

# **GOLDENDALE MUNICIPAL AIRPORT**

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**AIRPORT LAYOUT PLAN AND NARRATIVE REPORT**

**MARCH 2006**

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# Chapter 1: Introduction

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This airport layout plan and narrative report (ALP) for Goldendale Municipal Airport is sponsored by the city of Goldendale. It examines existing conditions at Goldendale Municipal Airport, forecasts future aviation activity over a 20-year time period, recommends improvements to ensure that the airport can 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 Goldendale 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 Goldendale 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:

- Airport development plan prepared by Airside, 1996.
- Pavement condition report sponsored by WSDOT/AD, 2000.

- The Washington State Aviation System Plan.
- The Klickitat County Comprehensive Plan

Primary funding for this report has been provided by the Washington State Department of Transportation's Aviation Division (WSDOT/AD). It has been prepared by Airside with assistance from a volunteer steering committee seated by the city of Goldendale. 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: Goldendale Municipal Airport ALP Steering Committee**

MEMBER
Mark Sigfrinius (mayor of Goldendale)
Ordell Enstad
Jim Riley
Bud Nolan
Mike Macy
Doug Herlily

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.

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# Chapter 2: Inventory and Current Activity

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## 2.1 GENERAL

### Goldendale

The community of Goldendale is centrally located in Klickitat County approximately 10 miles north of the Columbia River in south-central Washington State. Goldendale is approximately 100 miles east of Portland, Oregon, 60 miles south of Yakima and 140 miles southwest of the tri-cities of Pasco, Kennewick and Richland. The community is located 10 miles south of the southern boundary of the 1.4 million-acre Yakima Indian Reservation.

### Klickitat County

Klickitat County is in south central Washington. The county consists of 1,908 square miles of land. The county is bordered on the west by Skamania County, on the north by Yakima County, on the east by Benton County and on the south by the Columbia River. Klickitat County is generally rural. Klickitat County has a varied topography and variable climate. The general topography is one of mountains, plateaus, and narrow valley lowlands. Elevations in Klickitat County vary from the average flood level of the Columbia River at White Salmon of 50 feet above sea level to mountain peaks, reaching 5,800 in the Simcoe Mountain Ridge. Most of the farm land is on elevated plateaus about 1,000 feet in elevation.

### City of Goldendale

The city of Goldendale is centrally located in Klickitat County. Goldendale, with a population of 3,960 citizens, is the largest of the county's municipalities. Other municipalities include White Salmon and Bingen with populations of 2,193 and 672, respectively. Goldendale is Klickitat County's seat of government.

### Goldendale Municipal Airport

Goldendale Municipal Airport is located one mile northwest of the city. Airport property consists of 73 acres. The airport is bounded on the east by Fairgrounds Road, which connects the airport with the city. Undeveloped property exists to the north, west and south. Southeast of the airport is the Klickitat County Fairgrounds.

### Climate

Klickitat County's climate is affected by Pacific Ocean pressure systems and seasonal temperature variations. During winter prevailing low-pressure systems off the Pacific Northwest coast bring cold and wet weather to the area. During summer low-pressure systems are deflected to more northerly locations and replaced by high-pressure systems. This change creates hot and dry summer weather. The county is located within a rain shadow created by the Cascade Mountains. Precipitation is greatest in the western part of the county and at higher elevations, reaching in excess of 36 inches annually northwest of Trout Lake. Precipitation decreases to the south and east until it is less than nine inches a year at the Benton County line.

## 2.2 SOCIOECONOMIC DATA

### Population

Over the 35-year period from 1969 to 2005 Klickitat County's population has grown from 12,301 to 20,338 – an increase of 65 percent. This is a slower rate of growth than the statewide average. The rate of population growth has been erratic, ranging from 0.95 percent from 1960 to 1970 to 5.14 percent from 1970 to 1980. Klickitat County ranks 30th out of Washington State's 40 counties in population. Population density at 10.3 persons per square mile ranks Klickitat 31st among the counties in the state.

## Economy

Between 1969 and 2003 the number of people employed in Klickitat County increased from 5,244 to 9,273, an average annual rate of 1.77 percent. As with increases in population, employment growth has been sporadic. Ten times over the 35-year period there were reductions in the numbers of persons employed from one year to the next. In 1969, workers in Klickitat County made up 0.3 percent of Washington’s employed individuals. In 2003, it was still 0.3 percent of the statewide total. Klickitat County’ posted a 76.8 percent gain in employment from 1969 to 2003. This is less than the statewide increase in employment (131.5 percent) but more than the national increase of 83.6 percent.

## 2.3 LAND USE AND PLANNING

### Existing land use and zoning

#### *Klickitat County*

Two chapters of the Klickitat County Zoning Code relate to Goldendale Municipal Airport. Chapter 2.17 – the “Airport Approach Zone” – is intended to “safeguard the public safety and welfare” by placing height restrictions and other regulations on properties in and adjacent to the airport. In addition to height restrictions this chapter addresses (1) conditions and activities that may cause electrical interference with air navigation or communications systems, (2) lights that may interfere with the airport’s lighting system, (3) conditions or activities that may cause smoke, dust and glare that might impact flight operations, and (4) conditions or activities that might increase bird strike hazards.

Height limits imposed by Chapter 2.17 address Federal Air Regulation Part 77 visual approach surfaces.

Chapter 2.29, titled “Airport Development District (AD),” provides for the establishment and development of public use airports and associated facilities. The intent of this district is to ensure compatibility with properties adjacent to Goldendale’s airport and to enhance economic development.

Chapter 2.29 lists both permitted and conditional uses within the property encompassing the air-

**Table 2: Industry sectors**

Industry sector	Establishments	Employees
Agriculture, forestry, fishing and hunting	114	921
Mining	*	*
Utilities	6	46
Construction	95	229
Manufacturing	21	344
Wholesale trade	30	129
Retail trade	49	316
Transportation and warehousing	22	60
Information	7	47
Finance and insurance	16	93
Real estate, rental and leasing	19	36
Services	296	1,155
Federal government	7	87
State government	17	165
Local government	30	1,381
Not elsewhere classified	3	28

*Source: Washington State Employment Security Department.*

port. Permitted uses include airport facilities, hangars, aviation schools and agricultural operations as long as they are compatible with airport operations. Conditional uses include general offices, restaurants, a caretaker residence and public util-

**Map 1: Goldendale regional location**



ity facilities. This chapter provides a case-by-case review of proposed individual development. The section titled “Master Plan and Binding Site Plan” of Chapter 2.29 provides for review and approval of an “FAA approved master plan.”

Section 2.29:6, paragraph 1, states that “all [development] improvements shall conform to applicable federal regulations concerning dimensional restriction on air operations, including height restrictions and required setbacks from air operations areas.”

### City of Goldendale

Goldendale Municipal Airport is within an industrial park (IP) zone. This zone is outside of the community’s urban growth boundary. The city zoning code makes no reference specifically to the airport.

Klickitat County’s zone chapters 2.17 and 2.29, as well as the city’s land-use map, are included in the appendix to this document.

### Washington Growth Management Act

State legislation requires that all towns, cities and counties in which there is located a public use general aviation airport discourage incompatible development through comprehensive plan policies and consistent development regulations. This legislation is set forth in the Revised Code of Washington (RCW 35.63.250, 35A.63.250, 36.70.547, and 36.70A.510). This legislation is applicable to all GMA and non-GMA jurisdictions in the state.

Depending on airport characteristics, location and the amount of usable open space adjacent to a general aviation airport, incompatible land uses may include public assembly/large concentrations of people, residential density, intensity of nonresidential development, structure height, hazardous/explosive material, wildlife hazards, light/glare, air quality and electronic signals.

Klickitat County is planning under GMA RCW 36.70A.510. Code sections implemented by Klicki-

tat County are in general conformance with the growth management act.

tions are, in general, contrary to policies of the FAA and WSDOT/AD.

Klickitat County does not have a population or a rate of growth that require it to plan according to Chapter 36.70A.040. Nevertheless, county code chapters identified in this section that relate to Goldendale Municipal Airport are in general conformance with the Growth Management Act.

## 2.5 RECENT AIRPORT REVITALIZATION

Within the past three years the city of Goldendale, with financial assistance from WSDOT/AD, has rehabilitated runway, taxiway and aircraft parking pavement. These projects cost just over \$125,000,

Recommendations related to land use and zoning are contained in Chapter 4.

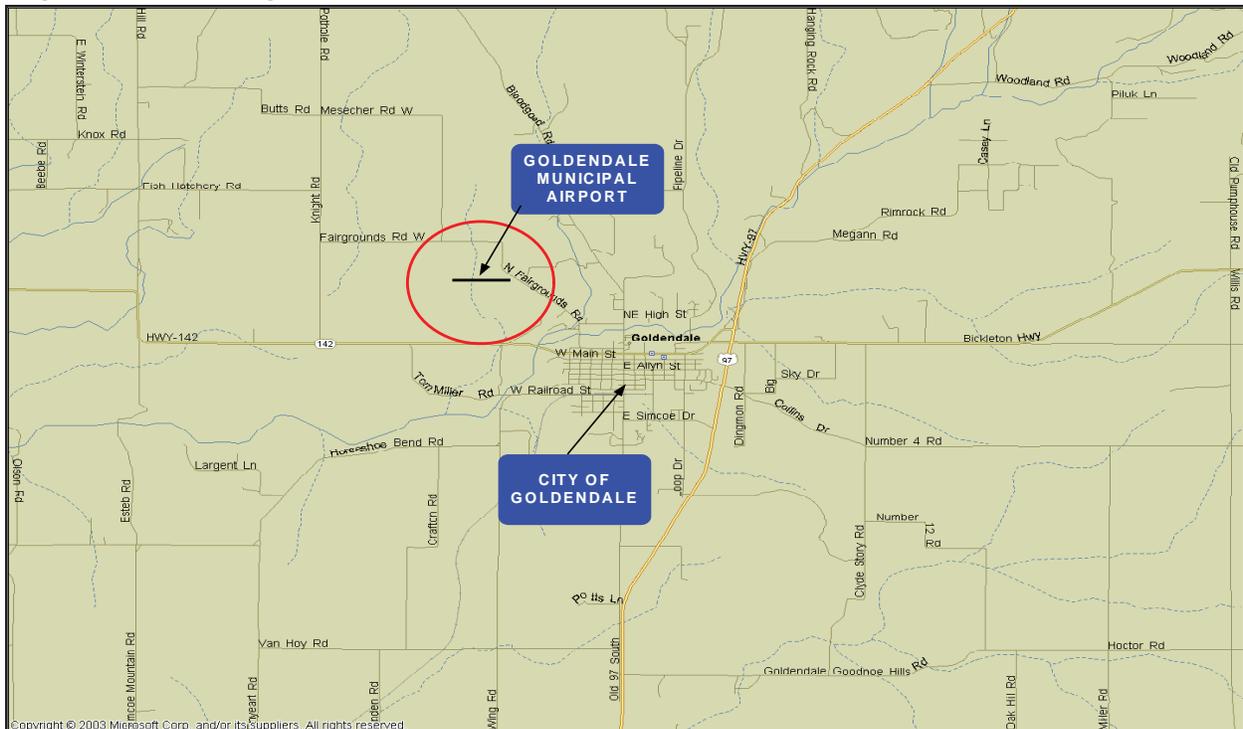
## 2.4 AIRPORT SITE – GENERAL

Goldendale Municipal Airport property consists of three parcels of land totaling 73 acres. Within the airport’s property, north of the runway and at the east end of the facility are five privately owned parcels of land that total about one-half acre. Access to the airport’s runway by aircraft from these parcels of property is consistent with what the FAA and WSDOT/AD define as “through-the-fence” conditions. Through-the-fence condi-

**Table 3: Recent capital projects**

Project	City portion	WSDOT/AD portion	Total cost
Apron rehabilitation	\$2,035	\$18,315	\$20,350
Runway rehabilitation	\$5,575	\$50,175	\$55,750
Taxiway rehabilitation	\$4,895	\$44,055	\$48,950
<b>Total</b>	<b>\$12,505</b>	<b>\$112,545</b>	<b>\$125,050</b>

**Map 2: Goldendale Airport site**



as indicated in Table 3.

## 2.6 AIRPORT CLASSIFICATION – THE ARC SYSTEM

Both the FAA and 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 aircraft, described 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 to be considered the critical aircraft for an airport.

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 Goldendale as having an ARC classification of B-I (small). This category includes aircraft with approach speeds of at least 91 nautical miles (knots) per hour and less than 121 knots per hour, a wingspan of less than 49 feet and a weight under 12,500 pounds.

A review of Goldendale Municipal Airport’s operations conducted for this plan indicates that it generally serves aircraft in the A-I ARC category

**Table 4: The ARC system**

AIRCRAFT APPROACH CATEGORY APPROACH SPEED IN KNOTS			AIRPLANE DESIGN GROUP WINGSPAN IN FEET		
Category	At or more than	Less than	Wing-span	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

Source: FAA Advisory Circular 150/5300-13

(approach speeds of less than 91 knots) that weigh less than 12,500 pounds and that it primarily accommodates recreational flying. Two based aircraft, a twin-engine Cessna 414 and a Lancair, are in the B-1 (small) category.

Activity levels at the airport are relatively low. None of the models of based aircraft or itinerant aircraft uses the airport often enough to meet the FAA’s requirement (500 annual operations) for an aircraft to be considered a critical or design aircraft. Since there are no models of aircraft that operate at or near a level of 500 annual itinerant operations from the airport, this plan identifies

**Photo 1: Cessna 414**



the aircraft that has the highest performance characteristics as the critical aircraft.

