

CHAPTER B.

Aviation Activity Demand Forecasts

INTRODUCTION. Forecasting is a key element in the master planning process and is essential for analyzing existing airport facilities and identifying future needs and requirements of those facilities. By its very nature, forecasting is not an exact science, but it does establish some general parameters for development and, when soundly established, provides a defined rationale for various development activities. The amount and kind of aviation activity occurring at an airport is dependent upon many factors, but is usually reflective of the services available to aircraft operators, the meteorological conditions under which the airport operates (daily and seasonally), the businesses located on the airport or within the community the airport serves, and the general economic conditions prevalent within the surrounding area.

Forecasting generally commences by obtaining accurate historical and existing aviation activity data. Utilizing the present time as an initial point, certain quantifiable facts and trends can be identified, along with many intangible factors, which will impact the aviation activity forecasts for a particular airport or geographic area. The data presented below have evolved from a comprehensive examination of historical airport records and various planning documents relative to the Airport, which include: the FAA Terminal Area Forecast, 2007-2025, the FAA Aerospace Forecast Fiscal Years 2008-2026, the 2007 Washington State Department of Transportation, Aviation Division (WSDOT Aviation) Long-Term Air Transportation Study (LATS), and the 2002 Arlington Municipal Airport Layout Plan Update. These documents were assembled in different years, making the data quite variable and emphasizing the need for establishing a well defined and well documented set of base information from which to develop forecasts of aviation activity.

Historical and Existing Aviation Activity

Historical counts of aircraft operations at airports without control towers are difficult to determine with any degree of certainty. Often, the only data available is that contained in the FAA's *Terminal Area Forecasts* or FAA Form 5010-1 *Airport Master Record*. A tabulation of the best available historical aviation activity since 1998 at Arlington Municipal Airport is presented in Table B1, entitled *HISTORICAL AVIATION ACTIVITY, 1998-2008*. This table presents the numbers of aircraft operations (an operation is defined as either a takeoff or a landing) in six categories that include air taxi, itinerant general aviation, itinerant military, total itinerant, local general aviation, and total operations.



Table B1
HISTORICAL AVIATION ACTIVITY, 1998-2008

Year ⁽¹⁾	Air Taxi	Itinerant			Total	Local General Aviation	Total Operations
		General Aviation	Military				
1998	3,000	55,561	550	59,111	75,899	135,000	
1999	3,000	56,098	550	59,648	76,623	136,271	
2000	3,000	56,635	550	60,185	77,357	137,542	
2001	3,000	56,042	550	59,592	76,548	136,140	
2002	3,000	56,586	550	60,136	77,292	137,428	
2003	3,000	57,131	550	60,681	78,036	138,717	
2004	3,000	57,673	550	61,223	78,776	139,999	
2005	3,000	58,217	550	61,767	79,520	141,287	
2006 ⁽¹⁾	520	58,293	20	58,833	131,167	190,000	
2007 ⁽²⁾	500	59,240	20	59,760	158,917	218,677	
2008 ⁽²⁾	2,325	54,453	20	56,798	76,694	133,492	

Source: BARNARD DUNKELBERG & COMPANY, using data from the *FAA Terminal Area Forecast, 2007-2025* unless noted otherwise.

⁽¹⁾ Data obtained from Airport Master Record FAA Form 5010-1.

⁽²⁾ Data estimated from discussions with Arlington Municipal Airport personnel.

Aircraft operations are categorized into two categories, itinerant and local. The *Air Traffic Control Handbook* defines a local operation as any operation performed by an aircraft operating in the local traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport. They are often associated with flight training operations. On the other hand, itinerant operations are all other aircraft operations.

Aircraft Operations

Air Taxi Operations. Arlington Municipal Airport does not have scheduled passenger service, but does have air taxi service. Air taxi operations consist of any operations conducted by a company or individual performing air passenger and/or air freight transportation service on a non-scheduled basis over unspecified routes. At Arlington Municipal Airport, air taxi operations are primarily related to contract flying of fixed wing aircraft for various federal agencies (e.g., the U.S. Forest Service, the Bureau of Land Management, the Department of the Interior, and the Bureau of Indian Affairs) in support of fire fighting reconnaissance and Air Attack Coordination operations, but also include medevac operations using twin-engine helicopters. From 1998 to 2005, estimated air taxi activity at the Airport has remained steady (based upon historic *Terminal Area Forecast* data) at 3,000 annual operations. The decrease in air taxi operations since 2006 is based on the use of a different data source (i.e., FAA Form 5010-1 *Airport Master Record* compared to the *FAA Terminal Area Forecast*) and the estimate provided by airport personnel. Based upon the type of air taxi



activity occurring at the Airport, air taxi operations will be included in the general aviation operations category for future forecasting elements of this study.

General Aviation Operations. General aviation aircraft conduct the vast majority of the aircraft operations at Arlington Municipal Airport. General aviation is the branch of aeronautical activity that is not commercial or military. Thus, general aviation encompasses pleasure flying and flight training, along with business and corporate aviation activity. Itinerant general aviation operations have shown a fairly steady increasing trend throughout the time frame presented in the table.

From 1997 through 2005, the number of local general aviation operations at the Airport fluctuated with a slight overall increase. However, operations in 2006 and 2007 increased dramatically, with operations in 2008 returning to levels reported in previous years. This is reflective of the increased helicopter flight training activity conducted by Silver State Helicopters training facility that began in 2005, but ceased operations in early 2008. However, airport personnel reported that Phoenix Rotorcraft began helicopter flight training operations in early 2008, but their activity is not at the level of the previous venture.

Military Operations. The few military operations occurring at the Airport are primarily helicopter activity originating from McChord Air Force Base (AFB) or Gray Army Air Field (AAF). As with general aviation air taxi operations, the decrease in military operations reported since 2006 is based on the use of a different data source and discussions with airport personnel.

Existing Operations by Aircraft Type

The current level of aviation activity by aircraft type is summarized in the following table, entitled *EXISTING OPERATIONS BY AIRCRAFT TYPE, 2008*. This summary indicates that approximately 98% of the Airport's aviation activity can be attributed to general aviation operations, with approximately 1.7% conducted by air taxi aircraft. With 20 operations, military activity account for less than 0.1% of all airport activity. Approximately 90% of all airport operations are single engine aircraft, 7.5% are multi-engine piston aircraft, with less than 0.1% allocated to turboprop aircraft. Business jets conduct roughly 1% of all operations, while helicopter operations constitute over 10% of the activity.



