AIRPORT DEVELOPMENT PLAN

ALBIA, IOWA

1985

CITY OFFICIALS

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Bernard F. Carr

Clerk
Carl E. Gragg

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PREPARED BY

FRENCH-RENEKER-ASSOCIATES, INC.

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CONSULTING ENGINEERS

AIRPORT DEVELOPMENT PLAN

ALBIA MUNICIPAL AIRPORT

ALBIA, IOWA

PREPARED BY:

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Professional Design Services of Ia. Inc.
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This Airport Development Plan was funded in part by a grant from the Iowa Department of Transportation

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of Iowa.

June 1985

Signed _______ Date 7/5/85

Kenneth D. Bucklin, PE Iowa Reg. No. 5673

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COMMUNITY AND AIRPORT BACKGROUND

INTRODUCTION

AIRPORT PLANNING PROCESS:

The City of Albia retained French-Reneker-Assoicates, Inc. to examine short and long range needs for the Albia Municipal Airport. A scope of work was developed by French-Reneker-Associates, Inc. which would address aviation demand and development needs from 1985 through 2005. The scope of work was carried out in accordance with Airport Development Plan guidelines set forth by the Iowa Department of Transportation (IDOT). Specific objectives of the scope of work are summarized as follows:

- To summarize relevant socio-economic background data,
- To define an airport service area,
- To prepare an estimate of the potential numbers of aircraft that might be based at the Albia Municipal Airport,
- To prepare an estimate of aviation operations for a 20-year period,
- To determine the type of airport facility needed to meet estimated aviation demand levels,
- To select the most feasible and prudent airport development strategy,
- To establish a schedule of priorities and phasing for various improvements proposed in the plan.

To achieve the above objectives, the airport development planning process outlined in Figure One was utilized.

Consideration of alternative airport sites was not a factor herein nor was the preparation of an environmental impact assessment report a part of the scope of work. It should be noted that the airport planning process is a continual effort. As such, the City is encouraged to update the plan on a periodic basis.

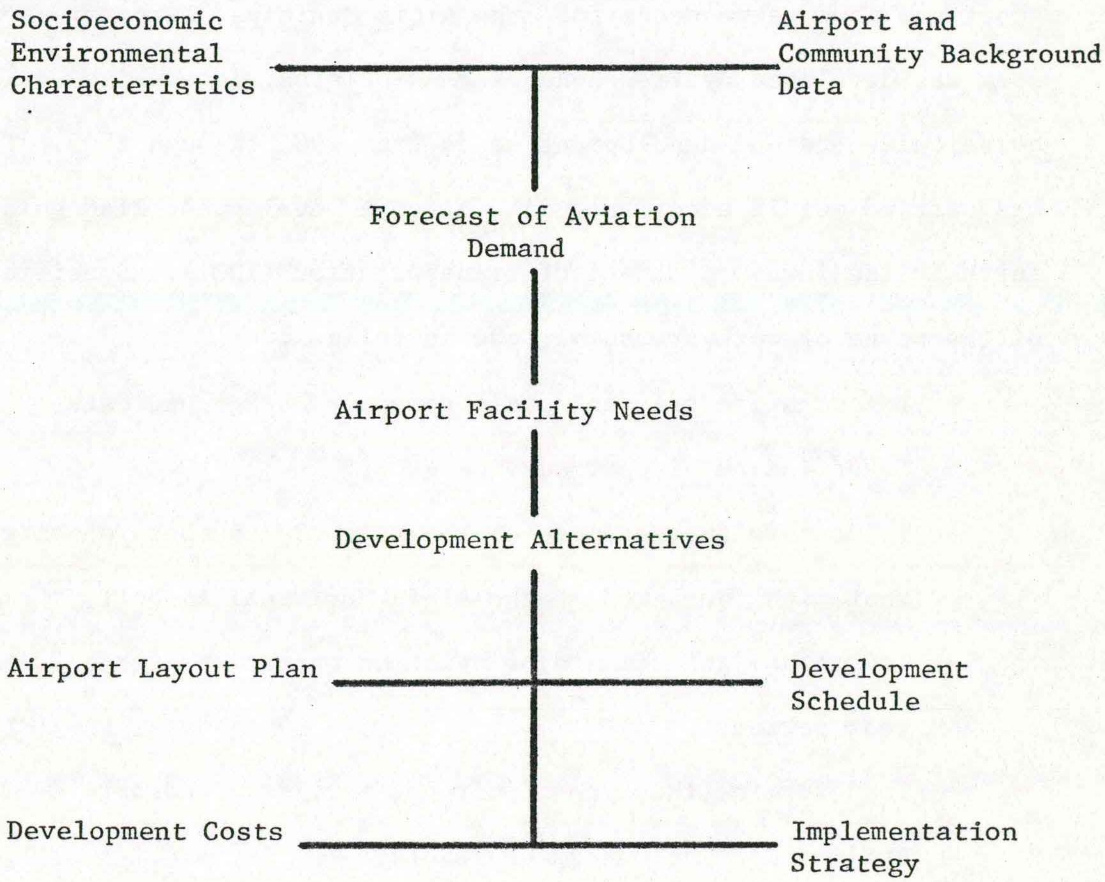


FIGURE 1-1 AIRPORT DEVELOPMENT PLANNING PROCESS

The report is presented in six (6) sections, the first of which summarize relevant background information used in the preparation of later study elements.

SOCIOECONOMIC BACKGROUND

REGIONAL ACCESSIBILITY:

The City of Albia is located 21 miles west of Ottumwa via U.S. Highway 34 and 61 miles southeast of Des Moines via State Highway 5 in south central Iowa. State Highway 137 provides access north to Eddyville (16 miles) and Oskaloosa (26 miles). State Highway 5 provides access south to Lake Rathbun and Centerville (21 miles).

Albia is well served by rail. The main east-west line of the Burlington Northern (BN) provides access west to Omaha and east to Chicago. The Chicago Northwestern (CNW) maintains a track between Albia and its main east-west line (Marshalltown). The Norfolk and Western (N & W) provides rail service to and from Des Moines.

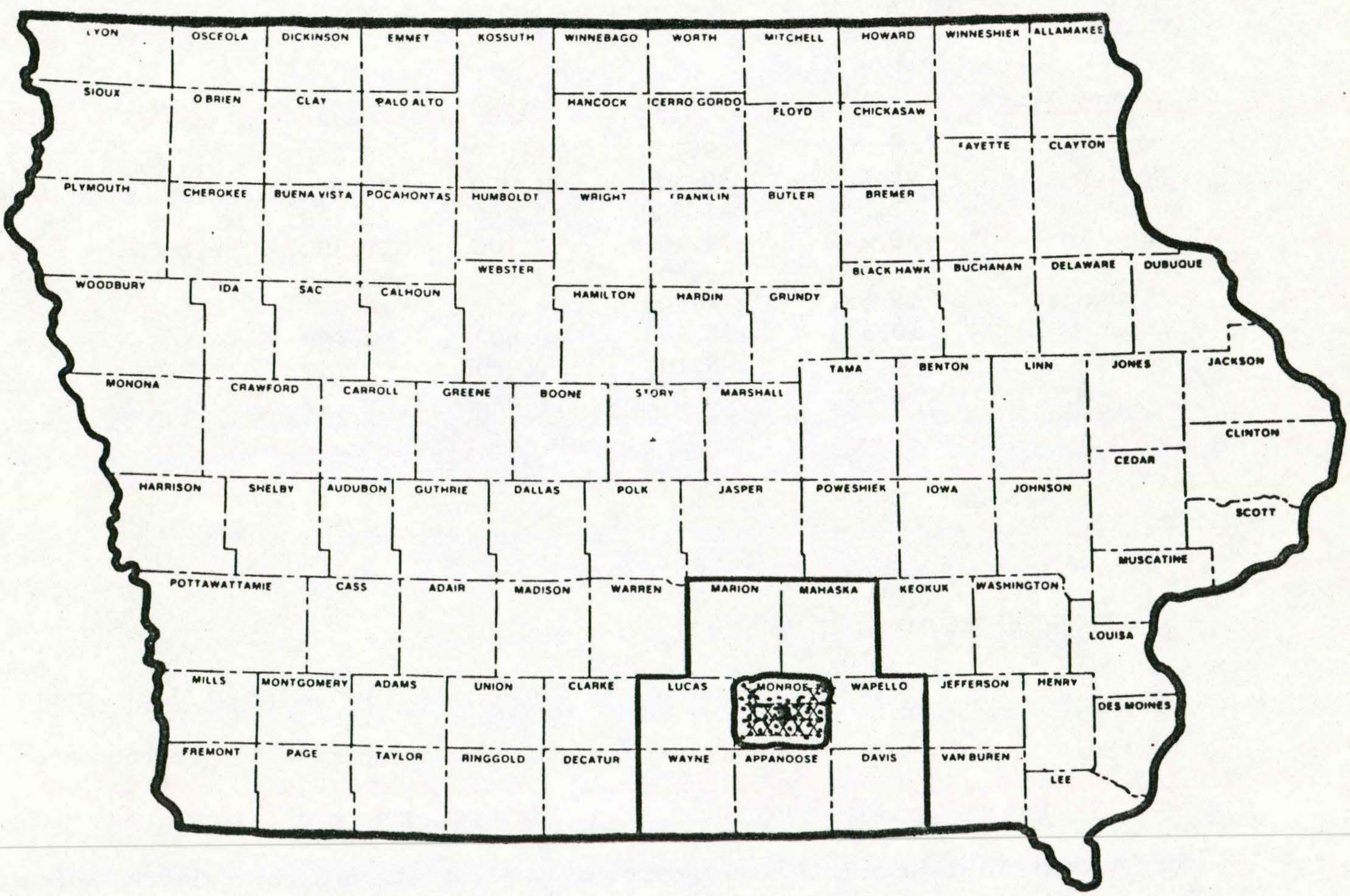


FIGURE 1-1: REGIONAL SETTING

POPULATION:

Population change anticipated through the year of 2000 for an eight county region indicate a slight decrease of less than two percent. The region consists of an eight (8) county area encompassing Monroe County. Monroe County can expect, at current trends, to experience a loss of over three percent from 1980 through 2000. Like Monroe County, Mahaska and Wayne Counties are expected to experience a similar decrease of three and five percent, respectively. However, the counties having the greatest loss of population are Wapello (9.4%) and Appanoose (8.0%). As previously mentioned, the regional net decline was slight, suggesting that there are positive figures to offset the aforesaid losses. A slight increase was projected for Lucas County (4.5%) followed by Marion (7.3%) and Davis (12.5%).

TABLE 1-1: POPULATION, EIGHT COUNTIES, 1980-2000

County/Year	1980	1985	1990	1995	2000	% Change
Monroe	9,209	9,100	9,000	8,900	8,900	- 3.5
Marion	29,669	30,500	31,300	32,000	32,000	+ 7.3
Mahaska	22,867	25,500	22,200	22,100	22,200	- 3.0
Wapello	40,241	39,100	38,100	37,300	36,800	- 9.4
Davis	9,104	9,400	9,800	10,100	10,400	+12.5
Appanoose	15,551	14,900	14,500	14,300	14,400	- 8.0
Lucas	10,313	10,400	10,600	10,700	10,800	+ 4.5
Wayne	8,199	8,100	7,900	7,800	7,800	- 5.1
Total	145,153	147,000	143,400	143,200	143,300	- 1.3

Source: OPP, 1984.

STATE OF THE ECONOMY:

A means of assessing economic conditions at a regional or county level is by evaluating the deviation that exists when compared to a larger economic entity such as the State or the Nation. Several economic indicators reviewed can result in a descriptive composite of what exists and the relative potential for stability or growth.

On a national scale, per capital income has shown a steady increase for the past twenty years. Likewise, Iowa has followed the same pattern (Figure 1-3). However, a crucial point of deviation occurred in mid-1979 whereby the Iowa per capita income failed to duplicate the national pattern. The deviation here is similar with other agricultural-base, Midwest States. In 1982, the discrepancy in per capita income between the U.S. and the State of Iowa was slightly over $300.00. Figure 1-5 summarizes annual change in Iowa personal income as expressed in real terms. Figure 1-6 depicts the downward trend in Iowa farm income as expressed in real terms.

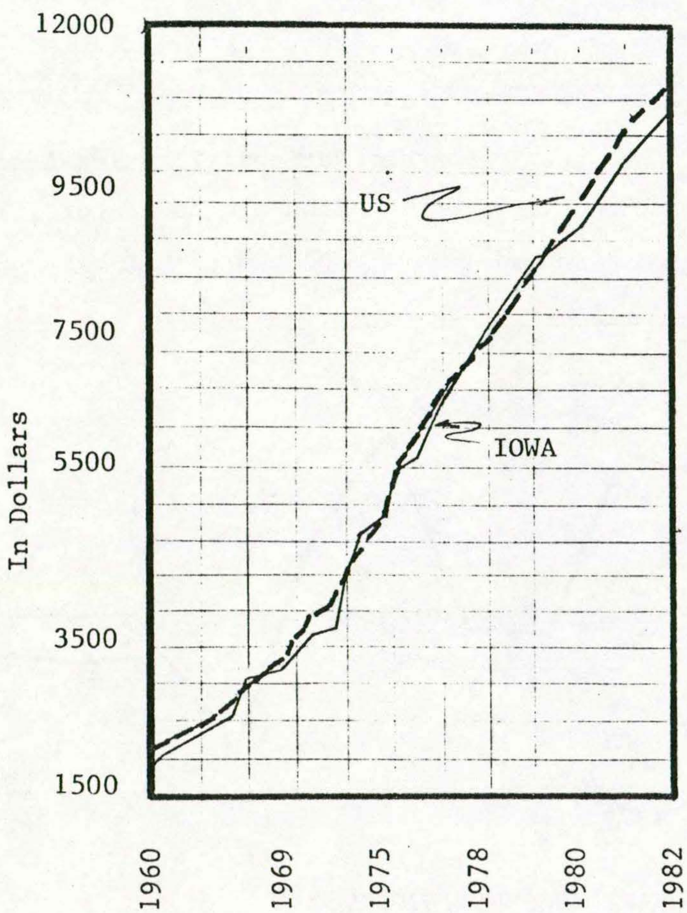


FIGURE 1-3: IOWA PER CAPITA INCOME

Source: Survey of Current Business
U.S. Dept. of Commerce

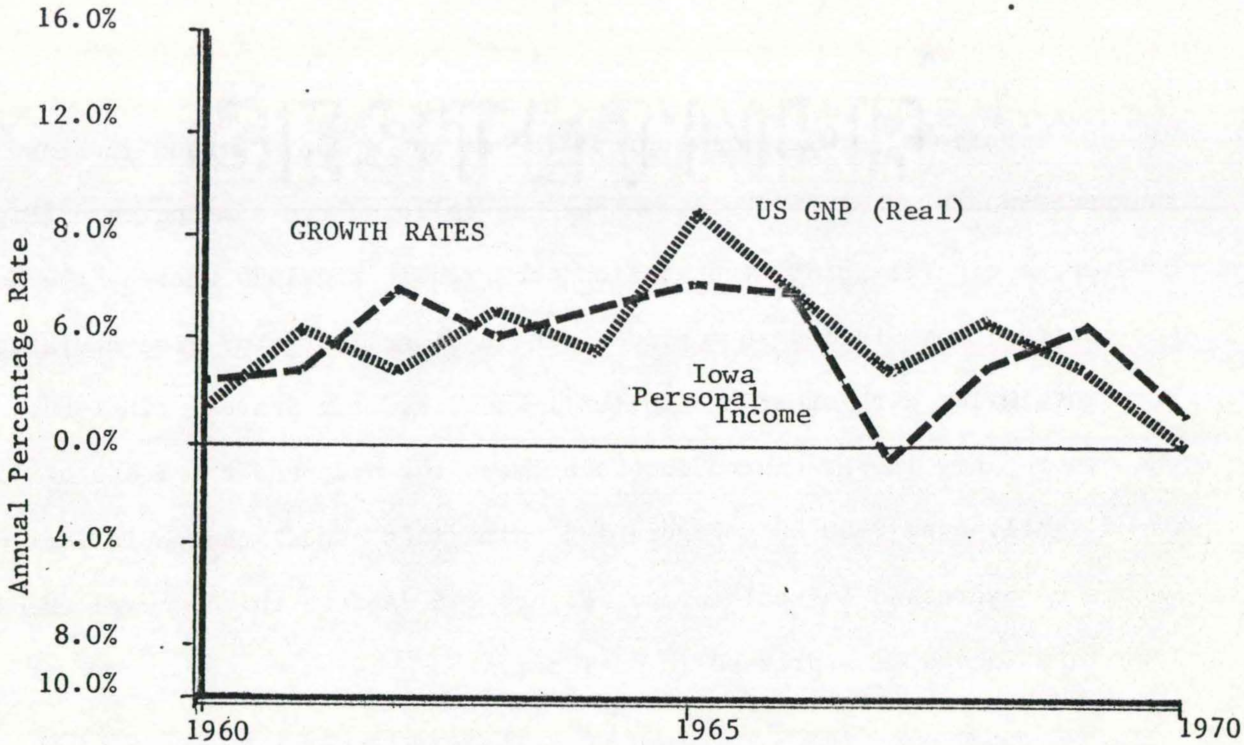


FIGURE 1-5: IOWA REAL PERSONAL INCOME,
1960-1970

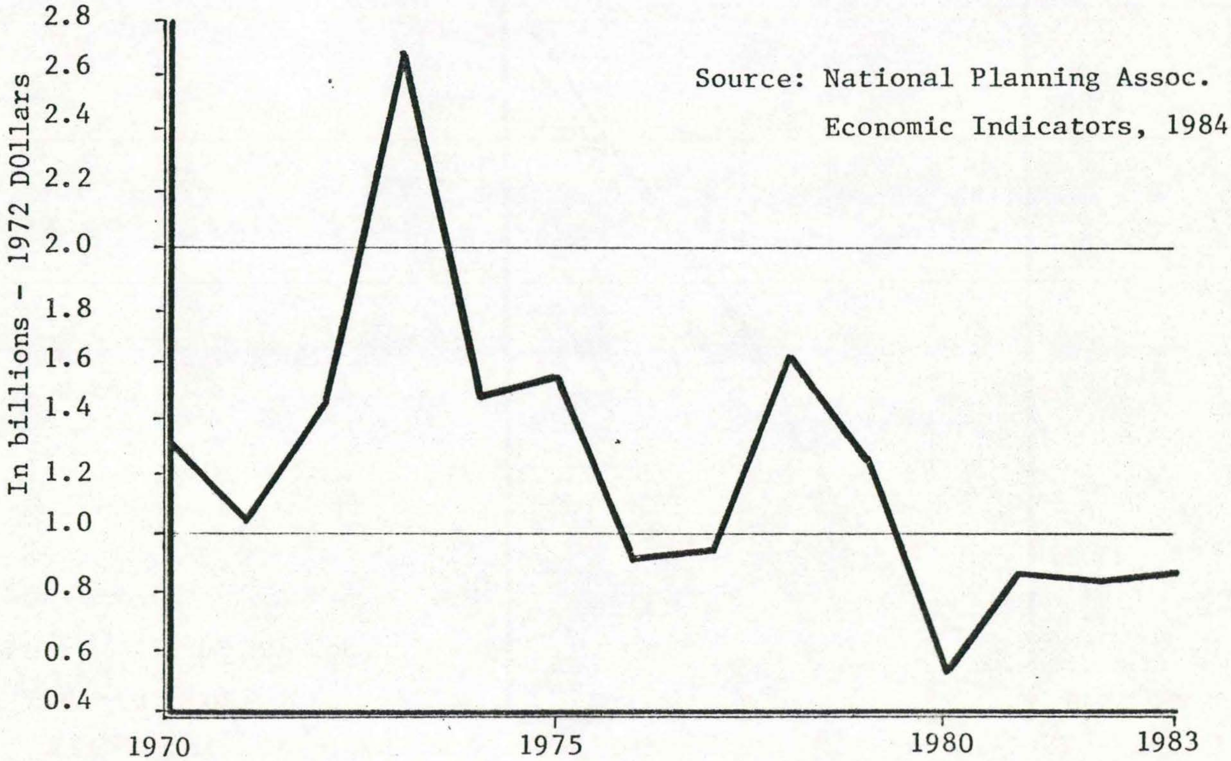


FIGURE 1-6: IOWA REAL FARM INCOME, 1970-1983

On a county scale, total personal income might appear quite low for Monroe County when compared to Marion, Mahaska and Wapello, however, this would be indicative of those counties having areas with an economic base consisting of more industrial employment than agriculture and/or a greater population density (population per square mile.) Both prove to be the case with Monroe County having a population density of 21.2 compared to Marion (59.6), Mahaska (48.1) and Wapello (92.0). The positive change in total personal income from 1979 to 1981 is proportional for each county with Lucas County being the major exception.

Total per capita personal income follows a similar pattern as above when comparing the counties within the region (Table 1-2). The greatest difference that does exist, however, is the percentage change between 1979 and 1981 for Monroe County. This change exceeds all other counties with the exception of Lucas and Appanoose. This change is certainly a positive note for those counties, but where a degree of change is held constant it will have a far greater impact on a small community as opposed to a large one. The significance of these data lie in the fact that the growth trend appears to be comparable to changes on a national and state scale.

TABLE 1-2: COUNTY PER CAPITA INCOME DISTRIBUTION FOR REGION

	Total Personal Income (Millions of Dollars)			Total Per Capita Personal Income (Dollars)		
County/Year	1979	1981	% Change	1979	1981	% Change
Monroe	72	83	13.3	7,493	8,954	16.3
Marion	257	310	17.1	8,788	10,432	15.8
Mahaska	192	223	13.9	8,332	9,713	14.2
Wapello	333	388	14.2	8,180	9,750	16.1
Davis	63	74	14.9	6,833	8,149	16.1
Appanoose	105	126	16.7	6,749	8,433	20.0
Lucas	80	97	17.5	7,690	9,555	19.5
Wayne	61	71	14.1	7,469	8,556	12.7

Source: Survey of Current Business, 1983, U.S. Dept. of Commerce

As an indicator of a community's economic viability, retail sales are closely linked with other socio-economic characteristics. On a comparative basis with other communities in Monroe County, retail sales in Albia account for almost eighty (80) percent of taxable sales in the county (Table 1-3). Another indicator is retail capture which means the portion of the local retail trade potential that a town actually "captures." Based on its actual sales in 1983, Albia is selling to 112% of the town population in full-time customer equivalents.

