LAMONI AIRPORT DEVELOPMENT PLAN

LAMONI MUNICIPAL AIRPORT

LAMONI, IOWA

March, 1980

The preparation of this document was financed in part through a planning grant from the Iowa Department of Transportation Planning and Research Division. The contents of this report reflect the views of H. Gene McKeown and Associates, Inc., Consulting Engineers, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policy of the Iowa Department of Transportation.

I hereby certify that this 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 and that I am competent to prepare this document.

3/3/80
Date

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March 3, 1980

Honorable Chairman & Commissioners
Lamoni Airport Commission
City Hall
Lamoni, Iowa 50140

Gentlemen:

We are pleased to present this report as the overall Airport Development Plan for the Lamoni Airport Commission in accordance with your authorization of November 7, 1977.

The material presented in this report is designed to provide the necessary guidelines for the future expansion and development of the Lamoni Municipal Airport. The expansion and development proposed herein will satisfy the aviation demand of the Lamoni community, and will remain compatible with the environment, other community development efforts and other modes of transportation.

This report contains pertinent background information about the community and the Lamoni Municipal Airport, aviation forecasts and a facility requirement schedule to satisfy the future aviation demand. A discussion of the existing airport site and its adequacy is also included along with a narrative evaluation of the socio-economic-environmental feasibility of airport development.

The study concludes with airport site plans depicting ultimate development of the facility, an outline of the stage development process, construction cost estimates and discussion of possible sources of financing to aid the City in actually implementing the plan.

Very truly yours,

H. GENE MCKEOWN & ASSOCIATES, INC.

C. Peter Crawford, P.E.

CPC/lp

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LAMONI, IOWA

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We wish to gratefully acknowledge the cooperation and assistance of the Lamoni Airport Commission, the City of Lamoni and all the citizens of the community who contributed time and effort to assist in this planning program.

H. GENE MCKEOWN AND ASSOCIATES, INC.
Consulting Engineers

LAMONI AIRPORT DEVELOPMENT PLAN

INTRODUCTION

Purpose

A major goal in developing a good air transportation system is to provide safe, adequate and efficient facilities and services to those who will be using the system.

In the past airport development was undertaken mainly on the basis of local aviation needs. Today airport planning covers many aspects of aviation and these effects, including the social, economic and environmental impacts an airport and its use will have on the surrounding community, must be carefully weighed.

The purpose of the airport development plan is, "To provide guidelines for future development of the airport which will satisfy aviation demand and be compatible with the environment, community development and other modes of transportation."

Development Plan Content

The overall Development Plan for the Lamoni Airport contains seven major work elements which are:

1) Inventory and Data Collection
2) Aviation Forecasts
3) Facility Requirement Determination
4) Site Review
5) Socio-Economic-Environmental Feasibility
6) Airport Plans
7) Financial Plan

INVENTORY AND DATA COLLECTION

Project Background

During 1974, the City of Lamoni sought to acquire a new airport site and develop basic facilities which would meet both current and future needs of the community. Four candidate sites were studied, with the existing site being selected because of its accessibility, its relation to potential industrial sites along Highway 69 between Lamoni and I-35, its availability and because it would permit development of a crosswind runway.

An environmental impact assessment report concerning the proposed airport was prepared and a hearing held on March 25, 1975.

Application was made to the Federal Aviation Administration (FAA) for assistance to acquire the site and develop the airport, however, approval of the application was not granted.

In 1976, the city purchased the site which had been leased and airport planning activities ceased.

Early in 1977, representatives of Lamoni discussed airport improvements with the Iowa Department of Transportation (IDOT). These discussions indicated the need for an Airport Development Plan, and, in June of 1977, H. Gene McKeown and Associates was retained by the city to prepare the plan.

Application was made to IDOT requesting a grant of 70 percent of the cost of preparing the plan. On July 27, a grant offer was extended by IDOT which was accepted by the community in early October.

A notice to proceed was issued by the state in November and was acknowledged by H. Gene McKeown and Associates with a project outline and work schedule showing completion of the program during calendar year 1978, if the work schedule went as planned.

Previous Planning Activity

In recent years a number of planning studies have been prepared for southern Iowa, including Lamoni and Decatur County. Relevant data generated by those reports has been reviewed and incorporated into the Airport Planning Program for Lamoni.

The following reports and studies contain information relevant to Lamoni and Decatur County:

- Comprehensive Plan, City of Lamoni, Iowa, Schott Farrington Hays & Associates. 1962
- Southern Iowa Resource Conservation and Development Project, USDA, SCS. 1970
- Review and Update of Decatur County Comprehensive Outdoor Recreation and Open Space Plan, SICOG. 1975
- Preliminary Airport Layout Plan, Mid-State Engineering Company. 1974
- Environmental Impact Assessment Report, Lamoni Municipal Airport, Mid-State Engineering Company. 1975
- Local Airport Survey, Lamoni Airport Commission. 1977
- A Plan for Parks and Open Space, City of Lamoni, Iowa, H. Gene McKeown and Associates. 1977
- Areawide Development Plan, SICOG. 1977

- Southern Iowa Regional Transit Development Program, SICOG. 1977

- Zoning Ordinance for the Unincorporated Areas of Decatur County, SICOG. 1977

- Airport Tall Structures Zoning Ordinance, adopted 1977

Physical Characteristics

Location and Description. Lamoni is located in the extreme southwest corner of Decatur County, Iowa, two miles west of Interstate 35 and two miles north of the Missouri State Line.

The community's heritage has been an important element in its establishment and development. Initial development began in 1870 when a group of persons connected with Reorganized Church of Jesus Christ of Latter Day Saints formed a corporation for the purpose of purchasing and developing land for church settlements.

Some 2,600 acres of land in Fayette Township was purchased and the new settlement called, "The Colony," would later become Lamoni. In 1879, when the Chicago, Burlington and Quincy Railroad was extended through the community, additional growth took place, however, the community was not incorporated until 1885.

The City of Lamoni has a population of 2,540 (1970 census) and is the home of Graceland College, a four-year liberal arts college founded in 1895. Current enrollment at Graceland is nearly 1,500 with the college serving students from all over the world.

Lamoni, unlike many rural Iowa communities, has not experienced marked changes in population or community growth or decline; but instead, has been relatively stable, maintaining a somewhat low but continuous rate of growth. Graceland College, which is largely responsible for the community's stability and positive growth, is the areas' largest industry employing some 300 persons.

Lamoni also contains a variety of businesses and industries, many of which are closely related to the agricultural economy of the region.

Topography and Soils. The topography of Lamoni and the surrounding area is characteristic of that in much of southern and south-central Iowa. Upland plains have been eroded over the years to create rolling hills and broad stream valleys.

Principal soils include Shelby loam, Findley loam and Grundy silt loam. Shelby and Findley soils, which are generally found on steep slopes, account for over half the soils in the county.

Land Use. Land use in the vicinity of Lamoni, including a portion of Ringgold County, Iowa, and Harrison County, Missouri, is predominantly agricultural with the majority of non-farm residential, commercial and industrial uses located within or adjacent to the City of Lamoni.

Existing uses in the vicinity of Lamoni include I-35 to the east and various commercial uses which have developed along Highway 69 between I-35 and the city. These businesses include a motel, restaurant, service station, commercial printing operation and farm implement sales and service. Other uses are predominantly agricultural with a few scattered non-farm dwellings located in the rural area.

Parks and recreation facilities in and near Lamoni include: North and Central Parks in Lamoni; the Lake LaShane Reservoir and Campground on the west edge of the city; various recreational facilities on the Graceland College campus and the Lamoni Golf Course which is a private facility in the southeastern part of the community.

State and county facilities in the vicinity include Nine Eagles State Park, Shewmaker Park, Slip Bluff Park, Trailside Historical Park, Fifers Grove Park and Poe Hollow Park.

Recent trends indicate that future commercial and industrial development can be expected along Highway 69 between Lamoni and I-35. Continued development of Graceland College is expected to continue primarily to the south.

Residential development in the community has focused largely on the east-central part of the community where additional undeveloped lands are available for future use.

Transportation

Streets and Highways. Principal highways serving Lamoni and the surrounding community include one state and two federal routes.

Interstate 35 is the principal highway serving Lamoni with interchanges approximately two miles east and four miles south of the city. Iowa Highway 69, which is also a north-south route, links the city with these interchanges and Des Moines, 70 miles to the north and Kansas City, 125 miles southwest.

Iowa Highway 2, the principal east-west traffic carrier across southern Iowa is seven miles north of Lamoni and is linked to the community by I-35 and Decatur County roads R-18 and J-45.

Bus service is provided to the community by Jefferson Lines which travels in a north-south direction on I-35 and Highway 69.

Railroads. The Burlington-Northern Railroad provides freight service to various businesses in the community, with frequency of service being once or twice weekly.

Pipelines. The Michigan-Wisconsin Pipeline Company provides natural gas to the community from the southwest. The Williams Bros. Pipeline Company has three parallel pipelines which run in a north-south direction across the county and are adjacent to the east edge of the city.

Existing Airport Facilities. The nearest public airports in the vicinity of Lamoni are the general aviation airports at Mount Ayr 19 miles northwest, Osceola 32 miles north and Chariton 56 miles northeast. Air carrier airports serving the region are Des Moines Municipal 70 miles north, Omaha Eppley 145 miles west-northwest; and Kansas City International 125 miles southwest of Lamoni.

The Lamoni airport is located approximately one mile northeast of the city on a 60-acre site where airport operations have existed for the past two years. The site was initially leased for airport purposes and was purchased by the city in 1976. Prior to that time an airport with a grass strip was located south of the city.

The site is 500 feet wide and 4,050 feet long with a 66-foot wide access road connecting it with Highway 69. The site, which is oriented in a north-south direction, is adjacent to the county road to the north where an access drive and parking lot are located. The airport is situated on a north-south ridge and has an elevation of 1,130 feet above sea level. Drainage patterns in the vicinity indicate that lands to the north and east of the airport drain in a northerly direction and lands to the west and south drain in a southerly direction.

Existing improvements include a seal-coat surfaced runway approximately 25 feet wide by 2,600 feet long which is located near the north end of the 4,050-foot long site. A small storage building is located at the north end of the runway where a telephone and automobile parking area have been provided.

All improvements, including acquisition of the site, were made with local funds.

Socio-Economic Characteristics

Population Trends and Characteristics. An airport at Lamoni would serve an area well beyond the city and is expected to have a service area that would extend approximately midway between Lamoni and the nearest surrounding public airports.

Generally, the airport would serve the southern two-thirds of Decatur County and portions of one or two townships in southeastern Ringgold County. In addition, the service area would include parts of Harrison and Mercer Counties in Missouri. These areas combined would give the Lamoni airport a service area having a size and population nearly equivalent to that of Decatur County.

The population characteristics of the service area would most closely approximate those of Decatur County. Therefore, trends and characteristics of the county must be considered along with those of the City of Lamoni.

Population trends in Decatur County during the past 30-40 years are typical of those in neighboring counties as well as the rural Midwest. Population has declined significantly and is largely attributed to the lack of job opportunity resulting from consolidation and automation in farming operations.

The population trends for each of the seven counties in Region 14 in which Lamoni and Decatur County are located are shown in the following table. Of particular interest is the fact that the total population of Decatur County declined 22.7 percent from 1950 to 1970 while the population of the entire region declined 23.3 percent.

TABLE 1

Population by County

County	1950	1960	1970	% of change 1950-1970
Adair	12,292	10,893	9,487	-22.8
Adams	8,753	7,468	6,322	-27.8
Clarke	9,369	8,222	7,581	-18.5
Decatur	12,601	10,539	9,737	-22.7
Ringgold	9,528	7,910	6,373	-33.1
Taylor	12,420	10,288	8,790	-29.2
Union	15,651	13,712	13,557	-13.4
	80,614	69,032	61,847	-23.3

Source: U.S. Census of Population

In Decatur County all townships (with the exception of Fayette and Center) experienced major losses from 1960 to 1970. Woodland Township, for example, lost nearly 31 percent and the Towns of Pleasanton and LeRoy lost 39.8 and 38.6 percent of their population. Decatur County as a whole had a 7.6 percent decrease in population during the period.

Ringgold County suffered population losses in all cities and townships except for the City of Mount Ayr, which had a 1.4 percent increase during the decade. Ringgold County had an overall decrease of 19.4 percent in population from 1960 to 1970.

These trends are moderating and the out-migration of population is being replaced with better job opportunity resulting from new and expanded industry within the region.

Population forecasts from various sources reflect the slowing of past trends and indicate population increases in some of these counties may be reflected in the 1980 census.

Despite declining populations in Decatur County (as a whole) and other counties in the region, population trends in Lamoni are not typical of the area, nor are they consistent with many other communities of similar size.

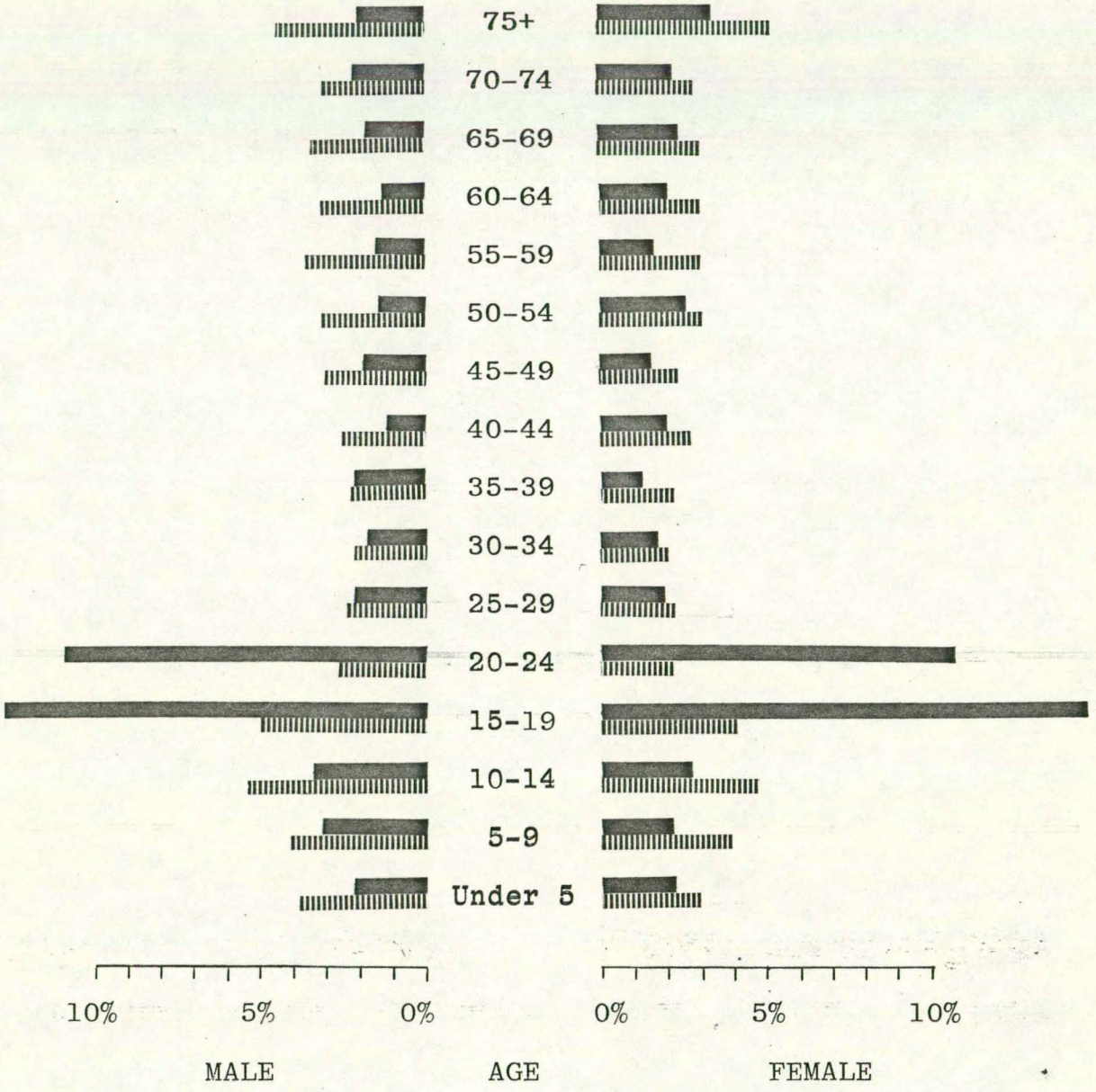
During the past 30-40 years, Lamoni has experienced a very significant increase in population - from 1,567 in 1940 to 2,540 in 1970. This increase is primarily the result of expanded enrollment at Graceland College and continued development of local businesses and industries. Job opportunity, while decreasing in the rural areas of the county has been sustained by the college and other industries in the community.

The age composition of Lamoni's population clearly reveals the high percentage of persons between the ages of 15 and 24. Persons in this age group (which includes the majority of the Graceland College student population) account for 47 percent of the city's total population. Declining birth rates over the past 10-15 years are also readily apparent with decreases in the under 5, 5-9 and 10-14 year age groups.

The age composition of the rural population of Decatur County (outside Lamoni) also reflects the declining birth rates and the high percentage of elderly persons. In addition, the number of persons in the 25-29 and 30-34 year age groups (which are prime childbearing years) is comparatively small in both the rural areas of Decatur County and within the City of Lamoni.

Population composition is shown in Figure 1.

Future population growth of Lamoni and the surrounding community will depend largely upon development of increased job opportunity within commuting distance of the City.



Source: U.S. Census of Population, 1970

FIGURE 1

1970 POPULATION COMPOSITION

Local officials in Lamoni are extremely optimistic about the city's population growth. In an effort to obtain population projections, from our independent agency, based on current trends, the Southern Iowa Council of Governments (SICOG), the areawide regional planning agency, was consulted. Officials from SICOG indicate that Lamoni is one of only three cities in the entire region which is projected to increase in population in the next 20 years. Projections for Lamoni have been made by SICOG and are based on a linear regression method using historical trends at 10-year intervals. These projections are tabulated below for the 25-year period, 1975-2000.

1975 - - - - 2,574
1980 - - - - 2,641
1985 - - - - 2,707
1990 - - - - 2,774
1995 - - - - 2,841
2000 - - - - 2,908

Although these projections indicate substantial growth over the next 20 years, the method used does not consider the changing enrollments at Graceland College separately. Enrollment at Graceland steadily increased quite rapidly in fact, from 798 in 1960 to a peak 1,717 in 1974. Since that time, however, the college enrollment has slowly declined but is now showing signs of leveling off. Local officials expect Graceland enrollment to level off at approximately the 1977 figure of 1,347. Assuming this to be the case, future growth in Lamoni will be attributed to "city" growth only. The favorable outlook for locating new industry in the area and expanded job opportunity is anticipated to account for this projected future growth.

Economic Considerations. Lamoni and the surrounding area are closely linked to the agricultural economy of the region as evidenced by the type and extent of agriculture-oriented businesses

and service industries in the community. Some of these include the Lamoni Sales Company, the Farmers Co-Op Grain and Seed Company, and farm implement sales and service.

In addition to the agriculture-related economy, there are other factors which affect the economic stature of the community, the most significant of which is Graceland College which employs over 300 people and generates numerous secondary jobs. Not only is the college a major employer of regular staff and service personnel, but, occasionally, has major construction projects underway which also contribute to the local economy.

Other non-agricultural businesses in the community which are major employers include Industrial Hardface, Inc., a firm specializing in metal plating and industrial tool facing; a commercial printing operation; the Lamoni Public School system and Lamoni Products Company, which manufactures electrical harnesses. This firm has erected a new structure east of the Graceland College campus and is expected to employ approximately 100 persons.

These businesses and industries provide a diversified employment base and contribute to the stability of the area's overall economy.

The 1970 census shows a total of 1,143 persons 16 years and older who are in the labor force in Lamoni. Of these, 743 (66 percent), are engaged in professional and related services. Of the total labor force, 656 (57 percent) work in educational services which is largely a result of Graceland College. Wholesale and retail trade comprises the next largest category with 197 persons or 17 percent of the labor force.

Family income in Lamoni and Decatur County was lower than the state average in 1969 as shown in Table 2. The sources of family income are shown in the table.

TABLE 2

1969 FAMILY INCOME AND SOURCES

	Lamoni	Decatur County	Iowa
Number of Families	482	2,471	--
Median Family Income	$6,545	$5,690	$9,018
Per Capita Income	$1,950	$1,982	$2,893
Percent Families with Income below Poverty Level	14.3	19.2	8.9
Percent Families earning $15,000 or more	8.5	5.1	16.2
Families receiving Wages	390	1,572	--
Families Self-Employed (non-farm)	91	369	--
Families Self-Employed (farm)	22	753	--
Families receiving Social Security	119	758	--
Families receiving Public Assistance.	16	144	--
Families with Other Income	53	630	--

Source: U.S. Census of Population, 1970

Recent economic history of the region has been one of erosion of the overall economic base as a result of population loss caused by consolidation and mechanization in agriculture. Decatur and other counties in the area have not had sufficient time to neutralize both population and economic erosion suffered during the past 2-3 decades; and, as a result, many of the economic indicators are low in comparison to state averages.

FORECASTS OF AVIATION DEMAND

Forecasting Principles & Methodologies

Developing reasonable aviation demand forecasts for the Lamoni Municipal Airport is a very important part of the Airport Development Plan for these forecasts will provide the basis for and justification of all subsequent steps to the study. Existing and projected aircraft activity counts must support the need for an airport for Lamoni to be included in the State Airport System and thus, become eligible for State and/or Federal aid for development.

