

# **LYNDEN MUNICIPAL AIRPORT**

## **AIRPORT LAYOUT PLAN AND NARRATIVE REPORT**

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**FINAL**

**SEPTEMBER 2008**

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# Chapter 1: Introduction

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This airport layout plan and narrative report (ALP) for Lynden Municipal Airport is sponsored by the city of Lynden in Whatcom County, Washington. It examines existing conditions at the airport, forecasts future aviation activity over a 20-year time span, recommends improvements to increase safety and ensure that the airport will serve projected demand, and identifies sources of funds to pay for those improvements.

This report focuses on:

- The size and layout as well as the existing and planned uses of Lynden Municipal Airport.
- The extent to which the airport conforms to Federal Aviation Administration (FAA) design recommendations and, where such recommendations are not met, whether they can be met considering site constraints.
- Projected facility development and whether that development can be accomplished in conformance with FAA design recommendations.
- Enhancements at Lynden Municipal Airport that will increase the airport’s value to the community and the surrounding area.

In preparing this ALP, Airside has reviewed the following:

- Washington State Department of Transportation/Aviation Division (WSDOT/AD) airport database.
- Washington State Long-Term Air Transportation Study (LATS).
- FAA Form 5010.

- Applied Pavement Technology Inc. pavement report dated February 2006.
- Lynden Municipal Airport (Jansen Field) Master Plan dated July 2006.
- Numerous documents provided by the city of Lynden.

Primary funding for this report has been provided by WSDOT/AD. It has been prepared by Airside with assistance from a volunteer steering committee seated by the city of Lynden. Review of the interim report, as well as ongoing technical assistance, has been provided by WSDOT/AD.

This ALP has been prepared according to WSDOT/AD guidelines contained in Appendix E of the Aviation Division’s Grant Procedures Manual.

**Table 1: ALP Steering Committee**

Member	Affiliation
Don Korthuis	Airport advisory committee member
Roger Humphreys	Airport advisory committee member
William Stoelt	Airport advisory committee member
Duane Huskey	Director of public works
Herb Stober	Airport advisory committee chair
Jason Jansen	Airport advisory committee member

In writing this report we have followed the guidelines of the *Chicago Manual of Style* and the *AP Stylebook*, the two most widely used stylebooks in American publishing. These stylebooks call for different practices than are sometimes used in these kinds of plans, particularly with respect to capitalization of cities, as well as government agencies and offices.

# Chapter 2: Inventory and current activity

## 2.1 GENERAL

### Whatcom County

Whatcom County is the northernmost county in Washington State. The county's 2,120 square miles of land are bordered on the north by British Columbia, Canada, on the east by Okanogan County, on the south by Skagit County and on the west by the Strait of Georgia in Puget Sound. Incorporated cities in the county are Bellingham, Lynden, Ferndale, Everson, Sumas, Nooksack and Blaine. Bellingham is the seat of Whatcom County and the county's largest city, with a population of 75,200. The highest point in the county is Mt. Baker, part of the Cascade mountain range, with an elevation of 10,778 feet. Much of the county is lowland delta plain, extending from the Fraser Valley in southern British Columbia. Over 103,000 acres are currently in agricultural production.

### City of Lynden

Lynden is located between Mt. Baker and Puget Sound, 15 miles north of Bellingham and five miles from the Canadian border at a mean sea level (MSL) elevation of 95 feet. It is north of the Nooksack River, which runs generally east west. The city encompasses 4.55 square miles of land.

### Climate

Whatcom County has a marine, West Coast climate. The mean average high and average low temperatures are 59

degrees and 44 degrees Fahrenheit, respectively. Average annual precipitation is 35 inches. Heavy snowfall is common at higher elevations.

## 2.2 SOCIOECONOMIC DATA

### Population

According to the Washington State Office of Financial Management, Whatcom County is Washington's ninth most populous county, with 188,300 persons estimated to be in residence in 2007. The county has grown consistently from its 1990 population level of 127,780. Over those 17 years, county population increased by almost 48 percent.

During the period from December 2000 to April 2007, Whatcom County's growth rate of 13 percent outpaced Washington State's growth rate of 10 percent and exceeded or kept pace with other fast-growing counties, such as King County

Map 1: Lynden regional map



(7 percent), Snohomish County (13 percent), and Pierce County (13 percent), only to be surpassed in growth rate by Clark County (20 percent). Over 78,000 people reside in unincorporated areas of the county. The county has a population density of 85.3 people per square mile, which ranks 11th in Washington.

Lynden’s population has grown from 9,020 in 2000 to a state-estimated 11,150 in April 2007. This growth of 23.6 percent over the seven-year period is higher than any other incorporated city in the county except for Nooksack, which experienced a 24.6 percent rate of growth over the same period. Lynden’s growth rate between 2000 and 2007 was also higher than the 10.9 percent growth rate of unincorporated areas of the county.

**Table 2: Whatcom County population**

Area	Population
Bellingham	75,220
Blaine	4,115
Everson	2,165
Ferndale	10,540
Lynden	11,150
Nooksack	1,075
Sumas	1,191
Unincorporated	82,844
<b>Total</b>	<b>188,300</b>

Source: Municipal Research and Services Center of Washington.

## Economy

Between 2003 and 2005 per capita personal income in Whatcom County grew at a rate of 10.2 percent, from \$26,823 to \$29,561. Only three counties in Washington posted larger percentage increases in personal income during this period. Nevertheless, the county continues to lag behind both Washington State and the United States in average per capita personal income.

The economy in Whatcom County has been based on agriculture, fishing and timber for many

years. All three industry segments have declined in activity but remain important to the county’s economy. Trade and employment services have shown rapid growth in recent years.

Proceeds from Whatcom County agriculture totaled \$242 million in 2006. The county ranks first in the state for dairy production, with a value estimated at \$120 million, and has the largest per capita crop of red raspberries in the world. Petroleum and coal products manufacturing pay the highest wages in the county, followed by securities and commodity brokerage. Mining is the fastest growing industry, with a growth rate of 52.9 percent, compared to 4.7 percent nationally.

Table 3 depicts primary industry segments in Whatcom County as well as the average numbers of establishments and employees engaged in those segments in 2006 in a system used by the Washington State Employment Security Department.

## 2.3 LAND USE AND PLANNING

### Purpose

This section describes existing comprehensive plans, land-use characteristics and zoning designations relevant to Lynden’s Jansen Field. Table 4 provides an overview of city and county documents that contain policies that are relevant to airport protection and airport/community compatibility. Findings related to these elements are identified in this section.

Recommendations related to land use and zoning are contained in Chapter 4. Drawings C1.6 and C1.7 of the airport layout plan drawing set provide graphic depictions of existing conditions and recommendations.

### Comprehensive planning

Washington Growth Management Act Chapter 36.70A of the Revised Code of Washington (RCW), titled “Growth Management

– Planning by Selected Counties and Cities,” and referred to as the Growth Management Act (GMA), imposes planning requirements on counties and cities based on their population or rates of population growth. Twenty-nine counties and the cities in those counties currently plan under the GMA. The primary goals of GMA are best described by what the GMA calls its basic steps. These are:

1. Identification and protection of critical areas and resource lands.
2. Designation of countywide planning policies and urban growth areas.
3. Preparation and adoption of comprehensive plans.
4. Adoption of development regulations to carry out comprehensive plans.
5. Evaluation and updating of comprehensive plans and development regulations.

**Whatcom County comprehensive plan**

While Jansen Field is not under Whatcom County’s jurisdiction, major transportation improvements and other development projects within the county often require intergovernmental coordination due to their impacts on local transportation systems. The following airport-related policies are found in Whatcom County’s comprehensive plan adopted in 2005.

- Policy 6B-7: Use the financial resources available for transportation improvements to support a program of capital facilities needed for a multi-modal transportation

**Table 3: Industry sectors**

North American Industry Classification System (NAICS) Sector	Establishments	Employees
Agriculture, forestry, fishing and hunting	367	2,742
Mining	6	150
Utilities	16	205
Construction	939	7,216
Manufacturing	327	8,630
Wholesale/retail trade	984	13,128
Transportation and Warehousing	163	1,751
Information	57	1,620
Finance, insurance, real estate	393	3,011
Professional and technical services	476	2,857
Management of companies and enterprises	22	505
Administrative and waste services	268	3,024
Educational services	64	583
Health care and social assistance	466	8,644
Arts, entertainment and recreation	80	1,457
Accommodation and food services	425	7,944
Other services, except public administration	1,248	2,969
Government	113	13,742
<b>Total</b>	<b>6,414</b>	<b>80,188</b>

*Source: Covered Employment & Wage Data, First Quarter 2004 Washington State Employment Security Department. Note: The North American Industry Classification System (NAICS) was developed jointly by the U.S., Canada, and Mexico. It is a comprehensive classification system which groups establishments into industries based on their primary activities, both goods producing and service producing.*

system. The priority ranking system should balance the overall system and individual improvement needs.

- Policy 6K-4: Support a regional public transit system with various modes of transportation, including auto, bicycle, pedestrian travel, intercity bus, rail, ferries and airline facilities.
- Policy 6Q-2: Support convenient access to ports, airports, other inter-modal freight facilities and international border crossings to enhance freight mobility.



**City of Lynden comprehensive plan**

In 2004, the city of Lynden adopted an update to its 1995 comprehensive plan. The plan contains goals with corresponding community-value statements and policies that are consistent with GMA goals and that are intended to achieve the community’s vision of its future. Jansen Field is identified and described in the plan. No specific airport-related policies exist, but the plan contains the following transportation-related policies.

**City of Lynden transportation plan**

Lynden’s transportation plan is an element of the city’s comprehensive plan. Its purpose is to provide a guide for transportation system improvements in order to meet existing and future travel needs and a means for integrating these improvements with the state, the county and the regional transportation system. Jansen Field is identified in the plan’s inventory and existing transportation chapter. However,

**Table 4: Airport protection and compatibility documents**

**Goal 3: Transportation**

- Community Value Statement. The city of Lynden will encourage efficient multi-modal transportation systems in cooperation with regional transportation goals, as well as county and city comprehensive plans.

Policies considered relevant to airport protection	Whatcom County Comprehensive Plan	City of Lynden Comprehensive Plan	City of Lynden Transportation Plan	City of Lynden zoning ordinance
Identification of airport as an essential public facility	No	No	No	No
Identification of airport as part of a multi-modal transportation system	Yes	No	No	No
Language that discourages incompatible development	No	Yes	No	Yes
Language that prohibits penetration of FAR Part 77 surfaces	No	No	No	No

- Policy 3C. The city of Lynden has adopted a transportation plan and will actively pursue the implementation of that plan to provide residents with a safe and efficient transportation system.

**Goal 12: Public Facilities and Services**

- Community Values Statement. The city of Lynden will provide the community with sufficient police and fire protection to ensure the community’s safety. In addition, the community will be provided with appropriately scaled and quality city facilities, such as the library, senior center, parks and city hall.
- Policy 12C. Siting of public facilities will be done as a conditional use within community regulations.

there are no specific policies related to airport operations or land-use compatibility surrounding the airport. The transportation plan contains one overarching goal with policies categorized into seven transportation-related subjects. Policies that are most pertinent to this plan are found below.

1. Review land-use policies and implementing regulations, standards and incentives to ensure they support and encourage alternative transportation modes, such as bicycling, walking, transit and transportation demand-management programs.
2. Ensure that public and private projects systematically implement the policy objectives of the transportation plan through the development review process.

3. Prioritize city transportation improvement projects, programs and participation with other agencies to reflect the city's vision and comprehensive plan goals. At a minimum, the city will consider the following objectives:

- Transportation safety of all modes.
- Maintenance and preservation of the existing transportation system.
- Upgrading or expansion of the transportation system to support growth within the city.
- Expand facilities and services to improve connectivity of the transportation system.

### **Existing land-use characteristics**

#### ***Existing land uses***

Jansen Field is located in the North Lynden subarea and shares its western boundary with Lynden's corporate limits. The airport property is almost entirely surrounded by single-family residential development. The area south of the runway's east end is identified in Lynden's comprehensive plan as the "LTI industrial area." This area contains Lynden Transport Inc.'s trucking division facilities. Land west of the airport is primarily used for agricultural purposes. In order to prevent development that would interfere with airport operations, the city purchased a 4.95 acre tract of undeveloped land directly west of the runway. This property is not within the city limits but is within the city's urban growth area (UGA).

#### ***Zoning characteristics***

Properties north, east and south of the airport are within Lynden's corporate limits. Their zoning standards are determined by Title 19 (the zoning ordinance) of the municipal code. Land west of the airport is within Lynden's urban growth area and is zoned as agricultural under Whatcom County's zoning ordinance. Within corporate limits, all properties surrounding the airport,

excluding the LTI industrial area, are zoned as single-family residential. The LTI industrial area is zoned as industrial. An airport overlay zone encompasses the runway and extends 150 feet north and 150 feet south of the edge of the runway pavement. Below are descriptions of each district. Table Y in the zoning ordinance provides a summary of each district's permitted uses.

- Single-family (RS-100). This district allows single-family homes to be built at a maximum density of four dwelling units per acre and, under certain conditions, also allows for accessory and related uses. Structures can be no more than 32 feet in height. Nonresidential uses permitted under certain conditions include uses incidental to residential uses, such as club facilities, churches and schools.
- Industrial (I-2). The purpose of the industrial district is to provide a suitable area in which manufacturing is conducted. By establishing additional limitations and enforcing performance standards, properties zoned I-2 permit less intensive industrial uses than those allowed in the I-1 district. Within the ordinance, performance standards are established for: air contaminants, odors, gases, air solids, sewage wastes, noise, glare and heat. The height limitation for structures in the I-2 district is 40 feet.
- AO – airport overlay. This overlay district exists to prevent airport hazards and incompatible land uses from occurring near the airport by regulating land use and structure heights. While underlying zoning districts establish permitted uses for properties within the overlay district, these properties must also adhere to the overlay district's setback, density, marking and lighting, and access requirements. In the airport overlay district there are no stated height restrictions. However, the district allows a maximum of one aircraft per 200

feet of frontage along the airport property. Aircraft tie-down facilities and hangars may not be located closer than 75 feet from the runway centerline and all other structures may not be located closer than 95 feet from the runway centerline. Should any existing or future permitted structure or tree be considered a potential hazard due to height, the owner is responsible for marking the hazard in a way that does not interfere with airport operations.