TABLE 1-3: RETAIL SALES, 1983

Town	# of Business	Taxable Sales	%	Retail Capture
Albia	737	$21,013,656	79.8	1.12
Lovilia	93	689,338	2.6	0.24
Non-Permit	6	27,598	0.1	--
Other	343	4,617,739	17.5	0.23

Source: Iowa Department of Revenue

In other words, Albia is selling to the equivalent of 100 percent of its population plus twelve (12) percent more. The pull factor is a reliable indicator of the relative size of the trade area for the city in question. Per capita retail sales in 1983 was 5,022 dollars for Albia, 1,082 dollars and 6005 for Lovilia and Monroe County respectively. It should be noted that the airport service area often coincides with the retail trade area of a community.

As mentioned previously, the link between certain economic variables can support the degree of likelihood for the existence of another related variable. In this case, the market for air travel can often be measured by employment figures for that particular county or region. Historically, there has been a consistent and high correlation between the amount/type of employment and the quantity of air travel. The ENO Foundation, a research organization, categorized industry by travel tendency as follows:

High Travel - Business and professional services, government, manufacturing and mining.

Medium Travel - Construction, finance, insurance and real estate, and wholesale and retail trade.

Low Travel - Agriculture, communications and utilities.

TABLE 4: PERSONS EMPLOYED BY INDUSTRY, MONROE COUNTY, 1970-1980

	Year		Change	
Industry	1970	1980	Number	%
(High Travel)				
Services	963	774	-189	-24.4
Public Administration	126	125	- 1	- 0.8
Manufacturing	729	921	192	20.8
Mining	18	15	- 3	-20.0
(Medium Travel)				
Construction	171	217	46	21.2
Finance/Insurance/ Real Estate	80	162	82	50.6
Wholesale Trade	44	172	128	74.4
Retail Trade	419	593	174	29.3
(Low Travel)				
Agriculture	549	659	110	16.7
Communication/ Transportation/ Public Utilities	173	158	- 15	- 9.5
Total	3,272	3,796	524	13.8

Source: Census of Population: General Social and Economic Characteristics, 1970 and 1980

Over the course of the decade, the high travel category for industrial activity showed a slight decrease, but was offset by the large increases under the Medium Travel category. The manufacturing category had a twenty (20) percent increase with an inverse parallel action to counter balance that loss in services. Under the Medium Travel category, wholesale trade increased by almost seventy-five (75) percent. The total sum of employment by industry results in a net positive quantity for Monroe County. The percentage of inclined growth would indicate a reasonably stable economic entity.

As already indicated, the use of air travel as a mode of transportation is dependent upon a number of factors. In addition to some of the socio-economic factors previously mentioned, other include travel distance, accessibility and availability of other transportation modes.

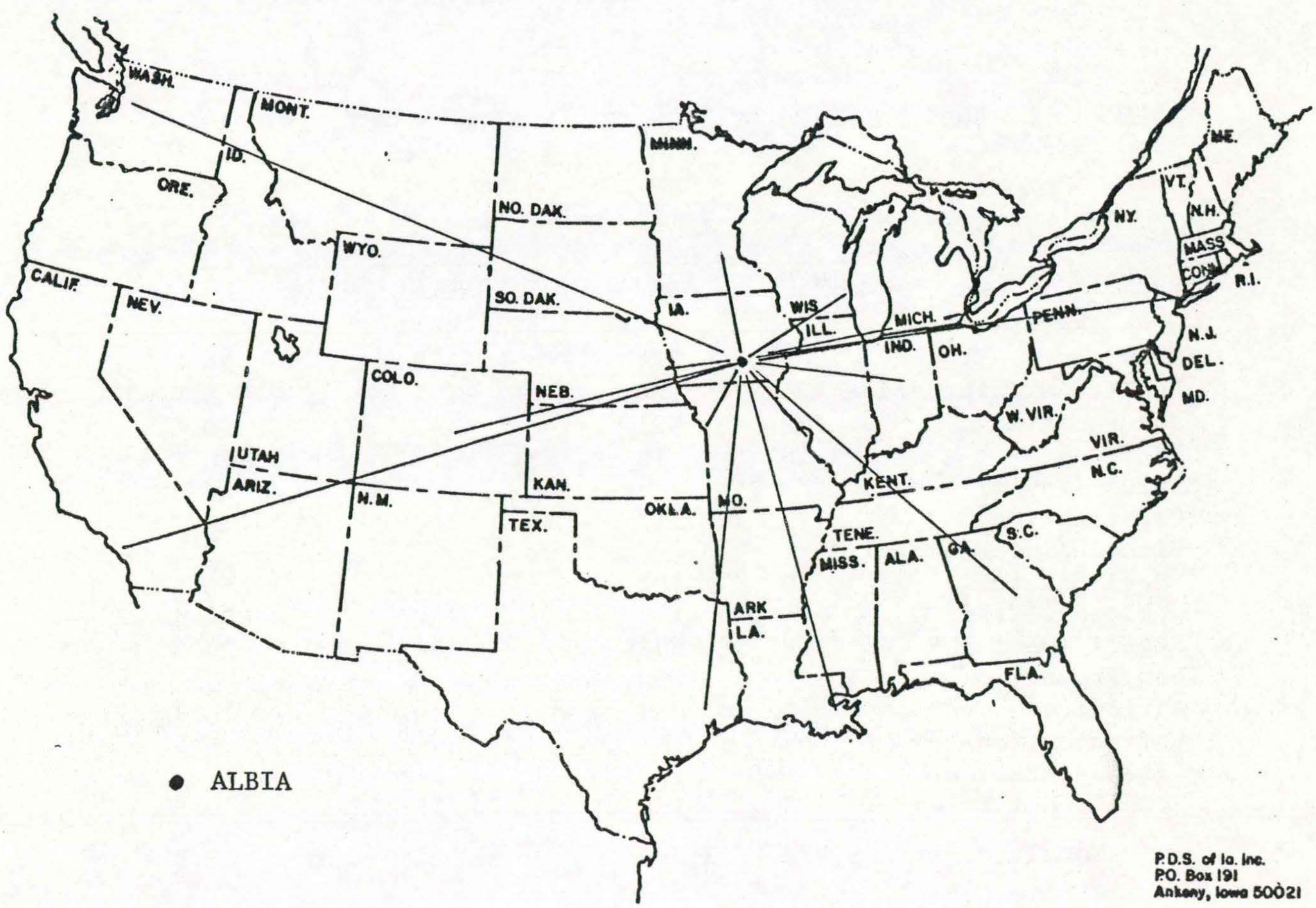


TABLE 1-5: TRAVEL DISTANCE

City	Miles	Days by Railroad (Carload)	Days by Motor Freight (Truckload)
Atlanta	802	5	4
Chicago	305	1	3
Cleveland	652	5	3
Denver	619	3	3
Des Moines	68	1	1
Detroit	581	3	3
Houston	890	4	4
Kansas City	195	1	2
Los Angeles	1,727	5	5
Milwaukee	361	n/a	3
Minneapolis	315	1	2
New Orleans	910	6	4
New York	1,119	n/a	4
Omaha	192	½	3
St. Louis	271	2	1

AIRPORT SERVICE AREA:

The Albia airport service area coincides with that of Monroe County. The service area contains 12 townships and all of 3 communities and part of one community. (Eddyville - 1980 population of 5.) As of 1985, an estimated 9,100 persons reside within the service area down slightly from 9,209 in 1980. The service area extends outward from Albia to encompass 434 square miles. Reference may be made to Figure 1-7.

The service area population has declined since 1930 when 15,010 person s resided within Monroe County. This decrease was typical of all rural counties in Iowa as the number of farmsteads decreased along with the smaller rural communities.

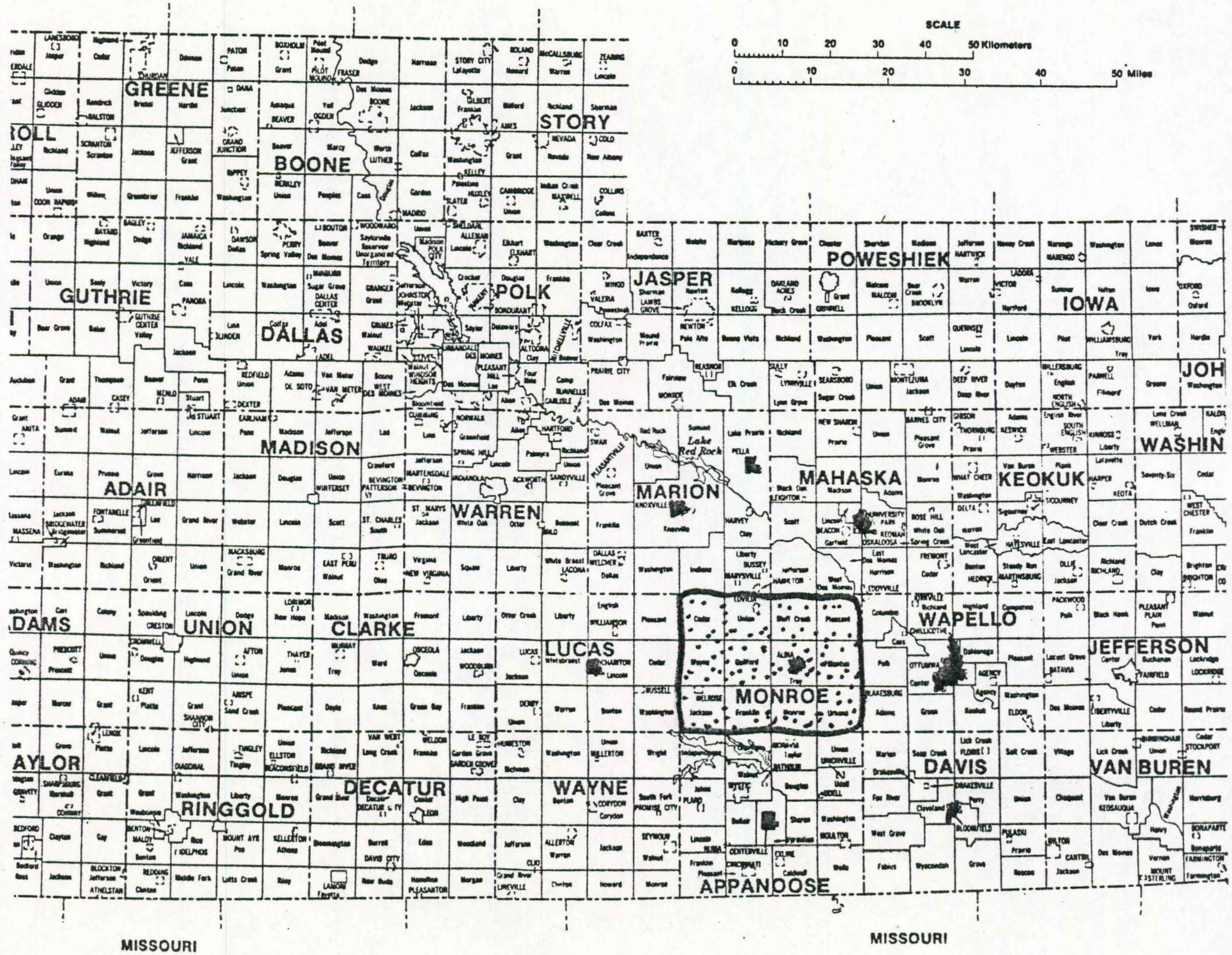


FIGURE 1-7: ALBIA AIRPORT SERVICE AREA

TABLE 1-6: MONROE COUNTY POPULATION, 1930-1980

Year	Population	Year	Population
1930	15,010	1960	10,463
1940	14,553	1970	9,357
1950	11,814	1980	9,209

Source: U.S. Census Number of Inhabitants 1980

Table 1-7 summarizes population change within the airport service area from 1960 to 1980. Future population change is presented in table 1-8.

TABLE 1-7: AIRPORT SERVICE AREA POPULATION, 1960-1980

	1960	1970	1980	Change 1960-80	
Townships				Number	Amount
Bluff Creek	518	401	330	-188	-36.3
Cedar	302	229	185	-117	-38.7
Franklin	267	246	230	- 37	-13.9
Guilford	505	407	374	-131	-25.9
Jackson	466	402	454	- 12	- 2.6
Mantua	557	544	587	30	5.3
Monroe	401	388	366	- 35	- 8.7
Pleasant	434	360	422	- 12	- 2.8
Troy	5,283	4,784	4,711	-572	-10.8
Union	1,063	1,076	1,029	- 34	- 3.2
Urbana	327	294	303	- 24	- 7.3
Wayne	340	226	218	-122	-35.9
Total County	10,463	9,357	9,209	-1254	-12.0
Communities					
Melrose	214	192	218	4	1.9
Eddyville (part)	7	7	5	-	-
Albia	4,582	4,151	4,181	-398	- 8.7
Lovilia	630	640	637	7	1.1

Source: U.S. Census Number of Inhabitants 1980

TABLE 1-8: AIRPORT SERVICE AREA POPULATION, 1980-2000

	Service Area	Iowa		
1980	9,209	2,913,808		
1985	9,100	2,905,400	-109	-1.1
1990	9,000	2,913,500	-100	-1.1
1995	8,900	2,931,000	-100	-1.1
2000	8,900	2,965,000	0	0
2,005	8,900		0	0

Source: Iowa Census Data Center Iowa Population Projections
July 5, 1984 (1980-2000)

The service area population is expected to change little through the year 2005. Population projections prepared by the Iowa Census Data Center project a modest decline in total service area population thorugh 1995 when an estimated 8,900 persons will reside within the service area. For each five year period from 1980 through 1995, the service area population is projected to decline by 1.1 percent.

The decline is expected within the rural areas. From 1970 to 1980, the total county population (service area) declined by 148 persons. Albia and Melrose within the same period recorded a population increase of 33 and 26 persons respectively. Lovilia recorded a loss of 3 persons. Consequently, township population decreased by 204 while community population increased by 56 persons. Albia is expected to experience little population change over the 20 year planning period.

AREA AIRPORTS

STATE SYSTEM OF AIRPORTS:

The 1982 IOWA AVIATION SYSTEM PLAN identifies 80 airports which will serve the needs of the state. In addition, there are 41 publicly-owned airports that are classified as "local service airports." (Figure 1-8).

A local service airport is eligible for state planning safety project funding, but not development funding. These airports could, provided there was a substantial increase in activity, be placed in a higher category of development.

The state system is based upon hierarchy of airports each providing an increasing service capability.

Basic Utility (BU):	Those airports designed to accomodate 95 percent of all aircraft weighing 12,500 pounds or less.
General Utility (GU):	Those airports designed to accommodate 100 percent of all aircraft with a gross landing or take-off weight of 12,500 pounds or less.
Basic Transport (BT):	Those airports accommodating aircraft weighing 60,000 pounds or less and computer airline service aircraft.
General Transport (GT):	General Transport airports will accommodate all aircraft weighing 150,000 pounds or less and major airline turbojet aircraft.

The state system consists of four general transport airports and 16 basic transport category airports. Of the 60 utility category airports, 33 are classified as general utility airports and 27 as basic utility facilities.

Area airport facilities are located in Chariton, Knoxville, Ottumwa, and Centerville. Of the system airports, facilities at Chariton and Albia were classified as Basic Utility (BU) airports. Centerville and Knoxville were classified as a General Utility (GU) airport. Ottumwa, a former naval air station is classified as a Basic Transport airport. Selected characteristics of the area airport facilities are summarized in Table 1-9. Of the area airports, all are in the National Plan of Integrated Airport Systems (NPIAS).

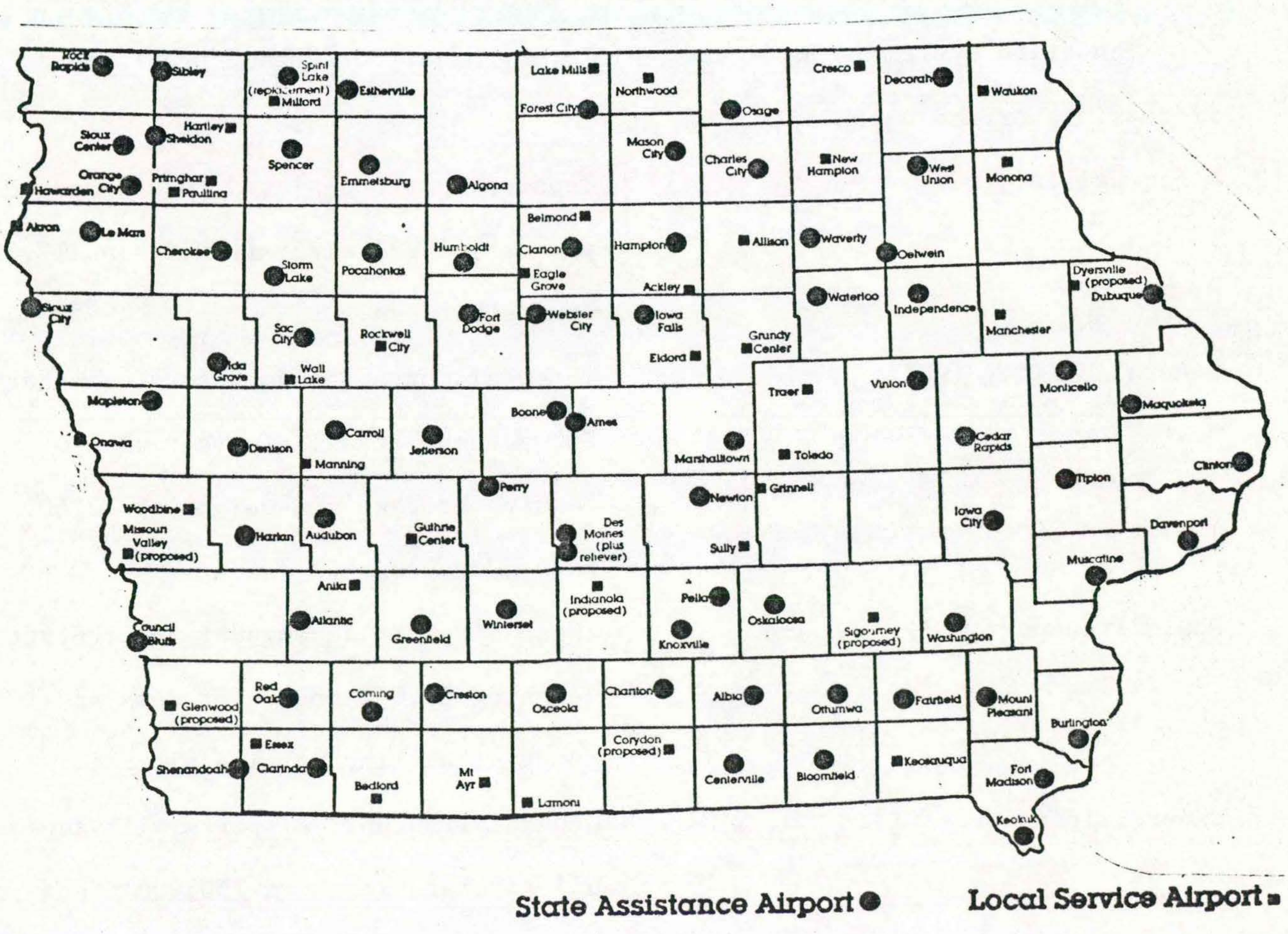


FIGURE 1-8 1982 IOWA AVIATION SYSTEM

TABLE 1-9: AREA AIRPORTS

	Albia	Knoxville	Ottumwa		Chariton	Centerville	
Elevation	963	927	845		1049	1028	
Long.	92-45-46W	93-07-00W	92-26-53W		93-21-44W	92-53-45W	
Lat.	40-59-40N	41-18-00N	41-06-24N		41-01-13N	40-41-13N	
Acreage	63	160	1400		120	178	
Runway	13/31	15/33	13/31	4/22	17/35	15/33	17/35
Length	2500	2980	6500	5177	2800	3500	2640
Width	50	75	150	200	60	50	30
Surf.	Asph.	Conc.	Asph-C	Asph.	Asph.	Conc.	Asph.
Gross Weight	15000SW	28,000SW	80,000SW	42,000SW	4,000SW	10,000SW	-
Lighting	LIRL	LIRL	HIRL	MIRL	MIRL	MIRL	
Marking	Basic	NPI	PIR	NPI	Basic	Basic	-
VASI	No	No	V-4	V-4	No	No	No
REIL	No	Yes	No	No	No	No	No
Beacon	Yes	Yes	Yes		No	Yes	
Seg. Circle	No	No	Yes		Yes	Yes	
Based Aircraft							
Single Eng.	17	38	30		26	8	
Multi-Eng.	1	2	10		5	1	
Total	18	40	40		31	9	

Source: FAA Form 5010, 1984

Area airport facilities are depicted in Figure 1-9 to include Victor enroute airways and VHR Omni Directional Range (VOR) locations.

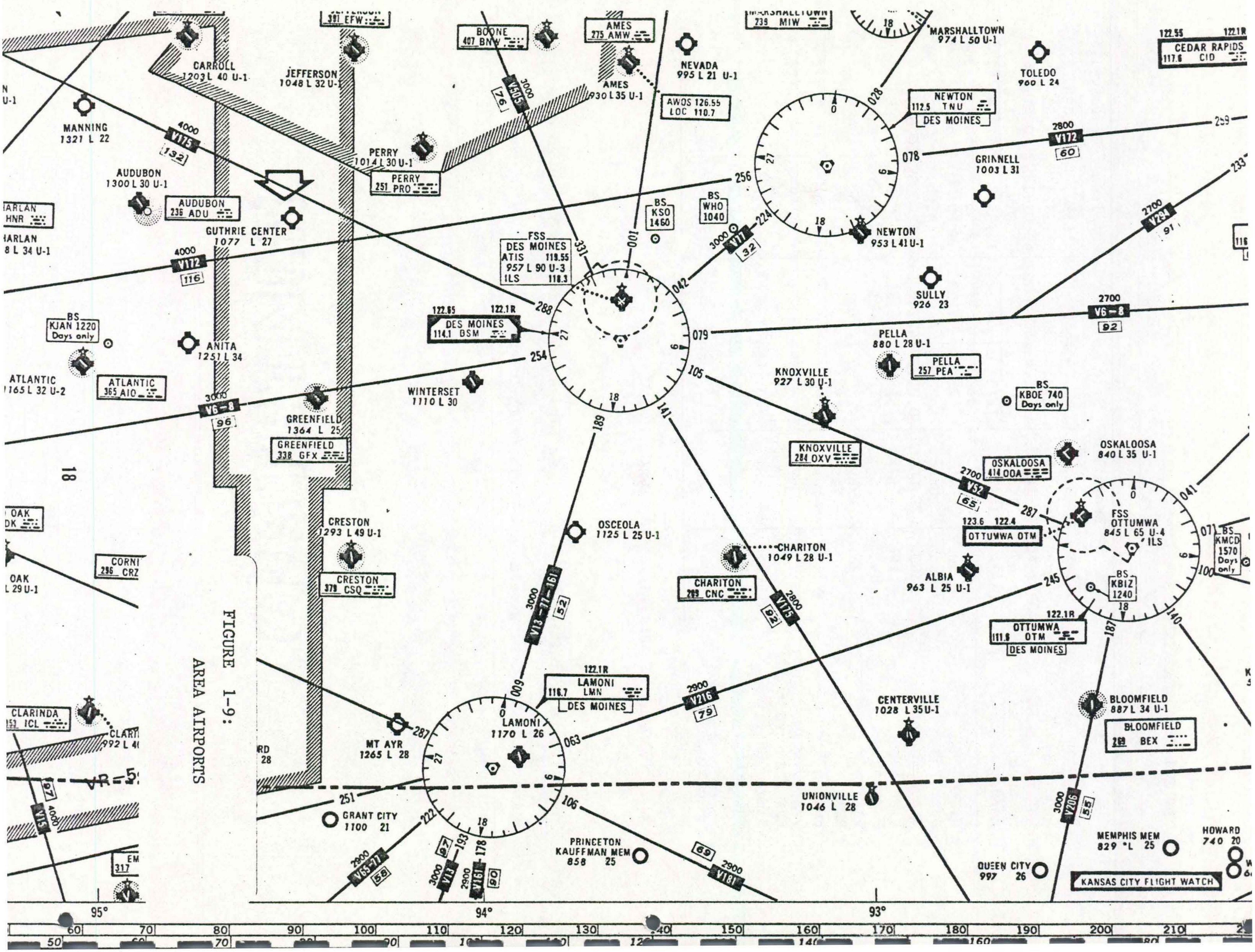


FIGURE 1-9: AREA AIRPORTS

II. FORECAST OF AVIATION DEMAND

FORECAST OF AVIATION DEMAND

Introduction:

The forecast of aviation demand provides a basis by which to evaluate existing facility development against immediate and long range operational activity. The estimates of aviation activity presented herein are based upon potential levels found within a defined geographical area. National and state trends are summarized followed by regional and airport service area trends.

