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Cashmere-Dryden Airport Cashmere, Washington

AIRPORT LAYOUT PLAN REPORT

“The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration (Project Number 3-53-5300-03) as provided under Title 49, United States Code, section 47104. The contents do not necessarily reflect the official views of policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.”

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Chapter One

INVENTORY

Airport Layout Plan Report
Cashmere-Dryden Airport

The initial step in the preparation of the Airport Layout Plan Report for Cashmere-Dryden Airport is the collection of information pertaining to the Airport and the area it serves. The information collected in this chapter will be used in subsequent analyses in this study. The inventory portion of this chapter will summarize the airport location, history and existing facilities. By establishing a thorough and accurate inventory, an appropriate forecast and recommendations for airfield and landside facilities can be developed.

The information was obtained from several sources, including on-site inspections, airport records, reviews of other planning studies, the Federal Aviation Administration (FAA), various government agencies, a number of on-line (Internet sites), which presently summarize most statistical information and facts about the airport, and interviews with airport staff, planning associations, and airport tenants. As with any airport planning study, an attempt has been made to utilize existing data, or information provided in existing planning documents, to the maximum extent possible.

AIRPORT LOCATION AND ACCESS

Cashmere-Dryden Airport is located southwest of the City of Cashmere, Washington in Chelan County. Cashmere is the geographic center of Washington State and is situated in the foothills on the eastern side of the Cascade Mountains. The city is bounded by state and federal forests and sits at the edge of the Central Washington desert. U.S. Highways 2 and 97 provide roadway

access to Cashmere. Public transportation to and from the City includes bus service provided by the Link Transit System, Mountain View Taxi, and an airport courtesy van.

AREA TOPOGRAPHY

The Cashmere-Dryden Airport has an elevation of 858 feet (NAVD 88). The surrounding terrain is hilly. To the west of the Airport is the Cascade Mountain Range. Mt. Cashmere, part of this range, peaks at 8,500 feet. The terrain to the east of the Airport consists of rolling hills which descend to approximately 800 feet at the Wenatchee River.

CLIMATE

Winter temperatures in Cashmere can range from 18 to 35 degrees Fahrenheit, and summer temperatures can range from 55 to 95 degrees Fahrenheit. Annual rainfall averages about 13 inches per year. Annual snowfall averages about 50 inches per year and typically occurs between December and February.

COMMUNITY AND AIRPORT HISTORY

The area, which is now the City of Cashmere, was originally settled in 1881. The city was officially incorporated on July 1, 1904 and quickly became one of the most productive agricultural areas in the Wenatchee Valley. Today, the major industry is fruit growing.

The airport was established in 1949 by Chelan County who owned and operated the Airport. At the time, the County designated three individuals to serve as airport board members. Today, the airport is still owned by the County, but it is operated as it's own department within the County. The airport advisory board, now consisting of five members, governs the internal operations of the Cashmere-Dryden Airport. An airport manager is appointed by County Commissioner resolution.

AIRCRAFT ACTIVITY DATA

There are two types of aircraft activity data: based aircraft and annual operations. Based aircraft are the number of aircraft that are stored at an airport (either in hangars or in tie-downs). Annual operations are a reflection of the yearly number of aircraft that perform a takeoff or a landing at the Airport. There are currently fifty single-engine aircraft based at the Airport. Current annual aircraft operations at the Airport are estimated to be 5,000. 3,500 of these operations are general aviation local operations, while the remaining 2,000 operations are general aviation itinerant. Projected based aircraft and annual operations data will be presented in Chapter Two, *Forecasts*.

No significant airport service area studies have been conducted, but based on discussions with the Airport tenants and users, it is estimated that airport service area includes Chelan County.

CRITICAL AIRCRAFT

An airport is designed based on the characteristics of the most demanding aircraft, in terms of approach speed and wingspan, which currently use an airport or that is projected to use an airport at some point in the future. The critical aircraft for an airport must have 500 or more annual itinerant operations at that airport. The critical aircraft at Cashmere-Dryden Airport is a Cessna 172. This aircraft has a wingspan of 36.1 feet and a maximum takeoff weight of 2,450 pounds.

EXISTING FACILITIES

The airport reference code is a criterion that defines the critical airport dimensions by the characteristics of the aircraft operating at the airport. This code is defined specifically by the approach category and the design group of the aircraft. The approach category of the aircraft is determined by 1.3 times the stall speed of the aircraft in its landing configuration at its maximum landing weight. The approach category is represented by the letters A, B, C, D and E. The design group of the aircraft is based on the length of the wingspan and is defined by roman numerals I, II, III, IV, V and VI. **Exhibit 1A** summarizes representative aircraft by ARC.

Cashmere-Dryden Airport has an existing ARC of A-I (small). Approach category A includes those aircraft that have an approach speed of less than 91 knots. Design group I includes those aircraft that have a wingspan up to but not including 49 feet. “Small” refers to those aircraft that have a maximum takeoff weight of less than 12,500 pounds. The existing facilities at Cashmere-Dryden Airport are discussed in the following paragraphs and are identified on **Exhibit 1B**.

Table 1A presents the existing Airport design standards and the design standards that the Airport should have in order to meet the ARC of A-I (small).

Table 1A - Airport Design Standards

Design Feature	Existing (feet)	Standard A-I (small) (feet)
Runway Safety Area (RSA)		
- Width	50	120
- Length beyond Runway 7 end	240	240
- Length beyond Runway 25 end	85	240
Runway Object Free Area (OFA)		
- Width	250	250
- Length beyond Runway 7 end	240	240
- Length beyond Runway 25 end	85	240
Runway Obstacle Free Zone (OFZ)		
- Width	250	250
- Length beyond Runway 7 end	200	200
- Length beyond Runway 25 end	85	200
Runway Protection Zone	250 x 1,000 x 450	250 x 1,000 x 450

Sources: Existing – W&H Pacific, Inc.

Standard – FAA AC 150/5300-13, Change 8

Note: The existing RPZs are not owned by the Airport

As can be noted in Table 1A, the RSA and OFA do not meet A-I (small) ARC standards. The RSA, or Runway Safety Area, should be an area 120 feet wide, centered on the runway centerline, and should extend 240 feet beyond each runway end. The Airport’s available RSA width is only 50 feet due to four to five foot drops within 15 to 20 feet from the runway pavement on both sides of the runway. The RSA, OFA and OFZ lengths beyond the approach end of Runway 25 are only 85 feet due to the location of Sullivan Street and the fence. While the displaced threshold does provide the appropriate safety area length, the FAA does not recommend displacing a threshold to achieve a standard RSA. Recommendations to correct these deficiencies will be presented in subsequent chapters.

AIRFIELD FACILITIES

All existing pavement sections and pavement condition information was obtained from Pavement Consultants Inc.’s 1999 pavement survey (see **Exhibits 1C** and **1D**), the 2002 WSDOT Aviation System Plan Inventory, and airport management. The pavement condition index (PCI) survey is an inventory of the existing pavement sections and pavement conditions at all state-funded airports. The survey is compiled by a consultant hired by the State of Washington. The consultant uses a form of pavement testing to get a rating for each pavement surface. The rating, based on a numbered scale of 0-100, with 0 being the lowest and 100 being the highest, corresponds to a pavement condition ranging from poor to excellent. The State has hired another consultant to update this data in 2004/2005. Current pavement conditions discussed below are reported based on visual observations by W&H Pacific through a September, 2004 airport field visit.

Runway

Cashmere-Dryden Airport has one paved asphalt runway, Runway 7-25, at a length of 1,800 feet and a width of 50 feet. Runway 25 has a 155-foot displaced threshold due to obstructions such as trees, and ballpark lights within the runway's approach surface.

In 2001, the runway was reconstructed and a new runway grade was established. The original pavement section for Runway 7-25 consisted of nine inches of crushed aggregate base course, bituminous surface treatment (BST), and an unknown asphalt thickness. The runway was resurfaced with an asphalt overly in 2001 and three inches of asphalt were added to its surface. The runway is in fair condition. The pavement is rated for single wheel gear 8,000 pound aircraft. This pavement strength is adequate in supporting operations by the critical aircraft.

Runway orientation is determined by the direction of the prevailing winds. The FAA recommends that a runway have 95% wind coverage based on specified crosswind components. Cashmere-Dryden Airport does not currently have a wind rose; therefore, current wind coverages can not be identified. Information obtained from existing airport users indicated that the current runway alignment is not the direction of the prevailing wind and some rotation of the runway would provide better wind coverage.

Taxiways and Taxilanes

Runway 7-25 has a full-length parallel taxiway (Taxiway A) at 20 feet wide and its pavement section consists of nine inches of crushed aggregate base course and BST. This taxiway was seal coated in 1990 and is considered to be in fair condition. There are two connector taxiways, Taxiway B at the west end of the runway and Taxiway C at the east end of the runway, both of which were reconstructed in 2001. Both connector taxiways are 20 feet wide and have the same pavement sections as the runway. They are in good condition.

There are two taxilanes on the east side of the airfield that provide access to several hangars and to the pilot's lounge. The taxilanes are constructed of BST and two inches of asphalt. Both are in fair to good condition.

