20	30	40	60
Enplaned Passengers (1000/year)	3	4.5	6	9
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	B-II	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000'	3000'	3600'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Airfield Paving:
   New Apron
   Connecting Taxiway
2. Administration Building
3. Other:
   Auto Parking
   Access Road
   Fencing

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen E/W to 3600'
   New N/S Runway to 3200'
   Extend Apron
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway Marking
   Fencing

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen E/W Runway to 5000'
   Strengthen Existing Apron and Taxiway
3. Airfield Lighting:
   Runway Lighting
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Marking
   Fencing

SUMMARY DATA SHEET

State Planning & Development Region - 10

Table V - 12

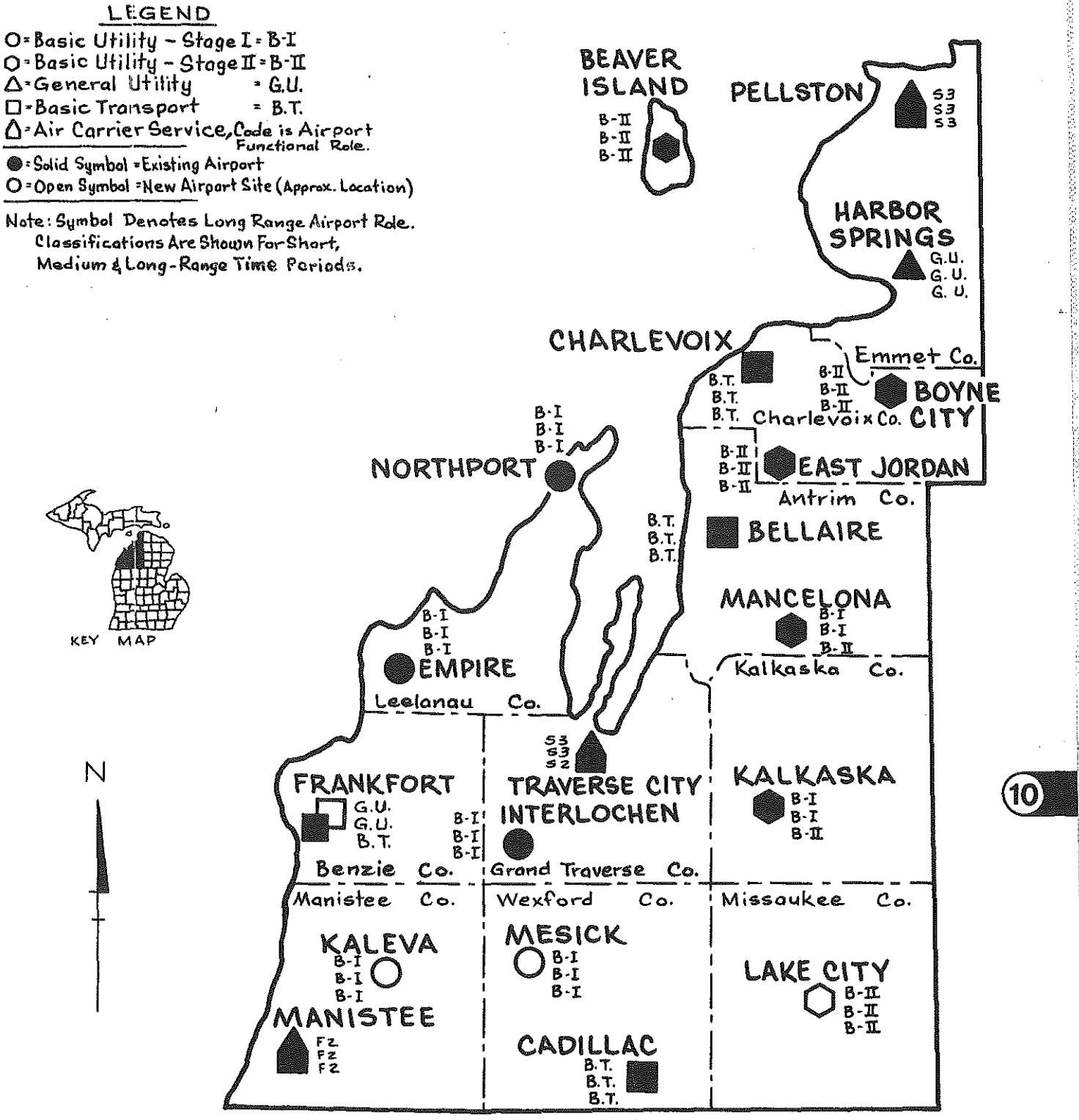
	1970	1975	1980	1990
POPULATION (000)	159	168	179	199
VALUE ADDED ($ Millions)	445	510	589	770
GENERAL AVIATION BASED AIRCRAFT	166	190	240	560
GENERAL AVIATION OPERATIONS (000)	148	177	216	304

Generalized Data Sheets Follow For Airports At : Beaver Island, Bellaire, Boyne City, Cadillac, Charlevoix, East Jordan, Empire, Frankfort-Existing, Frankfort-New, Harbor Springs, Interlochen, Kaleva, Kalkaska, Lake City, Macelona, Manistee, Mesick, Northport, Pellston, Traverse City

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 10

Figure V - 11



CITY : Beaver Island

PLANNING REGION: 10

AIRPORT NAME : Beaver Island

LOCATION : 4.2 mi. S.S.W.

ELEVATION : 670'

EXISTING FACILITIES: Rwys 5/23 2540x200 and 14/32 3400x200 turf; UNICOM; NDB; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	0	0	1	2
Total Aircraft Operations (100/year)	20	20	75	130
Itinerant Operations (100/year)	20	20	25	30
Enplaned Passengers (1000/year)	3	3	3.8	4.5
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500' (turf)	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additonal Land	1. No Development	1. No Development
2. Airfield Paving: New Runway 5/23 3200' New Runway 14/32 3200' Partial Parallel Taxi to 5/23 and 14/32 Connecting Taxiways New Apron		
3. Airfield Lighting: Install Runway and Taxi Lights Lighted Wind Cone Beacon		
4. New Administration Building		
5. Approach Aids: Install VASI and REIL		
6. Other: Obstruction Removal Runway and Taxi Marking Entrance Road Auto Parking		

CITY : Bellaire

PLANNING REGION: 10

AIRPORT NAME : Antrim County

LOCATION : 0.25 mi. N.E.

ELEVATION : 628'

EXISTING FACILITIES: Rwys 2/20 5000x100 and 13/31 2500x75 paved; lights; UNICOM; NDB; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	22	24	25	31
Total Aircraft Operations (100/year)	220	240	250	310
Itinerant Operations (100/year)	110	120	125	155
Enplaned Passengers (1000/year)	16.5	18	18.8	23.3
Functional Role	F2	F2	F2	F2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5000'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land 2. Airfield Paving: Extend Runway 13/31 to 3000' 3. Airfield Lighting: Runway and Taxi Lights 4. Approach Aids: Install VASI 5. Other: Obstruction Removal Runway Marking	1. Airfield Paving: Parallel Taxi to 2/20 and 13/31 Expand Apron 2. Airfield Lighting: Install Taxiway Lights 3. Other: Taxiway Marking	1. No Development

CITY : Boyne City

PLANNING REGION: 10

AIRPORT NAME : Boyne City

LOCATION : 1.0 mi. E

ELEVATION : 651'

EXISTING FACILITIES: Rwys 9/27 3040x50 paved; 13/31 3400x75 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	7	7	8	12
Total Aircraft Operations (100/year)	70	70	80	120
Itinerant Operations (100/year)	35	35	40	60
Enplaned Passengers (1000/year)	5.3	5.3	6	9
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-I	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3040'	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Additional Land	1. No Development	1. No Development
2. Airfield Paving: Construct NW/SE Runway 3200' Connecting Taxiways Apron		
3. Airfield Lighting: Install Runway end Taxi Lights Lighted Wind Cone Beacon		
4. Approach Aids: Install VASI and REILS		
5. Administration Building		
6. Other: Fencing Auto Parking Access Roads Runway and Taxiway Marking Obstruction Removal		

CITY : Cadillac

PLANNING REGION: 10

AIRPORT NAME : Wexford County

LOCATION : 2.5 mi. N.W.

