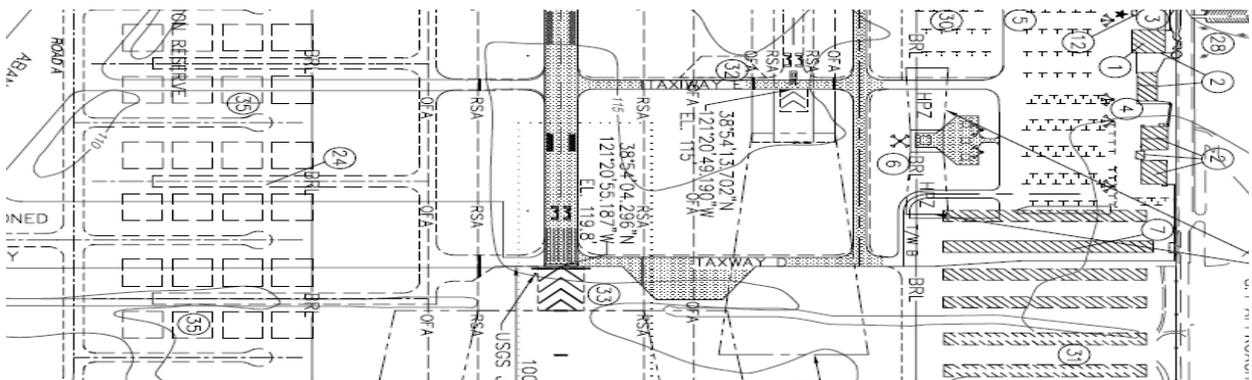
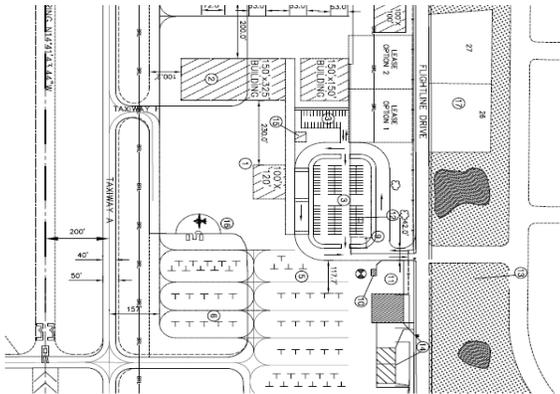


# Lincoln Regional Airport Master Plan



City of Lincoln  
Placer County, California

November 2007



# **LINCOLN REGIONAL AIRPORT MASTER PLAN**

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*Prepared for  
City of Lincoln, California*

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*November 2007*

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**LINCOLN REGIONAL AIRPORT  
 MASTER PLAN  
 CITY OF LINCOLN, PLACER COUNTY, CALIFORNIA**

**TABLE OF CONTENTS**

Chapter 1.	Introduction.....	1-1
Chapter 2.	Inventory.....	2-1
	2-1 Existing Airport Facilities.....	2-1
	2-2 Airspace and Air Traffic Control.....	2-3
	2-3 Wind Data.....	2-3
	2-4 Surrounding Land Use.....	2-6
	2-5 Socioeconomic Data.....	2-6
Chapter 3.	Aviation Forecasts.....	3-1
	3-1 Based Aircraft and Operations.....	3-1
	3-2 Projected Fleet Mix.....	3-18
	3-3 Critical Aircraft.....	3-18
	3-4 Projected Peak Demand Characteristics.....	3-18
	3-5 Summary of Aviation Forecasts.....	3-19
Chapter 4.	Demand Capacity Analysis and Facility Requirements.....	4-1
	4-1 Design Standards.....	4-1
	4-2 Airfield Capacity.....	4-2
	4-3 Runway Length.....	4-2
	4-4 Pavement Strength.....	4-3
	4-5 Taxiway System.....	4-4
	4-6 Airfield Safety Areas.....	4-5
	4-7 Navigational Aids (NAVAIDs).....	4-5
	4-8 Air Traffic Control Tower.....	4-6
	4-9 General Aviation Facility Requirements.....	4-6
	4-10 FBO and Administration Facilities.....	4-8
	4-11 Helicopter Facilities.....	4-9
	4-12 Fuel Storage.....	4-9
	4-13 Airport Maintenance.....	4-9
	4-14 Utilities.....	4-9
	4-15 Security.....	4-9
Chapter 5.	Master Plan Development.....	5-1
	5-1 General.....	5-1
	5-2 Airfield Facilities.....	5-1

Chapter 6.	Airport Layout Plan Update .....	6-1
Chapter 7.	Airport Capital Improvement Program .....	7-1
Chapter 8.	Environmental .....	8-1
Chapter 9.	Aircraft Noise Assessment .....	9-1
Chapter 10.	Utilities and Drainage .....	10-1

### LIST OF TABLES

Chapter 2.	Inventory	
	2-1 Historical Socioeconomic Data .....	2-8
Chapter 3.	Aviation Forecasts	
	3-1 Active General Aviation Aircraft in the U.S., 1973 to 2006.....	3-2
	3-2 F.A.A. Certified U.S. Pilots by Type of Rating, 1929-2004 .....	3-3
	3-3 2006 Based Aircraft Owners' Resident Location Lincoln Regional Airport, Lincoln, California .....	3-5
	3-4 Historical and Forecast Population and Aviation Activity By City for Lincoln Regional Airport.....	3-6
	3-5 Historical and Forecast Employment and Aviation Activity By City for Lincoln Regional Airport .....	3-7
	3-6 Summary of Historical & Forecast Aviation Activity, Lincoln Regional Airport.....	3-8
	3-7 Historical & Forecast Based Aircraft by Market Share .....	3-9
Chapter 4.	Demand Capacity Analysis and Facility Requirements	
	4-1 Airport Design Standards – Airport Reference Code C III Airport	4-1
	4-2 Runway Length Requirements.....	4-3
	4-3 General Aviation Facility Requirements .....	4-7
	4-4 General Aviation Facility Requirements and Availability Comparison – East Side Airport Development for 2033 .....	4-8
Chapter 5.	Master Plan Development	
	5-1 Available Land Use by Acreage.....	5-4

**LIST OF FIGURES**

Chapter 2.	Inventory	
	2-1 Airspace.....	2-4
	2-2 Wind Roses .....	2-5
	2-3 City of Lincoln 2050 Proposed General Plan .....	2-7
Chapter 3.	Aviation Forecasts	
	3-1 Historical and Forecast Population Trends, Placer County, California.....	3-12
	3-2 Historical and Forecast Population Trends, Sacramento County, California.....	3-13
	3-3 Historical and Forecast Employment Trends, Placer County, California.....	3-14
	3-4 Historical and Forecast Employment Trends, Sacramento County, California.....	3-15
	3-5 Historical and Forecast Based Aircraft Trends, Lincoln Regional Airport, Lincoln, California.....	3-16
	3-6 – Historical and Forecast Annual Operations Trends Lincoln Regional Airport, Lincoln, California.....	3-17

**AIRPORT PLANS**

REDUCED SIZE INCLUDED IN REPORT – FULL SIZE SUBMITTED SEPARATELY

Title and Index .....	Sheet No. 1
Airport Layout Plan .....	Sheet No. 2
Airport Layout Plan Data Tables .....	Sheet No. 3
East Terminal Area Plan .....	Sheet No. 4
West Terminal Area Plan .....	Sheet No. 5
Airport Airspace Plan 1.....	Sheet No. 6
Airport Airspace Plan 2.....	Sheet No. 7
Inner Portion of Approach Surface Plan – Runway 15-33.....	Sheet No. 8
Inner Portion of Approach Surface Plan – Future Runway 15L-33R .....	Sheet No. 9
Off-Airport Land Use Plan .....	Sheet No. 10
Airport Property Map – Exhibit “A” .....	Sheet No. 11

**APPENDICES**

Appendix A      Airport Capital Improvement Program (ACIP)

Appendix B      Aircraft Noise Assessment

## CHAPTER 1. INTRODUCTION

The Lincoln Regional Airport, which is located on the west side and a part of the City of Lincoln, Placer County, California, is a general aviation airport classified by the Federal Aviation Administration Airport Reference Code (ARC) System as a C III airport. This airport serves the general aviation requirements of the air trade area, which generally consists of the City of Lincoln, the southwestern portion of Placer County, and a significant portion of the northern part of Sacramento County. The Airport is owned and operated by the City of Lincoln.

The original Master Plan for the Lincoln Regional Airport was prepared by the office of Reinard W. Brandley in 1976. At that time the airport consisted of three short runways in a triangular configuration, a fourth runway running north-south through the center of the triangular layout, and the general aviation apron and a small hangar located in the southwestern corner of the property. At that time the airport served 15 to 20 aircraft.

The 1976 Master Plan anticipated significant growth in the use of the airport and recommended a single 6,000-foot long north-south runway with a parallel taxiway located 900 feet center to center to the east of the runway in order to allow for the possible future construction of a parallel runway located 700 feet from the main runway. This would permit simultaneous VFR operations on both runways. The aircraft tie down apron and hangar development was proposed for the east side of the airport.

The airport was constructed following the recommendations of the 1976 Master Plan. There has been significant growth in both based aircraft and aircraft operations since that time, and it is anticipated that the airport will continue to grow if plans are developed that allow the orderly growth of the facility.

A Master Plan Study, including an Airport Layout Plan Update, was performed in 2004 by Mead & Hunt, Inc. 2002 data were used in preparation of the study. The results of this study were included in their report entitled, Lincoln Regional Airport Master Plan, Lincoln, California dated October 2004. The Airport Layout Plan was approved by the F.A.A. in February of 2006.

The office of Reinard W. Brandley was retained in 2006/2007 to update the based aircraft and aircraft operations forecasts using current data and to review and update the Airport Layout Plans. This Master Plan includes the results of this study and the revised Airport Layout Plan set of drawings. In this report the data included in the Mead & Hunt Master Plan are included where applicable with the source of data indicated.

## CHAPTER 2. INVENTORY

The Lincoln Regional Airport serves the aeronautical needs of the City of Lincoln, the southwestern portion of Placer County, and a significant portion of northern Sacramento County. The Lincoln Regional Airport is a general aviation airport that serves the general aviation requirements of the region, including the business jet, the smaller piston-engine aircraft, and helicopters. The major airports within a 25-mile radius of Lincoln Regional Airport that provide similar general aviation services include Auburn Municipal Airport, Yuba County Airport, Sutter County Airport, Sacramento Executive Airport, and McClellan Airfield. The Sacramento International Airport is located approximately 22 miles southwest of the Lincoln Regional Airport and is a major airline facility.

The City of Lincoln and Placer County have experienced explosive growth in the past five years. This growth is expected to continue. Placer County is the fastest growing county in California. The City of Lincoln was the fastest growing city in California between 2002 and 2005 and was the sixth fastest growing city in 2006. The City of Lincoln General Plan calls for significant expansion of the area.

This chapter will provide data on existing airside and building area facilities, existing airspace utilization, existing navigational aids, meteorological data, and air traffic data.

### 2-1 Existing Airport Facilities

#### 2-1.1 Airside Facilities

The airfield consists of features and facilities required to accommodate safe and efficient current and future aircraft operations.

- The airport has one asphalt-paved runway designated Runway 15-33, which is 100 feet wide by 6,001 feet long. The runway has an elevated medium-intensity runway edge lighting system.
- The taxiway system consists of one parallel taxiway (Taxiway A) and five cross taxiways, which are 40 feet wide. The centerline of the parallel taxiway is located 900 feet from the centerline of the runway to provide room for a parallel runway located 700 feet from the existing runway. All taxiways have an elevated medium intensity taxiway edge lighting system.
- Large aircraft holding aprons exist on the south cross taxiway and the north cross taxiway. The existing aircraft parking apron at the airport is approximately 107,000 square yards and has 240 aircraft parking positions. The sizes of the parking positions vary to accommodate single- and twin-engine aircraft and business jets.

- There is a series of hangars at the north end of the airport and one row of hangars at the south end of the airport. There are currently a total of 141 hangars located at the Lincoln Regional Airport.
- A helipad with three separate parking positions is also located between the apron and the parallel taxiway.

The pavements on the runway, taxiway and heavy-duty apron area have been designed for single gear aircraft with gross weights of 30,000 pounds and dual gear aircraft with gross weights of 50,000 pounds. The tee hangar taxiways and sections of apron designed for light aircraft are designed for single engine aircraft with gross weights of 12,600 pounds. The taxiways serving the corporate hangars are designed to support larger aircraft.

### 2-1.2 Building Area Facilities

There is significant general aviation development on the east side of the airport, which includes four fixed base operator hangars, a nested tee hangar row at the south end of the airport, and a series of hangars to the north of the apron. The hangars range from rows of nested tee hangars to box hangars to larger corporate hangars. There are currently 141 hangars at the airport.

### 2-1.3 Airport Offices

The airport offices and pilots' lounge are presently located in a separate temporary modular building near the center of the east side apron and hangar development and adjacent to Flightline Drive.

### 2-1.4 Fueling Facilities

The airport has self-serve and truck fueling facilities, which provide 100 low-lead gasoline and Jet-A fuel. The fuel system and delivery services are owned and operated by the City of Lincoln.

### 2-1.5 Wash Rack

An aircraft wash rack is located at the northeast end of the aircraft parking apron.

### 2-1.6 Land Uses

On the east side of the airport there is an 89-acre parcel located between Aviation Boulevard and Flightline Drive. This property is separated from the airport by Flightline Drive and the airfield's perimeter security fence and is currently designated for non-aviation professional business park use. There is a large area, approximately 160 acres of land, on the west side of Runway 15-33 which is not currently used for aviation facilities and is available for future aviation or non-aviation development. The airport lands are presently zoned as Industrial-Planned Development I (PD).

### 2-1.7 Ground Access and Parking

Ground access to the Lincoln Regional Airport from Central Lincoln, Southwestern Placer County, and Northern Sacramento County is by way of State Highway 65 to Nicolaus Road to Aviation Boulevard to Flightline Drive. A Highway 65 Bypass is proposed in 2010. This Highway 65 bypass will provide direct airport access from Nelson Lane one-half mile south of the airport.

Airport parking is provided along Flightline Drive and in a small parking lot located on the east side of this street, which will accommodate approximately 36 vehicles. Hangar tenants normally park their vehicles in their hangars.

### 2-2 **Airspace and Air Traffic Control**

NAVAIDs at the airport provide visual and instrument approaches to the runway. The instrument landing system (ILS) provides precision approach to Runway 15 with minimums of ½-mile visibility and 200-foot ceiling. Non-precision approaches to Runway 15 include a very high frequency omni-directional range (VOR) and global positioning system (GPS). Runway 33 has a non-precision GPS approach.

The Lincoln Regional Airport is depicted on the San Francisco Sectional Aeronautical Chart published by the U.S. Department of Commerce National Oceanic and Atmospheric Administration, National Ocean Survey. The airspace surrounding the airport is shown in Figure 2-1.<sup>1</sup>

There are no nearby airports with which Lincoln has conflicting airspace. Flights into the airport can be conducted using both instrument flight rules (IFR) and visual flight rules (VFR). The airport currently does not have an Air Traffic Control Tower (ATCT). The airspace around the airport is controlled by the Oakland Air Traffic Control Center and Norcal Approach-Departure Control.

### 2-3 **Wind Data**

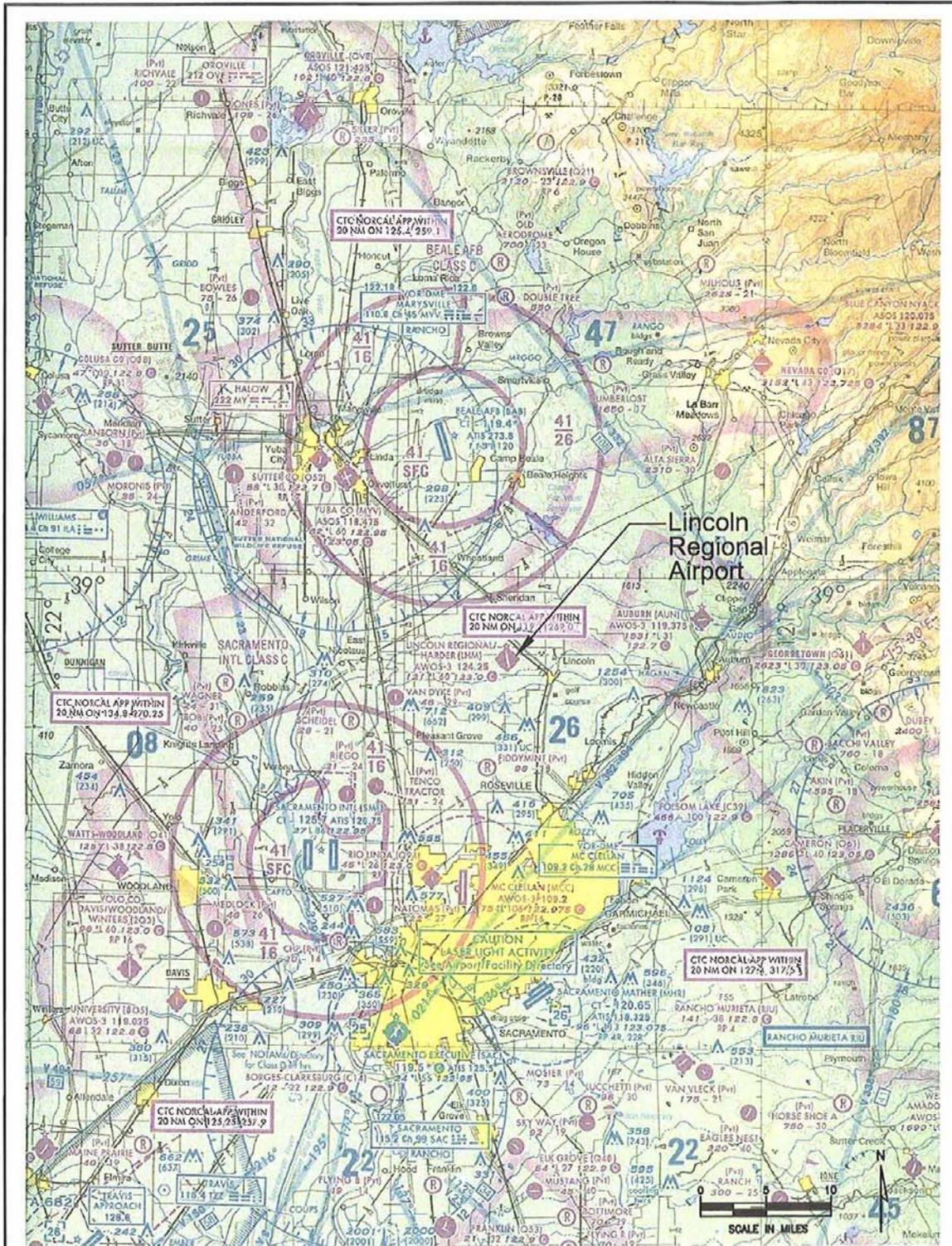
Wind data are available from the U.S. Weather Bureau Station, Beale Air Force Base for the period 1993 to 2002. These data are presented as a wind rose on the Airport Layout Plan set of drawings and are included as Figure 2-2.<sup>2</sup> F.A.A. recommends a crosswind runway if wind coverage is less than 95 percent. The wind coverage for Runway 15-33 at Lincoln Regional Airport is in excess of 99 percent. A single-direction runway system is acceptable at this airport.

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<sup>1</sup> Source: Mead & Hunt, Inc., Lincoln Regional Airport Master Plan, October 2004, Exhibit 1-8.

<sup>2</sup> Source: Mead & Hunt, Inc., Lincoln Regional Airport Master Plan, October 2004, Exhibit 1-9.

**FIGURE 2-1 - AIRSPACE**



Source: San Francisco Sectional Aeronautical Chart, September 2003



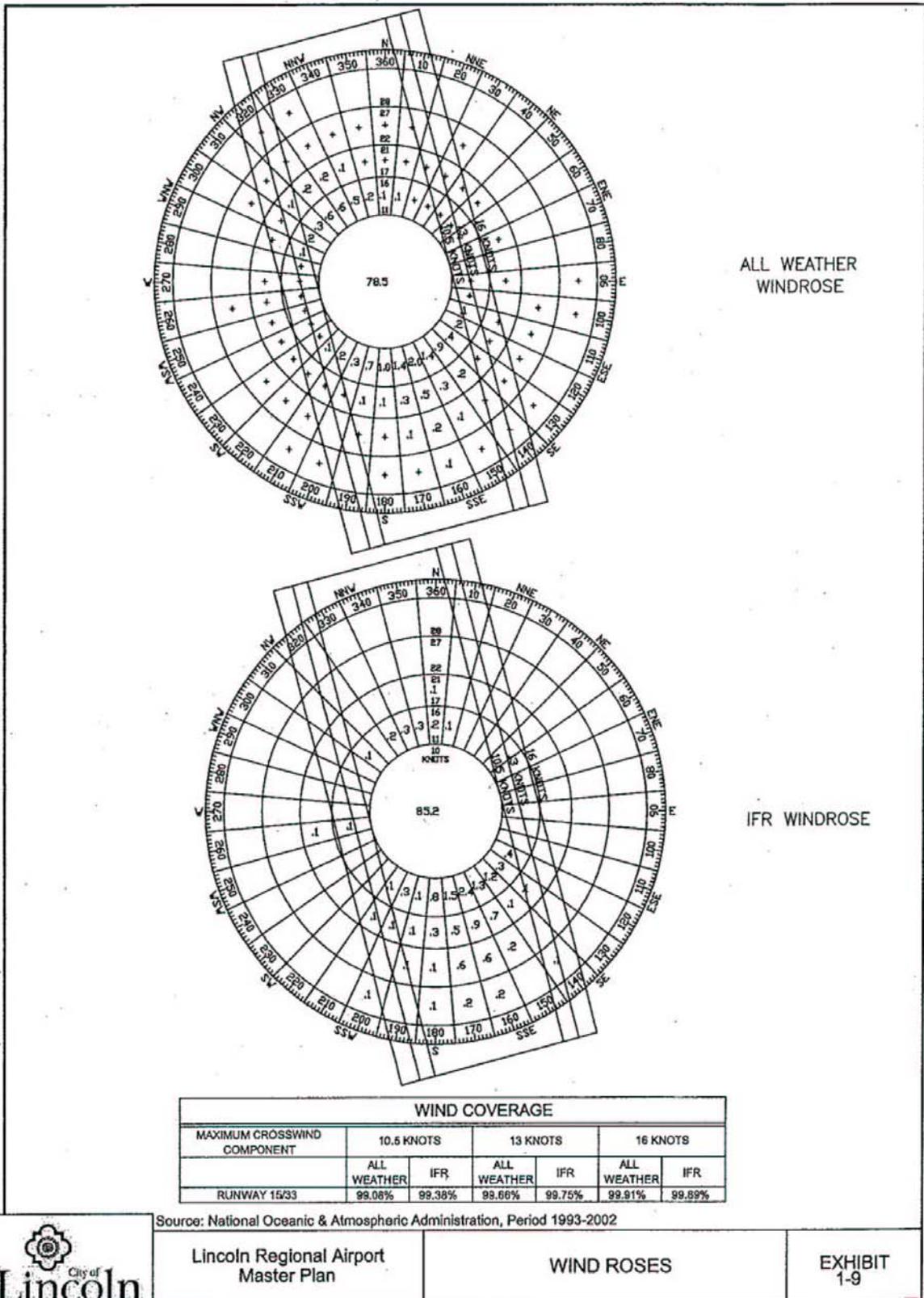
<p>Lincoln Regional Airport Master Plan</p>	<p>AIRSPACE</p>
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<p>EXHIBIT 1-8</p>
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1-14

Source: Mead & Hunt, Inc., Lincoln Regional Airport Master Plan, October 2004, Exhibit 1-8.

**FIGURE 2-2 – WIND ROSES**



Source: Mead & Hunt, Inc., Lincoln Regional Airport Master Plan, October 2004, Exhibit 1-9.

The average annual precipitation at Lincoln Regional Airport is approximately 22 inches. The average maximum temperature of the hottest month (July) is 97° F.

#### **2-4 Surrounding Land Use**

The City of Lincoln has zoned property around the airport to be generally compatible with airport operations. The Placer County Airport Land Use Commission has adopted Placer County Land Use Compatibility Plans to ensure that the land surrounding the Lincoln Regional Airport is zoned for airport-compatible uses. The City of Lincoln 2050 Proposed General Plan is included as Figure 2-3. The Placer County ALUC has found the City of Lincoln 2050 General Plan to be consistent with the ALUC for the Lincoln Regional Airport.

#### **2-5 Socioeconomic Data**

Changes in an area's population, employment, and income will have an impact on levels of aviation activity on an airport. Historical population, employment, and income data for Placer County were acquired by Mead & Hunt and included in Table 1-5 of their report. This table is reproduced as Table 2-1 in this report. Chapter 3, Aviation Forecasts, presents updated current data.

These data show that there has been explosive growth in the City of Lincoln population and in Placer County population, along with significant increases in per capita income. As the Cities of Rocklin and Roseville are built out, the City of Lincoln is expected to maintain the high growth rate for a significant period of time, accompanied by a significant growth in aircraft activity.

# Proposed General Plan

## Legend

### BOUNDARIES

-  City Limits
-  Proposed Sphere of Influence
-  Proposed Streets
-  Airport Runway Expansion

### LAND USE DESIGNATIONS

-  Rural Residential (RR)
-  Country Estates (CE)
-  Low Density Residential (LDR)
-  Medium Density Residential (MDR)
-  High Density Residential (HDR)
-  Planned Development (PD)
-  Village (V)
-  Neighborhood Commercial (NC)
-  Community Commercial (CC)
-  Mixed Use (MU)
-  Regional Commercial (RC)
-  Special Use District (SUD)
-  Business and Professional (BP)
-  Light Industrial (LI)
-  Industrial (I)
-  Industrial Planned Development (IPD)
-  Park and Recreation (PR)
-  Open Space (OS)
-  Agriculture (AG)
-  Public Facilities (PF)

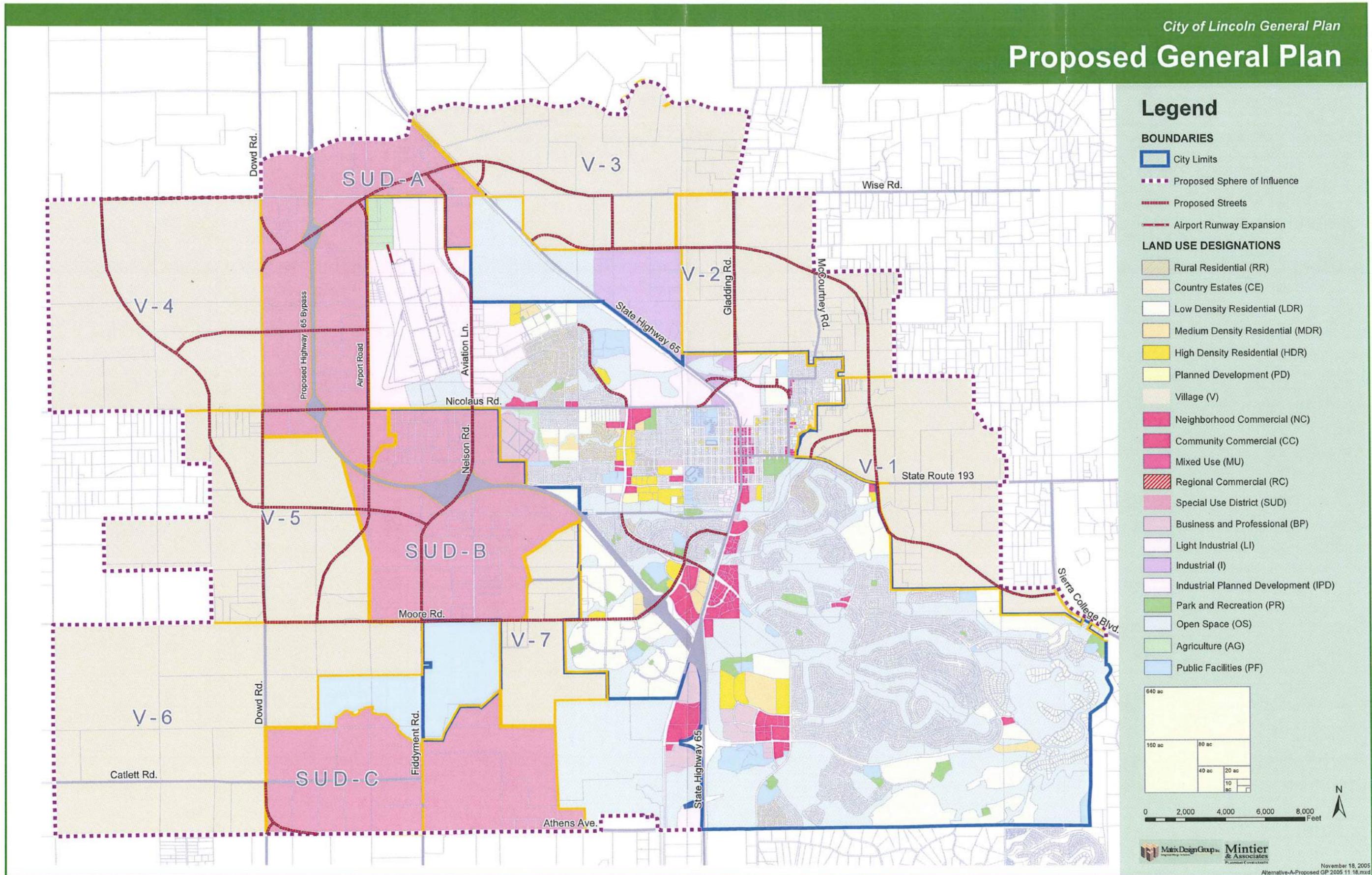
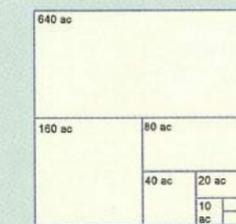


FIGURE 2-3

TABLE 2-1 – HISTORICAL SOCIOECONOMIC DATA

Table 1-5

## Historical Socioeconomic Data

Year	City of Lincoln Population	City Population Annual Growth Rate	Placer County Population	County		Per Capita Income Annual Growth Rate 2/
				Population Annual Growth Rate	Placer County Per Capita Income 1/	
1993	7,975		192,655		\$24,070	
1994	8,150	2.2%	199,290	3.4%	\$25,186	4.6%
1995	8,300	1.8%	207,071	3.9%	\$26,651	5.8%
1996	8,525	2.7%	214,726	3.7%	\$28,131	5.6%
1997	8,850	3.8%	222,168	3.5%	\$30,096	7.0%
1998	9,000	1.7%	231,179	4.1%	\$31,694	5.3%
1999	9,600	6.7%	240,928	4.2%	\$33,412	5.4%
2000	11,205	16.7%	251,293	4.3%	\$35,147	5.2%
2001	13,850	23.6%	264,556	5.3%	\$35,847	2.0%
2002	17,750	28.2%	275,600	4.2%	N/A	N/A
Average 1993-2002		9.7%		4.1%		5.1%
CAGR 1993-2002	8.3%		3.6%		4.5%	
CAGR 1993-1999						
CAGR 2000-2002						

Sources: 1993-2002 City Population Data - California Department of Finance

1993-2001 County Population &amp; Income Data - Bureau Of Economic Analysis

2002 County Population Data - California Department of Finance, Demographic Research Unit

1993-2002 Employment Data - California Labor Market Information Division

Notes: CAGR = Compounded Annual Growth Rate

N/A = Data Not Available

1/ Per Capita Income CAGR 1993-2001

2/ Per Capita Income Annual Growth Rate 1993-2001

3/ Employment Data for years prior to 2000 are not comparable with data for 2000 and later years

due to incorporation of the 2000 Census population controls at the state level and changes in methodology

## CHAPTER 3. AVIATION FORECASTS

This chapter presents the statistical data available for the general aviation activity at Lincoln Regional Airport located in Lincoln, Placer County, California. Lincoln Regional Airport does not serve any airline, air cargo, or air taxi operations at this time. The major airline operations for the area are served from Sacramento International Airport, and it is expected that Sacramento International Airport will continue to serve the major airlines. Short-haul commuter, air taxi, and air cargo operations are feasible uses in the future at Lincoln Regional Airport.

### 3-1 Based Aircraft and Operations

Forecasts of future operations at the airport, including the based aircraft and total aircraft operations through the year 2030 are presented in this chapter. Short-term forecasts (0 to 5 years), medium-term forecasts (5 to 10 years) and long-term forecasts (10 to 20 years) have been included.

The overall general aviation traffic generated at airports throughout the United States has shown little or no increase since 1980, as represented by the number of active general aviation aircraft and private pilots during this period. Statistics from the Federal Aviation Administration *Statistical Handbook on Aviation*, which are included in the *California Aviation System Planning Inventory Manual* and on the Aircraft Owners and Pilots Association (AOPA) website, are shown for the active general aviation aircraft in Table No. 3-1 and for the active pilots by type of rating in Table No. 3-2 for the entire United States.

In many areas of the United States there has been extensive growth of general aviation and in other areas there has been a decrease in general aviation activity. The average activities have remained fairly constant since 1980. These changes in activity are usually associated with changes in population and economic conditions. The large cost of operating and buying general aviation aircraft, including the increased cost of the aircraft, aircraft fuel and other support activities, have had a significant influence on the number of persons that own and fly the small general aviation aircraft. Leisure and recreation type flying has dropped off significantly, while business and airline type flying has increased.

The manufacture of small propeller-driven general aviation aircraft in the United States ceased in the 1980s and early 1990s because of large liability claims. The Air Revitalization Act of 1994 limited the liability of aircraft manufacturers, and there has now been a resumption of the manufacture of some models. The statistics indicate a trend for a significant growth in single engine piston and twin engine piston aircraft and a larger growth in turbojet, experimental aircraft, and light sport aircraft (LSA). The development of the Very Light Jet (VLJ) is expected to have a significant influence on business and recreational flying. This aircraft has excellent performance, and the cost of purchase and operation of the aircraft is significantly lower than the cost of other business jet aircraft.

**TABLE NO. 3-1  
ACTIVE GENERAL AVIATION AIRCRAFT IN THE U.S. – 1973 TO 2006**

Year	Piston Single Engine	Piston Multi-Engine	Piston Other	Turbo Prop <sup>1</sup>	Turbojet <sup>2</sup>	Rotorcraft	Experimental	Other	Total
1973	126,074	18,502	190	1,849	1,380	3,115	N/A	2,201	153,311
1974	131,512	19,553	190	2,095	1,561	3,597	N/A	2,525	161,033
1975	136,639	20,119	178	2,504	1,743	4,054	N/A	2,812	168,049
1976	144,752	21,111	196	2,453	1,881	4,425	N/A	3,146	177,964
1977	149,300	21,301	182	2,890	2,277	4,726	N/A	3,616	184,294
1978	160,651	22,949	221	3,129	2,479	5,314	N/A	4,028	198,778
1979	168,390	24,850	229	3,579	2,653	5,864	N/A	4,770	210,339
1980	168,435	24,366	212	4,090	2,992	6,001	N/A	4,945	211,045
1981	167,898	25,356	114	4,660	3,171	6,974	N/A	5,049	213,226
1982	164,173	24,882	140	5,186	3,996	6,169	N/A	5,233	209,779
1983	166,427	24,909	143	5,453	3,898	6,539	N/A	5,923	213,293
1984	171,922	25,258	262	5,809	4,320	7,096	N/A	6,275	220,943
1985	153,400	22,100	100	5,000	4,100	6,000	N/A	5,800	196,500 <sup>3</sup>
1986	160,300	22,100	100	5,600	4,200	6,500	N/A	6,500	205,300 <sup>3</sup>
1987	159,700	21,700	100	4,900	4,000	5,900	N/A	6,300	202,700 <sup>3</sup>
1988	153,700	21,200	100	4,900	3,900	6,000	N/A	6,400	196,200 <sup>3</sup>
1989	158,900	21,800	100	5,900	4,100	7,000	N/A	7,200	205,000 <sup>3</sup>
1990	154,000	21,100	100	5,300	4,100	6,900	N/A	6,600	198,000 <sup>3</sup>
1991	152,836	20,551	131	4,941	4,126	6,238	N/A	8,051	196,874 <sup>4</sup>
1992	144,837	17,966	77	4,786	4,004	5,979	N/A	8,000	185,650 <sup>4</sup>
1993	133,516	15,626	14	4,116	3,663	4,721	10,426	5,037	177,120 <sup>4</sup>
1994	127,351	14,801	NA	4,092	3,914	4,728	12,144	5,906	172,936 <sup>4</sup>
1995	137,049	15,739	NA	4,995	4,559	5,830	15,176	4,741	188,089 <sup>4</sup>
1996	137,401	16,150	NA	5,716	4,424	6,570	16,625	4,244	191,129
1997	140,038	16,017	NA	5,619	5,178	6,785	14,680	4,092	192,414
1998	144,234	18,729	NA	6,174	6,066	7,426	16,502	5,580	204,710
1999	150,886	20,930	108	5,679	7,120	7,448	20,528	6,765	219,464
2000	149,422	20,951	140	5,762	7,001	7,150	20,407	6,700	217,533
2001	145,034	18,192	89	6,596	7,787	6,783	20,421	6,545	211,447
2002	143,503	17,584	101	6,841	8,355	6,646	21,936	6,377	211,244
2003	143,265	17,491	182	7,689	7,997	6,525	20,550	6,008	209,708
2004	148,613	18,469	107	8,379	9,298	7,821	20,800	5,939	219,426
2005	148,101	19,412	170	7,942	9,823	8,728	23,627	6,454	224,352
2006	148,236	19,364	400	8,026	10,032	9,232	24,541	6,592	226,422

2006 totals are estimates

Subtotals might not add to totals due to rounding, estimation, and/or survey procedures.

Data is derived from the AOPA website, which includes all registered aircraft excluding: 1) air carrier aircraft operated under FAR Part 121, and 2) aircraft flown less than one hour per year (inactive).

SOURCE: AOPA Website (5-29-07)

<sup>1</sup> Turbo Prop is a jet engine turning a propeller.

<sup>2</sup> Turbojet is a pure jet.

<sup>3</sup> Revised to correct for nonresponse bias on FAA G.A. Activity Survey

<sup>4</sup> Revised due to change in estimating procedures for the 1996 FAA G.A. Activity Survey.

**TABLE NO. 3-2**  
**F.A.A. CERTIFIED U.S. PILOTS BY TYPE OF RATING - 1929-2004**

<b>Year</b>	<b>Student</b>	<b>Recreational</b>	<b>Private</b>	<b>Commercial</b>	<b>ATP</b>	<b>Other</b>	<b>Total</b>
1929	N/A	N/A	4,162	5,053	N/A	N/A	9,215
1930	N/A	N/A	7,433	7,847	N/A	N/A	15,280
1931	N/A	N/A	9,226	8,513	N/A	N/A	17,739
1932	N/A	N/A	10,297	7,964	330	N/A	18,591
1933	N/A	N/A	5,771	7,635	554	N/A	13,960
1934	N/A	N/A	5,789	7,484	676	N/A	13,949
1935	N/A	N/A	6,707	7,062	736	N/A	14,505
1936	N/A	N/A	7,622	7,288	842	N/A	15,752
1937	N/A	N/A	10,206	6,411	1,064	N/A	17,681
1938	N/A	N/A	13,985	7,839	1,159	N/A	22,983
1939	N/A	N/A	20,832	11,677	1,197	N/A	33,706
1940	N/A	N/A	49,507	18,791	1,431	N/A	69,729
1941	N/A	N/A	93,782	34,578	1,587	N/A	129,947
1942	N/A	N/A	108,689	55,760	2,177	N/A	166,626
1943	N/A	N/A	106,951	63,940	2,315	N/A	173,206
1944	N/A	N/A	111,883	66,449	3,046	N/A	181,378
1945	N/A	N/A	128,207	162,873	5,815	N/A	296,895
1946	N/A	N/A	189,156	203,251	7,654	N/A	400,061
1947	N/A	N/A	244,270	181,912	7,059	N/A	433,241
1948	N/A	N/A	306,699	176,845	7,762	N/A	491,306
1949	N/A	N/A	328,380	187,789	9,025	N/A	525,194
1950	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1951	N/A	N/A	371,854	197,900	10,813	N/A	580,567
1952	N/A	N/A	371,174	191,824	10,893	N/A	573,891
1953	N/A	N/A	N/A	N/A	18,279	N/A	N/A
1954	71,959	N/A	184,595	80,340	12,129	N/A	349,023
1955	80,494	N/A	132,526	72,957	11,774	N/A	297,751
1956	95,124	N/A	96,864	54,542	11,173	N/A	257,703
1957	98,498	N/A	124,799	70,813	13,964	N/A	308,074
1958	103,456	N/A	140,673	93,126	15,840	N/A	353,095
1959	107,816	N/A	139,804	93,815	18,950	N/A	360,385
1960	99,182	N/A	138,869	89,904	18,279	1,828	348,062
1961	93,973	N/A	144,312	92,976	19,155	2,444	352,860
1962	94,870	N/A	149,405	95,047	20,032	4,617	363,971
1963	105,298	N/A	152,209	96,341	20,269	4,583	378,700
1964	120,743	N/A	175,574	108,428	21,572	4,724	431,041
1965	139,172	N/A	196,393	116,665	22,440	5,100	479,770
1966	165,177	N/A	222,427	131,539	23,917	5,697	548,757
1967	181,287	N/A	253,312	150,135	25,817	7,380	617,931
1968	209,406	N/A	281,728	164,458	28,607	7,496	691,695
1969	203,520	N/A	299,491	176,585	31,442	8,990	720,028
1970	195,861	N/A	303,779	186,821	34,430	11,838	732,729
1971	186,428	N/A	312,656	192,409	35,949	13,567	741,009
1972	181,477	N/A	321,413	196,228	37,714	14,037	750,869
1973	181,905	N/A	298,921	182,444	38,139	13,198	714,607
1974	180,795	N/A	305,848	192,425	41,002	13,658	733,728
1975	176,978	N/A	305,863	189,342	42,592	13,412	728,187
1976	188,801	N/A	309,005	187,801	45,072	13,567	744,246

**TABLE NO. 3-2**  
**F.A.A. CERTIFIED U.S. PILOTS BY TYPE OF RATING - 1929-2004**

Year	Student	Recreational	Private	Commercial	ATP	Other	Total
1977	203,510	N/A	327,424	188,763	50,149	14,086	783,932
1978	204,874	N/A	337,644	185,833	55,881	14,601	798,833
1979	210,180	N/A	343,276	182,097	63,652	15,462	814,667
1980	199,833	N/A	357,479	183,442	69,569	16,748	827,071
1981	179,912	N/A	328,562	168,580	70,311	16,817	764,182
1982	156,361	N/A	322,094	165,093	73,471	16,236	733,255
1983	147,197	N/A	318,643	159,495	75,938	16,731	718,004
1984	150,081	N/A	320,086	155,929	79,192	17,088	722,376
1985	146,652	N/A	311,086	151,632	82,740	17,430	709,540
1986	150,273	N/A	305,736	147,798	87,186	18,125	709,118
1987	146,016	N/A	300,949	143,645	91,287	17,756	699,653
1988	136,913	N/A	299,786	143,030	96,968	17,319	694,016
1989	142,544	N/A	293,179	144,540	102,087	17,660	700,010
1990	128,663	87	299,111	149,666	107,732	17,400	702,659
1991	120,203	161	293,306	148,365	112,167	17,893	692,095
1992	114,597	187	288,078	146,385	115,855	17,857	682,959
1993	103,583	206	283,700	143,014	117,071	17,495	665,069
1994	96,254	241	284,236	138,728	117,434	17,195	654,088
1995	101,279	232	261,399	133,980	123,877	18,417	639,184
1996	94,947	265	254,002	129,187	127,486	16,374	622,261
1997	96,101	284	247,604	125,300	130,858	16,195	616,342
1998	97,736	305	247,226	122,053	134,612	16,366	618,298
1999	99,184 <sup>1</sup>	343	258,749	124,261	137,642	17,461	637,297
2000	99,110 <sup>1</sup>	340	251,561	121,858	141,598	17,502	631,629
2001	94,420 <sup>1</sup>	318	243,823	120,502	144,702	16,516	619,963
2002	85,991	318	245,230	125,920	144,708	29,913 <sup>2</sup>	631,762
2003	87,296	--	241,045	123,990	143,504	29,176 <sup>3</sup>	625,011
2004	87,910	--	235,994	122,592	142,160	29,977 <sup>3</sup>	618,633

<sup>1</sup>1999-2001 students restated in 2003-2014 FAA Aerospace Forecasts - March 2003.