Aprons and Aircraft Parking

There is one aircraft apron area located in the southeast corner of the Airport. The apron forms a small "L-shape" and contains two aircraft tiedown positions. During the recent site visit for the project's inventory review, it was noted that the apron is in poor condition and has many uneven surfaces which are in need of repair.

LANDSIDE FACILITIES

Hangars and Airport Buildings

The Airport has 33 individual hangar spaces all of which are located on the south side of Runway 7-25. Each hangar is privately owned and operated under terms of a ground lease from Chelan County. Two hangars (13 & 14) are county-owned rental hangars. There are also two hangars located outside of the airport property boundary (through the fence operations).

In addition to hangars, there are four other buildings on airport property – a pump house, located north of the aircraft tiedown area; the pilot’s lounge, located south of Taxiway A near the eastern hangar area; a private residence also located south of Taxiway A, near the eastern hangar area, and a tractor and tool barn located west of hangar number 12.

Maintenance Facilities

There are three maintenance facilities at Cashmere-Dryden Airport. These facilities provide major maintenance services to include airframe and power plant repairs.

Internal Circulation, Access and Vehicle Parking

Access to the airport from State Highway 2 is gained via Division Street to Pioneer Drive to Sullivan Street. Vehicular traffic utilizes Taxiway A and the taxilanes to access the Airport’s facilities. There is currently no standard automobile parking lot on the airfield. Typically, pilots park their vehicles in their hangars while utilizing their aircraft.

AIRFIELD SUPPORT FACILITIES

Aircraft Rescue and Firefighting

There are no Aircraft Rescue and Firefighting (ARFF) facilities available at the Airport, however, in the event of an emergency, these services are provided by the City of Cashmere’s volunteer fire department and the surrounding community’s emergency personnel crews.

Fueling Facilities

There are currently no fueling facilities available at the Airport.

Airport Maintenance

Airport maintenance is provided by Chelan County.

Utilities

Water and sewer services are provided by the City of Cashmere. Power and phone services are available at the airport from the local private and public utilities. Irrigation water is provided by the Peshastin Irrigation District.

Common Traffic Advisory Frequency (CTAF)

The Federal Communications Commission issued Cashmere-Dryden Airport a common traffic advisory frequency (CTAF) of 122.9 MHz. This frequency is used by pilots to communicate their intentions to other pilots who may be in the vicinity of the Airport.

AIRPORT NAVIGATIONAL AIDS

Airport Navigational Aids, or NAVAIDS, provide electronic navigational assistance to aircraft for approaches to an airport. NAVAIDS are either visual approach aids or instrument approach aids; the former providing a visual navigational tool, and the latter being an instrument-based navigational tool. The types of approaches available at an airport are based on the NAVAIDS which are provided.

Instrument Approach Aids

There is no air traffic control tower or any instrument approach aids at Cashmere-Dryden Airport; however, nearby airports (Ellensburg and Wenatchee) have a Very-High Frequency Omni-directional Range station, or a VOR, located on their airfields. VORs transmit signals to aircraft by providing heading and course information to assist a pilot in finding an airport. By following radials and distance information (found on an aeronautical chart), the VORs located at the Ellensburg and Wenatchee airports could assist a pilot in locating the Cashmere-Dryden Airport.

Visual Approach Aids

All approaches to the Airport are made on a visual basis. The Airport has a two-box Precision Approach Path Indicator (PAPI) on the left side of Runway 25. PAPIs contain multiple light units that are angled to provide the pilot with information as to whether they are approaching too high or too low.

Airport Lighting and Signing

Runway 7-25 is equipped with Medium Intensity Runway Lights (MIRL) which are pilot activated by using frequency 121.7 MHz. There is no lighting on the airport taxiways.

Other NAVAIDS

Cashmere-Dryden Airport is equipped with a rotating beacon to assist pilots in locating the Airport at night or during low visibility conditions. The beacon light can be activated by the pilot. A lighted wind sock is located on the south side of the field.

LAND USE PLANNING AND ZONING

There are several land use requirements, on the Federal, State, County and City levels, that need to be considered when reviewing existing land uses and planning for future development at and around an airport.

Federal regulations are generally concerned with airspace protection (14 CFR Part 77). 14 CFR Part 77, *Objects Affecting Navigable Airspace*, establishes obstruction standards used for identifying potential adverse effects to air navigation and establishes notice standards for proposed construction. Imaginary surfaces were created and are used as the basis for protecting the airspace around an airport. It is ideal to keep these areas clear of any obstructions. There are five imaginary surfaces, each with specific controlling measures: a primary surface, an approach surface, a transitional surface, a horizontal surface and a conical surface.

Under FAA guidelines, before FAA grants can be received, the airport sponsor must provide assurances that appropriate actions have been (or will be) taken to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport, to activities and purposes compatible with normal airport operations.

Washington State regulations are based on the Growth Management Act (GMA), Chapter 36.70A of the Revised Code of Washington (RCW), which requires most counties and cities to establish goals, evaluate community assets, and write comprehensive plans to discourage the siting of incompatible uses near airports that are operated for the benefit of the general public. The requirements to plan under GMA are based on the city or county's population or rate of population growth. Areas that do not meet specified growth rates may choose whether or not to plan under GMA requirements.

The GMA establishes four basic principles related to public use airports:

- Local comprehensive plans and development regulations must discourage development of incompatible land uses adjacent to public-use airports
- Formal consultation with airport owners, ports, pilots and WSDOT Aviation prior to adoption of protective ordinances
- WSDOT Aviation to provide technical assistance program to develop such protection
- Airport to be identified as an Essential Public Facility (EPF) in the Comprehensive Plan.

Chelan County does participate in Washington's Growth Management Act.

Cashmere-Dryden Airport falls outside of the City limits of Cashmere and is therefore controlled by Chelan County zoning ordinances. The following subsections describe the existing land uses and zoning that are currently in place.

EXISTING LAND USE

The land uses immediately adjacent to the airport property consist primarily of agricultural and residential. The area to the east of the airport consists of schools, facilities associated with schools (ball field, tennis courts, parking lots, etc.), and residential. The area lying to the north of the airfield consists primarily of residential and the area to the west and south of the airfield is primarily agricultural with some residential.

EXISTING ZONING

Chapter 11 of the Chelan County Code describes existing zoning designations. Description of the specific zones that are relevant to the Airport are included in Appendix B. A zoning map is also included in **Exhibit 1E**.

Cashmere-Dryden Airport and the area immediately south, west, and northwest of the Airport are located in the County's "Rural Residential/Resource 2.5 (RR 2.5)" zone. Permitted uses in this zone include agricultural uses and agricultural accessory buildings, single-family dwellings, adult family homes, U-pick and rent-a-tree operations, forestry uses, and heliports for temporary emergency and forest-related management support. The minimum lot size in this zone is two and one-half acres and the maximum building height is thirty-five feet.

In general, the permitted uses within the RR 2.5 zone are compatible with airports so long as buildings and trees do not penetrate the Airport's imaginary surfaces and that residential dwellings are not located within the Airport's Runway Protection Zones.

The areas to the east and northeast of the Airport are located in the County's "Tourist Commercial (CT)" zone. Permitted uses in this zone include agricultural, roadside stands, amusement and recreational facilities, lodging facilities, restaurants and drinking establishments, mini storage, retail sales, parking garages, campgrounds, churches and religious facilities, places of public and private assembly. The minimum lot size in this zone is based on the availability of public water and sewer. The maximum building height is fifty feet.

Many of the permitted uses with the CT zone are incompatible with airports. The existing Runway 25 RPZ is located in this zone and should be clear of all public assembly facilities. The CT zone allows this type of use. It is important the County take the appropriate steps to ensure that these types of facilities are not located within the airport approaches or RPZs.

Other zones within a two-mile radius of the Airport include the "Rural Residential/Resource 5 (RR5)" and the "Rural Village (RV)". The RR5 zone permits the same types of uses allowed in the RR 2.5 zone, however, the minimum lot size is five acres. The maximum building height is thirty-five feet. Permitted uses within the RV zoning designation includes agricultural uses, adult family home, single and multi-family dwellings, forestry uses, low impact utilities. The

minimum lot size in the RV zone is based on the availability of public water and sewer and the type of facility located in the zone. The maximum building height is thirty-five feet.

Chelan County has also incorporated an Airport Overlay Zone which applies to all airports located within Chelan County. The purpose of the overlay zone is to limit heights of structures and facilities near the Airport and to provide additional airspace protection around the Airport.

Comprehensive Plan Goals and Policies

Chelan County adopted a comprehensive plan in 2000. The comprehensive plan was last amended in April of 2007. The plan provides a vision for the County that is implemented through goals and policies that are defined within the plan.

Cashmere-Dryden Municipal Airport is discussed in the Transportation Element of the Chelan County Comprehensive Plan. The section on aviation addresses the major existing facilities at each airport within the County. It also addresses the goals, objectives and policies of the County as they relate to developing the Airport. The Transportation Element section does not define the Airport as an Essential Public Facility (EPF). Language is included which restricts uses that create hazard or conflict with safe and effective operations.