ELEVATION : 1305'

EXISTING FACILITIES: Rwys 7/25 5000x100 paved; 12/30 3100x250 turf; lights; UNICOM; NDB; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	17	20	25	37
Total Aircraft Operations (100/year)	170	190	230	340
Itinerant Operations (100/year)	85	95	115	170
Enplaned Passengers (1000/year)	12.8	14.3	17.3	25.5
Functional Role	F3	F3	F2	F2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5000'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Construct Crosswind Runway 3200'
   Connecting Texiways
3. Airfield Lighting:
   Install Runway and Taxi Lights
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Obstruction Removal
   Runway and Taxi Marking
   Fencing

Intermediate

1. Airfield Paving:
   Strengthen Runway 7/25 5000'
   Construct New Apron
   Parallel Taxi to Both Runways
   Connecting Taxiways
2. Airfield Lighting:
   Install Taxi Lights
3. Approach Aids:
   Install Precision Landing System
4. Administration Building
5. Other:
   Fencing
   Auto Parking
   Entrance Road
   Runway and Taxi Marking

Long-Range

1. No Development

CITY : Charlevoix

PLANNING REGION: 10

AIRPORT NAME : Charlevoix

LOCATION : 1.1 mi. S.W.

ELEVATION : 658'

EXISTING FACILITIES: Rwys 8/26 3500x75 paved; 4/22 2700x300 and 13/31 2400x300 turf; lights; UNICOM; NDB; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	12	12	13	18
Total Aircraft Operations (100/year)	150	150	160	210
Itinerant Operations (100/year)	98	98	103	128
Enplaned Passengers (1000/year)	14.7	14.7	15.5	19.2
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	4500'	4500'	4500'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Runway 8/26 to 4500'
   Strengthen and Widen Runway 8/26
   Partial Parallel Taxi to E/W
   Construct NW/SE Runway 3000'
   Extend Apron
   Strengthen Existing Apron and Taxi
   Construct Taxi Streets
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Install PELLS and VASI
   Install VOR
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

Intermediate

1. Airfield Paving:
   Complete Parallel Taxi on E/W
   Construct Parallel Taxi NW/SE
2. Airfield Lighting:
   Install Taxiway Lights
3. Other:
   Taxiway Marking

Long-Range

1. No Development

CITY : East Jordan

PLANNING REGION: 10

AIRPORT NAME : East Jordan

LOCATION : 1.9 mi. S.S.E.

ELEVATION : 640'

EXISTING FACILITIES: Rwys 9/27 3330x190 and 18/36 2000x145 turf; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	11	11	11	14
Total Aircraft Operations (100/year)	110	110	110	140
Itinerant Operations (100/year)	55	55	55	70
Enplaned Passengers (1000/year)	8.3	8.3	8.3	10.5
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3330' (turf)	3200'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct Primary Runway 3200' Partial Parallel Taxi Connecting Taxi Taxi Streets Apron Turf Crosswind Runway 3200' 3. Airfield Lighting: Runway and Taxi Lighting Lighted Wind Cone Beacon 4. Administration Building 5. Approach Aids: Install VASI and REILS 6. Other: Fencing Auto Parking Entrance Road Segmented Circle Runway and Taxi Marking Obstruction Removal	1. No Development	1. No Development

CITY : Empire

PLANNING REGION: 10

AIRPORT NAME : Empire

LOCATION : 3.2 mi. S.E.

ELEVATION : 920'

EXISTING FACILITIES: Rwys 9/27 2275x150 and 17/35 2700x150 turf; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	2	4	7
Total Aircraft Operations (100/year)	10	20	40	70
Itinerant Operations (100/year)	5	10	20	35
Enplaned Passengers (1000/year)	.8	1.5	3	5.3
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2700' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Frankfort

PLANNING REGION: 10

AIRPORT NAME : Frankfort City-County/New

LOCATION : 1.9 mi. E.S.E.

ELEVATION : 642'

EXISTING FACILITIES: Rwys 14/32 2750x50 paved 1/19 1050x200 turf; lights; UNICOM; fuel

REMARKS: Recommend that a new airport be built for Frankfort in the intermediate time period.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	3	5	8	13
Total Aircraft Operations (100/year)	30	50	80	130
Itinerant Operations (100/year)	30	40	55	80
Enplaned Passengers (1000/year)	4.5	6	8.3	12
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	G.U.	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2750'	3900'	3800'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving
   Extend Runway 14/32 to 3900'
3. Airfield Lighting:
   Extend Runway Lights
4. Other:
   Obstruction Removal
   Runway Marking

Intermediate

1. Purchase Land
2. Airfield Paving
   Construct Primary Runway 3800'
   Construct Crosswind Runway 3000'
   Partial Parallel Taxiway to Both Rwys
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Install Runway and Taxiway Lights
   Lighted Wind Cone
   Beacon
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Fencing
   Auto Parking and Entrance Road
   Runway and Taxiway Marking
   Obstruction Removal
   Segmented Circle

Long-Range

1. Land
2. Airfield Paving:
   Extend, Widen and Strengthen Primary Runway to 5000'
   Strengthen Existing Runway
3. Airfield Lighting:
   Runway Lighting
4. Approach Aids:
   Relocate VASI
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking

CITY : Harbor Springs

PLANNING REGION: 10

AIRPORT NAME : Harbor Springs

LOCATION : 3.8 mi. E

ELEVATION : 700'

EXISTING FACILITIES: Rwy 10/28 3900x60 paved; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	8	8	10	16
Total Aircraft Operations (100/year)	111.5	111.5	131.5	191.5
Itinerant Operations (100/year)	73	73	83	113
Enplaned Passengers (1000/year)	11	11	12.5	17
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	G.U.	G.U.	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3900'	3900'	3900'	3900'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New N/S Runway 3200'
   Partial Parallel Taxiway to N/S and E/W Runways
   Taxiway Streets
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REIL
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Access Road
   Auto Parking
   Fencing

Intermediate

1. Airfield Paving:
   Expand Apron
2. Administration Building

Long-Range

1. No Development

CITY : Interlochen

PLANNING REGION: 10

AIRPORT NAME : Green Lake

LOCATION : 3.0 mi. S

ELEVATION : 880'

EXISTING FACILITIES: Rwys 5/23 2800x300 and 16/34 2200x300; turf

REMARKS: Recommend purchase and expansion of this privately-owned airport

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	1	2	3
Total Aircraft Operations (100/year)	5	10	20	30
Itinerant Operations (100/year)	5	5	10	15
Enplaned Passengers (1000/year)	.8	.8	1.5	2.3
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2800' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	1. No Development

CITY : Kaleva

PLANNING REGION: 10

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the Kaleva area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	2	4	6
Total Aircraft Operations (100/year)	----	20	40	60
Itinerant Operations (100/year)	----	10	20	30
Enplaned Passengers (1000/year)	----	1.5	3	4.5
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Kalkaska

PLANNING REGION: 10

AIRPORT NAME : Kalkaska

LOCATION : 1.0 mi. S.W.

ELEVATION : 1031'

EXISTING FACILITIES: Rwy 10/28 3900x240 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	6	8	11
Total Aircraft Operations (100/year)	10	60	80	110
Itinerant Operations (100/year)	5	30	40	55
Enplaned Passengers (1000/year)	.8	4.5	6	8.3
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3750' (turf)	2700'	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
2. Administration Building
3. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

CITY : Lake City

PLANNING REGION: 10

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Missaukee County. Site selection study might show that an existing airport is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	3	5	12
Total Aircraft Operations (100/year)	----	30	50	90
Itinerant Operations (100/year)	----	15	25	45
Enplaned Passengers (1000/year)	----	2.3	3.8	6.8
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	3400'	3400'	3400'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct Primary Runway to 3400' Partial Parallel Taxi to Primary Rwy Turf Crosswind Runway to 3000' Connecting Taxiway Apron Taxiway Streets 3. Airfield Lighting: Runway and Taxiway Lights Lighted Wind Cone Beacon 4. Approach Aids: Install VASI and REILS 5. Administration Building 6. Other: Obstruction Removal Runway and Taxiway Marking Entrance Road Auto Parking Segmented Circle	1. No Development	1. No Development

CITY : Mancelona

PLANNING REGION: 10

AIRPORT NAME : Municipal

LOCATION : 1.5 mi. N.N.W.