### **Future land-use designations**

The city of Lynden projects its population growth over the next 20 years to be consistent with its current growth trend. To accommodate this growth and prepare for the extension of urban services, the city's comprehensive plan identifies urban growth areas and defines future land-use designations for those areas. Lynden has also adopted policies that determine when development and annexation will be permitted on unincorporated land.

Around the airport, existing land uses within city limits are designated to remain single-family residential and industrial in the future. Excluding the city-owned parcel west of Benson Road, the urban growth area to the west is designated for future residential use. However, the comprehensive plan states that this area will not be annexed for development until other areas of the city's urban growth area that are zoned for development are annexed and developed. When Benson Road is improved for future residential and commercial development northwest of the airport, the plan recommends that considerations be given to airport and automobile interaction and, if possible, that the road be shifted to the west to help avoid conflicts between the two modes of transportation.

### **Land-use and planning-related findings**

Existing land-use conditions around the airport do not appear to pose conflicts to airport operations. The city has made an effort to

promote airport land-use compatibility by, as noted, purchasing undeveloped land directly west of the airport. Lynden's zoning ordinance and comprehensive plan, however, do not contain language pertaining to all of the policies listed in Table 4 of this chapter. These policies are listed because they are relevant to airport protection and are intended to ensure airport-community compatibility into the future. Using these policies as a guide, the following are findings related to existing land-use plans and ordinances:

- The city of Lynden's zoning ordinance contains an airport overlay zone that establishes permitted uses on airport property and development restrictions to promote airport-community compatibility on surrounding industrial and residential properties.
- Jansen Field is not identified as an essential public facility or as part of a multi-modal transportation system in Lynden's comprehensive plan, transportation plan or zoning ordinance, or the transportation element of Whatcom County's comprehensive plan.
- Neither Lynden's comprehensive plan or transportation plan contain specific policies discouraging incompatible land uses around the airport.

## **2.4 AIRPORT SITE – GENERAL**

Lynden Municipal Airport is located in north central Lynden. It is bounded on the east by Depot Road, on the west by Benson Road, on the north by residences and the Homestead Farms Golf and Country Club and on the south by residences, churches, commercial/industrial areas and central Lynden.

The airport has one lighted, paved runway and a paved taxiway. The runway is oriented generally east-west and has very little slope. Only 1 foot of

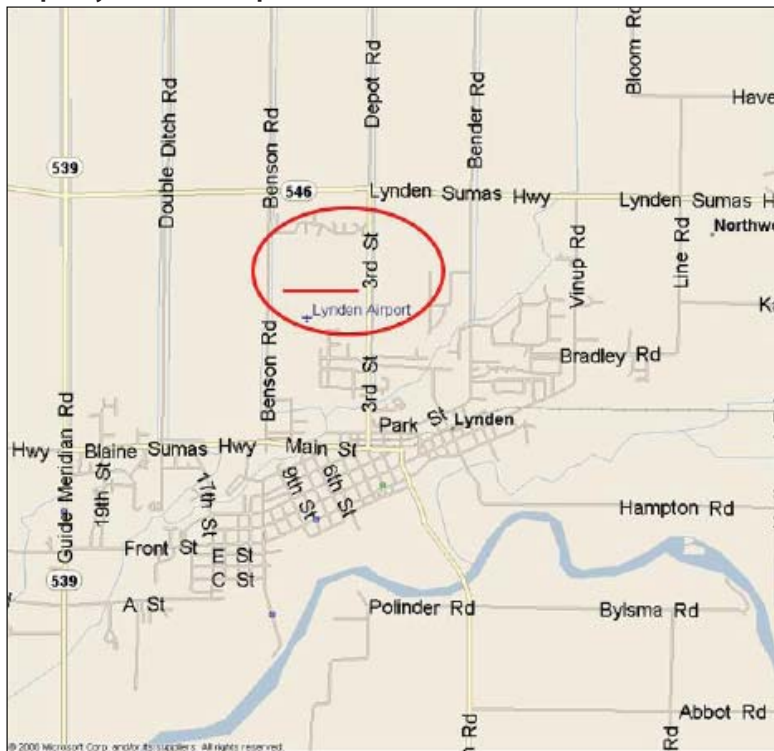
elevation difference exists between runway ends.

Private residences extend along the entire north side of the runway. Private residences, aircraft hangars, aircraft tie-down areas and a church are on the south side of the runway. The airport's primary vehicle entry is at the southeast corner of the property.

Both runway ends have visual (non instrument) approaches with vertical guidance provided by precision approach path indicators (PAPIs).

- Removal of overhead power lines along Depot Road.
- Construction of a parallel taxiway.
- Construction of a stormwater treatment system, which includes an oil/water separator for the fuel system.
- Installation of an automatic pay feature for the fuel system.
- Extensive landscaping.

**Map 2: Lynden local map**



## 2.5 RECENT AIRPORT REVITALIZATION

Over the past several years many projects have been accomplished at Lynden Municipal Airport. These have not only increased safety and functionality but have substantially contributed to the appearance of the airport.

Projects have included:

- Installation of flush-mounted fire hydrants.
- Installation of an electrically operated entry gate.
- Painting of the runway and taxiway.
- Removal of a house that was considered an obstruction to aircraft operations at the east end of the runway and purchase of property on which it was located.

The clean, orderly and well-kept appearance of Lynden Municipal Airport is reflective not only of the individual efforts of the voluntary airport board and the city but of their productive working relationship.

## 2.6 PROPERTY

The following narrative explains property ownership and land-use conditions at Lynden Municipal Airport.

### Owned/leased property

Property that is used for airport purposes is a combination of that owned by and leased by the city of Lynden. The city owns the property that contains the runway and roughly the west

half of Taxiway A. Property that contains the east half of taxiway A, the vehicle entry drive, the fuel system, the two multi-position hangars and the operations building – all in the southeast quadrant of the airport – is privately owned and is leased to the city.

Two narrow parcels of property north of the runway, between the runway and private residences, are also privately owned but are not leased to the city.

The lease for all privately owned parcels that are leased to the city is for a 20-year period. It was initiated in 1995 and is currently being renegotiated.

### **Privately owned property with aircraft access**

#### ***Southeast quadrant***

East of the operations building is a parcel of privately owned property that contains a hangar. This property is external of the leased property that surrounds it on all but the south side. West and south of the operations building are two privately owned hangars on individual parcels of property. Owners of the three parcels of property in proximity to the operations building pay to access the airport according to the terms of written agreements.

#### ***Southwest quadrant***

West of the property that is leased to the city and south of the runway are five parcels of privately owned property. Four of these are residential lots, one of which contains a home. The remaining property, which is tangent to Benson Road, is owned by a church. Owners of the four residential lots either have or may have, at their option, airport-access agreements.

#### ***Northwest and northeast quadrants***

North of the runway and along its entire length are 19 privately owned, residentially zoned properties. Seventeen of these properties have

the potential for runway-access agreements. Seven such agreements are in place.

In summary, Lynden Municipal Airport is an interesting combination of city-owned property, property that is leased to the city for airport purposes and properties that are adjacent to the airport that have potential access to airport.

Airport access agreements described on this page are contained in the appendix.

Figure 1 on the following page depicts the information contained in this section.

Reserved for Figure 1

## 2.7 AIRPORT CLASSIFICATION – THE ARC SYSTEM

Both the Federal Aviation Administration (FAA) and the Washington State Department of Transportation/Aviation Division (WSDOT/AD) use what is termed the “airport reference code,” or ARC system, to categorize airports. The ARC system provides a method for applying dimensional safety and protection standards to airports according to the aircraft those airports generally serve. Dimensional standards include such items as runway-to-taxiway separation distances, sizes of runway safety areas (RSAs) and sizes of runway object-free areas (ROFAs). The ARC system uses the concept of a critical or design aircraft, defined as an aircraft that controls one or more airport design features based on the aircraft’s approach speed and wingspan. Five hundred annual itinerant operations are required for an aircraft or group of aircraft to be considered the critical aircraft for an airport.

In the ARC system, letter designations from A to E represent five aircraft approach speed categories ranging from less than 91 nautical miles per hour (knots) to 166 knots or more. Roman numeral designations from I to VI represent aircraft wingspans of from less than 49 feet to 261 feet. There is a special designation, used in ARC categories A and B, for airports that serve aircraft weighing less than 12,500 pounds. This designation attaches the term “small” to the ARC letter/numeral combination.

The Washington State Continuous Airport System Plan (WSCASP) database shows Lynden as having an ARC classification of A-I (small). This category includes aircraft with approach speeds of less than 91 nautical miles (knots) per hour, wingspans of less than 49 feet and weights

under 12,500 pounds. A review of Lynden Municipal Airport’s operations conducted for this plan indicates that it does generally serve aircraft in the A-I ARC category that weigh less than 12,500 pounds and that it accommodates both recreational flying and business aircraft operations.

Information provided by the Lynden Airport Board about based and visiting aircraft confirms Lynden Municipal Airport’s ARC status as A-I. A list of based aircraft is included in Chapter 3.

**Table 5: The ARC system**

AIRCRAFT APPROACH CATEGORY APPROACH SPEED IN KNOTS			AIRPLANE DESIGN GROUP WINGSPAN IN FEET		
CATEGORY	AT OR MORE THAN	LESS THAN	WINGSPAN	AT OR MORE THAN	LESS THAN
A		91	I		49
B	91	121	II	49	79
C	121	141	III	79	118
D	141	166	IV	118	171
E	166		V	171	214
			VI	214	262

Table 6 contains primary attributes of Lynden’s airport.

### NPIAS

Lynden Municipal Airport is not listed on the 2005–2009 National Plan of Integrated Airport Systems (NPIAS) and is therefore ineligible to apply for federal grant funds from the FAA. WSDOT/AD is Lynden Municipal Airport’s primary source of grant funds.

### Wind Coverage

Information regarding prevailing wind is not available from the National Oceanic and Atmospheric Administration (NOAA) for Lynden Municipal Airport. Due to the absence of wind data, a graphic depiction of wind relative to the runway, often called a windrose, was not

constructed for the airport in this plan. Local observers note that prevailing winds are from the southwest and that, as in many areas of Washington State, strong south and southeast winds are sometimes experienced. Since the runway is oriented generally east-west and prevailing winds are from the southwest, pilots using Runway 25 experience varying degrees of left-side quartering cross winds.

## 2.8 EXISTING AIRSIDE FACILITIES

### Paved surfaces

#### Runway and taxiway

Lynden Municipal Airport has a single runway oriented on magnetic headings 70 and 250 degrees (Runway 7/25). It is 2,425 feet long and 40 feet wide. The runway is constructed of asphalt. Thresholds are displaced to provide increased safety for arriving aircraft at both ends of the runway: Runway 7 by 267 feet; Runway 25 by 434 feet.

A 20-foot-wide, 2,250-foot-long taxiway (Taxiway A) is located south of the runway. The distance between the centerline of the runway and the centerline of the east taxiway is 70 feet. There are eight paved connectors between the runway and Taxiway A.

#### Aircraft apron

A transient aircraft parking area is located south of the runway near the east end of the airport. Two based aircraft tie-down areas are on the south side of the runway. One based aircraft tie-down area is immediately south of the transient tie-down area; the other is approximately 500 feet west of the transient tie-down area.

**Photo 1: Transient Parking Area**



#### Additional paved surfaces

Additional paved surfaces include the vehicle entry south of the runway at the east end and the area surrounding multiple hangar structures at approximately mid-field.

#### Paved surface condition

Table 7 indicates the condition of paved surfaces at Lynden Municipal Airport as reported by Applied Pavement Technology Inc. (APT) in a

**Table 6: Airport data**

Name	Lynden Municipal Airport
Location number	38W
FAA Designation	26275.*A
Owner	City of Lynden
Acreage	12.23 acres
Service level (on the NPIAS system)	General aviation (GA)
Reference code existing	A-I (Small)
Design aircraft	Piper Seneca
Elevation	106 feet
Reference point (location) NAD83 NAVD88	Latitude: 48 deg. 57' 21.226" N Longitude: 122 deg. 27' 29.226" W
Mean maximum temperature	75.6 degrees (August)
Approach category	Visual
Navigation aids	Lighted wind indicator/rotating beacon
Approach guidance	PAPI system – Runways 7 and 25
Wind coverage	n/a



report dated February 2006. The table shows both the designations given to pavement sections by APT and pavement designations that have been determined for this plan. Pavement condition index (PCI) numbers indicate overall condition of each section of pavement using a numerical system of 0 (failed) to 100 (excellent).

Following Table 7 are two drawings of Lynden’s paved surfaces that were created by APT. The first drawing, titled “Network Definition Map,” shows the method used by APT to divide the airport’s paved surfaces into section categories. This map also identifies the PCI index status of general segments of the airport’s paving as recorded in 2005. The second APT drawing, the pavement condition index map, provides a useful color depiction of the condition of the paved surfaces as they were determined to be in 2005.

### **Pavement markings**

Pavement markings include runway identification numerals at both ends of the runway, a white dashed centerline, as well as displaced threshold arrows, chevrons and a threshold bar at both the Runway 7 and Runway 25 ends. The taxiway is marked with a yellow centerline and yellow fog lines. Runway hold lines are painted at all locations where Taxiway A connects with the runway.