Since the Cessna 414 has been at the airport for some time, since its owner is a longtime member of the community who expects to continue to operate this aircraft and since it is the most demanding of all based aircraft, the Cessna 414 is identified in this plan as Goldendale Municipal

**Table 5: Airport data**

Name	Goldendale Municipal Airport
Location number	S 20
FAA Designation	26222.1A
Owner	City of Goldendale
Acreage	73.37 acres
Service level (on the NPIAS system)	General aviation (GA)
Reference code existing	B-I (Small)
Design aircraft	Cessna 414
Elevation	1,678 feet
Reference point (location) NAD83 NAVD88	Latitude: N 45 deg. 49' 55.466" Longitude: W120 deg. 50' 42.989"
Mean maximum temperature	85.7 degrees
Approach category	Visual
Navigation aids	Wind indicator/rotating beacon
Approach guidance	PAPI - Runway 25
Wind coverage	n/a

Airport's design aircraft.

The 414 was in production for a number of years and has gone through several design changes. The based 414 has a wingspan of 44 feet, a maximum certified takeoff weight of just over 6,700 pounds and a final approach speed of 120 knots.

### NPIAS

Goldendale Municipal Airport is not listed on the National Plan of Integrated Airport Systems (NPIAS) and is therefore ineligible to apply for federal grant funds through the Federal Aviation Administration. The Washington State Department of Transportation's Aviation Division is Goldendale 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 Goldendale Municipal Airport. Due to the absence of wind data a windrose was not constructed for the airport. Local observers note that prevailing winds are from the west/northwest and that, as in many areas of Washington State, strong south winds are sometimes experienced. Since the runway is oriented almost directly east/west and prevailing winds are from the west/northwest, pilots using Runway 25 experience varying degrees of right-side quartering cross winds.

## 2.7 EXISTING AIRSIDE FACILITIES

### Paved surfaces

#### Runway and taxiway

Goldendale Municipal Airport has a single runway oriented on magnetic headings 070 and 250 degrees (Runway 7/25). It is 3,491 feet long and 40 feet wide. The runway is constructed of asphalt and has a gross weight-bearing capacity of 6,000 pounds for aircraft with single-wheel main landing gear, according to a report published by Pavement Consultants Inc. in 2000. A 25-foot-wide partial taxiway is located north of the runway at the airport's east end. The distance between the runway and the centerline of this taxiway is 151 feet. North of this taxiway is another paved area that the airport plans to use as a taxiway in the future. A 140-foot-long taxiway extends in a southeast direction from near the end of Runway 25 to a group of aircraft hangars on private property. Access to the airport's runway via this taxiway is also a through-the-fence condition.

Taxiways described in this section are identified as A, B and C on this plan's diagrams.

The runway has displaced thresholds at both ends. Runway 25 is displaced 319 feet. Its controlling obstruction is a group of trees over 2,500

feet west of the end of the runway. The Runway 7 threshold is displaced 135 feet. Its controlling obstruction is a fence 221 feet west of the end of the runway.

From the west end of the runway to a location approximately 1,900 feet from the west end of the runway terrain slopes to depths of 20 to 25 feet within a few feet of the runway on both sides. This condition makes it impossible for the runway to have a conforming safety area without importation of a major amount of fill material. This condition is noted on Figure 1.

### **Aircraft apron**

An aircraft parking apron approximately 75 feet by 390 feet in size is located north of the taxiway at the east end of the airport. Three long parallel cables oriented east/west (parallel with the runway) are used to secure aircraft. This system provides room for six to seven aircraft on the apron.

**Photo 2: Taxiway C to private property**



### **Pavement graphics**

Pavement graphics include runway end numerals, a white dashed centerline, fog lines and displaced threshold arrows at the east end. The taxiways do not have centerline markings except for partial faded markings on Taxiway B. There are no painted hold lines at any of the three locations where taxiways connect with the runway. There are solid

white lines across the runway both before and after the runway end numerals. The white lines before (near the bottom of) the runway end numerals are intended to be threshold markings.

## **Airport lighting and navigation aids**

### **Runway lights**

The runway is equipped with 34 medium-intensity runway edge lights (MIRLs) and 12 split red/green threshold lights. All lights are mounted on in-ground base cans. The base cans are exposed above grade to varying degrees.

### **Taxiway reflectors**

Blue taxiway reflectors are located on the south side of the taxiway that is immediately north of the runway.

### **Precision approach path indicator (PAPI)**

A PAPI system that provides visual glide slope guidance for pilots during landing approaches to runway 25 is located near the east end of the airport, south of the runway. The PAPI system is mounted on substantial concrete platforms that rise approximately 10 inches above grade elevation.

### **Wind indication**

Goldendale Municipal Airport has one lighted wind indicator. It is located north of the runway, east of mid-field and west of the parking apron. An unlighted wind indicator is located south of the runway, slightly east of mid-field.

### **Airport rotating beacon**

A rotating beacon is located between structures, north of the runway at the east end of the airport.

### **Light activation**

All lights associated with runway operations are activated by a light sensor that is located near the rotating beacon. For some time a short-circuit,

fault or variations of incoming electrical power, sometimes called “spikes,” have caused airport runway light failures. This problem is being investigated by the city of Goldendale and WSDOT/AD.

### **Signage**

Goldendale Municipal Airport has retroreflective hold-line signs at the two locations where the partial parallel taxiway connects with the runway. There is no hold-line sign at the taxiway that approaches the runway from the southeast. Distance-remaining signs serving runway 25 are located at 1,000-foot intervals along the south side of the runway. Non-frangible portions of hold-line sign supports and distance remaining sign supports extend approximately 6 inches above grade.

**Photo 3: Hold line sign**



## **2.8 EXISTING LANDSIDE FACILITIES**

### **Structures**

There are four structures within the 73-acre airport site. Three of these are privately owned hangars and are on private property. The fourth structure is a small, unused city-owned building.

### **Aircraft fuel**

There is no fueling system at Goldendale Municipal Airport.

### **Access road and vehicle parking**

Vehicle access from Fairgrounds Road to the airport is on the north side at the east end, north of the existing hangars. Paving for the vehicle

parking area is scheduled for 2006. The lot has a 14-vehicle capacity.

A 30-foot wide paved area, intended as a future taxiway to serve hangars north of the existing hangars, extends from south of the vehicle parking area in a westerly direction to a point past the aircraft parking apron, where it turns south and joins the runway.

### **Utilities**

#### **Power**

Electrical power connects to the airport on the east side of the city-owned structure near the rotating beacon.

#### **Telephone**

A telephone is located near the city-owned structure. It is inoperative and considered by local pilots to be unnecessary due to satisfactory cell phone signal strength.

#### **Water/Sewage**

A recently drilled well is located south of the vehicle parking area at the north edge of the future taxiway. The well has not been activated. The airport is not connected to the city sewage system nor is there a septic system on the property. The city sewer system exists approximately one-quarter mile southeast of the airport along Fairgrounds Road.

A portable toilet is located adjacent to the city-owned structure.

### **Airport maintenance equipment**

No major vehicles or large items of equipment are dedicated for use at the airport.

### **Fencing**

A security fence surrounds the vehicle parking area. A 30-foot wide vehicle entry gate is planned

for the entry from Fairgrounds Road. Two personnel gates lead through the security fence to airport property.

**Airport maintenance**

Goldendale Municipal Airport is primarily maintained by the city of Goldendale with assistance from local volunteers.

**2.9 COMPARISON OF EXISTING CONDITIONS TO FAA STANDARDS**

An important aspect of this planning program is comparison of FAA-recommended standards to existing conditions at Goldendale Municipal Airport. Dimensional standards published by the FAA are intended to provide an acceptable level of airport safety. This section defines specific FAA standards and relates them to existing conditions.

Information and definitions related to FAA standards was obtained from FAA Advisory Circular (AC) 150/5300-13. Airport information is from the WSDOT/AD database and from on-site measurements and observations.

**Standards definitions**

*Runway width* – A runway 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: (1) cleared and graded and have no potentially hazardous ruts, humps, depressions or other surface variations; (2) drained by grading or storm sewers to prevent water accumulation; (3) capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional

passage of aircraft without causing structural damage to the aircraft; and (4) 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 en-

**Table 6: Airport facility data**

Airport feature	Information
Runway	
Dimensions	3,491' x 40'
Gradient	.003%
Surface	Asphalt
Pavement strength	6,000 lbs per wheel
Marking	End numerals/fog lines/center dashed lines/displaced threshold Runway 25
Lighting	Edge (34)/threshold (6 per end)
Taxiway	
Dimensions	1,330' x 25' (partial parallel, Taxiway B) 140' x 25' to private structures (Taxiway C) 1,140' x 30' (partial parallel, Taxiway A)
Surface	Asphalt -- all
Marking	Reflectors (partial) Taxiway A
Lighting/reflectors	Reflectors -- partial parallel only
Aircraft parking apron	
Dimensions	150' x 430'
Surface	Asphalt
Marking	None
Lighting/reflectors	None
Tie-downs	7
Fuel system	
None	

hance 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.

*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 blast protection.

*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-holding-position marking* – A distance considered adequate to provide protection between aircraft using an active runway and aircraft waiting for takeoff from that runway.

*Runway Protection Zone (RPZ)* – RPZs enhance the protection of people and property on the ground. This is 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.

*Runway centerline-to-aircraft-parking area* – A distance considered sufficient to protect operating

**Table 7: Comparison of FAA standards for B-1 (small) airports**

Comparison of FAA standards for airport to existing conditions		
FAA standard	Dimension relative to Goldendale Municipal Airport	Existing condition at Goldendale Municipal Airport
Runway length*	3,600' (95%) 4,400' (100%)	3,491'
Runway width	60'	40'
Runway safety area	120'x3,971'	60'x3,715' The RSA standard is not complied with for much of the runway's length and at both ends of the runway.
Runway object-free area	250'x3,971'	250'x3,631' The ROFA standard is generally complied with except at the east end of the runway.
Shoulder	10'	10'
Taxiway width	25'	32'
Taxiway safety area	49'	49'
Taxiway object-free area	89'	Taxiway A -- 89' Taxiway B -- 44.5' north, 40' south (standard not complied with) Taxiway C -- 89'
Runway to taxiway separation	150'	151'
Runway centerline-to holding position marking	125'	No marking
Runway protection zone	250'x1,000'x450'	Complied with west of the runway but not east of the runway.
Runway centerline-to-aircraft parking area	125'	160'

\* Length of runway to accommodate 95 percent and 100 percent of a group of aircraft weighing fewer than 12,500 pounds. Source, AC 150/5325-4A.

aircraft, parked aircraft and activities occurring around parked aircraft.

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

### **Runway length**

Goldendale's runway, according to FAA data, is able to accommodate 95 percent of the aircraft fleet having a maximum certified takeoff weight 12,500 pounds. 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.

### **Runway safety area**

The runway safety area is not in conformance with the FAA standard due to steep reductions in terrain elevation within a few feet of both sides for at least half the length of the runway. Since the runway is marked with a displaced threshold and the paved portion of the runway extends to the Fairgrounds Road right-of-way the RSA is almost non-existent at the east end. Sufficient property and generally level terrain exist at the west end of the runway to allow for improvement of the RSA. The existing runway safety area dimension is approximately 60 feet by 3,715 feet.

### **Runway object-free area**

Non-frangible features of runway hold-line signs and the PAPI system do not comply with the ROFA standard. The ROFA at the east end of the runway does not comply with the standard. The existing runway object-free area dimension is approximately 250 feet by 3,631 feet.

### **Runway centerline-to-taxiway centerline**

The FAA standard for A-1 and B-I (small) airports is 150 feet from runway centerline-to-taxiway

centerline. The distance between the runway and Taxiway B – the taxiway closest to the runway – is 151 feet. This standard is complied with.

### **Runway shoulder**

The runway shoulder area of 10 feet is in general conformance with the relevant standard.

### **Taxiway hold-line standard**

The FAA standard from runway centerline to hold line is 125 feet. Hold lines are not identified on this taxiway system. Hold-line signs at the locations where the partial parallel taxiway joins the runway are approximately 40 feet from the runway's centerline. Locations of the signs do not conform to this standard.

### **Taxiway safety area**

There is sufficient space around all taxiways to provide for compliance with this standard. Grading and compaction of the taxiway safety areas are necessary for full compliance.

### **Taxiway object-free area**

The airport is in general compliance with this standard except for three structures north of the partial parallel taxiway where the south faces of the buildings are 40 feet from the taxiway's centerline. These structures penetrate the TOFA by approximately 5 feet.

### **Runway Protection Zone (RPZ)**

The Runway 25 RPZ extends over Fairgrounds Road. The Runway 7 RPZ extends over an empty field. There are no existing land uses within either RPZ that would result in large gatherings of people at either the east or the west end of the runway.