The first step in developing reasonable forecasts is to examine the local situation and determine what general forecasting tools and methods are applicable to the Lamoni area. Factors affecting the potential use of the airport must also be taken into account and it must be recognized that development of an improved facility will automatically encourage its use.

For Lamoni, certain local factors which might influence the potential use of the Lamoni Airport include community and areawide population trends, the community's economic activity and potential industrial growth and the demand for air service to compete with other modes of transportation. In addition, existing and past aircraft activity trends must be examined to determine their applicability and the possibility of projecting them into the future.

The population trend in the Lamoni community is similar to that of all of Southern Iowa in which the rural population is declining while the urban population has increased steadily over the past 30 to 40 years. This is true in Lamoni but not for Decatur County as a whole, as the county's population has steadily declined. The

fact that Lamoni's population has steadily increased reflects positively on the community itself and increases the potential for airport users because of the greater populus from which to draw. A slow, but steady, population growth is expected to continue in the Lamoni community throughout the planning period. Such growth would be attirbuted to factors discussed previously and would tend to increase aviation activity. This line of reasoning remains consistent with the State Airport System Plan which considers population growth as a major factor in projecting increased aircraft activity at a particular site. The contribution would not be as great for Lamoni as in some other areas of the State, however.

Lamoni's economic activity over the past several years has been generally stable but has maintained a good potential for improvement. This is primarily due to the sound economic base provided by Graceland College which employs over 300 persons and continues to grow and expand. In addition, there is other industrial potential as evidenced by the recent construction of the Lamoni Products Company Plant, a manufacturer of electrical harnesses. According to local officials, the Lamoni Development Corporation is constantly working with other industrial prospects in an effort to convince them to locate in the community. It is through these efforts that one or two additional industrial prospects are seriously considering locating in Lamoni at the present time. Overall, the economic outlook is favorable and is seen to have a positive effect on the aviation activity of the community.

Present day trends indicate that larger businesses and commercial and industrial concerns depend a great deal upon air travel in doing business across the county. Time is an essential element to all corporations. Decreasing the amount of travel time, particularly from the larger home office, is a definite benefit to any company. For this reason, today's air service demand is greater than ever before and very competitive with the other

modes of transportation. Considering Lamoni's geographical location - somewhat centered in the State, just south of Des Moines and just off Interstate 35 - the community would appear to be an excellent area for attracting industry. Assuming this to be the case, the community will definitely benefit by developing larger, more modern airport facilities which will attract aviation activity that cannot now be attributed to the area.

Historically, at least in recent years, Lamoni has been a community with a great deal of local interest in aviation and in developing adequate airport facilities. This may not be reflected in the growth of based aircraft or registered pilots in the area but is readily apparent in the number of accomplishments that have been undertaken with the use of local funds only. Aviation interest in Lamoni is high at the present time and is expected to continue to grow in the future, thus increasing the potential for more local aircraft activity.

A review of the local aviation situation reveals that there are currently 12 to 14 pilots in the Lamoni area. This includes some from the Leon community located approximately 15 miles to the northeast but well within the Lamoni service area. Of these pilots, four own and operate aircraft frequently out of Lamoni and would base their aircraft at the Lamoni Municipal Airport if hangar facilities were available. In addition, if a better, hard-surfaced runway and hangar facilities were available, it would seem reasonable to assume that other aircraft would be purchased and based at Lamoni by some of the other pilots in the area.

Also to be considered is the amount of industry in and around Lamoni that now use the existing airport. A larger, more modern runway would definitely benefit the Lamoni Livestock Sales Company which is considered the largest cattle feeder auction in the State of Iowa and northern Missouri. The auction is held every week on Thursday and attracts farmers from hundreds of miles

away. Better airport facilities would allow more buyers the opportunity to fly in, as a limited number are able to do so presently. Graceland College also attracts students and visitors from long distances. The existing airport frequently accommodates many of these but an all-weather, lighted facility would increase the usage substantially.

To aid in developing aviation forecasts for the Lamoni community and to better consider the aircraft activity currently provided by local industry using the existing airport, a mail survey was conducted of major business, commercial and industrial concerns in the area. Several responses were received from the companies contacted and much information provided as to the amount of existing aircraft activity and the potential for based aircraft at the Lamoni Airport. A review of the information received reveals that a few businesses own and operate aircraft out of Lamoni but do not base their aircraft at Lamoni because of inadequate hangar facilities. There are also several private and business aircraft owners that make regular business trips in and out of Lamoni. Most of these use the existing airport now but would increase their use substantially if the facility was upgraded. The information also revealed that there are several aircraft owners and businesses that do not now use the Lamoni Airport because of the inadequate facilities.

In order to properly assess the aviation activity indicated in the mail survey, the information was compiled into three different categories: a) those aircraft that would be based at Lamoni at the present time if proper facilities were available; b) those aircraft and their associated activity that use the existing facility but would not be based at Lamoni; and c) those aircraft and their associated activity that do not now use the Lamoni Airport but which would do so if a hard-surfaced, lighted facility were available. These separate categories are tabulated in Tables 3, 4 and 5 respectively.

All things considered, there is a certain amount of aviation activity existing today at Lamoni as a result of the current facility available; and there is a certain amount of "induced activity" that will be added almost immediately if a better runway and adequate hangar facilities were available.

TABLE 3

Potential "Based" Aircraft

Owner and/or Company	Home Base	Type of Aircraft
Private - Wight	Lamoni	Cessna 150
Private - Omstead	Lamoni	Cessna 140
Private - Reidy, Boswell, Hampton	Lamoni	Cherokee Warrior
Private - Veterinarian	Leon	Cessna Single Engine
Central Savings Association	Chariton/Lamoni	Piper Cherokee
Lamoni Livestock Sales Company	Lamoni	Piper Twin
Lamoni Livestock Sales Company	Lamoni	Piper 23S
McIntire - Aerial Photography	Lamoni	Aeronca Defender 65TC

Some of the information listed in the above and following tables was obtained from a public informational meeting held at the Lamoni City Hall on April 11, 1978. The meeting was conducted in order to allow interested persons the opportunity to add input into the airport planning process. Several positive responses were obtained at the meeting in regard to potential based aircraft and associated activity. However, only those that could be reasonably substantiated are listed in the tables.

State Projections

From the previous discussion and tabulated information, there seems to be an excellent basis from which to make some aviation forecasts.

TABLE 4

Existing Aircraft Activity from "Non-Based" Aircraft

Owner and/or Company	Home Base	Type of Aircraft	Estimated Annual Opers.
Private - Blessing	Bethany, Mo.	Piper 160	104
Private - Miller	Shannon, Ill.	Piper 23S	104
Private - Baur	Carroll, Ia.	Piper 140	104
Private - Clark	Sioux City, Ia.	Piper Twin	104
Graceland College Visitors	-	Single Engine	600
Graceland College Visitors	-	Twin Engine	50
Hy-Vee Food Stores	Chariton, Ia.	Piper Navajo Piper Lance	104
Lamoni Livestock Sales Customers	-	Single Engine	144
Michigan/Wisconsin Pipeline	-	Single Engine	730
		TOTAL	2,044

TABLE 5

Potential Aircraft Activity with Improved Facilities

Owner and/or Company	Home Base	Type of Aircraft	Estimated Annual Opers.
Central Savings Customers	-	Single Engine	48
Lamoni Livestock Sales Customers	-	Twin Engine	208
Graceland College Visitors	-	Single Engine	600
		TOTAL	856

Prior to developing these, however, it seems appropriate to compare the local aviation activity to that which has been projected for Lamoni in the State Airport System Plan (SASP).

The 1976 SASP Update, which has recently been updated for 1978, projected little or no growth of population, registered airmen, or registered aircraft in the Lamoni and Decatur County area. Lamoni's population was projected to remain stable at 2,500. Aircraft in Decatur County were projected to decrease from five to four by 1996, and airmen were projected to remain at three for the 20-year period. These numbers appear to be far too conservative after reviewing the information received locally and from the mail survey. Population figures exceeded 2,500 in 1970 and with the expected stable enrollment at Graceland College and the increased industrial growth in this decade, these figures are seen to be much higher by 1980, as is indicated by SICOG projections.

In addition, the fact that there are some 12 to 14 private pilots in the Lamoni area and the liklihood of 8 based aircraft almost immediately if the facility were upgraded clearly points out that the state projections are not indicative of this area.

The 1978 Updated SASP is somewhat more optimistic with registered airmen listed at 24 and registered aircraft at 6. However, no growth is predicted for either category over the 20-year planning period. As a result of the overall assessment of Lamoni's Airport by the state, the 1978 plan does not include Lamoni as a system airport but rather a "system candidate". This essentially means that Lamoni may be added to the state system at a later date if it is shown through an airport study that sufficient activity exists at the location to justify their inclusion in the system.

Because of the substantial amount of aviation activity that has been shown exists in the Lamoni area, it would seem reasonable to assume that Lamoni belongs in the state system.

However, future aviation forecasts, along with the overall outlook for community growth must also be considered. The overall outlook for future growth is optimistic, at least for Lamoni, if not all of Decatur County, as has been previously discussed.

Therefore, future aviation forecasts will be presented next so the overall evaluation for Lamoni can be made.

Aviation Forecasts

In order to reasonably forecast aviation activity at the Lamoni Airport, a "known basis" for making the projection had to be identified. In this case, the 8 aircraft listed in Table 3 that are considered "potentially based aircraft" can be readily identified and, therefore, were used as the basis for making based aircraft projections. Once the based aircraft projections were made, other forecasted aviation components were projected using the based aircraft numbers and data obtained from the mail survey.

In making the projections over the 20-year planning period, several assumptions were made in order to arrive at what are felt to be reasonable forecasts, representative of the Lamoni area. These assumptions included the following:

1) Since there are 8 aircraft that can be currently attributed to the Lamoni area (as tabulated in Table 3), it was assumed that 8 based aircraft exist at Lamoni in 1978. This is a reasonable assumption since four of these aircraft are privately owned with a home base in Lamoni or Leon today; two of the aircraft are owned by existing businesses with home bases in Lamoni today;

and two of the aircraft would be owned and operated by Lamoni Livestock Sales Company with home base in Lamoni if the existing airport was upgraded (i.e., lighted runway and hangar facilities).

2) Once a hard-surfaced, lighted runway and adequate hangar facilities exist at Lamoni, the airport should experience a growth in based aircraft. With 12 to 14 licensed pilots in the Lamoni and Leon areas today, there quite obviously would be more than 5 or 6 that eventually would own and operate private aircraft. In addition, aviation interest should increase in the area making it more likely for additional pilots to become licensed. This is supported by statements made at the public informational meeting that said there exists a definite need for improved airport facilities for flight instruction purposes. No less than six people have contacted officials in Lamoni about flight instruction.

Also to be considered is the existing industry in Lamoni and potential industrial users not now located in the area. Because of the industrial growth potential demonstrated in the Lamoni area and because much of the activity at the existing airport is business and company oriented, it seems reasonable to assume any growth in aviation or based aircraft at Lamoni quite likely will be aided by areawide industry.

As a result of the various positive factors that should contribute to aviation growth in Lamoni, it was assumed that based aircraft will grow from 8 to 9 by 1983, 9 to 10 by 1988 and 10 to 12 by 1998. These numbers seem almost conservative when considering that it means only one additional based aircraft every five years.

The assumed growth is also consistent with the "average" growth projected across the State of Iowa by the 1978 SASP Update. The 1978 report projects an average growth in general aviation "based aircraft" of 16% by 1982, 29% by 1987 and 55% by 1997, and is based on 1977 figures. This average growth would take into account the larger, more active general aviation airports and the small airports that are less likely to show any growth in 20 years. If Lamoni were considered just an "average" general aviation site and these growth factors applied to the 1978 count of 8, the 5, 10 and 20-year projections would be 9, 10 and 12 respectively or the same growth numbers that were "assumed" previously.

It does not seem unrealistic to consider Lamoni as an "average" general aviation site in terms of potential growth. There are several cities with populations similar in size to Lamoni's that anticipate substantial increases in general aviation activity and there are several that project little or no growth at all. With the Lamoni community recently experiencing a certain amount of growth and the trend expected to continue, it seems reasonable to consider the area's growth potential as equivalent to at least the average general aviation site in Iowa. Thus, the comparison of the "assumed" figures to the "state growth" figures is presented here primarily to provide overall support to the based aircraft numbers that were used to project other aviation components.

3) The SASP made projections for annual operations at a particular site by equating, through empirical formulas, the based aircraft and registered county airmen to the area's population. Since Decatur County and the surrounding area have experienced a sharp drop in population over the past few decades, it was felt that this type of comparison for Lamoni would not reflect the type of growth that is actually being experienced in the community. Therefore, annual operations were calculated using other criteria:

a) The first was that a single based aircraft will generate some 500 to 600 operations annually. These numbers are supported by actual counts taken at general aviation sites throughout the State and are also supported by information received in the mail survey. The questionnaire submitted by the Lamoni Livestock Sales Company indicated they would anticipate 24 operations per week from their based aircraft if a "new, lighted, hard-surfaced runway and hangar facilities were available." This totals 1,248 operations per year for two aircraft or 624 annual operations for each. The questionnaire submitted by the Lamoni aerial photography firm indicated 8 to 10 operations per week if upgraded facilities were provided. This is around 500 operations on an annual basis. Therefore, annual operations tabulated in Table 6 are partially based on the assumption that each based aircraft will generate 550 annual operations.

b) The second criteria used to estimate total annual operations was based on information received in

the mail survey and listed in Table 4. The estimated annual operations listed in this table are taken directly from the questionnaires submitted by the respective companies and essentially indicates the amount of activity at the existing site by aircraft not considered as based.

Considered together, the estimated annual operations occurring in 1978 is then assumed to be the sum of the two categories. Both categories are included because the aircraft and associated activity either exists today or would exist today if upgraded facilities were available. This activity is listed in 1978 rather than 1983 because it is based on Lamoni having the minimum essential airport facilities to serve a community (i.e., lights, hangars, hard-surfaced runway); and would not be activity resulting from growth.

The activity projections for 1983, 1988 and 1998 were then made by considering that each based aircraft continues to account for 550 annual operations and, adding to that, the non-based aircraft activity for each planning period. The non-based aircraft activity was increased 15% for each 5 years of the 20-year planning period to account for increased usage as a result of expanded facilities and to account for increased activity by users not now in the area.

This 15% increase in usage by the non-based aircraft seems realistic because it would mean only one additional take-off and landing at the site per day by a non-based aircraft for every 5 years of the planning period.

This increased usage is also supported by comments made on the questionnaires submitted and the information tabulated in Table 5. All of the estimated operations listed in Table 5 would be the result of "improved facilities". To remain on the conservative side, it will be assumed that these improved facilities are the result of expansion and development during the 20-year planning period. The activity would, therefore, not exist today as the result of a lighted, hard-surfaced runway; but, rather, would be the result of aviation growth in the community.

By comparing the 856 operations in Table 5 to the 2,044 listed in Table 4, it can be shown that there would be a 40% increase in non-based aircraft activity as a result of "improved facilities". This increase spread out over the 20-year planning period is approximately 10% of the 15% projected increase. It is assumed that the other 5% will be the result of expanded usage.

4) Itinerant and local operations were estimated next. It was felt that, initially, the itinerant operations would be a higher percentage of the total because of the amount of activity contributed by the "non-based" aircraft and the substantial amount of itinerant activity from the based aircraft.

This itinerant activity percentage would decrease during the 20-year planning period once adequate facilities were available for established flight instruction (i.e., more touch and go's) and increased pleasure flying.

Historically, itinerant operations are between 30 and 40% of the estimated total at small general aviation sites. For Lamoni, it will be assumed that 40% best represents the itinerant activity initially. During the 5-year planning period, this would decrease to 35% and remain stable through 1998.

5) Annual enplaned passengers equals 1.5 times annual itinerant operations.

6) Peak hour operations equals 0.18% of annual operations. This figure agrees substantially with SASP figures for similar facilities.

7) Peak hour passengers equals 1.5 times peak hour operations.

8) Annual air cargo tonnage is an estimate based on current and anticipated local business development.

9) Annual instrument approaches equals 0.5% of total annual operations. This assumed 5% instrument conditions, 20% of pilots qualified and 1 approach per 2 operations.

10) Functional system role classification is based on annual enplaned passengers and annual operations. The categories include primary, secondary and feeders with high, medium and low density. It is assumed that a Lamoni facility would not develop beyond the low density feeder (F-3) classification in 20 years.

11) The operational role classification is based on the type of activity as well as the number of operations

forecast. Basic Utility (BU) and General Utility (GU) classifications apply to general aviation airports where 90% or more of the aircraft are Class D (Medium Twins) and Class E (Light Twin and Singles). All Class D and E aircraft are under 12,500 lbs. gross weight. A substantial amount of Class D traffic would justify the higher General Utility classification, however, Basic Utility, Stage II is projected as the ultimate operational role classification for a Lamoni facility during the next 20 years.

12) General Utility aircraft operations are calculated assuming no GU aircraft presently use the airport. Within 5 years, it is assumed that the equivalent of one based aircraft will be using the facility on an itinerant basis that will be in the GU category (gross weight between 8000 lbs. and 12,500 lbs.). This number is then assumed to be two by 1988 and three by the end of the 20-year planning period.

Table 6 contains a complete listing of the aviation forecasts for the Lamoni Municipal Airport.

Table 7 is a tabulation of aircraft mix and lists the percentage of aircraft in each class that are projected to use the airport during the 20-year period.

The FAA aircraft classification used in Table 7 can be more readily understood by listing types of aircraft in each class. These include:

Class A - Large, Four Engine Turboprop and Turbojet Air Carriers such as Boeing 707, 747 - Douglas DC-8, DC-10;

Class B - Medium Sized Twin and Four Engine Air Carriers such as Boeing 727, 737 - Douglas DC-9;

Class C - Twin and Four Engine Turboprop and Turbojet type principally used for business such as Lear Jet, Cessna Citation, Douglas DC-3, Grumman Gulfstream I and II;

Class D - Principally Twin Engine Type, Medium Size such as Beechcraft King Air and Queen Air, Hawker Siddeley Dove, Mitsubitshi MU-2;

Class E - Single and Light Twin Engine Type such as Beechcraft Bonanza, Piper Cherokee 180, Cessna Sky Hawk, Rockwell Aero Commander.

TABLE 6

Forecasts of Aviation Demand

Component	1978	1983	1988	1998
Based Aircraft	8	9	10	12
Total Annual Opers.	6,440	7,295	8,195	10,165
Annual Local Opers.	3,864	4,742	5,327	6,607
Annual Itinerant Opers	2,576	2,553	2,868	3,558
Annual G. U. Opers.	0	192	385	576
Annual Enplaned Pass.	3,864	3,830	4,302	5,337
Peak Hour Opers.	12	13	15	18
Peak Hour Pass.	18	20	23	27
Annual Air Cargo (Tons)	-	5	10	20
Annual Instr. Approaches	32	36	41	51
Functional System Role	F-3	F-3	F-3	F-3
Operational Role	BU-I	BU-I	BU-I	BU-II

TABLE 7

Projected Aircraft Mix

Aircraft Classification	Planning Period			
	1978	1983	1988	1998
%A	0	0	0	0
%B	0	0	0	0
%C	0	0	0	0
%D	0	3	5	6
%E	100	97	95	94

FACILITY REQUIREMENTS

Introduction

The facilities required for an airport are many and varied. Recommendations for such facilities are determined from a combination of the projected aviation demand, selected design criteria, practical capital expenditures and from FAA advisory circulars. The number and type of aircraft are useful when determining apron area, width of taxiways, hangar spaces and overall terminal size. However, it must be understood that the projected figures are based on past and present trends and, as such, may not continue at the rates forecast. Therefore, the requirements must remain flexible with some allowance for up-dating of the airport master plan from time to time in the future. Airport lighting and navigational aids are additional items which are necessary for a functional airport facility. With the rapid innovations in technology, these two areas must also be closely monitored for future up-dating.

Facility Requirement Schedule

Table 8 represents a tabulation of a facility requirement schedule for the Lamoni Airport with the following discussion relating to the individual components.

Runways. After reviewing the short-term aviation forecast and the present aviation demand at the Lamoni Airport, the activity suggests there is immediate need for a Basic Utility, Stage I runway. The actual runway length is determined from performance curves plotted in Federal Aviation Administration Advisory Circular 150/5300-4B. These performance curves were developed using the following assumptions:

1) Zero headwind component
2) Maximum certificated takeoff and landing weights

TABLE 8

Facility Requirement Schedule

	Facility	Planning Period		
		Short Range 0-5 year	Intermediate Range 6-10 year	Long Range 11-20 year
1.	Runways			
	Primary	2900'x60'	2900'x60'	3400'x60
	Crosswind	none	2800' turf	2800' turf
2.	Taxiway	30' connecting R/W to Apron	30' connecting R/W to Apron	30' connecting R/W to Apron Rectangular Turnarounds
3.	Apron Areas			
	Itinerant A/C	1000 S.Y.	1000 S.Y.	1000 S.Y.
	Based A/C	1000 S.Y.	1000 S.Y.	1000 S.Y.
	Fuel and Service	2000 S.Y.	2000 S.Y.	2000 S.Y.
	Total Size	150'x250'	150'x250'	150'x 250'
4.	Structures			
	FBO/Admin.	none	none	1500 S.F.
	Shop	none	none	3000 S.F.
	Hangar	8	8	12
5.	Parking	25	25	25
6.	Lighting			
	Primary R/W	MIRL	MIRL	MIRL
	Crosswind R/W	none	none	none
	Taxiway	yes	yes	yes
7.	Vis-Aids	REIL	VASI	VASI
	Primary R/W		REIL	REIL
8.	Nav-Aids	NDB	NDB	NDB
9.	Miscellaneous	Lighted Wind Tee Rotating Beacon	Lighted Wind Tee Rotating Beacon	Lighted Wind Tee Rotating Beacon

3) Optimum flap setting for the shortest runway length (normal operation)

A temperature of 86° F. (normal maximum temperature, hottest month of the year) and an elevation of 1130 feet MSL were the parameters applied to the performance curves for Lamoni and resulted in the need for a runway length of 2900 feet for the short-term planning period. The construction of such a runway can be accomplished on property already owned by the city while the acquisition of another 50 acres - for future expansion and the addition of a crosswind runway - will be necessary in the intermediate period.

