Rolle AIRFIELD

YUMA COUNTY AIRPORT AUTHORITY

Chapter Two
AVIATION DEMAND FORECASTS

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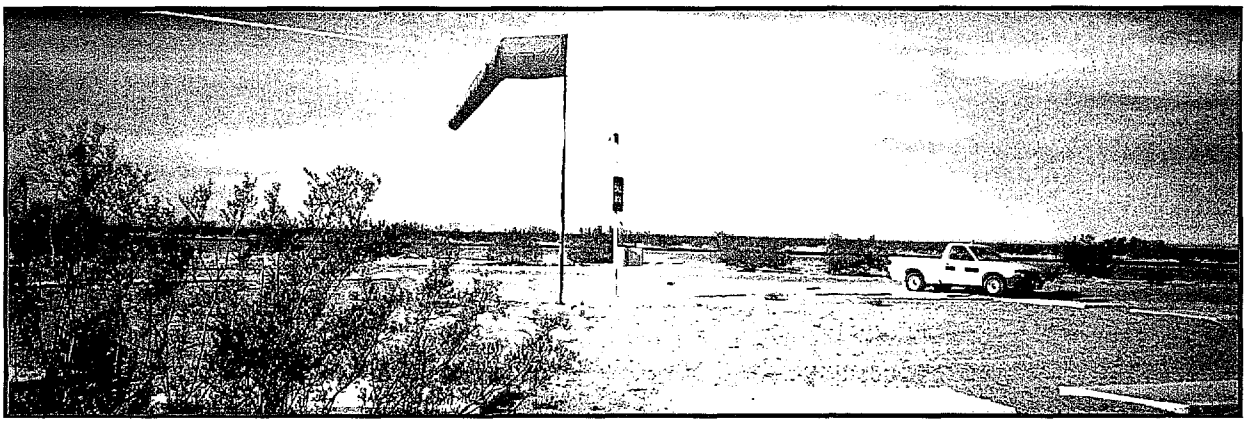

Facility planning must begin with a definition of the demand that may reasonably be expected to occur at the facility over a specific period. In airport master planning, this involves forecasts of aviation activity indicators over a twenty-year planning period. In this master plan, since Rolle Airfield presently has no based aircraft, forecasts of regionally based aircraft and based aircraft fleet mix (i.e., Yuma International Airport) along with annual aircraft operations will serve as the basis for facility planning at the Airfield.

It is virtually impossible to predict with certainty year-to-year fluctuations of activity when looking twenty years into the future. Because aviation activity can be affected by many influences at the local, regional, and national level, it is important to remember that forecasts are to serve only as guidelines and planning must remain flexible enough to respond to unforeseen facility needs.

The following forecast analysis examines recent developments, historical information, and current aviation trends to provide an updated set of based aircraft and operational projections. The intent is to permit the Yuma County Airport Authority to make the planning adjustments necessary to ensure that the facility meets projected demands in an efficient and cost-effective manner.

NATIONAL AVIATION TRENDS

Each year, the Federal Aviation Administration (FAA) publishes its national aviation forecast. Included in this publication are forecasts for air carriers, regional/commuters, general aviation, military, and FAA workloads. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. At the time this chapter was prepared, the current edition was *FAA Aviation Forecasts - Fiscal Years 1999-2010.* The forecasts use the economic performance of the United Sates as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

For the U.S. aviation industry, the outlook for the next twelve years is for moderate economic growth. Fuel prices during this period are expected to rise at an average annual rate of 2.8 percent, which is slightly

higher than that of predicted inflation (2.3 percent, consumer price index). Based on these assumptions, aviation activity by fiscal year 2010 is forecast to increase by 19.6 percent at combined FAA and contract towered airports and 23.8 percent at air route traffic control centers. Nationwide, the general aviation active fleet is projected to increase nearly 12.0 percent to 220,804 aircraft in 2010, while general aviation hours flown are forecast to increase by 17.3 percent.

GENERAL AVIATION

General aviation describes a diverse range of aviation activities that includes all segments of the aviation industry except commercial air carriers and military. General aviation (GA) is the largest component of the national aviation system and includes the production and sale of aircraft, avionics and other equipment, along with the provision of support services such as flight schools, fixed base operators, finance and insurance. The GA industry is an important contributor to the nation's economy. It provides on-the-spot efficient and direct aviation services that commercial aviation either cannot or will not provide. Based on most statistical measures, general aviation recorded its fourth consecutive year of growth.

In 1997, general aviation completed its fourth year of operations following the passage of the General Aviation Revitalization Act of 1994 (federal legislation that limits the liability on general aviation aircraft to 18 years from the date of manufacture). Prior to 1994, the high cost of product liability insurance had been a major factor in the decisions by many American aircraft manufacturers to slow or cease the production of general aviation aircraft. Passage of this legislation, resulting in reduced product liability, served to rejuvenate the general aviation aircraft manufacturing industry. So, while 1995 represented the beginning of renewed optimism for general aviation manufacturers, 1996 saw the industry convert this optimism into constructive actions that stimulated development and production of new GA products and services. By 1997, the industry began seeing the results of the renewed optimism and positive actions. While the results of the industry's performance over the last four years are mixed, they are, overall, positive. The general aviation industry appears to have laid a solid foundation for growth over the next 12 years and beyond.

By all accounts, 1998 was an extremely good year for general aviation. GA aircraft unit shipments were heading toward a fourth consecutive year of increase. General aviation manufacturers' shipments increased by 69.1 percent from 928 units in 1994 to 1,569 units in 1997. An additional 55.7 percent (1,495 units) were reportedly shipped during the first three quarters of 1998. Particularly important, is the renewed interest in piston powered aircraft. Shipments of piston powered aircraft nearly doubled between 1994 and 1997 (from 499 to 985 units), and were up an additional 85.4 percent following the first nine months of 1998.

Jet aircraft shipments have more than doubled since 1992 (171 units) to 1997 (348 units). The first three quarters of 1998 foretell of another successful year with shipments up 19.5 percent (282 units) over the same period in 1997. Meanwhile, shipments of turboprop aircraft have not fared as well as the other two aircraft categories with shipments reportedly up just 3.2 percent (282 units) for the first nine

months of 1998.