### **Runway centerline to aircraft parking**

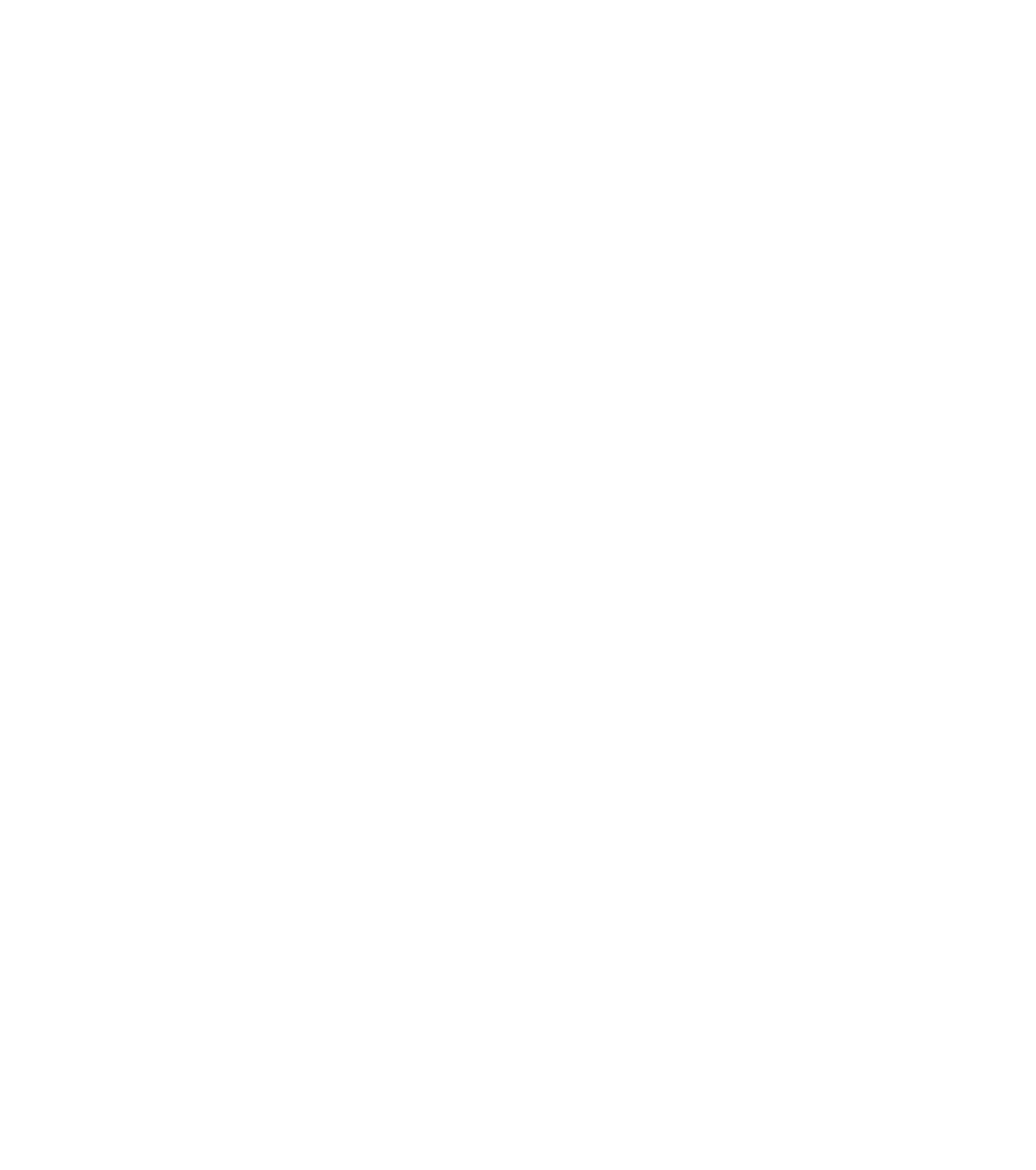
The south edge of the existing aircraft parking area is 160 feet from the runway centerline. The relevant standard is 125 feet. This standard is exceeded.

## 2.11 INFORMATION SOURCES

Sources of information provided in this chapter include:

- Washington State Department of Transportation/Aviation Division airport database.
- Federal Aviation Administration (FAA) Form 5010.
- 1996 airport development plan by Airside.
- Pavement Consultants Inc. pavement report dated June 2000

**Figure 1: Existing conditions autocad diagram**



# Chapter 3:

## Forecast

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### 3.1 INTRODUCTION

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

The forecasting process is an important one for a number of reasons. Forecasts will help the city of Goldendale plan the airport's future. Understanding future demand will help the city make better decisions about capital improvements.

Forecasts are also vital to the funding of those improvements. As stated, Washington State Aviation is Goldendale 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 and to 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 will be made only after careful evaluation of necessity based on logically quantified future 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 business on and adjacent to airport property. These entities are interested in funding projects that create jobs and that improve incomes.

It is a primary recommendation of this plan that, after it is published, the city of Goldendale update and communicate its activity-level forecast 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 Goldendale 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.

### 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.

### 3.3 FORECASTING METHODS

To determine the most accurate forecast of future airport operations this plan begins by quantifying existing conditions, including the numbers and types of based aircraft, estimating local and itinerant flight operations, and determining county and local population and other pertinent data. Next, factors that are likely to influence future demand are identified. These factors include population projections for Klickitat County over the planning period as well as projections made by state agencies about economic development in the region served by Goldendale Municipal Airport. Forecast information produced by WSDOT/AD and the FAA is also considered.

Other issues that may impact changes in airport activity are then evaluated. These include (1) development in Klickitat County and specifically in the Goldendale area, (2) changes in pilot rules recently promulgated by the FAA and (3) the impacts of airport development.

For purposes of this narrative report, the term “based aircraft” refers to aircraft that are tied down on the airport’s existing apron, stored in privately owned hangars within the airport’s boundaries or stored on private property adjacent to the airport and that have direct access to the airport’s taxiway.

### 3.4 EXISTING DATA

Existing data about based aircraft and annual flight operations are available from three sources: the FAA’s Airport Master Record, also called Form 5010, last updated in April 2003; the WSDOT/Aviation Division database, last updated in 2002; and data provided by the airport layout plan steering

**Table 8: FAA Form 5010**

Fleet Mix		Estimated	
Based aircraft 2003		Operations 2003	
Single-engine	8	GA local	1,500
Multi-engine	1	GA itinerant	3,600
Turboprop	0	Air carrier	0
Glider	0	Air taxi	0
Ultralight	0	Commuter	0
Rotorcraft	0	Military	0
<b>Total</b>	<b>9</b>	<b>Total</b>	<b>5,100</b>

Source: FAA Form 5010

committee. Information from these sources is shown in tables 8,9 and 10.

#### Determination of based aircraft baseline

Information from the FAA and WSDOT/AD about the numbers of based aircraft closely matches the data supplied by this plan’s steering committee. The steering committee’s data are more current and provide a clearer understanding of makes

**Table 9: WSDOT/AD database**

Fleet Mix		Estimated Annual Operations			
Based A/C	Existing 2002	Projected 2005		Existing 2002	Projected 2005
Single-engine	16	12	GA local	2,400	2,618
Multi-engine	1	0	GA itinerant	1,000	2,182
Turboprop	0	0	Air carrier	0	0
Glider	0	0	Air taxi	100	60
Ultralight	0	0	Commuter	0	0
Rotorcraft	0	0	Military	0	60
<b>Total</b>	<b>17</b>	<b>12</b>	<b>Total</b>	<b>3,500</b>	<b>4,920</b>

and models of aircraft. This data, contained in Table 10, will be used as the based aircraft baseline for this document. Ten operational aircraft are based at Goldendale Municipal Airport. Eight are in the A-I (small) category; two are in the B-I (small) category.

### Determination of flight operations activity baseline

The WSDOT/AD database estimates a total of 5,100 annual operations in 2002. Of those operations, 1,500 were to have been flown by locally based aircraft. The database projects 6,800 annual operations in 2005. Of those, 2,000 are identified as local operations.

The FAA does not provide estimates of flight activity levels at Goldendale Municipal Airport. However, the FAA publishes general guidelines that are intended to be used in airport planning. One of these guidelines is that one should assume 250 operations per year per based aircraft at rural airports. This multiplier, if applied to currently active aircraft at Goldendale Municipal Airport would result in annual flight operations of 2,500.

Flight operations activity levels at small, general-aviation airports are difficult to determine without direct inquiry of local pilots. For this report, a member of the Goldendale Municipal Airport’s advisory committee queried owners of based aircraft. As shown in Table 11, owners of aircraft based at the airport estimate their flight operations to be approximately 1,100 annually.

**Table 10: Currently based operational aircraft**

Aircraft	ARC category	General use
Cessna 152	A-1 (small)	Personal/instruction
Cessna 170	A-1 (small)	Personal/business
Grumman A1A	A-1 (small)	Personal
Zener (kit aircraft)	A-1 (small)	Personal
Piper J-3 Cub	A-1 (small)	Personal
Piper J-3 Cub	A-1 (small)	Personal
Cessna 172	A-1 (small)	Personal
Cessna 206	A-1 (small)	Personal/business
Lancair	B-1 (small)	Personal
Cessna 414	B-1 (small)	Personal/business
<b>Total</b>	10	

Source: Goldendale Municipal Airport Steering Committee.

Absent a more reliable system, itinerant operations are considered to be the average of those estimated by WSDOT/AD for the year 2005 (4,800) and the FAA’s most current estimate for the year 2003 (3,600). The result of this averaging is 4,200.

Total annual flight operations at Goldendale Municipal Airport are therefore estimated to be 5,300.

**Table 11: Based aircraft annual operations**

Aircraft	Annual Operations (takeoff or landing)
Cessna 152	78
Cessna 170	240
Grumman A1A	12
Zener (kit aircraft)	80
Piper J-3 Cub	8
Piper J-3 Cub	92
Cessna 172	140
Cessna 206	220
Lancair	60
Cessna 414	160
<b>Total</b>	1,090 (rounded 1,100)

Source: Interviews of aircraft owners

### 3.5 FORECASTS

#### WSDOT/AD

In 2002 WSDOT/AD published a document that extensively analyzed and forecast Washington aviation activity through the year 2020. This document is part of the Washington State Continuous Airport System Plan, or WSCASP. The plan concluded that numbers of based aircraft and flight operations activity for all airports in Klickitat County would change very little through the year 2020. The study estimates that 97 aircraft were based in the county in the year 2000 and that based aircraft would increase to 101, a net increase of just four aircraft throughout the planning period. Four aircraft were identified in this document as being based at Goldendale Municipal Airport. A fifth aircraft was projected in

the 2015 time period. No additional aircraft were projected through the year 2020.

**Federal Aviation Administration**

As stated, the FAA does not project future numbers of based aircraft or flight activity levels at Goldendale Municipal Airport. The FAA does, however, publish other useful forecasting information.

According to the FAA, the number of U.S.-based active general-aviation aircraft is expected to increase at an average annual growth rate of 0.5 percent per year through the year 2025. Most of this growth is attributed to business-type aircraft. Single-engine piston aircraft, those most applicable to Goldendale Municipal Airport, are expected to increase in numbers at a rate of 0.2 percent per year. Flight hours are expected to increase at a faster rate than the aircraft fleet, 1.5 percent annually through 2014 and then 1.2 percent annually through 2025. These modest numbers, when applied to Klickitat County and to Goldendale Municipal Airport, parallel estimates by WSDOT/AD.

**Conclusions based on WSDOT/AD, FAA and actual data**

Projections by WSDOT/AD and the FAA indicate very limited growth in based aircraft and flight operations over the planning period.

**Population and income projections**

Klickitat County has experienced slow and at times erratic growth in population over the past decade. During some periods population actually declined from year to year. Washington State analysts project that the county’s population will continue to grow slowly from its current level of just under 21,000 to about 24,493 in 2020 and 25,855 in 2025. This is a lower rate of growth than is projected statewide.

Klickitat County has experienced relatively steady growth in total personal income over the past several years. According to the U.S. Department

of Commerce’s Bureau of Economic Analysis (BEA), personal income is the best available local indicator of general purchasing power and is, therefore, important to tracking and comparing economic growth. Personal income is defined by BEA as the income received by all persons

**Table 12: Klickitat County population**

Year	Population
1990	16,616
2000	19,241
2005	20,338
2010	21,626 (projected)
2015	23,071 (projected)
2020	24,493 (projected)
2025	25,855 (projected)

Source: Office of Financial Management, 2003, <http://www.ofm.wa.gov/pop/coseriess/c60to3.xls>.

from working. Personal income is the sum of net earnings by place of residence, 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.

Klickitat County’s total personal income, computed in constant dollars to adjust for inflation, increased 181.5 percent from \$159,232,000 in 1969 to \$448,239,000 in 2003. The increase in total personal income within Klickitat County over this period was less than that experienced statewide (257.7 percent) but close to the 183.7 percent gain experienced nationally.

Relative to nationwide annual real personal income growth trends viewed in 10-year segments, Klickitat County led the nation during the 1970s (5.60 percent vs. 3.64 percent), trailed the nation in the 1980s (1.08 percent vs. 3.14 percent), exceeded the nation in the nation in the 1990s (3.41 percent vs. 3.03 percent), and is so far, from

the year 2000 to the year 2003, being outpaced nationally (2.00 percent vs. 2.09 percent).

Table 13 indicates Klickitat County’s personal income growth rate compared to Washington State and the United States between the years 1970 to 2003.

**Table 13: Klickitat County personal income growth rate**

	1970-2003	1970-1979	1980-1989	1990-1999	2000-2003
Klickitat County	3.2%	5.6%	1.08%	3.41%	200%
Washington	3.84%	4.55%	3.14%	4.64%	1.82%
United States	3.13%	3.64%	3.03%	3.03%	2.09%

Source: Washington State Office of Financial Management.

Klickitat County’s population and income are expected to continue to grow, though both are expected to advance at less than the statewide rate.

**Additional factors**

Airport forecasts should take into account specific local conditions and other factors to the extent that 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:

- Growth in Klickitat County/Goldendale
- Alterations to FAA rules regarding pilots
- Airport improvements

**Growth in Klickitat County and Goldendale**

The prior section addressed population and income projections as determined by Washington state and the federal government. This section explores local economic development efforts that are being led by Klickitat County Economic

Development, the Columbia Gorge Economic Development Association and the Port of Klickitat. These three entities are assisted by the city of Goldendale, as well as the towns of Bingen and White Salmon. Impacts on forecast based aircraft and on flight operations that are made further in this chapter under the heading “local growth” are based on information provided in the prior section and on the information in this section.

**Wind energy**

It is logical that when communities seek to improve their economies they begin by identifying not only the positive elements of their surroundings but also by looking for unique, inherent elements that can be used to their advantage. It is evident that not long after someone asked the question “How are we unique?” someone else answered “Wind!”

Klickitat County is the first county in the nation to develop and ratify what the county calls a Clean Energy Economic Development Zone. This effort is clearly associated with advancing national efforts to not only develop additional sources of energy but to do so in a way that is environmentally sound. Energy sources that are environmentally beneficial are often called “clean” or “green energy.” Klickitat County has done much of the preliminary work for clean energy project permitting using wind as an energy resource.

**Growth in Goldendale**

The most notable indication of growth in Goldendale is development of the Goldendale Energy Center, a new power plant located on approximately 45 acres in the southwest section of the city of Goldendale. Approximately 13 acres of the site will be used for facility structures and machinery. More than 11 acres are wetlands and will be maintained as wetlands. The remaining 21 acres will be left vacant as buffer zones.