Recommendations for changes to the existing zoning ordinances and comprehensive plan will be addressed in Chapter Three.

Chapter Two

FORECAST

Airport Layout Plan Report
Cashmere-Dryden Airport

INTRODUCTION

Aviation demand forecasts help to determine the size and timing of needed airport improvements. This chapter indicates the types and levels of aviation activity expected at Cashmere-Dryden Airport during the forecast period of 2005 through 2025. The methodology followed is from “Forecasting Aviation Activity by Airport,” GRA, Incorporated, July 2001.

AVIATION ACTIVITY PARAMETERS AND MEASURES TO FORECASTS

For Cashmere-Dryden Airport, the following activity categories are projected:

- Based Aircraft, including fleet mix.
- Aircraft Operations, including air taxi, general aviation (GA), local vs. itinerant, and annual instrument approaches.
- Airport Reference Code, which defines the appropriate FAA criteria for airport design and is determined by the most demanding aircraft that regularly uses the airport.

PREVIOUS AIRPORT FORECASTS

The FAA annually prepares aviation demand forecasts called the Terminal Area Forecasts (TAF) for all airports included in the National Plan of Integrated Airport Systems (NPIAS). The FAA provided an advance copy of the draft TAF for Cashmere-Dryden Airport, dated August 2004. The TAF (Table 2A) indicates no change in the number or composition of historical aircraft

operations from 1994 through 2003 and projects 0% growth through 2020. Table 2B shows TAF data for based aircraft, which indicate that the number of based aircraft has been growing. The TAF projects 0% growth in based aircraft through 2020.

Table 2A, FAA TAF Aircraft Operations, Historical and Forecast

Aircraft Operations	Actual/Forecast 1994-2020
Itinerant:	
Air Taxi	150
GA	4,500
Military	0
Local:	
GA	6,500
Military	0
Total:	11,150
Instrument Operations:	0

Table 2B, FAA TAF Based Aircraft, Historical and Forecast

Year	Single-Engine	Helicopter	Other Light Misc. Craft	Total Based Aircraft
Actual				
1985	16	2	0	18
1990	24	5	0	29
1995	28	4	0	32
2000	33	4	1	38
2003	52	5	3	60
Forecast				
2005	52	5	3	60
2010	52	5	3	60
2015	52	5	3	60
2020	52	5	3	60

WSDOT Aviation Division’s *Aviation System Plan – Forecast and Economic Significance Study* contains the forecasts for Cashmere-Dryden Airport that appear in Table 2C. Registered aircraft in the state were forecast by using the average of five forecasting models: 1) time-series analysis (continuation of historical trends); 2) regression analysis that examined per capita personal income (PCPI) in Washington compared to that in the United States; 3) regression analysis using state population and PCPI as independent variables; 4) the FAA’s nationwide growth rates for registered aircraft; and 5) a multiple regression analysis that used pilot population as one of the variables. The registered aircraft forecasts were distributed among the counties according to the actual distribution in 1998, with adjustments in the future to consider different population and PCPI growth forecast by the State. Based aircraft for individual airports were forecast by holding constant the market share of the aircraft based in the county to the number of aircraft registered in that county. To forecast aircraft operations, a utilization rate (operations per based aircraft) was calculated. Except where specific conditions were noted, the utilization rate at each airport was increased uniformly by 0.3% for 2005, 0.33% for 2010, .36% for 2015, and 0.39% for 2020.

Table 2C, Washington Aviation System Plan Forecasts

	2000	2005	2010	2015	2020	Annual Growth 2000-2020
Aircraft Operations						
Itinerant:						
Air Taxi	150	200	200	200	200	1.4%
GA	4,500	4,500	4,600	4,600	4,700	0.2%
Military	0	0	0	0	0	
Local:						
GA	6,500	6,500	6,600	6,700	6,800	0.2%
Military	0	0	0	0	0	
Total Operations	11,150	11,200	11,400	11,500	11,700	0.2%
Instrument Approaches	0	148	151	151	154	0.3%*
Total Based Aircraft	54	54	55	55	56	0.2%
Single Engine Piston	50	50	51	51	51	0.1%
Helicopter	4	4	4	4	5	1.1%

*Annual growth rate is for 2005-2020, since there were no instrument approaches in 2000.

NATIONAL FAA FORECASTS

FAA-APO-03-3, *FAA Long-Range Forecasts, Fiscal Years 2015, 2020, 2025, and 2030*, June 2003, contains forecasts of long-term growth in GA aircraft, GA hours flown, and pilots. GA activity is very sensitive to changes in fuel price and economic growth. Forecast assumptions include sustained economic growth, relative stability in fuel prices, and continued growth in fractional ownership programs and corporate flying. Also important to GA growth is continued investment in production by GA aircraft manufacturers. Pilot growth is aided by recent industry program initiatives designed to promote GA. According to FAA-APO-03-3, the number of active GA aircraft is expected to increase at an average annual growth rate of 0.5%, with slower growth for the piston engine portion of the fleet than the turbine portion, reflecting more business and corporate use of GA aircraft in an expanding U.S. economy. Flight hours are projected to increase at a faster rate than the fleet, 1.5% annually through 2014, and 1.2% annually from 2015 through 2030. The number of pilots is forecast to grow at an average annual rate of 1.2% over the 28-year period.

**Table 2D, FAA Long-Range GA Forecasts
(Average annual growth rates)**

	2002-2005	2005-2010	2010-2015	2015-2025
Piston	0.2%	0.3%	0.2%	0.2%
Turbine	2.2%	3.2%	2.6%	2.3%
Helicopters	0.5%	0.9%	0.5%	0.5%
Experimental	3.0%	1.9%	1.5%	1.0%
Hours Flown	1.3%	1.6%	1.5%	1.3%

Source: FAA-APO-03-3

FAA-APO-04-1, *FAA Aerospace Forecasts Fiscal Years 2004-2015*, March 2004, contains the FAA's latest national forecasts for GA. The document begins with an assessment of recent trends. GA aircraft manufacturing has been declining: an estimated 15.9% decline in 2003 shipments compared to 2002. The active GA fleet declined 0.1% and hours flown increased 0.1% from the previous year. The business/corporate segment continues to offer the greatest potential for GA growth; fractional ownership activity has been increasing, with flight hours up 3.8% in 2003. Student pilots also increased in 2003, up 1.5% from 2002.

**Table 2E, FAA Forecasts for GA and Air Taxi Active Fleet
(Average annual growth rates)**

	2002-2005	2005-2010	2010-2015
Single Engine Piston	0.0%	0.4%	0.3%
Multi-Engine Piston	-0.5%	-0.5%	-0.5%
Turboprop	0.8%	1.6%	1.4%
Turbojet	2.6%	5.9%	5.3%
Rotorcraft (Piston)	1.2%	1.2%	0.8%
Rotorcraft (Turbine)	-0.1%	0.6%	0.4%
Experimental	0.2%	0.6%	0.3%
Sport Aircraft		3.1%	3.0%

Source: FAA-APO-04-1

The FAA's forecasts for 2004–2015 assume there will not be any successful terrorist incidents against either U.S. or world aviation. Business use of GA is projected to expand more rapidly than that for personal and sport use. The business/corporate side of GA should continue to benefit from safety concerns for corporate staff, increased processing times for airline travel, and the bonus depreciation provision of the Presidents economic stimulus package that should help stimulate jet sales. The new Eclipse jet aircraft is assumed to add 4,600 aircraft to the fleet by 2015. The Eclipse, priced under \$1 million, is believed to have the potential to redefine the business jet segment and support a true on-demand air taxi business. Starting in 2003, owners of ultralight aircraft can begin registering these aircraft as "light sport" aircraft, and the GA fleet forecast includes 20,915 aircraft in this new category by 2015. The active GA fleet is projected to increase at 1.3% annually over the forecast period, while the GA hours flown are projected to increase at 1.6% per year over the last 11 years of the forecast period.

**Table 2F, FAA Forecasts for GA and Air Taxi Hours Flown
(Average annual growth rates)**

	2002-2005	2005-2010	2010-2015
Single Engine Piston	-0.3%	0.9%	0.7%
Multi-Engine Piston	-0.6%	-0.4%	-0.4%
Turboprop	-0.2%	0.5%	0.5%
Turbojet	2.5%	8.0%	6.3%
Rotorcraft (Piston)	1.2%	2.0%	0.9%
Rotorcraft (Turbine)	-0.3%	1.4%	0.7%
Experimental	0.1%	0.9%	0.6%
Sport Aircraft		3.2%	3.2%

Source: FAA-APO-04-1

POPULATION FORECASTS

Population growth within an airport’s service area is usually a significant factor in the growth of aviation activity at the airport. Table 2G shows historical and projected population for Chelan County.

