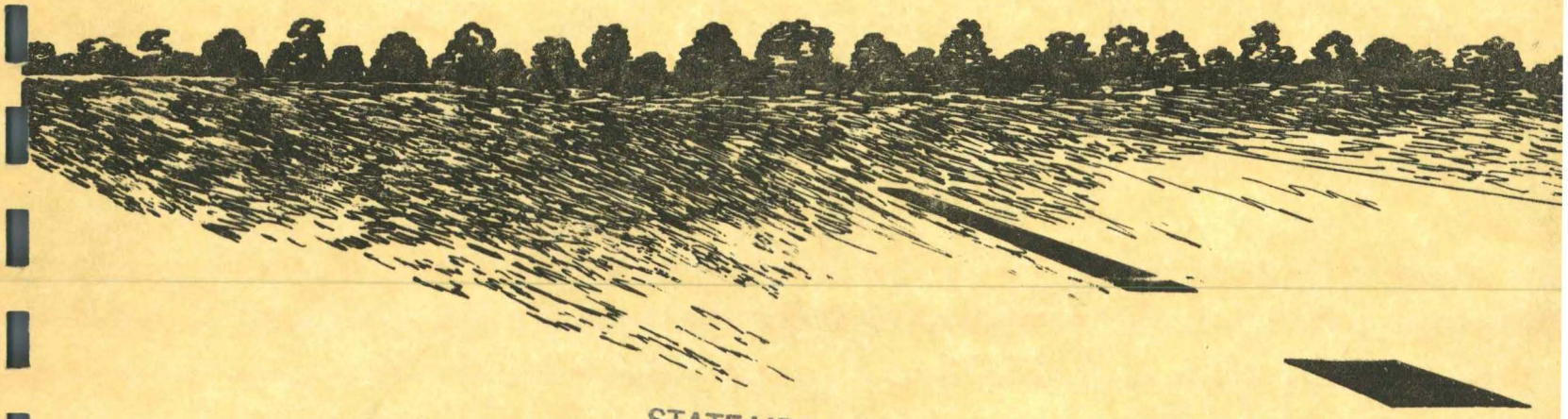
AIRPORT DEVELOPMENT PLAN

Clarion Municipal Airport
Clarion, Iowa



AIRPORT DEVELOPMENT PLAN

CLARION MUNICIPAL AIRPORT

Clarion, Iowa

Completed through the cooperation of the
Planning Grant Program of the
Iowa Department of Transportation

Ames, Iowa

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COMMUNITY AND AIRPORT BACKGROUND

SECTION I

I COMMUNITY AND AIRPORT BACKGROUND

GOALS AND OBJECTIVES

The objective of the Clarion Municipal Airport Development Plan is to provide guidelines for future airport development which will satisfy aviation demands and be compatible with the environment and community development objectives. The airport is only one of the many community facilities which contribute to the quality of life in Clarion and Wright County. Specific objectives of the Clarion Airport Development Plan are as follows:

- To provide an effective graphic presentation of the ultimate development of the airport over a 20 year planning period, 1977 to 1997.

- To establish a schedule of priorities and phasing for the various improvements proposed in the plan.

- To provide a plan that is consistent with other community goals and objectives of Clarion and Wright County as well as the State of Iowa D.O.T.

- To provide a tool for decision making at the local level.

- To provide an ultimate development plan which is feasible, acceptable and can be implemented within existing and future financial constraints of the community.

To achieve the above objectives, the planning process outlined in Figure One was developed and followed. Consideration of alternative airport sites was not included within the proposed scope of work. As such, considerable emphasis was placed upon an assessment of alternative development strategies at the existing site to insure compatability with the other community elements.

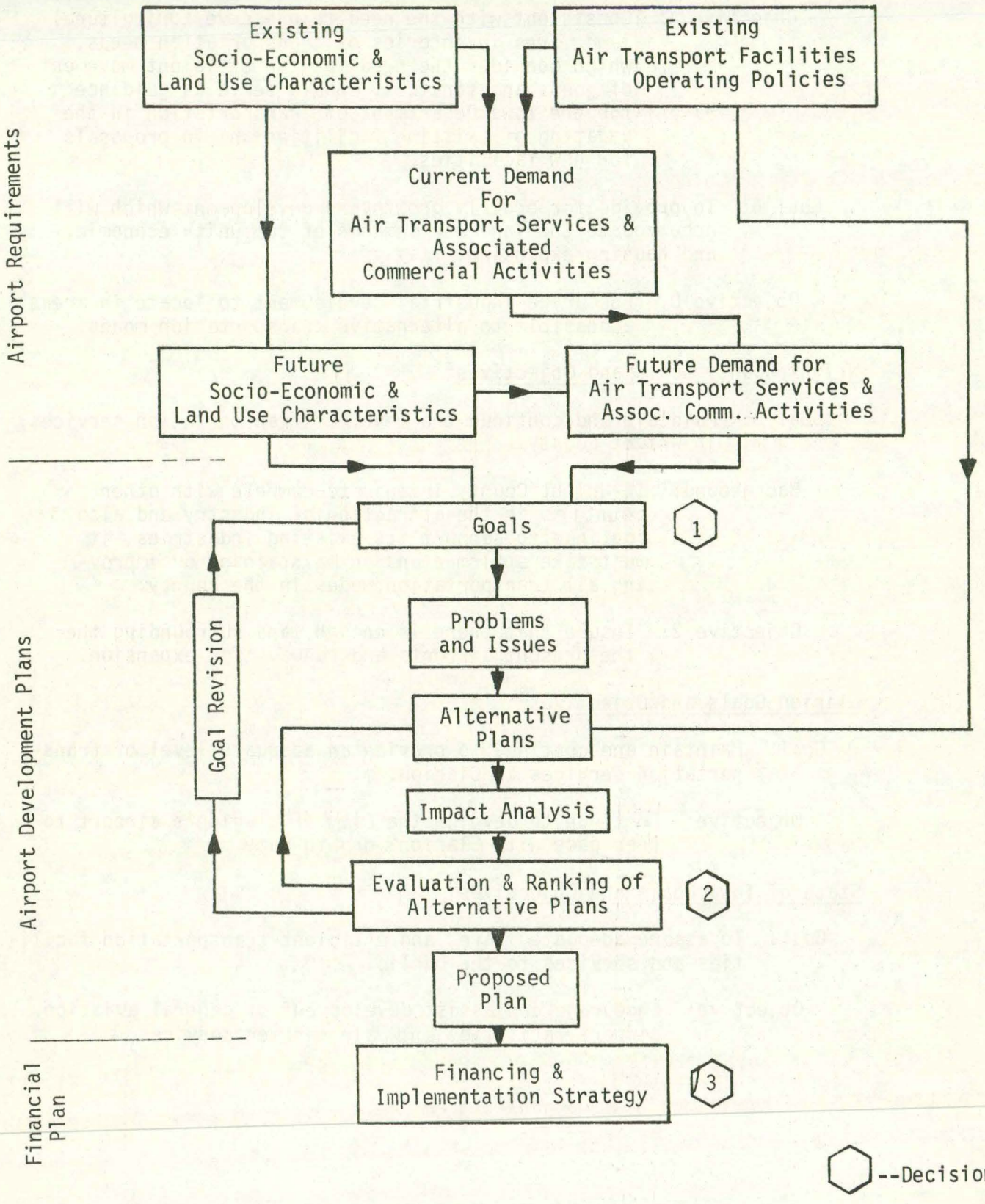
Summarized herein are the goals and objectives related to transportation from area-wide planning efforts by the Mid-Iowa Development Association Regional Council of Governments (MIDAS),RECOG; Wright County and the City of Clarion

Regional Goals and Objectives[1]

Goal 1: To protect and preserve agricultural lands.

Objective E: Consistent with current demand and practical safety standards, encourage the design of transportation services which require a minimum use of agricultural land.

FIGURE 1: AIRPORT DEVELOPMENT PLANNING PROCESS



Goal 2: To insure that the Community of Mid-Iowa is adequately served by public facilities and services in a manner compatible with Goal 1.

Objective A: Consistent with the need to preserve agricultural land area inventories of transportation needs, which consider the need for the efficient movement of goods and services, should serve as guidance for the Iowa Department of Transportation in the updating of existing facilities and in proposals for new facilities.

Goal 6: To provide for orderly growth and development which will accommodate the land use demands of community economic, and housing expansion.

Objective D. Encourage industrial development to locate in areas accessible to alternative transportation modes.

Wright County Goals and Objectives[2]

Goal 5: Maintain and continue the level of transportation services in Wright County.

Background: If Wright County intends to compete with other counties in the attraction of industry and also continue to support its existing industries, it must take a firm stand on maintaining or improving all transportation modes in the county.

Objective 2: Insure that there is enough land surrounding the the present airports and runways for expansion.

Clarion Goals and Objectives[3]

Goal: Maintain and continue to provide an adequate level of transportation services in Clarion.

Objective: Continue to develop the City of Clarion's airport to keep pace with Clarion's growth rate.

State of Iowa Goals and Objectives[4]

Goal: To assure adequate, safe, and efficient transportation facilities and services to the public.

Objective: Encourage and assist development of general aviation airport facilities and air carrier services.

Sources

[1]Mid-Iowa Development Association Council of Governments. Mid-Iowa Land Use Planning Guide, Fort Dodge, Iowa, July, 1977.

[2]Mid-Iowa Development Association Council of Governments, Wright County - A Comprehensive Plan, Draft Copy.

[3]Mid-Iowa Development Association Council of Governments. City of Clarion Statement of Goals and Objectives, Fort Dodge, Iowa, 1977.

[4]Engineering Research Institute. Iowa State Airport System Plan Update, Ames, Iowa, May, 1976.

The Goals and Objectives stated above provide an insight into area planning efforts relevant to the Clarion Airport Development Plan. Adopted goals and objectives of the City of Clarion are consistent with Development Plan objectives and will insure airport compatibility and community support for future airport development.

COMMUNITY ELEMENTS

The airport supports and is supported by other elements within the City of Clarion. A brief overview of these community facilities and services is provided. The objective of this overview is to identify their relationship to the airport and to insure future compatibility.

Wright County Landfill: The Wright County landfill site is located two miles south-east of the City. The location of the site will not have an impact upon aviation operations at the airport.

Water Supply and Distribution: The Clarion Municipal water supply is obtained from two wells with the total capacity of 1,625 gpm and 2,340,000 gpd. Water is treated and stored in two elevated storage tanks with a combined capacity of 570,000 gallons. The distribution system consists of lines ranging from 2 to 10 inches in size. Should the demand exist, the system could be extended to the airport.

Sewage System Collection and Treatment: The municipal sewage treatment plant consists of a primary clarifier, a trickling filter sludge beds, and a digester. The treatment plant is being studied in order to bring it into compliance with Iowa DEQ standards. As with water, it may be possible to extend service to the airport if the need arises.

Storm Sewer: The City is served by a storm sewer. The airport is within sub-drainage district #136 which will satisfy airport needs.

Gas and Electricity: Iowa Public Service provides gas and electricity to the community of Clarion. There are no limitations on electrical use; but, at present, there can be no new industrial gas hook-ups. The airport is not directly affected by the gas supply situation.

Fire Protection: Small general aviation airports do not maintain on site crash and fire rescue facilities and rely on community facilities. The City of Clarion would provide fire protection for the airport. The following personnel and equipment are available:

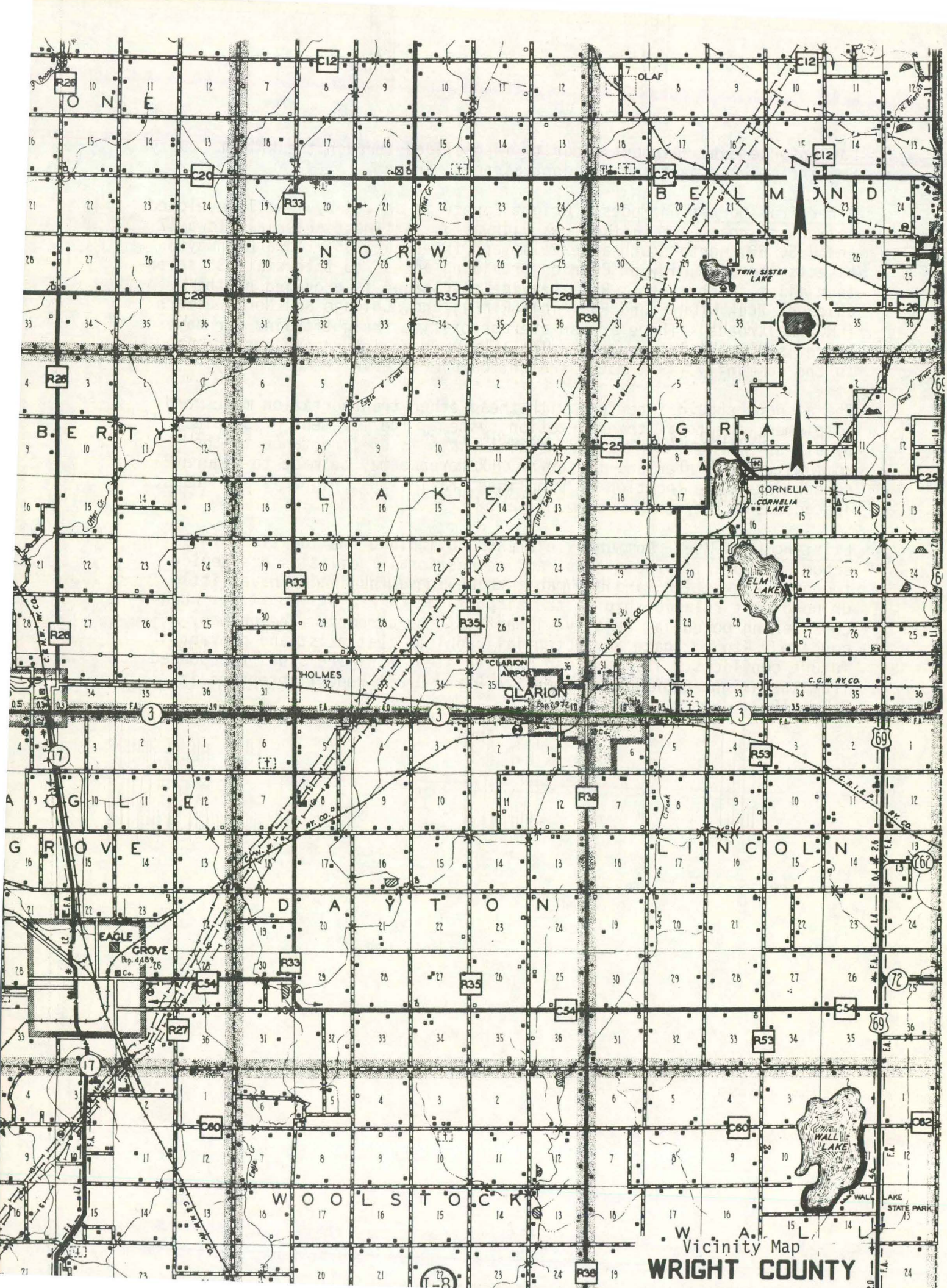
Equipment	Pump Cap. GPM	Tank Cap. Gal.	Volunteer Personnel
'70 Ford	750	500	20
'58 Chev.	500	500	
'72 Ford	300	1,000	
'56 Ford	250	1,000	

Law Enforcement: Airport security is provided through the Wright County Sheriff's Department and resident airport manager.

Other Transportation Modes: Wright County is served by a well-developed network of roads, including Iowa Highway 3, east-west arterial; Iowa 17 and U.S. 69, north-south arterials, and Interstate 35. Iowa Highway 3 bisects the Community of Clarion providing access to Interstate 35 seventeen miles to the east. Rail service to Clarion is provided by the Chicago, Rock Island and Pacific (CRI&P); and, Chicago and Northwestern (CNW) Railroads. There are an average of five freight trains per day. There is no rail passenger service. There is no interstate bus service to the community. Six motor freight carriers serve the community.

The airport should interface with these other transportation modes and complement the total transportation system. The movement of people by air as well as high valued machine parts is of importance to the community and hinterland it serves. Reference may be made to Figure 2 concerning route location of pipelines, rail lines, highways and roads, and accessibility to area communities.

Existing Land Use: Community elements to include the location of schools, libraries, hospitals, and recreational facilities are depicted on the existing land use map. While these facilities have little or no direct relationship to the airport, they are of importance when considering potential negative impacts of the airport. The primary concern is to mitigate any potential problems that exist and prevent future conflicts. The land use map depicted in Figure 3 was reproduced from the Wright County Comprehensive Plan, Draft Report, prepared in July, 1977.


ONE
NORWAY
BELMOND
BERTY
LAKE
GREAT
CORNELIA
CORNELIA LAKE
TWIN SISTER LAKE
ELM LAKE
OLAF
HOLMES
CLARION
CLARION AIRPORT
Pop. 2972
EAGLE GROVE
Pop. 4489
DAYTON
LINCOLN
WOOLSTOCK
WALL LAKE
WALL LAKE STATE PARK
Eagle Creek
Little Eagle Creek
Otter Cr.
W. Branch Iowa River
Iowa River
C.N.W. RY. CO.
C.G.W. RY. CO.
C.R.I.&P. RY. CO.
R26
R27
R33
R35
R36
R38
R53
C12
C20
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17
3
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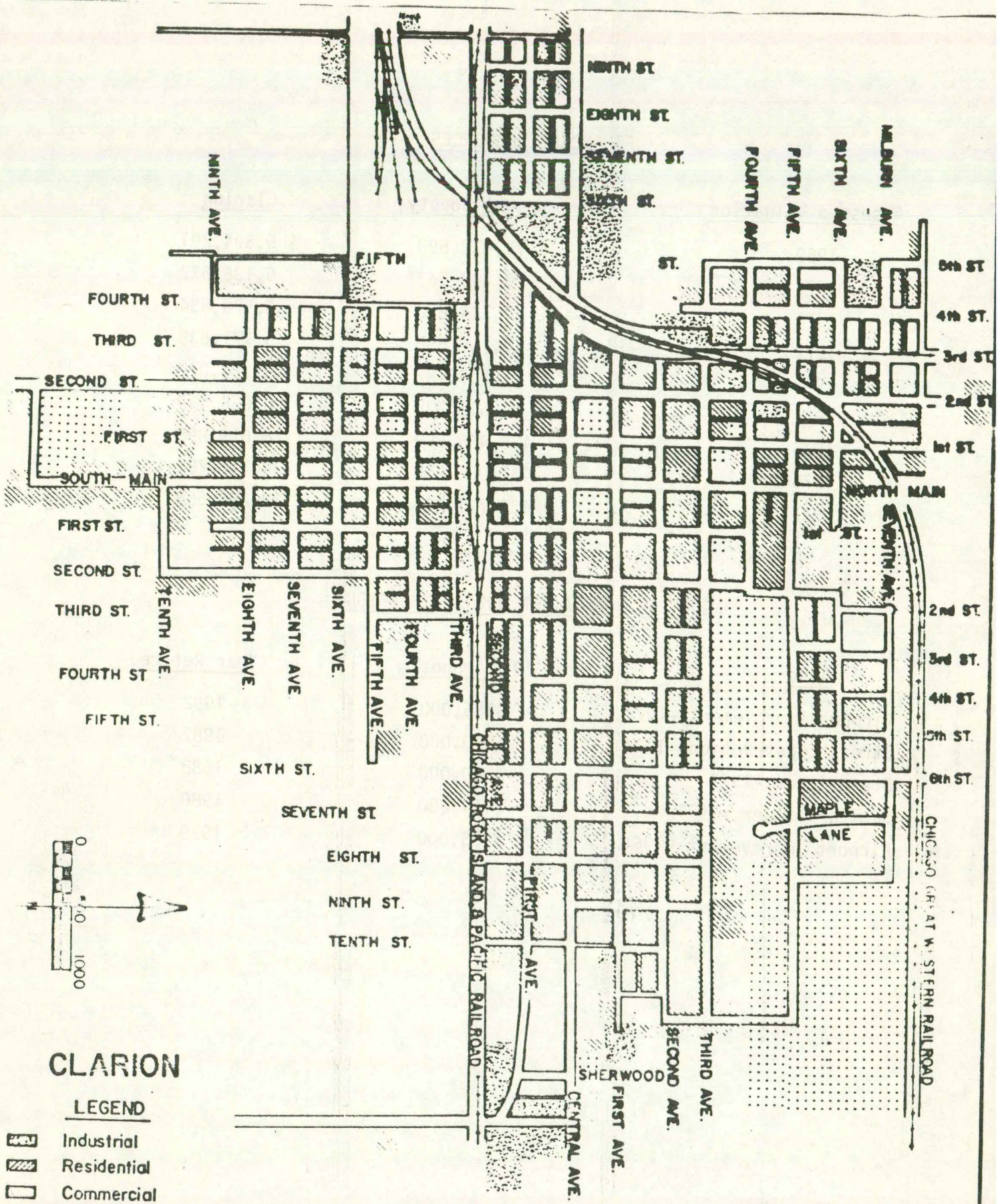
20
Vicinity Map
WRIGHT COUNTY
FIG. 2



EXISTING LAND USE

The preparation of this map was financed in part through a planning grant from the Department of Housing and Urban Development, under the Provisions of section 701 of the Housing Act of 1954, as amended under contract IGA-76-5.

Figure 3

FINANCIAL RESOURCES

Assessed Valuation	Wright County	Clarion
1969	$ 72,872,590	$ 5,394,291
1970	72,343,563	5,136,677
1971	74,744,012	5,579,534
1972	76,156,650	5,771,638
1973	77,533,187	5,924,072
1974	84,516,938	6,038,439
1975	426,485,569	28,619,298
1976	432,083,050	30,715,781
1977	438,777,493	32,206,658

GENERAL OBLIGATION BONDS - CLARION

Bond	Amount	Year Retired
Airport Improvement -1977	$185,000	1992
Street Construction -1974	$200,000	1987
Storm Sewer -1973	$ 90,000	1983
Sanitary Sewer -1971	$114,000	1980
Airport Improvement -1964	$ 55,000	1979

SOCIOECONOMIC CHARACTERISTICS

Socioeconomic characteristics of the community and its hinterland have a direct relationship to the airport. Economic development will facilitate not only population growth, but aviation activity as well. The socioeconomic background data summarized herein was obtained from preliminary draft reports of the Clarion Comprehensive Plan being prepared by MIDAS COG and the City of Clarion.

Population: The community of Clarion, as has many rural communities, has suffered a population loss. Between 1960 and 1970, the population declined by 8 percent. This trend can be attributed to out-migration and declining fertility rates. The out-migration, especially when composed of persons in their family formation years, can have a significant impact. The out-migration can be attributed to lack of employment opportunities within the community and its immediate hinterland.

The population loss of the 20 to 45 age group and increasing ratio of dependent persons to productive age persons could also have an impact upon the community's ability to finance community services which include the airport. To mitigate this problem, the City of Clarion has adopted the following goal: encourage the attraction of job opportunities in Clarion. This goal, if achieved, will tend to minimize the rate of out-migration. Assuming that employment opportunities increase, the medium forecast presented in Table 1 will be established as the future trend.

Table 1

Clarion Population 1970 - 1995

Year	Low	Medium	High
1970	2,972	2,972	2,972
1975	2,947	3,056	3,343
1980	2,935	3,129	3,416
1985	2,952	3,174	3,490
1990	2,960	3,260	3,563
1995	2,947	3,329	3,636

Source: Clarion Comprehensive Plan, Draft Report, 1977.

Economic Base: As previously discussed, the composition of the economic base of the community will influence future population trends. The Clarion Comprehensive Plan encourages the expansion of export job opportunities which will create 3.2 non-export jobs (1:3.2 in 1970). The analysis concludes that with positive local initiative, it would be possible to increase export sector employment by 30 persons resulting in increased population growth, (3,251 in 1995)

Reference to the 1976 State Airport Systems Plan suggests that there is a positive relationship between airport development and retail sales (see pages 7-9). The retail sales sector of the community is strong. Clarion captured 28 percent of the County's retail sales from December, 1975 to September, 1976. The equalization ratio, which is Clarion's share of the retail sales to its share of the county population was 1.65. This ratio indicates that there are more retail dollars being spent within Clarion. As such, Clarion has been able to attract certain numbers of people to the community from without.

$$\frac{\text{Sales (Dec. 1975 to Sept. 1976)}}{\text{Population (1970)}} \qquad \frac{.28}{.17} = 1.65$$

Source: Clarion Comprehensive Plan, Draft Report, 1977

The ENO Foundation[1] grouped industry by travel tendencies.

High Travel: Mining, Manufacturing, Government Business Services.

Medium Travel: Construction, Wholesale and Retail Trade, Personnel Services, Finance, Insurance, Real Estate, Professional Services.

Low Travel: Agriculture, Forestry, Transportation, Communication, Utilities, Repair Service, Amusement, Recreation, Printing and Publishing

The above travel tendencies relate not only to air, but to the other modes of transportation. In addition to industry, there are other social variables involved when an individual or family selects a particular mode of transportation to include family size, occupational background, age, and income. Family income, age, distance to be traveled and the number of persons making the trip were found, by the ENO Foundation, to be significant variables with respect to air travel.

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[1]Source: ENO Foundation, Air Travel Forecasting, Saugatuck, Connecticut, 1957, Page 24.

Clarion's employment by industry; as presented in the Clarion Comprehensive Plan, Draft Report, 1977, is shown in Table 2.

TABLE 2

CLARION EMPLOYMENT BY INDUSTRY, 1960 and 1970

Industry Group	Total Employment 1960	1970	Change 1960 -1970
Agriculture	56	23	-33
Construction	60	71	+11
Manufacturing	107	78	-29
Transportation, Communication, and Other Utilities	176	96	-80
Wholesale and Retail Trade	352	266	-86
Finance, Insurance, Real Estate Business & Repair Services	109	63	-46
Professional, Educational, and Related Services	136	250	+114
Public Administration	96	57	-39
Other	126	103	-13
Total	1,218	1,007	-201

Source: Clarion Comprehensive Plan, Draft Report, 1977

Relating Table 2 data back to travel tendencies, it can be seen that there was a decrease in persons employed in high travel industries and stability within those industries of the medium travel category.

There are a number of factors contributing to the demand for travel by air. Some of the factors are listed below:

- Distance
- Accessibility
- Time in terms of length of stay, travel time, and need
- Cost per unit of travel
- Reasons for making trip
- Number of persons or items involved
- Type and value of cargo
- Opportunity and availability of aircraft
- Regulations
- Economic trends
- Availability of other transportation modes
- Aviation interest

The sum total of the above factors will suggest a particular mode of transportation. It is obvious that the above factors are subject to change. Thus, at best, only a trend line suggesting aviation demand can be generated. Along this trend line, deviations above and below can be expected for one reason or another. Such deviations and forecasts for Clarion are elaborated on in Chapter Two.

FUTURE COMMUNITY LAND USE

Airport Development Planning efforts were closely coordinated with the MIDAS COG staff. The MIDAS staff was preparing the Clarion Comprehensive Plan within the same period of time. The opportunity to exchange input resulted in both efforts being compatible with each other. The future land use plan for the community and its relationship to the airport is significant. The objective of both efforts was to insure land use compatibility and minimize potential constraints to airport expansion and community growth.

AREA AIRPORTS

Area airports and their relationship to the Clarion Municipal Airport are summarized herein. Future aviation activity at these facilities and their role in the State Airport Systems Plan was obtained from the 1976 SASP. Physical characteristics were obtained from the F.A.A. Form 5010. Geographical location of area airports is depicted on Figure 4.

BASED AIRCRAFT

Year	Eagle Grove	Humbolt	Algona	Mason City	Fort Dodge	Clarion	Hampton
1975	17	14	21	61	27	12	12
1980	17	18	26	72	32	15	14
1985	18	22	32	84	37	17	15
1990	19	27	38	101	46	19	17

Source: IDOT 1976 SASP

Airport Classification and Category

	Eagle Grove	Humbolt	Algona	Mason City	Fort Dodge	Clarion	Hampton
Airport:	BU	BU	GU	AC	AC	BU	GU
Category:	IV	IV	II	I	I	II	II

Source: IDOT 1976 SASP

Airport Type

BU --- Basic Utility: Accommodates 95% of propeller airplanes under 12,500 lbs.

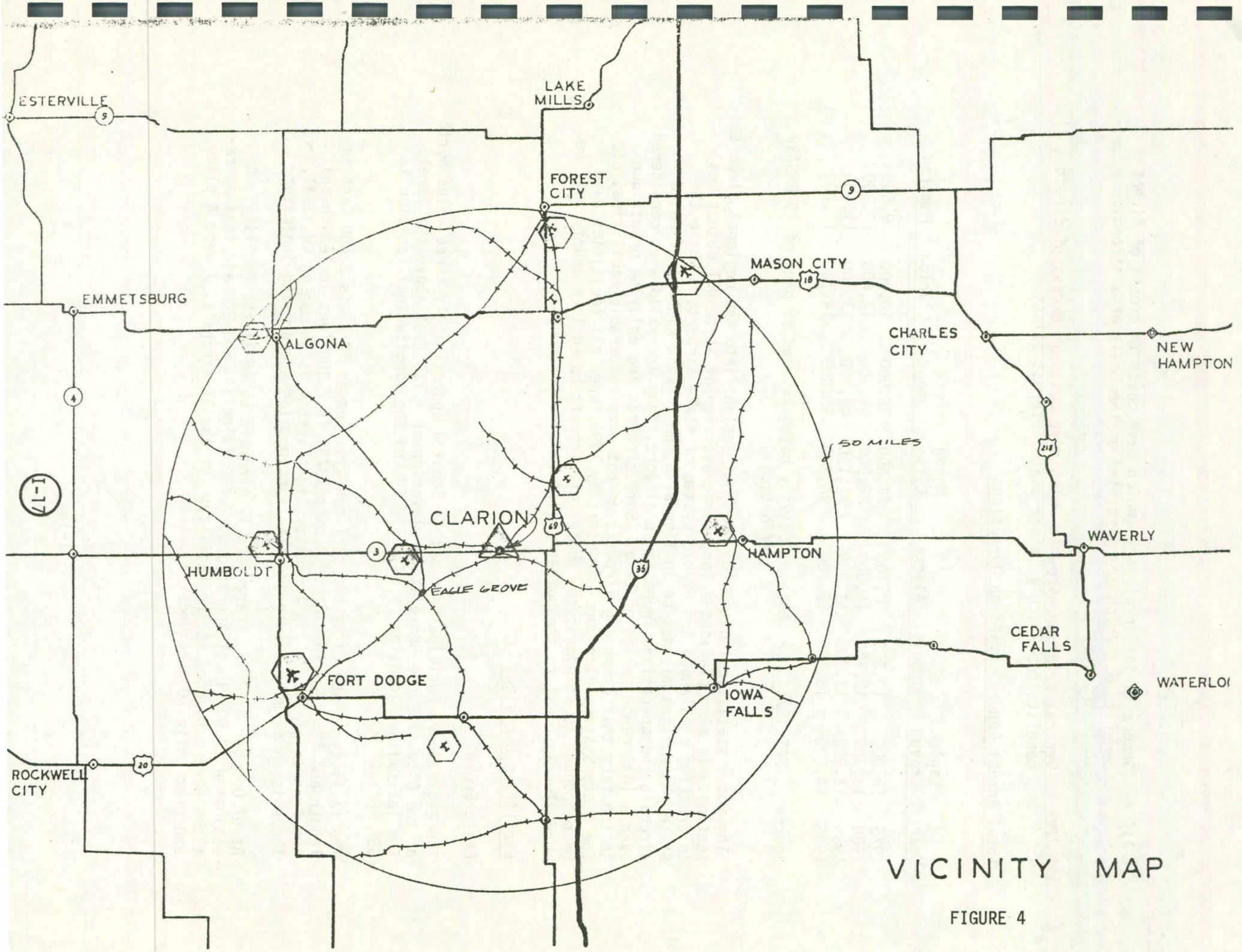
GU --- General Utility: Accommodates 100% of propeller airplanes under 12,500 lbs.