Billings for GA aircraft totaled $4.7 billion in 1997, an all-time high. The industries third quarter reported billings of $3.9 billion, reflected an increase of 21.0 percent over the same 1997 period. This relatively smaller increase in the billings to shipments ratio reflects the increased shipment of generally lower cost-per-unit priced piston powered aircraft. Additionally, reported increases in export shipments and billings were up 21.1 percent and 4.1 percent, respectively, through the third quarter of 1998.

The continued strong use of general aviation aircraft for business and corporate uses bodes well for the future of general aviation. Though down 1.4 percent when compared with 1996, the number of hours (38,100) flown by the combined use categories of business and corporate flying represented 19.8 percent of total general aviation activity in 1997. Some of this decline can be attributed to, in some extent, hours previously reported as business and corporate, which are now being reported as "public use", a new category added in 1996. Overall since 1991, the number of hours flown by the combined use categories of business and corporate flying represented 20.8 percent of total general aviation activity.

Other factors driving the revitalization of the GA industry are manufacturer and industry programs and initiatives. One such program, "GA Team 2000" has as its goal 100,000 annual pilot starts by the end of 2000. The New Piper Aircraft Company has created Piper Financial Services, offering competitive interest rates and/or the leasing of Piper aircraft.

A most dramatic industry trend is the continued growth of fractional ownership programs. These programs allow an individual or business to purchase an interest in an aircraft and pay only for the time they use that aircraft. These programs allow many individuals and businesses, who were once priced out of the market, to own or use GA aircraft for business or corporate purposes. Aircraft manufacturers Raytheon, Bombardier, and Dassault Falcon Jets have all established their own fractional ownership programs. Industry leader Executive Jet Aviation has expanded their program to include Boeing Business Jets and Gulfstream aircraft.

More good news for general aviation came as, following seven consecutive years of decline, the total number of active pilots increased by nearly 2,000 in 1998, totaling 618,298. Two major pilot categories (pilots holding private and commercial certificates) declined, however, two others (student and airline transport pilots) increased. Ending nearly five straight years of decline, the number of instrument rated pilots rose nearly 3,000 to 300,183 for 1998.

The number of airline transport pilots increased for the forty-second consecutive year. More important to the general aviation community, the number of active student pilots increased for the second consecutive year, up 1.7 percent for a total of 97,736 in 1998. In the first 11 months of 1998, the FAA processed 58,208 student pilot certificates (both new and renewals), an increase of 2.7 percent over 1997.

Additionally, the FAA issued 58,999 student pilot certificates through the same time period, up 3.1 percent over 1997.
In 1997, the number of aircraft whose primary use was instructional (14,463) increased 15.3 percent while the number of instructional hours flown (5.0 million) increased 4.1 percent. Though all of the historical growth measures relating to general aviation are encouraging, it is the increase in the number of student pilots and instructional flying hours which offer the greatest impact on the future of general aviation.

Exhibit 2A depicts the FAA forecast for active general aviation aircraft in the United States. The FAA forecasts general aviation active aircraft to increase at an average annual rate of 1.1 percent over the 11-year forecast period, increasing from 194,826 in 1997 to 220,804 in 2010. Over the forecast period, the active fleet is expected to increase by almost 2,000 annually considering approximately 2,000 annual retirements of older aircraft, and new aircraft production of nearly 4,000 annually. Turbine-powered, fixed wing aircraft are projected to grow three times faster than piston aircraft, growing 2.7 percent annually through the year 2010. This includes the number of turboprop aircraft increasing from 5,700 in 1998 to 6,610 in 2010 and the number of turbojet aircraft climbing from 5,468 in 1998 to 8,721 in 2010. Likewise, the turbine-powered rotocraft fleet is expected to equal 5,151 in 2010, an average annual increase of 1.0 percent.

The general aviation piston fleet is projected to increase by just under 18,000 aircraft (0.9 percent annually) over the forecast period, for a total of 175,693 aircraft in 2010. The number of single engine piston aircraft is expected to rise to 158,827 (1.0 percent annually) while multi-engine piston aircraft is projected at 16,866 (0.4 percent annually) in 2010. The number of piston powered rotocraft are expected to remain constant at 2,259 throughout the forecast period. Amateur-built (experimental) aircraft are projected to increase at an average annual rate of 1.5 percent over the next eleven years, from 14,900 in 1998 to 17,815 in 2010.

Throughout the forecast period, general aviation hours flown are expected to increase 1.6 percent annually, for a total of 34.1 million hours in 2010. This larger increase in hours in relation to the number of aircraft reflects expected increases in the utilization of general aviation aircraft, i.e., more hours flown per aircraft. By the year 2010, piston powered aircraft are projected to fly 24.5 million hours (1.3 annual increase); turbine-powered, fixed wing aircraft, 5.2 million hours (up 3.4 percent annually); rotocraft (piston and turbined combined) 2.5 million hours (up 1.4 percent annually); and experimental aircraft, 1.7 million hours (1.8 percent annual increase).

The number of pilots is forecast at 735,025 in 2010, an increase of nearly 117,000 or 1.5 percent annually over the forecast period. Student pilots are projected to increase by 31,000 (2.3 percent annually) for a total of 128,800 in 2010. Projected forecast period growth among other types of pilot certificates include: private pilots, 297,556 (1.6 percent annually); airline transport pilots, 160,900 (1.5 percent annually); commercial pilots, 130,100 (0.5 percent annually); and helicopter pilots, 7,500 (0.6 percent annually).

