GRANT COUNTY INTERNATIONAL AIRPORT

Moses Lake, Washington

AIRPORT MASTER PLAN

PORT OF MOSES LAKE

AIRPORT MASTER PLAN

for

Grant County International Airport
Moses Lake, Washington

Prepared for

The Port of Moses Lake

by

Coffman Associates, Inc.

FINAL

August 2014

"The preparation of this document was financially supported, in part, through the Airport Improvement Program as administered by the Federal Aviation Administration as provided under Title 49 United States Code, Section 47104. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws."

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INTRODUCTION

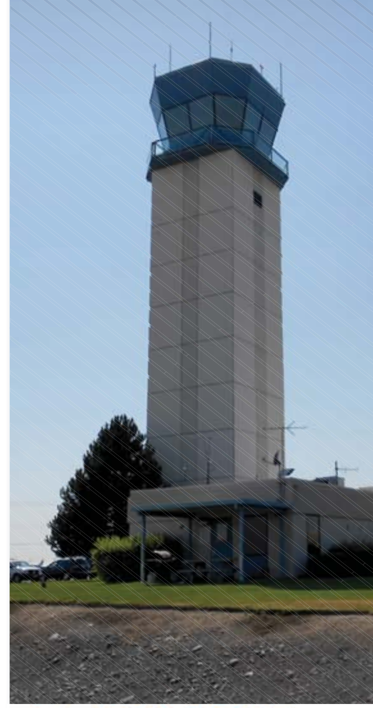
INTRODUCTION

The Federal Aviation Administration (FAA) recommends that airports update their long term planning documents every seven to 10 years, or as necessary to address local changes at the airport. The last Master Plan for Grant County International Airport (MWH) was finalized in 2005. The Port of Moses Lake has received a grant from the FAA to update the Airport Master Plan. The FAA grant covers 90 percent of the fixed fee project cost with the Port providing a ten percent match.

Following federal guidelines for consultant selection based on qualifications, the Port of Moses Lake selected Coffman Associates, a national aviation planning firm, to undertake the Master Plan. After project scope negotiations and an independent review of study costs, a contract was approved by the Port of Moses Lake in July 2013. The project schedule called for the work elements to be completed in one year.

The study is designed to provide guidance for future development and provide updated justification for projects for which the Airport may receive funding participation through federal and state airport improvement programs. The Airport Master Plan is prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5300-13A, *Airport Design*, and AC 150/5070-6B, *Airport Master Plans*.

Grant County International Airport is a general aviation facility, as defined by the FAA, which is intended to serve the aviation needs of the community. The Airport is included in the FAA's *National Plan of Integrated Airport Systems* (NPIAS). As such, the Airport is eligible for federal development grants. The Port of Moses Lake owns and operates the Airport, which is located six miles northwest of the Moses Lake central business district. The Airport provides support to commercial, military, and private aircraft. The U.S. Air Force and



PORT OF MOSES LAKE

AIRPORT MASTER PLAN

Boeing Company test aircraft at the facility. Services and facilities available include: hangar storage, tie-downs, fixed base operator services, flight instruction, aircraft rental, aircraft maintenance, and fueling. The airport encompasses approximately 4,650 acres of land. The airport industrial park lies adjacent to the Airport and Big Ben Community College is located on the grounds. The college operates a flight training program.

The current runway system consists of five runways, with the longest at 13,500 feet, one of the longest runways in the country. The airport averages 150 operations each day.

MASTER PLAN OBJECTIVES

The overall objective of the Airport Master Plan is to provide the sponsor with guidance for future development of the Airport, meeting the needs of existing and future users, while also being compatible with the environment. The most recent master planning effort for the airport was undertaken in 2005. This planning effort identifies and provides justification for new priorities. This plan has been closely coordinated with other existing and ongoing planning studies in the area, and with aviation plans developed by the FAA and the state. Specific objectives of the study include:

- Research factors likely to affect air transportation demand in the Moses Lake area over the next 20 years and develop new operational and basing forecasts.

- Determine projected needs of airport users, taking into consideration recent changes to FAA design standards, global positioning (GPS) aircraft approach capability, and transitions in the type of aircraft flown by corporate and general aviation users.

- Recommend improvements which will enhance the airport's ability to satisfy future aviation needs.

- Develop new airport layout drawings using updated aerial photography and mapping.

- Establish a schedule of development priorities and a financial program for implementation of development, and analyze potential funding sources, consistent with FAA planning.

- Provide specific recommendations for aviation and non-aviation related land uses on airport property and review existing or proposed land use, economic development, and zoning documents to ensure future compatibility with off-airport development.

- Develop active and productive public involvement throughout the planning process.

MASTER PLAN ELEMENTS AND PROCESS

To achieve the objectives described above, the Airport Master Plan was prepared in a systematic fashion pursuant to the scope of services that was coordinated with the airport sponsor and the FAA. The study has 12 elements:

1.0 **Study Initiation** - Development of the scope of services, budget, and schedule. A kickoff meeting was held with an Aviation Technical Advisory Committee (ATAC) at the study's initiation to obtain a more comprehensive understanding of local issues.

2.0 **Inventory** - Inventory of facility and operational data, wind data, population and economic data, airport financial data, and new aerial photography and mapping. All of the inventory data was organized into a draft working paper.

3.0 **Forecasts** - Forecasts for based aircraft, operations, and peaking characteristics of the airport over a 20-year period. The forecast was distributed to the FAA for review and approval.

4.0 **Facility Requirements** - After establishing the critical design aircraft and physical planning criteria, facility needs assessments were developed for airside and landside facilities.

5.0 **Phase 1 Draft Working Papers** – The results of the first four elements were compiled into draft working papers and submitted to the ATAC.

6.0 **Airport Development Alternatives** - Potential airside and landside alternatives were developed for meeting long-term needs. Each of the alternatives was subjected to engineering and environmental analysis.

7.0 **Phase 2 Draft Working Paper** – The results of the airport development alternatives were compiled into a draft working paper and submitted to the ATAC.

8.0 **Master Plan Concept/Capital Improvement Program/ Solid Waste Recycling Plan**– The consultant developed a recommended development concept for the airport. A 20-year capital improvement program that is phased over time to various demand milestones is included. Cost estimates for each project were developed in current (2014) dollars. A solid waste recycling plan for the airport was prepared to comply with current federal legislative requirements.

9.0 **Phase 3 Draft Working Paper** – The results of element 8.0 were compiled into a draft working paper and presented to the ATAC.

10.0 **Airport Layout Plans** - Airport layout plans (the technical drawings) were developed to depict existing and proposed facilities. The drawing set meets the requirements of the FAA Northwest Mountain Region.

11.0 **Draft Final Master Plan –** Following consideration of all comments on the draft working papers, a draft final master plan document was compiled.

12.0 **Final Documentation and Public Workshop** - Final report documentation includes technical reports (printed and digital for-mats), an executive summary of the study, and full size/full color copies of report exhibits and drawings produced for the study. The FAA reviews and approves the final airport layout plan drawings. A public information workshop was publicized and conducted to encourage the public to provide input to the final plan.

STUDY COORDINATION

The study process includes local participation through the formation of an ATAC. The ATAC consisted of federal, state, and local agencies, airport tenants, and general public representatives. The sponsor determined the final makeup of the committee, with the assistance of the consultant. The study schedule called out four points in the study where the ATAC met to discuss draft working paper submittals. A kickoff meeting was held during the initial inventory process. Other meetings were scheduled following facility requirements, development alternatives, and the capital improvement program.

One "open house" workshop for the general public was held to present the preliminary findings and to solicit public comment. The study was completed within approximately one year. The draft working papers and other project-related material were available online on a dedicated project website for the duration of the study. **Exhibit IA** presents the key study elements, meeting intervals, project schedule, and documentation. The members of the Aviation Technical Advisory Committee are listed below.

11MP08-IA-1/05/12

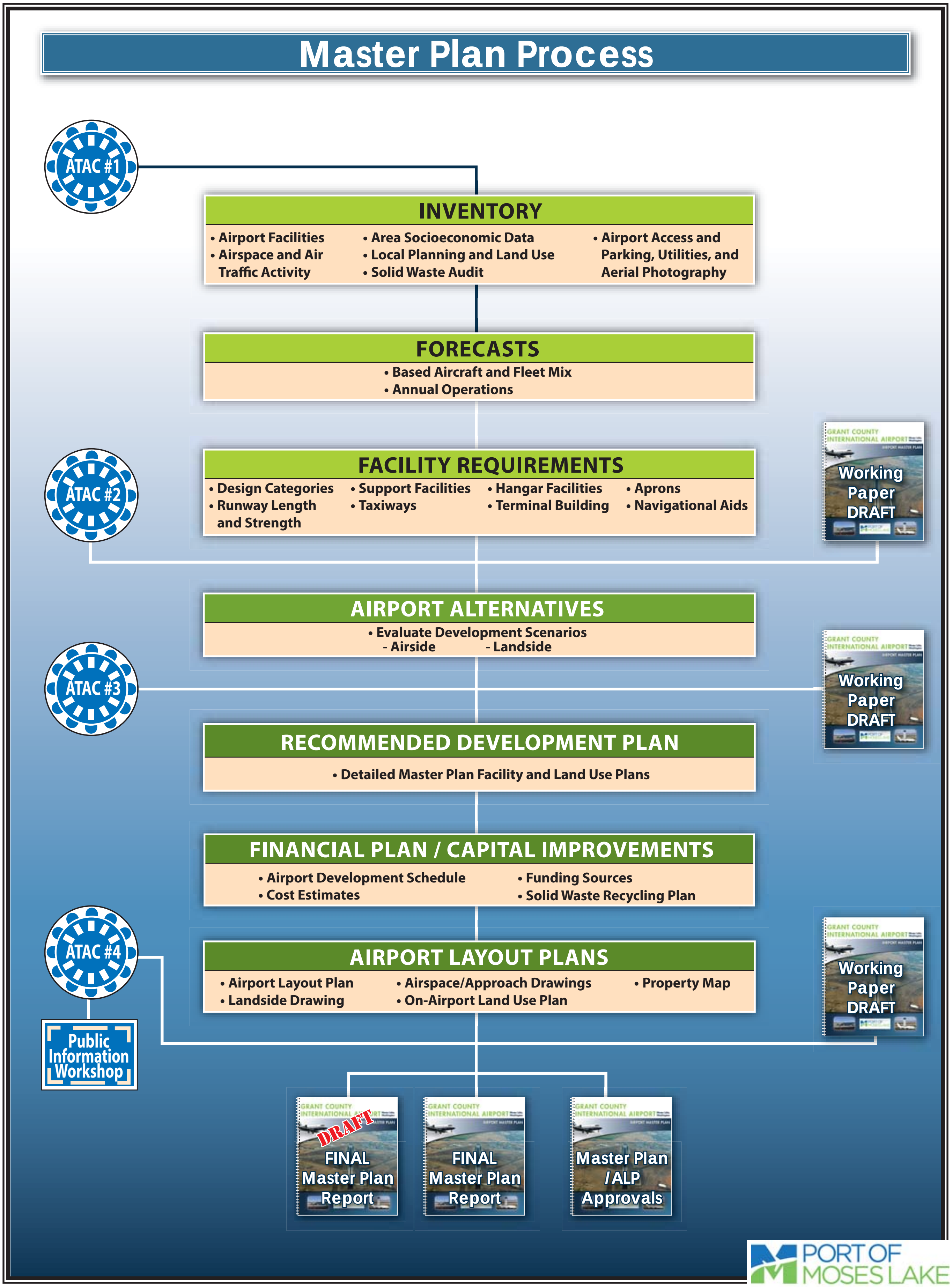


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Exhibit IA
PROJECT WORK FLOW

GRANT COUNTY INTERNATIONAL AIRPORT MASTER PLAN -AVIATION TECHNICAL ADVISORY COMMITTEE			
Last Name	**First Name**	**Title**	**Representing**
Akridge	Jeff	General Manager	Columbia Pacific Aviation (FBO)
Alvarado	Gil	Planning Director	City of Moses Lake
Crane	Gregory	Aviation Program Manager	Big Bend Community College
Carrigan	Joseph	MWH Tower Manager	FAA - Moses Lake Tower
Eklund	Nancy	Land Use Planner	The Boeing Co.
Godden	Larry	General Manager	Million Air (FBO)
Hatfield	Bill	Representative	Boeing - SSG Site Services
Hooper	Damien	Director of Planning	Grant County Planning Department
Human	Lee	President	AeroTEC
Johnson	Eric	Planning Manager	WSDOT - Aviation
Johnson	Jeffery	Representative	Fairchild AFB
Kruger	Delong	Representative	Aircraft Owners and Pilots Association (AOPA)
Kunkle	Stroud	Commissioner	Port of Moses Lake
Mason	Lew	Representative	Local GA Community
Meade	Robert	Base Manager	U.S. Forest Service - Moses Lake
Otsuka	Keith	Chief Pilot	Boeing
Parashar	Deepa	Airport Planner	FAA-Seattle Airports District Office
Ryan	John	Representative	Joint Base Lewis - McChord
Keimig	David	Chief Operating Officer	Aviation Technical Services
Smith	Jonathan	Executive Director	Grant County EDC
McFarland	Corley	Consulting Engineer	Precision Approach Engineering
Temple	Jason	Representative	Naval Air Station - Whidbey Island

PORT OF MOSES LAKE

Chapter One

INVENTORY

Chapter One

INVENTORY

The initial step in the preparation of the master plan update for Grant County International Airport (MWH) is the collection of information pertaining directly to or influencing the Airport and the area it serves. The information summarized in this chapter will be used in subsequent analyses in this study and includes:

- Physical inventories and descriptions of the facilities and services currently provided at the Airport, including the regional airspace, air traffic control, and aircraft operating procedures.
- Background information pertaining to the regional area, including descriptions of the climate, surface transportation systems, and the Airport's role in regional, state, and national aviation systems. Past capital development at the Airport will also be presented.
- Population and other significant socioeconomic data which can provide an indication of future trends that could influence aviation activity at the Airport.
- A review of existing local and regional plans and studies to determine their potential influence on the development and implementation of the Airport Master Plan.

The information outlined in this chapter provides a foundation for all subsequent chapters. The information was obtained through on-site inspections of the Airport, interviews with Airport staff and tenants, and documents prepared by the Federal Aviation Administration (FAA), state agencies, Grant County, and the City of Moses Lake.

PORT OF MOSES LAKE

AIRPORT MASTER PLAN

REGIONAL AIRPORT SETTING

Grant County International Airport is located adjacent and north of the City of Moses Lake, Washington as shown on **Exhibit 1A**. Moses Lake is located in the heart of the Columbia Basin in central Washington. The Columbia Basin is a large area in the Pacific Northwest that serves as the drainage basin for the Columbia River and numerous tributaries.

Central Washington, including Moses Lake, was a sparsely populated high desert area prior to the construction of the Grand Coulee Dam on the Columbia River in 1941 and the establishment of Moses Lake Army Air Base in 1942, later renamed Larson Air Force Base (present day Grant County International Airport). The City of Moses Lake was incorporated in 1938, with a population of 301. Significant population growth was spurred by the Columbia Basin Irrigation Project begun in 1950 which provided irrigation to wide areas of south central Washington. Today there are more than 21,000 residents. Moses Lake is named in honor of Chief Moses who was the leader of the Sinkiuse tribe from 1859 to 1899. Ultimately, the Native American tribes in the region were relocated to various reservations.

Moses Lake's historic economic base has been agriculture, but now includes considerable manufacturing and technology. Several companies have moved to the area including REC Silicon (one of the world's largest manufacturers of polysilicon use in solar panels) and SGL Group, in partnership with BMW, which invested over $100 million in a carbon-fiber manufacturing plant in 2010. Several manufacturers are located at the Airport or in the Airport industrial park including Genie Industries (aerial lift cranes), Takata Industries (vehicle air bag systems), and Chemi-Con (specialized aluminum products).

The Moses Lake region is also noted for a wealth of recreational and tourist attractions. Moses Lake accommodates all water sports and fishing. The Columbia River and Grand Coulee Dam are also located in the county.

AREA TRANSPORTATION MODES

Airports are a significant part of the national transportation infrastructure. Other modes of transportation can work in synergy with airports to promote access and economic development. They can also compete with airports for users. The following discussion presents information related to the various transportation modes available in the area of the Airport.

Highways

Grant County International Airport is located immediately north of the City of Moses Lake, Washington. The Airport terminal area is directly accessible via Patton Blvd. Patton Blvd. connects to State Highway 17, which provides north/south access through Moses Lake. State Highway 17 connects to Interstate 90 (I-90), which provides east/west access across the state. I-90 is located approximately eight miles to the south of the Airport.

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Exhibit 1A
LOCATION MAP

Rail

There is no passenger rail service in Moses Lake, Washington. Amtrak operates on the BNSF rail lines that run north and southwest of Moses Lake. The Amtrak Empire Builder line provides rail service from Chicago to Spokane where a northern line proceeds to Seattle and a southern line proceeds to Portland, OR. The closest station is approximately 14 miles to the northwest in Ephrata, WA.

Freight rail has the potential to be much more important to both the region and the Airport. The Columbia Basin Railroad (CBRW) owns rail lines that extend from the BNSF lines beginning in Connell, WA (45 miles SE of Moses Lake), to the Port of Moses Lake, terminating at the Airport. The rail line extending from south of Moses Lake to the airport is not currently in use, as a bridge over Parker Horn (an inlet from Moses Lake) is not structurally sound. As a result, there is no current freight rail service to the Port of Moses Lake.

In 2009, the Washington State Department of Transportation initiated an environmental assessment to analyze the practicality of repairing and reopening this rail line. The study also considered extending the rail lines along the eastern edge of the Airport in order to provide service to industrial property at the Port of Moses Lake. **Exhibit 1B** presents a map of the proposed rail improvement project.

The project is to extend a new rail line from Wheeler, WA (Segment 1) through the north side of the City of Moses Lake. This new line is intended to replace the existing line that extends throughout the City of Moses Lake. A replacement bridge would be constructed across Parker Horn to connect with the existing Segment 3 that extends to the Airport. Segment 3 would have to have extensive repairs to be brought back online. Segment 2 and 2A are planned new rail lines extending to the industrial Port of Moses Lake properties. As of 2013, the rail project had not been funded.