Table B2

EXISTING OPERATIONS BY AIRCRAFT TYPE, 2008

Aircraft Type	Operations	Percent of Category	Percent of Total
<i>Air Taxi</i>	2,325	100.0%	1.7%
Single Engine	409	17.6%	0.3%
Multi-Engine	50	2.2%	<0.1%
Turboprop	15	0.6%	<0.1%
Jet	27	1.2%	<0.1%
Helicopter	1,825	78.5%	1.4%
<i>General Aviation</i>	131,147	100.0%	98.2%
Single Engine	109,063	90.9%	89.3%
Multi-Engine	10,000	7.6%	7.5%
Turboprop	44	<0.1%	<0.1%
Jet	80	0.1%	0.1%
Helicopter	11,960	9.1%	9.0%
<i>Military</i>	20	100.0%	<0.1%
Helicopter	20	100.0%	<0.1%
TOTAL	133,492		

Source: Estimates of operational breakdown were generated by Barnard Dunkelberg & Company, using data compiled from the ASDI and with consultation from Arlington Municipal Airport personnel.

Based Aircraft

A historical summary of based aircraft is provided in the following table entitled *SUMMARY OF BASED AIRCRAFT, 1998-2008*. The data were compiled from FAA records and airport tabulations. It should be noted that, of the eight multi-engine aircraft, approximately three are turbine-powered (i.e., turboprops) and five are piston-powered. Also, nine of the jets based at Arlington Municipal Airport are ex-military turbojet-powered aircraft such as the Dornier GMBH Alpha-jet and the Aero Vodochody L-29 and L-39, which are imported for refurbishment and resale, and the one remaining jet is a Falcon that is used for business-related travel.



Table B3
SUMMARY OF BASED AIRCRAFT, 1998-2008

Year	Single Engine	Multi-Engine	Jet	Helicopter	Glider	Ultra-Light	Total
1998 ⁽¹⁾	330	16	7	6	---	---	359
1999	---	---	---	---	---	---	500
2000 ⁽²⁾	390	11	2	6	5	61	475
2001	---	---	---	---	---	---	500
2002	---	---	---	---	---	---	500
2003	---	---	---	---	---	---	503
2004	---	---	---	---	---	---	500
2005	---	---	---	---	---	---	501
2006 ⁽¹⁾	490	8	7	11	31	44	591
2007	---	---	---	---	---	---	505
2008 ⁽²⁾	447	7	10	13	45	60	582

Source: BARNARD DUNKELBERG & COMPANY, using data from the *FAA Terminal Area Forecast, 2007-2025* unless noted otherwise.

⁽¹⁾ Airport Master Record FAA Form 5010-1.

⁽²⁾ Data provided by Arlington Municipal Airport personnel.

Factors Influencing Aircraft Activity

Prior to projecting future activity levels at Arlington Municipal Airport, there are several conditions and assumptions that should be noted that help form the basis or foundation for the development of the forecasts contained here. These variables represent a variety of physical, operational, and socioeconomic considerations and are included in the following text, although not necessarily in order of importance or priority.

Weather Conditions

The most current and complete set of weather data available for Arlington Municipal Airport were obtained and evaluated. With the exception of very few days annually, the Airport is not adversely affected by poor weather conditions. Visual Flight Rules (VFR) meteorological conditions are experienced on average approximately 92% of the time. Therefore, aircraft can operate at the Airport on a regular basis throughout the year, with limited interruption due to weather. The potential negative impact of poor weather conditions, on the operational capability of the Airport, will be analyzed in the following chapter of this document.

Socioeconomic Conditions

Historically, the socioeconomic conditions of a particular region impact aviation activity within that region, and the most often analyzed indicators are population, employment, and income. The service area for Arlington Municipal Airport is generally comprised of Snohomish County, but is



influenced by the greater Puget Sound Region (i.e., consisting of the four counties of Snohomish, Pierce, King, and Kitsap). Consequently, the socioeconomic conditions of both the County and the Puget Sound Region will have an influence on aviation activity at the Airport. Additionally, comparisons to both the State and National socioeconomic conditions will be analyzed to give a broader context of the expectations of the local activity in relation to the State and National levels.

Population. Snohomish County and the Puget Sound Region experienced steady population growth over the past seven years, increasing at approximate growth rates of 1.1% and 0.8%, respectively, between the years 2000 and 2007. This compares to State and National growth rates of 1.4% and 1.0%, respectively, during the same time frame. As can be noted from the following table, entitled *POPULATION ESTIMATES AND PROJECTIONS 2000-2030*, the projected average annual population growth rate for Snohomish County, through 2030, exceeds the expected rates for the Puget Sound Region, the State of Washington, and the United States.

Table B4
POPULATION ESTIMATES AND PROJECTIONS, 2000-2030

Geographic Area	2000	2007	2010	2020	2030	2007-2030 Growth Rate
Snohomish County	606,024	655,800	725,963	844,541	950,066	1.62%
Puget Sound Region	3,275,847	3,460,400	3,745,825	4,190,121	4,578,606	1.22%
Washington	5,894,121	6,488,000	6,792,318	7,698,939	8,509,161	1.22%
United States	282,194,308	301,621,157	308,936,000	335,805,000	363,584,000	0.82%

Source: BARNARD DUNKELBERG & COMPANY, using data obtained from the Washington Office of Financial Management and the U.S. Census Bureau.

Employment. According to data from the U.S. Bureau of Economic Analysis, and as presented in the following table entitled *HISTORIC EMPLOYMENT, 1998-2006*, the total Snohomish County employment figures increased from 282,110 in 1998 to 318,597 in 2006. This represents an increase of 12.9% and an annual growth rate of 1.5%. By comparison, the Puget Sound Region total employment increased from 2,078,666 to 2,334,733 during the same time frame, representing an increase of 12.3% and an annual growth rate of 1.5% as well. The State of Washington employment numbers increased from 3,402,056 in 1998 to 3,868,813 in 2006, which represents an increase of 13.7% and an annual growth rate of 1.6%. And finally, the United States employment totals increased by 11.7% from 159,628,200 in 1998 to 178,332,900 in 2006, an annual growth rate of 1.4%.