AC --- Air Carrier: Accommodates certificated air carrier aircraft

Airport Category

I --- Air carrier airports and associated relievers.

II --- General aviation airports for which an economic justification exists.



VICINITY MAP

FIGURE 4

III --- General aviation airports which have costs in excess of direct benefits but which are justified on the basis of a strong state interest.

IV --- General aviation airports which have costs in excess of direct benefits for which a lesser state interest exists.

Total Annual General Aviation Operations

Year	Eagle Grove	Humbolt	Algona	Mason City	Fort Dodge	Clarion	Hampton
1975	13,000	10,600	8,700	24,000	35,900	10,900	9,500
1980	13,300	12,300	10,000	27,900	41,300	12,600	10,500
1985	13,900	13,900	11,000	31,100	46,300	13,700	11,100
1995	14,600	16,100	12,300	36,300	55,000	14,700	11,700

Source: IDOT 1976 SASP (Note: Activity being revised as part of 1978 SASP efforts.)

The above statistical data provides an insight into the regional airport setting. It also provides a long range overview of State DOT objectives in creating a balanced and viable system of state airports. While the State projections may not be in line with the present numbers of based aircraft and operations found at an airport, they are valid when considered over a long range period of time. Some airports are enjoying growth due to the fact that competing airports do not have comparable facilities, etc. The State Systems Plan concludes that by 1995, when all facilities have been brought to standard, the number of aircraft based in a county will be more closely equal to the number registered in that county.

Facilities Overview:

Eagle Grove:

The Eagle Grove Municipal Airport is located approximately three miles north of the City of Eagle Grove at an elevation of 1,131 feet above sea level. The latitudinal location is 42° 43' 00"N and the longitudinal location is 95° 55' 00" W.

The facility is served by two turf runways; Runway 10/19 is 2,600 feet in length and 125 feet in width; Runway 13/31 is 2,200 feet in length and 300 feet in width. A low intensity light system is in use on RW 13/31. There is no airport beacon or other landing aids except wind indicator.

As of October 8, 1976, there were 17 aircraft based at the facility. An estimated 10,000 local operations, 2,400 itinerant and 200 air taxi operations were conducted at the facility. Of the 17 aircraft, 7 were 4 place and over while 10 were under 4 place.

Humbolt:

The Humbolt Municipal Airport lies at an elevation of 1,095 feet above sea level and is approximately one mile west of the City of Humbolt. The airport latitude is 42° 44' 10" North. The longitude is 94° 14' 42" West.

The airport is served by a single runway, RW 12/30. The runway is 3,400 feet in length and 60 feet in width. The surface composition is asphalt. The gross weight strength is 4,000 pounds, single wheel.

The runway is lighted with a low intensity system. The taxiway is also lighted. There is no airport beacon light. A wind indicator is located on the field.

As of October 12, 1976, there were 11 based aircraft at the airport of which 8 were 4 place and over. There were an estimated 4,000 annual local operations, 1,200 itinerant, and 300 air taxi operations conducted.

Algona:

The Algona Municipal Airport, located two miles west of the community, is served by three runways. Runway 12/30 is 3,960 feet in length and 75 feet in width. The surface composition is concrete. The runway has a gross weight strength of 30,000 pounds (single wheel) and 48,000 pounds (dual wheel). Runway 18/36 has a turf compostion and is 2,100 feet in length; Runway 8/26 is turf and 2,400 feet in length.

Medium intensity runway lights are located on RW 12/30. The airport is also served by a wind indicator, beacon, segmented circle, and unicom. Taxiway lights are also available.

As of October 23, 1975, there were 16 based aircraft on the field. An estimated 300 annual air taxi operations were conducted. Of the 9,000 total operations conducted, 5,500 were local and 3,500 itinerant.

The airport lies at an elevation of 1,219 feet above sea level. The airport latitude and longitude and 43° 4' 30" N and 94° 16' 15" W respectively.

Hampton:

Hampton Municipal Airport had 11 aircraft based at the facility in 1976. Of the 11, 9 were 4 place and over and 2 under 4 place. There were an estimated 5,000 local operations conducted, 1,200 itinerant and 500 air taxi operations.

The airport is served by a single runway, Runway 17/35. The runway is 3,000 feet in length and 60 feet in width. The surface composition is asphalt. The gross weight strength is 1,200 pounds, single wheel. A low intensity runway light system has been installed. The facility is served by a beacon, unicom, segmented circle, and wind indicator.

The airport lies at an elevation of 1,175 feet above sea level. The airport latitude is 42° 43' 35" N; the longitude is 93° 13' 35" W.

Mason City:

The Mason City Municipal Airport, served by certificated air carrier service, had 67 based aircraft in 1976. Operational characteristics annual estimates were:

Military	200
Air Taxi	2,000
GA Local	12,000
GA Itinerant	22,000

The two runways, RW 12/30 and 17/35 are 5,501 and 6,504 feet in length respectively. The width of both runways is 150 feet. The surface composition is asphalt. The gross weight strength is as follows:

	Single Wheel (SW)	Dual Wheel (DW)	Dual Tand (DT)
RW 12/30	80,000	110,000	130,000
RW 17/35	80,000	110,000	180,000

Medium intensity lights are located on RW 12/30 and high intensity on 17/35. A medium intensity approach light system (MALSR) is located on Runway End 35. The facility is served by a beacon, unicom, wind indicator, and segmented circle.

The airport elevation is 1213 feet ASL. The latitude is 43° 09' 24" N; the longitude is 93° 19' 53" W.

Fort Dodge:

Fort Dodge Municipal Airport is served by certificated air carrier routes to Mason City, Sioux Falls, Omaha, and Des Moines. The facility is located four miles north of the community at an elevation of 1,157 feet ASL. The airport latitude and longitude are 42° 33' 06" N and 94°11' 19" W.

The two runways, Runways 06/24 and 12/30, provide the following service:

Runway	Length	Width	Surface Composition	Strength S.W.	Strength D.W.
06/24	6,500	150	Asphalt	6,500	110,000
12/30	4,400	100	Asphalt	36,000	58,000

Runway 06/24 has a precision instrument approach; Runway 12/30 has a non-precision instrument approach. A MALSR system is located on RW 06. A VASI - 4 system is also located on RW 06. High intensity lights are located on both runways. The field is also served by a beacon, wind indicator, segmented circle, and unicom. The taxiways are also lighted.

In 1976, there were an estimated 30 aircraft based at the field. Annual operations were estimated as follows:

Air Taxi ---------1,000
GA Local ---------2,000
GA Itinerant ----12,000
Military ---------1,000

CLARION MUNICIPAL AIRPORT FACILITIES

The Clarion Municipal Airport is located approximately one mile northwest of the developed area of Clarion and adjacent to the westerly corporate limits of the community. The facility is at an elevation of 1,162 feet above sea level. The maximum normal temperature is 86 degrees. The latitude is 42° 44' 30" N and the longitude is 93° 45' 30" W. The existing site is depicted in Figure 5, FAA FORM 5010.

The primary runway, Runway 14/32 is 3,000 feet in length. The runway width is 60 feet and has an asphalt surface composition. A crosswind runway, Runway 08/26, is 1,800 feet in length and has a turf surface composition. The runway has a width of 200 feet. Runway 14/32 has an effective gradient of .23 percent, while the effective gradient of Runway 08/26 is .21 percent. A partial paved taxiway from RW End 14 provides access to the apron area.

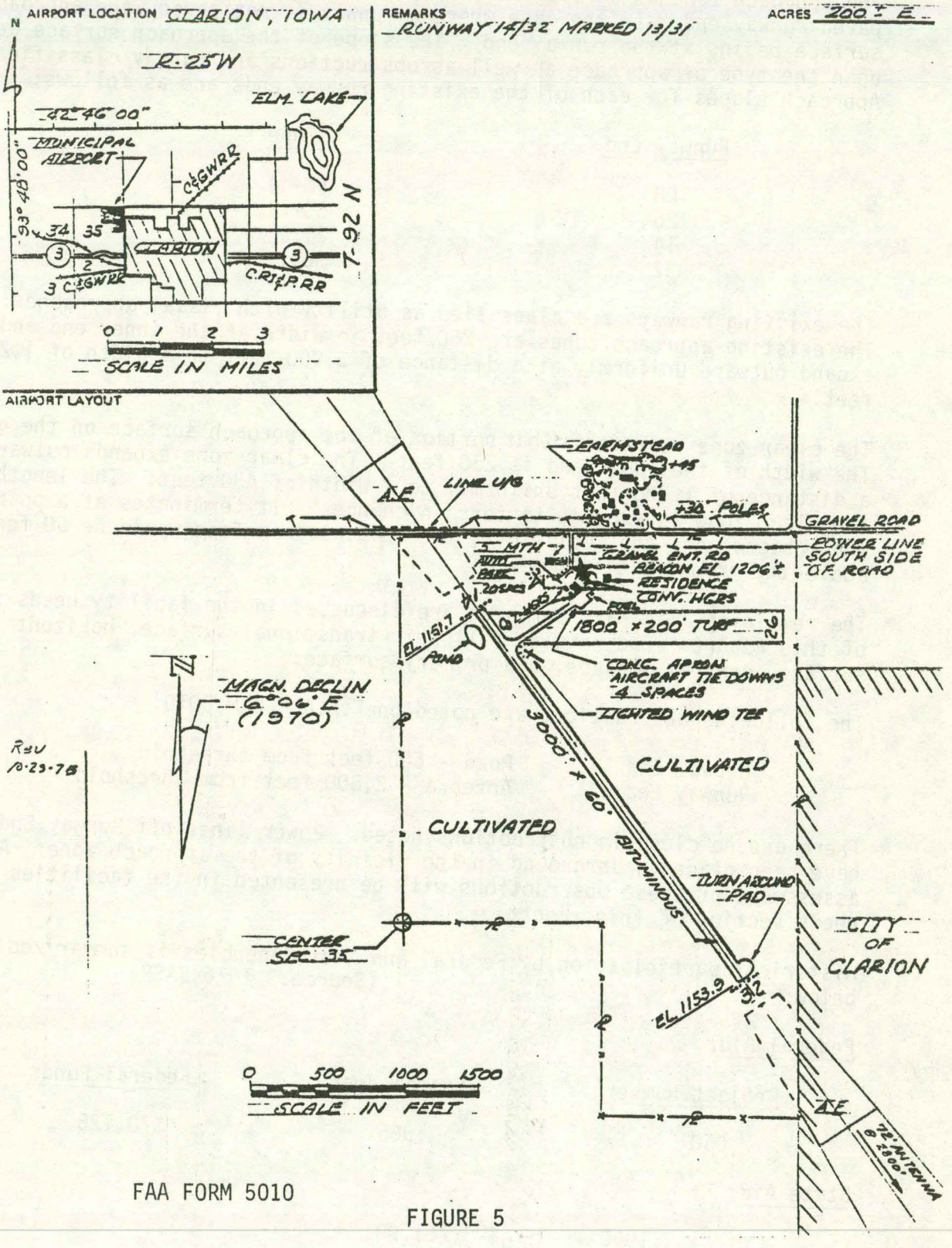
Low intensity lights are provided on Runway 14/32. The crosswind runway and taxiway are not lighted. Runway End Identifier Lights, REIL, have been installed on RW 14/32.

The existing terminal area contains two conventional hangars, a six unit tee hangar, F.B.O office and shop, and the airport manager's residence. Under construction is a ten unit nested tee hangar and shop. Hangar capacity at the airport is as follows:

Six unit tee hangar --------	6	
Conventional hangar --------	5	
Conventional hangar --------	5	
Shop ----------	1	
New tee hangar ----------	10	(under construction)
New shop ----------	5	(under construction)
Total Hangar Capacity --	32	(maximum capacity)

It should be noted that the hangar capacity is subject to the size of aircraft with respect to the conventional hangars. Total hangar capacity is the ultimate number of aircraft that can be stored based upon present size aircraft. There is tie-down space for 12 aircraft. The tie-downs are located on a turf surface.

The F.B.O. provides a 24 hour service at the facility, which along with the quality of service, has attributed to the increased number of based aircraft. Aviation fuel types 80-87 and 100-130 are available at an apron pump location. A Unicom and NDB system are also in use at the facility.



FAA FORM 5010

FIGURE 5

The approach zone is an imaginary surface beginning 200 feet off each paved runway end. In the case where a runway is not paved, the approach surface begins at the runway end. The slope of the approach surface depends upon the type of approach as well as obstructions and runway classification. Approach slopes for each of the existing runway ends are as follows:

Runway End	Slope
08	50+:1
26	50+:1
14	21:1
32	36:1

The existing runways are classified as utility with visual approaches. The existing approach zones are 250 feet in width at the inner end and expand outward uniformly at a distance of 5,000 feet to a width of 1,250 feet.

The clear zone represents that portion of the approach surface on the ground. The width of the inner end is 250 feet. The clear zone expands outward a distance of 1,000 feet uniformly to a width of 450 feet. The length of the clear zone is subject to terrain changes. It terminates at a point where, based upon the 20:1 slope, the imaginary surface would be 50 feet above the ground elevation.

The remaining imaginary surfaces are discussed in the facility needs section of this report. They are as follows: transtional surface, horizontal surface, conical surface, and primary surface.

The following obstructions are noted on F.A.A. FORM 5010:

Runway End 14: Road - 600 feet from threshold
Runway End 32: Antenna - 2,800 feet from threshold

There are no close-in obstructions noted. Power lines off Runway End 14 have been placed underground in the vicinity of the approach zone. An assessment of these obstructions will be presented in the facilities needs section of this report.

Historical participation by Federal and State Agencies is summarized below: (Source: 1976 SASP)

Federal Aid:

Project Number	Fiscal Year	Federal Funds
C501	1965	$70,125

State Aid:

1966	$ 8,761.00
1967	834.94
1968	3,518.47
1975	3,500.00
	$16,614.41

FORECAST OF AVIATION DEMAND

SECTION 2

II FORECAST OF AVIATION DEMAND
INTRODUCTION

The scope of work provides for an update of the 1976 State Airport System Plan aviation forecasts and to account for local variations affecting aviation activity. There are obvious factors that exist with respect to future aviation activity. These are summarized as follows:

- The projection and forecast effort is only able to predict a trend line.
- There will likely be a variation on an annual basis above and below this line
- Such short term variation can be explained by local and regional factors that might exist from time to time.
- Long term variations would alter the trend line and could be explained by national and/or international events.

The state projections that were prepared were used to establish the long term trend line. Local and regional events were used to explain the variations that exist at present. Upon completion of the development plan, local airport officials should make every effort to document the number and type of operations by based and itinerant aircraft. Such an inventory of activity will provide valuable input into the next update of the State Airport Systems Plan.

The 1976 SASP has drawn some conclusions that are significant with respect to aviation activity at Clarion. These are referenced and discussed with the first being related to numbers of based aircraft.

> "The number of aircraft based at an airport is not directly related to the area of residence of the owner. The choice of a site for basing an aircraft may be affected by such factors as: hangar rental and maintenance free structures, availability of navigational aids, and runway length and conditions."
>
> (1976 SASP, Page 59)

With Clarion, a major reason for the increased number of based aircraft can also be attributed to the services offered and airport management. Services include instructional flying, major and minor aircraft repairs, fuel availability, etc. Management of the airport is to include on site security, management concern, and 24 hour service (on call evenings) is important. It is these above variables that will not only encourage persons to base aircraft at the facility, but also to use services offered.

The above, however, must also be observed from a different perspective:

> " . . . the development of a quality system throughout the state would remove much of the attractiveness differentials between airports by 1995, thus causing the number of aircraft based in a county to be more clearly equal to the number of registered aircraft in the county."
>
> (1976 SASP, Page 61)

In other words, as regional airports are brought up to state standards, they will be much more attractive, thereby capturing their traditional service area. In order to identify direction for future airport development, a review of historical aviation data has been made with future activity predictions based upon local input and SASP assumptions.

BASED AIRCRAFT

From 1976 to 1977, there was a significant increase in the number of aircraft based at the airport. Reference may be made to the following table concerning aircraft types, ownership status, and gross weight of aircraft based at the Clarion Airport as of September, 1977.

Table 3

BASED AIRCRAFT
TYPE, OWNERSHIP, & GROSS WEIGHT, 1977

Aircraft Type	Ownership	Gross Weight (in lbs.)
1) PA-28-180	Private	2,450
2) PA-28-180	Private	2,450
3) C-182	Business	2,950
4) Beech 58 Twin	Business	5,400
5) PA-28-151	Private	2,325
6) PA-28-180	Private	2,450
7) PA-28-151	Business	2,325
8) C 177	Business	2,500
9) V35A	Business	3,400
10) PA-28-151	Corporation	2,325
11) PA-28-140	Corporation	2,150
12) PA-32-260	Corporation	3,400
13) PA-31-300 Twin	Corporation	6,200
14) PA 28R-200	Business	2,650
15) PA-28-140	Private	2,150
16) PA-28-180	Business	2,450
17) Beech 58 Twin	Corporation	5,400
18) C172	Private	2,300
19) Bellanca 17-30	Business	3,325
20) Aeronca	Private	
21) PA-22	Private	1,800
22) C172	Private	2,300
23) PA-22	Private	1,800
24) PA-28-180	Private	2,400
25) C150	Corporation	1,600
26) PA-28-180	Private	2,400
27) PA-28-140	Private	2,150
28) PA-32-30	Corporation	3,400
29) PA 28-180	Private	2,400
30) PA 22-150	Private	1,800

Source: Airport Manager, FAA AC 150/5325 - 5B

Of the 30 aircraft currently based at Clarion, only three have a gross weight exceeding 5,000 pounds. The largest aircraft based at the facility is a PA-31-300 twin having a gross weight of 6,200 pounds.

Table 4 provids a listing of aircraft that are serviced at the airport, the gross weight, and airport where based. From this table, an insight into the airport service area can be obtained.

Table 4

AIRCRAFT TYPE, GROSS WEIGHT, AND BASE OF AIRCRAFT SERVICED AT CLARION

	Aircraft Type	Gross Weight	Based At
1)	PA-28-180	2,450	Humbolt
2)	C-182	2,950	Pocahontas
3)	PA-32-300	3,400	Pocahontas
4)	C-130	5,100	Iowa Falls
5)	Bonanza	3,600	Ackley
6)	Aeronca	---	Clarion
7)	C-210	3,800	Webster City
8)	PA-15	1,750	Indianola
9)	C-172	2,300	Goldfield
10)	PA-22	1,800	Humbolt
11)	C-180	2,800	Des Moines
12)	C-340	5,975	Hampton
13)	M20C	2,576	Radcliff
14)	C-172	2,300	Pocahontas
15)	C-310	5,500	Rockwell City
16)	C-182	2,950	Des Moines
17)	PA-28-140	2,150	Des Moines
18)	C-172	2,300	Marshalltown
19)	C-177-RG	2,500	Des Moines
20)	C-310	5,500	Pocahontas
21)	Call Aviation 49	---	West Bend
22)	F-33-A	3,400	Des Moines
23)	PA-28-140	2,150	Clarion
24)	C-172	2,300	Greenfield
25)	Beech 35	3,400	Ackley
26)	C-172	2,300	Clarion
27)	C-172	2,300	Hampton
28)	C-310	5,500	Milford
29)	PA-31-300	6,200	Clarion
30)	C-182	2,950	Humbolt
31)	A2 Alan	---	Pocahontas
32)	Erocoupe	1,450	Des Moines
33)	C210	3,800	Indianola
34)	C150	1,600	Eagle Grove
35)	C182	2,950	Kanawha

	Aircraft Type	Gross Weight	Based At
36)	PA-28-151	2,325	Ackley
37)	C172	2,300	Pocahontas
38)	Bellanca 17-30	3,325	William
39)	C170	2,200	Albert City
40)	V35A	3,400	Clarion
41)	C-210	3,800	Madrid
42)	C140	1,450	Hampton
43)	Stinson 108	2,150	Hampton
44)	PA-28-180	2,450	Palmer
45)	C172	2,300	Eagle Grove
46)	C182	2,950	Humbolt
47)	PA-28-180	2,450	Perry
48)	PA-28-140	2,150	Clarion
49)	PA-28-151	2,325	Ackley
50)	C-177 RG	2,500	Des Moines
51)	B35	3,400	Ackley
52)	C-337 P	4,630	Spirit Lake
53)	PA-22	1,800	Rowan
54)	Stinson 108	2,150	Alexander
55)	C182	2,950	Greenfield
56)	Piper J4	1,750	Des Moines
57)	C-172	2,300	Des Moines
58)	C182	2,950	Havelock
59)	PA-28-140	1,450	Eagle Grove
60)	C172	2,300	Des Moines
61)	Aero Commander	6,500	Greenfield
62)	C182	2,950	Waterloo
63)	C172	2,300	Humbolt
64)	7GCAA	---	Fort Dodge
65)	PA-28-151	2,325	Kanawha
66)	Beech 35	3,400	Gilmore City
67)	PA22	1,800	Eagle Grove
68)	C182	2,950	Iowa Falls
69)	C182	2,950	Hampton
70)	PA-28-180	2,450	Des Moines
71)	C172	2,300	Laurens
72)	C172	2,300	Kanawha
73)	Beech 35	3,400	Des Moines
74)	C210	3,800	Havelock
75)	Aircoupe	---	Story City
76)	C177	2,500	Milford
77)	Aircoupe	---	Des Moines
78)	Senca	4,570	Des Moines
79)	C182	2,950	Hampton
80)	Aeronca	---	Humbolt
81)	Senca	4,570	Des Moines
82)	Beech 35	3,400	Milford
83)	C310	5,500	Edmonton, Alberta Canada

Source: Airport Manager, FAA AC 150/5325-5B

It should be noted that none of the aircraft presently serviced at Clarion exceed, for either landing or take-off, 8,000 pounds gross weight. The airport service area as evident from the table serves a geographical area centered in north-central Iowa.

Based upon the type of aircraft located at the facility and those that are serviced at the airport, it would appear that a basic utility airport, Stage II, would meet present airport needs. In order to justify a higher order type airport, there would have to be a substantial number of aircraft operations or aircraft with a gross take-off weight between 8,000 and 12,500 pounds.

The following table presents a listing of representative aircraft with a gross weight between 8,000 and 12,500 pounds.

Table 5

REPRESENTATIVE AIRCRAFT: Gross Weight 8,000 to 12,500 Pounds

Queen Air B80
GAF Nomad 22
Piper Navajo Cheyenne
Rockwell International Turbo Commander 690 A
Beech King Air C90, A100, Super King Air, E90
de Havilland Twin Otter
Mitsubishi MU-2M MU-2L
Beech 99
Swearingen Merlin IV A, III A

Source: Flying Annual

The basic utility airport, stage II, would accommodate 95 percent of the aircraft under 12,500 lbs. The exceptions may be those noted in the table above when temperatures would require a longer runway length.

Table 6 summarizes the historical number of aircraft based in Wright County, the State of Iowa, and Clarion.

Table 6

BASED AIRCRAFT 1965 to 1977

Year	State[1]	Wright Co.[2]	Clarion[3]	% County of State	% Clarion of Wright Co.
1965	1,911	29	NA	1.52	--
1966	2,150	29	NA	1.35	--
1967	2,294	26	NA	1.13	--
1968	2,399	20	14	0.83	70.0
1969	2,588	19	14	0.73	73.7

Year	State	Wright Co.	Clarion	% County of State	% Clarion of Wright Co.
1970	2,582	26	12	1.01	46.2
1971	2,550	27	11	1.06	40.7
1972	3,102	35	NA	1.13	--
1973	2,884	31	12	1.07	38.7
1974	2,965	34	NA	1.15	--
1975	3,044	30	NA	1.15	--
1976	2,984[5]	NA	11	--	--
1977	2,907[5]	38[4]	30[4]	1.31	78.9

Sources: 1,2: Census of U.S. Civil Aircraft, Total U.S. Active
3: FAA Form 5010
4: Airport Manager (Recent inquiry to base a King Air at Clarion, 10-20-77; Probability of two more aircraft moving from Eagle Grove to Clarion 10-20-77)
5: IDOT, Office of Advance Planning

The historical data reveals the following:

1. Wright County experienced a decrease in the number of aircraft registered in the County between 1965 and 1969.
2. Starting in 1970 the county experienced continual growth in aircraft numbers. This increase continued through 1973.
3. In 1973 stability and growth dominated the county with annual increases and decreases through 1977.
4. The county's share of the state total from 1970 to 1977 has varied between 1.01 percent and 1.31 percent. The eight year average is 1.1 percent. The ten year average is 1.03 percent.
5. Should the county continue to experience growth, it will be assumed that they will capture 1.30 to 1.50 percent of the state's future total numbers of aircraft.
6. Should the airport facilities of the county deteriorate it will be assumed that no more than 0.8 percent of the state's total aircraft will be based in the county.
7. Because of present airport management, facilities, and services at Clarion, it is assumed that 80 percent of the county's total aircraft will be based at Clarion.
8. That the number of aircraft based at the facility will vary from year to year. This variation is typical of all airport facilities.

One method of projection involves using a large geographical area and a step-down procedure to arrive at potential numbers of based aircraft. This method assumes the historical ratio of local aircraft to state aircraft will remain the same. The 1976 and 1978 SASP have projected future numbers of based aircraft for the state and Wright County. Reference may be made to Table 7 concerning estimated future number of based aircraft in Wright County.

Table 7

AIRCRAFT BASED IN WRIGHT COUNTY, 1975-1977

Year	Iowa[1]	Wright[2] County	Wright County's Share of State Low[3]	Medium[4]	High[5]
1975	2,789	26	---	---	---
1977	(2,907)	31	23	30	38
1980	3,700	32	29	38	48
1982	(3,885)	(33)	30	40	51
1985	4,070	33	32	42	53
1987	(4,296)	(34)	34	44	56
1995	4,820	28	38	50	63
1997	(4,544)	(44)	35	46	60

Sources: 1,2: 1976 SASP, Page 59; 1978 SASP (2907)
3: Low, 0.78% of State Total (Average of two lowest years)
4: Medium, 1.03% of State Total (Ten year average)
5: High, 1.31% of State Total (1977)

There are an estimated 38 aircraft currently based in Wright County. This number of based aircraft is expected to increase at a modest rate of growth. Three assumptions were made, based upon historical trends, to estimate the future number of aircraft. At present the high trend line is applicable, whereas over the twenty year planning period the medium trend line is expected to dominate. The low trend line will be realized if the present level of service provided at the airport would be discontinued.

For planning purposes the middle trend line will be used, realizing that there may be a variation from four to eight aircraft above or below the trend line throughout Wright Coutny.

Year	Total Aircraft Based in Wright County	
1977	38	
1980	38	
1982	40	
1985	42	Annual Variation
1987	44	4-8 Aircraft
1995	50	
1997	46	

Table 8 estimates future number of aircraft to be based at Clarion. As with the county, the medium trend line is expected to prevail over the twenty year planning period. The airport and its future number of based aircraft again are based to a great deal upon actions by the city to maintain a good facility and by the airport manager and F.B.O. to provide an exceptional level of service. An annual variation of four to six aircraft is expected at the Clarion Municipal Airport.

Table 8

PROJECTED BASED AIRCRAFT, CLARION

Year	Forecast	Based Upon 80% Wright County's Total Aircraft Projection		
	State	Low	Medium	High
1975	12[1]			
1977	28[2]	18	24	30
1980	15[1]	23	30	38
1982	32[2]	23	32	41
1985	17[1]	26	34	42
1987	34[2]	27	35	45
1995	19[1]	30	40	50
1997	40[2]	28	37	48

Source: 1: 1976 SASP, IDOT
2: 1978 SASP, IDOT

Year	Total Aircraft Based At Clarion	
1977	30	
1980	30	
1982	32	Annual Variation 4-6
1985	34	Aircraft
1987	35	
1997	40	

AVIATION OPERATIONS

General aviation operations consist of those made not only by based aircraft but also by aircraft based elsewhere. An operation is defined as a landing or takeoff and is classified as local or itinerant. A local operation is one which operates within sight of the control tower or within the local traffic pattern, and is known to be departing for, or arriving from, flight in local practice areas located within a twenty mile radius of the airport. Itinerant operations, the second type, compose the remaining arrivals and departures.

Unfortunately, there is no in-depth account of historical operations. Therefore, a data base must be created. Typically, local sources, (F.B.O.), are the most realiable and are used herein to explain short-term variations.

The 1976 SASP surveyed a selected number of general aviation airports. This survey was supplemented with control tower data at Iowa air carrier airports. A series of models was also developed. The first model used based aircraft and county airmen as variables, while the second used population and based aircraft. Reference may be made to the 1976 SASP report for a more detailed discussion. The 1978 update of the 1976 SASP produced the following estimate of total annual and annual itinerant operations at Clarion.