REGIONAL CLIMATE

Weather conditions are important to the planning and development of an airport. Temperature is an important factor in determining runway length requirements, while wind direction and speed are used to determine optimum runway orientation. The need for navigational aids and lighting is determined by the percentage of time that visibility is impaired due to cloud coverage or other conditions. **Table 1A** summarizes climatic data for Moses Lake which is sourced from the on-airport weather sensor (ASOS).

TABLE 1A
Climate Summary
Grant County International Airport

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High Temp. Avg. (°F)[1]	36.2	43.8	55.1	63.4	73.4	80.1	88.9	88.0	77.7	62.8	46.1	34.7
Low Temp. Avg. (°F)[1]	23.7	26.8	31.9	37.0	44.6	51.9	56.3	55.2	46.6	35.8	29.0	22.6
Precip. Avg.(in.)[1]	1.14	0.80	0.78	0.70	0.60	0.75	0.41	0.25	0.39	0.65	1.20	1.44
Wind Speed (mph)[2]	6.4	7.1	8.3	9.0	8.9	8.7	8.0	7.8	7.8	7.0	6.7	6.1
Sunshine (%)[2]	27%	40%	55%	60%	64%	65%	80%	78%	74%	55%	30%	25%
Snowfall Avg. (in.)[2]	9.8	4.0	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	3.5	9.7

Source: [1]Climatography of the United States No. 81 (30 years of data from 1981-2000)
[2]www.city-data.com analysis of weather station data.

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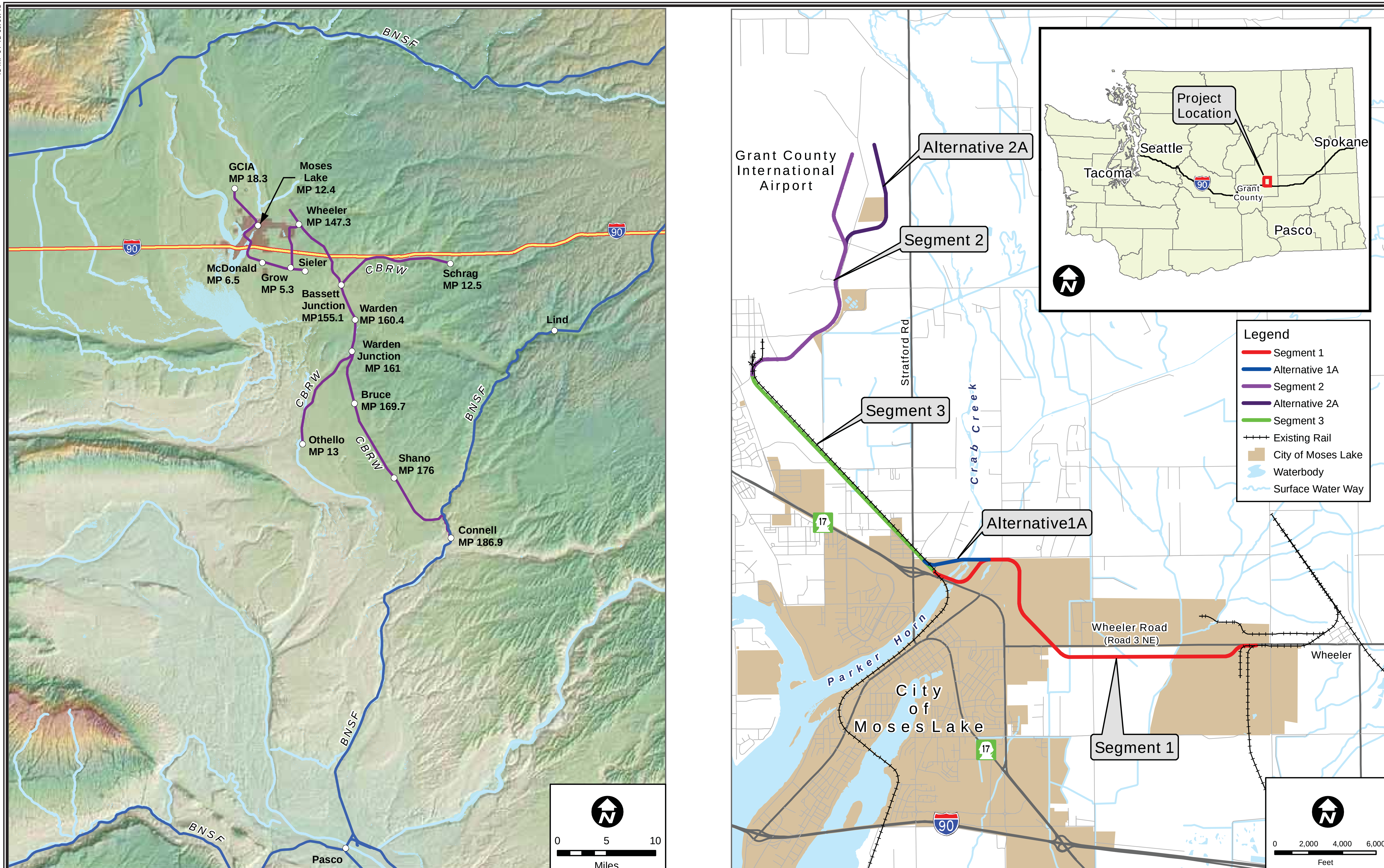

Exhibit 1B
RAIL STUDY MAP

Moses Lake has a dry climate and is classified as desert due to its low annual average rainfall of only eight inches per year. Moses Lake is, in effect, in the shadow of the Cascade Mountains which are located less than 100 miles to the west. On the west side of the Cascades, including Seattle, annual rainfall is nearly 40 inches per year. In general, the climate is ideal for aviation activity as there are approximately 350 days per year of visual flight rules (VFR) conditions.

During the summer months, average high temperatures are in the high 80s with nighttime lows in the low mid-50s. Winters can be cool with average highs in December of 34° F (Fahrenheit). The average winds are moderate in the region, averaging 7.65 mph. The strongest winds are from the north to the south, which typically occurs in the winter months. Snowfall can be significant in the region with annual averages of nearly 30 inches. **Exhibit 1C** presents graphs of various climate indicators for the Moses Lake region.

AIRPORT HISTORY AND DEVELOPMENT

On November 24, 1942, the federal government opened the Moses Lake Army Air Base for training P-38 pilots and, later, B-17 Flying Fortress crews. In May 1945, the base was briefly mothballed until 1948 when the facility was reopened as a U.S. Air Force Base, the headquarters of the 325th All-Weather Fighter Wing. The facility was renamed Larson Air Force Base (AFB) in 1950 in tribute to the late aviator Major Donald A. Larson from Yakima, who was killed in a mission over Germany.

Larson Air Force Base continued to grow through the 1950s adding a troop carrier wing and an air transportation operation. Larson AFB soon became a test flight center for the Boeing Company, located in nearby Seattle. The first Boeing tests were for the B-52 Stratofortress, the intercontinental bomber, and the KC-135 refueling tanker. The Air Force built a large hangar at the airport capable of housing eight B-52s. This hangar is now the Genie Industries manufacturing plant.

In 1960, the base became a Strategic Air Command (SAC) base under the 4170th Strategic Wing and also acquired three Titan missile-launching facilities. In the early 1960s, there were 15 B-52 bombers based at the Airport, several were on combat readiness alert capable of carrying four nuclear bombs each. At its height, Larson Air Force Base had more than 4,000 employees and housed 8,000, all in a town of 11,299 (1960 census).

In 1964, it was announced that the Air Force would be closing the base on June 30, 1966. The community explored several options for what to do with the Airport and ultimately chose to create a public port to administer the Airport and other lands. On November 15, 1965, the Grant County commissioners certified the results of a public vote to establish Grant County Port District No. 10, the Port of Moses Lake. The official dedication ceremony was held on October 8, 1966.

Ultimately, the General Services Administration (GSA) granted the runways and other aviation-related facilities at the former Larson AFB to the Port. Big Bend Community College was granted by the GSA three hangars to support flight and aviation mechanics programs.

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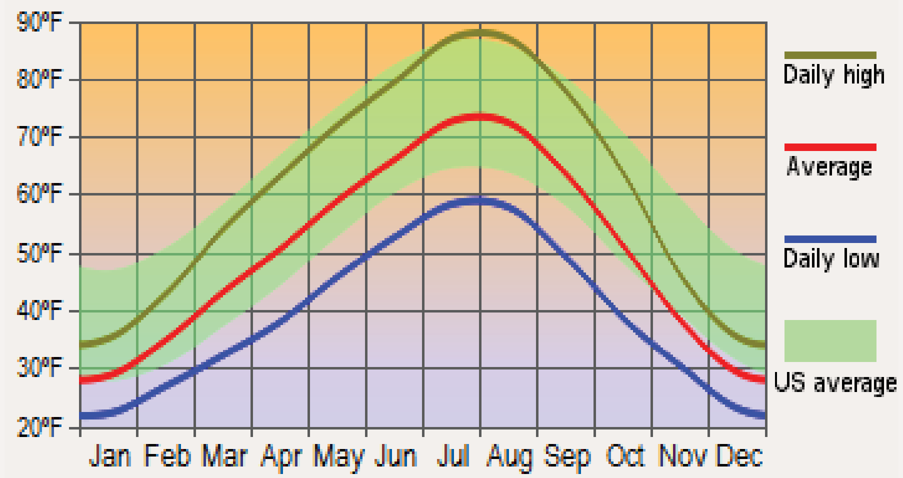
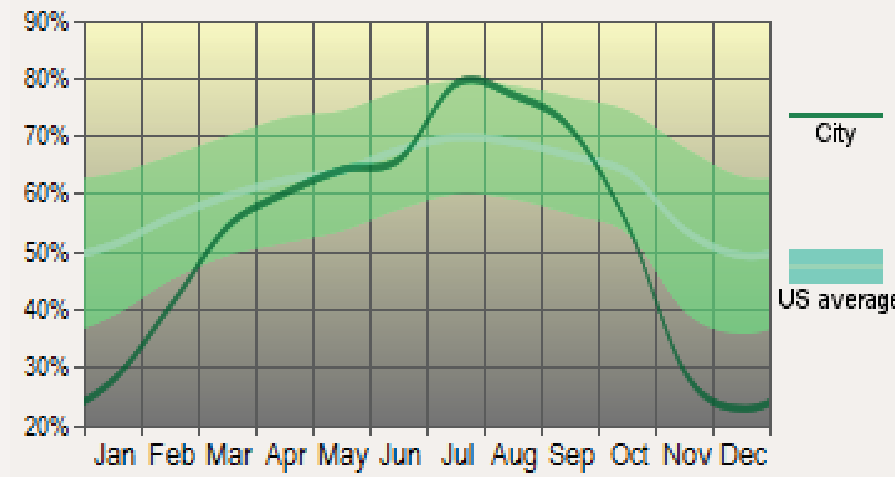
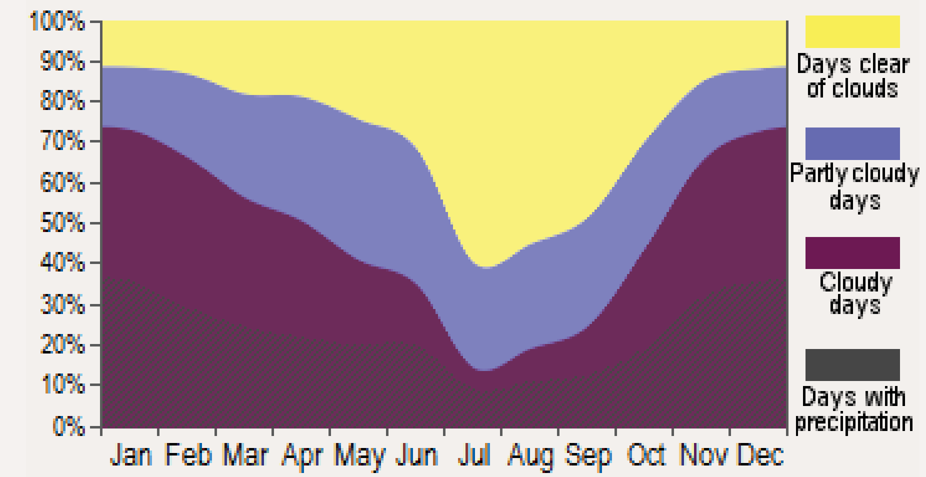
Average Temperatures



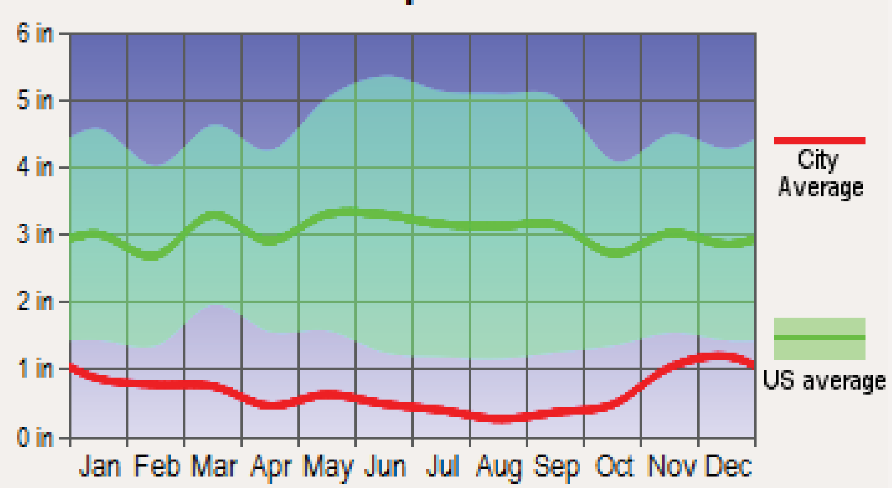
Sunshine



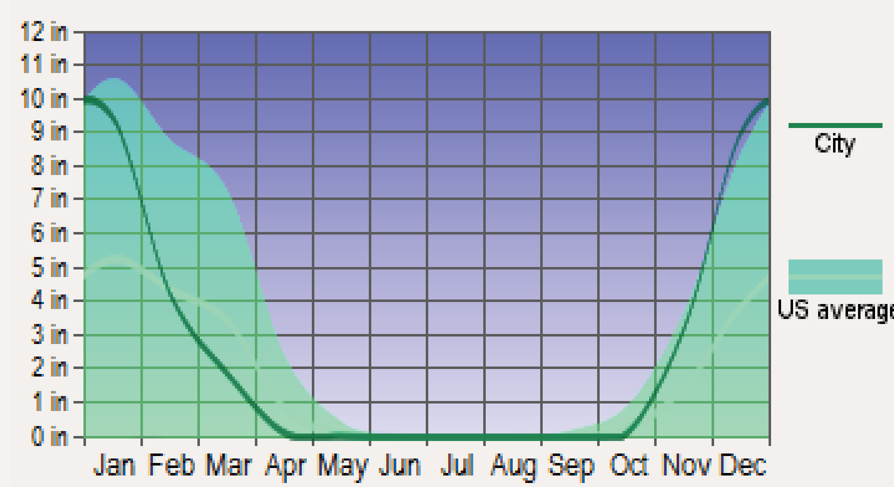
Cloudy Days



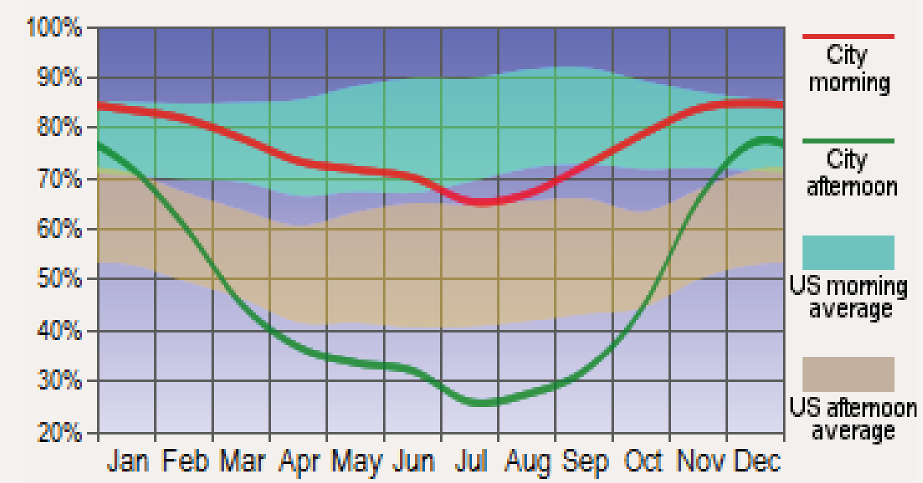
Precipitation



Snowfall



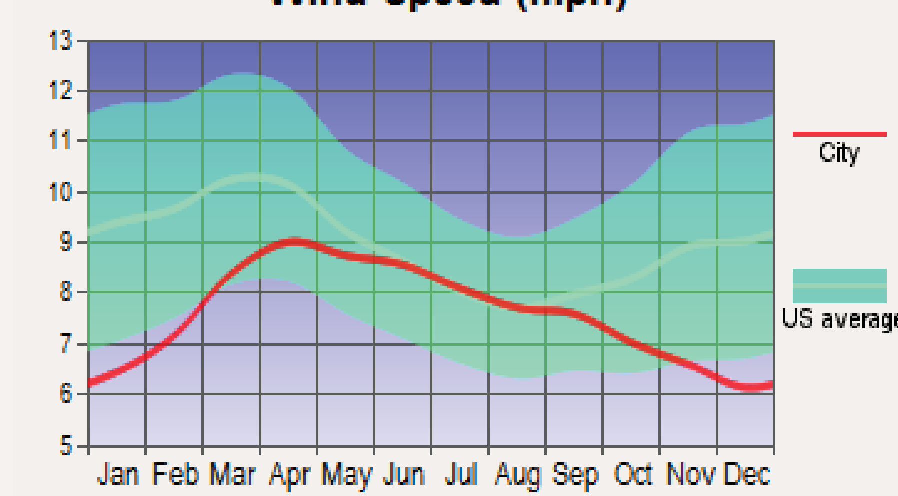
Humidity



Climate Summary

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High Temp. Avg. (°F)¹	34.3	42.1	53.6	63.6	72.8	80.5	88.2	87.6	78.1	63.3	45.0	34.4
Low Temp. Avg. (°F)¹	21.7	27.1	33.2	39.6	47.9	54.9	61.2	60.3	51.2	40.1	30.3	22.5
Precip. Avg.(in.)¹	0.83	0.78	0.75	0.43	0.64	0.51	0.44	0.25	0.37	0.47	1.03	1.19
Windspeed(mph)²	6.4	7.1	8.3	9.0	8.9	8.7	8.0	7.8	7.8	7.0	6.7	6.1
Sunshine (%)²	27%	40%	55%	60%	64%	65%	80%	78%	74%	55%	30%	25%
Snowfall Avg. (in.)²	9.8	4.0	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	3.5	9.7

Wind Speed (mph)



Source: ¹*Climatography of the United States No. 81 (30-years of data from 1971-2000)*
²*www.city-data.com analysis of weather station data.*

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Exhibit 1C
CLIMATE DATA SUMMARY

Eventually, additional land would be granted to the college which would ultimately move its entire campus to the Airport.