ELEVATION : 1130'

EXISTING FACILITIES: Rwys 10/28 2200x150 and 18/36 3000x250 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	3	5	8
Total Aircraft Operations (100/year)	10	30	50	80
Itinerant Operations (100/year)	5	15	25	40
Enplaned Passengers (1000/year)	.8	2.3	3.8	6
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3000' (turf)	2700'	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
2. Administration Building
3. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REILS and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

CITY : Manistee

PLANNING REGION: 10

AIRPORT NAME : Manistee County-Blacker

LOCATION : 4.0 mi. E.N.E.

ELEVATION 619'

EXISTING FACILITIES: Rwys 9/27 5500x100 paved; 1/19 2100x250 turf; lights; UNICOM; VOR; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	11	13	17	26
Total Aircraft Operations (100/year)	186	206	254	351
Itinerant Operations (100/year) — General Aviation	62	72	92	137
Itinerant Operations (100/year) — Air Carrier	7	7	15	22
Enplaned Passengers (1000/year) — General Aviation	9	11	14	21
Enplaned Passengers (1000/year) — Air Carrier	3	4	5	7
Enplaned Cargo (1000 tons/year)	< 1	< 1	< 1	1
Functional Role	F-3	F-2	F-2	F-2
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	C3	C3	C5	C5
Length of Longest Runway	5500'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Construct New Runway 9/27 to 5000'
   Use old Runway as a Parallel Taxi to 9/27
   Construct N/S Runway to 2800'
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lighting
4. Approach Aids:
   Install Instrument Landing System
   Install VASI and DME
5. Buildings:
   Expand Terminal
   Build Fire/Crash Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Expand Auto Parking

Intermediate

1. Terminal Building:
   Expand Terminal
2. Other:
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

CITY : Mesick

PLANNING REGION: 10

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Northern Wexford County

OPERATIONAL FORECASTS				
	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	2	4	6
Total Aircraft Operations (100/year)	----	190	230	340
Itinerant Operations (100/year)	----	95	115	170
Enplaned Passengers (1000/year)	----	14.3	17.3	25.5
Functional Role	----	F3	F2	F2
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT		
Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Northport

PLANNING REGION: 10

AIRPORT NAME : Woolsey Memorial

LOCATION : 1.0 mi. N.W.

ELEVATION : 630'

EXISTING FACILITIES: Rwys 8/26 2050x230 and 16/34 2670x140 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	2	3	6
Total Aircraft Operations (100/year)	10	20	30	60
Itinerant Operations (100/year)	5	10	15	30
Enplaned Passengers (1000/year)	.8	1.5	2.3	4.5
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2650' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Pellston

PLANNING REGION: 10

AIRPORT NAME : Emmet County

LOCATION : 1.5 mi. N.N.W.

ELEVATION 720'

EXISTING FACILITIES: Rwys 5/23 5400x150 and 14/32 6500x150 paved; lights; VORTAC; UNICOM; ILS; fuel; FSS

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	11	11	13	19
Total Aircraft Operations (100/year)	211	247	266	414
Itinerant Operations (100/year) — General Aviation	78	78	87	114
Itinerant Operations (100/year) — Air Carrier	37	73	73	161
Enplaned Passengers (1000/year) — General Aviation	12	12	13	17
Enplaned Passengers (1000/year) — Air Carrier	15	39	55	100
Enplaned Cargo (1000 tons/year)	< 1	< 1	1	2
Functional Role	F-2	S-3	S-3	S-3
Operational Role – Dominant	B3	B3	B3	B3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	6800'	6800'	6800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend Runway 14/32 to 6800'
   Extend Runway 5/23 to 5800'
   Extend Parallel Taxiways to both Rwys
   Expand Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:*
   Upgrade to "Secondary"
5. Buildings:
   Expand Terminal
   Construct Fire/Crash Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Intermediate

1. No Development

Long-Range

1. Airfield Paving:
   Expand Apron
2. Buildings:
   Expand Terminal

*See Table II-12 in Part One.

CITY : Traverse City

PLANNING REGION: 10

AIRPORT NAME : Cherry Capital

LOCATION : 2.1 mi. S.E.

ELEVATION : 624

EXISTING FACILITIES: Rwys 5/23 3200x150; 10/28 6500x150 and 18/36 5109x150 paved; lights; L/F Beacon; VOR; DF; V-2; ILS; fuel; FSS

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	30	38	49	78
Total Aircraft Operations (100/year)	587	667	813	1169
Itinerant Operations (100/year) — General Aviation	234	270	320	450
Itinerant Operations (100/year) — Air Carrier	66	66	102	168
Enplaned Passengers (1000/year) — General Aviation	35	41	48	68
Enplaned Passengers (1000/year) — Air Carrier	37	67	100	180
Enplaned Cargo (1000 tons/year)	< 1	1	1	4
Functional Role	S-3	S-3	S-3	S-2
Operational Role – Dominant	B3	B3	B3	B3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	6800'	6800'	6800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend Runway 10/28 to 6800'
   Extend Crosswind Runway to 5700'
   Parallel Taxiway to both Runways
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:*
   Upgrade to "Secondary"
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Expand Auto Parking

Intermediate

1. Terminal Building:
   Expand Terminal
2. Other:
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

*See Table II-12 in Part One.

SUMMARY DATA SHEET

State Planning & Development Region - 11

Table V - 13

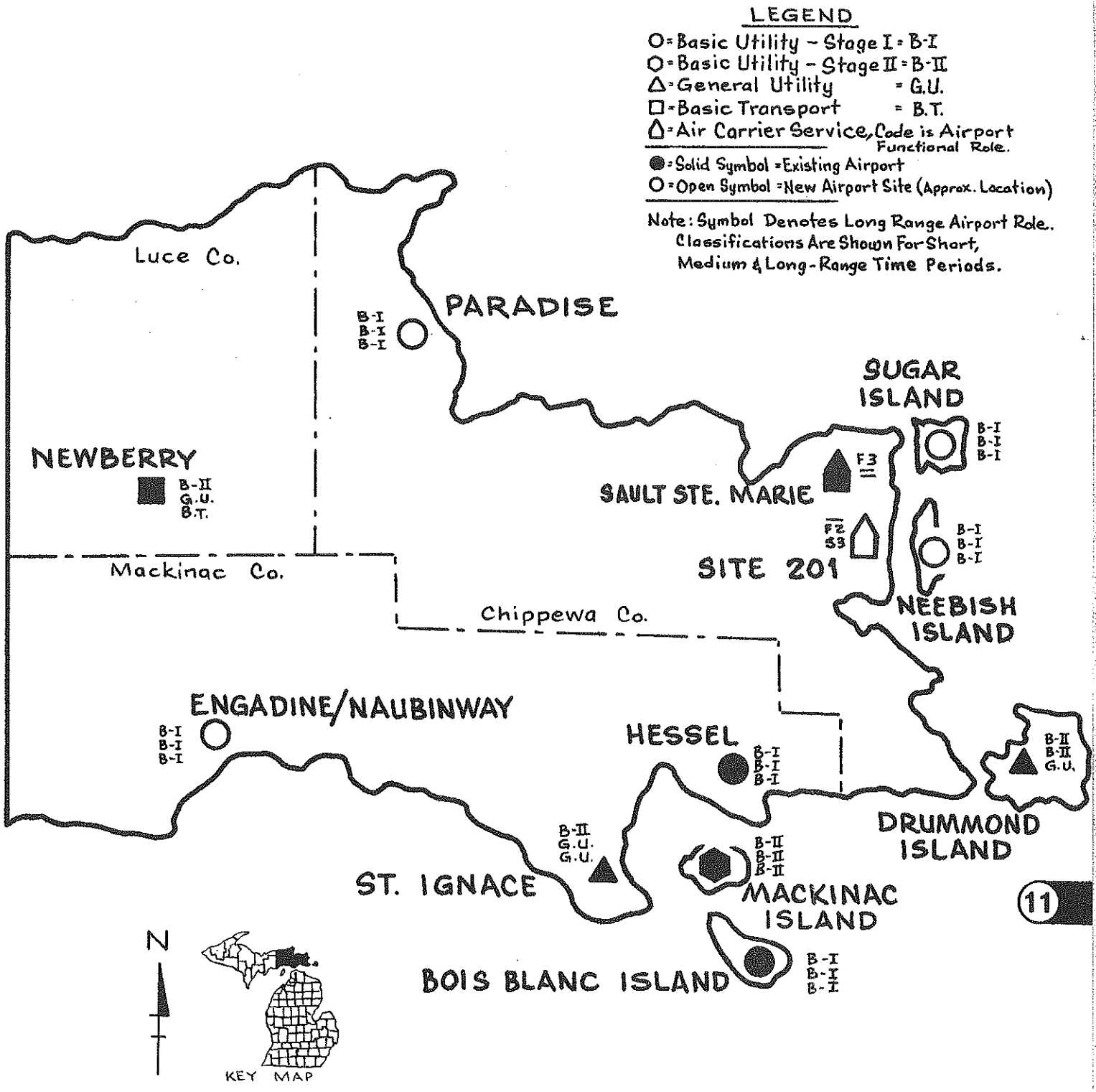
	1970	1975	1980	1990
POPULATION (000)	49	51	53	61
VALUE ADDED ($ Millions)	66	75	84	113
GENERAL AVIATION BASED AIRCRAFT	45	50	60	80
GENERAL AVIATION OPERATIONS (000)	58	66	79	113