<sup>2</sup>In March 2001, the FAA Registry changed the definition of this pilot category.

<sup>3</sup>"Other" includes recreational, helicopter (only) and glider (only).

Note: Certificate type (private, commercial, etc.) cannot be used to determine the number of "private pilots" or general aviation pilots. Many pilots who fly for personal business or pleasure earn higher FAA certificates or ratings for personal achievement. As a rule of thumb, about 20 percent of all pilots are actually employed full-time as pilots.

SOURCE: AOPA Website (2-05)

The home addresses of the aircraft owners that have currently based their aircraft at the Lincoln Regional Airport are listed in Table No. 3-3 to identify the area of influence of the airport. Significant portions of the aircraft owner population live outside of the City of Lincoln and even outside of Placer County. The projected growth of the airport is, therefore, expected to be a function of growth not only in Lincoln and Placer County, but in the northern portion of Sacramento County.

<b>TABLE NO. 3-3</b>			
<b>2006 BASED AIRCRAFT OWNERS' RESIDENCE LOCATION</b>			
County	City	Lincoln Based Aircraft	
		Total	% of Total
Placer	Lincoln	54	23.5
	Auburn	5	2.3
	Loomis	7	2.8
	Rocklin	28	12.2
	Roseville	30	13.1
	Unincorporated Area	<u>23</u>	<u>9.8</u>
	Subtotal	147	63.7
Sacramento	Sacramento	12	5.2
	Citrus Heights	12	5.2
	Folsom	3	1.4
	Unincorporated Area	<u>20</u>	<u>8.5</u>
	Subtotal	47	20.3
Others		37	16
<b>TOTAL</b>		<b>231</b>	<b>100</b>

Statistical data have been prepared for population, employment, per capital income, based aircraft, and total annual aircraft operations for various significant areas that contribute to growth at the Lincoln Regional Airport. These data have been obtained from the California Aviation System Plan and are shown in Tables No. 3-4 and 3-5 and summarized in Tables No. 3-6 and 3-7. The statistical data include total population and total jobs for the following areas:

- Auburn
- Lincoln
- Loomis
- Rocklin,
- Roseville
- Unincorporated Placer County
- Citrus Heights
- Folsom
- Sacramento and unincorporated Sacramento County

Base Historical Data		
Aircraft Based at Lincoln 2006	(airport)	213
Annual Operations at Lincoln 2003	(FAA)	73,360

Table 3-4  
Historical & Forecast Population & Aviation Activity by City  
For Lincoln Regional Airport

County	Placer										Others
	Auburn	Lincoln	Loomis	Rocklin	Roseville	Unincorporated	Citrus Heights	Folsom	Sacramento	Unincorporated	
2005 Population	12,683	26,661	6,115	52,035	104,136	98,158	86,744	67,325	448,648	540,521	34
# Based AC (2005)	5	50	6	26	28	21	11	3	11	18	34
% of Total Based AC (2005)	2.35	23.47	2.82	12.21	13.15	9.86	5.16	1.41	5.16	8.45	15.96
Annual Operations (2005) (based on % Total Based AC)	1,722	17,221	2,066	8,955	9,644	7,233	3,789	1,033	3,789	6,199	11,710
Ratio: Population / Based AC	2,536.60	533.22	1,019.17	2,001.35	3,719.14	4,674.19	7,885.82	22,441.67	40,786.18	30,028.94	-
Ratio: Population / Annual Operations	7.36	1.55	2.96	5.81	10.80	13.57	22.90	65.16	118.42	87.19	-

Historical & Forecast Population & Aviation Activity - Placer County

Year	Auburn					Lincoln					Loomis					Rocklin					Roseville					Unincorporated Placer County					Total Placer County			
	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Total Ops	
1970	6,570	-	-	-	-	3,176	-	-	-	-	-	-	-	-	-	3,039	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1975	6,725	-	-	-	-	3,420	-	-	-	-	-	-	-	-	-	3,490	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1980	7,540	-	-	-	-	4,132	-	-	-	-	-	-	-	-	-	7,344	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1985	8,725	-	-	-	-	5,400	-	-	-	-	-	-	-	-	-	10,050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	10,500	-	-	-	-	7,248	-	-	-	-	-	-	-	-	-	18,150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	11,150	-	-	-	-	7,811	-	-	-	-	-	-	-	-	-	25,850	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	12,800	-	-	-	-	11,205	-	-	-	-	-	-	-	-	-	36,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	12,683	5	-	1,722	-	26,661	50	-	17,221	-	6,115	6	-	2,066	-	52,035	26	-	8,955	-	104,136	28	-	9,644	-	98,158	21	-	7,233	-	259,788	136	46,840	
2010	13,872	5	0.09	1,884	32.29	45,657	86	7.13	29,490	2,453.95	7,101	7	0.19	2,400	66.64	56,765	28	0.47	9,769	162.80	107,038	29	0.16	9,912	53.75	115,233	25	0.73	8,491	251.63	345,666	180	61,945	
2015	15,027	6	0.09	2,040	31.36	54,657	103	3.38	35,304	1,162.64	8,129	8	0.20	2,747	69.48	61,338	31	0.46	10,556	157.39	108,692	29	0.09	10,065	30.63	133,147	28	0.77	9,811	264.00	380,990	205	70,523	
2020	16,331	6	0.10	2,217	35.41	63,247	119	3.22	40,852	1,109.68	9,298	9	0.23	3,142	79.01	66,498	33	0.52	11,444	177.60	110,412	30	0.09	10,225	31.86	153,567	33	0.87	11,315	300.78	419,343	230	79,195	
2025	17,663	7	0.11	2,398	36.17	72,042	135	3.30	46,533	1,136.16	10,548	10	0.25	3,565	84.48	71,749	36	0.52	12,347	180.73	111,258	30	0.05	10,303	15.67	175,445	38	0.94	12,927	322.56	458,705	256	88,074	
2030	18,995	7	0.11	2,579	36.17	80,837	152	3.30	52,214	1,136.16	11,798	12	0.25	3,987	84.48	77,000	38	0.52	13,251	180.73	112,104	30	0.05	10,381	15.67	197,333	42	0.94	14,540	322.56	498,067	282	96,952	

Historical & Forecast Population & Aviation Activity - Sacramento County

Year	Citrus Heights					Folsom					Sacramento					Unincorporated Sacramento Co.					Total Sacramento County			
	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Population	Based AC	Total Ops	
1970	-	-	-	-	-	5,810	-	-	-	-	257,105	-	-	-	-	367,349	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	9,125	-	-	-	-	262,700	-	-	-	-	410,300	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	11,003	-	-	-	-	275,741	-	-	-	-	490,209	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	15,600	-	-	-	-	319,700	-	-	-	-	537,800	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	29,600	-	-	-	-	366,500	-	-	-	-	625,785	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	39,800	-	-	-	-	384,300	-	-	-	-	675,370	-	-	-	-	-	-	-	-
2000	85,400	-	-	-	-	51,300	-	-	-	-	411,200	-	-	-	-	662,410	-	-	-	-	-	-	-	-
2005	86,744	11	-	3,789	-	67,325	3	-	1,033	-	448,648	11	-	3,789	-	540,521	18	-	6,199	-	1,143,238	43	14,810	
2010	89,177	11	0.06	3,895	21.25	70,372	3	0.03	1,080	9.35	473,218	12	0.12	3,996	41.50	564,736	19	0.16	6,477	55.55	1,197,503	45	15,448	
2015	90,573	11	0.04	3,956	12.19	72,778	3	0.02	1,117	7.38	493,034	12	0.10	4,163	33.47	583,772	19	0.13	6,695	43.67	1,240,157	46	15,932	
2020	92,027	12	0.04	4,019	12.70	75,425	3	0.02	1,158	8.12	517,035	13	0.12	4,366	40.53	604,702	20	0.14	6,936	48.01	1,289,189	48	16,478	
2025	92,755	12	0.02	4,051	6.36	77,695	3	0.02	1,192	6.97	538,303	13	0.10	4,546	35.92	622,564	21	0.12	7,140	40.97	1,331,317	49	16,930	
2030	93,483	12	0.02	4,083	6.36	79,965	4	0.02	1,227	6.97	559,571	14	0.10	4,725	35.92	640,426	21	0.12	7,345	40.97	1,373,445	50	17,381	

Average Based AC growth Rate (w/o Lincoln) (planes/yr.)	0.23
Average Total Operations growth Rate (w/o Lincoln) (ops/yr)	78.01

Historical & Forecast Population & Aviation Activity - Other Areas

Year	Based AC	Total Ops
2005	34	11,710
2010	35	12,100
2015	36	12,490
2020	37	12,880
2025	39	13,270
2030	40	13,660

Notes:  
 = Estimated  
**Bold** = Future Projection  
 Prior to 1984 the population of Loomis is included in unincorporated Placer County  
 Prior to 1997 the population of Citrus Heights is included in unincorporated Sacramento County  
 Prior to 2003 the population of Rancho Cordova is included in unincorporated Sacramento County

Sources:  
 Sacramento Council of Governments (sacog)  
 Ca Department of Finance (DOF)  
 City of Lincoln Data  
 Lincoln Regional Airport Records  
 Federal Aviation Administration (FAA)

Base Historical Data		
Aircraft Based at Lincoln 2006	(airport)	213
Annual Operations at Lincoln 2003	(FAA)	73,360

Table 3-5  
Historical & Forecast Employment & Aviation Activity by City  
For Lincoln Regional Airport

Formulation of Ratios for Projections											
County Area	Placer										Others
	Auburn	Lincoln	Loomis	Rocklin	Roseville	Unincorporated	Citrus Heights	Folsom	Sacramento	Unincorporated	
2005 Jobs	13,417	7,207	4,423	15,003	66,250	50,221	22,314	31,654	293,218	225,261	-
# Based AC (2005)	5	6	6	26	28	21	11	3	11	18	34
% of Total Based AC (2005)	2.35	23.47	2.82	12.21	13.15	9.86	5.16	1.41	5.16	8.45	15.96
Annual Operations (2005) (based on % Total Based AC)	1,722	17,221	2,066	8,955	9,644	7,233	3,789	1,033	3,789	6,199	11,710
Ratio: Jobs / Based AC	2,683.40	144.14	737.17	577.04	2,366.07	2,391.48	2,028.55	10,551.33	26,656.18	12,514.50	-
Ratio: Jobs / Annual Operations	7.79	0.42	2.14	1.68	6.67	6.94	5.89	30.64	77.40	38.34	-

Historical & Forecast Employment & Aviation Activity - Placer County

Year	Auburn					Lincoln					Loomis					Rocklin					Roseville					Unincorporated Placer County					Total Placer County		
	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Total Ops
1970	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	3,973	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	4,293	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	4,612	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	13,417	5	-	1,722	-	7,207	50	-	17,221	-	4,423	6	-	2,066	-	15,003	26	-	8,955	-	66,250	28	-	9,644	-	50,221	21	-	7,233	-	156,521	136	46,840
2010	14,661	5	0.09	1,882	31.93	9,802	68	3.60	23,421	1,240.12	4,851	7	0.12	2,266	39.99	17,349	30	0.81	10,355	280.05	80,211	34	1.18	11,676	406.44	54,127	23	0.33	7,795	112.51	181,001	167	57,395
2015	15,133	6	0.04	1,942	12.12	12,764	89	4.11	30,499	1,415.50	4,960	7	0.03	2,317	10.19	19,042	33	0.59	11,365	202.10	91,013	38	0.91	13,248	314.47	55,006	23	0.07	7,922	25.32	197,918	195	67,294
2020	15,579	6	0.03	2,000	11.45	15,726	109	4.11	37,576	1,415.50	5,025	7	0.02	2,348	6.07	20,833	36	0.62	12,434	213.80	102,880	43	1.00	14,976	345.48	55,757	23	0.06	8,030	21.63	215,800	225	77,364
2025	15,915	6	0.03	2,043	8.63	17,463	121	2.41	41,727	830.09	5,040	7	0.00	2,355	1.40	22,548	39	0.59	13,458	204.72	114,659	48	1.00	16,890	342.92	56,037	23	0.02	8,070	8.06	231,662	245	84,343
2030	16,251	6	0.03	2,086	8.63	19,200	133	2.41	45,877	830.09	5,055	7	0.00	2,362	1.40	24,263	42	0.59	14,482	204.72	126,438	53	1.00	18,405	342.92	56,317	24	0.02	8,111	8.06	247,524	265	91,322

Historical & Forecast Employment & Aviation Activity - Sacramento County

Year	Citrus Heights					Folsom					Sacramento					Unincorporated Sacramento Co.					Total Sacramento County			
	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Based Ac Growth Rate (planes/yr)	Total Ops	Ops Growth Rate (ops/yr)	Jobs	Based AC	Total Ops	
1970	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	22,314	11	-	3,789	-	31,654	3	-	1,033	-	293,218	11	-	3,789	-	225,261	18	-	6,199	-	572,447	43	-	14,810
2010	23,192	11	0.09	3,938	29.81	34,981	3	0.06	1,142	21.72	333,034	12	0.30	4,303	102.89	235,388	19	0.16	6,478	55.74	626,595	46	0.33	15,861
2015	22,818	11	-0.04	3,874	-12.70	36,453	3	0.03	1,190	9.61	356,983	13	0.18	4,612	61.89	231,365	18	-0.06	6,367	-22.14	647,619	47	0.06	16,044
2020	22,281	11	-0.05	3,783	-18.23	38,011	4	0.03	1,241	10.17	381,945	14	0.19	4,935	64.50	225,211	18	-0.10	6,198	-33.87	667,448	47	0.06	16,157
2025	21,568	11	-0.07	3,662	-24.21	39,015	4	0.02	1,274	6.55	405,943	15	0.18	5,245	62.01	216,077	17	-0.15	5,947	-50.28	682,603	47	0.06	16,127
2030	20,855	10	-0.07	3,541	-24.21	40,019	4	0.02	1,306	6.55	429,941	16	0.18	5,555	62.01	206,943	17	-0.15	5,695	-50.28	697,758	47	0.06	16,098

Average Based AC growth Rate Lincoln) (planes/yr.) (w/o Lincoln)	0.23
Average Total Operations growth Rate (w/o Lincoln) (ops/yr)	79.52

Historical & Forecast Employment & Aviation Activity - Other Areas

Year	Based AC	Total Ops
2005	34	11,710
2010	35	12,108
2015	36	12,505
2020	37	12,903
2025	39	13,300
2030	40	13,698

Notes:  
Bold = Future Projection

Sources:  
Sacramento Council of Governments (sacog)  
Ca Department of Finance (DOF)  
City of Lincoln Data  
Lincoln Regional Airport Records  
Federal Aviation Administration (FAA)

Table 3-6  
Summary of Historical & Forecast Aviation Activity  
Lincoln Regional Airport

Year	Based Aircraft										Total Annual Operations					
	Historical 15-20	FAA (TAF)	FAA (1.4% growth)	CASP	2004 Master Plan (Mead & Hunt)	% Market Share	Brandley Pop. Forecast	Brandley Job. Forecast	Historical	FAA (TAF)	FAA (1.4% growth)	CASP	2004 Master Plan (Mead & Hunt)	Brandley Pop. Forecast	Brandley Job. Forecast	
1976	-	-	-	-	-	-	-	15,500	15,500	-	-	-	-	-	-	
1977	-	-	-	-	-	-	-	-	15,500	-	-	-	-	-	-	
1978	-	-	-	-	-	-	-	-	15,500	-	-	-	-	-	-	
1979	-	-	-	-	-	-	-	-	16,250	-	-	-	-	-	-	
1980	94	94	-	-	-	-	-	16,600	16,000	-	-	-	-	-	-	
1981	-	103	-	-	-	-	-	-	16,000	-	-	-	-	-	-	
1982	-	110	-	-	-	-	-	-	39,002	-	-	-	-	-	-	
1983	-	137	-	-	-	-	-	-	50,000	-	-	-	-	-	-	
1984	-	137	-	-	-	-	-	-	50,000	-	-	-	-	-	-	
1985	137	137	-	-	-	-	-	50,000	50,000	-	-	-	-	-	-	
1986	-	172	-	-	-	-	-	-	50,000	-	-	-	-	-	-	
1987	-	225	-	-	-	-	-	-	71,000	-	-	-	-	-	-	
1988	-	219	-	-	-	-	-	-	71,882	-	-	-	-	-	-	
1989	-	225	-	-	-	-	-	-	71,000	-	-	-	-	-	-	
1990	225	225	-	-	-	-	-	71,000	71,000	-	-	-	-	-	-	
1991	-	225	-	-	-	-	-	-	71,000	-	-	-	-	-	-	
1992	-	225	-	-	-	-	-	-	71,000	-	-	-	-	-	-	
1993	-	225	-	-	-	-	-	-	71,000	-	-	-	-	-	-	
1994	-	207	-	-	-	-	-	-	71,000	-	-	-	-	-	-	
1995	207	207	-	207	-	-	-	71,000	71,000	-	68,000	-	-	-	-	
1996	-	207	-	-	-	-	-	-	71,000	-	-	-	-	-	-	
1997	-	207	-	-	-	-	-	-	71,645	-	-	-	-	-	-	
1998	-	207	-	-	-	-	-	-	72,154	-	-	-	-	-	-	
1999	-	207	-	-	-	-	-	-	72,674	-	-	-	-	-	-	
2000	207	207	-	248	-	-	-	73,194	73,194	-	81,468	-	-	-	-	
2001	-	207	-	-	-	-	-	-	72,312	-	-	-	70,360	-	-	
2002	-	207	-	-	198	-	-	-	72,836	-	-	-	-	-	-	
2003	-	208	-	-	-	-	-	-	73,360	-	-	-	-	-	-	
2004	-	207	-	-	-	-	-	-	73,882	-	-	-	-	-	-	
2005	-	207	207	292	-	-	213	74,406	74,406	74,406	95,923	-	-	73,360	73,360	
2006	213	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2007	231	-	-	-	-	-	-	71,000	-	-	-	-	-	-	-	
2008	-	212	216	-	229	217	-	-	75,909	77,575	-	87,020	-	-	-	
2010	-	214	222	331	-	221	260	-	76,928	79,762	108,734	-	89,494	85,364	-	
2013	-	218	231	-	258	227	-	-	78,483	83,159	-	103,200	-	-	-	
2015	-	229	238	366	-	230	287	-	79,538	85,504	120,232	-	100,000	98,000	-	
2020	-	229	255	398	-	240	325	-	82,242	91,659	130,774	-	113,000	110,000	-	
2023	-	235	266	-	318	-	-	-	83,910	95,563	-	133,560	-	-	-	
2025	-	237	273	-	-	-	362	-	85,044	98,258	-	-	125,000	120,000	-	
2030	-	-	293	-	-	-	398	-	-	105,331	-	-	-	138,000	132,000	

**Bold** = Future Projection

Sources:  
Sacramento Council of Governments (sacog)  
City of Lincoln Data  
Lincoln Regional Airport Records  
Federal Aviation Administration (FAA)  
Ca. Aviation System Plan (CASP)

Table 3-7			
Historical & Forecast Based Aircraft by Market Share			
For Lincoln Regional Airport			
Year	Based Aircraft		Market Share (%)
	Western Pacific Region	Lincoln Regional Airport	
1997	36,418	-	-
1998	36,396	-	-
1999	36,610	-	-
2000	37,223	-	-
2001	36,700	-	-
<b>2002</b>	<b>36,747</b>	<b>-</b>	<b>-</b>
<b>2003</b>	<b>37,058</b>	<b>-</b>	<b>-</b>
<b>2004</b>	<b>36,905</b>	<b>-</b>	<b>-</b>
<b>2005</b>	<b>37,920</b>	<b>-</b>	<b>-</b>
<b>2006</b>	<b>38,193</b>	<b>213</b>	<b>0.56</b>
<b>2007</b>	<b>38,489</b>	<b>216</b>	<b>0.56</b>
<b>2008</b>	<b>38,809</b>	<b>217</b>	<b>0.56</b>
<b>2009</b>	<b>39,117</b>	<b>219</b>	<b>0.56</b>
<b>2010</b>	<b>39,440</b>	<b>221</b>	<b>0.56</b>
<b>2011</b>	<b>39,753</b>	<b>223</b>	<b>0.56</b>
<b>2012</b>	<b>40,124</b>	<b>225</b>	<b>0.56</b>
<b>2013</b>	<b>40,448</b>	<b>227</b>	<b>0.56</b>
<b>2014</b>	<b>40,780</b>	<b>228</b>	<b>0.56</b>
<b>2015</b>	<b>41,133</b>	<b>230</b>	<b>0.56</b>
<b>2016</b>	<b>41,497</b>	<b>232</b>	<b>0.56</b>
<b>2017</b>	<b>41,852</b>	<b>234</b>	<b>0.56</b>
<b>2018</b>	<b>42,210</b>	<b>236</b>	<b>0.56</b>
<b>2019</b>	<b>42,583</b>	<b>238</b>	<b>0.56</b>
<b>2020</b>	<b>42,944</b>	<b>240</b>	<b>0.56</b>
<b>2021</b>	<b>43,317</b>	<b>243</b>	<b>0.56</b>
<b>2022</b>	<b>43,708</b>	<b>245</b>	<b>0.56</b>
<b>2023</b>	<b>44,114</b>	<b>247</b>	<b>0.56</b>
<b>2024</b>	<b>44,515</b>	<b>249</b>	<b>0.56</b>
<b>2025</b>	<b>44,919</b>	<b>252</b>	<b>0.56</b>

**Bold** = Future Projection

Source: FAA Terminal Area Forecast

The data also include the following information:

- Total based aircraft
- Annual aircraft operations including itinerant, local and total

Population data are available from 1976 through 2004 and forecast data for population, employment, based aircraft, and aircraft operations are available through 2025 in most

cases and up to 2050 for the total City and County population. Operations data are available and included from both the F.A.A. Terminal Area Forecast (TAF) System (<http://www.apo.data.faa.gov/main/taf.asp>) and the California Aviation System Plan. Population data were obtained from the U.S. Census Bureau, the California Department of Finance, the Sacramento Area Council of Governments (SACOG), and the City of Lincoln. The total based aircraft listed are obtained from two different sources; namely, the F.A.A. TAF and the California Aviation System Plan.

The population forecasts show a very rapid growth for the City of Lincoln, beginning in the year 2000, with a corresponding rapid growth for the unincorporated Placer County area. The rapid growth of Roseville and Rocklin occurred between 1990 and 2005. Sacramento City and County growth is forecast to be modest.

The historical data and the forecasts have been presented graphically as follows:

Figure No. 3-1 – Historical and Forecast Population Trends – Placer County California

Figure No. 3-2 – Historical and Forecast Population Trends – Sacramento County, California

Figure No. 3-3 – Historical and Forecast Employment Trends – Placer County, California

Figure No. 3-4 – Historical and Forecast Employment Trends – Sacramento County, California

Figure No. 3-5 – Historical and Forecast Based Aircraft Trends – Lincoln Regional Airport, Lincoln, California

Figure No. 3-6 – Historical and Forecast Annual Operations Trends – Lincoln Regional Airport, Lincoln, California

The based aircraft forecasts and operations forecasts varied significantly between the F.A.A. and the California Aviation System Plan. The F.A.A. forecasts show minor growth at the airport, which matches the forecast growth nationwide. However, with the explosive growth of population and employment in Placer County and the City of Lincoln, these forecasts are considered to be extremely conservative. F.A.A. has recently allowed use of an annual growth rate of 1.4 percent. This compound growth rate of 1.4 percent is shown on Figures 3-5 and 3-6 and is still fairly low.

The California Aviation System Plan (CASP) forecasts are higher than all other forecasts and appear to be based on a compounded growth rate beginning in 1995; whereas, all other forecast growth began in the year 2005. The CASP forecast line basically parallels the other forecast lines. The growth of based aircraft and operations at Lincoln Regional Airport from 1995 to 2005 did not match the CASP forecasts. Long-term trends of based aircraft and operations at an airport vary somewhat throughout the years but the trend is generally fairly uniform. If this holds true for Lincoln Regional

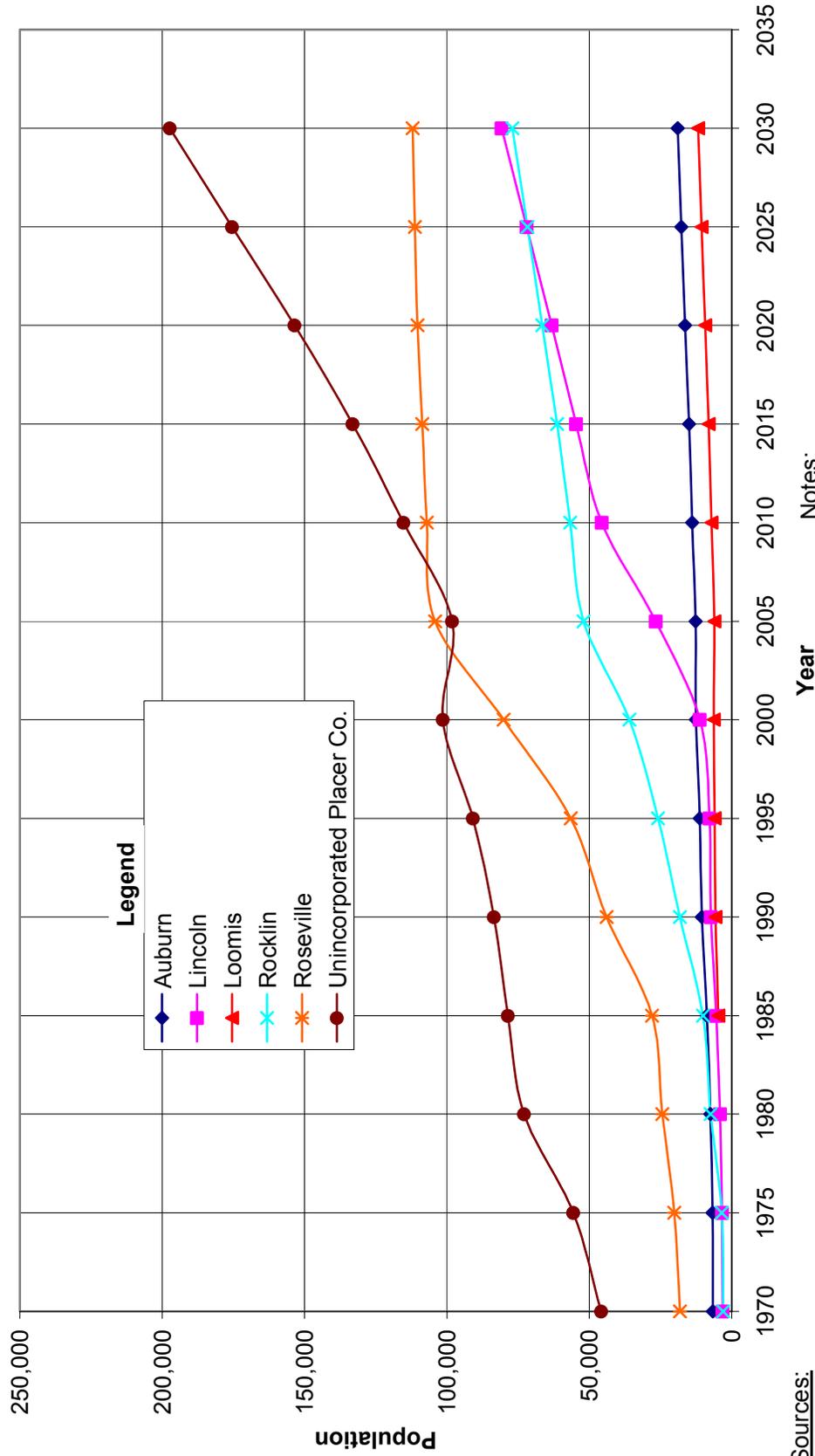
Airport, then the time period between 1988 and 2005 would represent a downtrend and the CASP forecasts could be realized during the forecast period through 2030.

As an alternative to the CASP forecasts, the forecasts designated as “Brandley Forecasts From Population” and “Brandley Forecasts From Employment” are considered to be realistic for this airport, and it is recommended that they be used for development of the airport facilities. The Mead & Hunt forecasts developed in 2004 are also shown on these Figures and indicate a slightly lower forecast for based aircraft and somewhat higher for aircraft operations. The Brandley forecasts are based on the historical relationship between population, employment, and based aircraft or operations of the total air trade area, which includes the City of Lincoln, the southwestern portion of Placer County, and some of the northern portion of Sacramento County and are, therefore, considered to be realistic for this particular airport.

With the introduction of the Very Light Jet, the increase in business jet travel brought on by the fractional ownership of jet aircraft and the possible introduction of Air Taxi Service, the Brandley Forecasts are probably conservative. The development of corporate hangars at general aviation airports near large centers of population and commerce attracts business jet aircraft to base at these general aviation airports, which significantly increases the aviation activity. This type of growth has recently occurred in Visalia and Madera, California, where business jet operators have moved their aircraft from Fresno.

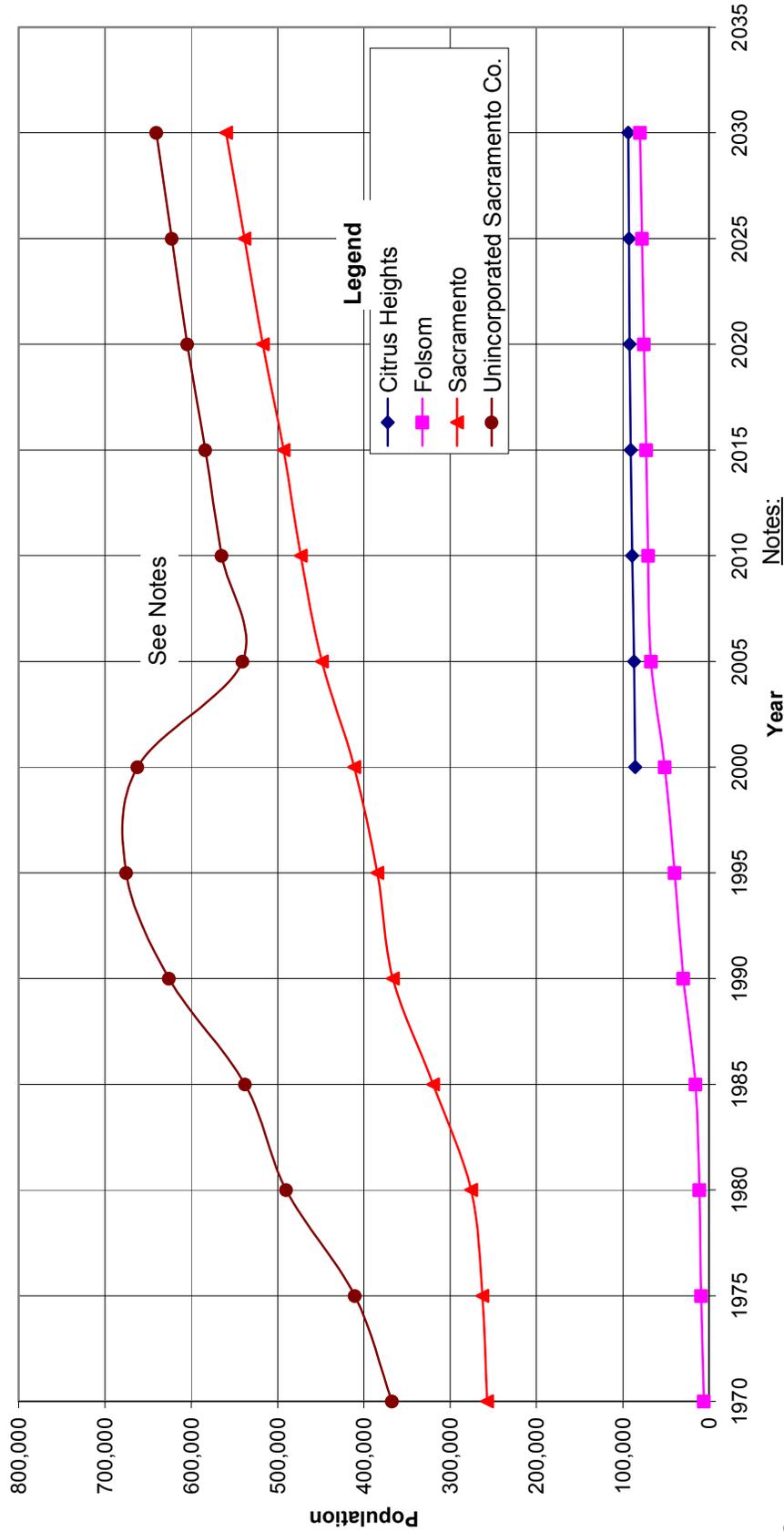
It is recommended that the Brandley forecasts for based aircraft and operations be used for the development of the updated Airport Layout Plan for the Lincoln Regional Airport. It is further recommended that land be preserved for 100 percent future aviation growth and that all other excess airport property be designated as non-aviation and that this land be considered eligible for release from F.A.A. jurisdiction.

**Figure 3-1  
Historical & Forecast Population Trends  
Placer County, CA**



**Sources:**  
Sacramento Area Council of Governments (sacog)  
Ca. Department of Finance (DOF)  
City of Lincoln Data

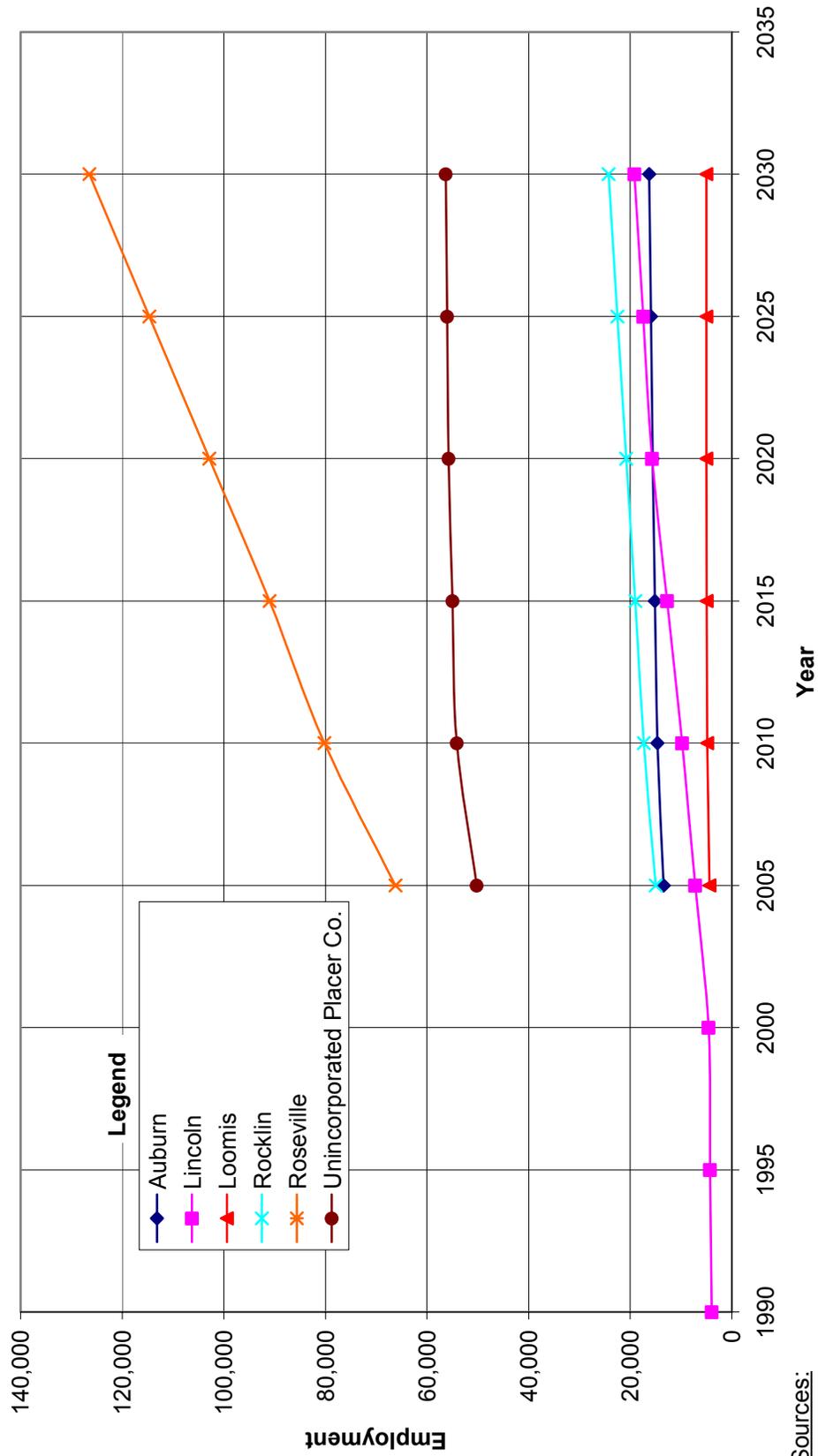
**Figure 3-2**  
**Historical & Forecast Population Trends**  
**Sacramento County, CA**



**Notes:**  
 1. Prior to 1997 the population of Citrus Heights is included in unincorporated Sacramento County  
 2. Prior to 2003 the population of Rancho Cordova is included in unincorporated Sacramento County

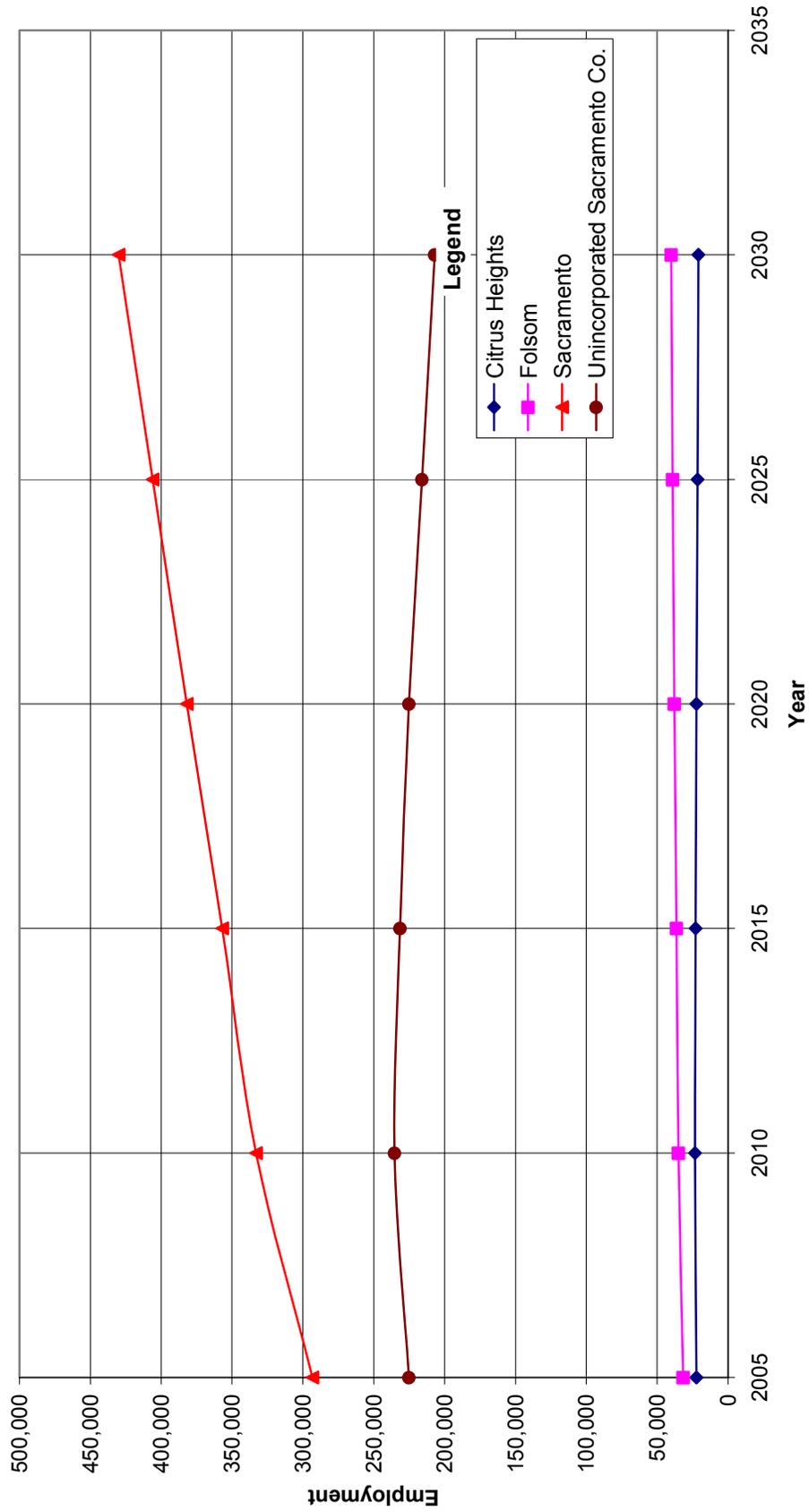
**Sources:**  
 Sacramento Area Council of Governments (sacog)  
 Ca. Department of Finance (DOF)  
 City of Lincoln Data