With several long runways, an excellent aviation climate, relatively uncongested airspace, and a supportive community, several long term business relations were established. Japan Airlines trained most of their pilots at Moses Lake from the mid-1960s until August, 2009. The Boeing Company has had a presence at the Airport since the 1950s and continues to actively utilize the Airport for flight testing today.

Cascade Airways began regular commercial service to both Seattle and Spokane in 1977. In 1985, Cascade Air was acquired by Horizon Air, which continued service until 2001. Non-stop service was once available to Boise, Portland, Spokane, and Seattle. Other "tag" service was available to Pasco, Pullman, Walla Walla, Wenatchee, and Yakima. The peak year for enplanements (passenger boardings) at the Airport was 2001 when the Airport had 11,534. A 30,000 square-foot passenger terminal building was dedicated in April 1998. **Table 1B** presents the history of the last 10 years of passenger service at the Airport through 2010, when service was most recently discontinued.

TABLE 1B
Historical Commercial Service Activity
Grant County International Airport

Destination	Airline	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Seattle	Horizon Air		Aug									
Seattle	Big Sky		Aug				Feb					
Spokane	Big Sky		Aug				Feb					
Boise	Big Sky						Feb	Aug				
Portland	Big Sky						Feb	Aug				
Seattle	United Express										Jun	Jun
Enplanements*		10,634	11,534	5,667	4,976	4,906	4,822	4,966	730	1,369	2,920	1,442

Source: SkyWest Service Proposal 2008/Airport records.
**Enplanements from FAA Air Carrier Activity Information System (ACAIS) Database*

The Port is active in marketing its industrial land and developing the overall economy of the region. There have been numerous industrial businesses bringing thousands of jobs to the region that have located on Port property. One of the main attractions for industrial businesses is the abundance of affordable electricity. The power comes from the Grant County Public Utilities District, which constructed two dams on the Columbia River: Priest Rapids and Wanapum.

The Airport also provides U.S. Customs and Border Protection services and is a Foreign-Trade Zone. The Port constructed a $3.8 million Industrial Wastewater Treatment Facility in 2000. The plant has a capacity of 27 million gallons. The Port is currently developing plans to expand this facility. All of these endeavors undertaken by the Port of Moses Lake benefit the community and the Airport itself.

RECENT CAPITAL IMPROVEMENTS

To assist in funding capital improvements at the Airport, the FAA has provided funding assistance through the Airport Improvement Program (AIP). The AIP is funded through the Aviation Trust Fund, which was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Trust Fund also finances a portion of the operation of the FAA. The Trust Fund is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts.

Table 1C summarizes FAA AIP grants for Fiscal Year (FY) 1999 through FY 2013. The FAA has provided $24.4 million for airport improvements at Grant County International Airport over the past 14 years.

TABLE 1C
Recent FAA Grant History
Grant County International Airport

Year	Grant #	Description	Grant Amount
2013	39	Master plan study	$300,000
2012	38	Rehabilitate apron	$4,422,408
2011	37	Rehabilitate east apron (Ph. I design and construction)	$2,500,000
2010	36	Acquire ARFF vehicle	$760,000
2009	35	Rehabilitate apron, security enhancements	$533,344
2009	34	Rehabilitate T-hangar taxiway, install enhanced taxiway markings	$1,178,144
2009	33	Rehabilitate apron, rehabilitate taxiway	$114,093
2007	32	Rehabilitate runway lighting - 14L-32R and 4-22, rehabilitate Taxiway D	$2,519,200
2006	31	Rehabilitate Taxiway D	$500,000
2005	30	Acquire snow removal equipment (SRE)	$1,179,098
2004	29	Rehabilitate Runway 14L-32R	$4,916,637
2004	28	Rehabilitate Runway 14L-32R	$191,475
2003	27	Modify ARFF training facility, install MIRL Rwy. 14L-32R, security fencing	$573,122
2002	26	Security enhancements	$23,338
2002	25	Construct SRE building	$1,148,858
2002	24	Security enhancements, remark runway hold lines	$414,161
2002	23	Master plan update	$221,752
2000	22	Rehabilitate Runway 4-22, including REIL, LAHSO lights	$2,584,258
1999	21	Reconstruct Rwy. 4/22 design	$140,801
1999	20	Acquire SRE blade, install signs, rehab and expand terminal parking lot (Ph. II)	$203,476
TOTAL AIRPORT IMPROVEMENT GRANTS SINCE 1999			**$24,424,165**

Source: FAA Records accessed on 4.18.2013.
http://www.faa.gov/airports/aip/grantapportion_data/

CURRENT CAPITAL IMPROVEMENT PROGRAM (CIP)

Airports must undertake a continual and ongoing planning process and capital improvement program in order to maintain safe, efficient, and modern transportation facilities. To this end, the FAA requests that airports provide a prioritized capital improvement plan (CIP) on an annual basis. **Table 1D** presents the most recent CIP for the Airport.

As can be seen in the table, all planned projects are related to pavement maintenance. For Grant County International Airport, with its wealth of paved surfaces, maintenance is an ongoing effort. In 2018, the major project considered is the reconstruction of Taxiway G, which is in relatively poor condition. One result of this master planning effort will be a revised CIP.

TABLE 1D
Capital Improvement Program (2013)
Grant County International Airport

Year	Project Name	FAA NPE	State/FAA Discretionary	Total
2014	TW C Rehab (Design & Construction)	$150,000	$330,000	$480,000
2015	RW Rehab Portion of 14L/32R (Design)	$100,000	-	$100,000
2016	RW Rehab Portion of 14L/32R (Construct)	$150,000	$350,000	$500,000
2017	TW G Rehab (Design)	$150,000	$250,000	$400,000
2018	TW G Rehab (Construction)	$150,000	$7,500,000	$7,650,000

NPE: Non-primary entitlement
Source: Airport records

AIRPORT ADMINISTRATION

The Port of Moses Lake was created in 1965 to manage and operate the Airport and Airport lands following the closure of Larson Air Force Base. The Port is a stand-alone public entity governed by three publically elected members of the Port Commission. The mission of the Port is to provide access to the air transportation system by developing and managing facilities and services that contribute to the economy of the region.

The Port Commissioners are elected to serve staggered six-year terms with an election once every two years. Registered voters residing within the Port boundaries are eligible to vote for board members. The Port of Moses Lake includes the City of Moses Lake and portions of unincorporated Grant County as shown on **Exhibit 1D**.

Day-to-day operation of the Port is charged to a professional Executive Director and a support staff. The Executive Director is hired by the Commission. The Port employs approximately 15 people and several part-time staff.

THE AIRPORT'S SYSTEM ROLE

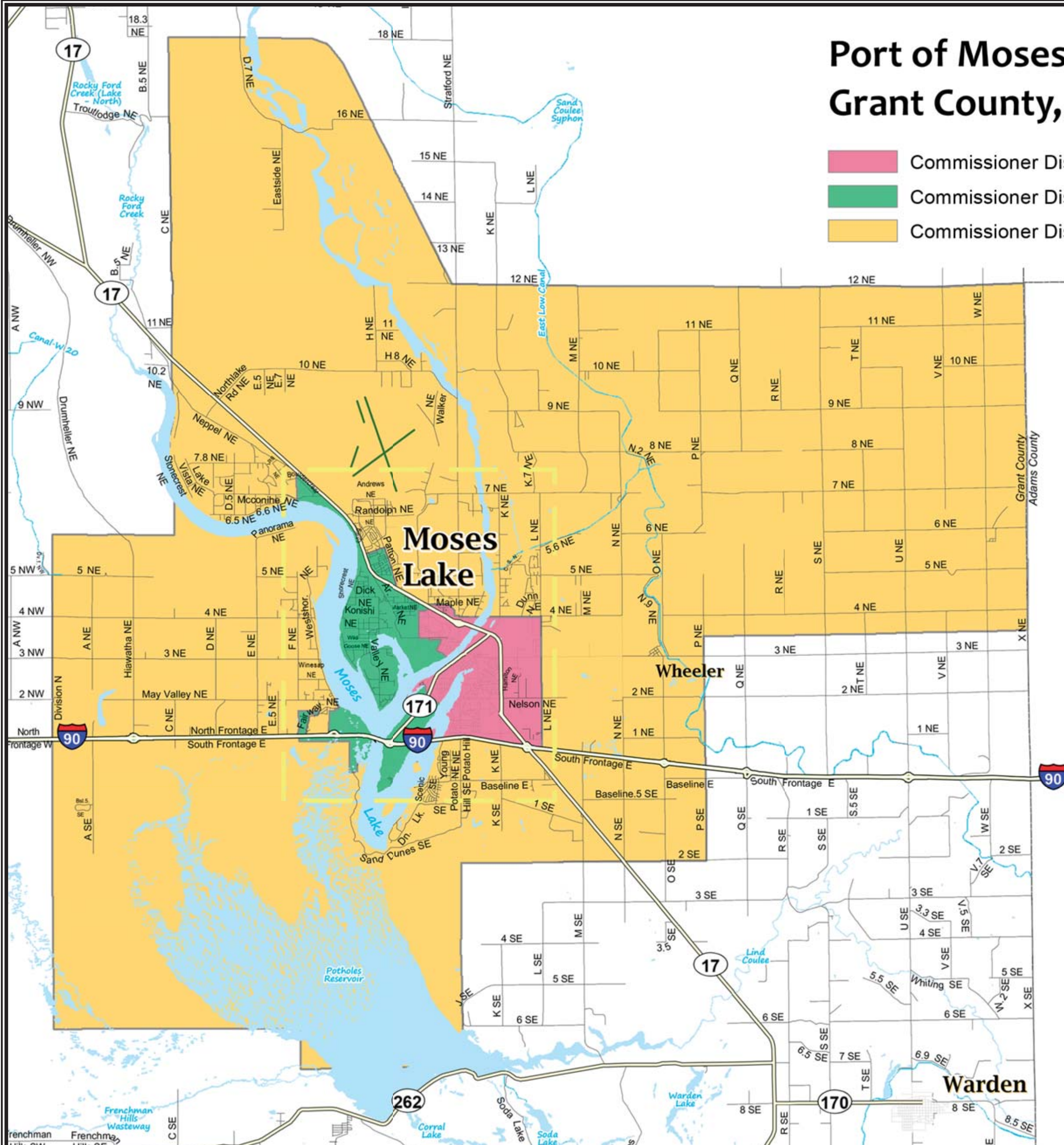
Airport planning takes place at the local, regional, state, and national levels. Each level has a different emphasis and purpose. On the national level, Grant County International Airport is included in the *National Plan of Integrated Airport Systems* (NPIAS). On the state level the Airport is included in the *Washington Aviation System Plan* (WASP), updated in 2009. The local planning document is the Airport Master Plan which was finalized in 2005.

13-MP-01-1D-09/09/13

Port of Moses Lake Commissioner Districts
Grant County, Washington

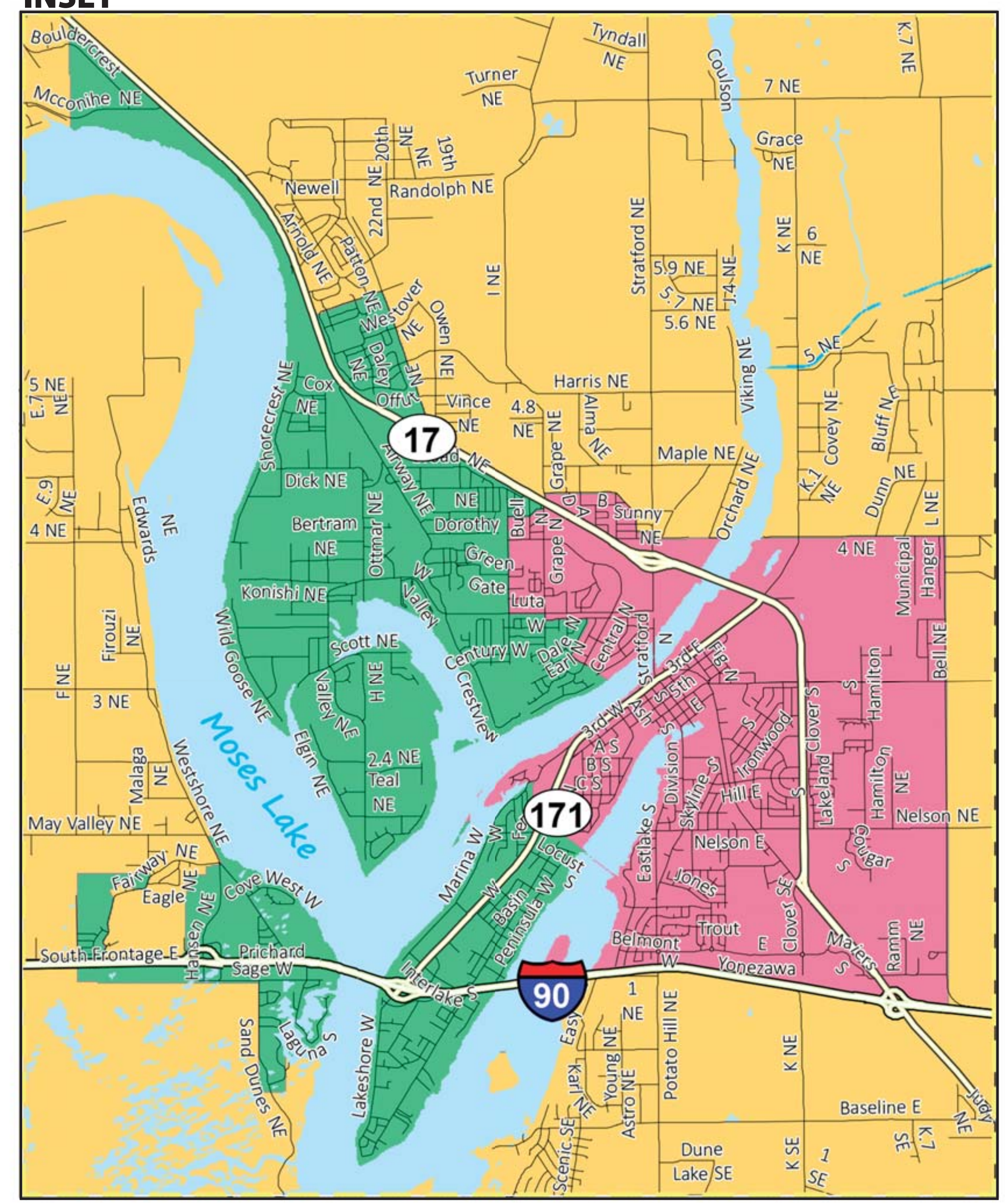
- Commissioner District 1
- Commissioner District 2
- Commissioner District 3

Map updated: 6/13/2013 11:26:42 AM
Data sources: Grant County, WDNR, WSDOT, ESRI



These maps should not be construed as legal advice or legal opinion on any specific facts or circumstances. The contents are intended for general information purposes only, and you are urged to consult your own lawyer concerning your own situation and any specific questions you may have. Infrastructure records, drawings, and other documents have been gathered over many decades, using differing standards for quality control, documentation and verification. All of the data provided represents current information in a readily available format. While the data is generally believed to be accurate, occasionally it proves to be incorrect; thus its accuracy is not warranted. Prior to making any property purchases or investments based in full or in part upon the material provided, it is specifically advised that you independently field verify the information contained in county records.

INSET



PORT OF MOSES LAKE

Exhibit 1D
PORT OF MOSES LAKE BOUNDARY

FEDERAL AIRPORT PLANNING

The role of the federal government in the development of airports cannot be overstated. Many of the nation's existing airports were either initially constructed by the federal government or their development and maintenance was partially funded through various federal grant-in-aid programs to local communities. In large measure, the system of airports existing today is due to the existence of federal policy that promotes the development of civil aviation. As part of a continuing effort to develop a national airport system to meet the needs of civil aviation and promote air commerce, the United States Congress has continually maintained a national plan for the development and maintenance of airports.

The current national airport system plan is the NPIAS 2013-2017. A primary purpose of the NPIAS is to identify the airports that are important to national transportation, which includes all commercial service airports, all reliever airports (high utility metropolitan general aviation airports), and selected general aviation airports. The NPIAS identifies 3,355 public use airports (3,330 existing and 25 proposed) which are eligible to receive development grants under AIP. The AIP program is funded exclusively by user fees and user taxes, such as those on fuel and airline tickets. The 2013-2017 NPIAS estimates that $42.5 billion worth of needed airport improvements are eligible for AIP funding across the country over the next five years. An airport must be included in the NPIAS to be eligible for federal funding assistance through the AIP.

As recently as 2005, Grant County International Airport was classified as a primary commercial service airport (more than 10,000 annual enplanements). In 2007 and 2009, the NPIAS classified the airport as a nonhub commercial service facility (between 2,500 and 10,000 annual enplanements). The Airport is currently classified as a general aviation facility in the NPIAS, meaning it has fewer than 2,500 annual enplanements. In fact, there are only a handful of annual enplanements which are passengers departing on charter aircraft. FAA classification can lag by as much as three years based on enplanement levels.