According to the *Bureau of Labor Statistics*, the June 2008 unemployment rate for Snohomish County was 4.5%, which was up slightly from 4.0% in June of 2007. This compares to the State of Washington June 2008 unemployment rate of 5.4% and the June 2007 rate of 4.5%, and the June 2008 and June 2007 United States rates of 5.5% and 4.5%, respectively. The historic employment data indicates that Snohomish County compares favorably to the rest of the Puget Sound Region, the State, and the Nation.

Table B5
HISTORIC EMPLOYMENT, 1998-2006

Geographic Area	1998	2006 ⁽¹⁾	1998-2006 Percent Increase	1998-2006 Growth Rate
Snohomish County	282,110	318,597	12.9%	1.5%
Puget Sound	2,078,666	2,334,733	12.3%	1.5%
Washington	3,402,056	3,868,813	13.7%	1.6%
United States	159,628,200	178,332,900	11.7%	1.4%

Source: BARNARD DUNKELBERG & COMPANY, using data from the U.S. Bureau of Economic Analysis.

⁽¹⁾ Data for calendar year 2006, most recent year available.

Income. Current data from the U.S. Bureau of Economic Analysis indicates that the per capita income for Snohomish County was \$27,692 in 1998. By 2006, the Snohomish County per capita income increased to \$37,115, which is a 34% overall increase and an annual growth rate of 3.7%. The Puget Sound Region per capita income increased from \$32,884 in 1998 to \$44,669 by 2006, representing an increase of 35.8% and a growth rate of 3.9%. The per capita income for the State of Washington was \$28,384 in 1998, increasing to \$38,212 by 2006. This is an overall increase of 34.6% and a growth rate of 3.8%. And finally, the per capita income of the United States in 1998 was \$26,883, increasing by 36.6% to \$36,714 in 2006. This represents an annual growth rate of 4.0%. This data is presented in the following table entitled *PER CAPITA INCOME, 1998-2006*.

Table B6
PER CAPITA INCOME, 1998-2006

Geographic Area	1998	2006 ⁽¹⁾	1998-2006 Percent Increase	1998-2006 Growth Rate
Snohomish County	\$27,692	\$37,115	34.0%	3.7%
Puget Sound	\$32,884	\$44,669	35.8%	3.9%
Washington	\$28,384	\$38,212	34.6%	3.8%
United States	\$26,883	\$36,714	36.6%	4.0%

Source: Data compiled by BARNARD DUNKELBERG & COMPANY, using information from the U.S. Bureau of Economic Analysis.

⁽¹⁾ Data for calendar year 2006, most recent year available.



Regulatory Climate

For purposes of forecasting in this MP Update, it is assumed that the regulatory climate of the aviation industry in general, and the general aviation industry in particular, will not change dramatically. Specifically, it is assumed that aircraft noise and emission requirements will remain within the bounds prescribed by current rules and regulations. It is also assumed that general aviation activity will not be subject to new user fees, that access to airports and airspace will not be limited, and that general aviation airports will not be subject to security restrictions that are currently imposed at air carrier airports.

Facilities Potential

Arlington Municipal Airport currently provides excellent general aviation facilities and a tremendous economic asset in the form of developable land. With approximately 20 commercial and corporate tenants offering a full line of specialty aviation services, aircraft operators have their choice of Aviation Service Operators (ASOs), as well as numerous aircraft service, repair, and refurbishment shops. In addition, the Airport has several aviation businesses that offer pilot training (fixed wing and rotorcraft), aircraft sales, and charters. However, the facility also has a tremendous asset in the form of both developed property associated with the Airport Industrial Park and undeveloped property, which has been identified for future Airport Business Park development. Also, because of the Airport's strategic location adjacent to the Seattle Metropolitan Area, existing undeveloped property, and excellent access to the regional roadway systems, each year the Airport hosts the extremely popular and successful annual Arlington Fly-in and Sport Aviation Convention. Due to these many facility attributes, it is anticipated that the Airport will continue to accommodate future aviation demands, along with the existing aviation-related needs of the community that are compatible with the continued development of the overall aviation facility.

At present, the existing aircraft hangars at Arlington Municipal Airport are at 100% occupancy and the Airport has a "T-hangar wait list" that has approximately 40 aircraft owners that would like to base their aircraft at the Airport if appropriate hangar space was available.

Negative or Neutral Factors

The Airport has few negative factors and is in an enviable position due to its many positive features and conditions. There are some broad factors that can have a negative or neutralizing impact on the Airport, and the aviation industry, and these must be considered in the planning process.

The first issue is associated with the continued industry-wide aviation recovery efforts following the terrorist attacks on September 11, 2001. With the focus of the attacks directly involving the aviation industry, their impact rippled throughout the economy on the heels of the economic recession that began in early 2000. One of the outcomes of the "Post 9/11" impacts on commercial



air travel has been the increased use of business/corporate general aviation aircraft for business travel. Fractional and corporate aircraft ownership of business-use aircraft continues to expand throughout the country due to increased travel times and inconvenience associated with commercial air travel that has resulted from the increased security requirements. This transitional movement to increased use of general aviation aircraft for business travel is expected to be enhanced further with the market entry of the less expensive Very Light Jets (VLJs), which are projected to further expand/popularize the “on-demand” air taxi service general aviation sector.

The second issue relates to the overall condition of the general aviation industry in the United States. Current economic impacts to general aviation include the expense of owning and operating an aircraft (i.e., costs of insurance, fuel, and maintenance), increased travel options provided by low-cost commercial airlines in the more open aviation market since airline deregulation, changes in disposable discretionary income, increases in airspace restrictions affecting fair-weather flying, reductions in personal leisure time, and shifts in personal preference as to how leisure time is spent. These factors have significantly influenced the single engine light aircraft segment of the industry in particular, with the general aviation industry focusing more on the business aircraft operator and less on the recreational flyer.