In addition to the airport facility the more significant variables influencing future numbers of based aircraft and aircraft operations are as follows:

1. Based Aircraft
   - A. Population

     Size, change and characteristics
   - B. Economic Base

     Industry, occupation
2. Aircraft Operations
   - A. Number of Airmen

     Pilots
   - B. Economic Base

     Industry, occupation

Aircraft storage facilities and unit cost together with services provided by a Fixed Base Operator (F.B.O.) also influence the level of activity. Touch and go operations generated by student traffic may be largely due in part to efforts by the local FBO or air taxi operator.

The decision to travel or transport an item from one point to another is based upon a number of factors to include those summarized below:

- Distance
- Accessibility
- Cost
- Purpose of trip
- Number of persons
- Type and value of cargo
- Availability of other modes
- Aviation interest

REGISTERED AND BASED AIRCRAFT

National Trends:

The number of general aviation aircraft within the United States increased from 1979 to 1983. As of January 1, 1983 there were 209,779 active general aviation aircraft within the fleet representing an annual increase of 1.4 percent. The most significant change within the 5-year period was the number of ultralights acquired for recreational flying. An estimated 25,000 to 30,000 ultralights are currently in use.

Table 2-1 summarizes the historic changes within the general aviation fleet by aircraft type for the period 1979 through 1983. As of January 1, 1983, single engine piston powered aircraft made up 78.2 percent of the fleet down slightly from the 1979 share of the total.

TABLE 2-1: U.S. GENERAL AVIATION AIRCRAFT BY TYPE, 1979-1983 (in thousands)

As of January 1 Historical*	Total	Fixed Wing: Piston: Single Engine	Fixed Wing: Piston: Multi Engine	Fixed Wing: Turboprop	Fixed Wing: Turbojet	Rotorcraft: Piston	Rotorcraft: Turbine	Balloons/ Dirigibles Gliders
1979	198.8	160.7	23.2	3.1	2.5	2.8	2.5	4.0
1980	210.3	168.4	25.1	3.5	2.7	3.1	2.7	4.8
1981	211.0	168.4	24.6	4.1	3.0	2.8	3.2	4.9
1982	213.2	167.9	25.5	4.7	3.2	3.3	3.7	5.0
1983	209.8	164.2	25.0	5.2	4.0	2.4	3.7	5.2

Source: FAA FAA Aviation Forecasts - FAA - APO - 84 - 1 Feb. 1984, (p. 51)

Active singe-engine and multi-engine piston aircraft are expected to grow 2.4 percent per year while turbine powered aircraft are expected to grow at 5.8 percent. A 7 percent annual rate of growth was estimated for turbine rotocraft. Some 7,300 aircraft per year are expected to be added to the national general aviation fleet between 1984 and 1995.

TABLE 2-2: U.S. ACTIVE GENERAL AVIATION AIRCRAFT BY TYPE, 1984-1995 (in thousands)

		Piston				Rotocraft		
Year	Total	Small Engine	Multi-Engine	Turboprop	Turboject	Piston	Turbine	Others
1984	207.0	160.6	24.7	5.5	4.2	2.4	4.3	5.3
1985	211.0	162.9	25.0	6.0	4.5	2.4	4.8	5.4
1986	216.9	166.7	25.6	6.6	4.9	2.3	5.2	5.6
1987	224.5	172.0	26.5	7.1	5.2	2.3	5.5	5.9
1988	233.6	178.7	27.5	7.6	5.5	2.3	5.8	6.2
1995	287.0	216.8	33.7	10.9	7.1	2.1	8.4	8.0

Source: FAA FAA Aviation Forecasts - FAA - APO - 84 - 1 Feb., 1984, (p.51)

Historic general aviation sales followed changes in the Gross National Product (GNP) suggesting that sustained growth in the economy should have a positive impact upon general aviation aircraft sales.

Business and executive use has increased while personal and instructional flying has decreased. Eighty (80) to eighty-five (85) percent of the turboprop aircraft and sixty (60) to seventy (70) percent of the multi-engine aircraft are purchased for business use. Ninety (90) percent of all turboject aircraft are sold for business purposes.

The number of hours flown by general aviation aircraft decreased from 1979 to 1983. In 1984, an estimated 37.6 million hours are expected to be flown by general aviation aircraft. A majority of the hours flown will be by single engine piston aircraft. The number of hours flown by general aviation aircraft is expected to increase from 37.6 million in 1984 to 58.4 million by 1995.

Statewide Trends:

Table 2-3 summarizes the number of aircraft registered in the State of Iowa from 1974 through 1984. As noted, the number of aircraft experienced a continual increase to 1979 when 3,530 aircraft were registered in the State. Beginning in 1980, the number of aircraft registered has experienced a decrease with 3,079 aircraft registered in 1984.

TABLE 2-3: REGISTERED AIRCRAFT - IOWA, 1974-1984

Year	Aircraft	Year	Aircraft
1974	2,565	1980	3,492
1975	2,620	1981	3,417
1976	3,144	1982	3,335
1977	3,308	1983	3,099
1978	3,492	1984	3,079
1979	3,530		

Source: IDOT, Aeronautics Division, 1984

As previously noted in Section One, annual changes in aircraft ownership parallel economic changes. As the gross state product in real terms begins to grow in a positive direction; the number of aircraft will also increase. Statewide change in the number of registered aircraft is expected to increase within the period from 1986 to 1990 at a rate well below the national rate. The period, 1990 to 2005, is expected to produce a more dramatic increase.

An estimated 3,250 aircraft are expected to be registered in the State in 1990 increasing to 3,875 by 2000 and 4,200 in 2005. These estimates are well below the estimates presented in the 1982 State Aviation System Plan.

The ratio of aircraft to 10,000 population in Iowa experienced a decrease from 11.98 aircraft per 10,000 population in 1980 to an estimated 10.59 aircraft per 10,000 population in 1985. Based upon population trends in Iowa and future aircraft, the ratio of aircraft to population is expected to increase as the economy of the state improves. By 1990, the ratio of registered aircraft to population will increase to 11.15 reaching 12.1 by 1995 wich is only a slight increase over the 1980 ratio of 11.98 aircraft per 10,000 population. An estimated 13.06 aircraft per 10,000 population will exist by 2000 increasing to fourteen (14) in 2005.

The ratio of registered aircraft to population within the Albia service area was an estimated 24.17 aircraft per 10,000 population in 1985. This ratio is well above the state estimate of 10.59 indicating a higher incidence of aircraft ownership within the Albia Airport Service Area.

As previously noted, population change within the airport service area is expected to decline through 1995 and stablize. Consequently, the number of aircraft registered in the service area are also expected to remain stable with only a modest increase anticipated through 2005. Within the State, the number of registered aircraft is expected to increase by 5.58 percent within the period 1985 to 1990. From 1990 to 1995, the number of registered aircraft is expected to increase by 9.25 percent and within the period from 1995 to 2005, an 18.3 percent increase is expected.

TABLE 2-4: REGISTERED AIRCRAFT, IOWA, 1985-2005

Year	Iowa Population	Registered G/A Aircraft	G/A Aircraft Per 10,000 Population
1980	2,913,808	3,492	11.98
1985	2,905,400	3,078	10.59
1990	2,913,500	3,250	11.15
1995	2,913,800	3,550	12.10
2005	2,998,576	4,200	14.00

Source: IDOT, 1984
PDS, 1984

Regional Trends:

An eight (8) county area was selected for a more indepth assessment thar provided by a review of statewide trends. Table 2-5 summarizes registered aircraft by year for Monroe, Appanoose, Davis, Lucas, Marion, Mahaska, Wapel and Wayne.

TABLE 2-5: REGISTERED AIRCRAFT - EIGHT COUNTIES, 1973-1984

Year	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
County					Number of Aircraft						
Appanoose	16	18	15	10	13	15	15	15	13	14	
Davis	8	10	6	6	7	5	6	9	8	7	
Marion	51	45	50	56	57	61	61	62	59	62	
Mahaska	36	29	34	35	36	33	33	30	24	26	
Monroe	17	16	16	13	18	22	21	19	22	22	
Lucas	14	16	18	19	14	16	14	13	14	14	
Wayne	4	3	4	1	8	8	10	11	11	11	
Wapello	39	45	39	52	69	68	71	74	78	67	
TOTAL	185	182	182	192	222	228	231	233	229	223	

Source: FAA as of Dec. 31, 1973-1981.
IDOT Dec., 1982-1983

The number of registered aircraft within the eight (8) county area exper the same general increase to 1979 when 231 aircraft were registerd within eight (8) counties. Beginning in 1980, the area experienced a decrease. Ir 1984, there were 182 aircraft registered in the eight (8) county area.

As might be expected, the largest number were registered in Wapello Cour followed by Marion County. The fewest number of aircraft registrations by county historically occurred in Wayne and Davis Counties.

Numbers of based aircraft at public airports within the eight (8) county region are summarized by year for the period 1976 through 1984.

TABLE 2-6: BASED AIRCRAFT AT PUBLIC OWNED AIRPORTS

Year	Albia	Ottumwa	Oskaloosa	Knoxville	Bloomfield	Centerville	Chariton	Total
1976	15	47	20	31	9	12	31	165
1977	15	47	20	31	9	12	31	165
1978	15	47	22	31	8	12	31	166
1979	18	47	29	32	8	12	31	177
1980	18	52	31	40	8	12	31	192
1981	14	39	31	43	10	13	35	165
1982	17	39	30	40	10	13	34	183
1983	16	40	27	38	12	14	31	178
1984	18	40	35	40	13	9	31	186

Source: IDOT, 1984

To facilitate understanding of the estimates for a specific airport location, reference is made to the 1978 SASP which concludes:

> "The choice of a site for basing an aircraft is not always directly related to the residence of the owner. The choice may be affected by such factors as hangar rental and maintenance fee structure, availability of terminal services, availability of navigational aids, runway length and condition, etc. An aircraft may be based several miles from the owner's place of residence in order to have access to more attractive features. Current based aircraft figures would indicate that some airports which provide services desired by aircraft owners may attract a larger number of aircraft than are registered in the county, while in other areas the total aircraft based in the county is less than the total registered aircraft in the county."

Source: SASP, 1978 (p. 38)

The above will explain some of the annual variations of general aviation aircraft registered or based at one airport or another. Those airports which now enjoy numbers of based aircraft owned by persons from outside the community or airport service area, may in the future loose their historical dominance.

"Ideally, as airport development improves the quality of airports throughout the state, the attractiveness of the airports will become more similar causing the number of aircraft based in a county to more nearly equal the number registered in that county."

Source: SASP, 1978, (p. 39)

Table 2-7 summarizes the relationship of based aircraft as a percent of the registered aircraft. Lucas County (Chariton Airport) in 1984 recorded 7.2 percent of the registered aircraft and 15.7 percent of the eight (8) county region based aircraft. The Chariton Airport was able to attract a number of aircraft from other airport service areas. Wapello County recorded 33.5 percent of regions registered aircraft and 20.1 percent of the based aircraft.

Monroe County (Albia) recorded 11.6 percent of the regional registered aircraft but only 9.1 percent of the based aircraft in 1984. In addition, the airport captured only 85.7 percent of the based aircraft potential.

TABLE 2-7: REGISTERED AND BASED AIRCRAFT - EIGHT COUNTIES - 1984

	County Registered Aircraft		Based Aircraft - Public Facility		
County	Number	% of Total	Number	% of Total	Based as % of Registered
Monroe	21	11.6	18	9.1	85.7
Appanoose	12	6.6	9	4.5	75.0
Davis	7	3.8	13	6.6	185.7
Lucas	13	7.2	31	15.7	238.5
Marion*	39	21.4	52	26.3	133.3
Mahaska	23	12.6	35	17.7	152.2
Wapello	61	33.5	40	20.1	65.6
Wayne	6	3.2	0	0.0	0.0
TOTAL	182	100.0	198	100.0	

*NOTE: Marion County has 2 public airports: Knoxville and Pella
Based Aircraft at Knoxville = 40, Pella = 12

Albia Airport Service Area:

As previsouly defined, the Albia airport service area extends across Monroe County. Of the twenty-two (22) registered general aviation aircraft, eighteen (18) reported an Albia mailing address, three (3) had a Lovilia address while one (1) was registered with a Melrose address. Table 2-8 summarizes aircraft type by community for 1984.

TABLE 2-8: REGISTERED AIRCRAFT, MONROE COUNTY, 1984

Albia - 18

1. Cessna 140
2. Cessna 172A
3. Cessna 182
4. Cessna 195B
5. Cessna 210
6. Chipmunk DHC - 1T10
7. Piper PA-23
8. Piper J3-65
9. Piper PA-72
10. Piper PA-24-250
11. Stinson 108-1
12. Swift GC1B
13. Cessna 177RG
14. Beechcraft S35
15. D Appusio
16. Aeronca 7AC
17. Cessna 150
18. 3

Lovilia - 2

1. Cessna 182
2. Beech G35

Melrose - 1

1. Piper J3C-65

Source: IDOT, December, 1984.

The number of registered and based aircraft at the Albia Municipal Airport is summarized in Table 2-9. From 1985 to 2005, the number of registered aircraft is expected to increase from 22 in 1985 to 29 in the year 2005. The number of aircraft based at the Albia Municipal is also expected to increase from eighteen (18) in 1985 to twenty-four (24) in 2005.

TABLE 2-9: REGISTERED AND BASED AIRCRAFT, ALBIA MUNICIPAL AIRPORT, 1985-2005.

Year	Registered Aircraft	Based Aircraft
1985	22	18
1990	23	19
1995	25	20
2005	29	24

Source: PDS, 1984.

The increase in the number of based aircraft assumes that the airport will capture no more than its historic share of the market and that the number of registered aircraft will increase at a rate estimated for the State of Iowa.

The future mix of based aircraft is expected to consist of single and light twin engine aircraft having a gross landing or takeoff weight of 12,500 lbs. or less. For planning purposes, the following assumptions were made:

Aircraft Approach Category

Category A Aircraft ÷ Speed less than ninety-one (91) knots.

Airplane Design Group

Design Group I ÷ Wingspan up to but not including forty-nine (49) feet.

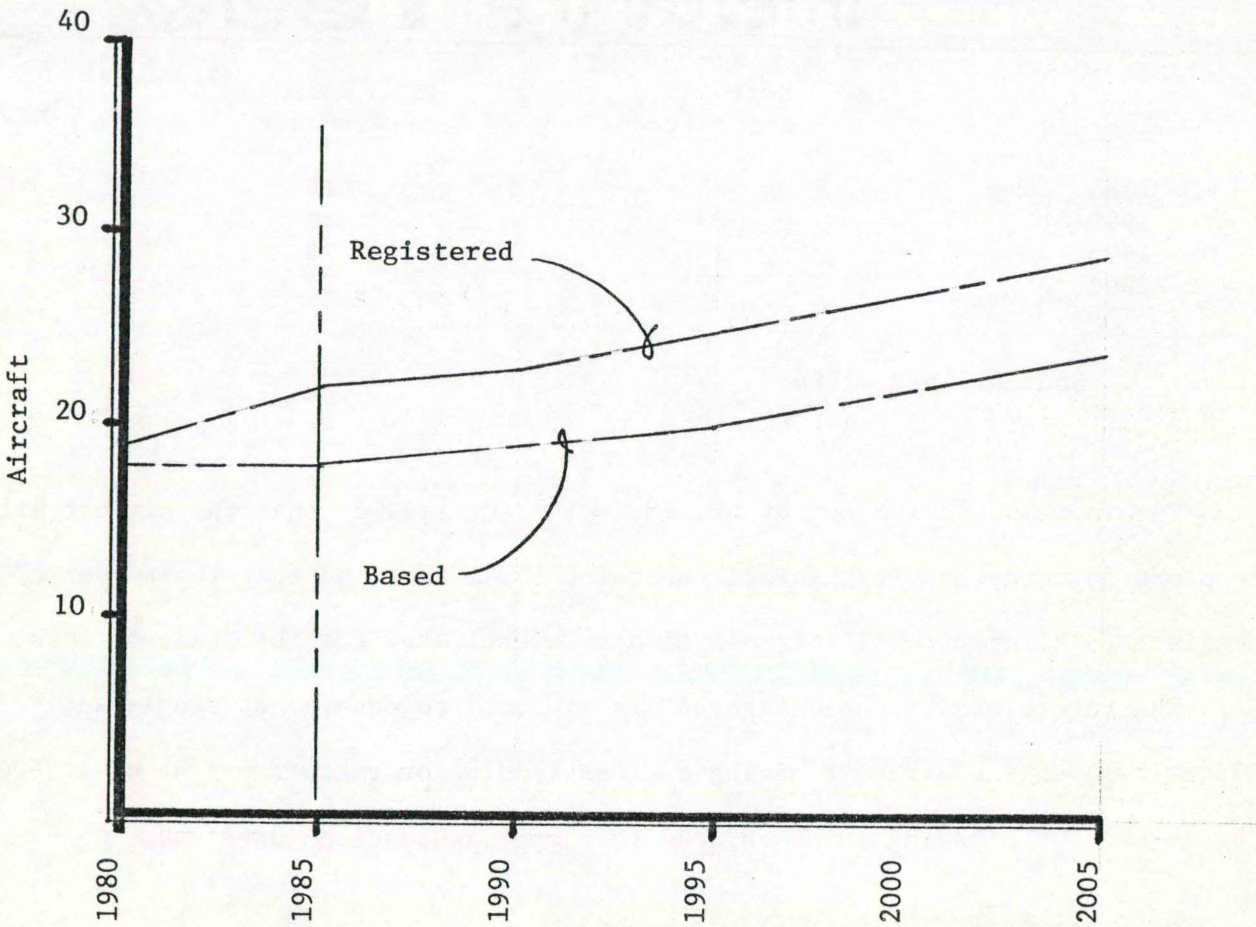


FIGURE 2-1: REGISTERED AND BASED AIRCRAFT TRENDS, ALBIA, 1985-2005

As previously noted, area airport facilities compete for aircraft. An increase in the number of based aircraft beyond the estimates in Table 2-9 would be realized only if there was an increase in ownership above historic levels or the airport offered services at a competitive price that would attract area aircraft to the facility. The actual number of based aircraft is expected to follow the trend line in Figure 2-1 deviating above and below on an annual basis.

PILOTS

National and State Trends:

The number of pilots per 10,000 population for the nation decreased from 33.94 pilots to an estimated 31.89 in 1985. The ratio of pilots to population is expected to increase from the estimated 31.89 in 1985 to 35.58 in 1990 and 38.15 airmen per 10,000 population by 1995.

The number of Iowa pilots also decreased from 40.26 in 1980 to 32.58 pilots per 10,000 population in 1984. While the decrease experienced by Iowa exceeded that of the nation, the number of registered pilots per 10,000 population was slightly greater than the U.S. ratio. The number of pilots in Iowa is expected to increase from 9,467 in 1985 to 13,413 in 2005. There were an estimated 32.58 Iowa pilots per 10,000 population in 1985.

Regional and Service Area Trends:

In 1984, there were 342 registered pilots residing in the eight (8) county region. Of the 342 pilots, 30 percent (102) resided in Marion County followed by Wapello County with 24 percent. Monroe County (Albia Airport Service Area) recorded twenty-two (22) registered pilots or 6.4 percent of the regional total. Wayne County reported the fewest number of pilots. Of the twenty-two (22) registered pilots within the Albia Airport service area fourteen (14) reported an Albia mailing address while 6 reported a Lovilia address and two (2) a Melrose mailing address. Reference may be made to Table 2-10 concerning regional pilot registration by county.

TABLE 2-10: REGISTERED PILOTS, EIGHT COUNTIES, 1984

County	Pilots	Pilots Per 10,000 Population	County	Pilots	Pilots Per 10,000 Population
Monroe	22	24.2	Davis	18	19.1
Appanoose	25	16.8	Wapello	83	21.2
Lucas	21	20.2	Mahaska	62	24.3
Wayne	9	11.1	Marion	102	33.4
			TOTAL	342	23.3

Source: IDOT, 1984.

The ratio of pilots to population in Monroe County is close to the eight (8) county area average. The low number in Wayne County may be explained in part due to the absence of a public owned airport facility. The above average number of pilots per 10,000 population in Marion County may be due to the location of two public airport facilities.

The ratio of pilots to aircraft in Monroe County was nearly one to one (1.04:1.0) whereas the eight (8) county regional ratio was 1.9 pilots per registered aircraft. As was previously noted, the number of registered aircraft (23.1/10,000) Monroe County was nearly twice the regional number (12.4/10,000).

Pilot trends within the Albia airport service area are summarized in Table 2-11. The number of registered pilots are expected to increase from twenty-two (22) in 1985 to thirty-one (31) in 2005. The increase follows statewide increases anticipated over the twenty (20) year planning period.