The term "hub" is used by the FAA to identify very busy commercial service airports as measured by passenger enplanements. Primary commercial service airports are grouped into four categories. Large hubs (e.g. Seattle-Tacoma International) are those airports that each account for at least one percent of total U.S. passenger enplanements; medium hubs (e.g. Portland International) for between 0.25 percent and one percent; small hubs (e.g. Spokane International) for between 0.05 percent and 0.25 percent; and nonhubs for less than 0.05 percent of all enplanements, but more than 10,000 annual enplanements. There are 239 nonhub primary commercial service airports that together account for three percent of all enplanements. These airports are heavily used by general aviation aircraft, with an average of 95 based aircraft. **Table 1E** presents the types of airport included in the NPIAS.

TABLE 1E
NPIAS Distribution of Activity

Number of Airports	Airport Type	% of Enplanements	% of Based Aircraft	% NPIAS Costs
29	Large Hub Primary Commercial	68.00	0.07	35.00
36	Medium Hub Primary Commercial	20.00	2.10	12.00
74	Small Hub Primary Commercial	8.00	4.00	8.00
239	Nonhub Primary Commercial	3.00	10.10	12.00
121	Nonprimary Commercial	0.01	1.60	2.00
499	**Total Commercial Service Airports**	**99.01**	**17.87**	**69.00**
268	Relievers	0.00	21.90	7.00
2,563	General Aviation	0.00	34.40	23.00
25	Planned New/Replacement Airports	0.00	0.00	1.00
3,355	**Existing NPIAS Airports**	**99.10**	**74.17**	**100.00**
16,456	**Non-NPIAS Airports**	**0.90**	**25.83**	**NA**

Source: 2013-2017 National Plan of Integrated Airport Systems (NPIAS)

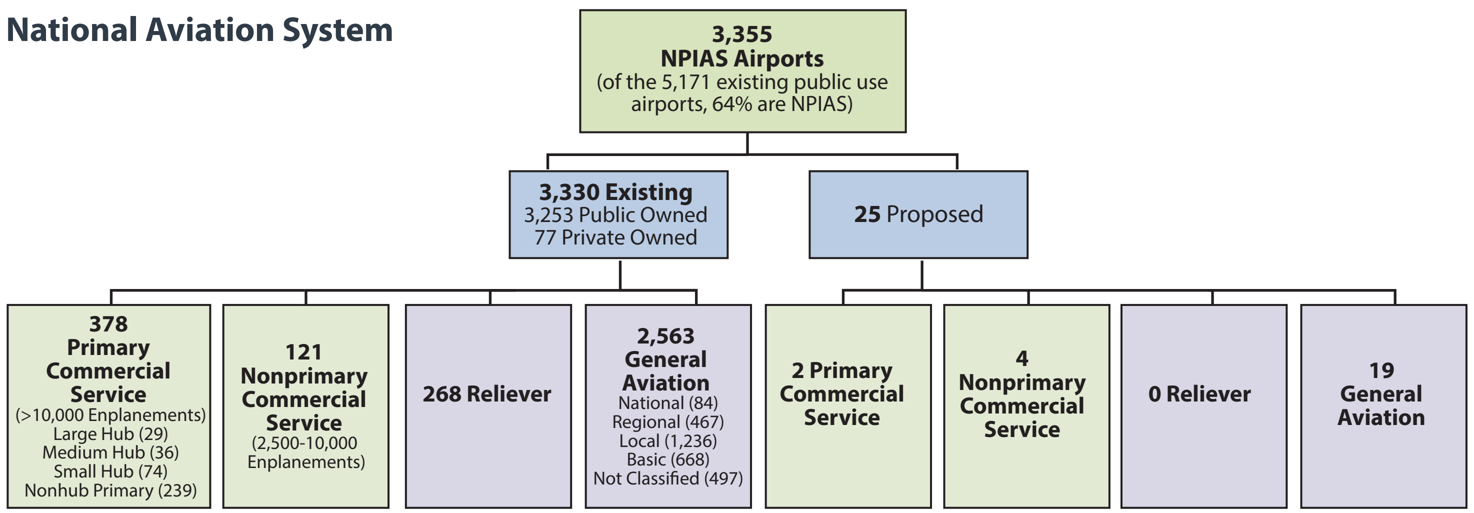
The NPIAS supports the goals identified in the FAA Strategic Plan entitled, "Destination 2025," for safety, efficiency, access, and environmental sustainability by identifying airport improvements that will help achieve those goals. The current issue of the NPIAS identifies approximately $17.6 million in development needs over the next five years for Grant County International Airport. This figure is not a guarantee of federal funding; instead, this figure represents development needs as presented to the FAA by the Airport administration in the annual airport capital improvement program.

Airports that apply for and accept AIP grants must adhere to various grant assurances. These assurances include maintaining the airport facility safely and efficiently in accordance with specific conditions. The duration of the assurances depends on the type of airport, the useful life of the facility being developed, and other factors. Typically, the useful life for an airport development project is a minimum of 20 years. Thus, when an airport accepts AIP grants, they are obligated to maintain that facility in accordance with FAA standards for at least that long.

Of the $42.5 billion in airport development needs nationally, approximately 30 percent is designated for 2,831 general aviation airports (includes reliever airports). Grant County International Airport is designated as a general aviation airport currently.

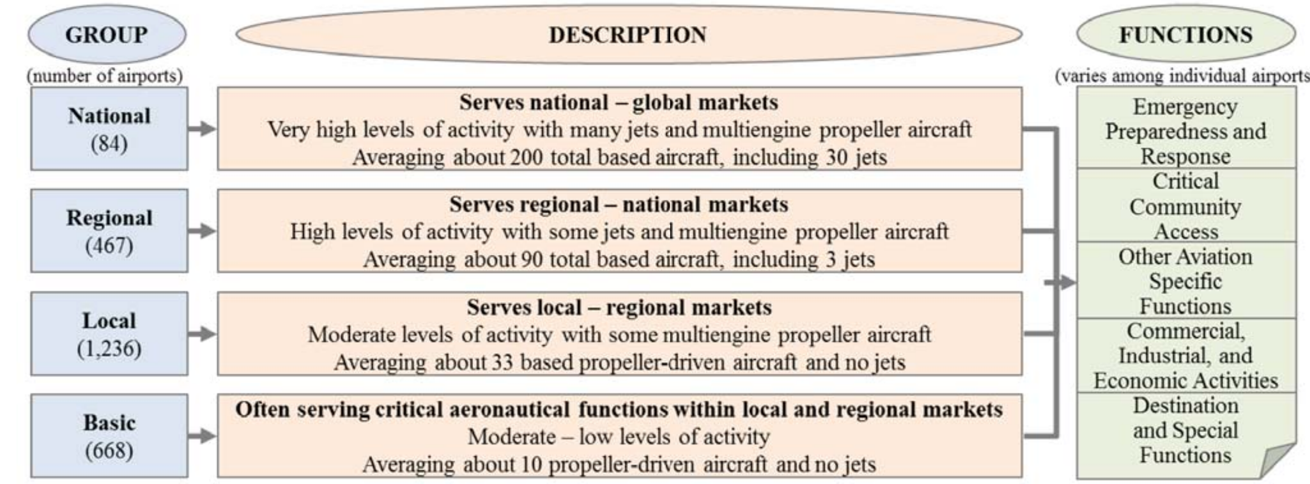
In 2012, the FAA published a study titled *General Aviation Airports: A National Asset*. The purpose of the report is to further classify general aviation airports into four categories: national, regional, local, and basic airports. Of the 2,952 general aviation airports included in the study, 497 were not specifically classified due to types of activity and characteristics that did not provide for clear classification within one of the four groups. **Exhibit 1E** summarizes the composition of the National Airspace System, as well as the general aviation classifications and functions.

National Aviation System

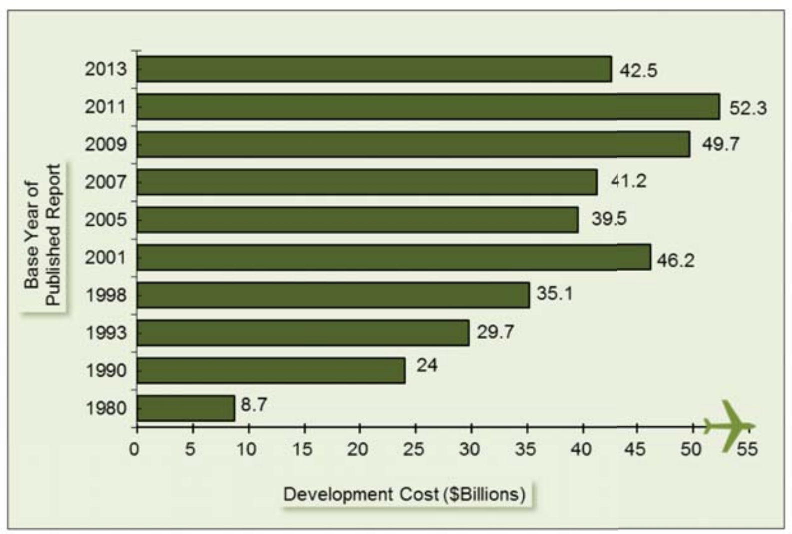


There are more than 19,800 aviation facilities in the United States. 5,171 of those are public use facilities. The National Plan of Integrated Airport Systems (NPIAS) includes 3,355 public use landing facilities, of which 3,330 are existing and 25 are proposed.

General Aviation Airports



The FAA has further categorized general aviation airports to help guide policy makers when making decisions regarding airport development.

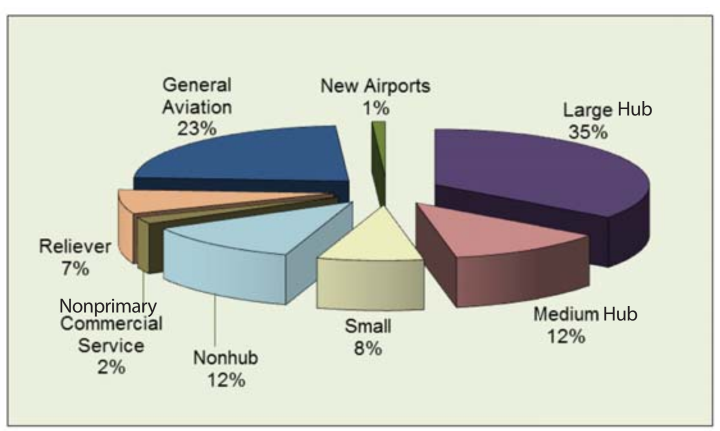


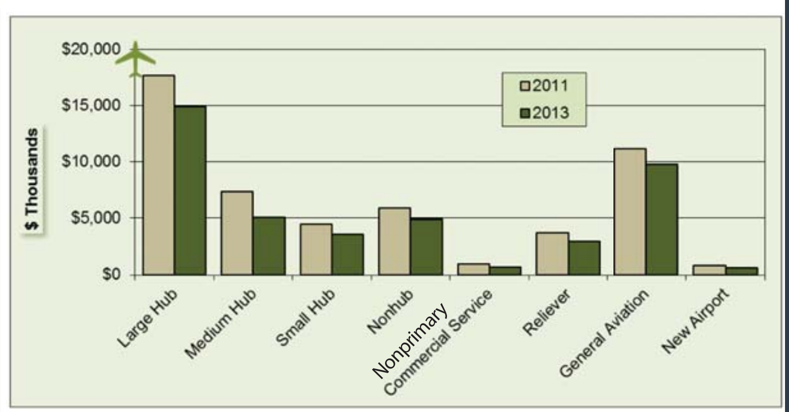
The FAA estimates that over the next five years, (2013-2017), there will be $42.5 billion of airport infrastructure projects eligible for Airport Improvement Program (AIP) funding.

Emergency Preparedness and Response	▪ Aeromedical Flights ▪ Law Enforcement/National Security/Border Security ▪ Emergency Response ▪ Aerial Fire Fighting Support ▪ Emergency Diversionary Airport ▪ Disaster Relief and Search and Rescue ▪ Critical Federal Functions
Critical Community Access	▪ Remote Population/Island Access ▪ Air Taxi/Charter Services ▪ Essential Scheduled Air Service Cargo
Other Aviation Specific Functions	▪ Self-Piloted Business Flights ▪ Corporate ▪ Flight Instruction ▪ Personal Flying ▪ Charter Passenger Services ▪ Aircraft/Avionics Manufacturing/Maintenance ▪ Aircraft Storage ▪ Aerospace Engineering/Research

Commercial, Industrial, and Economic Activities	▪ Agricultural Support ▪ Aerial Surveying and Observation ▪ Low-Orbit Space Launch and Landing ▪ Oil and Mineral Exploration/Survey ▪ Utility/Pipeline Control and Inspection ▪ Business Executive Flight Service ▪ Manufacturing and Distribution ▪ Express Delivery Service ▪ Air Cargo
Destination and Special Events	▪ Tourism and Access to Special Events ▪ Intermodal Connections (rail/ship) ▪ Special Aeronautical (skydiving/airshows)

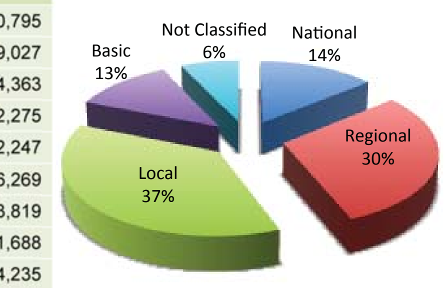
General aviation airports provide important services for both local communities and the national aviation system.





The 449 commercial service (primary and nonprimary) airports account for 69% of the total development in the NPIAS. The 2,563 general aviation and 268 reliever airports account for 30% of development.

Category	National	Regional	Local	Basic	Not Classified	TOTAL
Safety	$75,705,614	$86,710,307	$70,021,759	$16,866,556	$7,026,559	$256,330,795
Security	$30,588,072	$70,028,017	$116,979,036	$54,635,381	$42,428,521	$314,659,027
Reconstruction	$566,808,683	$1,151,264,524	$1,408,160,656	$505,127,646	$225,522,854	$3,856,884,363
Standards	$824,339,636	$2,215,374,810	$2,967,664,186	$1,013,246,603	$533,257,040	$7,553,882,275
Environmental	$15,797,438	$9,895,920	$25,330,900	$13,827,647	$4,270,342	$69,122,247
Noise	$59,033,952	$12,492,106	$4,410,211	$0	$0	$75,936,269
Capacity	$167,431,296	$218,153,518	$168,522,546	$56,143,576	$32,282,883	$642,533,819
Terminal	$48,187,551	$61,979,002	$70,218,522	$21,798,925	$9,867,688	$212,051,688
Access	$47,984,641	$109,815,827	$104,412,928	$42,708,943	$13,451,896	$318,374,235
Other	$7,571,000	$27,813,731	$49,226,059	$26,995,300	$15,686,691	$127,292,781
Total	$1,843,447,883	$3,963,527,762	$4,984,946,803	$1,751,350,577	$883,794,474	$13,427,067,499



Airports in the general aviation categories account for $13.4 billion of the $42.5 billion in identified development need over the next five years.

Source: National Plan of Integrated Airport Systems 2013-2017

Source: General Aviation Airports: A National Asset (May 2012)

PORT OF MOSES LAKE

Exhibit 1E
NATIONAL AVIATION SYSTEM
COMPOSITION AND DEVELOPMENT NEEDS

With this report, which has been integrated into the NPIAS, the FAA is recognizing the important contribution that general aviation airports provide to the national aviation system and economy. General aviation contributed $38.8 billion in economic output in 2009. When factoring in manufacturing and visitor expenditures, general aviation accounted for an economic contribution of $76.5 billion.

The new categories for general aviation airports are intended to help guide policymakers when making decisions regarding airports. The FAA recognized that categorizing all general aviation airports the same did not properly identify the important role of each airport within a community and the benefits of a large and diverse aviation system.

Grant County International Airport is categorized as one of the 467 "regional" general aviation facilities. "Regional" general aviation airports are typically located in metropolitan areas and serve relatively large populations. These airports will typically accommodate at least 10 domestic operations of over 500 miles in length, more than 1,000 annual instrument operations, have one or more based jets, or have more than 100 total based aircraft. Regional general aviation airports account for 37 percent of the total flying at the studied general aviation airports and 42 percent of flying with flight plans. There is a substantial amount of charter (air taxi), jet flying, and rotorcraft flights at regional airports. Other findings at regional general aviation airports include:

- 459 regional airports supported air ambulance services in 2009.
- 110 regional airports provided important access to law enforcement, the U.S. Postal Service, U.S. Customs and Border Protection, or U.S. Forest Service.
- 51 have limited scheduled air service that boarded more than 2,500, but less than 10,000, passengers in 2010.
- 137 are designated as reliever airports.
- 90 were used by large certificated air carriers for charter flights.
- 56 received scheduled air service through the Essential Air Service Program.
- On average, these airports have more than 90 based aircraft with a few jets.
- Operators spend over $10 million per year flying at the average regional airport.
- $2.4 billion of AIP funds was invested at regional airports during the period of 2001-2009. Recognizing that not all airports received AIP funds every year and that simple averages can present a skewed impression, the $2.4 billion represents a simple annual average of $575,016 per airport, including $90,520 in non-primary entitlement (NPE) funds and $484,497 in discretionary funds. Naturally, the size and nature of capital investments varied greatly among airports within the category.

14 CFR Part 139 Certification

An airport must have an Airport Operating Certificate (AOC) if it is serving air carrier aircraft with more than nine seats or serving unscheduled air carrier aircraft with more than 30 passenger seats. 14 CFR Part 139 (Part 139) describes the requirements for obtaining and maintaining an AOC. This includes meeting various Federal Aviation Regulations (FARs).

Airports are classified in the following categories based on the type of air carrier operations served:

- **Class I Airport** – an airport certificated to serve scheduled operations of large air carrier aircraft that can also serve unscheduled passenger operations of large air carrier aircraft and/or scheduled operations of small air carrier aircraft.