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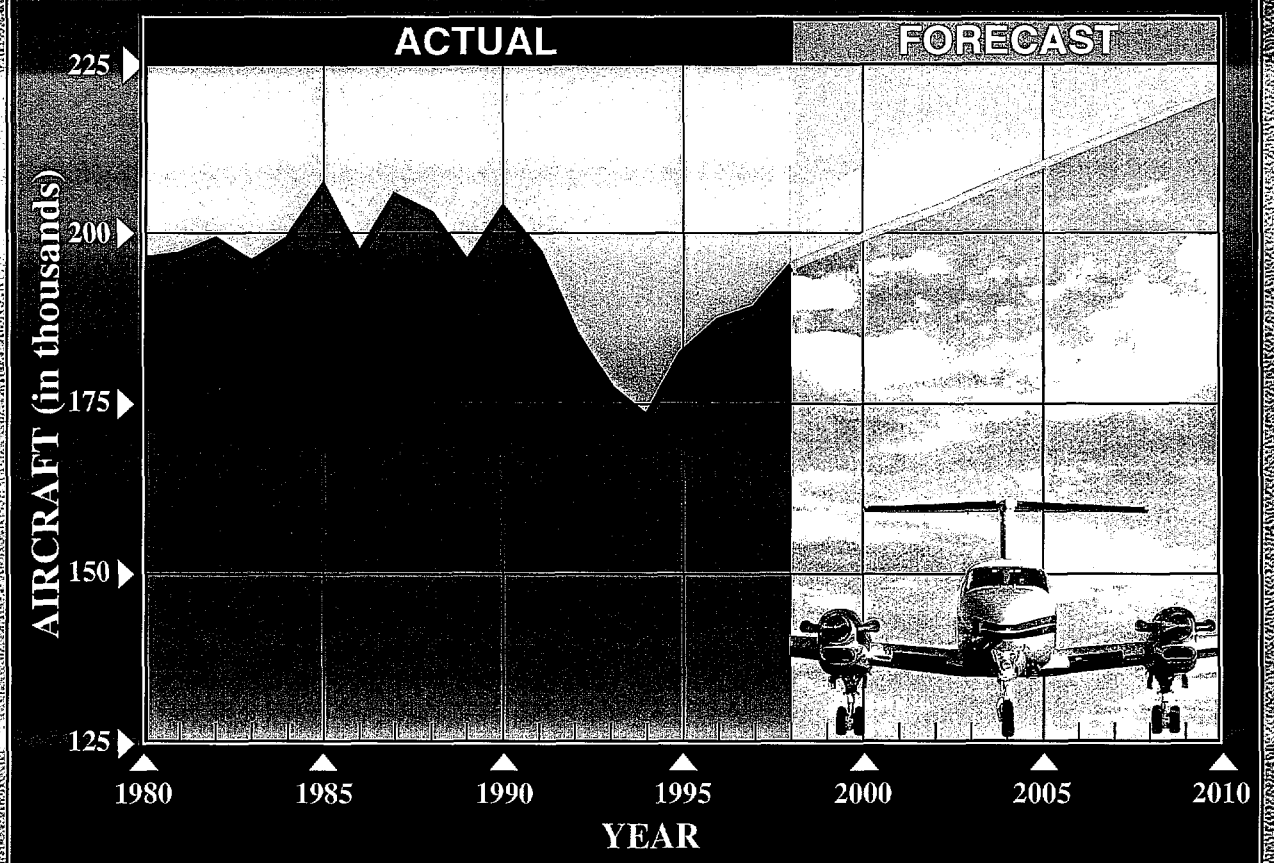
ACTIVE GENERAL AVIATION AIRCRAFT



U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

As of Dec. 31, 1998	FIXED WING				ROTORCRAFT				
	PISTON		TURBINE						
	Single Engine	Multi-Engine	Turboprop	Turbojet	Piston	Turbine	Experimental	Other	Total
1998	141.7	16.1	5.7	5.5	2.3	4.6	14.9	4.1	194.8
2000	144.7	16.2	5.8	6.0	2.3	4.7	15.4	4.2	199.3
2002	147.2	16.4	6.0	6.6	2.3	4.8	15.8	4.3	203.3
2004	150.2	16.6	6.2	7.2	2.3	4.9	16.3	4.3	207.9
2006	153.1	16.7	6.3	7.7	2.3	4.9	16.8	4.4	212.2
2008	156.0	16.8	6.5	8.2	2.3	5.0	17.3	4.5	216.5
2010	158.8	16.9	6.6	8.7	2.3	5.2	17.8	4.6	220.8

Source: FAA Aviation Forecasts, Fiscal Years 1999-2010.

Notes: Detail may not add to total because of independent rounding. An active aircraft must have a current registration and it must have been flown at least one hour during the previous calendar year.

Rolle AIRFIELD
YUMA COUNTY AIRPORT AUTHORITY

Exhibit 2A
U.S. ACTIVE GENERAL AVIATION AIRCRAFT FORECASTS

AIRPORT SERVICE AREA

The first step in determining aviation demand for an airport is to define its generalized service area for the various segments of aviation the airport can accommodate. The airport service area is determined primarily by evaluating the location of competing airports, their capabilities and services, and their relative attraction and convenience. With this information, a determination can be made as to how much aviation demand would likely be accommodated by a specific airport.

In determining the aviation demand for an airport it is necessary to identify the role of the airport. As noted in Chapter One, Rolle Airfield is classified as a general aviation airport. Again, general aviation describes all components of the aviation field with the exception of the military and commercial air carriers. General Aviation includes all business flying (corporate and executive), all agricultural aviation, personal flying for sport or pleasure, as well as flight schools and flight clubs. Aircraft manufacturers, and aircraft maintenance facilities are also apart of general aviation.

Rolle Airfield, which is located on land within the rapidly developing city of San Luis, is ideally positioned to service the expanding economies of southwestern Yuma County. As discussed in the previous chapter, Rolle Airfield is one of only two public use airports located in Yuma County. The other airport, Yuma International Airport, is located approximately 10 nautical miles northeast of Rolle Airfield, and offers fuel, maintenance, aircraft storage and tiedown services which are currently unavailable to the public anywhere else in the county, including Rolle Airfield. The projected continuation of exploding economic and population growth for San Luis, much of it based on increased economic relations with Mexico, should increase general aviation facilities demand in southwestern Yuma County. Along with the potential for increased business and corporate aviation activity, this growing population should also bring an increase in the number of personal or recreational general aviation aircraft owners and pilots. The forecast analysis conducted in the following sections take into consideration the expected local and regional growth as well as any nearby airport(s) that may influence the potential Rolle Airfield service area.