**Figure 3-3  
Historical & Forecast Employment Trends  
Placer County, CA**



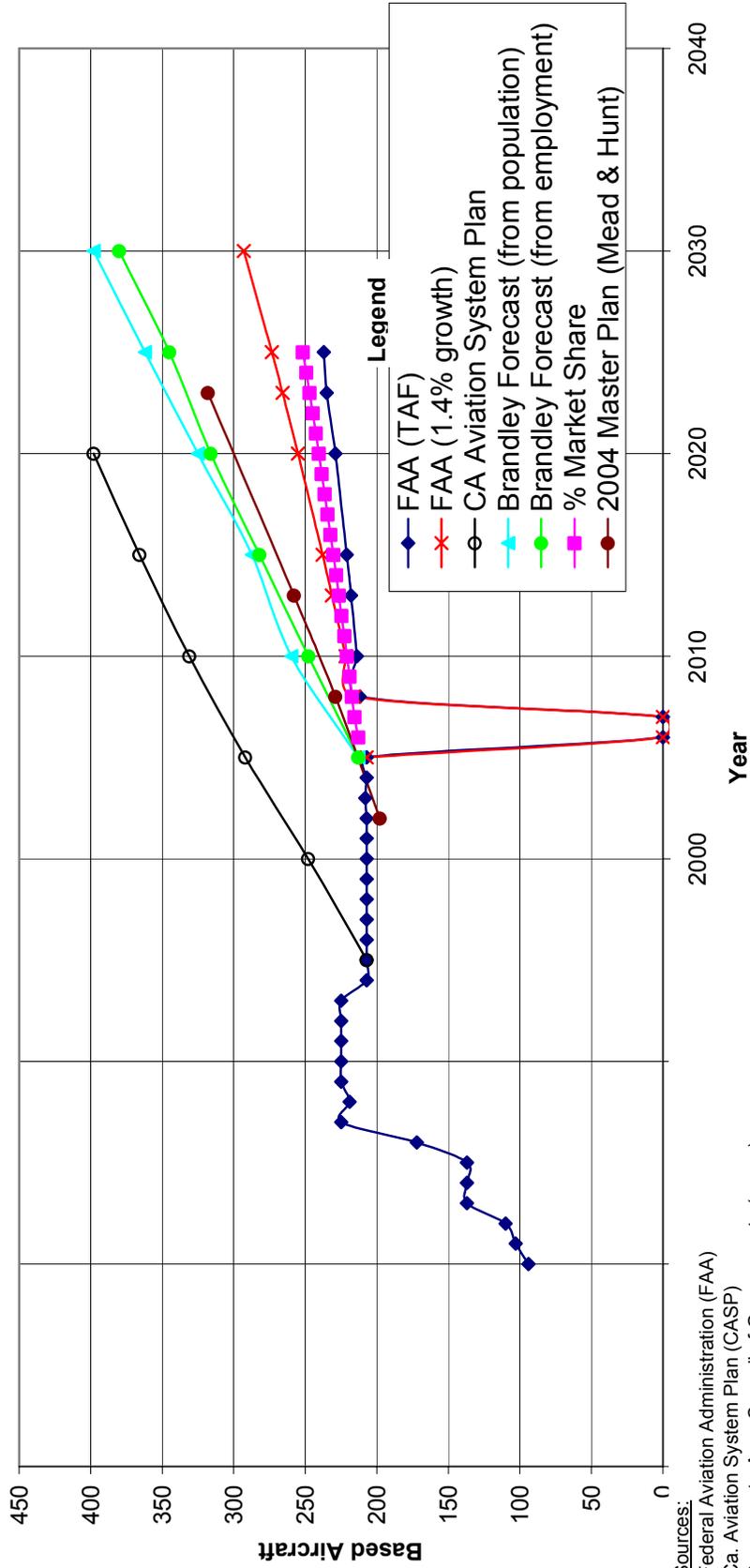
Sources:  
Sacramento Area Council of Governments (sacog)  
City of Lincoln Data

**Figure 3-4**  
**Historical & Forecast Employment Trends**  
**Sacramento County, CA**



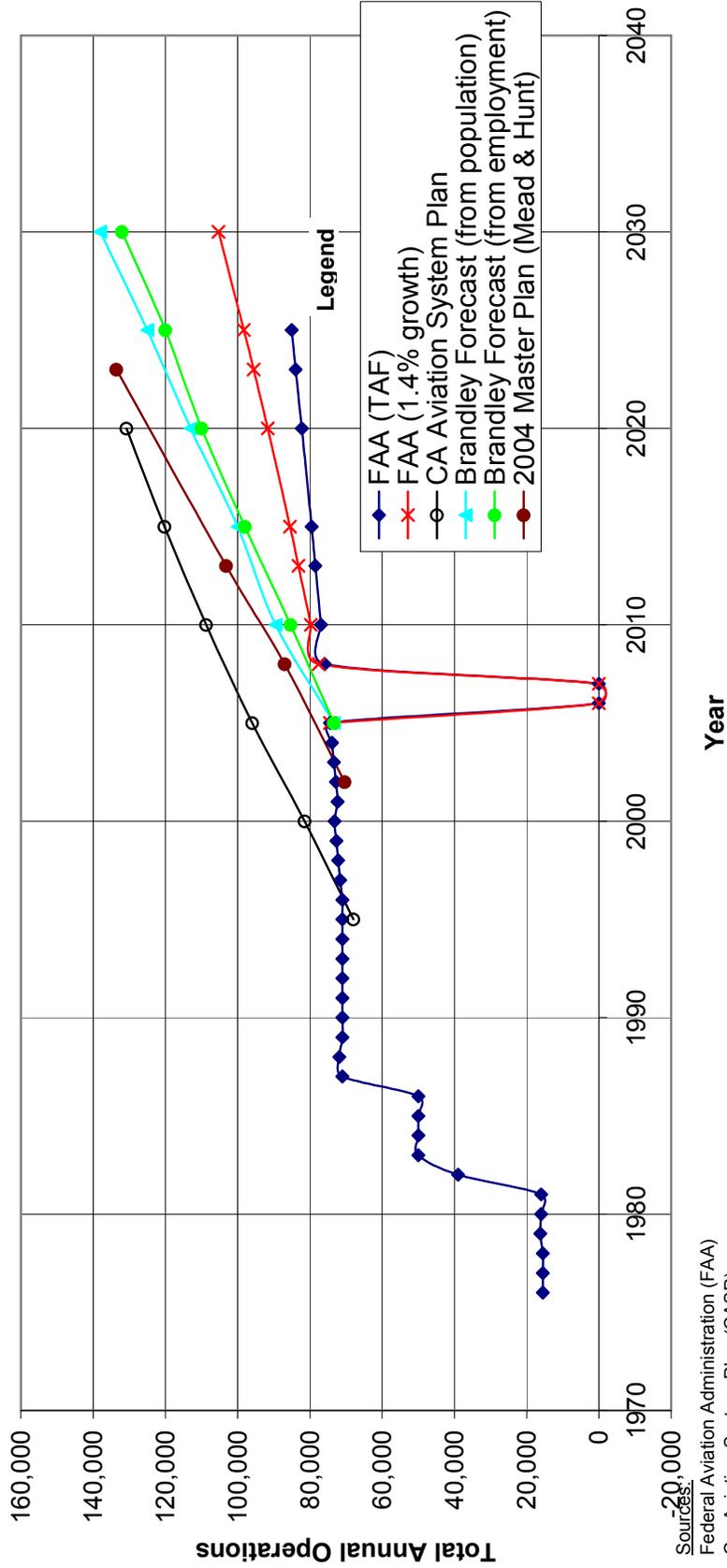
Sources:  
 Sacramento Area Council of Governments (sacog)  
 City of Lincoln Data

**Figure 3-5  
Historical & Forecast Based Aircraft Trends  
Lincoln Regional Airport, Lincoln, Ca.**



Sources:  
 Federal Aviation Administration (FAA)  
 Ca. Aviation System Plan (CASP)  
 Sacramento Area Council of Governments (sacog)  
 City of Lincoln Data  
 Lincoln Regional Airport Records

**Figure 3-6**  
**Historical & Forecast Annual Operations Trends**  
**Lincoln Regional Airport, Lincoln, Ca**



Sources:  
 Federal Aviation Administration (FAA)  
 Ca. Aviation System Plan (CASP)  
 Sacramento Area Council of Governments (sacog)  
 City of Lincoln Data  
 Lincoln Regional Airport Records

### 3-2 Projected Fleet Mix

The fleet mix at this airport in the 2002/2003 timeframe, which is still valid today, indicates 88 percent single engine aircraft, 8 percent multi-engine, 6 percent jet, and 1 percent helicopter. With the increase in jet traffic and multi-engine aircraft operations, it is expected that these percentages will change showing a decrease in single-engine aircraft operations and a significant increase in multi-engine and jet aircraft operations. F.A.A. projections of nationwide trends also indicate significant decrease in single engine operations and increase in multi-engine and jet operations. It is reasonable to assume that at the end of the forecast period (2030) the based aircraft fleet mix will be 76 percent single-engine, 15 percent multi-engine, 8 percent jet, and 1 percent helicopter.

Currently the based jet aircraft are of the smaller Cessna Citation class, but aircraft of the Gulfstream V and Global Express classes frequently utilize the airport. It is anticipated that future operations of the larger jet aircraft will expand, and there will be significant use by the Very Light Jet (VLJ).

### 3-3 Critical Aircraft

The critical or design aircraft is considered to be the most demanding aircraft that operate on the airport on a regular basis. F.A.A. considers a minimum of 500 operations annually of a class of aircraft as the minimum requirement for designation of that aircraft as the critical aircraft. The design aircraft at this time is the Cessna Citation VII and is expected to be the G V within the forecast period. The F.A.A. has established airport design standards based on Airport Reference Code (ARC). The ARC includes two components: aircraft approach category and airplane design group. The airport approach category represents operational approach speed characteristics of the critical aircraft. The airplane design group is based on wing span of the critical aircraft. The approach category is denoted by letter, and the airplane design group is denoted by Roman numeral. Lincoln Regional Airport is currently designated as an ARC C III, which will accommodate forecast traffic, including the Gulfstream GV.

### 3-4 Projected Peak Demand Characteristics

Projections of peak demand characteristics for aircraft operations at the airport are important to estimate delays an aircraft may experience at the airport and to determine the timing for improvements at the airport to increase capacity. Typically the peak hour operation levels are the critical feature for design purposes. The peaking characteristics are generally developed using the following methodology:

Annual Operation Data is converted to peak month activity by taking 10 percent of the annual operations as representing the peak month.

The average day of the peak month is determined by dividing the peak month by 30

The peak hour percentage is typically estimated as 12 to 20 percent of the peak day operations

Using this methodology, peak hour operations at the airport currently are 35 and in 2027 will be 70.

### **3-5 Summary of Aviation Forecasts**

Forecasts prepared have been limited to short-term, medium-term, and long-term and extend out to 20 years. The airport is expected to have a life much longer than 20 years, and it is prudent to provide space on the airport for significant increases in based aircraft and operations. It is considered prudent to reserve space on the airport to accommodate double the number of based aircraft and operations as forecast in the 20-year period, which for the Lincoln Regional Airport would require space for up to 800 based aircraft and 280,000 annual operations. The land should be reserved to accommodate this type of growth. In 20 to 30 years new projections should be made and if the anticipated potential growth is not occurring, then some of the land reserved for airport development could be released for other airport-compatible uses.

Lincoln Regional Airport has sufficient land area and facilities to accommodate double the 20-year forecast based aircraft and annual operations and still have significant area of land not needed for potential aviation uses. This excess land can be used for airport-compatible non-aviation development. Income from these uses will make the airport a financial self-sustaining operation, including the ability to fund Airport's share of facilities and capital improvements.

## CHAPTER 4. DEMAND CAPACITY ANALYSIS AND FACILITY REQUIREMENTS

### 4-1 Design Standards

F.A.A. Advisory Circular 150/5300-13 entitled, *Airport Design*, sets forth recommended runway and taxiway design standards for all reference code airports. The design standards for the current and future airport facilities are set forth in Table 4-1. Included on this table are the existing conditions, the proposed Runway 15-33 extension, and the proposed parallel light aircraft runway. Also included are the existing conditions and the dimensions that will be in effect if the recommended expansion of the airport occurs. It will be noted that the existing and future facilities meet all F.A.A. criteria except for the width of the taxiways.

**TABLE 4-1 - AIRPORT DESIGN STANDARDS - AIRPORT REFERENCE CODE C III AIRPORT**

Item	Runway 15R-33L				Runway 15L-33R	
	Existing (15-33)		Future (15R-33L)		Future	
	Lincoln Regional Airport	F.A.A. Standard	Lincoln Regional Airport	F.A.A. Standard	Lincoln Regional Airport	F.A.A. Standard
Approach Category and Design Group	C III	C III	C III	C III	B I	B I
Runway Width (foot)	100	100	100	100	75	60
Percentage Effective Gradient	0.0017	2% Max.	0.0017	2% Max.	0.0014	2% Max.
Runway Blast Pad Length (foot)	N/A	200	200	200	100	100
Runway Blast Pad Width (foot)	N/A	140	140	140	80	80
Runway Safety Area Width (foot)	500	500	500	500	120	120
Runway Safety Area - Distance Beyond Runway End (foot)	1,000	1,000	1,000	1,000	240	240
Runway Object Free Area Width (foot)	800	800	800	800	400	400
Runway Object Free Area - Distance Beyond Runway End (foot)	1,000	1,000	1,000	1,000	240	240
Runway Obstacle Free Zone Width (foot)	400	400	400	400	250	250
Runway Obstacle Free Zone - Distance Beyond Runway End (foot)	200	200	200	200	200	200
Runway Centerline to Taxiway Centerline Distance (foot)	900	400	400-900	400	200	225
Runway Centerline to Fixed or Moveable Object (foot)	1,088	500	1,088 East Side 500 West Side	500	200	200
Taxiway Width (foot)	40	50	50	50	50	25
Taxiway Safety Area Width (foot)	118	118	118	118	49	49
Taxiway Object Free Area Width (foot)	186	186	186	186	89	89
Taxiway Centerline to Fixed or Moveable Object (foot)	121	93	121	93	44.5	44.5

## 4-2 Airfield Capacity

F.A.A. Advisory Circular 150/5060-5, *Airport Capacity and Delay*, contains guidelines for determining airfield capacity and delays. The Annual Service Volume (ASV) is a reasonable estimate of the maximum annual capacity of the airfield facilities. The existing Lincoln Regional Airport with a single runway has an ASV of approximately 230,000 annual operations. In 2005 the total annual operations were 74,406, which is 32 percent of the ASV. By 2030 the forecast annual operations are 138,000, which is 60 percent of the ASV. It is expected that the annual demand-to-ASV ratio would increase to 80 percent in 2035 to 2040. F.A.A. recommends that when the annual demand-ASV ratio approaches 60 percent, planning should be underway for increasing the capacity of the facility and that by the time it reaches 80 percent the work should be accomplished to increase the capacity and thus decrease delays.

The capacity increase at this airport would be obtained by the construction of a parallel runway. The planning for this parallel runway should be started before 2030 with construction completed in the 2035 range. It is recommended that the parallel runway be constructed as a general aviation runway serving small aircraft so as to relieve the main runway for the larger aircraft operations. The parallel runway is recommended to be located between Taxiway A and existing Runway 15-33 with a runway centerline spacing of 700 feet to allow simultaneous VFR operations. The original 1976 Master Plan provided the necessary spacing between Runway 15-33 and Taxiway A to allow the construction of this runway. With 700-foot spacing between runways, simultaneous IFR operations on both runways are not allowed at this time. The IFR capacity is less than the VFR capacity because of spacing requirements. During IFR weather conditions, many aircraft are grounded and the capacity of the single runway will accommodate the anticipated IFR traffic. It is recommended that the runway be constructed between Taxiway F and Taxiway J, which would allow the development of a 3,350-foot long runway. The short runway should be an ARC B I category and be 75 feet wide by 3,350 feet long. No additional land will need to be acquired for the construction and operation of the proposed new parallel runway.

## 4-3 Runway Length

F.A.A. Advisory Circular 5325-4B, *Runway Length Requirements for Airport Design*, provides generalized plans for runway length requirements. For the Lincoln Regional Airport – with an airport elevation of 118 feet MSL, average maximum average temperature of hottest month of 97 degrees, 0 wind, and 0 runway gradient – the runway length requirement for large airplanes of 60,000 pounds or less is 7,300 feet for 75 percent of the fleet at 90 percent useful load and 9,200 feet for 100 percent of the fleet at 90 percent useful load. The design aircraft for future use at this airport are the business jets such as Citation X, Hawker Horizon, Gulfstream V and Global Express. Mead & Hunt calculated aircraft specific runway length requirements for these aircraft on the hottest days. The results of this analysis have been included in Table No. 4-2.

Table 3-4

TABLE 4-2 – RUNWAY LENGTH REQUIREMENTS

Runway Length Requirements			
Aircraft	Type	Max Take-Off Weight (pounds)	Required Runway Length (ft) <sup>1/</sup>
Citation X	Jet	35,700	6,863
Hawker Horizon	Jet	36,000	6,310
Gulfstream V	Jet	90,900	7,344
Global Express	Jet	95,250	6,995

Notes: Runway length requirements are based on the following assumptions:

- Airport elevation of 118 feet MSL
- Average maximum temperature of hot day = 97°.
- Zero wind
- Zero runway gradient

<sup>1/</sup> Required runway lengths are based on 100% of maximum take-off weight.

Sources: Aviation Week & Space Technology, Aerospace Source Book, 2003

Boeing Commercial Airplane Group Airport Planning Manuals—B737-600/ -700/ -800/ -900

Citation X Planning and Performance Manual

Source: Mead & Hunt, Inc., Lincoln Regional Airport Master Plan, October 2004, Table 3-4.

It will be noted that all of these aircraft required runway lengths in excess of 6,000 feet, and only the Gulfstream V required runway lengths greater than 7,000 feet. If the existing runway at Lincoln Regional Airport is extended to 7,000 feet it would adequately serve all of the expected fleet at all conditions except for the very hottest day with full load. On the hottest day the G-V would be required to offload somewhat or wait until the temperature cooled before taking off. It is, therefore, recommended that provisions be made for extending Runway 15-33 by 1,000 feet to a total length of 7,001 feet.

The 3,350-foot length of the proposed parallel runway will accommodate more than 95 percent of the fleet of the small airplanes having less than 10 passenger seats at the maximum temperature of 97 degrees F., which will adequately serve as a reliever runway for the small aircraft at this airport.

#### 4-4 Pavement Strength

A Pavement Evaluation Study/Pavement Management Plan has been prepared by Reinard W. Brandley for the Lincoln Regional Airport. This study is under separate cover. The analysis shows that with existing and forecast traffic the remaining pavement life of all pavements, except the tee hangar taxilanes, is 16 to 20 years so far as subgrade failure is concerned. This analysis includes the forecast use of the G-V and Global Express type aircraft. The pavements at the airport are fairly old and have weathered significantly, and there are numerous cracks developing in the pavement due to weathering and thermal stresses. Rehabilitation of the surface pavement will be required within 6 to 10 years and the required maintenance will increase annually before

that time. After 18 to 20 years it will be necessary to provide a strengthening overlay or reconstruction of the pavements.

The existing pavements are rated to support single gear aircraft with a gross weight of 30,000 pounds or dual gear aircraft with a gross weight of 50,000 pounds. The Pavement Evaluation Study has shown that occasional use of these pavements by the heavier aircraft of the G-V and Global Express types weighing up to 90,000 pounds can be accommodated on the runway, taxiway, and that section of apron designed for the heavier aircraft without causing serious problems other than a slight decrease in the remaining life of the pavements.

It is recommended that the existing cracks on the airport pavements be sealed as early as possible. A Federally-funded project is underway in the summer of 2007 to seal the pavement cracks in the runway, taxiway and the apron. It is further recommended that this crack sealing and minor repairs of the pavement be continued as required until such time as the cost of maintenance makes further maintenance impractical. At that time it is recommended that the pavements be recycled and a thin overlay be placed. It is expected that this will occur within 6 to 10 years (2013 to 2017). In 18 to 20 years it is expected that it will be necessary to strengthen the pavements, and this will require a reconstruction of the sections.

#### **4-5 Taxiway System**

The existing taxiways adequately serve the existing runway and aprons at the Lincoln Regional Airport. When the runway is extended to 7,000 feet, it will be necessary to extend the parallel taxiway an equal distance and construct a new cross taxiway. A new aircraft holding apron will also be required on the new cross taxiway. The parallel taxiway – extended Taxiway A – required to serve the new runway extension can be located 400 feet centerline to centerline east of the runway extension without interference with the operation of the proposed new parallel runway. This taxiway location will eliminate the need to acquire additional land east of the proposed runway extension. The existing taxiway system will also serve the future parallel runway. In fact, when the original taxiway and runway system was constructed, it was anticipated that the parallel runway would be installed at the location recommended in this report, and the grades on the taxiway were set to accommodate this future runway.

The existing taxiways are 40 feet wide. For ARC C III classification F.A.A. recommends 50-foot wide taxiways. It is recommended that the critical taxiways serving the existing and proposed lengthened Runway 15-33 be widened to a width of 50 feet. It would be appropriate to include this widening at the same time as the rehabilitation of the pavement on the taxiways in the 6 to 10 year timeframe.

## 4-6 Airfield Safety Areas

Airfield safety areas are set forth in F.A.A. Advisory Circular 150/5300-13 and FAR Part 77. The Airport Design Manual defines the requirements for Runway Protection Zones (RPZ), Runway Safety Areas (RFA), and Obstacle Free Areas (OFA). FAR Part 77 defines surfaces surrounding the airport above which objects penetrating those surfaces will affect navigable airspace. These surfaces include primary surface, approach surface, transitional surface, horizontal surface, and conical surface. The Lincoln Regional Airport meets all of the design standards for the airfield safety areas as set forth in Advisory Circular 150/5300-13 and, except for a few trees and poles, there are no obstructions that penetrate the FAR Part 77 surfaces. These obstructions have been tentatively identified, and the Airport is in the process of identifying the existence and location of any obstructions and taking action to remove or trim the items so as to eliminate all obstructions.

## 4-7 Navigational Aids (NAVAIDs)

NAVAID requirements for the Lincoln Regional Airport are based on guidance contained in 150/5300-13, *Airport Design*, and F.A.A. Order 7031.2C, *Airway Planning Standards Number One-Terminal Air Navigation Facilities and Air Traffic Control Services*. NAVAIDs provide precision and non-precision guidance to a runway or to an airport. Precision NAVAIDs provide the pilot with both vertical and horizontal course guidance. Non-precision approach provides only horizontal course guidance. These facilities are used for navigation to the airport and for setting up approaches to the runway.

There are three categories of NAVAIDs used by pilots operating to and from Lincoln Regional Airport:

- Terminal Area NAVAIDs - Terminal Area NAVAIDs provide positive control to an aircraft and maintain orderly flow of air traffic within a specified area. Terminal NAVAIDs currently available to Lincoln Regional Airport include the Oakland Air Route Traffic Control Center (ARTCC) and Norcal Approach/Departure Control.
- Electrical Approach NAVAIDs – The electrical approach NAVAIDs assist the pilot in executing an instrument approach to an airport. Lincoln Regional Airport is currently equipped with a Category 1 instrument landing system on Runway 15 with current minimums for this approach at ½ mile visibility and 200 foot ceiling. The Airport also has a non-precision VOR GPS approach to Runway 15 and a GPS approach to Runway 33. It is recommended that the Airport acquire GPS with F.A.A.'s Wide Area Augmentation System (WAAS) to provide better navigation accuracy and lower minimums.

With instrument approaches to the runway it is important that the Airport protect the approach surfaces to each runway end to accommodate the type of approach that is available with the current and future NAVAIDs. The

approach surface for Runway 15 extends at a slope of 50:1, which meets F.A.A. requirements. Runway 33 is currently a non-precision runway and has an approach surface that extends at a slope of 34:1, which also meets F.A.A. requirements. These approach surfaces should be maintained clear and the Airport should maintain control of the area under these surfaces, either by ownership of the land or avigation easements on the property. When the main runway is extended 1,000 feet to the north, the 50:1 approach surface will also be extended, and it will be necessary that the City obtain additional land or easements to provide protection for the RPZ to this runway.

- Visual NAVAIDs – Visual NAVAIDs available at the Lincoln Regional Airport include:
  - ◆ Visual approach slope indicator (VASI) – Runway 15 and Runway 33
  - ◆ Medium intensity approach lighting system and runway alignment indicator lights (MALSR) – Runway 15
  - ◆ Wind cones and segmented circle and rotating beacon

These visual NAVAIDs meet all F.A.A. requirements. The VASI units are being phased out, and the existing VASIs are being removed and replaced with 4-box PAPI units in a contract that will be completed in the summer of 2007.

#### **4-8 Air Traffic Control Tower**

An Air Traffic Control Tower's primary purpose is to ensure a safe airport environment by providing sufficient separation between aircraft landing and departing. As aircraft operations increase and the mix of aircraft types varies, the need for a control tower increases. Provision should be made in the Airport Layout Plan for the installation of an Air Traffic Control Tower.

#### **4-9 General Aviation Facility Requirements**

Based aircraft are either stored in hangars or tied down in the aircraft parking apron. Transient aircraft are generally tied down on the apron, but some aircraft owners staying overnight request hangar facilities. With the increased cost and sophistication of the general aviation aircraft, most pilots will store their aircraft in hangars if available rather than tie them down on the aircraft parking apron. Of the 231 aircraft currently based at Lincoln Regional Airport, 171 to 182 are stored in hangars and the rest are tied down on the apron. There is a waiting list for new hangar storage, some of which are pilots who currently store their aircraft off site and others are pilots who have aircraft tied down on the apron. If hangars are available, it is estimated that 80 to 85 percent of the fleet will be stored in hangars and the remaining on the aircraft tie down apron.

Hangar storage facilities constructed should include tee hangars for light twin engine and single engine aircraft, box hangars for larger aircraft, and corporate hangars for the larger business jets.

In their 2004 Master Plan Mead & Hunt prepared as Table 3-6 the general aviation facility requirements table for this airport. This table is included in this report as Table 4-3. The data included in this table appears reasonable for use in evaluating the requirements for general aviation facilities, and it is recommended that planning include development of hangar and apron space to accommodate the forecast requirements.

It will be noted that there is a significant need for both tee hangars and conventional hangars and that the existing aircraft parking apron is significantly larger than will be needed. Portions of the existing aircraft parking apron could be used for the development of future hangars.

**TABLE 4-3 – GENERAL AVIATION FACILITY REQUIREMENTS**

Table 3-6  
General Aviation Facility Requirements

Facility	Existing Capacity	Requirements				
		2002/2003	2008	2013	2023	2033
<b>Based Aircraft</b>	198	218 1/	229	258	318	400
<b>T-Hangars</b>						
Aircraft Stored	142	142	152	166	203	252
Square Feet	183,700	184,600	197,600	215,150	263,250	326,950
<b>Conventional Hangars</b>						
Aircraft Stored	29-40	26	27	35	52	77
Square Feet	126,200	51,000	57,700	74,900	112,500	168,000
<b>Aircraft Parking Apron</b>						
Based Aircraft (Spaces)	230	50	50	57	64	72
Based Aircraft (Square Yards)	93,000	15,000	15,000	17,100	19,200	21,600
Transient Aircraft (Spaces)	10	24	30	43	65	86
Transient Aircraft (Square Yards)	3,600	8,491	10,878	15,480	23,373	30,800
<b>Total Apron Square Yards</b>	<b>107,600</b>	<b>23,491</b>	<b>25,878</b>	<b>32,580</b>	<b>42,573</b>	<b>52,400</b>
<b>Auto Parking (Public)</b>						
Spaces	36	54	67	79	103	135
Square Yards	1,600	2,400	2,970	3,510	4,570	5,990

Source: Mead & Hunt, Inc., 2003

Source: Mead & Hunt, Inc., Lincoln Regional Airport Master Plan, October 2004, Table 3-6.

The Airport Layout Plan provides for construction of new hangars on the east side and west side of the airport. Some of the hangars are shown to be constructed on a portion of the surplus tie down apron and others in undeveloped areas.

A summary showing a comparison of required facilities and proposed facilities on the east side of the airport for the year 2033 is presented in Table 4-4. It will be noted that there is adequate space on the east side of the airport to accommodate most of the forecast growth except for the corporate hangars. Experience at other airports indicates that there is a significant demand at an airport such as Lincoln Regional Airport for corporate hangars in the 100 foot by 100 foot hangar size if space and infrastructure are available. The Airport Layout Plan recommends reserving area on the west side of the runway for additional facility development. Space is provided for corporate hangars, tee hangars, box hangars, an FBO, a jet center, and a tie down apron. It would be advisable to concentrate the business jet activity using corporate hangars in one area away from the smaller general aviation fleet.

The development of the west side of the airport will be driven by need.

**TABLE 4-4 – GENERAL AVIATION FACILITY REQUIREMENTS AND AVAILABILITY COMPARISON  
EAST SIDE AIRPORT DEVELOPMENT FOR 2033**

Facility	Requirements in 2033	Planned Facilities in 2033
Based Aircraft	400	400
Tie Down Spaces – Transient Aircraft	86	67
Based Aircraft	72	72
Total Aircraft	158	139
Hangars - Tee Hangars	252	327
Conventional Hangars	77	70
Corporate Hangars	Varies	1
Total Hangars	329	397
Automobile Parking Spaces	135	124

#### 4-10 FBO and Administration Facilities

There are currently four FBOs located at Lincoln Regional Airport providing various aviation services. As the airport grows, there will be need for one or more full-service FBOs on the airport. There are several industrial parks developed in the Lincoln area which are served by the Lincoln Regional Airport. Business jets and larger turboprop aircraft serve these businesses. Additionally, Lincoln Regional Airport serves the industrial and corporate businesses of Placer County, Roseville, and Rocklin given that Lincoln Regional Airport is the largest air facility and has the largest jet capacity in Placer County and for its service area. With the increase of the business jet operations serving commercial/industrial facilities of the region and possible introduction of shuttle airline service or air taxi service, there will be need for the development of an arrival/departure building and of a jet center at the airport. The arrival/departure building should include administration facilities, pilots' lounge, weather information terminals, concession areas, rest rooms, etc. Consideration should be given to

including a restaurant in this facility. The jet center could consist of a large hangar adjoining the arrival/departure building, which could be used for short-term aircraft storage, aircraft maintenance, catering, and servicing facilities and/or a full service FBO.

#### **4-11 Helicopter Facilities**

The existing helicopter facilities include a helicopter landing pad and three helicopter parking spots adjacent to the helipad. This facility is located between Taxiway A and the apron. Future development of aircraft storage areas may dictate that these helicopter facilities be moved to the west side of the airport. Planning for a replacement helipad should include potential parking areas for five to six helicopters.

#### **4-12 Fuel Storage**

The Airport's fuel service facility is located on the aircraft apron near the Airport Administration Building. Jet-A and 100 Low Lead fuel are stored in 12,000-gallon underground tanks. The City of Lincoln operates the fueling service at the airport using refueler trucks and self-fueling stations. This fueling facility is located in a prime development area. The City of Lincoln plans to relocate this existing facility in the near term. When the west side area develops, consideration should be given to including fueling facilities.

#### **4-13 Airport Maintenance**

Airport maintenance is currently provided by the City of Lincoln, Lincoln Regional Airport. There are currently no facilities on the airport to store maintenance vehicles and/or equipment. The City of Lincoln plans to create a formalized airport maintenance and operations building and yard area.

#### **4-14 Utilities**

Existing utilities, including water, sewer, electrical, and communication, exist on Airport Boulevard and portions of Flightline Drive. As the west side of the airport develops, it will be necessary to extend the utilities to service the new facilities. In order to plan an orderly development of the airport, a Utility Master Plan should be prepared that shows the location and size of all required utilities, both on the east side and on the west side of the airport.

#### **4-15 Security**

Security at all airports, including general aviation airports, has become a high priority item. The Lincoln Regional Airport has a chain link and barbed wire fence around the perimeter of the improved airfield area with controlled entry on the east side of the airport. As the west side of the airport develops, sections of the fence in this area will need to be relocated and controlled access provided in this area. Future requirements may also include perimeter monitoring of the airport property.

## CHAPTER 5. MASTER PLAN DEVELOPMENT

### 5-1 General

Based on forecast needs and making the best use of existing airport land, recommendations have been made for future development of the Lincoln Regional Airport. These recommendations are presented in the Airport Layout Plan drawings, which consist of 11 sheets. The sheet titles are listed below:

Sheet 1	Title & Index
Sheet 2	Airport Layout Plan
Sheet 3	Airport Layout Plan Data Tables
Sheet 4	East Terminal Area Plan
Sheet 5	West Terminal Area Plan
Sheet 6	Airport Airspace Plan 1
Sheet 7	Airport Airspace Plan 2
Sheet 8	Inner Portion of Approach Surface Plan – Runway 15-33
Sheet 9	Inner Portion of Approach Surface Plan – Future Runway 15L-33R
Sheet 10	Off-Airport Land Use Plan
Sheet 11	Airport Property Map – Exhibit “A”

This chapter describes the proposed development of the airport.

### 5-2 Airfield Facilities

#### 5-2.1 Runways

Lincoln Regional Airport has one runway, 100 feet by 6,001 feet. It is proposed to extend this runway by 1,000 feet, providing a total length of 7,001 feet. It is impractical to extend the runway to the south because of the location of Nicolaus Road and housing developments to the south of the airport. It is, therefore, proposed to extend the runway to the north to avoid conflicts with roads and development. Consideration was given to displacing the threshold on Runway 33 to the north so as to decrease noise generation in the populated area south of Nicolaus Road and provide replacement for runway length lost by displacement of the threshold by additional extension to the north. This concept was abandoned because of potential problems with the proximity of Wise Road to the north, the cost of the development, and the inconvenience to the pilots by having the runway complex moved away from the main operating and storage areas, which would increase taxi distances and time.

A parallel runway will be required in the future to increase the capacity of the airport. This parallel runway can be designed as a reliever runway in which the small airplanes are diverted from the long runway to the new parallel runway, thus providing the additional required capacity on the long runway. A 3,350-foot long by 75-foot wide runway is proposed. In order to keep this runway centered as much as possible on the

existing and future development areas and to allow sufficient distance off the end of the runway so that aircraft can taxi on the cross taxiways without interfering with approaches to the short runway, it is recommended that the runway extend from Taxiway F to Taxiway J. In order to provide simultaneous VFR operations on the two runways, and thus realize the increased capacity, it will be necessary that the centerline spacing between the two runways be established at 700 feet. This spacing was anticipated in the original 1976 Master Plan and there will be no need to adjust any of the taxiways to accommodate this runway. The parallel runway will have an ARC B I classification.

### 5-2.2 Heliport

The existing heliport is located on the east side of the airport between Taxiway A and the apron and near the south end of the runway. This heliport is located in an area that could be used for aircraft storage, and in the future it may be appropriate to relocate this facility to the west side of the airport. A possible location for a new heliport is shown on the Airport Layout Plan.

### 5-2.3 Taxiways

The existing taxiways adequately serve the existing runway and the proposed parallel runway. When the existing runway is extended 1,000 feet to the north, it will be necessary to extend Taxiway A 1,000 feet to the north and construct a new cross taxiway. The east parallel taxiway (Taxiway A Extension) should be located 400 feet centerline to centerline distance east of Runway 15-33. A taxiway at this location does not interfere with the operation of the proposed new parallel runway, allows full uninterrupted operations on the taxiway system, and eliminates the requirement to acquire additional land. A new aircraft holding apron will be required on this taxiway. All existing taxiways are 40 feet wide. For an ARC C III category airport, the taxiways should be 50 feet wide. It is, therefore, recommended that all taxiways be widened and the new taxiways be constructed with a 50-foot width.

It is proposed to develop the west side of the airport for aircraft storage and/or non-aviation development. A new parallel taxiway to the existing and extended Runway 15-33 will be required on the west side of the airport and should be located 400 feet center to center distance from the runway. Cross taxiways should be constructed to line up with the existing cross taxiways.

### 5-2.4 General Aviation Facilities

The existing aircraft parking apron on the east side of the airport is larger than is necessary to accommodate future transient and local tied-down aircraft. It is, therefore, proposed that a portion of this apron be abandoned and used for the development of aircraft storage hangars, a possible future jet center, and the arrival/departure building with associated automobile parking. Approximately 60 additional tee hangars can be developed on the abandoned aircraft parking apron and adjoining space. Additional tee hangars can be developed both north and south of the existing south tee hangar. There is room in these areas for approximately 250 total hangars in nested tee configuration.

Development at other airports indicates that with the introduction of business jets to the airport that there is a significant need for box hangars and large corporate hangars. The corporate hangars are generally 100 foot by 100 foot or larger. It is considered appropriate to maintain the smaller aircraft, including the propeller-driven single engine and twin engine aircraft and some of the jets, on the east side of the airport and to place the large corporate jet facilities at a separate location. These facilities could be located on the west side of the airport and would be serviced by the new taxiway on the west side of Runway 15-33. A second jet center may ultimately be necessary on this side of the airport. Fueling facilities should be planned for the west side development.

### 5-2.5 Land Acquisition

The Airport owns more land than is needed for forecast airport operations.

### 5-2.6 Surplus Land

There are areas of property on the airport that are not needed for aviation purposes. In order to make the Airport self-sufficient, it is proposed to utilize these lands for non-aviation development. Development of these non-aviation areas must be consistent with the Placer County Airport Land Use Compatibility Plan criteria. On the area between Flightline Drive and Aviation Boulevard on the east of the airport there are 89.1 acres that are not accessible to the airport or needed for airport development. This land is proposed for use for non-aviation development. The development will be light industrial type development, which is not sensitive to airport operations and will form a good buffer for the airport.

At the northwest corner of the intersection of Nicolaus Road and Aviation Boulevard there are 24± acres of land that is not required for airport development and is inconvenient for access to the airport. This land will be reserved for non-aviation development, which will also be compatible with airport operations.

On the west side of the airport, provision has been made for the development of box hangars, corporate hangars, tee hangars, tie downs, and a possible jet center. This can be accommodated in 66 acres of airport-owned land. To the west of this airport development there is an additional 90 acres, which are not required for airport development and will not be accessible to the airport. This land is proposed to be used for future non-aviation development.

More space is reserved on the Airport Layout Plan for aircraft storage in the form of hangars and tie downs than is forecast or even included in the 100 percent reserve. This land should be reserved for this use until all other non-aviation areas have been developed. At that time new forecasts should be made and, if these forecasts indicate there will never be a need for airport aircraft storage facilities in this area, then portions of the area could be released for non-aviation development that requires airport access.

The location of the potential land development areas are identified on the Airport Layout Plan, Sheet No. 2, and a summary of the area of land available for aviation use and non-aviation use is shown in Table 5-1, Available Land Use by Acreage.

Land Use	East Side	West Side
Aviation	57	0
Aviation Reserve	7	66
Non-Aviation	113	90

## CHAPTER 6. AIRPORT LAYOUT PLAN UPDATE

An Airport Layout Plan set of drawings has been prepared and is included with this report. Eleven drawings are included in this set. A table of contents of the drawings is indicated below, along with a general description of information provided on the drawings.

***Sheet No. 1 – Title and Index***

***Sheet No. 2 – Airport Layout Plan*** – The Airport Layout Plan shows existing facilities, short-term proposed development, and ultimate development.

***Sheet No. 3 – Airport Layout Plan (Data Tables)*** – The wind rose and airport data table, runway end data table, and runway data table are included on this sheet.

***Sheet No. 4 – East Terminal Area Plan*** – This sheet shows an expanded scale drawing of the terminal area facilities located on the eastern portion of the site. It also indicates existing facilities, proposed short-term development, and proposed long-term development.

***Sheet No. 5 – West Terminal Area Plan*** – This sheet shows an expanded scale drawing of the terminal area facilities located on the western portion of the site. It also indicates existing facilities, proposed short-term development, and proposed long-term development.

***Sheet No 6 – Airport Airspace Plan 1*** - The Airport Airspace Plan 1 is a drawing that depicts the critical surfaces for this airport as defined by FAR Part 77 and as they relate to existing topography. This plan shows that there are no obstructions to these surfaces other than a few isolated trees and poles that will be removed, lowered, or marked.

***Sheet No 7 – Airport Airspace Plan 2*** - The Airport Airspace Plan 2 is a drawing that depicts the critical surfaces for the north end of the approach to Runway 15 at this airport as defined by FAR Part 77 and as they relate to existing topography and shows that there are no obstructions to these surfaces.

***Sheet No. 8 – Inner Portion of Approach Surface Plan - Runway 15-33*** – This drawing shows the plan/profile of the approaches to Runway 15 and Runway 33, indicating absence of any obstructions.

***Sheet No. 9 – Inner Portion of Approach Surface Plan – Future Runway 15L-33R*** – This drawing shows the plan/profile of the approaches to proposed future Runway 15L and proposed future Runway 33R, indicating absence of any obstructions.

**Sheet No. 10 - Off-Airport Land Use** – This drawing represents the land use recommendations as developed and adopted by the Placer County Airport Land Use Commission.

**Sheet No. 11 – Airport Property Map – Exhibit A** – The Airport Property Map has been updated and is included on this drawing. This is a map showing the major airport features with relation to the property boundaries. The property boundaries are identified by metes and bounds.