- **Class II Airport** – an airport certificated to serve scheduled operations of small air carrier aircraft and the unscheduled passenger operations of large air carrier aircraft. A Class II airport cannot serve scheduled large air carrier aircraft.

- **Class III Airport** – an airport certificated to serve scheduled operations of small air carrier aircraft. A Class III airport cannot serve scheduled or unscheduled large air carrier aircraft.

- **Class IV Airport** – an airport certificated to serve unscheduled passenger operations of large air carrier aircraft. A Class IV airport cannot serve scheduled large or small air carrier aircraft. Grant County International Airport is a Class IV airport.

Part 139 (which implemented provisions of the *Airport and Airway Development Act of 1970*, as amended on Nov. 27, 1971) set standards for: the marking and lighting of areas used for operations; firefighting and rescue equipment and services; the handling and storing of hazardous materials; the identification of obstructions; and safety inspection and reporting procedures. It also required airport operators to have an FAA-approved Airport Certification Manual (ACM).

The ACM defines the procedures to be followed in the routine operation of the airport and for response to emergency situations. The ACM is a working document that is updated annually. It reflects the current condition and operation of the airport and establishes responsibility, authority, and procedures. There are required sections for the ACM, covering administrative detail and procedural detail. Each section independently addresses the: who (primary/secondary), what, how, and when as it relates to each element.

The administrative sections of the ACM cover such elements as the organizational chart, operational responsibilities, maps, descriptions, weather sensors, access, and cargo. The procedural elements cover such items as paved and unpaved areas, safety areas, lighting and marking, communications and navigational aids, airport rescue and firefighting, handling of hazardous material, utility protection, public protection, self-inspection program, ground vehicle control, obstruction removal, wildlife management, and construction supervision. Grant County International Airport has a current, approved ACM.

While Grant County International Airport has been without scheduled commercial passenger service since 2010, management has maintained the Part 139 operating certificate. By maintaining the certificate, the Airport is in position to accept service from any new providers. Depending on the frequency of service and aircraft utilized, some improvements may be required.

STATE AIRPORT PLANNING

Grant County International Airport is included in the WASP. The WASP includes 138 public use airports, 65 of which are included in the federal NPIAS (including Grant County International Airport). The WASP classifies airports according to their roles in the state air transportation system in the following manner:

- **Commercial Service:** At least 2,500 scheduled passenger enplanements (boardings) per year for at least three years.
- **Regional Service:** Serve large or multiple communities; all NPIAS reliever airports; at least 40 based aircraft; a minimum runway length of 4,000 feet.
- **Community Service:** Serves a community; at least 25 based aircraft, has a paved runway.
- **Local Service:** Serves a community; less than 20 based aircraft, has a paved runway.
- **Rural Essential Service:** Other land-based airports, including residential airparks.
- **Seaplane Bases:** Identified by the FAA as a seaplane base, unless it is a Commercial Service Airport.

The WASP, published in 2009, identifies Grant County International Airport as a Commercial Service airport. By today's standards, the Airport would be classified as a regional service airport. Regional Service Airports meet the following criteria:

- Have at least 40 based aircraft, unless the airport is required for coverage of lower density population areas.
- Have a runway at least 4,000 feet long, unless the airport is designated as a NPIAS *reliever*.
- Be separated from another Regional Service Airport or a comparable Commercial Service Airport by at least 30 minutes driving time, unless closer airports are justified by large population numbers within the service area.
- Have a minimum service area population of approximately 5,000 (90-minute driving time) and a maximum service area population of approximately 400,000 (60-minute driving time).

The Washington State airport classification system not only assigns airports based on their function and role, but also sets performance objectives. The performance objectives are used to evaluate facilities, services, and other factors important to preserving the airport system. **Table 1F** presents the performance objectives for Regional Service Airports such as Grant County International Airport.

TABLE 1F **Performance Objectives for Regional Service Airports** ***Washington Aviation System Plan***	
Operational Factors	
	Standard runway safety area Standard obstacle free zone Runway condition exceeds 75 PCI Taxiway condition exceeds 70 PCI Apron condition exceeds 70 PCI Clear threshold siting surface
Planning Document	
	Planning documents less than 7 years old
Land Use Compatibility Protection	
	Compatibility policies in local comprehensive plan Appropriate zoning designation for airport Land use controlled in runway protection zones Height and hazard zoning Zoning discourages incompatible development
Facilities	
	4,000 foot long runway Full length parallel taxiway Lower than 3/4-mile visibility minimum Visual glide slope indicators Weather reporting capability
Services	
	Jet A and AvGas Major maintenance services
PCI: Pavement Condition Index *Source: Washington Aviation System Plan (2009)*	

LOCAL AIRPORT PLANNING

The Airport Master Plan is the primary local planning document. The Master Plan provides a 20-year vision for airport development based on aviation demand forecasts. The previous Master Plan was completed in 2005 with a base year of 2001. Over time, the forecast element can become less reliable due to changes in the aviation industry or in the overall economy. Federal design standards will also change over time. In fact, the primary airport design guidance provided by the FAA underwent a complete rewrite which was published in September 2012. As a result, it is prudent to update the master plan every five to ten years, or as necessary to address any significant changes. Therefore, this is an appropriate time to update the Airport Master Plan and revisit the development assumptions and recommendations from the previous Master Plan.

ECONOMIC IMPACT

In 2012, the Washington State Department of Transportation – Aviation (WSDOT), with the financial assistance of the FAA, completed a study on the role aviation plays in Washington's economy. The *Aviation Economic Impact Study* provides a comprehensive picture of how Washington's public use airports contribute to the economy statewide and at the community level. The report studied 135 public use airports of which 11 are commercial service facilities and the remaining 124 are general aviation airports. The airport study supported 248,500 jobs, $15.3 billion in total economic activity. The top four airports account for 91 percent of total jobs and 95 percent of total output attributable to individual airport activity. The four airports are Snohomish County Paine Field, Boeing Field, Renton Municipal Airport, and Sea-Tac International Airport. Other than Sea-Tac International Airport, these three airports are large Boeing employment centers.

Grant County International Airport is included in the study. It was estimated that the Airport accounts for nearly 400 jobs, $16 million in labor income, and more than $50 million in total economic output. **Exhibit 1F** presents a summary of the state's economic impact data sheet for the Airport. The economic impact report excludes businesses that are not aviation dependent; however, it should be noted that several large businesses are located on Airport property. These include Genie Industries (1,200 employees), Takata Industries (350 employees), and Chemi-Con (75 employees). Air Transport Services is a new business, currently with 50 employees, that established operations since the report was completed.

Foreign Trade Zone

The Port of Moses Lake first established Foreign Trade Zone (FTZ) status for a 316-acre tract in 1994 (Designated FTZ #203). Businesses that locate within the FTZ are eligible to apply to the Port for the benefits that the FTZ offers. The Port of Moses Lake FTZ helps tenants to compete more efficiently and cost-effectively in the marketplace through duty deferral and exemption, inverted tariffs, and the many logistical improvements that can be incorporated into a company's production and distribution process when utilizing a FTZ.

The FTZ is designated to promote international trade and offer companies and importers a way to gain a financial edge in the global marketplace. The benefits of operating a business in an FTZ are primarily the reduction or elimination of duties or excise taxes on goods imported into the U.S. There are currently seven business subscribers of the FTZ.

Foreign and domestic merchandise may be moved into zones for operations, including storage, exhibition, assembly, manufacturing, and processing. The standard Customs entry procedures and payments of duties are not required on foreign merchandise unless and until it enters the U.S. Custom's territory, at which point the importer generally has the choice of paying duties at the rate of either the original foreign materials or the finished product. Domestic goods moved into the zone for export may be considered exported upon admission to the zone for purposes of excise tax rebates and drawback.

13MP01-1F-09/09/13

Grant County International

7810 Andrews Street NE, Ste. 200 Moses Lake, WA 98837

Airport Businesses and Visitors

Economic and Fiscal impacts calculated for each airport start with activity that can be directly associated with the airport, namely the businesses operating at the airport and the visitors traveling through the airport. For economic impacts, multiplier effects are estimated from this initial activity as portions of wages and business and visitor spending are re-spent within the local economy. Impacts of airport businesses are analyzed within the defined economic impact region, visitor spending is analyzed statewide, since once visitors land they may spend their dollars throughout the state. For fiscal impacts, taxes paid to various types of jurisdictions from this business and visitor activity are estimated.

NOTE: All impacts are shown in 2010 dollars.

ECONOMIC IMPACTS

AIRPORT BUSINESSES

Counties in Impact Region: Grant

Direct Jobs: Estimated jobs on the airport footprint (excluding businesses that are not aviation-dependent).

Direct Labor Income: Estimated income paid to the Direct Jobs located on the airport footprint.

Direct Output: Estimated value of original business activity that remains in the economic impact region (some business activity will be exported outside of the region).

Indirect/Induced Impacts: Increases in regional impacts from the local re-spending of direct dollars.

Total Impacts: The sum of Direct, Indirect, and Induced Impacts, for a total regional impact.

Estimated Regional Impact from Airport Businesses

Estimated Economic Impact	Direct	Indirect/Induced	Total Impact
Jobs	289	107	**396**
Labor Income	$ 11,800,000	$ 4,000,000	**15,800,000**
Output	$ 38,600,000	$ 11,900,000	**50,500,000**

VISITOR SPENDING

Impact Region: Washington State (once visitors land they may spend their money throughout the state).

Total Visitor Spending: Estimated total annual spending by visitors traveling through this airport.

Direct Jobs: Estimated jobs supported by the total estimated visitor expenditures.

Direct Labor Income: Estimated income paid to the Direct Jobs supported by visitor expenditures.

Direct Output: Estimated value of original visitor spending that remains in the state (some visitor spending dollars paid to businesses will be exported out of the state).

Indirect/Induced Impacts: Increases in regional impacts from the local re-spending of direct dollars.

Total Impacts: The sum of Direct, Indirect, and Induced Impacts, for a total regional impact.

Estimated Regional Impacts from Visitor Spending

Total Estimated Visitor Spending: $ 1,693,600

	Direct	Indirect/Induced	Total Impact	All State Impacts	% State Impact
Jobs	17	9	**26**	**94,000**	**0.03%**
Labor Income	$ 481,000	$ 412,000	**$ 893,000**	**$ 3,311,700,000**	**0.03%**
Output	$ 1,500,000	$ 1,300,000	**$ 2,800,000**	**$ 10,160,600,000**	**0.03%**

FISCAL IMPACTS

Estimated Taxes Paid to Each Jurisdiction Type

	Cities	Counties	Special Districts	State	Total Taxes
Airport Businesses	$ 700	$ 45,000	$ 8,100	$ 6,800,000	**$ 6,853,800**
Visitors	$ 14,000	$ 15,000	$ 15,000	$ 83,000	**$ 127,000**
Total	**$ 14,700**	**$ 60,000**	**$ 23,100**	**$ 6,883,000**	**$ 6,980,800**

NOTE: Tax estimates include Aircraft Excise Tax, Property Tax, Business & Occupation Tax, Sales Tax, Aviation Fuel Tax, State and Local Utility Taxes, Rental Car Tax, and Lodging Tax.
Special Districts include Transit, Schools, Hospitals, Fire, EMS, Parks, Ports, Utilities, and others.

PORT OF MOSES LAKE

The Port's FTZ #203 Alternative Site Framework allows businesses in 11 counties in south central Washington State to take advantage of the benefits of the FTZ. The following is a summary of the benefits for a business operating within an FTZ:

Duty Deferral – Delaying payment of duties on goods that enter the U.S. market.

Duty Exemption – No duties or quota charges on imported goods that are later re-exported.

Inverted Tariff – Reduction of duties if a lower tariff rate applies to the finished product leaving the zone than the tariff rates of the individual components of the product.

Cost Savings – Reduced insurance costs and protection against product theft.

Other Benefits – Eliminate the duty on waste, scrap, product lost during manufacturing, and rejected or defective parts.

U.S. Customs and Border Protection (CBP)

There is a U.S. Customs and Border Protection (CBP) station located in the Airport terminal building. The presence of this service is of great benefit to certain Airport users and reinforces the international nature of the Airport. The Port of Moses Lake shares the expenses for maintaining the CBP presence at the Airport.

The CBP provides oversight of the activities of the businesses within the FTZ. They essentially manage the required documentation for these businesses to benefit from the FTZ. They also do limited Customs and Immigration clearance of international flights arriving at the Airport.

UAS TEST SITE PROPOSAL

The *FAA Modernization and Reform Act* (FMRA) *of 2012*, PL-112-95, requires the FAA to establish a program to integrate unmanned aircraft systems (UAS) into the National Airspace System (NAS) at six (6) test ranges. In February 2013, the FAA issued a Screening Information Request soliciting information from interested parties desiring to be considered for one of the test sites. The FAA intends to award the UAS test sites at the end of 2013.

The Port of Moses Lake is a partner in the Pacific NW Unmanned Aircraft Systems Flight Center, the consortium submitting for consideration as one of the six UAS test sites. The consortium is led by Innovate Washington and consists of Washington-based organizations, including Pacific Northwest National Lab, Washington State University, University of Washington, Washington Army National Guard, Center for Excellence for Aerospace and Advanced Materials Manufacturing, Greater Grays Harbor, Inc., Klickitat County EDC, Washington Governor's Office of Aerospace, and Washington Department of Commerce.

The Flight Center is proposed to be based at the Grant County International Airport. Satellite locations are in Dallesport (Columbia Gorge region) and Grays Harbor (Pacific Ocean region). The consortium submission identifies numerous benefits to basing a UAS test center at Moses Lake, including an existing operational aviation facility with extensive flight testing from Boeing and the military.

The testing environments include high desert, foothills and mountains, ravines and canyons, water bodies, and open range. The area is rural with a population density of approximately 33 people per square mile and has good flying weather for an average of 330 days per year. Weather extremes range from -15°F to 112°F during the year. The Pacific Northwest is also notorious for winter icing conditions, which provide yet another singular opportunity to test and evaluate aircraft and deicing approaches in a safe operating environment.

Services at the Airport are extensive, including an FAA control tower, FAA TRACON radar facility, and two fixed base operators providing a full range of aviation services. There are five runways, as well as large open, undeveloped areas available for testing (e.g., drop zones). The airspace is relatively uncongested and, in some regards, underutilized, allowing for a wide variety of uses.

Selection of the Pacific NW Unmanned Aircraft Systems Flight Center as one of the six FAA designated UAS test locations will be considered in this Master Plan. **Exhibit 1G** presents the proposed test ranges for UAS activity. (Note: The Airport was not selected.)

HISTORICAL AVIATION ACTIVITY

Records of airport operational activity are essential for determining required facilities (types and sizes), as well as eligibility for federal funding. Airport staff and the FAA record key operational statistics including aircraft operations, enplaned passengers, cargo shipments, and based aircraft. Analysis of historical activity levels aid in projecting future trends which will enhance the airport's ability to plan for facility demands in a timely manner. The following sections detail specific operational activities. **Exhibit 1H** graphically presents historical aviation activity at the Airport.

AIRCRAFT OPERATIONS

Aircraft operational statistics at Grant County International Airport are recorded by the airport traffic control tower (ATCT) that is operated by the FAA daily from 6:00 a.m. to 10:00 p.m. Among other duties, the ATCT counts aircraft operations, where a landing and a takeoff count as two operations. Operations are categorized as either itinerant or local. Itinerant operations are those made by aircraft which arrive from or depart to destinations outside the local operating area. Local operations are associated primarily with touch-and-go or pilot training activity.

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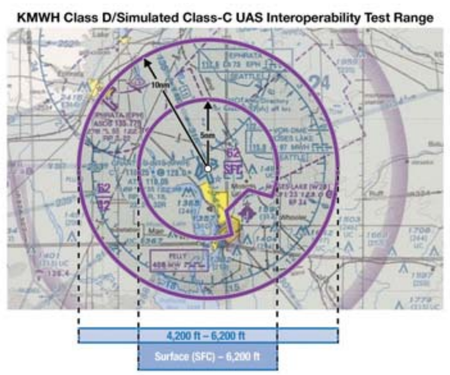
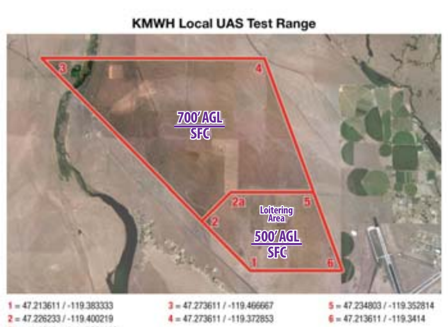
PACIFIC NORTHWEST UNMANNED AIRCRAFT SYSTEMS FLIGHT CENTER (PNUASFC)

Proposed Test Ranges

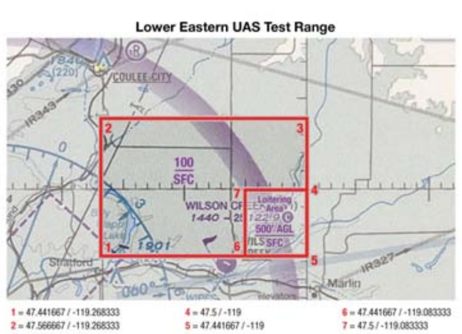
The seven PNUASFC test ranges, with highly diverse topology and climates, were selected to meet the priority FAA research goals and objectives related to integration of UAS into the national airspace. PNUASFC efforts will address the major obstacles to the integration of UAS into the National Airspace System. Additionally, the diversity of each range, from open ocean, to arid desert, to high mountain terrain, will provide for a variety of secondary research objectives, ranging from emergency response/fire/search and rescue, to propulsion system development and testing, to environmental monitoring and border patrol. Of note, all seven ranges have seasonal icing conditions that would support icing countermeasures testing.



