

**APPENDIX B: ECONOMIC IMPACT OF AIRPORT INFRASTRUCTURE DEVELOPMENT**

**INTRODUCTION**

This appendix encapsulates an analysis of the economic impacts that could result from the implementation of the findings of the *Chandler Municipal Airport Master Plan Update*. Specifically, this analysis assesses the direct economic impacts that would be projected to result from the enhancements of the existing infrastructure at the Airport, with principal consideration given to an extended primary runway. The analysis includes a comparative review of the potential economic and market impacts of the Airport under existing conditions, under conditions of an enhanced infrastructure, as well as a review of other selected, comparable airports.

**BACKGROUND**

Chandler Municipal Airport serves as one of seven “reliever” airports for Phoenix Sky Harbor International Airport as designated by the Federal Aviation Administration’s (FAA) National Plan of Integrated Airport Systems (NPIAS). The role of a reliever airport is to provide an alternate location for general aviation aircraft to operate away from a large commercial service airport. As a reliever, Chandler Municipal supports general aviation aircraft activity in the Phoenix metropolitan area and the City of Chandler. In 2005, Chandler Municipal Airport accommodated over 235,000 operations and had over 450 based general aviation aircraft.

As an important part of the economic infrastructure of both the City of Chandler and the Phoenix metropolitan area, Chandler Municipal Airport generates significant economic impacts for the region and stimulates economic development through its provision of aviation services and transportation infrastructure. The primary airport activities at Chandler Municipal include those conducted by private and non-commercial aircraft operators, flight schools, and other general aviation operations or fixed base operators (FBOs). These types of activities generally consist of providing support services for general aviation aircraft, including fuel and maintenance; providing aircraft charter operations; corporate aircraft support operations; as well as services for local residents who own and operate general aviation aircraft.

Note that the types of activities and aircraft that can be accommodated at an airport are largely dependent on the basic airfield infrastructure that is available for use. Different aircraft have different needs with regards to runway length, approaches, fuel and maintenance services, and parking and/or hangar size. The availability of these services and required infrastructure are considered each time a pilot opts to utilize an airport that lies within the vicinity of the aircraft passengers’ final destination.

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The purpose of this analysis is to evaluate the potential change in economic impact that could result from infrastructure improvements at Chandler Municipal Airport. While this analysis is being prepared separately from the Airport Master Plan, its objective is to provide more information on the economic impacts of the potential airport improvements being considered as part of that plan. Therefore, relevant findings of the Master Plan will be incorporated directly into this analysis.

### **RELEVANT MASTER PLAN FINDINGS**

The on-going Master Plan Update for Chandler Municipal Airport is currently being concluded, having reached consensus on establishing a long-term airport development program for the 20-year planning period. For the purposes of this economic impact analysis, key development concepts and their potential impacts on airport operations must be identified and quantified. Specifically, and of greatest relevance, is the proposed extension of the Airport's primary runway, and how this extension could impact the Airport's future operational levels and aircraft fleet mix.

Through the master planning process, an 850-foot extension to Runway 4R-22L, bringing its total usable length up from 4,850 feet to 5,700 feet, has been identified as being a key component of the Airport's long-term development program. In general, this extension will:

- Enhance the overall level of airport operational safety;
- Improve the stage length capabilities of aircraft that operate on the runway;
- Reduce or eliminate any operational weight limitations currently being realized by aircraft operating on the existing runway;
- Result in quieter aircraft operations; and
- Enhance the Airport's overall economic benefits to the surrounding communities.

Directly attributable to the benefits listed above, the extended runway is projected to result in an increase in corporate jet aircraft activity at the Airport. This increase is detailed in the following table (**Table B.1**). Note that these projections are based on airport operations being constrained by airfield infrastructure conditions; in this case the constraint is runway length. As shown in this table, the extended runway is projected to result in an increase of 2,404 jet operations at the Airport, or approximately 6.6 operations per day.