# LINCOLN REGIONAL AIRPORT

## CITY OF LINCOLN, PLACER COUNTY, CALIFORNIA

### AIRPORT LAYOUT PLAN

NOVEMBER, 2007

SHEET INDEX

1. TITLE & INDEX
2. AIRPORT LAYOUT PLAN
3. AIRPORT LAYOUT PLAN DATA TABLES
4. EAST TERMINAL AREA PLAN
5. WEST TERMINAL AREA PLAN
6. AIRPORT AIRSPACE PLAN 1
7. AIRPORT AIRSPACE PLAN 2
8. INNER PORTION OF APPROACH SURFACE PLAN - RUNWAY 15-33
9. INNER PORTION OF APPROACH SURFACE PLAN - FUTURE RUNWAY 15L-33R
10. OFF-AIRPORT LAND USE PLAN
11. AIRPORT PROPERTY MAP - EXHIBIT "A"



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APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

**FAA**

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

**DESIGNED BY :**

**Reinard W. Brandley**  
CONSULTING AIRPORT ENGINEER  
SACRAMENTO, CALIFORNIA

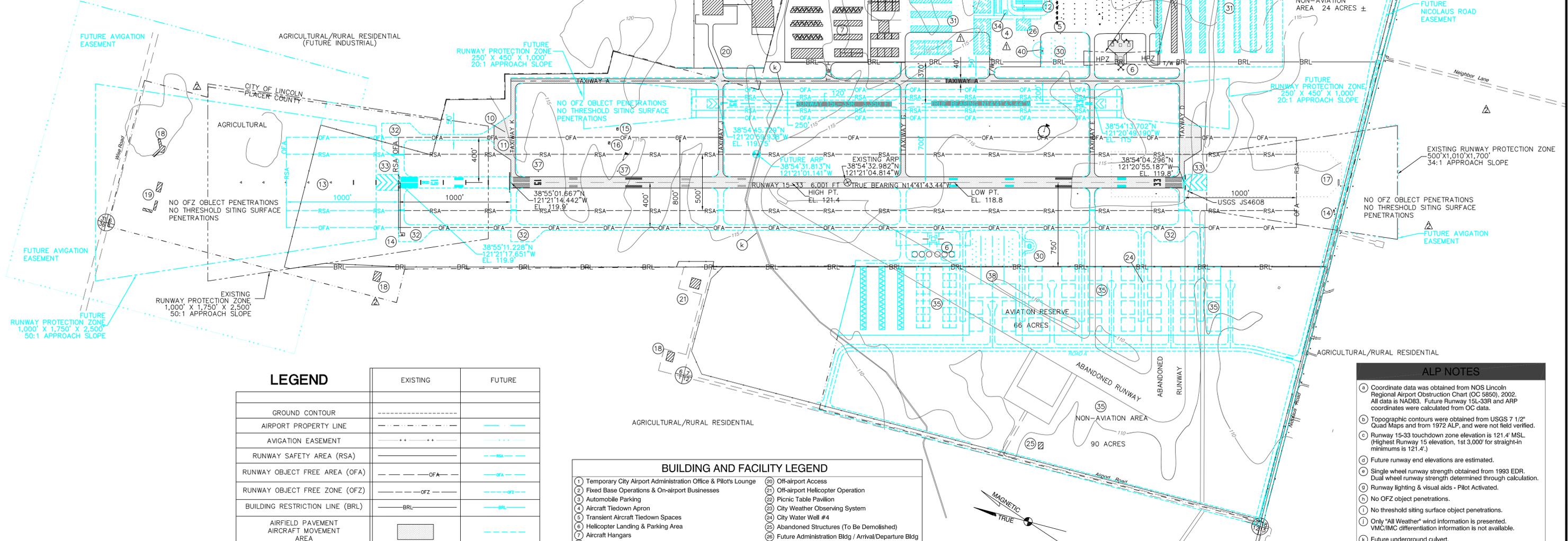
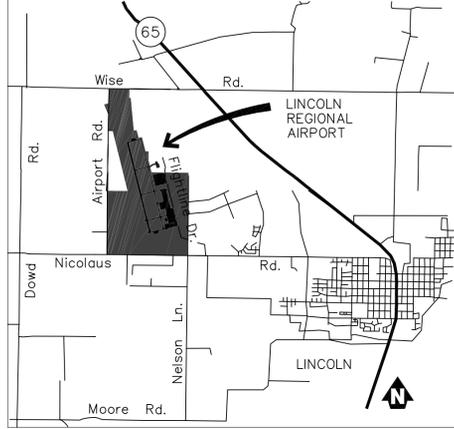
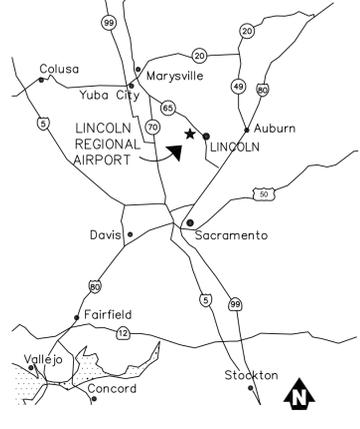
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DATE



**LOCATION MAP**

**VICINITY MAP**



**FUTURE AVIGATION EASEMENT**

**FUTURE RUNWAY PROTECTION ZONE**  
1,000' X 1,750' X 2,500'  
50:1 APPROACH SLOPE

**EXISTING RUNWAY PROTECTION ZONE**  
1,000' X 1,750' X 2,500'  
50:1 APPROACH SLOPE

**NO OFZ OBJECT PENETRATIONS  
NO THRESHOLD SITING SURFACE  
PENETRATIONS**

**LEGEND**

	EXISTING	FUTURE
GROUND CONTOUR	- - - - -	- - - - -
AIRPORT PROPERTY LINE	- - - - -	- - - - -
AVIGATION EASEMENT	- - - - -	- - - - -
RUNWAY SAFETY AREA (RSA)	- - - - -	- - - - -
RUNWAY OBJECT FREE AREA (OFA)	- - - - -	- - - - -
RUNWAY OBJECT FREE ZONE (OFZ)	- - - - -	- - - - -
BUILDING RESTRICTION LINE (BRL)	- - - - -	- - - - -
AIRFIELD PAVEMENT AIRCRAFT MOVEMENT AREA	[Hatched Box]	[Dashed Box]
FACILITIES	[Hatched Box]	[Dashed Box]
ROAD (PAVED)	- - - - -	- - - - -
FENCE	- - - - -	- - - - -
RUNWAY THRESHOLD LIGHT	⊙	⊙
SUPPLEMENTAL WINDCONE	⊙	⊙
AIRPORT REFERENCE POINT	⊙	⊙

**BUILDING AND FACILITY LEGEND**

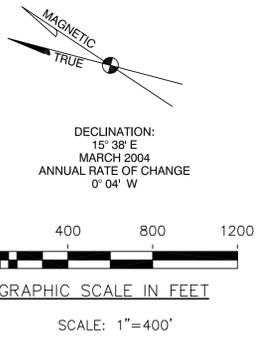
- 1 Temporary City Airport Administration Office & Pilot's Lounge
- 2 Fixed Base Operations & On-airport Businesses
- 3 Automobile Parking
- 4 Aircraft Tiedown Apron
- 5 Transient Aircraft Tiedown Spaces
- 6 Helicopter Landing & Parking Area
- 7 Aircraft Hangars
- 8 Aircraft Wash Rack
- 9 Aircraft Underground Fuel Storage & Fuel Pump
- 10 Aircraft Compass Calibration Area
- 11 Aircraft Holding Bay / Run-up Pad (To Be Removed)
- 12 Airport Electrical Vault / Future 100kw power generator
- 13 MALSR (Medium-Intensity Airport Lighting System - with Runway Alignment Indicator Lights)
- 14 MALSR Electrical Vault & ILS Localizer Electrical Vault
- 15 AWOS (Automated Weather Observing System)
- 16 ILS Glide Slope Antenna
- 17 ILS Localizer Antenna
- 18 Residential Home
- 19 Agricultural Sheds
- 20 Off-airport Access
- 21 Off-airport Helicopter Operation
- 22 Picnic Table Pavilion
- 23 City Weather Observing System
- 24 City Water Well #4
- 25 Abandoned Structures (To Be Demolished)
- 26 Future Administration Bldg / Arrival/Departure Bldg
- 27 Future Fixed Base Operations Hangar Area
- 28 Future Automobile Parking (Phases I-IV)
- 29 Future Aircraft Apron / Fuel Island
- 30 Future Hangar Site (see sheet 4)
- 31 Future Aircraft Holding Bay / Run-up Pad
- 32 Future Runway 15-33 Blast Pads
- 33 Future Air Traffic Control Tower
- 34 Future West Side Development (see sheets 5 thru 7)
- 35 Aviation Businesses
- 36 VASI (TO BE REPLACED WITH PAPI)
- 37 Future Jet Center
- 38 Future Maintenance Building and Yard
- 39 Future Underground Fuel Storage & Fuel Pump

**ALP NOTES**

- (a) Coordinate data was obtained from NOS Lincoln Regional Airport Obstruction Chart (OC 5850), 2002. All data is NAD83. Future Runway 15L-33R and ARP coordinates were calculated from OC data.
- (b) Topographic contours were obtained from USGS 7 1/2" Quad Maps and from 1972 ALP, and were not field verified.
- (c) Runway 15-33 touchdown zone elevation is 121.4' MSL. (Highest Runway 15 elevation, 1st 3,000' for straight-in minimums is 121.4').
- (d) Future runway end elevations are estimated.
- (e) Single wheel runway strength obtained from 1993 EDR. Dual wheel runway strength determined through calculation.
- (f) Runway lighting & visual aids - Pilot Activated.
- (g) No OFZ object penetrations.
- (h) No threshold siting surface object penetrations.
- (i) Only "All Weather" wind information is presented. VMC/IMC differentiation information is not available.
- (j) Future underground culvert.
- (k) Deviations from FAA standards:  
 - Fence bisects Runway 15-33 RSA & OFA. (Fence to be removed.)  
 - Existing taxiway widths at 40' (typical); 50' future.  
 - Drainage ditches and culverts are located within Runway 15-33 RSA.  
 (Drainage culverts to be extended, ditches to be filled.)

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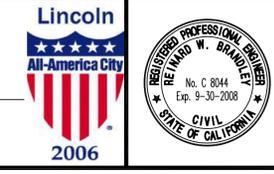
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APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
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APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
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**Reinar W. Brandley**  
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PLACER COUNTY  
STATE OF CALIFORNIA

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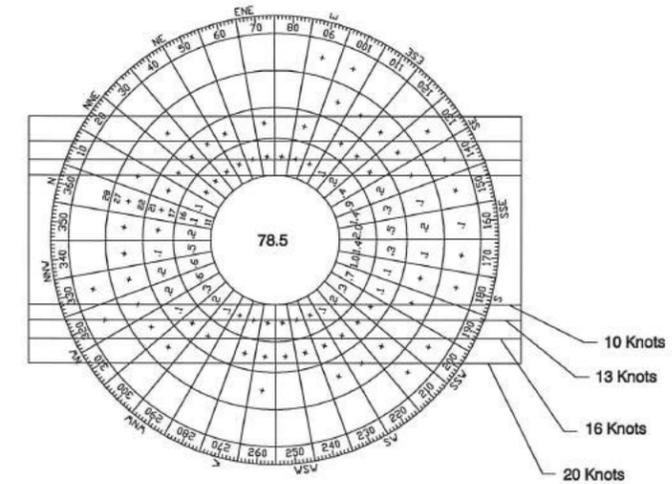
**AIRPORT LAYOUT PLAN**

NO.	REVISIONS	BY	APR	DATE
1	REVISED EAST SIDE HANGAR LAYOUTS	DB	RWB	11/2/07
2	CORRECTED FUTURE 50:1 RPZ FOR RUNWAY 33L TO 34:1 AND RELATED AVIGATION EASEMENTS	DB	RWB	2/26/08

DATE: NOV. 15, 2007  
SHEET 2 OF 11 SHEETS

**RUNWAY DATA TABLE**

	RUNWAY 15R - 33L				RUNWAY 15L - 33R	
	EXISTING (15-33)		FUTURE (15R-33L)		FUTURE	
	LINCOLN REGIONAL AIRPORT	FAA STANDARD	LINCOLN REGIONAL AIRPORT	FAA STANDARD	LINCOLN REGIONAL AIRPORT	FAA STANDARD
APPROACH CATEGORY AND DESIGN GROUP	C-III	C-III	C-III	C-III	B-I	B-I
DESIGN AIRCRAFT	CITATION VII		GULFSTREAM V		BEECH KING AIR B100	
WINGSPAN OF CRITICAL DESIGN AIRCRAFT (FT)	53.06		98.06		45.8	
UNDERCARRIAGE WIDTH OF CRITICAL AIRCRAFT (FT)	9.05		13.08		13.0	
APPROACH SPEED OF CRITICAL DESIGN AIRCRAFT (KNOTS)	137		140		111	
MAXIMUM CERTIFIED TAKEOFF WEIGHT OF CRITICAL DESIGN AIRCRAFT (LBS)	22,450		89,000		11,800	
RUNWAY WIDTH (FT)	100	100	100	100	75	60
RUNWAY LENGTH (FT)	6001		7001		3350	
LINE OF SIGHT REQUIREMENT MET	FULL		FULL		FULL	
PERCENTAGE EFFECTIVE GRADIENT (%)	0.0017	2% MAX	0.0017	2% MAX	.0014	2% MAX
PERCENTAGE MAXIMUM GRADIENT (%)	0.275		0.275		.0014	
ELEVATION RUNWAY HIGH POINT (NAVD 88)	121.4		121.4		119.75	
ELEVATION RUNWAY LOW POINT (NAVD 88)	118.9		118.9		115.0	
RUNWAY BLAST PAD LENGTH (FT)	N/A	200	200	200	100	100
RUNWAY BLAST PAD WIDTH (FT)	N/A	140	140	140	80	80
RUNWAY PAVEMENT SURFACE	ASPHALT		ASPHALT		ASPHALT	
RUNWAY MARKING	PRECISION (R/W 15)		PRECISION		VISUAL	
RUNWAY LIGHTING	MIRL		HIRL		MIRL	
PAVEMENT DESIGN STRENGTH (LBS)	60,000 S, 120,000 D		60,000 S, 120,000 D		12,600 S	
RUNWAY SAFETY AREA WIDTH (FT)	500	500	500	500	120	120
RUNWAY SAFETY AREA - DISTANCE BEYOND RUNWAY END (FT)	1000	1000	1000	1000	240	240
RUNWAY OBJECT FREE AREA WIDTH (FT)	800	800	800	800	400	400
RUNWAY OBJECT FREE AREA - DISTANCE BEYOND RUNWAY END (FT)	1000	1000	1000	1000	240	240
RUNWAY OBSTACLE FREE ZONE WIDTH (FT)	400	400	400	400	250	250
RUNWAY OBSTACLE FREE ZONE - DISTANCE BEYOND RUNWAY END (FT)	200	200	200	200	200	200
HOLD BAR DISTANCE TO RUNWAY CENTERLINE (FT)	250	250	250	250	125	125
RUNWAY CENTERLINE TO TAXIWAY CENTERLINE DISTANCE (FT)	900	400	400 - 900	400	200	225
RUNWAY CENTERLINE TO FIXED OR MOVEABLE OBJECT (FT)	1088	500	1088 EASTSIDE, 500 WESTSIDE	500	200	200
TAXIWAY WIDTH (FT)	40	50	50	50	50	25
TAXIWAY SURFACE TYPE	ASPHALT		ASPHALT		ASPHALT	
TAXIWAY SAFETY AREA WIDTH (FT)	118	118	118	118	49	49
TAXIWAY OBJECT FREE AREA WIDTH (FT)	186	186	186	186	89	89
TAXIWAY CENTERLINE TO FIXED OR MOVEABLE OBJECT (FT)	121	93	121	93	44.5	44.5



**ALL WEATHER WIND ROSE**

SOURCE: U.S. WEATHER BUREAU STATION  
BEALE AIR FORCE BASE

PERIOD: 1983-2002, ALL MONTHS, ALL HOURS

WIND COVERAGE: 12 MPH (10.5 KNOTS) - 99.08%  
15 MPH (13 KNOTS) - 99.66%  
18.5 MPH (16 KNOTS) - 99.91%  
23 MPH (20 KNOTS) - 99.96%

**RUNWAY END DATA**

	RUNWAY 15R-33L				RUNWAY 15L-33R	
	EXISTING		FUTURE		FUTURE	
	15	33	15R	33L	15L	33R
RUNWAY THRESHOLD COORDINATES (NAD 83)	38°55'1.667"N 121°21'14.442"W	38°54'4.296"N 121°20'55.187"W	38°55'11.228"N 121°21'17.651"W	38°54'4.296"N 121°20'55.187"W	38°54'45.729"N 121°20'59.938"W	38°54'13.702"N 121°20'49.19"W
RUNWAY END COORDINATES (NAD 83)	38°55'1.667"N 121°21'14.442"W	38°54'4.296"N 121°20'55.187"W	38°55'11.228"N 121°21'17.651"W	38°54'4.296"N 121°20'55.187"W	38°54'45.729"N 121°20'59.938"W	38°54'13.702"N 121°20'49.19"W
APPROACH VISIBILITY MINIMUMS	<1/4 MILE	1 MILE	<1/4 MILE	<3/4 MILE	VISUAL	VISUAL
FAR PART 77 CATEGORY RUNWAY	PRECISION	NON-PRECISION	PRECISION	PRECISION	VISUAL	VISUAL
ELEVATION RUNWAY END OF PAVEMENT (NAVD 88)	119.9	119.8	119.9	119.8	119.75	115.0
ELEVATION RUNWAY THRESHOLD (NAVD 88)	119.9	119.8	119.9	119.8	119.75	115.0
ELEVATION RUNWAY TOUCHDOWN ZONE (NAVD 88)	121.4	120.6	121.4	120.6	119.75	117.35
APPROACH SURFACE SLOPE	50:1	34:1	50:1	34:1	20:1	20:1
NAVIGATIONAL AIDS	ILS, GPS, VOR	GPS	ILS, GPS, VOR	ILS, GPS	NONE	NONE
VISUAL AIDS	PAPI, MALSR	PAPI	PAPI, MALSR	PAPI, MALSR	PAPI	PAPI
OFZ PENETRATIONS	NONE	NONE	NONE	NONE	NONE	NONE
THRESHOLD SITING SURFACE OBJECT PENETRATIONS	NONE	NONE	NONE	NONE	NONE	NONE

**AIRPORT DATA TABLE**

	EXISTING	FUTURE
AIRPORT ELEVATION (NAVD 88)	121	121
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD 83)	38°54'32.982"N 121°21'04.814"W	38°54'31.813"N 121°21'01.141"W
NAVIGATIONAL AIDS	BEACON, ILS, GPS	BEACON, ILS, GPS
MEAN MAX. TEMP. (HOTTEST MONTH)	95° F (JULY)	95° F (JULY)
AIRPORT REFERENCE CODE (ARC)	C-III	C-III

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APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
AIRPORT MANAGER



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CONSULTING AIRPORT ENGINEER

PLACER COUNTY  
STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
CITY OF LINCOLN, CALIFORNIA

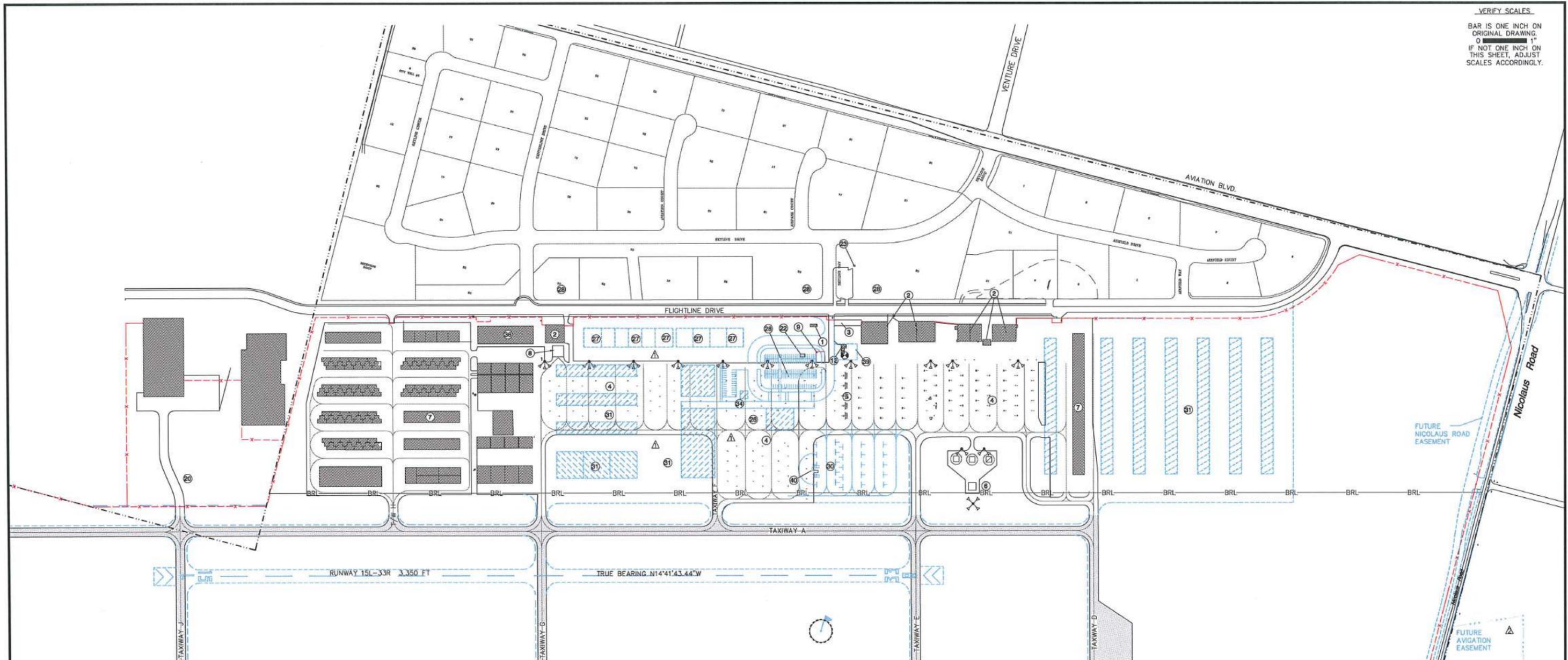
**DATA TABLES**

DATE NOV. 15, 2007

SHEET NUMBER  
3 OF 11 SHEETS

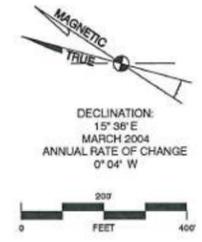
NO.	REVISIONS	BY	APR	DATE
Δ	CORRECTED FUTURE 50:1 RPZ FOR RUNWAY 33L TO 34:1	DB	RWB	2/26/08

VERIFY SCALES.  
 BAR IS ONE INCH ON ORIGINAL DRAWING.  
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.



FACILITIES INVENTORY	
1	TEMPORARY CITY AIRPORT ADMINISTRATION OFFICE & PILOT'S LOUNGE
2	FIXED BASE OPERATIONS & ON-AIRPORT BUSINESSES
3	AUTOMOBILE PARKING
4	AIRCRAFT TIEDOWN APRON/FUTURE HANGARS
5	TRANSIENT AIRCRAFT TIEDOWN SPACES
6	HELICOPTER LANDING & PARKING AREA
7	AIRCRAFT HANGARS
8	AIRCRAFT WASH RACK
9	AIRCRAFT UNDERGROUND FUEL STORAGE & FUEL PUMP
12	AIRPORT ELECTRICAL VAULT/FUTURE 100kw POWER GENERATOR
20	OFF-AIRPORT ACCESS
22	PICNIC TABLE PAVILION
23	CITY WEATHER OBSERVING SYSTEM
26	FUTURE ADMINISTRATION BUILDING/ARRIVAL/DEPARTURE BUILDING
27	FUTURE FIXED BASE OPERATIONS HANGAR AREA
28	FUTURE AUTOMOBILE PARKING(PHASES I-VI)
30	FUTURE AIRCRAFT APRON / FUEL ISLAND
31	FUTURE HANGAR SITE
34	FUTURE AIR TRAFFIC CONTROL TOWER
36	AVIATION BUSINESSES
39	FUTURE MAINTENANCE BUILDING

EAST SIDE - TIEDOWNS AND HANGARS INVENTORY		
<b>TIEDOWNS:</b>		
EXISTING		240
CHANGES - FUTURE		-101
TOTAL - FUTURE		139
<b>HANGARS:</b>		
EXISTING		141
CHANGES - FUTURE		+256
TOTAL - FUTURE		397
<b>AUTOMOBILE PARKING:</b>		
EXISTING		36
CHANGES - FUTURE		+124 -36
TOTAL - FUTURE		124
<b>FBO &amp; ADMINISTRATION:</b>		
JET PORT		1 FUTURE
FBO		4 EXISTING
ARRIVAL/DEPARTURE BUILDING		1 FUTURE



**LEGEND**

	EXISTING	FUTURE
AIRPORT PROPERTY LINE	---	---
BUILDING RESTRICTION LINE (BRL)	BRL	BRL
AIRFIELD PAVEMENT	[Pattern]	[Pattern]
AIRCRAFT MOVEMENT	[Pattern]	[Pattern]
FACILITIES	[Pattern]	[Pattern]
ROAD (PAVED)	---	---
FENCE	---	---
TAXIWAY EDGE LIGHTS	•	•
RUNWAY EDGE LIGHTS	•	•
FLOODLIGHTS	⬆	⬆
BEACON	⊙	⊙

DATE Nov. 15, 2007  
 SHEET 4 OF 11 NUMBER SHEETS

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APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
 FAA



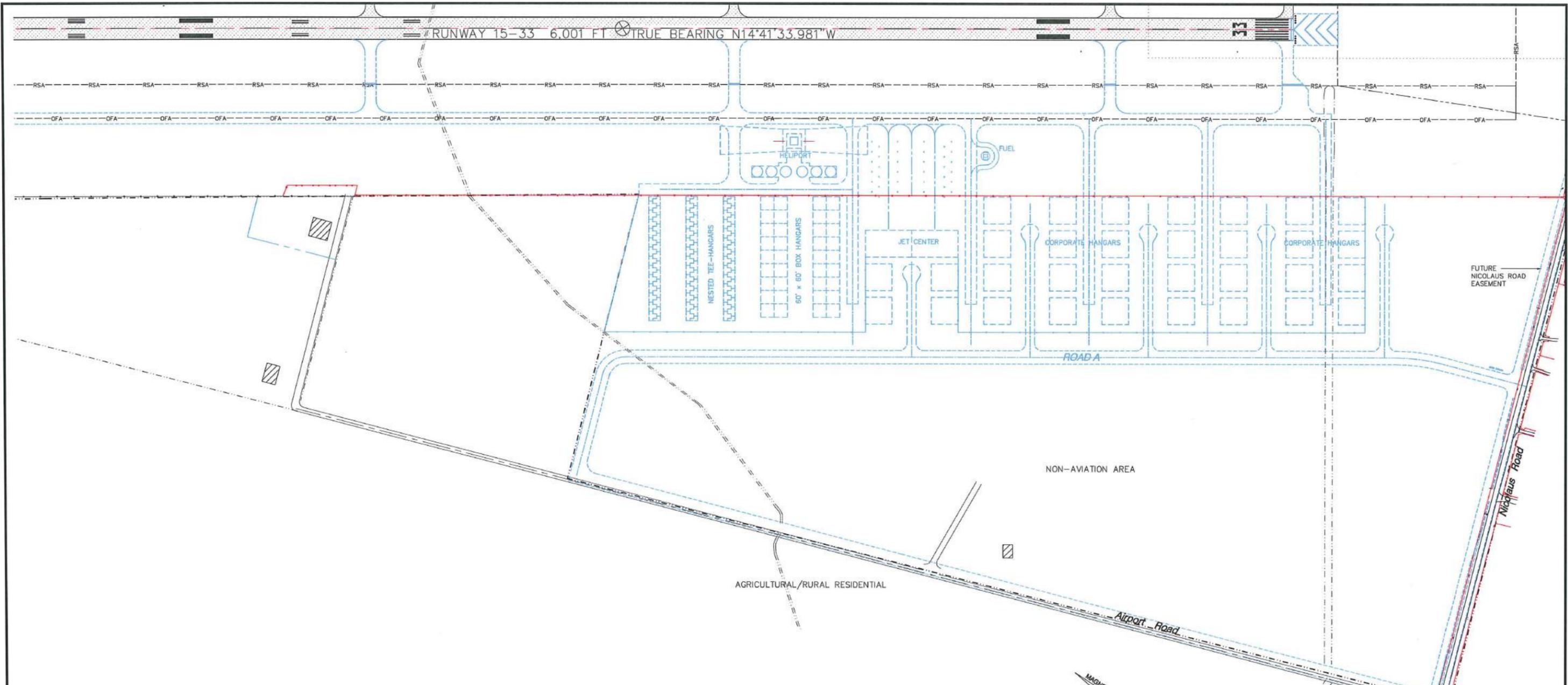
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 AIRPORT MANAGER



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PLACER COUNTY  
 STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
 CITY OF LINCOLN, CALIFORNIA  
**EAST TERMINAL AREA PLAN**

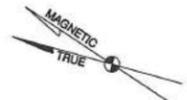
NO.	REVISIONS	BY	APR	DATE
Δ	REVISED EAST SIDE HANGAR LAYOUTS	DB	RWB	11/2/07
Δ	CORRECTED AVIGATION EASEMENT	DB	RWB	2/26/08



LEGEND	EXISTING	FUTURE
GROUND CONTOUR	---	---
AIRPORT PROPERTY LINE	---	---
RUNWAY SAFETY AREA (RSA)	---	---
RUNWAY OBJECT FREE AREA (OFA)	---	---
RUNWAY OBJECT FREE ZONE (OFZ)	---	---
BUILDING RESTRICTION LINE (BRL)	---	---
AIRFIELD PAVEMENT AIRCRAFT MOVEMENT AREA	[Hatched Box]	---
FACILITIES	[Hatched Box]	[Dashed Box]
ROAD (PAVED)	---	---
FENCE	---	---

- WEST SIDE DEVELOPMENT - TIE DOWNS, HANGARS & COMMERCIAL/INDUSTRIAL**
- 1 - JET CENTER 120' x 415' BUILDING PAD, 72,000 SQ. FT. APRON - FUTURE
  - 36 - TIEDOWNS - FUTURE
  - 32 - 120' x 120' CORPORATE HANGARS - FUTURE
  - 36 - 60' x 60' HANGARS - FUTURE
  - 78 - NESTED TEE-HANGARS - FUTURE
  - 90 ACRES NON-AVIATION REVENUE PROPERTY

**NOTE:**  
LAYOUT SHOWS ONE POSSIBLE DEVELOPMENT PROGRAM.  
TYPE OF DEVELOPMENT IN THIS AREA IS DEPENDENT ON NEED.



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AIRPORT MANAGER

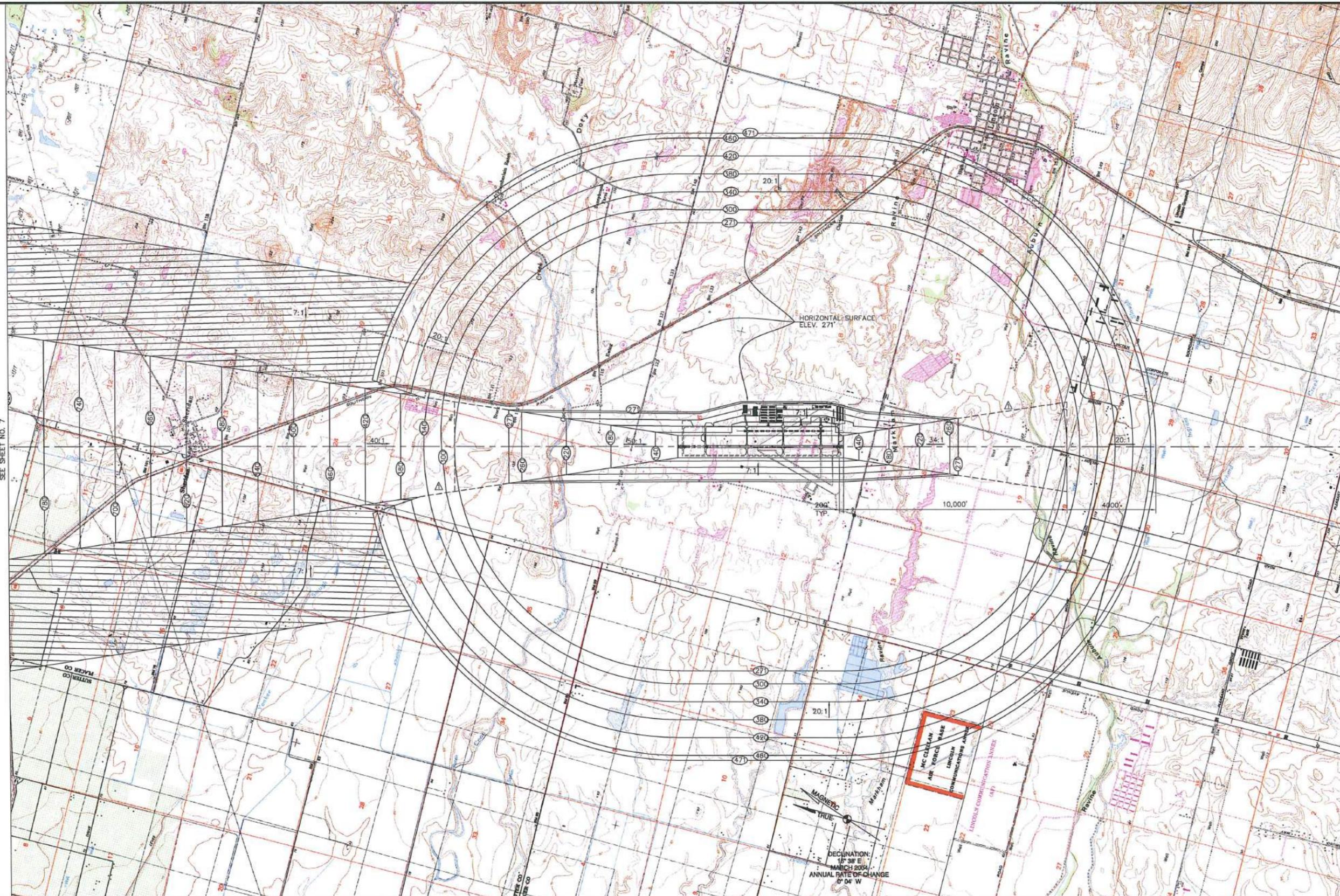


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**WEST TERMINAL AREA LAYOUT PLAN**

DATE NOV. 15, 2007		NO.	REVISIONS	BY	APR	DATE
SHEET NUMBER						
5 OF 11 SHEETS						

MATCH LINE - 30,000' FROM RUNWAY 15 APPROACH SLOPE BEGINNING  
SEE SHEET NO. 7



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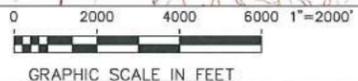
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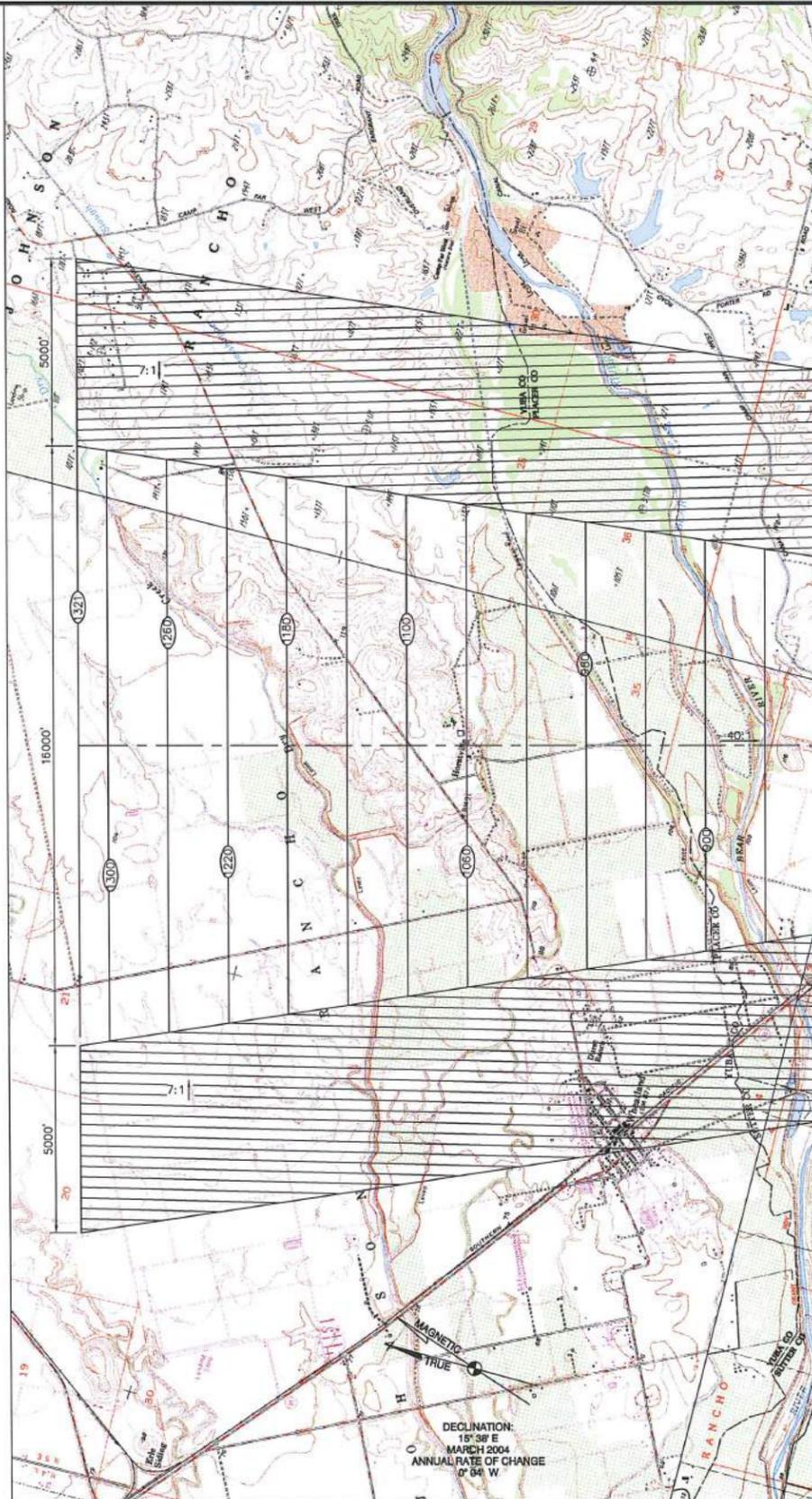
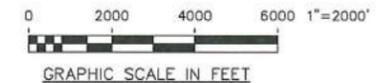
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CITY OF LINCOLN, CALIFORNIA  
**AIRPORT AIRSPACE PLAN 1**



DATE NOV. 15, 2007

SHEET NUMBER  
6 OF 11 SHEETS

NO.	REVISIONS	BY	APR	DATE
1	CORRECTED APPROACH SURFACE BOUNDARIES	DB	RWB	2/26/08



MATCH LINE - 30,000' FROM RUNWAY 15 APPROACH SLOPE BEGINNING  
SEE SHEET NO. 6

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APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
FAA



APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
AIRPORT MANAGER



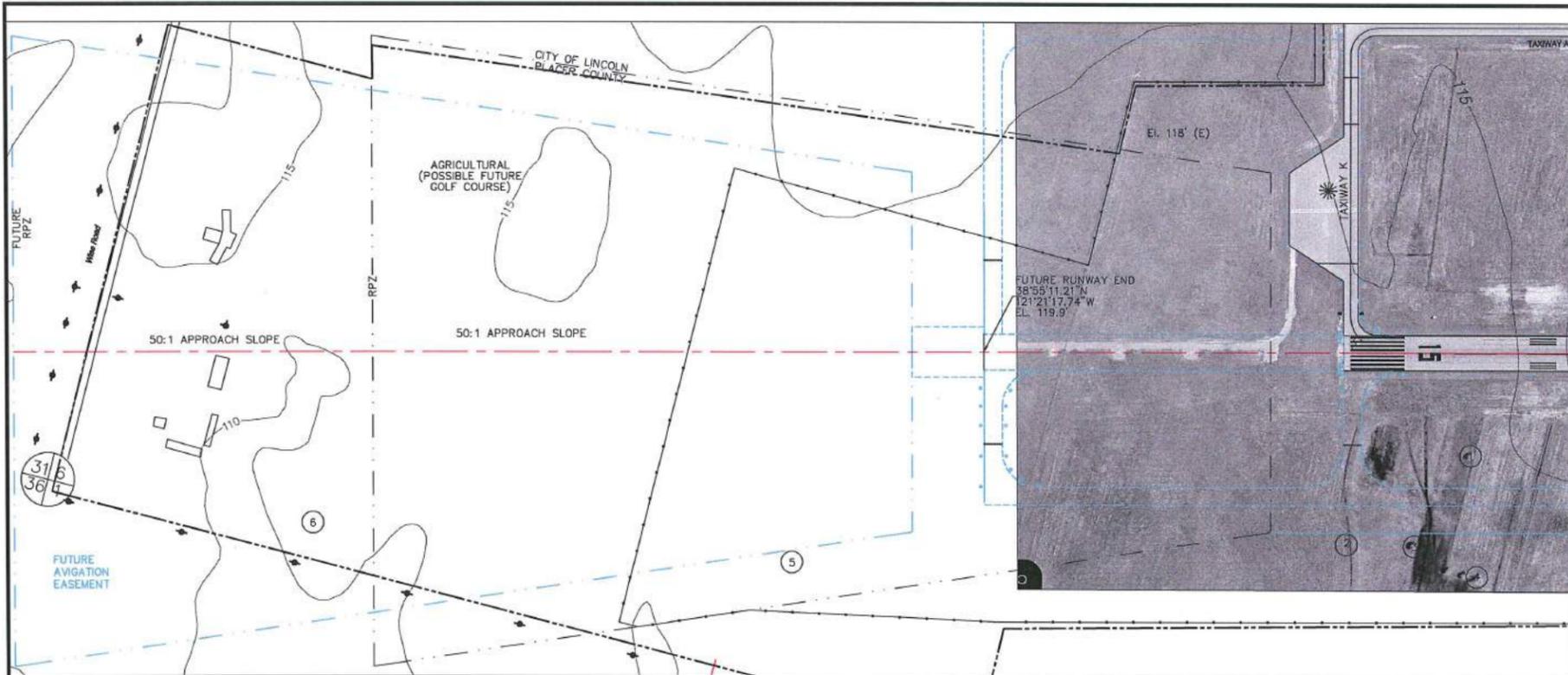
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PLACER COUNTY  
STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
CITY OF LINCOLN, CALIFORNIA  
**AIRPORT AIRSPACE PLAN 2**