Table 2G, Chelan County Population

Year	Population		
1980	45,061		
1985	49,250		
1990	52,250		
1995	63,839		
2000	66,616		
	Forecasts		
	Low	Medium	High
2005	66,616	66,616	66,616
2010	67,913	71,169	74,443
2015	71,015	75,993	81,009
2020	74,146	81,056	88,027
2025	76,848	85,864	94,966
	Average Annual Growth Rates		
1980-1985	1.8%		
1985-1990	1.2%		
1990-1995	4.1%		
1995-2000	0.9%		
2000-2005	0.4%	1.3%	2.2%
2005-2010	0.9%	1.3%	1.7%
2010-2015	0.9%	1.3%	1.7%
2015-2020	0.7%	1.2%	1.5%
2020-2025	0.6%	1.0%	1.4%

Source: State of Washington Office of Financial Management, Projections released January 2002

CASHMERE-DRYDEN AIRPORT FORECASTS

For the Cashmere-Dryden Airport forecasts, growth rates or methodology from three different sources were examined—the FAA’s Terminal Area Forecasts, the Washington Aviation System Plan, and State of Washington Office of Financial Management Population Forecasts. The forecast numbers from the TAF and Washington Aviation System Plan were not used due to errors in their base year data, compared to actual based aircraft and operations.

BASED AIRCRAFT FORECASTS

The inventory effort for this report found that the actual number and fleet mix of based aircraft differs from the TAF, Airport Master Record, and Washington Aviation System Plan records. The Airport Manager reported that 50 single engine piston aircraft are based at Cashmere-Dryden Airport now. Table 2H presents the based aircraft forecasts that resulted from the three different sources cited in the previous paragraph. Table 2H does not contain the actual forecast numbers that are in the TAF.

Table 2H, Comparison of Based Aircraft Forecast Models

Year	FAA*	State**	Population***
2005	52	52	53
2010	52	53	56
2015	52	53	60
2020	52	54	64
2025	52	54	67

**0.0% annual growth from Terminal Area Forecasts, August 2004*

***0.2% annual growth from Washington Aviation System Plan – Forecast and Economic Significance Study*

****Annual growth rates from intermediate population projections of State of Washington Office of Financial Management, Table 2G*

The selected forecast is the population model. The FAA and State models project no or very little growth, which is not consistent with the history of growth that has occurred at the airport. TAF data in Table 2B indicates that from 1985 through 2003, based aircraft grew at an average annual rate of 7%. It would not be prudent to assume that growth would suddenly stop. The selected based aircraft forecast, based upon population growth in the service area, is for 1.2% average annual growth through 2025. Throughout the 20-year planning period, the fleet mix of based aircraft is not projected to change from all single engine piston aircraft.

AIRCRAFT OPERATIONS FORECASTS

The inventory effort for this report also found that the actual number of aircraft operations differs from the TAF and Washington Aviation System Plan records. The Airport Manager reported that 5,500 GA operations occur annually at Cashmere-Dryden Airport. Of the total, 3,500 are local and 2,000 are itinerant.

Table 2I shows the operations forecasts for Cashmere-Dryden Airport, using the same three sources of growth rates or methodology as the based aircraft forecasts. The selected forecast uses the State Aviation System Plan’s aircraft utilization method. Annual operations per based

aircraft are projected to grow from 106 now to 108 in 2025. A slight increase in utilization is consistent with FAA forecasts for hours flown in GA piston aircraft. Table 2I does not contain the actual forecast numbers that are in the TAF.

Table 2I, Comparison of Aircraft Operations Forecast Models

Year	FAA*	State**	Population***
2005	5,500	5,588	5,572
2010	5,500	5,981	5,943
2015	5,500	6,403	6,340
2020	5,500	6,823	6,729
2025	5,500	7,201	7,073

*0.0% annual growth from Terminal Area Forecasts, August 2004

**Growing aircraft utilization method from Washington Aviation System Plan – Forecast and Economic Significance Study

***Annual growth rates from intermediate population projections of State of Washington Office of Financial Management, Table 2G

SELECTED FORECASTS

Table 2J presents the selected forecasts for based aircraft and aircraft operations. Based aircraft are projected to grow at 1.2% annually and operations are projected to grow at 1.3% annually.

Table 2J, Cashmere-Dryden Airport Aviation Demand Forecasts

Year	Based Aircraft		Aircraft Operations		
	Single Engine	Itinerant GA	Local GA	Total Operations	Inst. Approaches
Current	52	2,000	3,500	5,500	0
2005	53	2,012	3,576	5,588	0
2010	56	2,153	3,828	5,981	0
2015	60	2,305	4,098	6,403	0
2020	64	2,456	4,366	6,823	0
2025	67	2,592	4,608	7,201	0

There has been no indication that military or air taxi aircraft will start to use the airport or that the split between local and itinerant operations will change in the future. Consequently, the operations in Table 2J are 36% itinerant GA and 64% local GA throughout the forecast period. All of the itinerant and local GA operations will be ARC A-I small (12,500 pounds and less).

The airport does not have an instrument approach now. The Washington Aviation System Plan forecasts assumed that all public-use airports in the state would have a minimum of one GPS approach. However, the Cashmere-Dryden Airport runway is only 1,800 feet long. The minimum length of runway required for an instrument approach under special conditions is 2,400 feet as sited in Appendix 16 of Advisory Circular 150/5300-13. For this Airport Layout

Plan Report, it is assumed that Cashmere-Dryden Airport will not receive an instrument approach throughout the forecast period.

AIRPORT REFERENCE CODE AND CRITICAL AIRCRAFT

As discussed in Chapter One, the Airport Reference Code (ARC) is an important parameter for airport design. The appropriate ARC for an airport is determined by its design, or critical, aircraft, which is the most demanding aircraft that regularly uses the airport. Regular use is defined as at least 500 annual itinerant operations--equivalent to an average of one departure per weekday. The current critical aircraft is the Cessna 172 (2,450 pounds maximum takeoff weight) and the future critical aircraft is the Cessna 206 (3,600 pounds maximum takeoff weight).

The current and forecast ARC for Cashmere-Dryden Airport Municipal Airport is A-I (small). The most demanding aircraft based at the airport is the Cessna 172, a single engine piston aircraft with a maximum takeoff weight under 12,500 pounds, an aircraft approach speed less than 91 knots (Aircraft Approach Category A), and wingspan less than 49 feet (Airplane Design Group I). Transient aircraft using the airport are nearly all the single engine aircraft. The Airport Manager estimated approximately 50 annual operations by transient multi-engine piston aircraft.

AIRPORT PLANNING FORECAST RESULTS COMPARED WITH TAF

Table 2K compares the selected forecasts for Cashmere-Dryden Airport with the TAF numbers. The selected forecasts are mostly lower than the TAF numbers, because the actual number of based aircraft and aircraft operations are lower than reported in the TAF.

Table 2K, Comparison of Selected Forecasts with Terminal Area Forecasts

Year	Based Aircraft Forecast			Operations Forecast		
	TAF	Selected	Difference	TAF	Selected	Difference
2005	60	53	-12%	11,150	5,588	-50%
2010	60	56	-6%	11,150	5,981	-46%
2015	60	60	0%	11,150	6,403	-43%
2020	60	64	6%	11,150	6,823	-39%

Following approval of the forecasts and after having worked through the facility requirements and development alternatives for the Airport, the County Commission elected to enter a maintenance-only mode. In this mode, FAA dollars will not be used to fund capacity improvements and the growth and activity forecasts presented in this chapter are insignificant. The maintenance-only mode is further discussed in Chapter Three, Facility Requirements.

Chapter Three

AIRPORT FACILITY

REQUIREMENTS/ALTERNATIVES

Airport Layout Plan Report

Cashmere-Dryden Airport

An updated set of aviation demand forecasts for Cashmere-Dryden Airport were established in the previous chapter. These activity forecasts include aircraft operations, based aircraft, and fleet mix. With this information, specific components of the airfield and landside system can be evaluated to determine their capability to accommodate future demand.

The objective of this effort is to identify, in general terms, the adequacy of the existing airport facilities, outline what new facilities may be needed, and when these may be needed to accommodate forecast demands.

As indicated earlier, airport facilities include both airfield and landside components. Airfield facilities include those facilities that are related to the arrival, departure, and ground movement of aircraft. These components include:

- Runways
- Taxiways
- Navigational and Approach Aids
- Lighting, Marking, and Signage
- Security Fencing
- Weather Reporting

Landside facilities are needed for the interface between air and ground transportation modes. This includes components for general aviation needs such as:

- General Aviation Terminal

- Aircraft Hangars and Parking Aprons
- Auto Parking and Access
- Airport Support Facilities

PLANNING HORIZONS

Cost-effective, safe, efficient, and orderly development of an airport should rely more upon actual demand than on a time-based forecast. Thus, in order to develop an airport layout plan that is demand-based rather than time-based, a series of planning horizon milestones have been established that take into consideration the reasonable range of aviation demand projections.

It is important to consider that the actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts, or changes, in the area’s aviation demand. It is important for the plan to accommodate these changes so that airport officials can respond to unexpected changes in a timely fashion. These milestones provide flexibility, while potentially extending the plan’s useful life if activity slows.

The most important reason for utilizing milestones is that they allow the airport to develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to actual demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and need-based program.