The Goldendale Energy Center (GEC) has completed 80 percent of the construction of a 248 megawatts (MW) power plant to produce electricity. This project has many benefits, including increased employment and increased property taxes, that will help support county and city programs. An additional benefit of this plant is that it will lower existing property taxes. Property tax benefits to the city of Goldendale will amount to about 25 percent of the city's current general fund budget.

The GEC is an example of developments that create jobs and improve economies not only through their own operation but because they act as catalysts for additional development.

#### ***Additional development efforts***

During formulation of this plan, an extensive interview was conducted with the director of Klickitat County's Office of Economic Development. During that interview the director indicated that the pace and intensity of economic development efforts in the county have increased considerably over the past few years. Strong emphasis is being placed on three so-called "focus areas." One of these areas is a 40-acre parcel of property in the southeast section of Goldendale. This property is zoned M-1 Light Industrial and is adjacent to U. S. Highway 97. The county and the city are working to develop this area as a business park. Their goal is to have it completely developed and filled with commercial and light industrial firms within the next 10 years.

With respect to the county's future economic status, the director said that two factors are important to note about the M-1 zoned light industrial property. First, a considerable amount of money has been spent on infrastructure necessary to support its growth. Secondly, the parcel is one of the few remaining properties available for commercial and light industrial development along the corridor from Goldendale all the way to Portland. The director stated that he is genuinely optimistic about the likely development of this parcel of property and the impact it will have on Goldendale and Klickitat County.

Another interesting point came from this discussion. Klickitat County may be growing slowly but its demographics are changing in ways that will positively impact the county's economic health and that will result in increased disposable income. Hundreds of individuals who had for years been employed by timber and aluminum industries have either left the county, have retired or are working in a variety of jobs unrelated to their former ones.

At the same time the county is experiencing an influx of retirees, skilled workers and white collar workers. The bottom line: Although the county's population is growing rather slowly compared to other areas its demographics are, from an economic perspective, improving. (A copy of an e-mail from the director is included in the appendix to this plan.)

#### ***Anticipated impact of local growth on forecast***

When correlating development and development efforts with actual growth it is logical to consider whether recent and expected near-future development activities are more extensive than those that have occurred historically. There is an obvious connection between effort (economic development activities) and results (establishment of new businesses). Clearly, added emphasis is being placed on quality growth in Klickitat County. The city of Goldendale is positioned to be a beneficiary of much of this growth.

Consequently, two additional locally based aircraft are projected per five-year cycle throughout the planning period. One hundred annual flight operations are attributed to each based aircraft. Fifty additional itinerant operations per year throughout the planning period are projected.

#### ***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. It is logical to assume that pilots in this category will, in general, prefer to operate from airports such as Goldendale that have low-activity levels, are non-towered and that have an abundance of adjacent, uncontrolled airspace.

#### **Anticipated impact of sport pilot rules on forecast**

The sport-pilot category is expected to increase the based aircraft census by six aircraft between 2005 and 2025. Annual operations flown by based aircraft are expected to increase at a rate of 150 per based aircraft. Itinerant operations are expected to increase at a rate of 100 per five-year cycle.

#### **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 actually generating demand. Capital improvements that cause Goldendale Municipal Airport to be increasingly attractive, efficient and functional will likely create additional demand. During an interview with a member of this plan's steering committee it was noted that there have been several recent inquiries from individuals about potential plans to development the airport and, specifically, to construct hangars. These inquiries are assumed to be evidence of potential growth.

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 based and itinerant activity levels.

Basic layout improvements involving widening the runway and development of a full-length taxiway are challenging and possibly impractical due to terrain elevation issues that will be more fully discussed in Chapter 4. A number of feature and

utility improvements could be accomplished that would make the airport more functional, more efficient and safer. These are also addressed in the following chapter.

It is possible that Goldendale Municipal Airport would draw aircraft that are currently based at Columbia Gorge Regional Airport (CGRA) near The Dalles if airport improvements at Goldendale were accomplished. It is unlikely that this would have a major impact on the numbers of aircraft based at the airport due to drive distance between Goldendale Municipal Airport and CGRA.

As indicated in Table 12, Klickitat County's population in 1990 was 16,616. In 2005 it is estimated to be 20,338. It is expected to grow to over 24,000 by the year 2020 and to almost 26,000 by 2025. This amounts to an average of approximately 270 additional people per year over the 35-year period.

This raises a question about where this increased population will reside. Goldendale, with 3,960 citizens, is the not only the largest city in the county it is also the county seat. It is, and is expected to continue to be, the center of economic development in the county. White Salmon, with just over 2,000 residents, and Bingen, with almost 700 residents, are the only other populated communities. Approximately 6,660 people, or 40 percent of the county's population, live within incorporated areas. The rest of the county's population lives in unincorporated areas and is widely dispersed. Klickitat County is not expected to grow dramatically over the planning period but it is logical to assume that much of the growth that occurs will be in and around Goldendale.

#### **Anticipated impact of airport improvements on forecast**

Two additional aircraft are forecast over the period 2005–2010 during a period when additional airport improvements will be accomplished. Three additional aircraft are forecast during each

of the three remaining five-year planning periods. One hundred operations per year are attributed to each additional based aircraft. Fifty additional itinerant operations per year are attributed to airport improvements.

**Forecast of based aircraft and operations**

**Based aircraft**

Ten aircraft are currently based at Goldendale Municipal Airport. Forecasts by WSDOT/AD and the FAA expect no growth. If this were the extent of our forecast we would assume that throughout the 20-year planning period Goldendale Municipal Airport will continue to be home to between 10 and 15 aircraft. This plan, however, assumes that the factors identified earlier in this section

will have an impact on the based aircraft census. The impacts of each of these factors on based aircraft over the planning period are shown in Table 14. Table 15 shows these impacts cumulatively. Forecast additions of multi-engine based aircraft are based on statements by local current aircraft owners and the director of the county’s economic development agency.

**Annual operations**

As explained earlier in this section, current annual flight operations resulting from both based and itinerant activity are assumed to be 5,300. Table 14 indicates the expected impacts of each of the factors identified in this section. Table 16 applies these additions to flight operations over the planning period.

**Table 14: Additions to based aircraft and annual flight operations over the planning period**

Factor	2006-2010			2011-2015			2016-2020			2021-2025		
	Based aircraft	Local Ops	Itinerant Ops	Based aircraft	Local ops	Itinerant ops	Based aircraft	Local ops	Itinerant ops	Based aircraft	Local ops	Itinerant ops
Local growth	2	200	50	2	200	50	2	200	50	2	200	50
Sport pilot	2	300	20	2	300	20	1	150	20	1	150	20
Airport improvements	2	400	50	3	600	50	3	600	50	3	600	50
<b>Totals</b>	<b>6</b>	<b>900</b>	<b>120</b>	<b>7</b>	<b>1,100</b>	<b>120</b>	<b>6</b>	<b>950</b>	<b>120</b>	<b>6</b>	<b>950</b>	<b>120</b>

**Table 15: Forecast based aircraft 2006-2025**

Based aircraft by type	2006 (1)	2011	2016	2021	2025
Single-engine	9	13	19	25	31
Multi-engine	1	3	4	4	4
Helicopter	0	0	0	0	0
Total based aircraft	10	16	23	29	35
Average annual percentage increase		12	8.8	5.2	4.2

(1) Estimated current

**Table 16: Forecast annual flight operations 2006-2025**

<b>Operations</b>	<b>2006 (1)</b>	<b>2011</b>	<b>2016</b>	<b>2021</b>	<b>2025</b>
Single-engine	5,000	5,820	6,940	7,910	8,935
Multi-engine	300	500	600	700	745
Helicopter	0	0	0	0	0
Total operations	5,300	6,320	7,540	8,610	9,680
Average annual percentage increase in total operations		19	19	14	12
Local operations	1,100	2,000	3,100	4,050	5,000
Average annual percentage increase in local operations		16.4	11	6.2	4.6
Itinerant operations	4,200	4,320	4,440	4,560	4,680
Average annual percentage increase in itinerant operations		0.6	0.6	0.6	0.6

(1) Estimated current

The above tables and graphs indicate slow to moderate growth of based aircraft and flight operations over the planning period. These forecasts are based on additional development in and around Goldendale, expected slow but steady population increases, expected advances in total personal income, changes in FAA rules regarding the light-sport category of aircraft and improvements to the airport.

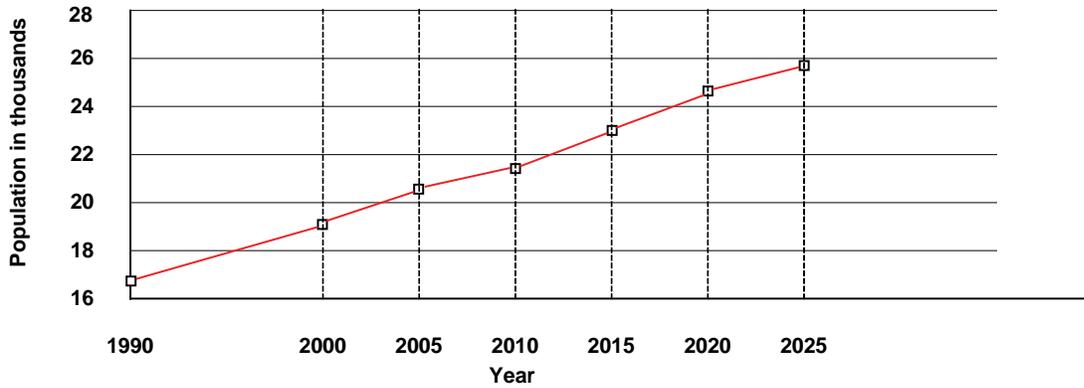


Figure 2: Klickitat County Population Growth Estimated by the Washington State Office of Financial Management in 2003

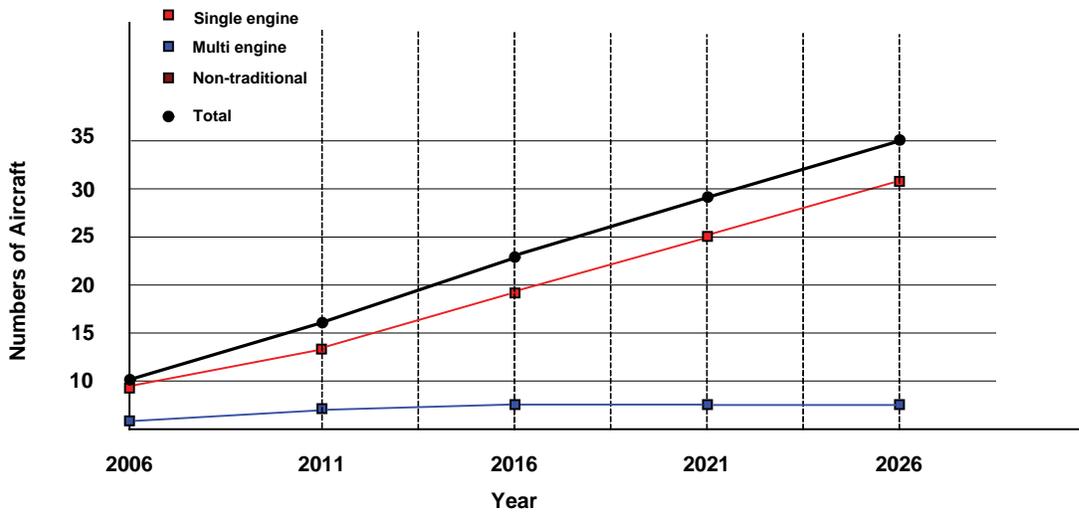
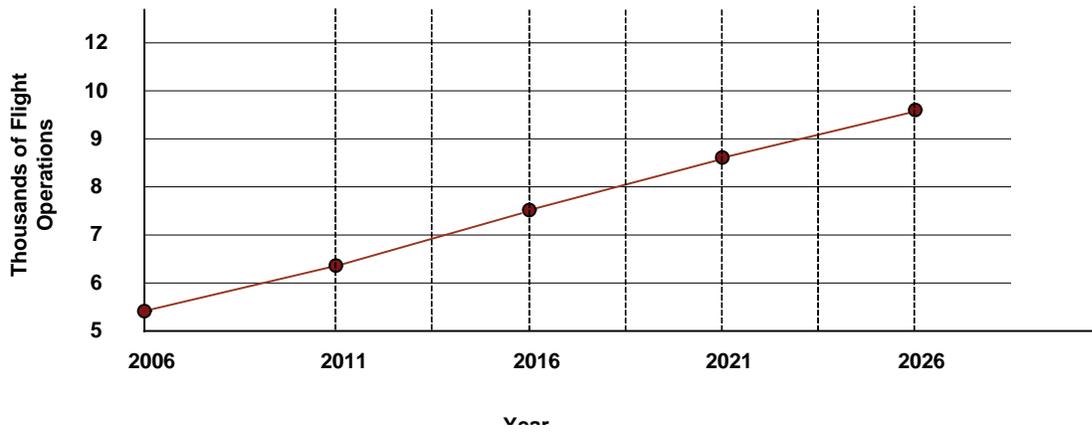


Figure 3: Forecast of Based Aircraft at Goldendale Municipal Airport



# Chapter 4:

## Facility requirements and development alternatives

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### 4.1 INTRODUCTION

This chapter uses information from Chapters 2 and 3, data gathered during site visits, and suggestions from the ALP steering committee to develop a list of recommended improvements at Goldendale Municipal Airport over the planning period. Projects listed are intended to increase safety, accommodate forecast demand and provide a transportation facility that is aesthetically pleasing and accommodating to local citizens and visitors. Information about the timing of projects is at the end of the chapter. Estimated expenses associated with recommendations are contained in Chapter 5.

As stated in Chapter 3, the Cessna 414 and the B-1 (small) group of aircraft it represents is identified as the design aircraft throughout the planning period. Additional kinds of aircraft that may use Goldendale 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 AIRPORT LAYOUT

#### Challenging conditions

Before addressing requirements and development alternatives at Goldendale it will be useful to review the overall layout of the airport and the challenges that exist.