POPULATION PROJECTIONS

Population growth provides an indication of the potential for sustaining growth in aviation activity over the planning period. A summary of historical and forecast population for San Luis, Somerton, and Yuma County is presented in **Table 2A**. Between 1980 and 1998, each of these entities showed a positive increase in population, led by San Luis' staggering 10.15 percent average annual growth rate over the 18-year period. The AAGR for the populations of Somerton (2.89 percent) and Yuma County (3.24 percent) more closely paralleled that of Arizona (3.17 percent), as a whole, for the same time period. The majority of San Luis' burgeoning population increase can be attributed to the booming trade relations between the United States and Mexico.

Population projections for San Luis forecast a total population of 20,517 (2.84 percent AAGR) by the year 2020. While the forecast reflects a much more moderate rate of growth for San Luis than currently exists, the growth

rate remains higher than Somerton (1.83 percent annually), Yuma County (2.02 percent annually), and the State (2.04 percent annually) over the same forecasting period.

TABLE 2A
Historical and Forecast Population

Year	San Luis	Somerton	Yuma County
Historical			
1980	1,946	3,969	76,205
1990	4,212	5,282	106,895
1998	11,090	6,625	135,200
Forecast			
2005	14,894	7,475	154,582
2010	16,976	8,224	171,689
2015	18,460	9,001	189,783
2020	20,517	9,872	209,861

Source: Arizona Department of Economic Security, Population Statistics Unit.

ECONOMIC OUTLOOK

As discussed in Chapter One, Yuma County's primary industry is agriculture, contributing more than $800 million to the local economy. Other major contributors to the region's economy include tourism at approximately $400 million, followed by the military and government at around $300 million combined. The County's manufacturing and industrial base on both sides of the border (including maquiladoras) has grown at a steady rate, generating additional trade in the Yuma-Rio Colorado region. Maquiladoras are assembly plants located along the U.S.-Mexico border. These plants are generally owned by non-Mexican corporations, and produce finished goods for the U.S. market. Originating in the 1960s but significant only since the 1980s, they depend on low-cost labor, favorable tariffs, and their proximity to the United States. A multibillion dollar industry, maquiladoras constitute one of Mexico's primary sources of export income and have stimulated migration to the border cities. Additionally, shoppers from Mexico contribute approximately $160 million annually to the Yuma County economy.

Despite the existing high unemployment rate for Yuma County, San Luis, and Somerton, the overall outlook for the Airfield's service area economies is good. Of particular importance is the continuing booming expansion and development of San Luis, as the Airfield is now part of that community, and is positioned to both contribute to and service this growing economy. The new commercial port of entry project and the private prison facility project discussed in Chapter One should spark growth in what is now eastern San Luis. Related support

businesses along with residential development usually follow such projects as both vendors and employees seek to be closer to their sources of income and prosperity.

FORECASTING METHODOLOGY

The development of aviation forecasts is both an analytical and judgmental process. Different mathematical relationships are tested and applied to establish statistical logic and rationale for projected aviation growth. Additionally, the forecast analyst must rely upon their own professional experience, aviation industry knowledge, and personal assessment of the service area situation when making a final determination as to the preferred forecast methods and results.

Aviation forecasts which extend beyond five years should not be granted an overly high level of confidence. Due to the fact that it often takes longer than five years to complete a major facility development program, facility and financial planning usually require a minimum ten-year projection. It is important, however, to use forecasts which do not overestimate the Airfields revenue-generating capability or underestimate future facility needs which are required to meet aviation activity demands.

The aviation industry is heavily influenced by many factors, some of which can have significant impact on both a local and national level. Advances in aviation technology have in the past and will in the future continue to effect the growth rate of aviation demand. As these technologies evolve and new ones emerge it is hard to predict their impact on the aviation industry; simply put there is no way to mathematically estimate what influence they may have. Therefore, a wide variety of local, regional, and national socioeconomic information has been applied in the analysis and development of the aviation forecasts which are presented in the following sections.

GENERAL AVIATION FORECASTS

To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. Indicators of general aviation demand usually include: based aircraft, the based aircraft fleet mix, annual operations, and peak activity. The remainder of this chapter will examine historical trends regarding these areas of general aviation and project future demand for these segments of general aviation activity at Rolle Airfield.

BASED AIRCRAFT

At an airport, the number of based aircraft is the most elemental indicator of general aviation demand. By first developing a forecast of based aircraft, the growth of aviation activities at the airport can be projected. However, since Rolle Airfield presently has no based aircraft, it is the Airfield's future potential for based aircraft which must be analyzed and forecast. The basis for appraising this potential is an examination of current Yuma County registered aircraft; historical based aircraft per 1,000 residents for the county; current based aircraft as well as future projections for Yuma International Airport; and forecasts from the *1995 Arizona State Aviation Needs Study*

(SANS). Other factors to consider when gauging this future potential include the projected population growth rate and economic expansion potential of the airport service area, particularly, the city of San Luis.

As a point of reference, **Table 2B** summarizes historical registered aircraft in Yuma County and historical based aircraft at Yuma International Airport. From 123 aircraft in 1991 to 138 aircraft in 1997, Yuma County registered aircraft grew at an average annual growth rate of 1.7 percent. Further, examination of this table reveals that over the past four (reported) years the number of registered aircraft in the county has stayed rather steady. For the same reporting period, the percentage of Yuma County registered aircraft based at Yuma International Airport has remained in the mid 80s percentile, growing from 105 aircraft (1991) to 118 aircraft (1997), likewise reflecting an average annual growth rate of 1.7 percent. As discussed in Chapter One, 17 of the remaining Yuma County registered aircraft are reportedly based at the two private airports, Somerton and Checkerboard. For further reference, the second section of **Table 2B** presents comparative forecasts from the current *Yuma International Airport, Airport Master Plan* report (Coffman Associates, Inc., 1999).