### **Airport lighting and navigation aids**

#### **Runway lights**

The runway is equipped with 18 medium-intensity runway edge lights (MIRLs) and 12 split red/green threshold lights. Threshold lights for Runway 7 are located 40 feet west of the painted threshold. Threshold lights for Runway 25 are located 10 feet east of the painted threshold.

All lights are mounted on in-ground stakes. There are three red, post-mounted lights on each side of the east end of the runway and one on each side of the west end of the runway.

#### **Taxiway reflectors**

There are a few taxiway reflectors located on the taxiway but no organized system of reflectors or lights is established along the taxiway or along the runway-to-taxiway system.

#### **Precision Approach Path Indicator**

Precision approach path indicator (PAPI) systems provide visual glide slope guidance for pilots during landing approaches to both Runway 7 and Runway

**Table 7: Pavement summary**

<b>Airport layout plan designation</b>	<b>Applied Pavement Technology Inc. designation</b>	<b>Total square feet</b>	<b>Surface material</b>	<b>Pavement condition PCI 2005</b>
Runway (west)	R07LY-01	11,000	AAC	78
Runway (central)	R07LY-02	69,800	AAC	89
Runway (east)	R07LY-03	17,800	AAC	82
Taxiway A (west)	T09LY-01	29,374	AC	100
Taxiway A (central) Multi-hangar (surround)	A01LY-01	46,339	AC	100
Taxiway A (central/east)	T03LY-01	4,597	AC	98
Taxiway A (central/apron)	A02LY-01	18,009	AC	96
East apron/entry 1	A02LY-02	1,977	AC	100
East apron/entry 2	A02LY-03	6,243	AC	100
Transient lane 1	T07LY-01	1,041	APC	92
Transient lane 2	T08LY-01	1,041	APC	95
Connector 1	T06LY-01	4,620	AC	64
Connector 2	T05LY-01	803	AC	65
Connector 3	T04LY-01	926	AC	87
Connector 4	T02LY-01	926	AC	87
Connector 5	T01LY-01	926	AC	77
<b>Total</b>		<b>215,422</b>		

Note: PCC = Portland cement concrete; AC = Asphalt cement concrete; ACC = Asphalt overlay on asphalt cement; APC – Portland cement concrete. Source: Applied Pavement Technology Inc.

25. Both PAPI systems are located north of the runway. The Runway 25 and Runway 7 PAPI systems are 270 feet and 234 feet from their respective thresholds.

**Photo 2: Runway looking east**



### ***Wind indication***

Lynden Municipal Airport has two wind indicators. A lighted wind indicator is located approximately 180 feet east of the Runway 25 pavement end and approximately 70 feet south of the runway's extended centerline. The lighted wind indicator is north of the vehicle drive lane as it enters airport property from Depot Road. A second lighted wind indicator is located at approximately mid-field, 70 feet north of the runway centerline.

### ***Airport rotating beacon***

A rotating beacon is mounted on a pole and located near the northwest corner of the operations building on the south side of the airport, adjacent to the Runway 25 threshold.

### ***Light activation***

The airport is equipped with a system that allows pilots to activate runway lights by using their aircraft radios. The light-control unit is located on the external wall of the operations building. The antenna for the light control is mounted on the pole that supports the adjacent rotating beacon. When pilots key their radio microphones

on a specific radio frequency, the light controller activates the runway lights and then turns them off automatically 15 minutes later. This system, often called "pilot-controlled lighting," or PCL, saves electrical power and reduces light emissions from the airport.

### ***Signage***

The following operational signs are installed at Lynden Municipal Airport:

- A sign indicating "Transient Parking" near the parallel transient aircraft parking lanes east and south of the Runway 25 threshold.
- Signs adjacent to the transient parking area indicating airport elevation and recommending that aircraft climb on runway heading until reaching at least 800 feet mean sea level elevation when departing the airport.
- A "1/2 way" sign at mid-field north of the runway.
- A sign south of the runway near the Runway 7 end indicating the airport elevation at that location.
- Numerous informational signs are located on the operations building, near the fuel area and at the vehicle entry gate.

**Photo 3: Runway looking west**



There are no runway hold-line signs at any of the locations where aircraft may access the runway.

None of the operational signs that are mounted on the ground near operating aircraft are on frangible (breakable) supports.

**Photo 4: Lighted wind indicator**



## 2.9 EXISTING LANDSIDE FACILITIES

### Structures

As described in section 2.6, there are three structures on property leased by the city of Lynden. Two of these structures are multi-position hangars ( i.e., hangars that contain more than one aircraft). The third structure is used, in part, as the airport operations building. Table 8 provides additional detail about these structures.

### Aircraft fuel

A fuel system is located south of the runway near the east end of the airport. The system consists of a single tank with a capacity of 6,000 gallons. The fuel grade available is AVGAS (aviation gas) 100 low-lead. An automatic “cardlock” system is installed that allows pilots to access and pay for fuel at any time.

### Access road and gates

Vehicle access to Lynden Municipal Airport is from Depot Road at the southeast corner of the

airport. A security gate is located at the access point. Vehicles are able to access structures south of the runway via a vehicle drive lane that exists east to west, south of the runway.

### Fencing

A chain-link fence runs from the south corner of the security gate to the operations building and to the first of the two privately owned hangars west of the operations building.

### Utilities

#### Power

Electrical power connects to the airport on the south side of the operations building.

#### Telephone

A public telephone is located inside the operations building.

#### Water/sewage

City water service and city sewer service are available at the airport but are limited to the operations building, which has a public restroom.

**Table 8: Structures on Lynden Municipal Airport**

Designation	Use	Size in square feet	Structure ownership
1	Multi-position hangar	65' X 165'	Private
2	Multi-position hangar	45' X 200'	Private
3	Operations building	50' X 120'	Private

*Note: A multi-position hangar is a hangar that accommodates more than one aircraft at a time.*

### Airport maintenance

There are no large items of equipment available for exclusive use at the airport. The airport is primarily maintained by the city of Lynden with assistance from local volunteers.

**Table 9: Airport facility data**

Airport feature		Information
Runway		
Dimensions		2,425' X 40'
Gradient		Less than 0.1 percent (1' over 2,425')
Surface		Asphalt concrete
Pavement strength		Unknown
Marking		End numerals/center dashed lines/displaced thresholds
Lighting		Edge (18)/threshold 12 (6 per end)/red at runway ends
Taxiway		
Dimensions		2,250' X 20' (Taxiway A)
Surface		Asphalt concrete
Marking		Centerline and fog lines
Reflectors		None
Aircraft aprons		
Transient tie-downs		Perpendicular, paved areas south of runway at east end
Based tie-down area 1		Four positions south of transient tie-downs
Based tie-down area 2		Four positions west of operations building
Fuel system		
Available fuel		AVGAS 100LL
Tank size		6,000 gallons
Dispensing mechanism		Automatic cardlock

Figures 2 and 3 on the following pages are drawings created by APT Inc. of paved surface conditions.

Reserved for Figure 2

Reserved for Figure 3

## 2.10 EXPLANATION OF FAA STANDARDS

An important aspect of this planning program is comparison of FAA-recommended design standards to Lynden Airport's existing conditions. This section defines several key FAA standards and relates them to corresponding areas on the airport. FAA standards information has been obtained from FAA Advisory Circular (AC) 150/5300-13 titled "Airport Design." Standards related to ARC A-I (small) are used. Airport information used in these comparisons is from on-site measurements.

### Standards definitions

#### *Runway length*

A distance that is adequate to accommodate all aircraft within a specific ARC group.

#### *Runway width*

A width considered adequate to provide for safe aircraft operations.

#### *Runway safety area (RSA)*

A defined rectangular surface centered on a runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot or excursion from the runway. Runway safety areas shall be:

- Cleared and graded and have no potentially hazardous ruts, humps, depressions or other surface variations.
- Drained by grading or storm sewers to prevent water accumulation.
- Capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and aircraft without causing structural damage to the aircraft.

- Free of objects, except for objects that need to be located in the RSA because of their function.

Objects higher than 3 inches above grade should be constructed, to the extent practicable, on low-impact resistant supports (frangible mounted structures) of the lowest practical height with the frangible point no higher than 3 inches above grade.

Other objects, such as manholes, should be constructed at grade. In no case should their height exceed 3 inches above grade. Runway safety areas, including their conditions and their protection, are one of the highest priorities of both the FAA and WSDOT/AD.

#### *Runway object-free area (ROFA)*

An area on the ground centered on a runway provided to enhance the safety of aircraft operations by being free of objects, except for objects that need to be located within the ROFA for air navigation or aircraft ground maneuvering purposes.

#### *Runway obstacle-free zone (OFZ)*

A defined volume of airspace centered above a runway centerline. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline.

**Note:** It is important to understand the differences between the RSA and the ROFA/ROFZ standards. RSAs are to be prepared to accommodate aircraft at runway elevation. ROFAs and ROFZs are to be clear of objects relative to runway elevation. Therefore, a steep terrain dropoff within an RSA area will cause an RSA to not be consistent with the RSA standard whereas a terrain dropoff within an ROFA or ROFZ dimension will not create an inconsistent condition.

### ***Shoulder***

An area adjacent to the edge of runways, taxiways or aprons providing a transition between pavement and the adjacent surface, support of aircraft running off the pavement, enhanced drainage and, where necessary, blast protection.

### ***Taxiway width***

A width considered adequate to accommodate aircraft in an airport's design group.

### ***Taxiway safety area (TSA)***

A defined rectangular surface centered on a taxiway prepared or suitable for reducing the risk of damage to airplanes unintentionally departing from the taxiway.

### ***Taxiway object-free area (TOFA)***

An area on the ground centered on a taxiway provided to enhance the safety of aircraft operations by being free of objects, except for objects that need to be located within the TOFA for air navigation or aircraft ground maneuvering purposes.

### ***Runway-to-taxiway separation***

A distance between a runway centerline and an adjacent taxiway centerline considered adequate to protect operating aircraft.

### ***Runway centerline-to-runway hold-position marking***

A distance considered adequate to provide protection between aircraft using an active runway and aircraft waiting to takeoff from or exiting that runway.

### ***Runway centerline-to-aircraft parking area***

A distance considered sufficient to protect operating aircraft, parked aircraft and activities occurring around parked aircraft.

### ***Runway protection zone (RPZ)***

RPZs enhance the protection of people and property on the ground. This is ideally achieved through airport owner control over RPZs. Such control includes clearing of RPZ areas of incompatible objects and activities. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ. Uses of property within RPZ areas should not attract large groups of people.

## **2.11 ASSESSMENT OF EXISTING CONDITIONS RELATIVE TO FAA DESIGN STANDARDS**

### ***Runway length***

According to FAA data, Lynden Municipal Airport's 2,425-foot-long runway is able to accommodate 70 percent of the A-I aircraft fleet having a maximum certified takeoff weight of 12,500 pounds. To accommodate 95 percent of the A-1 (small) fleet the runway would have to be 2,950 feet long. To accommodate 100 percent of the fleet the runway would have to be 3,450 feet long.

It is important to note that the airport's runway is adequate for most of the aircraft that use it. Both the A-1 (small) and B-1 (small) aircraft fleets are comprised of a wide range of aircraft. Aircraft in the low- and mid-size weight ranges of those fleets have wing spans and final approach speeds that are compatible with Lynden's runway length.

There are occasions, however, when aircraft weighing 10,000 to 12,500 pounds, and that have relatively fast final approach speeds, use Lynden's airport. In these situations the airport's runway length is marginal. Acceptability of the runway length for high-performance aircraft may depend on operating conditions, such as temperature and wind as well as aircraft landing and takeoff weight.



Information from the FAA's advisory circular relating to runway length is contained in the appendix to this narrative.

### **Runway width**

At 40 feet, the width of the airport's runway is 20 feet less than the FAA standard of 60 feet.

### **Runway safety area (RSA)**

The FAA-recommended runway safety area at Lynden extends 240 feet beyond each runway end and 60 feet on both sides of centerline. Benson Road and a white fence are both within the RSA at the west end of the runway. At the east end, Depot Road is within a part of the RSA.

The FAA's RSA standard length for the runway safety area is 2,905 feet – the sum of the runway length (2,425 feet) and 240 feet at each end. The available RSA is 240 feet short of the standard at the west end and 55 feet short of the standard at the east end. The actual RSA available is 2,610 feet, or 295 feet less than the FAA's recommended standard.

It is important to note that the RSA at Lynden is based on a 240-foot dimension from both ends of the runway's pavement even though the runway is marked with displaced thresholds.

The areas that comprise the RSA that are to the sides of the runway are in conformance with the RSA standard within the area that is compliant longitudinally with the runway.

### **Runway object-free area (ROFA)**

As with RSAs, ROFAs also extend 240 beyond each runway end. ROFAs however encompass a wider area (125 feet on both sides of centerline) than RSAs. ROFA's do not need to accommodate straying aircraft, as do runway safety areas. ROFA's do, however, need to be free of objects that rise above the runway elevation unless those objects must be in their locations to meet an operational need and are on frangible (breakable) supports.

ROFA compliance at the west end of the airport is also impacted by the white fence and Benson Road. Items within the ROFA at the east end of the airport are Depot Road, a line of hedges and a private residence north and east of the runway end.

Perpendicular to the runway, the ROFA is impacted by structures on both the north and south sides of the runway.

The FAA standard length for the ROFA at Lynden is 2,905 feet which, again, is the sum of the length of the runway plus 240 feet at each end. Actual ROFA available at the west end is 0 feet. At the east end, the ROFA extends 69 feet from the end of pavement. Total existing ROFA length is, therefore, 2,494 feet. Total ROFA width is 164 feet, 86 feet less than the FAA standard.

### **Runway shoulder**

The runway shoulder area of 10 feet is well-graded and in conformance with the relevant standard.

### **Taxiway width**

Taxiway A's width of 20 feet is 5 feet narrower than the FAA standard.