Table 3A presents the planning milestones for each aircraft activity category. The planning milestones essentially correlate to the five, ten, and twenty-year periods used in the previous chapter.

TABLE 3A, Aviation Demand Planning Horizons

Demand Category	Current	Intermediate		
		Short Term (2010)	Term (2015)	Long Term (2025)
<i>Total Operations</i>	5,500	5,981	6,403	7,201
Local	3,500	3,828	4,098	4,068
Itinerant	2,000	2,153	2,305	2,592
<i>Based Aircraft</i>	52	56	60	67

AIRFIELD REQUIREMENTS

The adequacy of existing airfield facilities at Cashmere-Dryden Airport has been analyzed from a number of perspectives, including airfield capacity, runway length, runway pavement strength, airfield lighting, navigational aids, and pavement markings.

AIRFIELD DESIGN STANDARDS

To determine facility requirements, the Airport Reference Code (ARC) must be referred to in order for the appropriate airport design criteria to be applied. As discussed in prior chapters, the existing ARC for Cashmere-Dryden Airport is A-I (small) and the critical aircraft is a Cessna 172. The forecasts anticipate the Airport maintaining the current operational fleet mix, which will continue to place the Airport in the A-I (small) category. Facility requirements will be developed based on these assumptions.

The FAA has established several airport design standards to protect aircraft operational areas and keep them free from obstructions that could affect the safe operation of aircraft. These include the runway safety area (RSA), object free area (OFA), obstacle free zone (OFZ), and runway protection zone (RPZ).

The RSA is “a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or an excursion from the runway.”

An OFA is an area on the ground centered on the runway or taxiway centerline provided to enhance the safety of aircraft operations. No above ground objects are allowed except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

An OFZ is a volume of airspace that is required to be clear of objects, except for frangible items required for navigation of aircraft. It is centered along the runway and extended runway centerline.

The RPZ is defined as an area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape and centered about the extended runway centerline. The dimensions of an RPZ are a function of the runway ARC and approach visibility minimums.

Table 1A in the Inventory Chapter identified the dimensions of these areas by the existing ARC A-I (small) standards and the actual dimensions. Several of the actual dimensions do not meet the FAA’s standards for a A-I (small) ARC. The following text will discuss these deficiencies.

The RSA width for Runway 7-25 is 70 feet narrower than the 120-foot standard. The width is non-standard due to dropping terrain on both sides of the runway. In order to bring the RSA width to standard, fill and grading work would need to be accomplished.

The RSA, OFA, and OFZ lengths beyond the Runway 25 end are less than the 240-foot standard (at 155 feet short). All three are non-standard due to the location of Sullivan Street, which is 85 feet from the existing Runway 25 end. Because it is not feasible to relocate the road and because the FAA does not recommend displacing thresholds to achieve standard safety area, it is likely that the Runway 25 threshold will need to be relocated to the west.

RUNWAY

The adequacy of the existing runway system at Cashmere-Dryden Airport was analyzed from a number of perspectives, including airfield capacity, runway orientation, runway length, runway width, and pavement strength. From this information, requirements for runway improvements were determined.

Airfield Capacity

A demand/capacity analysis measures the capacity of the airfield configuration. Planning standards indicate that when demand reaches 60% of capacity, new facilities should be planned. When demand reaches 80% of capacity, new facilities should be in place. To determine the airfield capacity at Cashmere-Dryden Airport, Advisory Circular 150/5060-5, Airport Capacity and Delay was referenced. A typical airport with a single runway and parallel taxiway configuration has an annual capacity of 230,000 operations. Since the forecasts for the Airport remain well below this threshold through 2025, the capacity of the existing runway will not be reached; therefore the airfield will be able to meet operational demands.

Runway Orientation

For the operational safety and efficiency of an airport, it is desirable for the primary runway of an airport's runway system to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of crosswind components during landing or takeoff.

FAA design standards recommend additional runway configurations when the primary runway configuration provides less than 95 percent wind coverage at specific crosswind components. The 95 percent wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for small aircraft weighing less than 12,500 pounds and from 13 to 20 knots for aircraft weighing over 12,500 pounds. No current wind data was available for Cashmere-Dryden Airport. A review of the most recent Airport Facilities Inventory Drawing (AFID) indicated 95% wind coverage. As mentioned in Chapter 1, information obtained from existing airport users indicated that the current runway alignment is not the direction of the prevailing wind and some rotation of the runway would provide better wind coverage.

Runway Length

The runway length requirements for an airport are based on five primary factors: airport elevation; mean maximum temperature of the hottest month; runway gradient (difference in runway elevation of each runway end); critical aircraft type expected to use the airport; and stage length of the longest nonstop trip destination. Aircraft performance declines as each of these factors increase. Summertime temperatures and stage lengths are the primary factors in determining runway length requirements.

The local airport elevation is 853 feet above mean sea level (MSL) and the mean maximum temperature of the hottest month is 88 degrees Fahrenheit (F). Runway end elevations vary by approximately 25 feet along Runway 7-25.

Using the site-specific data described above, runway length requirements for the various classifications of aircraft that may operate at the airport were examined using the FAA Airport Design computer program, Version 4.2D. The program groups general aviation aircraft into several categories, reflecting the percentage of the fleet within each category and useful load (passengers and fuel) of the aircraft. Table 3B summarizes FAA’s generalized recommended runway lengths for Cashmere-Dryden Airport.

TABLE 3B, Runway Length Requirements

AIRPORT AND RUNWAY DATA	
Airport elevation.....	853 feet
Mean daily maximum temperature of the hottest month.....	88° F
Maximum difference in runway centerline elevation.....	25 feet
Wet and slippery runways	
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with approach speeds of less than 30 knots	330 feet
Small airplanes with approach speeds of less than 50 knots	870 feet
Small airplanes with less than 10 passenger seats	
To accommodate 75 percent of these small airplanes.....	2,780 feet
To accommodate 95 percent of these small airplanes.....	3,310 feet
To accommodate 100 percent of these small airplanes.....	3,930 feet
Small airplanes with 10 or more passenger seats	4,390 feet

Source: FAA’s airport design computer software utilizing Chapter Two of AC 150/5325-4A, *Runway Length Requirements for Airport Design*, no changes included.

As shown in the table, the FAA recommends a minimum runway length of 2,780 feet to accommodate 75% of small aircraft using the facility.

The current runway length of 1,800 feet accommodates the small aircraft operating at Cashmere-Dryden Airport. A runway extension to 2,000 feet would support larger A-I aircraft, as shown in Table 3C:

TABLE 3C, Group A-I Aircraft Requiring 1,800’ Runway Length

AIRCRAFT	FAA TAKEOFF FIELD LENGTH	FAA LANDING FIELD LENGTH
Cessna Stationair	1,860’	1,395’
EADS Tampico	1,870’	1,378’
Piper Saratoga	1,810’	1,700’

Source: “Business and General Aviation Aircraft”, *Aviation Week & Space Technology*, 1/17/05

This runway extension will be evaluated, and will be shown as a development alternative.

RUNWAY WIDTH

The width of the runway was also examined to determine the need for facility improvements. The current Runway 7-25 width of 50 feet should be increased to a minimum of 60 feet to meet standards for an A-I (small) classification. This widening should be performed as soon as practicable and can be completed in conjunction with any runway extension that may occur.

RUNWAY PAVEMENT STRENGTH

The most important feature of airfield pavement is its ability to withstand repeated use by aircraft of significant weight. Runway 7-25 has a current strength rating of 8,000 pounds single wheel gear loading (SWL), based on the most recent A.F.I.D. This pavement strength will be sufficient for the existing and future fleet.

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and the runways, whereas other taxiways become necessary as activity increases at an airport to provide safe and efficient use of the airfield.

Taxiway width is determined by the ADG of the most demanding aircraft to use the taxiway. As previously mentioned, the most demanding aircraft to use the airfield fall within ADG I. According to FAA design standards, the minimum taxiway width for ADG I is 25 feet. Cashmere-Dryden Airport is served by a full-length parallel taxiway. This taxiway is 20 feet wide and should be increased to a minimum of 25 feet to meet standards for an A-I (small) classification.

The runway-taxiway separation distance was also examined. This distance is such to satisfy the requirement that no part of an aircraft (tail tip, wing tip) on the taxiway/taxilane centerline is within the runway safety area or penetrates the obstacle free zone (OFZ). The current distance between the Runway 7-25 centerline and the parallel taxiway centerline is 120 feet. The required distance for ARC A-I (small) facilities serving small airplanes exclusively is 150 feet.

NAVIGATIONAL AND APPROACH AIDS

As discussed in Chapter One, Cashmere-Dryden Airport does not currently have any navigational or approach aids. However, pilots flying into or out of Cashmere-Dryden Airport can utilize NAVAIDS at nearby airports. A Very High Frequency Omnidirectional Range/Tactical Air Navigation device (VORTAC) is available at Bowers Field in Ellensburg (30 mi south) and Pangborn Memorial Airport in Wenatchee (18 mi east).