Table 2B
Historical Registered Aircraft - Yuma County,
Historical and Forecast Based Aircraft - Yuma International Airport

Year	Yuma County Registered Aircraft	Yuma International Airport Based Aircraft	Percentage of Yuma County Registered Aircraft Based at Yuma International Airport
1991	123	105	85%
1992	123	105	85%
1993	119	101	85%
1994	139	120	86%
1995	137	112	82%
1996	138	108	78%
1997	138	118	86%

Forecasts - Yuma International Airport

	2000	2005	2010	2015	2020
1992 Airport Master Plan	140	160	180	N/A	N/A
1995 SANS	144	159	173	187	N/A
1999 Airport Master Plan Planning Forecast	***125***	***140***	***155***	***170***	***185***

Historical Data Source: ADOT - Aeronautics Division
Forecast Data Source: 1992 and 1999 Airport Master Plans, *1995 SANS.*

The *1995 Arizona State Aviation Needs Study (SANS)* indicates zero (0) based aircraft for Rolle Airfield throughout the *SANS'* 20-year forecasting period (1995 through 2015). These forecasts, particularly for Rolle Airfield, are based on existing airport facilities. In this same time period, for Yuma International Airport, the *SANS* predicted an increase from 130 aircraft in 1995 to 187 in 2020. The 1995 *SANS* registered Yuma County aircraft forecast totals for the 20-year period show 130 aircraft for 1995 and 188 aircraft for 2015. At the time of this publication, no other based aircraft forecasts were known to exist for Rolle Airfield.

Perhaps an accurate measure for forecasting potential based aircraft for Rolle Airfield would be based aircraft per 1,000 residents for the Airfield's service area. Typically, as an area's population increases, the number of aircraft per 1,000 residents decreases. For reference, a summary of historical and forecast registered aircraft per 1,000 residents for Yuma County (taken from the 1999 Yuma International Airport, Airport Master Plan report) is presented in **Table 2C**.

Table 2C
Yuma County
Aircraft Per 1,000 Residents

Year	Yuma County Registered Aircraft	Yuma County Population	Aircraft per 1,000 Residents
1991	123	108,100	1.14
1995	137	121,875	1.12
Forecasts - Yuma County			
Year	**Yuma County Registered Aircraft**	**Yuma County Population**	**Aircraft per 1,000 Residents**
2005	159	154,582	1.03
2010	173	171,689	1.01
2015	188	189,783	1.01
2020	205	209,861	1.02

One way of measuring potential future based aircraft at Rolle Airfield would be to determine the number or percentage of Yuma County registered based aircraft whose owner lists either San Luis or Somerton as their place of residence. A review of the *1999 U.S. Registered Aircraft Database*, which is maintained by the FAA Civil Aviation Registry, Aircraft Registration Branch (AFS-750), lists 18 registered aircraft with either a San Luis or Somerton address/zip code. Of these 18 aircraft, four (4) are helicopters (used for agricultural purposes), six (6) are agricultural aircraft (i.e., crop dusters), and the remaining eight (8) are light, single-engine piston, recreational (private) aircraft. Two (2) of the single engine piston aircraft are currently based at Yuma International Airport.

It is assumed that the remaining 16 aircraft are presently based at the two private airports (Somerton and Checkerboard) identified in Chapter One. Furthermore, it is assumed that the 10 ag-type aircraft will remain based at the private airports where environmental restrictions are less stringent than at public-use facilities. Essentially, this leaves the eight (8) private aircraft, including those presently based at Yuma International Airport, as those with the most potential to relocate to Rolle Airfield should adequate facilities become available in the future. These eight (8) aircraft along with the combined 1998 populations of San Luis/Somerton of 17,715 equates to a current (1998/1999) ratio of 0.45 aircraft per 1,000 residents for the Airfield's most immediate potential service area. Furthermore, these eight (8) San Luis/Somerton area registered aircraft represent approximately 5.8 percent of the total Yuma County registered aircraft. Utilization of these two factors (0.45 aircraft per 1,000 San Luis/Somerton residents, and 5.8 percent of the total Yuma County registered aircraft) coupled with sound professional judgement, should allow one to prepare reasonable potential based aircraft forecasts for Rolle Airfield.

Table 2D presents future forecasts based on aircraft per 1,000 residents for the combined populations of the cities of San Luis and Somerton.

Table 2D
San Luis/Somerton Area
Aircraft Per 1,000 Residents

Year	Potential San Luis/ Somerton Area (Yuma County Registered) Aircraft	Cities of San Luis and Somerton, Combined Population	Aircraft per 1,000 Residents
1998/1999	8	17,715	0.45
Forecasts -San Luis and Somerton			
Year	**San Luis/ Somerton Area (Yuma County Registered) Aircraft**	**Cities of San Luis and Somerton, Combined Population**	**Aircraft per 1,000 Residents**
2005	12	22,369	0.55
2010	15	25,200	0.60
2015	16	27,461	0.60
2020	18	30,389	0.58

Source: **FAA Civil Aviation Registry, Aircraft Registration Branch (AFS-750).

It was assumed that for the first several years the aircraft per 1,000 residents section would rise slightly over its current ratio of 0.45 due to such factors as rapid population growth, booming economic development, and expansion (through annexation) of the city limits of San Luis. Eventually, however, the ratio of aircraft per 1,000 residents should level off and then begin to decrease as these influential socioeconomic factors return to more moderate levels. Potential based aircraft from the San Luis/Somerton area using this forecast method increases from eight (8) aircraft in 1998/1999 to 18 aircraft by 2020.

Meanwhile, **Table 2E** depicts San Luis/Somerton area potential based aircraft forecasts which are predicated on, first, a constant market share (5.8 percent)of forecast Yuma County registered aircraft, and secondly, an increasing market share percentage. Maintaining a constant 5.8 percent market share of Yuma County registered aircraft, potential based aircraft for Rolle Airfield should increase from eight (8) aircraft in 1998/1999 to 12 aircraft by 2020, the end of the forecast period. Using a moderately increasing market share ratio of Yuma County registered aircraft results in 16 potential based aircraft for the Airfield service area (San Luis/Somerton) by the year 2020.