The primary challenge is the drop in terrain elevation within areas that are close to both sides of the runway extending from its west end for approximately 1,900 feet, or 55 percent of the

runway's length. Because of this, Goldendale Municipal Airport's runway does not comply with one of the most basic safety standards, the runway safety area standard, which at this airport is a 120-foot-wide surface centered on the runway. This topographical problem has also impacted efforts to develop a full-length taxiway.

Another challenge facing the airport is that its runway is not aligned with the rather narrow parcels of land that encompass it. As the runway progresses westward from its east end it converges on the south property boundary. A few years ago the city of Goldendale purchased property to the west of the airport. This purchase was intended to increase runway safety by ensuring more control over the Runway 7 runway protection zone. This newly purchased area cannot be used for a runway extension, however, unless the runway is rotated clockwise.

With these issues in mind, this chapter of this plan describes alternatives for development.

#### Runway length/width

The existing runway at Goldendale Municipal Airport is 3,491 feet long and 40 feet wide. For small, single-engine aircraft this runway length is generally adequate. According to FAA Advisory Circular 150/5325-4B the airport's runway is approximately 1,000 feet shorter than the length necessary to accommodate 100 percent of the general aviation fleet weighing less than 12,500 pounds. Runway width -- at 40 feet -- is 20 feet less than the FAA's runway width design standard of 60 feet.

#### Parallel taxiway

Absence of a parallel taxiway makes it necessary for pilots to "back-taxi," that is, to use the run-

way as a taxiway either before or after takeoff or landing operations. Back-taxi operations reduce safety because they increase the risk of accident through use of an active runway for activities other than those directly related to landing and taking off. The degree of risk associated with back-taxi operations is dependent on a number of factors, such as whether aircraft using the airport have radios and, if they do have them, whether they use them to communicate with other aircraft in the area. Other factors include visibility, signage, pilot skill levels and pilot awareness.

Another key factor is an airport's activity level. The busier an airport is the more risk is associated with back-taxi operations. Night operations and day operations conducted in reduced visibility conditions further increase back-taxi risks and liability exposure.

Some of the light sport aircraft and variations of aircraft based on new technologies that are expected to use Goldendale Municipal Airport will not have radios with which to listen to other air traffic and to announce their intentions. The degree to which communications issues relating to light sport aircraft will reduce safety in a non-taxiway environment is not known but it is reasonable to assume some negative impact.

Back-taxi operations are arguably the ultimate runway encroachment since they require operations on active runways that do not relate to landing and taking off.

### 4.3 ALTERNATIVES DEVELOPMENT

A review of the overall conformation of Goldendale Municipal Airport and discussions with the ALP steering committee have resulted in consideration of four development alternatives. Considering the inadequacy of the runway safety area and the absence of a full-length taxiway it is apparent that future expenditures of capital improvement funds are justified as much for safety

reasons as for accommodating future activity levels.

Although consideration of an alternative site for the airport was not within the scope of work for this study, we recommend that the city of Goldendale and WSDOT/AD consider such an option before devoting funds to improving the existing site. If the decision is made that moving the airport is not feasible, the ultimate airport recommendation made in this plan should be pursued.

Serious consideration was not given to a "do nothing" alternative. Choosing this alternative would leave Goldendale Municipal Airport in its current configuration, including the absence of a standard runway safety area and full-length taxiway. Doing nothing would mean that these two important safety issues would remain unattended.

Considering the layout and site constraints at Goldendale Municipal Airport, there are few development options available. The following might be better characterized as variations on development themes that would be determined by available funding. The alternatives, as depicted in Figures 2-5, are:

- **Alternative 1:** Create a conforming runway safety area.
- **Alternative 2:** Widen the runway and create a conforming runway safety area.
- **Alternative 3:** Accomplish Alternate 1 and add a full-length taxiway with a conforming taxiway safety area.
- **Alternative 4:** Rotate the runway to align it with its property boundary lines, widen the runway and lengthen it to accommodate 100 percent of the B-I (small) aircraft fleet. Construct a full-length taxiway. Ensure conforming safety areas throughout the runway/taxiway system.

## **ALTERNATIVE 1: CREATE A CONFORMING RUNWAY SAFETY AREA**

With this alternative, the runway centerline and runway pavement length would remain as they are. Fill would be imported to the airport, graded and compacted where necessary to create a 60-foot-wide safety area, as measured from the runway centerline, on both sides of the runway, including an area 240 feet beyond the end of Runway 7.

The runway safety area would be prepared so that it has a minimal outward slope. It would be within a few inches of the runway elevation at the runway edge and free of objects that would cause damage to aircraft in the event of an inadvertent excursion from the runway. From the lateral termination of the safety area the slope to existing terrain would be no more than a 4:1 ratio.

The east end of the runway would be re-painted and lighting adjusted to identify the Runway 25 threshold as being relocated instead of being displaced, thus creating a conforming runway safety area and runway object-free area. This relocation would shorten the runway by 339 feet from its current length of 3,491 feet to 3,152 feet. The paved surface east of the Runway 25 relocated threshold would be identified as a taxiway.

The displaced threshold graphics at the west end would be removed and the runway numerals relocated to indicate that there is no displaced threshold at Runway 7. This would be the result of eliminating the Runway 7 controlling obstruction and properly preparing the RSA, ROFA and FAR Part 77 Primary Surface.

### **Assessment of this alternative**

#### *Advantages*

- Improved safety if aircraft inadvertently depart the runway, land short of Runway 7 or overrun the runway surface when landing on Runway 25.

- Reduced liability.
- Lowest in cost of the four alternatives.

#### *Disadvantages*

- The runway would continue to be used as a taxiway.
- The runway would continue to be 20 feet less than the FAA recommended 60-foot width standard.
- The alignment of the runway relative to the property boundary would not allow lengthening of the runway.
- Runway length would be less than that required to accommodate 100 percent of the B-1 (small) aircraft fleet.

## **ALTERNATIVE 2 – WIDEN RUNWAY/CREATE SAFETY AREA**

With this alternative, the runway centerline and runway length would also remain as they are. The runway would be widened to 60 feet to conform to the relevant FAA standard. Fill would be imported to the airport to create a runway safety area as described in Alternative 1. Other improvements identified in Alternative 1, such as relocating the Runway 25 threshold and ensuring a completely conforming runway safety area, would be accomplished. A 4:1 slope from the edge of the runway safety area should also be created. The runway should be repainted.

### **Assessment of this alternative**

#### *Advantages*

- Improved safety on the runway during landing, takeoff and taxi operations.
- Improved safety if aircraft inadvertently depart the runway, land short of Runway 7 or

overrun the runway surface when landing on Runway 25.

- Reduced liability.
- Lower in cost than two of the alternatives.

#### *Disadvantages*

- The runway would continue to be used as a taxiway.
- As with Alternative 1, the alignment of the runway relative to the property boundary would not provide for lengthening of the runway.
- Runway length would continue to be less than that necessary to accommodate 100 percent of the B-1 (small) aircraft fleet.

#### **ALTERNATIVE 3 – ACCOMPLISH ALTERNATIVE 2 AND ADD A FULL-LENGTH TAXIWAY WITH A TAXIWAY SAFETY AREA**

This alternative incorporates all the advantages of Alternative 2 and, after the importation, grading and compacting of fill material, adds a full-length taxiway with a conforming taxiway safety area. The taxiway would be constructed to a width of 25 feet and would have a centrally located taxiway connector and a taxiway connector at the Runway 7 end.

#### ***Assessment of this alternative***

##### *Advantages*

- Improved safety on the runway during landing, takeoff and taxi operations due not only to runway improvements but to elimination of the need to back taxi.
- Improved safety if aircraft inadvertently depart the runway, land short of Runway 7 or overrun the runway surface when landing on Runway 25.

- Greatly reduced liability.
- Lower in cost than one of the alternatives.

#### *Disadvantages*

- Cost. This alternative is more expensive than Alternatives 1 and 2.
- As with Alternatives 1 and 2, this alternative does not provide for runway lengthening due to the convergence of the runway with the airport's property boundary.

#### **ALTERNATIVE 4 – ROTATE, WIDEN AND LENGTHEN THE RUNWAY; CONSTRUCT A FULL-LENGTH TAXIWAY. ENSURE RUNWAY AND TAXIWAY SAFETY AREAS**

This alternative would incorporate all of the safety and operating advantages identified in Alternative 3. It would also rotate the runway approximately 1.4 degrees clockwise from its Runway 25 threshold allowing it to be lengthened over property owned by the city that is west of the Runway 7 end. Lengthening of the runway to 4,400 feet would allow Goldendale Municipal Airport to accommodate 100 percent of the B-1 (small) aircraft fleet.

The Runway 25 threshold would be moved 200 feet further west than indicated in Alternative 3. This is advisable due to the relationship of existing structures southeast of the airport with the airport's FAR Part 77 Approach Surface created by the runway rotation.

A primary benefit of Alternative 4 is the improved Runway 25 approach surface created not only by movement of the threshold to the east but because rotation of the runway aligns the runway more advantageously with terrain east of the airport.

In this alternative, Taxiway B would be slightly realigned to be parallel with the runway. Taxiway A is already aligned to be parallel with the airport's property lines so it would be parallel with the rotated runway. Taxiways A and B would converge but at right angles rather than the existing acute angle. This would provide increased visibility among taxiing aircraft. For a visual depiction of the convergence of these taxiways see the existing conditions diagram on page 2:12 and the Alternative 4 diagram on page 4:11.

### Assessment of this alternative

#### *Advantages*

- Provision of a fully functional, good quality, efficient runway/taxiway system that, if cared for, would probably last the term addressed in this plan.
- Ability to meet FAA recommendations related to runway width and runway-taxiway separation distance between the taxiway and the realigned runway.
- Ability to fully comply with FAA recommendations related to runway and taxiway safety area and object-free area standards.
- Vastly increased safety during all airport operations.
- Improved FAR Part 77 Approach Surface to Runway 25.

#### *Disadvantages*

This is the most costly alternative.

### **SUMMARY ASSESSMENT**

Alternative 1, improvement of the runway safety area along the existing runway would be a major safety improvement. It would however require

continued use of a runway that has a non-standard width. Back taxi operations would continue to be necessary.

Alternative 2, improvement of the runway safety area and widening of the runway would improve safety more than would Alternative 1. This alternative would however not address the back-taxi issue. It is likely that widening of the runway would not, in this case, be done as a reconstruction project but rather as an overlay project. Consequently, runway elevation deviations that exist today would continue to exist.

Alternative 3 accomplishes the beneficial actions of Alternative 2 but adds a full-length taxiway. This alternative would widen the runway, improve the runway safety area and eliminate the need for back-taxi operations. Clearly, were it not for an interest in accommodating the B-1 (small) aircraft fleet this would be a viable alternative except for one important issue: A considerable amount of money would have been expended on a runway/taxiway system that could not be extended without major property purchase due to the convergence of the runway with the property boundary.

Alternative 4 incorporates the actions of Alternative 3 with one important change: This alternative rotates the runway clockwise to align it with the airport's property boundary. This includes not just the property parcel on which the airport is currently located but also the 33.33 acres west of the runway that the city of Goldendale purchased in 2002. This realignment of the runway provides for lengthening of the runway to the degree necessary to allow it to accommodate 100 percent of the B-1 (small) aircraft fleet. As stated, there are also approach airspace benefits created by realignment of the runway.

It is a conclusion of this plan that the city's status as the seat of county government and projected development of the Goldendale area justify the airport being improved to accommodate at least the B-1 (small) aircraft fleet, as is described in Alternative 4.

An additional benefit exists with Alternative 4. Should there be future justification for extending the runway further than that necessary to accommodate B-I (small) aircraft, the airport would be aligned to allow that to be accomplished on property currently owned by the city of Golden-dale.

It is important to note that regardless of the alternative chosen, the threshold at the east end of the runway should be changed from its cur-

rent displaced markings to relocated markings. This would cause the runway to the east of the threshold to be used as a taxiway. The effective length of the runway in Alternatives 1 – 3 would be shortened by 339 feet to 3,152 feet. If Alternative 4 is accomplished the ultimate 4,400 foot runway would begin at the Runway 25 relocated threshold.

Table 17 reviews these four alternatives with respect to compliance with FAA standards.

**Table 17: Comparison of alternatives with FAA standards**

FAA standard	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Runway length -- 100% of the B-I (small) fleet 4,400'	3,152*	3,152*	3,152*	4,400*
Runway width standard 60'	40', would not conform	60', would conform	60', would conform	60', would conform
Taxiway width Standard 25'	Existing three partial taxiways conform. Full-length taxiway would not be constructed.	Existing three partial taxiways conform. Full-length taxiway would not be constructed.	Conforming full-length taxiway.	Conforming full-length taxiway.
Runway Safety Area (RSA) 120' wide centered on the runway. Extends 240' beyond each runway end.	Conforming RSA would be created.	Conforming RSA would be created.	Conforming RSA would be created.	Conforming RSA would be created.
Runway Object-Free Area (ROFA) 250' wide centered on the runway. Extends 240' beyond each runway end.	Conforming ROFA would be created.	Conforming ROFA would be created.	Conforming ROFA would be created.	Conforming ROFA would be created.
Taxiway safety area (TSA) 49' wide centered on the taxiway.	Existing partial taxiways conform.	Existing partial taxiways conform.	Full-length taxiway would conform.	Full-length taxiway would conform.
Taxiway Object-Free Area (TOFA) 89' wide centered on the taxiway.	The taxiway object-free area will be addressed by alterations to the airport that are unrelated to any of these alternatives. (See the following section.) Conforming taxiway object-free area will occur regardless of the alternative chosen.			
Runway/taxiway separation 150'	Separation standard is currently met. This alternative would have no impact.	Separation standard is currently met. This alternative would have no impact.	Full-length taxiway would be constructed to the standard.	Full-length taxiway would be constructed to the standard.
Runway protection zone (RPZ) under owner control Length 1,000' Width inner 250' Width outer 450'	Most of the Runway 25 RPZ would continue to be east of Fairgrounds Road. A small part of the Runway 7 RPZ would not be under city control.	Most of the Runway 25 RPZ would continue to be east of Fairgrounds Road. A small part of the Runway 7 RPZ would not be under city control.	Most of the Runway 25 RPZ would continue to be east of Fairgrounds Road. A small part of the Runway 7 RPZ would not be under city control.	Less of the Runway 25 RPZ would continue to be east of Fairgrounds Road. All of the Runway 7 RPZ would be under city control.
FAR Part 77 approach surface 20:1 slope beginning 200' from the ends of the paved runway surface.	FAR Part approach surfaces will not be impacted by a decision between alternatives 1 – 3. Runway 25 has an existing surface of 26:1. Runway 7 has an existing approach surface of 3:1 but this will be corrected by actions unrelated to this decision. Alternative 4 provides potential future options to increase the approach surface through further relocation of the threshold since runway length can be increased at the west end of the airport.			
FAR Part 77 Transitional Surface 7:1 slope beginning at the edge of FAR 77 Primary surface	No impact.			