The long-range forecast period indicates a need for expansion of the facility to a Basic Utility, Stage II (BU-II) Airport - requiring the addition of 500 feet to the primary runway for a total length of 3400 feet. A BU-II Airport would accommodate 95% of the propeller aircraft under 12,500 pounds gross weight.

Since the primary runway only provides 86% coverage against crosswind components of 12 mph or greater, a secondary or crosswind runway should be constructed during the intermediate forecast period to provide a combined wind coverage of 95% for the airport. The crosswind is proposed to be constructed as a turf runway and should be at least 80% of the primary runway length. Terrain features of the airport site limit the practical length of the crosswind runway to 2800 feet.

The width required for a hard surfaced runway in the BU-I category is 50 feet. To meet the requirements of a BU-II runway, 60 feet is recommended. Because Lamoni is expected to expand from a BU-I to a BU-II airport, and, especially, if capital funds are available, it is recommended that the 60-foot width be constructed for the initial runway during the short-range planning period.

Pavement design will not be covered in this report; however, evaluation of the prospective users of the airport reveals that the pavement should be designed for aircraft with gross weights of less than 12,500 pounds. This weight category would include personal, agricultural, and other nonscheduled aircraft used for such things as instructional or aerial chemical application flying.

Taxiways. The primary use of taxiways is to facilitate aircraft movements to and from the runways and, as such, are a basic part of any airport. There are, according to FAA classifications, three types of taxiways: 1) parallel; 2) exit; and 3) hangar and apron access. The FAA promotes construction of parallel taxiways when aircraft movements and safety factors warrant them.

However, the projected operations at Lamoni do not justify such an expenditure. Therefore, runway end turnarounds are proposed and should be provided at each end of the primary runway. The turnarounds may be constructed in such a manner as to be easily incorporated into a parallel taxiway if annual operations should justify one in the long-range planning period.

An exit taxiway, 30 feet in width, is recommended to connect the runway with the apron area. Also, access taxiways, with a minimum width of 20 feet, should be constructed to connect the hangar facilities with the apron area.

Although the use of parallel or partial parallel taxiways cannot be justified in the foreseeable planning periods, the efficiency and safety of the facility should be considered before a final decision is made to exclude them from future plans.

Apron Area. Complete apron development is recommended in the short-term forecast period. The need for a hard surfaced facility to provide for all-weather operations is one of the main goals of the

overall airport development. The layout of the terminal apron includes space for both itinerant and based aircraft parking as well as tiedowns. There is also area provided for aircraft fueling and parking in front of the maintenance hangar.

Structures. The principal structure necessary for the short-term planning period is an eight-unit hangar building because, at the present time, no storage facility for aircraft exist at the Lamoni Airport. It has been assumed that all based aircraft would be kept in hangar facilities if the hangars were available. During the forecasting phase, it was established that at least eight aircraft would be locally based if the airport facilities were improved; therefore, it is recommended that an eight-unit tee hangar be constructed intially.

Another option would be the construction of a conventional hangar that could be used for aircraft storage and double as a maintenance facility during the short term. It is recommended, however, that a separate administration building and maintenance hangar be constructed in the long-term planning period. The size of such structures vary with the amount of activity but, as a guide, the FBO/Administration building should have a minimum of 1500 square feet to accommodate pilot briefing rooms, waiting room, public restrooms and the airport manager's office.

Access Drive and Auto Parking. The airport access road will give direct access to the terminal area from U.S. Highway 69 approximately one-fourth mile south of the airport. During the short-term planning period, a gravel access road should adequately serve the needs of the airport.

The initial auto parking lot is proposed to include enough area to accommodate 25 vehicles. That amount of parking should be adequate throughout the master plan period. Separate parking areas should be set aside for long and short-term parking plus designated areas near the hangars for pilots. When designing the actual layout of

parking areas, future expansion possibilities of the terminal area must be considered in order to avoid conflict later in the airport development of the terminal area. Also, a turfed area beside the access road can be provided for overflow parking if necessary.

Airport Lighting. The existing runway (17/35) has no lighting available at the present time which limits the airport to a daytime VFR (visual flight rule) field. One of the initial goals of any development plan is to provide for nighttime operations. Items such as runway lights, rotating beacon and lighted wind direction indicator should be considered essential if there is a substantial amount of night operations.

A runway lighting system for small general aviation airports consists of two types of lights - runway edge lights and runway end/threshold lights delineating both the lateral and longitudinal limits of the useable landing area. The lateral limits are defined by two parallel rows of edge lights equal distance from the runway centerline. The lights are generally located between two and ten feet from the paved surface and spaced longitudinally not more than 200 feet. The height of the edge light above ground should be increased as it is moved out to the ten foot limit. The standard height is fourteen feet but may be increased to as much as 30 feet for snow and vegetation clearance. The edge lights should be perpendicular to the runway centerline and directly across from each other. A medium intensity runway lighting system (MIRL) is typical for airports such as Lamoni's.

The other part of the runway lighting system is the threshold/runway end lights. These lights are located perpendicular to the extended runway centerline and positioned between two and ten feet from the end of the useable runway. The lights are required to have a split lens which omits aviation red light toward the runway side and green light toward the approach side.

The taxiway edge lighting system is installed using the same dimensional standards relating to runway edge lighting. Taxiway lights required to have blue lenses are generally spaced less than 200 feet longitudinal because of the relative short length of taxiways connecting runway and apron. In addition to the edge lights, two exit lights should be placed next to the runway to identify the entrance to the taxiway.

Approach Lighting Aids. Runway End Identifier Lights (REIL's) are proposed on the primary runway during the short-term planning period. This lighting system is beneficial to pilots in locating the runway at night in areas having rather featureless terrain such as at the Lamoni Airport. An omnidirectional REIL is the preferred system; however, the close proximity to the terminal area, as well as farmsteads, may dictate the need for the unidirectional system.

A two-box visual approach slope indicator (VASI) system is recommended during the intermediate planning period. This system provides visual slope guidance to an incoming pilot and is especially useful where visual reference information is lacking or deceptive, such as hilltops, valleys or steep terrain grades. The visual aiming point obtained from the VASI reduces the probability of descending below the normal glide path and colliding with hazardous objects in the approach area. A VASI also helps to prevent the pilot from landing short or long of the runway.

Segmented Circle and Wind Indicator. A lighted wind indicator in a segmented circle is recommended for installation early in the master plan period. A segmented circle provides two functions: 1) aids pilots in finding obscure airports; and 2) provides a centralized location for signal devices or indicators. The wind tee and segmented circle should conform to FAA criteria and be installed in accordance with FAA guidelines.

Beacon. A rotating light beacon should be installed at the same time as the MIRL system to give a visual reference point to a lighted airport. The beacon generally has an optical system of one green lens and one clear lens which rotate at six RPM to produce an alternating clear and green flash of light. The standard small beacon is ten inches in diameter.

Non-Directional Beacon. Navigation aids are useful tools to a pilot in locating the runway at night or during periods of restricted visibility. The non-directional radio beacon (NDB) is the least sophisticated navigational aid and, therefore, is also the most economical system for navigation. The NDB generally is considered an essential part of an airport facility and is recommended for use in the non-precision instrument approach procedures proposed for R/W 17/35.

Pavement Markings. The paved, primary runway at Lamoni is recommended to have an NDB with an FAA approved straight-in nonprecision approach. Therefore, the runway markings should consist of non-precision instrument (NPI) markings.

NPI markings include the basic runway markings plus threshold markings. Basic markings consist of marking the paved runway centerline plus designating each runway end with numbers corresponding to the magnetic azimuth of the centerline. The runway bearing is measured to the nearest ten degrees and the end numbers installed omitting the last zeros. Threshold markings are large white stripes up to 150 feet long and ranging in width which mark the runway threshold.

Taxiways should be marked with a continuous centerline strip six inches in width. At the intersection of the taxiway and the runway, the taxiway centerline shall curve into the runway centerline marking and extend parallel along the centerline for 200 feet from the point of tangency. Aircraft holding lines are recommended to be marked on each taxiway as well as on each runway turnaround.

SITE REVIEW

Introduction

Selection of the proper site for airport development is essential to the success of any airport development program. The site must be able to accommodate the facilities which will satisfy the needs of the existing and future aviation demand of the area with due consideration given to initial construction costs, future expansion capabilities, accessibility by users, airspace compatibility, land use consistency and environmental impact, among other things. While land costs must also be considered, emphasis on selection of a site with relatively low land costs can create problems in design, construction and operation of the facility. The site selection process must therefore be a balanced and reasoned effort to select the site which will satisfy the airport requirements but remain economically and environmentally feasible.

The investigation and location of alternative sites for airport development is a local responsibility, at least initially, whereby the airport sponsor and their consultant present recommendations to the appropriate Federal and/or State agency to obtain their endorsement of the site prior to any detailed planning.

The site selection process for Lamoni began in 1974 when four (4) alternative locations were evaluated extensively. The existing site, located in the east one-half of Section 1 - Fayette Township, was the top candidate selected from the four studied because of easy accessibility and the potential for accommodating a crosswind runway.

After completing an environmental impact assessment for the existing site in 1975, the City of Lamoni submitted an application to the Federal Aviation Administration (FAA) for assistance in

purchasing and developing the site. The proposal was rejected by the FAA however, because of lack of funding and low priority. The City then proceeded to purchase the site with local funds and accomplished this the same year - 1975.

Site Review

Because the Lamoni Airport site was evaluated extensively in the 1974-75 site selection process, this phase of the development plan will deal primarily with an overall review of the existing site and its adequacy versus relocation to a new site.

In making a good evaluation of an airport site, several major points must be examined. These include: 1) ability to satisfy existing and future airport needs; 2) accessibility by primary users of the facility; 3) initial construction costs; and, 4) the ever-increasing importance of environmental impact and compatibility of land use. These four points are addressed in the following discussion relating to the existing airport site:

1) Existing and future needs

Through a series of office and field reviews, the existing site looks very adequate. Future airport expansion proposes construction of a 3400 foot primary runway with a 2800 foot crosswind runway. Through the use of aerial photographs and USGS quadrangle maps of the site and the surrounding area, ample space exists for the proposed expansion. Beyond the long-range planning period and the development of a Basis Utility (II) facility, the possibility would still exist for development of a 4100 foot runway should it become desirable to expand to a General Utility (GU) airport.

Using FAA guidelines, land requirements are approximately 60 acres for the short-range needs - which the City already

owns - and approximately 50 acres for the future expansion. Acquisition of the additional land required for the development of a crosswind runway would appear to be quite feasible since the land is immediately adjacent to the existing site. An option to purchase a portion of the required land has existed for some time.

A further look around the existing site reveals there are no obstructions which penetrate the approach surfaces to either runway, existing or proposed; thus, no obstruction removal is necessary for development of the site. Clear distance between clear zones and roadways is also sufficient for future expansion of the primary runway beyond the 3400 feet up to 4100 feet and still maintain adequate roadway clearance over U.S. Highway 69 to the south.

Development of a crosswind runway on an east-west alignment appears to be the main concern. A crosswind runway should be a minimum of 80% of the length of the primary runway and provide wind coverage, when combined with the primary, at least 95% of the time against crosswind components of 12 mph or greater. While it is entirely possible to do this on the existing site, the main consideration is how to provide an adequate length with a minimum amount of grading. The crosswind runway, as proposed in an east-west direction, provides for optimum wind coverage. The limiting factors for its length and orientation is the terrain and farmsteads located east of the existing airport. Field reconnaissance indicates a few possible navigation obstructions - such as, power lines, farmsteads, trees and terrain - if the runway is not properly situated.

The most suitable crosswind runway appears to be on an 08/26 heading providing a combined wind coverage of 95.1% when considered together with the existing runway - adequate to satisfy minimum FAA criteria.

2) Accessibility

The present location of the Lamoni Airport is quite favorable and easily meets one of the major goals of an airport development - good access. The airport site is located within a mile and a half of the center of the city and approximately one-half mile west of the interchange of U.S. Highway 69 and Interstate Highway 35. The location of the airport site is conducive to the development of an industrial park in the immediate area if properly zoned. Such a development would be quite compatible with the adjacent airport land use - assuming that proper planning will be undertaken to insure no airspace or noise conflicts, etc.

3) Initial Construction Cost

Initial construction costs when derived in the site selection phase, are preliminary estimates of the proposed construction and are not the result of detailed engineering analysis or design. Estimated costs are broken down into three planning periods to correspond with the proposed stage construction of the airport facility. The planning periods include the short (0-5 years), intermediate (6-10 years) and long-term (11-20 years).

The short-term planning period, as can be expected, will account for a majority of the capital expenditures, since a great deal of the work on the airport site is proposed during the first five years.

Preliminary estimates indicate nearly one million dollars will be necessary to develop the Lamoni airport to a Basic Utility Stage I facility. The development would include construction of a paved runway, 2900 feet long by 60 feet wide, hard-surfaced apron area, associated lighting and navigational aids. An eight-unit hangar is also proposed in the terminal area during the short-term.

During the intermediate and long-term periods, the major expenditures proposed include construction of a turf crosswind runway and the addition of 500 feet onto the primary runway. Also, if sufficient traffic is generated, the terminal area may be expanded with the addition of more hangars, a terminal building and a maintenance hangar. The combination of expenditures during the latter two planning periods will account for approximately another one million dollars.

4) Environmental

The most noticeable environmental impact of an airport upon a community can be aircraft noise. However, with proper planning and runway orientation, this problem can be minimized. Both the existing and proposed runways at Lamoni are oriented such that the majority of traffic patterns will avoid the populated areas. Enforcement of good land use zoning early in the airport development process will also minimize adverse environmental impact.

Other environmental considerations to be explored include air and water pollution and the problems associated with ground transportation to the airport. Access routes can, with proper planning, be designed to minimize pollution generated by ground transportation.

Lamoni has a very good ground transportation network to the airport via paved routes I-35 and U.S. Highway 69. Once the proposed access drive from Highway 69 is completed, air pollution caused by ground transportation will be minimal.

Some adverse environmental effects generally will occur with any airport development. However, many can be offset by certain positive aspects. In some instances, an airport can enhance the community's environment by providing a large, open area buffer zone between the city and the industrialization that usually develops along a prime ground transportation route, such as Interstate Highway 35.

Another major environmental consideration is the removal of prime farm land from agricultural production. The removal of a few acres of land from agricultural production is most often offset by an increase in a community's industrial growth potential as well as other positive community benefits.

With nearly all land in the State of Iowa considered prime farm ground, airport development of any kind must carefully consider land needs in order to minimize the amount of land removed from crop production and still satisfy the airport needs of the community. The Lamoni airport site, as it presently exists and as proposed for future expansion considers this point very strongly.

The existing terrain is utilized to the greatest extent possible in the planning for the runways. In this way, grading costs and land acquisition are minimized.

Summary

In the previous discussion, four major points concerning the existing site of the Lamoni Airport were reviewed. It is readily apparent that the adequacy of the present airport site is quite good, especially when the alternative is relocation to a new one.

The present site was selected in 1975 for development of a complete airport because it had the greatest potential. Since this potential still exists today, the site has the best chance of satisfying the present and future needs of the community.

From an accessibility standpoint, the site is very well located with an access road leading off of U.S. Highway 69. The airport is only a short distance from Lamoni and is very close to I-35. No other site in the area can offer this.

Initial construction costs are minimized by developing on the present site because of the investment that has already been made locally. In addition, utilization of the site terrain in the layout and development of runways decreases the initial construction costs of this site when compared to a site unable to offer suitable terrain. Many of the costs associated with construction will be the same regardless of which airport site is developed. However, in Lamoni's case, the initial and overall construction costs can be reduced by developing the existing site.

Environmentally, developing the existing site will have the least adverse effects on Lamoni and the surrounding area. Objectionable aircraft noise will not be generated beyond the airport boundary. Air and water pollution will not be a significant problem regardless of which site is developed. However, the good, hard-surfaced ground transportation route to the present site makes it more favorable. The present site minimizes the removal of prime farmland from production because over one-half of the overall land needs already exist. In addition, the remaining land required for

future expansion is not considered the prime farmland of the area. Such a consideration may not exist if an alternate site were selected.

In summary, it must be concluded that development of the existing airport site is much more desirable than the alternative of relocation to another area.

SOCIO-ECONOMIC-ENVIRONMENTAL FEASIBILITY

Introduction

The Lamoni Airport Commission is proposing to request funds from the Iowa Department of Transportation (IDOT) to assist in upgrading and expanding the Lamoni Municipal Airport. It must be recognized that the proposed expansion, when eventually undertaken, will have various impacts on the human and natural environment. In an effort to properly address both the positive and negative effects of the proposed action on the environment, a narrative discussion of the proposed project, the alternative actions considered, the probable impacts on the human and natural environment and the mitigating measures to offset the unavoidable adverse effects was completed. This narrative evaluation follows.

Project Description

The proposed project consists of upgrading the existing Lamoni airport facility and the long-range planning for future expansion. Initially, the existing airport would be improved to a Basic Utility Stage I (BU-I) facility. The airport would then function as a BU-I facility for the first ten (10) years of the master plan period and be upgraded in the long-range planning period to a BU - Stage II classification to meet increased aviation demand. The initial development would include the construction of a 2900 foot long by 60 foot wide hard-surface primary runway. A 2800 foot turf crosswind runway is proposed in the intermediate planning period.

The overall development of the airport would take place in stages over a twenty year period to satisfy the aviation demands of the City of Lamoni and the surrounding area. This stage construction will also allow for the proposed improvements to be more feasibly financed.

The progressive nature of Lamoni, as shown by its steady growth in population and industrial activity while most of the surrounding region is experiencing a decline, is a major factor contributing to the positive growth of aviation in the area. This growth is generated by Graceland College as well as a variety of other businesses and industries closely related to the agricultural economy of the region.

To support this continued growth and the development of a safe, adequate and efficient airport facility, Lamoni has undertaken the task of expanding and modernizing its municipal airport.

Project Purpose

The primary purpose of the proposed expansion project is to provide safe, more modern airport facilities for the Lamoni community and surrounding area. The nearest public-use airports are located in Bethany, Missouri, 28 miles south and Osceola, Iowa, 31 miles north. These facilities are too far removed to adequately serve the demands of the Lamoni area. Aviation demands in Lamoni cannot be satisfied with the present facilities. The existing runway - 25 feet wide and 2600 feet long - is too narrow, poorly surfaced and unlighted - making it unsafe in inclement weather and limiting the airport to daytime operation only. Several aircraft, in the past few years, have experienced minor accidents as a result of trying to land after dark.

The proposed project would alleviate the shortcomings of the existing facility. A good, hard-surfaced, lighted primary runway would make the airport safe for day and nighttime operations. This alone would satisfy many of Lamoni's needs. As a result of improving the airport, overall activity will increase, attracting more business and industry to the area and enhancing the community's economic base. Hangar facilities at the existing site will save time and money, both public and private, by allowing private and business aircraft to base their aircraft at Lamoni rather than

make a special trip to another site several miles away. Eventually, a hard-surfaced primary runway, together with a turf crosswind, will accommodate aircraft at least 95% of the time. This also will increase aircraft activity, improving the community's likli-hood of attracting industry and expanding Lamoni's economic base.

The proposed project will enhance the availability of air taxi and air parcel delivery service and will improve opportunity for air ambulance service. Expansion and improvements of the airport will permit greater efficiency to be realized from area-based aircraft as well as providing a more useful and versatile facility for improving the welfare of the community.

The proposed airport is in conformity with the goals and objectives of the Iowa State Airport System Plan which designates Lamoni as the location of a general aviation airport to be included in the state system if sufficient activity exists at the site. The justification for inclusion in the State plan was shown earlier in this report.

Although regional transportation goals have not yet been established, the proposed project will contribute to the development of a well-rounded, multi-modal transportation system serving substantial portions of Decatur and Ringgold Counties in Iowa and Harrison and Mercer Counties in Missouri.

Development of a Basic Utility, Stage I airport at Lamoni is consistent with the goals and objectives of the City in seeking out new ways to create jobs and improve the community's economic base. Success in creating new jobs will eventually attract new people to the area as well as provide local opportunities for the younger generations just entering the job market.

Alternatives Considered

Three possible alternatives were considered for the expansion of the Lamoni Airport. These included:

1) Expansion of existing site
2) Selection of an alternative site
3) Do-nothing

Alternative No. 2, selecting another site for development, was discussed in the site review portion of this report. Of four sites originally studied in 1975, the existing site was selected as having the greatest potential for satisfying the present airport needs of Lamoni as well as having good access and good potential for a crosswind runway and other future expansions. In addition to the investment the City already has in the existing site, no other site in the area can offer the advantage of the site.

Alternative No. 3, that of "do-nothing" was not considered a valid choice since it would not be consistent with the goals and objectives of the City in providing the community with a safe, adequate airport facility.

Alternative No. 1, expansion of the existing site, was selected as the desirable alternative of the three. The existing site of 60 acres consists of a strip of land 500 feet wide by 4050 feet long, more than ample to accommodate the proposed 3400 feet long by 60 feet wide primary runway. A 10-acre terminal area site and right-of-way for an access road from U.S. Highway 69 also exists. The site can be readily expanded to accommodate a crosswind runway. An additional 50 acres of land will be required to provide a 2800 foot long by 120 foot wide turf strip. In addition to the crosswind runway potential, the site is also capable of being expanded to accommodate a primary runway of up to 4100 feet long.