TABLE 2-11: PILOTS, ALBIA AIRPORT SERVICE AREA, 1985-2005

Year	Pilots	Increase Number	Increase Percent
1985	22	-	-
1990	25	3	13.6
1995	27	2	8.0
2005	31	4	14.8

Source: PDS, 1984

AIRCRAFT OPERATIONS

Annual, Itinerant and Local Operations:

An aircraft operation is defined as the airbourne movement of aircraft in controlled and non-controlled airport terminal areas and about given enroute fixes or at other points where counts can be made. Each movement counts as an operation. A "touch and go", for example, counts as two operations.

Total annual aircraft operations are further broken down into local and itinerant operations. A local operation is defined as one by an aircraft that:

1. Operates within the local traffic pattern or within sight of the control tower:

2. is known to be departing for or arriving from local practice areas; or

3. executes simulated instrument approaches of low passes at the airport.

An itinerant aircraft operation is one that operates outside the local traffic pattern. A typical example of an itinerant operation is an air taxi operation. Aviation operations are most often discussed in terms of:

1. Total annual aircraft operations
   - Total annual local
   - Total annual itinerant

2. Peak day and peak hour operations

Aircraft operations are a function of the following elements:

1. Based Aircraft
2. Resident Airmen
3. Airport Facilities
4. Airport Management
5. Social and Economic Characteristics of the Airport Service Area
6. F.B.O. and Air Taxi Services

Without a daily log of operational activity, an estimate of total annual itinerant and local operations are most often derived from a random survey or local sources. A high degree or correlation has typically been found between aircraft operations and service area population, based aircraft and registered airmen.

Total annual aircraft operations were computed utilizing the following equation:

$$\text{Log (Total Annual Operations)} = 2.614 + 0.501 \text{ Log (Based Aircraft} \times \text{pilots)}$$

The same variables were used to estimate itinerant operations:

$$\text{Log (Total Itinerant Operations)} = 1.865 + 0.605 \text{ Log (Based Aircraft} \times \text{pilots)}$$

The above models are obtained from the 1978 Iowa State Airport System Plan Update prepared by the Engineering Research Institute, Iowa State University. The models (equations) accounted for 88 and 95 percent of the variation respectively.

A count of aircraft operations was conducted by the IDOT for a one (1) week period (June 7-13) in 1982. Of the 183 total operations, eighty-eight (88) were touch and go, fifty-five (55) were classified as local and thirty (30) as itinerant. Assuming that the period (one week) was a typical week, 9,516 operations would have been conducted. Since operational activity generally increases in the summer months, a seasonal adjustment must be made. Research presented in the 1976 Iowa State Aviation System Plan found that in the month of June, a factor of 0.84 applied to the weekly count times fifty-two (52) would produce a realistic estimate of total annual operations. In summary, an estimated 7,993 to operations were conducted.

Based upon the forecast of based aircraft and airmen within the Albia Airport service area, an estimate of total annual aircraft operations was made for the period 1985 to 2005. As noted in Table 2-12, the number of aircraft operations are expected to record a modest increase throughout the twenty (20) year planning period reaching 12,412 by the year 2005.

TABLE 2-12: TOTAL ANNUAL OPERATIONS, 1985-2005.

Year	Annual Operations
1985	9,101
1990	9,932
1995	10,752
2005	12,412

Source: PDS, 1984

Annual itinerant and local operations are summarized in Table 2-13. Local operations were obtained by subtracting annual itinerant operations from total annual operations presented in Table 2-12.

TABLE 2-13: ANNUAL ITINERANT AND LOCAL OPERATIONS, 1985-2005.

Year	Annual Itinerant	Annual Local
1985	3,086	6,015
1990	3,425	6,507
1995	3,773	6,979
2005	4,488	7,924

Source: PDS, 1984.

The majority of aircraft operations are expected to be made by single engine and light twin engine aircraft with a gross land and takeoff weight under 12,500 pounds. For planning purposes, it is assumed that nearly all operations would be made by aircraft with an approach speed less than 91 knots and a wingspan up to but not including forty-nine (49) feet. An airport designed to Airplane Design Group I standards is expected to satisfy future aviation demand activity.

No indepth assessment of peak day and peak hour operational activity was made. Reference to FAA AC 150/5060-3A, "Airport Capacity Criteria Used In Long-Range Planning" reveals the following generalizations concerning capacity.

Single Runway Configuration
- Arrivals equal departures, Aircraft mix one.
- Practical Annual Capacity

    1) VFR: Ninety-nine (99) Operations/hour
    2) IFR: Fifty-three (53) Operations/hour

- Practical Annual Capacity

    1) 215,000 operations

Maximum operations recorded for a one hour period in 1982 activity count was eighteen (18). The average daily activity was twenty-six (26) operations. Consequently, the airport is not expected to experience a runway/taxiway capacity problem within the twenty (20) year planning period.

AIR PASSENGERS/FREIGHT

Commuter Airline/Air Taxi:

The Airline Deregulation Act of 1978 provided for the phase out of the Civil Aeronautics Board (CAB) control over pricing market entry and market exit. Consequently, there has been a pronounced effect upon air service in Iowa with the communities of Ottumwa and Clinton being served at present by commuter air carriers. Certificated air service by major carriers is also expected to be replaced by commuter service in Fort Dodge, Mason City, Dubuque and Burlington.

The Iowa DOT concluded in the 1982 state Airport Systems Plan that commuter air carrier service to Iowa communities, other than those with prior air carrier service, appears marginal.

> "Although commuter air service has been established in several very small markets in Iowa (Clinton, Marshalltown and Spencer), the prospects for the expansion of such services in Iowa are limited."
>
> Source: IDOT, 1982 Iowa Aviation Systems Plan, (p. 27).

American Central Airlines, a commuter, currently provides service to Ottumwa from Clinton with three (3) round trips daily. The nearest certificated air carrier service is provided at Des Moines. The air taxi is the most appropriate carrier of air passengers and cargo for Albia and Monroe County.

The number of air passengers was estimated for the Albia Municipal Airport based upon the number of itinerant operations times an average 1.5 enplanements per operation divided by two (2). Air freight was estimated at eight (8) pounds per enplaned passenger. Reference may be made to Table 2-14.

TABLE 2-14: AIR PASSENGERS AND AIR FREIGHT, ALBIA, 1985-2005.

Year	Passenger Enplanements	Air Freight (In Tons)
1985	4511	18
1990	4880	20
1995	5234	21
2005	5943	24

wrong by about factor of 2

Source: PDS, 1984

The forecast of aviation activity represents a trend line along which actual occurrences are anticipated. Actual occurences will fall above and below the trend line. In summary, future numbers of based and registered aircraft together with operational activity will experience a modest growth through the year 2005.

III. FACILITY REQUIREMENTS

AIRPORT FACILITY REQUIREMENTS

INTRODUCTION

Section Three outlines those facilities required to meet and satisfy anticipated aviation activity through the year 2005. Facility requirements outlined herein are based upon FAA and IDOT guidelines. The Iowa Department of Transportation has taken exception to conformance with FAA guidelines in some cases. The most salient of these relate to the crosswind runway.

> "FAA standards suggest that crosswind runways at utility airports should be paved whereas the premise here is that these will remain unpaved."
> (1978 IDOT SASP, p. 54)

Such deviation by the IDOT is based upon the assessment of future funding levels for airport improvements in the State of Iowa. Whereas the FAA guidelines represent the ultimate level of development, the IDOT maintains that such deviation from FAA guidelines is an appropriate subject for detailed review within the planning process.

The objective herein is to identify those facility needs which will enhance the operational capability and safety of the existing airport site in a viable and prudent manner. As noted in Section II, the airport should ultimately be developed to Basic Utility-Stage II standards. Section Three examines the existing level of service provided by each air and landside component of the airport.

RUNWAYS AND TAXIWAYS

Runway Alignment

Runway alignment is based upon a number of factors to include topography, cultural features, physical features, land ownerships, environmental and climatic conditions. Of these, wind coverage provided by an existing or proposed runway is a primary concern.

The optimum runway orientation is one which will provide the airport a 95 percent level of wind coverage at a crosswind component value not exceeding 12 m.p.h. (10.5 knots) for utility airports and 15 m.p.h. for larger than utility airports. It would be desirable to orient a single runway so as to obtain the 95 percent wind coverage. In Iowa, the wind is so varied that a crosswind runway is required to supplement coverage obtained from the primary runway.

Since there is no wind data available for the Albia Municipal Airport, wind data tabulated at the Des Moines Airport was used for determining wind coverage by the existing runway alignments. Reference may be made to Figure 3-1 regarding the percentage of wind by knots and direction.

The orientation for the existing runway facility is as follows:

Primary Runway	RW 13/31	N49°36'44"W (true)
Crosswind Runway	None	

Based upon Des Moines data and a 10.5 knot crosswind component value, the primary runway provides 81.6% coverage. It should be noted that local topographic conditions may alter local wind characteristics somewhat.

The crosswind runway should be aligned so as to obtain required length and optimum wind coverage within site and environmental constraints.

The IDOT, as a rule of thumb, recommends a min. of 60 degree separation between runway facilities. Although this is not a standard, it does minimize a duplication of wind coverage. Such consideration is relevant where funding is limited and a maximum return is expected from the investment in crosswind runway facilities.

Source: Des Moines 1951-1960

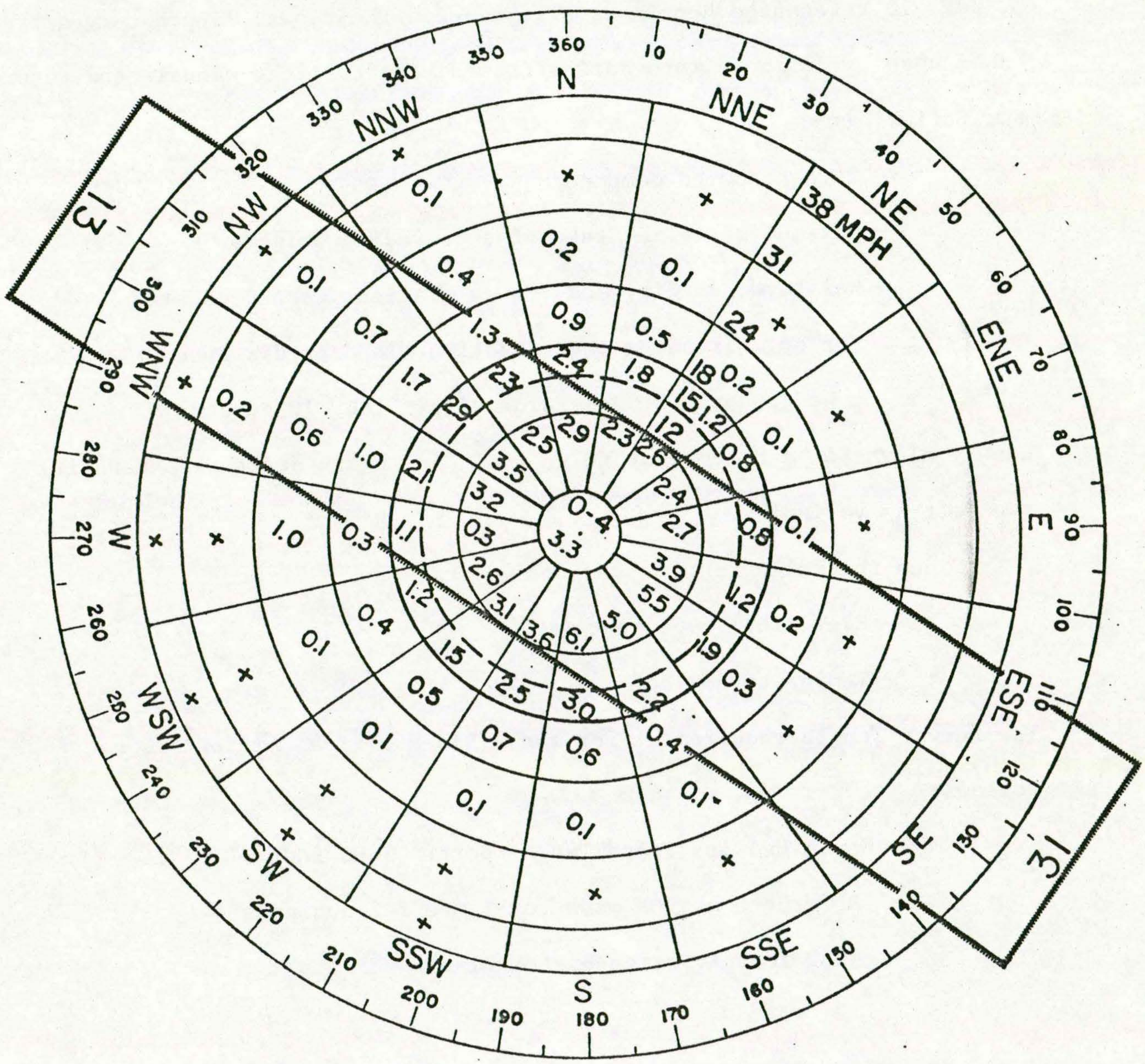


FIGURE 3-1 Wind Rose

Runway Length and Width

The runway length requirement at a given airport facility is a function of the aircraft fleet using the facility. As previously noted, an airport developed to Basic Utility Standards would generally satisfy aviation demand over the twenty-year planning period. Basic transport category aircraft would be expected to utilize the Ottumwa Airport.

Runway length requirements were obtained from FAA AC 150/5300-4B, CHG. 6, page 13 referenced herein as Figure 3-2. The runway length curves are based upon performance information from aircraft flight manuals and assumes the following:

- Zero headwind component
- Maximum certified takeoff and landing weights
- Relative humidity and runway gradient were accounted for by increasing the takeoff or landing distance of the groups most demanding aircraft by 10 percent.

Runway elevation and temperature (normal maximum in degrees Fahrenheit) are left as variables.

Given the following:

- Elevation: 963 feet (ASL)
- Temperature: $88^{o}F$

The runway length requirement for the Albia Municipal Airport is as follows:

- Basic Utility Stage Two Airport: 3400 feet (Reference may be made to Figure 3-2 and page 44, 1982 Iowa Aviation System Plan).

Note: Albia: Runway length to:
3400 feet (3350')

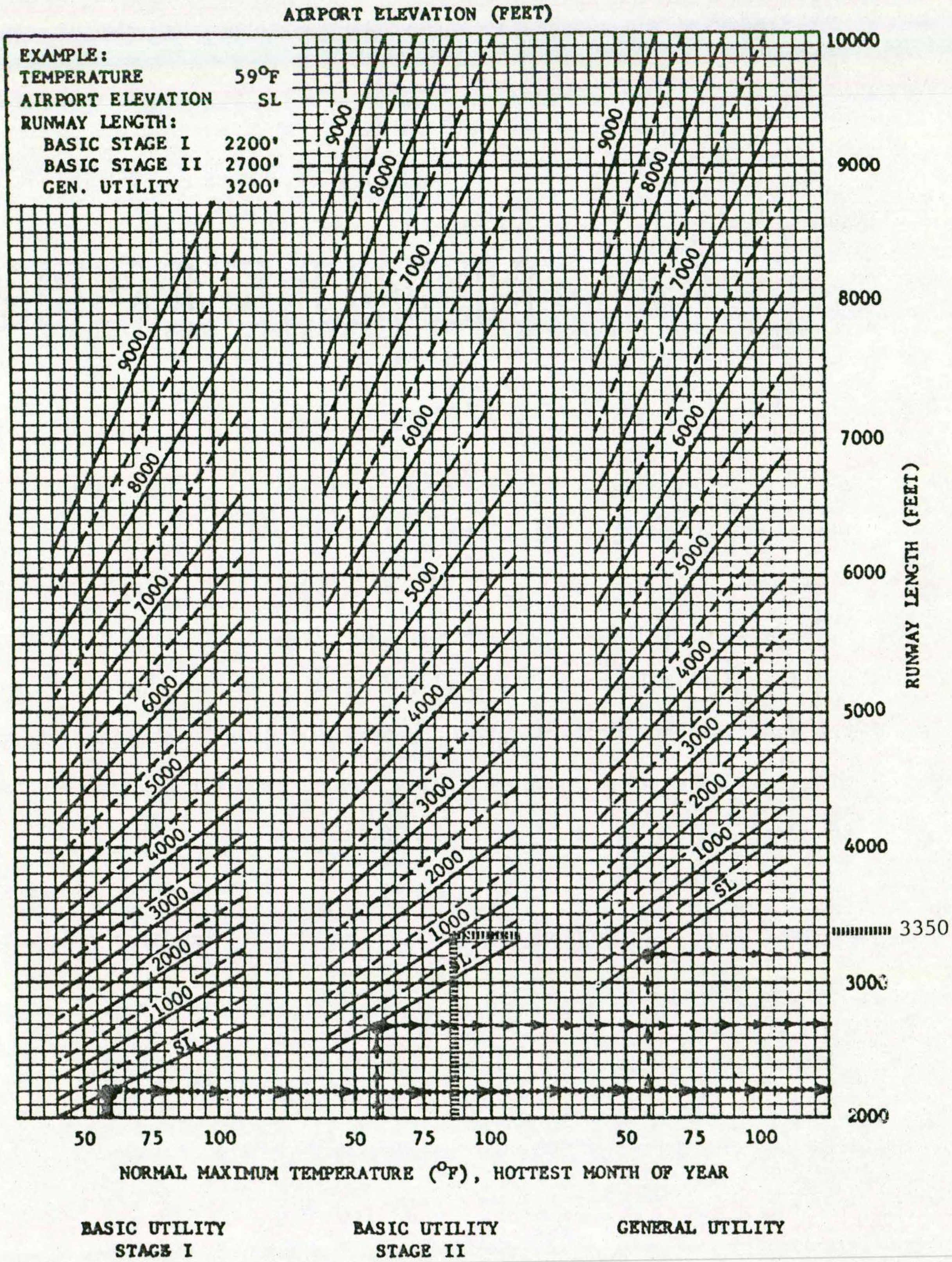


FIGURE 3-2

RUNWAY LENGTH

Where it is not feasible to construct a runway to the desired length, no less than 80 percent of the desired length should be constructed. While the crosswind runway should be the same length as the primary runway, it should in no case be less than 2720 feet.

For planning purposes an ultimate length of 3400 feet is recommended. Based upon anticipated use, it would not appear to be cost effective to extend the runway length beyond 3400 feet.

The runway width should be no less than 60 feet for a basic utility runway (airplane design group I with a non precision approach).

Taxiway

The IDOT finds justification for a partial parallel taxiway system when total annual operations are between 30,000 and 50,000. A full parallel system is justified when operations are in excess of 50,000 annually.

Based upon the forecast of aviation demand and IDOT criteria, there would appear to be no justification for the construction of a parallel taxiway. The FAA finds justification for a parallel taxiway based upon the criteria of safety. For planning purposes, a full parallel taxiway would be expected to receive a low priority in terms of implementation.

The taxiway should be no less than 25 feet in width. Existing and future taxiways providing access to hangar facilities need not be more than 20 feet in width.

TABLE 3-1: RUNWAY AND TAXIWAY NEEDS

PERIOD	RUNWAY LENGTH	RUNWAY WIDTH	TAXIWAY* LENGTH	TAXIWAY* WIDTH
1985-1989	3400'	60'	Parallel	25'
1990-1994	3400'	60'	Parallel	25'
1995-2005	3400'	60'	Parallel	25'

* Low Priority

Holding Apron

Where a partial or full parallel taxiway is not recommended, an aircraft turnaround is recommended for each runway end. A typical turnaround is depicted in Figure 3-3.

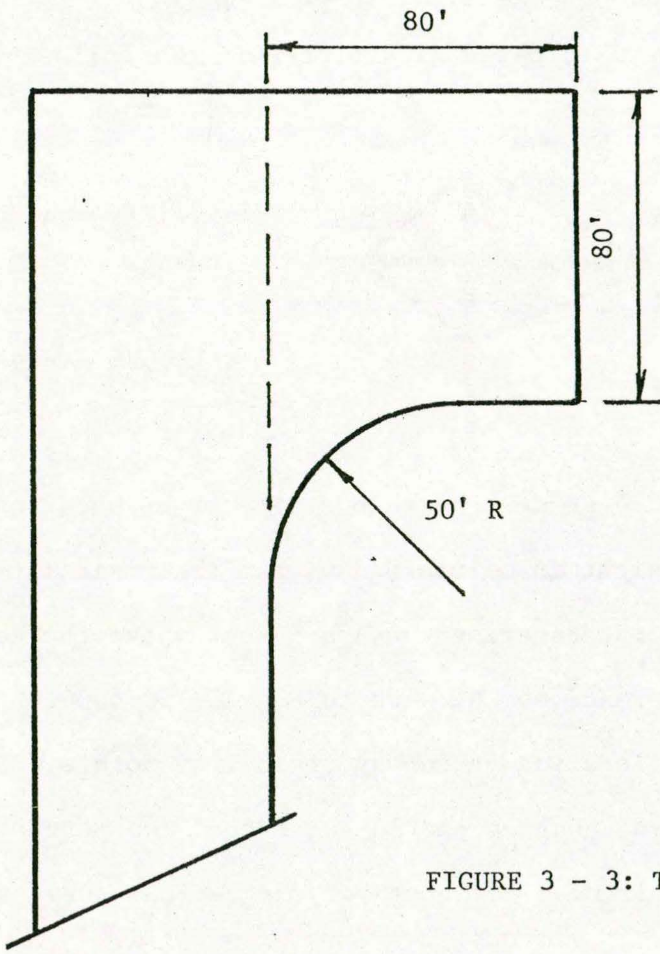


FIGURE 3 - 3: TYPICAL TURNAROUND

Runway Grade Change and Visibility

Consideration must be also given to runway grade changes, line of sight along and between runways as well as elimination of obstructions within the obstacle free zone (OFZ). The following line of sight criteria should be obtained.

- Runway grade changes should be such that any two points 5 feet above the runway centerline will be visible along the entire length of the runway where a full parallel taxiway does not exist. Where a full parallel taxiway does exist, the criteria may be reduced to one half the runway length rather than the entire runway length.
- Where intersecting runways exist, a runway visibility zone is created as depicted in the following figure:

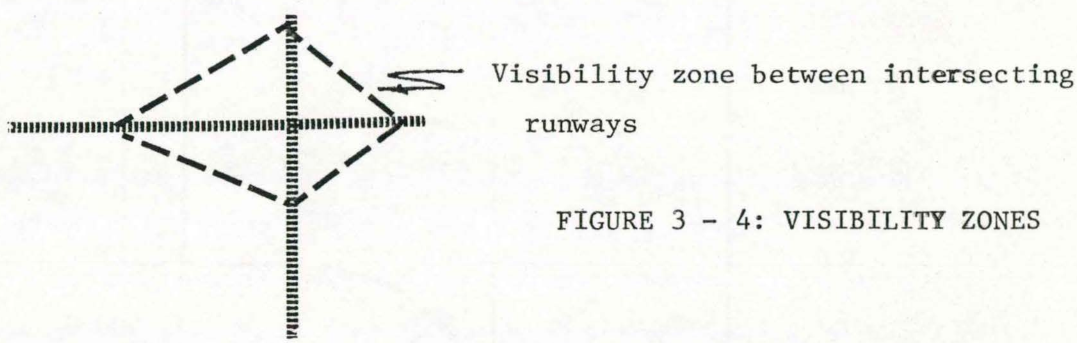


FIGURE 3 - 4: VISIBILITY ZONES

- Runway grades; terrain etc. must be such that a line of sight is maintained within the visibility zone of the intersecting runways 5 feet above the centerlines. Reference may be made to FAA AC 150/5300-4B concerning the location of runway visibility points.