## RECOMMENDATIONS RELATED TO THE RUNWAY/TAXIWAY SYSTEM

1. The runway/taxiway configuration identified in Alternative 4 is recommended for implementation. This configuration will result in an airport that meets recommended standards and that is functionally supportive of existing and expected future demand.
2. Rotating the runway will allow its lengthening on the west end. This will mitigate the loss of runway length caused by necessary relocation of the Runway 25 threshold.
3. Site work accomplished for the extended taxiway system could also enhance development of an access road from the east end of the airport to centrally located developable property north of the taxiway.

Following are Figures 2–5, which depict each of the four alternatives described in this section.

## PHASING

Current state regulations do not allow WSDOT/AD to provide grants in excess of \$250,000. Design, engineering and construction of a new taxiway/runway system as described in Alternative 4 will exceed that amount. Unless state regulations regarding maximum grant amounts are changed before implementation of this option, Alternative 4 should be accomplished in three grants as indicated below.

### Phasing plan

1. Design, engineering, specifications and contract documents for the runway/taxiway system including grading, drainage, lighting, signage and other features.
2. Construction of full-length taxiway. This phase includes striping and installation of all taxiway features.
3. Construction of the realigned runway. This phase would include striping and installation of all runway equipment.

**Alt 1 drawing**

**Alternative 2 drawing**

**Alternative 3 drawing**

**Alternative 4 drawing**

## 4.4 PROJECTS AND IMPROVEMENTS

This section lists recommended improvements and the timing of those improvements. It includes actions necessary to implement Alternative 4 as well as actions that are not directly related to Alternative 4.

Projects identified for completion between 2006 and 2010 are listed by year and are prioritized. Projects from 2011 to 2025 – the end of the planning period – are shown in five-year increments. All improvements are listed in Table 19 at the end of this section. Table 19 is used as the basis for the capital improvement program contained in the following chapter. Improvements described in this section are depicted on the airport layout plan (drawing C1.1) or the Building Area Plan (drawing C1.2) or both.

### PROJECTS 2006

Following is a list of prioritized projects recommended for completion in 2005 and 2006.

#### **A1. Runway safety area (RSA), runway object-free area (ROFA) and FAR Part 77 Primary Surface enhancements**

Efforts to improve the RSA, ROFA and FAR Part 77 Primary Surface should be accomplished as soon as possible and regardless of future airport development. The recommended RSA for Goldendale Municipal Airport measures 120 feet wide and is centered on the runway. The RSA extends 240 beyond each runway end. The recommended ROFA measures 250 wide and is centered on the runway. It also extends 240 beyond the runway end. The FAR Part 77 primary surface extends 200 feet beyond the runway and is 250 wide centered on the runway.

As mentioned earlier in this plan, when a displaced threshold is graphically identified on a runway the FAA standard relating to RSAs and ROFAs indicate that they extend 240 feet beyond the end of the paved surface of the runway. With

a relocated threshold, RSAs and ROFAs begin at the relocated threshold. Runway 25 at Goldendale is painted to indicate a displaced threshold. The proximity of the threshold to the property boundary causes the RSA, ROFA to be non-compliant with the relevant standard. It also means that the FAR 77 Primary Surface extends well beyond the property boundary.

The following actions are recommended:

- Repaint graphics at the east end of the runway, placing the threshold at a distance of 339 feet from the center of the end of the runway's paved surface. This will bring the RSA and ROFA on airport property and provide for RSA and ROFA improvements.
- Paint the runway east of the threshold as a taxiway according to recommendations contained in FAA Advisory Circular 150/5340-1J.
- Adjust lighting at and east of the relocated threshold.
- The controlling obstruction for Runway 7 is a 7-foot-high fence that is located within the ROFA. Remove this fence, thereby eliminating the controlling obstruction.
- Grade and compact the runway safety area to the extent possible. Particular attention should be given to the area west of the end of Runway 7. This area beyond the runway end – which measures 120 feet wide and 240 feet long – should be prepared to conform to the RSA standard.
- Repaint graphics at the Runway 7 end to indicate that the displaced threshold no longer exists.
- Update FAA Form 5010 to indicate the adjustment to length of the runway.

### **A2. Hold line and taxiway centerline improvement**

Paint hold lines on Taxiways A, B and C a distance of 125 feet from centerline of the runway. Reinstall the two existing retroreflective hold-line signs on frangible mountings to locations adjacent to the relocated Taxiway B hold lines. Install new hold-line signs in proper locations for Taxiways A and C. Ensure that the non-frangible portions of all hold line signs extend no more than 2 inches above grade. Paint taxiway centerlines. All taxiway markings are yellow. Centerlines are 6 inches wide. Paint hold lines. They are 1 foot wide.

### **A3. Install taxiway reflectors along all three taxiways**

This will take approximately 80 reflectors.

### **A4. Reposition distance-remaining signs**

When the Runway 25 threshold is relocated, locations of the two distance-remaining signs should be changed to ensure that they accurately reflect distances between themselves and between each of them and the ends of the runway.

### **A5. Reinstall runway edge and threshold lights**

Several runway edge and threshold lights represent hazards because their supporting base cans extend more than 2 inches above grade. Remove these lights. Clean lenses, replacing them as necessary, inspect wiring and ensure that the tops of the base cans are level and even with grade when reinstalled. The base cans that extend more than 2 inches above grade should be corrected during this time period even though the entire runway edge and threshold light system will be reconfigured when Alternative 4 is implemented.

### **A6. Off-airport signs**

Signs should be installed at the Highway 142 exit off U. S. Highway 97 and on Broadway at both sides of the corner of North Mill Street indicating the direction to Goldendale Municipal Airport.

These signs should state the name of the airport instead of simply saying "airport."

### **A7. Install pilot controlled lighting**

Replace the existing light sensor with a control allowing activation of lights by pilots.

### **A8. Plan, specify and develop bid and contract documents intended to implement Alternative 4**

All planning for Alternative 4 development should be accomplished in time to have the initial phase of the runway/taxiway project bid by the spring of 2007.

## **PROJECTS 2007-2011**

Following is a list of projects recommended for the 2006-2011 time period.

### **2007**

#### **B1. Landside development between Taxiways A and B**

Review and refine the recommendations of this plan relative to the area between Taxiways A and B at the east end of the airport. This area will be developed in stages. It will be used for based and, over the short term, itinerant aircraft parking, a future fueling station and two, six-unit nested T-hangars. Property in this area should be owned by the city of Goldendale.

#### **B2. Construct full-length taxiway**

Construct an extension to Taxiway B to conform to the ultimate runway length of 4,400 feet. This construction will require importation, grading and compaction of fill material. Adjust the location where Taxiways A and B converge. Prepare an area for aircraft taxiing west on Taxiway B to defer to aircraft approaching the intersection of these two taxiways from the west. Mark this taxiway with an "X" according to the standards contained in FAA Advisory Circular 150/5340-1J until it is ac-

tivated after runway reconstruction. Defer painting of the taxiway until future runway is painted.

### **B3. Install weather reporting station**

Install an automatic weather observing system (AWOS) or similar system to provide weather information to pilots. High-performance aircraft have limited abilities to identify and interpret wind information from wind indicators when planning their landing approaches. Safety is also increased if aircraft are able to determine wind and basic weather information before entering the airport area. AWOS systems are also helpful to departing pilots.

## **2008**

### **C1. Reconstruct the runway according to Alternative 4**

Extend the runway to its planned 4,400-foot length. Construct the Runway 7 and mid-field taxiway connectors. Construct the connector between Taxiways A and B at the east end of the airport. Runway construction will require importation, grading and compaction of fill material.

### **C2. Install PAPI runway 7, relocate PAPI Runway 25**

Ensure that PAPI installations are accomplished so that concrete bases are no more than 2 inches above grade.

### **C3. Install runway edge and threshold lights**

Thirty-four existing runway edge lights and 12 threshold lights will need to be reinstalled. An additional 14 runway edge lights will be required for the runway extension.

### **C4. Paint graphics**

Paint runway numerals, fog lines, centerlines, taxiway centerlines and hold lines at all locations.

### **C5. Install hold line signs**

Install hold-line signs at the mid-field and Runway 7 locations.

### **C6. Install supplemental wind indicator near the end of Runway 7**

This indicator will not be lighted. It will be on a short, frangible pole.

### **C7. Install taxiway reflectors**

Install reflectors the entire distance along Taxiway B. Approximately 60 reflectors will be required.

### **C8. Purchase property north of Taxiway A**

This property will be able to accommodate airport-dependent, airport-related and airport-compatible uses. The portion of this property adjacent to Taxiway A should be used for aircraft tie-downs and hangars. For purposes of this plan, this area is termed "Expansion Area A." It is scheduled for development in the 2016–2020 time period.

## **2009**

### **D1. Plan landside development**

Using the general recommendations of this plan, identify future uses for and layout of the area identified for landside development on the airport layout plan and building area plan. Address delivery and distribution of utilities including the city sewer system.

### **D2. Remove existing structures/construct T-hangar**

Activate property purchases and/or property exchanges formerly negotiated with individuals owning property in the area between Taxiways A and B. Install one six-position T-hangar orienting it so that it may be accessed by both Taxiways A and B.

## **2010**

### **E1. Provide water and sewer**

Extend city of Goldendale water and sewer service to Goldendale Municipal Airport.

**E2. Construct terminal welcome center on property north of the vehicle parking lot**

This building will be used as a visitor center where those flying to the Goldendale area can be accommodated in clean, comfortable and functional surroundings. This building will provide increased opportunities for the city of Goldendale, Klickitat County Economic Development, and local business interests to display information about their individual and mutual economic development and tourism efforts. Those flying to Goldendale will have a place to await ground transportation. Pilots will use this building for flight planning. This new structure will serve as the focal point for the airport.

**E3. Install airport entry sign/landscape**

Install lighted entry sign and landscape entry.

**PROJECTS 2011–2015**

**F1. Expand and re-orient aircraft parking apron**

Currently there are seven aircraft tie-down locations. The existing apron and the undeveloped apron to its north are able to accommodate additional aircraft if the locations of the tie-downs are changed. After consideration of taxiway object-free areas, there are approximately 4,200 square yards of space in this general area. The apron will accommodate 14 aircraft.

**F2. Install fuel system**

Install a 100 LL fuel system with cardlock that will allow 24-hour self fueling. Save space for a jet fuel tank to be installed as demand requires. The fueling location will be between Taxiways A and B at the east end of the airport.

**F3. Conduct paved surface maintenance**

Seal cracks, apply high-quality seal coat and re-paint all paved surfaces.

**F4. Construct second T-hangar**

Construct the second of the planned T-hangars between Taxiways A and B.

**PROJECTS 2016–2020**

**G1. Additional fuel tank**

Goldendale's 4,400-foot runway will accommodate some models of turboprop and turboprop aircraft. Install a Jet A fuel tank as demand exists in the area planned for this use.

**G3. Utilities and vehicle access to expansion area**

Construct an access road and provide utilities in support of development in Expansion Area A.

**G4. Develop parking area for itinerant aircraft**

Until this period itinerant aircraft will have been accommodated in the existing tie-down area. This action moves itinerant aircraft parking to a location west of the vehicle parking area. It will have capacity for three itinerant small aircraft and two larger multi-engine reciprocating and turboprop aircraft. It will be adjacent to the terminal (welcome center).

**G5. Additional hangars**

Develop hangars in Expansion Area A as demand warrants.

**G6. Paved surface maintenance**

Seal cracks, apply high-quality seal coat and re-paint all paved surfaces.

**PROJECTS 2021 – 2025**

**H1. Grade and prepare hangar development property**

Property located west of the location where Taxiway A is perpendicular to the runway and north of Taxiway B is available for construction of hangars for use by private individuals and firms that are based at or near Goldendale Municipal Airport. Grade and prepare this property for use. Preparation includes extension of the access road

and utilities that serve Expansion Area A. This area on drawings is noted as Expansion Area B.

**H2. Develop individual hangars**

Once the property described in I1 is ready lease this property for construction of hangars by their owners.

**H3. Conduct paved surface maintenance**

Seal cracks, apply high-quality seal coat and repaint all paved surfaces.

**Table 18: Forecast based aircraft 2006-2025**

	2006 (1)	2011	2016	2021	2025
Existing/projected on-airport based aircraft	5	11	17	24	29
Projected itinerant aircraft tie-down requirement	2	2	2	3	4
Total spaces required	7	13	19	27	33
Available tie-downs	7	7	14	19	19(3)
Available hangars	0(2)	6	12	12	18 + (3)
Space provided		13	26	31	42+

*(1) Aircraft based on airport property. (2) Existing hangars not counted in current storage inventory since they are scheduled to be removed. (3) During this time period tie-downs and hangars may be constructed as necessary on property added in Expansion Areas A and B.*

**4.5 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 10 aircraft are currently based at Goldendale Municipal Airport. Since five of these aircraft are stored in private hangars off airport property the based aircraft baseline for purposes of this section is five.

