CHAPTER THREE
AVIATION ACTIVITY FORECASTS

Introduction

The purpose of this chapter is to update the forecasts of aviation activity for the twenty year planning period addressed in the Airport Master Plan Update (2007-2027). The updated activity forecasts will provide the basis for estimating future facility needs at Sanderson Field. The 1997/1992 Airport Master Plan; current Washington State Department of Transportation - Aviation Division (WSDOT) forecasts; and current Federal Aviation Administration (FAA) forecasts will be compared with current and historical activity at Sanderson Field to determine their applicability for use in this planning update.

EXECUTIVE SUMMARY

The updated master plan forecasts of aviation activity reflect strong local conditions that contribute to overall economic growth and a thriving local general aviation market. Public and private investment at Sanderson Field since the last master plan has increased significantly, particularly related to increasing hangar capacity and expansion of aviation related businesses. Based on these factors, combined with broad industry trends, growth in activity at Sanderson Field is expected during the current twenty year planning period. The master plan generated forecasts are generally consistent with the projected growth rates for Sanderson Field reflected in the current WSDOT Long Term Air Transportation Study (LATS) forecasts, although activity measures have been adjusted based on airport specific data collection conducted for this master plan update.

Summary of Key Elements in Updated Aviation Forecasts:

General Aviation Activity - Forecast growth in based aircraft and aircraft operations at Sanderson Field is modest to moderate through the twenty year planning period. Based aircraft and annual aircraft operations at Sanderson Field are forecast to increase at an average annual rate of approximately 2.2 and 2.1 percent respectively during the twenty year planning period. Based on current Port plans to construct a new T-hangar in 2008, the airport is expected to initially experience a moderate increase in both based aircraft and operations, followed by more modest growth rates (typically less than 2 percent per year) through the remainder of the planning period. Locally based and transient aircraft activity at Sanderson Field is expected to become more diverse during the forecast period, to include light sport aircraft (LSA) and increased turbine aircraft activity, including very light jets (VLJ) and a broad range of

corporate aircraft.[26] The broad range of business class aircraft is consistent with Sanderson Field's functional role as a regional general aviation airport, within the Washington State Aviation System.

Design Aircraft - The current design aircraft for Sanderson Field is a medium business turboprop such as Beechcraft King Air 300 included in airplane design group (ADG) II and approach category B (corresponds to Airport Reference Code (ARC) B-II). All B-II activity at Sanderson Field is currently generated by transient aircraft. The future design aircraft is also included in ARC B-II, but is expected to be a medium size business jet, such as a Cessna Citation Bravo. This expectation is consistent with turbine aircraft manufacturing trends and Sanderson Field's role as a regional general aviation airport, which, by definition serve a broad range of business aviation users. In addition, the anticipated growth of very light jets (VLJ) within the general aviation fleet is expected to be an element in the airport's growing levels of turbine aircraft activity. However, the majority of these aircraft are included in airplane design group I (ARC: A-I or B-I) and are not expected to represent the most demanding aircraft (in terms of runway length requirements, pavement strength, or wingspan clearances) using the airport on a regular basis.

Sanderson Field currently accommodates two locally based ADG II turboprop aircraft, operated by the local skydiving business, that are included in aircraft approach category A. The two aircraft combine for approximately 1,900 *local* annual operations that are associated with the designated parachute drop zone located on the airport. Although FAA criteria for definition of design aircraft requires a minimum of 500 annual *itinerant* operations, the regular use of Sanderson Field by these two aircraft and other ADG II aircraft is substantial (8.2% of current airport operations) and is the appropriate design criteria to apply to airfield facilities. Local operations include touch and go operations and operations conducted in the vicinity of the airport; itinerant operations are defined as flights between airports.

National General Aviation Activity Trends

After an extended period of decline, the U.S. general aviation industry experienced a period of sustained growth between 1994 and 2000 (coinciding with the General Aviation Revitalization Act of 1994). During this period, the general aviation fleet increased by 25 percent overall, or about 3.2 percent per year. The fastest growing fleet segments during this period were business jets, helicopters and experimental aircraft, which increased between 7.5 and 9 percent per year. The general aviation industry experienced a significant downturn in 2001, which began with an economic slowdown and then accelerated following the events associated with September 11th.

[26] Light Sport Aircraft (LSA) is a newly-defined category of aircraft with a maximum gross takeoff weight of 1,320 pounds or less (land planes) and simplified design. The new FAA Sport Pilot Certificate requires a minimum of 20 hours training for non-transitioning pilots. Very Light Jets (VLJ) (also referred to as light jets or micro jets) are small jet-powered aircraft (weighing less than 12,500 pounds) with airport-related performance characteristics (takeoff weight, approach speed, runway length requirements, physical dimensions, passenger load, etc.) comparable to a high-performance light twin-engine aircraft.

Over the last several years, a steep rise in aviation fuel prices combined with weak economic conditions has continued to constrain the general aviation industry. However, as noted in the current Federal Aviation Administration (FAA) long term aviation activity forecasts,[27] several key economic indicators have shown signs of improvement and this trend is expected to continue in 2007 and beyond. These expectations are generally in line with broad based measures of economic health such as long term forecasts of gross domestic product (GDP), consumer price index, fuel prices and interest rates. Although some segments of general aviation (primarily business aircraft usage) are expected to grow at moderately high rates, most conventional measures of the general aviation industry suggest modest, sustained growth in the range of 1 to 2 percent annually over the next 10 to 15 years.

The FAA's long term forecasts project modest growth in the U.S. general aviation aircraft fleet, with an increase from 226,422 to 274,914 aircraft (+48,492) between 2006 and 2020 (+21.4%; average annual increase of 1.4 %).

Although single engine piston aircraft (not including experimental or light sport aircraft) currently account for approximately 65 percent of the general aviation fleet, the rate of growth in business jets, turboprops, piston and turbine helicopters, experimental aircraft and sport aircraft has been two to four times greater than single engine aircraft over the last several years. The number of business jets in the general aviation fleet has increased by more than 43 percent since 2000. Strong increases in the number of corporate aircraft operators, fractional ownership of business aircraft, and aircraft charter activity appears to represent a business response to current commercial air service options.

In addition, the FAA considers the ongoing development and deliveries of micro jets (the FAA term for light jets or very light jets) to be among the more significant events affecting business aviation activity over the next several years. The FAA forecasts project the micro jet fleet to increase from about 350 in 2007 to 6,300 in 2020, averaging 22.9 percent per year over the 14 year forecast period. With relatively low acquisition and operating costs, the FAA anticipates that this category of aircraft will become increasingly popular for use in on demand air taxi business service. Although the growth in micro jets segment is expected to be significant and sustained over an extended period, these aircraft are expected to represent approximately 2.3 percent of the general aviation fleet in 2020.

At the opposite end of the general aviation industry, the number of active experimental and light sport aircraft (LSA) in the U.S. general aviation fleet increased by more than 4,500 units between 2000 and 2006. These two categories of aircraft currently account for 11 percent of the active general aviation fleet. The LSA segment of general aviation aircraft manufacturing is expected to experience the most rapid growth over the next 14 years, projected to grow from 400 aircraft (FAA estimate for 2006) to 13,200 in 2020, averaging 28.4 percent per year. By 2020, the FAA predicts that certificated sport pilots

[27] FAA Aerospace Forecasts Fiscal Years 2007-2020.

will account for 3.2 percent of all general aviation pilots and light sport aircraft will account for 4.8 percent of the general aviation fleet. The FAA projects experimental aircraft to account for approximately 12.3 percent of the general aviation fleet in 2020. New LSA and experimental aircraft are expected to account for approximately 39 percent of the overall net increase in the active general aviation fleet during the 14 year period.

It is worth noting that new light jet, light sport aircraft and experimental aircraft designs will not require significant upgrades in airfield capabilities (longer runways, etc.) for most airports currently able to accommodate twin engine piston or turboprop aircraft. However, increased activity within these categories could be expected to affect based aircraft and transient aircraft fleet mix and stimulate demand for hangar space and aircraft services.

The FAA expects some general aviation activity segments to experience flat or declining numbers during the forecast period. For example, the multi engine piston fleet is forecast to decline by 0.2 percent annually through 2020. This downward trend is attributed to fleet attrition and the lack of multi engine piston aircraft production. Similarly, the single engine piston fleet is expected to lose approximately 1,500 aircraft per year to attrition. While renewed production of updated established designs or new aircraft designs is expected to help arrest the downward trend, overall growth is expected to be approximately 0.3 percent annually through 2020.

Growth in the number of pilots is expected to be in the range of 0.8 to 1.2 percent annually through 2020, although sport pilots are expected to increase at a rate of approximately 22.6 percent annually (from less than 1,000 to more than 16,250 by 2020).