The final negative factor on the aviation industry is the recent dramatic increase in aviation fuel. According to the Energy Information Administration, the retail price (less taxes) of a gallon of Jet-A fuel increased by 74.7% from May 2007 to May 2008 (latest data available). From October 2007 through May 2008, the price increased by 54.2%. The FAA *Terminal Area Forecasts* are published in December of each year, using data gathered from FAA towers and Federal contract towers through September of the same year. Therefore, the drastic aviation fuel price increases experienced in a short time period will certainly have a negative impact on aircraft operations, but to what extent is yet to be seen and has not been factored into the FAA forecast. Arlington Municipal Airport reports that year-to-date (July 2008) sales of both 100LL AVGAS and Jet-A fuel are off by about 37% compared to 2007, though a percentage of this decline in fuel sales can be attributed to the closure of the Silver State Helicopter training facility located at the Airport.

There are also a number of bright spots having a positive impact in certain segments of the general aviation industry. They include the passage of the General Aviation Revitalization Act of 1994, which provides an 18-year limit on product liability lawsuits against general aviation aircraft and component manufacturers. This legislation continues to facilitate a renewed interest and optimism among U.S. aircraft manufacturers, who either re-entered the single engine aircraft market after several years' absence, or have increased future production schedules to meet expected renewed demand. The growth in the amateur-built aircraft market, and the strength of the used aircraft market, indicate that demand for inexpensive personal aircraft is still relatively strong. Additionally, according to data from the General Aviation Manufacturers Association (GAMA), total general



aviation aircraft shipments have risen by 1.6% for the first six months of 2008 compared to the same time period of 2007, while total billings on these shipments have increased by 24.1% for the same period. Specific aircraft shipment data for 2007 reflect a generally diversified demand for all categories of aircraft, but this aircraft mix is expected to change as deliveries for the VLJs/microjets ramp up over the next several years. These aircraft began entering the fleet in 2007 and, according to some industry forecasts, are expected to grow by 400 to 500 aircraft per year through 2020. In addition, beginning in 2005 a new category of aircraft, referred to as “light sport” aircraft, was established by the FAA, and the following types of aircraft are included in this category:

- **single engine airplanes (with capacity, weight, and performance restrictions)**
- **gliders**
- **lighter-than-air (airship or balloon)**
- **rotorcraft (gyroplane)**
- **powered parachute**
- **weight-shift control aircraft (trikes)**

Arlington Municipal Airport has long been recognized as a preferred basing location for ultralight and glider aircraft within the Seattle Metropolitan Area, of which many have been certified into the light sport aircraft category. Due to the relatively low costs associated with this type of recreational flying, it is anticipated that this sector of general activity will continue to thrive at Arlington. According to FAA records, there were an estimated 1,273 light sport aircraft registered in the U.S. at the end of 2006, with forecast increases to 5,600 aircraft by 2010 and to 14,700 aircraft by 2025.

The FAA’s efforts to aid general aviation revitalization include streamlining the certification process for new entry-level aircraft and implementing measures to provide regulatory relief and reduce user costs (i.e., reduced rules, improving the delivery of FAA services by decreasing excess layers of management, and the elimination of unneeded programs and processes). Groups such as the Aircraft Owners & Pilots Association (AOPA) and National Aeronautics and Space Administration (NASA) are sponsoring programs that aggressively promote the benefits of general aviation and learning to fly.

Aviation Activity Forecast

Aviation activity is forecasted by using the historical data and incorporating the assumptions, conditions, and trends. Forecasting any type of future activity is as much an art as science. Any forecast, no matter how sophisticated, represents a “best guess” or “deducted guess” at a particular point in time. Therefore, forecasts must be updated periodically and revised if necessary to reflect new conditions and developments. Activity forecasts for airports are often established using various



sets of assumptions that generate different outcomes that provide a broad view of future airport utilization potentials. Several forecasting elements are pertinent to the planning effort for Arlington Municipal Airport, which include itinerant general aviation operations, local general aviation operations, operations by aircraft type, based aircraft, and peak period operations.

Itinerant General Aviation Activity Forecast

Recessions and growth periods in the country's economic cycle have historically affected overall aviation operations in general and, specifically, have impacted general aviation operations more severely than air carrier operations. However, with more general aviation aircraft being used for business purposes than in the past, the economic fluctuations should have somewhat less of an effect upon overall general aviation activity.

In developing the general aviation activity forecasts, several forecast and national trends were reviewed. As presented in the following table, entitled *ITINERANT GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2008-2028*, three scenarios have been developed for itinerant general aviation projections. Also presented are the forecasts from the FAA *Terminal Area Forecast* for Arlington Municipal Airport, a projection based on the expected growth rate used in the FAA *Aerospace Forecasts/Fiscal Years 2008-2025* for general aviation operations, a trend projection, and three forecast scenarios developed for this study.

- **TAF:** The FAA's *Terminal Area Forecast* developed a forecast for itinerant general aviation operations specifically for Arlington Municipal Airport. It provides comparative projections based on an average annual growth rate of roughly 0.8% through the year 2025. Base year data for year 2006 was utilized for the analysis.
- **FAA 2008:** The FAA's *Aerospace Forecasts, Fiscal Years 2008-2025* provides comparative nationwide general aviation activity projections based on an average annual growth rate of approximately 1.7% through the year 2025. These forecasts reflect projected itinerant general aviation activity at airports with both FAA and contract traffic control service (i.e., facilities with airport traffic control towers). The Arlington Municipal Airport 2008 base year data was utilized for the analysis.
- **Trend:** The trend analysis is a future projection based solely on the previous ten years' historical data collected for Arlington Municipal Airport. This analysis indicates that, even though the overall trend numbers are decreasing, the trend projection results in an average annual growth rate of 0.2% from 2008 operations through the year 2028 operations. This forecast is included for comparison purposes only.
- **Scenario One:** This scenario applies the itinerant general aviation average annual growth rate used in the *Terminal Area Forecast* developed for Arlington Municipal



Airport (0.8%) and applies it throughout the 20-year time frame, with 2008 data as the base year.

- **Scenario Two:** This scenario reflects a market share rate analysis between Arlington Municipal Airport and total U.S. itinerant general aviation operations projected in the *Terminal Area Forecast*. Over the past 11 years, this operational ratio has varied between 0.13% in 2000 and 0.16% in 2007, with an average of 0.14% for the time period. An operational ratio of 0.145% was applied for the 20-year forecast period. Additionally, this ratio equates to an average annual growth rate of approximately 1.3% through the year 2028.
- **Scenario Three:** This scenario uses general aviation operational data developed by WSDOT Aviation in their LATS specifically for the Puget Sound Regional Transportation Planning Organization (RTPO). WSDOT Aviation forecasted that the Puget Sound Region would experience an average annual growth rate of 1.91% during the first ten-year period (2005-2015), and would thereafter grow at a rate of 1.56% annually through 2030. By using these same annual growth rates and applying them to Arlington Municipal Airport’s base year (2008), itinerant general aviation operations result in an average annual growth rate of approximately 1.7% through the year 2028.