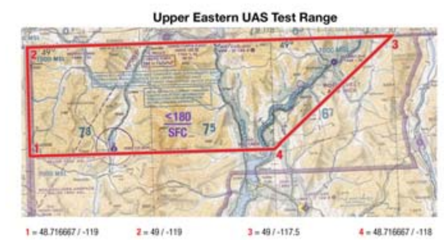
KMWH Class D/Simulated Class C Airspace Interoperability UAS Test Range, centered at Grant County International Airport in Moses Lake, provides the controlled airspace required for critical sense and avoid capabilities testing, and Air Traffic Control (ATC) interoperability of small-to-large size UAS in a simulated Class C airspace. This test range provides over 330 days a year of visual operation in varying climate conditions—truly an all-seasons test range.



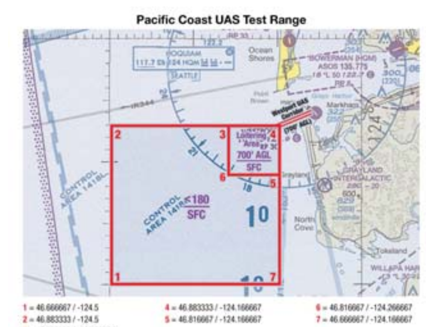
KMWH Local UAS Test Range provides ample space and altitude ceiling for UAS reliability testing of small-to-midsize UAS, as well as sense and avoid capability. The climate is identical to that of KMWH Class D/Simulated Class C Airspace Interoperability UAS Test Range. The range is located within KMWH Class D airspace, out of runway traffic patterns and within visual range of the tower.



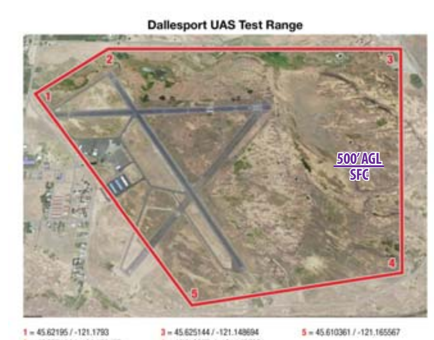
Lower Eastern UAS Test Range, located near the Wilson Creek airport, provides the rural airspace needed for testing of sense and avoid operations, as well as testing of communications systems required for successful operation within Class C airspace. This range is thus the proving area prior to operation in the KMWH Class D/Simulated Class C Airspace Interoperability Test Range. Accommodating small-to-large size UAS with a climate similar to KMWH ranges, this range has a set loitering area and direct launch and recovery from within the range or the adjacent Wilson Creek (5W1) Airport. The range includes a variety of terrain, with agriculture, desert, flatlands, ravines, and fresh water bodies.



Upper Eastern UAS Test Range is located in the northern section of the Roosevelt A&B Military Operations Area MOA, supporting testing of small-to-large size UAS in climate conditions that range from semi-arid in the summer to heavy snow in the winter. This expansive range, with an altitude ceiling at the edge of Class A airspace, can support UAS reliability and high-speed supersonic testing at high altitudes and in diverse weather conditions, as well as dedicated protected spectrum testing. Loitering area(s) will be established test-by-test, based upon individual research requirements and split range operations. Range terrain, with forests, flatlands, mountainous terrain, ravines, canyons, and fresh water bodies.



Pacific Coast UAS Test Range, located close to Grays Harbor, provides open-ocean maritime testing in an area known for high precipitation and high humidity. It will allow testing of small to large UAS, including aircraft certification standards for UAS seaplanes and maritime launch and recovery.



Southern (Dallesport) UAS Test Range, located at the Columbia Gorge Regional Airport, provides an airport location for pattern work at low altitudes in support of UAS system reliability testing. The arid climate here is similar to the two KMWH test ranges.

Yakima UAS Test Range supports aircraft standards, providing the required restricted airspace (R-6714A) to safely test and evaluate UAS prior to being qualified for a Certificate of Operation (COA) for testing on other ranges. This includes flight up to FL290, in an arid climate similar to that of the two KMWH test ranges.

Source: www.pnwuas.org

PORT OF MOSES LAKE

Exhibit 1G
POTENTIAL UAS TEST RANGES

Year	Itinerant Operations					Local Operations			Total Operations
	Air Carrier	Air Taxi	General Aviation	Military	Total	Civil	Military	Total	
2013[1]	8,094	2,359	16,626	7,730	34,809	27,915	9,729	37,644	72,453
2012[2]	4,362	2,403	12,172	6,266	25,203	25,078	8,597	33,675	58,878
2011[2]	6,188	2,360	12,136	14,708	35,392	19,164	4,772	23,936	59,328
2010	5,248	2,099	12,828	10,504	30,679	20,401	5,967	26,368	57,047
2009	5,175	2,637	13,735	8,208	29,755	22,041	11,519	33,560	63,315
2008	5,753	2,346	15,166	7,970	31,235	24,295	14,995	39,290	70,525
2007	9,362	2,335	13,879	9,887	35,463	19,308	16,428	35,736	71,199
2006	11,594	3,997	15,179	8,858	39,628	20,108	19,265	39,373	79,001
2005	7,015	4,926	18,227	7,444	37,612	25,940	16,979	42,919	80,531
2004	10,122	4,868	21,340	9,815	46,145	33,703	24,055	57,758	103,903
2003	10,089	5,204	22,361	9,569	47,223	34,168	21,088	55,256	102,479
2002	12,045	5,126	25,076	9,912	52,159	43,874	22,846	66,720	118,879
2001	16,420	5,123	26,907	7,881	56,331	43,408	14,966	58,374	114,705
2000	24,228	4,823	31,489	4,759	65,299	52,124	7,733	59,857	125,156
1999	19,701	4,792	30,291	3,425	58,209	60,453	9,315	69,768	127,977
1998	7,291	5,804	29,982	2,579	45,656	81,995	7,099	89,094	134,750
1997	6,024	5,368	22,522	2,298	36,212	70,709	8,162	78,871	115,083
1996	4,984	5,324	19,590	2,404	32,302	64,026	8,483	72,509	104,811
1995	6,364	5,319	18,690	2,816	33,189	70,890	10,734	81,624	114,813
1994	6,501	5,263	23,086	2,365	37,215	89,220	8,251	97,471	134,686
1993	8,725	4,339	23,292	2,393	38,749	111,112	6,200	117,312	156,061
1992	8,824	4,195	24,824	3,289	41,132	114,662	11,368	126,030	167,162
1991	8,504	3,766	24,455	2,249	38,974	107,282	8,577	115,859	154,833
1990	9,945	4,546	24,801	2,835	42,127	106,946	9,726	116,672	158,799

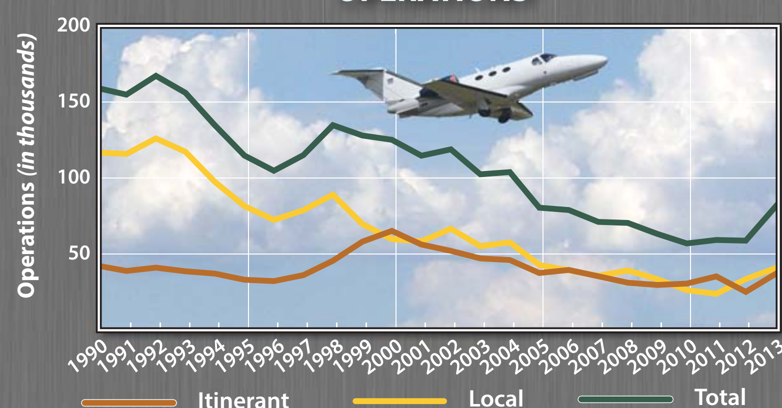
[1]September 2012 through August 2013.
[2] Local operations from August 2011 through June 2012 were not properly counted by the ATCT. Local operations counts for August 2012-June 2013 were used to update 2011 and 2012.
Source: Federal Aviation Administration (FAA) - Air Traffic Activity System (ATADS)

ENPLANEMENTS

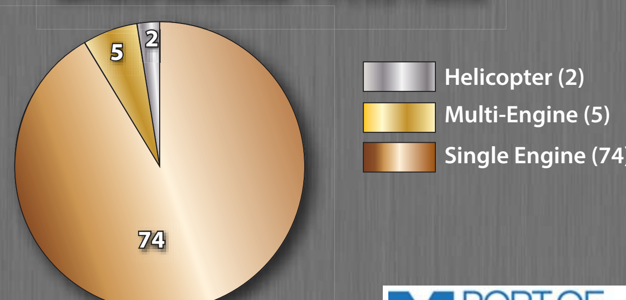
Year	Enplanements	Year	Enplanements
1980	2,000	1996	10,837
1981	2,168	1997	11,468
1982	2,000	1998	11,436
1983	1,431	1999	11,861
1984	2,260	2000	10,634
1985	2,541	2001	11,534
1986	2,079	2002	5,667
1987	4,000	2003	4,976
1988	4,538	2004	4,906
1989	4,025	2005	4,822
1990	5,381	2006	4,966
1991	5,067	2007	730
1992	5,234	2008	1,369
1993	5,704	2009	2,920
1994	8,258	2010	1,442
1995	10,831	2011	0

Source: 1980-1991: Airport Master Plan 2005; 1992-2010: FAA Air Carrier Activity Information System (ACAIS) database.

OPERATIONS



BASED AIRCRAFT FLEET MIX



PORT OF MOSES LAKE

Exhibit 1H
AIRPORT AVIATION ACTIVITY

Aircraft operations are further segregated into four general categories: air carrier, air taxi, military, and general aviation. Air carrier operations are performed by commercial airline aircraft with greater than 60 seats. Air taxi operations are generally associated with commuter aircraft, but also include for-hire general aviation aircraft. Military operations are those conducted by the military and general aviation is everything else.

Itinerant operations have historically averaged 40 percent of overall operations at the Airport. The most recent 10 years of data show itinerant operations averaging 48 percent. In general, there is slightly more local aviation traffic at the Airport.

PASSENGER ACTIVITY

Passenger traffic is collected and analyzed by recording the number of passengers who arrive (deplane) or depart (enplane) commercial service aircraft and certain charter aircraft. Enplanement levels are the primary consideration by the FAA to determining certain funding levels available to commercial service airports. Passenger enplanement figures are the planning yardstick utilized to determine terminal building space capacities, automobile parking requirements, automobile access capacities, etc. Also, the FAA provides annual entitlement funds based upon the level of enplanements reached at an airport. Passenger levels on each flight are recorded by the airlines and reported to the airport and the FAA on a monthly basis.

The Airport has been without regularly scheduled passenger air service since June 2010 when United Express discontinued service to Seattle. Historically, enplanements have been below the 10,000 level except for a period from 1995 to 2001. During this time, enplanements exceeded the 10,000 threshold, which is the level at which commercial service airports receive a minimum $1 million entitlement from the Airport Improvement Program (AIP).

CARGO ACTIVITY

Air cargo is an encompassing term used to describe the combined activities of air mail and air freight operations. The air cargo industry includes a diverse range of businesses providing a variety of different services supporting the movement of air freight. This includes air cargo transported by dedicated cargo airlines, passenger airlines, freight forwarders and custom brokers, and air freight truckers.

Currently, both FedEx and UPS subcontract to private air cargo carriers for daily air cargo operations. Empire Air contracts with FedEx and utilizes a Cessna Caravan (single engine turboprop) for daily flights between Moses Lake and Spokane. Ameriflight contracts with UPS and operates a Beech 99 Airliner (twin turboprop) between Moses Lake and Seattle.

Airports that exceed 100 million pounds of landed air cargo receive a predetermined AIP entitlement. Grant County International Airport has not, to date, become a major air cargo hub eligible for additional air cargo federal entitlements. Even if both these aircraft operated daily at full capacity, the maximum annual cargo weight would be approximately 3 million pounds. Therefore, air cargo activity does not approach the level where federal air cargo entitlement would be available.

BASED AIRCRAFT

The number of based aircraft is an important consideration in determining general aviation facility needs. As part of the development of this Master Plan, Airport management conducted a physical count of the based aircraft and determined there to be 81 based aircraft. The based aircraft total is comprised of 73 single engine piston, three (3) multi-engine piston, , three (3) turboprops, and two (2) helicopters,.

AREA LAND USE

Land uses in the vicinity of the Airport can have an impact on airport operations and growth potential. The following section identifies baseline information relating to both existing and future land uses in the vicinity of Grant County International Airport. By understanding the land use issues surrounding the Airport, more appropriate recommendations can be made for the future of the Airport. **Exhibit 1J** presents the existing land uses and zoning in the immediate vicinity of the Airport.

To the west of the Airport is mostly undeveloped open space or agricultural space. To the south is some residential housing and to the north is some rural residential housing. To the east are industrial uses and open space/agricultural uses.

FEDERAL LEGISLATION AND REGULATIONS

There are numerous federal laws and regulations related to airport land use compatibility. Airports that accept federal development grants are required to make every reasonable effort to comply with the laws and regulations. Nevertheless, the federal government has no direct legal authority to regulate land uses. The following is a summary of the federal laws and regulations related to land use compatibility surrounding airports.

Airport and Airway Improvement Act of 1982 - United States Code (USC), Title 49: Upon acceptance of federal funds, this Act obligates the airport owners to operate and maintain the airport and comply with specific assurances, including maintenance of compatible land uses around airports. The implementation of this Act is handled through stipulations outlined in the grant documents signed by airport owners when they accept federal funds for a project.

Objects Affecting Navigable Airspace - Federal Code of Federal Regulations (CFR) Title 14, Part 77: This federal regulation establishes standards for determining obstructions in navi-

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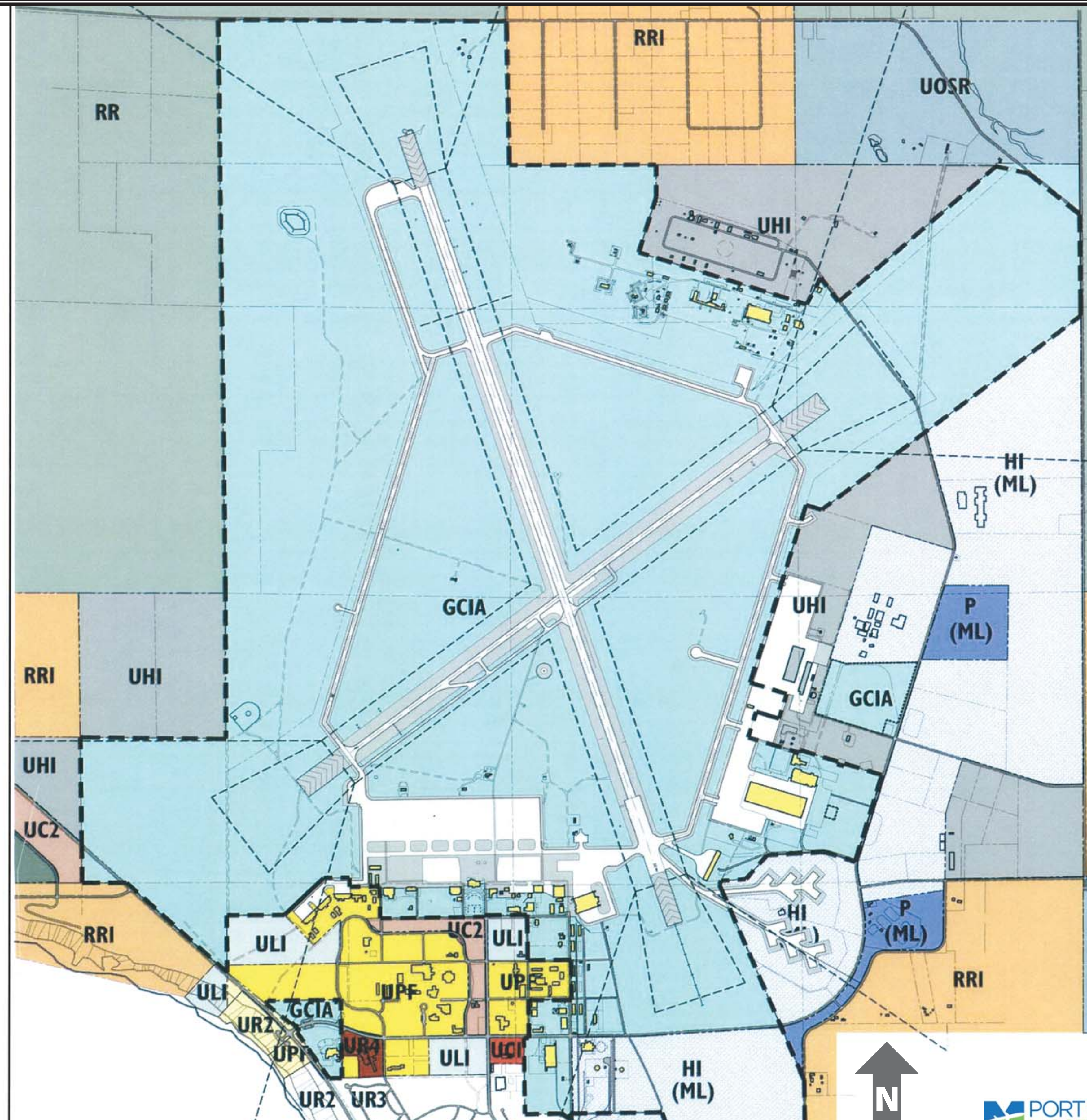
GRANT COUNTY ZONING

Designation	Description
GCIA	Grant County International Airport
UHI	Urban Heavy Industrial
ULI	Urban Light Industrial
UC1	Urban Commercial 1
UC2	Urban Commercial 2
UPF	Urban Public Facilities
UR2	Urban Residential 2
UR3	Urban Residential 3
UR4	Urban Residential 4
UOSR	Urban Open Space
RR	Residential Remote
RR1	Rural Residential 1

MOSES LAKE ZONING

Designation	Description
HI	Heavy Industrial
P	Public Facilities

The Port of Moses Lake is comprised entirely of the Grant County International Airport Zone in Grant County's jurisdiction. Where portions of the Port District have been annexed by the City of Moses Lake, the designation is Heavy Industrial.