The FAA's forecasts for hours flown, tower operations and instrument operations reflect moderate annual average growth ranging from about 2.0 to 3.4 percent. Certain segments of activity, such as hours flown for turbine aircraft, (particularly business jets) are expected to increase at rates approaching 7 to 9 percent per year, due in part to the popularity of fractional ownership and the introduction of micro jets into the fleet. Several of the FAA's general aviation activity growth assumptions are summarized in **Table 3-1.**

It is interesting to compare forecast growth for general aviation in Washington State to national expectations. The 2007 WSDOT LATS forecast projects Washington's general aviation fleet to increase by 3,640 aircraft over the next 25 years, which equates to average annual growth of 1.49 percent; general aviation aircraft operations are projected to increase at an average annual rate of 1.60 percent, from 2,968,784 in 2005 to 4,414,494 in 2030.

TABLE 3-1: FAA LONG RANGE FORECAST ASSUMPTIONS

Activity Component	Forecast Annual Average Growth Rate (2007-2020)
Pilot Population (All Ratings)	0.8%
Student Pilots (indicator of flight training activity)	1.2%
Light Sport Pilots	22.6%
Hours Flown - GA Fleet (All AC Types)	3.4%
GA Instrument Operations at FAA and Contract Towers	2.0%
Active GA Fleet (# of Aircraft)	1.4%
AVGAS (Gallons consumed - GA only)	1.0%
Jet Fuel (Gallons consumed – GA only)	7.8%

Source: FAA Long Range Aerospace Forecasts (FY 2007-2020) March 2007

Population and Airport Activity Trends

Changes in population within an airport's service area often provide a broad indication about trends in airport activity. Although a large number of factors normally affect activities at general aviation airports, changes in population often reflect other economic conditions, which may affect airport activity more directly. However, since it is difficult to identify specific connections between airport activity and individual economic indicators such as growth in personal income, unemployment rates, or business spending, population provides a general indication of an area's economic health. Regions with flat or declining populations often have weak underlying economic conditions. In contrast, higher rates of population growth often characterize a growing economy that can stimulate individual and business use of general aviation.

Population growth within Mason County has outpaced Washington's statewide averages in recent years. Between 1990 and 2000, Mason County's population increased by 28.9 percent, which equals an average annual growth rate of 2.57 percent. During the same period, Washington's population increased by 21.1 percent overall, with an average annual growth of 1.93 percent. Between 2000 and 2007, average annual growth slowed to less than 1.5 percent for both statewide and county population, although Mason County has continued to grow at a slightly faster rate (1.44 % compared to 1.38%). **Table 3-2** summarizes county and statewide population data from the U.S. Census and a certified estimate for 2007, prepared by the State of Washington.[28] Historic and current based aircraft totals and the corresponding based aircraft – population ratios are also listed.

[28] Washington State Office of Financial Management (OFM), April 1, 2007 Estimate

TABLE 3-2: HISTORICAL POPULATION

	1970[1]	1980[1]	1990[1]	2000[1]	2007[2]
Mason County	20,918	31,184	38,341	49,405	54,600
Overall Growth Percentage *(from prior data period)*	--	+49.1%	+23.0%	+28.9%	+10.5%
Average Annual Growth Rates	--	*+4.1%*	*+2.1%*	*+2.6%*	*+1.44%*
Sanderson Field Based Aircraft	**9**	**32**	**42**	**40**	**95**
Ratio: Based Aircraft Per 1,000 Population (Mason County)	**0.43**	**1.03**	**1.10**	**0.81**	**1.74**
State of Washington	3,143,250	4,132,353	4,866,669	5,894,121	6,488,000
Overall Growth Percentage *(from prior data period)*	--	+31.5%	+17.8%	+21.1%	+10.1%
Average Annual Growth Rates	--	*+2.8%*	*+1.7%*	*+1.9%*	*+1.38%*

1. U.S. Census Data.
2. Washington State Office of Financial Management Estimates for April 1, 2007.

In 1970, there was a ratio of 2,324 county residents for each based aircraft at Sanderson Field; this equates to 0.43 based aircraft per 1,000 residents. In 2007, there was a ratio of 575 county residents for each based aircraft, which equates to 1.74 based aircraft per 1,000 residents. In a 2000 WSDOT Aviation System Plan Forecast and Economic Analysis Study[29], the ratios of registered aircraft per 1,000 population for the Olympic Region and Central Puget Sound Region were 1.68 and 1.64, respectively for the year 2000. The ratios were forecast to increase to 1.78 and 1.73 in 2020. The current based aircraft to population ratio for Sanderson Field (1.74 aircraft per 1,000 Mason County residents) is relatively consistent with overall expectations for the region. However, for forecasting purposes, it appears reasonable to assume that the ratio may continue to increase slightly during the forecast period as a reflection of Sanderson Field's airport's ability to effectively compete for market share. **Table 3-3** compares historic growth in based aircraft at Sanderson Field and Mason County population over the last thirty years; **Figure 3-1** illustrates the recent surge in based aircraft experienced at the airport.

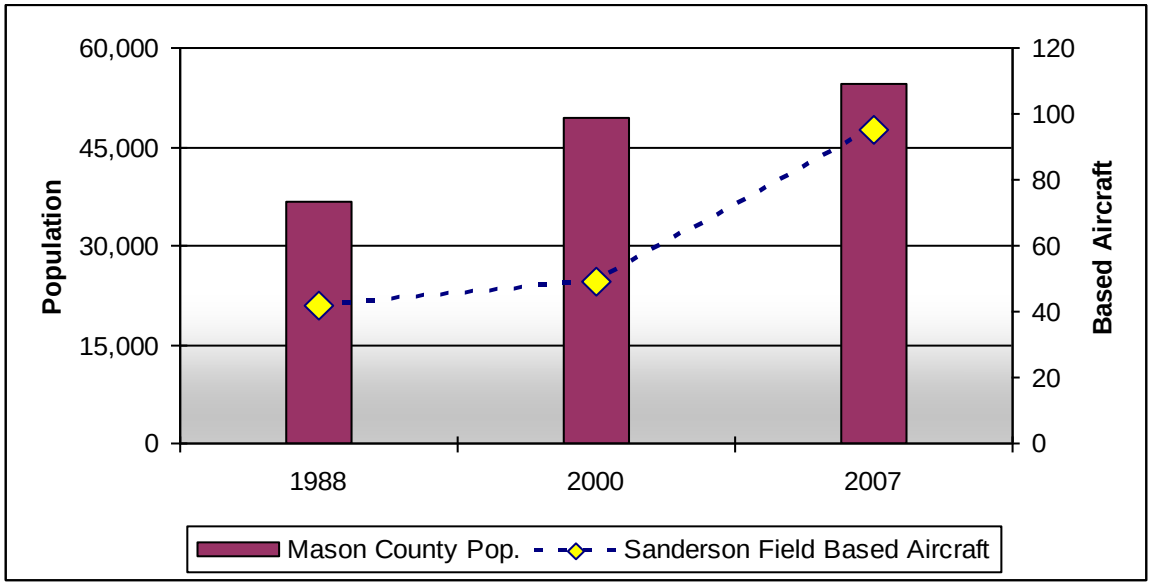
TABLE 3-3: COMPARISION OF AVERAGE ANNUAL GROWTH RATES MASON COUNTY POPULATION AND SANDERSON FIELD BASED AIRCRAFT

	1978-1988	1988-1997	1997-2007
Mason County Population *Average Annual Growth Rate (AAR)*	3.10%	2.76%	1.45%
Based Aircraft (Sanderson Field) *Average Annual Growth Rate (AAR)*	3.42%	-0.54%	9.04%

[29] Bucher Willis Ratliff Aviation System Plan – Forecast and Economic Significance Analysis Study (2000)

FIGURE 3-1: POPULATION & SANDERSON FIELD BASED AIRCRAFT TRENDS

Source: (Population Data) US Census; Washington OFM; (Based Aircraft) Airport Management Estimates, FAA 5010 airport



record forms and Terminal Area Forecast data.

The data indicate that while both population and based aircraft totals have experienced overall growth, fluctuations have occurred within both trends. In recent years, growth in based aircraft at Sanderson Field has exceeded area population growth by a wide margin; although the opposite has also occurred during periods when based aircraft totals were static or declined slightly. In the ten years between 1997 and 2007, the number of based aircraft at Sanderson Field more than doubled while Mason County population increased by 15 percent. The recent strong increase in based aircraft at Sanderson Field coincided with expansion of T-hangar capacity at the airport.

Sanderson Field also added Kapowsin Air Sports skydiving operations in mid-2006. As a result of recent growth, the ratio of Sanderson Field based aircraft to county population has increased from approximately 1.14 aircraft per 1,000 residents in 1988 to 1.74 per 1,000 residents in 2007.