Table B7

ITINERANT GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2008-2028

Year	TAF ⁽¹⁾ 0.8%	FAA 2008 ⁽²⁾ 1.7%	Trend ⁽³⁾ 0.2%	Scenario One 0.8%	Scenario Two ⁽⁴⁾ 1.3%	Scenario Three 1.7%
2008 ⁽⁵⁾	62,759	56,778	56,778	56,778	56,778	56,778
2009	63,282	57,743	59,204	57,232	58,993	57,861
2010	63,809	58,725	59,174	57,690	59,803	58,964
2011	64,342	59,723	59,143	58,152	60,632	60,089
2012	64,879	60,738	59,112	58,617	61,483	61,235
2013	65,420	61,771	59,082	59,086	62,358	62,403
2018	68,201	67,203	58,928	61,487	65,785	68,114
2023	71,106	73,113	58,775	63,986	69,200	73,582
2028	---	79,542	58,621	66,587	73,123	79,490

Source: BARNARD DUNKELBERG & COMPANY.

⁽¹⁾ FAA Terminal Area Forecast, 2007-2025.

⁽²⁾ FAA Aerospace Forecasts, Fiscal Years 2008-2025 for itinerant general aviation operations at airports with ATCT service.

⁽³⁾ Projection based on eleven-year historical data.

⁽⁴⁾ Selected Forecast.

⁽⁵⁾ Base year operation counts of 56,778 include existing itinerant air taxi operations.

--- Data not available.



Selected Forecast. Scenario Two is the selected forecast for itinerant general aviation activity at Arlington Municipal Airport. It is thought that the growth rate for Scenario One is not reflective of the potential growth in itinerant aircraft operations throughout the planning period. As additional economic growth occurs in the north Puget Sound Region, additional general aviation aircraft operations will follow suit. Conversely, the operational forecast for Scenario Three, following the WSDOT Aviation forecast assumptions, was thought to be too ambitious based on the current economic conditions and expectations. Scenario Two provides a realistic and reasonable association with the nationwide itinerant *Terminal Area Forecast* operations as they apply to Arlington Municipal Airport.

Local General Aviation Activity Forecast

Local general aviation operations have been forecast for Arlington Municipal Airport and, like the itinerant operations projections, several forecast and national trends were reviewed and evaluated. As illustrated in the following table, entitled *LOCAL GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2008-2028*, three scenarios have been developed. Also included in the table are the forecast from the FAA's *Terminal Area Forecast* for Arlington Municipal Airport, a forecast extrapolated from the growth rate taken from the FAA's *Aerospace Forecasts/Fiscal Years 2008-2025* for overall general aviation operations, a trend projection, and three scenarios developed for this study.

- **TAF:** The *Terminal Area Forecast* provides a forecast specifically for local general aviation operations at Arlington Municipal Airport based on an average annual growth rate of roughly 0.9% through the year 2025. Again, base year data for year 2006 was utilized for the analysis.
- **FAA 2008:** This forecast is based on the nationwide general aviation activity projections from the FAA's *Aerospace Forecasts, Fiscal Years 2008-2025*. An average annual growth rate of approximately 0.8% through the year 2025 forms the basis for this forecast, and is reflective of projected local general aviation activity at airports with both FAA and contract traffic control service (i.e., facilities with airport traffic control towers). The Arlington Municipal Airport 2008 base year data was utilized for the analysis.
- **Trend:** The trend analysis is based on the previous eleven years of local general aviation operations conducted at Arlington Municipal Airport. The analysis indicates that the trend projection results in an average annual growth rate of 5.0% through the year 2028. As with the itinerant general aviation operations, this forecast is included for comparison purposes only.
- **Scenario One:** This scenario also applies the local general aviation average annual growth rate used in the *Terminal Area Forecast* developed for Arlington Municipal



Airport (0.9%) and applies it throughout the 20-year time frame, using 2008 base year data.

- **Scenario Two:** The second scenario is based on the expectations of the Phoenix Rotorcraft helicopter flight training business that recently began operating at the Airport. Using past performances as a gauge, it is expected that local operations will increase more rapidly in the near-term, but gradually decrease throughout the planning period. The initial five-year growth rate averages 1.8%, the second five-year growth rate averages 1.2%, and the final ten-year average annual growth rate is 0.66%. Throughout the 20-year planning period, this scenario has an average annual growth rate of 1.1%.
- **Scenario Three:** This scenario reflects a market share rate analysis between Arlington Municipal Airport and total U.S. local general aviation operations projected in the *Terminal Area Forecast*. Over the past eleven years, this operational ratio has varied between 0.17% in 2001 and 0.32% in 2006, with an average of 0.2% for the time period. Following the recent trend for Arlington Municipal Airport, an increasing operational ratio is applied throughout the forecast period, beginning with a ratio of 0.1878% in 2009 and ending with a ratio of .203% in 2025. For years 2026 through 2028, an extrapolation of the growth rate experienced throughout the time period is applied. The increasing operational ratio equates to an average annual growth rate of approximately 1.3% through the year 2028.



Table B8

LOCAL GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2008-2028

Year	TAF ⁽¹⁾ 0.9%	FAA 2008 ⁽²⁾ 0.8%	Trend ⁽³⁾ 5.0%	Scenario One 0.9%	Scenario Two ⁽⁴⁾ 1.1%	Scenario Three 1.3%
2008	81,625	76,694	76,694	76,694	76,694	76,694
2009	82,339	77,307	117,096	77,384	78,227	78,176
2010	83,060	77,926	121,660	78,080	79,792	79,166
2011	83,787	78,549	126,224	78,783	81,188	80,167
2012	84,520	79,177	130,788	79,492	82,609	81,182
2013	88,285	79,811	135,352	80,207	83,848	82,213
2018	92,219	83,055	158,173	83,882	89,001	87,628
2023	93,026	86,431	180,994	87,726	92,526	93,473
2028	---	89,943	203,815	91,745	95,051	98,928

Source: BARNARD DUNKELBERG & COMPANY.