Table 9

ANNUAL TOTAL AND ANNUAL ITINERANT OPERATIONS
CLARION, 1978 SASP

YEAR	BASED AIRCRAFT	TOTAL ANNUAL OPERATIONS	ANNUAL OPERATIONS/ BASED AIRCRAFT	ANNUAL ITINERANT OPERATIONS	ANNUAL ITINERANT OPERATIONS/ BASED AIRCRAFT
1977	28	21,700	775	8,800	314
1982	32	24,600	769	10,200	319
1987	34	25,800	759	10,800	318
1997	40	29,100	728	12,500	313

Source: 1978 SASP, IDOT

Table 10 summarizes future anticipated levels of aviation activity. The ratio of aircraft operations to based aircraft, as calculated in the above table, was used to estimate upper levels of operational activity based upon the range of based aircraft presented in Table 9.

Table 10

TOTAL ANNUAL AIRCRAFT OPERATIONS
1977-1997, Clarion

YEAR	LOW	MEDIUM	HIGH
1977	13,950	18,600	23,250
1982	17,687	24,608	31,529
1987	20,493	26,565	34,155
1997	20,384	26,936	34,944

Total annual operations are expected to fall within a range of 18,600 to 23,250 in 1977. In 1982, some 24,600 total annual operations are expected increasing to 26,936 by 1997. Table 11 summarizes total annual itinerant aircraft operations at Clarion from 1977 to 1997.

Table 11

ANNUAL ITINERANT AIRCRAFT OPERATIONS
1977 to 1997

YEAR	LOW	MEDIUM	HIGH
1977	5,652	7,536	9,420
1982	7,337	10,208	13,079
1987	8,586	11,130	14,310
1997	8,764	11,581	15,024

Total annual itinerant operations in 1977 are expected to fall between 7,536 and 9,420. In 1982, this number is expected to increase to 10,208,and by 1987 to 11,130. In 1997, thereare expected to be 11,581 itinerant operations. Total annual operations less total annual itinerant operations yields total local operations.

AIRCRAFT MIX

Various aircraft are grouped by the FAA into the following:

Class A	4 engine jet and larger
Class B	2 and 3 engine jet, 4 engine piston, and turbo prop
Class C	Executive jet and transport type twin-engine piston
Class D & E	Light twin-engine piston and single-engine piston

Aircraft based at Clarion are in the D and E class. Over the twenty year planning period, the probability of substantial numbers of Class C type aircraft being based at the facility is low. Reference may be made to Table 5 concerning representative Class C aircraft.

There may, however, be operations by the above aircraft. For purposes here, it is assumed that 90% plus of the total annual operations will be by D and E aircraft. The remaining zero to ten percent will be by Class C aircraft.

In the 1976 SASP, the following mixes (as averages) for each of the airport classifications were used:

Basic Utility:	100% D & E
General Utility:	98.5% D & E, 1.5% C

Operations by aircraft, with a gross take off weight over 8,000 pounds which can be documented, is limited to an average of 14 per month or an average of 168 operations per year.

5 landings and take-offs/month by King Air
2 landings and take-offs/month by MU-2

7 X 2 = 14 operations per month

Negotiations are presently underway to base a King Air at the airport. Should that aircraft be based at the facility, the number of operations by aircraft over 8,000 pounds would be substantially greater.

The design aircraft selected, upon which to assess proposed development needs, are Beech King Air Models C90, E90 and A100.

BASED AIRCRAFT MIX

Planning Period		Class D + E No.	Class D + E %	Class C No.	Class C %
I	1977 - 1982	31	96.9	1	3.1
II	1982 - 1987	34	97.1	1	2.9
III	1987 - 1997	38	95.0	2	5.0

Note: Middle Estimate From Table 8

OPERATIONAL MIX

Planning Period		Class D + E No.	Class D + E %	Class C No.	Class C %
I	1977 - 1982	24,208	98.38	400	7.62
II	1982 - 1987	25,965	97.75	600	2.25
III	1987 - 1997	25,636	95.20	1,300	4.80

Note: Middle Estimate From Table 10

AIRPORT CAPACITY

Over the twenty year planning period, no airport operational capacity problems are anticipated. Reference to FAA AC 150/5060 - 1A and AC 150/5060 - 3A reveals the following generalities concerning airport capacity:

Single runway, Mix 1

PANCAP	215,000 ops/year
PHOCAP	IFR - 53 ops/hour
	VFR - 99 ops/hour

Intersecting runway, Mix 1

PANCAP	220,000 ops/year
PHOCAP	IFR - 61 ops/hour
	VFR - 99 ops/hour

PANCAP ---------- Practical Annual Capacity
PHOCAP ---------- Practical Hourly Capacity
Mix 1 ---------- 90% D & E, 10% C aircraft (± 10%)

The 1978 SASP estimated the following peak hour activity at Clarion

1977	28
1982	30
1987	31
1997	33

Note: This estimate would approximate the medium trend line.

From the preceeding discussion, it is evident that capacity problems from the standpoint of operations are not, nor are expected to be, a future concern. This assumption is based upon typical single annual runway capacity under IFR conditions as developed by the FAA as well as the practical hourly capacity of a single sunway under IFR conditions.

AIRMEN, AIR FREIGHT AND PASSENGERS

Airmen: As of September 1977, there were 43 airmen in the city of Clarion. Table 12 identifies their level of proficiency.

Table 12

AIRMEN PROFICIENCY PILOTS IN CLARION, 1977

Private Pilot	30
Commercial Multi Instrument	1
Commercial Instrument Instruction	1
Commercial Instrument	2
Commercial	1
Student	7
Total	42

Source: Airport Manager

In 1975, there were an estimated 43.374 registered airmen per 10,000 population in Iowa. The medium population forecast places the 1975 Clarion population at 3,095 persons. The number of airmen in Clarion is well above the state average. The 1976 SASP expects the ratio of registered airmen to population to continue increasing from 43.374 in 1975 to 57.423/10,000 in 1995.

The 1978 SASP estimates the following number of airmen in Wright County: 98 in 1977, 110 by 1982, 114 in 1987, and 123 by 1997. It may be assumed that a large share of the county's airmen will reside in the vicinity of Clarion based upon present data.

Air Freight and Passengers: Historical information, upon which to assess or project air freight tonnage or passenger activity, is lacking. Air freight may be assessed more in terms of value and savings by an operation than volume. The ability to obtain quick delivery of materials is of importance to commercial and industrial operations in the area.

General aviation passengers were calculated to be 1.5 times the GA itinerant operations by the 1976 SASP. Based upon the above, the number of general aviation passengers was calculated. Reference may be made to Table 13.

Table 13

GENERAL AVIATION PASSENGERS, 1977 - 1997

YEAR	ITINERANT OPERATIONS MEDIUM FORECAST	NUMBER OF PASSENGERS* CLARION
1977	9,420	14,130
1982	10,208	15,312
1987	11,130	16,695
1997	11,581	17,372

*Assuming 1.5 passengers per itinerant operation

In 1977 there were an estimated 14,130 GA passengers enplanements and deplanements at Clarion. This number is expected to increase to 17,372 by 1997.

No attempt was made to estimate the volume of air freight at Clarion.

SUMMARY

Based upon present activity, a basic utility Stage II airport will satisfy immediate aviation demand. Should there be a substantial increase in the number of aircraft operations by aircraft with a gross weight over 8,000 pounds, a general utility airport is recommended.

Because of the present circumstances contributing to current levels of activity as well as future levels, the facility needs section of the airport development plan will be based upon the following development schedule:

1977 - 1982	Basic Utility Stage II Airport
1982 - 1987	General Utility Airport
1987 - 1997	General Utility Airport

Prior to the decision to develop the airport to general utility standards, it is recommended that the forecast of aviation demand be reviewed to better document the number of operations by aircraft with a gross weight of 8,000 to 12,500 pounds.

AIRPORT REQUIREMENTS

SECTION 3

III AIRPORT REQUIREMENTS
INTRODUCTION

Based upon the forecast of aviation demand and the assessment of present airport capacity, the airport facility components anticipated for implementation over the twenty-year planning period can be identified. It should be clearly understood that, as time passes, specific airport facility components identified herein are likely to change. Thus, a degree of flexibility must be "built" into the plan to include the components discussed within this section.

The methodology and reasoning used within this analysis are summarized below:

- Aviation activity identified represents only a trend line. Actual occurrences will most likely vary above and below the trend line.

- Certain variables may cause an unexpected increase in aviation activity thereby encouraging a change in airport service from a basic utility, Stage II to general utility airport level.

- In order to satisfy the above, the high forecasts of aviation activity will be used to establish upper limits in terms of land reservation while the medium forecast will be used to identify specific airport components.

- Certain elements of the plan can be implemented which would permit ease of expansion or change in airport service level. (For example, the runway to building restriction line is 250 feet for a Basic Utility Airport and 300 feet for a General Utility Airport. It would make good sense to use 300 feet for future planning.)

Good judgement must also be used to insure that the airport is not overbuilt and that recommended components are justified.

RUNWAYS AND TAXIWAYS

OVERVIEW:

Runways are a basic facility component common to all airports To summarize the basis for the following discussion on runways, the following points must be considered:

- Wind coverage by the existing runway is such that a single runway cannot provide adequate wind coverage. A second or crosswind runway is needed.

- Aviation demand levels suggest that a basic utility runway will provide an adequate level of service over the initial five year period.

- The forecast of aviation demand suggests that a general utility runway level of service may be required over the last 15 years of the planning period.

- A single wheel load design of 12,500 pounds is expected to provide a satisfactory level of service over the entire twenty year planning period.

WIND COVERAGE:

Wind data is not available at the Clarion Airport. The 1976 SASP recommended Waterloo data as approximating the Clarion situation most closely. This data was supplemented by Fort Dodge wind data. A crosswind limiting factor of 12 mph was used.

Wind coverage provided by RW 14/32 did not provide the recommended ultimate coverage of 95%. The need for a crosswind runway is thus evident at the facility..

Crosswind runway orientation is quite flexible with a range from N0° to N30° E. The ultimate crosswind runway orientation will depend upon a number of factors other than wind. An assumed orientation of N 26° E was used herein for wind assessment purposes. It also appears to be the most compatible with adjacent land uses.

It is recommended that prior to construction of the crosswind runway, wind data be monitored for a minimum period of time. Such efforts may, after a one or two year period, be compared with the Waterloo data and the degree of correlation determined. Should there be considerable variation, winds should then be monitored for no less than a five year period. An analysis of Waterloo wind is provided below.

RW 14/32 provides for a 92.2% coverage. Supplementing that with wind coverage by the crosswind runway will provide the facility with a 97.7% coverage.

Primary Runway, RW 14/32

RW 14 End: Wind from SE; Approach from NW to SE
1/2 of Calms (0-4) = 6.75 %

MPH	Calms	WSW	W	WNW	NW	NNW	N	NNE	NE
4-12	6.75	2.3	2.3	4.0	5.3	2.7	2.2	1.5	1.6
12-18	--	0.0	0.5	1.5	3.9	2.4	1.4	0.1	0.0
18-24	--	0.0	0.0	0.3	1.4	0.7	0.2	0.0	0.0
24-31	--	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0
Total	6.75	2.3	2.8	5.8	11.1	5.9	3.8	1.6	1.6

Total: 41.7 % ±

RW 32 End: Wind from NW; Approach from SE to NW
1/2 of Calms (0-4) = 6.75%

MPH	Calms	ENE	E	ESE	SE	SSE	S	SSW	SW
4-12	6.75	1.9	3.1	5.0	5.0	5.1	6.0	3.2	2.5
12-18	--	0.0	0.3	1.6	1.8	2.8	2.8	0.9	0.0
18-24	--	0.0	0.0	0.2	0.4	0.5	0.5	0.0	0.0
24-31	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Total	6.75	1.9	3.4	6.8	7.3	8.5	9.3	4.1	2.5

Total: 50.55% +/-

Total Coverage by RW 14/32: 92.3% +/-

Crosswind Runway: Suplemental Wind Coverage by Crosswind Runway

Runway End 02: Wind from NE, Approach from SW to NNE

MPH	NNW	N	NNE	NE	ENE	E
0-12	0.0	0.0	0.0	0.0	0.0	0.0 (Provided by RW 14/32)
12-18	0.0	0.0	0.3	0.3	0.5	0.0
18-24	0.0	0.2	0.1	0.1	0.1	0.0
24-31	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.2	0.4	0.4	0.6	0.0

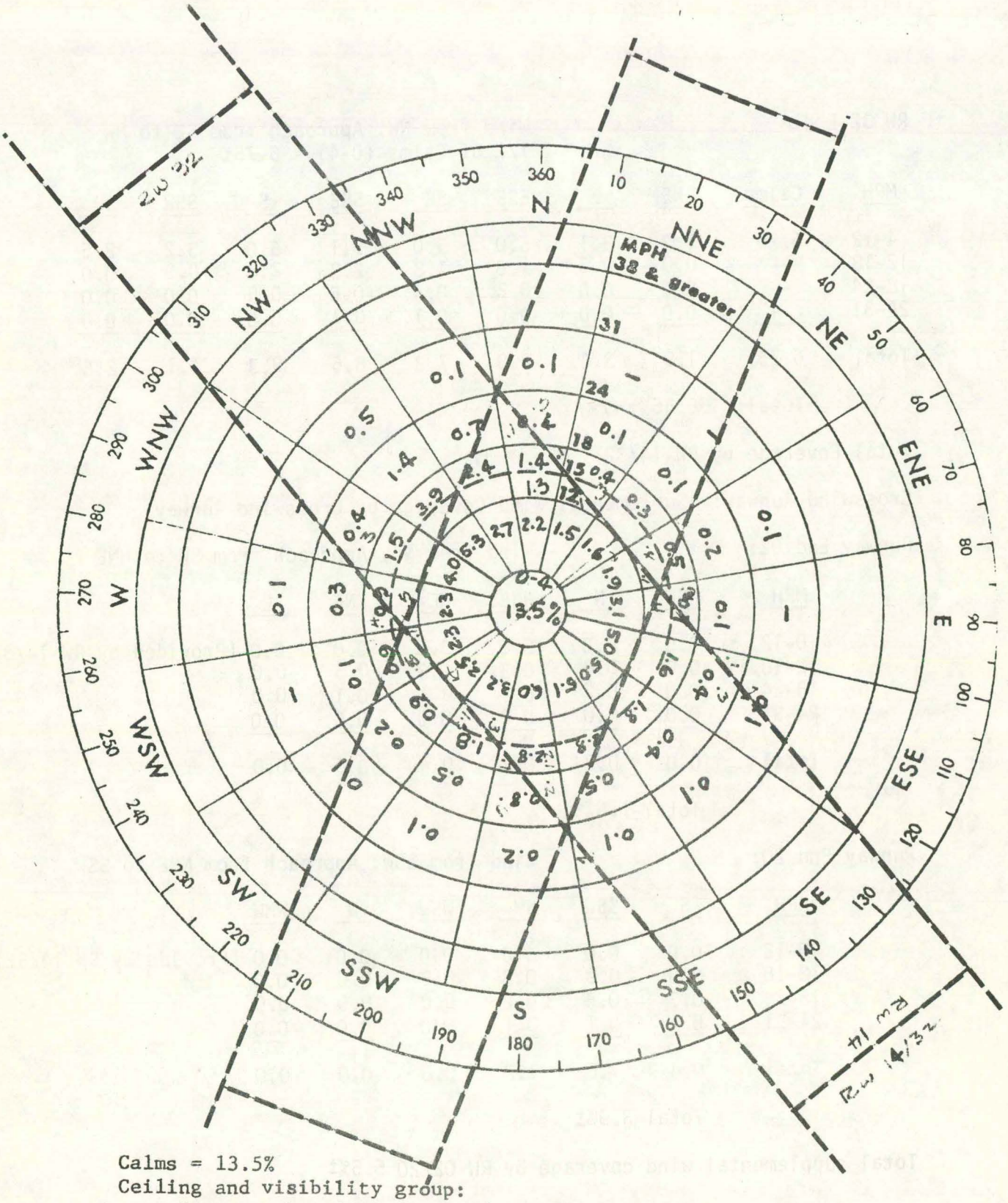
Total 1.6%±

Runway End 20: Wind from SSW; Approach from NNE to SSW

MPH	S	SSW	SW	WSW	W	WNW
0-12	0.0	0.0	0.0	0.0	0.0	0.0 (Provide By RW 14/32)
12-18	0.0	0.9	0.9	0.8	0.0	0.0
18-24	0.3	0.5	0.2	0.0	0.0	0.0
24-31	0.1	0.1	0.1	0.0	0.0	0.0
Total	0.4	1.5	1.2	0.8	0.0	0.0

Total 3.9%±

Total supplemental wind coverage by RW 02/20 5.5%±



Calms = 13.5%
Ceiling and visibility group:
Greater than 1000 ft and/or 3 miles = 96.2%
Less than 1000 ft and/or 3 miles = 3.8%

Exhibit N. Waterloo wind rose (mph), record of period 1948-1950 and 1963-1964.

Source: 1972 SASP

FIGURE: 6

RUNWAY LENGTH:

Runway length requirements were obtained from FAA Advisory Circular 150/5300 - 4B, Utility Airports. Reference may be made to Figure 7 The runway length curves assumed the following to exist:

- Zero headwind component
- Maximum weight for take-off and landing
- Optimum flap setting for shortest runway length (normal ops)
- Airport elevation equal to pressure altitude
- Relative humidity and runway gradient were not accounted for individually but were based upon the groups most demanding aircraft.
- Airport elevation and temperature were left as varying conditions.

An elevation of 1,162 feet above sea level and a normal maximum temperature of 86 degrees was used for Clarion. From Figure 7 the runways lengths for the three classes of utility airports were obtained.

Basic Utility

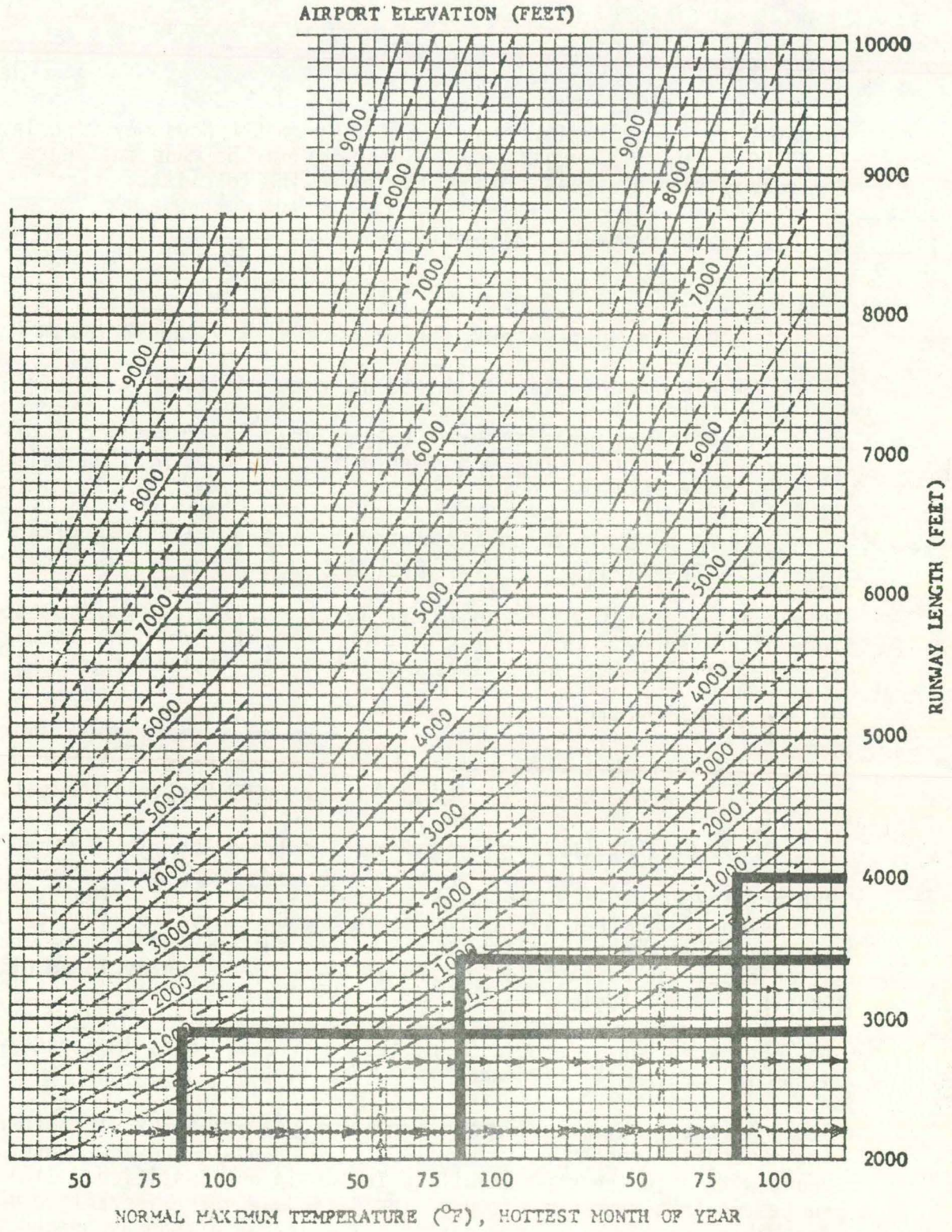
Stage 1 ---------- 2,900 Feet
Stage 2 ---------- 3,400 Feet, Justification

General Utility ---------- 4,000 Feet

The primary runway, RW 14/32, is currently 3,000 feet in length. An extension of 500 feet would provide an adequate level of service over the next five years, 1977 to 1982. Within this period of time, consideration should be given to extension of the primary runway to an ultimate length of 4,000 feet.

The crosswind runway should be no less than 3,200 feet in length with 4,000 feet being the ultimate desirable length.

Although there may be a limited number of operations by aircraft requiring excessive lengths, a runway length which would provide these aircraft with a 100 percent usability factor is not justified. It is suggested that the aircraft operator "schedule" his aircraft to more favorable conditions of the day when the length of runway needed is less or use the Fort Dodge or Mason City facilities.



RUNWAY LENGTH CURVES

SOURCE: FAA AC 150/5300-4B FIGURE: 7

The design aircraft selected as a basis upon which to refine runway length requirements as developed by the FAA are the Beech King Air C90 and E90.

King Air C90		King Air E90	
Gross Weight	9,650 lbs.	Gross Weight	10,100 lbs.
Empty Weight	5,630 lbs.	Empty Weight	5,876 lbs.
Equipped useful load	3,770 lbs.	Equipped useful load	3,974 lbs.

Reference may be made to Figures 8 and 8a concerning take-off distance requirements for the C90 and E90. Figures 8b and 8c represent distance to accelerate to decision speed and stop by the C90 and E90 respectively.

Financial constraints among others, may require staging of runway construction over the planning period. Such staging will be presented in the development schedule.

The width of both runways should be no less than 75 feet. Runway 14/32 currently is 60 feet in width. It is recommended that this width be increased to 75 feet within the 20 year period. The crosswind runway should be constructed to a width of 60 feet initially. The Iowa DOT recommends a 75 foot width for general utility runways and a 60 foot width for basic utility runways.

Parallel taxiways improve the safety and efficiency of the airport. The FAA supports the construction of a partial parallel taxiway when total operations exceed 20,000 annually. A full parallel taxiway is justified when annual operations exceed 50,000. The Iowa DOT finds justification for a partial parallel taxiway at one runway end when annual operations are between 30,000 and 50,000. A full parallel taxiway is not justified within the twenty year planning period at Clarion. A partial parallel system would be justified only if the high forecast was realized in 1985. Thus, only a partial taxiway will be recommended for implementation. This partial system will connect the apron area to the crosswind runway and provide for movement along the apron.

RW 14/32 Primary

Existing	Basic Utility	General Utility
60' x 3,000'	60' x 3,000'	75' x 4,000'

RW 02/20 Crosswind

Existing	Basic Utility	General Utility
---	60' x 3,200'	75' x 3,200' (4,000')

TAKE-OFF DISTANCE — 0% FLAPS

TWO ENGINES

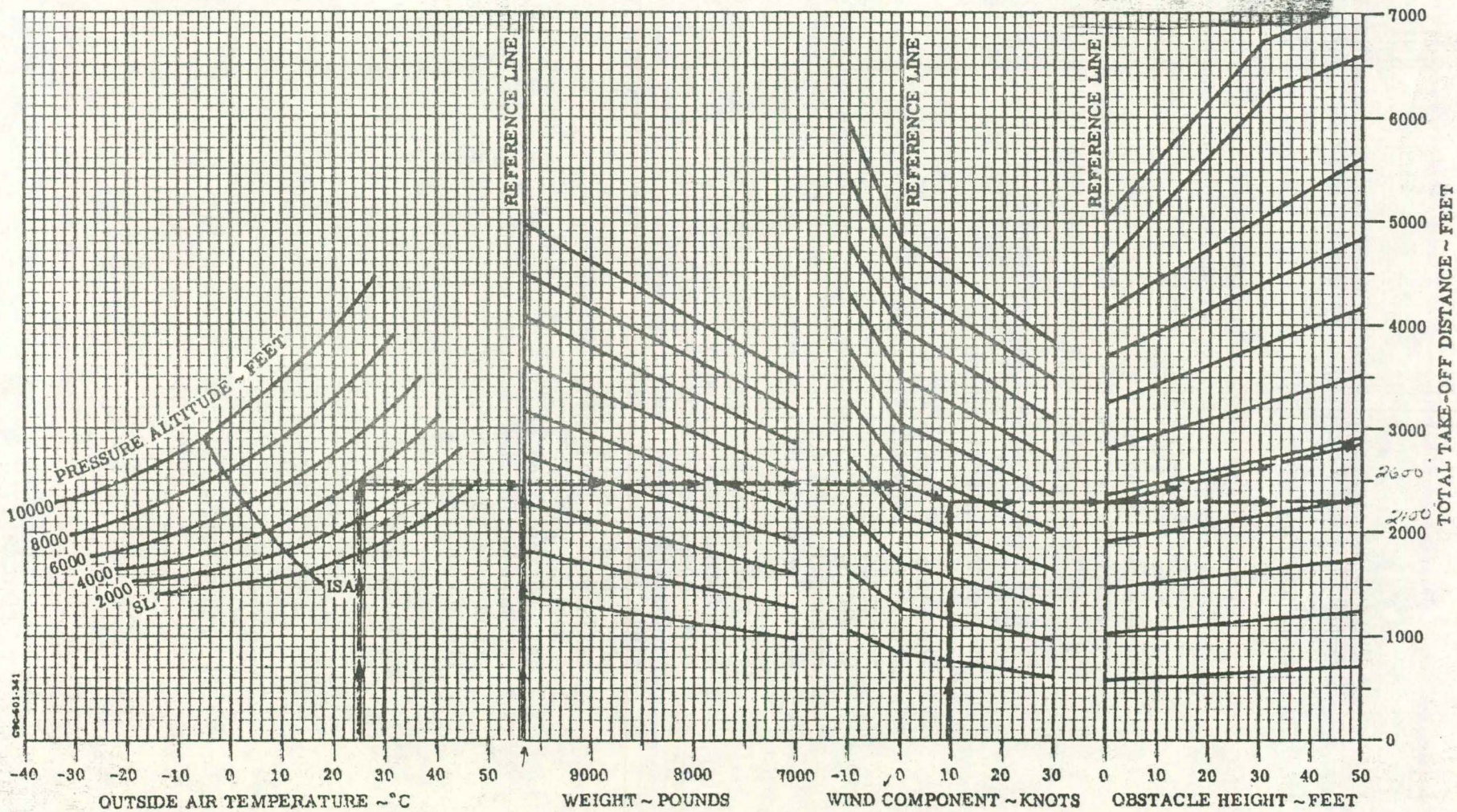
TAKE-OFF SPEED: 100 KNOTS

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	UP
GEAR	RETRACT AFTER LIFT OFF
RUNWAY	PAVED, LEVEL, DRY SURFACE

EXAMPLE:

OAT	25	°C
PRESSURE ALTITUDE	3968	FT
TAKE-OFF WEIGHT	9650	LBS
HEADWIND COMPONENT	9.5	KTS
GROUND ROLL	2300	FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	2840	FT



TAKE-OFF DISTANCE — 0% FLAPS

TWO ENGINES

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	UP
GEAR	RETRACT AFTER LIFT-OFF
RUNWAY	PAVED, LEVEL, DRY SURFACE

TAKE-OFF SPEEDS:

LIFT-OFF	95 KNOTS IAS
50 FT	100 KNOTS IAS

(IAS ASSUMES ZERO INST. ERROR)

EXAMPLE:

OAT	25°C
PRESSURE ALTITUDE	3966 FT
TAKE-OFF WEIGHT	9800 LB
HEADWIND COMPONENT	9.5 KT
GROUND ROLL	1830 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	2400 FT