Generalized Data Sheets Follow For Airports At: Bois Blanc Island, Drummond Island, Engadine/Naubinway, Hessel, Mackinac Island, Neebish Island, Newberry, Paradise, St. Ignace, Sault Ste. Marie, Sugar Island

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 11

Figure V - 12



CITY : Bois Blanc Island

PLANNING REGION: 11

AIRPORT NAME : Bois Blanc

LOCATION :

ELEVATION :

EXISTING FACILITIES: Runway 10/28 2600x200 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	0	0	0	0
Total Aircraft Operations (100/year)	5	5	5	5
Itinerant Operations (100/year)	5	5	5	5
Enplaned Passengers (1000/year)	.8	.8	.8	.8
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2600' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Airfield Paving: Construct Runway 2700' Construct Apron Construct Connecting Taxiway 2. Administration Building 3. Other: Fencing Runway and Taxiway Marking Segmented Circle and Wind Cone Entrance Road Auto Parking Obstruction Removal	1. No Development	1. No Development

CITY : Drummond Island

PLANNING REGION: 11

AIRPORT NAME : Drummond Island

LOCATION : 0.5 mi. S

ELEVATION : 635'

EXISTING FACILITIES: Rwys 8/26 3660x200 and 18/36 2700x150 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	5	5	6	10
Total Aircraft Operations (100/year)	32	32	45.5	99.5
Itinerant Operations (100/year)	11	11	15.5	33.5
Enplaned Passengers (1000/year)	1.7	1.7	2.3	5
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-II	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3660' (turf)	3100'	3100'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New N/S Runway 3100'
   New NE/SW Runway 3100'
   Partial Parallel Taxiways to Both Rwys
   Connecting Taxiways
   Taxi Streets
   Apron
3. Airfield Lighting:
   Runway and Taxiway Lights
   Beacon
   Lighted Wind Cone
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Obstruction Removal
   Access Road and Auto Parking
   Runway and Taxiway Marking
   Segmented Circle
   Fencing

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend and Widen NE/SW Rwy to 3800'
   Extend Apron
3. Airfield Lighting:
   Runway Lighting
4. Approach Aids:
   Relocate VASI
5. Other:
   Obstruction Removal
   Runway Marking

CITY : Engadine/Naubinway

PLANNING REGION: 11

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the Engadine/Naubinway area . A site selection study might show that an existing airport site is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	1	2	4
Total Aircraft Operations (100/year)	----	13.5	27	54
Itinerant Operations (100/year)	----	4.5	9	18
Enplaned Passengers (1000/year)	----	.7	1.4	2.7
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	1. No Development

CITY : Hessel

PLANNING REGION: 11

AIRPORT NAME : Hessel

LOCATION : 2.0 mi. N

ELEVATION : 760'

EXISTING FACILITIES: Rwys 9/27 3300x100 and 18/36 1800x100 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	1	1	2
Total Aircraft Operations (100/year)	13.5	13.5	13.5	27
Itinerant Operations (100/year)	4.5	4.5	4.5	9
Enplaned Passengers (1000/year)	.7	.7	.7	1.4
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3300' (turf)	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Mackinac Island

PLANNING REGION: 11

AIRPORT NAME : Mackinac Island

LOCATION : W shore of Island

ELEVATION : 739'

EXISTING FACILITIES: Rwy 8/26 3500x75 paved; UNICOM

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	0	0	0	0
Total Aircraft Operations (100/year)	96	150	180	250
Itinerant Operations (100/year)	96	150	180	250
Enplaned Passengers (1000/year)	14.4	22.5	27	37.5
Functional Role	F3	F3	F3	F2
Operational Role – Dominant	B-II	B-II	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3500'	3500'	3500'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Airfield Paving: Parallel Taxiway to Runway 8/26 Apron Expansion 2. Airfield Lighting: Runway and Taxiway Lights Beacon Lighted Wind Cone Apron Lighting 3. Approach Aids: Install VASI 4. Other: Taxiway Marking Fencing	1. No Development	1. No Development

CITY : Neebish Island

PLANNING REGION: 11

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve an isolated area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	0	1	2
Total Aircraft Operations (100/year)	----	5	13.5	27
Itinerant Operations (100/year)	----	5	4.5	9
Enplaned Passengers (1000/year)	----	.8	.7	1.4
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Newberry

PLANNING REGION: 11

AIRPORT NAME : Luce County

LOCATION : 4.1 mi. S.E.

ELEVATION : 872'

EXISTING FACILITIES: Rwy 11/29 3500x75 paved; lights; UNICOM; VOR; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	6	6	7	10
Total Aircraft Operations (100/year)	55	55	68.5	109
Itinerant Operations (100/year)	19	19	23.5	37
Enplaned Passengers (1000/year)	2.9	2.9	3.5	5.6
Functional Role	F3	F3	F3	F3
Operational Role -- Dominant	B-II	B-II	G.U.	B.T.
Operational Role -- Subordinate	----	----	----	----
Length of Longest Runway	3500'	3500'	4000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New N/S Runway to 3200'
   Connecting Taxiways
   Turnarounds on N/S Runway
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI
5. New Administration Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Fencing

Intermediate

1. Airfield Paving:
   Extend Runway 11/29 to 4000'
   Extend Apron
2. Airfield Lighting:
   Runway Lights
3. Approach Aids:
   Relocate VASI
4. Other:
   Runway Marking

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 11/29 to 5000'
   Strengthen Existing Apron and Taxiway
3. Airfield Lighting:
   Runway Lighting
4. Approach Aids:
   Relocate VASI
5. Other:
   Obstruction Removal
   Fencing
   Marking

CITY : Paradise

PLANNING REGION: 11

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new facility to primarily serve recreational activity in Northwestern Chippewa and Northeastern Luce Counties

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	0	0	2
Total Aircraft Operations (100/year)	----	5	5	27
Itinerant Operations (100/year)	----	5	5	9
Enplaned Passengers (1000/year)	----	.8	.8	1.4
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : St. Ignace

PLANNING REGION: 11

AIRPORT NAME : Mackinac County

LOCATION : 2.0 mi. N.N.W.