### **Taxiway safety area (TSA)**

Sufficient space exists around Taxiway A to be in compliance with the taxiway safety area standard, a clear and well-compacted area 49 feet wide, centered on the taxiway. Depending on how aircraft are positioned in the aircraft parking area west of the operations building, this standard could be impacted.

### **Taxiway object-free area (TOFA)**

The recommended TOFA at Lynden is 89 feet wide, centered on the taxiway. South of the taxiway a number of objects interfere with the TOFA. These include the hedges at the west end, the multi-position hangars and the operations

building. Aircraft parked on the apron west of the operations building would also be within the TOFA.

### Runway-to-taxiway centerline

The FAA standard for A-1 (small) airports is 150 feet from runway centerline-to-taxiway centerline. The distance between the runway and Taxiway A at Lynden is 70 feet which is 80 less than the standard.

### Runway centerline to runway hold-position marking

The FAA standard from runway centerline to runway hold lines is 125 feet. Hold lines at Lynden are marked at 60 feet from the runway centerline. All are, therefore, 65 feet less than the FAA standard.

### Runway centerline to aircraft parking

The FAA standard from runway centerlines to aircraft parking areas is 125 feet. Two of the three aircraft parking areas are closer to the runway than the standard. The transient parking area is approximately 60 feet from the runway centerline. The based aircraft parking area west of the operations building is approximately 95 feet from the runway centerline. Its distance from the runway centerline is therefore 30 feet less than the FAA standard. The based aircraft parking area east of the fuel system is approximately 125 feet from centerline and, therefore, consistent with the standard.

### Runway Protection Zone (RPZ)

Both the Runway 7 and Runway 25 runway protection zones (RPZs)

**Table 10: Comparison of FAA design standards to existing conditions**

FAA design standard	Design standard relative to Lynden Municipal Airport	Existing condition
Runway length	3,450 feet and 2,950 feet to accommodate 100 percent and 95 percent of A-1 (small) fleet	2,425' 1,125' less than FAA standard (100 percent) 525' less than FAA standard (95 percent)
Runway width	60'	40' 20' less than FAA standard
Runway safety area length	2,905'	2,610' 295' less than FAA standard
Runway safety area width	120'	120' Meets FAA standard
Runway object free area length	2,905'	2,494' 411' less than FAA standard
Runway object free area width	250'	164' 86' less than FAA standard
Runway shoulder	10'	10' Meets FAA standard
Taxiway width	25'	Taxiway A 20' 5' less than FAA standard
Taxiway safety area	49'	49' Meets FAA standard
Taxiway object-free area	89'	64' Hedge at west end and structures as close as 25' to the taxiway centerline south of the taxiway.
Runway-to-taxiway separation	150'	70' 80' less than the standard
Runway centerline-to-holding position marking	125'	60' 65' less than standard at all eight locations south of the runway
Runway protection zone	250' X 1,000' X 450'	Runway 7 RPZ extends over a road and on to unoccupied property. Runway 25 RPZ extends across a road. Homes are within the Runway 25 RPZ.
Runway centerline-to-aircraft parking area	125'	Based aircraft parking approximately 95' from the runway centerline. Transient parking is 60' from centerline. Two of three aircraft parking areas do not meet the FAA standard.

*Note: Runway length standard computed using average mean/maximum temperature of hottest month (75.6 degrees/August) and 106 feet above mean sea level elevation.*

extend over public roads. West of Runway 7 the RPZ is generally clear. Much of the Runway 7 RPZ is owned by the city and is part of airport property. The Runway 25 RPZ extends over a group of houses. The Runway 7 RPZ is generally in compliance with the FAA recommended standard in that it is not likely to attract large groups of people. The Runway 25 RPZ is not in compliance with the standard due to existing residences.

Figure 4 on the following page depicts FAA standards and conditions relative to them at Lynden Municipal Airport.

Reserved for Figure 4

## 2.12 INFORMATION SOURCES

Sources of information provided in this chapter include:

- Washington State Department of Transportation/Aviation Division airport database.
- Lynden Municipal Airport Map produced by the city of Lynden in May of 2007.
- FAA Form 5010.
- Applied Pavement Technology Inc. pavement report dated February 2006.
- Lynden ALP steering committee.
- Site visits.

# Chapter 3:

## Forecasts

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### 3.1 INTRODUCTION

This chapter forecasts the numbers of based aircraft and annual aircraft operations at Lynden Municipal Airport in five-year intervals over a 20-year planning period (2008–2027). A future airport reference code (ARC) based on forecast data is identified.

This forecasting effort is important for a number of reasons. Primarily, forecasts will help the city of Lynden plan the airport's future. Understanding future demand will help the city make informed decisions about airport capital improvements.

Forecasts are also vital to the funding of those improvements. As stated, the Washington State Department of Transportation/Aviation Division (WSDOT/AD) is Lynden Municipal Airport's primary source of grant funds for the airport's operational areas. Though the Aviation Division has made considerable progress over the past few years with respect to the grant process as well as with the amount of funds available, the division continues to have less money than is needed to meet project demands. Consequently, the division must carefully prioritize grants. Forecasts assist WSDOT/AD with these funding decisions.

Capital projects that are necessary to correct conditions that negatively impact safety, as well as projects that maintain investment in infrastructure, especially paved surfaces, should be funded as money is available regardless of forecasts. However, major development that enhances airport operational capability should be undertaken only after careful evaluation of necessity based on logically quantified need.

Forecasts are also important to organizations interested in financing features of airports that are not generally funded by WSDOT/AD. Both the Washington State Department of Community Trade and Economic Development (CTED) and the U.S. Department of Commerce's Economic Development Administration offer financial resources for projects, such as utility infrastructure and road construction, that are necessary to support development of airport-related and airport-compatible businesses on and adjacent to airport property. These entities are interested in funding projects that create jobs and that improve local and regional economies.

It is a recommendation of this plan that the city of Lynden update its activity-level forecast in the WSDOT/AD Aircraft Information System as conditions indicate it is appropriate to do so. For instance, if a new manufacturing business that operates one or more aircraft moves to the area the resulting increase in based aircraft and annual operations should be added to the forecast and communicated to WSDOT/AD. This will help Lynden Municipal Airport maintain its appropriate place in the Aviation Division's priority list. Also, this information will be useful during the next update to this airport layout plan. Forecasting by professionals has become a highly refined art but it is still, in the end, guessing. Tracking and noting actual conditions that alter forecasts help refine this process.

It is important to note that this chapter estimates current activity and forecasts demand. It does not address whether Lynden's airport, as it exists today, is able to accommodate projected demand. This issue will be addressed in the following chapter.

### 3.2 TERMINOLOGY

Terms used in this section that require definition are:

*Aircraft operation:* A takeoff or a landing.

*Local aircraft operation:* Aircraft operating in an airport’s traffic pattern or aircraft known to be departing to or arriving from local practice areas.

*Itinerant aircraft operation:* All other operations.

*Based aircraft:* Aircraft that are routinely stored on the airport, stored in privately owned hangars inside the airport boundary, stored in privately owned hangars or garages or tied down outside the airport boundary and that have agreements with the city to access the airport.

### 3.3 FORECASTING METHODS

This section begins by quantifying existing conditions, including the numbers and types of based aircraft, estimating local and itinerant flight operations, and reviewing county and local population as well as other pertinent data. Next, factors that are likely to influence future demand are identified. These factors include population projections for Whatcom County over the planning period as well as projections made by state agencies about economic development in the region served by Lynden Municipal Airport. Forecast information produced by WSDOT/AD and the Federal Aviation Administration (FAA) is also considered.

Other issues that may impact airport activity are then evaluated. These include changes in pilot rules recently promulgated by the FAA and the potential for airport development to affect demand.

The process used in this plan for identifying the number of based aircraft is different from the process used to estimate annual flight operations activity. While both FAA and WSDOT/AD

databases contain information about the number of based aircraft, the most accurate method to use and the process that has been employed is a query of the steering committee. The numbers of based aircraft shown in FAA and WSDOT/AD databases are included in this plan but only as a matter of interest.

It is not as easy to determine annual flight operations activity at airports such as Lynden’s that do not have control towers and therefore have no operations records. For this we have relied heavily on WSDOT/AD and FAA data as well as on local input.

### 3.4 EXISTING DATA

The following sources have been used to help determine based aircraft and annual flight operations levels at Lynden Municipal Airport:

- The FAA’s *Airport Master Record*, also called *FAA Form 5010*, last updated in December 2005.
- The 2005 draft of the *Airport Facilities & Services Summary* portion of the *Long-Term Air Transportation Study (LATS)* sponsored by WSDOT/AD.
- Data provided by the airport layout plan steering committee.

Information from these sources is shown in Tables 11-14.

**Table 11: FAA Form 5010**

Fleet mix based aircraft 2005		Estimated operations 2005	
Single-engine	14	GA local	3,000
Multi-engine	3	GA itinerant	2,000
Turboprop	0	Air carrier	0
Glider	0	Air taxi	0
Ultralight	0	Commuter	0
Rotorcraft	0	Military	0
Total	17	Total	5,000

Source: FAA Form 5010.

### Flight operations activity baseline

This plan recaps airport-specific information from the FAA and WSDOT/AD and considers general estimating guidelines provided by the FAA to determine a flight operations activity baseline.

As stated, flight operations activity levels at small general-aviation airports are difficult to determine. Efforts are being made to develop automated processes to gather operational information at unattended airports but, as of the date of this plan, a reliable, cost-effective process is not known to be available.

**Table 12: WSDOT/AD LATS existing**

Fleet mix		Estimated annual operations	
Based A/C	Existing 2005		Existing 2005
Single-engine	14	GA local	4,410
Multi-engine	3	GA itinerant	2,940
Jet engine	0		
Helicopter	0		
Other	4		
<b>Total</b>	<b>21</b>	<b>Total</b>	<b>7,350</b>

Source: WSDOT/AD.

Information provided in Tables 11 and 12 indicate that there are between 5,000 and 7,350 flight operations that occur annually at Lynden’s airport. Of these, between 3,000 and 4,410 are estimated to be local operations.

Another element to consider as we attempt to estimate annual flight operations activity is the FAA’s position that it is reasonable to assume 250 operations per year per based aircraft at small, general aviation airports. This multiplier, if applied at Lynden, would result in 6,000 annual flight operations by based aircraft.

As to itinerant operations, comments from this plan’s steering committee indicate that the airport is used often for charter flights as well as for flights conducted by the customs

service, border patrol and homeland security in both fixed-wing aircraft and rotorcraft. It is reasonable to assume that the pending closure of Blaine’s airport, west of Lynden, Lynden airport’s proximity to the Canadian border, increased activity related to the 2010 Winter Olympics, as well as the active business environment of the Lynden area, all contribute to higher than usual itinerant flight activity levels.

Airside concludes that actual annual flight operations are more consistent with the WSDOT/AD LATS program estimates than the FAA estimates. The LATS program estimates local flight operations at 4,410, itinerant flight operations at 2,940 and, therefore, total operations at 7,350. It should be noted that local and itinerant operations do not directly relate to locally based aircraft versus aircraft that visit the airport from other airports. Aircraft that are based at Lynden’s airport might conduct both local and itinerant operations. It is unlikely, however, that aircraft based at other facilities are involved in local operations at Lynden to a measurable extent.

### 3.5 FORECASTS

#### Population and income

##### Population

Over the 17-year period from 1990 to 2007, Whatcom County’s population grew by almost 47 percent. Washington State analysts project that Whatcom County’s population will increase from its current estimated level of 188,300 to slightly over 230,000 in 2020 and to more than 261,000 in 2030. Over the planning period addressed in this document Whatcom County is expected to add another 68,000 residents. This is a faster rate of growth than the state’s projected growth rate.



Lynden, with approximately 11,000 citizens, is not the largest city in Whatcom County but it is strategically located in the more populous west half of the county, north of fast-growing Bellingham along the SR 546 corridor. It is logical to assume that the Lynden area will continue to grow at a pace that is generally consistent with populated areas to its west and south.

**Income**

According to the U.S. Department of Commerce’s Bureau of Economic Analysis (BEA), in 2005 Whatcom County had a per capita personal income (PCPI) of \$29,561, which places it 13<sup>th</sup> among the counties in Washington State. The 2005 PCPI reflected an increase of 5.1 percent from 2004. The PCPI increase is significant since the state increase was 1.5 percent and the national increase was 4.2 percent over the same period. In 1995 the PCPI of Whatcom County was \$19,771 and ranked 17<sup>th</sup> in the state.

Whatcom County has also experienced relatively steady growth in total personal income (TPI) over the past several years. According to the BEA, TPI is the best available local indicator of general purchasing power and is, therefore, important to tracking and comparing economic growth. TPI is defined by BEA as the sum of net earnings by place of residence, as well as rental incomes of persons, personal dividend payments, personal interest income and transfer payments. Examples of transfer payments are Social Security payments, Medicare payments, unemployment insurance payments and veterans’ pensions. Personal income is measured before the deduction of personal income taxes and other personal taxes.

In 2005 Whatcom had a total personal income (TPI) of \$5,420,349. This TPI ranked ninth in the state and accounted for 2.4 percent of the state total. In 1995 the TPI of Whatcom was \$2,992,774 and ranked 10<sup>th</sup> in the state. The 2005 TPI reflected an increase of 7.0 percent from 2004.

**Table 13: Based operational aircraft**

Aircraft	ARC category
Beechcraft Baron (multi-engine)	A-I (small)
Beechcraft Baron (multi-engine)	A-I (small)
Beechcraft Bonanza	A-I (small)
Beechcraft Bonanza	A-I (small)
Beechcraft Bonanza	A-I (small)
Beechcraft Bonanza	A-I (small)
Cessna 172	A-I (small)
Cessna 172	A-I (small)
Cessna 172	A-I (small)
Cessna 150	A-I (small)
Cessna 177	A-I (small)
Cessna 182	A-I (small)
Citabria	A-I (small)
Stinson 108	A-I (small)
Beaver (amphibious)	A-I (small)
Robinson R44 helicopter	Not categorized
Robinson R22 helicopter	Not categorized
Homebuilt	A-I (small)
Homebuilt	A-I (small)
Homebuilt	A-I (small)
Homebuilt	A-I (small)
Homebuilt	A-I (small)
Homebuilt	A-I (small)
Homebuilt	A-I (small)
<b>Total</b>	<b>24</b>

Source: Lynden Municipal Airport Steering Committee.