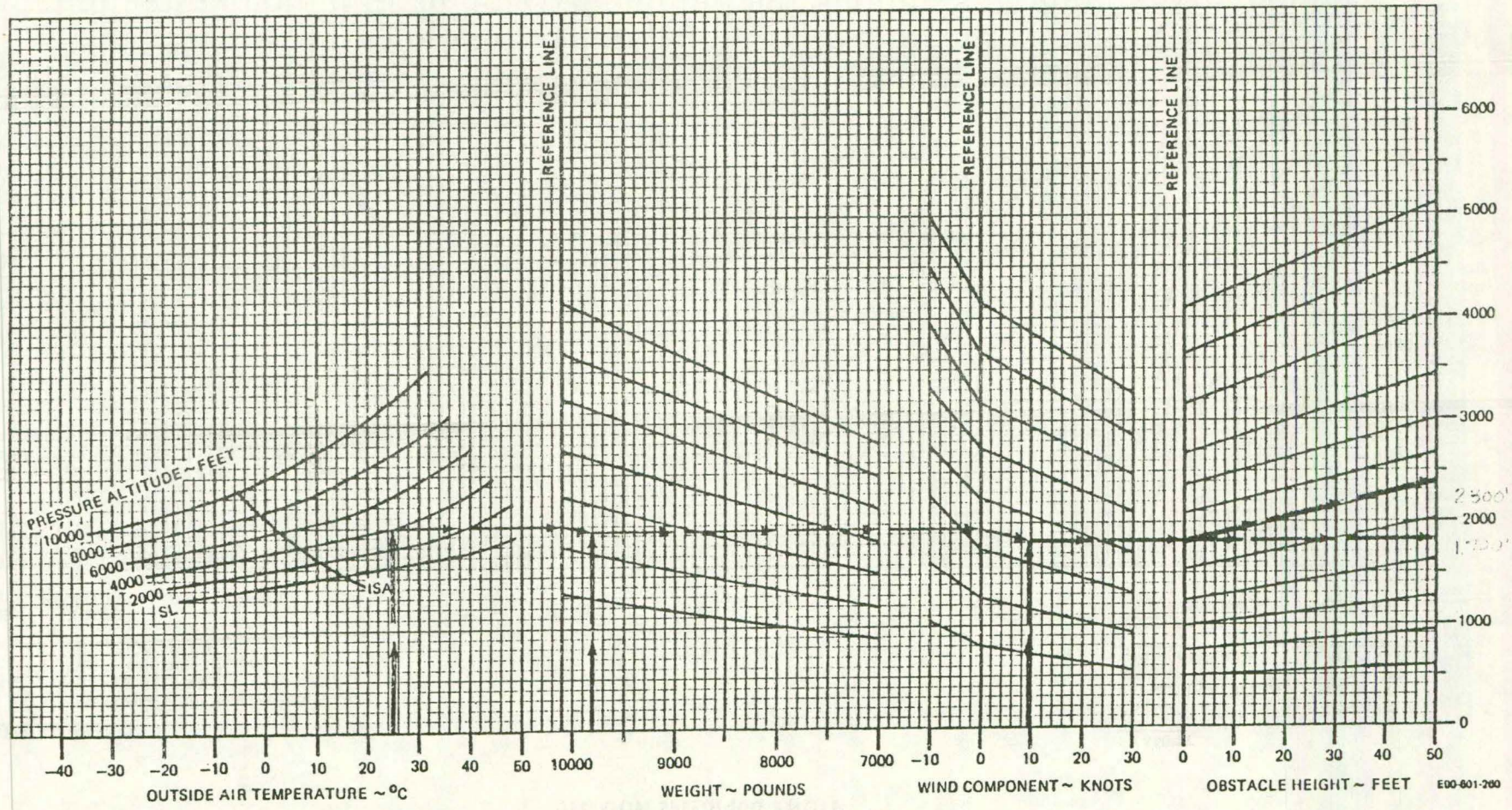


FIGURE 8A

DISTANCE TO ACCELERATE TO DECISION SPEED AND STOP – 0% FLAPS

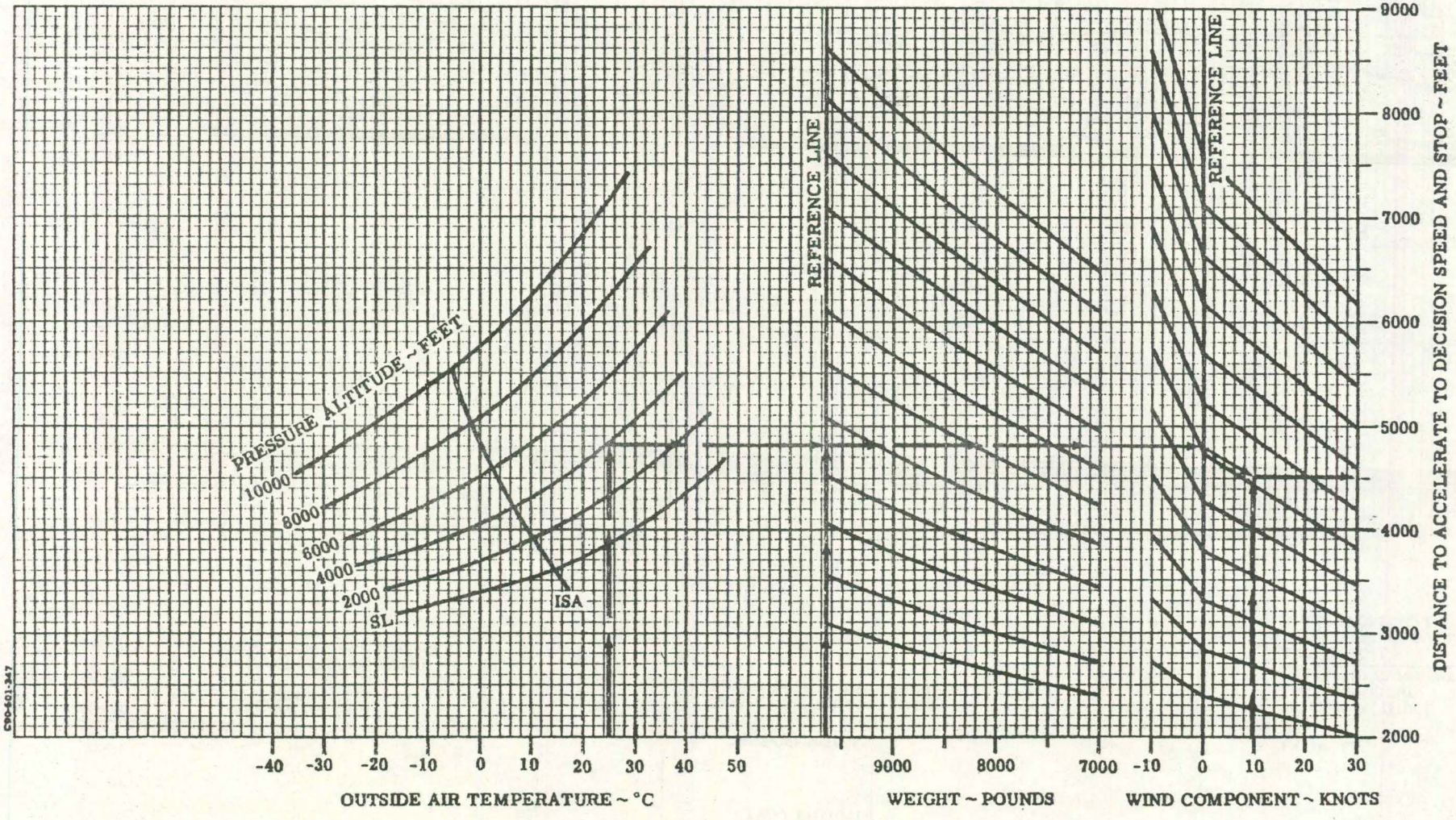
DECISION SPEED: 100 KNOTS

ASSOCIATED CONDITIONS:

POWER	1. TAKE-OFF POWER SET BEFORE BRAKE RELEASE 2. BOTH ENGINES IDLE AT DECISION SPEED
FLAPS	UP
BRAKING	MAXIMUM
RUNWAY	PAVED, LEVEL, DRY SURFACE

EXAMPLE:

OAT	25	°C
PRESSURE ALTITUDE	3966	FT
WEIGHT	9650	LBS
WIND COMPONENT	9.5	KNOTS
ACCELERATE AND STOP DISTANCE	4520	FT



DISTANCE TO ACCELERATE TO DECISION SPEED AND STOP – 0% FLAPS

DECISION SPEED: 95 KIAS

ASSOCIATED CONDITONS:

POWER	1. TAKE-OFF POWER SET BEFORE BRAKE RELEASE 2. BOTH ENGINES IDLE AT DECISION SPEED
FLAPS	UP.
BRAKING	MAXIMUM
RUNWAY	PAVED, LEVEL, DRY SURFACE

NOTE: DISTANCES INCLUDE A 2 SECOND FAILURE RECOGNITION TIME

EXAMPLE:

OAT	25°C
PRESSURE ALTITUDE	3966 FT
WEIGHT	9800 LBS
WIND COMPONENT	9.5 KNOTS
ACCELERATE AND STOP DISTANCE	4130 FT

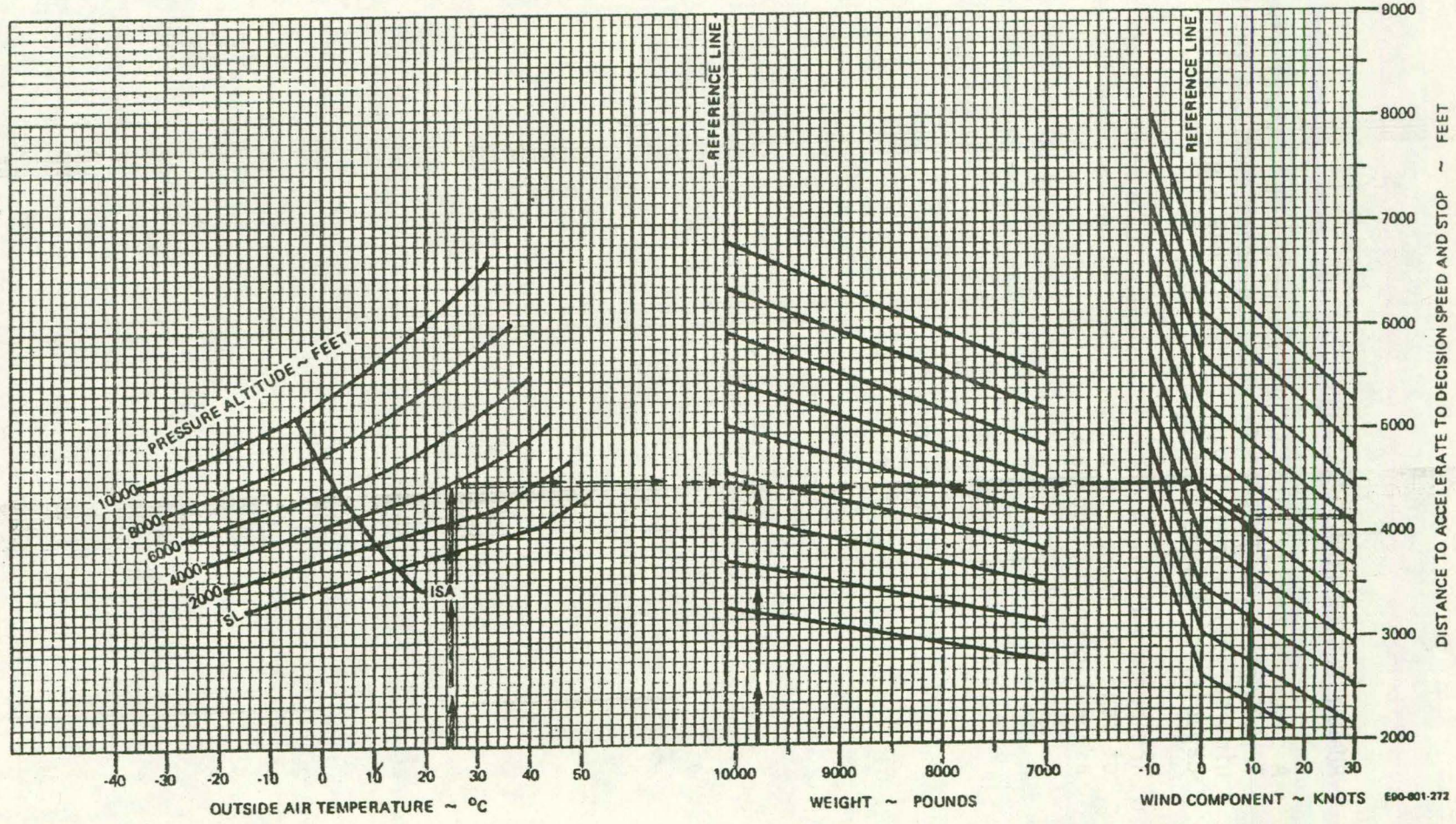


FIGURE 8C

RUNWAY DESIGN CONSIDERATIONS:

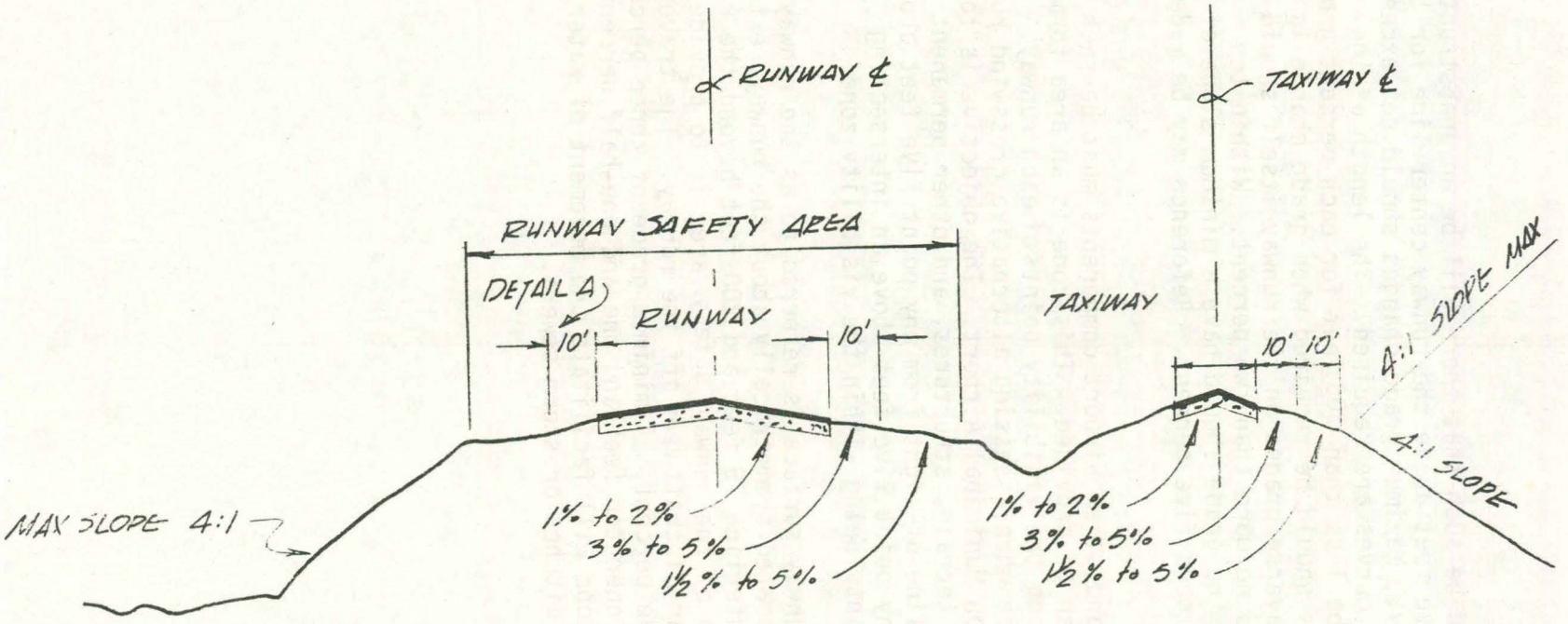
A pavement design which will support a single wheel aircraft load of 12,500 pounds will satisfy aviation needs over the twenty year planning period. Runway 14/32 currently has a gross weight, single wheel capacity of 17,000 pounds.

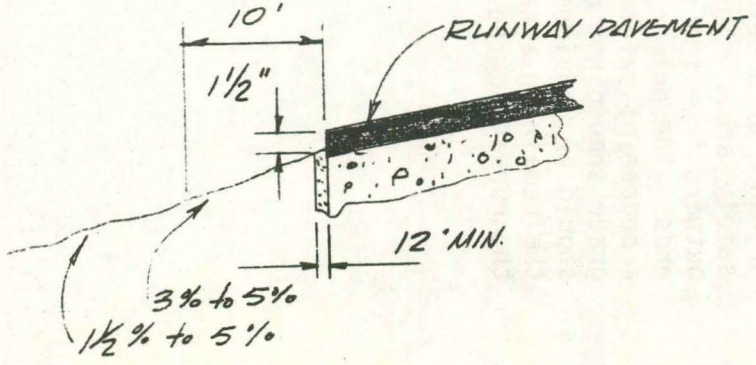
The proposed extension and subsequent construction are to consist of four (4) inches of asphalt treated base with a two (2) inch asphaltic cement overlay.

Runway grade changes should be such that there will be an unobstructed line-of-sight any point five feet above the runway center line for the entire length of the runway. Maximum grade changes should not exceed two percent where vertical curves are required. The length of the vertical curve should not be less than 300 feet for each percent grade change. No vertical curves should be required when grade change is less than 0.4 percent. Traverse grades on the runway itself should be at least one percent and no more than two percent. Within ten feet of the pavement edge, the grade should have a minimum slope of three percent and not to exceed five percent. Reference may be made to Figure 9 .

The layout of the runways and other airport components must be such that a runway visibility zone can be provided. This zone is an area formed by imaginary lines connecting the visibility points of each runway. This requirement is of importance when assessing alternative crosswind runway locations at the Clarion Municipal Airport. The objective is to insure that runway grades, terrain, structures, and other permanent objects do not obstruct a line-of-sight from any point five feet above one runway centerline to any point five feet above an intersecting runway centerline, both points being within the visibility zone.

A graded area beyond the runway surface is referred to as the runway safety area. The area, located symmetrically about the runway, extends outward from the runway centerline 75 feet and 200 feet beyond the runway ends. The primary function of the runway safety area is to provide a degree of safety should an aircraft veer off the runway. The traverse grade should not exceed five percent. A minimum grade of three percent should be provided on the inner ten feet and one and one-half percent on the remaining area. The slope will facilitate the movement of water off the runway to the drainage ditches or storm sewers.





DETAIL A

TYPICAL CROSS SECTION

FIG. 9

SOURCE: AC 150-5300-4B

LATERAL WIDTHS AND CLEARANCES:

Following is criteria for separation of airport facilities. As previously discussed, the use of maximum standards will provide for ease of upgrading the facility on future years. While the airport is designated as an initial basic utility airport, general utility requirements related to lateral widths and clearances will be used for planning purposes.

	Minimum	Desireable
- Runway to taxiway centerline	150'	200'
- Runway centerline to building restriction line (BRL) and property line (non-taxiway side)	200'	250'
- Runway centerline to building restriction line (taxiway side)	250'	300'
- Taxiway centerline to airplane tie-down area	75'	75'
- Taxiway centerline to fixed or movable obstacle	50'	50'
- Runway centerline to fixed or movable obstacle	125'	125'
- Runway centerline to tie-down area	275'	275'

Source: FAA AC 150/5300 - 4B

PAVEMENT MARKINGS:

Non-precision instrument (N.P.I.) markings are recommended for installation on Runway 14. A non-precision instrument runway is one in which a straight-in non-precision approach has been approved. N.P.I. markings consist of basic runway markings in addition to threshold markings.

- Centerline Markings:

  The centerline marking consists of a broken line having 120 foot dashes and 80 foot blank spaces. The minimum width is one foot.

- Designation Markings:

  Each runway end is marked with designated numbers representing the magnetic azimuth, measured clockwise from north and the runway centerline from the approach end and recorded to the nearest 10° with the last zero omitted.

- Threshold Markings:

  Threshold markings consist of eight 150' x 12' stripes. Each stripe is separated by a minimum of three feet except in the center where the minimum distance is 16 feet.

Reference should be made to FAA AC 150/5340 1D concerning pavement marking requirements.

Visual markings are recommended for Runway 02/20 and Runway End 32.

LANDING AND NAVIGATIONAL AIDS

RUNWAY AND TAXIWAY LIGHTING:

Runway 14/32 is presently lighted with a low-intensity system. It is recommended that the low-intensity system be replaced with a medium intensity system (MIRL). As such, a medium intensity runway light system is recommended on both the primary and crosswind runways within the twenty year planning period.

Upgrading the existing runway light system could be given a low priority since the present system appears to function well. The MIRL system could be implemented when problems are encountered with the present system or budget constraints are minimized. A MIRL system should be installed on the crosswind runway at time of runway construction.

Runway lights are used to outline the edges of the runway during periods of darkness or low visibility. Each runway edge light fixture emits an aviation white light defining the lateral limits of the runway. The edge light fixture should be located no more than ten feet from the defined runway edge and spaced 200 feet on center. The runway light stake should be no less than 30 inches high due to snow, snow removal and grass cutting. The lights, located on both sides of the runway, should be directly across from each other and perpendicular to the runway centerline. Special requirements exist at runway intersections. Two groups of threshold lights, the second part of a runway light system, are located symmetrically about the runway centerline. The threshold lights emit an 180° aviation red light inward and a 180° green light outward. Threshold lights should be located no closer than two feet and no more than ten feet from the runway threshold. Threshold lights are place in two groups with each group having no less than three light fixtures for a VFR runway and four fixtures for an IFR runway.

Taxiway edge lights are recommended for implementation within the twenty year planning period. Taxiway lights are of a low priority. Reflectors may be used as an interim substitute until the lights can be installed.

VISUAL APPROACH SLOPE INDICATOR, VASI-2:

A 2-box VASI system is recommended for installation on the primary runway, RW 14/32. Justification for installation of a VASI-2 system on the crosswind runway is questionable in terms of operations, but may be justified for noise abatement or obstruction clearance purposes. A VASI system on the primary runway is given a high priority and a low priority on the crosswind runway.

The VASI-2 system should be located on the left side of the runway approach and 50 feet out from the pavement edge. The downwind bar should, ideally, be located 500 feet +/- from the threshold. The upwind bar should be located 700 feet from the downwind bar. The VASI system enables the pilot to determine whether his approach is high, on glide slope or low from the two-color light beam emitted. The State DOT recommends 10,000 annual operations as a level of justification for VASI installation.

RUNWAY END IDENTIFIER LIGHTS, REIL

Runway 14/32 presently has a REIL system. REIL's on Runway End 32 will need to be relocated in conjunction with runway extension. REIL installation, as with the VASI-2, is given a low priority on the crosswind runway. Should development continue to take place along Highway 3, the REIL on the crosswind runway should be given a higher priority.

REIL's assist the pilot with runway identification and are extremely beneficial in areas of intense or confusing light from other than airport sources. The REIL consist lights.

Reference should be made to FAA AC 150/5300 - 2C concerning layout of VASI and REIL systems. It should be noted that REIL systems, when used in conjunction with a VASI system, should be located at the 75 foot out board location; where they are used alone they may be as close as 10 feet from the runway edge.

SEGMENTED CIRCLE, WIND CONES, AND BEACON:

The airport currently has a lighted wind tee. It is recommended that a segmented circle be constructed as well. The airport beacon light is satisfactory. Wind cones are recommended for installation on each runway end and should be lighted. An eight-foot wind cone assembly is adequate to meet the needs of the airport.

The existing wind tee should be located within the proposed segmented circle and so located within sight of both the primary and crosswind runways.

NON-DIRECTIONAL RADIO BEACON:

A non-directional radio beacon, (NDB), system is in operation at the Clarion Municipal Airport. The NDB system allows an aircraft equipped with an automatic direction finder (ADF) to "home" in on the signal. There appears to be no need to consider installation of a TVOR facility or other non-precision instrument equipment.

TERMINAL AREA

APRON AND HANGAR ACCESS:

The existing apron area is functional only from the standpoint of temporary storage and aircraft movements. It does not provide for improved surface tie-down. With the recent construction project, there are approximately 811 SY of improved area. Except for 201 SY of concrete the balance is asphalt.

The apron area in front of the two 50' x 70' conventional hangars is used to move aircraft in and out of these hangars as well as to provide operational space at the gas pumps. The balance of the apron area is used for aircraft movement to and from the shop and tee hangar areas.

There is a definite need for additional apron area at the airport. Itinerant and based aircraft tie-downs should be installed on an improved surface apron. It is recommended that the following number of tie-down spaces be provided:

Table 14

TIE-DOWN NEEDS, 1977 to 1997

Year	Itinerant	Based	Total
1977-1982	7	6	13
1982-1987	0	0	5
1987-1997	4	1	0
Total	11	7	18

Apron area needed to accommodate the tie-downs and future hangar structures is presented in the table below:

Table 15

APRON AND HANGAR ACCESS APRON AREA

YEAR	APRON TIEDOWN AREA	
1977-1982	4,972 S.Y.	
1982-1987	4,938 S.Y.	(Low Priority)
1987-1997	-0-	
Total	9,910 S.Y. Maximum	

HANGARS:

The current hangar space available ranges from 26 to 32 aircraft. Aside from tee hangars, the maximum or ultimate number of aircraft that can be accommodated is subject to aircraft size and staking procedure. Following is a summary of hangar space, (maximum number based upon present aircraft).

Table 16

EXISTING HANGAR CAPACITY

Hangar	No. of Stalls	Dimension
Old Tee Hangar	6	32.2' x 149.2'
New Nested Tee Hangar	10	56.0' x 242.0'
Conventional Hangar - 1	5	50.0' x 50.0'
Conventional Hangar - 2	5	50.0' x 50.0'
Old Shop (FBO)	1	34.0' x 56.7'
New Shop (FBO)	5	60.0' x 80.0'
Total	32	30,084 S.F.

Source: Airport Manager

Should a larger number of aircraft between 8,000 and 12,500 pounds be based at the airport, the number of aircraft which could be hangared would be less. The two shops, with six spaces, are used for maintenance and as such may not be readily available for storage. For planning purposes, it is assumed that the existing maximum desirable readily available aircraft storage is 25.

The demand for hangar stalls is a function of cost/unit/period of time as well as availability. The investment in an aircraft coupled with weather conditions suggests that the demand for hangar stalls or space is high. For planning purposes it is assumed that 80% of the aircraft based at the facility will be in hangars. The balance would be tied down on an improved surface apron. Reference may be made to Table 18 concerning aircraft dimensions. This table can be used to determine future hangar sizing needs.

It is not the intent of the airport development plan to specify a specific hangar type. It is assumed that the bidding process would be used with a number of hangar manufacturers submitting bids.

Table 17

HANGAR CONSTRUCTION SCHEDULE

Year	No. of Stalls	Approximate Size	No. of Structures
1977-1982	0	---	0
1982-1987	6-10	Nested Tee	1
1987-1997	0	---	0

GROUND STORAGE DIMENSIONS OF SELECTED
GENERAL AVIATION AIRCRAFT
(in feet and inches)

Single Engine, High Wing Tailwheel

MAKE	MODEL	(WINGSPAN)	(LENGTH)	(HEIGHT)
Bellanca	7	35-5	22-8	6-8
Cessna	120/140	32-10	21-0	6-3
	170	36-0	25-0	6-7
	180/185	36-2	25-9	7-9
	190	36-2	27-1	7-2
	195	27-4	27-1	7-2
Piper	Pa-12/14/15	35-6	22-6	6-10
	PA-18	35-3	22-5	6-8
	PA-20	29-4	20-5	6-3
Taylorcraft	BC-12	36-0	22-0	6-8

Single Engine, Low Wing Tricycle Gear

MAKE	MODEL	(WINGSPAN)	(LENGTH)	(HEIGHT)
Aerostar	415	30-0	20-7	6-3
	M-20	35-0	23-7	8-4
	M-22	35-0	27-0	9-10
Beechcraft	23	32-9	25-0	8-3
	V-35B	33-6	26-5	6-7
	F-33	32-10	25-6	8-3
Bellanca	260/300	24-2	23-6	7-4
Grumman	AA-1	24-6	19-3	6-10
Piper	PA-24	36-0	24-9	7-5
	PA-28-180	30-0	23-6	7-4
	-200	30-0	24-2	8-0
	PA-32	32-10	27-9	7-11
Rockwell Int'l	122	35-0	27-2	10-1

Single Engine, High Wing Tricycle Gear

MAKE	MODEL	(WINGSPAN)	(LENGTH)	(HEIGHT)
Cessna	150	32-9	23-0	8-8
	172	35-10	26-11	8-10
	177	35-6	27-0	9-1
	182	35-10	28-1	8-11
	206	35-10	28-0	9-8
	207	35-10	21-9	9-7
	210	36-9	28-3	9-8
Piper	PA-22	29-4	20-4	6-3

Twin Engine, High Wing Tricycle Gear

MAKE	MODEL	(WINGSPAN)	(LENGTH)	(HEIGHT)
Cessna	366/377	38-2	29-10	9-4
DeHaviland	DHC-6	65-0	65-0	18-7
Mitsubishi	MU-2	39-2	39-6	13-8
Rockwell Int'l.	500	49-6	35-1	14-6
	560/680/Shrike	49-1	36-7	14-6
Short Bros.	Skyvan	40-1	15-1	14-10

Twin Engine, Low Wing Tricycle Gear

MAKE	MODEL	(WINGSPAN)	(LENGTH)	(HEIGHT)
Aerostar	600/601	34-3	34-10	12-2
Beechcraft	B-55	37-10	27-0	9-7
	E-55	27-10	29-0	9-2
	A-60	39-3	33-10	12-4
	A-65	45-11	35-6	14-3
	B-80	50-3	35-6	14-3

Twin Engine, Low Wing Tricycle Gear

Cont.

MAKE	MODEL	(WINGSPAN)	(LENGTH)	(HEIGHT)
Beechcraft	A-90	50-3	36-6	14-8
	A-100	45-11	39-11	15-4
	99A	45-11	44-7	14-4
Cessna	310	37-6	29-7	9-11
	401/402/421	39-10	33-9	11-10
Grumman	Gulfstream I	78-4	63-9	22-10
Piper	PA-23-160	37-2	27-5	9-6
	-250	37-0	27-7	10-4
	PA-30	36-0	25-2	8-3
	PA-31	40-8	32-8	13-0
Swearingen	Merlin IIB	45-11	40-1	14-4
	Merlin III	46-3	42-2	16-8

Turbo Jet, Turbo Fan Aircraft

MAKE	MODEL	(WINGSPAN)	(LENGTH)	(HEIGHT)
Dassault	Fan Jet			
	Falcon	53-6	56-3	17-5
Cessna	Citation	43-9	44-1	14-4
Learjet	24	35-7	43-3	12-7
	25	35-7	47-7	12-7
	35/36	38-1	48-8	12-4
Grumman	G-II	68-10	79-11	24-6
Hawker Siddeley	HS-125	47-0	47-5	16-6
Lockheed	Jetstar	53-8	60-5	20-6
Rockwell Int'l.	40	44-5	43-9	16-0
	60	44-5	48-4	16-0
	70/75A	44-6	47-2	17-3

Source: FAA AC150/5325-5B
AC150/5325-5B, Chg. 1
Airport Services Management, January, 1976

VEHICLE PARKING:

There is no improved surface designating parking at the facility. This lack of defined vehicle parking contributes to an inefficient use of space. The existing problem appears to be one characterized more by lack of definition than capacity.