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**Table B.1  
CONSTRAINED JET OPERATIONS FORECAST**

	4,850 ft Runway		5,700 ft Runway		Net Difference	
	Jet Ops	Total Ops	Jet Ops	Total Ops	Jet Ops	Total Ops
2005	3,527	235,111	NA	NA	NA	NA
2010	4,029	265,915	5,641	267,527	1,612	1,612
2015	4,604	303,831	6,445	305,672	1,841	1,841
2020	5,259	345,341	7,363	347,445	2,104	2,104
2025	6,009	392,588	8,413	394,992	2,404	2,404

SOURCE: Wilbur Smith Associates.  
PREPARED: September 2006

As important as it is to quantify the overall operational benefits of a longer runway, it is equally important to identify its qualitative benefits. In this case, an analysis of the runway length requirements of corporate jet aircraft through application of the FAA's Runway Design 4.2 model analysis (reflected in Chapter Three, *Capacity Analysis and Facility Requirements*) indicates that a 5,700 foot runway at Chandler Municipal would be capable of handling 75 percent of the business jet fleet at 60 percent useful load throughout the entire year (**Table B.2**).

**Table B.2  
AIRPLANES THAT MAKE UP 75% OF FLEET**

Manufacturer	Model	Manufacturer	Model
Aeospatiale	Sn-601 Corvette	<b>Dassault</b>	<b>Falcon 10</b>
BAE	127-700	<b>Dassault</b>	<b>Falcon 20</b>
<b>Beech Jet</b>	<b>400A</b>	<b>Dassault</b>	<b>Falcon 50/50EX</b>
Beech Jet	Premier I	Dassault	Falcon 900/900B
Beech Jet	2000 Starship	IAI	Jet Commander 1121
Bombardier	Challenger 300	IAI	Westwind 1123/1124
Cessna	500 Citation/501 Citation Sp	<b>Learjet</b>	<b>20 series</b>
<b>Cessna</b>	<b>Citation I/II/III</b>	<b>Learjet</b>	<b>31/31A/31A ER</b>
<b>Cessna</b>	<b>525A Citation II (CJ-2)</b>	<b>Learjet</b>	<b>35/35A/36/36A</b>
<b>Cessna</b>	<b>550 Citation Bravo</b>	<b>Learjet</b>	<b>40/45</b>
Cessna	550 Citation II	Mitsubishi	Mu-300 Diamond
Cessna	551 Citation II/Special	<b>Raytheon</b>	<b>390 Premier</b>
Cessna	552 Citation	<b>Raytheon Hawker</b>	<b>400/400XP</b>
<b>Cessna</b>	<b>560 Citation Encore</b>	Raytheon Hawker	600
<b>Cessna</b>	<b>560/560 XL Citation Excel</b>	Sabreliner	75A
Cessna	560 Citation V Ultra	Sabreliner	80
Cessna	650 Citation VII	Sabreliner	T-37

SOURCE: FAA AC 150/5324-4B, Runway Length Requirements for Airport Design  
PREPARED: July 2006  
NOTE: Those aircraft noted in bold currently operate at Chandler Municipal Airport.

It should also be noted that many of the aircraft that are included in the remaining 25 percent of the business jet fleet mix not shown above are currently operating at the Airport. As such, Chandler Municipal would continue to accommodate those aircraft, albeit at some reduced operational capabilities.

### **ECONOMIC IMPACT ANALYSIS**

General aviation airports are an integral component of a region's overall multi-modal transportation infrastructure. Furthermore, general aviation airports serve as an important economic stimulus by generating revenues, payroll, and jobs. Additionally, not only do the airports themselves generate direct economic benefits, but many non-aviation employers who rely on airports to support their daily business activities also contribute to the overall economy.

#### **Economic Impact at Comparable Airports**

It is important to note that no two airports, whether they are commercial service or general aviation, are exactly alike. However, by comparing airports based on similarities such as FAA role (i.e. commercial, reliever, general aviation), Airport Reference Code (ARC), proximity to a metropolitan area, facilities, activity levels, as well as the many other commonalities that airports share, the economic impact derived from an airport and its facilities can be estimated.