Table 2E
San Luis/Somerton Area
Forecasts of Market Shares of Yuma County Registered Aircraft

Constant Share

Year	Yuma County Registered Aircraft	San Luis/Somerton Area (Yuma County Registered) Aircraft	Percent of Yuma County Registered Aircraft in the San Luis/ Somerton Area
2005	159	9	5.8
2010	173	10	5.8
2015	188	11	5.8
2020	205	12	5.8

Increasing Share

Year	Yuma County Registered Aircraft	San Luis/Somerton Area (Yuma County Registered) Aircraft	Percent of Yuma County Registered Aircraft in the San Luis/ Somerton Area
2005	159	10	6.5
2010	173	12	7.0
2015	188	14	7.5
2020	205	16	8.0

A summary of all forecasts for potential based aircraft at Rolle Airfield, along with the selected 20-year planning forecast is presented in **Table 2F**, and further illustrated on **Exhibit 2B**. The planning forecast is a median range projection which reflects the San Luis/Somerton area garnering a larger percentage of Yuma County registered aircraft

over the planning period. The expected continuation of local and regional economic and population growth supports the long-range capacity for potential based aircraft growth in the Airfield's immediate service area. The planning forecast projects potential based aircraft (San Luis/Somerton area) at Rolle Airfield growing at an average annual rate of 4.2 percent, from the current total of eight (8) aircraft to 18 aircraft in 2020. In all likelihood, actual activity will not follow any one of the projections exactly. A more logical and likely scenario is that potential based aircraft levels will fluctuate within the range of the projections depicted on **Exhibit 2B**. These lines should serve more as a planning envelope, and reflect a reasonable range for potential based aircraft at Rolle Airfield. Accordingly, these time-based projections of anticipated growth should serve only as a guide. At any point in the planning period, the actual level of potential based aircraft could fall within the envelope area defined by the lower range forecast numbers and the higher range forecast numbers.

TABLE 2F
Rolle Airfield
Potential Based Aircraft Forecast Summary

	2005	2010	2015	2020
Aircraft per 1,000 Residents				
San Luis/Somerton Area	12	15	16	18
San Luis/Somerton Area Constant Market Share of:				
Yuma County Registered Based Aircraft	9	10	11	12
San Luis/Somerton Area Increasing Market Share of:				
Yuma County Registered Based Aircraft	10	12	14	16
Other Forecasts:				
1995 State Aviation Needs Study (SANS)	0	0	0	0
Planning Forecast	***12***	***14***	***16***	***18***

FLEET MIX

Knowing the aircraft fleet mix which in the future may utilize Rolle Airfield is necessary to properly plan the facilities that will best serve not only the level of activity but also the type of activities occurring at the airport. As previously discussed, the current San Luis/Somerton area total of eight (8) potential based aircraft is comprised of all single-engine, piston aircraft. It is assumed that initially any increase in potential based aircraft will still be of the single engine variety, however, a small percentage of the potential fleet mix could be twin-engine aircraft by the end of the 20-year planning period.

The forecast mix of potential based aircraft was determined by examining existing and forecast U.S. general aviation fleet trends. The

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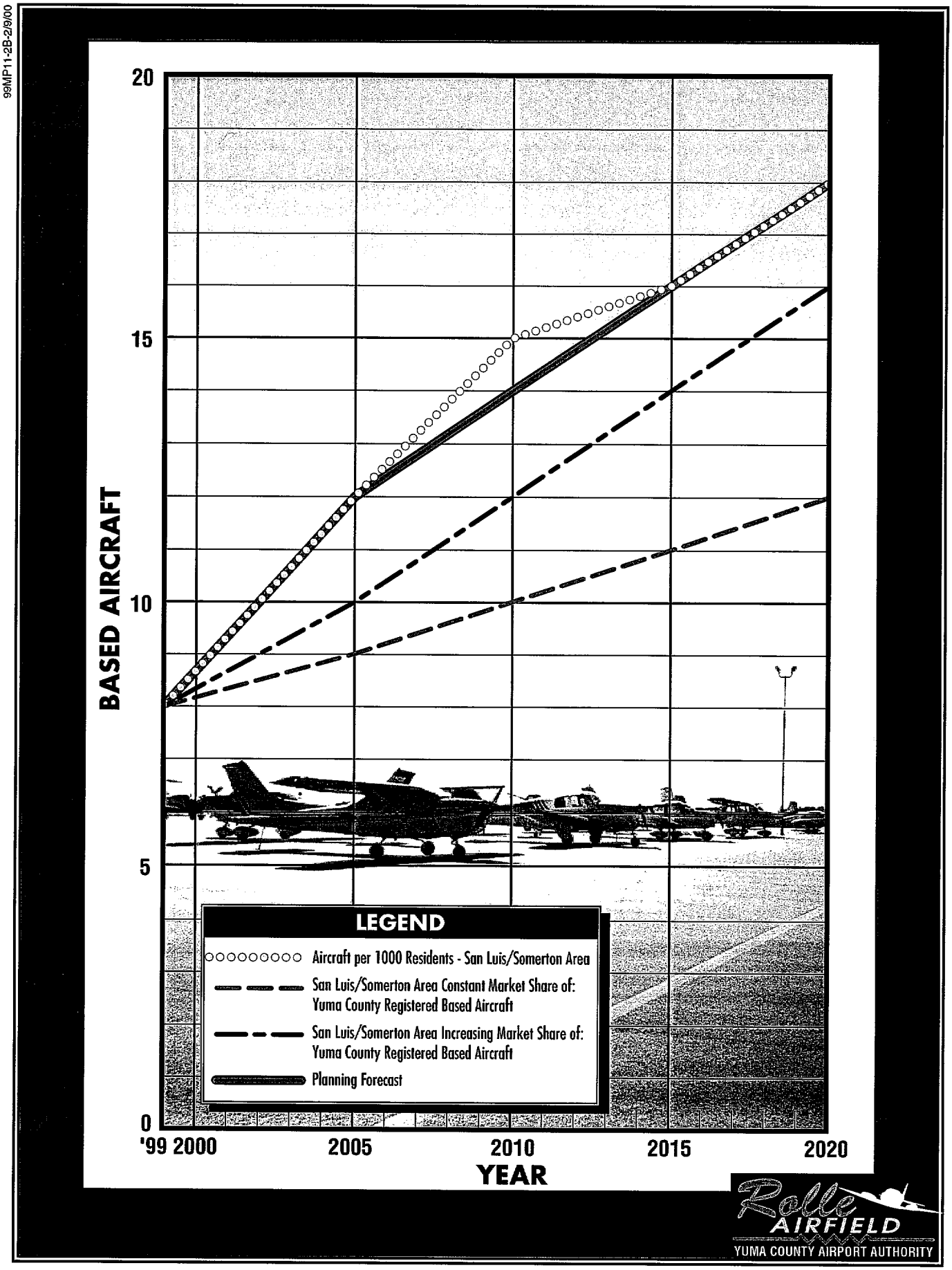