⁽¹⁾ FAA Terminal Area Forecast, 2007-2025.

⁽²⁾ FAA Aerospace Forecasts, Fiscal Years 2008-2025 for local general aviation operations at airports with ATCT service.

⁽³⁾ Projection based on eleven-year historical data.

⁽⁴⁾ Selected Forecast.

--- Data not available.

Selected Forecast. Based on the significant basing contingency of “light sport” aircraft at Arlington and the existing demand for helicopter flight training in the region, which was realized when Sliver State Helicopters operated a flight training facility at the Airport, Scenario Two is selected as the most realistic local operational scenario for the Airport. As with the itinerant general aviation operations, the growth rate associated with Scenario One is thought to inaccurately reflect the current and future conditions of the Airport. Scenario Three is thought to be too aggressive given the current fuel costs and uncertainty with the economic conditions.

Military Activity Forecast

There are generally three components in determining military aircraft use at an airport. The first is Department of Defense (DOD) funding, which has been increasing in recent years, but the year-to-year amount is uncertain. The second is a fueling contract the airport or FBO may have with the DOD. The third is the location, or proximity, of the airport with adjacent aviation-related military bases or training areas. As identified previously, Arlington Municipal Airport is not a primary destination training facility for military aircraft, with historic activity averaging less than 1% of total annual operations. The majority of military activity is associated with transient helicopter activity originating from McChord AFB and Gray AAF.

It is anticipated that military operations will continue to fluctuate in the future in response to changing missions and training levels, but no significant increase in flight operations is projected at



Arlington Municipal Airport through the 20-year planning period of this document. The following table, entitled *MILITARY OPERATIONS FORECAST, 2008-2028*, presents the expected military operations forecast for the Airport.

Table B9
MILITARY OPERATIONS FORECAST, 2008-2028

Year	Operations
2008	20
2009	20
2010	20
2011	20
2012	20
2013	20
2018	20
2023	20
2028	20

Source: BARNARD DUNKELBERG & COMPANY.

Operations Forecast by Aircraft Type

A further assessment of the forecasts involves the individual and collective use of the Airport by various types of aircraft. The types of aircraft expected to use the Airport assist in determining the amount and type of facilities needed to meet the aviation demand.

The following table, entitled *SUMMARY OF OPERATIONS FORECAST BY AIRCRAFT TYPE, 2008-2028*, depicts the approximate level of use by aircraft types that are projected to use Arlington Municipal Airport. This table reflects the growing percentage of turbine engine powered aircraft anticipated to operate at the Airport, with a corresponding decrease in the percentage of single and multi-engine aircraft, which is anticipated in response to the anticipated influx of the Very Light Jets into the business-use general aviation sector. However, operationally, the Airport's activity will continue to be dominated by the single engine aircraft category, and military activity will continue to remain steady at the Airport throughout the planning period.



Table B10

SUMMARY OF OPERATIONS FORECAST BY AIRCRAFT TYPE, 2008-2028

Operations by Type	2008	2013	2018	2023	2028
<i>General Aviation</i>	133,472	146,206	154,786	161,726	168,174
Single Engine	109,472	120,050	126,924	132,130	137,062
Multi-Engine	10,050	10,717	11,145	11,483	11,772
Turboprop	58	80	155	323	505
Jet	107	154	310	647	841
Helicopter	13,785	15,205	16,252	17,143	17,995
<i>Military</i>	20	20	20	20	20
Helicopter	20	20	20	20	20
Total Operations	133,492	146,226	154,806	161,746	168,194

Source: BARNARD DUNKELBERG & COMPANY.

In addition, an estimated breakdown of representative aircraft types for each category has been generated for reference, and is presented for reference in Appendix Three of this document.

VFR and IFR Forecast

An additional element in assessing airport use and determining various demand considerations is to ascertain the operations occurring during Visual Flight Rules (VFR) weather conditions compared to those occurring during Instrument Flight Rules (IFR) conditions. By utilizing operational data derived from existing Aircraft Situation Display to Industry (ASDI) records, which is a compilation of IFR flight plans filed by pilots operating within the continental United States, an estimate of the number of operations occurring during IFR weather conditions can be formulated. According to the ASDI data, there were 1,266 operations recorded at Arlington Municipal Airport in 2007 (latest calendar year data available) that included the filing of IFR flight plans (see Appendix Two for a compilation of the ASDI dataset). It is understood that not all IFR flight plans are conducted during IFR weather conditions, so an assumption was made for this study that approximately 12% of the operations recorded by the ASDI data were conducted during IFR weather conditions. This amounts to approximately 150 IFR operations for 2008. It is expected that as additional turbine-powered aircraft (both turboprop and turbojet) are based at the Airport, and more and more business-related aircraft operations occur at the Airport, the number of IFR operations will increase correspondingly. The following table, entitled *VFR AND IFR AIRCRAFT OPERATIONS FORECAST, 2008-2028*, provides a summary of the VFR and IFR operations that are projected to occur at the Airport during the 20-year planning period.



Table B11

VFR AND IFR AIRCRAFT OPERATIONS FORECAST, 2008-2028

Type of Operation	2008 ⁽¹⁾	2013	2018	2023	2028
VFR	133,342	145,946	154,406	161,096	167,394
IFR	150	280	400	650	800
Total Operations	133,492	146,226	154,806	161,746	168,194

Source: BARNARD DUNKELBERG & COMPANY.

⁽¹⁾ Estimate using Aircraft Situation Display to Industry (ASDI) data for 2007.

Based Aircraft Forecast

The number of general aviation aircraft that can be expected to base at an airport facility is dependent on several factors, such as airport radio communications, available facilities, airport operator services, airport proximity and access, aircraft basing capacity available at adjacent airports, and similar considerations. General aviation operators are particularly sensitive to both the quality and location of their basing facilities, with proximity of home and work often being identified as the primary consideration in the selection of an aircraft basing location. According to airport personnel, there is a current waiting list for additional aircraft storage facilities at Arlington Municipal Airport, with approximately 40 individuals currently identified. At present, the Airport has 582 based aircraft with over 87% of those stored in hangars.