The 1976 SASP recommends a minimum of six spaces adjacent to the terminal building in addition to FBO needs and one space per based aircraft. Vehicle parking construction schedule is presented in the table below and incorporates the state's recommended guidelines.

Table 19

VEHICLE PARKING, 1977 - 1997

Year	Terminal/FBO	Hangar Areas
1977-1982	20 (H)	22 spaces (G)
1982-1987	0	0 (G)
1987-1997	0	20 spaces (G)

G: Granular Surface H: Hard surface of asphalt or concrete

It is recommended that curb and gutter be installed within all parking areas. This will establish grade and assist drainage. Surfacing of the parking areas is a low priority item and as such may consist initially of a granular surface. However, it is recommended that the parking lot serving the terminal area be paved in conjunction with the construction of a new airport manager's residence. The remaining parking areas could be hard surfaced as financing would permit.

ACCESS ROAD:

The existing access road consists of granular surfacing. It is recommended that the road be hard surfaced within the twenty-year planning period. This should be accomplished in conjunction with surfacing of the terminal area parking lot and construction of the airport manager's new residence. The access road is defined as the roadway from the county road to the terminal building. The remaining internal service roads may be of granular surfacing.

TERMINAL BUILDING:

The present airport manager's residence should be developed as the new terminal building some time within the twenty year planning period. The structure is so located as to be readily accessible to the gas pumps and itinerant aircraft apron. Parking can also be constructed adjacent to the structure thus providing better pedestrian access to the terminal building than currently exists.

The terminal building should be the focal point of airport activity. Relocation of terminal building functions will contribute to airport identity as well as focality. The existing terminal building, which also functions as the FBO office, could be maintained as an FBO storage area and classroom for student pilots.

The present residence contains approximately 1,000 SF of floor area. The 1976 SASP recommends the following minimum space be made available:

Public waiting and services area	500 SF ±
Pilot briefing area	180 SF
Airport Manager's office	180 SF
Total (General Utility)	860 SF to 1,000 SF

Thus it appears that the existing residential structure will meet terminal area needs over the twenty year planning period. Some modifications would need to be made to the structure.

One terminal building gate position appears sufficient to meet needs and should be so located as to provide direct access to the itinerant apron area.

AIRPORT MANAGER'S RESIDENCE:

A new airport manager's residence is recommended. The floor plan should contain no less than 1,200 SF on the main floor and be approved by the airport manager. The location should be such as to allow the manager to maintain visual contact with the entire terminal area as well as to allow for ease of providing services after hours. Security is a major factor in determining final siting of the proposed structure.

FAR PART 77

Obstruction Standards

Part 77 of Volume XI, Federal Aviation Regulations, sets forth a number of standards to be used in identifying obstructions to air navigation. These standards are of considerable importance in view of the plight of the present airport site. The discussion herein is primarily extracted from Part 77. These standards will be used as a guide in the preparation of a zoning ordinance and the airport layout plan.

Standards for Determining Obstructions

1. A stationary or mobile object is defined as an obstruction to air navigation if it is of a greater height than any one of the following:

   A. A height of 500 feet above the ground at the site.

   B. A height 200 feet above the ground or airport elevation, whichever is higher, within 3 nautical miles of the airport reference point.

   C. The surface of a takeoff or landing area of an airport or any imaginary surface.

   D. Traverse ways on or near an airport to be used for the passage of mobile objects.

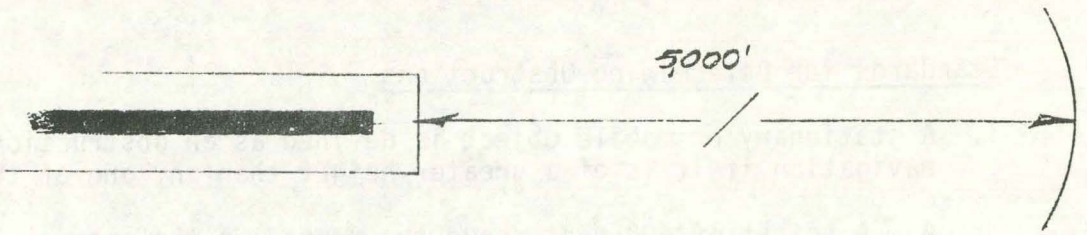
- Interstate Highway	17 feet
- Public Roadway	15 feet
- Private Road	10 feet or height of the highest mobile object
- Railroad	23 feet

Imaginary Surfaces

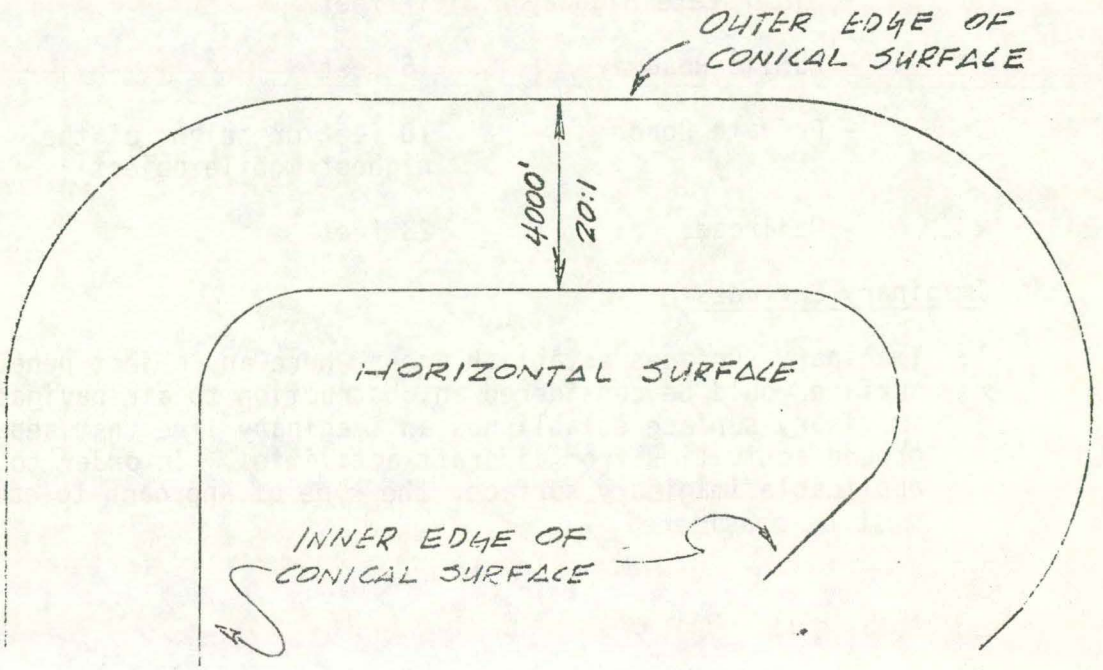
1. Imaginary surfaces establish areas where any object penetrating that surface would be considered an obstruction to air navigation. The imaginary surface establishes an imaginary line that separates ground activities from aircraft activities. In order to select the applicable imaginary surface, the type of approach to each runway must be considered.

A. Horizontal Surface: The horizontal surface is a plane 150 feet above the established airport elevation. It is constructed by swinging arcs of specific radii from the center of each end of the primary surface and by connecting the arcs by lines tangent to those arcs.

- Visual Radius of 5,000 feet
- NPI Radius of 10,000 feet (runway larger than utility)
- NPI Radius of 5,000 feet (utility runway)



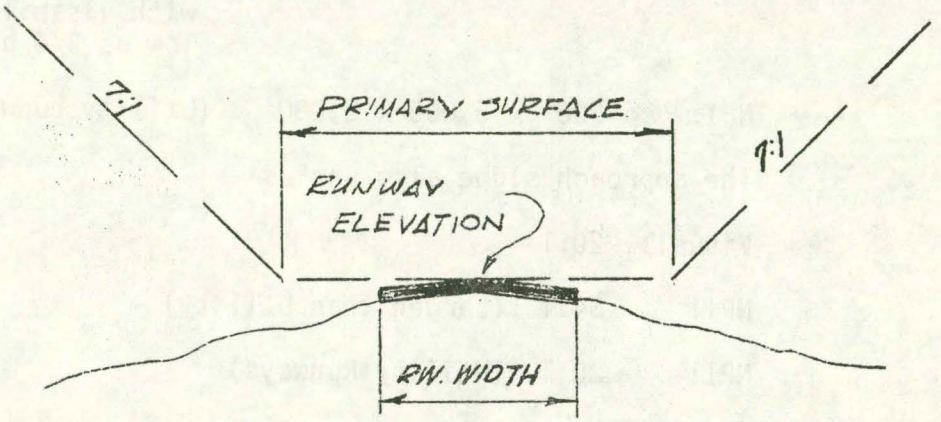
B. Conical Surface: The conical surface extends outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet at the ends and 7:1 laterally.



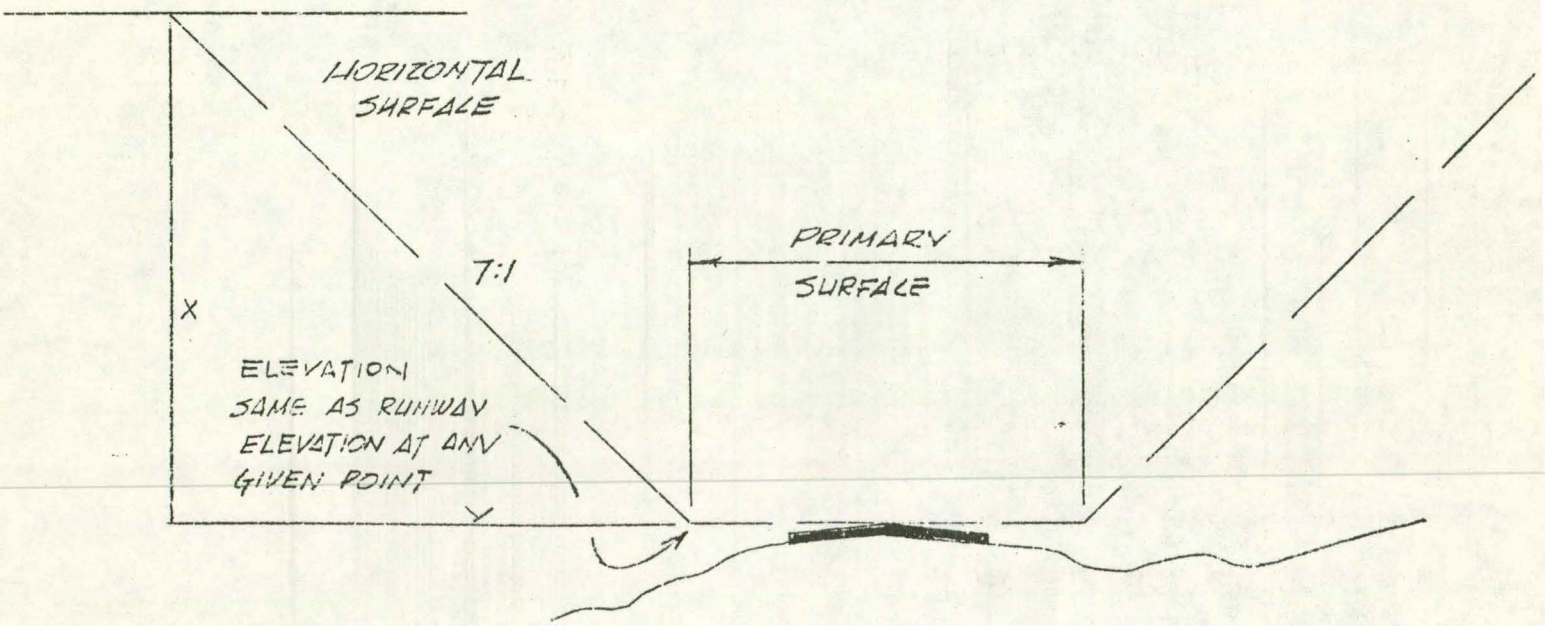
C. Primary Surface: The primary surface is longitudinally centered on the runway and extends 200 feet beyond the runway end in the case of a paved runway. The primary surface end coincides with the runway end in the case of a turf runway. The width of the primary surface varies with the approach.

	Width	End of Runway
- Visual	250'	200'
- NPI	500'	200'

The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.



D. Transitional Surface: The transitional surface extends upward at a slope of 7:1 from the edge of the primary surface and approach surfaces. They extend outward and upward from the runway centerline and runway centerline extended until they intersect with the horizontal surface.



X and Y vary in dimension and are determined by the distance required for an imaginary line at a 7:1 slope, to intersect with the primary surface.

E. Approach Surface: The approach surface is longitudinally centered on the extended runway centerline. The inner edge of the approach surface coincides with primary surface and expands uniformly outward to a width determined by the type of approach:

Visual: 250' x 5,000 x 1,250'

NPI: 500' x 10,000 x 3,500' (Runway larger than utility with visability minimum as low as 3/4 of a mile)

NPI: 500' x 5,000 x 2,000' (Utility runways)

The approach slope also varies

Visual: 20:1

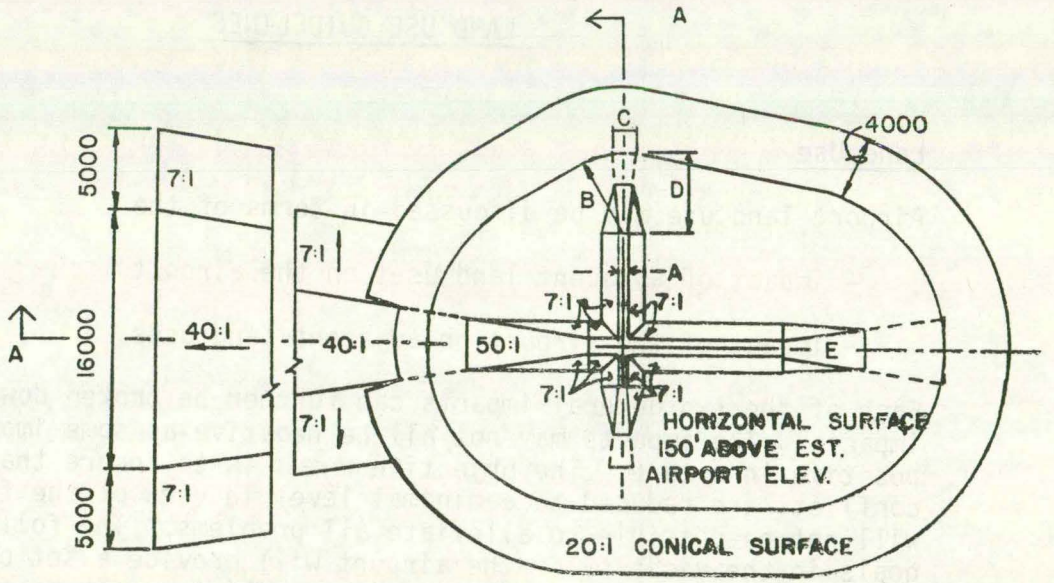
NPI: 34:1 (Larger than Utility)

NPI: 20:1 (Utility Runways)

The clear zone represents that portion of the approach surface on the ground. The inner edge of the approach surface coincides with the primary surface. The clear zone extends outward uniformly to a width determined by a point which is 50 feet above the ground elevation or runway end elevation

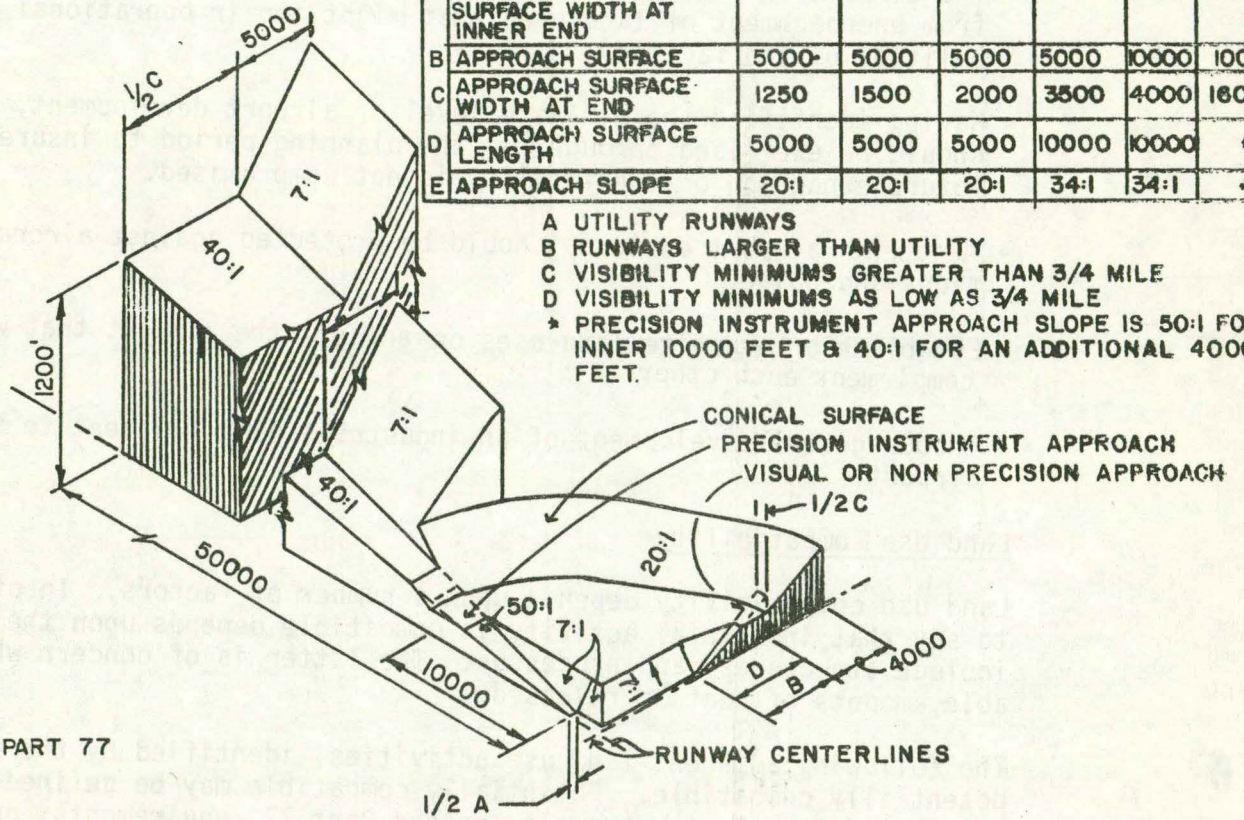
Visual: 250' x 1,000 x 450' Utility Runway

NPI: 500' x 1,000 x 800' Utility Runway



	ITEM	DIMENSIONAL STANDARDS (in feet)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE & APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1000	1000
B	APPROACH SURFACE	5000	5000	5000	5000	10000	10000
C	APPROACH SURFACE WIDTH AT END	1250	1500	2000	3500	4000	16000
D	APPROACH SURFACE LENGTH	5000	5000	5000	10000	10000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A UTILITY RUNWAYS
B RUNWAYS LARGER THAN UTILITY
C VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10000 FEET & 40:1 FOR AN ADDITIONAL 40000 FEET.



Source: FAR PART 77

AIRPORT IMAGINARY SURFACE

FIGURE: 10

LAND USE GUIDELINES

Land Use

Airport land use may be discussed in terms of the

- impact of adjacent land uses on the airport
- impact of the airport on adjacent land uses.

Each of the two general impacts can further be broken down into specific impacts. The impacts may not all be negative as some impacts are quite positive in nature. The objective herein is to insure that the land use conflicts are reduced to a minimal level in view of the fact that it will not be possible to alleviate all problems. The following land use goals in the vicinity of the airport will provide a set of parameters upon which to design specific land use policies. These goals are not static nor is the list all inclusive. Through-out the planning period, goals are expected to change to meet unforeseen demand.

Goals

- The airport and associated imaginary surfaces should be protected from encroachment of land uses that might impair operational capabilities of the facility.
- Having identified the ultimate level of airport development, care should be exercised throughout the planning period to insure that future expansion of the facility is not compromised.
- Adjacent airport environs should be protected against aircraft operations and noise.
- Establish or organize land uses on and off the airport that will complement each other.
- Encourage the development of an industrial park adjacent to the airport.

Land Use Compatibility

Land use compatibility depends upon a number of factors. In other words, to say that industrial activity is compatible depends upon the type to include structures and processes. The latter is of concern where considerable amounts of heat are released.

The following adjacent land use activities, identified by the FAA, are potentially compatible. Potentially compatible may be defined as a land use that does not, for example, exceed Part 77 requirements, or has properly been designed so that noise is not a problem.

- Natural Corridors

Rivers	Canals	Natural Buffer Areas
Lakes	Drainage Basins	Forest Reserves
Streams	Flood Plain Areas	Land Reserves and Vacant Land

- Open Space Areas

Memorial Parks and Pet Cemeteries	Archery Ranges
Water & Sewage Treatment Plants	Golf Driving Ranges
Water Conservation Areas	Go-cart Tracks
Marinas, Tennis Courts	Skating Rinks
Golf Courses	Passive Recreation Areas
Park & Picnic Areas	Reservation/Conservation Areas
Botanical Gardens	Sod and Seed Farming
Bowling Alleys	Tree and Crop Farming
Landscape Nurseries	Truck Farming

- Industrial and Transportation Facilities

Textile & Garment Industries	Foundaries
Fabricated Metal Products Industries	Saw Mills
Brick Processing Industries	Machine Shops
Clay, Glass, Stone Industries	Office Parks
Chemical Industries	Industrial Parks
Tire Processing Companies	Public Buildings
Food Processing Plants	Auto Storage
Paper Printing & Publishing Inds.	Parking Lots, Gas Stations
Public Workshops	Railroad Yards
Research Labs	Warehouse & Storage Buildings
Wholesale Distributors	Freight Terminals
Bus, Taxi & Trucking Terminals	

- Airport and Aviation Oriented Facilities

Airparks	Aerial Survey Labs	Aerospace Industries
Banks	Aircraft Repair Shops	Airfreight Terminals
Hotels	Aircraft Factories	Aviation Research and Testing Labs
Motels	Aviation Schools	
Restaurants	Employee Parking Lots	Aircraft and Aircraft Parts Manufacturers

- Commercial Facilities

Retail Businesses	Professional Services
Shopping Centers	Gas Stations
Parking Garages	Real Estate Firms
Finance & Insurance Companies	Wholesale Firms

The compatibility of each of these land use activities depends upon the proximity of the specific land use to the airport; the level of sound proofing; and the type, height, and location of building structures.

The land uses identified herein as being compatible are not all inclusive nor is the list intended to suggest that such community land uses be located in the vicinity of the airport. Such land uses, when incorporated into the comprehensive growth and management plan, will insure a degree of compatibility within the vicinity of the airport. The land use plan to be prepared will reflect the above discussion.

LAND ACQUISITION

Most airports involved with major runway extension projects also need to acquire additional land. Unfortunately, such land is not always available and the airport owner must resort to condemnation. Because of the importance of land to an airport, it is recommended that short range acquisition needs be made at the earliest possible date. The key concern is acquistion of land to allow for expansion and protection of the airport. Such land, while undeveloped (agriculture), can be acquired at a lower cost than if under urban development pressure.

Control over land in the vicinity of the airport can be obtained in three ways:

- Fee Title
- Eminent Domain (Condemnation)
- Easements

Fee title is the most desirable, while condemnation is the least desirable. Easements may afford the airport owner minimal control and are often used for purposes of meeting clear zone and avigation needs.

In reality, acquisition of property control rights is a negotiatable item. The Airport Development Plan shows minimum recommended acres for acquisition of title or easements. Land requirements are summarized as follows:

RW 32

Fee Title
- Phase One: 1.76 Acres
- Phase Two: 5.54 Acres±

Easement:
- Phase One: 13.0 Acres±
- Phase Two: 7.0 Acres±

RW 14

Fee Title
- No Acquisition

Easement:
- Phase One: 14.0 Acres±

RW 2

Fee Title
- Phase Three: 11.57 Acres±

Easements
- Phase Three: 9.52 Acres±

RW 20

Fee Title
Phase Three: 1.88 Acres±

Easements
Phase Three: 3.29 Acres±
5.53 Acres±

In some cases, it is also desirable to obtain an avigation and hazard easement for that area which coincides with the approach surface. Such an easement would appear desirable off runway ends 2 and 32. A model avigation and hazard easement form is found in Appendix C.

AIRPORT ZONING

The authority to establish zoning for airports found in Chapter 329, Airport Zoning, of the Iowa Code. Zoning powers granted to city and counties (320.3) provides that the airport hazard area may be divided into zones. Within such zones, land uses and the height of structures and trees may be regulated. Airport hazard means any structure or tree or use of land which would exceed the federal obstruction standards as contained in FAR Part 77.

The airport hazard area means any area of land or water upon which an airport hazard might be established. For purposes of this airport development plan, the airport hazard area shall be the area of land and/or water within the imaginary surfaces as established by FAR Part 77. Thus, it deals only with the regulation of the height of structures and not the use of land. Appendix B of "A Guide to Land Use Planning and Zoning in Airport Vicinities" contains a model Tall Structure Zoning Ordinance. This model ordinance was used as the basic text for preparation of the ordinance for Clarion.

The zoning ordinance presented in Appendix B is recommended for adoption. The City of Clarion and Wright County should jointly create an Airport Zoning Commission. This Commission would administer the provisions of the ordinance.

SOCIOECONOMIC/ENVIRONMENTAL FEASIBILITY

SECTION 4

IV. SOCIOECONOMIC/ENVIRONMENTAL FEASIBILITY

AIRPORT DEVELOPMENT ALTERNATIVES

Four airport development alternatives are presented herein. For the most part, the alternatives involve only the crosswind runway alignment. The terminal area, terminal access, and primary runway are fixed. Relocation of the terminal area to the south with access off Highway 3 may be desirable; but is an unrealistic objective in view of the level of investment at the present terminal site.

Each of the alternatives will influence ultimate future off-airport land use patterns. One of the primary objectives of this plan is to provide for an interfacing of three primary modes of transportation: highway, rail, and air. An industrial park is proposed where these modes of transportation interface.

Each of the alternatives will have a different development cost associated with it. One will fit the "lay of the land" better while one will involve a minimal amount of land acquisition. One will provide for better supplemental wind coverage than the other. These among other factors, must be considered when selecting one of the proposed development alternatives.

Alternative One

Alternative One is depicted as having the crosswind runway oriented in a north-south direction intersecting the primary runway at the RW14 end. The crosswind runway, 3,400 feet in length, could be accommodated within existing airport acreage. The clear zones for both ends would extend beyond present airport boundaries. The clear zone for the south end would be entirely outside airport property.

The threshold of the south end would be approximately 1,320 feet north of Highway 3. The threshold of the north end would lie approximately 825 feet south of the county road. Pole lines on the north end would have to be placed underground. Orientation in this direction would find flight patterns passing over a dwelling unit directly off the south runway end. The farmstead directly to the west could also be impacted as could the farmstead north of the terminal area.

Alternative Two

Alternative Two places the crosswind runway orientation at approximately N 15° E, intersecting the primary runway some 2,250 feet from RW End 14. This alignment will, as in Alternative One, provide for construction of a crosswind runway 3,400 feet in length on existing property. The clear zones would extend beyond present airport property. The south approach may be such that existing trees could penetrate the imaginary surface and would require removal. Pole lines off the northeast end would have to be placed underground.

The threshold of the north end would coincide with that of Alternative One. The threshold of the south end would lie approximately 1,400 feet from Highway 3. There appears to be no land use conflicts other than possible impact upon the farmstead directly east and south of the clear zone. The farmstead directly north of the terminal area would not be impacted.

Alternative Three

The third alternative is based upon a crosswind runway orientation of N 20° E. The crosswind runway would intersect the primary runway approximately 2,080 feet from RW End 14. This alternative would require a a minimum land acquisition of 40 acres and up to 80 acreas if to accommodate the clear zone off the south end. The clear zone would extend beyond the airport property on the north end. By moving the runway to the south along the same alignment, the north clear zone could nearly be accommodated within the airport property.

There appears to be no land use conflicts other than the pole lines along the county road to the north. None of the area farmsteads would be potentially impacted as in Alternatives One and Two. The threshold to the south would lie some 1,250 feet from Highway 3. The threshold to the north would lie some 460 feet from the County Road.

Alternative Four

The fourth alternative is based upon a crosswind runway orientation of N 25° E. The crosswind runway would intersect the primary runway approximately 1,950 feet from Runway End 14. This alternative would involve slightly more land than Alternative Three, as well as one additional property owner.

A recommended requirement is to provide a minimum of 60 degrees separation between runway facilities where possible. This alternative is the only one of the four that does. There appears to be no conflict other than pole lines to the north. The farm dwellings on the south are not expected to be impacted by the proposed extension. The threshold to the south would lie approximately 1,300 feet from State Highway 3.

Comparision of Alternatives

The primary runway, RW 14/32, can be extended to the southeast. Land acquisition and associated cost would be held constant. Crosswind construction and drainage costs will vary with each alternative, but not to any significant degree. As such, crosswind construction costs will be held constant. Future development of the terminal area is expected to take place east of existing terminal area. Each of the four alternatives would provide access to the terminal from the north end of the crosswind runway. No significant terminal area cost difference is anticipated with respect to the four alternatives.

As previously stated, the most significant variation within the four alternatives is associated with the following:

1. Land requirements for runways (crosswind)
2. Land requirements for clear zones (crosswind)
3. Potential impact upon existing farm operations and farmsteads
4. Potential usage in conjunction with development of an industrial park and future interfacing with highway and rail
5. Ultimate wind coverage
6. Location of physical features which would likely be an obstruction
7. Future runway extension

ASSESSMENT OF ALTERNATIVE CROSSWIND ALIGNMENTS

	Alternatives			
	One	Two	Three	Four
	N360°	N15°E	N20°E	N25°E
Primary Runway Const. Costs	0	0	0	0
Primary Runway Land Acquisition	0	0	0	0
Clear Zone Acquisition for Primary Runway	0	0	0	0
Crosswind Construction Costs	0	0	0	0
Crosswind Land Acquisition	+	-	-	-
Clear Zone Acquisition for Crosswind Runway	-	0	0	0
Terminal Area Expansion	0	0	0	0
Potential Impact upon Farmsteads (no.)	-(2)	-(3)	0	0
Runway Extension Opportunities	-	-	0	0
Potential for Interfacing of Rail & Highway 3 with Airport	0	0	0	0
Potential for Industrial Park Devlp.	0	0	0	0
Number of Land Owners Involved	-(7)	-(6)	-(7)	-(8)
Wind Coverage	-	0	+	+

	Alternatives			
	One	Two	Three	Four
	N360°	N15°E	N20°E	N25°E
Potential for Compromise of FAR Part 77	-	0	+	+
Impact upon other Land Uses (Non-Agriculture)	-	0	0	0

0 -- No Significant Difference, Not Quantified

(-)-- Some Disadvantages

(+)-- Some Advantages

Decision Point

The four alternatives were presented at a public meeting on January 16, 1978. Based upon input by the consultant, IDOT, the City Council, and public, it appeared that Alternative Three or Four would provide for the best airport development scheme.