ELEVATION : 623'

EXISTING FACILITIES: Rwys 7/25 3200x50 paved; and 18/36 1700x200 turf; lights; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	8	8	9	10
Total Aircraft Operations (100/year)	153	153	166.5	180
Itinerant Operations (100/year)	100	100	104.5	109
Enplaned Passengers (1000/year)	15	15	15.7	16.4
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	- -- -	----
Length of Longest Runway	3200'	3200'	3800'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   New N/S Runway 3200'
   Connecting Taxiway
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install REILS and VASI
5. New Administration Building
6. Other:
   Obstruction Removal
   Auto Parking

Intermediate

1. Airfield Paving:
   Extend and Widen Runway 7/25 to 3800'
   Partial Parallel Taxiway and Turnaround
   Expand Apron
2. Airfield Lighting:
   Runway and Taxiway Lights
3. Other:
   Runway and Taxiway Marking

Long-Range

1. No Development

CITY : Sault Ste. Marie

PLANNING REGION: 11

AIRPORT NAME : Municipal - New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: Rwy 14/32 5000x100 paved; lights; fuel; FSS; NDB; VORTAC

REMARKS: Pending a master plan study, a new airport is recommended to replace the existing Sault Ste. Marie Municipal airport for air carrier and general aviation service.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	21	21	25	35
Total Aircraft Operations (100/year)	178	178	216	308
Itinerant Operations (100/year) — General Aviation	100	100	119	166
Itinerant Operations (100/year) — Air Carrier	15	15	22	37
Enplaned Passengers (1000/year) — General Aviation	15	15	18	25
Enplaned Passengers (1000/year) — Air Carrier	9	14	20	40
Enplaned Cargo (1000 tons/year)	< 1	< 1	< 1	< 1
Functional Role	F-3	F-3	F-2	S-2
Operational Role – Dominant	B.T.	B.T.	C3	C3
Operational Role – Subordinate	C3	C3	B.T.	B.T.
Length of Longest Runway	5000'	5600'	5600'	5600'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land for a New Airport
2. Airfield Paving:
   Construct Primary Runway 5600'
   Construdt Crosswind Runway 3700'
   Parallel Taxiways for both Runways
   Construct Apron
3. Airfield Lighting:
   Runway and Txwy Lights
   Lighted Wind Cone
4. Approach Aids:*
   Install "Feeder"
5. Buildings:
   Construct Terminal and Fire/Crash Bldg
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Auto Parking and Access Road

Intermediate

1. No Development
   (Complete development recommended for short term, as required)

Long-Range

1. Airfield Paving:
   Expand Apron
2. Approach Aids:*
   Upgrade to "Secondary"
3. Terminal Building:
   Expand Terminal
4. Other:
   Expand Auto Parking

*See Table II-12 in Part One.

CITY : Sugar Island

PLANNING REGION: 11

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve this isolated area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	0	1	2
Total Aircraft Operations (100/year)	----	5	13.5	27
Itinerant Operations (100/year)	----	5	4.5	9
Enplaned Passengers (1000/year)	----	.8	.7	1.4
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

SUMMARY DATA SHEET

State Planning & Development Region - 12

Table V - 14

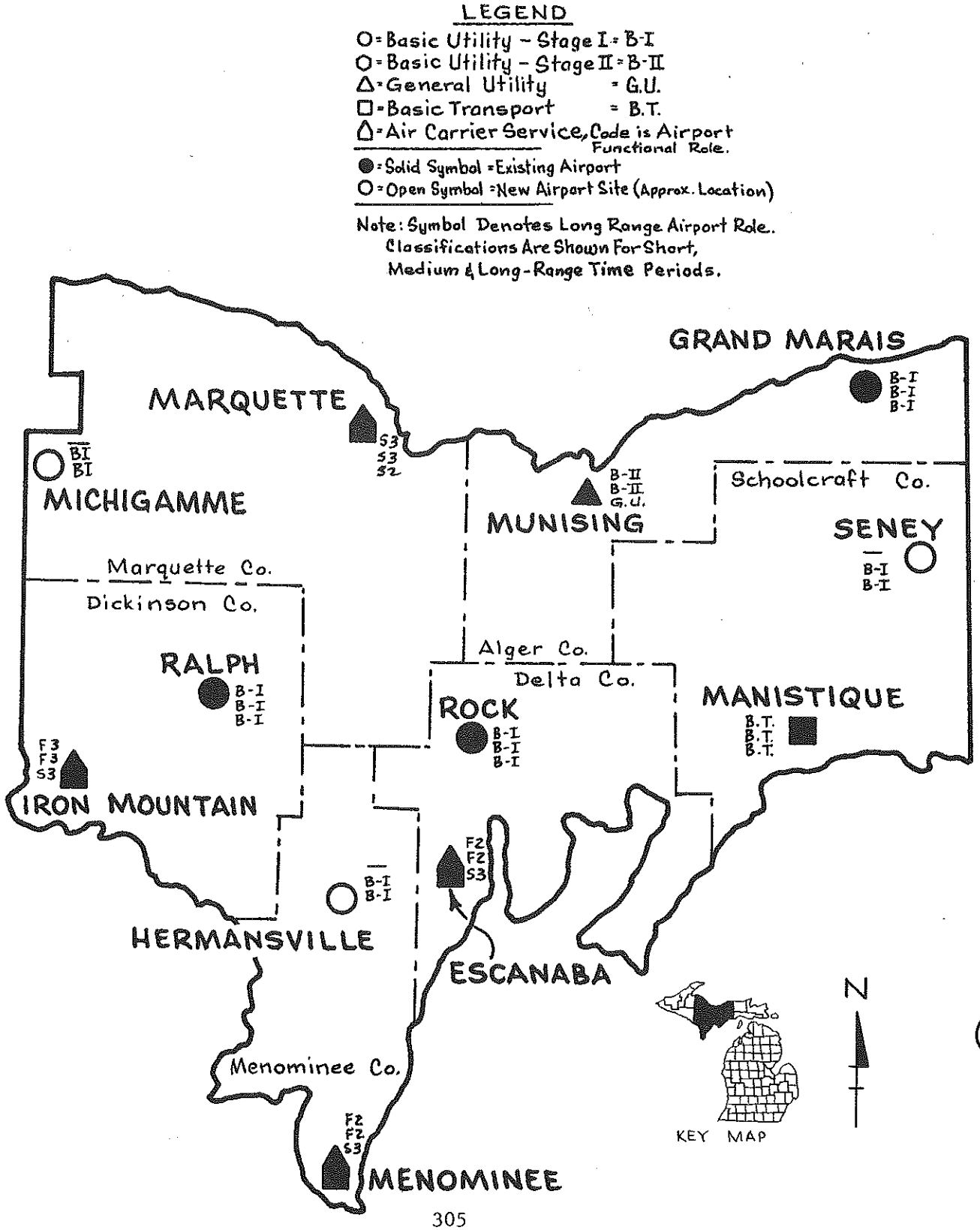
	1970	1975	1980	1990
POPULATION (000)	166	189	193	222
VALUE ADDED ($ Millions)	402	481	543	731
GENERAL AVIATION BASED AIRCRAFT	102	140	170	270
GENERAL AVIATION OPERATIONS (000)	111	145	182	263

Generalized Data Sheets Follow For Airports At: Escanaba, Grand Marais, Hermansville, Iron Mountain, Manistique, Marquette, Menominee, Munising, Ralph, Rock, Seney

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 12

Figure V - 13



CITY : Escanaba

PLANNING REGION: 12

AIRPORT NAME : Delta County

LOCATION : 2.0 mi. S.S.W.

ELEVATION 608'

EXISTING FACILITIES: Rwys 9/27 6500x100 and 18/36 3800x100; paved; lights; VORTAC; UNICOM fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	16	21	27	40
Total Aircraft Operations (100/year)	225	256	303	425
Itinerant Operations (100/year) — General Aviation	73	88	106	145
Itinerant Operations (100/year) — Air Carrier	37	29	29	51
Enplaned Passengers (1000/year) — General Aviation	11	13.3	16	21.8
Enplaned Passengers (1000/year) — Air Carrier	14	17	24	58
Enplaned Cargo (1000 tons/year)	< 1	< 1	< 1	1
Functional Role	F-2	F-2	F-2	S-3
Operational Role – Dominant	B3	B3	B3	B3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	6500'	6500'	6500'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Widen Runway 9/27
   Extend and Widen Rwy 18/36 to 5600'
   Construct Parallel Texiway for both Runways
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:*
   Upgrade to "Feeder"
5. Buildings:
   Expand Terminal
   Construct Fire/Crash Building
6. Other:
   Obstruction Removal

Intermediate

1. Terminal Building
   Expand Terminal
2. Other:
   Expand Auto Parking

Long-Range

1. Approach Aids:*
   Upgrade to "Secondary"
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

*See Table II-12 in Part One.