It should be noted that, generally, there is a relationship between aviation activity and based aircraft, stated in terms of operations per based aircraft (OPBA). Sometimes, a trend can be established from historical information of operations and based aircraft. The national trend has been changing with more aircraft being used for business purposes and less for pleasure flying. This impacts the OPBA in that business aircraft are usually flown more often than pleasure aircraft. For 2008, the OPBA at Arlington Municipal Airport was approximately 229, and below the average OPBA of 294 that has been recorded at the Airport over the past eleven years. The following table, entitled *BASED AIRCRAFT FORECAST SCENARIOS, 2008-2028*, presents the forecasts for the 20-year planning period.

- **TAF:** The *Terminal Area Forecast* provides a forecast specifically for aircraft expecting to base at Arlington Municipal Airport. An average annual growth rate of 0.8% is used through the year 2025. Again, base year data for year 2006 was utilized for the forecast.
- **FAA 2008:** This forecast is based on the nationwide general aviation active aircraft as projected in the FAA's *Aerospace Forecasts, Fiscal Years 2008-2025*. Active general aviation aircraft nationwide are expected to increase by an average annual rate of approximately 1.4% through the year 2025. This growth rate is applied to the



Arlington Municipal Airport 2008 base year data and projected throughout the forecast period.

- **Trend:** The trend analysis is based on the previous eleven years of based aircraft data at Arlington Municipal Airport. The trend projection results in an average annual growth rate of 0.7% through the year 2028.
- **Scenario One:** Scenario One applies the Arlington Municipal Airport based aircraft average annual growth rate used in the *Terminal Area Forecast* (0.8%) and applies it throughout the 20-year time frame with the updated 2008 base year data.
- **Scenario Two:** This scenario uses the 2008 OPBA ratio of 229 as a starting point and applies it to the 2009 and 2010 selected total general aviation operations forecast. Throughout the 20-year forecast period, the OPBA ratio increases slightly to 236 by 2028.
- **Scenario Three:** Scenario Three is a market share rate analysis between based aircraft at Arlington Municipal Airport and the total U.S. active aircraft fleet projected in the *Terminal Area Forecast*. The ratio of based aircraft at Arlington Municipal Airport and the total U.S. active fleet has fluctuated between 0.25% and 0.28%, with an average of 0.26% for the time period. For the forecast period, an increasing ratio is applied beginning with a ratio of 0.289% in 2009 and ending with a ratio of .312% in 2025. For years 2026 through 2028, an extrapolation of the growth rate experienced throughout the time period is applied. The applied increasing ratio equates to an average annual growth rate of approximately 1.4% through the year 2028.



Table B12
BASED AIRCRAFT FORECAST SCENARIOS, 2008-2028

Year	TAF ⁽¹⁾ 0.8%	FAA 2008 ⁽²⁾ 1.4%	Trend ⁽³⁾ 0.7%	Scenario One 0.8%	Scenario Two ⁽⁴⁾ 1.0%	Scenario Three 1.4%
2008	510	582	582	582	582	582
2009	514	590	533	587	598	591
2010	518	598	537	591	609	598
2011	521	607	541	596	617	607
2012	527	615	545	601	626	614
2013	531	624	549	606	636	623
2018	552	669	570	630	664	661
2023	575	717	590	656	691	710
2028	---	769	610	683	713	766

Source: BARNARD DUNKELBERG & COMPANY.

⁽¹⁾ FAA Terminal Area Forecast, 2007-2025.

⁽²⁾ FAA Aerospace Forecasts, Fiscal Years 2008-2025 for active general aviation aircraft nationwide.

⁽³⁾ Projection based on eleven-year historical data.

⁽⁴⁾ Selected Forecast.

Selected Forecast. Scenario Two is the selected based aircraft forecast for this MP Update. It is reflective of the increasing trend of operations per based aircraft, following the expected slight increase by itinerant users of the Airport compared to local operators. Scenario One does not accurately reflect the existing demand for additional aircraft storage spaces at the Airport, which is manifested by the approximate 40 individuals on the current waiting list. And, while market share rate forecasts are reasonably good analyses to use for forecasting, Scenario Three is thought to be too ambitious throughout the entire 20-year planning period.

The mix of based aircraft for incremental periods is shown in the following table entitled *BASED AIRCRAFT FORECAST BY TYPE, 2008-2028*. The percentage of multi-engine turbine-powered aircraft (i.e., turboprop and turbojet) has the potential to increase as a part of the total based aircraft population at the Airport. This is primarily related to overall national trends in general aviation, but it can be equally indicative of a growing local and regional economy. For the purposes of this MP Update, aggregate growth (not to be confused with aircraft type growth on a percentage basis) is primarily forecast in the single engine aircraft type.

Table B13

BASED AIRCRAFT FORECAST BY TYPE, 2008-2028

Aircraft Type	2008⁽¹⁾	2013	2018	2023	2028
Single Engine	447	488	507	526	539
Multi-Engine	5	5	5	6	6
Turboprop	2	3	4	6	7
Jet	10	10	11	11	12
Helicopter	13	15	16	17	18
Glider	45	50	52	55	57
Ultralight ⁽²⁾	60	65	68	71	73
Total Aircraft	582	636	664	691	713

Source: BARNARD DUNKELBERG & COMPANY.

⁽¹⁾ Actual.

⁽²⁾ Approximately 90% of the Airport's ultralight aircraft have been certified into the "light-sport" aircraft category.

Summary

A summary of the aviation forecasts prepared for this study are presented in the following table entitled *SUMMARY OF AVIATION ACTIVITY FORECASTS, 2008-2028*. This information will be used in the following chapters to analyze the capacity of the Airport, develop facility requirements, and to determine future noise impacts and exposure. In other words, the aviation activity forecasts are the foundation from which future plans will be developed and implementation decisions will be made.



Table B14

SUMMARY OF AVIATION ACTIVITY FORECASTS, 2008-2028

Operations	2008⁽¹⁾	2013	2018	2023	2028
<i>General Aviation</i>	133,472	146,206	154,786	161,726	168,174
Single Engine	109,472	120,050	126,924	132,130	137,062
Multi-Engine	10,050	10,717	11,145	11,483	11,772
Turboprop	58	80	155	323	505
Jet	107	154	310	647	841
Helicopter	13,785	15,205	16,252	17,143	17,995
<i>Military</i>	20	20	20	20	20
Helicopter	20	20	20	20	20
Total Operations	133,492	146,226	154,806	161,746	168,194
Local Operations	76,694	83,848	89,001	92,526	95,051
Itinerant Operations	56,798	62,378	65,805	69,220	73,143
Based Aircraft by Type					
Single Engine	447	488	507	526	539
Multi-Engine	5	5	5	6	6
Turboprop	2	3	4	6	7
Jet	10	10	11	11	12
Helicopter	13	15	16	17	18
Glider	45	50	52	55	57
Ultralight	60	65	68	71	73
Total Based Aircraft	582	636	664	691	713

Source: BARNARD DUNKELBERG & COMPANY.