SOURCE: Port of Moses Lake Industrial Park Master Plan - 2013

PORT OF MOSES LAKE

Exhibit 1J

EXISTING LAND USE

gable airspace. It sets forth requirements for construction and alteration of structures (i.e., buildings, towers, etc.). It also provides for studies of obstructions to determine their effect on the safe and efficient use of airspace, as well as providing for public hearings regarding these obstructions, along with provisions for the creation of antenna farm areas. It also establishes methods of identifying surfaces that must be free from penetration by obstructions, including buildings, cranes, cell towers, etc., in the vicinity of an airport. This regulation is predominately concerned with airspace-related issues. Implementation and enforcement of the elements contained in this regulation are a cooperative effort between the FAA and the individual state aviation agencies; in this instance, WSDOT.

Airport Land Use Compatibility Planning - FAA Advisory Circular (AC) 150/5060-6: This document guides the development of a compatibility plan to ensure the environs surrounding an airport are not developed in a manner that could pose a risk to the airport's operations. This document specifically looks at land use and noise issues.

Airport Master Plans - FAA Advisory Circular (AC) 150/5070-6A: This document guides the development of airport master plans. The guiding principle of the airport planning process is to develop a safe and efficient airport through the use of acceptable standards. While there are many steps in the planning process, none of these steps should be treated in a piecemeal manner. The airside and landside issues must be equally evaluated to create a plan that provides for compatible airport and community development where possible.

A Model Zoning Ordinance to Limit Height of Objects Around Airports FAA Advisory Circular (AC) 150/5190-4A: This advisory circular concerns itself with developing zoning ordinances to control the height of objects. It is based upon the surfaces described in Subpart C of CFR Part 77, *Objects Affecting Navigable Airspace*. This document provides sample language and model ordinances for use by airports.

Airport Design - Advisory Circular (AC) 150/5300-13A: This document provides the basic standards and recommendations for airport design. Topics include various runway and taxiway safety areas, the runway protection zones, threshold siting surfaces, runway length, and facility separation standards.

Grant Assurances: Pursuant to the provisions of Title 49, U.S.C., subtitle VII, as amended, assurances are required to be submitted as part of a project application by sponsors requesting funds. Upon acceptance of the grant offer by the sponsor, these assurances are incorporated in, and become part of, the grant agreement. There are 39 grant assurances, several of which address airport planning. The following are the primary land use compatibility grant assurances:

- Grant Assurance 21 requires, in part, that the sponsor:

> "…take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft."

- Grant Assurance 20 relates to an airport sponsor's obligation for hazard removal and mitigation to address potential obstructions to the airspace around the airport. Grant Assurance 20 states that the airport sponsor will:

> "…take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards."

In addition to appropriate land use zoning, communities are responsible for protecting airports from obstruction to the airspace. Most communities develop height and hazard regulations surrounding airports.

WASHINGTON STATE LEGISLATION AND REGULATION

In 1996, the Washington State Legislature amended the *Washington State Growth Management Act* to require cities and counties to protect airports from incompatible development. The legislature was concerned that land use development trends were negatively impacting airport operations from incompatible uses and development. WSDOT Aviation assists local jurisdictions, airports, and other interests in protecting public use airports from incompatible development by providing technical assistance and resources to support local decision-making. The Airport Land Use Compatibility Program is continually being updated to reflect new research and planning methods to assist local jurisdictions. The *Airports and Compatible Land Use Guidebook,* published in January 2011, is the most recent guidance available from the state.

There are four primary state land use laws which affect development on and around airports. Each is briefly described as follows:

RCW 14.07 and 14.08 Municipal Airports Act: The Act, adopted in 1941 and 1945, provides for the acquisition and sponsorship of airports by Washington cities, towns, counties, port districts, and airport districts.

RCW 14.12 Airport Zoning: This section was adopted in 1945 and establishes definitions, criteria, and allows local jurisdictions to adopt zoning controls to protect critical airspace from buildings, structures or other airspace obstructions. The law provides direction and guidance to cities and counties on airport hazards.

RCW 36.70A Growth Management Act: The Growth Management Act was adopted in 1990. The Act identifies requirements and processes under which counties and cities are required to act. Within the Act, there are several important sections related to airports. RCW 36.70A.070 outlines mandatory elements within a comprehensive plan, which includes maps, descriptive text covering objectives, principles, and standards, and that the comprehensive plan must also be internally consistent with all elements. This section also requires that an inventory of air, water, and ground transportation facilities and services be included. As well, new or amended elements of the Act must be adopted concurrent with the scheduled update provided in RCW 36.70A.130.

RCW 36.70A.130 requires that each comprehensive plan and development regulations shall be subject to continuing review and evaluation by the county or city that adopted them. A county or city shall take legislative action to review and, if needed, revise its comprehensive plan and regulations to comply with this section. Legislative action means the adoption of a resolution or ordinance following notice and a public hearing, indicating at a minimum, a finding that a review and evaluation has occurred and identifying the revisions made, or that a revision was not needed and the reasons thereof. Additionally, any amendment of or revision to development regulations shall be consistent with the comprehensive plan.

Airports are also recognized under RCW 36.70A.200 by the state as essential public facilities (EPF). All counties and cities planning under GMA RCW 36.70A.040 are required to protect public use airports as essential public facilities. Jurisdictions are required to develop a siting process for locating EPF and should not prohibit the siting, expansion, or continuation of EPF within their comprehensive plan or development regulations. Nor can jurisdictions develop strategies or provisions within their comprehensive plan or development regulation that would render the siting of an EPF impossible, impractical, or incapable of being accomplished; however, it is not inappropriate for a jurisdiction to require applicable conditions or mitigation measures.

RCW 36.70.547, 36.70A.510, 35A.63.270, and 35.60.250 General Aviation Airports: These sections were adopted in 1996 and require all cities and counties (also applies to city or counties not planning under GMA) to protect public use airports from the siting of incompatible development, whether publicly owned or privately owned public use airports, through its comprehensive plan and development regulations. The plans may only be adopted following formal consultation with airport owners and manager, private airport operators, general aviation pilots, ports, and the WSDOT Aviation Division. The law requires that comprehensive plans and regulations be filed with WSDOT Aviation and that each jurisdiction may obtain technical assistance from WSDOT to develop plans consistent with state law.

Under state law, local jurisdictions are required to discourage incompatible development adjacent to public use general aviation airports through adoption of comprehensive plan policies and development regulations. WSDOT Aviation recommends that jurisdictions consider three primary areas: height hazards (uses that may affect critical airspace), noise (over flight and noise 65 DNL or greater), and safety (historical aircraft accident locations, wildlife hazards and hazardous/explosive materials). Additionally, it is recommended that jurisdictions review airport master plans, airport layout plans, other airport documents, aircraft/pilot characteristics, and airport operations.

LOCAL LAND USE PLANNING AND ZONING

The Port of Moses Lake has worked in partnership with both the City of Moses Lake and Grant County to develop and implement land use compatibility guidelines. **Exhibit 1K** presents the area zoning from both Grant County and the City of Moses Lake.

Grant County Overlay Zoning

Chapter 23.04.640 of the Grant County Zoning Ordinance provides for an Aerospace Overlay zoning district. The purpose of the district is to protect the air and land space around Grant County International Airport from obstructions or hazards and incompatible land uses. Essentially, this overlay zone permits airport functions to occur within the zone.

Chapter 23.04.645 of the Grant County Zoning Ordinance provides for an Airport Safety Overlay zoning district. This overlay zone is intended to protect the airspace around airports in the county from airspace obstructions and hazards, incompatible land uses, and to protect public health, safety, and general welfare. The Airport Safety Overlay applies to any new buildings, structures, and outdoor activities involving human use or assembly. The Airport Safety Overlay zone is defined by the Airport Imaginary Surfaces defined in accordance with Federal Aviation Regulations (FAR), Part 77, "Objects Affecting Navigable Airspace." **Exhibit 1L** presents the Grant County Airport Safety Overlay zone.

City of Moses Lake Municipal Code

Chapter 18.52.030 establishes designated airport zones. The designated airport zone corresponds to the Grant County Airport Zoning map. The zones are defined by FAR, Part 77. Chapter 18.52.040 defines the height limitations of structures within the designated zones. The height limitations also are defined by FAR, Part 77.

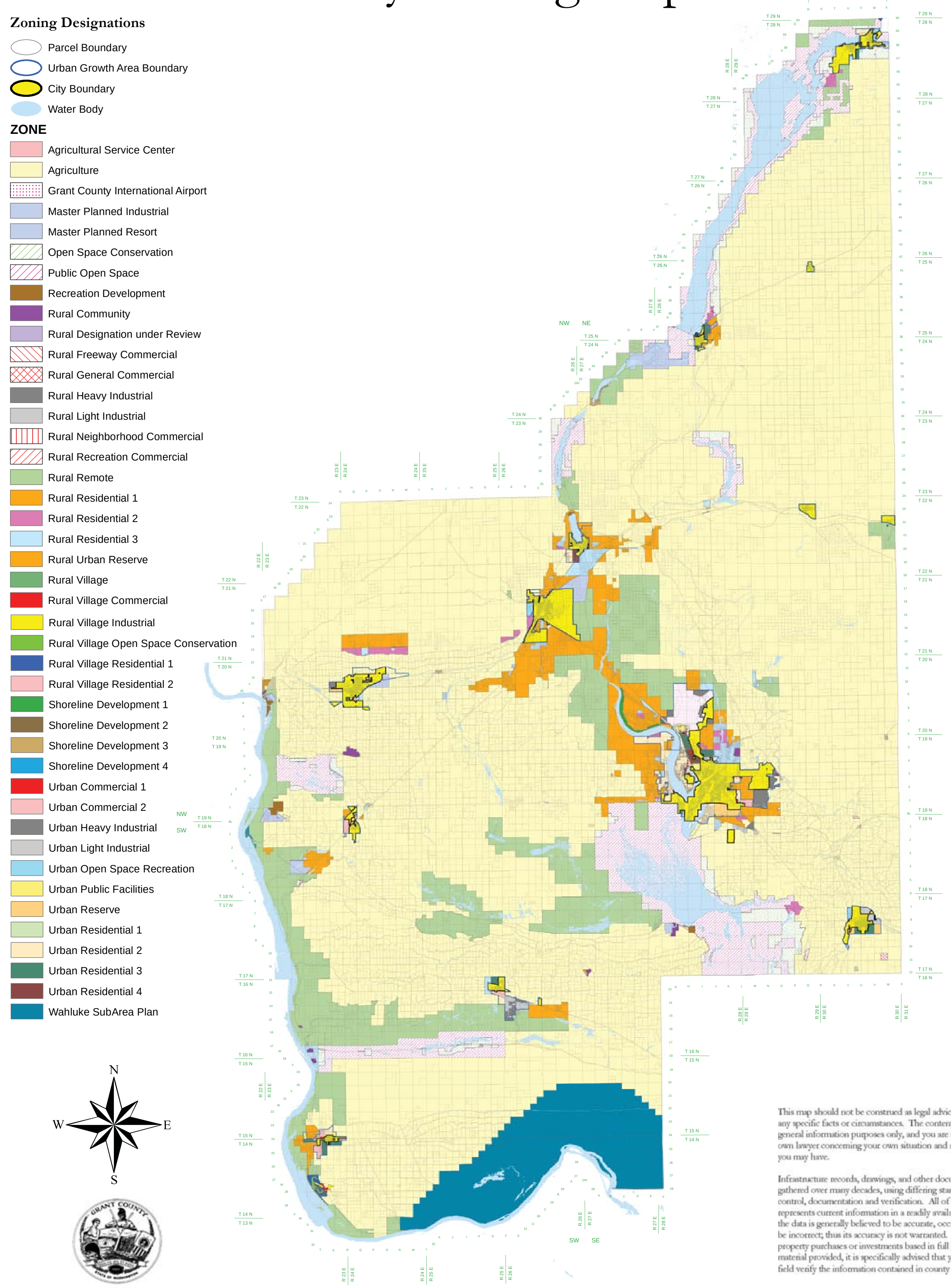
AIRFIELD FACILITIES

Airfield facilities include runways, taxiways, airport lighting, and navigational aids. A depiction of airfield facilities at the Airport is provided on the aerial photograph on **Exhibit 1M**.

RUNWAYS

Grant County International Airport is served by five runways. The runways vary in length from less than 3,000 feet to more than 13,500 feet. Each of the runways tends to serve a different segment of aviation activity operating at the Airport. **Exhibit 1N** presents detail regarding each runway.

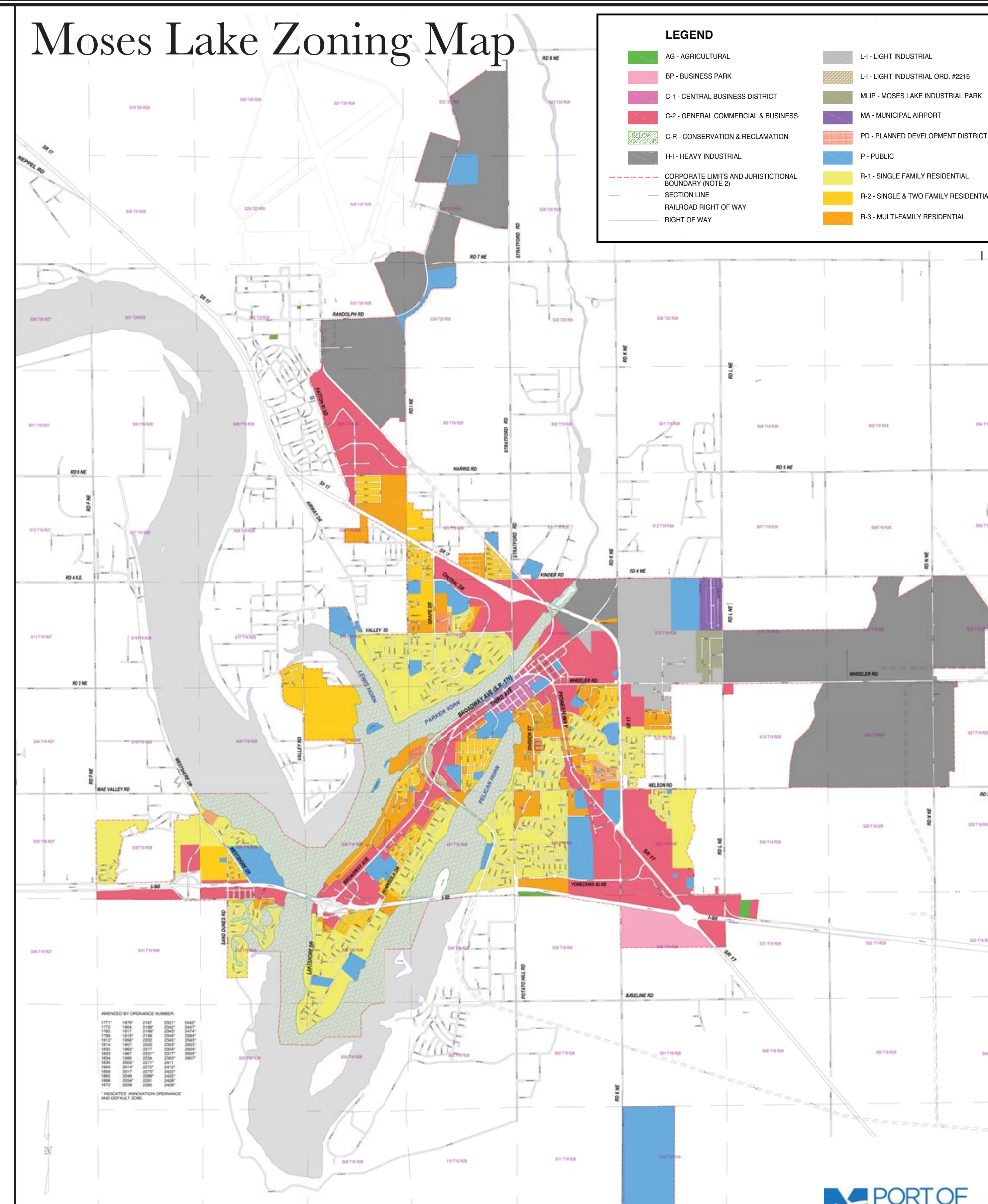
Grant County Zoning Map



This map should not be construed as legal advice or legal opinion on any specific facts or circumstances. The contents are intended for general information purposes only, and you are urged to consult your own lawyer concerning your own situation and any specific questions you may have.

Infrastructure records, drawings, and other documents have been gathered over many decades, using differing standards for quality control, documentation and verification. All of the data provided represents current information in a readily available format. While the data is generally believed to be accurate, occasionally it proves to be incorrect; thus its accuracy is not warranted. Prior to making any property purchases or investments based in full or in part upon the material provided, it is specifically advised that you independently field verify the information contained in county records.