Maximum grade changes should not exceed two percent where vertical curves are required. The length of the verical curve should not be less than 300 feet for each percent grade change. No vertical curves are required when the grade change is less than 0.4 percent.

Transverse grades on the runway 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 3-5 concerning a typical runway cross section. Beyond 10 feet, turf areas should be sloped at 2%.

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 120 feet and 240 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 transverse grade should not exceed five percent.

Lateral Widths and Clearances

The following are criteria for separation of airport facilities that should be taken into consideration:

- Runway centerline to taxiway centerline	225'
- Runway centerline to building restriction line (BRL) and airplane tiedown area	250' (Min. + 7:1)
- Runway centerline to property line (PL)	250'
- Taxiway centerline to airplane tiedown area and to fixed or movable obstacle	50'
- Taxiway centerline to hangar structure (one way traffic)	37.5' min.
- Runway safety area width	240'

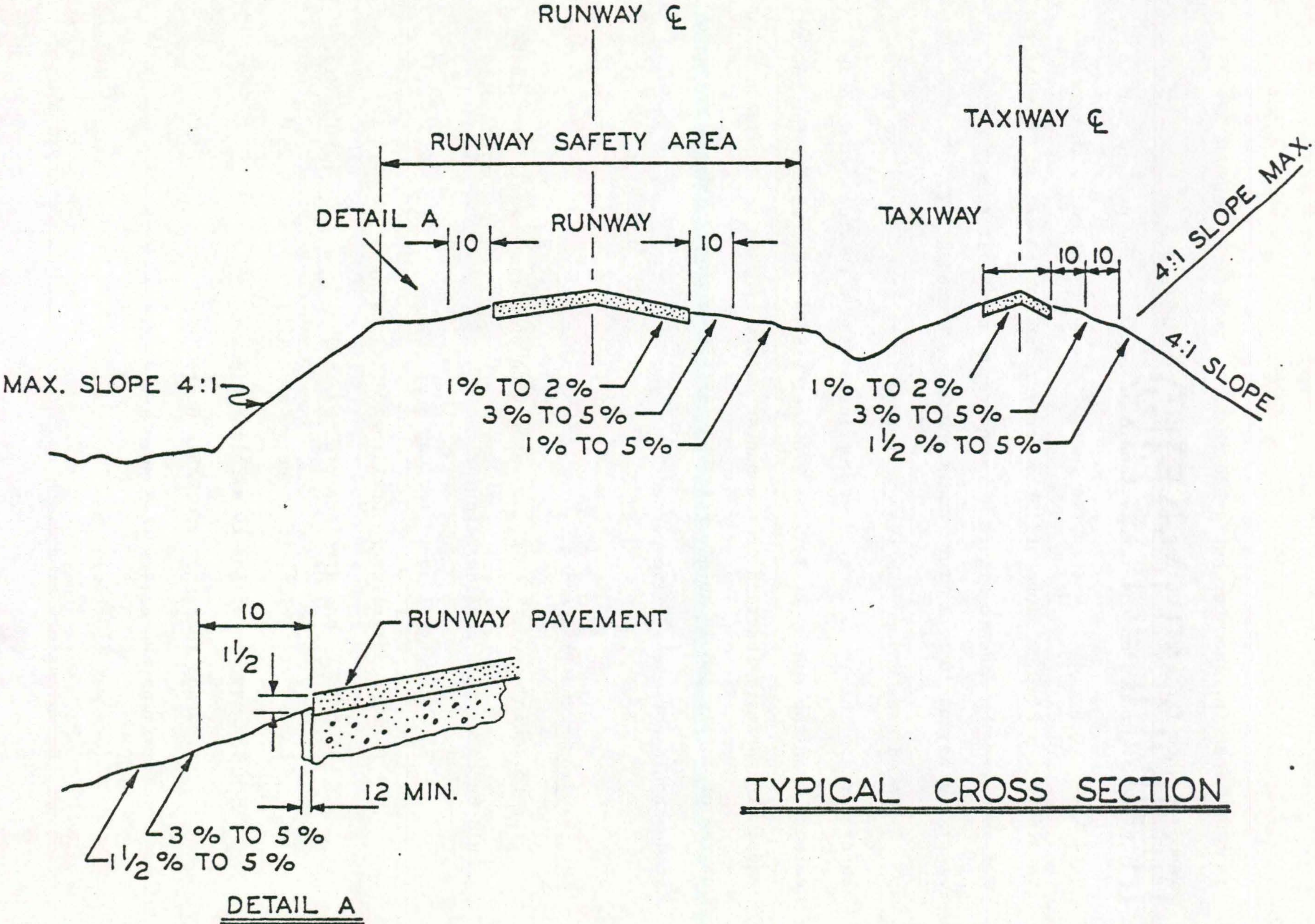

RUNWAY ℄
TAXIWAY ℄
RUNWAY SAFETY AREA
DETAIL A
RUNWAY
TAXIWAY
10
10
10 10
4:1 SLOPE MAX.
4:1 SLOPE
MAX. SLOPE 4:1
1% TO 2%
3% TO 5%
1% TO 5%
1% TO 2%
3% TO 5%
1 1/2 % TO 5%
10
1 1/2
RUNWAY PAVEMENT
12 MIN.
3 % TO 5 %
1 1/2 % TO 5 %
DETAIL A
TYPICAL CROSS SECTION

FIGURE 3 - 5

Runway and Taxiway Paving

Airport pavement is intended to provide a smooth and safe all-weather surface free from particles and other debris that may be picked up by propeller wash. The pavement should be of sufficient thickness and strength to accommodate the anticipated loads without undue pavement stress. Pavement for the Albia airport should be designed to accommodate aircraft up to a maximum gross weight of 12,500 pounds and a single wheel gear.

The various pavement courses are shown graphically in Figure 3-6 and described as follows:

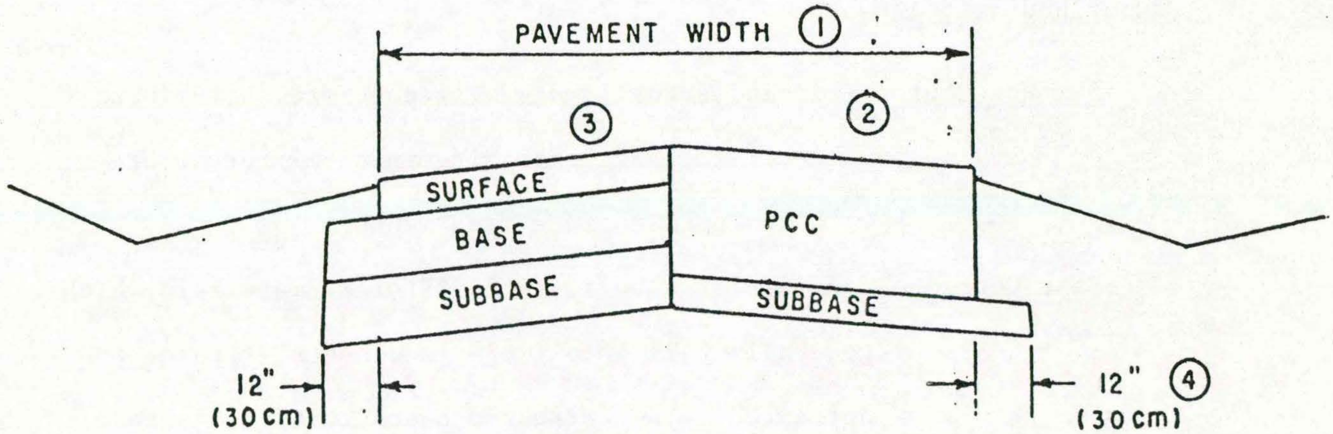
Surface Course - includes Portland cement concrete, bituminous concrete, aggregate bituminous mixtures, or bituminous surface treatments.

Base Course - consists of a variety of different materials which generally fall into two main classes, treated and untreated. The untreated bases consist of stone, gravel, limerock, sand-clay, or a variety of other materials. The treated bases normally consist of a crushed or uncrushed aggregate that has been mixed with cement or bitumen.

Subbase Course - consists of a granular material or a stabilized soil.

RIGID PAVEMENT: A rigid pavement section for the Albia airport would consist of a 5 inch thick Portland Cement Concrete surface course. The necessity of a base course, probably of crushed stone, is dependent on the bearing capacity of the soil on the selected site. A poor grade of soil will require a minimum 4 inch thick subbase course.

FLEXIBLE PAVEMENT: There are many combinations of flexible surface, base and subbase that could be required for the Albia airport. Design parameters are outlined in FAA Advisory Circular 150/5320-6C. Of critical importance in the flexible pavement design process is the bearing capacity of the existing soil.



1. Runway and taxiway widths in accordance with appropriate Advisory Circulars. Albia: runway, 60feet; taxiway,25 feet.
2. Transverse slopes in accordance with appropriate Advisory Circulars, (See Figure 3 - 5).
3. Surfacing, base, PCC, etc., as required.
4. Minimum 12" typical.

FIGURE 3 - 6: TYPICAL PAVEMENT SECTION

Runway 13/31 was resurfaced in 1981 with a one inch asphaltic concrete overlay. FAA 5010 reports a single wheel bearing of 15000 pounds. Consequently, no improvements are recommended to increase the bearing capacity of RW13/31.

The existing runway, RW13/31, consists of a 4 inch subbase, 6 inch crushed aggregate base course and a 2 inch aphaltic concrete surface course in addition to the one inch overlay (1981).

Initial apron construction (15000 square feet),(1667 square yards) consisted of a 4 inch subbase, 6 inch crushed aggregate base course and 2 inch aphaltic concrete surface course. In 1981, the existing apron was resurfaced (1 inch aphaltic concrete surface source.

Drainage

An adequate drainage system is important for the safety of aircraft operations and for the longevity of the pavements. Improper drainage can result in the formation of puddles on pavements which are hazardous to aircraft landing or taking off. Improper drainage can also reduce the load bearing capacity of subgrades and the anticipated life of expensive pavement structures.

Surface drainage systems **should** be designed on a 5-year frequency of storm. Methods of computation are contained in FAA Advisory Circular 150/5300-5B Airport Drainage.

Subsurface drainage systems are desirable where water may rise to within 1 foot of the pavement section. Water in the subgrade contributes directly to frost boil and heaving action. Also, saturated subgrades exhibit a greatly reduced load bearing capacity. For these reasons, soil conditions and subsurface water conditions play an important part in site selection and airport design.

Pavement Markings

Non-precision instrument (NPI) markings are recommended on RW 13/31 with installation of an NDB. A non-precision instrument runway is one to which a straight-in non-precision approach has been approved. NPI markings consist of basic runway markings in addition to threshold markings.

- Centerline markings:

  The centerline markings consist of a broken line having 120 foot dashes and 80 foot blank spaces. the minimum width is eighteen inches.

- Designation markings:

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

- Threshold markings:

  Threshold markings consist of eight 150' x 12' stripes. Each stripe is separated by 3 feet except the center where the separation is 16 feet. Where the runway is less than 150 feet, the width of the stripes and separation is reduced proportionally.

Taxiways are marked by a continuous stripe, 6 inches in width, along the taxiway centerline. Holding lines are located on the taxiway 100 feet from the runway edge. Additional information on pavement markings may be obtained from FAA AC150/5340-1D.

LANDING AND NAVIGATIONAL AIDS

Runway and Taxiway Lighting

A low Intensity Runway Light System (LIRL) is currently in operation on RW 13/31. It is recommended that the light system be upgraded to a medium intensity system. This action should be taken in Phase One.

Runway lights are used to outline the edges of the runway during periods of darkness or low visibility. Each runway edge light fixture emits a white light except on instrument runways where yellow is substituted for white on the last 2000 feet or one-half the runway length which ever is less. The yellow lights are located on the end opposite the landing threshold or instrument approach end. The edge light fixtures 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 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 a 180 red light inward and 180 green light outward. Threshold lights should be located no closer than two feet and no more than ten feet from the runway threshold. The two groups of lights contain no less than three fixtures for a VFR runway and four fixtures for an IFR runway. The outer most light is located in line with the runway edge lights. The remaining lights are placed on ten foot centers towards the runway centerline extended.

Taxiway edge lights should be located no more than 10 feet from the taxiway edge on 200- foot centers. The taxiway edge lights which emit a blue light define the lateral limits of the system. Reflectors may be used in lieu of taxiway lights where activity is minimal.

Reference may be made to the following FAA Advisory Circulars:

AC 150/5340-24	Runway and Taxiway Edge Lighting Systems
AC 150/5340-27	Air-to-Ground Radio Control of Airport Lighting Systems

<u>Visual Approach Slope Indicator, VASI</u>

A Visual Approach Slope Indication (VASI-2) is recommended on RW 13/31. The color light beams enable the pilot to determine if his approach is high, on course, or low. Installation of a VASI system is recommended by IDOT when there are 10,000 or more annual operations.

The VASI-2 is located on the left side of the approach to the runway. Ideally, the first light box is located 50 feet out from the runway edge and 500 feet from the threshold. The second light box should be located 700 from the first box.

Runway End Identifier Lights, REIL

Runway End Identifier Lights (REIL'S) should be in operation on each runway end. REIL's should be located in line with the threshold lights, 75 feet from the runway edge. IDOT recommends installation of a REIL system when the annual operations exceed 3,000.

Reference may be made to FAA AC 150/5340-14B, AC 150/5300-2C, and AC 150/5340025 concerning VASI and REIL design requirements.

Airport Beacon Light

An airport beacon light is in operation at the airport. The beacon light, which emits alternating white and green flashes of light, should be located no closer than 750 feet to a runway centerline.

Reference may be made to FAA AC 150/5340-21 and 150/5300-2C.

Segmented Circle and Lighted Wind Tee

A lighted wind indicator is operational. A segmented circle should be constructed in accordance with FAA design requirements.

Nondirectional Beacon

A nondirectional Beacon (NDB) is recommended for the airport. The NDB radiates a signal which can be used by pilots to provide electronic directional guidance to the airport.

This consists of two 65 foot poles spaced at approximately 350 feet with two wires strung between them. The NDB should be located on airport property but at least 100 feet away from any metal buildings, power lines or metal fences. The ground should be smooth, level and well drained. The location should take into account the obstruction standards described in this report.

Terminal Very High Frequency Onmirange

Should instument operations justify, a terminal very high frequency onmirange (TVOR) may ultimately be installed at the Albia airport. The TVOR provides azimuth information to the pilot. The TVOR should be near the runway intersection but at least 500 feet from a runway centerline and 250 feet from a taxiway centerline. The signal can be distorted or reflected by fences, structures, power lines or trees. The following clearances should be maintained.

Structures - No structures within 750 feet. Beyond that metal buildings should be cleared by a vertical angle of 1.2 degrees and other buildings by 2.5 degrees.

Fences - Metal fences should be at least 500 feet away.

Power and Telephone Lines - Overhead power and telephone lines should have clearance of at least 1,200 feet.

Trees - Trees within 1,000 feet of the antenna should be removed. Beyond 1,000 feet, trees should be cleared by a vertical angle of 2 degrees.

The groundsurface around a TVOR should be relatively flat and free from ravines, ditches, rocks or embankments. The ground may slope gently away from the TVOR but not toward it.

TERMINAL AREA

The demand for hangar space is influenced not only by the absolute number of aircraft, but by the cost, availability, and condition of the units as well. For planning purposes, it is assumed that all registered and based aircraft would be kept in hangars. For reasons previously noted, a number of aircraft owners may chose to tie down their aircraft should hangar rental cost be beyond what the owner is willing to pay. The demand for hangar space may also be influenced by the cost of comparable space at area airport facilities.

Existing hangar facilities consist of four tee and 3 conventional hangars. The capacity of the conventional hangars depend upon the size of the aircraft being stored, stacking procedures and use. One of the 3 conventional hangars is used as the FBO shop. For purposes of estimating aircraft storage needs, it is assumed that no more than one based aircraft could be accommodated in addition to itinerant aircraft in repair. Existing hangar capacity is limited to the storage of seven aircraft plus/minus two aircraft.

Future hangar needs was based upon existing capacity and the estimated number of based aircraft through the year 2005. A 6-10 unit tee type hangar may be constructed in Phase Two, 1990-1994. From 1990 through 2005, 6 additional aircraft may be based at the facility. A second 6-10 unit tee type hangar may be needed within the period 1995 through 2005 (Phase Three).

Consideration may be given to hard surfacing of a 24 stall parking lot and drive. An area to accommodate additional parking should be set aside or maintained with a gravel surface for overflow parking.

TABLE: 3-2

CURRENT AIRCRAFT ARRANGED BY AIRPLANE DESIGN GROUP

Aircraft	Appch Speed Knots	Wingspan Feet	Wingspan Meters	Length Feet	Length Meters	Tail Height Feet	Tail Height Meters	Maximum Takeoff Weight Lbs	Maximum Takeoff Weight Kg
AIRCRAFT APPROACH CATEGORY A AND B SMALL AIRPLANES IN AIRPLANE DESIGN GROUP I									
Beech Skipper 77	63	30.0	9.1	24.0	7.3	6.9	2.1	1,675	759
Foxjet 600	97	31.6	9.6	31.5	9.6	10.2	3.1	4,449	2,018
Beech Sierra C24R	70	32.8	9.9	25.8	7.8	8.1	2.4	2,750	1,247
Beech Sundowner C23	68	32.8	9.9	25.8	7.8	8.3	2.5	2,450	1,111
Cessna-150	55	33.3	10.1	24.1	7.3	8.5	2.6	1,670	757
Beech Bonanza V35B	70	33.5	10.2	26.4	8.0	7.6	2.3	3,400	1,542
Beech Bonanza F33A	70	33.5	10.2	26.7	8.1	8.3	2.5	3,400	1,542
Beech Bonanza A36	72	33.5	10.2	27.5	8.3	8.4	2.5	3,600	1,632
AJI Hustler	98	34.3	10.5	41.0	12.5	13.1	4.0	9,500	4,309
Cessna-177	64	35.5	10.8	27.2	8.3	8.6	2.6	2,500	1,134
Embraer-326	102	35.6	10.9	35.0	10.7	12.2	3.7	11,500	5,216
Piper Aerostar	94	36.7	11.2	34.8	10.6	12.1	3.7	6,000	2,722
Beech Bonanza B36TC	75	37.8	11.5	27.5	8.3	8.4	2.5	3,850	1,723
Beech Baron 58P	101	37.8	11.5	29.9	9.1	9.1	2.7	6,200	2,812
Beech Baron 58TC	101	37.8	11.5	29.9	9.1	9.1	2.7	6,200	2,812
Beech Baron E55	88	37.8	11.5	29.9	9.1	9.1	2.8	5,300	2,404
Beech Baron 58	96	37.8	11.5	29.9	9.1	9.5	2.8	5,400	2,449
Beech Baron B55	90	37.8	11.5	28.0	8.5	9.6	2.9	5,100	2,313
Beech Duchess 76	76	38.0	11.5	29.0	8.8	9.5	2.9	3,900	1,769
Mitsubishi Solitaire	87	39.1	11.9	33.2	10.1	12.9	3.9	10,470	4,749
Mitsubishi Marquise	88	39.1	11.9	39.4	12.0	13.6	4.1	11,575	5,250
Mitsubishi MU-2	119	39.1	11.9	39.5	12.0	13.6	4.1	10,800	4,899
Beech Duke B60	98	39.3	11.9	33.8	10.3	12.3	3.7	6,775	3,073
Partenavia 68B Victor	73	39.4	12.0	30.7	9.4	11.2	3.4	4,321	1,960
Learfan 2100	86	39.9	12.2	38.7	11.8	11.5	3.5	7,200	3,266
Embraer-820	74	40.7	12.4	34.6	10.5	13.0	4.0	7,000	3,175
Piper Navajo	100	40.7	12.4	32.6	9.9	13.0	4.0	6,500	2,948
Cessna-421	96	41.1	12.5	36.4	11.1	12.9	3.9	7,500	3,402
Piper Cheyenne	110	42.7	13.0	32.1	9.8	12.6	3.8	10,500	4,763
Cessna-402	95	44.1	13.4	36.3	11.1	11.4	3.5	6,850	3,107
Cessna-414	94	44.1	13.4	36.4	11.1	11.5	3.5	6,785	3,078
Beech C99 Airliner	107	45.9	13.9	44.5	13.5	14.4	4.3	11,300	5,125
Beech King Air F90	108	45.9	13.9	39.8	12.1	15.1	4.6	10,950	4,966
Beech King Air B100	111	45.9	13.9	39.9	12.1	15.4	4.6	11,800	5,352
Hamilton Westwind	96	46.0	14.0	45.0	13.7	9.2	2.8	12,495	5,668
Volpar Turbo 18	100	46.0	14.0	37.4	11.4	9.6	2.9	10,286	4,666
Cessna-404	92	46.3	14.1	39.5	12.0	13.3	4.1	8,450	3,833
Swearingen Merlin	105	46.3	14.1	42.2	12.9	16.8	5.1	12,500	5,670
Swearingen Metro	112	46.3	14.1	59.4	18.1	16.8	5.1	12,500	5,670
Rockwell 690	97	46.5	14.2	44.3	13.5	15.0	4.6	10,250	4,649
Cessna Citation I	108	47.1	14.4	43.5	13.3	14.3	4.4	11,850	5,375
Embraer-121	92	47.4	14.4	40.2	12.3	15.9	4.8	12,500	5,670
Lapan XT-400	75	47.9	14.6	33.5	10.2	14.1	4.3	5,555	2,520
DeH DHC-2	50	48.0	14.6	30.3	9.2	9.0	2.7	5,100	2,313
Piaggio P-166 Portofino	82	48.2	14.7	39.2	11.9	16.4	5.0	9,480	4,300
Learjet 28/29	120	42.2	12.9	45.0	13.7	12.6	3.8	15,000	6,804
SN-600 Corvette	118	42.2	12.9	45.4	13.8	13.9	4.2	14,550	6,600
Breguet FAL-10	104	42.9	13.1	45.5	13.9	15.1	4.6	18,740	8,500
Mitsubishi Diamond MU-300	100	43.3	13.2	48.3	14.7	13.7	4.2	13,890	6,300
Piaggio PD-808	117	43.3	13.2	42.2	12.9	15.8	4.8	18,300	8,301
Rockwell Sabre 40	120	44.4	13.5	43.8	13.4	16.0	4.9	18,650	8,459
AIRCRAFT APPROACH CATEGORY C AND D AIRPLANES IN AIRPLANE DESIGN GROUP I									
Learjet 24	128	35.6	10.9	43.2	13.2	12.6	3.8	13,500	6,123
Learjet 25	137	35.6	10.9	47.6	14.5	12.6	3.8	15,000	6,804
Learjet 35A/36A	143	39.6	12.1	48.6	14.8	12.6	3.8	18,000	8,165
Rockwell JC1121	130	43.3	13.2	50.4	15.4	15.8	4.8	16,800	7,620
Learjet 54-55-56	128	43.8	13.4	55.1	16.8	14.8	4.5	20,500	9,299
Rockwell Sabre 75A	137	44.7	13.6	47.2	14.4	17.2	5.2	23,000	10,433
IAI-1124 Westwind	129	44.8	13.7	52.3	15.9	15.8	4.8	23,650	10,727
HS-125-1/400	124	47.0	14.3	47.4	14.4	16.5	5.0	26,500	12,020
HS-125-600	125	47.0	14.3	50.5	15.4	17.3	5.3	25,000	11,340
HS-125-700	125	47.0	14.3	50.7	15.5	17.6	5.4	25,000	11,340
Hansa HAB-320	125	47.5	14.5	54.5	16.6	16.2	4.9	20,280	9,199

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. 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 of 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.