**Table 14: Whatcom County population projections**

Year	Projected population
2010	195,633
2015	213,046
2020	230,008
2025	246,406
2030	261,416

Source: Washington State Office of Financial Management.

The 2004-2005 state change was 2.9 percent and the national change was 5.2 percent. The 1995-2005 average annual growth rate of TPI was 6.1 percent. The average annual growth rate for the state was 5.6 percent and for the nation was 5.2 percent.

### ***Summary of official projections of population and income***

Whatcom County's population is expected by Washington State economists and planners to grow by just over 47 percent between 2005 and 2030. This is slightly higher than the 44 percent growth rate expected statewide.

Clearly, Whatcom County is not only performing well economically but compares favorably to other Washington counties, Washington State in general and the United States as a whole.

A key point to keep in mind when considering population growth and personal income as they may relate to airport usage is that demographics in areas such as Whatcom County and Lynden are changing in ways that may positively impact economic health and result in increased disposable income. Studies by those who track such things indicate that significant numbers of individuals who had for years been employed in timber and fishing industries have either left the county, have retired or are working in a variety of jobs unrelated to their former ones. In some cases the jobs that are being transitioned to pay higher wages than the jobs being left.

At the same time the county is experiencing an influx of retirees, skilled workers and white-collar workers. The bottom line: Whatcom County is not only growing, it is growing in a manner that may continue to increase disposable income.

### ***Additional factors***

Airport forecasts should take into account specific local conditions and factors other than official population and income projections as long as the information used is logical, reasonable and

credible. The factors included in this section are considered to meet this test. These local conditions and factors relate to:

- Development efforts in Whatcom County/Lynden.
- Alterations to FAA rules regarding pilots.
- Airport improvements.

### ***Development efforts***

Whatcom County and the city of Lynden have well-developed and active chambers of commerce and economic development organizations. Economic development efforts in the four-county area – including Whatcom, Snohomish, Island and Skagit counties – have been successful for several years. It is logical to assume that these efforts will continue and will probably improve. This will have positive impacts on population and income levels.

### ***Alterations to FAA Rules regarding pilots***

Rules recently promulgated by the FAA allow owners of several categories of ultralight aircraft to register those aircraft in a new category called "light sport." Light-sport aircraft are expected to substantially add to the numbers of based aircraft and flight operations at U.S. airports. Pilots in this category will, in general, prefer to operate from airports such as Lynden municipal that have relatively low activity levels, do not have control towers and have an abundance of adjacent airspace that is not under direct FAA control.

### ***Airport Improvements***

Though typical planning procedures call for airport improvements, especially those that increase airport capacity, to be justified by demand it is also logical to assume that such improvements might in turn have some impact on generating demand. Capital improvements that cause Lynden Municipal Airport to be increasingly attractive, efficient and functional may create additional interest in the facility.

**Anticipated impact of additional factors on forecast**

The factors cited above are likely to have a positive impact on both based aircraft and the level of flight operations at Lynden Municipal Airport.

The airport will, without doubt, attract its share of the sport-pilot market. The airport’s runway is not as long as is required to accommodate a high percentage of traditional A-1 and B-1 (small) aircraft but it is ideal for aircraft in the light-sport category.

The city of Lynden and volunteers on the airport board have endeavored over the past several years to improve the functionality and aesthetics of Lynden’s airport. These efforts have helped create an environment that has attracted based aircraft. It is logical to assume that if the city continues to improve the airport’s facilities, demand will continue to increase. It is a conclusion of this narrative that alterations to the airport’s layout, operating features and operational capability are likely to have a supportive impact on the aircraft census as well as on local and itinerant activity levels.

**Aviation projections**

**WSDOT/AD**

The Aviation Division’s Long-Term Air Transportation Study forecasts based aircraft and flight operations levels through the year 2030. The LATS program will be further developed over the next several years. Preliminary LATS forecasts have, however, been published. LATS

forecasts for Lynden Municipal Airport indicate that the numbers of based aircraft are expected to increase to 39 and that the estimated 7,350 annual flight operations in 2005 will increase by over 6,300 to 13,650. This projected growth in both based aircraft and flight operations compares favorably to the majority of general aviation airports in Washington.

**Table 15: WSDOT/AD LATS forecast**

Fleet mix			Estimated annual operations		
Based aircraft	Base year 2005	Projected 2030	Operations	Existing 2005	Projected 2030
Single-engine	14	16	GA local	4,410	8,190
Multi-engine	3	4	GA itinerant	2,940	5,460
Jet engine	0				
Helicopter	0				
Other*	4	19			
<b>Total</b>	<b>21</b>	<b>39</b>	<b>Total</b>	<b>7,350</b>	<b>13,650</b>

*Source: WSDOT/AD (LATS). \*Other includes ultralight and light sport aircraft.*

**Summary of WSDOT/AD data**

Projections by WSDOT/AD in both the published database and LATS indicate moderate growth in Lynden Municipal Airport’s based aircraft and flight operations through the year 2030. LATS information states that expected growth will occur in a generally steady manner from year to year.

**Forecast of based aircraft and operations**

After taking into consideration state and federal population and income projections, specific development efforts in Whatcom County and the Lynden area, FAA sport pilot rules, the likely impact of continuing airport improvements and preliminary forecasts by WSDOT/AD’s LATS, Airside makes the following projections about based aircraft and flight operations activity over the planning period:

*Airport reference code (ARC)*

The ARC for Lynden Municipal Airport is forecast to remain A-I (small). This conclusion is not based on demand, which may exceed the A-I (small) category, but rather on an assumption that the kinds of aircraft the airport will be able to accommodate will be generally within the A-I (small) category. Some aircraft in the B-I (small) category will be based at or will visit the airport.

*Based aircraft*

Based aircraft will increase by 26 to 50 by the end of the planning period. Most of the additional aircraft will be single-engine. Some, possibly a significant number, will be in the light-sport category. This is moderately more than the LATS program estimate of 39 by the end of the planning period. Airside concludes that the rate of growth in Whatcom County will increase more than is generally expected due, in part, to quality of life and economic development efforts.

*Flight operations*

Local flight operations, estimated by Airside to be 4,000 annually, will increase to about 8,500 over

**Table 16: Forecast based aircraft 2008-2027**

Based aircraft by type	2008	2013	2018	2023	2027
SE	13	19	24	29	34
SESP	7	8	9	10	12
ME	2	2	2	2	2
Heli	2	2	2	2	2
Total	24	31	37	43	50

*Note: SE = Conventional single-engine, fixed-wing aircraft; SESP = Single-engine sport category or ultralight aircraft; ME = Multi-engine aircraft; Heli = Helicopter.*

the planning period. This is consistent with the percentage of growth in based aircraft.

Annual itinerant operations, currently estimated by Airside to be 3,000, are expected to increase. Airside forecasts that itinerant operations will reach 6,000, a 100 percent increase over the planning period. This is slightly more than the LATS estimate of 5,460 by the end of the planning period.

Tables 16 and 17 indicate growth in based aircraft and flight operations projected by this plan over the planning period.

**Table 17: Forecast annual flight operations 2008-2027**

Operations	2008 (1)	2013	2018	2023	2027
Local	4,000	4,700	5,700	6,800	8,500
Itinerant	3,000	3,800	4,600	5,300	6,000
Total operations	7,000	8,500	10,300	12,100	14,500
Average annual increase in total operations		4.3%	4.3%	3.4%	4.0%

*Note: (1) Estimated current; (2) Local and itinerant flight operations do not directly relate to locally based and non-based aircraft since locally based aircraft can be involved in both local and itinerant operations. SE = Conventional Single-engine aircraft; SESP = Single-engine sport category aircraft; ME = Multi-engine aircraft; Heli = Helicopter.*

# Chapter 4: Requirements

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## 4.1 INTRODUCTION

This chapter discusses projects that will improve Lynden Municipal Airport. Information contained herein is derived from this report's Chapters 2 and 3, data gathered during site visits and suggestions from the ALP steering committee. Recommended improvements at Lynden Municipal Airport extend over the 20-year planning period. Projects listed are intended to increase safety, accommodate forecast demand to the extent possible, and enhance the airport's role as a portal to Lynden and its environs. Information about the timing of projects is at the end of this chapter. Estimated expenses associated with recommendations are contained in Chapter 5.

As stated in Chapter 3, the Piper Seneca aircraft, which is in the A-I (small) ARC group, is identified as the design aircraft throughout the planning period. Additional kinds of aircraft that may use Lynden Municipal Airport are light-sport aircraft and variations of aircraft based on advancing technologies.

FAA recommendations related to design standards that are contained in Advisory Circular 150/5300-13, "Airport Design," have been applied in this chapter.

## 4.2 PRIMARY FEATURE DECISIONS

Chapter 2 identifies several features of Lynden Municipal Airport that fail to meet Federal Aviation Administration (FAA) design standard recommendations. These features include runway length and width, runway safety and object-free areas at both runway ends, and runway/taxiway separation distance. This section discusses these primary features.

### Runway length

Figure 2-1 in FAA Advisory Circular 150/5325-4B provides a method for determining runway lengths that are adequate to accommodate both 95 percent and 100 percent of what the FAA terms "small airplanes." According to the FAA, small airplanes are those that have certificated gross weights of less than 12,500 pounds and that have fewer than 10 passenger seats.

The graph in Figure 2-1 of the advisory circular provides a method for using temperature and airport elevation to compute runway length calculations since both of these factors affect aircraft performance. According to this graph, which is included in the appendix to this report, runway lengths of 2,900 feet and 3,400 feet are required to accommodate 95 percent and 100 percent, respectively, of the small airplane fleet at Lynden Municipal Airport, considering the mean temperature of the area's hottest month (75.6 degrees in August) and the mean sea level elevation of 106 feet. This means that the airport's runway, which is 2,425-feet long, is 475 feet shorter than required for 95 percent of the fleet and 975 feet shorter than required for 100 percent of the fleet.

A decision about extending the airport's runway to the west, which is the only direction in which an extension might be feasible, is affected by a number of factors. First, the property west of Benson Road (owned by the city) measures 160 feet north to south. A runway extension would logically include a taxiway extension. The clear space that would be necessary from north to south, considering the runway and taxiway object-free areas would be 240 feet. Also, the city-owned property is not parallel with the runway, but instead angles south from the location where

its eastern boundary is tangent to Benson Road. Both of these issues – inadequate space north to south and the property angle – indicate that the city would have to purchase additional property in order to extend the runway/taxiway system.

Another element that makes it unlikely that a runway extension is feasible is that it would be illogical to assume funding from the Washington State Department of Transportation/Aviation Division (WSDOT/AD) for a runway and taxiway extension unless the separation distance between the two could be increased so that it is consistent with the FAA's recommendation. This would mean increasing the separation distance by 80 feet. This is unlikely given property ownership north and south of the property owned by the city.

One must also consider the aircraft Lynden's airport is likely to accommodate in the future. While light, multi-engine aircraft such as the Piper Seneca and high-performance, single-engine aircraft such as the Beechcraft Bonanza will continue to use the airport, it is expected that additional aircraft will generally be in the Cessna 172/182 and Piper Cherokee category along with light-sport aircraft. While additional runway length is always desirable, accommodating aircraft in these categories does not make a strong argument for what would be an expensive undertaking.

Lastly, it is important to consider the sources of funds necessary to expand the runway and taxiway. As noted, Lynden is not on the federal National Plan of Integrated Airport Systems and is not likely to be placed on the NPIAS due to the airport's inability to conform to several key federal design standards. Therefore capital funds from the FAA would not be forthcoming. At this time, WSDOT's Aviation Division is making a strong effort to maintain the Washington airport system as it is currently configured. Money for runway lengthening would only be made available in cases where the need is clear and vital. Further, the aviation division is currently limited to

\$250,000 per grant. This is far short of the funds needed to purchase Benson Road right-of-way, to purchase additional property, and to construct a lengthened runway and taxiway system.

In case this narrative has left some readers with the impression that Lynden's runway is generally inadequate it is important to note that many general aviation airports do not have runways that are long enough to accommodate all of the small airplane fleet. The A-I (small) ARC category includes some aircraft that would be considered very large were they seen at Lynden's airport. Examples are the Marquise and Solitaire turboprop aircraft made by Mitsubishi Heavy Industries, the venerable DHC-2 Beaver and the Piaggio Portofino.

Airside does not recommend major capital projects unless there are logical sources of funds to pay for them and the projects are reasonable to undertake given general conditions. It is a conclusion of this plan that increasing the length of the runway/taxiway system at Lynden Municipal Airport is not feasible. It is not justified by forecast levels of activity and it is not logical to assume that sources of funds for such an endeavor would be forthcoming.

### **Runway/taxiway width**

The FAA standard for runway width is 60 feet. Lynden's runway is 40 feet wide. Unique conditions at Lynden must be considered in the runway-widening decision as well. The runway centerline-to-taxiway centerline separation distance is 80 feet less than the FAA recommended standard of 150 feet. Widening the runway would increase the width of maneuvering space for aircraft but it might also erode safety by potentially reducing the distance between aircraft on the runway and the taxiway to the south and homes to the north.

The taxiway is 20 feet wide, which is 5 feet less than the FAA standard. This plan's steering

committee indicates that airport users have not complained about this width. Further, widening of the taxiway would reduce the existing taxiway object-free area to the south of the taxiway, which is already smaller than the FAA standard. It is also unlikely that funding for widening the taxiway would be forthcoming from WSDOT/AD for this reason.