DATE NOV. 15, 2007

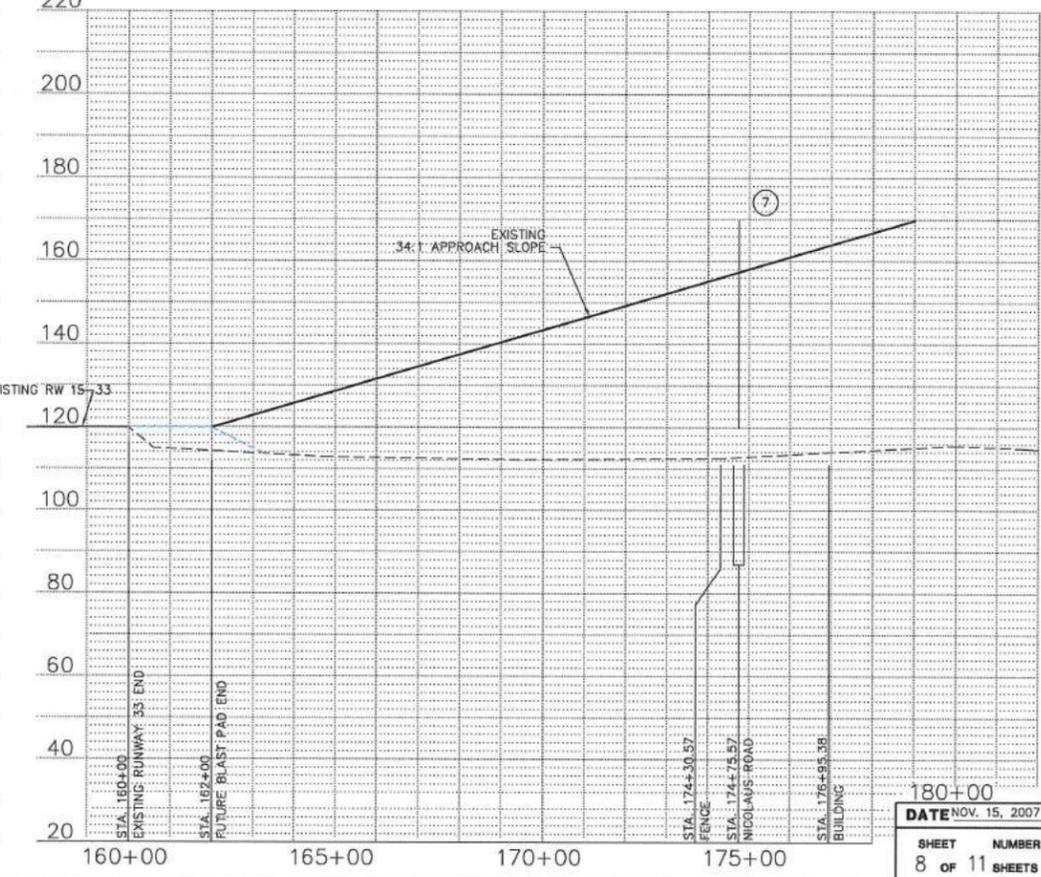
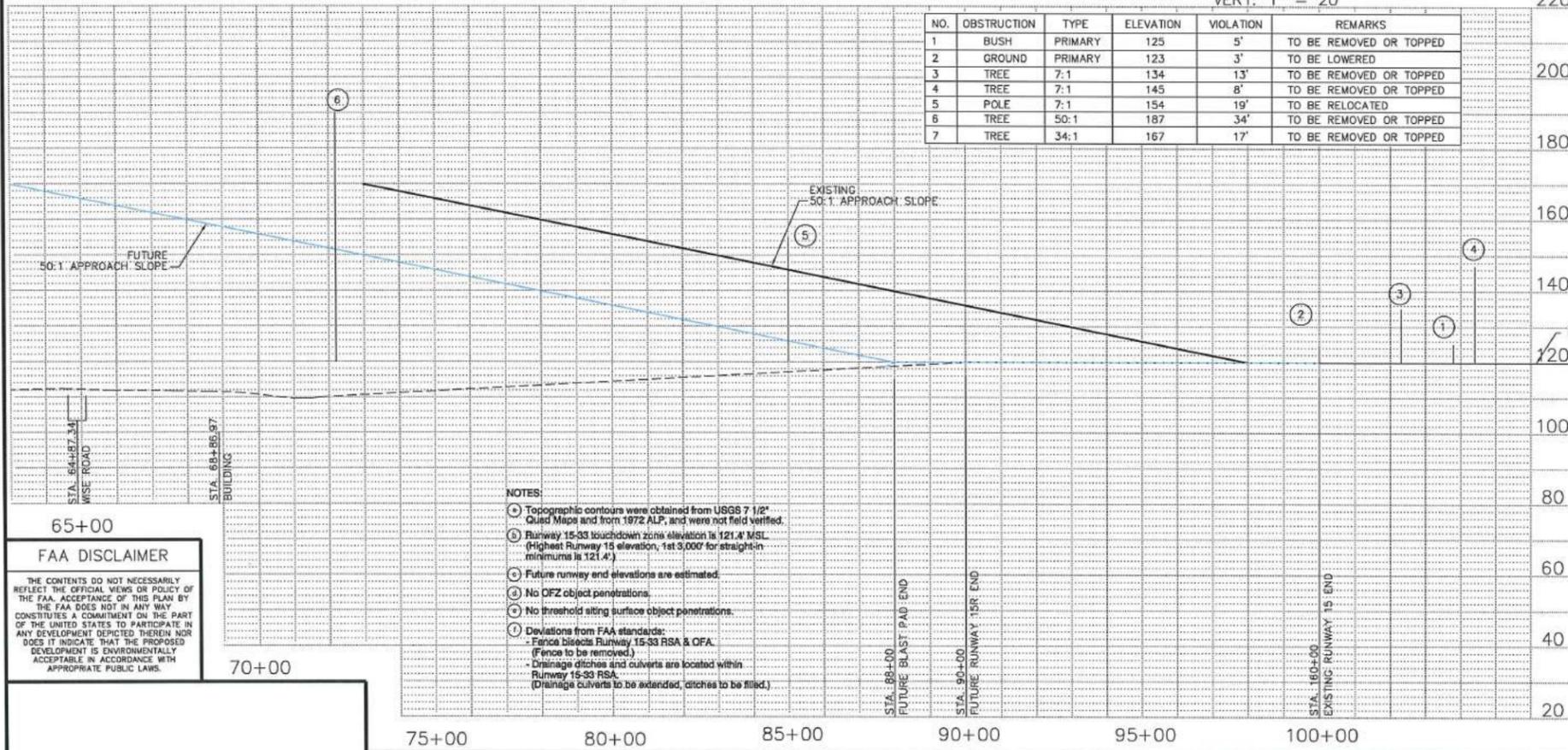
SHEET NUMBER  
7 OF 11 SHEETS

NO.	REVISIONS	BY	APR	DATE



SCALE:  
 HORIZ: 1" = 200'  
 VERT: 1" = 20'

NO.	OBSTRUCTION	TYPE	ELEVATION	VIOLATION	REMARKS
1	BUSH	PRIMARY	125	5'	TO BE REMOVED OR TOPPED
2	GROUND	PRIMARY	123	3'	TO BE LOWERED
3	TREE	7:1	134	13'	TO BE REMOVED OR TOPPED
4	TREE	7:1	145	8'	TO BE REMOVED OR TOPPED
5	POLE	7:1	154	19'	TO BE RELOCATED
6	TREE	50:1	187	34'	TO BE REMOVED OR TOPPED
7	TREE	34:1	167	17'	TO BE REMOVED OR TOPPED



- NOTES:
- ① Topographic contours were obtained from USGS 7 1/2" Quad Maps and from 1972 ALP, and were not field verified.
  - ② Runway 15-33 touchdown zone elevation is 121.4' MSL (Highest Runway 15 elevation, 1st 3,000' for straight-in minimums is 121.4').
  - ③ Future runway end elevations are estimated.
  - ④ No OFZ object penetrations.
  - ⑤ No threshold silt surface object penetrations.
  - ⑥ Deviations from FAA standards:
    - Fence bisects Runway 15-33 RSA & OFA. (Fence to be removed.)
    - Drainage ditches and culverts are located within Runway 15-33 RSA. (Drainage culverts to be extended, ditches to be filled.)

65+00  
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APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
 FAA



APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
 AIRPORT MANAGER

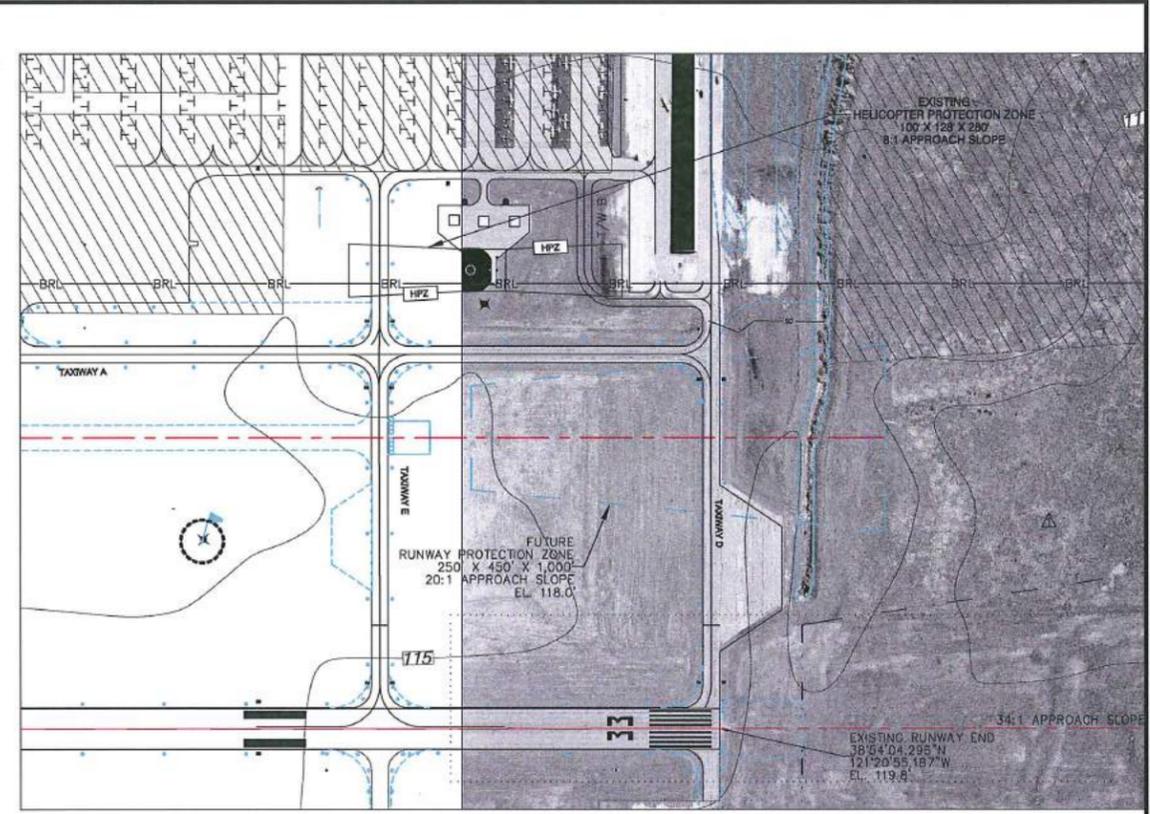


6125 King Road, Suite 201 • Loomis, California 95650 • (916) 852-4725  
**Reinard W. Brandley**  
 CONSULTING AIRPORT ENGINEER

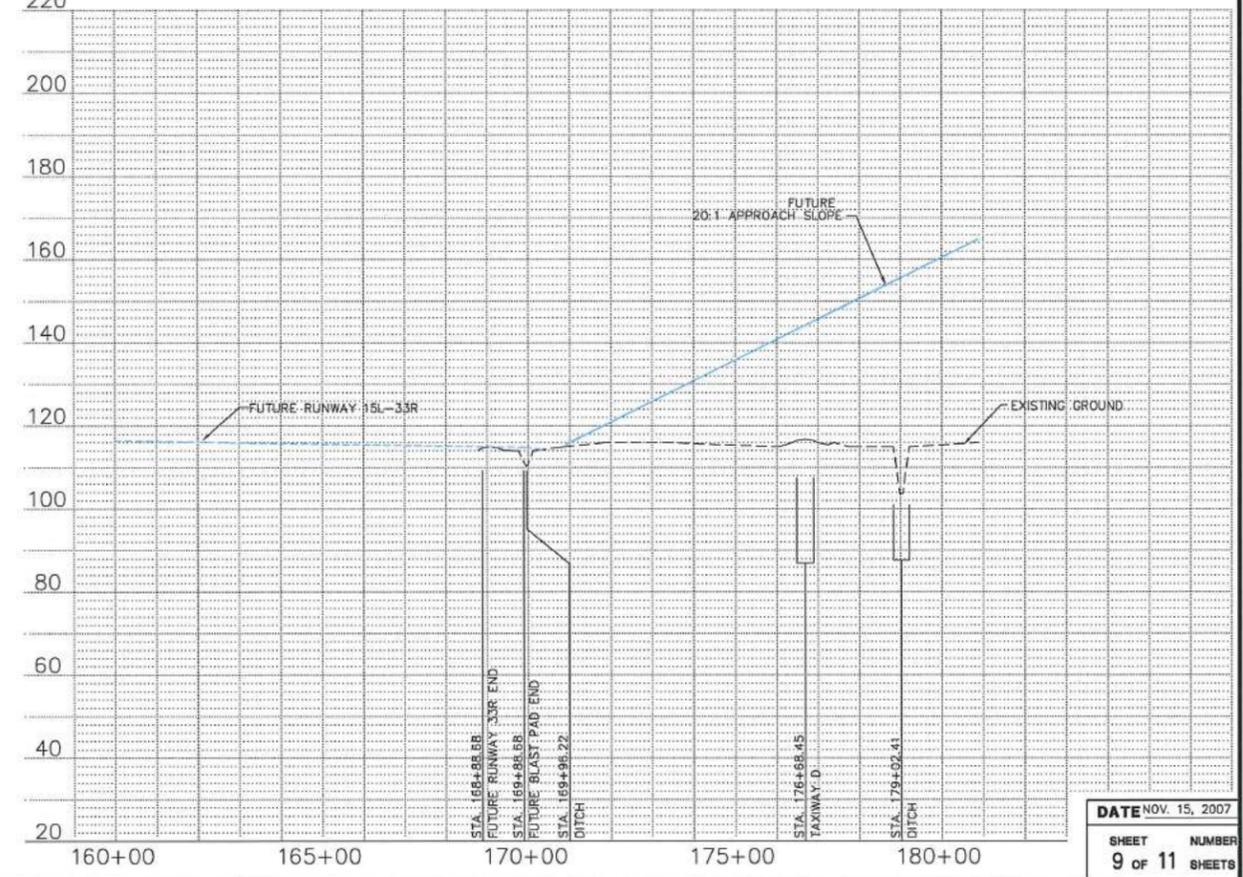
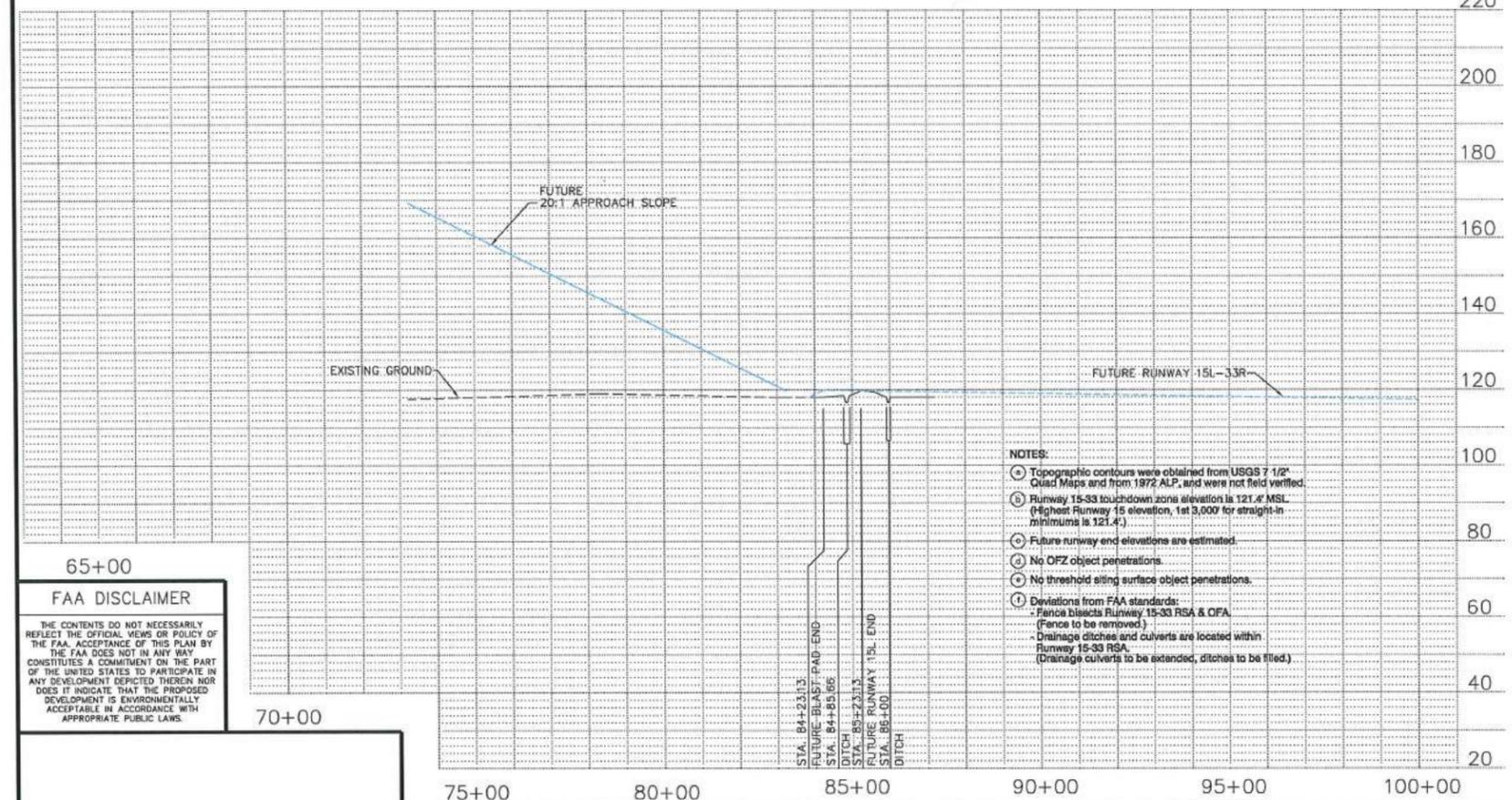
PLACER COUNTY  
 STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
 CITY OF LINCOLN, CALIFORNIA  
**INNER PORTION OF APPROACH SURFACE PLAN  
 RUNWAY 15R - 33L**

NO.	REVISIONS	BY	APR	DATE
1	CORRECTED FUTURE 50:1 APPROACH SLOPE FOR RUNWAY 33L TO 34:1 AND RELATED AVIGATION EASEMENTS	DB	RWB	2/26/08

DATE NOV. 15, 2007  
 SHEET NUMBER 8 OF 11 SHEETS



SCALE:  
 HORIZ: 1" = 200'  
 VERT: 1" = 20'  
 220 220



- NOTES:
- Topographic contours were obtained from USGS 7 1/2" Quad Maps and from 1972 ALP, and were not field verified.
  - Runway 15-33 touchdown zone elevation is 121.4' MSL (Highest Runway 15 elevation, 1st 3,000' for straight-in minimum is 121.4').
  - Future runway end elevations are estimated.
  - No OFZ object penetrations.
  - No threshold silt surface object penetrations.
  - Deviations from FAA standards:
    - Fence bleeds Runway 15-33 RSA & OFA (Fence to be removed).
    - Drainage ditches and culverts are located within Runway 15-33 RSA (Drainage culverts to be extended, ditches to be filled).

65+00  
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DATE	NOV. 15, 2007
SHEET	9 OF 11
NUMBER	SHEETS

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
 FAA



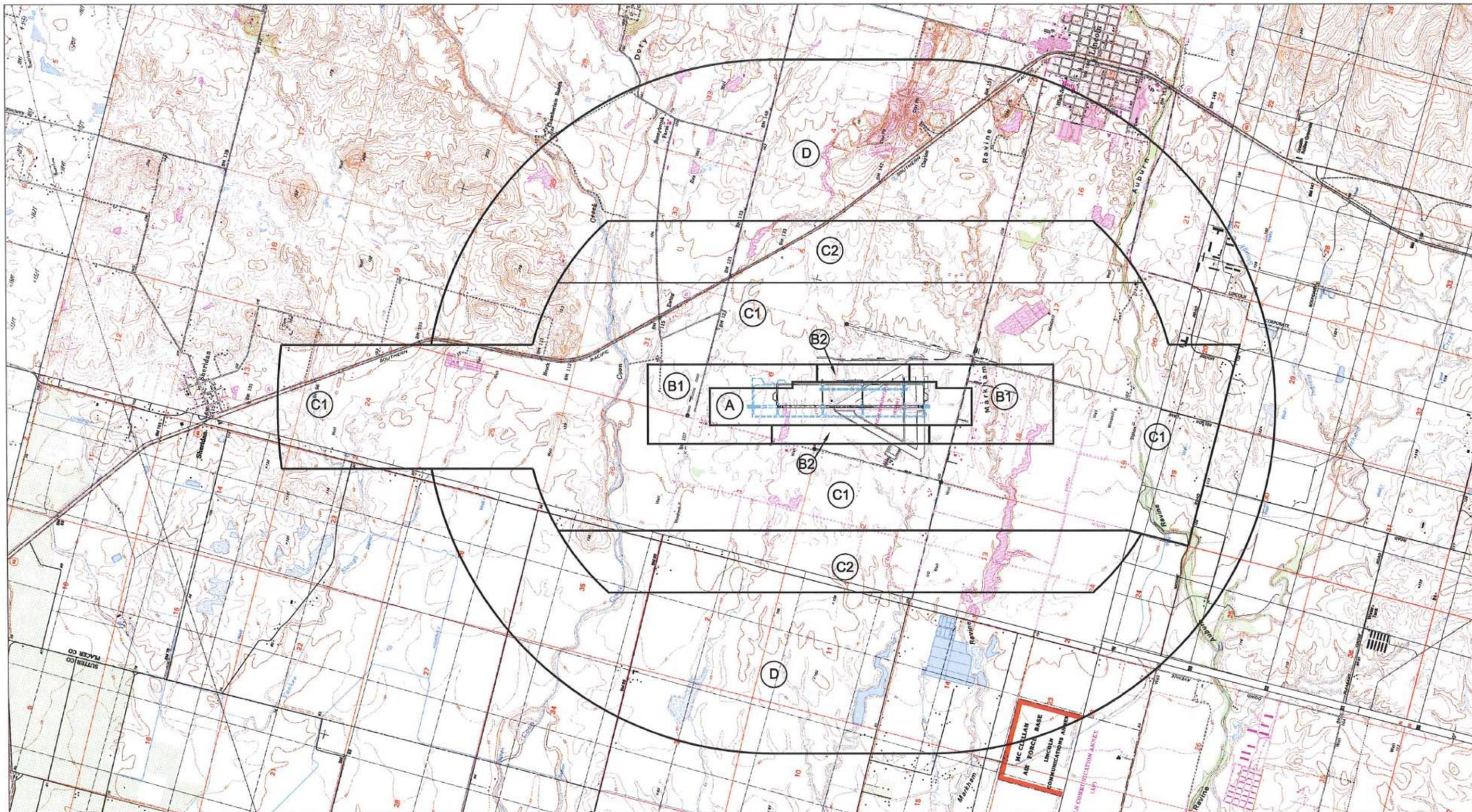
APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
 AIRPORT MANAGER



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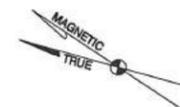
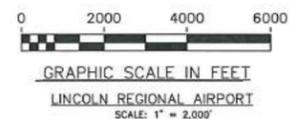
PLACER COUNTY  
 STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
 CITY OF LINCOLN, CALIFORNIA  
**INNER PORTION OF APPROACH SURFACE PLAN**  
**FUTURE RUNWAY 15L - 33R**

NO.	REVISIONS	BY	APR	DATE
1	CORRECTED FUTURE 50:1 APPROACH SLOPE FOR RUNWAY 15L TO 34:1	DB	RWB	2/26/08



ALUCP LAND USE RECOMMENDATIONS

COMPATIBILITY ZONE	LOCATIONS	RESIDENTIAL LAND USE	OTHER USES (PEOPLE/ACRE)	SPECIAL FUNCTIONS
(A)	RUNWAY PROTECTION ZONE & WITHIN BUILDING RESTRICTION LINE	PROHIBITED	10	PROHIBITED
(B)	APPROACH / DEPARTURE ZONE	10 ACRES/DWELLING	25 - 65	PROHIBITED
(B2)	ADJACENT TO RUNWAY	10 ACRES/DWELLING	50 - 130	PROHIBITED
(C1)	EXTENDED APPROACH/DEPARTURE ZONE & PRIMARY TRAFFIC PATTERN	2 ACRES/DWELLING	75 - 195	AVOIDED
(C2)	OTHER TRAFFIC PATTERN	NO LIMIT	100 - 390	AVOID ASSEMBLIES OVER 60/ACRE
(D)	OTHER	NO LIMIT	NO LIMIT	AVOID ASSEMBLIES OVER 150/ACRE



DECLINATION:  
15° 38' E  
MARCH 2004  
ANNUAL RATE OF CHANGE  
0" 04' W

NOTES:  
1. THE COMPATIBILITY ZONES SHOWN ARE TAKEN FROM THE ADOPTED PLACER COUNTY AIRPORT LAND USE COMPATIBILITY MAP.

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DATE NOV. 15, 2007

SHEET NUMBER 10 OF 11 SHEETS

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
FAA



APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
AIRPORT MANAGER

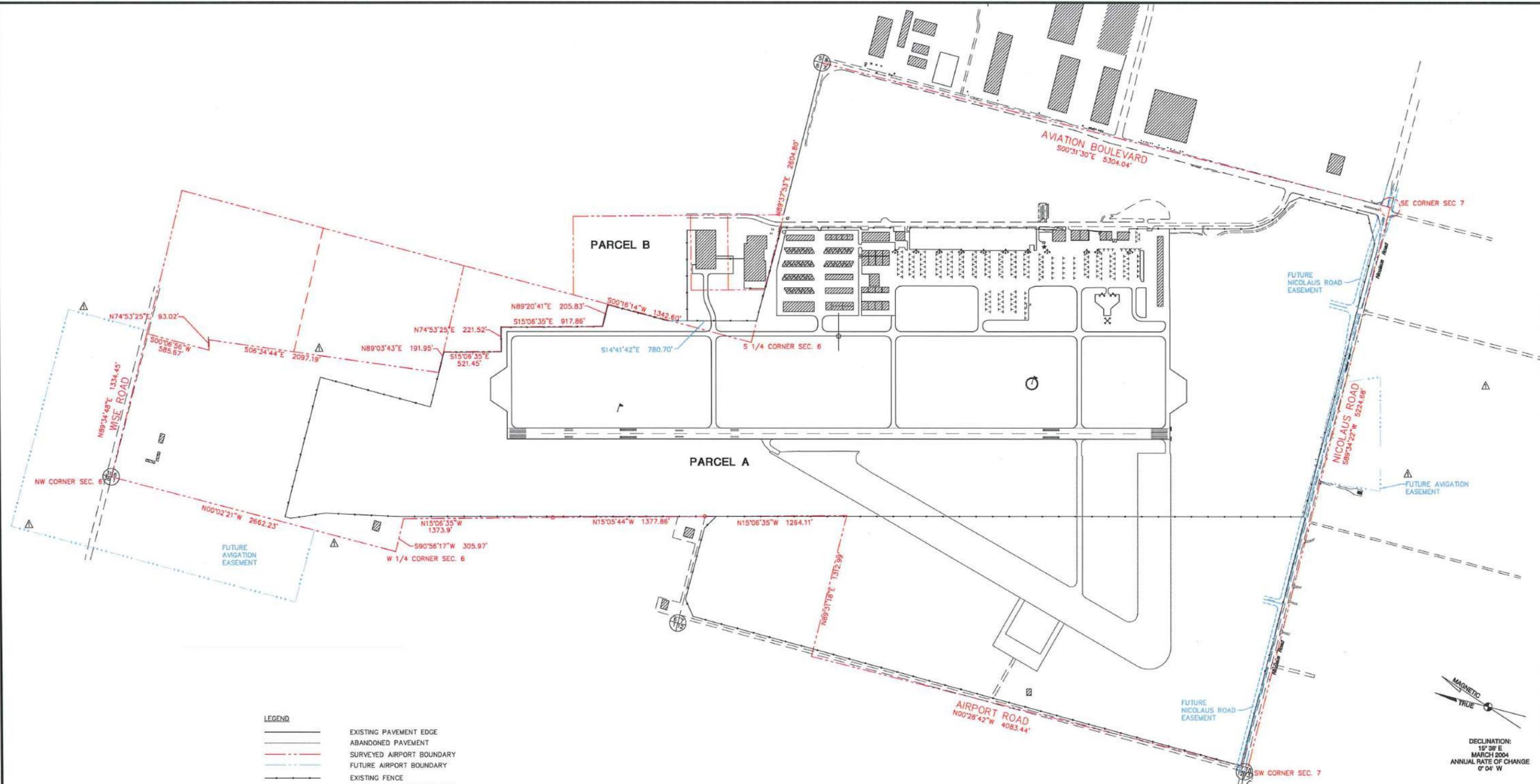


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Reinold W. Brandley  
CONSULTING AIRPORT ENGINEER

PLACER COUNTY  
STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
CITY OF LINCOLN, CALIFORNIA  
**OFF AIRPORT LAND USE PLAN**

NO.	REVISIONS		BY	APR	DATE
	INCLUDED ADOPTED PLACER COUNTY AIRPORT LAND USE COMPATIBILITY MAP				
1			DB	RWB	2/26/08



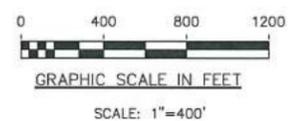
**LEGEND**

	EXISTING PAVEMENT EDGE
	ABANDONED PAVEMENT
	SURVEYED AIRPORT BOUNDARY
	FUTURE AIRPORT BOUNDARY
	EXISTING FENCE
	EXISTING AVIGATION EASEMENT
	FUTURE AVIGATION EASEMENT
	EXISTING ROAD

- NOTES:**
1. PARCEL A - AIRPORT FEE SIMPLE TITLE
  2. PARCEL B - CITY OF LINCOLN PROPERTY
  3. LOT LINE ADJUSTMENT ON PARCEL B TO MOVE PORTION OF PARCEL B TO AIRPORT PROPERTY - 1.75 ACRES

MAGNETIC  
TRUE

DECLINATION:  
15° 38' E  
MARCH 2004  
ANNUAL RATE OF CHANGE  
0' 04' W



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APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
FAA



APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
AIRPORT MANAGER



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CONSULTING AIRPORT ENGINEER

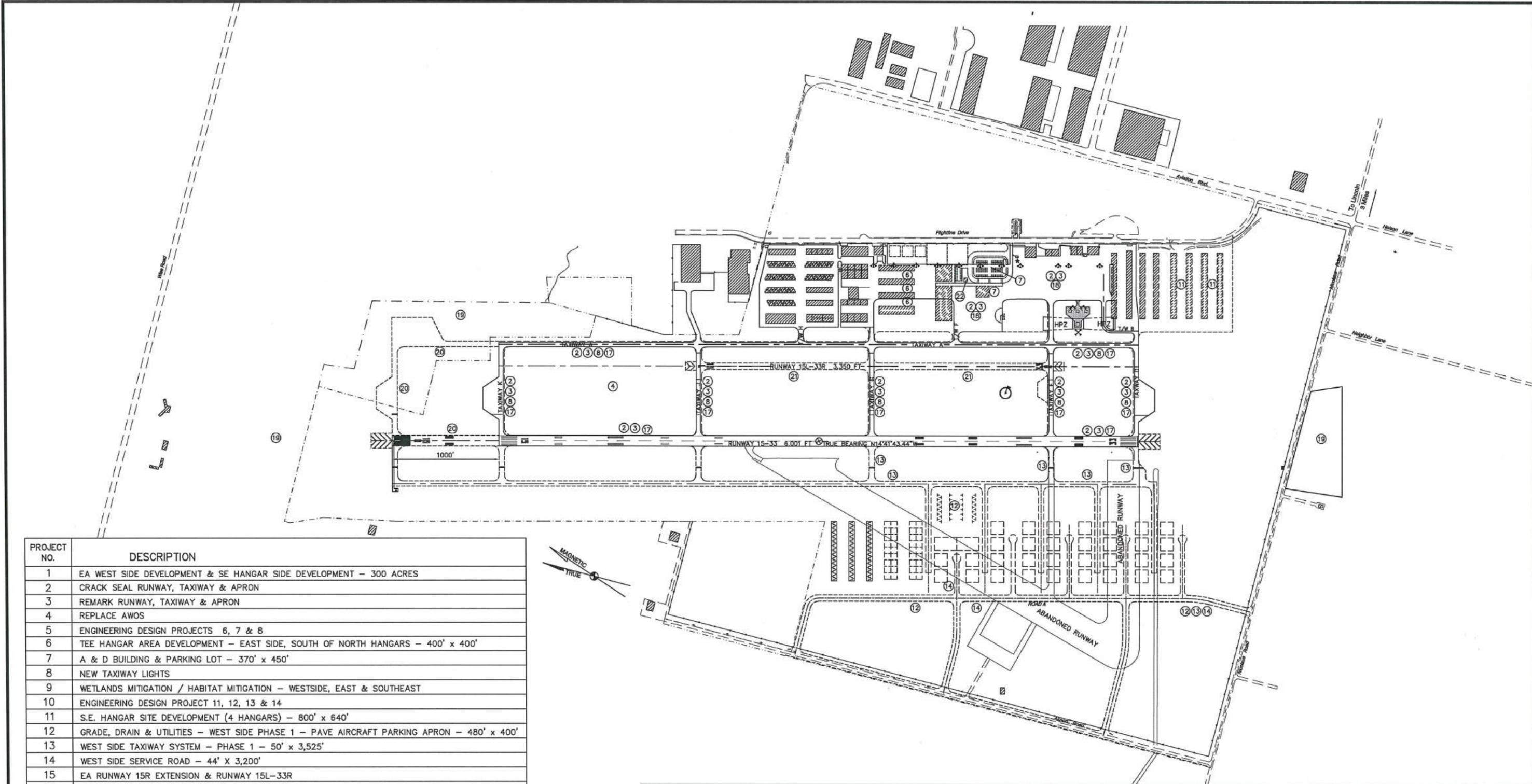
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PLACER COUNTY  
STATE OF CALIFORNIA

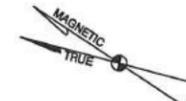
**LINCOLN REGIONAL AIRPORT**  
CITY OF LINCOLN, CALIFORNIA

**AIRPORT PROPERTY MAP - EXHIBIT 'A'**

DATE NOV. 15, 2007		SHEET NUMBER	
		11 OF 11 SHEETS	
NO.	REVISIONS	BY	DATE
1	CORRECTED AVIGATION EASEMENTS	DB	RWB 2/26/08



PROJECT NO.	DESCRIPTION
1	EA WEST SIDE DEVELOPMENT & SE HANGAR SIDE DEVELOPMENT - 300 ACRES
2	CRACK SEAL RUNWAY, TAXIWAY & APRON
3	REMARK RUNWAY, TAXIWAY & APRON
4	REPLACE AWOS
5	ENGINEERING DESIGN PROJECTS 6, 7 & 8
6	TEE HANGAR AREA DEVELOPMENT - EAST SIDE, SOUTH OF NORTH HANGARS - 400' x 400'
7	A & D BUILDING & PARKING LOT - 370' x 450'
8	NEW TAXIWAY LIGHTS
9	WETLANDS MITIGATION / HABITAT MITIGATION - WESTSIDE, EAST & SOUTHEAST
10	ENGINEERING DESIGN PROJECT 11, 12, 13 & 14
11	S.E. HANGAR SITE DEVELOPMENT (4 HANGARS) - 800' x 640'
12	GRADE, DRAIN & UTILITIES - WEST SIDE PHASE 1 - PAVE AIRCRAFT PARKING APRON - 480' x 400'
13	WEST SIDE TAXIWAY SYSTEM - PHASE 1 - 50' x 3,525'
14	WEST SIDE SERVICE ROAD - 44' x 3,200'
15	EA RUNWAY 15R EXTENSION & RUNWAY 15L-33R
16	ENGINEERING DESIGN PROJECTS 17, 18, 20 & 21
17	R/W & T/W REHABILITATION - 6,000' X 100' & 10,150' X 40'
18	APRON REHABILITATION - 400' X 1,500'
19	AVIGATION EASEMENT
20	RUNWAY 15R EXTENSION & ASSOCIATED TAXIWAYS - 100' x 1,000' & 40' x 1,830'
21	RUNWAY 15L-33R CONSTRUCTION - 60' x 3,350'
22	AIR TRAFFIC CONTROL TOWER



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CITY OF LINCOLN  
 STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
 PLACER COUNTY, CALIFORNIA  
 AIRPORT CAPITAL IMPROVEMENT PROGRAM - SKETCH MAP

**SCALE**  
 NONE  
**DATE** JAN. 22, 2007  
**SHEET NUMBER**  
 1 OF 1 SHEETS

## **CHAPTER 7. AIRPORT CAPITAL IMPROVEMENT PROGRAM**

An Airport Capital Improvement Program (ACIP) has been prepared and submitted to the Federal Aviation Administration to solicit funds for future development at the Lincoln Regional Airport. A copy of this ACIP is included as Appendix A to this report.

This ACIP was prepared in January 2007 based on the recommended development in the previous Master Plan. An updated ACIP will be prepared in January 2008 that will be based on the recommended development presented in this Master Plan.

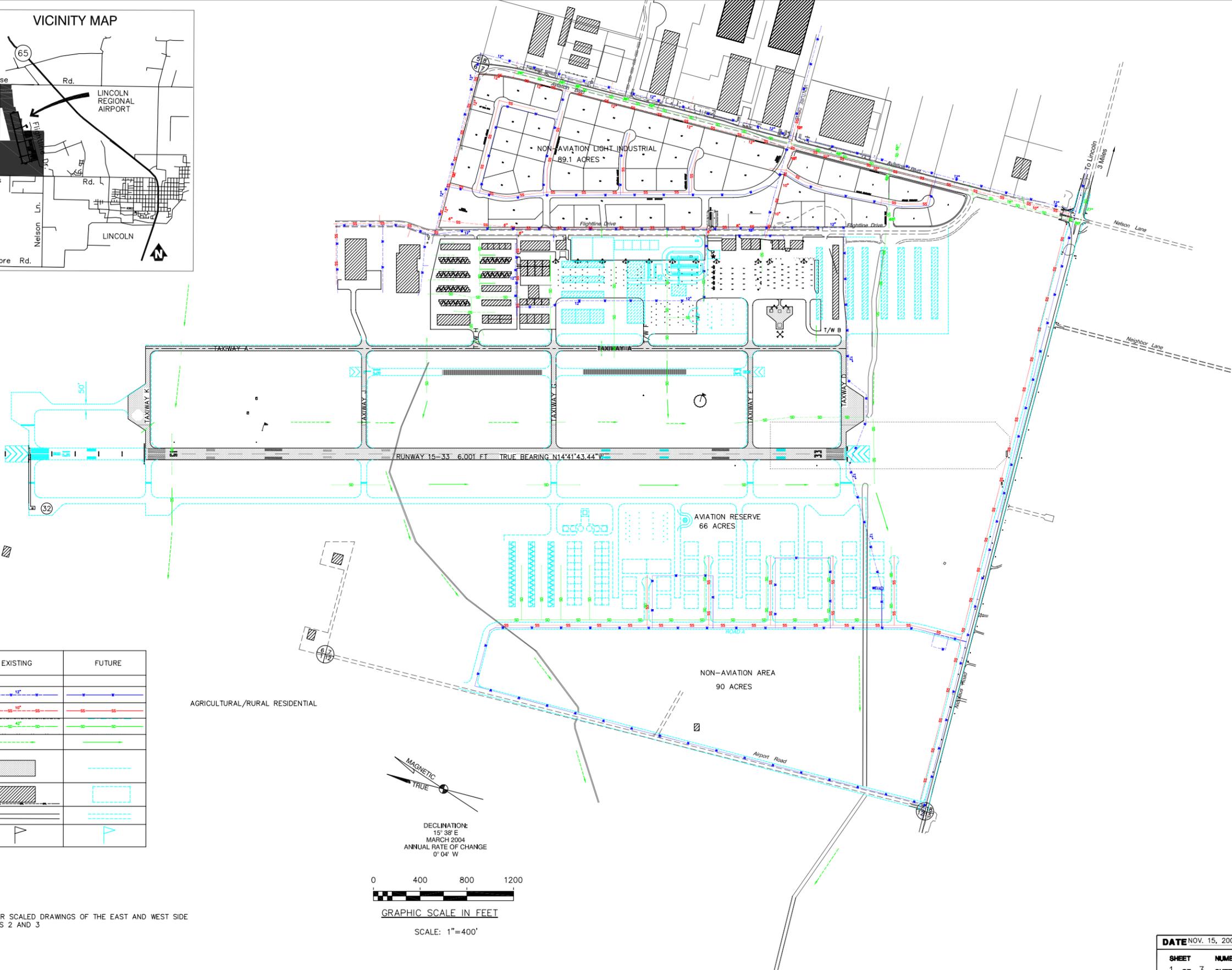
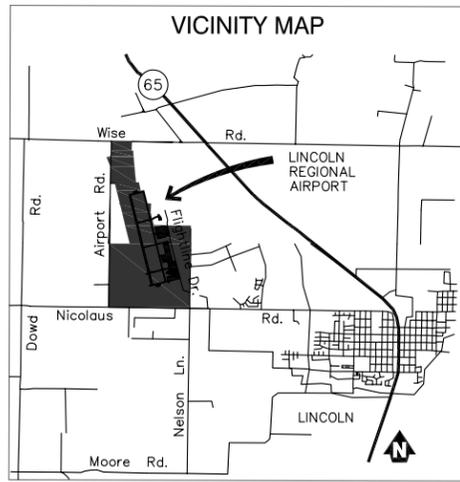
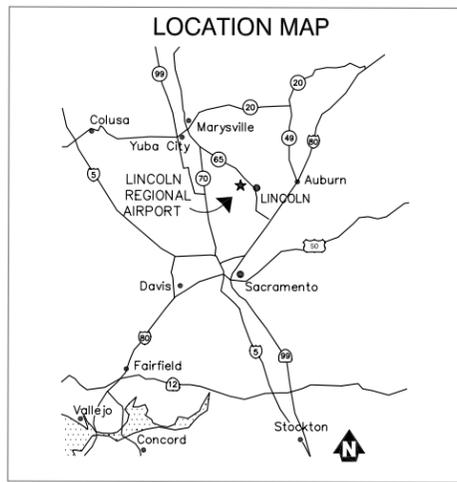
## CHAPTER 9. AIRCRAFT NOISE ASSESSMENT

An Aircraft Noise Assessment was performed as part of the Environmental Studies being conducted at this time for the Lincoln Regional Airport. This report, including the results of these studies, is included as Appendix B to this report.