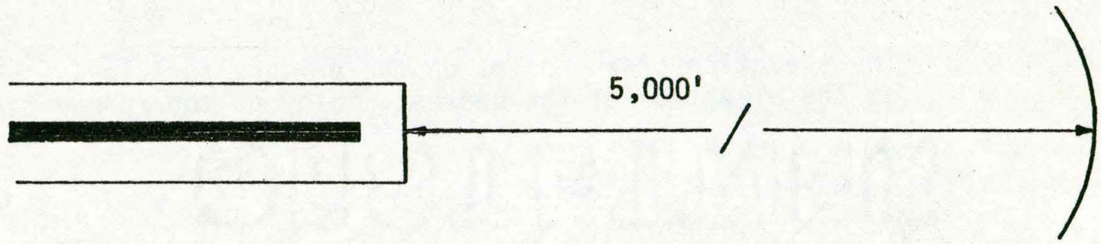
-Interstate Highway	17 feet
-Public Roadway	15 feet
-Private Road	10 feet or height of the highest mobile object
-Railroad	23 feet

Imaginary Surfaces

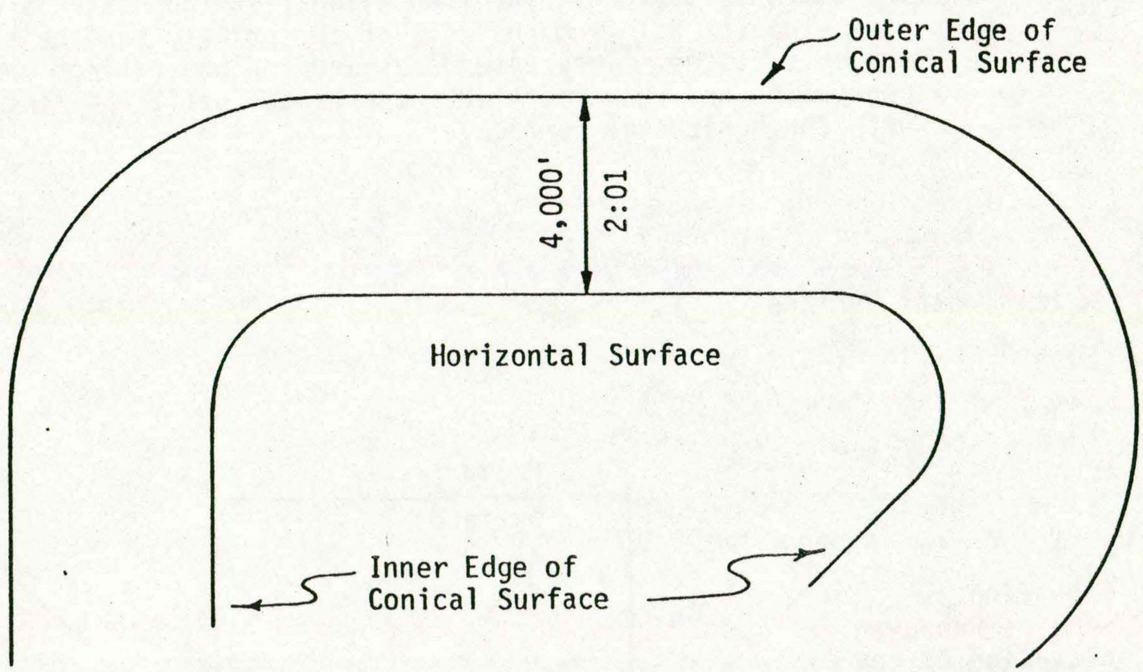
Imaginary surfaces establish areas where any object penetrating that surface would be considered an obstruction to air navigation. The imaginary surface establishes an imaginary line that separates ground activities from aircraft activities. In order to select the applicable imaginary surface, the type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



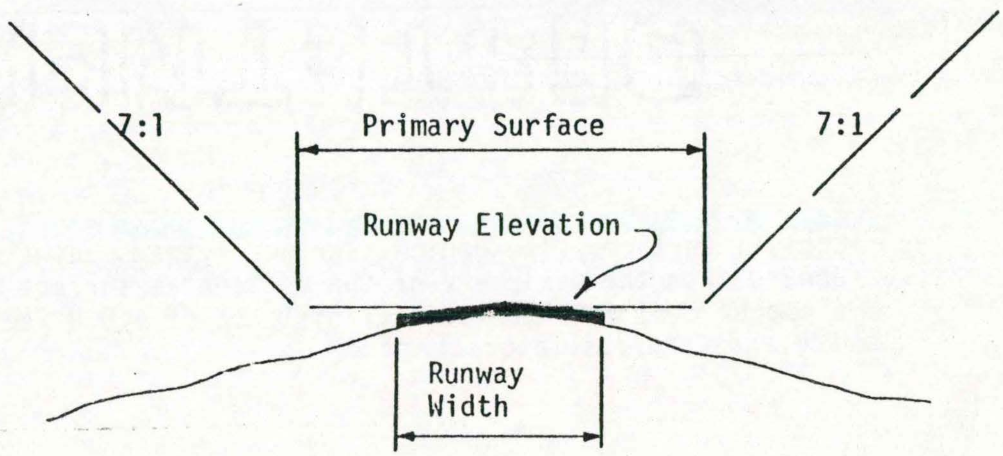
B. Conical Surface: The conical surface extends outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet at the ends and 7:1 laterally.



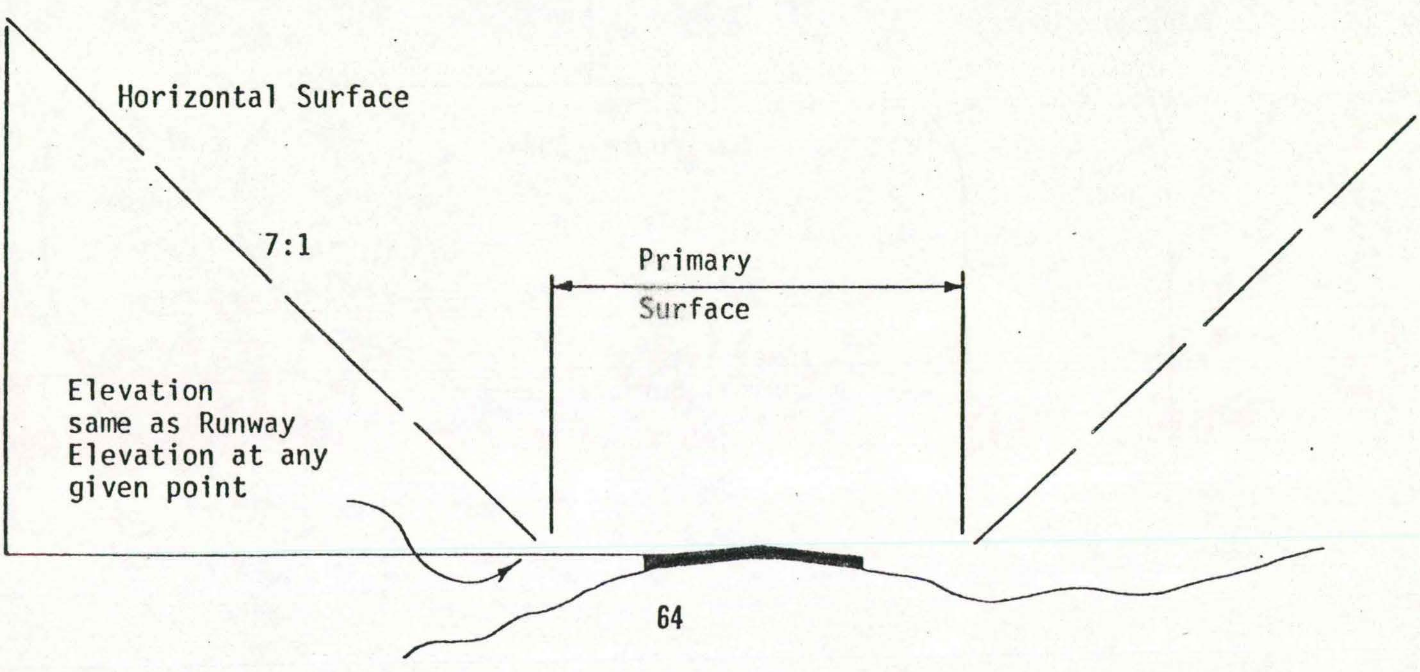
C. Primary Surface: The primary surface is longitudinally centered on the runway and extends 200 feet beyond the runway end in the case of a paved runway. The primary surface end coincides with the runway end in the case of a turf runway. The width of the primary surface varies with the approach.

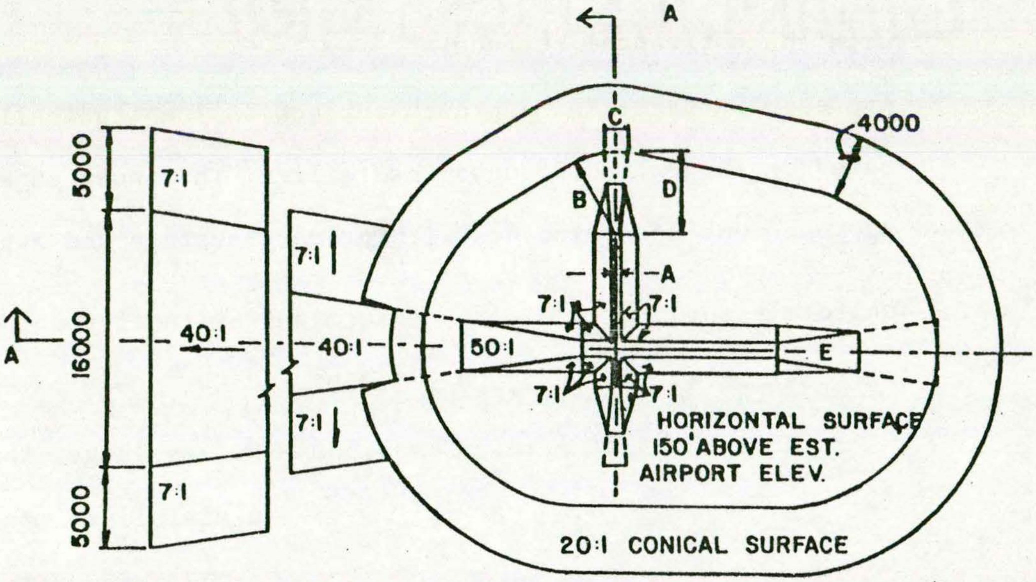
	Width	End of Runway
Visual	250'	200'
NPI	500'	200'

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



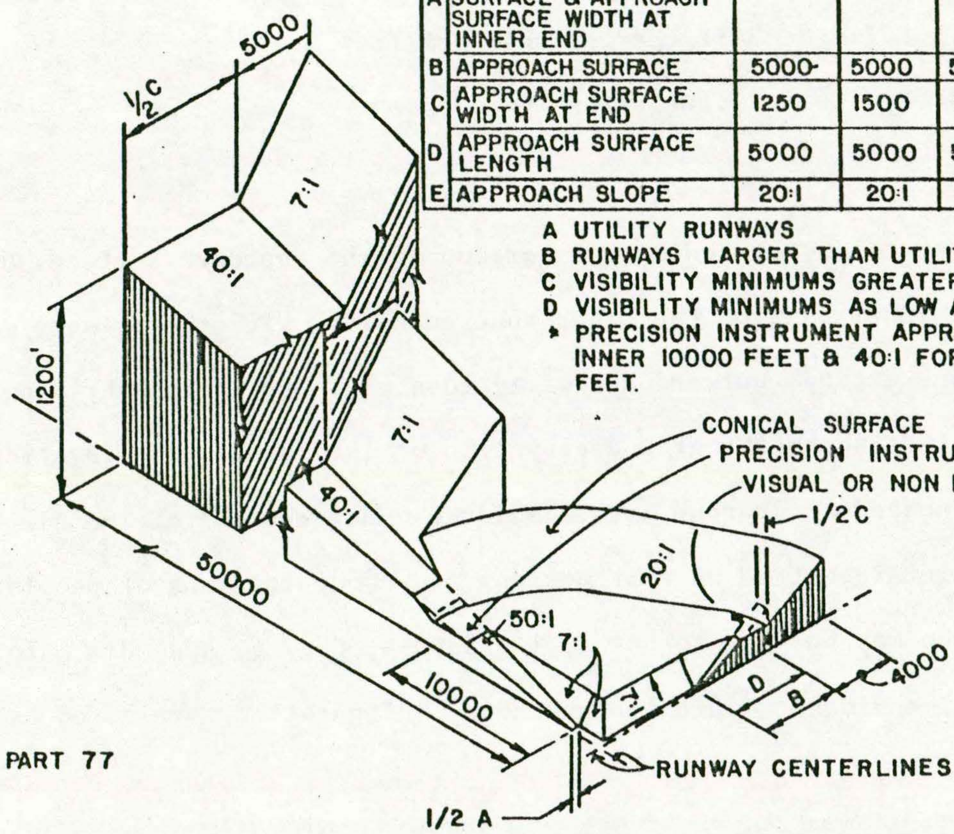
D. Transitional Surface: The transitional surface extends upward at a slope of 7:1 from the edge of the primary surface and approach surfaces. They extend outward and upward from the runway centerline and runway centerline extended until they intersect with the horizontal surface.





	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

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 horizontal 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 w/visibility 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)

Clear Zone

The clear zone represents that portion of the approach surface on the ground. The inner edge of the clear zone 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 the runway end elevation. The trapezoidal shaped clear zone area should be under control of the airport owner and maintained free of obstructions and concentrations of people.

Reference may be made to FAA AC 150/5300-4, Chg. 6, Appendix 6 for applicable dimensions. Typical clear zone configurations are noted as follows:

Utility Runways:

- Visual Approach: 250' x 1000' x 450' (8.035 acres)
- Non Precision Instrument Approach: 500' x 1000' x 800' (14.922 Acres)
- Visual Approach opposite non-precision instrument approach: 500' x 1000' x 650' (13.2 Acres)

Obstacle Free Zone (OFZ)

The obstacle free zone consists of the volume of space above the runway, approach area and inner-transitional surface. The runway OFZ extends 200 feet beyond each end of the runway and to a width of 250 feet for non-precision instrument and visual runways.

The approach OFZ applies only to runways with an approach light system. The inner-transitional surfaceOFZ applies only to precision instrument runways. The obstacle free zone is to be maintained free of all objects except frangible navigational aids.

Clearway

The clearway is an area 500 feet in width extending from the runway end outward and upward at a slope not exceeding 1,25% above which no objects or terrain may penetrate. The clearway should be under control of the airport owner and generally extends no more than 1000 feet from the runway end.

Hazard Determination

All objects which penetrate the imaginary surfaces of the airport are considered an obstruction and a hazard to air navigation unless a FAA aeronautic study should be made where a proposed action is thought to be a hazard to air navigation.

FAA AC 150/5300-4B CHG 6 summarizes minimum standards for identifying and preventing airport hazards on the airport.

- All objects which prevent operational clearance for terminal navigational facilities.
- All objects, including parked aircraft, within 7 feet plus 0.75 feet times the wing span of the most demanding aircraft from the taxiway centerline, except for frangibly mounted NAVAIDS. For example:

  King Air C90-1 (50.3 feet x 0.75 + 7 feet = 44.725')

- All objects, including parked aircraft, within 7 feet plus 0.63 times the wing span of the most demanding aircraft from a taxilane centerline.

LAND USE

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 areas 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 is to insure that the land use conflicts are reduced to a minimal level in view of the fact that it may 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. Throughout 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 the airport and off the airport that will complement each other.

Land Use Compatibility

Land use compatibility depends upon a number of factors. In other words to imply that an industrial activity is compatible depends upon the type to include processes. The latter is of concern where considerable amounts of heat is 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.

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, should insure a degree of compatibility within the vicinity of the airport.

Land Area Requirements

An adequate amount of land should be made available to support airport functions and accommodate required facilities. Such land should be owned in fee simple title. Clear zone and aviation easements should also be acquired.

Natural Corridors

Rivers	Canals	Natural Buffer Area
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 & Testing Labs
Motels	Aviation Schools	Aircraft and Aircraft Parts
Restaurants	Employee Parking Lots	Manufacturers

Commercial Facilities

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

IV. AIRPORT DEVELOPMENT ALTERNATIVES

AIRPORT DEVELOPMENT ALTERNATIVES

INTRODUCTION

ALTERNATIVES

Project development alternatives for the Albia Municipal Airport are summarized within this section, "Airport Development Alternatives." Such alternatives included the following actions:

1. No project improvement(s)
2. New airport site
3. Construction of a secondary runway less than the minimum desired length.
4. Elimination from consideration the construction of a crosswind runway.
5. Terminal area expansion
6. Runway extension to the primary runway, RW 13/31

The "No Project Alternative" was not considered a viable alternative because of present and future levels of aviation activity and past investment in the airport. A new airport site was not considered feasible although the existing site has limitations. The primary limitation concerns the crosswind runway and whether or not construction of such a runway should be considered a viable and prudent action.

Prior evaluation of the airport site in 1980 by a Citizens' Advisory Committee concluded that:

1. The present site had the potential for expansion and development to meet <u>most</u> of the anticipated future needs.
2. The Airport Development Plan should be based on the present site despite the constraints of crosswind runway development.

CROSSWIND RUNWAY

The initial Airport Layout Plan prepared in 1966 and approved by the FAA in 1967 depicted a crosswind runway, S $6^{\circ}23'$W, 75 feet in width and 2200 feet in length. As previously noted, the desired crosswind runway length is 80 percent of the primary runway length or 2720 feet. The ultimate length that could be obtained and still provide supplemental wind coverage is 2000 feet plus/minus 200 feet.

The site offers only one alternative for construction of a crosswind runway. A ridgeline extends in a north-south direction beginning at a point approximately 300 feet south from RW 13. The ridge extends south from RW 13/31 2000 feet where the terrain drops in elevation from 940 feet to 890 feet within a horizontal distance of 400 feet. Extension north of RW 13/31 is limited by an existing road and increasing terrain. The ridge orientation would provide for a crosswind runway alignment of N 11°E A 60 degree separation would be obtained between runway facilities.

Wind coverage by RW 13/31 (at a 10.5 knots crosswind component) was estimated at 81.6 percent based upon Des Moines Wind Data. The addition of the crosswind runway would provide the Albia Airport the desired 95 percent coverage. FAA AC 150/5300-4B Chg. 7 states that: Where feasible, it should be 80 percent of the length recommended for the primary runway. The basic question/issue is if construction of a crosswind runway less than 2720 feet would represent a prudent decision. Another alternative to be considered is an increase in width of RW 13/31 from 60' to 75' to compensate for the lack of a crosswind runway.

Prior discussions by the Advisory Committee concluded that few flights would be inconvenienced by the lack of a crosswind runway. In those situations where the use of airport would not be available, the Ottumwa Industrial Airport could provide a satisfactory alternative. It is recommended that consideration not be given to the construction of a crosswind runway within the 20 year planning period. However, the land area identified as providing the only feasible location for a crosswind runway should be kept void of any structures which would compromise future development of a crosswind runway. The Airport Layout Plan and airport zoning should depict a crosswind alignment and minimal area to accommodate a turf facility 120 feet in width and 2000 feet in length.

Proposed Action -

- Reserve crosswind Alignment
- Assume that no crosswind development will take place with the 20 year planning period.

PRIMARY RUNWAY

No alternative alignment to RW 13/31 was considered. Extension of RW 13/31 is only feasible on RW End 13. A 900 foot extension to RW 13 should be made on RW 13 to include a turnaround. The runway width should be increased ten feet from 50 feet to 60 feet. With the addition of a NDB, non-precision instrument markings should be added.

TERMINAL AREA

No alternatives were considered for terminal area relocation. The increase in width of the primary surface as required by the proposed non-precision instrument approach to RW 13/31 causes two problems. The FBO shop penetrates the transitional surface and the apron area lies within the primary surface. The transitional surface begins at the edge of the primary surface and extends outward and upward at 7:1 slope. Consequently, a structure 10 foot in height should be located no closer than 320 feet to the runway centerline and a structure 16 feet in height no closer than 362 feet, (assuming ground elevations are the same.)

FAA AC 150/5300-4B Chg. 7 sets forth criteria for locating the Building Restriction line (BRL). Based upon Airplane Design Group I, the BRL is located 200 feet from the runway centerline and for Airplane Design Group II, 250 feet. Existing structures are located 270 feet plus from the centerline of RW 13/31. However FAA AC 150/5300-4B Chg. 7, footnotes the above as follows:

> "Objects located outside of the building restriction lines may penetrate the airport imaginary surfaces defined in Subpart C of FAR Part 77 where an FAA Aeronautical study has determined that the specific penetration will not result in a hazard to air navigation."

As previously noted, the apron does lie within the proposed primary surface. Parked aircraft may be considered a hazard. The City of Albia should request a determination from the FAA concerning the potential hazard to air navigation that may exist should the proposed non-precision instrument approach to RW 13/31 be obtained.

The above concerns can be mitigated by not allowing aircraft to park within the primary surface area and relocation of the FBO shop should the FAA Aeronautical Study determine such action is necessary.