SOCIOECONOMIC/ENVIRONMENTAL FEASIBILITY

I. Consistency of the proposed actions in achieving community goals and objectives

II. Community support for airport

- A. Support at public meetings
- B. Past actions by City
- C. Recent growth in numbers of based aircraft
- D. Projected potential aviation activity
- E. Questionnaire

III. Assessment of the proposed actions

- A. An Environmental Impact Assessment Report, EIAR, is not required by the IDOT at the time the ADP is prepared.
- B. Certain critical areas of concern should be examined if identified by local government as having a potentially significant impact.

IV. Potential areas of concern

- A. Noise
  1. CNR, NEF, ASDS, Methodologies
  2. Residential, public meeting places, schools, etc.
- B. Land use
  1. Consistent with comprehensive land use plan
  2. Land acquisition
  3. Avigation easements
  4. Airport zoning ordinance
  5. Secondary induced uses
- C. Vegetation, wildlife, and endangered species
  1. Intensive agriculture (man-dominated)
  2. Similar habitat adjacent to airport
  3. No known endangered species on site
- D. Water quality
  1. River basins, water bodies, wet lands
  2. Site drainage plans; Input from areawide 208
  3. Sedimentation
     - a. Wastes from fueling operations
     - b. Fuel and oil spills
     - c. Chemicals used in snow and ice removal
     - d. Detergents
     - e. Solid waste disposal
     - f. Sanitary wastewater

4. Mitigation measures
   a. Erosion and sediment control (retention ponds)
   b. Grease and oil traps
   c. Solid waste disposal in landfill
   d. On-site sanitary wastewater system (septic tank)
   e. Use of petroleum-absorbent materials

5. Short/Long-term

E. Water hydrology
1. Storm water management plan (retention)
2. Short/Long-term

F. Flood plain

G. Wetlands

H. Air quality
1. Increase in aircraft emissions
2. Ciirdination/Long-term

I. Direct socioeconomic impacts
1. No relocation of residential or business units

2. Economic Impact
   a. Direct (employment)
   b. F.B.O./Air Taxi (taxes)
   c. Consistent with economic diversification

3. Utilities
   a. On-site
   b. Induced impact upon community facilities

4. Access Surface
   a. No surface improvements required

J. Induced secondary impacts

1. Spin-off jobs and service expansion
2. Increased employment
3. Increased tax base
4. Airport industrial park concept
5. Impact upon community utilities

K. Section 4(F) lands

L. Historical & Archaeological sites

M. Light emissions

N. Prime and unique farm lands
1. Alternative runway alignments
2. Removal of land from production
3. Compatibility of agriculture with airport

From the areas of environmental concern outlined on the preceding two pages, there appear to be no significant detrimental impacts involved in the proposed actions. This is not to say that there will be no detrimental impact as there will be an increase in aircraft operations that will alter existing levels of noise and emissions. Land will also be removed from production because of the primary runway extension and construction of a crosswind runway.

The land on and adjacent to the airport is under intensive cultivation. Consequently there is no natural habitat existing. There are no bodies of water or rivers on or adjacent to the site. Sedimentation will be controlled through construction procedures on the on-site drainage structures.

The proposed actions will not displace any persons or businesses. Secondarily induced impacts are expected to be positive in scope by contributing to the tax base and bringing money into the community. The airport is one of the community facilities which will be a factor in the community's effort to attract industry.

Attendance at the public meetings suggests that there is wide spread community support for the airport. Past actions by the City Council of Clarion further demonstrate this level of community support. The proposed actions are also compatible with the Comprehensive Community Development Plan.

While this section does not constitute an environmental assessment report, it does suggest that an awareness of environmental concerns has been considered to a limited degree. Feasibility of the proposed actions rests with the ability of the community to implement such actions. The development schedule and financial plan, presented in the following sections, are structured so as to allow the community to implement the plan over a twenty-year period.

Should the community apply for federal assistance from the Federal Aviation Administration, the request for such assistance must comply with environmental requirements set forth by that agency. Reference may be made to FAA Order 5050-2B concerning proposed actions which require an environmental assessment.

AIRPORT SITE PLANS

SECTION 5

V AIRPORT SITE PLANS

AIRPORT SITE PLANS

Based upon the analysis of facility requirements in the previous section, improvements and additions to the various elements of the Clarion Municipal Airport are recommended in this section and depicted graphically in the airport plans as follows:

AIRPORT LAYOUT PLAN, ALP: (Sheet 1) Figure 11

The ALP depicts existing and proposed airport facility components. The major proposed actions relate to extension of the primary runway and construction of a crosswind runway. Expansion of the terminal area is also a major action and is depicted graphically at a larger scale.

AIRPORT LAYOUT PLANT DATA SHEET: (Sheet 2) Figure 12

The ALP Data Sheet depicts the location of the airport with respect to area communities and airports. Relevant airport data and runway data are also summarized together with wind rose data on this sheet. All general notes regarding the ALP should be placed on this sheet.

FAR PART 77: (Sheet 3) Figure 13

The imaginary surfaces criteria shown on this sheet is based upon FAR Part 77. This sheet also serves as the airport zoning map and should be made a part of the tall structures ordinance. The imaginary surfaces are normally drawn on a 7 1/2 minute U.S.G.S Quad. However, this mapping is not available.

CLEAR ZONE PLAN AND PROFILE SHEETS: (Sheets 4 and 5) Figures 14 & 15

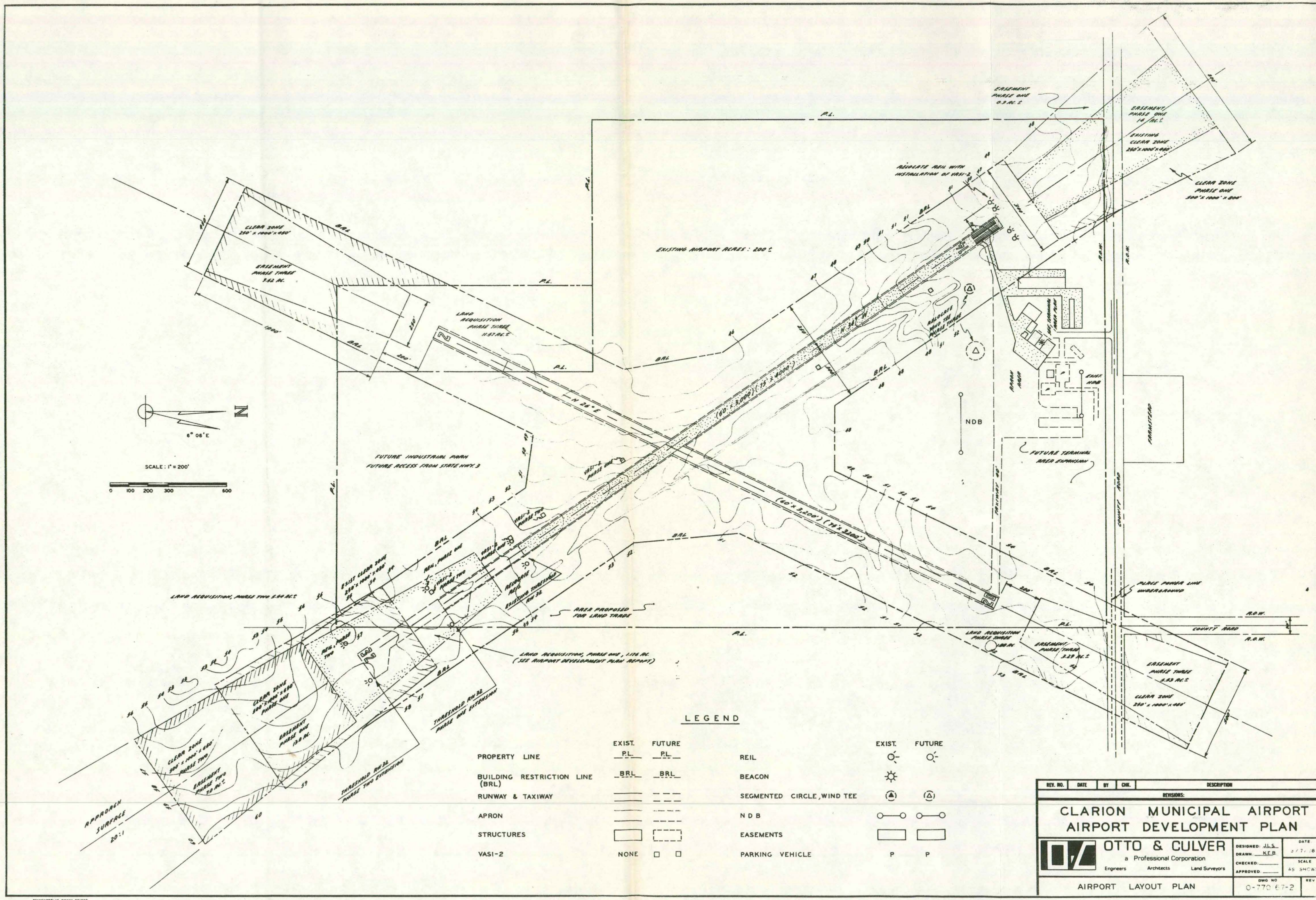
The clear zone plan and profile for each runway end is depicted on sheets 4 and 5 of the airport site plan package.

TERMINAL AREA PLAN: (Sheet 6) Figure 16

The terminal area plan depicts at a larger scale anticipated improvements and additions to the present apron and hangar complex.

It should be noted that the facility requirements depicted are based upon the twenty-year forecast of aviation demands. For example, unless there are 500 or more annual itinerant operations by aircraft with a gross weight in excess of 8,000 pounds, the proposed extension to RW 14/32 in Phase Two would not be justified.

Extension of RW 14/32 by 500 feet, shown on the ALP as a Phase One improvement is currently being implemented. It is expected that the airport will develop in this manner over the twenty year planning period.



LEGEND

	EXIST.	FUTURE		EXIST.	FUTURE
PROPERTY LINE	P.L.	P.L.	REIL		
BUILDING RESTRICTION LINE (BRL)	BRL	BRL	BEACON		
RUNWAY & TAXIWAY			SEGMENTED CIRCLE, WIND TEE		
APRON			N D B		
STRUCTURES			EASEMENTS		
VASI-2	NONE		PARKING VEHICLE	P	P

REV. NO.	DATE	BY	CHK.	DESCRIPTION

REVISIONS:

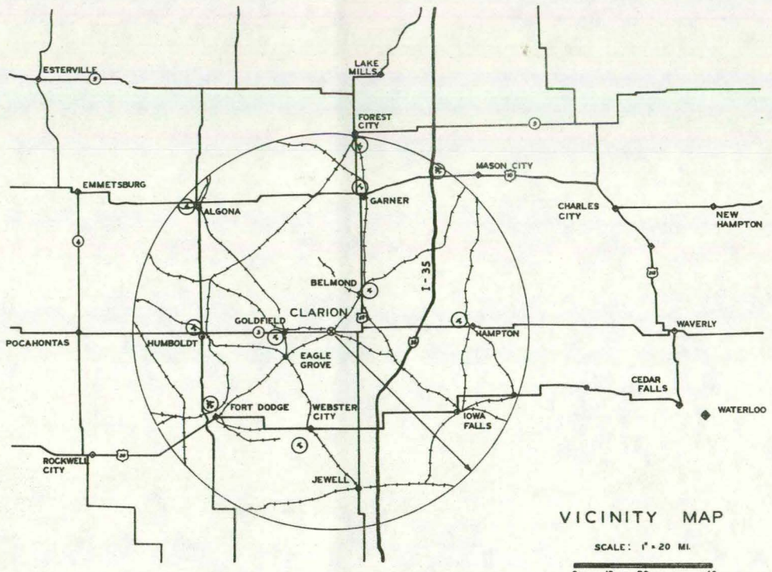
CLARION MUNICIPAL AIRPORT
AIRPORT DEVELOPMENT PLAN

OTTO & CULVER
a Professional Corporation
Engineers Architects Land Surveyors

DESIGNED: JLS
DRAWN: KFB
CHECKED:
APPROVED:
DATE 3/7/78
SCALE AS SHOWN

AIRPORT LAYOUT PLAN

DWG NO 0-770 67-2
REV NO

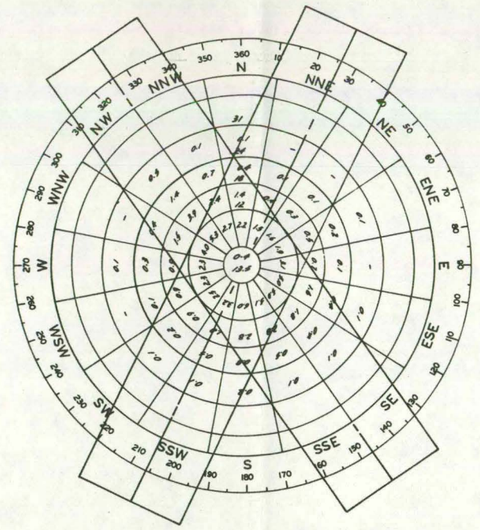


VICINITY MAP

SCALE: 1" = 20 MI.

0 10 20 40

CALMS : 13.5 % 0-4 M.P.H.
CEILING AND VISIBILITY GROUP : GREATER THAN 1000 FT. AND / OR 3 MILES, 96.2 %
LESS THAN 1000 FT. AND/ OR 3 MILES, 3.8 %
WIND COVERAGE : 12 M.P.H.
RUNWAY 14/32 : 91.3 %
RUNWAY 2/20 : 82.4 %
COMBINED 97.7 %



WIND ROSE

SOURCE: 1972 SASP / WATERLOO, IOWA
1948-1950, 1963-1964

RUNWAY DATA	RUNWAY 14/32		RUNWAY 9/27		RUNWAY 08/26	
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
EFFECTIVE RUNWAY GRADIENT	.23 %	.13		.21	.21 %	
% WIND COVERAGE	91.3 %	SAME		82.4%	N/A	
INSTRUMENT RUNWAY	N. P. I.	N. P. I.		NO	NO	
APPROACH SURFACE	RW 14 21:1, RW 32 36:1	20:1		20:1	RW 08 50:1, RW 26 50:1	
RUNWAY LENGTH	3000 FT.	4000		3,200 4,000	1800 FT.	
RUNWAY WIDTH	60 FT.	75 FT.		60 FT.	200 FT.	
RUNWAY STRENGTH	17000 LBS. S.W.	17000 LBS. S.W.		12500	N/A	
RUNWAY SAFETY AREA	120	120		120	N/A	
RUNWAY LIGHTING	LIRL	MIRL		MIRL	NONE	
NAVIGATIONAL AIDS	REIL	VASI-2 REIL		REIL	NONE	
RUNWAY MARKING	VISUAL	N.P.I.		VISUAL	N/A	
RUNWAY END ELEVATION IN FEET ASL	RW 14 1151.7, RW 32 1153.9	RW 32 1152		RW 2 1154 RW 20 1147	N/A	
RUNWAY SURFACE	ASPHALT	ASPHALT		ASPH	TURF	

TO BE CONSTRUCTED

TO BE ABANDONED

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION	1153.9' E	1157' E
AIRPORT LOCATION POINT	LONG	93° 45' 30" W
ALP COORDINATES	LATITUDE	42° 44' 30" N
MEAN MAX. TEMPERATURE NORMAL	86° F.	SAME
% WIND COVERAGE	91.3 %	97.7 %
AIRPORT NAVIGATIONAL AIDS	REIL, N.D.B.	VASI-2, REIL, N.D.B.
AIRPORT ACREAGE	200±	220±
FBO FACILITIES	YES	YES
FUEL	F-12, F-18	SAME
BEACON	YES	YES
SEGMENTED CIRCLE	NO	YES
LIGHTED WIND TEE	YES	YES
EASEMENTS	NONE	YES

CLARION MUNICIPAL AIRPORT
AIRPORT DEVELOPMENT PLAN

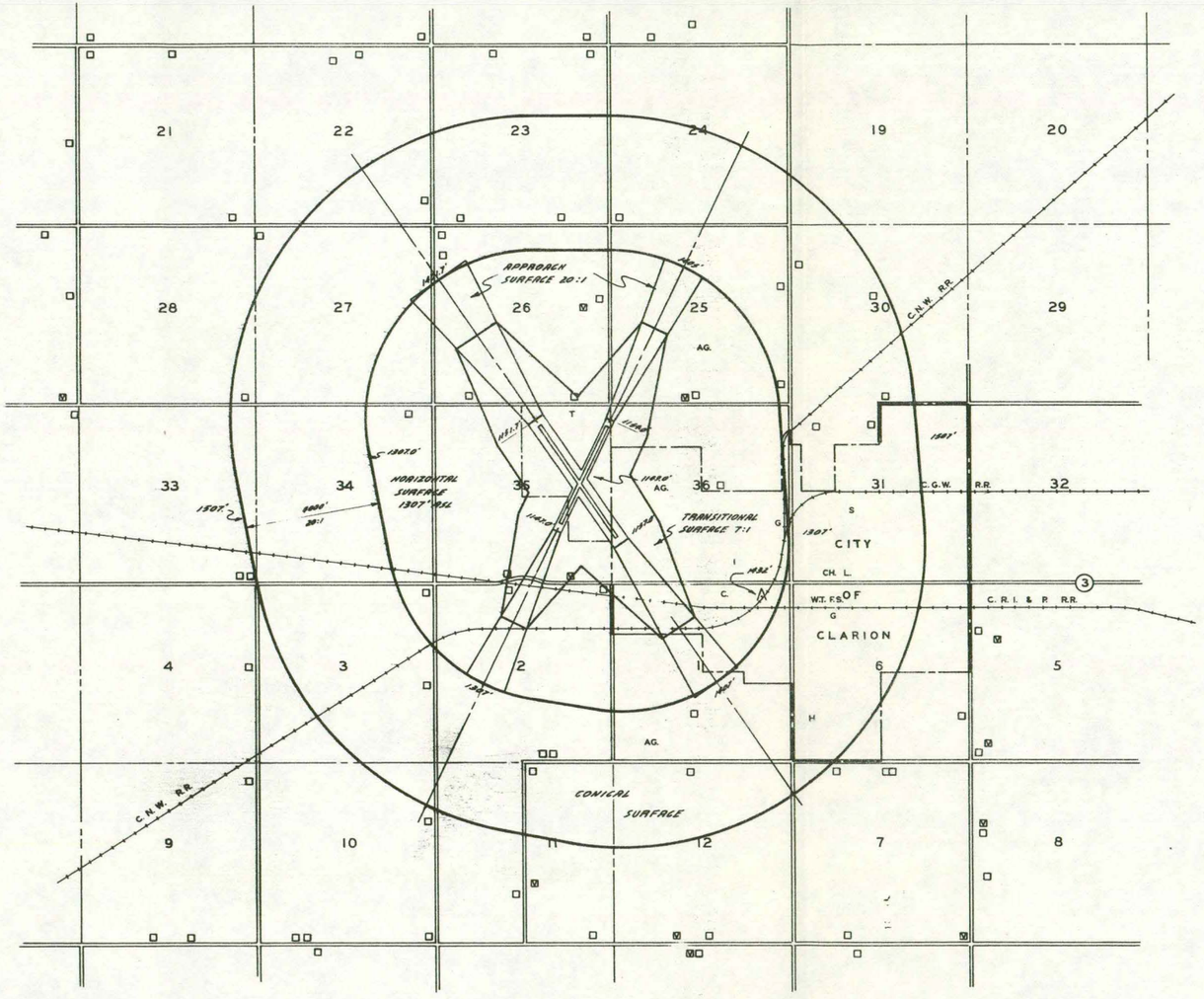
OTTO & CULVER

J.L.S.
K.E.B. 3/1/78

AS SHOWN

ALP DATA SHEET

0-770167-3



NORTH

SCALE: 1" = 2000

0 2000 4000

LEGEND

H	=	HOSPITAL
CH	=	COURT HOUSE
L	=	LIBRARY
S	=	SCHOOL
A	=	TOWER
G	=	GRAIN ELEVATOR
W.T.	=	WATER TOWER
F.S.	=	FIRE STATION
T	=	AIR TERMINAL AREA
□	=	FARMSTEAD
□	=	VACANT
AG	=	AGRICULTURAL

ESTABLISHED AIRPORT ELEVATION 1157.0' ASL.

REV NO.	DATE	BY	CHK.	DESCRIPTION
				REVISIONS:

CLARION MUNICIPAL AIRPORT
AIRPORT DEVELOPMENT PLAN

OTTO & CULVER
a Professional Corporation
Engineers Architects Land Surveyors

DESIGNED J.L.S.
DRAWN K.E.B.
CHECKED
APPROVED

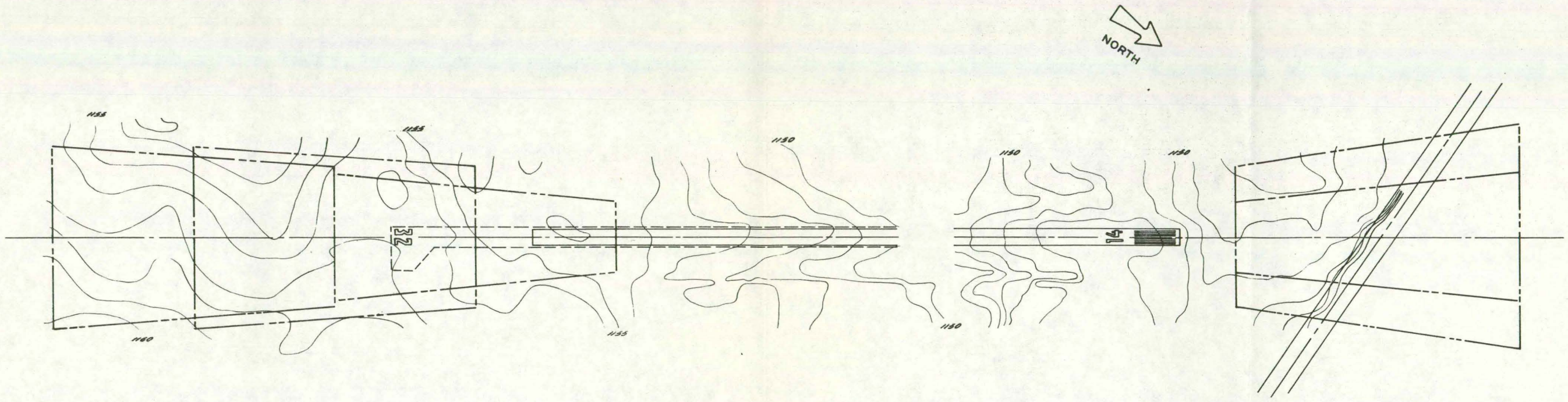
DATE 3/7/78

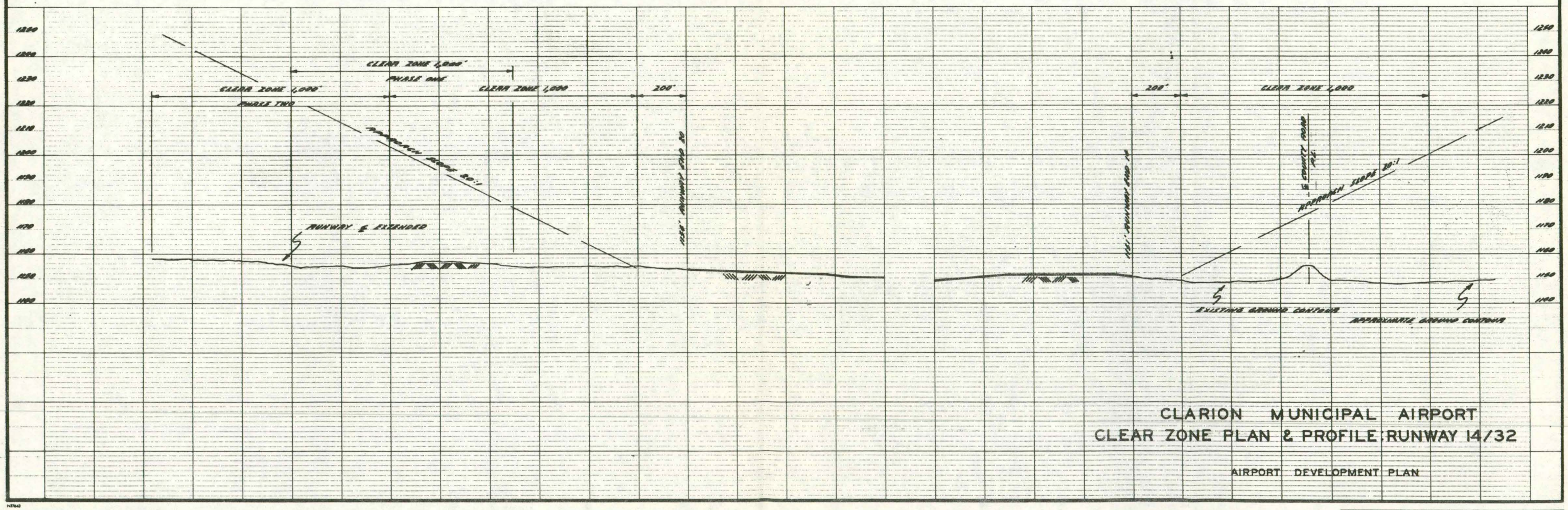
SCALE AS SHOWN

FAR PART 77

DWG NO 0-770167-4

REV NO





CLARION MUNICIPAL AIRPORT
CLEAR ZONE PLAN & PROFILE: RUNWAY 14/32

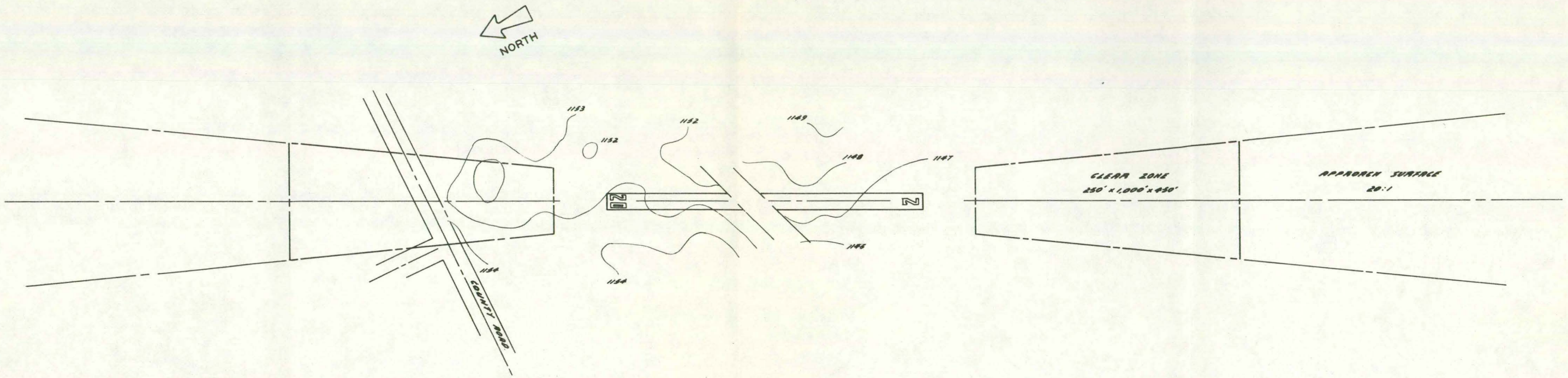
AIRPORT DEVELOPMENT PLAN

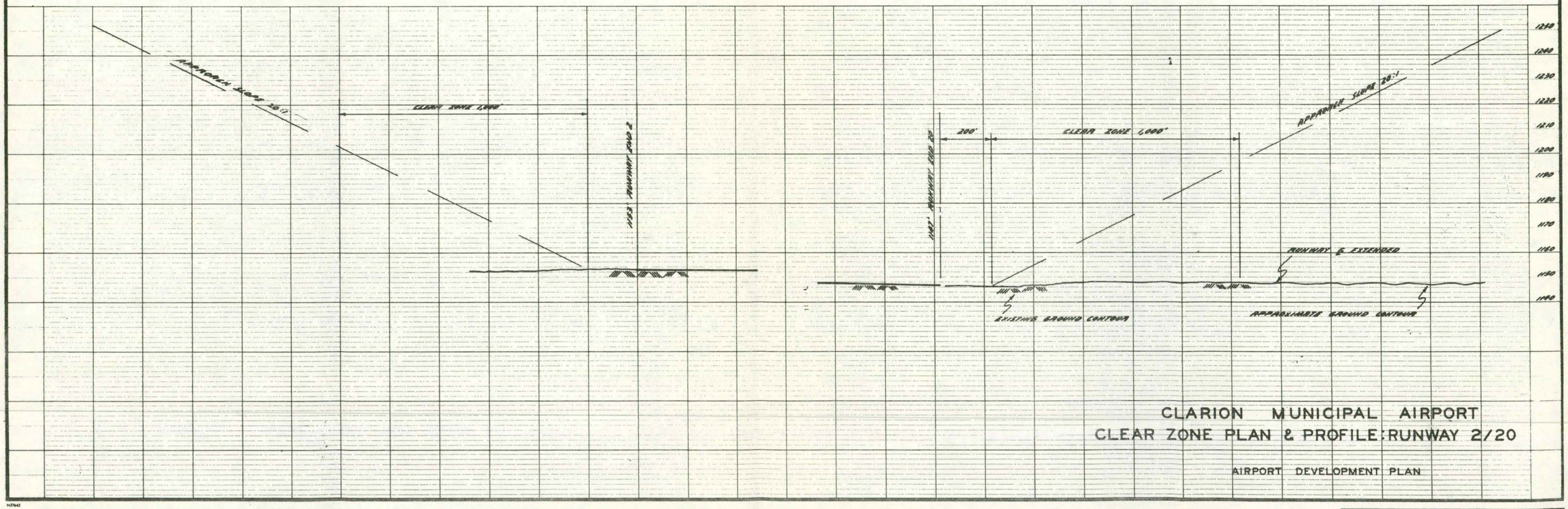
N7642

OTTO & CULVER, a Professional Corporation — Engineers, Architects, Land Surveyors