Project Background

Considerable public interest in the local airport has existed at Lamoni for many years. More recently, the interest has increased as evidenced in 1974 when the City began seeking a new airport site to better serve the community's need. The site selection process was undertaken, four potential airport sites studied and the existing site finally selected in 1975. A brief environmental impact assessment report on the selected site was prepared and submitted to the Federal Aviation Administration (FAA) the same year. This was done in an attempt to secure the approval of the FAA and obtain financial assistance for purchasing the site. Failure to obtain FAA financial assistance did not stop the proceedings, however; support of the public was again demonstrated when the City was able to purchase the site on its own in 1976. Funds were also obtained for perimeter fencing, site grading and seal coating a landing strip 25 feet wide by 2600 feet long.

In 1977, with the landing strip in very poor condition and local funds exhausted, Lamoni officials approached the Iowa Aeronautics Division in an effort to obtain state funding for improving the runway. State funds were not available, however, primarily because there were not enough funds to go around and because Lamoni was not eligible until included in the State Airport System Plan (SASP). The Aeronautics Division suggested the City undergo an airport study to determine if sufficient aviation activity existed at Lamoni to justify their inclusion in the plan. If eventually included in the SASP, Lamoni would then be eligible for state funding to improve the airport.

In June of 1977, the City retained the services of H. Gene McKeown and Associates to apply for funds and eventually complete a comprehensive Airport Development Plan study. The application was succesful and the state issued a grant to pay for 70% of the costs of the study with the other 30% coming from local funds. Again, local

public support was demonstrated as the City was capable of providing their share of the funds for this study.

Throughout the development plan process, which began in early 1978, public information meetings have been held with many people attending and expressing their support for the airport. The welfare of the Lamoni Airport is of concern to a great many people of the community. These people are not all pilots, although many do fly. A close look at the aviation activity of the area reveals several potential based aircraft that already exist. This number would increase if improved airport facilities existed. Aviation activity is projected to increase steadily for the next 20 years - providing more basis for improving the existing airport in the future. Aviation forecasts and based aircraft numbers were discussed in detail in the forecasting part of this report.

Probable Impacts on the Environment

Several impacts on the human and natural environment will be realized when the proposed improvements are actually undertaken. A discussion of these positive and negative impacts follows:

Noise. Aircraft noise and the problems associated with it have become more relevant today than ever before. The proposed layout of the Lamoni airport will not effect any changes in land use in the immediate area as a result of noise generation. The existing area already functions as a limited airport facility with no adverse criticism. The expanded facility would function in much the same way except that a crosswind runway would eventually be constructed. Runway orientation and the associated flight patterns were laid out to provide optimum wind coverage and not route airport traffic over the noise sensitive areas of the City. The affected area is principally agricultural in nature and is considered compatible with the proposed airport.

Land Use. Land use in the vicinity of the airport may be subject to change. Improvements to or upgrading of airport facilities generally increases the interest of companies which find the use of modern airports advantageous to their business. The favorable location of the airport, midway between the interstate and the City of Lamoni also lends itself toward promoting commercial development along the highway. Commercial enterprises which already exist include a motel, restaurant, service station, printing operation and a farm implement sales and service. These types of business establishments are generally all compatible with a general aviation airport as long as sound land use and site planning principles are observed. The commercial developments, when properly planned, act as an effective buffer zone between an airport and residential neighborhoods.

The land use immediately surrounding the airport site is predominately agricultural in nature, a use compatible with aviation activities. Some farm land will have to be removed from production for the proposed expansion in the future. However, much of the land necessary for development is already owned by the City. It is also possible that some of the airport property acquired for future expansion could be leased back to the adjacent owners in the interim before the land is developed. Any crops raised on this land would have to be a control crop - low-growing and not an attraction for birds.

Although Lamoni does not have a comprehensive land use plan in effect, the City has taken steps to preserve the integrity of the airport. The initial step was to pass an airport tall structure zoning ordinance to maintain clear unobstructed approaches to the airport's runways. This was done in December of 1977.

It is recommended that a land use plan depicting the generalized uses of land in the vicinity of the airport be established. The uses depicted must consider land needs for the future expansion of the airport, runway alignments and aircraft flight patterns as

well as the predicted noise contours which outline the area affected by aircraft noise in an effort to identify the noise sensitive areas and minimize the potential adverse effects.

Vegetation, Wildlife and Endangered Species. Although the proposed project will result in the loss of some permanent pasture land, the effects on wildlife will be minimal. This statement is supported by the fact that most of the area is subjected to grazing and other uses by livestock leaving very little areas for use by wildlife. Besides the pasture land, the remainder of the area is farmed on rowcrop - oats - meadow rotation which does provide limited cover for pheasants, rabbits and ground nesting songbirds when used for small grains. The impact of any loss of cover should be offset by the cover around the perimeter of the proposed project and the cover provided by the airport site itself.

The greatest loss to wildlife will come from the destruction of trees and shrubs that are removed from fencelines and permanent pastures during construction. However, this will not be significant. Any affects on the bird populations which habitate these areas should be minimal. Again, the overgrazing of the pasture land and the relatively small area affected tend to support this statement.

Although there are numerous farm ponds in the region, there is no anticipated loss of waterfowl habitat in the proposed area. There are no known endangered species residing in the project area.

With the construction of larger runway facilities and other impervious surfaces at the airport site, there will most likely be increased surface water runoff. The runoff, however, should be less erosive because much of the area surrounding the runways and parking apron will be permanently seeded. If the proposed terrain should be of such a slope as to cause destructive erosion, the construction of retaining terraces surrounding the airport project will be proposed.

During the actual construction phase of the project, surface runoff and accompanying erosion should be no greater than that which occurs when the fields are plowed or under cultivation. Measures to minimize erosion during construction, such as terraces, detention facilities, diversion ditches, seeding and mulching, and the addition of holding ponds will be included in the construction specifications. More permanent erosion control measures as recommended by the Soil Conservation Service may be required to minimize soil erosion after construction due to the terrain of the western part of the site. These proposals will also be incorporated into the construction plans.

A decrease in the use of agricultural chemicals and fertilizers, which have a pollution potential, will be experienced as a result of developing the airport site. Potential pollution from aircraft fueling operations will be minimized through the use of specially constructed refueling areas and absorbents. All above ground fuel storage units will have retaining barriers surrounding them in the event of ruptured tanks. Underground storage tanks will be protected either chemically or mechanically from corrosion and subsequent leaks.

Other additional pollutants such as detergents, solvents, oils, grease and sediments which are found in service areas in hangars or on aprons where aircraft maintenance and cleaning operations are performed will be retained through the use of special construction areas. These areas will be constructed to retain pollutants but exclude storm water runoff.

All chemicals used in snow and ice removal operations will be approved by the Department of Environmental Quality (DEQ). Special areas will be constructed for the storage of all such materials. The materials will also be used only in accordance with manufacturer's recommendations and directions.

Solid wastes which are generated during the normal operations of the airport facilities will be stored in approved containers and disposed of at the county landfill.

Sanitary wastes will be disposed of through the use of an approved septic tank system or the use of other methods which have been approved by local or state agencies. This system will be used until the area is served by a public sanitary sewer system.

An ever-increasing pollution source is the use of aircraft applied agricultural sprays and chemicals. Strict compliance with DEQ guidelines and procedures in dealing with the handling and storage of these chemicals will be adhered to by any operator using the facility.

Floodplain, Hydrology and Wetland. The proposed airport site is not located in a floodplain or flood hazard area. The only flooding which may occur on the airport site will be in predesigned holding areas for temporary ponding or storage during excessive periods of precipitation. If necessary, these ponding areas will be included in the final design of the airport.

The hydrology of the area should not be changed appreciably by the expansion of the airport. The amount of additional paving surface added will be offset by the addition of more permanently grassed areas, with much lower runoff coefficients than the rowcrop land which now exists. A grading plan has not been developed for the site; however, if it is found that excessive runoff is produced, terraces or holding ponds will be incorporated into the final design to prevent damage from such an occurrence. The present area is now drained by a normally dry ditch. There are also no wetland, marshes or lakes which would be affected by a changing hydrological profile.

Air Quality. There is no readily available data on the ambient quality of the air in the vicinity of the proposed airport. However, the quality of the air may decrease during the construction phase because of increased dust pollution. This will be minimized through appropriate construction techniques and wetting the unprotected soil. As a result, the air will experience only a short-term negative impact from the temporary dust pollution.

The State Department of Environmental Quality has done no monitoring in this area which is not an Air Quality Maintenance Area (AQMA). An AQMA is a region which has the potential for exceeding the National Air Quality Standards as a result of current conditions or anticipated growth from 1975 to 1985. The existing airport will continue to function regardless of whether the proposed expansion is undertaken. If the proposed action is taken, an additional amount of pollutants will be emitted to the atmosphere as a result of increased aviation activity. However, the amount will still be well below the allowable standards for the region.

Direct Socio-Economic Impacts. The development of the airport site will involve the acquisition of approximately 50 more acres of farmland to be used for development of a crosswind runway. Removal of this tract of land from agricultural production will result in an annual loss in farm income. However, considering the amount of land removed from production to the total land available in the area, the impact on the economy of the region will not be significant. The fact that the land is acquired by a public agency will, however, remove it from the tax rolls and the county and school district will no longer derive property tax income from the tract.

The expansion of the site will not involve the disruption of any farmsteads, businesses or homes in the area. The acquisition of more land may impose some hardships on the farmers from whom the land is to be purchased.

Employment opportunities for the region will be enhanced by the construction of the improved airport facility. The construction phase will mean more short-term jobs in the construction area while long-term jobs will be introduced in the operation and maintenance of the facility.

The airport also has the potential to enhance the availability of flight training, air ambulance service, crop dusting and the use of business aircraft. The airport will add to the economic diversity of the community by adding a new economic base to a predominantly rural economy.

The proposed site has no utilities presently available. However, the only utility which would have to be brought in would be electricity which is available along the north side of U.S. Highway 69. The site can be served with water more economically by digging an on-site well than extending a main from the City. A septic tank will be used for sanitary waste.

Access to the airport site will be by an access road built from U.S. Highway 69 north to the proposed terminal area. This surface transportation route to the airport will have no adverse affects for there are no proposed road closures or relocating of existing routes.

Induced Secondary Impacts. An improved airport facility at Lamoni will increase the potential for the region to attract new industry. New industry will not only have a direct impact on job opportunities but will also help stabilize or even increase the population of the region. The airport, through the attraction of new business and industry, will have a positive impact on the entire region by increasing the tax base, as well as stabilizing population and producing additional job opportunities.

Historical and Archaeological Sites. There are two historical and archaeological sites in the region but neither area is located within the project area. One site is an Indian burial ground located four miles to the north. The other is the restored home of Joseph Smith, descendant of the founder of the Reorganized Church of Jesus Christ of Latter Day Saints, located in the city. Neither of these sites will be effected by the proposed action.

Light Emissions. The lighting systems for the proposed airport have not yet been designed. Because of the location of the airport site and the type of lighting associated with this classification of general aviation airport, no conflict is anticipated between residential areas and surface transportation and the lighting at the airport site.

Lighting associated with the facility will be normal security lighting for the hangar and terminal areas, medium intensity runway lighting, runway end identifier lights (REILS), obstruction clearance lighting and other general aviation lighting necessary for the safe operation of the airport.

Since the REIL units are flashing strobe lights, it may be possible that these lights will be an annoyance to area farmers. If so, shielding will be used to minimize or eliminate problems.

Prime and Unique Farm Lands. The ultimate development of the proposed project will permanently remove an additional 50 acres of cropland from production. This is not considered a significant amount when considering the total amount of land available for farming in the county. A majority of the land is considered prime farm ground but is not the top farming land in the area. In the development and layout of the proposed airport site, land requirements are minimized by utilizing ridges and only proposing to acquire the amount of land absolutely necessary for airport development. This minimizes the adverse effects of removing the land from

production. The remaining agricultural land surrounding the proposed expansion site is projected to remain agricultural in the future, a use compatible with small general aviation airports such as Lamoni's.

AIRPORT LAYOUT PLAN

Introduction

After reviewing the forecast of aviation demand, the existing airport site and the projected facility requirements, a comprehensive plan was drawn up to depict the ultimate development of the present airport site. Aerial photographs and topographic data obtained from field surveys were used to help determine the layout of the various facilities.

The planning period covers the next twenty years; however, the plan must remain flexible. The levels of activity forecast for the future were based upon present and past trends, which may or may not continue. The development of more sophisticated aircraft and/or navigational aids may also change design standards. Therefore, to insure current planning does not become obsolete, the overall master plan should be updated at regular intervals. Stage development of the proposed facilities must also be kept in mind. The airport plans, along with this narrative, depict ultimate development of the facility - which is projected to take place over a twenty-year period. Many features of the plan are not proposed until the intermediate or long-range planning period.

Airport Layout Drawing

The airport layout drawing includes the existing runway facility plus proposed runways, taxiways, aprons, terminal buildings and hangar facilities as well as the access drive and parking lot. The layout plan is drawn to a suggested FAA scale of 1" = 300'.

The proposed airport boundary, as depicted on the drawing, represents the amount of land required to accommodate existing facilities and the future airport expansion. The boundary represents

the amount of land needed for ultimate development of a crosswind runway and that land required to maintain proper control over runway visibility zones and building restriction lines. An additional 50 acres will be needed for ultimate development of the runways. This assumes that the existing site of 60 acres adequately accommodates the primary runway, terminal area and airport access road.

Fee acquisition is recommended for all the land required for the construction of the crosswind runway. By purchasing the additional land beyond the turf runway itself, the City will be able to maintain proper control over the airspace in and around the runway. Clear zone easements will be required for approaches to each end of all runways to preserve free airspace of the inner approach surfaces. The size and configurations of the clear zones are based upon establishing a nonprecision instrument approach procedure for each end of the primary runway (17/35). These are depicted on the airport layout drawing. Clear zones for the crosswind runway are based upon visual approaches only, which should meet the needs throughout the twenty-year planning period.

Runways shown on the airport layout drawing include the primary (17/35) which is projected as a hard-surfaced runway with an ultimate size of 60' x 3400'. The crosswind runway (08/26) is proposed as a turf strip 80 percent the length of the primary or 2800 feet. Present traffic at the Lamoni Airport shows justification for a Basic Utility - Stage I facility with a 50' x 2900' primary runway. However, it is recommended that the 60 foot width be constructed initially in order to accommodate the Basic Utility - Stage II facility in the long-range planning period without having to widen the entire runway ten feet.

The orientation of the crosswind runway (08/26) was selected to provide optimum crosswind coverage and to minimize grading costs. Other considerations were the proximity of the farmsteads and businesses which exist to the southeast of the present runway. The

ultimate length of the crosswind runway is limited to approximately 2800 feet by terrain features at both ends.

Building restriction lines are shown as such to prevent buildings from being constructed within the runway visibility zone and to insure that buildings of reasonable height will not penetrate the imaginary approach surfaces around each runway.

The runway visibility zone (RVZ) is an area formed by imaginary lines connecting runway visibility points. The visibility points are located at prescribed distances from the intersection of the two runways and provides an unobstructed line-of-sight from any point five feet above one runway centerline to a point five feet above the intersecting runway centerline.

The airport layout drawing depicts two types of taxiways - exit and access. The taxiways are designed to provide movements to and from the runway and to the proposed tiedown and hangar areas. A thirty-foot exit taxiway is proposed to the apron area with twenty-foot access taxiways to the hangar buildings. A parallel taxiway during the majority of the planning period is not justified by the number of operations; however, as traffic increases, the addition of a parallel taxiway should be considered from both a safety viewpoint and to increase airport capacity.

Rectangular turnarounds are recommended for each end of the primary runway in order to improve the airport's safety and efficiency. The turnarounds should be constructed in such a manner as to tie in to a parallel taxiway if future operations would justify it.

Full apron development is proposed during the short-range planning period in order to provide for all-weather operations - one of the main goals of the airport development process. The initial apron, if constructed 150' x 250', allows room for itinerant and based aircraft parking and ample space for aircraft fueling and service areas.

Other features of the terminal area depicted include locations reserved for tiedowns, aircraft hangars, administration building, maintenance shop and automobile parking. The size and number of the facilities shown are adequate for the twenty-year planning period. However, if demand necessitates, the plan is flexible enough to eliminate or add certain features.

Also shown on the ALP drawing is the access route to the terminal area from U.S. Highway 69 and the City of Lamoni, one mile west.

Airport Airspace Drawing

The airport airspace drawing shows in plan view the imaginary surfaces as outlined in Federal Aviation Regulation (FAR) Part 77 for airspace surrounding the airport at Lamoni.

The drawing consists of a mosaic of aerial photographs published by the United States Geodetic Service. The plan view of the area surrounding the proposed airport is at a scale of 1" = 2000' with the elevations of the imaginary surfaces corresponding to guidance set out in FAR Part 77 and using the established airport elevation above mean sea level. The mosaic depicts nearby ground features which help to identify the airport surroundings and those physical features which may have an adverse affect on free airspace. Items specifically noted include cities, highways, railroads, rivers, towers and terrain features in the immediate vicinity of the airport site.

Also shown on the drawing are small scale profile views of the approach surfaces on the extended runway centerline for each end of each runway. The profile views are drawn to indicate the features that exist beyond the ends of the runways which may affect navigable airspace.

Clear Zone Drawings

The clear zone drawings of the airport layout plan consist of large scale plan and profile views of the inner approach surface or clear zone for each end of each runway. The approach surfaces are drawn from their respective runway ends showing the proposed glide slope and the existing ground profile. The profiles extend 5000 feet from the runway ends and depict objects which might penetrate into the approach surface, thereby becoming an obstruction which must be considered for removal. No objects in the clear zones of any approach penetrate the approach surface and, therefore, no obstructions are noted.

Terminal Area Drawing

The terminal area plan is drawn to give an overview of the proposed development of this area. In the development of the plan, such items as surface drainage, surface access, available space, minimum clearance distances, grading and ease of expansion were taken into account. Once the necessary features and their respective sizes were identified, areas were set aside for each. The next step was to determine where all the elements could best be located to provide safe, efficient aircraft operations in and around the terminal area.

A major component of the new terminal area will be the 150' x 250' apron area. The proposed size is adequate to accommodate some based and itinerant aircraft parking, plus ample space for refueling. The apron is considered to be the hub of the terminal area and will be bounded on the east side by the future maintenance hangar and administration building. The administration building is located on the south side of the terminal facilities to provide convenient access to the parking lot and to U.S. Highway 69.

The parking lot, as proposed, is of a size to accommodate approximately 24 vehicles, with separate areas set aside for employees,

handicapped, pilots and long-term parking for passengers. A grassed area can be provided which adjoins the access road and parking lot for overflow parking if necessary.

Land Use Plan

The objective of an airport land use plan is to achieve and maintain a compatibility between the airport and its neighbors. The best way to achieve this goal is through the implementation of a comprehensive land use plan. Inherent in this goal is the ability of the airport facility to maintain and expand its size and operation to satisfy present and future aviation demands. The plan must also consider those persons who live, work or own property near the airport. The airport must not infringe on their rights to use their property to the maximum extent possible with the minimum amount of noise or other adverse impacts related to the airport. Another equally important point is the protection of Lamoni's investment in a facility which may be impractical to replace in the future.

The need for such planning has been accented by conflicts at larger airports which have either altered or restricted their operations because of conflicts with residential or noise sensitive developments. Other conflicts which arise are due to the protection of runway approaches and the safety of persons and property on the ground. The conflicts may be minimized and new ones avoided through the development and implementation of land use plans.

The land use plan for the Lamoni Airport includes one drawing - a combination vicinity and on-airport land use plan.

The vicinity land use plan consists of an aerial mosaic of the Lamoni Airport vicinity and is drawn to a scale of 1" = 2000'. The plan depicts the extent of land area that may be directly impacted by the operation of the airport facility. Important ground features are shown on the plan to identify their location in relationship to the airport.

Essentially all of the major residential, commercial and industrial areas are located within the City of Lamoni. However, a small commercial and light industrial area is being developed along U.S. Highway 69 between Lamoni and the I-35 interchange east of town - an area located just south and east of the proposed airport expansion. Enterprises that exist in this recently developed area are all compatible with the operation of the airport.

The most sensitive areas around an airport are the approach and climb-out corridors - that is, the area under the approach and take-off extensions as defined by the flight paths in use at the airport. These areas correspond closely with the clear zone and approach surfaces (as illustrated on sheets 4 through 7 of the airport layout plan) and must be analyzed from a noise standpoint as well as from a safety standpoint. The safety aspect includes identifying and disposing of any obstructions in the approach zone which would be a hazard to airspace.

Also depicted on the land use plan is the extent of the area around the Lamoni Airport which is zoned for height restrictions. The boundaries of these areas are outlined on the drawing and are taken directly from the airport airspace drawing. An airport tall structure zoning ordinance was adopted by the City in December of 1977 and restricts the height of objects in these areas. The ordinance should be reviewed and updated, if necessary, to reflect any changes or revisions as a result of this overall plan. A "draft" copy of the revised ordinance is contained in Appendix B of this report.

On-airport land uses are also shown on this drawing. A comprehensive on-airport land use plan was not drawn because all land inside the proposed airport boundary is recommended for aeronautical purposes. The land requirements are minimized by restricting the amount of land purchased to only that which is needed for airport development and future expansion. While it may be feasible to farm a portion

of the land required for future expansion between the time it is purchased and the time it is actually developed, there should not be any land inside the airport boundary which can be used for farming on a permanent basis.