## **CHAPTER 10. UTILITIES AND DRAINAGE**

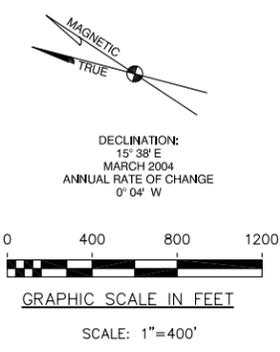
Preliminary Utility and Drainage Master Plans have been prepared to show extent and probable location of the major features. Detailed sizing and location of these utility and drainage lines will be finalized during design of each development. These plans are for the purpose of identifying location and extent of the major facilities.

The Preliminary Utility and Drainage Master Plans are included separately.



LEGEND	EXISTING	FUTURE
WATER LINE & SIZE		
SANITARY SEWER & SIZE		
STORM DRAIN LINE & SIZE		
OPEN CHANNEL FLOW		
AIRFIELD PAVEMENT AIRCRAFT MOVEMENT AREA		
FACILITIES		
ROAD (PAVED)		
SUPPLEMENTAL WINDCONE		

NOTES:  
1. FOR LARGER SCALED DRAWINGS OF THE EAST AND WEST SIDE SEE SHEETS 2 AND 3



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APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
FAA



APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
AIRPORT MANAGER

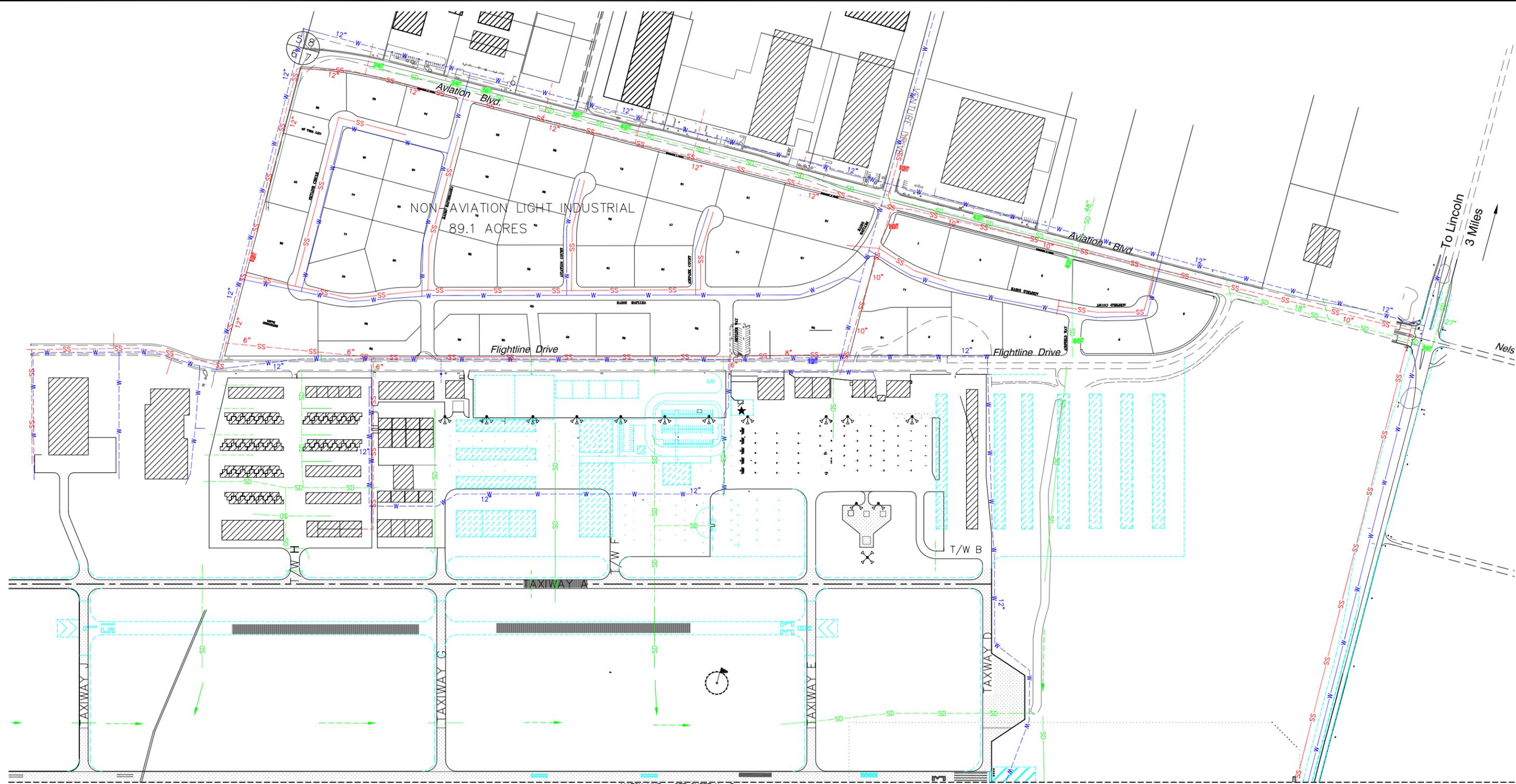


**Reinard W. Brandley**  
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PLACER COUNTY  
STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
CITY OF LINCOLN, CALIFORNIA  
**OVERALL UTILITY & DRAINAGE PLAN**

NO.	REVISIONS	BY	APR	DATE

DATE NOV. 15, 2007  
SHEET NUMBER 1 OF 3 SHEETS



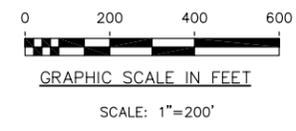
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**LEGEND**

	EXISTING	FUTURE
WATER LINE & SIZE	12" W	W
SANITARY SEWER & SIZE	10" SS	SS
STORM DRAIN LINE & SIZE	42" SD	SD
OPEN CHANNEL FLOW	→	→

**LEGEND**

	EXISTING	FUTURE
AIRFIELD PAVEMENT	[Hatched Box]	[Dashed Box]
AIRCRAFT MOVEMENT AREA	[Hatched Box]	[Dashed Box]
FACILITIES	[Hatched Box]	[Dashed Box]
ROAD (PAVED)	[Solid Line]	[Dashed Line]



MATCH LINE - SEE SHEET No. 3

<b>DATE</b>	NOV. 15, 2007
<b>SHEET</b>	2 OF 3
<b>NUMBER</b>	SHEETS

NO.	REVISIONS	BY	APR	DATE



APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
 FAA AIRPORT MANAGER

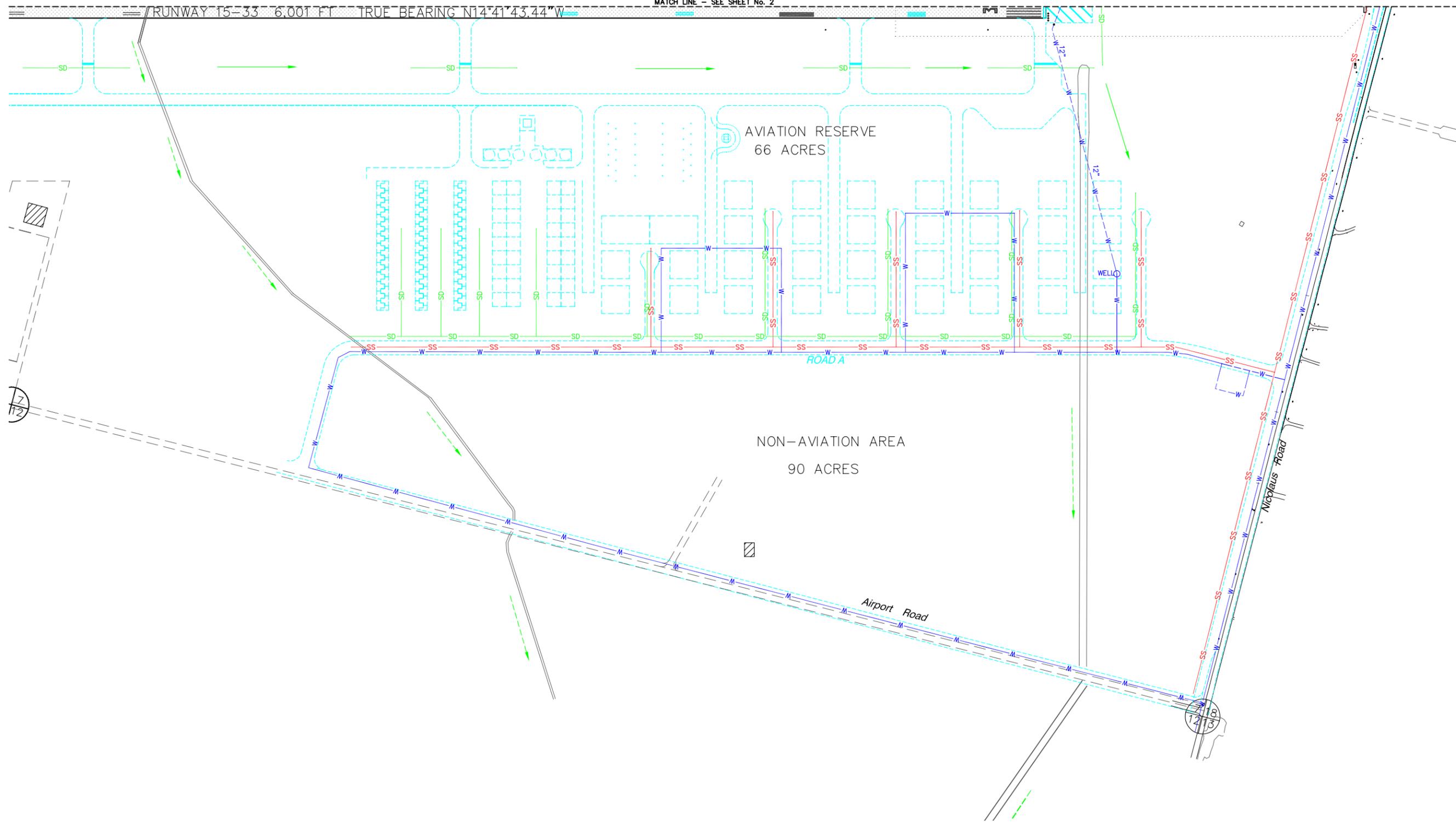


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PLACER COUNTY  
 STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
 CITY OF LINCOLN, CALIFORNIA  
**UTILITY & DRAINAGE PLAN - EAST SIDE DEVELOPMENT**

RUNWAY 15-33 6,001 FT TRUE BEARING N14°41'43.44"W

MATCH LINE - SEE SHEET No. 2

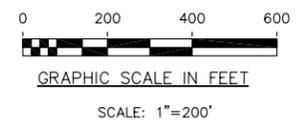


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LEGEND	EXISTING	FUTURE
WATER LINE & SIZE	12" W	W
SANITARY SEWER & SIZE	10" SS	SS
STORM DRAIN LINE & SIZE	42" SD	SD
OPEN CHANNEL FLOW	→	→

LEGEND	EXISTING	FUTURE
AIRFIELD PAVEMENT	[Hatched Box]	[Dashed Box]
AIRCRAFT MOVEMENT AREA	[Hatched Box]	[Dashed Box]
FACILITIES	[Hatched Box]	[Dashed Box]
ROAD (PAVED)	[Double Line]	[Dashed Double Line]

MAGNETIC  
TRUE  
 DECLINATION:  
 15° 38' E  
 MARCH 2004  
 ANNUAL RATE OF CHANGE  
 0° 04' W



DATE NOV. 15, 2007  
 SHEET NUMBER 3 OF 3 SHEETS

NO.	REVISIONS	BY	APR	DATE



APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
 AIRPORT MANAGER



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**Relnard W. Brandley**  
 CONSULTING AIRPORT ENGINEER

PLACER COUNTY  
 STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
 CITY OF LINCOLN, CALIFORNIA  
**UTILITY & DRAINAGE PLAN - WEST SIDE DEVELOPMENT**

**LINCOLN REGIONAL AIRPORT  
MASTER PLAN**

---

**Appendix A  
Airport Capital Improvement Program (ACIP)**

## **AIRPORT CAPITAL IMPROVEMENT PROGRAM (ACIP)**

### **LINCOLN REGIONAL AIRPORT LINCOLN, PLACER COUNTY, CALIFORNIA**

**January 3, 2008**

The Lincoln Regional Airport serves the general aviation needs of the western portion of Placer County, the City of Lincoln, and portions of northeastern Sacramento County. The airport has developed with aid from the Federal Aviation Administration and the State Division of Aeronautics from a small surplus military field to a major facility that is capable of accommodating the turbojet fleet of the commercial users as well as the smaller general aviation fleet. The airport is in a position to act as a reliever airport for Sacramento International Airport and is anticipated to develop as a major general aviation facility serving a rapidly growing area.

An ACIP has been prepared for this airport that includes 24 projects that are required for continued operation of this airport. Included in this ACIP are the following:

- ◆ AWP ACIP Data Sheets
- ◆ Series of tables showing the breakdown of costs for each project
- ◆ A table showing the summary of project costs based on 2008 unit costs
- ◆ Program Narrative
- ◆ Sketch Map showing the location of the projects

The Airport Layout Plan including Exhibit "A" was last updated in November 2007.

An environmental update for those portions of the airport to be developed in the immediate future is included as Project No. 1 of this ACIP.

**AWP ACIP DATA SHEET**

Airport Name		Lincoln Regional Airport	Fiscal Yr			2008
Shown On ALP	Project Type*	Project Description	Federal Share	Local Share	Total	
Yes	E	EA - West Side Development and SE Hangar Site Development	\$ 332,500	\$ 17,500	\$ 350,000	
Yes	D	Architectural Design - A&D Building	200,000	10,526	210,526	
Yes	D	Replace AWOS	197,600	10,400	208,000	
Yes	D	Tee Hangar Area Development - East Side, South of North Hangars - A & B	383,800	2,238,200	2,622,000	
Yes	D	Engineering Design - Projects 6, 8, 9 & 10	332,500	17,500	350,000	
* D - Development; P - Planning; E - Environmental						
<b>PROVIDE THE FOLLOWING DETAILED INFORMATION FOR PROJECTS ANTICIPATED WITHIN 1-2 YEARS</b>						
Detail Project Description (Square/Lineal Footage or Length/Width)						
Project 1 - EA West Side Development and SE Hangar Site Development - 300 Acres - Reimbursement Project 2 - Architectural Design - A & D Building Project 3 - Replace AWOS Project 4 - Tee Hangar Area Development - East Side, South of North Hangars - 400' x 400' - Phases A & B Project 5 - Engineering Design - Projects 6, 8, 9 & 10 - See Table 5 for project descriptions <b>See Program Narrative for Detailed Descriptions</b>						
Project Schedule (Anticipated date for bids or negotiated prices, consultant selection for planning or environmental projects, length of construction or design, planning or environmental process)						
Project 1 - EA West Side Development and SE Hangar Site Development - The consultant selection has taken place and this environmental study is in progress and will be completed the early part of 2008. Project 2 - Architectural Design - The consultant selection has taken place and it is proposed to complete this design work by the end of 2008. Projects 3 and 4 - It is proposed to design and construct these projects in 2008. Project 5 - Engineering Design - Projects 6, 8, 9 & 10 - The consultant selection has taken place and it is proposed to complete the engineering design of these projects in 2008.						
NEPA Environmental Status (Date of FONSI or submit CATEX Form for Approval)						
A CATEX shall be completed as first phase prior to design of all projects. In 2008 an Environmental Assessment will be accomplished for the west side development and the southeast hangar site development.						
Land Title Status & Date of Exhibit "A" Status			Date	November 2007		
Title, in fee, to all land outlined in red on Exhibit "A," Property Map, except for those encumbrances or other adverse interests listed in title opinions/certifications.						
Open AIP Funded Projects			Expected Close-out Date			
AIP 3-06-0120-12			March 2008			
AIP 3-06-0120-13			March 2008			
AIP 3-06-0120-14			March 2008			
Certification: To the best of my knowledge and belief, all information shown in the ACIP Data Sheet is true and correct and had been duly authorized by the Sponsor.						
Name and Title of Authorized Representative (Print or Type)			Contact Name and Title (Print or Type)			
David Daly, Airport Manager			David Daly, Airport Manager			
Signature		Date	Contact Phone (Print or Type)			
			(916) 645-3443			

**AWP ACIP DATA SHEET**

<b>Airport Name</b>		Lincoln Regional Airport	<b>Fiscal Yr</b>			2009
<b>Shown On ALP</b>	<b>Project Type*</b>	<b>Project Description</b>	<b>Federal Share</b>	<b>Local Share</b>	<b>Total</b>	
Yes	D	Two New Automatic Entrance Security Gates	\$ 87,400	\$ 4,600	\$ 92,000	
Yes	D	A & D Building and Parking Lot	4,685,400	246,600	4,932,000	
Yes	D	Tee Hangar Area Development - East Side, South of North Hangars - C & D	690,650	5,392,350	6,083,000	
* D - Development; P - Planning; E - Environmental						
<b>PROVIDE THE FOLLOWING DETAILED INFORMATION FOR PROJECTS ANTICIPATED WITHIN 1-2 YEARS</b>						
<b>Detail Project Description (Square/Lineal Footage or Length/Width)</b>						
Project 6 - Two New Automatic Entrance Security Gates Project 7 - A & D Building and Parking Lot - 370' x 450' Parking Lot Project 8 - Tee Hangar Area Development - East Side, South of North Hangars - 400' x 400' - Phases C & D						
<b>See Program Narrative for Detailed Descriptions</b>						
<b>Project Schedule (Anticipated date for bids or negotiated prices, consultant selection for planning or environmental projects, length of construction or design, planning or environmental process)</b>						
Projects 6 through 8 - These projects will be designed in 2008. It is proposed to construct these projects in 2009.						
<b>NEPA Environmental Status (Date of FONSI or submit CATEX Form for Approval)</b>						
A CATEX shall be completed with the design of Projects 6 through 8 in 2008. In 2008 an Environmental Assessment will be completed for the west side development and the southeast hangar side development.						
<b>Land Title Status &amp; Date of Exhibit "A" Status</b>			<b>Date</b>	November 2007		
Title, in fee, to all land outlined in red on Exhibit "A," Property Map, except for those encumbrances or other adverse interests listed in title opinions/certifications.						
<b>Open AIP Funded Projects</b>			<b>Expected Close-out Date</b>			
Certification: To the best of my knowledge and belief, all information shown in the ACIP Data Sheet is true and correct and had been duly authorized by the Sponsor.						
<b>Name and Title of Authorized Representative (Print or Type)</b>			<b>Contact Name and Title (Print or Type)</b>			
David Daly, Airport Manager			David Daly, Airport Manager			
<b>Signature</b>		<b>Date</b>	<b>Contact Phone (Print or Type)</b>			
			(916) 645-3443			

**AWP ACIP DATA SHEET**

Airport Name		Lincoln Regional Airport	Fiscal Yr			2010
Shown On ALP	Project Type*	Project Description	Federal Share	Local Share	Total	
Yes	D	New Taxiway Lights	\$ 433,200	\$ 22,800	\$ 456,000	
Yes	D	Flightline Drive Rehabilitation	1,934,200	101,800	2,036,000	
Yes	D	Wetlands Mitigation/Habitat Mitigation - West Side, East and Southeast	2,280,000	120,000	2,400,000	

\* D - Development; P - Planning; E - Environmental

**PROVIDE THE FOLLOWING DETAILED INFORMATION FOR PROJECTS ANTICIPATED WITHIN 1-2 YEARS**

**Detail Project Description (Square/Lineal Footage or Length/Width)**

Project 9 - Furnish and Install New Taxiway Lights  
 Project 10 - Flightline Drive Rehabilitation - \_\_\_ x \_\_\_  
 Project 11 - Wetlands Mitigation/Habitat Mitigation - West Side, East and Southeast

***See Program Narrative for Detailed Description***

**Project Schedule (Anticipated date for bids or negotiated prices, consultant selection for planning or environmental projects, length of construction or design, planning or environmental process)**

Projects 9 & 10 - These projects will be designed in 2008. It is proposed to construct these projects in 2010.  
 Project 11 - Wetlands Mitigation/Habitat Mitigation - It is proposed to accomplish this mitigation work in 2010.

**NEPA Environmental Status (Date of FONSI or submit CATEX Form for Approval)**

CATEX shall be completed as the first phase of design for Projects 9 and 10 in 2008.

**Land Title Status & Date of Exhibit "A" Status** Date **November 2007**

Title, in fee, to all land outlined in red on Exhibit "A," Property Map, except for those encumbrances or other adverse interests listed in title opinions/certifications.

**Open AIP Funded Projects** Expected Close-out Date

**Certification: To the best of my knowledge and belief, all information shown in the ACIP Data Sheet is true and correct and had been duly authorized by the Sponsor.**

Name and Title of Authorized Representative (Print or Type)	Contact Name and Title (Print or Type)
David Daly, Airport Manager	David Daly, Airport Manager

Signature	Date	Contact Phone (Print or Type)
		(916) 645-3443

**AWP ACIP DATA SHEET**

<b>Airport Name</b>		Lincoln Regional Airport	<b>Fiscal Yr</b>		2011
Shown On ALP	Project Type*	Project Description	Federal Share	Local Share	Total
Yes	D	Engineering Design - Projects 13 through 16	\$ 332,500	\$ 17,500	\$ 350,000
Yes	D	Southeast Hangar Site Development - 4 Hangars	1,325,820	69,780	1,395,600
* D - Development; P - Planning; E - Environmental					
<b>PROVIDE THE FOLLOWING DETAILED INFORMATION FOR PROJECTS ANTICIPATED WITHIN 1-2 YEARS</b>					
<b>Detail Project Description (Square/Lineal Footage or Length/Width)</b>					
Project 12 - Engineering Design - Projects 13 through 16 - See Table 12 for project descriptions					
Project 13 - Southeast Hangar Site Development for 4 Hangars - 800' x 640'					
<b>See Program Narrative for Detailed Description</b>					
<b>Project Schedule (Anticipated date for bids or negotiated prices, consultant selection for planning or environmental projects, length of construction or design, planning or environmental process)</b>					
Project 12 - Engineering Design - Projects 13 through 16 - This consultant selection has taken place and it is proposed to accomplish the engineering design of these projects in 2011.					
Project 13 - Southeast Hangar Site Development for 4 Hangars - It is proposed to complete the engineering design and construction of this project in 2011.					
<b>NEPA Environmental Status (Date of FONSI or submit CATEX Form for Approval)</b>					
An Environmental Assessment has been accomplished in 2008 for the west side development and the southeast hangar side development.					
A CATEX shall be completed with the design of Project 13 in 2011.					
<b>Land Title Status &amp; Date of Exhibit "A" Status</b>			<b>Date</b>	November 2007	
Title, in fee, to all land outlined in red on Exhibit "A," Property Map, except for those encumbrances or other adverse interests listed in title opinions/certifications.					
<b>Open AIP Funded Projects</b>			<b>Expected Close-out Date</b>		
Certification: To the best of my knowledge and belief, all information shown in the ACIP Data Sheet is true and correct and had been duly authorized by the Sponsor.					
<b>Name and Title of Authorized Representative (Print or Type)</b>			<b>Contact Name and Title (Print or Type)</b>		
David Daly, Airport Manager			David Daly, Airport Manager		
<b>Signature</b>		<b>Date</b>	<b>Contact Phone (Print or Type)</b>		
			(916) 645-3443		

**AWP ACIP DATA SHEET**

<b>Airport Name</b>		Lincoln Regional Airport	<b>Fiscal Yr</b>		2012
<b>Shown On ALP</b>	<b>Project Type*</b>	<b>Project Description</b>	<b>Federal Share</b>	<b>Local Share</b>	<b>Total</b>
Yes	D	Grade, Drain and Utilities - West Side Phase 1 - Pave Aircraft Parking Apron	\$ 1,540,900	\$ 535,100	\$ 2,076,000
* D - Development; P - Planning; E - Environmental					
<b>PROVIDE THE FOLLOWING DETAILED INFORMATION FOR PROJECTS ANTICIPATED WITHIN 1-2 YEARS</b>					
<b>Detail Project Description (Square/Lineal Footage or Length/Width)</b>					
Project 14 - Grade, Drain, and Utilities - West Side - Phase 1 - Pave Aircraft Parking Apron - 480' x 400'					
<i><b>See Program Narrative for Detailed Description</b></i>					
<b>Project Schedule (Anticipated date for bids or negotiated prices, consultant selection for planning or environmental projects, length of construction or design, planning or environmental process)</b>					
Project 14 - Grade, Drain, and Utilities - West Side - Phase 1 - Pave Aircraft Parking Apron - It is proposed to complete the engineering design of this project in 2011 and construct the project in 2012.					
<b>NEPA Environmental Status (Date of FONSI or submit CATEX Form for Approval)</b>					
An Environmental Assessment has been accomplished in 2008 for the west side development and the southeast hangar side development. A CATEX shall be completed with the design of Project 14 in 2011.					
<b>Land Title Status &amp; Date of Exhibit "A" Status</b>			<b>Date</b>	November 2007	
Title, in fee, to all land outlined in red on Exhibit "A," Property Map, except for those encumbrances or other adverse interests listed in title opinions/certifications.					
<b>Open AIP Funded Projects</b>			<b>Expected Close-out Date</b>		
<b>Certification: To the best of my knowledge and belief, all information shown in the ACIP Data Sheet is true and correct and had been duly authorized by the Sponsor.</b>					
<b>Name and Title of Authorized Representative (Print or Type)</b>			<b>Contact Name and Title (Print or Type)</b>		
David Daly, Airport Manager			David Daly, Airport Manager		
<b>Signature</b>		<b>Date</b>	<b>Contact Phone (Print or Type)</b>		
			(916) 645-3443		

**AWP ACIP DATA SHEET**

Airport Name		Lincoln Regional Airport	Fiscal Yr		2013
Shown On ALP	Project Type*	Project Description	Federal Share	Local Share	Total
Yes	D	West Side Taxiway System - Phase 1	\$ 2,094,750	\$ 110,250	\$ 2,205,000
Yes	D	West Side Service Road	1,269,200	66,800	1,336,000
* D - Development; P - Planning; E - Environmental					
<b>PROVIDE THE FOLLOWING DETAILED INFORMATION FOR PROJECTS ANTICIPATED WITHIN 1-2 YEARS</b>					
Detail Project Description (Square/Lineal Footage or Length/Width)					
Project 15 - West Side Taxiway System - Phase 1 - 50' x 3,525'					
Project 16 - West Side Service Road - 44' x 3,200'					
<i>See Program Narrative for Detailed Description</i>					
Project Schedule (Anticipated date for bids or negotiated prices, consultant selection for planning or environmental projects, length of construction or design, planning or environmental process)					
Projects 15 and 16 - The engineering design of these projects will be completed in 2011. It is proposed to construct these projects in 2013					
NEPA Environmental Status (Date of FONSI or submit CATEX Form for Approval)					
An Environmental Assessment has been accomplished in 2008 for the west side development and the southeast hangar side development. A CATEX shall be completed with the design of Projects 15 and 16 in 2011.					
Land Title Status & Date of Exhibit "A" Status			Date	November 2007	
Title, in fee, to all land outlined in red on Exhibit "A," Property Map, except for those encumbrances or other adverse interests listed in title opinions/certifications.					
Open AIP Funded Projects			Expected Close-out Date		
Certification: To the best of my knowledge and belief, all information shown in the ACIP Data Sheet is true and correct and had been duly authorized by the Sponsor.					
Name and Title of Authorized Representative (Print or Type)			Contact Name and Title (Print or Type)		
David Daly, Airport Manager			David Daly, Airport Manager		
Signature		Date	Contact Phone (Print or Type)		
			(916) 645-3443		

**TABLE NO. 1**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 1 - EA West Side Development & SE Hangar Site Development - 300 acres  
(Reimbursement)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Environmental Assessment	L.S.	L.S.	L.S.	\$ 340,000
2	Administrative Costs	L.S.	L.S.	L.S.	10,000
	<b>Total Project No. 1</b>				<b>\$ 350,000</b>

**TABLE NO. 2**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 2 - Architectural Design - A & D Building**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Architectural Design	L.S.	L.S.	L.S.	\$ 200,000
2	Administrative Costs	L.S.	L.S.	L.S.	10,526
	<b>Total Project No. 2</b>				<b>\$ 210,526</b>

**TABLE NO. 3**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA  
AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 3 - Replace AWOS  
(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Remove Existing AWOS	L.S.	L.S.	L.S.	\$ 15,000
2	Furnish and Install New AWOS III	L.S.	L.S.	L.S.	140,000
3	New 1/C #8 5kv Airfield Cable	Ln. Ft	4.00	2,000.0	8,000
4	Vault Work and Transformers	L.S.	L.S.	L.S.	10,000
	<b>Total Project No. 3</b>				<b>\$ 173,000</b>

**TABLE NO. 4**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 4 - Tee Hangar Area Development - East Side, South of North Hangars -  
400' x 400' - Phases A and B  
(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 10,000
2	Mobilization	L.S	L.S.	L.S.	30,000
3	Unclassified Excavation	Cu. Yd.	\$ 20.00	1,260.0	25,200
4	Scarify and Recompact Subgrade	Sq. Yd.	3.00	15,690.0	47,070
5	Pulverize Existing AC & AB	Sq. Yd.	6.00	1,410.0	8,460
6	Remove and Stockpile Pulverized AC & AB	Cu. Yd.	6.00	3,990.0	23,940
7	Place and Compact Stockpiled AC & AB as 6" ASB	Cu. Yd.	14.00	1,868.0	26,152
8	Aggregate Base Course - 6"	Tons	45.00	5,295.0	238,275
9	Bituminous Surface Course - 3"	Tons	100.00	1,955.0	195,500
10	Portland Cement Concrete Slabs	Sq. Ft.	7.00	40,320.0	282,240
11	Bituminous Prime Coat	Tons	700.00	9.0	6,300
12	Airfield Marking	Sq. Ft.	2.00	850.0	1,700
13	New DI	Each	5,000.00	1.0	5,000
14	Raise Existing DI	Each	2,000.00	1.0	2,000
15	New 24" RCP	Ln. Ft.	80.00	205.0	16,400
16	New 6" Water Line	Ln. Ft.	50.00	515.0	25,750
17	Fire Protection (32 units + storage @ 1018s.f./unit)	Sq. Ft.	8.00	34,612.0	276,896
18	New 4" Sewer Line	Ln. Ft.	50.00	300.0	15,000
19	Tee Hangar Buildings (32 units + storage @ 1018s.f./unit)	Sq. Ft.	27.00	34,612.0	934,524
20	New Rest Room	Each	15,000.00	1.0	15,000
	<b>Total Project No. 4</b>				<b>\$ 2,185,407</b>
				<b>Use</b>	<b>\$ 2,185,000</b>
	<b>F.A.A. Ineligible</b>				<b>\$ 336,000</b>
	<b>F.A.A. Eligible</b>				<b>\$ 1,849,000</b>

**TABLE NO. 5**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA  
AIRPORT CAPITAL IMPROVEMENT PROGRAM  
ENGINEER'S ESTIMATE**

**Project No. 5 - Engineering Design:**

Project No. 6 - Two New Automatic Entrance Security Gates  
Project No. 8 - Tee Hangar Area Development - East Side - Phases C and D  
Project No. 9 - New Taxiway Lights  
Project No. 10 - Flightline Drive Rehabilitation  
**Estimated Construction Cost - 2008 Basis - \$6,467,000**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Topographic Surveys	L.S.	L.S.	L.S.	\$ 10,000
2	Geotechnical Studies	L.S.	L.S.	L.S.	10,000
3	Engineering Design	L.S.	L.S.	L.S.	320,000
4	Administrative Costs	L.S.	L.S.	L.S.	10,000
	<b>Total Project No. 5</b>				<b>\$ 350,000</b>

**Note:**

Engineering design fee includes engineering design, preparation of plans, specifications, Engineer's Estimate, and Engineer's Report ready for bidding. It does not include assistance in bidding project, construction surveillance, resident engineering, or testing and inspection during construction.

**TABLE NO. 6**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA  
AIRPORT CAPITAL IMPROVEMENT PROGRAM  
ENGINEER'S ESTIMATE**

**Project No. 6 - Two New Automatic Entrance Security Gates  
(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mobilization	L.S	L.S.	L.S.	\$ 4,000
2	Automatic Entrance Security Gates	Each	\$ 35,000.00	2.0	70,000
	<b><i>Total Project No. 6</i></b>				<b>\$ 74,000</b>

**TABLE NO. 7**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 7 - A & D Building & Parking Lot - 370' x 450' Parking Lot**  
**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 10,000
2	Mobilization	L.S	L.S.	L.S.	20,000
3	Clearing & Grubbing	Acre	\$ 3,000.00	3.0	9,000
4	Unclassified Excavation	Cu. Yd.	12.00	7,000.0	84,000
5	Scarify & Recompact 6" Subgrade	Sq. Yd.	2.00	14,000.0	28,000
6	Remove & Recompact 6" Aggregate Subbase Course	Cu. Yd.	12.00	2,500.0	30,000
7	Aggregate Base Course	Ton	45.00	5,000.0	225,000
8	Bituminous Surface Course	Ton	100.00	2,500.0	250,000
9	Bituminous Prime Coat	Ton	1,200.00	11.0	13,200
10	Pulverize Existing AC & AB	Sq. Yd.	5.00	15,000.0	75,000
11	Remove Pulverized Material & Stockpile	Cu. Yd.	12.00	3,000.0	36,000
12	Saw Cut Existing AC	Ln. Ft.	5.00	1,200.0	6,000
13	New 18" RCP	Ln. Ft.	70.00	800.0	56,000
14	New Drop Inlet	Each	8,000.00	2.0	16,000
15	New Curb Inlet	Each	9,000.00	6.0	54,000
16	Raise Existing Drop Inlet	Each	6,000.00	1.0	6,000
17	New Curb & Gutter	Ln. Ft.	15.00	5,000.0	75,000
18	New Sidewalk	Sq. Ft.	8.00	6,500.0	52,000
19	New Security Fence	Ln. Ft.	25.00	900.0	22,500
20	New A & D Building	Sq. Ft.	250.00	12,000.0	3,000,000
21	Parking Lot and Road Lighting	L.S.	L.S.	L.S.	40,000
	<b>Total Project No. 7</b>				\$ 4,107,700
				<b>Use</b>	\$ 4,110,000

**TABLE NO. 8**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 8 - Tee Hangar Area Development - East Side, South of North Hangars -  
400' x 400' - Phases C and D  
(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 10,000
2	Mobilization	L.S	L.S.	L.S.	30,000
3	Clearing and Grubbing	Acre	\$ 5,000.00	1.0	5,000
4	Unclassified Excavation	Cu. Yd.	20.00	565.0	11,300
5	Imported Fill	Cu. Yd.	20.00	13,310.0	266,200
6	Scarify and Recompact Subgrade	Sq. Yd.	3.00	20,770.0	62,310
7	Pulverize Existing AC & AB	Sq. Yd.	6.00	480.0	2,880
8	Remove and Stockpile Pulverized AC & AB	Cu. Yd.	6.00	1,390.0	8,340
9	Place and Compact Stockpiled AC & AB as 6" ASB	Cu. Yd.	14.00	960.0	13,440
10	Remove, Place, Compact Stockpiled ASB	Cu. Yd.	14.00	1,323.0	18,522
11	Aggregate Base Course - 6"	Tons	45.00	7,010.0	315,450
12	Bituminous Surface Course - 3"	Tons	100.00	2,393.0	239,300
13	Portland Cement Concrete Slabs	Sq. Ft.	7.00	63,360.0	443,520
14	Bituminous Prime Coat	Tons	1,200.00	11.0	13,200
15	Airfield Marking	Sq. Ft.	2.00	855.0	1,710
16	New DI	Each	5,000.00	4.0	20,000
17	New 18" RCP	Ln. Ft.	70.00	67.0	4,690
18	New 24" RCP	Ln. Ft.	80.00	523.0	41,840
19	New 6" Water Line	Ln. Ft.	50.00	355.0	17,750
20	Fire Protection (32 units + storage @ 1018s.f./unit)	Sq. Ft.	8.00	60,506.0	484,048
21	Tee Hangar Buildings (16 units + storage @ 1018s.f./unit)	Sq. Ft.	27.00	17,306.0	467,262
22	120'x120' Hangars (3 total)	Sq. Ft.	60.00	43,200.0	2,592,000
	<b>Total Project No. 8</b>				\$ 5,068,762
				<b>Use</b>	\$ 5,069,000
	<b>F.A.A. Ineligible</b>				\$ 606,000
	<b>F.A.A. Eligible</b>				\$ 4,463,000

**TABLE NO. 9**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA  
AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 9 - New Taxiway Lights  
(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mobilization	L.S	L.S.	L.S.	\$ 20,000
2	New Medium Intensity Taxiway Edge Light	Each	\$ 1,700.00	194.0	329,800
3	Remove and Replace 1/C #8 5kv Airfield Cable	Ln. Ft.	1.50	19,500.0	29,250
	<b>Total Project No. 9</b>				<b>\$ 379,050</b>
				<b>Use</b>	<b>\$ 380,000</b>

**TABLE NO. 10**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA  
AIRPORT CAPITAL IMPROVEMENT PROGRAM  
ENGINEER'S ESTIMATE  
Project No. 10 - Flightline Drive Rehabilitation  
(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mobilization	L.S.	L.S.	L.S.	\$ 30,000
2	Traffic Control	L.S.	L.S.	L.S.	20,000
3	Pulverize, Excavate and Stockpile AC & AB	Sq. Yd.	\$ 10.00	22,000.0	220,000
4	Excavation	Cu. Yd.	20.00	8,000.0	160,000
5	Scarify and Recompact Subgrade	Sq. Yd.	2.00	22,000.0	44,000
6	Place Pulverized AC & AB as ASB	Cu. Yd.	10.00	6,000.0	60,000
7	Aggregate Base Course	Ton	45.00	10,000.0	450,000
8	Bituminous Surface Course	Ton	100.00	6,000.0	600,000
9	Roadway Marking	Sq. Ft.	3.00	8,000.0	24,000
10	Shoulder Grading	Sq. Yd.	3.00	7,000.0	21,000
	<b><i>Total Project No. 10</i></b>				<b>\$ 1,629,000</b>

**TABLE NO. 11**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 11 - Wetlands Mitigation / Habitat Mitigation - Westside, East & Southeast**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Wetlands Mitigation/Habitat Mitigation	L.S.	L.S.	L.S.	\$ 2,000,000
	<b>Total Project No. 11</b>				<b>\$ 2,000,000</b>

**TABLE NO. 12**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 12 - Engineering Design:**

- Project No. 13 - Southeast Hangar Site Development (4 Hangars)
- Project No. 14 - Grade, Drain and Utilities - West Side - Phase 1 - Pave Aircraft Parking Apron
- Project No. 15 - West Side Taxiway System - Phase 1
- Project No. 16 - West Side Service Road

Estimated Construction Cost - 2008 Basis - \$5,842,000

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Topographic Surveys	L.S.	L.S.	L.S.	\$ 20,000
2	Geotechnical Studies	L.S.	L.S.	L.S.	20,000
3	Engineering Design	L.S.	L.S.	L.S.	300,000
4	Administrative Cost	L.S.	L.S.	L.S.	10,000
	<b>Total Project No. 12</b>				<b>\$ 350,000</b>

**Note:**

Engineering design fee includes engineering design, preparation of plans, specifications, Engineer's Estimate, and Engineer's Report ready for bidding. It does not include assistance in bidding project, construction surveillance, resident engineering, or testing and inspection during construction.

**TABLE NO. 13**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 13 - S.E. Hangar Site Development (4 Hangars) - 800' x 640'**  
**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mobilization	L.S	L.S.	L.S.	\$ 20,000
2	Clearing and Grubbing	Acre	\$ 3,000.00	12.0	36,000
3	Unclassified Excavation	Cu. Yd.	12.00	20,000.0	240,000
4	Scarify and Recompact Subgrade	Sq. Yd.	2.00	12,300.0	24,600
5	Imported Aggregate Subbase	Cu. Yd.	40.00	2,100.0	84,000
6	Imported Crushed Aggregate Base Course	Tons	45.00	4,200.0	189,000
7	Bituminous Surface Course	Tons	100.00	2,200.0	220,000
8	Bituminous Prime Coat	Tons	1,400.00	10.0	14,000
9	Airfield Marking	Sq. Ft.	2.00	3,100.0	6,200
10	New 18" Reinforced Concrete Pipe	Ln. Ft.	70.00	1,850.0	129,500
11	New 24" Reinforced Concrete Pipe	Ln. Ft.	100.00	850.0	85,000
12	Drop Inlet Structure	Each	8,000.00	11.0	88,000
13	New 1W-2" Type II Underground Duct	Ln. Ft.	16.00	900.0	14,400
14	New 1/C #8 5kv Airfield Cable	Ln. Ft.	2.00	1,850.0	3,700
15	New Medium Intensity Taxiway Edge Lights	Each	1,700.00	5.0	8,500
	<b>Total Project No. 13</b>				\$ 1,162,900
				<b>Use</b>	\$ 1,163,000

**TABLE NO. 14**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 14 - Grade, Drain & Utilities - West Side Phase 1 - Pave Aircraft Parking Apron -  
480' x 400'**

**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 10,000
2	Mobilization	L.S	L.S.	L.S.	25,000
3	Clearing & Grubbing	Acre	\$ 3,000.00	5.0	15,000
4	Unclassified Excavation	Cu. Yd.	12.00	5,000.0	60,000
5	Scarify & Recompact 6" Subgrade	Sq. Yd.	2.00	21,500.0	43,000
6	Aggregate Subbase Course	Cu. Yd.	40.00	4,000.0	160,000
7	Aggregate Base Course	Ton	45.00	7,500.0	337,500
8	Bituminous Surface Course	Ton	100.00	4,000.0	400,000
9	Bituminous Prime Coat	Ton	1,400.00	18.0	25,200
10	New Airfield Marking	Sq. Ft.	2.00	1,100.0	2,200
11	New 18" RCP	Ln. Ft.	70.00	600.0	42,000
12	New Drop Inlet	Each	8,000.00	1.0	8,000
13	New Flared End Section	Each	1,000.00	1.0	1,000
14	New 2W-6", 4W-4" Type I Electrical Duct	Ln. Ft.	60.00	3,200.0	192,000
15	New Tiedowns	Each	170.00	36.0	6,120
16	New 10-inch Water Line	Ln. Ft.	50.00	3,200.0	160,000
17	Water Valves	Each	60.00	16.0	960
18	Fire Hydrant	Each	500.00	16.0	8,000
19	New 18-inch Sewer Line	Ln. Ft.	60.00	3,200.0	192,000
20	Sewer Manhole	Each	6,000.00	7.0	42,000
	<b>Total Project No. 14</b>				<b>\$ 1,729,980</b>
				<b>Use</b>	<b>\$ 1,730,000</b>
	Less: Ineligible Items*				<b>(378,000)</b>
	F.A.A. Eligible				<b>\$ 1,352,000</b>

\*Ineligible items: Electrical Duct (50%), Water Line (30%), Sewer Line (100%) and Sewer Manhole (100%).