As such, the four airports that share such commonalities with Chandler Municipal and whose economic impacts will be compared include Phoenix Deer Valley (DVT) in the Phoenix area; Spirit of Saint Louis (SUS) in St. Louis, Missouri; Charles B. Wheeler Downtown (MKC) in Kansas City, Missouri; and Van Nuys Regional (VNY) in Los Angeles, California. These airports are all located in major metropolitan areas which have experienced similar socioeconomic growth and have similar types of airport activity. Further, all airports have an ARC of either C or D and serve as reliever facilities for major metropolitan commercial service airports.

**Table B.3** shows that while Chandler Municipal Airport has a shorter runway length than the other four comparable airports, it actually exceeds the based aircraft and annual operational levels of two of those other airports. However, when the most recent available economic impact is examined, Chandler Municipal's economic impact is significantly lower than all but one. One reasonable conclusion that can be drawn from this information is that if Chandler Municipal Airport had a longer runway, the economic benefit to the community and the region could increase. This increase would be due to the ability to support operations by more jet aircraft year round with limited or no restrictions to payload and/or fuel capacity. While precise estimates of additional economic impacts resulting from additional runway length at Chandler Municipal are impossible, it is reasonable to expect gains in economic benefit if the runway at the Airport were extended to better accommodate jet aircraft activities.

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**Table B.3  
ECONOMIC IMPACT AND FACILITIES AT COMPARABLE AIRPORTS**

	Facilities				
	CHD	DVT	SUS	MKC	VNY
Primary Runway Length	4,850'	8,208'	7,485'	7,002'	8,001'
Based Aircraft Total	457	890	416	202	712
Jets	1	13	126	43	155
Annual Operations	235,095	290,791	146,145	102,807	504,502
	Economic Activity*				
	CHD	DVT	SUS	MKC	VNY
Employment	845.0	2,209.0	3,053.0	591.0	12,014.0
Payroll (in millions)	\$24.3	\$59.4	\$116.0	\$12.5	\$327.5
Economic Activity (in millions)	\$58.4	\$135.4	\$411.6	\$46.0	\$1,471.2

SOURCE: Chandler Municipal Airport Records; www.airnav.com; *The Economic Impact of Aviation in Arizona, 2002*; *The Economic Benefit of Missouri's Airport System, 2005*; *Economic Impact of Van Nuys Airport-Update 1998, 1999*

PREPARED: August 2006

NOTE: All impacts associated with the economic activity have been adjusted for inflation.

From a business standpoint, the presence of a modern general aviation airport is commonly listed in business location studies as being one of the top ten reasons a firm chooses a specific location to base its operations. Over 90 percent of *Fortune 500* firms own and operate general aviation aircraft, and a majority of these are business jet aircraft. Moreover, the business jet segment of the nation's general aviation fleet is currently the fastest-growing segment, and the FAA expects this trend to continue at least through 2017. The ability to safely and efficiently operate at Chandler Municipal Airport would allow large companies to more effectively conduct business in Chandler and nearby communities. Similarly, Chandler-area businesses would also benefit from a longer runway, as many of those firms' clients and vendors would have an easier, more efficient means of access via a local, full service, jet-capable runway.

### Economic Impact of Jet Aircraft Operations

An economic impact analysis of reliever airports throughout the U.S. conducted by Wilbur Smith Associates indicates that, on average, reliever airports similar to Chandler Municipal experience an economic impact of \$961 per jet aircraft operation. Based on this level of economic impact, **Table B.4** presents the possible economic impacts of the proposed 5,700-foot runway, as well as the economic impact that could be expected to be realized from jet aircraft operations with the current runway length of 4,850 feet. The totals represent the sum of the annual projected economic impacts from 2010 to 2025. The analysis indicates that if the runway were extended to 5,700 feet, almost \$31 million of additional economic impact could be realized over the 15-year period between 2010 and 2025.