Chapter 3 forecasts that 35 aircraft will be based at the airport at the end of the planning period - the year 2025. Since off-airport storage of approximately five aircraft is expected to continue, 30 of these aircraft are expected to be based on the airport. Itinerant aircraft storage requirements will range from two to four during the planning period.

Table 18 identifies forecast aircraft and the facilities required to accommodate them.

Planned additional tie-down locations and hangar development will accommodate projected growth in a timely manner.

**4.6 BUILDING RESTRICTION LINES (BRLS)**

Building restriction lines (BRLs) 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. 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 77 surface called the "primary surface" which, at Goldendale Municipal Airport is 125 feet from centerline on both side of the runway. Primary surfaces rise and decrease in elevation with the nearest point of the runway so differences in runway elevations relative to adjacent proposed building sites must be taken into consideration.

It should be noted that FAR 77 is not a legal restriction of structure heights. It is instead 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, thus the logic behind showing BRLs on airport plans. FAR 77 requires 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.

Table 19 provides a detailed list of recommended projects and when their accomplishment is projected.

**Table 19: Projects and timing**

<b>Projects and timing</b>	
<b>2006</b>	
A1. Improve runway safety area, runway object-free area and FAR Part 77 Primary Surface.	D2. Remove existing structures/construct T-hangar.
A2. Hold line and taxiway centerline improvement.	
A3. Install taxiway reflectors.	<b>2010</b>
A4. Reposition distance-remaining signs.	E1. Provide water and sewer.
A5. Reinstall runway edge and threshold lights.	E2. Construct terminal.
A6. Install off-airport signs	E3. Install airport entry signs and landscape.
A7. Install pilot-controlled lighting.	
A8. Plan Alternative 4.	<b>2011-2015</b>
	F1. Expand and reorient aircraft parking area.
<b>2007</b>	F2. Install fuel system.
B1. Refine development between Taxiways A and B.	F3. Conduct paved surface maintenance.
B2. Construct full-length taxiway.	F4. Construct second nested T-hangar.
B3. Install weather reporting station.	
	<b>2016-2020</b>
<b>2008</b>	G1. Add additional fuel tank and dispensing system.
C1. Reconstruct runway according to Alternative 4.	G2. Purchase property north of Taxiway A (Expansion Area A).
C2. Install PAPI runway 7, relocate PAPI Runway 25.	G3. Provide utilities and vehicle access to Expansion Area A.
C3. Install runway edge and threshold lights.	G4. Provide itinerant aircraft parking.
C4. Paint runway/taxiway graphics.	G5. Construct additional hangars.
C5. Install hold-line signs.	G6. Conduct paved surface maintenance.
C6. Install supplemental wind indicator at Runway 7.	
C7. Install taxiway reflectors.	<b>2021-2025</b>
	H1. Grade and prepare hangar development property (Expansion Area B).
<b>2009</b>	H2. Add hangars.
D1. Plan landside development.	H3. Conduct paved surface maintenance.

## 4.7 ZONING AND LAND USE

Addressing specific issues related to zoning and land use on Goldendale Municipal Airport and the areas adjacent to it will increase safety and foster airport/community compatibility. Recommended actions are described in this section and are depicted in drawings C 1.6, titled "Zoning and Land Use," and C 1.7, titled "Exhibit A."

### Zoning

The property encompassing Goldendale Municipal Airport as depicted in Figure 1, page 2:13, consists of 73 acres. It is zoned "industrial park" (IP), as is a large area south, west and north of the airport. Property east of the airport, across Fairgrounds Road is zoned "open space" and is outside of the city's urban growth boundary. Approximately 2,500 feet east of the east boundary of the airport is an area zoned "suburban residential" (SR). This SR district is outside of the city's municipal boundary but inside of its urban growth boundary.

The industrial park zoning district, which encompasses the airport and which includes large areas adjacent to the airport, is generally protective of airport operations and conducive to airport/adjacent area compatibility. Development standards that are in place – as well as county code sections 2.17, the airport approach zone (AA) and 2.29, the airport development district – are also generally protective of the airport with respect to activities that are permitted on and near airport property.

### Land Use

Land in the area surrounding Goldendale Municipal Airport is generally underdeveloped. For considerable distances north, west and south there are open fields. Southeast of the airport along Fairgrounds road are parcels of property that are used for business offices and hangars containing aircraft that have access to the airport's runway via Taxiway C. Further southeast along Fairgrounds Road are the Klickitat County Fairgrounds. Use of the fairground's property is sporadic and at times intense. This property, how-

ever, is over 700 feet south of the airport's runway protection zone as well as FAR Part 77 approach and transitional zones.

As stated, properties east of Fairgrounds Road both north and south of the airport's Runway 25 approach surface are zoned "open space" and are outside of the city of Goldendale's Urban Growth Area. Section 2.05 of the county zoning code, which addresses open-space zoning, contains subsection 2.5:2 "dwellings." This subsection includes single-family homes, mobile homes and seasonal homes as permitted uses.

*Recommendation:* It is recommended that the city of Goldendale and Klickitat County develop comprehensive plan policies and review applicable sections of the zoning code to determine land-use compatibility factors in accordance with RCW 35.63.250 and RCW 36.70.547. City and county zoning ordinances may need to be amended to ensure that new developments adjacent to the airport are compatible with airport operations and that airport operations are not likely to have a negative impact on that development. Part of the intent of the open-space zone is to review and permit development after careful consideration of special circumstances, such as slopes, flood plains and other issues that exist in the zone. Though not specifically stated in the zoning ordinance, it is obvious that existence of an airport directly across Fairgrounds Road from the west extent of the zone should be one of those special circumstances.

Klickitat County has two sections of its zoning ordinance that address Goldendale Municipal Airport. Section 2.17 codifies the approach surface portion of FAR Part 77.

Section 2.29 states that "all [development] improvements shall conform to applicable federal regulations concerning dimensional restriction on air operations, including height restrictions and required setbacks from air operations areas."

The phrase "height restrictions" refers to FAR Part 77 airspace surfaces including those surfaces

termed “primary, transitional, horizontal and conical” that are not included in county ordinance 2.17.

Federal Aviation Regulation (FAR Part 77) does not automatically restrict development. It is a process that may or may not find proposed development acceptable. Part 77 establishes so-called “imaginary surfaces” centered on an airport’s runway or runways for the purpose of providing a method of identifying existing and proposed penetrations of airspace surfaces. The sizes of these imaginary surfaces is based on the category of each runway according to the current approach, and of any future approach planned for that runway. The slope and dimensions of the approach surface applied to each end of a runway are determined by the most precise instrument approach existing or planned for that runway. FAR Part 77 requires applicants proposing to construct on or near an airport to submit application 7460-1 “Notice of Proposed Construction” if the application threshold criteria are triggered. Typical projects include cell phone towers, top-mounted antennas, building power lines; radio broadcast towers, and temporary construction equipment such as cranes.

Through an aeronautical study the FAA may issue a determination of “no hazard” or a determination of “hazard to airspace.” The FAA can call for the proponent to reduce the height of the object, change the broadcast frequency of a transmitter, or outfit an object with obstruction marking and lighting. In cases where the FAA determines an object will be a “hazard” to air navigation, the FAA can issue a hazard determination. In rendering a decision of “no hazard” the FAA is advisory in nature and provisions of enforcement by the FAA are not binding. Filing of a 7460-1 notice does not relieve an applicant from responsibilities associated with local building or zoning regulations. Additionally, the possibility exists that what the FAA considers acceptable or acceptable with

mitigation does not correspond with the opinion of the city, county, WSDOT/AD or local pilots. The loss of navigable airspace to non-aviation uses, particularly within an airport approach or other flight-critical areas, creates potential hazards to flight activity, aircraft passengers, and to people and property on the ground. Obstructions can also inhibit the safe and efficient operation of an airport in the future by raising aircraft approach minimums, interference with navigation aids and reduction of runway lengths.

*Recommendation:* In order for there to be additional local control over airspace protection, this plan recommends changing the title of section 2.17 from “airport approach zone (AA) to “height limit zone” (HL) by codifying all of FAR Part 77. This recommended ordinance need not be a blanket restriction. It would, however, be written in such a way as to provide more control over future development that might impact airspace on and adjacent to the airport. This control is especially important in areas that would be within the FAR Part 77 transitional and approach surfaces. It is also important in order for the city and county to have more control over airspace that may be necessary to serve a future instrument-approach procedure.

A model height-limit zoning ordinance may be found in FAA Advisory Circular 150/5190-4A. Assistance is also available through the Washington State Department of Transportation/Aviation Division at (360) 651-6300.

### **Technical recommendation**

As indicated in Section 2.3 of this report, Chapter 2.29 of the Klickitat County Zoning Code contains a section titled “Master Plan and Binding Site Plan.” That section discusses review and approval by the FAA of an airport master plan. Since Goldendale Municipal Airport is not listed on the National Plan of Integrated Airport Systems (NPIAS) there is no process by which the FAA would

approve an airport master plan accomplished by the city of Goldendale. This section should indicate that an airport master plan accomplished by the city of Goldendale should be accepted by WSDOT/AD.

*Recommendation:* Review and adjust as appropriate this section of Chapter 2.29.

### **Disclosure Notice**

The appendix to this report contains a form recommended by WSDOT/AD that provides notice to those contemplating purchases of real property near airports.

*Recommendation:* Ensure consistent use of this form within the city limits. Recommend adoption of this process by Klickitat County.

# Chapter 5: Financial

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Chapter 4 contained information about airport improvements that are intended to meet forecast demand and increase safety, utility and efficiency at Goldendale Municipal Airport. This chapter identifies the cost of those improvements and establishes a plan for paying for them. Also included in this chapter is data related to current and projected airport income and expenses.

## 5.1 GENERAL FINANCIAL INFORMATION

### Cost estimates

Project cost estimates are in 2006 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 Goldendale will need to adjust the 2005-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 estimate for importing, grading and compacting fill material to be used for development of runway safety and taxiway safety areas was provided by Taylor Engineering Inc. of Goldendale. Their estimate is the result of an on-site survey accomplished during preparation of this plan. A copy of data provided by Taylor Engineering Inc. is included in the appendix.

The following formulas were applied to estimates for paved surfaces.

### Base course and top course rock

Surface area multiplied by a depth of 0.167 inches (for 2 inches compacted) or 0.25 inches (for 3 inches compacted) times 136 divided by 2,000 to arrive at tons required.

### Class A/B asphalt (ACP)

8.25 square yards per ton for a 2-inch compacted mat.

### Organization

This capital improvement program (CIP) has been organized according to the project schedule included in Table 19 in the previous chapter.

Projects recommended for the years 2006 through 2010 are listed in the individual years. Projects for the remaining time periods are listed in five-year increments.

This CIP is intended to provide scheduling of projects as they are envisioned at this time. Costs of projects recommended for the 2005-2010 time period are easier to estimate than costs of projects identified for implementation 15 or 20 years from now. It is important to review and adjust this CIP at least annually.

### Funding sources

This capital improvement program makes assumptions that some funding sources other than the city of Goldendale and WSDOT/AD will be available, especially for structure and infrastructure projects. 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 Goldendale 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 Development, is advance communication. Granting agencies are

more likely to respond positively to grant requests if they are given plenty of advance notice about intentions to apply for funds. This helps granting agencies with their own planning and prepares them to serve their municipal clients. Informing grant sources of your plans three to four years in advance and each year thereafter until funds are requested is an effective and thoughtful 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 no cost to the city of Goldendale because of assumed third-party financing.

### **Rates and charges**

It is very important at Goldendale Municipal Airport, as with all airport facilities, that careful attention be paid to establishment of appropriate rates and charges. Small airports have limited ability to collect revenue. In many cases, 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. Clearly, 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, however, 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.

Those responsible for the establishment of rates and fees should consider volunteerism. Efforts by individuals who volunteer their time are very important to many airports in Washington includ-

ing Goldendale Municipal Airport. It is important, though, to strike a fiscally sound balance between recognizing volunteer efforts and charging rates that help airports remain financially viable.

Taxiway C, indicated on the airport layout plan and described in Chapter 2, extends from the east end of the runway to private hangars. This circumstance is often called a “through-the-fence” condition. For many years, both WSDOT/AD and the FAA have had policies against such access for a number of reasons. This plan does not recommend cancellation of this access for it clearly serves a purpose. It is recommended, however, that the city charge those using Taxiway C reasonable access fees. The city may, at its discretion, also require hold-harmless agreements and additional insured status on liability portions of insurance policies held by those using Taxiway C access. Access fees for through-the-fence operations are both fair and reasonable.

It is particularly important for airports such as Goldendale Municipal Airport to carefully consider the value of its property as it looks forward to growth and major capital improvements. A periodic review of airport-related property lease fees is recommended. Fees should be adjusted to reflect real market conditions.

### **Financing of this development program**

#### WSDOT/AD

The Washington State Department of Transportation’s Aviation Division is Goldendale 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.

**CTED and EDA**

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

CTED's contact information is:  
 Washington State Department of Community Trade and Economic Development  
 RAAD Building  
 MS: 42525  
 128 10th Avenue  
 P.O. Box 42525  
 Olympia, WA 98504  
 (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

**The Port of Klickitat and Klickitat County Economic Development**

A continued close working relationship between the Port of Klickitat and Klickitat County Economic Development will be beneficial to all parties. Goldendale Municipal Airport represents a portal to the local area that will be increasingly important to business interests and therefore to the missions of these entities. Regular planning sessions intended to more fully develop policies, procedures, areas of mutual interest and goals will help maximize this relationship. As this plan is developed, Goldendale Municipal Airport should

be increasingly recognized as a primary feature that will help the Port of Klickitat and Klickitat County Economic Development promote both the county and the Goldendale area.

**Development Area A**

This plan assumes that the city of Goldendale will seek ownership of the area termed Area A on the airport layout plan. Area A is north of the existing vehicle parking area and adjacent to Fairgrounds Road.

**The safety area grant program**

WSDOT/AD has a grant program specifically designed to address runway safety area 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 repainting and hold-line sign installation noted in Chapter 4 would qualify for funding under this program. This is an excellent program that targets a specific, high-priority safety issue.