⁽¹⁾ Actual.

Airport Reference Code (ARC)/Critical Aircraft Analysis

The types of aircraft presently utilizing an airport and those projected to utilize the facility in the future are important considerations for planning airport facilities. An airport should be designed in accordance with the Airport Reference Code (ARC) standards that are described in *AC 150/5300-13, Airport Design*. The ARC is a coding system used to relate and compare airport design criteria to the operational and physical characteristics of the aircraft intended to operate at that airport. The ARC has two components that relate to the Airport's "Design Aircraft". The first component, depicted by a letter (i.e., A, B, C, D, or E), is the aircraft approach category and relates to aircraft approach speed based upon operational characteristics. The second component, depicted by a Roman numeral (i.e., I, II, III, IV, or V), is the aircraft design group and relates to aircraft wingspan (physical characteristic). Generally speaking, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan is primarily related to separation criteria associated with taxiways and taxilanes.



Based on an examination of the current operations information for Arlington Municipal Airport, there are a limited number of business jet operations within ARC C-I, C-II, D-I, D-II, or D-III. These aircraft include the Cessna 650 (ARC C-II), the Dassault Falcon 900 EX (ARC C-II), the Learjet 31A and 35A (ARC C-I), and the Gulfstream G-V (ARC D-III). The following table, entitled *SUMMARY OF AIRCRAFT OPERATIONS BY AIRPORT REFERENCE CODE (ARC), 2008-2028*, provides an estimate of the breakdown of aircraft operations by Airport Reference Code. The existing estimates are derived by using operational data that were compiled from existing ASDI data. As illustrated in the table, it is projected that the most critical aircraft regularly utilizing the Airport will be represented by the aircraft fleet within ARC B-II.

Table B15
SUMMARY OF OPERATIONS BY AIRPORT REFERENCE CODE (ARC), 2008-2028

Operations by ARC	2008 ⁽¹⁾	2013	2018	2023	2028
A-I through B-II	133,447	146,162	154,679	161,487	167,866
C-I through D-II	45	64	127	259	328
Total Operations	133,492	146,226	154,806	161,746	168,194

Source: BARNARD DUNKELBERG & COMPANY.
⁽¹⁾ Estimate using Aircraft Situation Display to Industry (ASDI) data for 2007.

Forecast Approval

In accordance with language specified in *Aviation Forecast Guidance APP-400*, local aviation forecasts are approved by regional airports division offices or airports district offices (ADOs). Local forecasts that are consistent with the FAA’s *Terminal Area Forecast* (i.e., the local forecast differs by less than 10% in the first five years, differs by less than 15% in the remaining forecast periods, and does not affect the timing or scale of an airport project) do not need to be coordinated with APP-400 and APO-110. Local forecasts that are not consistent with the TAF, but which do not affect the timing or scale of an airport project and do not impact the analysis of a National Environmental Policy Act (NEPA) document or Benefit Cost Analysis (BCA), may be accepted (not approved) for information purposes by the regional office/ADO without APP/APO coordination. As noted on the following tables, entitled *SUMMARY OF AIRPORT & TAF FORECAST COMPARISON, 2008-2028* and *TAF SUMMARY OF AIRPORT PLANNING FORECASTS*, the MP Update forecasts for total operations are less than, or within, the specified TAF thresholds for acceptance. In addition, the actual FAA templates for these two tables have been completed and are presented for reference in Appendix Three of this document.



Table B16

SUMMARY OF AIRPORT & TAF FORECAST COMPARISON, 2008-2028

Total Operations	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Base yr.	2008	133,492	144,934	-7.9%
Base yr. + 5yrs.	2013	146,226	151,230	-3.3%
Base yr. + 10yrs.	2018	154,806	157,809	-1.9%
Base yr. + 15yrs.	2023	161,746	164,682	-1.8%

Source: BARNARD DUNKELBERG & COMPANY.

Note: TAF data is based on the U.S. Government fiscal year basis (October through September).

Table B17

TAF SUMMARY OF AIRPORT PLANNING FORECASTS

	Base Yr. (2008)	Average Annual Compound Growth Rates							
		Base Yr. + 1yr. (2009)	Base Yr. + 5yrs. (2013)	Base Yr. + 10yrs. (2018)	Base Yr. + 15yrs. (2023)	Base yr. to +1 (2009)	Base yr. to +5 (2013)	Base yr. to +10 (2018)	Base yr. to +15 (2023)
Operations									
<u>Itinerant</u>									
General Aviation	56,778	58,993	62,358	65,785	69,200	3.9%	1.9%	1.5%	1.3%
Military	20	20	20	20	20	0.0%	0.0%	0.0%	0.0%
<u>Local</u>									
General Aviation	76,694	78,227	83,848	89,001	92,526	2.0%	1.8%	1.5%	1.3%
Military									
TOTAL	133,492	137,240	146,226	154,806	161,746	2.8%	1.8%	1.5%	1.3%
Instrument Operations	150	176	280	400	650	17.3%	13.3%	10.3%	10.3%
Peak Hour Operations	43	44	47	50	52				
Based Aircraft									
Single Engine	447	455	488	507	526	1.8%	1.8%	1.3%	1.1%
Multi Engine	7	7	8	9	12	2.9%	2.7%	2.5%	3.7%
Jet Engine	10	10	10	11	11	0.0%	0.0%	1.0%	0.6%
Helicopter	13	13	15	16	17	3.1%	2.9%	2.1%	1.8%
Other	105	107	115	120	126	0.0%	0.0%	0.0%	0.0%
TOTAL	582	593	636	663	692	1.9%	1.8%	1.3%	1.2%
GA operations per based aircraft	229	231	230	233	234				

Source: BARNARD DUNKELBERG & COMPANY.