**Table B.4  
ECONOMIC IMPACT OF JET AIRCRAFT OPERATIONS**

<b>Year</b>	<b>Total Annual Economic Impact @ 4,850 ft</b>	<b>Total Annual Economic Impact @ 5,700 ft</b>
2010	\$3,871,869	\$5,420,617
2015	\$4,423,964	\$6,193,549
2020	\$5,053,899	\$7,075,459
2025	\$5,774,649	\$8,084,509
<b>Total 2010 – 2025 Economic Impact</b>	<b>\$76,328,867</b>	<b>\$106,860,413</b>
<b>Total 2010 – 2025 Additional Economic Impacts</b>	<b>\$0</b>	<b>\$30,531,547</b>

SOURCE: Wilbur Smith Associates.  
PREPARED: September 2006

Additionally, a Wilbur Smith Associates economic impact analysis of airports throughout the U.S. indicates that a typical corporate flight department employs, on average, 11 workers and has an annual output of \$4,032,000. These facilities tend to provide high paying jobs comprised of corporate pilots, mechanics and aircraft operational dispatchers. The flight departments themselves also purchase goods and services from local vendors such as catering companies and FBOs. Presented below, **Table B.5** summarizes the potential economic impact generated by corporate flight departments located at Chandler Municipal Airport, assuming that the runway were to be extended to 5,700 feet. The scenario also assumes that additional corporate flight departments will locate at the Airport in five-year increments. In this capacity alone, corporate flight departments based at the Airport could potentially contribute over \$137.0 million to the local Chandler economy over a 20-year period.

Finally, it is noteworthy that many corporations' insurance policies require aircraft operations to be conducted on runways of at least 5,000 feet in order for coverage to be in effect. In other words, corporate aircraft under this type of insurance restriction would be effectively prohibited from operating at Chandler Municipal in its current configuration. It is also notable that the availability of developable land and a convenient location gives Chandler Municipal Airport an advantage in attracting corporate flight departments over the other airports in the Phoenix area, again provided that the runway length is sufficient to meet aircraft performance and insurance requirements.

**Table B.5**  
**5,700-FOOT LONG RUNWAY EXTENSION**  
**CHD CORPORATE FLIGHT DEPARTMENT ECONOMIC IMPACT**

Year	Number of Corporate Flight Departments	Number of Employees	Annual Output
2010	1	11	\$4,032,000
2011	1	11	\$4,032,000
2012	1	11	\$4,032,000
2013	1	11	\$4,032,000
2014	1	11	\$4,032,000
2015	2	22	\$8,064,000
2016	2	22	\$8,064,000
2017	2	22	\$8,064,000
2018	2	22	\$8,064,000
2019	2	22	\$8,064,000
2020	3	33	\$12,096,000
2021	3	33	\$12,096,000
2022	3	33	\$12,096,000
2023	3	33	\$12,096,000
2024	3	33	\$12,096,000
2025	4	44	\$16,128,000
<b>Total</b>			<b>\$137,088,000</b>

SOURCE: Wilbur Smith Associates.  
 PREPARED: September 2006

## Economic Impact of Corporate Flight Departments

Airports located in metropolitan areas, especially those located near major corporations, typically accommodate corporate flight departments. Corporate flight departments are utilized by many businesses, including most *Fortune 500* companies, in order to transport their employees for business purpose on aircraft that are owned or leased by the corporation. With a longer runway that could accommodate a higher level of service for these corporate-class aircraft, Chandler Municipal Airport would likely attract corporate flight departments of existing or new businesses in the metropolitan area.

According to a study conducted by the Arizona Department of Transportation (ADOT), the economic impact of Chandler Municipal Airport was \$53.8 million in 2002. Applying the Airport Master Plan's based aircraft forecast annual growth rate of 2.44 percent to the total economic impact for the 20-year period indicates that the Airport's economic impact is estimated to grow to \$87.1 million by 2025 without any significant improvements to the airfield. If the runway were extended to 5,700 feet and corporate flight departments were to locate on the Airport, the impact by 2025 would be \$105.5 million, a 17.5 percent increase. **Table B.6** summarizes the total annual economic impacts of a 5,700-foot long runway.