Aeronautical purposes includes terminal facilities, auto parking, airport access, hangar facilities, aprons and tie-downs and the actual airfield. These areas are identified on the airport layout drawing and the terminal area drawing and not depicted separately on the land-use plan.

Appendix A of this report contains reduced copies of the nine (9) sheets to the Lamoni Airport plans.

FINANCIAL PLAN

Introduction

The final phase of the airport development plan study is the financial plan. This phase begins with a discussion of the proposed improvements and outlines the stage development to be undertaken in each planning period. Accompanying the discussion are sketches depicting the stage development process. Estimates of the development costs were then made and are tabulated for each of the three planning periods.

The third part of the financial plan is a discussion of the costs versus benefits of improving the Lamoni Airport in an effort to help justify the economic feasibility of the proposed plan. This phase of work concludes with a discussion of the various means of financing available to the sponsor for financing the proposed improvements. This includes discussion of certain state and federal programs which are available for financing airport improvements.

Schedules of Proposed Development

Airport development plans are prepared on the basis of short, intermediate and long-range aeronautical demand as outlined and determined in the forecasting and facility requirement sections of this study. By considering this fact and the needs developed in the early part of this report, a schedule indicating stage development of the proposed facilities was prepared along with sketches depicting the stage development process.

The following items of development tabulated for each of the three planning periods represents a schedule which would satisfy the aeronautical activity projected for Lamoni. The feasibility of actual

financing of these improvements, however, will depend heavily on the availability of state and/or federal grants.

A. Short Range (0-5 Years)

1. Acquisition of clear zone easements for primary runway.
2. Site grading and drainage for larger primary runway and new terminal area.
3. Paving of primary runway 17/35, 2900 feet long by 60 feet wide.
4. Construction of 150 foot by 250 foot apron on new terminal site and a 30 foot wide taxiway connecting runway 17/35 and the new apron area.
5. Medium Intensity Runway Lighting (MIRL) with threshold lights for the primary runway and appropriate apron and taxiway lights.
6. Grading, drainage and crushed stone surfacing for access drive and 25-vehicle parking lot.
7. Construction of 8-unit tee-hangar on terminal site plus connecting taxiway.
8. Install appropriate runway and taxiway markings.
9. Installation of Non-Directional Radio Beacon.
10. Construction of a lighted wind tee, segmented circle and rotating light beacon.

B. Intermediate Range (6-10 Years)

1. Acquisition of approximately 50 acres of land for airport expansion and construction of the crosswind runway.
2. Grading, drainage and seeding of crosswind runway, 8/26.
3. Installation of Runway End Identifier Lights (REILS) on runway 17/35.
4. Perimeter fencing for new airport boundary.

C. Long Range (11-20 Years)

1. Grading, drainage and paving of primary runway 17/35 to 3400 feet long by 60 feet wide.
2. Installation of Visual Approach Slope Indicator Lights on runway 17/35.
3. Construction of rectangular turnarounds at each end of primary runway 17/35.
4. Construction of additional tee-hangars plus an administration building and maintenance shop.

The preceding schedule calls for extensive development during the initial (0 to 5 year) planning period. This can be attributed to the fact that the existing airport was initially developed as a temporary facility until proper funding and planning could be undertaken to provide an airport facility which would meet the aviation needs of the area. These aviation needs not only exist today but continue to increase, yet the airport has remained deficient in several critical areas. The projected development during the first five years will allow the Lamoni facility to "catch-up" with the demand of the area.

The intermediate forecast period primarily calls for the development of the crosswind runway. Approximately 50 acres of additional land will have to be purchased and a major grading project undertaken to provide an adequate crosswind runway. The crosswind is projected to remain a turf runway throughout the planning period.

The long-range planning period calls for the extension of the primary runway to meet the requirements of a Basic Utility Stage II facility with a length of approximately 3400 feet. The traffic during this period will determine to what extent the terminal area will have to be expanded. It is assumed that activity will justify the construction of additional hangars, administration and maintenance buildings and the addition of paved rectangular turnarounds at each end of the primary runway. Figures 2, 3 and 4 immediately following depict the stage development outlined earlier.

STAGE DEVELOPMENT SKETCH
SHORT RANGE (0-5 YEARS)

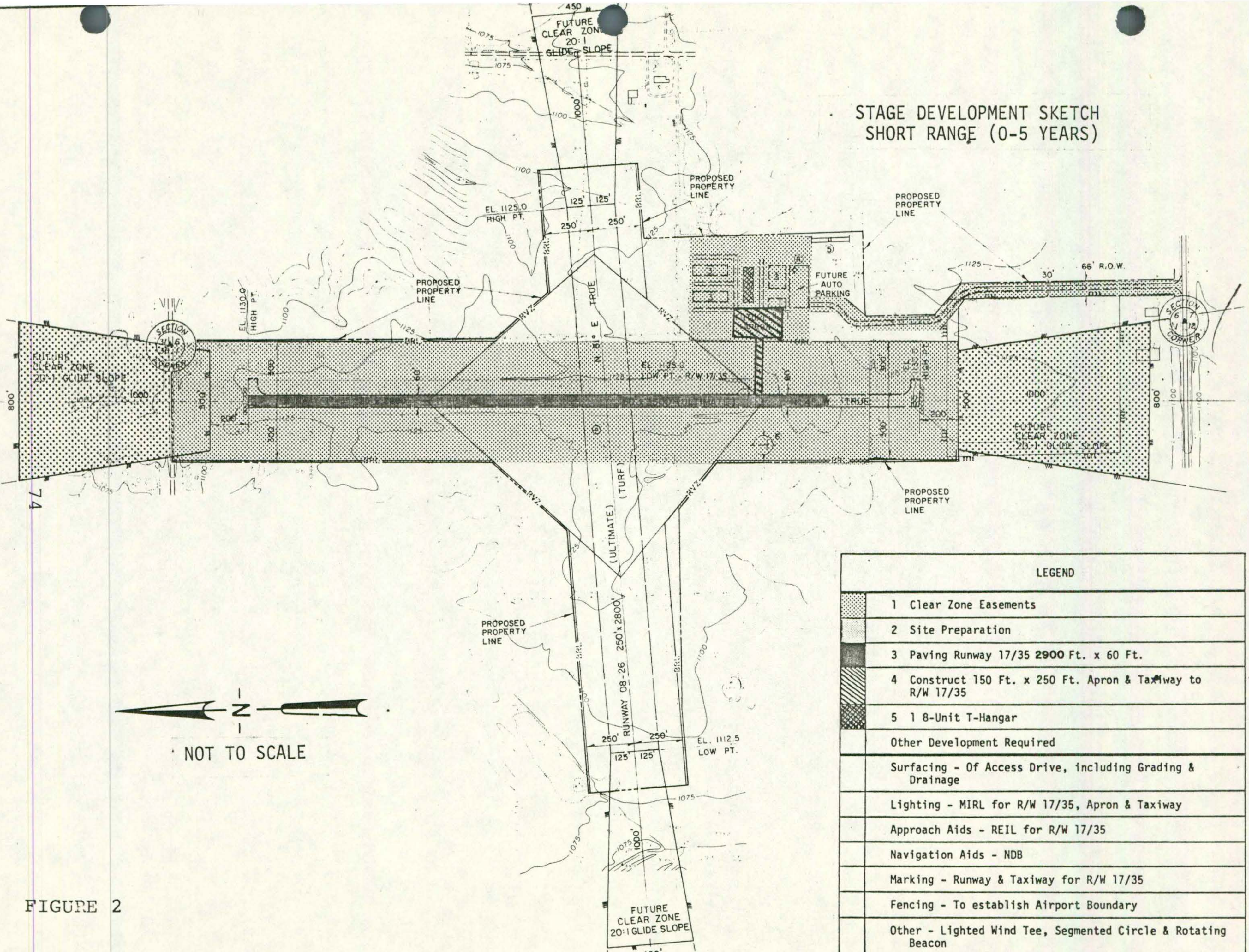


FIGURE 2

LEGEND	
	1 Clear Zone Easements
	2 Site Preparation
	3 Paving Runway 17/35 2900 Ft. x 60 Ft.
	4 Construct 150 Ft. x 250 Ft. Apron & Taxiway to R/W 17/35
	5 1 8-Unit T-Hangar
	Other Development Required
	Surfacing - Of Access Drive, including Grading & Drainage
	Lighting - MIRL for R/W 17/35, Apron & Taxiway
	Approach Aids - REIL for R/W 17/35
	Navigation Aids - NDB
	Marking - Runway & Taxiway for R/W 17/35
	Fencing - To establish Airport Boundary
	Other - Lighted Wind Tee, Segmented Circle & Rotating Beacon

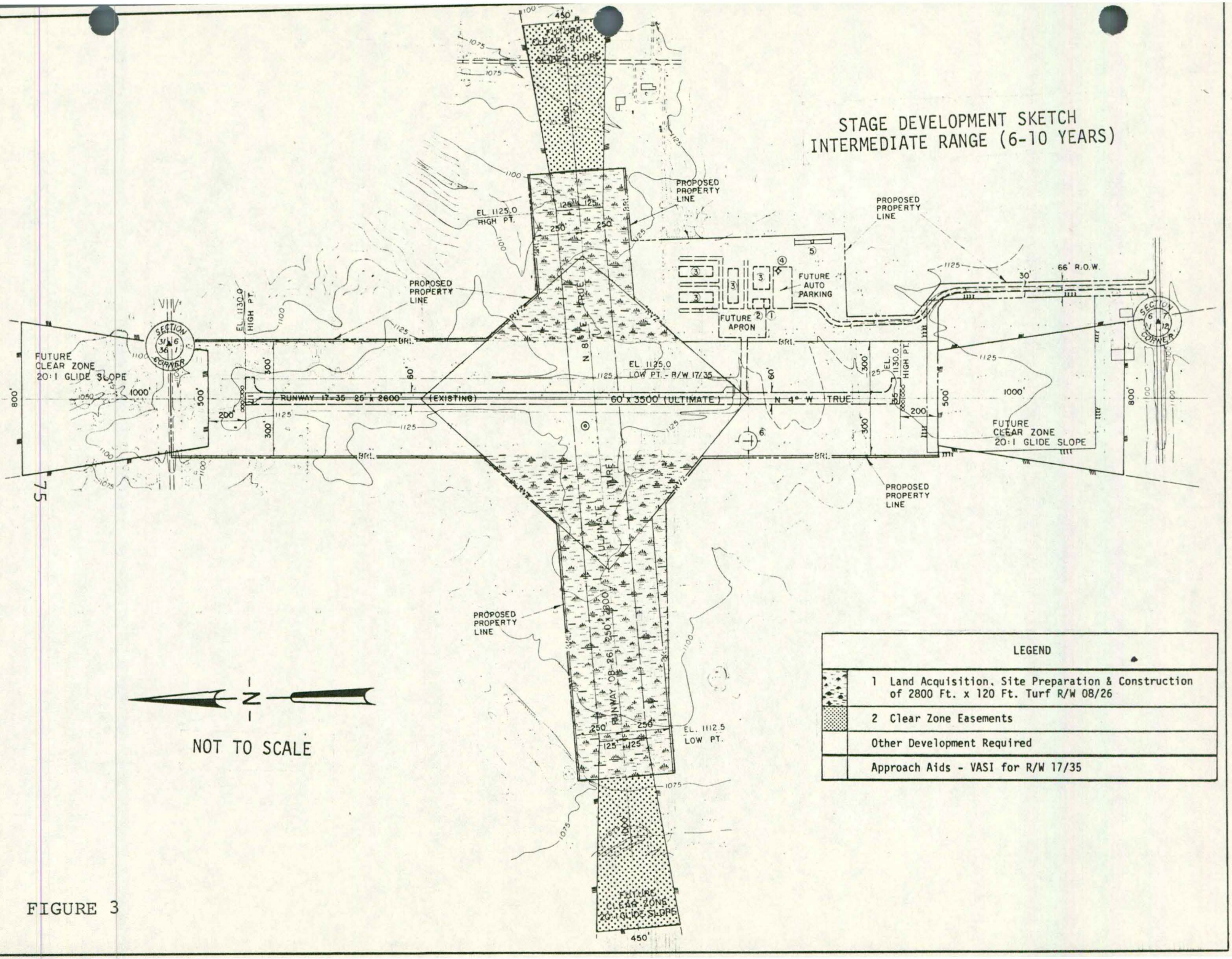

STAGE DEVELOPMENT SKETCH
INTERMEDIATE RANGE (6-10 YEARS)
RUNWAY 17-35 25' x 2600' (EXISTING)
60' x 3500' (ULTIMATE)
N 4° W TRUE
RUNWAY 08-26
2800' x 120'
FUTURE AUTO PARKING
FUTURE APRON
PROPOSED PROPERTY LINE
EL. 1125.0 HIGH PT.
EL. 1130.0 HIGH PT.
EL. 1125.0 LOW PT. - R/W 17/35
EL. 1112.5 LOW PT.
66' R.O.W.
FUTURE CLEAR ZONE 20:1 GLIDE SLOPE
SECTION CORNER
NOT TO SCALE
LEGEND
1 Land Acquisition, Site Preparation & Construction of 2800 Ft. x 120 Ft. Turf R/W 08/26
2 Clear Zone Easements
Other Development Required
Approach Aids - VASI for R/W 17/35

FIGURE 3

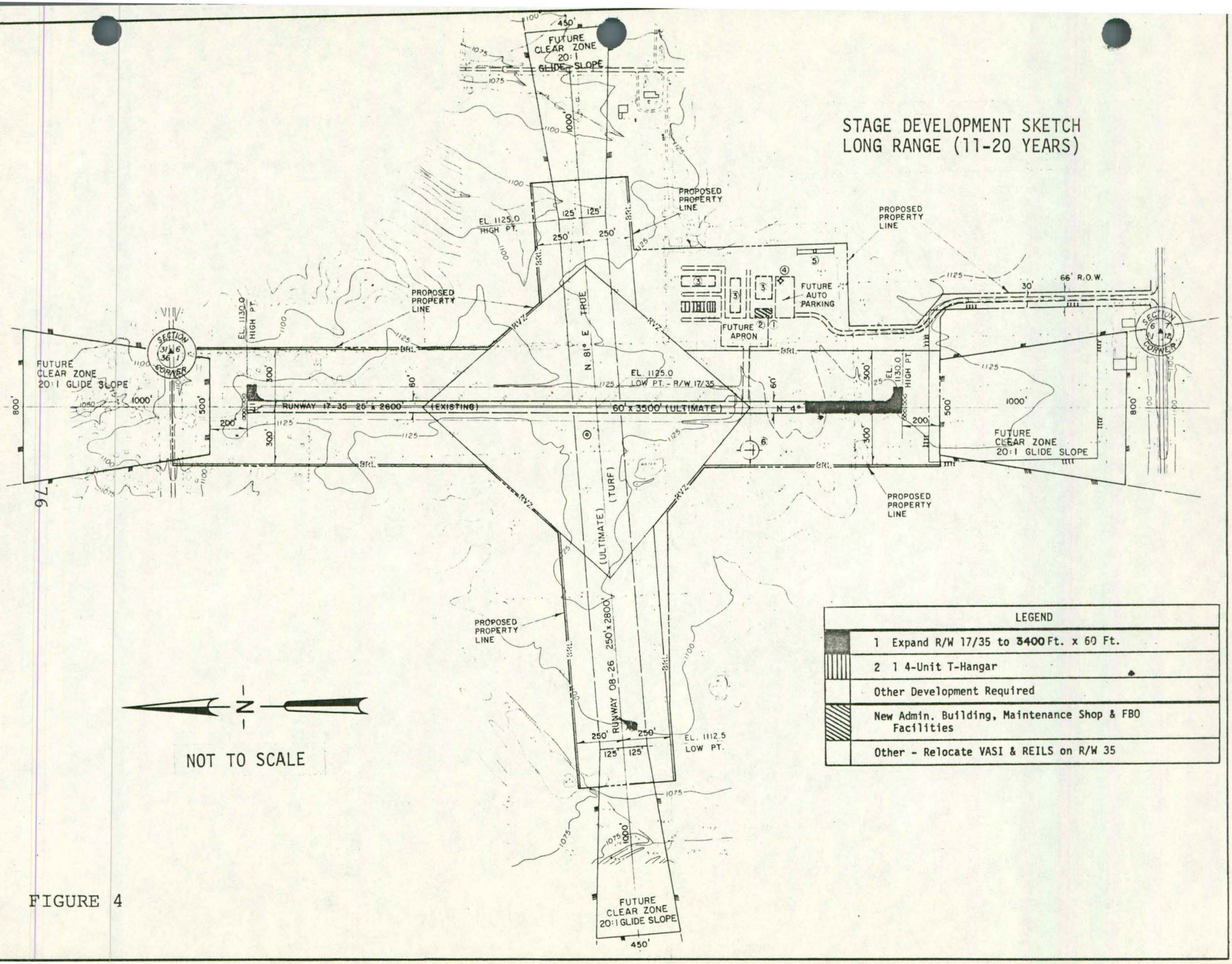

STAGE DEVELOPMENT SKETCH
LONG RANGE (11-20 YEARS)
FUTURE CLEAR ZONE 20:1 GLIDE SLOPE
PROPOSED PROPERTY LINE
EL 1125.0 HIGH PT.
FUTURE AUTO PARKING
FUTURE APRON
66' R.O.W.
SECTION CORNER
EL 1130.0 HIGH PT
N 81° E TRUE
EL 1125.0 LOW PT. - R/W 17/35
RUNWAY 17-35 25 x 2600' (EXISTING)
60' x 3500' (ULTIMATE)
N 4°
RUNWAY 08-26 250'x2800' (ULTIMATE) (TURF)
EL. 1112.5 LOW PT.
NOT TO SCALE
LEGEND
1 Expand R/W 17/35 to 3400 Ft. x 60 Ft.
2 1 4-Unit T-Hangar
Other Development Required
New Admin. Building, Maintenance Shop & FBO Facilities
Other - Relocate VASI & REILS on R/W 35

FIGURE 4

Estimate of Development Costs

After determining the schedules of development, an estimated cost for each forecast period was tabulated. The purpose of such an accounting was to help assess the economic feasibility of the proposed project and to set up a schedule for financing the improvements.

The following table contains a preliminary cost estimate for the proposed improvements during each of the three forecast planning periods based on the schedule tabulated previously. It must be emphasized that the cost figures presented are preliminary estimates only and are valid for use only as estimates. The table also indicates which items are eligible for state aid, as many items are not. The total funding figures given near the bottom of the table are based on 70% state participation for state-eligible items. The remaining 30% plus all costs of non-eligible work is a local obligation. If federal aid is eventually used or if state participation changes by the time this plan is implemented, the percentage of participation will have to be taken into account in adjusting the numbers accordingly.

Economic Feasibility

To investigate the economic feasibility of the proposed improvements, the project was first looked at from the "break-even" need standpoint. "Break-even" need is defined as the annual amount required to cover the cost of capital investment, administration, operation and maintenance. It was then necessary to determine the annual revenues anticipated from various components of the airport and compare them to the break-even need. If anticipated revenues will not meet the break-even need, the economic feasibility of the airport will then depend upon the availability of federal, state and local subsidies to meet this need.

TABLE 9

Development Cost Estimate

	DEVELOPMENT NEED	********** DEVELOPMENT COST **********		
		Short Range (0-5 Years)	Intermediate Range (6-10 Years)	Long Range (11-20 Years)
STATE AID ELIGIBLE	Land & Clear Zone Easements	$ 12,500	$ 78,500	$ -
	Site Preparation	154,000	195,000	11,500
	Runways	320,000	-	86,000
	Taxiways	14,400	-	-
	Aprons	66,600	-	-
	Lighting and Marking	21,500	6,500	9,000
	Approach Aids	11,500	4,500	10,000
	Access & Service Roads	15,000	5,000	5,000
	Miscellaneous	40,000	50,000	75,000
	Admin., Legal, Engineering	80,000	48,000	25,000
	Subtotal	$745,500	$387,500	$221,500
FUNDING	State @ 70%	$521,850	$271,250	$155,050
	Local @ 30%	223,650	116,250	66,450
NON-ELIGIBLE	T-Hangars	$120,000	$ -	$112,000
	Terminal Buildings	-	-	153,000
	Parking Lots	5,000	5,000	5,000
	Miscellaneous	15,000	25,000	25,000
	Admin., Legal, Engineering	15,000	3,000	29,500
	Subtotal	$155,000	$ 33,000	$324,500
	TOTAL DEVELOPMENT	$900,500	$420,500	$546,000
TOTAL FUNDING	State	$521,850	$271,250	$155,050
	Local	378,650	149,250	390,950

Break-Even Need. To determine the break-even need of the airport, the various components which make up the expenditures and incomes were independently analyzed.

Capital Investment. The estimated cost of capital improvements for each stage (short, intermediate and long-range) of the development plan is shown in Table 9. From these figures, the annual cost of capital improvements was then estimated to be $180,100 during the short-range (0-5 years), $84,100 during the intermediate (6-10 years) and $54,500 during the long-range (11-20 years) planning periods.

Administration and Operation. Due to the relatively low activity level at the airport, a fixed based operator (FBO) is not considered practical until sometime in the long-range planning period. However, for estimating annual administrative and operational expenses, it was assumed that an amount would be set aside each year even though the function may be handled by city employees initially.

Normally, an FBO is paid a base salary for operating an airport. Then, through written agreement with the owner, the salary is supplemented by allowing the operator the care of the administration building and maintenance shop in return for certain concessions and aircraft maintenance work. However, because of relatively low activity and lack of facilities, initially, a full-time FBO is not planned until the long-range planning period. At that time, concessions from the maintenance and administration building plus the fuel concessions should be granted to the FBO. The income from the concessions would not only supplement the salary of the operator, but should provide incentive for good management of the terminal facilities. The projected annual costs for administration are $1,500, $3,500 and $15,000 respectively for each of the three forecast periods.