The advent of GPS technology can ultimately provide the airport with the capability of establishing new instrument approaches at minimal cost since there is not a requirement for the installation and maintenance of costly ground-based transmission equipment at the airport. The FAA is proceeding with a program to transition from existing ground-based navigational aids to

a satellite-based navigation system utilizing GPS technology.

The FAA commissioned the Wide Area Augmentation System (WAAS) in July 2003. The WAAS refines the GPS guidance for enroute navigation and approaches. General aviation, corporate, air taxi, and regional airline operators are expected to benefit from this augmentation to GPS signals. The FAA is certifying new approaches at the current rate of about 300 per year, nationally.

GPS approaches fit into three categories, each based upon the desired visibility minimum of the approach. The three categories of GPS approaches are: precision, non-precision with vertical guidance, and non-precision. To be eligible for a GPS approach, the airport landing surface must meet specific standards as outlined in *FAA AC 150/5300-13*, Airport Design, Change 10. The FAA requires that airports having a non-precision GPS approach must have a minimum runway length of 3,200 feet and depending on the visibility minimums, may be required to have an approach lighting system. However the Design AC does state that airports having runways as short as 2,400 feet could support an instrument approach if the lowest Height Above Touchdown (HAT) is based on clearing a 200-foot obstacle within the final approach segment.

The airport does not currently meet runway length requirements, and site topography and property restrictions would likely preclude the installation of an Automated Weather Observation System (AWOS). The FAA Flight Procedures Office (FPO) completed a review of the airport to determine if an instrument approach would be feasible in the future. The results of this analysis indicated that an instrument approach into Cashmere-Dryden Airport is not feasible.

AIRFIELD LIGHTING, SIGNAGE AND MARKING

Airports commonly include a variety of lighting and pavement markings to assist pilots utilizing the airport. These lighting systems and marking aids are used to assist pilots in locating the airport during the day, at night, during poor weather conditions, and assisting in the ground movement of aircraft.

Identification Lighting

Cashmere-Dryden Airport is equipped with an airport beacon; however, it is currently inoperable and should be replaced.

Runway and Taxiway Lighting

Airport lighting systems provide critical guidance to pilots during nighttime and low visibility operations. Runway 7-25 is equipped with medium intensity runway lighting (MIRL). The lighting system is outdated and should be replaced with a new MIRL system.

Effective ground movement of aircraft at night is enhanced by the availability of taxiway lighting. There is currently no taxiway lighting system at the Cashmere-Dryden Airport. Taxiways should be planned for medium intensity taxiway edge lighting once the airport reaches

20,000 annual operations.

Visual Approach Lighting

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, visual glide slope indicators are commonly provided at airports. Presently, a two-box precision approach path indicator (PAPI) is available at the Runway 25 end. The existing PAPI is outdated and should be replaced with a new PAPI. In addition, a PAPI should be considered for the end of Runway 7.

Pilot-Controlled Lighting

Cashmere-Dryden Airport is equipped with pilot-controlled lighting (PCL). PCL allows pilots to control the intensity of runway lighting using the radio transmitter in the aircraft. This system should be maintained through the planning period.

Airfield Signage

There are currently no directional or hold signs at the Cashmere-Dryden Airport. This signage identifies runways and taxiways to aid pilots in determining their position on the airport and provide directions to their desired location on the airport. The directional and hold signs should be installed for the connector taxiways.

Pavement Markings

Runway markings are designed according to the type of instrument approach available on the runway. FAA Advisory Circular 150/5340-1J, *Standards for Airport Markings*, provides the guidance necessary to design airport markings. Basic markings are in place on Runway 7-25. Besides routine maintenance of the striping, the markings should be sufficient through the planning period.

Taxiway and apron areas also require marking. Yellow centerline stripes are currently painted on all taxiway surfaces at the airport to provide this guidance to pilots. Hold lines should be painted on all taxiways adjoining the runway.

SECURITY FENCING

It has been reported that there have been non-authorized vehicles and objects in aircraft operating areas. Examples include children riding bikes, people driving golf carts, and skateboards and broken concrete left near the runway. The airport should consider the installation of security fencing and access control system around the airport property.

WEATHER REPORTING

Cashmere-Dryden Airport is equipped with a lighted wind cone, which provides pilots with information about wind conditions and local traffic patterns. These facilities are required when an airport is not served by a 24-hour ATCT.

It is unlikely that the Cashmere-Dryden Airport would be able to install an Automated Weather Observing System without a significant purchase of additional land due to siting restrictions.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for handling of aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacities of the various components of each area were examined in relation to projected demand to identify future landside facility needs.

GENERAL AVIATION TERMINAL BUILDING

The airport currently has a pilot's lounge at the east end of the airport. The pilot's lounge could be expanded for additional flight planning, airport management, and storage space.

HANGARS/AIRCRAFT PARKING APRON

There are currently 33 conventional hangars at the airport and two aircraft tiedowns, supporting the 52 based aircraft. The tiedowns are also used for itinerant aircraft. In addition to on-airport storage facilities, there are also two through-the-fence operations located on the south side of the airfield. These users are not paying a fee to the County for providing direct access to the taxiway. This practice is discouraged by the FAA and State and both agencies expect that the airport treat all users fairly with regard to fees.

The demand for aircraft storage hangars and tiedowns is dependent upon the number and type of aircraft expected to be based at the airport in the future. Because the aircraft forecast shows an increase in based aircraft and local/itinerant operations through the planning period, additional hangar and tiedown space should be developed.

Because the existing two tiedowns and 33 hangars appear to be 100% utilized, it is difficult to determine the amount of future development area that should be allocated for each. However, because the trend in general aviation aircraft is towards more sophisticated (and more expensive) aircraft, many owners prefer enclosed hangar space to tiedowns. For both development alternatives, the majority of future aircraft storage space will be dedicated to hangar development.

Development of new hangars or tiedown apron will require acquisition of adjacent properties. This is shown in the development alternative exhibits.

VEHICLE PARKING

The airport does not currently have a vehicle parking lot. Pilots typically park their vehicles in their hangars while utilizing their airport. However, it has been reported that vehicles are often parked within Taxiway and Taxilane OFA's. A vehicle parking lot should be considered.

Industry standards have shown that typically one-half of based aircraft at the airport will require a parking space. As shown in **Table 3D**, the existing vehicle parking facilities will be sufficient through the planning period.

TABLE 3D, Vehicle Parking Requirements

	Future Requirements			
	Current	Short Term (2010)	Intermediate Term (2015)	Long Term (2025)
Based Aircraft	52	56	60	67
Vehicle Parking Requirements	26	28	30	34

Construction of a vehicle parking lot will require property acquisition. Two alternatives for vehicle parking lots and associated vehicle access roads will be shown in the development alternative exhibits.

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airfield, terminal building, or general aviation areas have also been identified. These other areas provide certain functions related to the overall operation of the airport, and include: aircraft rescue and firefighting, fuel storage, and airport maintenance facilities.

AIRCRAFT RESCUE AND FIREFIGHTING

There are no Aircraft Rescue and Firefighting (ARFF) Facilities at the airport. In the event of an emergency, these services are provided by the City of Cashmere's volunteer fire department and the surrounding community's emergency personnel crews. The current services will be adequate through the planning period.

AIRPORT MAINTENANCE/STORAGE FACILITIES

There are currently three maintenance facilities at the airport, which should be sufficient for the planning period.

AVIATION FUEL STORAGE

There are currently no fueling facilities available on the airport. Based on Chelan County policy, installation of a fueling facility is not expected during this planning period.

LAND USE PLANNING AND ZONING RECOMMENDATIONS

There are several items that Chelan County should complete with regard to land use and zoning around the Airport. These recommendations are provided below. The Capital Improvement Plan (CIP) (included in Chapter 5) will provide a cost estimate to implement these recommendations.

Zoning Code:

- Rezone the Airport property as “Airport” to ensure that only compatible uses are occurring within the Airport property boundary. Alternatively, the property could be zoned as “Industrial”, which would help limit incompatible uses.

Comprehensive Plan:

- Adopt the final Airport Layout Plan, by reference, into the Chelan County Comprehensive Plan.
- Insert a summary of planned improvements identified in the Airport Layout Plan to the transportation inventory section.
- Identify Cashmere-Dryden Airport as an Essential Public Facility.
- Adopt a title notice or similar requirement to inform purchasers of property within one mile of the Airport that their property is located adjacent to or in close proximity to Cashmere-Dryden Airport and that their property may be impacted by a variety of aviation activities. Note that such activities may include but are not limited to noise, vibration, chemical odors, hours of operations, low overhead flights, and other associated activities.

SUMMARY

The intent of this chapter has been to outline the facilities required to meet potential aviation demands projected for Cashmere-Dryden Airport through the long term planning horizon. The next step is to develop an alternative for development to best meet these projected needs. The remainder of the airport layout plan will be devoted to outlining this direction, its schedule, and costs.

Chapter Three-Subpart One

DEVELOPMENT ALTERNATIVES

Airport Layout Plan Report
Cashmere-Dryden Airport

Based on the facility requirements, two development alternatives were created, each with different airside and landside development options. The alternatives are shown in Exhibit 3A (Alternative 1) and Exhibit 3B (Alternative 2), and are described below.