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**Table B.6  
TOTAL ANNUAL ECONOMIC IMPACT OF A 5,700-FOOT RUNWAY EXTENSION  
AND CHD CORPORATE FLIGHT DEPARTMENT**

Year	Economic Impact Forecast for CHD Based on Current Runway Length	Economic Impact Forecast for CHD Based on 5,700-ft Runway Length	Economic Impact from Additional Operations	Scenario A Corporate Flight Department(s)	Total New Impacts
2005	\$53,800,000	NA	NA	NA	NA
2010	\$60,689,164	\$66,270,296	\$1,549,132	\$4,032,000	\$5,581,132
2015	\$68,460,495	\$78,293,696	\$1,769,201	\$8,064,000	\$9,833,201
2020	\$77,226,956	\$91,344,900	\$2,021,944	\$12,096,000	\$14,117,944
2025	<b>\$87,115,974</b>	<b>\$105,554,218</b>	\$2,310,244	\$16,128,000	<b>\$18,438,244</b>

SOURCE: Wilbur Smith Associates.  
PREPARED: September 2006

## Benefits

Benefits are defined as the services that a community receives by developing and maintaining an airport, and differ from the economic impact discussed in the previous section. Airports support a variety of public benefits, the most substantial of which is the time and cost saved by utilizing air transportation. Other benefits can include increased levels of safety, comfort and convenience, the access to the national airport system that an airport provides, and enhancements to the community sense of well-being. Note that these benefits cannot always be expressed in terms of dollars.

### *Transportation Benefits*

Jet aircraft that are currently operating at Chandler Municipal are often doing so at various degrees of constraints because of the constraining impact of the primary runway's existing length. As a result, weight and fuel restrictions may require flights to further destinations may be forced to stop en route for refueling purposes.

Additionally, there are quantifiable costs associated with each refueling stop. These associated operational costs are described below on a per incident basis:

- Stopping to refuel adds approximately 50 minutes (30 minute average turnaround time for actual refueling and 20 minute average to climb to appropriate altitude) of flight time to operating costs. Per minute average operating costs for the planes being used and projected to be used (i.e., Beech Jet 400A or Citation X) is \$35.32<sup>1</sup>. Thus, every re-fueling stop avoided saves on average \$1,765.85.
- With a longer runway, aircraft are more capable of operating at optimum capacity and weights. Each gallon of Jet A fuel that an aircraft cannot take due to weight

<sup>1</sup> Source: Aviation Research Group/US Inc. *Fractional Program Cost Comparison Utility* between a Beech Jet 400A and Citation X results in a direct cost per flight hour of \$1,900 and \$2,338, respectively. The average per minute flight cost for these two aircraft is \$35.32.



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restrictions results in an average loss of \$4.97<sup>2</sup> per gallon to the local fixed base operator (FBO), as well as any fuel flowage fee realized by the Airport. Thus, for every 1,000 pounds of additional fuel weight taken on results in fuel sales of \$596.64.

### **SUMMARY**

The *Chandler Municipal Airport 2007 Master Plan Update* has concluded that in order for the Airport to better fulfill its designated role of “reliever” airport within the national transportation system, an extension of the Airport’s primary runway to 5,700 feet is necessary to better accommodate corporate-class aircraft. While some corporate-class aircraft currently operate at Chandler Municipal, they are projected to use the Airport with greater frequency as population and employment in the City of Chandler continues to grow. As such, from Airport safety, operational, and economic impact perspectives, it is desirable to upgrade the existing Airport and airfield infrastructure to meet the projected needs of these aircraft. This appendix has identified the potential economic impact and benefits that could be realized by the City of Chandler, the surrounding communities, and the other users of the Airport if the runway were upgraded to better accommodate larger corporate-class aircraft.

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<sup>2</sup> Source: Aviation Research Group/US Inc., *ARG/US Fuel Price Survey, September 2006*. Western average for Jet A fuel is \$4.97 per gallon. The national average as of September 2006 for Jet A fuel is \$4.68 per gallon.