Exhibit 2B
POTENTIAL BASED AIRCRAFT

FAA Aviation Forecasts Fiscal Years 1999-2010 was consulted for the U.S. general aviation fleet mix trends and considered in the fleet mix projections. The fleet makeup of potential based aircraft at Rolle Airfield is anticipated to remain mostly single-engine piston aircraft, however, a small percentage of the future mix could consist of fixed wing, multi-engine and turboprop aircraft, as well as helicopters, all of which is consistent with national trends. The potential based aircraft fleet mix projections are summarized in **Table 2G.**

TABLE 2G
Potential Based Aircraft Fleet Mix - Existing and Forecast

Year	Total Potential Based Aircraft	Single Engine	Multi Engine	Turbo Prop	Helicopter
Existing					
1998	8	8	0	0	0
Forecast					
2005	12	11	1	0	0
2010	14	12	1	1	0
2015	16	13	1	1	1
2020	18	14	2	1	1

ANNUAL OPERATIONS

There are two types of general aviation operations at an airport: local and itinerant. A local operation is a take-off or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Generally, local operations are characterized by training operations. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Typically, itinerant operations increase with business and industry use since business aircraft are used primarily to carry people from one location to another. Since the Airfield is unattended (no on-site employees) and has no airport traffic control tower, aircraft operations have not been accurately documented. Instead, only general estimates of historical and current activity is available. **Table 2H** summarizes historical operational (both general aviation and military) estimates for the airport.

TABLE 2H
Historical Operations Summary

Year	General Aviation Local Operations	General Aviation Itinerant Operations	Military Operations	Total Operations
1988	0	5,400	600	6,000
1989	2,500	100	1,000	3,600
1990	2,500	100	1,000	3,600
1992	2,500	100	2,000	4,600
1995	2,900	0	2,000	4,900
1996	2,900	0	2,000	4,900
1998	2,900	0	2,000	4,900

Source: FAA Form 5010, Airport Master Record, Rolle Airfield.

For forecasting purposes, two forecasts utilizing a percentage of Yuma County registered aircraft general aviation operations have been developed. These two forecasts use, as a baseline, Rolle Airfield's current estimated percentage share of the historical Yuma County general aviation operations as shown in **Table 2J**.

TABLE 2J
Rolle Airfield - Historical Percentage of Total Yuma County General Aviation Operations

Year	Yuma County Registered Aircraft	Combined Total Yuma County General Aviation Operations[1]	Rolle Airfield General Aviation Operations	Rolle Airfield Percentage of Yuma County G.A. Operations
1992	123	38,771	2,600	6.7%
1995	137	29,991	2,900	9.7%
1996	138	28,385	2,900	10.2%
1998	138	24,380	2,900	11.9%

[1]Combined Yuma International Airport and Rolle Airfield operations.
Sources: Yuma International Airport: ATCT records; Rolle Airfield: FAA Form 5010, Airport Master Record.

The first forecast, using a constant percentage equal to the current 11.9 percent share of total Yuma County General Aviation operations, results in an operational level of 6,650 in 2020. The second projection uses an increasing share (0.2 percent annually) of total operations to arrive at 7,100 operations by the year 2020.

A third forecasting method uses the FAA's projected 1.4 percent annual increase, as described in the *FAA Aviation Forecasts Fiscal Years 1999-2010*, for a total of 3,935 operations by 2020. The fourth method is based on the number of potential based aircraft divided into the current estimated annual operations. This number, 363

operations per potential based aircraft, then remains static throughout the forecast period resulting in 6,535 operations in 2020. As an additional reference, operations forecasts from the *1995 Arizona SANS* are presented, along with the other previously discussed forecasts, in **Table 2K**. The last line of this table, the planning forecast was arrived at by analyzing and comparing these varied methodologies, and then weighing the results along with several other factors influencing growth both on and around the Airfield. Together these forecasts, including the planning forecast represent the "forecast envelope".

TABLE 2K
Comparative Annual General Aviation Operations Forecast Summary

	2005	2010	2015	2020
Constant Share of Yuma Co. Registered Aircraft GA Operations (11.9%)	4,550	5,210	5,915	6,650
Increasing Share of Yuma Co. Registered Aircraft GA Operations (+0.2 yearly)	4,625	5,390	6,210	7,100
FAA's Projected 1.4 Percent Annual Increase	3,195	3,425	3,670	3,935
Operations Per Potential Based Aircraft (363 Annual Operations)	4,355	5,080	5,810	6,535
1995 Arizona SANS	200	200	200	N/A
Planning Forecast	***4,035***	***4,575***	***5,135***	***5,710***

Exhibit 2C depicts the planning forecast and "forecast envelope". For the short term, at least, it is assumed that training (local operations) will continue to be the driving factor in the number of annual operations at Rolle Airfield. Additional activity, however, resulting from the anticipated continued economic and population growth in the Airfield's service area should begin to exert some influence on the number of annual operations at Rolle Airfield in the next few years, and will most likely lead to an increase in the number of annual operations. The planning forecast accounts for this additional activity, as well as additional activity resulting from the increased numbers of potential based aircraft and, given the development of the proper Airfield facilities, increased itinerant use of Rolle Airfield. This forecast projects annual operations at Rolle Airfield of 5,710 by the year 2020.

Without a tower or formal airport records, the percentage of local to total Airfield operations can only be estimated. FAA 5010 inspection forms for the years 1995, 1996, and 1998 shows local GA operations accounting for approximately 59 percent of the estimated total of 4,900 operations at Rolle Airfield. The balance (2,000) of the Airfield's operations are listed as military operations. Given Rolle Airfield's close proximity to Yuma International Airport, plus the neighboring restricted airspace, and lack of existing landside facilities to attract based aircraft, it is assumed that for the immediate future, local (training related) operations will continue to account for the majority of operations at Rolle Airfield. It is further assumed, that eventually, based on potential based aircraft projections and the continued regional economic growth, that the demand for adequate landside facilities will need to be addressed. Once this occurs, the Airfield will begin to experience an increasing percentage of itinerant operations. Projections of the long

term (20-year) operations mix total shown in **Table 2L** reflect an estimate of 70 percent local to 30 percent itinerant operations.