As noted in the Inventory Chapter, the Washington State Office of Financial Management (OFM) has developed long term population forecasts for Mason County that extend through 2025. Based on annual tracking[30] performed by OFM, it appears that the OFM "intermediate" forecast closely approximates the actual population growth trend experienced in Mason County between 2000 and 2007. The OFM 2007 estimate for Mason County (54,600) is 1,115 (2%) below the intermediate projection of 55,715. The intermediate 2025 population forecast for Mason County is 75,088, which reflects annual average growth of 1.69 percent (between 2000 and 2025). In its recent comprehensive plan update, Mason

[30] July 2007 OFM GMA Forecast Population Tracking.

County adopted the OFM intermediate projection, plus a onetime adjustment of an additional 10,000 residents for the year 2015.

As indicated above, while historic growth in based aircraft and population do not always closely correlate, the expectation of future population growth in Mason County that exceeds statewide averages (projected at 1.22%), suggests a presence of positive economic conditions that can be reasonably expected to contribute to growth in activity at Sanderson Field. In the absence of more sophisticated data, use of forecast population will provide a reasonable basis for projecting future activity at Sanderson Field. This relationship is also reflected in the 2007 LATS forecasts: "Demand for aviation facilities and services tracks with population and economic growth. For this reason, concentration of demand is often found in areas with concentrations of population. Forecasting conducted as part of the Phase II analysis supports this view." [31]

Economic & Market Conditions

As noted in the Inventory Chapter, the major industry sectors in Mason County include government, wood products, tourism, and services. The Port of Shelton maintains a substantial inventory of both developed and developable industrial land in the Sanderson Field Industrial Park and the nearby John's Prairie Industrial Park. Long term employment forecasts for Mason County range between 0.8 and 2.1 percent annually, excluding manufacturing, which is projected to experience a slight decline in employment (-0.2 % average annual growth). It is reasonable to conclude that the factors contributing to overall population growth within Shelton and Mason County, including a growing resident commuter population sector, can translate into aviation demand at Sanderson Field.

Airports throughout the Puget Sound region are becoming increasingly congested; factors such as competitive pricing or availability of hangar space may contribute to demand among pilots currently living within a 30 to 60 minute drive time of Sanderson Field (defined as the airport service area) or for those considering relocating to the area. When combined with overall population and economic growth, these conditions create an environment that is positive for sustaining growth in aviation activity at Sanderson Field.

It is recognized that regional general aviation airports, as defined in the WSDOT Long Term Air Transportation Study (LATS), use a 90 minute surface travel time to define the boundaries of their service area. This assumption is based partly on the relatively small number of airports in the category, the greater distances between these airports, and the willingness of potential users to travel greater distances to access aviation services or capabilities that are not available at smaller general aviation airports. It is also noted that most commercial service or general aviation reliever airports provide

[31] WSDOT Long Term Air Transportation Study (Phase II Technical Report, June 3, 2007)

similar or higher functional capabilities and services. As a result, within a 90 minute drive of the local area, there are numerous airports with capabilities comparable to Sanderson Field. The demand that could be attributed to Sanderson Field's regional general aviation airport capabilities (i.e., accommodating business aviation, etc.) is expected to grow, and the airport's ability to draw that segment of users from greater distances is established. However, it is anticipated that a smaller local service area (30 or 60 minute travel time) will continue to generate the majority of activity at Sanderson Field.

As indicated earlier, a variety of broad industry conditions and trends within general aviation are reflected in long term national aviation forecasts. However, unexpected changes in economic conditions can affect activity, which in turn, can affect forecasts significantly. Industry specific factors such as the price or availability of insurance and fuel can influence both aircraft ownership and utilization trends. One of the more critical issues currently facing general aviation is the declining production and rising price of aviation gasoline (AVGAS). According to industry reports, the current volume of AVGAS production is less than half of the volume produced in the 1980s, while prices have increased dramatically. A December 2007 survey of fixed base operators (FBO) indicates that the average price for 100LL AVGAS in the Northwest-Mountain region is $4.71 per gallon; the average price for Jet Fuel is $4.60 per gallon.[32] (Note: an 11/08 update of the same regional survey was $5.02 for 100LL AVGAS and $4.74 for Jet Fuel).

The future of AVGAS production and the price pilots will have to pay for fuel is uncertain, however, the potential for negatively impacting general aviation activity clearly exists. Considerable research is currently underway by aircraft engine manufacturers and energy companies to develop alternative fuels for general aviation use, although no single solution appears to be readily available. A similar change in AVGAS production occurred in the late 1970s when the most commonly used lower octane AVGAS (80/87) was phased out in favor of the low lead 100 octane fuel grade (100LL). This prompted the use of lower octane regular automobile gasoline (MOGAS) or the use of additives to allow older engines to operate normally. In the near term, the combination of declining supply and even high prices could negatively affect general aviation activity levels. This uncertainty is reflected in current FAA long term aviation forecasts, although some general aviation industry experts believe the impact could be significantly more dramatic on both new aircraft manufacturing and utilization within the existing piston engine fleet. The presence of this market condition suggests that growth in general aviation activity during the current twenty year planning period may be tempered to some degree by sensitivity to rising fuel prices and potentially limited availability.

[32] National FBO Fuel Survey AirNav, LLC (12/5/07)

Historic Aviation Activity

Historic operational data for Sanderson Field are relatively limited and consist largely of estimates from FAA 5010 Airport Record Forms, FAA forecasts, airport master plans, state aviation system plans, and airport management. No formal activity counts have been conducted at the airport in recent years.

The 1997 and 1992 master plans listed Sanderson Field based aircraft at 40 aircraft (1997 Port estimate), and 42 aircraft (1988 Port estimate), respectively. Terminal Area Forecast (TAF) historic data list based aircraft totals ranging from 32 in 1980 to the most recent estimate of 48, which has been maintained largely unchanged since 1991. The current FAA 5010 Airport Record Form lists 102 based aircraft for Sanderson Field. The 102 based aircraft total was used as the base for 2007 LATS forecasts for Sanderson Field.

In the absence of precise activity counts, the accuracy of the prior operations estimates cannot be determined. For this reason, the FAA recommends use of activity ratios (expressed as the total number of airport operations per based aircraft) to provide reasonable estimates local and itinerant general aviation operations.[33] The range of activity ratios reflects typical operational profiles for small, medium and large general aviation airports (250 to 450 annual operations per based aircraft). For medium activity general aviation airports (defined as those with "moderate to high levels of itinerant traffic and low to medium use by based aircraft"), a ratio of 350 operations per based aircraft is recommended to establish activity. It is noted that the LATS forecast estimate of statewide general aviation activity for 2005 yielded a ratio of 363 operations per based aircraft.

TABLE 3-4: SUMMARY OF HISTORICAL ACTIVITY (SANDERSON FIELD)

Year	Aircraft Operations	Based Aircraft	Operations Per Based Aircraft
1971	7,200	9	800
1980	48,500[1]	32[1]	1,516
1988	18,714[2]	42[2]	446
2005	44,209[3]	102[3]	433
2007	35,650[4]	95[2]	375

Data Sources:
1 .Terminal Area Forecasts (TAF).
2. 1992 Airport Master Plan.
3. FAA 5010 Airport Record Form.
4. David Miller/Century West Engineering estimate based on updated based aircraft count and FAA activity ratios.

[33] An aircraft operation is defined as one takeoff or one landing. A takeoff and a landing are counted as two operations.

Based Aircraft

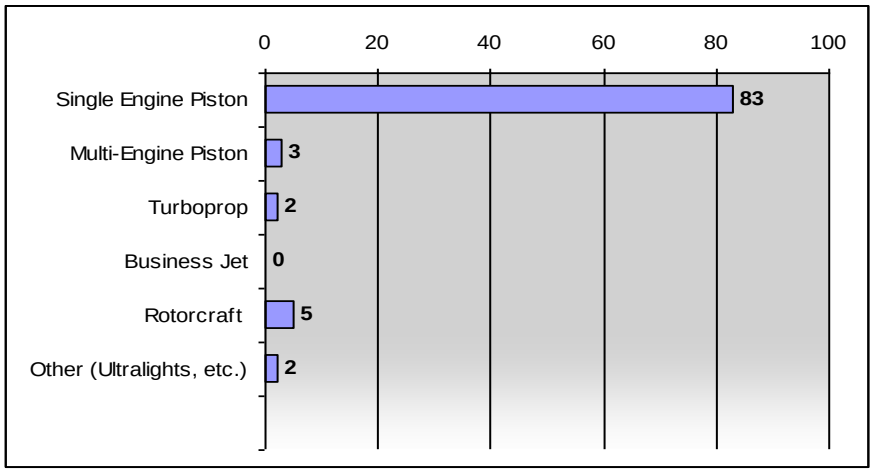
An updated based aircraft count was conducted by the consultant for this project in November 2007, using the current Port tenant list (for Port owned hangars), Olympic Air records for apron tiedown leases, and information provided by private hangar owners on the airport. The updated count of 95 based aircraft is lower than the estimates from the other sources noted above. Applying the ratio of 350 operations to the current based aircraft count of 95 aircraft yields a total of 33,250 annual operations; this total was adjusted by adding 2,400 operations to account for the unique operational activity associated with an active airport based skydiving operation (Kapowsin Air Sports), resulting in an estimate of 35,650 operations for 2007. Additional information about the current based aircraft fleet composition and operation levels is provided later in this chapter. Current and historic aviation activity at Sanderson Field is summarized in **Table 3-4.** The current distribution of Sanderson Field based aircraft types is summarized in **Table 3-5** and depicted in **Figure 3-2.**

TABLE 3-5: SANDERSON FIELD BASED AIRCRAFT (NOVEMBER 2007)

Aircraft Type	Aircraft
Single Engine Piston	83
Multi Engine Piston	3
Turboprop	2
Business Jet	0
Rotorcraft	5
Other (*Ultralights*)	2
Total	**95**

Source: Century West count, based on Port and FBO records.