Future development within the terminal area must consider the following:

1. Building Restriction Line (BRL)
2. Airport Imaginary Surfaces and in particular the transitional surface.
3. Obstacle Free Zone (OFZ)
4. Taxiway

TAXIWAY

It was concluded that a full parallel taxiway would not be constructed within the 20 year planning period based upon criteria set forth by the IDOT. Turnarounds are recommended on RW 13/31. However, consideration should be given to the dimensional requirements should a taxiway be constructed. Structures should be located no closer than 7 feet plus 0.63 times the wingspan of the most demanding aircraft. Provided no structure was located within 320 of the runway centerline, sufficient area would exist to allow construction of a parallel taxiway.

CLEAR ZONES

The clear zones, 500' x 1000' x 800', are void of obstacles except as follows:

RW 31 - Road, fence

RW 13 - Road, pole line, fence, tree growth along fence line

The approach slope, (north outside edge) to RW 31 provides approximately a 14 foot +/- vertical clearance over the road. Along the RW 31 centerline extended, a 24 foot vertical clearance is obtained. The minimum vertical clearance is 15 feet above a road. None of the above obstacles noted penetrate the 20:1 approach slopes. The clear zones may be used for agricultural purposes provided such activities do not penetrate the approach slope. The clear zone should be kept clear of tree growth and buildings.

ENVIRONMENTAL CONSIDERATIONS

Need:

The need for the proposed actions are based upon present and future levels of aviation activity summarized in Section II. In addition to the alternatives previously discussed, the following alternative was also available.

1. No Project Alternative

A no project alternative would not allow the airport to satisfy aviation demand expectations.

Environmental Consequences:

1. Noise: FAA Order 1050.26 Appendix 6, Chapter 5, Paragraph 47, Page 26 states: "No noise analysis is needed for proposals involving utility or basic transport type airports whose forecast of operations do not exceed 90,000 annual adjusted propeller operations or 700 annual adjusted jet operations."
2. Compatible Land Use: In general, industrial, agricultural, and open space land uses are compatible with the operation of the airport. The proposed actions are consistent with such community planning as has been carried out.
3. Social Impacts: The proposed actions will not involve the relocation of any existing residence or place of business. The proposed actions will require the removal of crop land from production.

4. Induced Sócioeconomic Impacts: The proposed actions may have a positive impact upon industrial development in the community.

5. Air Quality: The proposed actions are not expected to have any negative impact upon the Clean Air Act Amendments of 1977.

6. Water Quality: Provided mitigating measures to control erosion during construction are followed, the proposed actions will have no significant detrimental impact upon water quality.

7. DOT, Section 4 (F): There are no Section 4 (F) lands proposed for acquisition.

8. Historical, Architectural, Archaeological, and Cultural Resources: There are no know historical or cultural resources which would be affected by the proposed actions.

9. Biotic Communities: The proposed actions will have no significant impact upon biotic communities.

10. Endangered and Threatened Species of Flora and Fauna: There are no known endangered or threatened species in the vicinity of the airport.

11. Wetlands: There are no wetland areas on the airport site.

12. Flood Plain: The airport does not lie within a flood plain.

13. Prime and Unique Farmland: The proposed actions will remove certain amounts of farm land from production.

14. Energy Supply and Natural Resources: The proposed actions are expected to have no significant impact upon energy supplies and other natural resources.

15. Light Emissions: No detrimental impacts are expected.

16. Solid Waste: No detrimental impacts are expected.

17. <u>Construction Impacts</u>: Such impacts resulting from construction are of a short term nature and should have no detrimental impact provided mitigating measures are employed.

The above outlines subject matter typically contained within an Environmental Assessment. As previously noted, the Iowa DOT does not require a full-blown Environmental Assessment. As such, no in depth analysis was accomplished for items 1 through 17 above. Should any of the above have an impact or be impacted by the proposed actions, detailed evaluation of the impact should be accomplished prior to proceeding with implementation.

V. AIRPORT PLANS

AIRPORT DATA

ITEM	EXISTING	ULTIMATE
CLASSIFICATION	BU-II	BU-II
WIND COVERAGE (12 MPH)	81.6 %	96 %
AIRPORT ELEV.	963.31'	SAME
NORMAL MAX. TEMP.	88° F	SAME
AIRPORT CORDINATES LAT.	40° 59' 40" N	
AIRPORT CORDINATES LONG.	92° 45' 46" W	
NAVIGATIONAL AIDS	BEACON WIND INDICATOR	NDB

LEGEND

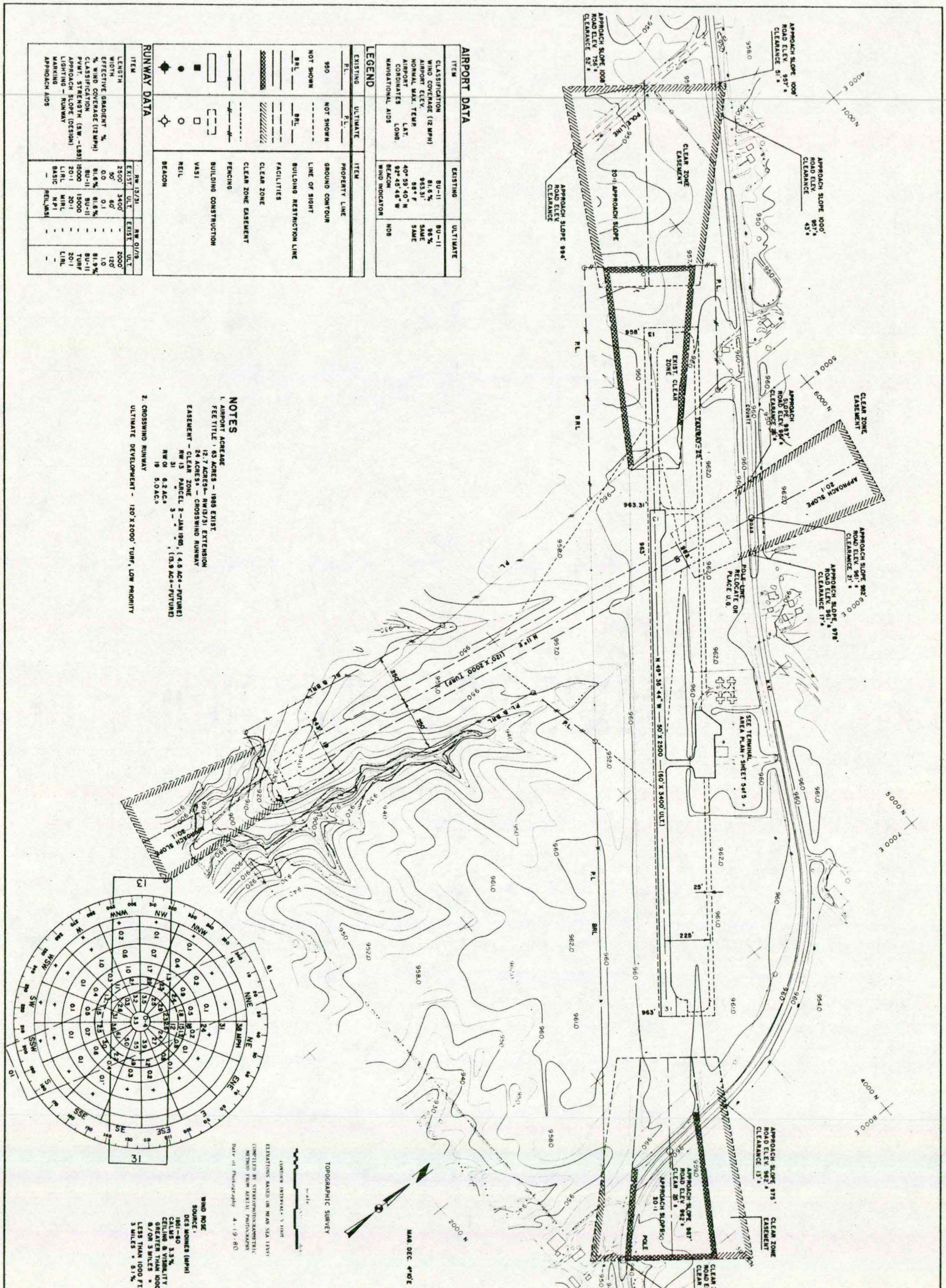
EXISTING	ULTIMATE	ITEM
P.L.	P.L.	PROPERTY LINE
950	NOT SHOWN	GROUND CONTOUR
NOT SHOWN	- - - - -	LINE OF SIGHT
BRL	BRL	BUILDING RESTRICTION LINE
		FACILITIES
		CLEAR ZONE
		CLEAR ZONE EASEMENT
		FENCING
		BUILDING CONSTRUCTION
		VASI
		REIL
		BEACON

RUNWAY DATA

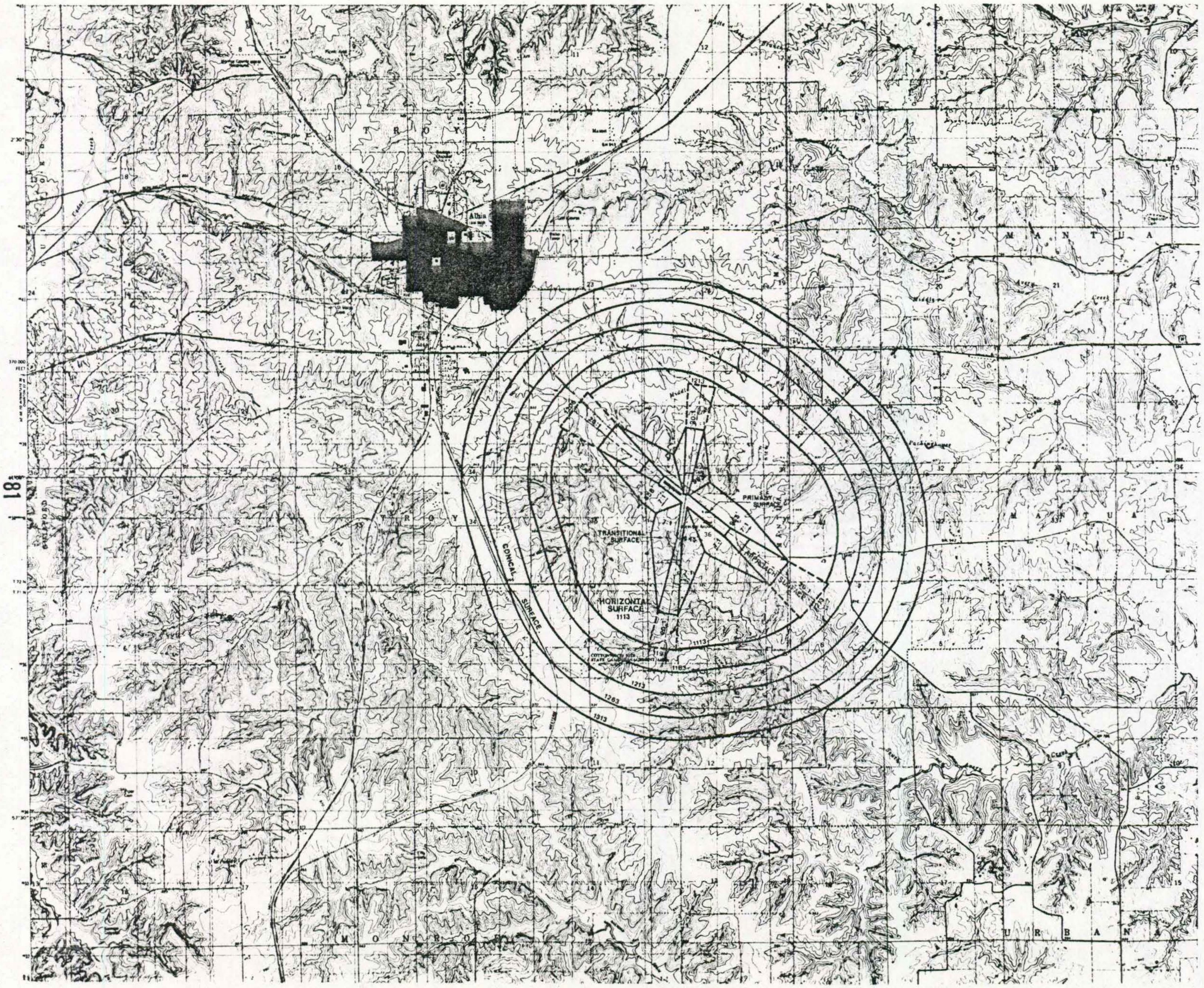
ITEM	RW 13/31 EXIST.	RW 13/31 ULT.	RW 01/19 EXIST.	RW 01/19 ULT.
LENGTH	2500'	3400'	-	2000'
WIDTH	50'	60'	-	120'
EFFECTIVE GRADIENT %	0.0	0.1	-	1.0
% WIND COVERAGE (12 MPH)	81.6 %	81.6 %	-	81.9 %
CLASSIFICATION	BU-II	BU-II	-	BU-II
PVMT. STRENGTH (S.W. - LBS)	15000	15000	-	TURF
APPROACH SLOPE (DESIGN)	20:1	20:1	-	20:1
LIGHTING - RUNWAY	LIRL	MIRL	-	LIRL
MARKING	BASIC	NPI	-	-
APPROACH AIDS	-	REIL, VASI	-	-

NOTES

1. AIRPORT ACREAGE
   FEE TITLE : 63 ACRES - 1985 EXIST.
   12.7 ACRES± - RW13/31 EXTENSION
   24 ACRES± - CROSSWIND RUNWAY
   EASEMENT - CLEAR ZONE
   RW 13 PARCEL 2 - JAN 1985, (4.5 AC± - FUTURE)
   31 " 3 - " " , (13.9 AC± - FUTURE)
   RW 01 6.2 AC.±
   19 5.0 AC.±
2. CROSSWIND RUNWAY
   ULTIMATE DEVELOPMENT - 120' X 2000' TURF, LOW PRIORITY



SECTION	ALBIA MUNICIPAL AIRPORT AIRPORT DEVELOPMENT PLAN	ALP AIRPORT LAYOUT PLAN	FRENCH · RENEKER · ASSOCIATES, Inc. Fairfield, Iowa — Consulting Engineers
SHEET 1 OF 5			



NORTH

0 2000 4000
SCALE IN FEET

ESTABLISHED AIRPORT ELEVATION: 963'ASL

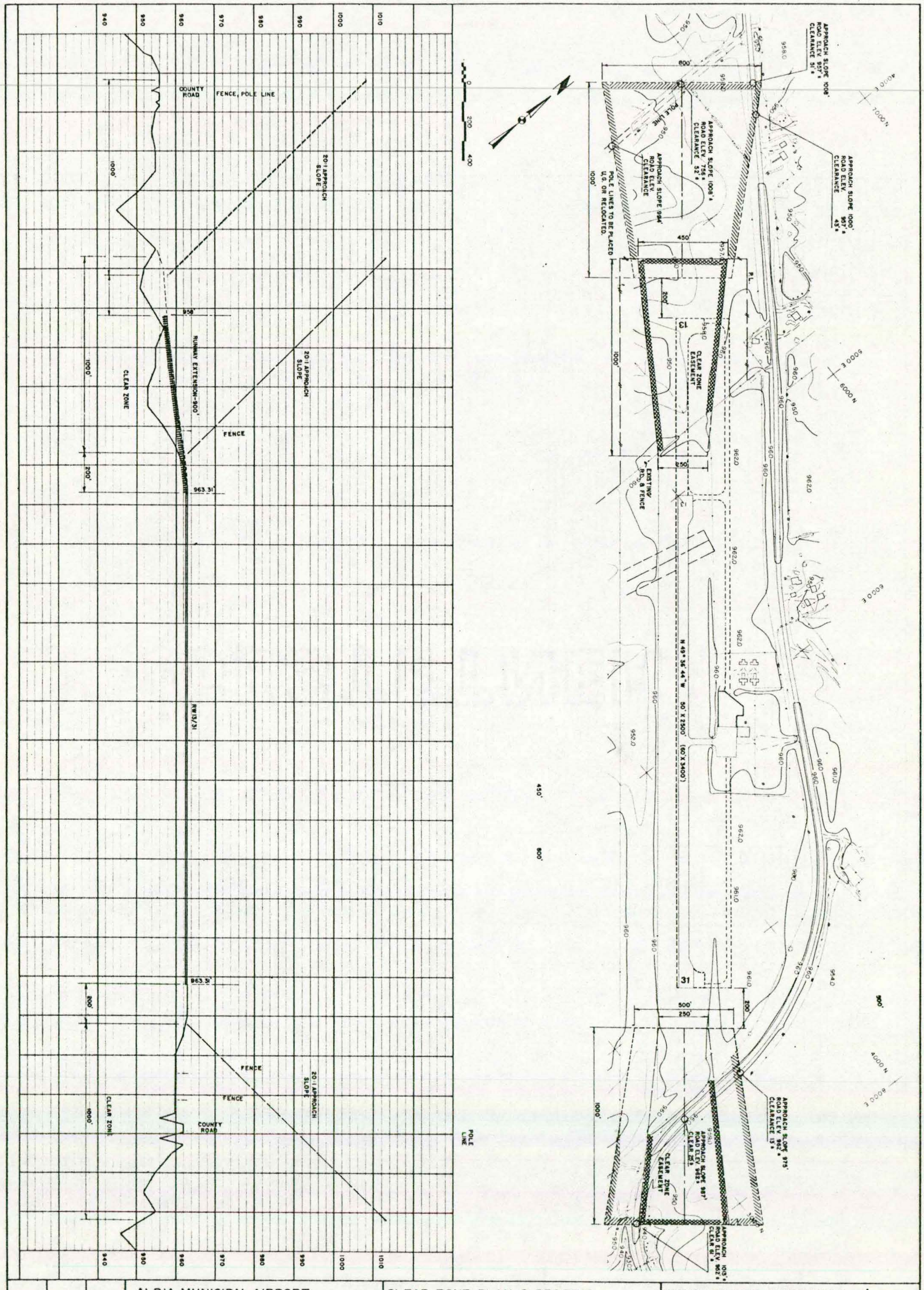
NOTE:
1. CROSSWIND RUNWAY - TURF

ALBIA MUNICIPAL AIRPORT
AIRPORT DEVELOPMENT PLAN

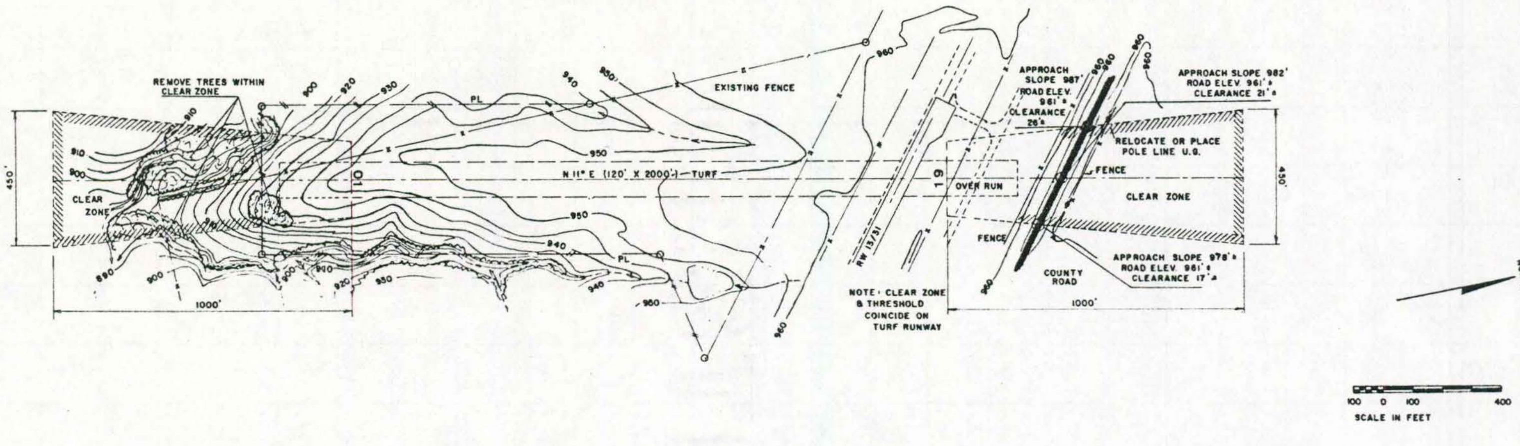
AIRPORT IMAGINARY SURFACES

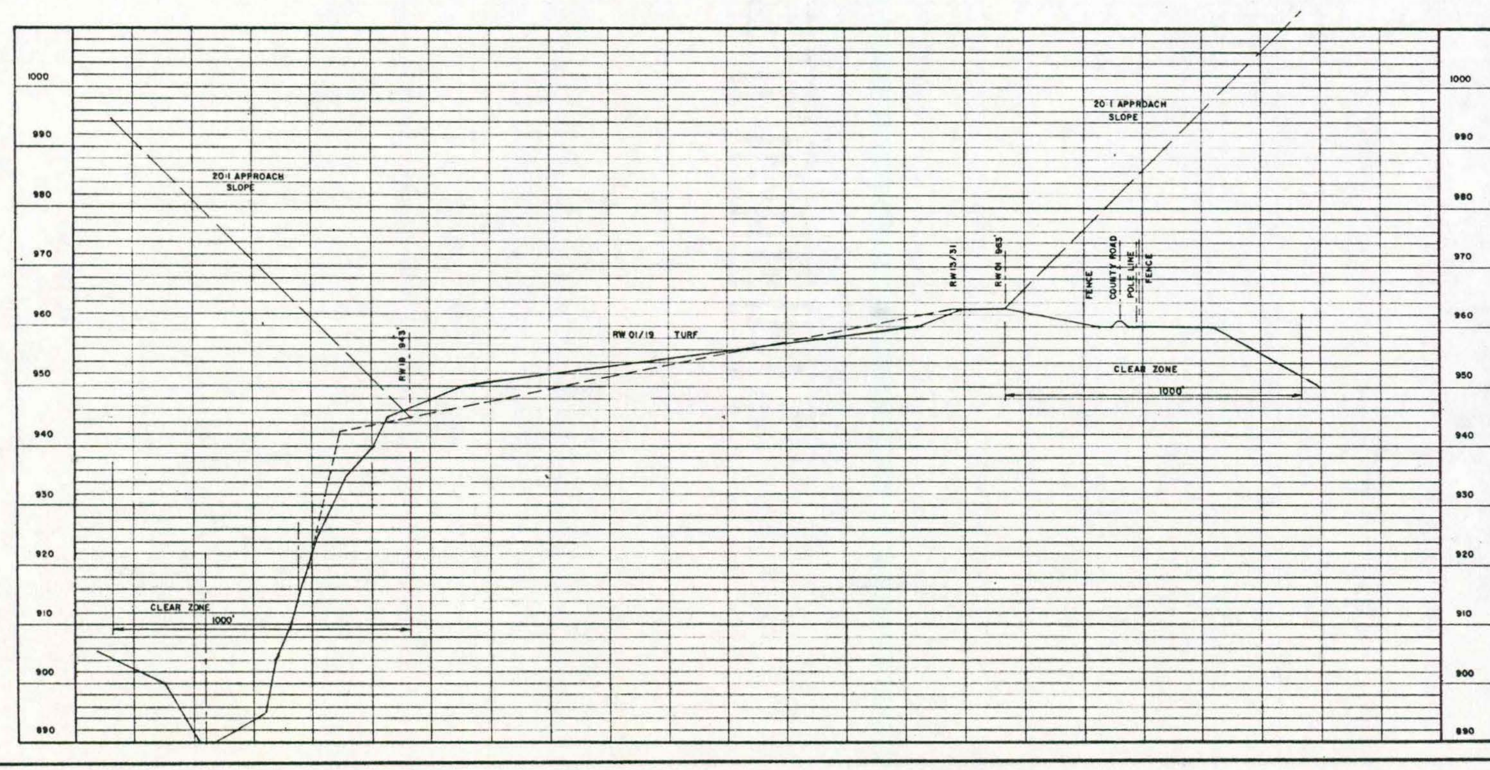
FRENCH - RENEKER - ASSOCIATES, Inc.
Fairfield, Iowa
Consulting Engineers