**TABLE NO. 15**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 15 - West Side Taxiway System - Phase 1 - 50' x 3,525'**  
**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 10,000
2	Mobilization	L.S	L.S.	L.S.	25,000
3	Clearing & Grubbing	Acre	\$ 3,000.00	25.0	75,000
4	Unclassified Excavation	Cu. Yd.	12.00	28,000.0	336,000
5	Scarify & Recompact 6" Subgrade	Sq. Yd.	2.00	24,000.0	48,000
6	Aggregate Subbase Course	Cu. Yd.	40.00	4,000.0	160,000
7	Aggregate Base Course	Ton	45.00	8,100.0	364,500
8	Bituminous Surface Course	Ton	100.00	4,000.0	400,000
9	Bituminous Prime Coat	Ton	1,200.00	20.0	24,000
10	New Airfield Marking	Sq. Ft.	2.00	11,000.0	22,000
11	New 18" RCP	Ln. Ft.	70.00	350.0	24,500
12	New Drop Inlet	Each	8,000.00	3.0	24,000
13	New Flared End Section	Each	1,000.00	3.0	3,000
14	New 1w-2" Type II Duct	Ln. Ft.	15.00	7,200.0	108,000
15	New 2W-3" Type I Duct	Ln. Ft.	26.00	600.0	15,600
16	New Airfield Cable	Ln. Ft.	2.00	1,000.0	2,000
17	New Taxiway Edge Lights	Each	1,700.00	50.0	85,000
18	New Type C Pull Box	Each	4,000.00	16.0	64,000
19	New Airfield Guidance Sign	Each	4,500.00	3.0	13,500
20	Modify Existing Airfield Guidance Sign Legend	Each	2,000.00	3.0	6,000
21	New 10 kw Regulator	Each	16,000.00	1.0	16,000
22	Electrical Vault Work	L.S	L.S.	L.S.	10,000
	<b>Total Project No. 15</b>				\$ 1,836,100
				<b>Use</b>	\$ 1,837,000

**TABLE NO. 16**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 16 - West Side Service Road - 44' x 3,200'**  
**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 10,000
2	Mobilization	L.S	L.S.	L.S.	20,000
3	Clearing & Grubbing	Acre	\$ 3,000.00	10.0	30,000
4	Unclassified Excavation	Cu. Yd.	12.00	7,500.0	90,000
5	Scarify & Recompact 6" Subgrade	Sq. Yd.	2.00	22,500.0	45,000
6	Aggregate Subbase Course	Cu. Yd.	40.00	4,000.0	160,000
7	Aggregate Base Course	Ton	45.00	7,500.0	337,500
8	Bituminous Surface Course	Ton	100.00	3,700.0	370,000
9	Bituminous Prime Coat	Ton	1,200.00	18.0	21,600
10	New Road Marking	Sq. Ft.	2.00	2,200.0	4,400
11	New 18" RCP	Ln. Ft.	70.00	80.0	5,600
12	New Flared End Section	Each	8,000.00	1.0	8,000
13	New Head Wall	Each	10,000.00	1.0	10,000
14	New Stop Sign	Each	600.00	1.0	600
	<b>Total Project No. 16</b>				\$ 1,112,700
				<b>Use</b>	\$ 1,113,000

**TABLE NO. 17**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 17 - EA - Runway 15R Extension & Runway 15L-33R**  
**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Environmental Assessment	L.S.	L.S.	L.S.	\$ 400,000
2	Environmental Impact Report	L.S.	L.S.	L.S.	130,000
3	Administrative Costs	L.S.	L.S.	L.S.	10,000
	<b><i>Total Project No. 17</i></b>				<b>\$ 540,000</b>

**TABLE NO. 18**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 18 - Engineering Design:**

Project No. 19 - Runway and Taxiway Rehabilitation

Project No. 20 - Apron Rehabilitation

Project No. 21 - Runway 15R Extension and Associated Taxiways

Project No. 22 - Construct Runway 15L-33R

Estimated Construction Cost - 2008 Basis - \$11,934,000

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Topographic Surveys	L.S.	L.S.	L.S.	\$ 30,000
2	Geotechnical Studies	L.S.	L.S.	L.S.	30,000
3	Engineering Design	L.S.	L.S.	L.S.	500,000
4	Administrative Costs	L.S.	L.S.	L.S.	10,000
	<b><i>Total Project No. 18</i></b>				<b>\$ 570,000</b>

**Note:**

Engineering design fee includes engineering design, preparation of plans, specifications, Engineer's Estimate, and Engineer's Report ready for bidding. It does not include assistance in bidding project, construction surveillance, resident engineering, or testing and inspection during construction.

**TABLE NO. 19**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 19 - Runway and Taxiway Rehabilitation**

***Runway - 100' x 6,000'; Taxiway - 40' x 10,150'***

**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 20,000
2	Mobilization	L.S	L.S.	L.S.	20,000
3	Grind AC	Sq. Ft.	\$ 4.00	112,000.0	448,000
4	Remove and Stockpile Grindings	Cu. Yd.	8.00	4,000.0	32,000
5	Heater Remix	Sq. Yd.	4.00	128,000.0	512,000
6	Bituminous Surface Course	Ton	100.00	26,000.0	2,600,000
7	New Airfield Marking	Sq. Ft.	2.00	70,000.0	140,000
	<b>Total Project No. 19</b>				<b>\$ 3,772,000</b>

**TABLE NO. 20**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 20 - Apron Rehabilitation - 400' x 1,500'**

**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 15,000
2	Mobilization	L.S	L.S.	L.S.	25,000
3	Grind AC	Sq. Ft.	\$ 4.00	67,000.0	268,000
4	Remove and Stockpile Grindings	Cu. Yd.	8.00	2,000.0	16,000
5	Heater Remix	Sq. Yd.	\$ 4.00	58,000.0	232,000
6	Bituminous Surface Course	Ton	100.00	15,500.0	1,550,000
7	New Airfield Marking	Sq. Ft.	2.00	3,100.0	6,200
8	New Tiedowns	Each	180.00	250.0	45,000
	<b>Total Project No. 20</b>				<b>\$ 2,157,200</b>
				<b>Use</b>	<b>\$ 2,160,000</b>

**TABLE NO. 21**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 21 - Runway 15R Extension & Associated Taxiways**  
**Runway - 100' x 1,000'; Taxiway - 40' x 1,830'**  
**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S.	L.S.	L.S.	\$ 20,000
2	Mobilization	L.S.	L.S.	L.S.	25,000
3	Clearing & Grubbing	Acre	\$ 3,000.00	55.0	165,000
4	Unclassified Excavation	Cu. Yd.	12.00	60,000.0	720,000
5	Scarify & Recompact 6" Subgrade	Sq. Yd.	2.00	42,000.0	84,000
6	Aggregate Subbase Course	Cu. Yd.	40.00	7,000.0	280,000
7	Aggregate Base Course	Ton	45.00	14,500.0	652,500
8	Bituminous Surface Course	Ton	100.00	7,100.0	710,000
9	Bituminous Prime Coat	Ton	1,200.00	35.0	42,000
10	New Airfield Marking	Sq. Ft.	2.00	30,000.0	60,000
11	Remove Existing Airfield Marking	Sq. Ft.	3.00	18,200.0	54,600
12	New 18" RCP	Ln. Ft.	70.00	600.0	42,000
13	New Drop Inlet	Each	8,000.00	1.0	8,000
14	New Flared End Section	Each	1,200.00	1.0	1,200
15	New 1W-2" Type II Duct	Ln. Ft.	16.00	6,100.0	97,600
16	New 2W-3" Type I Duct	Ln. Ft.	26.00	300.0	7,800
17	New Airfield Cable	Ln. Ft.	2.00	9,000.0	18,000
18	New Runway Edge Lights	Each	1,700.00	20.0	34,000
19	New Taxiway Edge Lights	Each	1,700.00	50.0	85,000
20	New Type C Pull Boxes	Each	4,000.00	6.0	24,000
21	New Airfield Guidance Signs	Each	4,500.00	2.0	9,000
22	Relocate Existing MALSR	L.S.	L.S.	L.S.	400,000
23	Relocate Existing PAPI	L.S.	L.S.	L.S.	60,000
24	Relocate Existing Glide Path Antenna	L.S.	L.S.	L.S.	500,000
	<b>Total Project No. 21</b>				\$ 4,099,700
				<b>Use</b>	\$ 4,100,000

**TABLE NO. 22**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**ENGINEER'S ESTIMATE**

**Project No. 22 - Runway 15L-33R Construction - 60' x 3,350'**

**(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Mark & Light Closed Airport Facilities	L.S	L.S.	L.S.	\$ 25,000
2	Mobilization	L.S	L.S.	L.S.	30,000
3	Clearing & Grubbing	Acre	\$ 3,000.00	20.0	60,000
4	Unclassified Excavation	Cu. Yd.	12.00	12,000.0	144,000
5	Scarify & Recompact 6" Subgrade	Sq. Yd.	2.00	26,000.0	52,000
6	Aggregate Subbase Course	Cu. Yd.	40.00	4,300.0	172,000
7	Aggregate Base Course	Ton	45.00	8,700.0	391,500
8	Bituminous Surface Course	Ton	100.00	4,200.0	420,000
9	Bituminous Prime Coat	Ton	1,200.00	20.0	24,000
10	New Airfield Marking	Sq. Ft.	2.00	25,000.0	50,000
11	New 18" HDPE	Ln. Ft.	60.00	1,600.0	96,000
12	New 24" RCP	Ln. Ft.	100.00	1,000.0	100,000
13	New Drop Inlet	Each	8,000.00	6.0	48,000
14	New Flared End Section	Each	1,200.00	2.0	2,400
15	New 1W-2" Type II Duct	Ln. Ft.	16.00	3,000.0	48,000
16	New 2W-3" Type I Duct	Ln. Ft.	24.00	700.0	16,800
17	New Airfield Cable	Ln. Ft.	2.00	9,300.0	18,600
18	New Runway Edge Lights	Each	1,700.00	46.0	78,200
19	New Type C Pull Boxes	Each	4,000.00	12.0	48,000
20	New Airfield Guidance Signs	Each	4,500.00	10.0	45,000
21	New 10 kw Regulator	Each	17,000.00	1.0	17,000
22	Electrical Vault Work	L.S	L.S.	L.S.	15,000
	<b>Total Project No. 22</b>				<b>\$ 1,901,500</b>
				<b>Use</b>	<b>\$ 1,902,000</b>

**TABLE NO. 23**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA  
AIRPORT CAPITAL IMPROVEMENT PROGRAM  
ENGINEER'S ESTIMATE**

**Project No. 23 - Air Traffic Control Tower  
(Based on 2008 Unit Prices)**

Item No.	Description	Unit	Unit Cost	Quantity	Total Cost
1	Air Traffic Control Tower	L.S.	L.S.	L.S.	\$ 1,500,000
	<b><i>Total Project No. 23</i></b>				<b>\$ 1,500,000</b>

**TABLE NO. 24**

**LINCOLN REGIONAL AIRPORT  
LINCOLN, PLACER COUNTY, CALIFORNIA**

**AIRPORT CAPITAL IMPROVEMENT PROGRAM**

**SUMMARY OF PROJECT COSTS**  
**(Based on 2008 Unit Prices)**

Project/ Priority No.	Shown on ALP	Project Type	Construction Year	Description	Construction Cost	Engineering & Administration Cost	Total Project Cost	FAA Eligible Project Cost	FAA Ineligible Project Cost	F.A.A. Participation	Local Participation
1	Yes	E	2008	EA - West Side Development and SE Hangar Site Development - 300 acres - Reimbursement	\$ -	\$ 350,000	\$ 350,000	\$ 350,000	\$ -	\$ 332,500	\$ 17,500
2	Yes	D	2008	Architectural Design - A & D Building	-	210,526	210,526	210,526	-	200,000	10,526
3	Yes	D	2008	Replace AWOS	173,000	35,000	208,000	208,000	-	197,600	10,400
4	Yes	D	2008	Tee Hangar Area Development - East Side, South of North Hangars - 400' x 400' - Phases A & B	2,185,000	437,000	2,622,000	404,000	2,218,000	383,800	2,238,200
5	Yes	D	2008	Engineering Design - Projects 6, 8, 9 and 10	-	350,000	350,000	350,000	-	332,500	17,500
6	Yes	D	2009	Two New Automatic Entrance Security Gates	74,000	18,000	92,000	92,000	-	87,400	4,600
7	Yes	D	2009	A & D Building and Parking Lot - 370' x 450' Parking Lot	4,110,000	822,000	4,932,000	4,932,000	-	4,685,400	246,600
8	Yes	D	2009	Tee Hangar Area Development - East Side, South of North Hangars - Phases C and D	5,069,000	1,014,000	6,083,000	727,000	5,356,000	690,650	5,392,350
9	Yes	D	2010	New Taxiway Lights	380,000	76,000	456,000	456,000	-	433,200	22,800
10	Yes	D	2010	Flightline Drive Rehabilitation	1,629,000	407,000	2,036,000	2,036,000	-	1,934,200	101,800
11	No	D	2010	Wetlands Mitigation/Habitat Mitigation - West Side, East and Southeast	2,000,000	400,000	2,400,000	2,400,000	-	2,280,000	120,000
12	Yes	D	2011	Engineering Design - Projects 13 through 16	-	350,000	350,000	350,000	-	332,500	17,500
13	Yes	D	2011	Southeast Hangar Site Development (4 Hangars) - 800' x 640'	1,163,000	232,600	1,395,600	1,395,600	-	1,325,820	69,780
14	Yes	D	2012	Grade, Drain & Utilities - West Side Phase 1 - Pave Aircraft Parking Apron - 480' x 400'	1,730,000	346,000	2,076,000	1,622,000	454,000	1,540,900	535,100
15	Yes	D	2013	West Side Taxiway System - Phase 1 - 50' x 3,525'	1,837,000	368,000	2,205,000	2,205,000	-	2,094,750	110,250
16	Yes	D	2013	West Side Service Road - 44' x 3,200'	1,113,000	223,000	1,336,000	1,336,000	-	1,269,200	66,800
17	Yes	E	2014	EA - Runway 15R Extension & Runway 15L-33R	-	540,000	540,000	540,000	-	513,000	27,000
18	Yes	D	2014	Engineering Design - Projects 19, 20, 21, & 22	-	570,000	570,000	570,000	-	541,500	28,500
19	Yes	D	2015	Runway and Taxiway Rehabilitation - 6,000' x 100' R/W and 10,150' x 40' T/W	3,772,000	754,000	4,526,000	4,526,000	-	4,299,700	226,300
20	Yes	D	2016	Apron Rehabilitation - 400' x 1,500'	2,160,000	432,000	2,592,000	2,592,000	-	2,462,400	129,600
21	Yes	D	2017	Runway 15R Extension and Associated Taxiways - 100' x 1,000' R/W and 40' x 1,830' T/W	4,100,000	820,000	4,920,000	4,920,000	-	4,674,000	246,000
22	Yes	D	2018	Runway 15L-33R Construction - 60' x 3,350'	1,902,000	380,000	2,282,000	2,282,000	-	2,167,900	114,100
23	Yes	D	2019	Air Traffic Control Tower	1,500,000	300,000	1,800,000	1,800,000	-	1,710,000	90,000
				<b>Totals</b>	<b>\$ 34,897,000</b>	<b>\$ 9,435,126</b>	<b>\$ 44,332,126</b>	<b>\$ 36,304,126</b>	<b>\$ 8,028,000</b>	<b>\$ 34,488,920</b>	<b>\$ 9,843,206</b>

## AIRPORT CAPITAL IMPROVEMENT PROGRAM (ACIP)

### LINCOLN REGIONAL AIRPORT LINCOLN, PLACER COUNTY, CALIFORNIA

#### PROGRAM NARRATIVE

The City of Lincoln, with financial assistance from the F.A.A. through the Airport Improvement Program, proposes the development of 24 projects at the Lincoln Regional Airport. This Program Narrative provides a brief description of each project and details of the proposed construction.

#### ***Project No. 1 – EA – West Side Development and Southeast Hangar Site Development – 300 Acres - Reimbursement***

The Lincoln Regional Airport has an immediate need for additional hangars for aircraft storage. The Airport Layout Plan Update shows new hangars to be developed on the northern portion of the existing aircraft tie down apron and to the south of the existing south hangar development. It is also proposed to provide significant space on the west side of the airport for potential increases in aeronautical use of the airport. There is significant area remaining that will not be needed for aeronautical purposes and is proposed for development as commercial/industrial facilities.

There exist on the airport wetlands and potentially endangered species. It is, therefore, important prior to detailed development of the area to conduct a detailed Environmental Assessment of the affected areas. This project will include preparation of the Environmental Assessment for the total west side development area on the airport and the two proposed tee hangar site development areas on the southeast side of the airport. This work will include a detailed Environmental Assessment of the areas proposed for development and the preparation of an Environmental Assessment Report (EA). An Environmental Impact Report (EIR) will also be included in this study to satisfy State requirements, but the EIR portion of the work will not be eligible for Federal funding.

The cost breakdown of this work is included in Table No. 1.

#### ***Project No. 2 – Architectural Design – A & D Building***

The Federal Aviation Administration Western Region has instituted a policy whereby grants are to be issued after bids on the project have been obtained and the cost is defined. It is difficult for a Sponsor to go through the process of selecting an engineer if necessary, negotiating a contract for engineering design on a specific project, preparing the engineering design and plans and specifications, and then obtaining bids on the project early enough to begin construction in the summer construction season of the same year in which the grant is provided, particularly when notification of a grant being available is not given until early spring. It is, therefore, proposed to request an F.A.A. grant for engineering design of the projects anticipated to be constructed with F.A.A. funding during the following three to four years.

This Project No. 2 includes the engineering design for the project included in this ACIP as Project No. 7, A & D Building and Parking Lot, which project is anticipated to be constructed and funded in 2009. The architectural design for this project will be limited to conducting necessary topographic surveys, geotechnical studies, and pavement design studies for all the project and

then conducting detailed architectural design and preparation of plans and specifications, Engineer's Estimate, and Engineer's Design Report for the project. Not included in this Project No. 2 are the costs for the following items:

- Assistance to Sponsor during bidding and bid award
- Surveillance during the construction of the project
- Resident engineering, testing, and inspection services provided during construction of the project.

The cost breakdown of this work is included in Table No. 2.

### ***Project No. 3 – Replace AWOS***

The existing AWOS is old and requires significant maintenance to keep it in operation. Because of the age of the equipment, it is difficult to obtain replacement parts. It is, therefore, proposed to replace the existing AWOS with a new AWOS III. The existing AWOS equipment will be removed from the existing foundations and a new AWOS will be purchased and installed. The existing power supply cable will be removed and replaced with new cable and the electrical distribution equipment required for the AWOS in the vault will be updated. The construction cost breakdown of this work is included in Table No. 3.

### ***Project No. 4 – Tee Hangar Area Development – East Side South of North Hangars – 400' x 400' – Phases A & B***

Most aircraft owners prefer storing their aircraft in hangars rather than on a tie down apron. As a result, if hangars are available the requirement for tie down apron is reduced significantly. Forecasts have indicated that there is more tie down apron available at the Lincoln Regional Airport than will be needed in the foreseeable future. There is an urgent need for additional hangars. It is, therefore, proposed to construct a series of new hangars on the existing tie down apron and in the open field between the existing tie down apron and Taxiway "A" in that area at the north end of the tie down apron immediately south of the north hangar development area.

This area is currently paved and drainage is provided; however, the existing grades will not adequately accommodate the addition of tee hangars in this area. In some areas it will be necessary to raise the grade as much as one foot in order to provide adequate drainage for the development. It is, therefore, more economical to pulverize the existing pavement and base for the entire area that will be developed for hangars, remove the existing pavement and base and stockpile it for future use as aggregate subbase. The subgrade exposed will be graded to the new grades required to accommodate the tee hangar development. Then the pulverized material removed from the section will be replaced as aggregate subbase course, a new aggregate base course will be added, and new bituminous surface course will be placed. The pavement section construction included in this project is limited to the development of a 35-foot wide collector taxiway and 25-foot wide taxilanes between the proposed hangars to meet F.A.A. eligibility requirements.

The floors for the hangars and fire protection will be constructed in this project, as will the apron between the hangar and the taxilane.

The construction of the hangars will be covered in a separate project, which will not be funded by F.A.A.

Drainage will be provided by construction of new drop inlets and piping extending into the existing drainage system. New water and sewer lines will be installed.

This project will be constructed in four phases. This project includes Phases A and B.

The construction cost breakdown of this work is included in Table No. 4.

***Project No. 5 – Engineering Design – Projects No. 6, 8, 9 and 10***

The Federal Aviation Administration Western Region has instituted a policy whereby grants are to be issued after bids on the project have been obtained and the cost is defined. It is difficult for a Sponsor to go through the process of selecting an engineer if necessary, negotiating a contract for engineering design on a specific project, preparing the engineering design and plans and specifications, and then obtaining bids on the project early enough to begin construction in the summer construction season of the same year in which the grant is provided, particularly when notification of a grant being available is not given until early spring. It is, therefore, proposed to request an F.A.A. grant for engineering design of the projects anticipated to be constructed with F.A.A. funding during the following three to four years.

This Project No. 5 includes the engineering design for the projects included in this ACIP as Projects No. 6, 8, 9 and 10, which projects are anticipated to be constructed and funded between the years 2009 and 2010. The engineering design for these projects will be limited to conducting necessary topographic surveys, geotechnical studies, and pavement design studies for all of the projects and then conducting detailed engineering design and preparation of plans and specifications, Engineer's Estimate, and Engineer's Design Report for each of the projects. A separate set of plans and specifications will be prepared for each project and will be available (on the shelf) so that by adding bid dates and any modifications required to the legal end of the specifications, the project can immediately be put out to bid. Not included in this Project No. 4 are the engineering costs for the following items:

- Assistance to Sponsor during bidding and bid award
- Engineering surveillance during the construction of the project
- Resident engineering, testing, and inspection services provided during construction of the project.

A separate contract will be entered into with the engineer for each project or combination of projects that are bid under a specific construction contract. The engineering costs that are excluded from this project are included in the engineering and administrative costs allowed for each of the separate projects.

The cost breakdown of this work is included in Table No. 5.

***Project No. 6 – Two New Automatic Entrance Security Gates***

The automatic entrance security gates at the south end of the airport and the north end of the airport are old gates that have been damaged and worn. The new security gates at the airport are designed such that all of the gates can be controlled and monitored from the Airport Manager's Office. It is, therefore, important in order to maintain security that the north and south gates be replaced with new gates and the wireless control equipment be installed such that the control and monitoring of these gates can be added to the existing monitoring and control facilities.

The south gate will be relocated to better serve the south hangar area by aligning the gate with the centerline of the hangar taxi lanes.

The construction cost breakdown of this work is included in Table No. 6.

***Project No. 7 – A & D Building and Parking Lot – 370' x 450' Parking Lot***

Inquiries have been made to the Airport concerning the development of a jet center at the airport. There are significant business jet operations currently occurring at the airport, and it is expected that these operations will increase significantly in the near future. With the development of the Very Light Jet (VLJ), many companies are proposing the use of these aircraft for an air taxi type service. All of these services will require the development of an arrival/departure building, which will include Airport Manager's office, FBO office for the jet center, pilot lounge, and a restaurant. This facility will be constructed on the east side of the airport immediately south of the new hangars proposed on the site to be developed under Projects No. 5 and 8.

An automobile parking lot will be constructed as part of this project to provide space for automobile parking to serve this facility and the proposed jet center.

The existing apron pavement will be used for aircraft parking. A new access road and parking lot will be paved, including curb, gutter, sidewalk, lighting, and drainage.

The construction cost breakdown of this work is included in Table No. 7.

***Project No. 8 – Tee Hangar Area Development – East Side South of North Hangars – 400' x 400' – Phases C and D***

Most aircraft owners prefer storing their aircraft in hangars rather than on a tie down apron. As a result, if hangars are available the requirement for tie down apron is reduced significantly. Forecasts have indicated that there is more tie down apron available at the Lincoln Regional Airport than will be needed in the foreseeable future. There is an urgent need for additional hangars. It is, therefore, proposed to construct a series of new hangars on the existing tie down apron and in the open field between the existing tie down apron and Taxiway "A" in that area at the north end of the tie down apron immediately south of the north hangar development area.

This area is currently paved and drainage is provided; however, the existing grades will not adequately accommodate the addition of tee hangars in this area. In some areas it will be necessary to raise the grade as much as one foot in order to provide adequate drainage for the development. It is, therefore, more economical to pulverize the existing pavement and base for the entire area that will be developed for hangars, remove the existing pavement and base and stockpile it for future use as aggregate subbase. The subgrade exposed will be graded to the new grades required to accommodate the tee hangar development. Then the pulverized material removed from the section will be replaced as aggregate subbase course, a new aggregate base course will be added, and new bituminous surface course will be placed. The pavement section construction included in this project is limited to the development of a 35-foot wide collector taxiway and 25-foot wide taxilanes between the proposed hangars to meet F.A.A. eligibility requirements.

The floors for the hangars and fire protection will be constructed in this project, as will the apron between the hangar and the taxilane.

The construction of the hangars will be covered in a separate project, which will not be funded by F.A.A.

Drainage will be provided by construction of new drop inlets and piping extending into the existing drainage system. New water and sewer lines will be installed.

This project will be constructed in four phases. This project includes Phases C and D.

The construction cost breakdown of this work is included in Table No. 8.

### ***Project No. 9 – New Taxiway Lights***

The existing taxiway lights were installed in 1984. These lights are old, the cable serving the lights has low-resistance to ground, and it is difficult to maintain the system. It is proposed to reconstruct the entire taxiway lighting system at the airport. The existing underground electrical duct appears to be in good condition and the regulators serving the taxiways are operating satisfactorily. This project will include removing and replacing all of the existing medium intensity taxiway edge lights and transformers and removing and replacing all of the electrical cable associated with the taxiway lighting system. The construction cost breakdown of this work is included in Table No. 9.

### ***Project No. 10 – Flightline Drive Rehabilitation***

Flightline Drive is in a condition of incipient failure at this time. There is extensive alligator cracking and some minor rutting. Much of this road has curb and gutter development on both sides and the grade cannot be raised adequately enough to strengthen the pavement section without reconstructing curbs, gutters, and sidewalks and modifying drainage. It is, therefore, proposed to reconstruct Flightline Drive.

The reconstruction will consist of pulverizing the existing bituminous surface course and aggregate base course, removing these materials and stockpiling them, and then replacing

them as aggregate subbase course. After the pulverized materials have been removed, the existing soils will be excavated to new subgrade level, the subgrade will be scarified and recompacted, the pulverized material will be placed as aggregate subbase, new 8-inch aggregate base course will be placed, and then 4 inches of bituminous surface course will be placed. New markings will be applied to the area. On the sections where curb and gutter does not exist, the shoulders will be regraded to provide adequate drainage.

The construction cost breakdown of this work is included in Table No. 10.

***Project No. 11 – Wetlands Mitigation/Habitat Mitigation – West Side, East and Southeast***

There are wetlands that have been identified on the airport that will be filled as part of the airport development. It will be necessary to mitigate for the loss of these wetlands. There is also endangered habitat in the area that will be affected by the development, and there will be mitigation for encroachment on the endangered habitat areas. The areas affected by the development at this time will be the west side of the airport and the east and southeast hangar development areas. The cost of this wetlands mitigation is summarized in Table No. 11.

***Project No. 12 – Engineering Design – Projects 13 through 16***

The Federal Aviation Administration Western Region has instituted a policy whereby grants are to be issued after bids on the project have been obtained and the cost is defined. It is difficult for a Sponsor to go through the process of selecting an engineer if necessary, negotiating a contract for engineering design on a specific project, preparing the engineering design and plans and specifications, and then obtaining bids on the project early enough to begin construction in the summer construction season of the same year in which the grant is provided, particularly when notification of a grant being available is not given until early spring. It is, therefore, proposed to request an F.A.A. grant for engineering design of the projects anticipated to be constructed with F.A.A. funding during the following three to four years.

This Project No. 12 includes the engineering design for the projects included in this ACIP as Projects No. 13 through 16, which projects are anticipated to be constructed and funded between the years 2011 and 2013. The engineering design for these projects will be limited to conducting necessary topographic surveys, geotechnical studies, and pavement design studies for all of the projects and then conducting detailed engineering design and preparation of plans and specifications, Engineer's Estimate, and Engineer's Design Report for each of the projects. A separate set of plans and specifications will be prepared for each project and will be available (on the shelf) so that by adding bid dates and any modifications required to the legal end of the specifications, the project can immediately be put out to bid. Not included in this Project No. 12 are the engineering costs for the following items:

- Assistance to Sponsor during bidding and bid award
- Engineering surveillance during the construction of the project
- Resident engineering, testing, and inspection services provided during construction of the project.

A separate contract will be entered into with the engineer for each project or combination of projects that are bid under a specific construction contract. The engineering costs that are excluded from this project are included in the engineering and administrative costs allowed for each of the separate projects.

The cost breakdown of this work is included in Table No. 12.

***Project No. 13 – Southeast Hangar Site Development (4 Hangars) – 800' x 640'***

In order to meet the demand for hangars at the airport, it is considered that by 2011 it will be necessary to construct a series of new hangars. These hangars will be located in the southeast portion of the airport immediately south of the existing south hangar. The development of the site for these hangars will include grading and drainage of the complete site and paving of a 35-foot wide collector taxiway and five 25-foot wide taxilanes between the hangar sites. New taxiway edge lights will be installed on the edge of the collector taxiway. The construction cost breakdown of this work is included in Table No. 13.

***Project No. 14 – Grade, Drain, and Utilities – West Side – Phase 1 – Pave Aircraft Parking Apron – 480' x 400'***

The proposed West Side Development includes the development of sites for additional hangars and for possible FBO and jet center development including aircraft parking aprons. It is proposed in this project to grade and drain the access road, the first phase of the west side parallel taxiway, connecting taxiways, and the first phase of the hangar development area. Also included will be the paving of the aircraft parking apron. The aircraft parking apron will not be utilized until the connecting taxiways have been completed, but these are proposed as the next project. It is considered important to pave the aircraft parking apron early so that in the following year when the connecting taxiways are completed and some of the hangar development occurs, an operating facility will be in place on the west side of the airport.

The construction cost breakdown of this work is included in Table No. 14.

***Project No. 15 – West Side Taxiway System – Phase 1 – 50' x 3,525'***

As the west side industrial area develops, it will be necessary to construct a taxiway parallel to the runway to provide access to the runway and the rest of the airport from the west side development projects. In this phase of the work the West Side Taxiway will be constructed from Taxiway "D" to Taxiway "G" including the connector taxiways to the runway. The remaining taxiways will be constructed in a subsequent project as needed. Construction of this Phase 1 portion of the West Side Taxiway will include grading, drainage, paving, marking, and lighting. Lighting will consist of standard taxiway edge lights.

The construction cost breakdown of this work is included in Table No. 15.

***Project No. 16 – West Side Service Road – 44' x 3,200'***

The development of the west side of the airport envisions a new service road into the airport off Nicolas Road looping around and departing on Airport Road. There will be a series of cross roads and cul de sacs leading off from this road into the development area to provide access to these areas. The development area will consist of aircraft storage hangars, commercial aircraft hangars, jet center, corporate hangars, industrial/commercial buildings requiring aircraft access and aircraft tie down areas. The project will consist of grading, drainage, paving and marking of a new service road.

The construction cost breakdown of this work is included in Table No. 16.

***Project No. 17 – EA – Runway 15R Extension and Runway 15L-33R***

In the 10-12 years timeframe it is anticipated that the growth of traffic and increase in heavy jet aircraft operations will require a runway extension on existing Runway 15-33 and the construction of a parallel Runway 15L-33R. The extension to Runway 15R-33L is proposed to be 1,000 feet and parallel Runway 15L-33R is proposed to be 3,350 feet long. This short runway will serve the small general aviation aircraft and will relieve the traffic on the main runway. An Environmental Assessment will be required in order that construction of these projects can occur. It is proposed to provide this Environmental Assessment in this project.

The cost breakdown of this work is included in Table No. 17.

***Project No. 18 – Engineering Design – Projects No. 19, 20, 21, and 22***

The rehabilitation of existing runways, taxiways, and aprons are included in Projects 19 and 20 and the extension of Runway 15R and construction of Runway 15L-33R are included in Projects 21 and 22.

The Federal Aviation Administration Western Region has instituted a policy whereby grants are to be issued after bids on the project have been obtained and the cost is defined. It is difficult for a Sponsor to go through the process of selecting an engineer if necessary, negotiating a contract for engineering design on a specific project, preparing the engineering design and plans and specifications, and then obtaining bids on the project early enough to begin construction in the summer construction season of the same year in which the grant is provided, particularly when notification of a grant being available is not given until early spring. It is, therefore, proposed to request an F.A.A. grant for engineering design of the projects anticipated to be constructed with F.A.A. funding during the following three to four years.

This Project No. 18 includes the engineering design for the projects included in this ACIP as Projects No. 19, 20, 21, and 22, which projects are anticipated to be constructed and funded between the years 2015 and 2018. The engineering design for these projects will be limited to conducting necessary topographic surveys, geotechnical studies, and pavement design studies for all of the projects and then conducting detailed engineering design and preparation of plans and specifications, Engineer's Estimate, and Engineer's Design Report for each of the projects. A separate set of plans and specifications will be prepared for each project and will be available

(on the shelf) so that by adding bid dates and any modifications required to the legal end of the specifications, the project can immediately be put out to bid. Not included in this Project No. 18 are the engineering costs for the following items:

- Assistance to Sponsor during bidding and bid award
- Engineering surveillance during the construction of the project
- Resident engineering, testing, and inspection services provided during construction of the project.

A separate contract will be entered into with the engineer for each project or combination of projects that are bid under a specific construction contract. The engineering costs that are excluded from this project are included in the engineering and administrative costs allowed for each of the separate projects.

The cost breakdown of this work is included in Table No. 18.

***Project No. 19 – Runway and Taxiway Rehabilitation – 100' x 6,000' R/W; 40' x 10,150' T/W***

Pavement Evaluation Studies conducted in 2006 indicate that from a subgrade strength standpoint, the pavements on the runway and taxiway have a remaining life of 15 to 20 years with forecast traffic. The bituminous surface course pavement is weathering and cracks are developing, all due to thermal expansion and contraction. There is currently some cracking occurring at the edge of the taxiway. This cracking is fairly extensive and extends in from the edge of the taxiway 3 to 5 feet. The cracking is caused by expansion and contraction of the underlying clay subgrade soils, which swell in the winter and shrink in the summer. In the center portion of the runway the soils are saturated all year round and do not move. As a result of this shrinking and swelling of the subgrade soils, the pavement at the edges rises and falls with the seasons and cracking of the pavement occurs. It will be necessary to maintain these pavement edges by resealing the cracks or removing and replacing some of the pavement. Within 8 to 10 years it is estimated that the cracking and weathering of the pavement will be sufficiently severe that it will need rehabilitation.

The rehabilitation will consist of rejuvenating or grinding off the upper 2 inches of the 3-inch bituminous surface course and then constructing a 2-inch overlay on top of the existing pavements. The rejuvenation of the surface material can consist of heater remixing and adding a rejuvenating agent, or grinding and recycling the pavement. New markings of all pavements will be required.

The construction cost breakdown of this work is included in Table No. 19.

***Project No. 20 – Apron Rehabilitation – 400' x 1,500'***

Pavement Evaluation Studies conducted in 2006 indicate that from a subgrade strength standpoint, the pavements on the apron have a remaining life of 15 to 20 years with forecast traffic. The bituminous surface course pavement is weathering and cracks are developing, all due to thermal expansion and contraction. The cracking is caused by expansion and contraction of the underlying clay subgrade soils, which swell in the winter and shrink in the

summer. As a result of this shrinking and swelling of the subgrade soils, the pavement at the edges rises and falls with the seasons and cracking of the pavement occurs. It will be necessary to maintain these pavement edges by resealing the cracks or removing and replacing some of the pavement. Within 8 to 10 years it is estimated that the cracking and weathering of the pavement will be sufficiently severe that it will need rehabilitation.

The rehabilitation will consist of rejuvenating or grinding off the upper 2 inches of the 3-inch bituminous surface course and then constructing a 2-inch overlay on top of the existing pavements. The rejuvenation of the surface material can consist of heater remixing and adding a rejuvenating agent, or grinding and recycling the pavement. New markings of all pavements will be required.

The construction cost breakdown of this work is included in Table No. 20.

***Project No. 21 – Runway 15R Extension and Associated Taxiways – 100' x 1,000' R/W;  
40' x 1,830' T/W***

Runway 15R and associated taxiways are proposed to be extended 1,000 feet to the north to provide adequate length for takeoff of the larger business jets anticipated to operate at the airport by 2018. It is proposed to construct this runway and taxiway extension in this project. The project will consist of grading, drainage, paving, and lighting. With this extension it will be necessary to relocate the existing MALSR, the existing PAPI on Runway 15R and the existing glide path.

The construction cost breakdown of this work is included in Table No. 21.

***Project No. 22 – Runway 15L-33R Construction – 60' x 3,350'***

By the year 2018 it is anticipated that the traffic volume at Lincoln Regional Airport will be such that significant delays will be experienced on the single runway design at this airport. It is proposed in this project to construct a parallel runway located 700 feet east of the existing runway. This runway will be 60 feet wide by 3,350 feet long. In the original planning for this airport, separation of the original runway and Taxiway A was designed to allow the construction of the short parallel runway far enough away from the main runway to allow simultaneous operations of the two runways in VFR conditions. The work included in this project will be grading, paving, drainage, and lighting of the new runway. Existing taxiways will be used. A new regulator will be required to power the lights.

The construction cost breakdown of this work is included in Table No. 22.

***Project No. 23 – Air Traffic Control Tower***

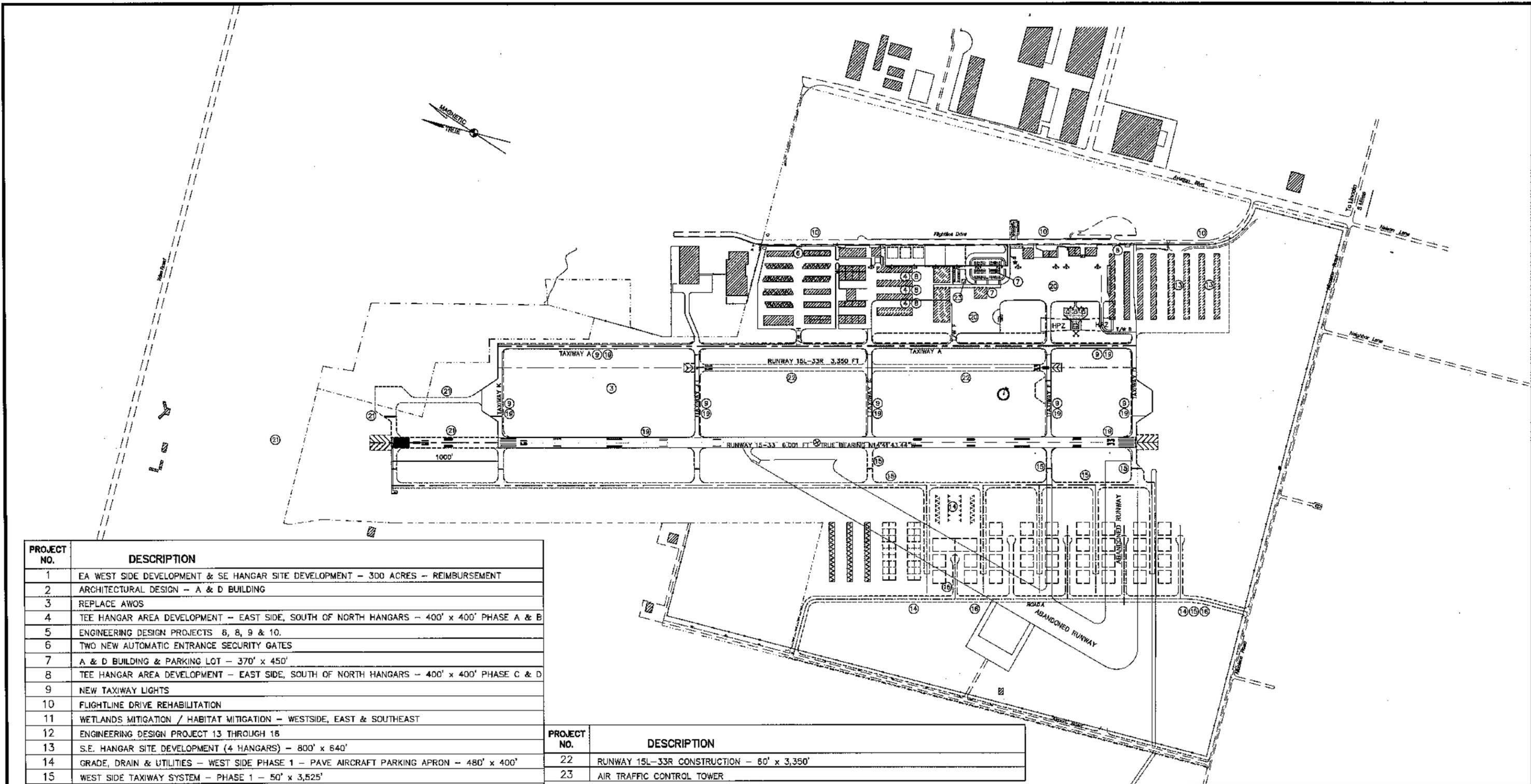
It is estimated that by 2019 traffic will have increased at the Lincoln Regional Airport to a point where air traffic control will be required. A new Air Traffic Control Tower is anticipated in this project.

The construction cost breakdown of this work is included in Table No. 23.

The Engineer's Estimate for each project is included in Tables 1 through 23. A summary of project costs showing construction costs, engineering and administration costs, total costs, F.A.A. participation, and local participation are included in Table No. 24.

A Sketch Map has been prepared and is included as Sheet No. 1. On the sketch map the location and extent of each project are identified.