TABLE 2L
Aviation Forecast Summary

	2005	2010	2015	2020
Annual Operations				
Itinerant Operations	1,210	1,370	1,540	1,710
Local Operations	2,825	3,205	3,595	4,000
Total Annual Operations	4,035	4,575	5,135	5,710
Based Aircraft	12	14	16	18

PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods. The periods used in developing facility requirements for this study are as follows:

- ***Peak Month*** - The calendar month when peak aircraft operations occur.
- ***Design Day*** - The average day in the peak month. Normally this indicator is easily derived by dividing the peak month operations by the number of days in a month.
- ***Busy Day*** - The busy day of a typical week in the peak month. This descriptor is used primarily to determine apron space requirements.
- ***Design Hour*** - The peak hour within the design day. This descriptor is used primarily in airfield demand/capacity analysis, and in determining terminal building and access road requirements.

Adequate operational information is not available to directly determine peak aviation activity at the airport; therefore, peak period forecasts have been determined according to trends experienced at similar airports across the country. Typically, the peak month for activity at general aviation airports approximates 10-12 percent of the airport's annual operations. Peak month operations have been estimated as 11 percent of annual operations. The forecast of busy day operations at the airport was calculated as 1.25 times design day activity. Design hour operations were calculated as 13.0 percent of design day operations. **Table 2M** summarizes peak activity forecasts for Rolle Airfield.

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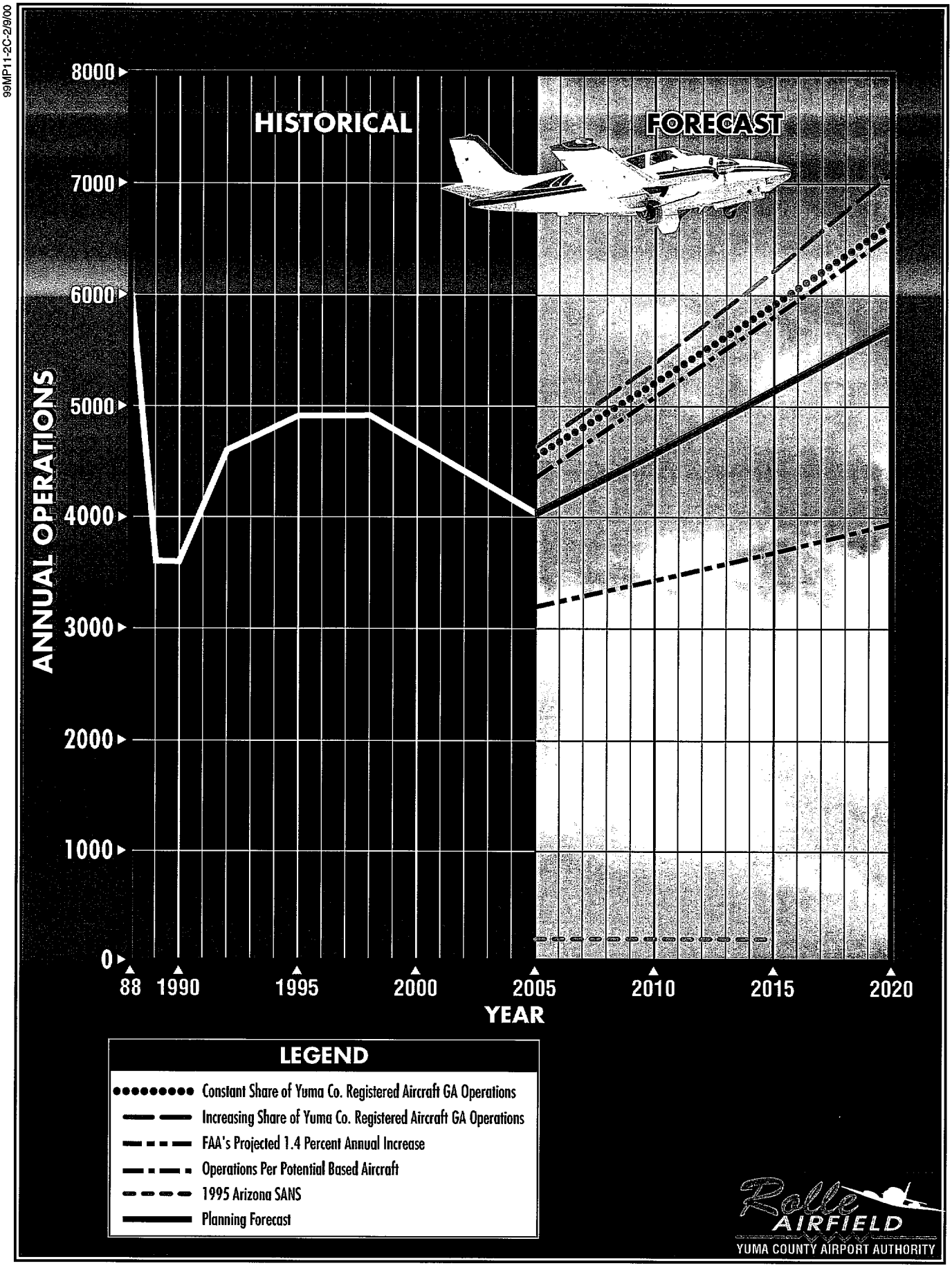

Exhibit 2C
ANNUAL OPERATIONS FORECAST

TABLE 2M
Peak Period Forecasts

	2005	2010	2015	2020
Annual Operations	4,035	4,575	5,135	5,710
Peak Month	444	503	565	628
Design Day	15	17	19	21
Busy Day	19	21	24	26
Design Hour	2	2	3	3

SUMMARY

This chapter has outlined the various aviation demand levels anticipated over the planning period. The next step in the master plan is to assess the capacity of the Airfield to accommodate forecast demand and determine which facilities will need to be constructed or improved to meet these demands. This will be evaluated in the next chapter -- Chapter 3, Aviation Facility Requirements. **Table 2L,** presented earlier, depicts a summary of the aviation forecasts developed for Rolle Airfield.