**5.2 EXISTING REVENUE AND EXPENSES**

Goldendale Municipal Airport's only source of income is from an annual lease arrangement with an agricultural aircraft operator who uses the airport as a base of operations each year. The value of this lease is \$500 per year.

Income and expenses related to airport operations are shown in Tables 20 and 21.

**Table 20: Revenue 2002-2004**

Revenue source	2002	2003	2004	Three-year total	Three-year average
Lease of property	\$500	\$500	\$500	\$1,500	\$500
<b>Total</b>	<b>\$500</b>	<b>\$500</b>	<b>\$500</b>	<b>\$1,500</b>	<b>\$500</b>

*Source: city of Goldendale*

### Revenue/expense summary

During the period 2002-2004, expenses exceeded revenue by an average of \$13,150 per year.

Tables 20 and 21 do not include grant funds from WSDOT/AD or expenses associated with projects related to those funds.

### 5.3 RECOMMENDED PROJECTS

This section estimates costs of projects included in Table 19 (Page 4:17).

Table 22 provides detail about how project costs were calculated. Table 23 indicates all projects over the 20-year planning period and identifies planned sources of funds. Table 24 shows funds required by each source according to specific time periods.

Some projects in this capital improvement plan exceed amounts of grant funds that WSDOT/AD can provide in an individual grant. These costs are due to the amount of fill necessary to provide conforming runway and taxiway safety areas (RSA and TSA). Options include (1) extending delivery and compaction of fill over several years and over several grants, (2) delivering only the fill necessary to provide for RSA and TSA improvement and allowing the area in between the planned runway and taxiway to remain at existing grade and (3) determining additional sources of funding.

**Table 21: Expenses 2002-2004 and net financial**

Expense category	Three-year total	Three-year average
Salaries/wages	\$2,068	\$690
Personnel benefits	\$440	\$146
Airport supplies	\$1,982	\$660
Professional services	\$1,320	\$440
Telephone	\$1,292	\$431
Insurance	\$9,700	\$3,233
Public utility services	\$4,874	\$1,625
Repairs and maintenance	\$19,125	\$6,375
Miscellaneous	\$149	\$50
<b>Total</b>	<b>\$40,950</b>	<b>\$13,650</b>
<b>Total revenue</b>	<b>(\$1,500)</b>	<b>(\$500)</b>
<b>Net income</b>	<b>(\$39,450)</b>	<b>(\$13,150)</b>

Source: city of Goldendale

**Table 22: 20-year capital improvement program**

Item	Project	Total cost	WSDOT/AD	Private or other grant agency	Volunteer labor, materials and equipment	City
<b>2006</b>						
A1	Improve runway safety area, runway object-free area and FAR Part 77 Primary Surface	\$11,500	\$10,925	0	0	\$575
A2	Hold line and taxiway centerline improvement	\$4,000	\$3,800	0	0	\$200
A3	Install taxiway reflectors (80 reflectors @ \$35 plus installation)	\$3,500	\$2,660	0	\$500	\$340
A4	Reposition existing distance-remaining signs	\$500	0	0	\$400	\$100
A5	Reinstall runway edge and threshold lights	\$2,500	0	0	\$2,000	\$500
A6	Install off-airport signs	\$800	0	0	0	\$800
A7	Install pilot controlled lighting	\$2,500	\$2,375	0	0	\$125
A8	Plan Alternative 4	\$23,000	\$21,850	0	0	\$1,150
<b>Total 2005-2006</b>		<b>\$48,300</b>	<b>\$41,610</b>	<b>0</b>	<b>\$2,900</b>	<b>\$3,790</b>
<b>2007</b>						
B1	Refine development between Taxiways A and B (Administrative)	0	0	0	0	0
B2	Construct full-length taxiway (portion past Taxiway B intersection) (3,700' X 25' = 10,278 SY)	\$542,700	\$515,565	0	0	\$27,135
B3	Install weather reporting station (AWOS 1) (engineering, purchase and installation)	\$37,000	\$35,150	0	0	\$1,850
<b>Total 2007</b>		<b>\$579,700</b>	<b>\$550,715</b>	<b>0</b>	<b>0</b>	<b>\$28,985</b>
<b>2008</b>						
C1	Reconstruct runway according to Alternative 4	\$1,154,640	\$1,096,908	0	0	\$57,732
C2	Install PAPI runway 7, relocate PAPI Runway 25	\$7,000	\$6,650	0	0	\$350
C3	Install runway edge and threshold lights	\$20,000	\$19,000	0	0	\$1,000
C4	Paint runway/taxiway graphics	\$3,500	\$3,325	0	0	\$175
C5	Install hold-line signs	\$1,500	\$1,425	0	0	\$75
C6	Install supplemental wind indicator at Runway 7	\$2,000	\$1,900	0	0	\$100
C7	Install taxiway reflectors	\$2,000	\$1,900	0	0	\$100
C8	Purchase property north of Taxiway A (Expansion Area A)	\$30,000	\$15,000	0	0	\$15,000
<b>Total 2008</b>		<b>\$1,220,640</b>	<b>\$1,146,108</b>	<b>0</b>	<b>0</b>	<b>\$74,532</b>
<b>2009</b>						
D1	Plan landside development	\$10,000	\$9,500	0	0	\$500

Under existing law, WSDOT/AD grants are restricted to \$250,000.

**Table 22: 20-year capital improvement program (continued)**

D2	Remove existing structures/construct T-hangar	\$305,000	0	\$300,000	0	\$5,000
	<b>Total 2009</b>	<b>\$315,000</b>	<b>\$9,500</b>	<b>\$300,000</b>	<b>0</b>	<b>\$5,500</b>
	<b>2010</b>					
E1	Provide water and sewer	\$100,000	0	\$80,000	0	\$20,000
E2	Construct terminal (1,200 foot structure with lighting and landscaping)	\$200,000	0	\$150,000	0	\$50,000
E3	Install airport entry signs and landscape	\$4,000	0	0	0	\$4,000
	<b>Total 2010</b>	<b>\$304,000</b>	<b>0</b>	<b>\$230,000</b>	<b>0</b>	<b>\$74,000</b>
	<b>2011-2015</b>					
F1	Expand and reorient aircraft parking apron	\$35,000	\$33,250	0	0	\$1,750
F2	Install fuel system	\$70,000	\$35,000	0	0	\$35,000
F3	Conduct paved surface maintenance (seal and repaint all surfaces)	\$20,000	\$19,000	0	0	\$1,000
F4	Construct second nested T-hangar	\$300,000	0	\$300,000	0	0
	<b>Total 2011-2015</b>	<b>\$425,000</b>	<b>\$87,250</b>	<b>\$300,000</b>	<b>0</b>	<b>\$37,750</b>
	<b>2016-2020</b>					
G1	Add additional fuel tank and dispensing system as necessary	\$50,000	\$25,000	0	0	\$25,000
G2	Provide utilities and vehicle access to Expansion Area A	\$100,000	0	\$90,000	0	\$10,000
G3	Provide itinerant aircraft parking	\$50,000	\$47,500	0	0	\$2,500
G4	Construct additional hangars (six nested-T)	\$300,000	0	\$300,000	0	0
G5	Conduct paved surface maintenance)	\$20,000	\$19,000	0	0	\$1,000
	<b>Total 2016-2020</b>	<b>\$520,000</b>	<b>\$91,500</b>	<b>\$390,000</b>	<b>0</b>	<b>\$38,500</b>
	<b>2021 - 2025</b>					
H1	Grade and prepare hangar development property (Expansion Area B)	\$50,000	0	\$25,000	0	\$25,000
H2	Add hangars	\$300,000	0	\$300,000	0	0
H3	Conduct paved surface maintenance	\$20,000	\$19,000	0	0	\$1,000
	<b>Total 2021-2025</b>	<b>\$370,000</b>	<b>\$19,000</b>	<b>\$325,000</b>	<b>0</b>	<b>\$26,000</b>
	<b>20-year total</b>	<b>\$3,782,640</b>	<b>\$1,945,683</b>	<b>\$1,545,000</b>	<b>\$2,900</b>	<b>\$289,057</b>

**Table 23: CIP details**

<b>Item</b>	<b>Project</b>	<b>Detail cost</b>
	<b>2006</b>	
A1	<b>Improve runway safety area, runway object-free area and FAR Part 77 Primary Surface</b>	
	Repaint threshold graphics Runways 25 and 7	\$1,000
	Adjust runway/taxiway lighting	\$3,000
	Runway 7 fence removal	\$500
	Grade and compact runway safety area -- add shoulder rock as necessary	\$7,000
A2	<b>Hold line and taxiway centerline improvement</b>	
	Paint hold lines and taxiway centerlines	\$2,000
	Relocate and install existing hold-line signs	\$500
	Purchase/install two addition hold-line signs	\$1,500
A3	<b>Install taxiway reflectors (80 reflectors @ \$35 plus installation</b>	\$3,500
A4	<b>Reposition existing distance-remaining signs</b>	\$500
A5	<b>Adjust and reinstall runway edge and threshold lights</b>	\$2,500
A6	<b>Install off-airport signs</b>	\$800
A7	<b>Install pilot-controlled lighting</b>	\$2,500
A8	<b>Plan Alternative 4</b>	
	Detailed planning, engineering, development of drawings, contract documents and bid documents	\$23,000
	<b>Total for 2005-2006 projects</b>	<b>\$48,300</b>
	<b>2007</b>	
B1	<b>Refine development between Taxiways A and B (Administrative)</b>	\$0
B2	<b>Construct full-length taxiway (portion past Taxiway B intersection) (3,700' x 25' -- 10,278 SY)</b>	
	Import, grade and compact fill material	\$400,000
	Base course rock application and compaction (1,800 tons @ \$15)	\$27,000
	Top course rock application and compaction (1,200 tons @ \$15)	\$18,000
	Asphalt application and compaction -- entire realigned taxiway (4,400' x 25') (1,500 tons @ \$55)	\$82,500
	Application and grading of rock for taxiway shoulders	\$5,000
	Sales tax on \$127,500	\$10,200
B3	<b>Install weather reporting station (AWOS 1) (engineering, purchase and installation)</b>	\$37,000
	<b>Total for 2007 projects</b>	<b>\$579,700</b>
	<b>2008</b>	
C1	<b>Reconstruct runway according to Alternative 4</b>	
	Import, grade and compact fill material	\$775,000
	Base course rock application and compaction -- including taxiway connectors (6,000 tons @ \$15)	\$90,000
	Top course rock application and compaction (3,000 tons @ \$15)	\$45,000
	Asphalt application and compaction (3,600 tons @ \$55)	\$198,000
	Application and grading of rock for runway and taxiway connector shoulders	\$20,000
C2	<b>Install PAPI Runway 7, relocate PAPI Runway 25</b>	\$7,000
	Detailed planning, engineering, development of drawings, contract documents and bid documents	\$23,000

**Table 23: CIP details**

<b>Item</b>	<b>Project</b>	<b>Detail cost</b>
C4	Paint runway/taxiway graphics	\$3,500
C5	Install hold-line signs	\$1,500
C6	Install supplemental wind indicator at Runway 7	\$2,000
C7	Install taxiway reflectors	\$2,000
C8	Purchase property north of Taxiway A (Expansion Area A)	\$30,000
	Sales tax on \$333,000	\$26,640
	<b>Total for 2008 projects</b>	<b>\$1,220,640</b>
	<b>2009</b>	
D1	Plan landside development	\$10,000
D2	Remove existing structures/construct T-hangar	\$305,000
	<b>Total for 2009 projects</b>	<b>\$315,000</b>
	<b>2010</b>	
E1	Provide water and sewer	\$100,000
E2	Construct terminal (1,200-foot structure with lighting and landscaping)	\$200,000
E3	Install airport entry signs and landscape	\$4,000
	Eight spaces, including paving	\$20,000
	<b>Total for 2010 projects</b>	<b>\$304,000</b>
	<b>2011-2015</b>	
F1	Expand and reorient aircraft parking apron	\$35,000
F2	Install fuel system	\$70,000
F3	Conduct paved surface maintenance (seal and repaint all surfaces	\$20,000
F4	Construct second nested T-hangar	\$300,000
	<b>Total for 2011-2015 projects</b>	<b>\$425,000</b>
	<b>2016-2020</b>	
G1	Add additional fuel tank and dispensing system as necessary	\$50,000
G2	Provide utilities and vehicle access to Expansion Area A	\$100,000
G3	Provide itinerant aircraft parking	\$50,000
G4	Construct additional hangars (six nested-T)	\$300,000
G5	Conduct paved surface maintenance	\$20,000
	<b>Total for 2016-2020 projects</b>	<b>\$520,000</b>
	<b>2021-2025</b>	
H1	Grade and prepare hangar development property (Expansion Area B)	\$50,000
H2	Add hangars (assume six nested-T)	\$300,000
H3	Conduct paved surface maintenance	\$20,000
	<b>Total for 2021-2025 projects</b>	<b>\$370,000</b>

**Table 24: Capital expenditure by phase**

Phase	CIP total cost	WSDOT/AD	Private or other funding agency	Volunteer labor	City
2006	\$48,300	\$41,610	0	0	\$3,790
2007	\$579,700	\$550,715	0	0	\$28,985
2008	\$1,220,640	\$1,146,108	0	0	\$74,532
2009	\$315,000	\$9,500	\$300,000	0	\$5,500
2010	\$304,000	0	\$230,000	0	\$74,000
2011-2015	\$425,000	\$87,250	\$300,000	0	\$37,750
2016-2020	\$520,000	\$91,500	\$390,000	0	\$38,500
2021-2025	\$370,000	\$19,000	\$325,000	0	\$26,000
<b>Total</b>	<b>\$3,782,640</b>	<b>\$1,945,683</b>	<b>\$1,545,000</b>	<b>\$2,900</b>	<b>\$289,057</b>

Funding totals in this table are for planning purposes only. No agency or department, including WSDOT/AD, has committed to providing these funds.