CITY : Grand Marais

PLANNING REGION: 12

AIRPORT NAME : Grand Marais

LOCATION :

ELEVATION :

EXISTING FACILITIES: Currently Closed

REMARKS: Recommend that the old Grand Marais Airport be reactivated and expanded

OPERATIONAL FORECASTS				
	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	0	1	2	3
Total Aircraft Operations (100/year)	5	13.5	27	40.5
Itinerant Operations (100/year)	5	4.5	9	13.5
Enplaned Passengers (1000/year)	.8	.7	1.4	2
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT		
Short-Range	Intermediate	Long-Range
1. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 2. Administration Building 3. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	1. No Development

CITY : Hermansville

PLANNING REGION: 12

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport East of Hermansville in the intermediate time period to serve Eastern Gogebic County

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	3	6
Total Aircraft Operations (100/year)	----	----	40.5	72
Itinerant Operations (100/year)	----	----	13.5	27
Enplaned Passengers (1000/year)	----	----	2	4
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	

CITY : Iron Mountain

PLANNING REGION: 12

AIRPORT NAME : Ford

LOCATION : 2.5 mi. W

ELEVATION : 1174'

EXISTING FACILITIES: Rwys 1/19 6500x100 and 13/31 3800x75 paved; lights; UNICOM; VORTAC; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	17	17	21	33
Total Aircraft Operations (100/year)	169	151	192	277
Itinerant Operations (100/year) — General Aviation	51	51	63	99
Itinerant Operations (100/year) — Air Carrier	37	29	29	51
Enplaned Passengers (1000/year) — General Aviation	7.7	7.7	9.5	14.9
Enplaned Passengers (1000/year) — Air Carrier	13	15	26	59
Enplaned Cargo (1000 tons/year)	< 1	< 1	< 1	1
Functional Role	F-3	F-3	F-3	S-3
Operational Role – Dominant	B3	B3	B3	B3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	7000'	7000'	7000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend Runway 1/19 to 7000'
   Complete Parallel Taxiways to both Rwys
   Expand Apron
3. Airfield Lighting:
   Runway and Twy Lights
4. Approach Aids:
   Install VASI and REILS
5. Buildings:
   Construct New Terminal and Fire/Crash Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking

Intermediate

1. Terminal Building
   Expand Terminal
2. Other:
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Approach Aids:*
   Upgrade to "Secondary"
3. Terminal Building:
   Expand Terminal
4. Other:
   Expand Auto Parking

*See Table II-12 in Part One.

CITY : Manistique

PLANNING REGION: 12

AIRPORT NAME : Schoolcraft County

LOCATION : 3.3 mi. E.N.E.

ELEVATION : 684'

EXISTING FACILITIES: Rwy 9/27 3000x75 paved; lights; UNICOM; TVOR; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	10	12	12	13
Total Aircraft Operations (100/year)	135	162	162	175.5
Itinerant Operations (100/year)	45	54	54	58.5
Enplaned Passengers (1000/year)	6.8	8.1	8.1	8.8
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B.T.	B.T.	B.T.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	5000'	5000'	5000'	5000'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Airfield Paving: Extend and Widen N/S Runway to 3000' Partial Parallel Taxiway to E/W Runway Turnaround, Runway 9 End 2. Airfield Lighting: Taxiway Lights Relocate N/S Runway Lights 3. Approach Aids: Install VASI and REILS 4. Other: Obstruction Removal Runway and Taxiway Marking	1. No Development	1. No Development

CITY : Marquette

PLANNING REGION: 12

AIRPORT NAME : Marquette County

LOCATION : 4.0 mi. E

ELEVATION 1419'

EXISTING FACILITIES: Rwys 8/26 6500x100 and 1/19 3000x75 paved; lights; VORTAC; DF; U-2; fuel; FSS

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	41	62	74	116
Total Aircraft Operations (100/year)	407	633	775	1207
Itinerant Operations (100/year) — General Aviation	130	193	232	355
Itinerant Operations (100/year) — Air Carrier	22	95	131	241
Enplaned Passengers (1000/year) — General Aviation	19	29	35	53
Enplaned Passengers (1000/year) — Air Carrier	26	60	89	180
Enplaned Cargo (1000 tons/year)	< 1	< 1	< 1	2
Functional Role	F-2	S-3	S-3	S-2
Operational Role – Dominant	B3	B3	B3	B3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	6900'	6900'	6900'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Extend and Widen Runway 8/26 to 6900'
   Extend Runway 1/19 to 3800'
   Extend Parallel Taxiways to Both Rwys
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:
   Install VASI and REILS
   Install Control Tower
5. Terminal Building:
   Construct New Terminal
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Expand Auto Parking

Intermediate

1. Terminal Building:
   Expand Terminal
2. Other:
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

CITY : Menominee

PLANNING REGION: 12

AIRPORT NAME : Menominee County

LOCATION : 1.5 mi. N.W.

ELEVATION : 621'

EXISTING FACILITIES: Rwys 14/32 5100x100 and 18/36 3200x100 paved; lights; VOR; UNICOM; fuel

REMARKS:

OPERATIONAL FORECASTS

		Current	Short-Range (0-5 yrs.)	Intermediate (5-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft		16	22	27	40
Total Aircraft Operations (100/year)		252	314	342	687
Itinerant Operations (100/year)	General Aviation	92	110	125	164
	Air Carrier	44	29	29	263
Enplaned Passengers (1000/year)	General Aviation	14	16	19	25
	Air Carrier	8	9	12	51
Enplaned Cargo (1000 tons/year)		< 1	< 1	1	2
Functional Role		F-2	F-2	F-2	S-3
Operational Role – Dominant		B.T.	B.T.	B.T.	B3
Operational Role – Subordinate		C3	C3	C3	B.T.
Length of Longest Runway		5100'	5550'	5550'	6600'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Construct New NE/SW Runway to 5550'
   Widen Runway 14/32
   Construct Parallel Taxiways to both Rwys
3. Airfield Lighting:
   Runway and Taxiway Lights
4. Approach Aids:*
   Upgrade to "Feeder"
5. Buildings:
   Expand Terminal
   Construct Fire/Crash Building
6. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Expand Auto Parking

Intermediate

1. Terminal Building:
   Expand Terminal

Long-Range

1. Airfield Paving:
   Extend NE/SW Runway to 6600'
   Extend Runway 14/32 to 5700'
   Extend Parallel Taxiway to both Rwys
   Extend Apron
2. Airfield Lighting:
   Runway and Taxiway Lights
3. Approach Aids:*
   Upgrade to "Secondary"
4. Buildings:
   Expand Terminal
5. Other:
   Obstruction Removal
   Runway and Taxiway Marking
   Expand Auto Parking

*See Table II-12 in Part One.

CITY : Michigamme

PLANNING REGION: 12

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate time period to serve the Michigamme area

OPERATIONAL FORECASTS				
	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	5	8
Total Aircraft Operations (100/year)	----	----	67.5	108
Itinerant Operations (100/year)	----	----	22.5	36
Enplaned Passengers (1000/year)	----	----	3.4	5.4
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	2700'

RECOMMENDED DEVELOPMENT		
Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	

CITY : Munising

PLANNING REGION: 12

AIRPORT NAME : Hanley Field

LOCATION : 4.0 mi. S.S.E.