In addition to this, other annual administrative and operational expenditures such as utilities, insurance, telephone and supplies must be considered. A review of the records of other airports of similar size and activity reveals that these costs can be estimated at $2,500, $3,500 and $6,000 for each of the respective planning periods. However, with the ever-increasing cost trends, these figures may be conservative over the long-range planning period.

Total expenditures for administration and operation during the development plan period are, therefore, estimated to be $4,000, $7,000 and $21,000 for each year of short, intermediate and long-range forecast periods, respectively.

Maintenance. Maintenance items such as snow removal and groundskeeping can be expected to vary from year to year. They can be directly related to the yearly weather conditions. Annual maintenance on buildings, equipment and other capital improvements, although not directly related to weather conditions, are equally difficult to predict on a yearly basis. Therefore, the annual maintenance expenditures of airports with facilities similar to those proposed at Lamoni were reviewed in an effort to arrive at an estimated average annual cost of maintenance. By averaging the cost from this review, the annual cost of maintenance at Lamoni is estimated to be $3,000 for the first five years, $6,000 for the second five years and $10,000 for the last ten years.

Considering each of the above components collectively, the break-even need or the total annual sum needed to meet the cost of capital investments, administration, operation and maintenance during each of the planning periods is estimated to be $187,100 for the short-range, $97,100 for the intermediate-range and $85,500 for the long-range.

Revenues. Revenues were then determined by considering the various components of the airport which would produce an annual income.

Commonly examined components of airports which might produce income include landing areas, aircraft aprons, aircraft parking areas, public parking areas, aviation fuel, hangar space and other usable ground space. It must be pointed out that the proposed Lamoni facility is a basic utility airport; and, as such, the majority of activity will be generated by public users. Therefore, the airport components at Lamoni will not produce revenues as they would at an air carrier facility.

Users fees for landing area (runways and taxiways) and rental fees for aircraft apron and parking areas are normally charged only at air carrier airports to regularly scheduled airlines, other air carrier users, and private general aviation enterprises. Public users of the airport facility should not be charged users fees for these components of the airport. Automobile parking should also be provided as a free courtesy to the public users.

Although revenues from aviation fuel could be derived from fees charged to fuel handling concessionaires, it is felt that this concession should be a part of the fixed base operator's agreement. The income from the fuel sales would not only supplement the operator's salary, but should also provide some incentive for good management of the fueling facility.

The only other available revenue sources would be usable ground space and rental fees from proposed hangar spaces. Hangar revenues are derived from rental fees which are generally based on a per square foot or a per unit basis. The operational and management duties related to hangar space are minimal. Revenues, therefore, should be paid directly to the owner of the airport. Revenue from hangar rental at Lamoni is estimated to be $50, $75 and

$100 per unit per month for the short, intermediate and long-range forecast periods, respectively. The annual revenues from hangar rental during each of the three periods is then estimated to be $4,800, $7,200 and $14,400 per year. These revenues are based on the assumption that eight units will be rented during the short-range and intermediate periods and twelve units during the long-range period.

There will be no anticipated revenues from other usable ground space inside the airport boundary, as all land acquired is proposed to be used for aeronautical purposes. The airport expansion is designed using the minimum amount of land necessary for construction of the required facilities and also guarantee the owner free airspace in and around the airport. Therefore, unless some land can be rented for agricultural purposes between the time it is acquired and the time it is developed as a crosswind runway, no land is available for farming.

In summary, the only component of the airport which can be anticipated to produce revenues is the hangar facilities. Total annual revenues to be derived from the hangars are estimated at $4,800, $7,200 and $14,400 for the short, intermediate and long-range periods, respectively.

Comparison of the estimated annual break-even need and anticipated annual revenues clearly indicates that the economic feasibility of the proposed airport will depend upon the availability of federal, state and local funds to subsidize the cost of constructing, operating and maintaining the facility. Current funding policies of the state and federal government will be used in this report in order to determine the estimated amount of local funding required to cover these costs.

Although federal funding for capital improvements has not been ruled out, federal funds are not immediately available to Lamoni.

Lamoni is currently included in the National Airport System Plan (NASP) but is of low priority. Because of the small amount of funds available from FAA each year, this places Lamoni far down the list. In addition, this airport study does not include a detailed environmental analysis which will be required if federal funds are sought. Therefore, the City of Lamoni is proposing to apply for state assistance for this project. Historically, the state has participated up to 70% of a project with the local share being 30%. For financing purposes, it will be assumed that the state will maintain the 70/30 funding split throughout the 20-year planning period.

It must be kept in mind that not all capital improvements are eligible for state and/or federal funding. Local funding must be available to cover 100% of the costs of non-eligible items as well as the balance of 30% needed to fund those items that are eligible. These items were categorized earlier in Table 9. Using that table as a basis, the total amount of funds required locally to construct the capital improvements was computed to be $378,650 for the short-range, $149,250 for the intermediate range and $390,950 for the long-range. A review of current local financial obligations indicates that funding capabilities at the local level are sufficient to cover the cost of the capital improvements estimated above. Therefore, to establish the economic feasibility of the proposed improvements, it must be assumed that local funds can and will be made available to offset the cost of constructing, operating and maintaining the improvements.

In addition to the financial feasibility of an airport development, for communities such as Lamoni, the feasibility of constructing new airport facilities cannot be based solely upon whether or not anticipated revenues will be produced to offset the "break-even" need.

Lamoni is a relatively small rural community which is trying to revise the population trends of the region. Over the last few

decades, while Decatur County and other counties in the region have shown decreases, Lamoni has shown a steady growth. This trend is due in part to Graceland College and the impact it has on the community and is due to continued development of local businesses and other industries. An improved airport facility will definitely enhance the community's chances of maintaining and attracting industries to the region. The actual dollar value of benefits derived from such an effort cannot be determined but, nonetheless, must be weighed heavily in the final assessment. Intangible benefits are critical items when considering the feasibility of an airport facility and may, in the final analysis, outweigh the financial aspect in determining whether or not a community can justify an airport.

Financing will be discussed next, and it will be shown what the local share of the funding will have to be on an annual basis to accomplish the development plan.

Financing

Analysis of the economic feasibility of the proposed facilities indicates that the capability of financing the improvements at the local level will depend upon the availability of state or federal assistance.

Public financing for airport development can be accomplished through various means. These may include taxes, general obligation bonds, revenue bonds, private financing, governmental assistance or a combination thereof.

Private financing for airports is usually restricted to certain facilities such as hangars, fuel distribution systems, motels, etc., which can be owned and operated as a private business by investors. The activity level of a basic utility airport such as Lamoni's could not be anticipated to support such a venture.

The sale of revenue bonds would also seem to be a highly unlikely method of financing. Annual revenues estimated to be generated by the facility, as previously pointed out, would be inadequate to meet the total estimated annual cost of operation and maintenance. Excess revenues, therefore, cannot be expected to be available to retire revenue bonds.

This leaves general obligation bond financing, as backed by local taxing powers, as the most viable means of financing the annual local share of the improvements. Table 10 is a capital budget which tabulates the annual amount required by the City to retire G.O. bonds covering the local share of the improvements at an interest rate of 5½%, considered reasonable for Lamoni's bonded indebtedness. The balance of the annual cost is assumed to be financed through state assistance, as categorized in Table 9.

At present, Lamoni has $100,000 outstanding general obligation bonds. These represent sewer construction in 1964, swimming pool bonds issued in 1967 and street improvement projects in 1968 and 1969. The retirement schedule for each of these issues together with the annual debt service is shown in Table 11. The debt service for 1979-80 for the four issues and the airport warrants outstanding will total $26,930 and will require a debt service levy of approximately $2.139 per $1000 of assessed valuation.

By state statute, the total general obligation (G.O.) indebtedness a city may incur is limited to 5% of the actual value of the property within the municipality. According to this, Lamoni has a current bonding capacity in excess of $600,000. As of June 30, 1979, the City's bonded indebtedness was $100,000; however, the 5% limit is seldom a limiting factor. Voter reluctance to accept the additional tax burden resulting from increased debt service levies is most often the governing factor.

Year Ended June 30	Operating Revenues	Tax Revenues *	Bond Issue (Range) $10,000 Rev*		Total Debt Service	Surplus
			terest	Total		
1980	4,800	63,200	68		60,845	155
1981	4,800	63,200	68		58,645	2,510
1982	4,800	63,200	68		56,445	7,065
1983	4,800	63,200	68		54,245	13,820
1984	4,800	63,200	68		52,045	22,775
1985	7,200	49,800	57		48,095	18,680
1986	7,200	49,800	57		46,445	16,235
1987	7,200	49,800	57		44,795	15,440
1988	7,200	49,800	57		43,145	16,295
1989	7,200	49,800	57		41,495	18,800
1990	14,400	86,600	101,505	36,505	76,350	12,450
1991	14,400	86,600	101,680	35,680	73,875	8,575
1992	14,400	86,000	101,855	34,855	71,400	7,175
1993	14,400	86,000	101,030	34,030	58,925	13,250
1994	14,400	86,000	101,205	33,205	56,000	32,250
1995	14,400	66,600	81,380	42,380	55,130	27,120
1996	14,400	66,600	81,005	41,005	53,205	23,915
1997	14,400	66,600	81,630	39,630	51,280	22,635
1998	14,400	66,600	81,255	38,255	49,355	23,280
1999	14,400	66,600	81,800	36,800	47,350	25,930
2000	14,400	41,600	50,505	30,505	30,505	20,425
2001	14,400	41,600	50,405	29,405	29,405	16,020
2002	14,400	41,600	50,305	28,305	28,305	12,715
2003	14,400	41,600	50,205	27,205	27,205	10,510
2004	14,400	41,600	56,105	26,105	26,105	9,405
2005	14,400	38,600	53,005	25,005	25,005	6,400
2006	14,400	38,600	53,905	23,905	23,905	4,495
2007	14,400	38,600	53,805	22,805	22,805	3,690
2008	14,400	38,600	53,705	21,705	21,705	3,985
2009	14,400	38,600	53 605	11,605	11,605	14,380

*Includes assumed allocation from
and total operating expense.
**Interest rate of 5.5% assumed for

TABLE 11

Bond Maturity and Interest Schedule

June 30, 1979

Fiscal Year Due	General Obligation				Airport Warrants Outstanding	Total	
	Sewer 1964-3.25%	Street 1968-4.1%	Swimming Pool 1967-4%	Street 1969-6%	Airport 1975-8%	Bond & Warrant Maturities	Projected Interest
1979-80	$5,000	$4,000	$ 4,000	$ 5,000	$3,500	$ 21,500	$ 5,430
1980-81		5,000	4,000	5,000	2,145	16,145	4,321
1981-82			4,000	15,000		19,000	3,390
1982-83			4,000	15,000		19,000	2,330
1983-84				15,000		15,000	1,350
1984-85				15,000		15,000	450
	$5,000	$9,000	$16,000	$70,000	$5,645	$105,645	$17,271

From: City of Lamoni, Decatur County, Iowa
Audit Report
July 1, 1978 to June 30, 1979

All of the current outstanding bond issues will be paid out prior to the end of the development plan forecast period.

The airport bond issues for the short and intermediate planning periods are set up on 15-year issues, while the long-range issue is projected for a 20-year period. All of the bond issues would then be retired within 30 years. The reason for extending the retirement time is to initially hold down the debt service contributed to the airport. As such, the debt service levy would still be $5.50 per $1,000 assessed valuation, which is quite high for a community the size of Lamoni. A common service levy for a growing city should be around $2.50 per $1,000 assessed valuation.

In summary, the City of Lamoni has several options to meet its desire to improve the airport facility. First, the recommendations in this report represent the optimum facility required to meet forecast demands; however, due to capital costs, it may be desirable to limit the scope of construction and further extend the planning periods. By reducing capital expenditures, it will be possible to lower the debt service and may make the airport construction more viable.

The second option is the financing of certain portions of the facility through private sources. If the Lamoni community is sold on the importance of an airport for future development, private contributions may very well be a source of funds. Private individuals with direct involvement in aviation may also take it upon themselves to fund certain areas of the facility. Items such as hangars and maintenance facilities can be built by private individuals on airport land leased from the City.

A third option may be the financing of the project or certain parts of the overall project through the Federal Aviation Administration. The Airport Development Aid Program (ADAP) was established to provide funds (up to 80%) for land acquisition, construction and improvement or repair of such items as runways, taxiways, aprons,

lighting, navigational aids, etc. However, because of the high demand for such funds, there is a priority basis established for obtaining them. At this particular time, Lamoni does not have very high priority. Nonetheless, inclusion in the National Airport System Plan (NASP) is the main criteria. As long as Lamoni maintains this, the chance for federal funds will always be there.

APPENDIX A

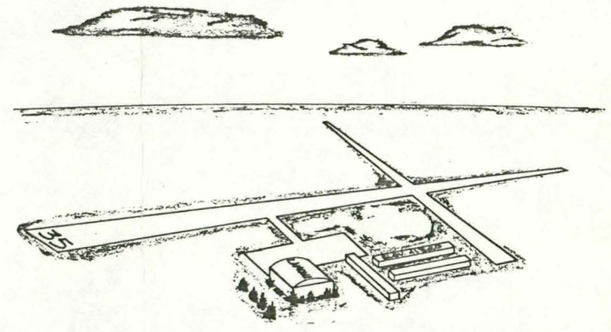
Airport Plans
for
Lamoni Municipal Airport

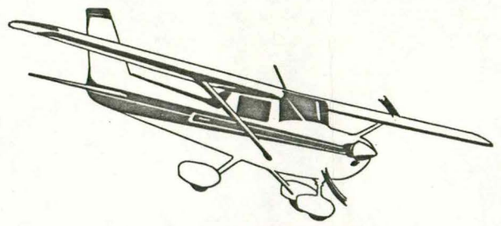
Lamoni, Iowa

AIRPORT LAYOUT PLAN

LAMONI MUNICIPAL AIRPORT

LAMONI, IOWA





INDEX TO DRAWINGS	
SHT.	DESCRIPTION
1	TITLE SHEET
2	AIRPORT LAYOUT PLAN
3	AIRPORT AIRSPACE DRAWING
4	APPROACH TO RUNWAY 17
5	APPROACH TO RUNWAY 35
6	APPROACH TO RUNWAY 08
7	APPROACH TO RUNWAY 26
8	TERMINAL AREA PLAN
9	VICINITY LAND USE PLAN

APPROVAL BLOCK

IDOT APPROVAL

_____ _____
TITLE OF IDOT APPROVING OFFICAL — DATE

SPONSOR APPROVAL

_____ _____
TITLE OF ACCEPTING OFFICIAL — DATE

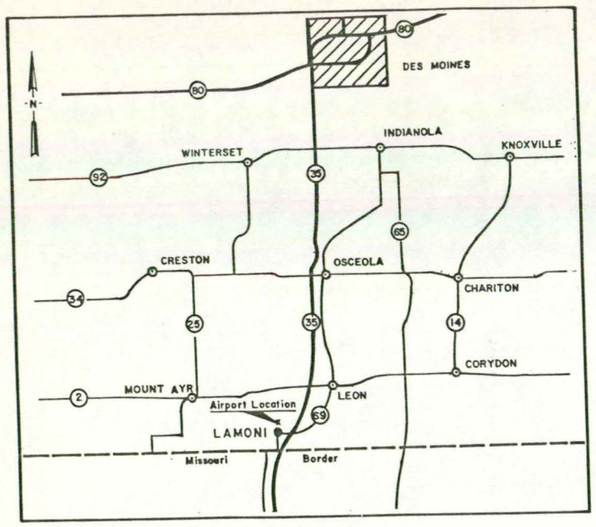
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY SUPERVISION AND THAT ENGINEERING DECISIONS WITH REGARD TO THE DESIGN WERE MADE BY ME OR BY OTHER DULY REGISTERED PROFESSIONAL ENGINEERS UNDER THE LAWS OF THE STATE OF IOWA.

C. Peter Crawford P.E.

DATE March 3 1980 IOWA REG. NO. 8152

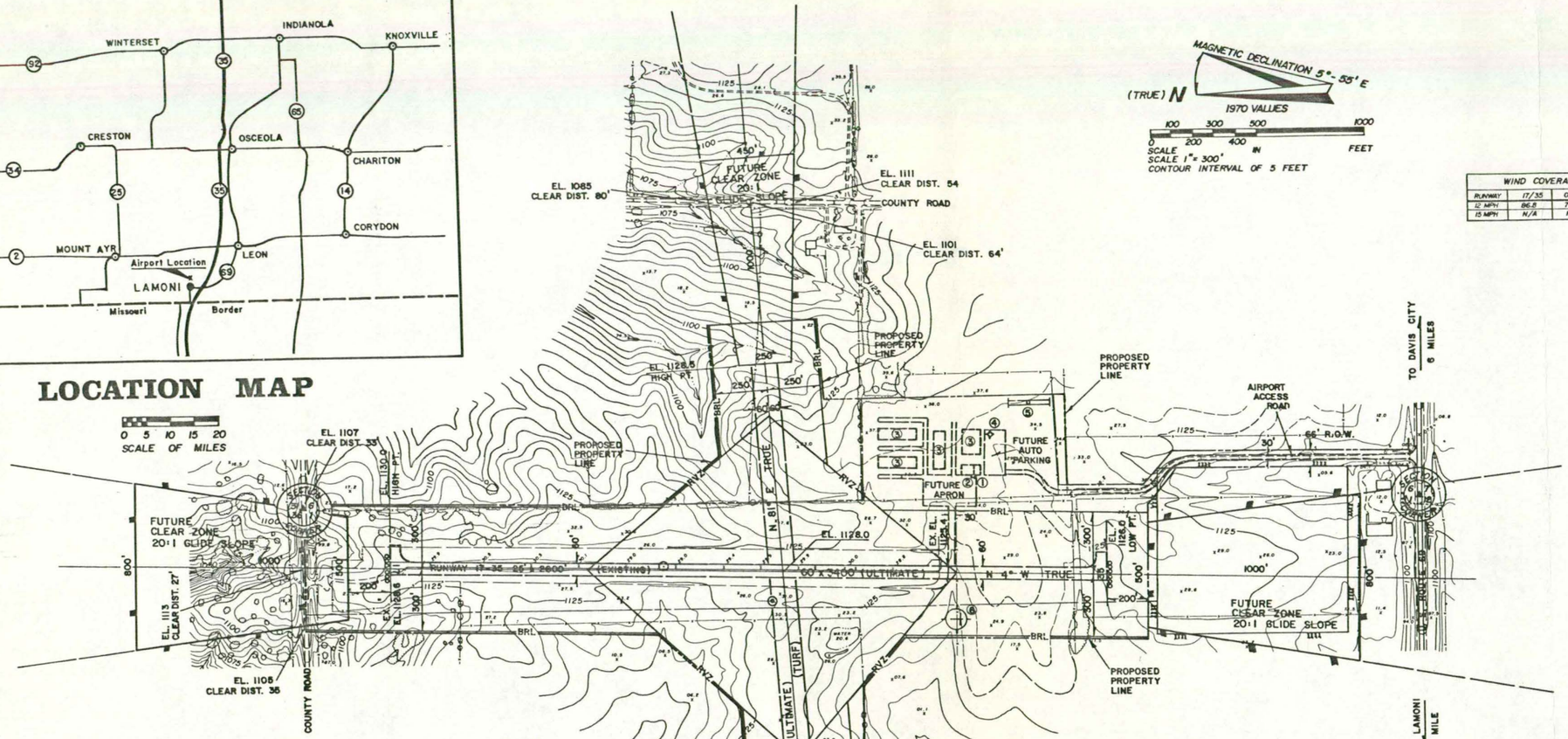
H. GENE McKEOWN AND ASSOCIATES INC.
CONSULTING ENGINEERS AND LAND SURVEYORS OFFICES COUNCIL BLUFFS RED OAK DENISON ATLANTIC

PROJ. NO. 50467
DATE 12-79
DRAWN BY PJH
APPD. BY CPC
CLIENT CITY OF LAMONI, IOWA
DATE REVISIONS
TITLE TITLE SHEET
SHT. 1 of 9



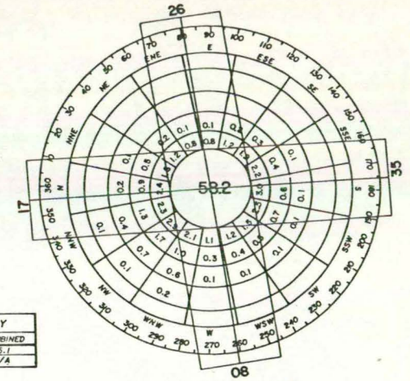
LOCATION MAP

SCALE OF MILES 0 5 10 15 20



MAGNETIC DECLINATION 5°-55' E
(TRUE) N
1970 VALUES
SCALE 1"= 300'
CONTOUR INTERVAL OF 5 FEET
0 100 200 300 400 500 1000 FEET IN

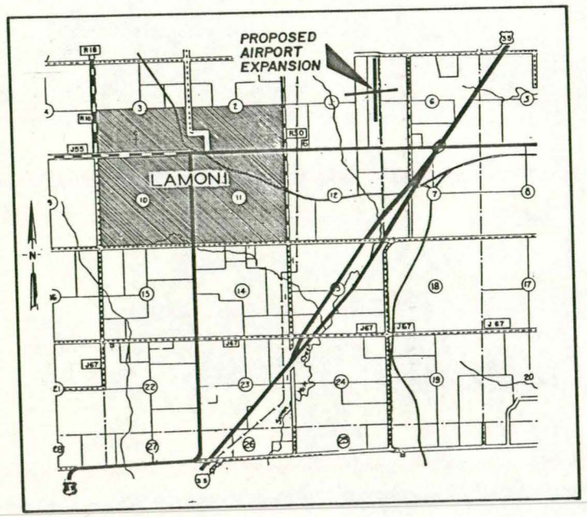
WIND COVERAGE SUMMARY			
RUNWAY	17/35	08/26	COMBINED
12 MPH	86.8	73.4	95.1
15 MPH	N/A	N/A	N/A



SURFACE WIND VELOCITY
9 YEAR PERIOD 1951-1960 USWS
DES MOINES, IOWA

LEGEND

EXISTING	FUTURE	DESCRIPTION
—x—	---x---	FENCE LINE
1275	1275	GROUND CONTOURS
85 x 9		SPOT ELEVATIONS
		FACILITIES
xxxx	xxxx	EASEMENTS
		PROPERTY LINE (FEE ACQUISITION)
BRL	BRL	BUILDING RESTRICTION LINE
⊙	◎	ARP
•	•	POWER POLE
-☼-	-☼-	AREA LIGHTS
▲		SECTION CORNER
BM ≡		BENCH MARK
●●● ●●●	○○○ ○○○	RUNWAY THRESHOLD LIGHTS
✦	✧	BEACON LIGHT
		ROADWAY DRAINAGE STRUCTURES
RVZ	RVZ	RUNWAY VISIBILITY ZONE
▫▫	▫▫	FUEL PUMPS



VICINITY MAP

SCALE OF MILES 0 1 2

RUNWAY DATA

ITEM	RUNWAY 17/35 EXISTING	RUNWAY 17/35 FUTURE	RUNWAY 08/26 EXISTING	RUNWAY 08/26 FUTURE
EFFECTIVE GRADIENT	0.07 %	0.12 %	——	0.57 %
% WIND COVERAGE 12.0 MPH	86.8	86.8	——	73.4
% WIND COVERAGE 15.0 MPH	NA	NA	NA	NA
APPROACH SURFACES	20:1	20:1	——	20:1
RUNWAY LIGHTING	——	MIRL	——	——
RUNWAY SAFETY AREA	100x300	120x3800	——	120x3200
PAVED RUNWAY	25x2600	60x3400	——	——
TRUE BEARING	N 4° W	N 4° W	——	N 81° E
MAXIMUM ELEVATION	1130	1130	——	1128.5
PAVEMENT STRENGTH (GROSS)	——	8,000	——	TURF
COMBINED WIND COVERAGE (12.0 MPH)	95.1 %			
RUNWAY MARKING	——	NON-PRECISION INSTRUMENT	——	——
APPROACH AIDS	——	VASI-REIL	——	——

AIRPORT DATA

ITEM	EXISTING	FUTURE
ELEVATION DATUM	MSL	MSL
AIRPORT ELEVATION	1130	1130
MEAN AVG DAILY MAX TEMP (HOTTEST MONTH)	86° F	86° F
ARP COORDINATES	W 93° 56' 00" N 41° 34' 07"	W 93° 57' 55" N 41° 33' 58"
DESIGN GLIDE SLOPE	20:1	20:1
NAVAIDS - AIRPORT		NDB
TAXIWAY LIGHTING & MARKING		STD.