AIRSIDE DEVELOPMENT

Alternative 1 proposes the following airside development:

- The runway would be expanded to a standard 60' width.
- The taxiway would be expanded to a standard 25' width.
- The runway would be shifted 15' to the north and the parallel taxiway would be shifted 15' to the south. The current distance between the runway and taxiway centerline of 120' would be expanded to 150' per design standards for Airport Design Group I. Shifting the taxiway south will require land acquisition or an easement for the Taxiway OFA.
- The runway shift will also impact the current Part 77 surface. There are currently Part 77 obstructions all around the airport. The runway shift will increase penetration of obstructions on the north side of the runway by approximately 2', and decrease penetration of obstructions on the south side of the runway by approximately 2'. Any obstructions would be identified with obstruction lighting.

- The existing Runway 25 displaced threshold would be changed to a 220' relocated threshold. This would create a standard Runway Safety Area behind the threshold, and provide the required 15' clearance over Sullivan Street at a 20:1 approach slope.
- The existing pavement east of the relocated Runway 25 threshold would be removed.
- Because the relocated Runway 25 threshold would shorten the runway, the Runway 7 end would be extended to the west to provide a 1,800' runway available for takeoff and landing.
- The parallel taxiway would be extended to the new Runway 7 end.
- Both existing connector taxiways would be removed.
- A new connector taxiway would be constructed at the new runway thresholds.
- A 2-box P.A.P.I. would be installed for Runway 7.
- The Runway 25 PAPI would be relocated to the correct location per the new Runway 25 threshold.
- R.E.I.L.s would be installed at each runway end.
- The existing non-functioning airport beacon would be replaced.
- Lighted hold signs would be installed at each connector taxiway.
- Security fencing would be installed around the airport property line. Automated gates would be installed at each entrance to the airport.
- The properties located in the Runway 7 RPZ would be acquired by the airport.
- An aviation easement would be obtained for the Runway 25 RPZ to regulate future development. Because the existing RPZ includes a major roadway and a school, it is unlikely that the airport would be able to acquire this property.

Alternative 2 proposes the following airside development:

- The existing Runway 25 displaced threshold would be shifted 60' west to provide the required 15' clearance over Sullivan Street at a 20:1 approach slope.
- The runway would be extended 220' to the south.
- The runway extension and new displaced threshold would result in 2,000' of runway available for takeoff on Runway 25. Takeoffs from Runway 7 and landings from both ends would have 1,800 feet of available runway.
- The parallel taxiway would be extended to the new Runway 7 end.
- The existing west connector taxiway would be removed.
- A new connector taxiway would be constructed at the new Runway 7 end.
- Two midfield connector taxiways would be constructed, 500' from each threshold.
- The Runway 25 PAPI would be relocated to the correct location per the new Runway 25 threshold.
- Security Fencing would be installed around the airport property line. Automated gates would be installed at each entrance to the airport.
- The properties located in the Runway 7 RPZ would be acquired by the airport.
- An aviation easement would be obtained for the Runway 25 RPZ to regulate future development. Because the existing RPZ includes a major roadway and a school, it is unlikely that the airport would be able to acquire this property.

LANDSIDE DEVELOPMENT

Alternative 1 proposes the following landside development:

- The existing pilot's lounge would be expanded to provide additional space for flight planning, airport management, and storage.
- An access drive to the airport and additional automobile parking would be constructed off of Sullivan Street, near the pumphouse. Vehicles would no longer access the airport via the entrance off the parallel taxiway.
- Land acquisition of approximately 5 acres on the north side of the airport, at the west end. This area would be developed with hangars.

Following the presentation of these two alternatives to the Airport Advisory Committee and the FAA, the FAA had asked the consulting team to evaluate a runway rotation in order to provide additional runway length. Four separate alternatives had been created to show various degrees of rotation ranging from 2° to 11°. **Exhibits 3C through 3G** depict these alternatives.

Out of the four runway rotation alternatives, Alternatives 4 and 5 (Exhibits 3E and 3F, respectively) were analyzed in more detail. Both of these alternatives address the request to rotate the runway at least 3° in order to reduce the crosswind component on landing and takeoff. An alternative proposing a 3° rotation was not prepared because the future runway protection zone (RPZ) at the Runway 25 end would be over the school. The 2° alternative was not analyzed further as the RPZ remained over the school and provided minimal benefit to the wind coverage. The 11° alternative was not analyzed further as this option required substantially more land than the other alternatives and would place a significant Cashmere street within the RPZ.

Alternative 4, Exhibit 3E, proposes a 4° runway rotation. With this alternative approximately 34 acres of land will need to be purchased effecting approximately 52 homes. An avigation easement of 4.92 acres will need to be acquired for the future RPZ.

Alternative 5, Exhibit 3F, proposes a 7° runway rotation. With this alternative approximately 36.5 acres of land will need to be purchased affecting approximately 64 homes and one apartment complex. An avigation easement of 5.21 acres will need to be acquired for the future RPZ.

At the runway 25 end, there are school buildings and several athletic facilities. Both alternative 4 and 5 would require an avigation easement for the future RPZ area. Neither alternative will require the easement to include the school buildings. More of the athletic facilities will be within the future RPZ avigation easement with a 7° runway rotation.

Upon developing and evaluating these four alternatives which showed various degrees of rotation and runway length, the development of a fifth alternative (**Exhibit 3H**) to show a 3,000' runway length was requested by the FAA. All five alternatives were then presented at a public meeting where there was strong vocal opposition to any alternative that included airport expansion.

Chapter Three-Subpart Two

PREFERRED ALTERNATIVE

Airport Layout Plan Report
Cashmere-Dryden Airport

After reviewing all of the alternatives, the County Commissioners ultimately decided that the best option for the Cashmere-Dryden Airport was to enter into a “maintenance-only” mode whereby the Airport will only complete projects that will allow them to maintain the existing airport facilities. In other words, no facility expansion would be planned.

The maintenance only mode allows the airport to continue operating as currently constructed, provide limited FAA funding to maintain the airport in its current configuration, and provide for activities that increase the level of safety at the airport (such as meet the FAA's runway safety area standards). For NPIAS airports, this status as a "maintenance only" mode is something new within the FAA and the precise requirements need to be worked out on a case by case basis. In order to better understand the projects and design guidelines that will be acceptable at the Cashmere-Dryden airport, two alternatives were developed illustrating how the airport could be configured and still meet the "maintenance only mode" guidelines. These are listed as Scenario A and Scenario B (**Exhibits 3I and 3J**, respectively) and are included in the pages following this section.

Scenario A was created to provide standard Runway Safety Area. This alternative depicts the

runway being shifted 155 feet to the west and requires a 40 foot displaced threshold for Runway 25. A limited portion of land was required to be acquired on the west end of the airport to meet the runway shifting needs. This scenario allows the airport to maintain their full existing runway length and obtain a full FAA standard Runway Safety Area. The land acquisition was agreed to occur "if and when" the land becomes available. Another section of land on the west end would need to be acquired to extend the parallel taxiway. A third area of land was listed for acquisition on the east of the runway along the extended runway centerline.

Scenario B was created to provide clear approaches. This scenario shows a 305' displaced threshold on the Runway 25 end in order to clear trees within the approach surface and requires removal of trees beyond the Runway 7 end. The trees beyond the Runway 7 end are too tall to provide adequate runway length by displacing the threshold and therefore need to be topped or removed. This scenario does not provide full FAA standard Runway Safety Areas.

Through conversations with the airport manager, the County Commissioner who represents this area of the County, WSDOT Aviation, the FAA, and the consulting team, it was determined that Scenario A would be the preferred alternative and the basis for the Airport Layout Plan drawing set. This option was determined to be the best option for the airport, City of Cashmere, and Chelan County. The scenario allowed the airport to maintain the existing runway length with only a minor area of land acquisition necessary. In addition, the FAA provided the County flexibility as to the timing of the land acquisition, so that the County would only purchase the land "if and when" it became available. This allows the airport to continue to be a "good neighbor" in the community and not use the threat of eminent domain to obtain additional property. The airport would also be able to obtain a FAA standard runway safety area and continue to maintain the airfield pavements in proper conditions.

The decision to operate the Airport in a maintenance only mode means that several of the existing non-standard conditions will continue to be non-standard. Table 3E compares the actual dimensions of a few of the more critical design standards to the FAA recommended dimensions. Some of these items are correctable by operating in a maintenance only mode, while others are dependant on additional property acquisition.

Table 3E: Design Standards Comparison

	ARC A-I (small) Standards	Runway 7-25 Actual Dimensions
Runway Length	3,310 ¹	1,800'
Runway Width	60'	50'
Taxiway Width	25'	20'
Runway to Taxiway Centerline Separation	150'	120'
Approach Slope (based on Obstacle Clearance Surface)		
Runway 7	20:1	10:1
Runway 25	20:1	6:1
Runway Safety Area (RSA)		
Width	120'	50'
Length Beyond Runway 7 Approach End	240'	70'
Length Beyond Runway 25 Approach End	240'	110'
Runway Object Free Area (ROFA)		
Width	250'	250'
Length Beyond Runway 7 Approach End	240'	70'
Length Beyond Runway 25 Approach End	240'	110'
Runway Obstacle Free Zone (OFZ)		
Width	250'	250'
Length Beyond Runway Ends	200'	
Taxiway Object Free Area (TOFA) Width	89'	89' ²

¹ Runway Length based on FAA's Airport Design Computer Program, using specific information for Cashmere-Dryden Airport conditions.