ELEVATION : 990'

EXISTING FACILITIES: Rwy 18/36 3050x120 turf; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	3	4	7
Total Aircraft Operations (100/year)	7	34	47.5	88
Itinerant Operations (100/year)	7	16	20.5	34
Enplaned Passengers (1000/year)	1	2.4	3.1	5.1
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-II	B-II	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3050' (turf)	3200'	3200'	3800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Airfield Paving:
   Construct Primary Runway 3200'
   Partial Parallel Taxi
   Connecting Taxi
   Taxi Streets
   Apron
   Turf Crosswind Runway 3200'
2. Airfield Lighting:
   Runway and Taxi Lighting
   Lighted Wind Cone
   Beacon
3. Administration Building
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle
   Runway and Taxi Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Airfield Paving:
   Extend and Widen Primary Runway to 3800'
   Pave Crosswind Runway 3000'
   Partial Parallel Taxiway to Crosswind Runway
   Widen Existing Taxiways
   Expand Apron
2. Airfield Lighting:
   Runway and Taxiway Lights
3. Approach Aids:
   Install VASI and REILS
4. Enlarge Administration Building
5. Other:
   Obstruction Removal

CITY : Ralph

PLANNING REGION: 12

AIRPORT NAME : Ralph

LOCATION : 0.7 mi. S

ELEVATION : 1135'

EXISTING FACILITIES: Rwy 12/30 2000x300 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	1	1	2	4
Total Aircraft Operations (100/year)	13.5	13.5	27	54
Itinerant Operations (100/year)	4.5	4.5	9	18
Enplaned Passengers (1000/year)	.7	.7	1.4	2.7
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2000' (turf)	2000' (turf)	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. No Development	1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development

CITY : Rock

PLANNING REGION: 12

AIRPORT NAME : Bonnie Field

LOCATION : 4.6 mi. W.S.W.

ELEVATION : 970'

EXISTING FACILITIES: Rwy 12/30 2725x100 turf

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	0	1	2	3
Total Aircraft Operations (100/year)	5	13.5	27	40.5
Itinerant Operations (100/year)	5	4.5	9	13.5
Enplaned Passengers (1000/year)	.8	.7	1.4	2
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2725' (turf)	2725' (turf)	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range

1. No Development

Intermediate

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Long-Range

1. No Development

CITY : Seney

PLANNING REGION: 12

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate period to serve the Seney area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	1	2
Total Aircraft Operations (100/year)	----	----	13.5	27
Itinerant Operations (100/year)	----	----	4.5	9
Enplaned Passengers (1000/year)	----	----	.7	1.4
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	

SUMMARY DATA SHEET

State Planning & Development Region-13

Table V - 15

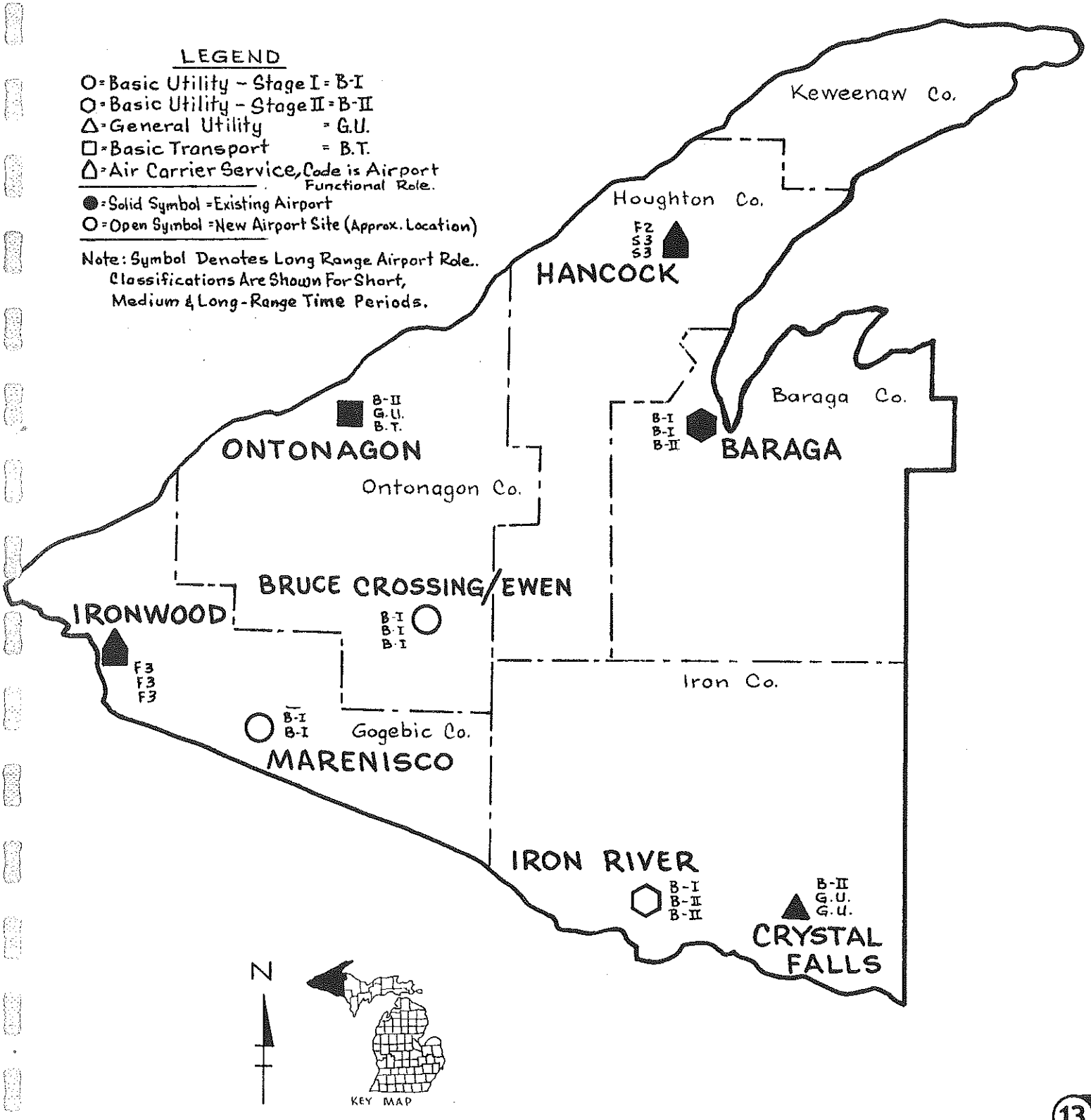
	1970	1975	1980	1990
POPULATION (000)	90	90	91	98
VALUE ADDED ($ Millions)	181	196	216	272
GENERAL AVIATION BASED AIRCRAFT	51	70	80	120
GENERAL AVIATION OPERATIONS (000)	45	61	81	120

Generalized Data Sheets Follow For Airports At: Baraga, Bruce's Crossing/Ewen, Crystal Falls, Hancock, Iron River, Ironwood, Marensico, Ontonagon

PROPOSED MICHIGAN AIRPORT SYSTEM PLAN

STATE PLANNING REGION No. 13

Figure V - 14



13

CITY : Baraga

PLANNING REGION: 13

AIRPORT NAME : Baraga

LOCATION : 4.0 mi. W

ELEVATION : 840'

EXISTING FACILITIES: Rwy 9/27 2080x140 turf; fuel

REMARKS: Recommend the purchase and expansion of this privately-owned facility

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	4	7	9	13
Total Aircraft Operations (100/year)	54	94.5	121.5	175.5
Itinerant Operations (100/year)	18	31.5	40.5	58.5
Enplaned Passengers (1000/year)	2.7	4.7	6.1	8.8
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	2080' (turf)	2700'	2700'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land.
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install MIRL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

CITY : Bruce's Crossing/Ewen

PLANNING REGION: 13

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve the Bruce's Crossing/Ewen area

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	1	2	3
Total Aircraft Operations (100/year)	----	13.5	27	40.5
Itinerant Operations (100/year)	----	4.5	9	13.5
Enplaned Passengers (1000/year)	----	.7	1.4	2
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land	1. No Development	1. No Development
2. Airfield Paving: Construct New Runway 2700' Construct Stub Taxiway Construct New Apron		
3. Administration Building		
4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal		

CITY : Crystal Falls

PLANNING REGION: 13

AIRPORT NAME : Iron County

LOCATION : 7.0 mi. S.S.E.