Due to the conditions noted above, this plan does not recommend adding width to either the runway or the taxiway.

### **Runway safety areas (RSA) and object-free areas (ROFA)**

As explained in Chapter 2, runway safety areas are rectangular areas that surround runways. RSA sizes vary with the category of runway to which they are applied. At Lynden, the FAA standard RSA extends 240 feet from each end of the runway and 60 feet on both sides of the runway's centerline. RSAs are to be generally level with the runway surface, free of objects that could damage aircraft, graded, compacted and capable of supporting airplanes and vehicles. The main purpose of an RSA is to limit damage to airplanes and injury to occupants if aircraft were to stray from the runway, to land short of a runway or to overrun a runway.

The ROFA standard does not require a surface that is able to accommodate straying aircraft, as does the RSA standard. Instead, the ROFA standard only requires that terrain, items of equipment, structures, etc., do not rise above the runway's elevation or – if they must to support airport functions, such as with runway lights – that they have frangible (breakable) supports.

At Lynden Airport's west end, a fence, a ditch and Benson Road are within much of the RSA and ROFA. At the airport's east end, a hedge and Depot Road are within the RSA, although not to a great degree. Objects within the OFA at the east end include a private residence, the aforementioned hedge, Depot Road, an unlighted wind indicator and the vehicle drive lane that provides access to the airport.

Given conditions at both ends of Lynden's runway, the only way to attempt to conform to the FAA's RSA and ROFA standards is to relocate the runway's thresholds. It is important to make sure that a clear distinction is made between displaced and relocated runway threshold markings. Displaced thresholds, such as those currently marked at Lynden, are intended to provide approach slope clearance over objects along approach paths. When runway thresholds are relocated, runway pavement generally stays in place but new runway ends are marked on runway surfaces. Runway lights are also adjusted to indicate adjusted runway ends. The resulting shortened lengths of runways are changed in government and private publications that are available to pilots. Technically, once a runway threshold is relocated, runway pavement behind a threshold cannot be used for takeoff or landing roll-out from the opposite direction.

It is important to note that when thresholds are displaced RSA and ROFA areas, which are 240 feet long, begin at the end of pavement. When thresholds are relocated they begin at the point of relocation. This is why airports sometimes relocate thresholds. It allows airports to bring RSA and ROFA areas onto airport property, where they are more likely to meet the FAA's standards.

At Lynden, relocation of the runway's thresholds to comply with the RSA standard would result in shortening the runway from its current length of 2,425 feet to approximately 2,100 feet. Even with this reduction in length, which would be intended to bring the RSA onto airport property, the ROFA standard could not be met due to residences on the north side of the runway.

If Lynden's thresholds were relocated, based pilots who understand local conditions would probably use the entire runway length for takeoff, regardless of markings. This would be more likely to occur during hot days with heavily loaded aircraft. The major concern about runway shortening therefore is the impact it might have on visiting pilots who are required to consider

published runway length at destination airports as they plan their flights. These include those operating for government entities, FAA-regulated for-hire charter services, and some businesses. It is probable that some of these entities would decide against using Lynden's airport even though pavement beyond the relocations would still be in place.

Questions about the ramifications of not conforming to the FAA's RSA and ROFA standards naturally arise. To not relocate Lynden's thresholds will mean that the city decides against conforming to two of the most basic FAA design recommendations. Conversely, relocating the thresholds would result in sizeable reductions in posted, if not actual, runway length.

It is logical to obtain as much information about this subject as possible before committing to a course of action. Of primary importance is the position of Washington State Aviation in terms of how a decision might impact future grants-in-aid to the city of Lynden for its airport.

### **WSDOT/AD's position**

The Aviation Division stated several years ago in public forums that it expected airports to "move toward" compliance with FAA design standards. Indeed, the scope of work for this project, as mentioned earlier, requires that Lynden's airport and other airports involved in similar planning projects, use FAA design standards in their evaluations of airport features and in depictions of future capital projects.

The Aviation Division's stance is logical for a number of reasons. First, if the division does not subscribe to FAA airport design philosophy then what standards does it use? The state has no published design standards. Efforts some time ago to create standards for non-NPIAS, non-obligated, community airports in Washington were unsuccessful. Also, there is concern that if the division does not require facilities that it helps fund to promote safety by adhering to reasonable

standards, the state may assume unwanted legal liability. Further, no one can argue that making every effort to conform to FAA standards at Lynden and similar community airports will create safer facilities and will lower community liability.

The Aviation Division is aware of the need to develop a clear policy about this subject. As of the publication of this plan, a comprehensive policy has not been announced however a draft policy statement has been provided by the division and is included in the appendix.

### **RSA and ROFA recommendations**

After due consideration, Airside recommends that the city of Lynden do all it can to prepare those portions of the runway safety area and clear those portions of the runway object-free area over which the city has reasonable control. Airside does not recommend shortening the airport's runway in order to fully comply with these standards. Airside's recommendations are based on the following factors:

- Relocation of the runway thresholds would reduce published runway length to a degree that would have a measurable effect on decisions by government, for-hire (charter) and corporate operators to use the airport.
- Relocation of the thresholds would not alter the operating conditions that exist at the airport. There is a finite amount of runway pavement. Regardless of how the runway is marked, Benson Road and Depot Road will continue to exist. Aircraft landing short of the runway or overrunning the runway will do so regardless of alterations to markings and lighting.
- Relocation of the thresholds would create conforming runway safety and runway object-free areas at the expense of runway length, a step that would have its own, possibly more serious, safety implications.



### 4.3 DEVELOPMENT ALTERNATIVES

The size and layout of Lynden Municipal Airport's property and constraints that exist on all sides of the property make identification of a variety of development alternatives impossible. Major roads extend perpendicular to the runway on both its east and west ends. Private properties exist along the north and south sides of the airport.

It may be both possible and desirable, as explained below, to increase the size of so-called landside areas – areas used for structures, vehicle roads and vehicle parking – on the southeast side of the airport. The remainder of this section focuses on recommendations that, if followed, will increase airport safety and efficiency as well as enhance the airport's role as a portal to the city of Lynden and its environs.

#### Airport capital improvements

Actions recommended within Lynden's existing airport boundary are listed below and further explained in the following section.

- Runway 25 approach surface improvements. These improvements include a reduction in height or removal of trees east of Runway 25 to provide for a 20:1 approach surface and a re-aiming of the PAPI system. A 20:1 (5 percent) approach surface is consistent with FAA airspace standards relative to airports with visual approaches. Measurement of the 5 percent surface should begin at a location 200 feet east of the marked threshold.
- Improvements to the runway safety area, including: 1) civil work at the ditch east of Benson Road; 2) removal of the white fence east of Benson Road; 3) removal of all non-frangible signs, placement of all runway edge and threshold lights on frangible supports.
- Improve north side drainage.

- Paving of the aircraft parking area west of entry gate.
- Paved surface maintenance.
- Installation of runway hold-line signs.
- Installation of taxiway reflectors.
- Installation of coordinated caution, direction and feature identification signs on and off the airport.
- Reinstallation of specific runway lights.
- Installation of security cameras.
- Improvements to based and itinerant aircraft parking.
- Overlaying of paved surfaces.
- Installation of an automated weather observing system (AWOS).
- Reinstallation of runway light cable.

### 4.4 DEVELOPMENT DETAILS

#### ACTION 1: RUNWAY 25 APPROACH SURFACE IMPROVEMENTS

Several trees east and a few trees west of Depot Road penetrate the Runway 25 approach surface to an unsafe degree. Depictions of the approach surface are on several drawings that are contained in the drawings section of this plan and on a separate large-scale drawing set. Local pilots are aware of these trees and are able to compensate for them. However, the trees cause their approaches from and departures to the east to be steeper than ideal. Visiting pilots who are unaware of the trees are at increased risk, especially at night.

This plan recommends lowering or removal of trees that penetrate the Runway 25 approach surface. A depiction of the relationship of the trees to the approach surface may be found on

drawing C1.3 of this plan's drawing set. A survey will be required to determine the extent to which the trees currently penetrate the approach surface.

After the approach slope obstructions are lowered or removed the precision approach path indicator (PAPI) that provides visual glide path information to approaching pilots should be relocated as necessary and re-aimed to indicate a standard approach slope, which is typically between 3 and 4 degrees. It is very important to have the PAPI system reinstalled and aimed in a manner that is consistent with the PAPI manufacturer's directions and that both the Runway 25 and Runway 7 PAPI systems are routinely checked for proper alignment. Records of PAPI system checks should be dated, signed and made a part of a permanent airport maintenance record.

### **ACTION 2: IMPROVEMENTS TO THE RUNWAY SAFETY AREA**

As explained in Chapter 2, Lynden Municipal Airport does not have a conforming runway safety area at either end due to a number of issues, including a ditch and fence that are east of Benson Road, Benson Road itself and Depot Road. Some features, such as signs on non-frangible posts, are also inconsistent with the RSA standard.

For airports with the airport reference code category of Lynden, RSAs extend 60 feet on either side of the runway's centerline and 240 feet beyond the pavement ends.

Recommendations are:

- Enclose the ditch that is east of Benson Road by installing a culvert and surface drainage features as necessary. Ensure that the elevation of the area within the RSA is generally even with the runway elevation.
- Remove the white fence east of Benson Road.
- Remove the non-frangible sign east of Ben-

son Road and south of the runway.

- Remove all signs, including the "1/2 way" sign, that are on non-frangible posts.
- Pass and enforce a city ordinance making it unlawful for all but emergency vehicles to enter or leave airport property from Benson Road.

### **ACTION 3: SELF-SERVE FUEL TERMINAL REPLACEMENT**

The computer equipment and software that operate the fuel-payment system are outdated. The city has received a quote from its fuel terminal supplier to replace this equipment. This alteration to the fuel system should be accomplished as soon as possible.

### **ACTION 4: IMPROVE NORTH SIDE DRAINAGE**

During extended periods of rain, water collects north of the runway. Drainage in these areas should be improved.

### **ACTION 5: PAVE AIRCRAFT PARKING**

Pave additional areas south of the airport entry drive between the fuel tank and the entry gate to improve based and transient aircraft parking. Install a fifth aircraft parking space east of the existing four spaces.

### **ACTION 6: PAVED SURFACE MAINTENANCE**

Actions that would continue to preserve – and that would in some cases replace – paved surfaces are among the most important capital projects that could be carried out at Lynden Municipal Airport. The runway has PCI values of 78 to 81, which indicate, according to Applied Pavement Technology Inc., that preventive maintenance such as crack sealing and seal coating is satisfactory to maintain its integrity. PCI values along much of the taxiway are even higher. Preventive maintenance is also sufficient for these areas. It should be remembered, however, that pavement deterioration is insidious. It

is important to address the runway/taxiway system routinely. Paved surface maintenance is recommended throughout this plan during each of the five-year capital expenditure periods. A runway overlay project is planned for the second of the five-year capital periods.

### **ACTION 7: RUNWAY HOLD-LINE SIGNS**

Among the most important safety actions that can be taken at any airport are those that attempt to prevent untimely runway incursions. Runway incursions are defined as movement by an aircraft or vehicle onto an active runway at a location and a time that risks collision with aircraft using the runway. Risks of such incursions vary with facilities. At Lynden, the less than standard runway-to-taxiway separation and the numerous locations where aircraft can access the runway intensify this risk.

Pilots who routinely use this airport are mindful of its conditions and are most likely extra vigilant. Visiting pilots have varying knowledge of the airport. All that can be done to avoid mishaps between aircraft and between aircraft and vehicles should be done.

Two methods are generally employed to prevent runway incursions: painted runway hold lines and runway hold-line signs. Both methods indicate to pilots the locations that they should not pass beyond toward a runway before assuring themselves that it is safe to do so.

The constrained conditions at the airport combined with the runway's numerous access locations – eight on the south side alone – make installation of standard hold-line signs challenging as those signs can themselves become hazards to aircraft. Nevertheless, it is better to have runway hold-line signs in even a constructed area than to not have the signs at all. It is recommended that Lynden install runway hold-line signs at all areas on the south side of the runway where aircraft can access the runway.

These signs should be consistent with FAA sign design standards.

It is also recommended that the airport committee review the access locations on the south side of the airport to determine whether all of them are necessary. For instance, the two transient aircraft taxilanes at the east end of the airport that directly access the runway may not be necessary. It may be safer to route aircraft parked in those areas to the large taxiway-to-runway connector that is west of those locations. This action may require additional paving. Another access location that is suspect is the one directly west of the primary connector at the east end. These three access locations should be considered for decommissioning. Further, this plan recommends that additional access locations not be created on the south side of the runway.

Finally, it is important to include in agreements that provide direct access to the runway from private properties on the north side a stipulation that homeowners will paint hold-line graphics where possible to remind them to be vigilant.

### **ACTION 8: TAXIWAY REFLECTORS**

Taxiway reflectors are an inexpensive and effective way to define the edges of taxiway systems. Reflectors are recommended throughout the taxiway and taxiway-to-runway connectors on the south side of the airport. It is important that the reflectors chosen are low in height and frangible. Some reflectors require non-frangible pipes to act as supports for frangible elements. If such reflectors are chosen, it is important that the non-frangible portions of the reflectors are no more than two inches above grade.

Occasionally, surplus taxiway reflectors are available from airports that have installed taxiway lights. WSDOT's Aviation Division and the Washington State Community Airport Association (WSCAA) are sources of information about surplus reflectors.

## **ACTION 9: DIRECTION AND FEATURE SIGNS**

Signs that provide information, especially to visitors, are important. If properly designed and coordinated, signage can also display pride in a facility and be representative of good management. Additionally, signs play a role in reducing theft and vandalism. General signage should be worded carefully so as to recognize the airport's role as a portal to the city of Lynden and its environs. Signs should also be installed at key areas in Lynden to provide those visiting by vehicle with directions to the airport.