FIGURE 3-2: SANDERSON FIELD BASED AIRCRAFT (NOVEMBER 2007)



Aircraft Operations

Table 3-6 summarizes (2006) FAA Terminal Area Forecast (TAF) and 5010 Airport Record form (12 months ending 12/31/05) operations (takeoffs and landings) estimates for Sanderson Field. The two estimates are relatively similar, suggesting that they share a common base with only minor revisions made when updated. The 1992 Airport Master Plan estimated airport operations at 18,714, with 42 based aircraft, which equals a ratio of 446 operations per based aircraft.

TABLE 3-6: FAA AIR TRAFFIC ESTIMATES (SANDERSON FIELD)

Operations by Type	TAF Data	TAF % by Type	5010 Airport Record Form Data	5010 % by Type
Based Aircraft	48	n/a	102	n/a
Itinerant Operations				
General Aviation	15,593	35.8%	15,639	35.4%
Air Taxi	126	0.3%	130	0.3%
Military	21,888	50.2%	21,888	49.5%
Total – Itinerant	37,607	*86.3%*	37,657	*85.2%*
Local Operations				
General Aviation	5,957	*13.7%*	6,552	*14.8%*
Total Airport Operations	**43,564**	**100%**	**44,209**	**100%**
Ratio of Operations per Based Aircraft	*908*	*n/a*	*433*	*n/a*

Source: FAA TAF 2006 Data; FAA Airport Record Form 5010-1 (12/31/05)

Updated Activity Assessment

Based on the FAA methodology of using activity ratios to estimate airport operations when actual counts are not available, an updated estimate of operations was prepared for Sanderson Field. It appears that the 350:1 ratio recommended by FAA for medium activity general aviation airports (defined as those with "moderate to high levels of itinerant traffic and low to medium use by based aircraft") is appropriate for Sanderson Field. Applying the ratio of 350 operations to current count of 95 based aircraft yields a total of 33,250 annual operations.

From this baseline estimate, one specific adjustment was made to account for the airport's unique skydiving operations. Kapowsin Air Sports, the local skydiving operator, provided precise activity counts for 2006 and year to date counts that result in 2,400 operations for 2007. This activity equals about 6.7 percent of current airport operations. The skydiving operations are local since the aircraft remain close to the airport and the parachute drop area is located on the airport. Kapowsin has indicated that they believe this level of activity is typical and they expect to maintain similar activity levels for the foreseeable future. Since this type of activity is not typical of most general aviation airports, the additional operations were added to the ratio driven total, which results in an estimate of 35,650 operations for 2007. With the skydiving operations added, the corresponding activity ratio increases to 375 operations per based aircraft. It is interesting to note that this estimate for Sanderson Field is

slightly above the median for all public use general aviation airports in Washington contained in the current WSDOT LATS forecast (2005: 363 operations per based aircraft).

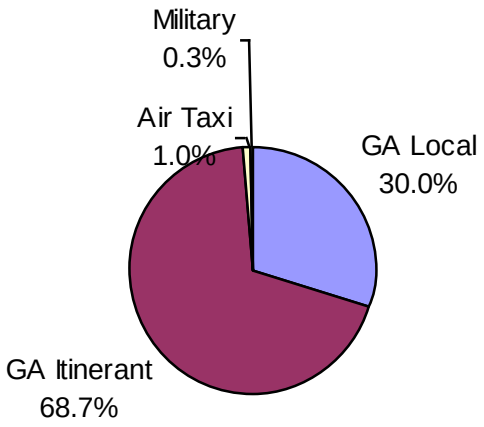
This updated estimate also reflects a significantly reduced estimate of military operations. In both the FAA 5010 and TAF data, military operations at Sanderson Field are estimated at nearly 22,000, which equal an average of 60 operations per day. However, based on data collection and interviews with local airport users and military officials, it does not appear that military traffic at Sanderson Field is substantial. Helicopters from nearby Gray Army Airfield (AAF) routinely operate in the vicinity of Sanderson Field, although the activity does not consistently involve takeoffs or landings. Other military aircraft reportedly practice the nondirectional beacon (NDB) instrument approach, generally without executing a landing at the airport. The operations office at Gray AAF was contacted in an attempt to verify the typical level of military activity at Sanderson Field. Army officials indicate that specific records are not kept (such as flight plans) because Sanderson Field is located within the boundaries of their "local" training area. Military aircraft operating in the training area do require formal flight plans within a typical 8 hour operational window. Based on the limited activity, military operations resulting in an actual takeoff or landing are estimated at 100 per year.

The current distribution of aircraft operations is estimated to be 30 percent local and 70 percent itinerant. As noted earlier, local operations include touch and go operations and flights conducted in the vicinity of the airport; itinerant operations are defined as flights between airports. **Table 3-7** and **Figure 3-3** summarize the distribution of traffic by aircraft type for the updated consultant estimate.

TABLE 3-7: UPDATED (2007) AIR TRAFFIC ESTIMATES

Activity		% by Type
Based Aircraft	95	n/a
Itinerant Operations		
General Aviation	24,505	68.7%
Air Taxi	350	1.0%
Military	100	0.3%
Total – Itinerant	24,955	70.0%
Local Operations		
General Aviation	10,695	*30.0%*
Total Airport Operations	**35,650**	**100%**
Ratio of Operations per Based Aircraft	*375*	*n/a*

FIGURE 3-3: 2007 SANDERSON FIELD AIRPORT OPERATIONS DISTRIBUTION



Source: FAA TAF 2006 Data; FAA Airport Record Form 5010-1 (12/31/05)

AVIATION INDICATORS/INFLUENCES

Airport Fuel Data

A review of recent aviation fuel deliveries at the airport was conducted to help gauge current activity trends. The data summarized in **Table 3-8** and **Figure 3-4** indicates that overall fuel delivery volumes have increased by 36 percent since 2003; aviation gasoline (AVGAS) volumes doubled over the last three years, although year to year volumes have fluctuated slightly. The sharp increase in AVGAS deliveries appears to be partly attributed to the recent construction of new T-hangars, and the subsequent increase in based aircraft at the airport. However, because the surge in fuel consumption occurred over a relatively short period of time and coincided with specific events, it does not provide a reliable basis for projecting long term activity in the future. In addition, there is industry-wide concern that the declining production and rising price of AVGAS may already be exerting downward pressure on fuel use patterns and this condition may continue in the future.

Olympic Air, the local fixed base operator (FBO) owns and operates the airport fuel storage facility and is also the largest consumer of Jet Fuel with its fleet of four Hughes 500D turbine helicopters. Olympic Air estimates that approximately 80 percent (approximately 80,000 to 100,000 gallons) of current Jet Fuel delivery volume is used by their turbine helicopters that are operated in contract charter service away from the airport for extended periods. Kapowsin Air Sports receives direct delivery from the distributor, rather than purchasing through Olympic Air. However, this is not expected to change the volume of Jet Fuel delivered to Sanderson Field since Kapowsin's usage has been reflected in the fuel delivery volumes since mid-2006. Both operators indicate that their current flight levels are expected to remain relatively consistent for the foreseeable future, which suggests that future increases in Jet Fuel volume will result from growth in transient and possibly locally based turbine aircraft activity.

In 2006, the average volume of AVGAS delivered per based piston aircraft at Sanderson Field was 651 gallons; Jet fuel averaged 20,936 gallons delivered per based turbine aircraft.