DWG. NO. 0-770167-5

REV





CLARION MUNICIPAL AIRPORT
CLEAR ZONE PLAN & PROFILE: RUNWAY 2/20

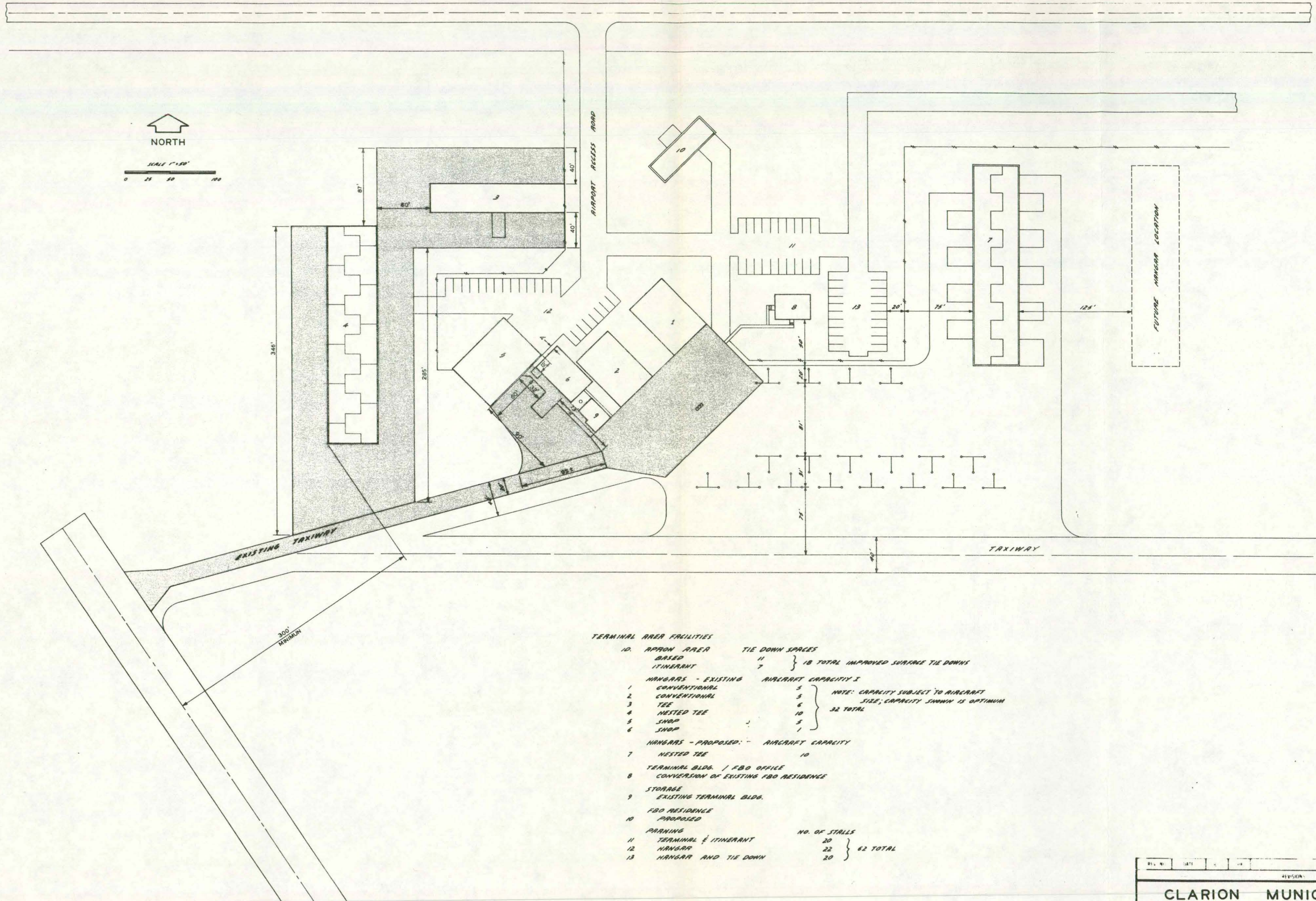
AIRPORT DEVELOPMENT PLAN

N37643

OTTO & CULVER — A Professional Corporation — Engineers Architects Land Surveyors

DWG. NO. 0-770167-6

REV



TERMINAL AREA FACILITIES

10.	APRON AREA	TIE DOWN SPACES		
	BASED	11	18 TOTAL IMPROVED SURFACE TIE DOWNS	
	ITINERANT	7		
	HANGARS - EXISTING	AIRCRAFT CAPACITY I		
1	CONVENTIONAL	5	32 TOTAL	NOTE: CAPACITY SUBJECT TO AIRCRAFT SIZE; CAPACITY SHOWN IS OPTIMUM
2	CONVENTIONAL	5		
3	TEE	6		
4	NESTED TEE	10		
5	SHOP	5		
6	SHOP	1		
	HANGARS - PROPOSED:	AIRCRAFT CAPACITY		
7	NESTED TEE	10		
	TERMINAL BLDG. / FBO OFFICE			
8	CONVERSION OF EXISTING FBO RESIDENCE			
	STORAGE			
9	EXISTING TERMINAL BLDG.			
	FBO RESIDENCE			
10	PROPOSED			
	PARKING	NO. OF STALLS		
11	TERMINAL & ITINERANT	20	62 TOTAL	
12	HANGAR	22		
13	HANGAR AND TIE DOWN	20		

REVISIONS

CLARION MUNICIPAL AIRPORT
AIRPORT DEVELOPMENT PLAN

OTTO & CULVER

J.L.S.
K.E.B.
3/1/78
AS SHOWN

TERMINAL AREA PLAN

0-770167-7

FINANCIAL PLAN

SECTION 6

VI FINANCIAL PLAN

PROPOSED DEVELOPMENT SCHEDULE

The airport facility improvements, identified in Section III are ultimate actions anticipated because of existing levels of development and future estimated levels of aviation activity over a twenty-year period. It is conceivable that some of the items may never be implemented, while others may be implemented earlier than anticipated. The airport development schedule is based upon five-year, ten-year and twenty-year programs by planning period.

PLANNING PERIOD

Phase I
Phase II
Phase III

The City should revise, on an annual basis, the proposed development schedule which follows. This continual update is salient because of changing aviation demands and availability of state and federal development assistance.

I. PHASE ONE: 1977-1982

A. Land Acquisition

1. RW 32

a. Fee Title: 1.176 Acres
b. Easement -Clear Zone: 13.0 Acres

2. RW 14

a. Easement - Clear Zone: 14.0 Acres±

B. Runway Construction

1. RW 14/32, RW End 32

a. 60' x 500', 3,333.3 s.y.

2. Turnaround, RW End 32

a. 1,200.0 s.y. (Low priority or eliminate)

C. Runway Lighting

1. RW 14/32

a. Medium Intensity System, MIRL, 500 l.f.

D. Runway End Identifier Lights, REIL

1. RW End 32

a. Relocate with extension and place 75' from pavement edge.

2. RW End 14

a. Relocate 75' from pavement edge.

E. Visual Approach Slope Indicator, VASI - 2

1. RW 14/32

a. Install both ends

F. Segmented Circle

1. Construct and relocate lighted wind tee

G. Apron

1. Extend apron

a. 4,972 s.y.

2. Install tie-downs

a. 13 spaces (39 anchors)

H. Taxiway

1. Increase width of existing stub taxiway

a. 20' x 550'±, 644 s.y.

I. Vehicle Parking

1. 22 total spaces

   a. Granular surface, 2,795 s.y.

J. Pavement Markings

1. RW 14/32

   a. N.P.I. RW End 14
   b. Visual RW End 32
   c. Centerline 500 L.F.

2. Taxiway

   a. Centerline 550 L.F.

II. PHASE TWO: 1983-1987

A. Runway Construction

1. RW 14/32, RW End 32

a. 75' x 500', 4,166.6 s.y.

2. Turnaround, RW End 32

a. 1,200 s.y.

3. Increase Runway 14/32 width: 60' to 75'

a. 15' x 3,500, 5,833.3 s.y. (Low priority or eliminate)

B. Hangar

1. 10 unit nested tee hangar

a. 225' x 52', 11,700 s.f.

C. Apron

1. Extend Apron

a. 4,938 s.y.

2. Install Tie-downs

a. 5 spaces: 15 anchors

D. Land Acquisition

1. RW 32

a. Fee Title 5.54 acres±
b. Easement 7.0 acres±

E. Runway End Identifier Lights, REIL

1. RW 32

a. Relocate

F. Visual Approach Slope Indicator, VASI-2

1. RW 32

a. Relocate

G. Runway Lighting

1. RW 32

a. Extend MIRL light system - 500 l.f.

H. Pavement Marking

1. RW End 32

a. Visual

III. PHASE THREE: 1988-1997

A. Land Acquisition

1. RW 2

a. Fee Title: 11.6 Acres±
b. Easement: 9.5 Acres±

2. RW 20

a. Fee Title: 1.9 Acres±
b. Easement 8.8 Acres±

B. Runway Construction

1. RW 2/20

a. 60' x 3,200', 21,333.3 s.y.

2. Turnaround, RW End 2

a. 1,200.0 s.y. (Low priority)

C. Runway Lighting

1. RW 2/20

a. Medium Intensity System, MIRL, 3,200 l.f.

D. Rehabilitate or replace existing wood conventional hangars

1. Two structures

E. Airport Managers Residence

1. Construct new residence

a. 1,375 s.f. ±

F. Rehabilitate existing managers residence for Terminal Building

1. Rehabilitation

a. 1,120 s.f.

G. Vehicle Parking

1. Terminal Building 20 spaces

a. Asphalt pavement: 640 s.y.

2. Hangar - Apron, 20 spaces

a. Granular surface: 640 s.y.

H. Access Road & Internal Circulation

1. Vehicle Circulation Asphalt

a. 610 l.f. of asphalt pavement
610' x 20' - 1,355 s.y.

2. Vehicle Circulation - granular

a. 60 l.f.
60' x 20' - 133 s.y.

I. Security Fence (Low priority)

1. 4' Chain-link fence

   a. 470 l.f.

2. Gate

   a. 2 gate positions
   b. 1 personnel gate

J. Pavement Marking

DEVELOPMENT SCHEDULE COST ESTIMATES

The proposed development schedule cost estimates are presented in the following table. It should be noted that only the 1978 dollar cost is presented. Also, the proposed development items are presented by two five-year periods and one ten-year period. Thus, within the respective period, the actual cost will vary according to future levels of inflation.

Some flexibility is maintained throughout the twenty-year period. The order does not suggest a priority of items, but only those facilities anticipated as needed to meet aviation demands within that particular phase. This flexibility allows the city to extablish a short-range program, one to five years, based upon immediate opportunities and constraints. For example, an opportunity and constraint may be the availability of, or lack of, state and federal assistance. It may also be an unforeseen demand for hangar space. It could also be a city wide financial constraint that prohibits expansion of or improvements to any one given facility. Thus, the airport development plan is a tool for future decision making. The table provides the following information: Item, unit of measurement; unit cost; quantity; 1978 dollar cost; legal, administrative, engineering costs; and total cost.

TABLE 20
COST ESTIMATES

PHASE: One: 1977-1982

ITEM	UNIT	UNIT COST	QUANTITY	1978 DOLLAR COST	LEGAL. ADMIN. CONT.	TOTAL COST
A. Land Acquisition						
1. RW 32						
a. Fee Title	Acre	$ 3,500	1.176	$ 4,116		
b. Easement	Acre	425	13.0	5,525	$ 1,928	$ 11,569
2. RW 14						
a. Easement	Acre	425	14.0	5,950	1,190	7,140
B. Runway Construction						
1. RW End 32						
a. 60 x 500', 3,333sy						
1) Clearing and Grubbing	Acre		0	---	---	---
2) Grading	C.Y.	2.00	925	1,350	307.80	2,161.80
3) Subgrade Prep.	S.Y.	1.00	3,333	3,333	666.66	3,999.66
4) Base Course Type B	Ton	17.50	740	12,950	2,590	15,540
5) Drainage						
a) Pipe	L.F.	5.50	1,000	5,500	1,100	6,600
b) Rock	Ton	8.00	300	2,400	480	2,880

TABLE 20 -- Continued

PHASE: One Continued

ITEM	UNIT	UNIT COST	QUANTITY	1978 DOLLAR COST	LEGAL. ADMIN. CONT.	TOTAL COST
C. Runway Lighting						
1. RW End 32						
a. MIRL	L.F.	8.60	500	4,300	850	5,150
D. Runway End Identifier Lights						
1. Relocate RW End 32	L.S.	1,000	1	1,000	200	1,200
2. Relocate RW End 14	L.S.	1,000	1	1,000	200	1,200
E. Visual Approach Slope Indicator						
1. RW 14/32						
a. Each End	L.S.	13,500	2	27,000	5,400	32,400
F. Segmented Circle	L.S.	2,200	1	2,200	440	2,640
1. Lighted Wind Cone, 8'	L.S.	3,200	1	3,200	640	3,840
G. Apron						
1. Expansion						
a. 4,972 s.y.						
1) Grading	C.Y.	2.00	1,300	2,600	520	3,120
2) Subgrade	S.Y.	1.00	4,972	4,972	994	5,966
3) Base Course Type B	Ton	17.50	1,105	19,338	3,868	23,206
4) Surface Course Type A	Ton	25.00	552	13,800	2,760	16,560
5) Tie-down Anchors	EA.	12	39	468	94	562

TABLE 20 Continued

PHASE: One Continued

ITEM	UNIT	UNIT COST	QUANTITY	1978 DOLLAR COST	LEGAL. ADMIN. CONT.	TOTAL COST
H. Taxiway						
1. Increase Width						
a. 20' x 550' 1,222sy						
1) Grading	C.Y.	2.00	500	1,000	200	1,200
2) Subgrade Prep	S.Y.	1.00	1,222	1,222	244	1,466
3) Base Course Type B	Ton	17.50	271	4,742.50	948	5,690.50
4) Surface Course Type A	Ton	25.00	136	3,400	675	4,075
I. Vehicle Parking						
1. 22 total spaces						
a. Granular surface 2,795						
1. Grading	C.Y.	2.00	922	1,844	369	2,213
2. 3 inch surface course	S.Y.	1.00	2,795	2,795	559	3,354
J. Pavement Markings						
1. RW 14/32						
a. N.P.I.	L.S.	4,250	L.S.	4,250	850	5,100
b. Visual	L.S.	1,500	L.S.	1,500	300	1,800

TABLE 20 Continued

PHASE: Two, 1983-1987

ITEM	UNIT	UNIT COST	QUANTITY	1978 DOLLAR COST	LEGAL. ADMIN. CONT.	TOTAL COST
A. Runway Construction						
1. RW End 32						
a. 60' x 500' 3,333sy						
1) Grading	C.Y.	2.00	1,000	2,000	400	2,400
2) Subgrade Prep	S.Y.	1.00	3,333	3,333	667	4,000
3) Base Course Type B	Ton	17.50	740	12,950	2,590	15,540
4) Surface Course Type A	Ton	25.00	370	9,250	1,850	11,100
5) Drainage						
a) Pipe	L.F.	5.50	1,000	5,500	1,100	6,600
b) Rock	Ton	8.00	300	2,400	480	2,880
b. Turnaround						
1) 1,200 s.y.	L.S	11,000	1	11,000	2,200	13,200
B. Hangar						
1. 10 unit nested tee	L.S.	70,000	1	70,000	14,000	84,000
C. Apron/Taxiway						
1. Expansion						
a. 4,938 s.y.						
1) Grading	C.Y.	2.00	1,300	2,600	520	3,120
2) Subgrade Prep.	S.Y.	1.00	4,938	4,938	988	5,926
3) Base Course Type B	Ton	17.50	1,098	19,215	3,843	23,058
4) Surface Course Type A	Ton	25.00	549	13,725	1,922	15,647
5) Tie-downs	Ea.	12.00	15	180	36	216

TABLE 20 Continued

PHASE: Two Continued

ITEM	UNIT	UNIT COST	QUANTITY	1978 DOLLAR COST	LEGAL. ADMIN. CONT.	TOTAL COST
D. Land Acquisition						
1. RW 32						
a. Fee Title	Acre	3,500	5.5	19,250	3,850	23,100
b. Easement	Acre	500	7.0	3,500	700	4,200
E. Runway End Identifier Lights						
1. RW 32						
a. Relocate	L.S.	1,000	1	1,000	200	1,200
F. Visual Approach Slope Indicator						
1. RW 32						
a. Relocate RW End 32	L.S.	1,000	1	1,000	200	1,200
G. Runway Lighting						
1. RW End 32						
a. 500 L.F.	L.F.	8.60	500	4,300	850	5,150
H. Pavement Markings						
1. RW End 32						
a. Visual	L.S.	1,500	1	1,500	300	1,800

TABLE 20 Continued

PHASE: Three, 1988-1997

ITEM	UNIT	UNIT COST	QUANTITY	1978 DOLLAR COST	LEGAL. ADMIN. CONT.	TOTAL COST
A. Land Acquisition						
1. RW 2						
a. Fee Title	Acre	3,500	11.6	40,600	8,120	48,720
b. Easement	Acre	500	9.5	4,750	950	5,700
2. RW 20						
a. Fee Title	Acre	3,500	1.9	6,650	1,330	7,980
b. Easement	Acre	500	8.8	4,400	880	5,280
B. Runway Construction						
1. RW 2/20						
a. 60 x 3,200 21,333sy						
1) Grading	C.Y.	2.00	6,400	12,800	2,560	15,360
2) Subgrade Prep.	S.Y.	1.00	21,333	21,333	4,267	25,600
3) Base Course Type B	Ton	17.50	4,740	82,950	16,590	99,540
4) Surface Course Type A	Ton	25.00	2,370	59,250	11,850	71,100
5) Drainage	L.S.	52,000	1	52,000	10,400	62,400
2. Turnaround						
a. 1,200	L.S.	11,000	1	11,000	2,200	13,200
C. Runway Lighting						
1. RW 2/20						
a. MIRL	L.F.	8.60	3,200	27,520	5,504	33,024

TABLE 20 Continued

PHASE: Three Continued

ITEM	UNIT	UNIT COST	QUANTITY	1978 DOLLAR COST	LEGAL. ADMIN. CONT.	TOTAL COST
D. Rehab. Exist. Conv. Hangar						
1. Two Structures	L.S.	N/A	---	---	---	---
E. Airport Managers Residence						
1. Construct New Residence						
a. 1,375 S.F.	S.F.	30	1,375	41,250	8,250	49,500
F. Rehab. Exist. Res. for Terminal						
1. Rehab.						
a. 1,120 S.F.	L.S.	5,000	1	5,000	1,000	6,000
G. Vehicle Parking						
1. Terminal Building						
a. Asphalt, 640 S.Y.						
1) Grading, Subgrade	C.Y.	2.00	23	46	9.2	55
2) Base Course	Ton	17.50	142	2,485	497	2,982
3) Surface Course	Ton	25.00	71	1,755	355	
4) Curb & Gutter	L.F.	6.50	N/A	---	---	---
2. Hangar-Apron Parking						
a. Granular 640 S.Y.						
1) Grading	C.Y.	2.00	23	46	9.2	55.2
2) 3 inch surface course	S.Y.	1.00	640	640	128	768

TABLE 20 Continued

PHASE: Three Continued

ITEM	UNIT	UNIT COST	QUANTITY	1978 DOLLAR COST	LEGAL. ADMIN. CONT.	TOTAL COST
H. Access Road & Internal Circulation						
1. Vehicle Circulation 610 L.F.						
a. Asphalt 1,355 s.y.						
1) Grading	C.Y.	2.00	1,830	3,660	732	4,392
2) Base course	Ton	17.50	201	3,517	1,054	4,571.5
3) Surface Course	Ton	25.00	151	3,775	755	4,530
2. Vehicle Circulation 60 L.F.						
a. Granular 160 s.y.						
1) Excavation	C.Y.	2.00	180	360	74	434
2) 3"surface course	S.Y.	1.00	160	160	32	192
I. Security Fence						
1. 4' Chain Link a. 470 L.F.			NOT APPLICABLE (N/A)			
2. Gate a. Two gate positions b. One personnel gate						
J. Pavement Markings	L.S.	3,000	1	3,000	600	3,600
K. Taxiway - Stub RW 20	L.S.	40,000	1	40,000	8,000	48,000

DEVELOPMENT SCHEDULE COST SUMMARY

TABLE 21

DEVELOPMENT COST SUMMARY, 1978 - 1997

PHASE ONE

1978-1982
Total Cost ---------- $170,632.46

PHASE TWO

1983-1987
Total Cost ---------- $224,337.00

PHASE THREE

1988-1997
Total Cost ---------- $515,093.90

All costs are 1978 costs. Inflationary trends are expected to cause a significant increase in costs of each item as well as total cost by Phase Three.

A more realistic Phase Two cost is $247,417.06, (170,632.46 x 1.45 = 247,717.06). Based upon a multiplier of 2.10, Phase Three costs could total $1,081,697.10 at the time of construction. This reasoning is based upon a cost increace of 18 percent annually.

CURRENT REVENUE AND EXPENDITURES

The feasibility of implementing the proposed actions depend upon the revenue generation capability of the airport, level of public support and availability of state and federal aid. At most general aviation airports, generation of revenue comes from hangar rentals, rental of agricultural land and tax refunds. Most major capital improvements cannot be implemented without public support or state and federal grants in aid.

The Clarion Municipal Airport derives its support from two major sources:

- Hangar Rental Income
- Airport Farm Income

Hangar rental rates as of 1978 are $65.00 per month for twin engine aircraft and $40.00 per month for single engine aircraft. In FY 1978 hangar rentals are expected to yield $12,000 in annual income.

Rental of the airport farm lands yield an annual income of $15,000. In addition, the farm contract provides for snow removal and grass mowing. The FY 1978 annual income generated by the airport is expected to total approximately $27,000.

Airport expenditures are summarized in Tables 22 and 23 . Actual expenses in FY 1976 totaled $13,648. FY 1977 expenditures totaled $23,823 while estimated FY 1978 expenditures are expected to total some $26,970. Extimated FY 1979 expenditures total $29,360.

Annual operating and maintenance costs are expected to increase throughout the twenty-year planning period. Capital outlays to include dept service will vary with airport improvements.

For the most part, airport revenues will generate sufficient income to retire annual O and M costs. It should also provide sufficient revenue to retire hangar construction costs (principle and interest)

At present there are two general obligation bonds outstanding for airport improvements. They are as follows:

- 1964 - Airport Improvement - RW 14/32 Pavement, Land Acquisition
  $55,000 total principal
  To be retired in FY 1979
  Levy Varies

- 1977 - Airport Improvement - Hangars
  $185,000 total principal
  To be retired in FY 1992
  No levy: Hangar rental revenue
  $18,000 per year

Thus, airport revenues are not expected to be available until 1993. Major airport improvements recommended herein cannot be implemented without state and/or federal assistance. Also, the local match required will have to be generated from issuance of general obligation bonds.

ESTIMATED EXPENDITURES

TABLE 22

City of Clarion Airport

Instructions:
Complete Form by Activity and Object of Expenditure

BP - 1

1	2	3	4	5	6	7	8	9	9A	10	10A
V	Organization / Department Code	Program / Activity Code	Fund Code	Object Code (Optional)	DESCRIPTION	Program/Service and Economic Comments	Last Year FY 1976-77 Actual	Current Year FY 1977-78 Actual and Estimated	Budget Year FY 1978-79 Estimated	Budget Year Increase	Estimated 1st Quarter Expenditures Beg. 7-1-1979	Estimate for Following FY 1979-80
		77	01	A	Personal Services							
					Salaries per contract		1,800	3,000	3,300		600	3,300
					Subtotal		1,800	3,000	3,300		600	3,300
		77	01	B	Contractual Services							
					Insurance		203	400	3,175		-	1,200
					Utilities		831	1,800	2,100		600	2,400
					Repair & Maintenance	buildings	1,302	1,900	2,000		200	2,000
					Repair & Maintenance	runway repairs	3,050	-	-		-	-
					Misc.		930	900	1,000		200	1,000
					Subtotal		6,316	5,000	8,275		1,000	6,600
		77	01	C	Commodities							
					Misc.		511	600	700		150	750
					Subtotal		511	600	700		150	750
		77	01	D	Capital Outlay	Airport Dev. Plan	5,021	10,750	750		-	750
		77	01	E	Debt Service							
					Principal		-	-	5,000		-	10,000
					Interest		-	4,473	8,945		-	8,710
					Subtotal		-	4,473	13,945		-	18,710
					Total Airport	VI-20	13,648	23,823	26,970	3,147	1,750	29,360

ESTIMATED EXPENDITURES

TABLE 23

City of Clarion City Farms

Instructions:
Complete Form by Activity and Object of Expenditure

BP - 1

1	2	3	4	5	6	7	8	9	9A	10	10A
V Organization / Department Code	Program / Activity Code	Fund Code	Object Code (Optional)	DESCRIPTION	Program / Service and Economic Comments	Last Year FY 1976-77 Actual	Current Year FY 1977-78 Actual and Estimated	Budget Year FY 1978-79 Estimated	Budget Year Increase	Estimated 1st Quarter Expenditures Beg. 7-1-1979	Estimate for Following FY 1979-80
	78	01	B	Contractual Services - Airport Farm							
				Insurance		642	950	1,000		-	1,050
				Miscellaneous		464	50	50		-	50
				Subtotal		1,106	1,000	1,050		-	1,100
			B	Contractual Services - City Farm							
				Consulant fees		-	-	-		-	-
				Property taxes		807	936	1,000		500	1,000
				Insurance		-	495	525		-	550
				Miscellaneous		325	50	100		-	100
				Subtotal		1,132	1,481	1,625		500	1,650
				Subtotal		2,238	2,481	2,675		500	2,750
	78	01	C	Commodities - Airport Farm							
				Operating supplies		4,106	3,800	4,200		1,500	4,400
			C	Commodities - City Farm							
				Operating supplies		3,226	2,566	2,800		1,000	3,000
				Subtotal		7,332	6,366	7,000		2,500	7,400
	78	01	D	Capital outlay							
				Improvement	trees, seeding, gates, etc.	428	475	500		-	500
				Improvement	cover dump	8,602	753	-		-	-
				Subtotal		9,030	1,228	500		-	500
				Total City Farms		18,600	10,075	10,175	100	3,000	10,650

WORK SHEET

FORM 7.
C 64

GENERAL OBLIGATION BOND SCHEDULE — 20-YEAR

Local Government Name: City of Clarion

Project: Airport Impr. 1964 Amount $ 55,000 Voted _____ Sold 4/1/64 Certified _____

CALENDAR YEAR LEVY RESOLUTION (A)	DUE F (Fall) S (Spring) (B)	PRINCIPAL Outstanding (C)	PRINCIPAL Due (D)	Interest Due (E)	Other Expense (F)	REQUIREMENTS Current Expenditures (G)	REQUIREMENTS Ensuing Reserve (H)
1	S - 19 64	55,000	–			XXXXXXXXXX	XXXXXXXXXX
	F - 19 64	55,000	–			1	
2	S - 19 65	55,000	–				
	F - 19 65	52,000	3,000			2	
3	S - 19 66	52,000	–				
	F - 19 66	52,000	3,000			3	
4	S - 19 67	49,000	–				
	F - 19 67	49,000	3,000			4	
5	S - 19 68	46,000	–				
	F - 19 68	46,000	3,000			5	
6	S - 19 69	43,000	–				
	F - 19 69	43,000	3,000			6	
7	S - 19 70	40,000	–				
	F - 19 70	40,000	4,000			7	
8	S - 19 71	36,000	–				
	F - 19 71	36,000	4,000			8	
9	S - 19 72	32,000	–				
	F - 19 72	32,000	4,000			9	
10	S - 19 73	28,000	–				
	F - 19 73	28,000	4,000			10	
11	S - 19 74	24,000	–				
	F - 19 74	24,000	4,000			11	
12	S - 19 75	20,000	–				
	F - 19 75	20,000	4,000			12	
13	S - 19 76	16,000	–				
	F - 19 76	16,000	4,000	246		13 4,432	
14	S - 19 77	12,000	–	186			
	F - 19 77	12,000	4,000	186		14 4,186	
15	S - 19 78	8,000	–	62			
	F - 19 78	8,000	4,000	62		15 4,062	
16	S - 19 79	4,000	–	62			
	F - 19 79	4,000	4,000	62		16	
17	S - 19 80	–	–	–			
	F - 19					17	
18	S - 19						
	F - 19					18	
19	S - 19						
	F - 19					19	
20	S - 19						
	F - 19					20	
XXXXXXXXXX	S - 19						
	TOTALS		55,000				

PREPARED BY _____

DATE _____

Resolutions for tax levies must be filed with County Auditor before April 1

Future hangars should be constructed by the private sector. Hangar rental would be based upon a fee adequate to amortize the cost and provide an adequate return on investment. The hangar would become city property upon amortization of the cost. This strategy would make available bonding capacity for other airport improvements.

Farm rental income could be stabilized by utilizing a cash basis approach. Such would allow for better assessment of long term revenue and eliminate expenses associated with the farm operation.

Income from the lease of facilities to the F.B.O./air taxi operator is basically a trade off for services provided to the City by the F.B.O.

$ 900	Revenue from F.B.O. lease
3,300	900 + 200/month expenditure for services
$2,400	Expenditure for services (net)

Other possible sources of revenue may come from tie-down fees, fuel flowage fee on aviation fuel, and lease of industrial and commercial lands. Other than the lease of land, revenue from tie-down fees or fuel flowage fees would not generate enough revenue to defray the cost involved. Aviation fuel sales total approximately 70,000 gallons annually. At three cents per gallon, the total revenue would amount to some $2,100. The cost of collection would exceed the revenue, and the cost of additional liability insurance would not offset the revenue from a tie-down fee.