Signs recommended are:

*Airport direction:* located along roadways in the community to provide instructions to motorists as to how to find the airport.

*Transient aircraft parking:* These signs should be located on the fence south of the relocated transient aircraft parking area (see item 13).

*Welcome center signage:* It is understood that a new structure that will contain a visitor's area is pending as this plan is being developed. It is recommended that signage in this area welcome visitors and provide clear instructions about: 1) aircraft parking, including fees; 2) vehicle parking; 3) emergency contacts; 4) reporting of unsafe or suspect conditions; and 5) airport traffic pattern and noise abatement procedures.

All signs on the airport that are mounted on non-frangible posts, including the "1/2 way" signs north of the runway, should be removed. All new signs should be professionally designed and manufactured and should be consistent so as to provide a coordinated appearance.

It is recommended that the sign that is left of the airport entry drive that relates to grant funds from WSDOT/AD be removed and reserved for installation during times that projects that are funded by the Aviation Division are active.

## **ACTION 10: RUNWAY LIGHTS**

Runway edge and threshold lights are installed on general aviation base cans that act as large junction boxes. Some of the lights are, however, on non-frangible posts and many of the lights are installed so that they are not vertically oriented. These two conditions should be corrected. Further, the lighting array should conform to recommendations contained in FAA advisory circular 150/5340-30B or its successor. For instance, runway threshold lights should be co-located with threshold markings.

## **ACTION 11: INSTALL SECURITY CAMERAS**

Video cameras increase security and provide information about airport conditions. Probable locations for cameras are the airport entry gate, the fuel area and the runway environment from the east end. These cameras should be linked to Washington State Aviation's camera system that is available to pilots via the internet.

## **ACTION 12: IMPROVE BASED AND ITINERANT AIRCRAFT PARKING**

Move the based aircraft parking locations that are west of the existing operations building south to provide for taxiway object-free area (TOFA) clearance to the extent possible considering the need to move aircraft to and from hangars in the area. The TOFA extends 44.5 feet on both sides of the taxiway centerline. This area should be able to accommodate four based aircraft.

Adjust usage of the five aircraft parking spaces that are between the fuel area and the entry gate between based and transient aircraft as necessary.

## **ACTION 13: OVERLAY PAVED SURFACES**

Overlay the runway and other paved surfaces that are in need of an overlay with two inches of Class A/B hot-mix asphalt. Estimations contained in Chapter 5 are made for the existing runway and taxiway system.

#### **ACTION 14: INSTALL AWOS**

Automated weather observation systems (AWOS) have become quite sophisticated. AWOS are able to determine and communicate a number of weather factors to pilots. AWOS are available in a number of configurations, from those that provide very basic weather information such as temperature, wind direction, wind velocity and barometric pressure to those that are also capable of communicating cloud ceiling, horizontal visibility and a number of other weather factors.

#### **ACTION 15: REPLACE RUNWAY LIGHT CABLE**

The date of installation of the wiring that serves the runway lights is unknown but is estimated to be in the mid-1980s. It should be programmed for replacement.

#### **PROJECT PHASING**

Current state regulations do not allow WSDOT/AD to provide grants in excess of \$250,000. It is not anticipated that any project recommended in this plan will exceed that amount. Should the city decide to accomplish major construction projects that might exceed \$250,000 in capital expenditure it should consider phasing the work in two segments and dividing the work over at least two grants. Major runway reconstruction as an example would be divided into design and engineering (Phase 1) and construction (Phase 2).

All project phasing efforts should be coordinated closely with the WSDOT/AD project manager.

#### **4.5 DETAIL AND TIMING OF IMPROVEMENTS**

This section lists the timing of recommended improvements.

#### **PROJECTS 2008-2012**

Action items 1 through 12 are important to the safety and efficiency of Lynden Municipal

Airport. It is recommended that these actions be accomplished in the 2008-through-2012 time period or that they at least be programmed during that period for accomplishment shortly thereafter.

These actions include: 1) work necessary to improve the approach to Runway 25 and to ensure proper aiming of the PAPI systems; 2) improvements to the RSA and ROFA; 3) updating of the fuel terminal; 4) improvements to north side drainage; 5) additional paving east of the fuel area; 6) paved surface maintenance; 7) runway hold-line signs; 8) installation of taxiway reflectors; 9) improved general signage; 10) reinstallation of certain runway lights; 11) installation of security cameras; and 12) improvements to based and itinerant aircraft parking areas.

Items 13 through 15, including overlaying of paved surfaces, installation of an automated weather observing system (AWOS) and reinstallation of runway light cable, are programmed for the second five-year planning period.

Paved surface maintenance, identified as item 6, is programmed for each of the five-year planning periods.

#### **4.6 APPROACH SURFACE CONSIDERATIONS**

The existing displaced threshold for Runway 7 is approximately 300 feet east of the east right-of-way of Benson Road. Benson Road is considered a 15-foot obstruction by Federal Air Regulation Part 77. If Appendix 2, Table A2-1 of FAA Advisory Circular 150/5300-13, mentioned earlier in this section is employed, this threshold is appropriately located.

The existing displaced threshold for Runway 25 is 434 feet west of the end of pavement and 619 feet west of the west right-of-way of

Depot Road. Depot Road is, therefore, not an obstruction to the approach surface. Trees east and west of Depot Road are obstructions to the approach surface and are deemed by this plan to be hazards to flight. The Runway 25 approach surface should begin at a location 200 east of the existing threshold. That is to say that Table A2-1 of the FAA advisory circular should not be employed at the east end of the airport since the trees east of Benson Road are not visible at night.

#### **4.7 HANGAR AND TIE-DOWN DEVELOPMENT**

This section relates existing and expected numbers of based and itinerant aircraft to development of aircraft tie-downs and construction of aircraft hangars over the planning period.

Chapter 3 indicates that 24 aircraft are currently based at Lynden Municipal Airport. Twenty-three of these aircraft are in privately owned hangars. Seven of the hangars are on the north side of the airport; 16 of the hangars or hangar spaces are on the south side of the airport.

Chapter 3 also forecasts that by the year 2027, the end of the planning period addressed in this plan, there will be demand for another 26 aircraft parking places, which would be a combination of hangars and outside tie-downs. To determine whether that demand can be accommodated it is important to review private property adjacent to the airport in an effort to determine the number of future hangars that might be available. On the south side of the airport it appears that four additional hangars may be constructed. Those would be associated with the four remaining properties that are adjacent to the south airport boundary and that are west of the multi-position hangar. Future capacity on the north side is more difficult to determine. Several homeowners are in a position to construct hangars or to activate existing hangars. It is not readily apparent how many of those homeowners, or future owners

of those homes, will activate their airport-access privileges. This plan estimates five future hangars will be constructed on the north side.

Property available for parking an additional three aircraft exists east of the multi-position hangar. Outside parking for four to five aircraft exists immediately west of the entrance to the airport.

In total, then, Lynden Municipal Airport appears to have existing or future capacity for approximately 41 aircraft, considerably fewer than the 50 aircraft forecast. Further, it should be noted that if all of the available space on Lynden's airport and adjacent to it are used for based aircraft in the future it will be difficult for the airport to accommodate visiting aviators.

If the airport is not able to accommodate growing demand it will simply mean that the airport is full and that those wishing to park their airplanes will go elsewhere.

#### **4.8 DEVELOPMENT ALTERNATIVE – EXPANDED LANDSIDE**

It is important to identify reasonable options to expand and/or improve the airport whenever they are apparent. In this case, the only apparent option for expansion appears to be purchase of property south of the southeast quadrant of the airport. Property added to the airport would, at minimum, measure approximately 90 feet north to south and 650 feet east to west. It would require a property line boundary adjustment. This property, in combination with a purchase of the currently leased property, would provide not only adequate room to meet forecast demand but would also allow for relocation of the airport's vehicle entry drive, which would logically terminate at a small terminal for visitors. Adjacent to the terminal would be a relocated fuel area and a transient aircraft parking area. Relocation of the entry drive would, in turn, allow for extension of the existing taxiway to the east so that it is parallel with the 25 end of the runway. This would

be a major safety improvement.

This concept is depicted on drawing C1.2 of the official drawing set.

## **4.9 BUILDING RESTRICTION LINES (BRLS)**

Building restriction lines are lines parallel to runways that are established to identify permissible locations for structures. Generally, BRLs are located so that FAR Part 77 transitional surfaces will not be penetrated by planned structures. Maximum structure heights are typically considered to be 15 feet for planning purposes.

Transitional surfaces rise at a ratio of 7:1 (horizontal to vertical) perpendicular to an airport's runway. Outward and upward slopes begin at another FAR PART 77 surface called the "primary surface," which at Lynden Municipal Airport is 125 feet from centerline on both side of the runway. Primary surfaces increase and decrease in elevation with the nearest point of the runway, so differences in runway elevations relative to adjacent proposed building sites must be considered.

It should be noted that FAR Part 77 is not a legal restriction of structure heights. Instead, it is a federal regulation that identifies a method for determining existing and proposed penetrations of airspace and their dispensation. Penetrations are considered by the FAA to be obstructions to navigable airspace unless a study by the FAA determines otherwise. FAA studies may result in one of three conclusions: 1) no objection to the penetration; 2) objection unless mitigation, such as lighting, is accomplished; and 3) objection. FAA airspace determinations are not binding on local jurisdictions since the FAA does not have authority over local zoning. Nevertheless, it is a good idea, and WSDOT/AD policy, to avoid FAR Part 77 penetrations. FAR Part 77 requires the filing of documents related to proposed

construction on and near airports, depending on the height and location of the proposed construction.

BRLs related to both existing and ultimate runway conditions are depicted on the airport layout plan and should be adhered to as new construction is accomplished.

## **4.10 ZONING AND LAND USE**

Forecasting usage and scheduling improvements at Lynden Municipal Airport will ultimately prove to be fruitless exercises unless meaningful efforts continue to protect this facility. Airports in the United States close routinely, not because of a lack of funds to keep them open but because municipalities and counties did not anticipate and address the negative impacts of encroachment and the insidious advance of incompatible land uses. It is easy to overlook the need for airport protective zoning and land-use planning both at rural airports that do not have existing adjacent development or at airports, such as Lynden's, that seem to coexist well within their communities. It is best to address this subject before protective actions must be used to try to reverse incompatible growth.

Incompatible pressures on airports come in two forms: 1) those that restrict airspace necessary to maintain operational viability; and 2) those that place incompatible development so close to airports that it becomes a risk to the facility and its neighbors.

As mentioned throughout this plan, development exists on three sides of the airport. Growth and future development to the west will most likely be where land-use and zoning decisions could impact airport operations. Documents that can help prevent incompatible development and airport conflicts from occurring are the comprehensive plan and zoning ordinance.

Recommended actions in this section are

directed to Lynden's comprehensive plan and zoning ordinance and are depicted in drawings C 1.6, titled "Zoning and Land Use," and C 1.7, titled "Exhibit A."

**Recommendation 1: Amend the city comprehensive plan and transportation plan to include policies supportive of airport operations.**

Lynden's comprehensive plan update, adopted in 2004, plans for future growth. Its transportation plan addresses the overall transportation system. While both plans identify the airport and contain policies related to broader land use, growth and transportation issues, neither plan includes policies specific to the airport's role in the community.

WSDOT/AD offers model policies related to airport safety and long-term airport/community co-existence. Policies recommended to be added to Lynden's comprehensive plan are as follows:

- Encourage growth and development surrounding the airport that will be compatible with current airport operations and potential airport expansion.
- Reserve areas adjacent to the airport's taxiway system for uses that are airport-dependent. Avoid using areas adjacent to taxiways for uses that do not require such access since these areas are limited.
- Evaluate all proposed amendments to the comprehensive plan, capital facilities plan, and/or urban growth area in terms of whether such amendments may increase incompatible land uses or the potential for incompatible development adjacent to the airport through inappropriate land-use or zoning designations and/or inadvertent land-use policies.
- Continue to be aware of the need to maintain clearance of FAR Part 77 surfaces in all appropriate future zoning and land-use

documents.

Example policies under transportation-related goals could include:

- Identify, preserve and enhance, through inter-jurisdictional planning, goals, policies and development regulations that promote transportation linkages and multimodal connections to and from Lynden's airport.
- Clearly identify Jansen Field as an essential public facility.
- Recognize Jansen Field as an integral part of a larger multi-modal transportation system.

**Recommendation 2: Continue to plan for Benson Road improvements**

This plan's actions related to runway improvements and threshold relocations are based on the current location of Benson Road. Clearly, the further west Benson Road is located the safer airport operations will be.

**Recommendation 3: Maintain existing county zoning**

Land west of the airport is in Lynden's urban growth area and is zoned by Whatcom County as agriculture. This land is currently undeveloped and is compatible with airport operations. This plan recommends that the zoning for these properties not change. Any proposed zoning changes to these properties should consider the presence of the airport and only allow districts or uses that would not interfere with or be incompatible with the airport.

**Recommendation 4: Develop an airport-specific zoning district**

Airport-related parcels owned and leased by the city are currently zoned single-family residential overlaid by an airport overlay zone. Developing an airport-specific zoning district for these



parcels will permit only uses pertinent to airport operations and prevent conflicting uses from being developed. The ordinance should address height, setbacks, lighting, glare and signage as well as uses that produce emission of smoke, fly ash, dust, vapor, gases and other forms of air pollution that may conflict with any present or planned operations.

**Recommendation 5: Add height restrictions to airport overlay district**

Height restrictions are not specified in the airport overlay district, but the underlying district (single-family residential) restricts the height of structures to 32 feet. To ensure further safety and prevent penetration into FAR Part 77 imaginary surfaces, lower height restrictions in the airport overlay zone should be specified. The city may also want to consider adding other height restrictions to the single-family district where properties lie within the airport’s area of influence. For additional information on FAR Part 77 please consult drawings C1.1, C1.6 and C1.7.