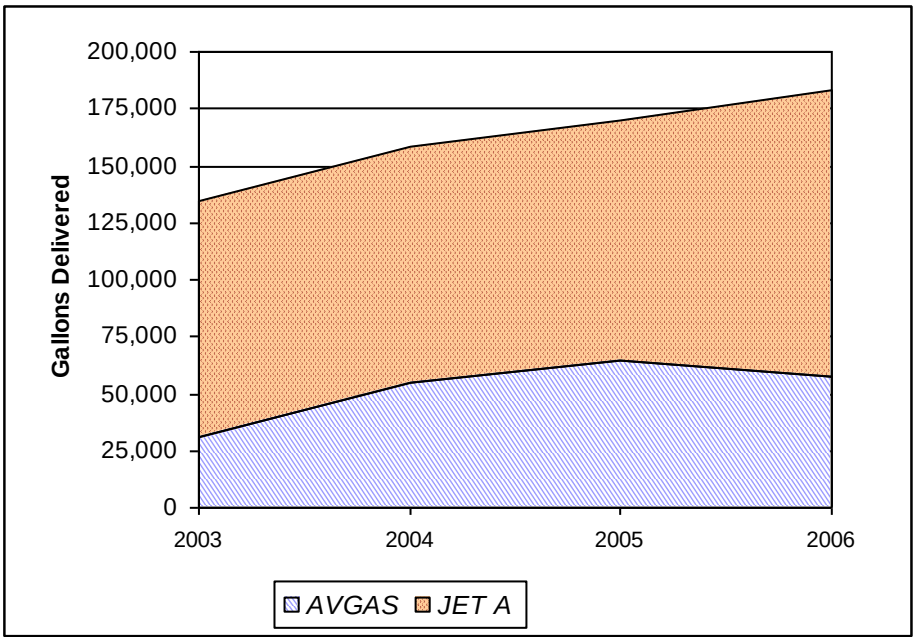
TABLE 3-8: AIRPORT FUEL ACTIVITY (SANDERSON FIELD) (GALLONS DELIVERED)

	2003	2004	2005	2006
AVGAS (% of total volume delivered)	31,176 (23%)	55,108 (35%)	64,182 (38%)	57,947 (32%)
Percent Increase/Decrease From Previous Year	--	*+17.7%*	*+16.5%*	*-9.7%*
Jet Fuel (% of total volume delivered)	103,301 (77%)	102,993 (65%)	106,025 (62%)	125,613 (68%)
Percent Increase/Decrease From Previous Year	--	*-0.3%*	*+2.9%*	*+18.5%*
Total	**134,477** (100%)	**158,101** (100%)	**170,207** (100%)	**183,560** (100%)
Percent Increase/Decrease From Previous Year	--	*+17.6%*	*+7.7%*	*+7.9%*

Source: FBO Records.

Note: 2006 jet fuel volume reflects arrival of Kapowsin Air Sports in (6/06) and temporary runway closures at Olympia Airport for jet aircraft. Percentages of total volume delivered during the calendar year.

FIGURE 3-4: SUMMARY OF HISTORIC AVIATION FUEL DELIVERIES (SANDERSON FIELD)



Local Hangar Construction/Utilization

A review of the previous airport layout plan and current aerial photography indicates that four 16 unit T-hangars (64 units) and 2 conventional hangars have been constructed at Sanderson Field since the 1997 master plan was completed. This activity is significant because it was the first new T-hangar construction at the airport in decades, effectively quadrupling T-hangar storage capacity in a very short period of time. The spike in activity suggests that a significant level of pent up demand existed for hangar space at Sanderson Field, which prompted an influx of new aircraft once hangar space became available. **Table 3-9** highlights the significant increase in hangar utilization that has occurred at Sanderson Field, up from 48 percent in 1988 to approximately 96 percent currently.

In November 2007, the Port had a waiting list of 15 aircraft owners interested in renting hangar space; six of the individuals indicate that would relocate their aircraft to Sanderson Field from other airports when hangar space becomes available. The remaining individuals currently store their aircraft in other hangar space on the airport. The existing hangar waiting list reflects a general indication of interest in rental space. *Note: A new 16 unit T-hangar was constructed in late 2008. This hangar is not reflected in the Airport Layout Plan in Table 3-9. As of 8/09, the new hangar was full with three vacancies in the remaining Port owned hangars.*

It is interesting to note that during the period that Sanderson Field expanded its hangar capacity, similar activity occurred at nearby Olympia Airport. According to the Olympia airport manager, recent hangar construction (all privately funded) included a 16 unit T-hangar in 2005 and one row of executive hangars (6 units) in 2006. The hangar developer has leased ground to construct another 16 unit T-hangar and two additional rows of 6 executive hangars (12 units). The airport manager indicates that this surge of hangar construction activity followed an extended period without significant new construction. Sanderson Field and Olympia Airport report that their hangars are consistently occupied and both anticipate additional hangar capacity being added in the near term. Other nearby airports, including Bremerton and Tacoma Narrows have also added new hangar capacity in recent years. As noted in the Inventory Chapter, development activity within an airport's service area affects activity throughout the entire area. The simultaneous development of new hangar capacity at multiple airports within a common service area indicates overall market strength, but may also reflect a level of absorption of current and near term demand.

Overall, the level of recent hangar construction in the local service area indicates strong market conditions. Competition among airports within the service area is expected to increase as hangars continue to be developed at each airport. Market conditions will determine the rate of construction and the points of equilibrium where existing capacity and demand are in relative balance.

TABLE 3-9: SANDERSON FIELD
BASED AIRCRAFT & HANGAR UTILIZATION

	1988	2007
Total Based Aircraft	42	95
Aircraft Stored in Hangars	22	91
Aircraft Parked on Apron	20	4
Percentage of Based Aircraft Stored in Hangars	*48%*	*96%*

Source: 1993 data from 1992/1997 Airport Master Plan; 2007 data from airport management records and consultant count.

ASSESSMENT OF LOCAL CONDITIONS

The historic activity and development events that are documented for Sanderson Field clearly indicate the airport's ability to respond to demand and reflect a strong overall general aviation market. These positive factors are expected to continue in the future, which will contribute to increased airport activity. However, it is recognized that factors beyond the control of airport management also exist. These include competition within the airport's service area and broader issues such as the price and availability of aviation fuel. Since most public and privately funded hangar construction follows a relatively conservative, risk averse development pattern, it is reasonable to assume that new construction will modulate upward and downward based on a variety of market conditions, keeping capacity relatively close to actual demand. Periods of strong demand will generate new construction; conversely, excess supply or flat demand will slow new construction.

Overall, local conditions support an expectation that future demand at Sanderson Field will continue to be strong and should track at, or slightly above statewide or national averages during the current twenty year planning period.

ASSESSMENT OF EXISTING FORECASTS

A review of existing aviation forecasts for Sanderson Field was conducted to identify information that may be useful in projecting future activity. The existing forecasts of based aircraft and aircraft operations are summarized in **Table 3-10** and **Table 3-11** and are depicted in **Figure 3-5** and **Figure 3-6.**

1997/1992 Airport Master Plan (AMP)

The 1997 airport master plan update did not include updated activity forecasts, but presented the 1992 master plan forecasts (1988-2008). Based aircraft were projected to increase from 42 to 98 (+133%) by 2008, which equals an annual average growth of **4.33 percent**. The 2007 count of 95 based aircraft is 3

aircraft below the master plan forecast for 2008, which tracks very well with forecast growth. Total airport operations were projected to increase by 167.2 percent, from an estimated 18,714 in 1988 to 50,000 in 2008. This equals an annual average growth of **5.04 percent**. Based on the current estimate of aircraft operations, it appears that the 2008 forecast is approximately 40 percent above 2007 activity.

WSDOT Long Term Air Transportation Study (LATS) Forecasts

Updated Washington Aviation System Plan forecasts were developed in 2007 as part of the Long Term Air Transportation Study (LATS), with projections made from 2005 to 2030. The LATS forecasts of based aircraft and operations for Sanderson Field reflect modest growth over the 25 year planning period. Sanderson Field based aircraft were forecast to increase at an average annual rate of 2.18 percent between 2005 and 2030; aircraft operations were projected to increase at an average annual rate of 1.48 percent during the same period.

However, in reviewing the LATS forecasts, it appears that current levels of based aircraft and operations were overestimated. The 2005 base year total for based aircraft (102) appears to have been taken directly from the FAA 5010 Airport Record Form and the LATS operations forecasts include an identical amount of military operations (10,944) in both local and itinerant categories. When combined, the 2005 base year total of military operations was 21,888, which equates to an average of 60 takeoffs and landings per day. The military operations accounted for nearly 40 percent of total Sanderson Field operations in the 2005 LATS base year projection. As noted earlier, no verification of this activity has occurred based on interviews with both military officials and the local fixed base operator (FBO). Based on these factors, the 2005 LATS operations forecast for Sanderson Field is approximately 60 percent higher than the operations estimate for 2007.

FAA Terminal Area Forecasts (TAF)

The Federal Aviation Administration (FAA) maintains forecasts for Sanderson Field in the Terminal Area Forecast (TAF). However, the TAF projects no increase in based aircraft or aircraft operations at Sanderson Field through 2020. When no growth is reflected for an airport in the TAF it generally indicates that inadequate data exists to support projections beyond current estimates. The TAF currently lists 48 based aircraft and 43,564 annual aircraft operations (static number extending from 1997 to 2020). The TAF projection reflects a ratio of 907.6 operations per based aircraft, well above the typical range of 250 to 450 operations per based aircraft found at most non towered general aviation airports. The FAA will evaluate the updated master plan forecasts for incorporation into the TAF.