Sheet 2 of 5



SHEET 3 of 5	ALBIA MUNICIPAL AIRPORT AIRPORT DEVELOPMENT PLAN	CLEAR ZONE PLAN & PROFILE RW 13/31	FRENCH-RENEKER-ASSOCIATES, Inc. Fairfield, Iowa — Consulting Engineers





ALBIA MUNICIPAL AIRPORT
AIRPORT DEVELOPMENT PLAN

CLEAR ZONE PLAN & PROFILE
RW 1/19

FRENCH-RENEKER-ASSOCIATES, Inc.
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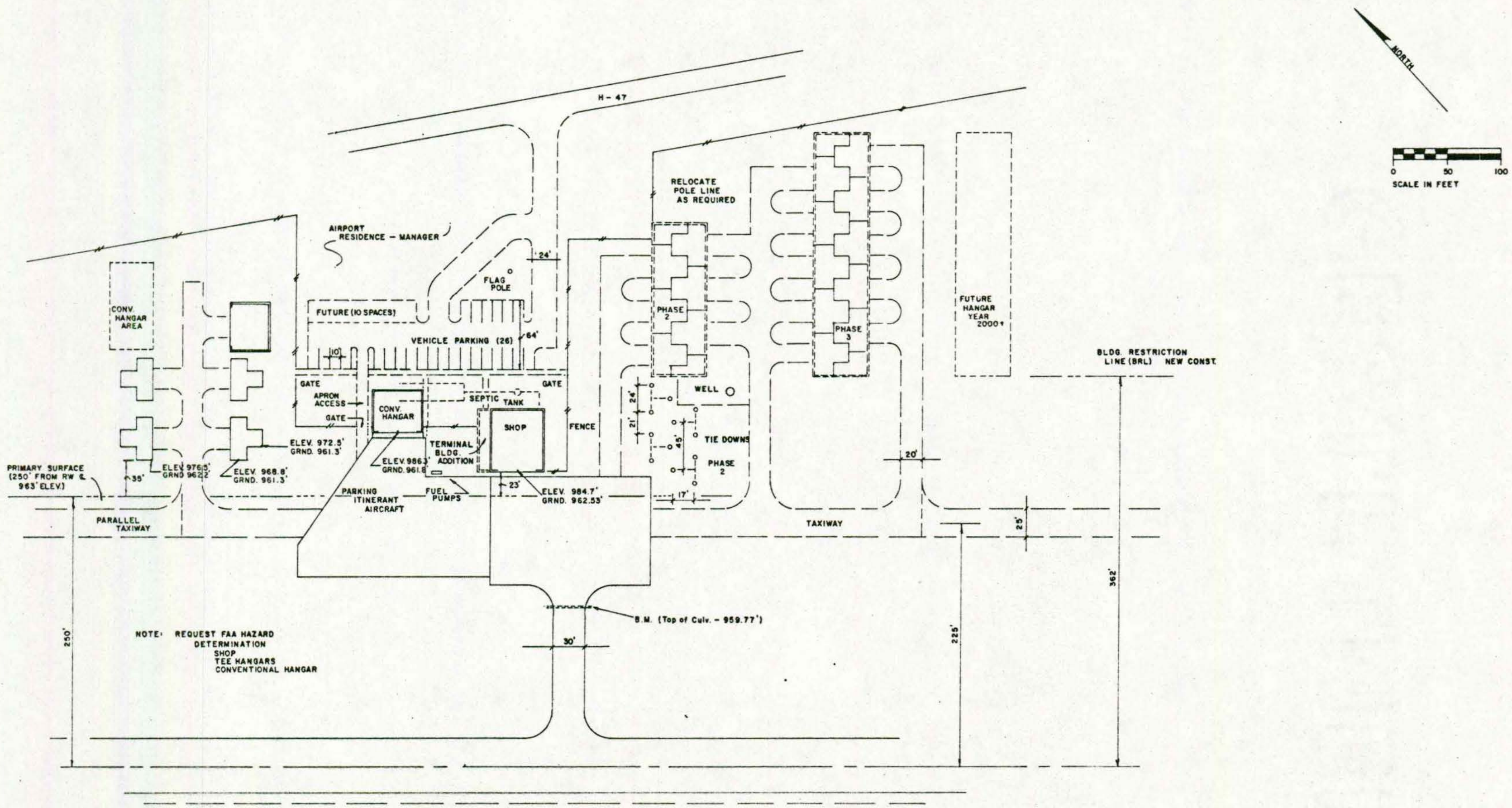
Consulting Engineers

Sheet 4 of 5



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TERMINAL AREA PLAN

ALBIA MUNICIPAL AIRPORT
AIRPORT DEVELOPMENT PLAN

Sheet 5 of 5

VI. DEVELOPMENT SCHEDULE STRATEGY FOR IMPLEMENTATION

DEVELOPMENT SCHEDULE

Introduction:

The Development Schedule is a listing of improvements needed at the airport over the twenty year planning period in order to satisfy anticipated aviation activity. The development schedule is divided into two five-year phases and one ten-year phase.

Phase One: 1985 - 1989

Phase Two: 1990 - 1994

Phase Three: 1995 - 2004

There are a number of factors which must be considered in the establishment of the initial development schedule. These factors are:

1. Absolute need
2. Availability of financial assistance
3. Anticipated changes in aviation activity
4. Local financial constraints

Safety and maintenance items should be given first priortiy. Those development items while desirable, but not critical to the operation of the airport should be given a lower priority. Hangars may be constructed in a phase other than as indicated since the proposed development is expected to be financed by the private sector. The costs presented are 1985 dollars. The quantities are rough estimates and are not to replace the need for engineering design.

In maintaining flexibility, the development schedule should be reviewed along with the aviation forecasts at five year intervals.

Phase One projects place an emphasis upon bringing RW 13/31 to minimum design standards. Proposed is land acquisition , fencing, clear zone protection and an increase in the length and width of RW 13/31.

The installation of a medium intensity runway light system (MIRL) to replace the existing low intensity system is also recommended. Installation of a visual approach slope indicator (VASI) and runway end identifier lights (REIL) is recommended along with a non-directional radio beacon (NDB).

Phase Two projects concentrate on improvements within the terminal area. Proposed is the construction of a tiedown apron (4 aircraft), a six unit tee hangar and a terminal building addition to the existing conventional hangar (FBO Shop). The existing apron area would with the additional tie downs be maintained for refueling and itinerant aircraft parking.

The third phase includes the construction of a 10 unit tee hangar, associated taxiway and vehicle parking and access improvements. Construction of a crosswind runway, although depicted on the Airport layout Plan (ALP), is not considered a high priority item. A parallel taxiway also depicted but is not considered a high priority item with the twenty year planning period.

Land acquisition for the development of a crosswind runway to include clear zone protection may be undertaken in Phase Three. Crosswind runway development would be limited to the construction of a turf facility 2000 feet in length with provisions for an overrun on each end. Construction within the 20 year planning period is considered remote.

Land acquisition and clear zone protection cost are noted and referenced as Item 3 and 4 in Phase Three. The primary concern is the acquisition of land for what is considered the only viable alignment for a crosswind runway.

ALBIA AIRPORT

CAPITAL PROJECTS

PHASE ONE: 1985-1989

Item	Description	Quantity	Unit	Unit Price	Total Price
Item 1	Land Acquisistion & Fencing				
	A. Fee Title				
	1) RW end 13	12.7±	Acre	2000	25,400
	2) Survey & Appraisal	-	L.S.		3,000
	B. Fencing				
	1) Field	2750	L.F.	2.50	6,875
	2) Eng. legal & Admin.	-	15%		1,030
	C. Total - Item One				$36,305
Item 2	Clear Zone Protection				
	A. Easements				
	1) RW End 13	13.9±	Acre	50	695
	2) RW End 31	4.5±	Acre	50	225
	3) Survey,legal & Appraisal	-	L.S.		500
	B. Total - Item Two				$1,420
Item 3	Runway Extension (RW 13/31)				
	A. 50' x 900', Turnaround-600 s.y.				
	1) Excavation & Grading	16500	C.Y.	2.00	33,000
	2) 18" RCP Culv.	270	L.F.	20	5,400
	3) Seeding and Fertilizing	6.3	Acre	1000	6,300
	4) Subgrade Preparation	5770	S.Y.	1.00	5,770
	5) 6" Granular Subbase	2000	Tons	12	24,000
	6) 2" Bit. Base Course	606	Tons	50	30,300
	7) 2" Bit. Surface Course	635	Tons	50	31,750

Item	Description	Quantity	Unit	Unit Price	Total Price
Item 3 cont.					
	8) Contingencies	–	10%		13,650
	9) Eng. Legal & Admin.	–	15%		20,500
	B. Total - Item Three				$170,670
Item 4	Pavement Marking				
	A. NPI - RW 13/31				
	1) Runway Markings	one	L.S.	5220	5220
	2) Contingencies	–	10%		522
	3) Eng. Legal & Admin.	–	15%		783
	B. Total Item Four				$6,525
Item 5	Lighting & Navigational Aids				
	A. Runway Lighting				
	1) MIRL (RW 13/31)	3400	L.F.	10	34,000
	2) Radio Control	one	L.S.	2500	2,500
	B. Landing Aids				
	1) VASI (RW 13/31)	2	Set	3500	7,000
	2)REIL (RW 13/31)	2	Set	2000	4,000
	3) Segmented Circle	One	L.S.	2000	2,000
	C. Non Directional Radio Beacon				
	1) N.D.B.	One	L.S.	10,000	10,000
	D. Subtotal				59,500
	1) Contingencies	–	10%	–	5,950
	2) Eng. Legal Admin.	–	15%	–	8,925
	E. Total - Item Five				$74,375
Item 6	Runway Widening (RW 16/34)				
	A. 10' x 3400'				
	1) Excavation & Grading	1300	C.Y.	2	2,600

Item	Description	Quantity	Unit	Unit Price	Total Price
Item 6 cont.					
	2) Subgrade Preparation	4000	S.Y.	1	4,000
	3) Seeding and Fertilizing	1	Acre	1000	1,000
	4) 6" Granular Subbase	1400	Tons	12	16,800
	5) 2" Bit. Base Course	403	Tons	50	20,150
	6) 2" Bit. Surface Course	416	Tons	50	20,800
	7) Contingencies	-	10%		6,500
	8) Eng. Legal & Admin.	-	15%		9,800
	B. Total - Item Six				$81,650

Note: Item 6 may be combined with Item 3

PHASE TWO: 1990 - 1994

Item	Description	Quantity	Unit	Unit Price	Total Price
Item 1	Apron				
	A. Itinerant Apron				
	1) Excavation & Grading	400	C.Y.	3	1,200
	2) Subgrade Prep.	1286	S.Y.	1	1,286
	3) Seeding & Fertilizing	-	Acre		
	4) 6" Granular Subbase	405	Tons	12	4,860
	5) 2" Bit. Base Course	137	Tons	50	6,850
	6) 2" Bit. Surface Course	142	Tons	50	7,100
	7) Tiedown Anchors	12	Each	50	600
	8) Contingencies		10%		2,190
	9) Eng. Legal & Admin.		15%		3,284
	B. Total - Item One				$27,370

Item	Description	Quantity	Unit	Unit Price	Total Price
Item 2	Hangar Const.				
	A. T - Hangar (Project 1)				
	1) 6 Unit	6	Unit	12000	72,000
	B. Taxiway (Project 1)				
	1) Hangar Access	1808	S.Y.	20	36,160
	C. Contingencies		10%		10,816
	D. Eng. Legal & Admin.		15%		16,224
	E. Total - Item Two				$135,200
Item 3	Terminal Building				
	A. Addition (To FBO Shop)				
	1) 600 S.F.	600	S.F.	25	15,000
	2) Contingencies		10%		1,500
	3) Eng. Legal & Admin.		15%		2,250
	B. Total - Item Three				$18,750

Note: Tee type hangars may be constructed in Phase One with the cost of development the responsibility of the private sector. Hangar construction and lease options should be investigated.

PHASE THREE: 1995 -2004

Item	Description	Quantity	Unit	Unit Price	Total Price
Item 1	Hangar				
	A. T - Hangar (Project 2)				
	1) 10 unit	10	Unit	12000	12,000
	B. Taxiway (Project 2)				
	1) Hangar Access	2074	S.Y.	20	41,480
	C. Contingencies		10%		16,148
	D. Eng. Legal & Admin.		15%		24,222
	E. Total - Item 1				$201,850

Item	Description	Quantity	Unit	Unit Price	Total Price
Item 2	Vehicle Parking/Access				
	A. Parking Lot - 24 Stalls				
	1) Excavation & Grading	150	C.Y.	3	450
	2) Subgrade Prep.	880	S.Y.	1	880
	3) 6" Granular Subbase	300	Tons	12	3,600
	4) Curb and Gutter	N/A	-	-	N/A
	5) Bit. Base Course	N/A	-	-	N/A
	6) Bit. Surface Course	N/A	-	-	N/A
	7) Seeding & Fertilizing	1	Acre	1000	1,000
	B. Fence				
	1) 4' Chair Link	738	L.F.	10	7,380
	C. Contingencies		10%		1,330
	D. Eng. Legal & Admin.		15%		2,000
	E. Total - Item Two				$16,640
Item 3	Land Acquisition				
	A. Fee Title				
	1) RW 1/19	24	Acre	2000	48,000
	2) Survey & Appraisal	-	L.S.		3,000
	B. Fencing				
	1) Field	4290	L.F.	2.50	10,725
	2) Eng. Legal & Admin.	-	15%		1,605
	C. Total - Item Three				$63,330
Item 4	Clear Zone Protection				
	A. Easements				
	1) RW End 1	6.2	Acre	50	310
	2) RW End 19	5.0	Acre	50	250
	3) Legal & Appraisal		L.S.		1,000
	B. Total - Item Four				$1,560

Item	Description	Quantity	Unit	Unit Price	Total Price
Item 5	Crosswind Construction				
	A. Grading	33,000	C.Y.	2	66,000
	B. Seeding & Fertilizing	7	Acre	1000	7,000
	C. Eng. Legal & Admin.		15%		11,000
	D. Total - Item Five				$84,000

Note: 1. No cost is noted for the construction of a parallel taxiway since projected activity is under 30000 total annual operations.

2. An overlay of RW 13/31 may be required in Phase Three as part of an on-going airport maintenance program. No cost is noted for an overlay and runway markings.

TABLE 6-1: DEVELOPMENT COST SUMMARY

PHASE ONE: 1985 - 1989	
Land Acquisition and Fencing	$ 36,305
Clear Zone Protection	1,420
Runway Extension	170,670
Pavement Markings	6,525
Lighting and Navigational Aids	74,375
Runway Widening	81,650
TOTAL PHASE ONE	$370,945
PHASE TWO: 1990 - 1994	
Itinerant/Based Apron	$ 27,370
Hangar - 6 Unit	135,200
Terminal Building	18,750
TOTAL PHASE TWO	$181,320
PHASE THREE: 1995 - 2004	
Hangar - 10 Unit	$201,850
Vehicle Parking	16,640
Land Acquisition	63,330
Clear Zone Protection	1,560
Crosswind Runway	84,000
TOTAL PHASE THREE	$367,380
TOTAL DEVELOPMENT	$919,645

AIRPORT MAINTENANCE

The primary emphasis of the Airport Development Plan is placed upon identifying those facility needs required to bring the airport to design standards and satisfy aviation demand activity. However once the facility component is constructed, maintenance becomes a major emphasis. Not only should the public investment in facilities be enhanced, those actions required to maintain a high degree of safety must be under taken and hazardous conditions corrected immediately. A daily airport inspection program should be established and deficiencies noted. This action should be undertaken by the airport manager with deficiencies reported to the City Clerk or Administrator for correction.

The structural adequacy of the runway, taxiway and apron area is rated annually by the IDOT.

TABLE 6-2: STRUCTURAL ADEQUACY

CATEGORY	MAXIMUM RATING	ACTUAL SUFFICIENCY RATING
Runway		
Wearing Surface	8.0	7.2
Base/Subbase	10.0	9.0
Drainage	6.0	5.4
Taxiway/Aprons	6.0	6.0

Source: IDOT Iowa Airport Sufficiency Rating, 1984.

With adequate maintenance, the existing runway should provide a satisfactory level of service throughout the first two planning phases. Resurfacing of the runway should be programmed for Phase Three. The apron and taxiway should provide a satisfactory level of service throughout the 20 year planning period.

STATE AND FEDERAL ASSISTANCE

Federal Assistance:

The Federal Airport Act of 1946 created the Federal - aid Airport Program (FAAP) and a National Airport Plan (NAP). The Airport and Airway Development Act of 1970 repealed FAAP and NAP programs and established the Airport Development Aid Program(ADAP) and National Airport System Plan (NASP). Public law 97-24B (Airport and Airway Improvement Act of 1982) required the publication of a National Plan of Intergrated Airport Systems (NPIAS) by September 3, 1984 and created the Airport Improvement Program (AIP). Airports in Iowa have benefited from the various federal airport assistance programs since FAAP was created in 1946.

The Airport and Airway Trust Fund created in 1970 as a repository for the tax monies paid by aviation users supports federal programs. The primary source of revenue is generated by an eight (8) percent tax on passenger tickets. Other sources include a tax on freightway bills, international departures and general aviation fuel. Trust fund outlays were projected to increase from two billion (1983) to 3.9 billion dollars in 1987.

At present, the Federal Aviation Administration provides grants-in-aid up to 90 percent of the project cost on eligible items. In general, eligible items include all airport requirements except those which specifically benefit the private sector. For example, hangar facilities and the taxiway 20 feet out from the hangar are not eligible. Vehicle parking lots are not eligible nor are terminal buildings except at Commercial Service airports.

State Assistance:

The Iowa Department of Transportation for airport improvements to those airports included in the state system of airports. Airports not included are referenced as system candidate airports are eligible for planning and safety related assistance.

At the present time, the rate of participation is 70 percent on eligible items. Airport components eligible for assistance are the same as those eligible for Federal assistance. Sources of aviation revenue are noted as follows:

1. Unrefunded gas tax (Iowa tax)
   - A. 13 cents per gallon
2. Aircraft registration fees
   - A. Commercial : $35/aircraft
   - B. General aviation:

     Year 1 - 1.5% of list price

     Year 2 - 75% of first year

     Year 3 - 50% of first year

     Year 4+ 25% of first year

     minimum $15/aircraft

Estimated resouces available for airport development in Iowa are shown in Table 6 - by year for 1985 through 1990.

IOWA AIRPORT IMPROVEMENT PROGRAM
ESTIMATED RESOURCES AVAILABLE [1]
$000's

AIR CARRIER	1985	1986	1987	1988	1989	1990
Federal (90%) [3]	2,893	3,119	3,360	3,495	3,633	3,800
Local Match (10%) [4]	321	346	373	388	403	422
Total	3,214	3,462	3,733	3,883	4,036	4,222
GENERAL AVIATION & OTHER COMMERCIAL SERVICE						
Construction						
Federal-formula (90%)	1,512	1,686	1,686	1,686	1,686	1,686
-discretionary (90%)	800	800	800	800	800	800
Local Match (10%) [4]	256	276	276	276	276	276
Subtotal	2,568	2,762	2,762	2,762	2,762	2,762
State (70%)	1,085	1,140	1,190	1,230	1,275	1,323
Local Match (30%) [4]	465	488	510	527	546	567
Subtotal	1,550	1,628	1,700	1,757	1,821	1,890
Total Construction	4,118	4,390	4,462	4,519	4,583	4,652
Safety						
State (50%) [5]	60	60	60	60	60	60
Local Share (50%)	60	60	60	60	60	60
Total	120	120	120	120	120	120

Notes: [1] This does not include possible federal-aid discretionary funds for reliever airports.
[3] This amount is the sum of the allocations for 4 locations.
[4] Includes only estimates of local funds needed to match federal and state funds. Does not include 100% locally financed improvements.
[5] State funds reserved for cooperative safety improvements, 50% state; 50% local.

Of the development items noted, all are eligible for a state or federal grant-in-aid except items two and three in phase two and items one and two in phase three. These items concern hangar, terminal building and vehicle parking lot construction.

	Total	State	Local	Private
Phase One: 1985 - 1989				
Items 1-6 (RW 13/31)	370,945	259,662	111,284	-0-
Total	370,945	259,662	111,284	-0-
Phase Two: 1990 -1994				
Item 1	27,370	19,159	8,211	-0-
Item 2 (hangar)	135,200	-0-	-0-	135,200
Item 3 (terminal)	18,750	-0-	18,750	-0-
Total	181,320	19,159	26,961	135,200
Phase Three: 1995 - 2004				
Item 1 (hangar)	154,148	-0-	-0-	154,148
Item 1 (taxiway)	47,702	33,391	14,311	-0-
Item 2 (vehicle parking)	16,640	-0-	16,640	-0-
Item 3-5 (RW 01/19)	148,890	104,223	44,667	-0-
Total	367,380	137,614	75,618	154,148

Over the twenty year planning period, based upon 1985 dollars, the City of Albia would be required to invest 213,863 dollars. The investment by the City of Albia would in turn generate 416,435 dollars in funding from state sources and a 289,348 dollar investment by the private sector in hangar construction.

The local share of 213,863 dollars would generally be obtained from general obligation bonds. Revenue generated by the airport should be used for annual operating and maintenance expenses.