² If runway to taxiway centerline separation met the FAA standard, the TOFA width would not be met – a portion of the TOFA would be located off of airport property.

Exhibit 3K depicts the preferred alternative and shows the projects which can and should be accomplished in order to enhance the airport's safety. These projects include:

- Shifting runway 155' to west – This project involves relocating the Runway 25 threshold to achieve standard runway safety area, and extending the Runway 7 end to maintain the existing 1,800-foot runway.
- Displace the Runway 25 threshold 40'
- Fill and grading work in Runway Safety Area along sides of runway.
- Purchase property on east, west, and south sides if and when the property becomes available.
- Install a PAPI on the Runway 7 end.

The preferred alternative drawing will serve as the basis for the Airport Layout Plan drawing set.

Chapter Four

AIRPORT PLANS

Airport Layout Plan Report

Cashmere-Dryden Airport

The airport plans are one of the last steps in the development of an airport layout plan report. They are a pictorial representation and summarization of the efforts made in the airport layout planning process. The previous chapters on Inventory, Forecasting, and Facility Requirements/Alternatives and the reviews provided by the Airport Advisory Committee supply the basis for the future airport layouts that are shown in the airport layout drawings. As was previously discussed, the development at an airport should rely more on actual demand rather than a time-based forecast. The development shown in the airport plans reflects planned development, but the course and timing of this development must be carried forward as airport activity demands rather than in the exact form it has been presented.

AIRPORT LAYOUT PLAN DRAWING SET

Cover Sheet

The cover sheet shows both the location and the vicinity map for Cashmere-Dryden Airport. A sheet index to the airport layout plan drawing set is also provided on this sheet.

Airport Layout Plan Drawing

The airport layout plan depicts the current airport layout and the proposed improvements to the airport for the 20-year planning period. Descriptions of the improvements and costs over the next 20-years are included in *Chapter 5, Capital Improvements Projects (CIP)*. As previously mentioned, the needs defined in Chapter 3 and the reviews provided by the Advisory Committee were the basis for determining the proposed improvements at the Airport. The future airport

development is shown on the airport layout plan as required by the FAA. The plan can be modified to accommodate development as dictated by demand.

Runway visibility minimums, runway protection zones, object free areas, safety areas and other standard airport dimensions are shown in the plan and in the runway data tables. Other tables include an airport data table, buildings/facilities table, and a non-standard conditions and disposition table.

Airport Airspace Plan Drawings

These drawings show the Part 77 Imaginary Surfaces for the existing and future layout of Cashmere-Dryden Airport with a USGS map as the background. Airport imaginary surfaces consist of five different types of surfaces. The surface shapes and dimensions as they apply to the Airport are as follows:

Primary Surface: A rectangular surface with a width (centered on the runway centerline) that varies for each runway and a length that extends 200 feet beyond each end of the runway. The elevation of the primary surface corresponds to the elevation of the nearest point of the runway centerline. The width of the primary surface of Runway 2-20 is 250 feet.

Approach Surface: A surface centered on the extended runway centerline, starting at each end of the primary surface (200 feet beyond each end of the runway), at a width equal to that of the primary surface and an elevation equal to that of the end of the runway. The approach surfaces at Odessa Municipal Airport reflect circling GPS approaches to both runway ends. The surface extends at a horizontal distance of 5,000 feet at a slope of 20:1 to a width of 1,250 feet.

Transitional Surface: A sloping 7:1 surface that extends outward and upward at right angles to the runway centerline from the sides of the primary surface and the approach surfaces.

Horizontal Surface: An elliptical surface at an elevation 150 feet above the established airport elevation created by swinging arcs of a 5,000-foot radius from the center of each end of the primary surface.

Conical Surface: A surface extending outward and upward from the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.

It is ideal to keep these surfaces clear of obstructions whenever possible. The Part 77 surfaces are the basis for protection of the airspace around the airport. Obstructions to these surfaces are identified in the Obstruction Data Tables (on sheets 3 and 4), along with the disposition to address the described obstructions. Obstructions to the Part 77 surfaces were determined based on a review of the USGS map and a preliminary field observation. A field survey was not performed. Past obstruction removal and the FAA 5010 form were also used to identify the existing obstructions. Obstruction removal has been incorporated into the capital improvement program.

Runway Protection Zone Plan & Profile Drawing

This drawing provides a plan and profile view of any obstructions within the primary and inner approach surfaces of the runway. Obstruction Data Tables with proposed dispositions are included for both existing and future scenarios.

Land Use Plan Drawing

A land use plan has been developed for the airport and the surrounding area. This plan includes the zoning on and around the airport per Chelan County Code.

In general, land use concerns associated with the areas around airports fall into one of the following categories:

- Lighting
- Glare, Smoke and Dust
- Bird Attractions/Landfills
- Airspace Obstructions and Height Restrictions
- Electrical Interference
- Concentrations of People
- Noise Impacts

Any of these activities can create safety concerns for airport users and people on the ground or can be impacted adversely by airport operations. It is important that these issues be addressed in the land use zoning and development around an airport.

As discussed in Chapter One, the Airport is currently zoned as “Rural Residential/Resource 2.5”. Most of the land uses allowed in this zoning district are generally compatible with airport operations, however, it is recommended that the County change the zoning designation to “Airport” to ensure that the land is used for aeronautical purposes only.

Exhibit “A” Drawing

An Exhibit “A” drawing has been prepared depicting existing property ownership and future land acquisition.

Chapter Five

CAPITAL IMPROVEMENT PROJECTS

*Airport Layout Plan Report
Cashmere-Dryden Airport*

Through the evaluation of the facility requirements and the development of the airport layout plan, the improvements needed at Cashmere-Dryden Airport over the next 20-year period have been determined. The capital improvement plan provides the basis for planning the funding of these improvements. The planned phases of development are in the 5-, 10- and 20-year time frames.

CAPITAL IMPROVEMENT PROJECTS

The Capital Improvement Plan (CIP) develops both the timeline for the airport improvements and estimated costs for those improvements. The plan is divided into three phases: Phase I, 2006-2010, Phase II, 2011-2015, and Phase III, 2016-2025. The projects for each phase are listed below.

Phase I

1. Crack Seal Runway
2. Fog Seal Runway
3. Reconstruct Parallel Taxiway
4. Acquire Land (East side) - .04 acres
5. Remove Obstructions (East side)
6. Conduct Environmental Assessment/Preliminary Engineering (for Runway Improvements)
7. Implement Zoning/Land Use Recommendations

Phase II

1. Acquire Land (West side) – 2.4 acres
2. Acquire Land (South side) - .07 acres
3. Design for Runway Construction/RSA Improvements (Shift runway 155' to the west)
4. Runway Construction/RSA Improvements (Shift runway 155' to the west)
5. Overlay Runway 7-25
6. Install PAPI (both runway ends)
7. Remove Obstructions (West side)

Phase III

1. Install Medium Intensity Runway Lighting System
2. Reconstruct Hangar Taxilanes (25' width)
3. Reconstruct Tiedown Apron
4. ALP Update
5. Pavement Maintenance (fog and crack sealing)

PROJECT COSTS

A list of improvements and costs over the next 20-years are included in **Table 5A** at the end of this chapter. All costs are estimated in 2007 dollars. Total project costs include construction, temporary flagging and signing, construction staking, testing, engineering, administration, and contingency, as applicable. **Table 5B** presents the CIP in the FAA's formatted spreadsheet.

FUNDING SOURCES

Funding for a CIP can come from several different sources, including the FAA, the State of Washington, Chelan County, Port of Chelan County, and private sources. Each project listed in the CIP has been assigned a total cost, which is then assigned a percentage based on its funding source(s) eligibility.

FAA

Federal grants are available through the current Airport Improvement Program (AIP) legislation called Vision 100 – Century of Aviation Reauthorization Act. This program was funded at \$3.4 billion in fiscal year 2004 and is allowed to increase \$100 million each year through 2007. Under most circumstances, projects that qualify for AIP funding are eligible for up to 95 percent of total project costs through 2007. It is anticipated that a similar reauthorization will continue in fiscal year 2008 and beyond. Typically, the remaining 5 percent of the project cost is funded by the airport sponsor. It is important to note that even though a project may be eligible for federal funding, this does not ensure that funds will be available or granted to the project by the FAA.

State

The Washington State Department of Transportation also provides grants. For projects eligible for AIP funding, the State typically matches the local share on a 50/50 basis, therefore, the funding percentages could be FAA -95%, State – 2.5%, Local – 2.5%. For projects funded by the State only, the minimum sponsor share is 5%.