**Recommendation 6: Expand airport overlay district**

Along with specified height restrictions, expanding the airport overlay zone by 100 feet in all directions will further protect the airport’s surrounding airspace and prevent development that could be detrimentally impacted by airport operations.

**Recommendation 7: Plan for additional roadways and consider nearby roadways as 15-foot objects**

Future residential development planned to the west and northwest of the airport will result in increased traffic along Benson Road and future local streets. As developments are reviewed, the placement of roads in proximity to the airport should be considered. FAR Part 77 considers roads of the category anticipated to serve Lynden’s future residential uses as 15-foot objects. Future roads, especially those underlying the FAR

Part 77 approach/departure surfaces, should be reviewed carefully.

**Additional zoning and land-use considerations**

***Required notice of construction***

Federal Air Regulation Part 77.13 requires that notice be given to the FAA of any construction, including roads, that is: 1) 200 feet or more above ground level; or 2) that is within 10,000 feet of the nearest part of a runway that is 3,200 feet long or less and that breaks a slope of 50:1. Notice may be given by filling out a paper form or can be submitted online at <https://www.oiaa.faa.gov/oiaa/external/portal.jsp>.

***Property Owner Notification Requirements***

Due to the residential nature of the airport environment and anticipated residential activities west of the airport, a process should be formalized requiring the city to inform purchasers of property around the airport that their property is located adjacent to, or within close proximity to, Jansen Field and that their property may be impacted by a variety of aviation activities. This process can be codified in the zoning ordinance. Note that such activities may include, but are not limited to, noise, vibration, chemicals, odors, hours of operation, low overhead flights and other associated activities, and that the FAA establishes standards and notification requirements for potential height hazards that may be caused by structures, building, trees and other objects affecting navigable air space through 14 CFR Federal Aviation Regulations (FAR) Parts 157 and 77. Any questions relating to structures, height hazards or obstructions should be directed to the Whatcom County Planning Department or the FAA. (See the WSDOT/AD disclosure notice and information related to Title 14 Code of Federal Regulations Parts 157 and 77 in the appendix to this plan.)

**Resources**

Both Airside and the Washington State

Department of Transportation's Aviation Division are very willing to assist the city of Lynden and Whatcom County as they continue to work with zoning and comprehensive plan issues. Airside may be reached at (360) 222-3646. The Aviation Division may be reached at (360) 651-6300.

# Chapter 5:

## Financial

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Chapter 4 contains information about airport improvements that are intended to meet forecast demand and increase safety, utility and efficiency at Lynden Municipal Airport. This chapter identifies the cost of those improvements and establishes a plan to pay for them.

### 5.1 GENERAL FINANCIAL INFORMATION

#### Cost estimates

Project cost estimates are in 2008 dollars. A 30 percent contingency has been incorporated into projects where applicable to cover engineering, administration and unforeseen circumstances. As this portion of this plan is updated, the city of Lynden will need to adjust the 2008-based dollar amounts as they are affected by inflation. These estimates are for planning purposes only and should not be used as construction cost estimates. The following formulas were applied to estimates for other paved surfaces.

#### *Base course and top course rock*

Area to be paved times the depth of compacted rock @ .167 for 2-inch depth and .25 for 3-inch depth.

#### *Class HMA asphalt (ACP)*

A yield of 8.25 square yards per ton of asphalt is estimated for a 2-inch mat depth.

#### Organization

This capital improvement program (CIP) has been organized by scheduling specific projects in four, five-year time periods. Using this five-year system will provide the city of Lynden with planning and funding flexibility. It will also allow for periods when grant funds requested by the city may

not be available from the Washington State Department of Transportation/Aviation Division (WSDOT/AD). It is important to review and adjust this CIP on at least an annual basis.

#### Funding sources

This capital improvement program makes assumptions that some funding will be available from sources other than WSDOT/AD. Actual availability of funds as identified herein will depend on a number of factors, including the level of funds available to WSDOT/AD and to other agencies to distribute and the needs of other airports as compared to the needs of Lynden Municipal Airport.

#### Planning ahead

A factor that plays a material role in the successful receipt of grant funds from WSDOT/AD and other sources, such as the Washington State Department of Community Trade and Economic Development, is communication. Granting agencies are more likely to respond positively to grant requests when they are given plenty of advance notice about intentions to apply for funds. This helps granting agencies to do their own advance planning. Informing grant sources of plans three to four years in advance, and each year thereafter until funds are requested, is an effective strategy.

#### Third-party financing

Airports often use third-party financing for development of facilities that are to be used primarily by private businesses or organizations. Projects of this kind include hangars and industrial structures. Some portions of this CIP identify limited cost to the city of Lynden – and, in some cases, no cost at all – because of assumed third-party financing.

## **Rates and charges**

It is very important at Lynden Municipal Airport, as with all airport facilities, that careful attention be paid to determinations of rates and charges. Small airports have limited abilities to generate revenue. It is often the case that fees that sponsors of small airports charge for based aircraft tie-downs, land leases, overnight tie-downs, fuel and other services are lower than what might be considered market value. In some cases, fees — with the exception of those associated with fuel — are not charged at all.

Sponsors of most small airports do not have the ability to collect revenue that is sufficient to pay for major capital improvements. It is important that airport sponsors do their best to maximize revenue while being cognizant of the ability of those engaged in general aviation to pay. In this way, airport sponsors can show that they are doing their best to contribute to the needs of their airports.

When establishing rates and charges, airport sponsors should consider the potential of volunteerism. Efforts by individuals who volunteer their time — local pilots, for example — are very important to airports such as Lynden Municipal Airport. It is important, though, to strike a fiscally sound balance between recognizing (applying a value to) volunteer efforts and charging rates that help airports remain financially viable. It is particularly important for the city of Lynden to carefully consider the value of Lynden Municipal Airport property as it looks forward to growth and major capital improvements. A periodic review of airport-related property lease fees and access fees is recommended. Fees should be adjusted to reflect real market conditions.

## **Financing of this development program**

As stated above, WSDOT/AD is Lynden Municipal Airport's primary source of grant funds for airside

improvements. Airside improvements are those that relate to the runway/taxiway system, the aircraft parking apron and navigational aids, including signage. Planning and engineering for projects that are eligible for WSDOT/AD construction grants are also eligible for grant funds. For additional information about eligibility of projects for WSDOT/AD grants, as well as the division's project priority system and application process, see their website: <http://www.wsdot.wa.gov/aviation/grants/default.htm>. Under the Grant Program tab see the Grant Procedures Manual.

The grant cycle following publication of this plan has not been announced by WSDOT/AD. This plan report should be used to prepare a grant request that will be submitted to WSDOT/AD in a timely manner once that cycle is announced.

## **The runway safety grant program**

WSDOT/AD has a grant program specifically designed to address runway safety improvements, especially those improvements that reduce the likelihood of inadvertent runway incursions. Information about this program is included in the appendix to this plan. Projects such as hold-line sign installation or graphic hold lines— as specified in Chapter 4 — would qualify for funding under this specific program. This is an excellent program that target high-priority safety issues.

## **CTED and EDA**

Sources of grant funds for landside-related projects such as structures, roads and utilities are the Washington State Department of Community Trade and Economic Development (CTED) and the United States Department of Commerce's Economic Development Administration (EDA).

CTED's contact information is:

Washington State Department of Community  
Trade and Economic Development  
RAAD Building  
MS: 42525  
128 – 10th Avenue  
PO Box 42525  
Olympia, WA 98504  
Business and Project Development Office  
(360) 725-4100

EDA's contact information is:

United States Department of Commerce  
Economic Development Administration  
Jackson Federal Building, Room 1856  
915 Second Avenue  
Seattle, WA 98174  
(206) 220-7682

## **5.2 RECOMMENDED PROJECTS**

This section estimates costs of projects over the 20-year planning period that are included in Chapter 4. Table 18 provides details about how project costs have been calculated. Table 19 indicates planned sources of funds for the projects. Table 20 recaps expected capital expenditures by five-year phase.

Capital project cost information has been detailed where possible. Costs associated with some items, such as a future welcome center, have been generally estimated because such costs can only be determined once design work has been accomplished. Minor maintenance expenses are not specifically identified.

Capital improvement information should be uploaded to the WSDOT/AD Airport Information System.

**Table 18: 20-year capital improvement program details**

<b>Item</b>	<b>2008 – 2012 projects</b>	<b>Detail cost</b>
A1	Runway 25 approach surface improvements Remove or lower height of trees in the Runway 25 approach surface Re-aiming of the PAPI system Total	Unknown \$3,000 \$3,000
A2	RSA and ROFA improvements - enclose ditch, remove fence and signs	\$25,000
A3	Self-serve fuel terminal replacement	\$6,500
A4	Improve north-side drainage (no estimate)	N/E
A5	Pave aircraft parking area	\$8,000
A6	Pavement maintenance - crack seal, sealcoat and re-paint	\$50,000
A7	Runway hold-line signs (6 @ \$750 plus installation)	\$6,000
A8	Taxiway reflectors (40 @ \$50)	\$2,000
A9	Signs on and off airport property	\$6,000
A10	Re-install runway lights	\$2,000
A11	Security cameras	\$5,000
A12	Aircraft parking improvements	\$1,000
	<b>Total 2008 – 2012 projects</b>	<b>\$114,500</b>
<b>2013 – 2017 projects</b>		
B1	Overlay existing aircraft operating paved surfaces Runway (11,000 square yards) Taxiway (4,450 Square yards) Sales tax at 8.4 percent Total	\$165,000 \$67,000 \$19,500 \$251,500
B2	AWOS installation	\$140,000
B3	Runway light cable re-installation	\$30,000
	<b>Total 2013 – 2017 projects</b>	<b>\$421,500</b>
<b>2018 – 2022 projects</b>		
C1	Pavement maintenance - crack seal, seal coat and re-paint	\$50,000
	<b>Total 2018 – 2022 projects</b>	<b>\$50,000</b>
<b>Item</b>	<b>2023 – 2027 projects</b>	<b>Detail cost</b>
D1	Pavement maintenance - crack seal, seal coat and re-paint	\$50,000
	<b>Total 2023 – 2027 projects</b>	<b>\$50,000</b>
	<b>Total CIP 2008 - 2027</b>	<b>\$636,000</b>

**Table 19: 20-year capital improvement program recommended cost distribution**

Item	Project	Total cost	WSDOT/AD	City of Lynden	Private or other grant agency	Volunteer labor, materials and equipment
<b>2008-2012</b>						
A1	Runway 25 approach	\$3,000	\$2,800	\$200	0	0
A2	RSA, ROFA improvements	\$25,000	\$10,000	\$15,000	0	0
A3	Fuel terminal	\$6,500	0	\$6,500	0	0
A4	Northside drainage	unknown				
A5	Paving	\$8,000	\$7,600	\$400	0	0
A6	Pavement maintenance	\$50,000	\$47,000	\$3,000	0	0
A7	Runway hold-line signs	\$6,000	\$5,500	\$500	0	0
A8	Taxiway reflectors	\$2,000	\$1,500	0	0	\$500
A9	Signs - general	\$6,000	0	\$6,000	0	0
A10	Runway lights	\$2,000	\$1,000	\$200	0	\$800
A11	Security cameras	\$5,000	\$4,750	\$250	0	0
A12	Aircraft parking improvements	\$1,000	\$500	\$500	0	0
	<b>Total 2008 - 2012</b>	<b>\$114,500</b>	<b>\$80,650</b>	<b>\$32,550</b>	<b>0</b>	<b>\$1,300</b>
<b>2013 - 2017</b>						
B1	Pavement overlay	\$251,500	\$238,000	\$13,500	0	0
B2	AWOS	\$140,000	\$100,000	\$40,000	0	0
B3	Runway light cable	\$30,000	\$28,500	\$1,500	0	0
	<b>Total 2013 - 2017</b>	<b>\$421,500</b>	<b>\$366,500</b>	<b>\$55,000</b>	<b>0</b>	<b>0</b>
Item	Project	Total cost	WSDOT/AD	City of Lynden	Private or other grant agency	Volunteer labor, materials and equipment
<b>2018 - 2022</b>						
C1	Pavement maintenance	\$50,000	\$47,000	\$3,000	0	0
	<b>Total 2018 - 2022</b>	<b>\$50,000</b>	<b>\$47,000</b>	<b>\$3,000</b>	<b>0</b>	<b>0</b>
<b>2023 - 2027</b>						
D1	Pavement maintenance	\$50,000	\$47,000	\$3,000	0	0

**Table 19: 20-year capital improvement program recommended cost distribution (continued)**

	<b>Total 2023 – 2027</b>	<b>\$50,000</b>	<b>\$47,000</b>	<b>\$3,000</b>	<b>0</b>	<b>0</b>
	<b>Total CIP</b>	<b>\$636,000</b>	<b>\$541,150</b>	<b>\$93,550</b>	<b>0</b>	<b>\$1,300</b>

*Note: Items that relate to paving, signage and lighting projects generally assume 95 percent participation from WSDOT/AD. Item A1 refers to the PAPI system but not to unknown costs that may be incurred with tree removal or reduction in height. A2 does not assume 95 percent WSDOT/AD participation due to nature of projects.*

**Table 20: Capital improvement program expenditure by phase**

<b>Phase</b>	<b>CIP total cost</b>	<b>WSDOT/AD</b>	<b>City of Lynden</b>	<b>Private or other grant agency</b>	<b>Volunteer labor, materials and equipment</b>
2008 – 2012	\$114,500	\$80,650	\$32,550	0	\$1,300
2013 – 2017	\$421,500	\$366,500	\$55,000	0	0
2018 – 2022	\$50,000	\$47,000	\$3,000	0	0
2023 - 2027	\$50,000	\$47,000	\$3,000	0	0
<b>Total</b>	<b>\$636,000</b>	<b>\$541,150</b>	<b>\$93,550</b>	<b>0</b>	<b>\$1,300</b>