TABLE 3-10: 1997/1992 SANDERSON FIELD MASTER PLAN FORECASTS

Source	1988	1993	1998	2003	2008
Based Aircraft *(4.33% AAR, 1988-2008)*	42	54	65	83	98
Aircraft Operations *(5.04% AAR, 1988-2008)*	18,714	27,000	33,000	42,000	50,000

TABLE 3-11: 2007 WSDOT AVIATION LATS FORECASTS (SANDERSON FIELD)

Source	2005	2010	2015	2020	2025	2030
2007 Forecasts						
Based Aircraft *(2.18% AAR 2005-2030)*	102	122	139	151	162	175
Aircraft Operations *(1.48% AAR, 2005-2030)*	57,714	64,714	70,664	74,864	76,714	83,264

FIGURE 3-5: EXISTING BASED AIRCRAFT FORECASTS (SANDERSON FIELD)

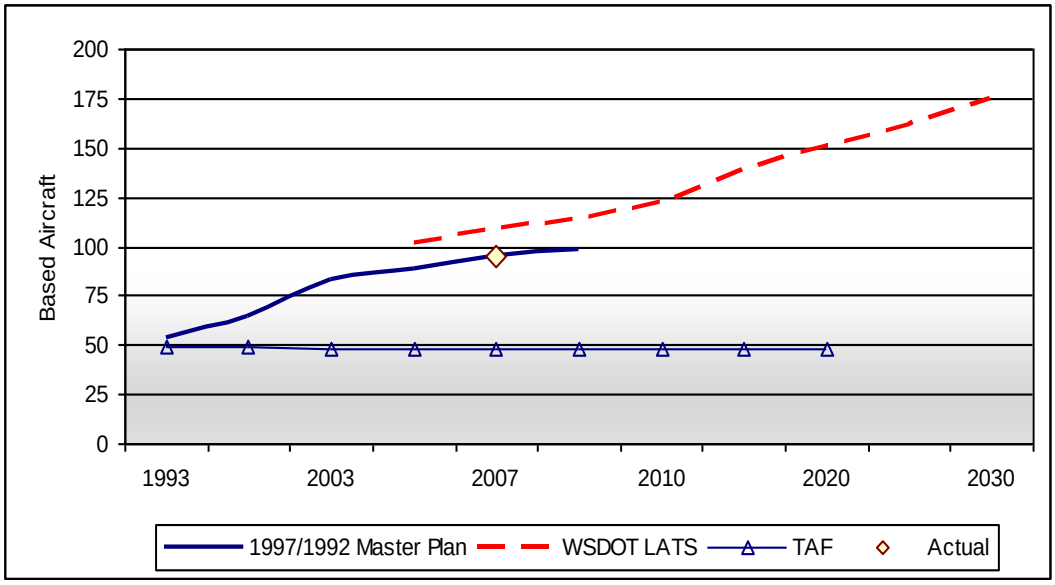
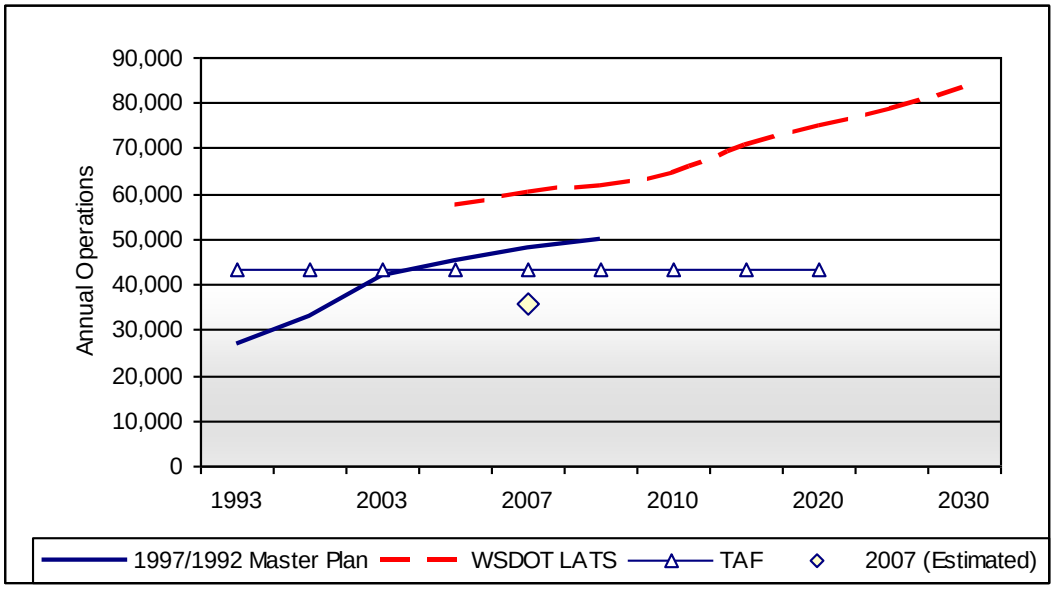


FIGURE 3-6: EXISTING AIRCRAFT OPERATIONS FORECASTS (SANDERSON FIELD)



UPDATED FORECASTS

Two forecast scenarios were developed for based aircraft and general aviation operations in addition to the LATS forecast, which represents current state aviation system planning. The updated forecasts are summarized **Table 3-12 and 3-13** and depicted in **Figures 3-7 and 3-8.** Based on the limited historical data available from which to build statistical models, projections were developed based on two approaches:

Historical Trend: Mason County Population and Sanderson Field Based Aircraft. As noted earlier, the ratio of county population and based aircraft has shifted in recent years due to a significant increase in based aircraft experienced over a relatively short period of time. The current aircraft inventory to population ratio is relatively consistent with the levels found throughout the Central Puget Sound and Olympic regions of Washington.

A forecast of based aircraft using a ratio of based aircraft to population was developed for this projection. The 2015 projection of Mason County population adopted in the most recent County Comprehensive Plan was based the Washington Office of Financial Management (OFM) Growth Management Act "Intermediate Series" forecast for Mason County, with one notable adjustment. Mason County anticipates a surge in population growth due to a variety of conditions within the next ten years. Based on this assumption, the County adopted the OFM Intermediate series projection, plus an additional 10,000 population. This "OFM Intermediate + 10,000" projection was a onetime adjustment for 2015.

The modest increase in the based aircraft to population ratio (rising from 1.74 to 1.90 per 1,000 Mason County residents over the twenty year planning period) reflects an assumption that Sanderson Field's established ability to increase its share of the based aircraft market within the region will continue, although at slower overall rate than in the recent past. New based aircraft forecasts were prepared using the 2007 base year total of 95 aircraft. It is assumed that six aircraft will relocate to the airport in 2008 or 2009 when construction of new T-hangar is completed.

A forecast of local and itinerant aircraft operations for this scenario was developed by applying the FAA recommended aircraft utilization factor of 350 annual aircraft operations per based aircraft, which is consistent with medium activity general aviation airports. The current level of skydiving operations (2,400 annual) was maintained through the planning period, above the 350 operations per based aircraft ratio, which results in a slightly higher aircraft utilization rate (375 operations per based aircraft). This utilization ratio was maintained through the current twenty year planning period. These projections reflect an average annual rate (AAR) of growth of **2.58 percent** for based aircraft and **2.49 percent** for operations between 2007 and 2027.

FAA Long Term Growth Scenario. This scenario applies a composite of several FAA growth rate assumptions used in their long term forecasting of general aviation activity. The selected average annual growth rate (1.81%) is consistent with FAA national forecasts for growth in the general aviation fleet and projected levels of activity (fuel consumption, hours flown, etc.). The growth rate was applied to the current based aircraft count and the FAA recommended aircraft utilization factor of 350 annual aircraft operations per based aircraft was also used in this projection. These projections reflect an average annual rate (AAR) of growth of **1.81 percent** between 2007 and 2027 for both based aircraft and operations.

WSDOT Long Term Air Transportation Study (LATS) Forecasts. The 2007 LATS forecasts for Sanderson Field are included to provide reference to current statewide aviation system planning expectations for the airport. As noted earlier, the forecast growth rates used in the LATS forecasts for Sanderson Field (**1.48 to 2.18 percent**) are well within a reasonable range of activity that is reflected in recent historic data and other general aviation system forecasts. The LATS forecasts also capture Sanderson Field's functional classification as a regional general aviation airport. However, as noted earlier, the base year (2005) estimates of based aircraft and aircraft operations at Sanderson Field used in the LATS forecast appear to be overestimated. As a result, the forecasts of activity are also affected, reflecting significantly higher numbers than generated in the other two projections.