FEDERAL AND STATE AID

The Department of Transportation, Federal Aviation Administration, provides financial assistance for a number of airport components under the Airport and Airway Development Act of 1970. The 1976 amendments to the act provide up to 90 percent of total cost on eligible items through September 30, 1978. This share then drops to 80 percent for FY's 1979 and 1980.

In general, eligible items include all airport requirements except those that specifically benefit the private sector. In other words hangar structures and taxiways 20 feet from the hangar are not eligible. Parking lots and internal road systems are not eligible. Terminal buildings are not eligible except at CAB certificated air carrier airports.

Airport components recommended from implementation over the twenty-year planning that are eligible are as follows:

- Land Acquisition
- Runway Construction
- Runway Lighting
- Access Road Improvements
- REIL and VASI-2
- Taxiway Construction
- Apron Area Construction
- Seeding, Etc.
- Drainage (Runway and Apron)

The Department of Transportation, Aeronautics Division, State of Iowa also provides grants-in-aid to airports within the state airport systems plan. At present, the rate of participation is 70 percent for eligible items. Airport components eligible for state assistance are the same as those eligible for federal assistance.

Total assistance available from F.A.A. and State sources for general aviation airports has historically not exceeded 1.2 million dollars annually. Competition for these funds is quite intense. The airport development plan will be a valuable tool in obtaining assistance from the above agencies.

TABLE 24

SUMMARY OF STATE AND FEDERAL ASSISTANCE
GENERAL AVIATION

YEAR	FEDERAL	STATE	STATE SAFETY RESERVE	TOTAL
1978	656,000	526,000	25,000	1,207,000
1979	700,000	587,000	25,000	1,312,000
1980	700,000	644,000	25,000	1,369,000
1981	700,000	704,000	25,000	1,429,000
1982	700,000	762,000	25,000	1,487,000
1983	700,000	825,000	25,000	1,550,000

Source: IDOT: Improvement Program, 1978-1983, Page A-7

The state also maintains a safety contingency reserve of $25,000 annually.

As noted in the above table, the availability of funds is limited. When considering all state system plan airports, not much assistance is available if such funds are to be distributed evenly. Thus, it is important for local airport sponsors to demonstrate and document the need for which assistance is being sought.

For example, the proposed runway extension in Phase Two may be eligible for funding, but may not be seriously considered for funding unless the 500 annual itinerant aircraft operations by aircraft with a gross weight in excess of 8,000 pounds is realized. Also, both agencies provide assistance based upon a priority of need. For example, an airport requesting funds for improvement of the primary runway would most likely obtain funding over an airport seeking funds for a crosswind runway. For this reason, construction of the crosswind runway has been placed in Phase Three. It is assumed that most primary runways in the state will have been constructed to standard by 1988.

A strategy for implementation of the proposed actions is outlined as follows:

STRATEGY FOR IMPLEMENTATION

PHASE ONE: 1977-1982

A. Hangar Construction - 1977
   1. Total Cost: $176,000
   2. Amortization of Cost
      a.) Local (100%)
         1.) $185,000 - General Obligation Bond, 1993

B. 500'Extension to RW 32 (lighting, pavement, markings, etc)1978
   1. Total Cost: $62,064
   2. Amortization of Cost
      a.) State Assistance (70%) $43,445
      b.) Local (30%) $18,619
         1.) From General Obligation Bond $18,619

C. Visual Approach Slope Indicator VASI-2, 1979
   1. Total Cost: $32,400
   2. Amortization of Cost
      a.) State Assistance (70%) $22,680
      b.) Local: (30%) $ 9,720
         1.) From General Obligation Bond: $9,720

D. Apron Expansion and Taxiway - 1980
   1. Total Cost: $61,821
   2. Amortization of Cost
      a.) State Assistance (70%) $43,275
      b.) Local (30%) $18,546
         1.) From General Obligation Bond: $18,546

E. Segmented Circle (Wind Cone), 1981
   1. Total Cost: $6,480
   2. Amortization of Cost
      a.) State Assistance (70%) $4,536
      b.) Local (30%) $1,944
         1.) From airport revenue: $1,944

F. Misc. Improvements (Vehicle Parking), 1982

1. Total Cost: $5,577
2. Amortization of Cost
   a.) Local (100%)
      1.) From airport revenue: $5,577

G. Misc. Improvements, (Markings, Relocate REIL RW14), 1978

1. Total Cost: $5,300
2. Amortization of Cost
   a.) State (70%) $3,710
   b.) Local (30%) $1,590
      1.) From General Obligation Bond: $1,590

H. Misc. Improvements, (Easement RW 14), 1978

1. Total Cost: $7,140
2. Amortization of Cost
   a.) State (70%) $4,998
   b.) Local (30%) $2,142
      1.) From General Obligation Bond: $2,142

PHASE TWO: 1983-1987

A. 500' Runway Extension to RW 32 (lighting, pavement, markings, relocate REIL & VASI-2, land acquisition, turnaround), 1983

1. Total Cost $91,320
2. Amortization of Cost
   a.) Federal Assistance (80%) $73,056
   b.) Local (20%) $18,264
      1.) From General Obligation Bond: $18,264

B. Apron Expansion, 1985

1. Total Cost: $43,850
2. Amortization of Cost
   a.) State Assistance (70%) $30,695
   b.) Local (30%) $13,155
      1.) From General Obligation Bond: $13,155

C. Hangar Construction, 1985

1. Total Cost: $84,000
2. Amortization of Cost
   a.) Local (100%)
      1.) Private Sector: $84,000

NOTE: ITEMS IN PHASE TWO MAY NOT BE NEEDED UNLESS AVIATION DEMAND EXPECTATIONS ARE REALIZED.

PHASE THREE: 1988-1997

A. Runway Construction, RW 02/20 (Land acquisition, lighting, stub taxiway, pavement markings), 1988

1. Total Cost $439,504
2. Amortization of Cost
   a. Federal Assistance (80%) $351,603
   b. Local (20%) $ 87,901
      1.) From General Obligation Bond: $87,901

B. Construction of Manager's Residence, Rhab. of Existing Structure for Terminal Bldg., 1992

1. Total Cost: $55,500
2. Amortization of Cost
   a.) Local (100%)
      1.) From General Obligation Bond: $55,500

C. Airport Access Road, 1992

1. Total Cost: $15,245
2. Amortization of Cost
   a.) State (70%) $10,672
   b.) Local (30%) $ 4,573
      1.) From Airport Revenue: $4,573

D. Misc. Improvements (Internal circulation, vehicle parking, security fence), 1992-1997

1. Total Cost: $6,114
2. Amortization of Cost
   a.) Local (100%)
      1.) From Airport Revenue: $6,114

FUNDING SOURCE

PHASE ONE: 1978-1982

Item	Federal	State	Local		Private
			G.O.	Revenue	
A.	---	---	---	---	---
B.	0	$ 43,445	$ 18,619	$ 0	$ 0
C.	0	22,680	9,720	0	0
D.	0	43,275	18,546	0	0
E.	0	4,536	0	1,944	0
F.	0	0	0	5,577	
G.	0	3,710	1,590	0	0
H.	0	4,998	2,142	0	0
TOTAL	0	$122,644	$ 50,617	$ 7,521	$ 0

PHASE TWO: 1983-1987

Item	Federal	State	Local		Private
			G.O.	Revenue	
A.	$ 73,056	$ 0	$ 18,264	$ 0	$ 0
B.	0	30,695	13,155	0	0
C.	0	0	0	0	84,000
	$ 73,056	$ 30,695	$ 31,419	$ 0	$84,000

PHASE THREE: 1988-1997

Item	Federal	State	Local		Private
			G.O.	Revenue	
A.	$351,603	$ 0	$ 18,264	$ 0	$ 0
B.	0	0	55,500	0	0
C.	0	10,672	0	4,573	0
D.	0	0	0	6,114	0
	$351,603	$ 10,672	$ 73,764	$10,687	$ 0

APPENDIX A

DEFINITIONS AND ABBREVIATIONS

Air Carrier - A person who undertakes directly, by lease, or other arrangement, to engage in air transportation.

Airport Development Aid Program - ADAP provides public sponsors financial aid for airport development. As a condition precedent to granting ADAP funds, an airport must be included in the National Airport Plan. The federal aid grant agreement requires that the airport sponsor operate the airport, as a public airport for a twenty-year period following the grant.

Airport and Airways Development Act of 1970 - The official legislation enabling the annual obligation authority of the Airport Development Aid Program during the period of July 1, through June 30, 1980, under the Federal Aviation Act of 1958.

Aircraft Operation - The airborne movement of aircraft in controlled and noncontrolled airport terminal areas and about given enroute fixes or at other points where counts can be made.

Airport Advisory Service - A service provided by Flight Service Stations at airports not served by a control tower. This service consists of providing information to landing and departing aircraft concerning wind direction and velocity, favored runway, altimeter setting, pertinent known traffic, pertinent known field conditions, airport taxi routes and traffic patterns, and authorized instrument approach procedures.

Airport Traffic Control Tower (ATCT) - A central operations facility in the terminal air traffic control system, consisting of a tower cab structure, including an associated IFR room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expenditous movement of terminal air traffic.

Certified Route Air Carrier - One of a class of air carriers holding certificates of public convenience and necessity issued by the Civil Aeronautics Board. These carriers are authorized to perfrom scheduled air transportation on specified routes and a limited amount of non-scheduled operations.

Commuter Air Carrier - An air taxi operator which (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed, or (2) transports mail by air pursuant to current contract with the Post Office Department (FAR 298.3).

Enplanements, Revenue Passenger - The total number of revenue passengers boarding aircraft, including originating, stopover, and transfer passengers.

Fixed-Wing Aircraft - Aircraft having wings fixed to the airplane fuselage and outspread in flight, i.e., nonrotating wings.

Flight Plan - Specified information relating to the intended flight of an aircraft, that is filed orally or in writing with air traffic control.

Flight Service Station (FSS) - A central operations facility in the national flight advisory system utilizing data interchange facilities for the collection and dissemination of NOTAMS, weather, and administrative data, and providing pre-flight and in-flight advisory service and other services to pilots, via air/ground communication facilities.

Freight, Air - Property other than express and passenger baggage transported by air.

General Aviation - That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity from the Civil Aeronautics Board, and large aircraft commercial operators.

IFR Conditions - Weather conditions below the minimum prescribed for flight under Visual Flight Rules.

Instrument Approach - An approach during which the pilot is dependent entirely upon instruments and ground-based electronic and communication systmes for orientation, position, altitude, etc.

Instrument Flight Rules (IFR) - FAR rules that govern the procedures for conducting instrument flight.

Instrument Landing System (ILS) - A system which provides in the aircraft, the lateral, longitudinal, and vertical guidance necessary for landing.

Local Operation - A local operation is performed by an aircraft that: (1) operates in the local traffic pattern or within sight of the tower; (2) is known to be departing for or arriving from flight in local practice areas; or (3) executes simulated instrument approaches or low passes at the airport.

Navigational Aid (NAVAID) - Any facility used in, available for use in, or designed for use in aid of air navigation, including landing areas, lighting; and apparatus or equipment for disseminating weather information, for signaling, for radio direction finding, or for radio or other electronic communication and any other structure or mechanism having a similar purpose for guiding or controlling flight in the air or the landing or takeoff of aircraft.

Piston-Powered Aircraft - An aircraft operated by an engine in which pistons moving back and forth work upon a crank shaft or other device to create rotational movement.

Precision Approach - An instrument approach conducted in accordance with directions issued by a controller referring to the surveillance radar display until the aircraft is turned onto final runway.

Turbojet - Aircraft operated by jet engines incorporating a turbine-driven air compressor to take in and compress the air for the combustion of fuel, the gases of combustion (or the heated air) being used to both rotate the turbine and to create a thrust producing jet.

Turboprop - Aircraft operated by turbine-propelled engines. The propeller shaft is connected to the turbine wheels, which operate both the compressor and the propeller.

Unicom - Frequencies authorized for aeronautical advisory services to private aircraft. Only one such stations is authorized at any landing area. The frequency 123.0 mcs is used at airports served by airport traffic control towers and 122.8 mcs is used for other landing areas. Services available are advisory in nature, primarily concerning the airport services and airport utilization.

VFR Conditions - Basic weather conditions prescribed for flight under Visual Flight Rules.

VFR Flight - Flight conducted in accordance with Visual Flight Rules.

VOR or Very High Frequency Omnirange Station - A specific type of range operating at VHF and providing radial lines of position in any direction as determined by bearing selection within the receiving equipment. (NOTE: This facility emits a nondirectional "reference" modulation and a rotating pattern which develops an "avariable" modulation of the same frequency as the reference modulation. Lines of position are determined by comparision of phase of the variable with that of the reference.

LIST OF ABBREVIATIONS

ATC - Air Traffic Control

ATCT - Airport Traffic Control Tower

CAB - Civil Aeronautics Board

DME - Distance Measuring Equipment

DOT - Department of Transportation

DWG - Dual Wheel Gear

DTWG - Dual Tandem Wheel Gear

FAA - Federal Aviation Administration

FAR - Federal Aviation Regulations

FAS - Flight Advisory Service

FBO - Fixed Base Operator

FSS - Flight Service Station

HIRL - High Intensity Runway Lights

IFR - Instrument Flight Rules

ILS - Instrument Landing System

MEA - Minimum En Route IFR Altitude

MIRL - Medium Intensity Runway Lights

MSL - Mean Sea Level

NASA - National Aeronautics and Space Administration

NAVAID - Navigational Aid or Air Navigational Facility

NOTAMS - Notice to Airmen

NTS - Not to Standard or Scale

REIL - Runway End Identifier Lights

STOL - Short Takeoff and Landing

SWG - Single Wheel Gear

TACAN - Tactical Air Navigation

TVOR - Terminal Very High Frequency Omnidirectional Radio Range

UNICOM - Air to Ground Radio Communication Facilities

APPENDIX B

TALL STRUCTURES ORDINANCE

AIRPORT TALL STRUCTURE ORDINANCE

FOR

CLARION MUNICIPAL AIRPORT

Prepared by

OTTO & CULVER, P. C.

and

IOWA DEPARTMENT OF TRANSPORTATION
AERONAUTICS DIVISION

April, 1978

ORDINANCE NUMBER: _____

RESOLUTION NUMBER: _____

AIRPORT TALL STRUCTURE ZONING ORDINANCE

An ordinance regulating and restricting the height of structures and objects of natural growth in the vicinity of the Clarion Municipal Airport by creating the appropriate zones and establishing those boundaries; defining certain terms used herein; referring to the Clarion Municipal Airport height zoning map which is incorporated in and made a part of this ordinance; providing for enforcement; establishing an airport zoning board; establishing a board of adjustment; and imposing penalties.

This Ordinance is adopted pursuant to the authority conferred on the City of Clarion and Wright County by Iowa Statutes, Section 329.3. It is hereby found that an airport hazard endangers the lives and property of users of the Clarion Municipal Airport, and the property and occupants of land in its vicinity. Accordingly, it is declared:

(1) That the creation or establishment of an airport hazard is a public nuisance and an injury to the City and County served by the Clarion Municipal Airport.

(2) That it is necessary in the interest of the public health, public safety, and general welfare that creation of airport hazards be prevented; and,

(3) That this should be accomplished, to the extent legally possible, by proper exercise of the police power; and,

(4) That the prevention of the creation or establishment of airport hazards, and the elimination, removal, alteration, mitigation, or marking and lighting of existing airport hazards are public purposes for which the City of Clarion may raise and expend public funds, as an incident to the operation of airports to acquire land or property interests therein.

It is Hereby Ordained by the Clarion City Council and Resolved by Wright County Board of Supervisors as follows:

SECTION I: SHORT TITLE

This Ordinance shall be known and may be cited as the "Clarion Municipal Airport Height Zoning Ordinance."

SECTION II: DEFINITIONS

As used in this Ordinance, unless the context otherwise requires:

(1) Airport - The Clarion Municipal Airport

(2) Airport Elevation - The highest point of an airport's usable landing area measured in feet above mean sea level.

(3) Airport Hazard - Any structure or object of natural growth located on or in the vicinity of a public airport, or any use of land near such airport, which obstructs the airspace required for the flight of aircraft in landing or take-off at such airport or is otherwise hazardous to such landing or take-off of aircraft.

(4) Airport Primary Surface - A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway. The width of the primary surface of a runway will be that width prescribed in Part 77 of the Federal Aviation Regulations (FAR) for the most precise approach existing or planned for either end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerlines.

(5) Airspace Height - For the purpose of determining the height limits in all zones set forth in this ordinance and shown on the zoning map, the datum shall be mean sea level elevation unless otherwise specified.

(6) Control Zone - Airspace extending upward from the surface of the earth which may include one or more airports and is normally a circular area of five statute miles in radius, with extensions where necessary to include instrument approach and departure paths.

(7) Instrument Runway - A runway having an existing instrument approach procedure utilizing air navigation facilities or area type navigation equipment, for which an instrument approach procedure has been approved or planned.

(8) Minimum Descent Altitude - The lowest altitude, expressed in feet above sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure, where no electronic glide slope is provided.

(9) Minimum Enroute Altitude - The altitude in effect between radio fixes which assures acceptable navigational signal coverage and meets obstruction clearance requirements between those fixes.

(10) Minimum Obstruction Clearance Altitude - The specified altitude in effect between radio fixes on VOR airways, off-airway routes, or route segments which meets obstruction clearance requirements for the entire route segment and which assures acceptable navigational signal coverage only within 22 miles of a VOR.

(11) Runway - A defined area on an airport prepared for landing and take-off of aircraft along its length.

(12) Visual Runway - A runway intended solely for the operation of aircraft using visual approach procedures with no straight-in instrument approach procedure and no instrument designation indicated on an FAA approved airport layout plan, a military services approved military airport layout plan, or by any planning document submitted to the FAA by competent authority.

SECTION III: AIRPORT ZONES AND AIRSPACE HEIGHT LIMITATIONS

In order to carry out the provisions of this Section, there are hereby created and established certain zones which are depicted on the Clarion Municipal Airport Height Zoning Map. A structure located in more than one (1) zone of the following zones is considered to be only in the zone with the more restrictive height limitations. The various zones are hereby established and defined as follows:

1. Airport Height Zones

A. Horizontal Zone - The land lying under a horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by:

1. Swing arcs of 5,000 feet radii from the center of each end end of the primary surface of runways 14, 32, 2, and 20 and connecting the adjacent arcs by lines tangent to those arcs.

No structure shall exceed 150 feet above the established airport elevation in the horizontal zone, as depicted on the Clarion Municipal Airport Height Zoning Map.

B. Conical Zone - The land lying under a surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet. No structure

shall penetrate the conical surface in the conical zone, as depicted on the Clarion Municipal Airport Height Zoning Map.

C. Approach Zone - The land lying under a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface.

1. The inner edge of the Approach Surface is:
   (a) For Visual Utility - 250 feet in width for Runways 2 and 20.
   (b) For NPI Utility - 500 feet in width for Runways 14 and 32.
2. The outer edge of the approach zone is:
   (a) For Visual Utility - 1,250 feet for Runways 2 and 20.
   (b) NPI Utility - 2,000 feet for Runway 14
   (c) Visual other than utility - 1,500 feet for Runway 32.
3. The Approach Zone extends for a horizontal distance of:
   (a) For Utility Runway - 5,000 feet at a slope of 20 to 1 for Runways 14, 32, 2, and 20.

No structure shall exceed the approach surface to any runway, as depicted on the Clarion Municipal Airport Height Zoning Map.

D. Transitional Zone - Land lying under those surfaces extending outward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the Approach Surfaces.
No structure shall exceed the Transitional Surface, as depicted on the Clarion Municipal Airport Height Zoning Map.

E. No structure shall be erected in Wright County that raises the published Minimum Descent Altitude or Decision Height for an instrument approach to any runway, nor shall any structure be erected that causes the Minimum Obstruction Clearance Altitude or Minimum Enroute Altitude to be increased on any Federal Airway in Wright County.

SECTION IV: USE RESTRICTIONS

Notwithstanding any other provisions of Section III, no use may be made of land or water within Clarion or Wright County in such a manner as to interfere with the operation of any airborne aircraft. The following special requirements shall apply to each permitted use:

A. All lights or illumination used in conjunction with street, parking, signs, or use of land and structures shall be arranged and operated in such a manner that it is not misleading or dangerous to aircraft operating from the Clarion Municipal Airport or in the vicinity thereof.

B. No operations from any use shall produce smoke, glare or other visual hazards within three (3) statute miles of any usable runway of the Clarion Municipal Airport.

C. No operations from any use in Clarion or Wright County shall produce electronic interference with navigation signals or radio communication between the airport and aircraft.

SECTION V: LIGHTING

Notwithstanding the provisions of Section IV, the owner of any structure over 2,000 feet above ground level must install on the structure lighting in accordance with Federal Aviation Administration (FAA), Advisory Circular 70-7460-1D and amendments. Additionally, any structure constructed after the effective date of this Ordinance and exceeding 949 feet above ground level, must install on that structure high intensity white obstruction lights in accordance with Chapter 6 of FAA Advisory Circular 7460-1D and amendments.

Any permit or variance granted may be so conditioned as to require the owner of the structure or growth in question to permit the City of Clarion at its own expense to install, operate, and maintain thereto such markers or lights as may be necessary to indicate to pilots the presence of an airspace hazard.

SECTION VI: VARIANCES

Any person desiring to erect or increase the height of any structure, or to permit the growth of any tree, or otherwise use his property in violation of any section of this Ordinance, may apply to the Board of Adjustment for variance from such regulations. No application for variance to the requirements of this Ordinance may be considered by the Board of Adjustment unless a copy of the application has been submitted to the Clarion Municipal Airport Manager for his opinion as to the aeronautical effects of such a variance. If the Clarion Municipal Airport Manager does not respond to the Board of Adjustment within fifteen (15) days from receipt of the copy of the application, the Board may make its decision to grant or deny the variance.

SECTION VII: BOARD OF ADJUSTMENT

A. There is hereby created a Board of Adjustment to have exercise the following powers: (1) To hear and decide appeals from any order, requirement, decision, or determination made by the Airport Zoning Commission in the enforcement of this Ordinance; (2) to hear and decide special exemptions to the terms of this Ordinance upon which such Board of Adjustment under such regulations may be required to pass; and (3) to hear and decide specific variances.

B. The Board of Adjustments shall consist of two members from the City of Clarion and Wright County, selected by the governing body thereof and one additional member to act as chairman and to be selected by a majority vote of the members selected by the City and County. Members shall be removable for cause by the appointing authority upon written charges and after a public hearing. Vacancies shall be filled for the unexpired term of any member whose office becomes vacant in the same manner in which said member was selected. The terms of the members of the Board of Adjustments shall be for five (5) years, excepting that when the Board shall first be created, one of the members appointed by the City and County shall be appointed for a term of two (2) years one, and one for a term of four (4) years.

C. The Board of Adjustment shall adopt rules for its governance and in harmony with the provisions of this Ordinance. Meetings of the Board shall be held at the call of the Chairman and at such other times as the Board of Adjustment may determine. The Chairman, or in his absence the Acting Chairman, may administer oaths and compel the attendance of witnesses. All meetings of the Board of Adjustment shall be open to the public. The Board of Adjustment shall keep minutes of its proceedings, showing the vote of each member upon each question or if absent of failing to vote, indicating such fact, and shall keep records of its examinations and other offical actions, all of which shall immediately be filed in the Office of the City/County Clerk, and on due cause shown.

D. The Board of Adjustment shall have the powers established in Iowa Statutes, Section 414.12.

E. The concurring vote of a majority of the members of the Board of Adjustment shall be sufficient to reverse any order, requirement, decision or determination of any administrative official or to decide in favor of the applicant on any matter upon which it is required to pass under this Ordinance, or to effect variations of this Ordinance.

SECTION VII: JUDICIAL REVIEW

Any person aggrieved or any taxpayer affected by any decision of the Board of Adjustment may appeal to the Court of Record as provided in Iowa Statutes, Section 414.15.

SECTION IX: ADMINISTRATIVE AGENCY

It shall be the duty of the Airport Zoning Commission to administer the regulations prescribed herein. Applications for permits and variances shall be made to the City Administrator upon a form furnished by him. Applications required by this Ordinance to be submitted to the Administrative Agency shall be promptly considered and granted or denied. Application for action by the Board of Adjustment shall be forthwith transmitted by the Airport Zoning Commission.

SECTION X: PENALTIES

Each violation of this Ordinance or any regulation, order, or ruling promulgated hereunder shall constitute a misdemeanor, and be punishable by a fine of not more than 500 dollars or imprisonment for not more than one year or both, and each day a violation continues to exist shall constitute a separate offense.

SECION XI: CONFLICTING REGULATIONS

Where there exists a conflict between any of the regulations or limitations prescribed in this Ordinance and any other regulations applicable to the same area, whether the conflict be with respect to height of structures, the use of land, or any other matter, the more stringent limitation or requirement shall govern and prevail.

SECTION XII: SEVERABILITY

If any provisions of this Ordinance or the application thereof to any person or circumstances is held invalid, such invalidity shall not affect other provisions or applications of the Ordinance which can be given effect without the invalid provision or application, and to this end the provisions of this Ordinance are declared to be severable.

SEXTION XIII: EFFECTIVE DATE

WHEREAS, the immediate operation of the provisions of this Ordinance is necessary for the preservation of the public health, public safety, and general welfare, and an EMERGENCY is hereby declared to exist; this Ordinance shall be in full force and effect from and after its passage by the City Council of Clarion and Wright County Board of Supervisors, Iowa.

Adopted by the City Council of the City of Clarion, Iowa, This _____ day of _____, 1978.

_____
Mayor

ATTEST: _____
City Administrator

Adopted by the Board of Supervisors, Wright County, Iowa, This

_____ day of _____, 1978.

_____
Chairman

ATTEST _____
Clerk

APPENDIX C

MODEL AVIGATION AND HAZARD EASEMENT FORM

FIGURE 2. MODEL AVIGATION AND HAZARD EASEMENT FORM

AVIGATION AND HAZARD EASEMENT

WHEREAS, [full name of property owner(s)], hereinafter called the Grantors, are the owners in fee of that certain parcel of land situated in the City of _____, County of _____, State of _____, more particularly described as follows:

[full description of property to be covered by easement]

hereinafter called "Grantors' property," and outlined on the attached map (Exhibit I);

NOW THEREFORE, in consideration of the sum of _____Dollars ($_____) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Grantors, for themselves, their heirs, administrators, executors, successors and assigns, to hereby grant, bargain, sell and convey unto [owner and operator of _____ Airport], hereinafter called the Grantee, its successors and assigns, for the use and benefit of the public, an easement and right of way, appurtenant to [full name of airport], for the unobstructed passage of all aircraft, ("aircraft" being defined for the purposes of this instrument as any contrivance now known or hereafter invented, used or designed for navigation of or flight in the air) by whomsoever owned and operated,

*in the air space above Grantors' property above an imaginary plane rising and extending in a generally [e.g. Easterly] direction over Grantors' property, said imaginary plane running from approximately [e.g. 25] feet mean sea level above Point A on Exhibit I at the rate of one foot vertically for each [e.g. 50] feet horizontally to approximately [e.g. 55] feet mean sea level above Point B on Exhibit I, to an infinite height above said imaginary plane, (OR USE FOLLOWING)

*in the air space above Grantors' property above a mean sea level of [e.g. 150] feet, to an infinite height above said mean sea level of [e.g. 150] feet, (OR USE FOLLOWING)

*in all air space above the surface of Grantors' property, to an infinite height above said Grantors' property,

together with the right to cause in all air space above the surface of Grantors' property such noise, vibrations, fumes, dust, fuel particles, and all other effects that may be caused by the operation of aircraft landing at, or taking off from, or operating at or on said [full name of airport]; and Grantors do hereby waive, remise and release any right or cause of action which they may now have or which they may have in the future against Grantee, its successors and assigns, due to such noise, vibrations, fumes, dust, fuel particles, and all other effects that may be caused or may have been caused by the operation of aircraft landing at, or taking off from, or operating at or on said [full name of airport].

The easement and right of way hereby granted includes the continuing right in the Grantee to prevent the erection or growth upon Grantors' property of any building, structure, tree or other object

*extending into the air space above the aforesaid imaginary plane (OR USE FOLLOWING)

*extending into the air space above said mean sea level of [e.g. 150] feet (OR USE FOLLOWING)

*extending into the air space above the surface of Grantors' property

and to remove from said air space, or at the sole option of the Grantee, as an alternative, to mark and light as obstructions to air navigation, any such building, structure, tree or other object now upon, or which in the future may be upon Grantors' property, together with the right of ingress to, egress from, and passage over Grantors' property for the above purposes.

TO HAVE AND TO HOLD said easement and right of way, and all rights appertaining thereto unto the Grantee, its successors and assigns, until said [full name of airport] shall be abandoned and shall cease to be used for public airport purposes.

AND for the consideration hereinabove set forth, the Grantors, for themselves, their heirs, administrators, executors, successors and assigns, do hereby agree that for and during the life

of said easement and right of way, they will not hereafter erect, permit the erection or growth of, or permit or suffer to remain upon Grantors' property any building, structure, tree or other object extending into the aforesaid prohibited air space, and that they shall not hereafter use or permit or suffer the use of Grantors' property in such a manner as to create electrical interference with radio communication between any installation upon said airport and aircraft, or as to make it difficult for flyers to distinguish between airport lights and others, or as to impair visibility in the vicinity of the airport, or as otherwise to endanger the landing, taking off or maneuvering of aircraft, it being understood and agreed that the aforesaid covenants and agreements shall run with the land.

IN WITNESS WHEREOF, **the Grantors have hereunto set their hands and seals this _____ day of _____, 19___.

Signed, sealed and delivered in the presence of:

_____ _____(SEAL)

_____ _____(SEAL)

(Notarial Acknowledgment)

_____

*Alternative language depending upon desired coverage of easement.

**Local recordation and subordination practices must also be met. If subordination is necessary, in which case the mortgagee must join in the agreement, the following language is suggested:

"In consideration of the premises, and to assure Grantee of the continued benefits accorded it under this Easement, [name of mortgagee], owner and holder of a mortgage dated _____ and recorded _____ covering the premises above described, does hereby covenant and agree that said mortgage shall be subject to and subordinate to this Easement and the recording of this Easement shall have preference and precedence and shall be superior and prior in lien to said mortgage irrespective of the date of the making or recording of said mortgage instrument."