\* \* \*



PROJECT NO.	DESCRIPTION
1	EA WEST SIDE DEVELOPMENT & SE HANGAR SITE DEVELOPMENT - 300 ACRES - REIMBURSEMENT
2	ARCHITECTURAL DESIGN - A & D BUILDING
3	REPLACE AWOS
4	TEE HANGAR AREA DEVELOPMENT - EAST SIDE, SOUTH OF NORTH HANGARS - 400' x 400' PHASE A & B
5	ENGINEERING DESIGN PROJECTS 6, 8, 9 & 10.
6	TWO NEW AUTOMATIC ENTRANCE SECURITY GATES
7	A & D BUILDING & PARKING LOT - 370' x 450'
8	TEE HANGAR AREA DEVELOPMENT - EAST SIDE, SOUTH OF NORTH HANGARS - 400' x 400' PHASE C & D
9	NEW TAXIWAY LIGHTS
10	FLIGHTLINE DRIVE REHABILITATION
11	WETLANDS MITIGATION / HABITAT MITIGATION - WESTSIDE, EAST & SOUTHEAST
12	ENGINEERING DESIGN PROJECT 13 THROUGH 18
13	S.E. HANGAR SITE DEVELOPMENT (4 HANGARS) - 800' x 640'
14	GRADE, DRAIN & UTILITIES - WEST SIDE PHASE 1 - PAVE AIRCRAFT PARKING APRON - 480' x 400'
15	WEST SIDE TAXIWAY SYSTEM - PHASE 1 - 50' x 3,525'
16	WEST SIDE SERVICE ROAD - 44' x 3,200'
17	EA RUNWAY 15R EXTENSION & RUNWAY 15L-33R
18	ENGINEERING DESIGN PROJECTS 19, 20, 21 & 22
19	R/W & T/W REHABILITATION - 6,000' x 100' & 10,150' x 40'
20	APRON REHABILITATION - 400' x 1,500'
21	RUNWAY 15R EXTENSION & ASSOCIATED TAXIWAYS - 100' x 1,000' & 40' x 1,150'

PROJECT NO.	DESCRIPTION
22	RUNWAY 15L-33R CONSTRUCTION - 60' x 3,350'
23	AIR TRAFFIC CONTROL TOWER

  
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CITY OF LINCOLN  
 STATE OF CALIFORNIA  
**LINCOLN REGIONAL AIRPORT**  
 PLACER COUNTY, CALIFORNIA  
**AIRPORT CAPITAL IMPROVEMENT PROGRAM - SKETCH MAP**

<b>SCALE</b>	NONE
<b>DATE</b>	JAN. 3, 2008
<b>SHEET NUMBER</b>	1 OF 1 SHEETS

**LINCOLN REGIONAL AIRPORT  
MASTER PLAN**

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**Appendix B  
Aircraft Noise Assessment**

# **AIRCRAFT NOISE ASSESSMENT**

## **AIRPORT MASTER PLAN LINCOLN REGIONAL AIRPORT LINCOLN, CALIFORNIA**

### **PREPARED FOR**

**Jim Wallace Environmental Consulting Services  
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### **PREPARED BY**

**Brown-Buntin Associates, Inc.  
Fair Oaks, California**

**REVISED  
JULY 27, 2007**



## **INTRODUCTION**

The project consists of a Master Plan for the Lincoln Regional Airport (LMH) in Placer County, California. The project considers construction of a new runway and an extension to the existing runway. It is the purpose of this report to document the potential changes in aircraft noise exposure that could result from the Master Plan and its alternatives. It is expected that the findings of this analysis will be incorporated into an Environmental Assessment for the project.

The noise-related implications of the project were analyzed using the Federal Aviation Administration (FAA) Integrated Noise Model (INM), based upon airport operations and airfield configuration information obtained from the Airport's Engineer and available environmental documentation.

Noise exposure information was quantified in terms of the Community Noise Equivalent Level (CNEL) for existing (2005) and forecast future (2030) operations. The CNEL is the noise metric required by the FAA and State of California for assessing potential noise impacts resulting from proposed airfield improvement projects and for planning for compatible land use around airports. Appendix A provides definitions of the acoustical terminology used in this report.

## **AIRCRAFT NOISE IMPACT ASSESSMENT**

### **The Integrated Noise Model (INM):**

Version 7.0 of the INM was used to prepare CNEL noise exposure maps for the Lincoln Regional Airport for existing and future conditions. The INM was developed for the FAA, and it represents the federally sanctioned and required method for assessing potential aircraft noise impacts resulting from airfield improvement projects. Version 7.0 is the current version of the INM.

The INM calculates aircraft noise exposure by mathematically combining aircraft noise levels and airport operations factors at a series of points on a map that defines the location of airport runways and generalized aircraft flight tracks. The model then interpolates between points to plot contours of equal noise exposure. User inputs to the INM include the following:

- Runway/helipad configuration
- Airport elevation and mean temperature
- Aircraft flight track definitions
- Distribution of aircraft to flight tracks
- Aircraft departure stage lengths
- Aircraft approach profiles
- Aircraft traffic volume and fleet mix
- Temporal distribution of flights (day, evening, night)

The INM database includes aircraft performance parameters and noise level data for most of the larger civilian aircraft presently in service at U.S. airports. Beginning with Version 7, the INM also includes data for several commonly-used helicopters, and incorporates the pertinent features of the FAA's Helicopter Noise Model (HNM). When a user specifies a particular aircraft type from the

INM database, the model automatically provides the necessary inputs concerning aircraft power settings, speed, arrival/departure profiles and noise levels. Since each airport is different in terms of the types of aircraft flown and local operating conditions, aircraft types and operating assumptions from the INM database must be carefully selected.

The INM can account for changes in the distance from the receptor to the aircraft noise source (slant range distance) due to variations in local terrain. Terrain is a minimal factor in the immediate vicinity of the Lincoln Regional Airport. The INM does *not* take into account reflections from nearby buildings or acoustical shielding provided by buildings or extensive vegetation. Such factors can be significant in areas located adjacent to an airport where noise levels generated by aircraft on the ground can make a significant contribution to overall aircraft noise exposure as defined by the CNEL. For many airports, the INM therefore will provide a conservative (or worst-case) assessment of aircraft noise exposure sideline to and in close proximity to the airfield.

### **Existing and Planned Airfield Facilities:**

The Lincoln Regional Airport presently consists of a single runway with associated taxiways and other support facilities. Runway 15-33 is presently 6,001 feet long.

The Master Plan envisions construction of a new runway (15L-33R) approximately 700 feet east of the existing runway, with a length of 3,350 feet. The Master Plan also envisions the addition of 1,000 feet to the north end of the existing runway 15-33, for a total length of 7,001 feet.

### **Aircraft Noise Modeling Assumptions:**

The appropriate selection of noise modeling assumptions is of critical importance to achieving an accurate assessment of aircraft noise exposure using the INM. Inaccuracies in the location or use of generalized aircraft flight tracks, the selection of aircraft types from the INM database or the frequency or time of day of aircraft operations can compromise the accuracy of the resulting noise exposure maps.

### ***Aircraft Operations and Fleet Mix***

Existing (2005) and forecast future (2030) aircraft operations data were obtained from the Draft Airport Master Plan<sup>1</sup>. Annual average daily aircraft operations by aircraft type are summarized in Table 3-6 of the Master Plan for 2005 and 2030 conditions. Section 3-2 of the Master Plan describes the aircraft types anticipated to operate at the Airport for existing and future conditions, summarized by Tables I and II.

Tables I and II list the aircraft type designations from the INM Version 7.0 database selected to model aircraft noise exposure for the Lincoln Regional Airport. These type designations were matched to those used in the April 2004 draft of the Lincoln Regional Airport Master Plan.

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<sup>1</sup> Lincoln Regional Airport Master Plan, April 2007, prepared by Reinard S. Brandley.

<b>TABLE I ANNUAL OPERATIONS BY AIRCRAFT TYPE EXISTING CONDITIONS (2005) LINCOLN REGIONAL AIRPORT</b>							
Category	Annual Operations	Aircraft Type	INM Type	Factor	Annual Operations	Daily Operations	Departures per day
General Aviation	77,360	GA Single Fixed Prop	GASEPF	0.5	36680	100.5	50.2
		GA Single Variable Prop	GASEPV	0.38	27877	76.4	38.2
		GA Twin Prop Reciprocating	BEC58P	0.04	2934	8.0	4.0
		GA Twin Turboprop	CNA441	0.04	2934	8.0	4.0
		GA Jet	CNA750	0.03	2201	6.0	3.0
		H500 (typical)	H500D	0.01	734	2.0	1.0

<b>TABLE II ANNUAL OPERATIONS BY AIRCRAFT TYPE FUTURE CONDITIONS (2030) LINCOLN REGIONAL AIRPORT</b>							
Category	Annual Operations	Aircraft Type	INM Type	Factor	Annual Operations	Daily Operations	Departures per day
General Aviation	127,993	GA Single Fixed Prop	GASEPF	0.5	63997	175.3	87.7
		GA Single Variable Prop	GASEPV	0.26	33278	91.2	45.6
		GA Twin Prop Reciprocating	BEC58P	0.07	8960	24.5	12.3
		GA Twin Turboprop	CNA441	0.08	10239	28.1	14.0
		GA Jet	CNA750	0.08	10239	28.1	14.0
		H500 (typical)	H500D	0.01	1280	3.5	1.8

***Annual Average Runway Use***

Runway use depends upon the length and weight-bearing strength of available runways, prevailing wind conditions, supporting taxiways and the availability of navigational aids. Tables III and IV summarize the assumptions developed for annual average runway use at the Lincoln Regional Airport, based upon discussions with the Airport's Engineer.

TABLE III ANNUAL AVERAGE RUNWAY USE EXISTING CONDITIONS (2005) LINCOLN REGIONAL AIRPORT					
Runway	% Runway Use				
	Single Prop	Twin Prop - Reciprocating	Turboprops	Jets	Helicopters
<b>Departures</b>					
15	85	85	85	85	85 (at helipad)
33	15	15	15	15	15 (at helipad)
<b>Arrivals</b>					
15	85	85	85	85	85 (at helipad)
33	15	15	15	15	15 (at helipad)

TABLE IV ANNUAL AVERAGE RUNWAY USE FUTURE CONDITIONS (2030) LINCOLN REGIONAL AIRPORT					
Runway	% Runway Use				
	Single Prop	Twin Prop - Reciprocating	Turboprops	Jets	Helicopters
<b>Departures</b>					
15L	85	42.5	17	0	85 (at helipad)
33R	15	7.5	3	0	15 (at helipad)
15R	0	42.5	68	85	
33L	0	7.5	12	15	
<b>Arrivals</b>					
15L	85	42.5	17	0	85 (at helipad)
33R	15	7.5	3	0	15 (at helipad)
15R	0	42.5	68	85	
33L	0	7.5	12	15	

### *Aircraft Flight Tracks*

Aircraft noise modeling requires the definition of generalized flight tracks to represent areas around the airport that are overflowed by aircraft either arriving at or departing from the airport. For the Lincoln Regional Airport, generalized aircraft flight tracks were developed based upon discussions with the Airport's Engineer, and upon review of the April 2004 draft of the Lincoln Regional Airport Master Plan.

Aircraft flight tracks tend to disperse as aircraft move farther from the airport. This occurs as a result of variable wind conditions, air traffic control instructions and pilot technique. Air carrier, military jet and corporate jet aircraft generally follow a more predictable route when arriving at or departing from the airport than do smaller, propeller-driven aircraft or helicopters.

The generalized aircraft arrival and departure flight tracks developed for noise modeling are shown by Figures 1, 2 and 3. The generalized flight tracks do not cover all areas around the airport where aircraft overflights may intermittently occur, but do represent areas that are subject to the greatest concentrations of overflights. (The scales of the figures are approximate.)

### ***Time of Day of Aircraft Flight Operations***

The assumptions for time of day of aircraft operations are significant because the CNEL is strongly influenced by nighttime and evening operational factors. Specifically, in calculating CNEL values, one aircraft operation during the nighttime hours (2200-0659) is equivalent on an energy basis to ten daytime operations. Similarly, one aircraft operation in evening hours (1900-2159) is equivalent on an energy basis to three daytime operations. For this analysis, the day/evening/night distribution of operations was taken from the April 2004 draft of the Lincoln Regional Airport Master Plan. Table V lists those assumptions.

<b>TABLE V ASSUMED TIME OF DAY FACTORS FOR AIRCRAFT FLIGHT OPERATIONS LINCOLN REGIONAL AIRPORT</b>			
<b>Aircraft Category</b>	<b>Day</b>	<b>Evening</b>	<b>Night</b>
All	88%	8%	4%

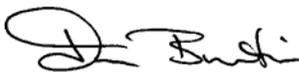
### **NOISE EXPOSURE MAPS**

The noise modeling assumptions described above were used to prepare noise exposure maps in terms of the annual average CNEL. The following alternatives were modeled:

- Existing Conditions (year 2005)
- 2030 with the new runway 15L-33R and the existing runway 15-33
- 2030 with the new runway 15L-33R and the extended runway 15R-33L

The 60, 65 and 70 dB CNEL contours for each scenario have been provided to the Airport in AutoCAD format for plotting on suitable base maps; examples are attached as Figures 4-6 on the following pages. (The scales of the figures are approximate.)

Respectfully submitted,  
Brown-Buntin Associates, Inc.



Jim Buntin  
Vice President

FIGURE 1  
EXISTING FLIGHT TRACKS for RUNWAY 15-33

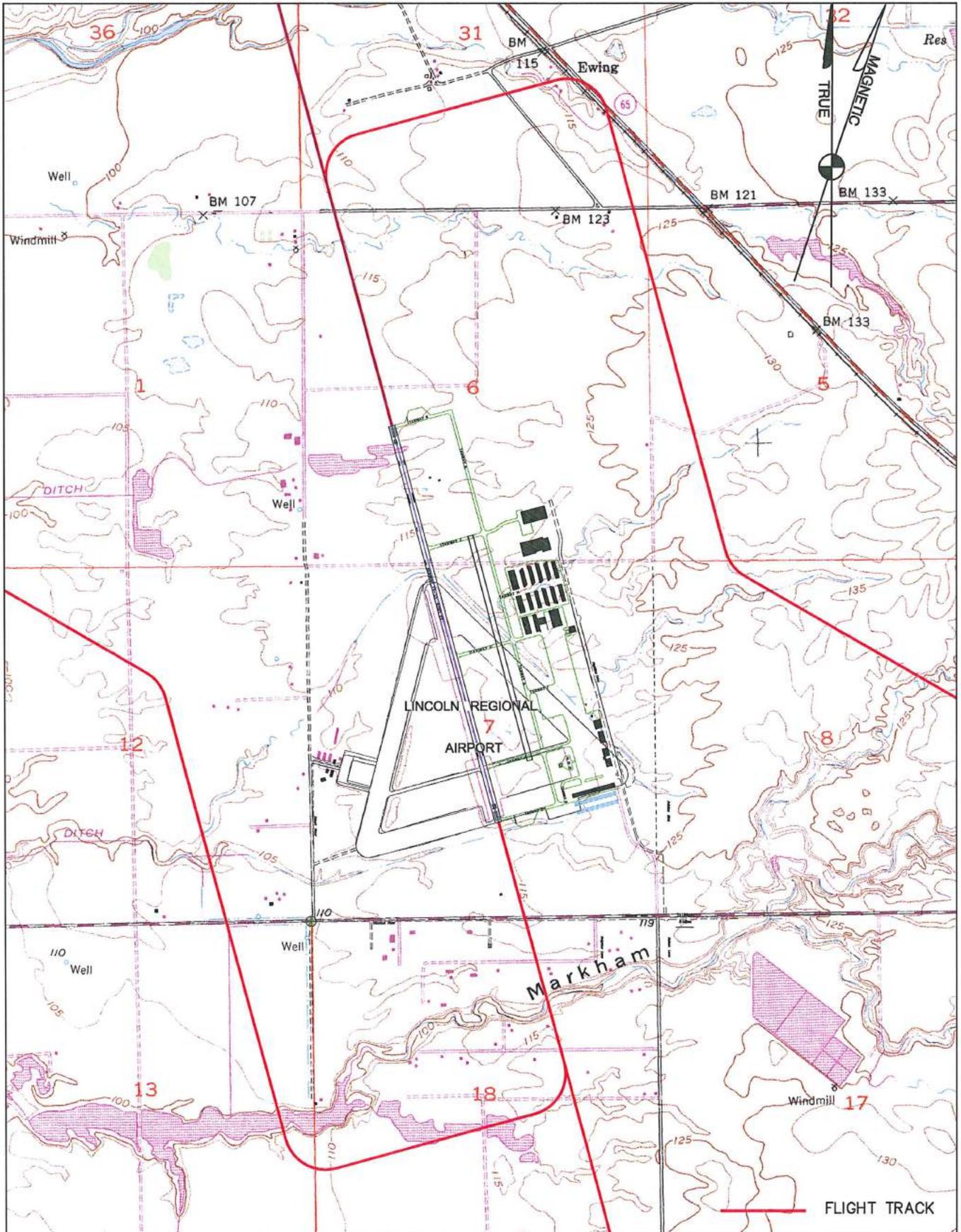


FIGURE 2  
EXISTING FLIGHT TRACKS for RUNWAY 15-33 and 15L-33R  
(No Runway Extension)

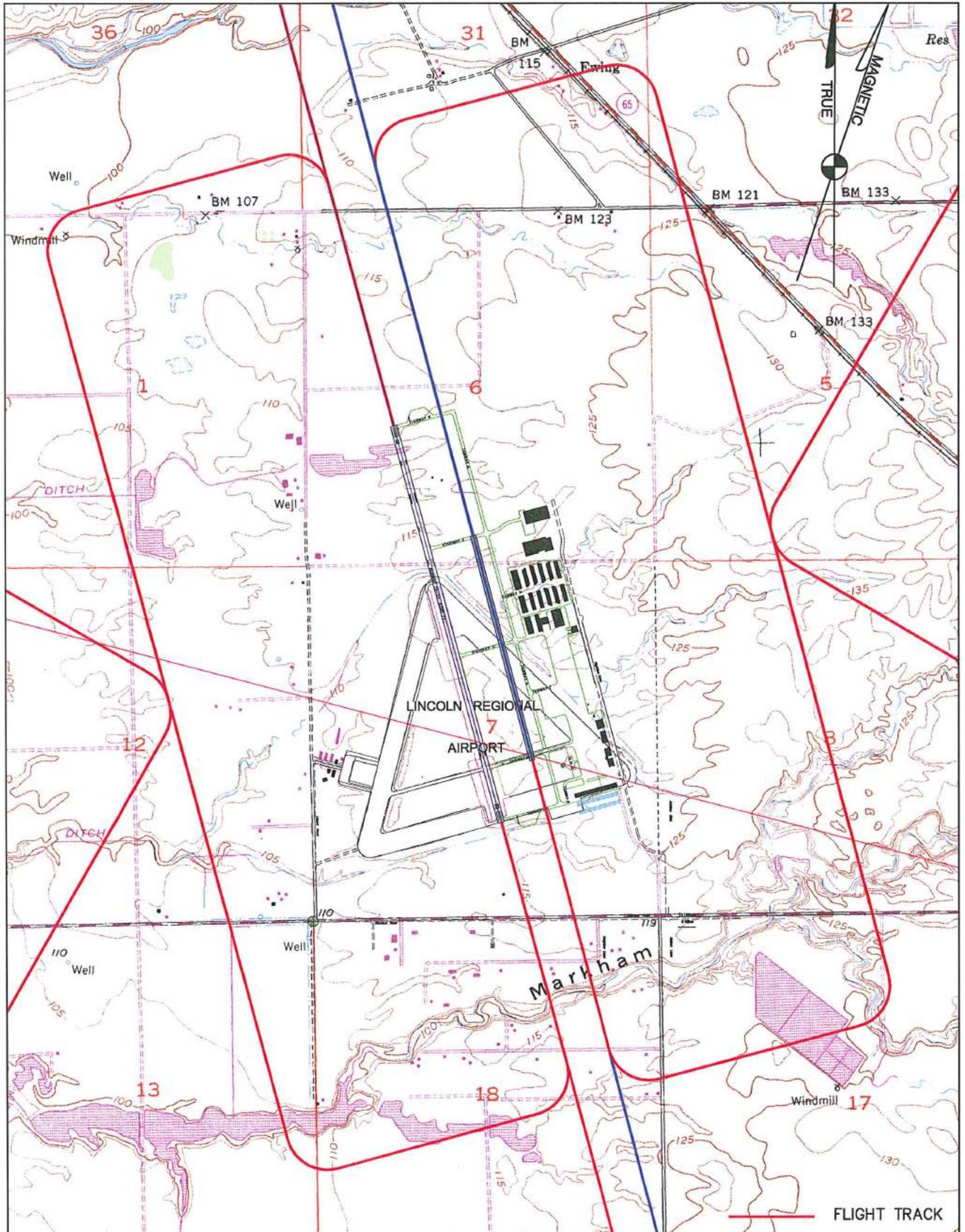


FIGURE 3  
EXISTING FLIGHT TRACKS for RUNWAY 15-33 and 15L-33R  
(With Runway Extension)

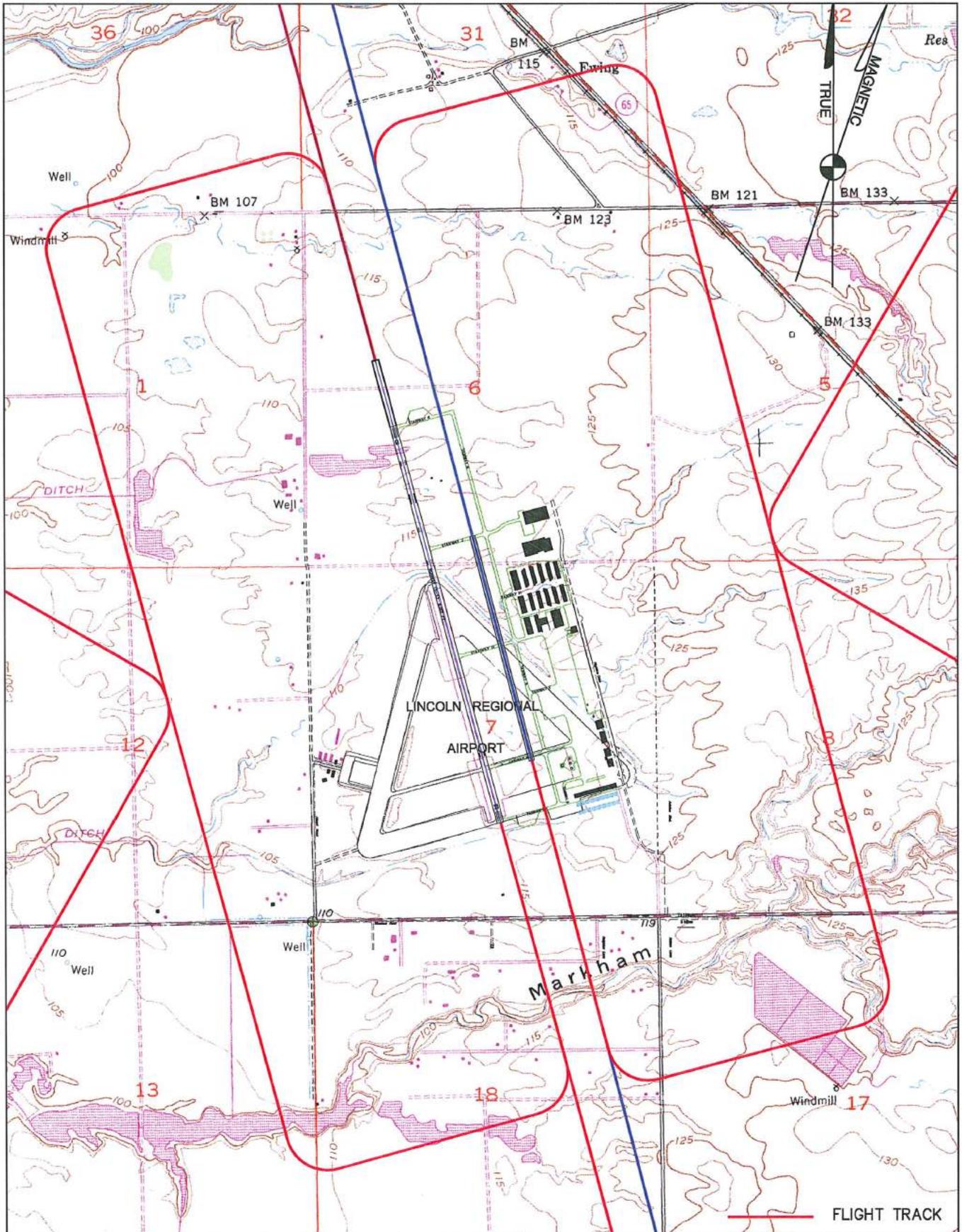


FIGURE 4  
EXISTING (2005)CNEL CONTOURS

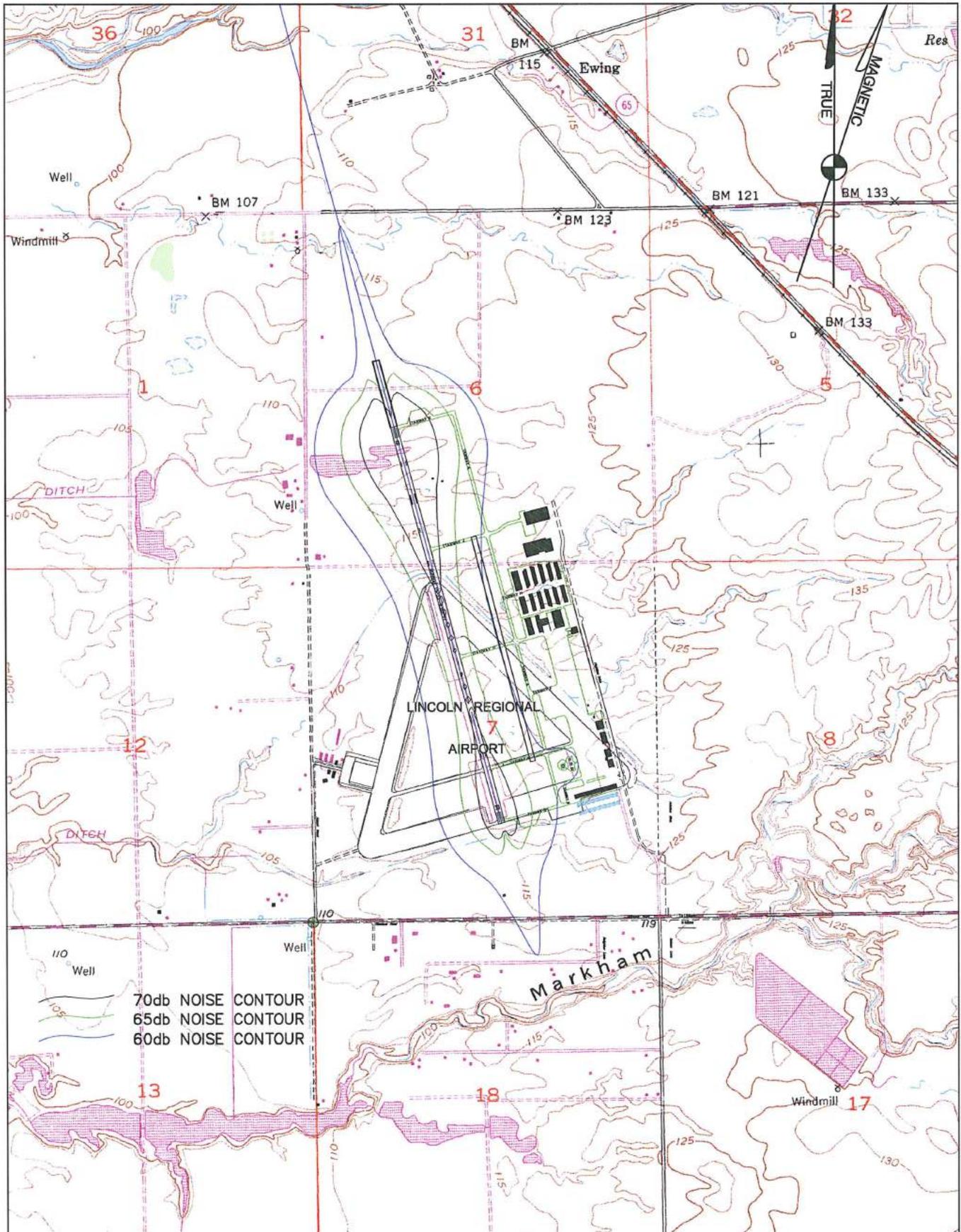


FIGURE 5  
 FUTURE (2030) CNEL CONTOURS WITHOUT RUNWAY 15-33 EXTENSION

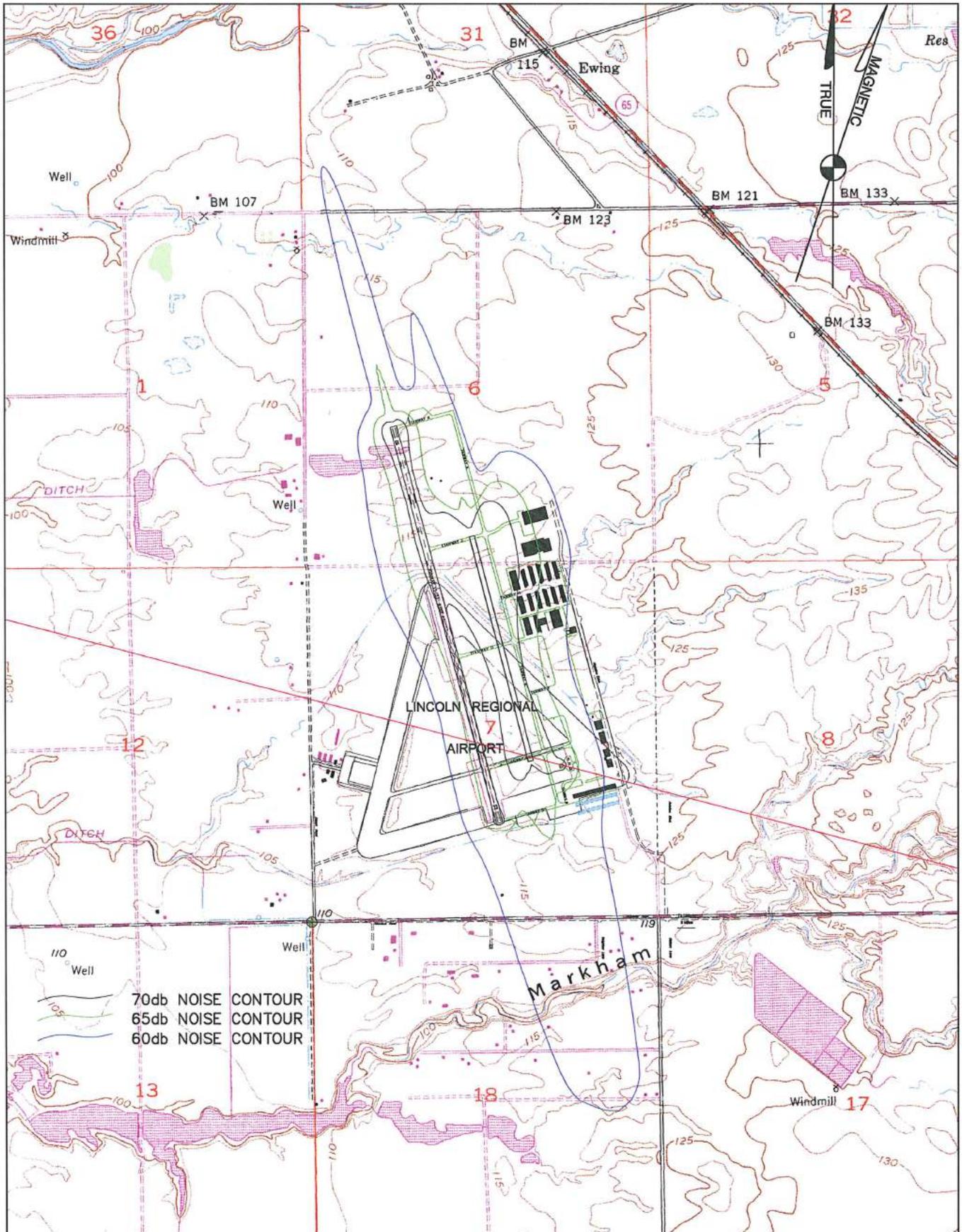
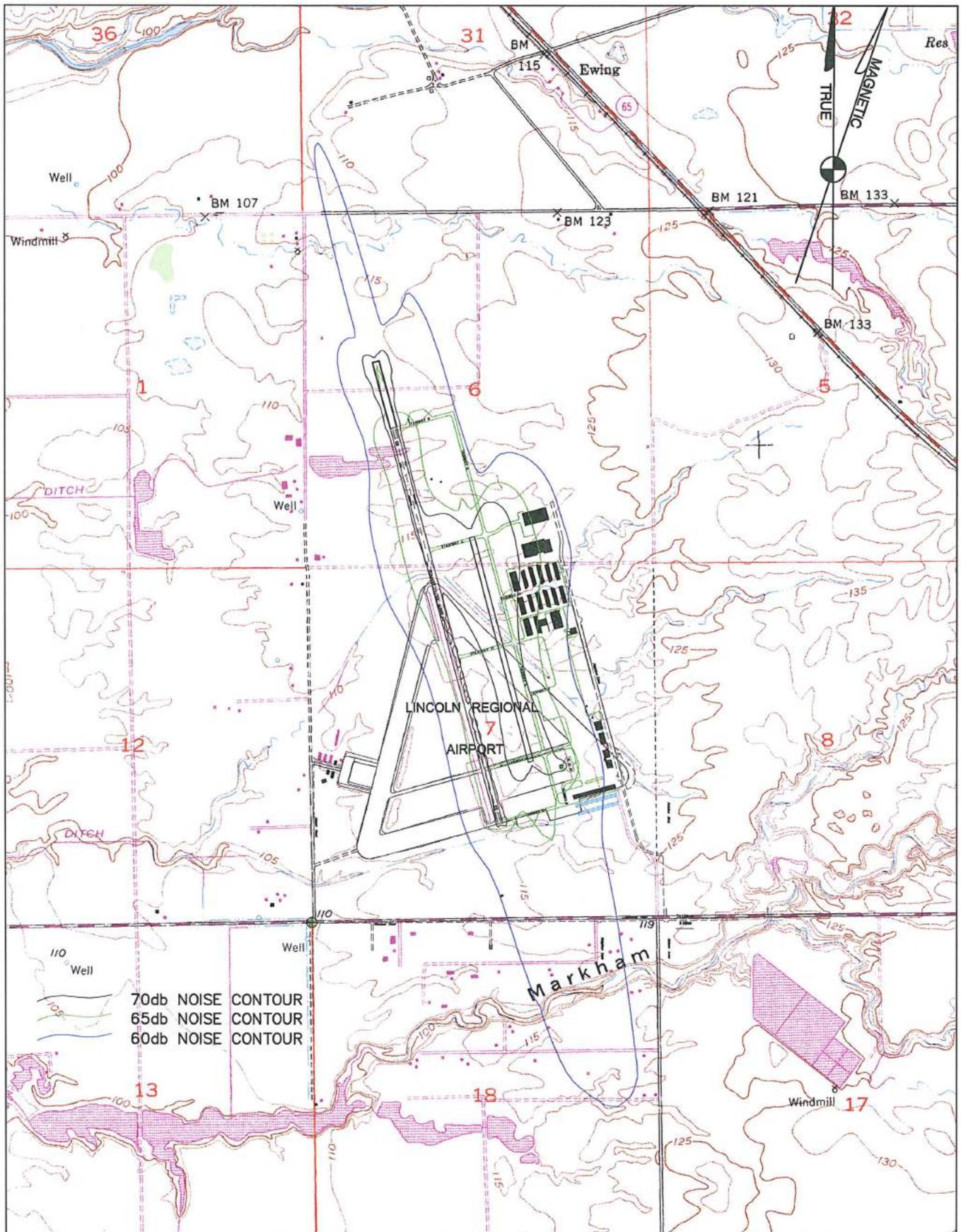


FIGURE 6  
 FUTURE (2030) CNEL CONTOURS WITH RUNWAY 15-33 EXTENSION



## APPENDIX A AIRCRAFT NOISE EXPOSURE METRICS

The Community Noise Equivalent Level (CNEL) is used by the State of California to evaluate land use compatibility around airports. The CNEL descriptor is similar to the Day Night Level (DNL) descriptor used by the FAA for noise compatibility planning around airports in states other than California.

The only difference between the CNEL and DNL is that the CNEL incorporates an evening penalty of 4.77 dB for noise levels occurring between 7:00 p.m. and 10:00 p.m., whereas the DNL does not. Both the CNEL and DNL apply a 10 dB penalty to noise levels occurring between 10:00 p.m. and 7:00 a.m. The evening and nighttime penalties (weighting factors) are mathematically equivalent to multiplying the number of events by three and ten, respectively. The CNEL and DNL are generally considered to be equivalent descriptors of the community noise environment within  $\pm 1.0$  dB.

One of the more controversial aspects of quantifying aircraft noise exposure in terms of the CNEL is that persons react to *individual* aircraft noise events rather than to the annual average CNEL. For that reason, it is important to understand the relationship between single events and the CNEL. For the determination of the CNEL for a noise source characterized as series of discrete single events, such as aircraft operations, the following formula is often used.

$$\text{CNEL} = \overline{\text{SEL}} + 10 \text{ Log } N_{eq} - 49.4,$$

where:

*$\overline{\text{SEL}}$  is the energy average SEL for all noise events,  $N_{eq}$  is the equivalent number of events that occur during an annual average day (determined by adding the actual number of events occurring between 7:00 a.m. and 7:00 p.m. to 3 times the number of events occurring between 7:00 p.m. and 10:00 p.m. and to 10 times the number of events occurring between 10:00 p.m. and 7:00 a.m.), and 49.4 is a time constant equal to 10 times the logarithm of the number of seconds in a 24-hour day.*

The above-described formula illustrates that the CNEL is calculated by mathematically combining the number of single events which occur during a 24-hour day with how loud the events are and what time of day they occur. The same formula is used to calculate the DNL, except that the evening penalty is not applied. Because of the interrelationship between the weighted number of daily noise events and the SEL's generated by the events, it is possible to have the same CNEL value for an area exposed to a few loud events as for an area exposed to many quieter events. This concept is illustrated by Figure A-1.

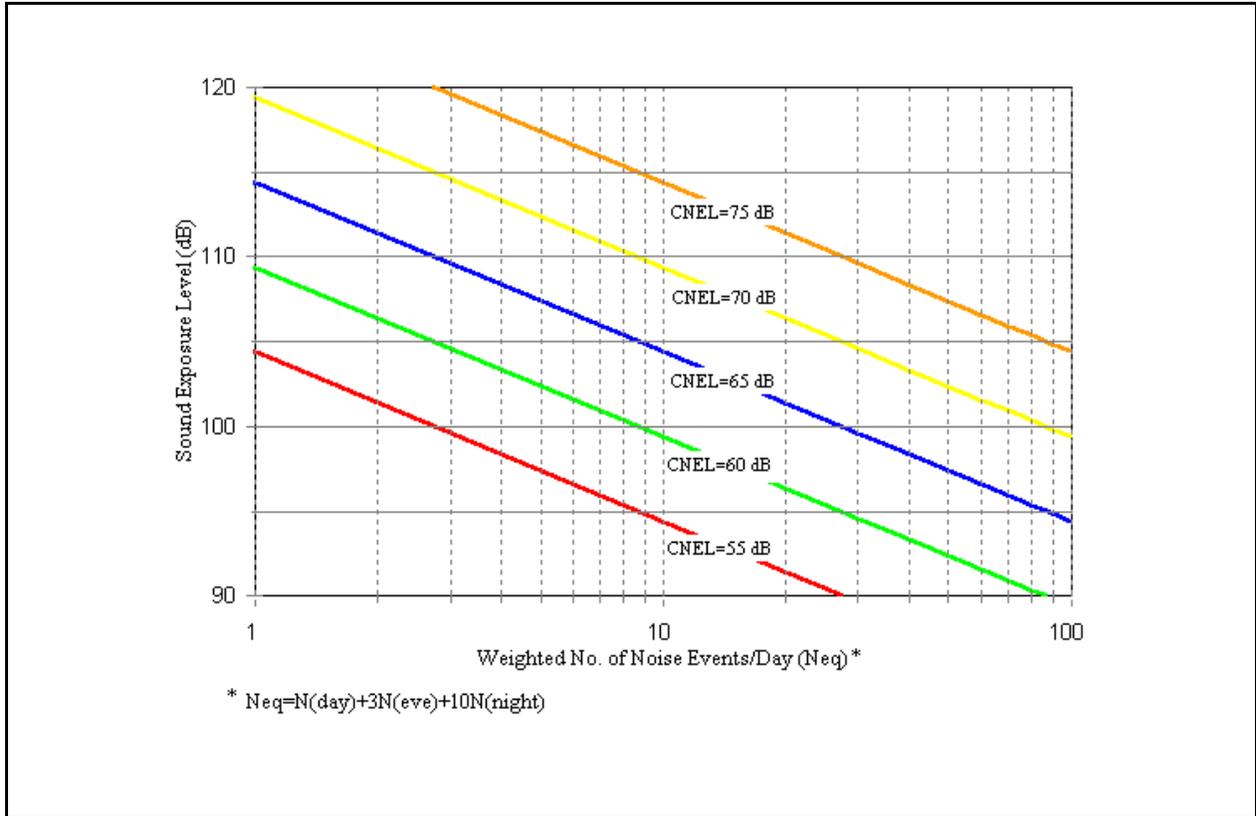


Figure A-1  
Relationship of CNEL to Event SEL

Definitions of some of the more important terms used to define aircraft noise exposure summarized below.

***A-weighted Sound Level:***

*The sound pressure level in decibels as measured on a sound level meter using an A-weighting filter. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear, and provides good correlation with subjective reactions to noise. CNEL and DNL values are expressed in terms of A-weighted sound levels.*

***CNEL:***

*Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of 4.77 dB to sound levels during the evening hours (7:00 p.m. - 10:00 p.m.) and 10 dB to sound levels during the nighttime hours (10:00 p.m. - 7:00 a.m.).*

**Decibel, dB:**

*A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter). The threshold of human hearing (young healthy ear) is 0 dB.*

**DNL (or  $L_{dn}$ ):**

*Day-Night Level. The average equivalent sound level during a 24-hour day, obtained after addition of 10 dB to sound levels during the nighttime hours (10:00 p.m. - 7:00 a.m.). The DNL and CNEL are generally considered to be equivalent descriptors of the community noise environment within  $\pm 1.0$  dB.*

**$L_{eq}$ :**

*Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. The  $L_{eq}$  is typically computed over 1, 8 or 24-hour sample periods.*

**$L_{max}$ :**

*The maximum sound level recorded during a single noise event.*

**Noise Exposure Contours:**

*Lines drawn about a noise source indicating constant levels of noise exposure. CNEL or DNL contours are frequently utilized to describe community exposure to noise.*

**SEL:**

*The Sound Exposure Level is the level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.*