TABLE 3-12: COMPARISION OF UPDATED BASED AIRCRAFT FORECASTS (SANDERSON FIELD)

	Base Year 2007[1]	**2012**	**2017**	**2022**	**2027**
Base Year Estimate	**95**				
FAA Long Term General Aviation Industry Growth Rate - 2007-2020 (Composite) *(1.81% AAR 2007-2027)*		104	114	124	136
Sanderson Field - Mason County Population – Activity Ratio *(2.58% AAR 2007-2027)* ***Preferred Mid-Range Projection***		**106**	**121**	**138**	**158**
WSDOT LATS Forecast 2005-2030 *(2.18% AAR 2005-2030)*		129	144	155	167

1. Base year total reflects 11/07 aircraft count prepared by airport consultant.
2. 2012 forecast includes 6 new aircraft currently on Port hangar waiting list that are expected to relocate to Sanderson Field in 2008 or 2009 after new T-hangar is constructed.
3. LATS forecasts are interpolated for master plan forecast years.

FIGURE 3-7: 2005-2025 BASED AIRCRAFT FORECASTS (SANDERSON FIELD)

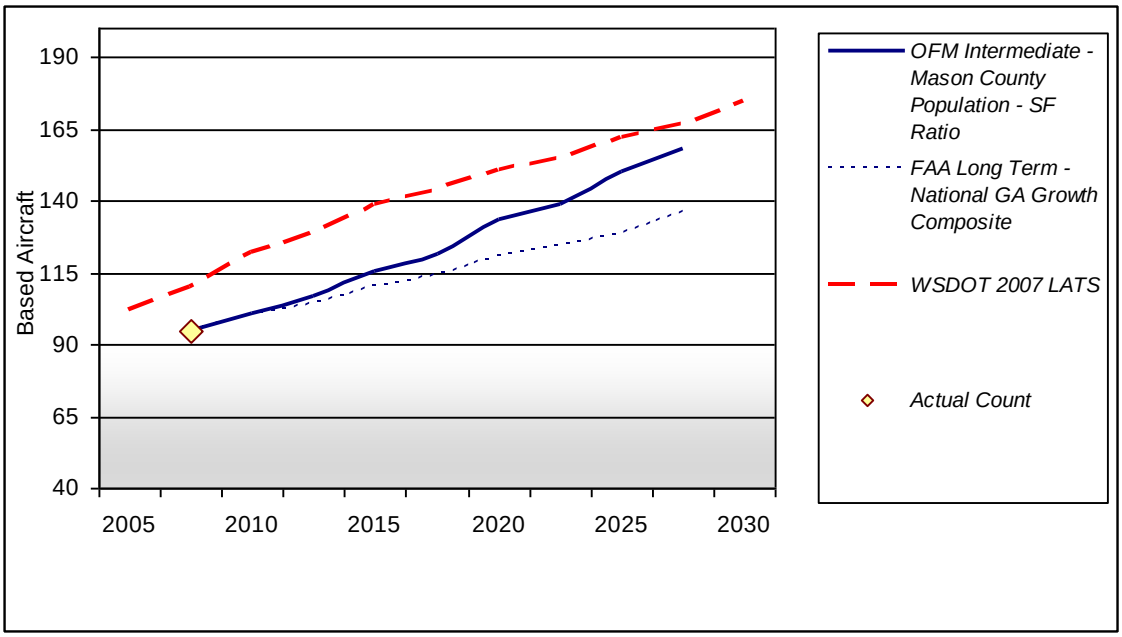
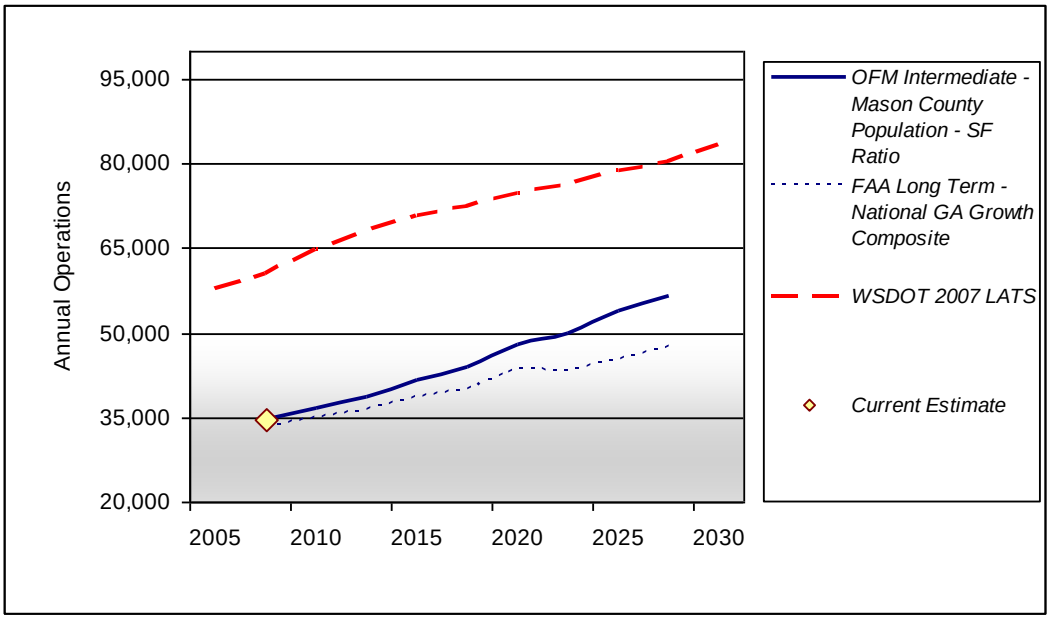


TABLE 3-13: COMPARISION OF UPDATED GA OPERATIONS FORECASTS (SANDERSON FIELD)

	Base Year 2007[1]	2012	2017	2022	2027
Base Year Estimate	34,600				
FAA Long Term GA Industry Growth Rate (Composite) *(1.81% AAR 2007-2027)*		36,400	39,900	43,400	47,600
Sanderson Field - Mason County Population – Activity Ratio *(2.49% AAR 2007-2027)* ***Preferred Mid-Range Projection***		**38,570**	**43,820**	**49,800**	**56,620**
WSDOT LATS Forecast 2005-2030 *(1.48% AAR 2005-2030)*		68,222	72,213	76,384	80,503

1. Base year activity estimated by David Miller/Century West based on November 2007 airport based aircraft records and FAA recommended activity ratio for medium activity general aviation airport.
2. LATS forecasts are interpolated for master plan forecast years.

FIGURE 3-8: UPDATED GA OPERATIONS FORECAST (SANDERSON FIELD)



Instrument Approaches

The FAA Terminal Area Forecast (TAF) does not list any instrument operations at Sanderson Field in any forecast year due inadequate data (listed at a static 0 through 2020). FAA Estimates of annual instrument approaches contained in the 1992 and 1997 master plan updates were approximately 3 percent of total airport operations. The 1992 airport master plan contains the following information *"Sanderson Field has instrument meteorological conditions approximately 16.4 percent of the time,"* citing information contained in the 1979 Sanderson Field Airport Master Plan.

A recent statewide aviation system plan study indicated that instrument meteorological conditions (IMC) prevail approximately 13 percent of the time in western Washington. It is noted by local pilots that area wide weather conditions often require aircraft to initiate an instrument approach to Sanderson Field from an enroute instrument flight plan. These aircraft are often able to terminate the instrument procedure as they establish visual contract with the airport.

With the existing mix of based aircraft, itinerant flight activity, and the existing instrument approach capabilities at Sanderson Field, the level of instrument operations is expected to be modest, although improvements in instrument approach capabilities could be expected to increase this activity. For planning purposes, it is assumed that instrument operations currently account for approximately 1 percent of total airport operations; this is projected to increase to 1.5 percent by the end of the current

planning period. A summary of forecast instrument approaches for Sanderson Field is included in **Table 3-14**.

Design Aircraft

The current recommended design aircraft for Sanderson Field is a medium business turboprop such as Beechcraft King Air 300, included in airplane design group (ADG) II and approach category B (corresponds to Airport Reference Code (ARC) B-II). All B-II activity at Sanderson Field is currently generated by transient aircraft. The future design aircraft is also included in Airport Reference Code (ARC) B-II, but is expected to be a medium size business jet, such as a Cessna Citation Bravo. This expectation is consistent with turbine aircraft manufacturing trends and Sanderson Field's role as a regional general aviation airport, which, by definition serve a broad range of business aviation users, including conventional users of corporate aviation and fractional ownership of aircraft.