BUILDINGS

NO.	STRUCTURE
①	FUTURE ADMINISTRATION
②	FUTURE A/C MAINTENANCE
③	FUTURE HANGAR
④	FUTURE LIGHT BEACON
⑤	FUTURE RADIO BEACON (NDB)
⑥	FUTURE WIND TEE & SEGM'TD CIRCLE

SUBMITTED BY H. GENE McKEOWN & ASSOC. DATE:

APPROVAL BLOCK

CITY OF LAMONI TITLE DATE

NO.	REVISIONS	BY	APPD.	DATE

CITY OF LAMONI, IOWA

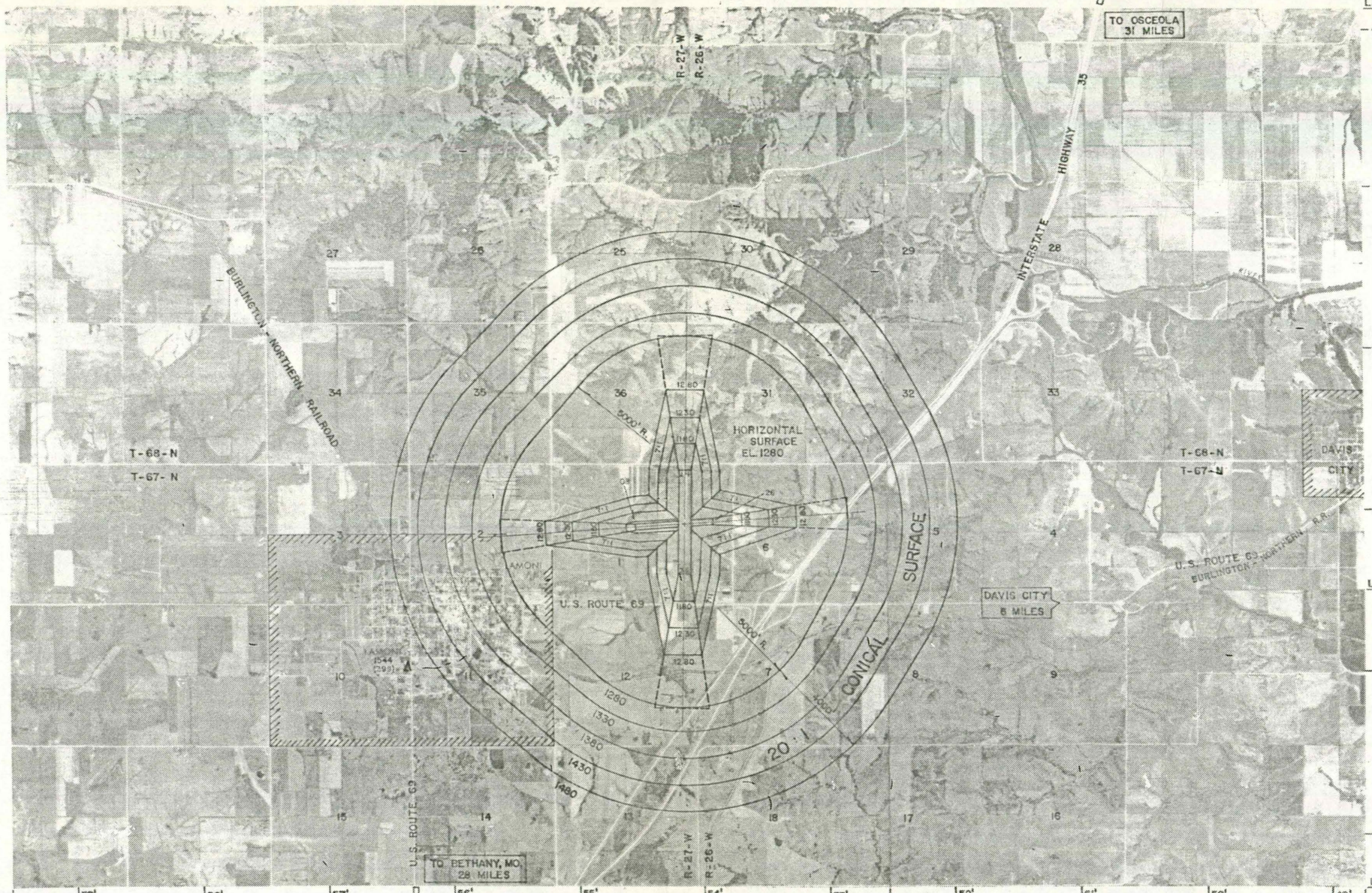
LAMONI MUNICIPAL AIRPORT
LAMONI, IOWA
AIRPORT LAYOUT PLAN

H. GENE McKEOWN & ASSOC.

DRAWN BY PJH | DATE NOV. 1979 | APPD. BY | DATE

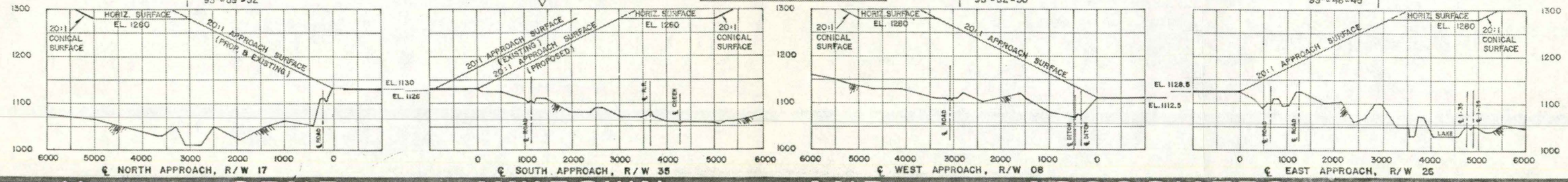
N

SCALE: 1" = 2000'



PROFILE SCALE
1" = 1000' HORIZ.
1" = 100' VERT.

RUNWAY END PROFILES



℄ NORTH APPROACH, R/W 17 ℄ SOUTH APPROACH, R/W 35 ℄ WEST APPROACH, R/W 08 ℄ EAST APPROACH, R/W 26

H. GENE McKEOWN AND ASSOCIATES INC.
CONSULTING ENGINEERS AND LAND SURVEYORS OFFICES COUNCIL BLUFFS RED OAK DENISON ATLANTIC

PROJ. NO	DRAWN BY	CLIENT	DATE	TITLE	SHT.
50467	PJH	CITY OF LAMONI, IOWA		AIRPORT AIRSPACE DRAWING	3 of 9
DATE 12-79	APPD BY CPC		REVISIONS		

PLAN
SURVEYED
PLOTTED
WORK BOOK
NO.
DRAWN CHECKED
SCALE
ALIGNMENT ENGINEER
AT RAY DIEGEL
BY
DATE

SCALE: 1" = 200'

APPROACH SURFACE

EXTENDED RUNWAY ℄

5000'

2000'

2000'

EL. 1107
CLEAR DIST. 33'

EL. 1113
CLEAR DIST. 27'

1000'

CLEAR ZONE
20:1 GLIDE SLOPE

500' PRIMARY SURFACE

500'

FUTURE RUNWAY

60'

200'

EL. 1130

EL. 1105
CLEAR DIST. 35'

PROPOSED
PROPERTY
LINE

PROFILE
SURVEYED
PLOTTED
WORK BOOK
NO.
DRAWN CHECKED
SCALE
ALIGNMENT ENGINEER
AT RAY DIEGEL
BY
DATE

APPROACH TO RUNWAY 17

EL. 1180 AT END OF CLEAR ZONE.

20:1 GLIDE SLOPE

℄ ROAD

CL. DIST. ℄ 27'

200'

EL. 1130

FUTURE PAVED RUNWAY

PROPOSED ℄ PROFILE

EXISTING ℄ PROFILE

℄ FENCE

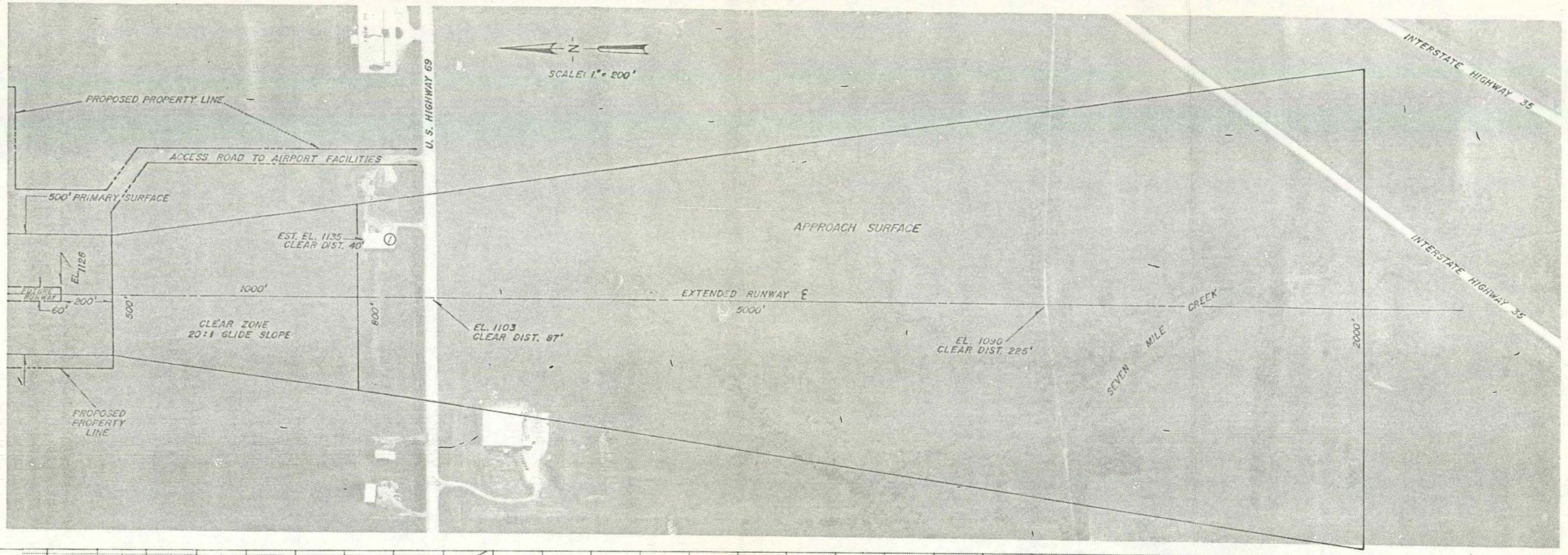
℄ FENCE

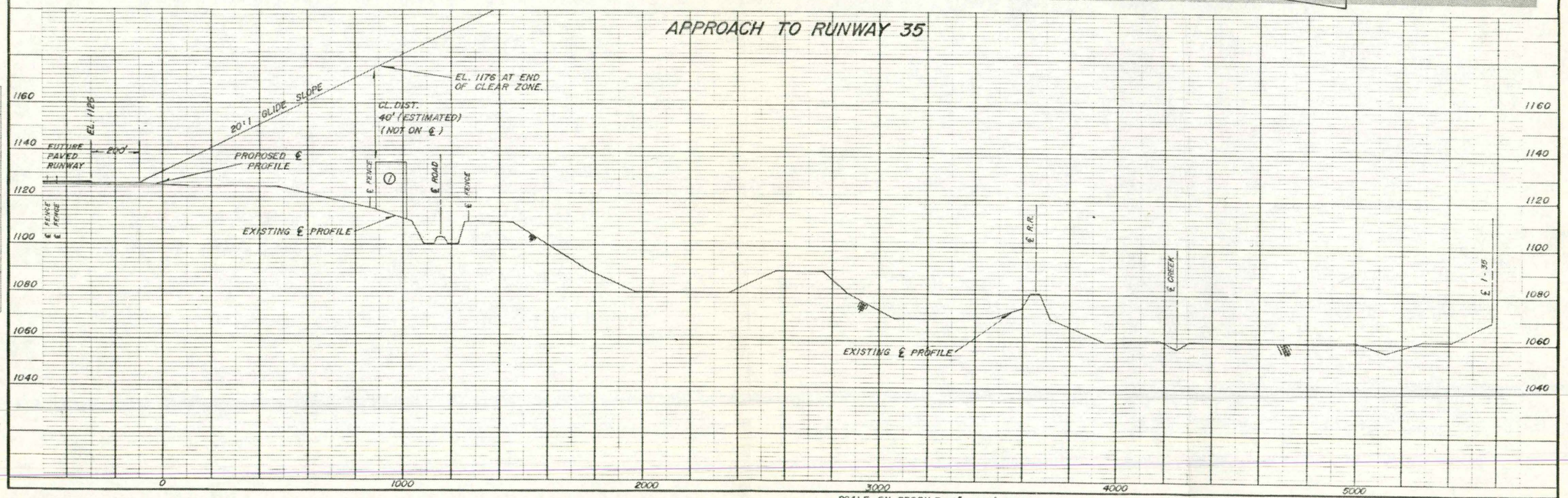
EXISTING ℄ PROFILE

1160
1140
1120
1100
1080
1060
1040

5000
4000
3000
2000
1000
0

SCALE ON PROFILE 1" = 200' HORIZ.
1" = 20' VERT.


N
SCALE: 1" = 200'
PROPOSED PROPERTY LINE
ACCESS ROAD TO AIRPORT FACILITIES
500' PRIMARY SURFACE
U. S. HIGHWAY 69
EST. EL. 1135
CLEAR DIST. 40'
EL. 1126
FUTURE PAVED RUNWAY
60'
200'
1000'
500'
CLEAR ZONE
20:1 GLIDE SLOPE
800'
APPROACH SURFACE
EXTENDED RUNWAY ℄
5000'
EL. 1103
CLEAR DIST. 87'
EL. 1090
CLEAR DIST. 225'
SEVEN MILE CREEK
2000'
INTERSTATE HIGHWAY 35
INTERSTATE HIGHWAY 35
PROPOSED PROPERTY LINE


APPROACH TO RUNWAY 35
EL. 1126
FUTURE PAVED RUNWAY
200'
20:1 GLIDE SLOPE
EL. 1176 AT END OF CLEAR ZONE.
CL. DIST. 40' (ESTIMATED) (NOT ON ℄)
PROPOSED ℄ PROFILE
EXISTING ℄ PROFILE
℄ FENCE
℄ ROAD
℄ R.R.
℄ CREEK
℄ I - 35
1160
1140
1120
1100
1080
1060
1040
0
1000
2000
3000
4000
5000
SCALE ON PROFILE 1" = 200' HORIZ.
1" = 20' VERT.

PLAN
SURVEYED
PLOTTED
SHEETS CHECKED
NOTE BOOK
NO.
BY
DATE

N

SCALE 1"=200'

PROPOSED PROPERTY LINE

EL. 1112.5

EXTENDED RUNWAY ℄

5000'

1000'

450'

250'

1220'

EL. 1105
CLEAR DIST. 164'

APPROACH SURFACE

CLEAR ZONE
20:1 GLIDE SLOPE

FUTURE RNWY (TYP.)

250'
PRIMARY
SURFACE

PROFILE
SURVEYED
PLOTTED
SHEETS CHECKED
NOTE BOOK
NO.
BY
DATE

APPROACH TO RUNWAY 08

EL. 1162.5 AT END OF CLEAR ZONE.

20:1 GLIDE SLOPE

EL. 1112.5

℄ ROAD

℄ DITCH

℄ DITCH

RNWY. 08

PROPOSED ℄ PROFILE

EXISTING ℄ PROFILE

EXISTING ℄ PROFILE

1160
1140
1120
1100
1080
1060

5000 4000 3000 2000 1000 0

PROFILE SCALE 1" = 200' HORIZ.
1" = 20' VERT.

PLAN
SURVEYED
PLOTTED
NOTE BOOK
NO.
DRAWN, CHECKED
STRUCTURE NOTATIONS ENTERED
BY
DATE

PROFILE
SURVEYED
PLOTTED
NOTE BOOK
NO.
DRAWN, CHECKED
STRUCTURE NOTATIONS ENTERED
BY
DATE

PROPOSED PROPERTY LINE
EL. 1128.5
EL. 1085
CLEAR DIST. 80'
EL. 1101
CLEAR DIST. 64'
FUTURE TURF RNWY.
250'
1000'
450'
CLEAR ZONE
20:1 GLIDE SLOPE
APPROACH SURFACE
EXTENDED RUNWAY ℄
5000'
EL. 1070'
CLEAR DIST. 305'
1250'
INTERSTATE HWY. 35
SCALE: 1"= 200'
N
250' PRIMARY SURFACE
EL. 1111
CLEAR DIST. 54'
EL. 1070
CLEAR DIST. 309'
COUNTY ROAD
INTERSTATE HWY. 35

APPROACH TO RUNWAY 26

EL. 1178.5 AT END OF CLEAR ZONE
℄ ROAD
20:1 GLIDE SLOPE
℄ LANE
EL. 1128.5
℄ FENCE
CLEAR DIST. 64'
PROPOSED ℄ PROFILE
℄ FENCE
℄ FENCE
EXISTING ℄ PROFILE
LAKE
LAKE
℄ I-35
℄ I-35

1160
1140
1120
1100
1080
1060

0
1000
2000
3000
4000
5000

SCALE ON PROFILE 1"= 200' HORIZ.
1"= 20' VERT.

SCALE: 1" = 100'

N

PROPOSED PROPERTY LINE

250'

60' 60'

RVZ

120' x 2800' FUTURE (TURF)

RUNWAY 17/35 25' x 2600' (EXISTING)

RUNWAY 17/35

RUNWAY 08/26

ARP

60' 60'

FUTURE HANGER & TERMINAL EXPANSION

FUELING & AREA

APRON (150' x 250')

SHORT TERM

LONG TERM PARKING

PILOT & EMPLOYEE

AUTO PARKING

ACCESS ROAD

66' R.O.W.