ELEVATION : 1340'

EXISTING FACILITIES: Rwys 12/30 3700x50 paved; 2/20 2500x150 turf; lights; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	2	2	4	6
Total Aircraft Operations (100/year)	33	33	60	87
Itinerant Operations (100/year)	21.5	21.5	39.5	57.5
Enplaned Passengers (1000/year)	3.2	3.2	5.9	8.6
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	B-II	G.U.	G.U.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3700'	3700'	3700'	3700'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Strengthen and Widen Rwy 12/30-3700'
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Relocate Runway Lights
4. Approach Aids:
   Install REILS and VASI
5. Other:
   Obstruction Removal
   Runway and Taxi Marking

Intermediate

1. Airfield Paving:
   Pave N/S Runway 3200'
   Connecting Taxiways
2. Airfield Lighting:
   Runway and Taxiway Lights
3. Approach Aids:
   Install VASI and REILS
4. Other:
   Runway and Texiway Marking
   Obstructing Removal

Long-Range

1. No Development

CITY : Hancock

PLANNING REGION: 13

AIRPORT NAME : Houghton County Memorial

LOCATION : 4.8 mi. N.E.

ELEVATION 1091'

EXISTING FACILITIES: Rwys 7/25 5200x150 and 13/31 6500x150 paved; lights; NBD; VOR; ILS; DME; fuel FSS

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	17	27	33	46
Total Aircraft Operations (100/year)	154	238	293	422
Itinerant Operations (100/year) — General Aviation	51	81	99	138
Itinerant Operations (100/year) — Air Carrier	22	29	37	66
Enplaned Passengers (1000/year) — General Aviation	7.7	12.2	14.9	20.7
Enplaned Passengers (1000/year) — Air Carrier	17	24	36	75
Enplaned Cargo (1000 tons/year)	< 1	< 1	1	2
Functional Role	F-3	F-2	S-3	S-3
Operational Role – Dominant	C3	C3	C3	B3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	6500'	6500'	6500'	6800'

RECOMMENDED DEVELOPMENT

Short-Range

1. Airfield Paving:
   Parallel Txwy to both Runways
2. Airfield Lighting:
   Taxiway Lights
3. Terminal Building:
   Expand Terminal
4. Approach Aids:
   Install VASI and REILS
5. Other:
   Taxiway Marking

Intermediate

1. Terminal Building:
   Expand Terminal
2. Approach Aids:*
   Upgrade to "Secondary"
3. Other:
   Expand Auto Parking

Long-Range

1. Airfield Paving:
   Extend Runway 13/31 to 6800'
   Extend Parallel Txwy to Runway 13/31
2. Airfield Lighting:
   Runway and Txwy Lights
3. Terminal Building:
   Expand Terminal
4. Other:
   Expand Auto Parking
   Runway and Txwy Marking
   Obstruction Removal

*See Table II-12 in Part One.

CITY : Iron River

PLANNING REGION: 13

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport to serve Western Iron County. Site selection study might show that an existing airport is adequate for expansion.

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	9	12	16
Total Aircraft Operations (100/year)	----	63	113.5	157.5
Itinerant Operations (100/year)	----	41	68	104
Enplaned Passengers (1000/year)	----	6.2	10.2	15.6
Functional Role	----	F3	F3	F3
Operational Role – Dominant	----	B-I	B-II	B-II
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	2700'	3200'	3200'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Land
2. Airfield Paving:
   Construct New Runway 2700'
   Construct Stub Taxiway
   Construct New Apron
3. Administration Building
4. Other:
   Fencing
   Auto Parking
   Entrance Road
   Segmented Circle and Wind Cone
   Runway Marking
   Obstruction Removal

Intermediate

1. Purchase Additional Land
2. Airfield Paving:
   Extend Primary Runway to 3200'
   Partial Parallel Taxiway
   Expand Apron
   Construct Turf Crosswind Runway 3200'
3. Airfield Lighting:
   Runway and Taxiway Lighting
   Light Wind Cone
   Beacon
4. Approach Aids:
   Install REIL and VASI
5. Other:
   Fencing
   Obstruction Removal
   Marking

Long-Range

1. No Development

CITY : Ironwood

PLANNING REGION: 13

AIRPORT NAME : Gogebic County

LOCATION : 4.5 mi. N.N.E.

ELEVATION : 1230'

EXISTING FACILITIES: Rwy 9/27 5400x100 paved; lights; UNICOM; TVOR; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs.)	Intermediate (6-10 yrs.)	Long-Range (11-20 yrs.)
Based Aircraft	12	15	16	20
Total Aircraft Operations (100/year)	121	145	153	184
Itinerant Operations (100/year) — General Aviation	35	45	48	60
Itinerant Operations (100/year) — Air Carrier	29	29	29	29
Enplaned Passengers (1000/year) — General Aviation	5.5	6.8	7.2	9
Enplaned Passengers (1000/year) — Air Carrier	9	11	16	34
Enplaned Cargo (1000 tons/year)	< 1	< 1	< 1	< 1
Functional Role	F-3	F-3	F-3	F-3
Operational Role – Dominant	C3	C3	C3	C3
Operational Role – Subordinate	B.T.	B.T.	B.T.	B.T.
Length of Longest Runway	5400'	5900'	5900'	5900'

RECOMMENDED DEVELOPMENT

Short-Range

1. Acquire Additional Land
2. Airfield Paving:
   Lengthen and Widen Rwy 9/27 to 5900'*
   Construct Crosswind Air Carrier Runway 5000'
   Parallel Taxiway to both Runways
3. Airfield Lighting:
   Runway and Txwy Lights
4. Approach Aids:**
   Upgrade to "feeder"
5. Buildings:
   Expand Terminal
   Construct Fire/Crash Building
6. Other:
   Obstruction Removal
   Runway and Txwy Marking

Intermediate

1. Terminal Building:
   Expand Terminal

Long-Range

1. Airfield Paving:
   Expand Apron
2. Terminal Building:
   Expand Terminal
3. Other:
   Expand Auto Parking

*Might use existing runway 9/27 as parallel taxiway.
**See Teble II-12 in Part One.

CITY : Marenisco

PLANNING REGION: 13

AIRPORT NAME : New

LOCATION : --

ELEVATION : --

EXISTING FACILITIES: None

REMARKS: Recommended new airport in the intermediate time period

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	----	----	2	4
Total Aircraft Operations (100/year)	----	----	27	54
Itinerant Operations (100/year)	----	----	9	18
Enplaned Passengers (1000/year)	----	----	1.4	2.7
Functional Role	----	----	F3	F3
Operational Role – Dominant	----	----	B-I	B-I
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	----	----	2700'	2700'

RECOMMENDED DEVELOPMENT

Short-Range	Intermediate	Long-Range
1. Purchase Land 2. Airfield Paving Construct New Runway 2700' Construct Stub Taxiway Construct New Apron 3. Administration Building 4. Other: Fencing Auto Parking Entrance Road Segmented Circle and Wind Cone Runway Marking Obstruction Removal	1. No Development	

CITY : Ontonagon

PLANNING REGION: 13

AIRPORT NAME : Ontonagon County

LOCATION : 3.0 mi. S.W.

ELEVATION : 640'

EXISTING FACILITIES: Rwy 16/34 3500x75 paved; lights; NDB; fuel

REMARKS:

OPERATIONAL FORECASTS

	Current	Short-Range (0-5 yrs)	Intermediate (6-10 yrs)	Long-Range (11-20 yrs)
Based Aircraft	4	6	6	11
Total Aircraft Operations (100/year)	32	59	59	148.5
Itinerant Operations (100/year)	11	20	20	49.5
Enplaned Passengers (1000/year)	1.7	3	3	7.4
Functional Role	F3	F3	F3	F3
Operational Role – Dominant	B-II	B-II	G.U.	B.T.
Operational Role – Subordinate	----	----	----	----
Length of Longest Runway	3500'	3500'	3500'	5000'

RECOMMENDED DEVELOPMENT

Short-Range

1. Purchase Additional Land
2. Airfield Paving:
   Crosswind Runway to 3200'
   Turnarounds on Crosswind Runway
3. Airfield Lighting:
   Runway Lighting
4. Approach Aids:
   Install VASI and REILS
5. Administration Building
6. Other:
   Obstruction Removal
   Runway Marking
   Auto Parking
   Fencing

Intermediate

1. No Development

Long-Range

1. Purchase Additional Land
2. Airfield Paving:
   Extend, Widen and Strengthen Runway 16/34 to 5000'
   Strengthen Existing Taxiway and Apron
3. Airfield Lighting:
   Runway Lights
4. Approach Aids:
   Install Precision Landing System
5. Other:
   Obstruction Removal
   Runway Marking
   Fencing