Sanderson Field currently accommodates regular activity from transient B-II aircraft in business use. In addition, two locally based turboprop airplane design group II aircraft, operated by the local skydiving business, are included in aircraft approach category A. The two aircraft combine for approximately 1,900 *local* annual operations (5.5% of total airport operations). Although FAA criteria for definition of design aircraft normally requires a minimum of 500 annual *itinerant* operations, the regular use of Sanderson Field by these two aircraft represents a significant portion of overall airport operations an established use. In addition, the current capabilities of the airport's runway taxiway system generally exceed the requirements of airplane design group II. Based on these considerations, Airport Reference Code B-II is considered to be the appropriate current and future design criteria to apply to the main airfield facilities at Sanderson Field. A more detailed discussion of design aircraft considerations is contained in the Facility Requirements Chapter.

Forecast Summary

The preferred forecasts of aviation activity at Sanderson Field are summarized in **Table 3-14.** Additional calculations of activity peaking, based aircraft and operational fleet mix are provided in **Table 3-15** through **3-17**.

The preferred forecast of based aircraft represents an annual average growth rate of **2.21 percent** over the twenty year planning period, although growth early in the planning period reflects the short term increase expected to result from planned hangar construction. After accounting for anticipated near term hangar construction, growth in based aircraft is projected to increase at an annual average rate of **1.89 percent** through the twenty year planning period.

Aircraft operations are forecast to increase at an average annual rate of **2.10 percent** during the planning period, which reflects stable aircraft utilization levels at the airport. The breakdown between

local and itinerant operations is projected to remain stable at approximately 30/70 percent, respectively.

Peak month activity is currently estimated to be 16 percent of annual activity, due to heavier seasonal skydiving activity and the normal increase in general aviation activity during summer months.

A 50 year extrapolation of the preferred forecast is presented in **Table 3-18.** This simple projection is intended to approximate very long term activity for the airport, which may be used to identify corresponding aviation land use requirements.

Forecast Note: Sanderson Field experienced a significant increase in military flight activity beginning in the late summer and fall 2011 that has continued throughout 2012. Airport management contact with the various military operating groups confirmed that the new activity was related to changes in training operations conducted from nearby Joint Base Lewis-McChord and Gray Army Airfield. Based on review of partial-year (year-to date) data provided by the military, 9,460 annual operations were estimated for this segment of activity. The military operations are divided between helicopters (83%) and fixed wing aircraft (17%). The flight activity includes basic flight training and parachute jump training.

Military officials indicate that the activity is expected to be maintained at current levels for the foreseeable future. Due to the unusual occurrence of having an extended period between printing the draft and final master plan reports, an opportunity was created to update the forecast data in the final airport master plan report to reflect the recent change in activity.

As noted above, this level of activity is determined to represent typical annual activity levels for military aircraft at Sanderson Field for both current and future projection purposes. The updated estimate of 9,460 annual military operations was incorporated into the aviation activity forecasts beginning with the 2012 projection, and maintained at that level through the remaining planning period (2017, 2022, and 2027 projections). **Tables 3-14, 3-16, 3-17, and 3-18** are updated and the remaining tables in the chapter are unaffected.

No changes were made to the projections of general aviation based aircraft, fleet mix, or aircraft operations. There was no change to the design aircraft or airport reference code for any forecast year. The net effect of the new military activity is an increase of approximately 25 percent in aircraft operations at Sanderson Field for 2012. Although the military activity is not expected to grow above current levels, it is evident that it will represent a significant portion of overall airport activity throughout the current planning period. The Port of Shelton requested an updated noise analysis to reflect the recent changes in air traffic (see Appendix D). The purpose of the updated analysis was to document recent events rather than replace the original noise analysis conducted in 2007. The updated forecast and noise information will provide a useful benchmark for the next airport master plan update.

TABLE 3-14: SUMMARY OF OPERATIONS BY ACTIVITY CATEGORY

	Actual**2007**	**2012**	**2017**	**2022**	**2027**
Based Aircraft	95	106	121	138	158
Itinerant Operations					
General Aviation	23,770	26,500	30,130	34,260	38,930
Air Taxi	350	400	450	500	600
Military	100	3,240	3,240	3,240	3,240
Total Itinerant	24,220	30,140	33,820	38,000	42,770
Local Operations-GA	10,380	11,570	13,140	14,940	16,990
Local Operations-Military	-	6,220	6,220	6,220	6,220
Total Local Operations	**10,380**	**17,790**	**19,360**	**21,160**	**23,210**
Total Operations	**34,600**	**47,930**	**53,180**	**59,160**	**65,980**
Ratio of Operations per Based Aircraft (GA Only)	*364*	*364*	*360*	*361*	*358*
Subtotal A-II Operations	2,023	2,915	3,072	3,310	3,513
Subtotal B-II Operations	633	2,173	2,462	2,793	3,170
Combined ADG II Operations (A&B)	2,656	5,088	5,534	6,103	6,683
Recommended Airport Reference Code (ARC)	B-II	B-II	B-II	B-II	B-II
Design Aircraft	King Air 300	King Air 300	King Air 300	Cessna Citation Bravo (CE 550)	Cessna Citation Bravo (CE550)
Typical Stage Length	<500 miles	<500 miles	<500 miles	<500 miles	<500 miles
Annual Instrument Approaches *	1,038	1,157	1,315	1,494	1,699

Numbers may not sum due to rounding.

* Estimates based on percentages used in the 1992/1997 master plan updates *(Annual Instrument Approaches = 3% of annual airport operations)*

TABLE 3-15: SUMMARY OF BASED AIRCRAFT FLEET MIX

Aircraft Type	**Actual 2007**	**2012**	**2017**	**2022**	**2027**
Single Engine Piston	83 *(87%)*	91 *(86%)*	99 *(82%)*	114 *(83%)*	132 *(83%)*
Multi Engine Piston	3 *(3%)*	3 *(3%)*	3 *(2%)*	3 *(2%)*	3 *(2%)*
SE/ME Turbine	2 *(2%)*	3 *(3%)*	4 *(3%)*	4 *(3%)*	4 *(3%)*
Turbojet	0 *(0%)*	0 *(0%)*	1 *(1%)*	1 *(1%)*	2 *(1%)*
Rotorcraft	5 *(5%)*	5 *(5%)*	6 *(5%)*	6 *(4%)*	6 *(4%)*
Other (LSA, Ultralights, etc.)	2 *(2%)*	4 *(4%)*	8 *(7%)*	10 *(7%)*	11 *(7%)*
Total Based Aircraft	**95** ***(100%)***	**106** ***(100%)***	**121** ***(100%)***	**138** ***(100%)***	**158** ***(100%)***

Numbers may not sum due to rounding; percentages rounded to nearest whole percent.

TABLE 3-16: SUMMARY OF OPERATIONS BY AIRCRAFT TYPE

Aircraft Type	Actual **2007**	**2012**	**2017**	**2022**	**2027**
Single Engine Piston	29,556 *(86%)*	32,400 *(68%)*	36,370 *(68%)*	40,840 *(69%)*	45,300 *(69%)*
Multi Engine Piston	1,038 *(3%)*	960 *(2%)*	1,100 *(3%)*	1,250 *(3%)*	1,360 *(2%)*
Single Engine Turbine	865 *(2%)*	1,460 *(3%)*	1,610 *(3%)*	1,790 *(3%)*	2,050 *(3%)*
ME Turbine (Turboprop/Turbojet)	1,903 *(6%)*	3,826 *(8%)*	4,176 *(8%)*	4,566 *(8%)*	5,006 *(8%)*
Other (LSA, Ultralights, etc.)	200 (<1%)	390 (1%)	880 (2%)	1,490 (3%)	2,830 (5%)
Rotorcraft	1,038 *(3%)*	8,894 *(19%)*	9,044 *(17%)*	9,224 *(16%)*	9,434 *(14%)*
Total Operations	**34,600** *(100%)*	**47,930** *(100%)*	**53,180** *(100%)*	**59,160** *(100%)*	**65,980** *(100%)*

Numbers may not sum due to rounding; percentages rounded to nearest whole percent.

TABLE 3-17: SUMMARY OF PEAK DEMAND

Activity Measure	Actual **2007**	**2012**	**2017**	**2022**	**2027**
Annual Operations	34,600	47,930	53,180	59,160	65,980
Peak Month *(= 16% of Annual Ops.)*	*5,536*	*7,669*	*8,506*	*9,466*	*10,557*
Design Day (Peak Month /31 days)	179	247	275	305	341
Design Hour (15% of Design Day)	27	37	41	46	51

TABLE 3-18: 50-YEAR OPERATIONS FORECAST (EXTRAPOLATION)

Activity Measure	2007	2027	**2037**	**2047**	**2057**
Based Aircraft	95	158	**204**	**263**	**339**
Annual Operations	34,600	65,980	**81,790**	**102,010**	**127,860**
Peak Month *(= 16% of Annual Ops.)*	*5,536*	*10,557*	***13,086***	***16,322***	***20,458***
Design Day *(Design Day/31 days)*	179	341	***422***	***527***	***660***
Design Hour *(15% of Design Day)*	27	51	***63***	***79***	***99***