30' ACCESS ROAD

WEST LINE, SECTION 6-67-26

EAST LINE, SECTION 1-67-27

BRL

30'

TAXIWAY

300'

60' x 3400' FUTURE

200'

250'

500'

1000'

800'

CLEAR ZONE
20:1 GLIDE SLOPE

300'±

TO DAVIS CITY

6 MILES

U.S. ROUTE NO. 69

TO LAMONI

1 MILE

PROPOSED PROPERTY LINE

BUILDINGS — DATA TABLE

NO.	STRUCTURE	TOP ELEVATION EXISTING	TOP ELEVATION FUTURE	OBSTRUCTION MARKED EXISTING	OBSTRUCTION MARKED FUTURE
①	FUTURE ADMINISTRATION				
②	FUTURE A/C MAINTENANCE				
③	FUTURE HANGAR				
④	FUTURE LIGHT BEACON				
⑤	FUTURE RADIO BEACON (NDB)				
⑥	FUTURE WIND TEE & SEGM'TD CIRCLE				

LEGEND

EXISTING	FUTURE	DESCRIPTION
—x—	—x—	FENCE LINE
—1275—	—1275—	GROUND CONTOURS
85 x 9		SPOT ELEVATIONS
		FACILITIES
		EASEMENTS
		PROPERTY LINE (FEE ACQUISITION)
—BRL—	—BRL—	BUILDING RESTRICTION LINE
⊙	◎	ARP
		POWER POLE
		AREA LIGHTS
		SECTION CORNER
BM ■		BENCH MARK
		RUNWAY THRESHOLD LIGHTS
		BEACON LIGHT
		ROADWAY DRAINAGE STRUCTURES
—RVZ—	—RVZ—	RUNWAY VISIBILITY ZONE
□□	□□	FUEL PUMPS

SUBMITTED BY: H. GENE McKEOWN & ASSOC. DATE:

APPROVAL BLOCK

CITY OF LAMONI, IOWA DATE

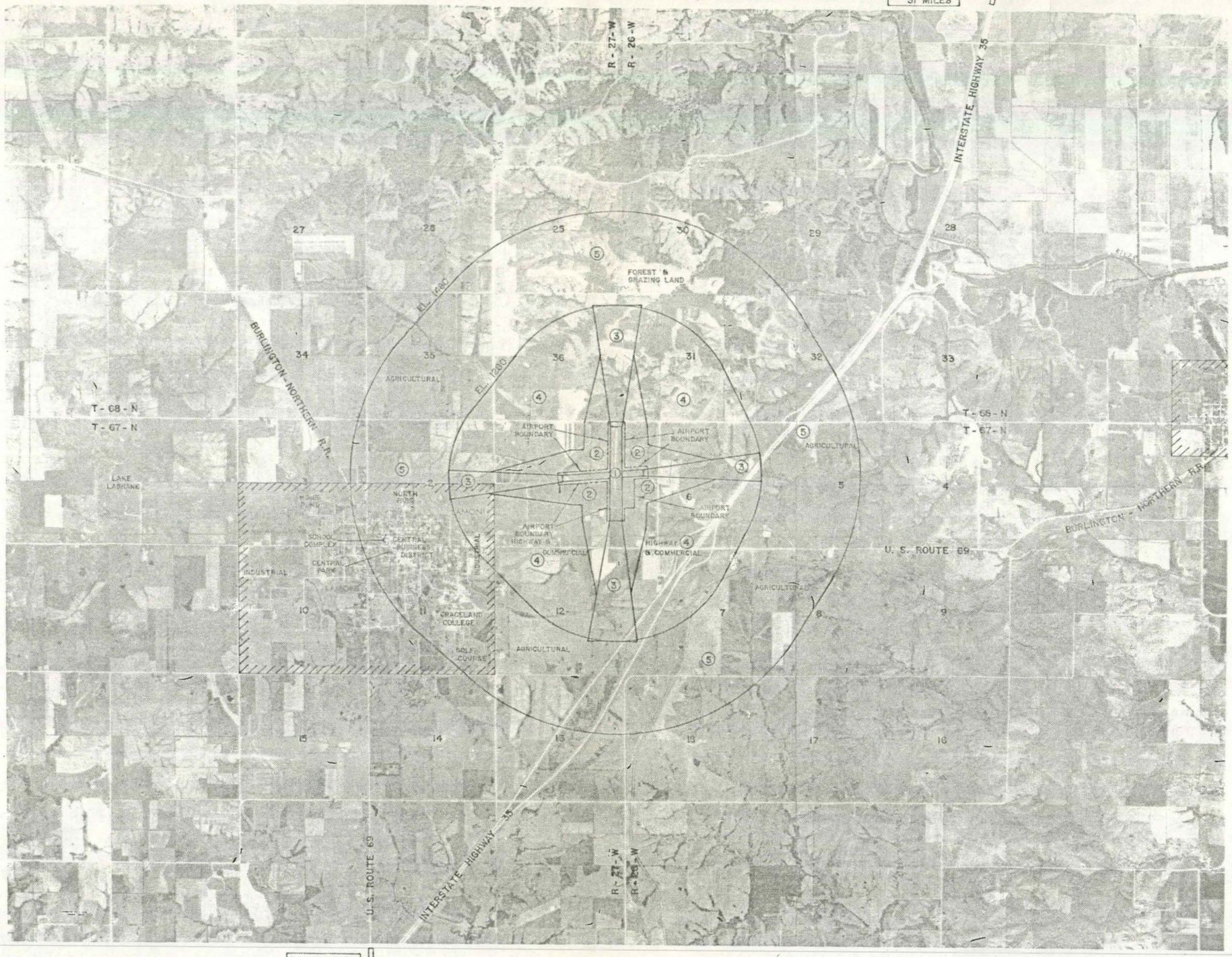
NO.	REVISIONS	BY	APPD.	DATE

CITY OF LAMONI, IOWA

LAMONI MUNICIPAL AIRPORT
LAMONI, IOWA
TERMINAL AREA PLAN

H. GENE McKEOWN & ASSOC.

DRAWN BY	DATE	APPD. BY	DATE
PJH			



- N -

SCALE: 1" = 2000'

On Airport Land Use: All land located within the proposed airport boundary shall be reserved for aeronautical purposes which includes: terminal area expansion, hangar construction, apron area and tiedowns and airfield development.

NOTE: THE HEIGHT OF STRUCTURES AND OBJECTS IN AREAS (1) THROUGH (5) SHALL BE RESTRICTED BY "THE LAMONI MUNICIPAL AIRPORT HEIGHT ZONING ORDINANCE" ADOPTED BY THE CITY OF LAMONI, IOWA, ON THE 5TH DAY OF DECEMBER, 1977.

(1) PRIMARY SURFACE

(2) TRANSITIONAL SURFACE

(3) APPROACH SURFACE

(4) HORIZONTAL SURFACE

(5) CONICAL SURFACE

H. GENE McKEOWN AND ASSOCIATES INC.
CONSULTING ENGINEERS AND LAND SURVEYORS OFFICES COUNCIL BLUFFS RED OAK DENISON ATLANTIC

PROJ NO. 50467	DRAWN BY PJH	CLIENT CITY OF LAMONI, IOWA	DATE	TITLE VICINITY LAND USE PLAN	SHT. 9 of 9
DATE 12-79	APPD BY CPC		REVISIONS		

APPENDIX B

Draft Copy
of
Tall Structure Zoning Ordinance

APPENDIX B

DRAFT
AIRPORT TALL STRUCTURE ZONING ORDINANCE

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

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

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

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

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

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

It is hereby ordained by the City of Lamoni and County of Decatur, Iowa (City Council/Board of Supervisors) as follows:

SECTION I: Short Title

This Ordinance shall be known and may be cited as "The Lamoni Municipal Airport Height Zoning Ordinance."

SECTION II: Definitions

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

(1) Airport - The Lamoni Municipal Airport.

(2) Airport Elevation - The highest point of an airport's usable landing area measured in feet above mean sea level, which elevation is established to be 1,130 feet.

(3) Airport Hazard - Any structure or tree or use of land which would exceed the Federal obstruction standards as contained in fourteen Code of Federal Regulations Sections seventy-seven point twenty-one (77.21), seventy-seven point twenty-three (77.23), and seventy-seven point twenty-five (77.25) as revised March 4, 1972, and which obstruct the airspace required for the flight of aircraft and landing or takeoff at an airport or is otherwise hazardous to such landing or taking off of aircraft.

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

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

(6) Control Zone - Airspace extending upward from the surface of the earth which may include one or more airports and is normally a circular area of 5 statute miles in radium, with extensions where necessary to include instrument approach and departure paths.

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

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

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

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

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

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

SECTION III: Airport Zones and Airspace Height Limitations

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

1. Airport Height Zones

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

Swinging arcs of 5,000 feet radii from the center of each end of the primary surface of runways 17, 35, 8, and 26 and connecting the adjacent arcs by lines tangent to those arcs.

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

B. Conical Zone - The land lying under a surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet. No structure shall penetrate the conical surface in the conical zone, as depicted on the Lamoni Municipal Airport Height Zoning Map.

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

(1) The inner edge of the Approach Surface is:

(a) 250 feet wide for Runways 8 and 26.

(b) 500 feet wide for Runways 17 and 35.

(2) The outer edge of the Approach Zone is:

(a) 1,250 feet for Runways 8 and 26.

(b) 2,000 feet for Runways 17 and 35.

(3) The Approach Zone extends for a horizontal distance of:

(a) 5,000 feet at a slope of 20 to 1 for Runways 17, 35, 8 and 26.

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

D. Transitional Zone - The land lying under those surfaces extending outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the Approach Surfaces.

No structure shall exceed the Transitional Surface, as depicted on the Lamoni Municipal Airport Height Zoning Map.

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

SECTION IV: Use Restrictions

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

A. All lights or illumination used in conjunction with street, parking, signs or use of land and structures shall be arranged and operated to aircraft operating from the Lamoni Municipal Airport or in the vicinity thereof.

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

C. No operations from any use in the City of Lamoni or Decatur County (City/County) shall produce electronic interference with navigation signals or radio communication between the airport and aircraft.

SECTION V: Lighting

A. Notwithstanding the provisions of Section IV, the owner of any structure over 200 feet above ground level must install on the structure lighting in accordance with Federal Aviation Administration (FAA), Advisory Circular 70-7460-1D and amendments. Additionally, any structure, constructed after the effective date of this Ordinance and exceeding 949 feet above ground level, must install on that structure high intensity white obstruction lights in accordance with Chapter 6 of FAA Advisory Circular 7460-1D and amendments.

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

SECTION VI: Variances

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

SECTION VII: Board of Adjustment

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

B. The Board of Adjustment shall consist of five (5) members appointed by the (City Council/Board of County Supervisors) and each shall serve for a term of five years and until his successor is duly appointed and qualified. Of the members first appointed, one shall be appointed for a term of five years, one for a term of four years, one for a term of three years, one for a term of two years, and one for a term of one year. Members shall be removable by the appointing authority for cause, upon written charges, after a public hearing.

(NOTE: For Board of Adjustments comprised of two or more municipalities, See Iowa Statutes, Section 329.12)

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

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

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

SECTION VIII: Judicial Review

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

SECTION IX: Administrative Agency

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

SECTION X: Penalties

Each violation of this Ordinance or of any regulation, order, or ruling promulgated hereunder shall constitute a misdemeanor, and be punishable by a fine of not more than Five Hundred Dollars ($500.00) or imprisonment for not more than one year or both; and each day a violation continues to exist shall constitute a separate offense.

SECTION XI: Conflicting Regulations

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

SECTION XII: Severability

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

SECTION XIII: Effective Date

WHEREAS, the immediate operation of the provisions of this Ordinance is necessary for the preservation of the public health, public safety, and general welfare, and an EMERGENCY is hereby declared to exist, and this Ordinance shall be in full force and effect from and after its passage by the Lamoni City Council (City Council/Board of County Supervisors) and publication and posting as required by law.

Adopted by the City of Lamoni, Iowa (City Council/Board of County Supervisors) this _____ day of _____, 19____.

APPENDIX C

Summary
of
Public Meetings

Summary of Public Meetings

Three public informational meetings were held during the time this Development Plan was being prepared for the Lamoni Municipal Airport.

The meetings were all held in the evening at the city hall building in Lamoni and were advertised well in advance in the local newspaper in order to give the public adequate notice.

Public informational meetings are conducted with the intent of obtaining public input and comment on the airport planning process and the particular plan being presented. The meetings are conducted at predetermined points in the overall plan - after the forecasting phase, during the site selection or site review phase and at the end of the plan, after the financing phase - to afford the public the opportunity to comment on each phase of the plan. The public input and comment obtained at the informational meetings is then used to help determine whether the development plan should continue.

There was good attendance at the three meetings held in Lamoni. The first meeting was held on April 11, 1978, in regard to a preliminary report which had been filed containing inventory data and forecasts of aviation demand. The development plan process was explained to those in attendance, along with an explanation of how the forecasts were prepared. Public comment was then obtained. The I-DOT representative at the meeting stated that the plan did not contain sufficient documentation to justify the forecasts that were presented. Many of the local people at the meeting expressed concern over this, as there appeared to be a great deal of aviation activity at the site already. The first meeting adjourned with the conclusion that the consultant re-examine the forecasts and obtain more documented evidence of existing aviation traffic.

The second meeting was held on the evening of March 27, 1979, after the preliminary report had been revised and the forecasting section

re-examined. Through the aid of an aviation questionnaire which had been mailed to pilots and users of the Lamoni Airport, sufficient documentation now existed to justify the forecasts and to justify an airport. The I-DOT concurred on this and recommended the plan continue to the airport plan and financing phase.

The major concern of those attending the meeting was the time element involved in completing the plan and being able to obtain state funding to actually finance a portion of the recommended improvements. The I-DOT representative pointed out that airport improvements - overall - are a step process. The first step was the need for inclusion in the state system plan. This is the major purpose of the development plan. Once the airport is included in the state system plan, this site is then eligible for state aid when, and if, it becomes available. If state aid is available, funding must then be generated for the local share. Beyond this, a project can then develop.

The third and final informational meeting was held on March 12, 1980, upon completion of the development plan. Once again, the planning process was reviewed for the benefit of the local people in attendance. The airport layout plans and draft final report were briefly reviewed. Cost figures, as presented in the report were discussed. Comments received centered around the costs of the proposed improvements. It was generally agreed that the overall plan, as presented, was good on paper but probably not practical for Lamoni - at least from a financial point of view.

It was pointed out that, in order for the plan to be feasible to finance, construction of the various improvements would have to be in stages. Perhaps the overall improvements would have to be staged over a longer period of time than presented in the report. At any rate, the overall development plan qualifies Lamoni for inclusion in the state system plan, and therefore, state aid if it were available. If Lamoni can generate the local financing, improvements to the airport should become a reality.

APPENDIX D

Results
of
Forecasting Questionnaires

LAMONI AIRPORT SURVEY

1. Please list the number and types of aircraft your company used for business purposes.

Name	No.	Make/Model	Home Base	Runway Length Required
Blessing		Piper 160	Bethany, Mo.	3000
Miller		Piper 235	Shannigill	3200
Baur		Piper 140	Carrol Iowa.	3000
Clark		Piper twin	Sioux City	3600

2. If a new, lighted, hard-surfaced runway and hangar facility was available at Lamoni, what type of aircraft would your company use at the facility and what would be the estimated frequency of use or operations?

Aircraft Type	*Number of Operations Per Week, Month, or Year
twin piper. 3	24 Per week
piper 235 }	

*One landing and one take-off equals two operations.

3. a. Are there any customers your company serves that would have need for better airport facilities at Lamoni?

Yes X No

b. If so, please list the aircraft they might use and the estimated frequency of their use.

Aircraft Type	Number of Operations Per Week, Month, or Year
Some of our Customers have twins that now land in Des Moines.	2 Per week.

4. Please furnish any comments you or your company may have regarding development of better facilities at the Lamoni Municipal Airport.

The names listed Above are People That Fly here on A Regular BASIS (once per week) at time they have to leave Early, (Before Sales is over) Because of lights. several Farmers Fly here to the SALE on A One or two month BASIS.

Name of Company Lamoni Livestock Sales Co

Address Lamoni Iowa. 50140

Name and Title of Company Representative Charles A Conner Co Owner.

LAMONI AIRPORT SURVEY

1. Please list the number and types of aircraft your company used for business purposes.

No.	Make/Model	Home Base	Runway Length Required
1	Aerosca Defender [6STC]	Lamoni	2000'

2. If a new, lighted, hard-surfaced runway and hangar facility was available at Lamoni, what type of aircraft would your company use at the facility and what would be the estimated frequency of use or operations?

Aircraft Type	*Number of Operations Per Week, Month, or Year
2 place single engine	per week 8-10

*One landing and one take-off equals two operations.

3. a. Are there any customers your company serves that would have need for better airport facilities at Lamoni?

Yes ____ No ✓

b. If so, please list the aircraft they might use and the estimated frequency of their use.

Aircraft Type	Number of Operations Per Week, Month, or Year

4. Please furnish any comments you or your company may have regarding development of better facilities at the Lamoni Municipal Airport.

Hangar Facility would decrease insurance rates, would be more convenient than traveling to Bethany Mo. to a hangar. Lights would mean more use of runway.

Name of Company Aerial Photography

Address

Name and Title of Company Representative Dennis E McCulture

LAMONI AIRPORT SURVEY

1. Please list the number and types of aircraft your company used for business purposes.

No.	Make/Model	Home Base	Runway Length Required

2. If a new, lighted, hard-surfaced runway and hangar facility was available at Lamoni, what type of aircraft would your company use at the facility and what would be the estimated frequency of use or operations?

Aircraft Type	*Number of Operations Per Week, Month or Year

*One landing and one take-off equals two operations.

3. a. Are there any customers your company serves that would have need for better airport facilities at Lamoni?

YES X NO ____

b. If so, please list the aircraft they might use and the estimated frequency of their use.

Aircraft Type	Number of Operations Per Week, Month or Year
Twin engine	50 - year
Single engine	600 - year

4. Please furnish any comments you or your company may have regarding development of better facilities at the Lamoni Municipal Airport.

Graceland College has many more friends and alumni who would use the Lamoni airport if it were a little longer and had lights for night use.

Name of Company Graceland College

Address Development Office, Lamoni, Iowa 50140

Name and Title of Company Representative Herbert C. Lively, Director of Development

LAMONI AIRPORT SURVEY

1. Please list the number and types of aircraft your company used for business purposes.

No.	Make/Model	Home Base	Runway Length Required
1	Piper Navajo	Chariton, Iowa	2500
1	Piper Lance	"	2000

2. If a new, lighted, hard-surfaced runway and hangar facility was available at Lamoni, what type of aircraft would your company use at the facility and what would be the estimated frequency of use or operations?

Aircraft Type	*Number of Operations Per Week, Month, or Year
Same as above	?

*One landing and one take-off equals two operations.

3. a. Are there any customers your company serves that would have need for better airport facilities at Lamoni?

Yes ____ No ____

b. If so, please list the aircraft they might use and the estimated frequency of their use.

Aircraft Type	Number of Operations Per Week, Month, or Year

4. Please furnish any comments you or your company may have regarding development of better facilities at the Lamoni Municipal Airport.

Name of Company Hy-Vee Food Stores

Address Chariton, Iowa

Name and Title of Company Representative [signature] Chief Pilot

LAMONI AIRPORT SURVEY

1. Please list the number and types of aircraft your company used for business purposes.

No.	Make/Model	Home Base	Runway Length Required
1	PA28R201T	Chariton, Ia	2800/ft.

2. If a new, lighted, hard-surfaced runway and hangar facility was available at Lamoni, what type of aircraft would your company use at the facility and what would be the estimated frequency of use or operations?

Aircraft Type	*Number of Operations Per Week, Month, or Year
Same as above	twice per week

*One landing and one take-off equals two operations.

3. a. Are there any customers your company serves that would have need for better airport facilities at Lamoni?

Yes ✓ No ____

b. If so, please list the aircraft they might use and the estimated frequency of their use.

Aircraft Type	Number of Operations Per Week, Month, or Year
Single engin	One or twice per month

4. Please furnish any comments you or your company may have regarding development of better facilities at the Lamoni Municipal Airport.

Most companies are looking at areas with improved airports and it would seem that Lamoni could improve it position and thus compete for more industry and business with an improved airport.

Name of Company Central Savings Association

Address 114 E. Main P.O. Box 28
Lamoni, Iowa, 50140

Name and Title of Company Representative David E. McCabe
President

Mail to: Karen Willis
RR 2, Box 60
Lamoni, IA 50140

APPENDIX E

Agency Review Responses

DEPARTMENT OF TRANSPORTATION
IOWA

Department of Transportation

PLANNING AND RESEARCH DIVISION
800 LINCOLN WAY AMES, IOWA 50010 515-296-1661

March 5, 1980
REF. NO. 765.200

Mrs. Dorothy Harris, Chairman
Lamoni Airport Commission
370 South State Street
Lamoni, IA 50140

Dear Mrs. Harris:

I have reviewed the final draft of the Airport Development Plan for the Lamoni Municipal Airport. In general, I agree with the consultant's report and the conclusions that are presented. However, this concurrence is not an approval for a construction project at the Lamoni Airport. Approval of state funds can only be accomplished by the submittal of an application for a specific project.

A public information meeting should be scheduled to receive public input on the plan before the report is accepted by the city and printed in final form.

Sincerely,

Glenn L. Miller

Glenn L. Miller
Office of Program Management
515/296-1680

GLM/jas

April 2, 1979
765.200

Subject: Lamoni Municipal Airport
Airport Development Study

Mrs. Dorothy Harris
370 So. State
Lamoni, IA 50140

Dear Mrs. Harris:

Your consultant for the Airport Development Phase Study has furnished us with a copy of the preliminary report of the first phase. Phase I of the study consists of the inventory, forecasts of aviation activity and facility requirements. The inventory and forecasts appear reasonable, and we agree with the facility requirements for a Basic Utility (BU) airport. However, there is not enough evidence to substantiate a General Utility (GU) airport in the 11 to 20-year planning period. We therefore recommend a Basic Utility airport for the full 20-year planning period. We also suggest that a copy of the mail survey and a tabulation of the results be made a part of the final report.

The preliminary report on Phase I of the study is approved, and we recommend that work continue on the next phase.

Sincerely,

Glenn L. Miller
Office of Program Management

GLM/jas
cc: Peter Crawford