Moses Lake Zoning Map



PORT OF MOSES LAKE

Exhibit 1K
AREA LAND USE ZONING

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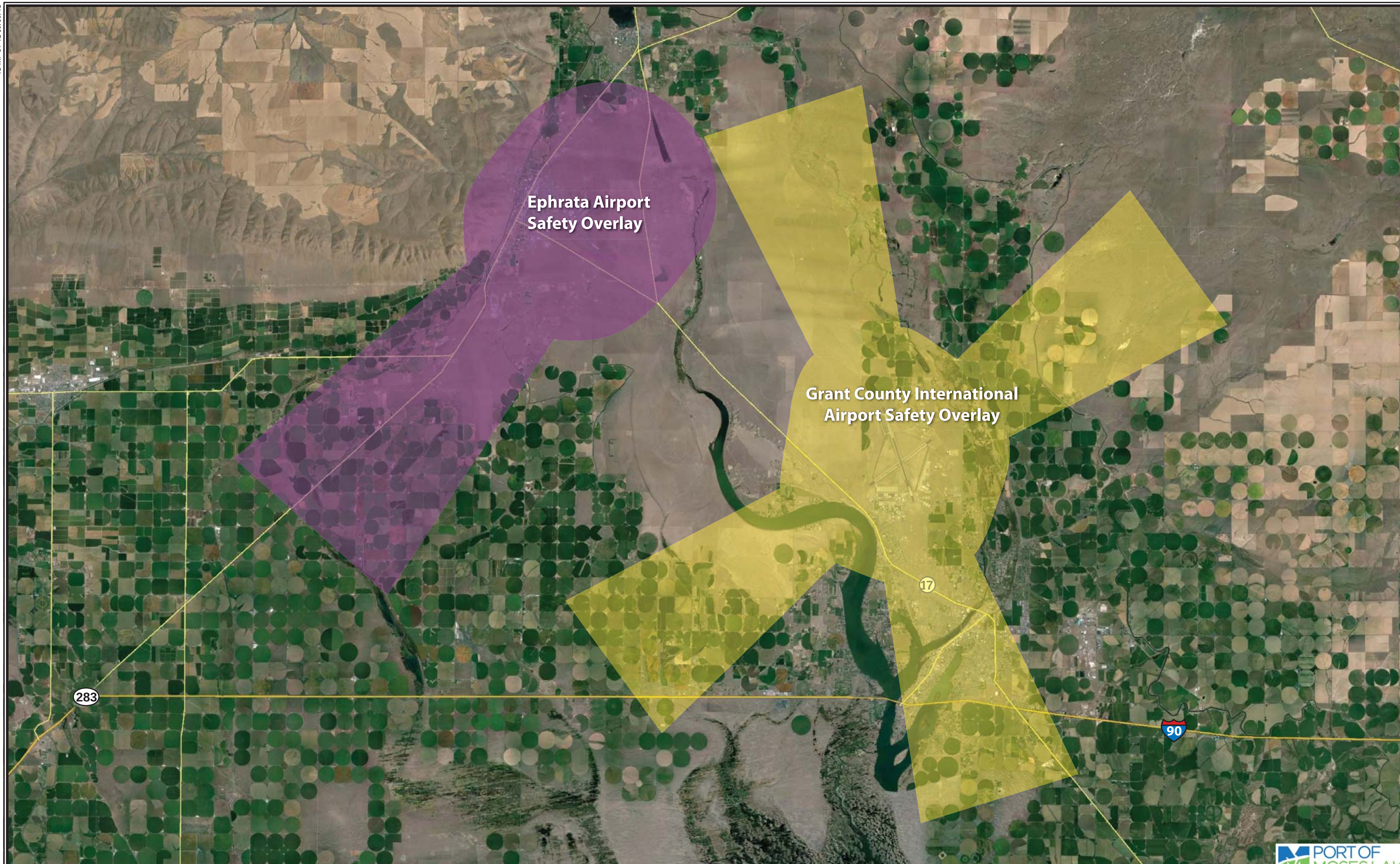
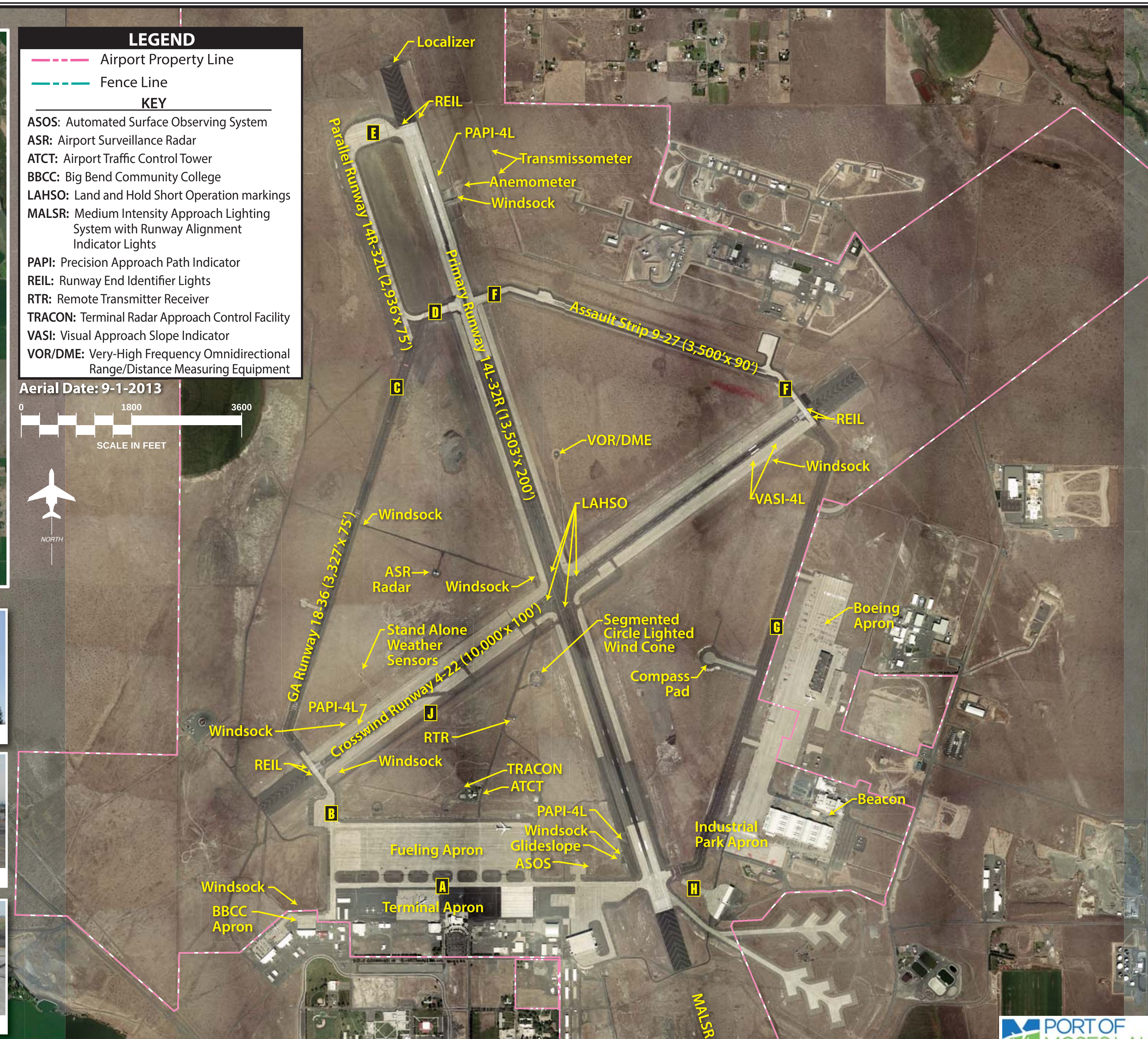


Source: Grant County GIS Department - www.co.grant.wa.us/GIS

Exhibit 1L
AIRPORT OVERLAY ZONING



LEGEND

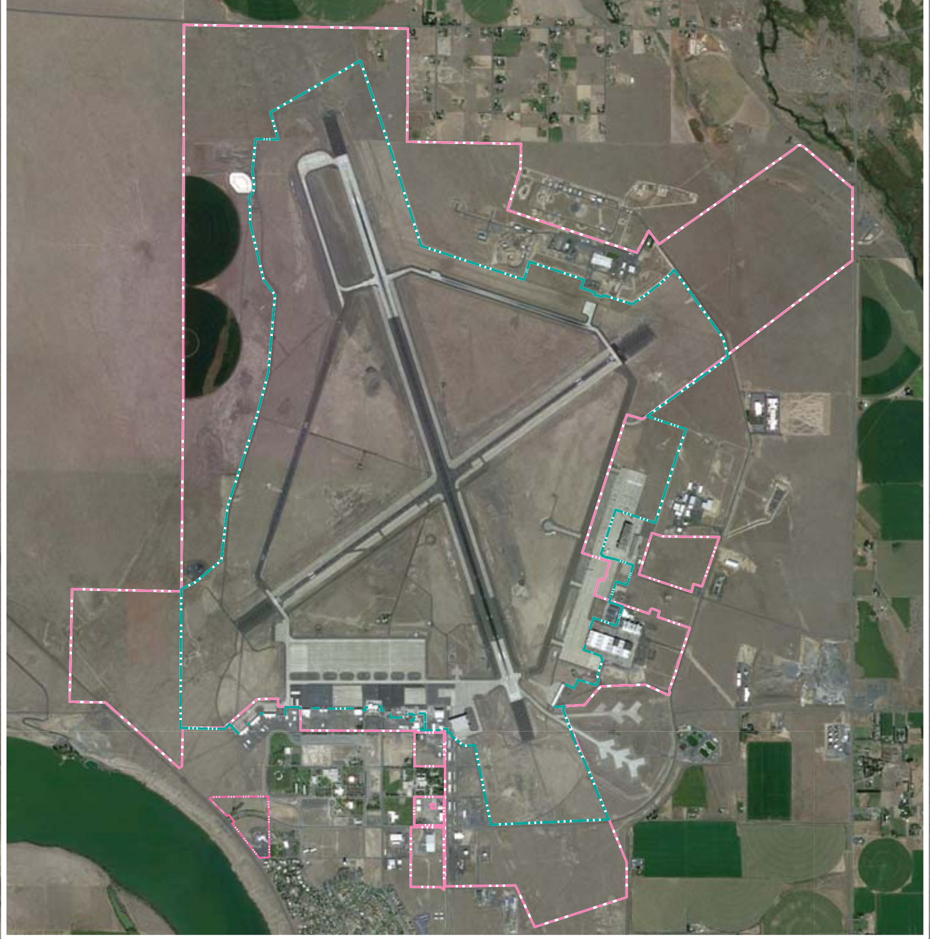
Airport Property Line

Fence Line

KEY

- **ASOS:** Automated Surface Observing System
- **ASR:** Airport Surveillance Radar
- **ATCT:** Airport Traffic Control Tower
- **BBCC:** Big Bend Community College
- **LAHSO:** Land and Hold Short Operation markings
- **MALSR:** Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
- **PAPI:** Precision Approach Path Indicator
- **REIL:** Runway End Identifier Lights
- **RTR:** Remote Transmitter Receiver
- **TRACON:** Terminal Radar Approach Control Facility
- **VASI:** Visual Approach Slope Indicator
- **VOR/DME:** Very-High Frequency Omnidirectional Range/Distance Measuring Equipment

FULL EXTENT OF AIRPORT PROPERTY



Airport Surveillance Radar (ASR)

Airport Traffic Control Tower (ATCT)

ILS Glide Slope Antenna

Terminal Area View from ATCT

Taxiway B to Runway 4-22

Taxiway E to Runway 14L

PORT OF MOSES LAKE

Exhibit 1M
AIRSIDE FACILITIES

13MP01-1N-09/09/13

RUNWAY CHARACTERISTICS

Field Elevation: 257.1' MSL

Runway Nickname	The Primary Runway[6]		The Crosswind Runway		The GA Runway		The Taxiway/Parallel Runway[5]		The Assault Strip[4]	
Runway Designation	RUNWAY 14L	RUNWAY 32R	RUNWAY 4	RUNWAY 22	RUNWAY 18	RUNWAY 36	RUNWAY 14R	RUNWAY 32L	RUNWAY 9	RUNWAY 27
Runway Heading	144°	324°	036°	216°	180°	000°	144°	324°	090°	270°
Runway Length	13,503'		10,000'		3,327'		2,936'		3,500'	
Runway Width	200'		100'		75'		75'		90'	
Runway Surface Material (Condition)	Concrete/Asphalt (Good)		Asphalt (Good)		Asphalt (Good)		Concrete (Good)		Concrete (Good)	
Runway Surface Treatment (if any)	Grooved[1]		Grooved		NA		NA		Grooved	
Runway Markings (Condition)	Precision (Good)		Nonprecision (Good)		Basic (Good)		Basic (Good)		None	
LAHSO Landing Distance	7,550'	5,050'	4,700'	4,650'	NA		NA		NA	
Declared Distances	NA	Yes[3]	NA		NA		NA		NA	
Runway Lighting	High Intensity (HIRL)[2]		Medium Intensity (MIRL)		Medium Intensity (MIRL)		Taxiway[7]		Military landing lights only	
Traffic Pattern	Left	Right	Left	Right	Right	Left	Right	Left	Left	Right
Runway Load Bearing Strength (pounds)										
Single Wheel (SWL)	85,000		75,000		75,000		100,000		100,000	
Double Wheel (DWL)	155,000		100,000		170,000		200,000		150,000	
Double Tandem (DTWL)	320,000		175,000		300,000		400,000		270,000	
Dual Double Tandem (DDTWL)	600,000		475,000		400,000		400,000		475,000	
Runway Gradient	0.1% Down	0.1% Up	0.4% Down	0.3% Up	0.00%	0.00%	0.1% Down	0.1% Up	0.3% Down	0.3% Up
Visual Approach Aids	PAPI-4L REIL	PAPI-4L MALSR	PAPI-4L REIL	VASI-4L REIL	NA		NA		NA	
Instrument Approach Aids	RNAV (RNP) RNAV (GPS) VOR-1 VOR-3	ILS or LOC RNAV (RNP) RNAV (GPS) VOR NDB	RNAV (RNP) RNAV (GPS) VOR	RNAV (RNP) RNAV (GPS) VOR	NA		NA		NA	

[1]First 10,000 feet from Rwy 32R is grooved to a width of 150 feet.
[2]Non-standard HIRL located 50' from runway edge markings.
[3]Landing and takeoff using Rwy 32R is 11 feet shorter than the total runway length due to the location of the localizer antenna.
[4]Military operations only
[5]Closed at night to all operations except for taxiing
[6]Closed when tower closed except for special military training
[7]No runway edge lights; blue taxiway lights at night.

TAXIWAY CHARACTERISTICS

Designation	A (Alpha)	B (Bravo)	C (Charlie)	D (Delta)	E (Echo)	F (Foxtrot)	G (Golf)	H (Hotel)	J (Juliett)
Width	75'	75'	75'	75'	75'	75'	75'	75'	35'
Surface Material	Concrete	Concrete	Asphalt	Asphalt	Concrete	Concrete	Asphalt	Concrete	Asphalt
Edge Lighting	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes

WEATHER AND NAVIGATIONAL AIDS

Automated Surface Observing System (ASOS)
Lighted Wind Cones
Airport Beacon
Airport Traffic Control Tower (ATCT)
Airport Terminal Information Service (ATIS)
Anemometer
Transmissometer
Stand Alone Weather Sensors
Segmented Circle

ABBREVIATION KEY

LAHSO - Land and Hold-Short Operations
GPS - Global Positioning System
RNAV - Area Navigation (GPS variant)
RNP - Required Navigation Performance (GPS variant)
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
REIL - Runway End Identifier Lights
LOC - Localizer
PAPI - Precision Approach Path Indicator
VASI - Visual Approach Slope Indicator

PORT OF MOSES LAKE

Exhibit 1N
RUNWAY-TAXIWAY
SYSTEM DATA

Runway 14L-32R (The Primary Runway)

Runway 14L-32R is 13,503 feet long by 200 feet wide and oriented in a northwest to southeast manner. The first 1,500 feet and last 3,500 feet, as measured from the Runway 32L end, are constructed of concrete and the middle section is constructed of asphalt. The surface of the runway is in good condition. The first 10,000 feet of the runway, measured from the Runway 32R end, is grooved to aid in drainage and wheel traction.

The runway was originally constructed at a width of 500 feet. It has since been reduced to a width of 200 feet. A 50-foot shoulder width is maintained. The remaining 100 feet on either side of the runway shoulder is not maintained; however, if there is significant foreign object debris (FOD) build-up, then it is removed by Airport maintenance staff.

The FAA's Airport Facility Directory indicates that for landings and takeoffs utilizing Runway 32R, the runway is declared to be 11 feet shorter (13,492 feet) than the full runway length. Utilization of declared distances in this manner is necessary due to the physical location of the localizer antenna north of the Runway 14L threshold. The localizer antenna is situated 11 feet within the runway safety area, which must extend 1,000 feet beyond the runway end.

Runway 14L-32R has pavement strength of 85,000 pounds single wheel loading (SWL). SWL refers to the design of certain aircraft landing gear that has a single wheel on each main landing gear strut. The runway pavement has also been strength-rated at 155,000 pounds dual wheel (DWL) and 320,000 pounds for dual tandem wheel (DTWL), and 600,000 pounds for dual double tandem wheel (DDWL). This pavement strength will accommodate repeated activity by nearly every aircraft in the commercial and military fleets today.

The runway edge lighting is non-standard in design as it is situated at a distance of 55 feet from the runway edge markings. The design standard for runway edge lighting is for them to be within 10 feet of the edge of the runway. An FAA approved modification of standards is in effect for this condition.

Operationally, this runway is closed to civilian activity when the airport traffic control tower is closed (10:00pm to 6:00am). Certain special military training operations are permitted to continue utilizing the runway when the tower is closed. The primary purpose for limiting civilian traffic is because the runway does not meet line-of-sight standards in that a pilot at one end may not be able to see a pilot at the other end due to the curve of the runway.

Runway 4-22 (The Crosswind Runway)

Runway 4-22 is the crosswind runway which crosses the primary runway. This runway is 10,000 feet long and 100 feet wide. It is constructed of asphalt, is in good condition, and is grooved to facilitate drainage and tire traction. This runway was also originally constructed at a width of 500 feet, with the edge pavement remaining in place.

Runway 4-22 has pavement strength of 75,000 pounds SWL. The runway pavement has also been strength-rated at 100,000 pounds DWL and 175,000 pounds DTWL, and 475,000 pounds DDWL. This pavement strength will accommodate repeated activity by most aircraft in the commercial and military fleets today.

Runway 18-36 (The General Aviation Runway)

Runway 18-36 is designated primarily for general aviation activity. It is strategically located in proximity to the Big Bend Community College aviation facilities. The location of the runway allows for a greater separation of training activity by student pilots from those aircraft utilizing the longer runways.

Runway 18-36 is 3,327 feet long and 75 feet wide. It is constructed of asphalt which is in good condition. Access to the runway thresholds is from lead-in Taxiway C.

Runway 18-36 has pavement strength of 75,000 pounds SWL. The runway pavement has also been strength-rated at 170,000 pounds DWL and 300,000 pounds DTWL, and 400,000 pounds DDWL; however, these types of aircraft would not use the runway due to the runway length.

Runway 14R-32L (The Parallel Runway/Taxiway)

Runway 14R-32L is 2,936 feet long and 75 feet wide and is parallel to the primary runway. It is separated from the primary runway by 1,031 feet. This runway is constructed of concrete and is in good condition. This runway is utilized for daytime visual approaches only. The edge lighting is actually blue taxiway light, thus the runway is utilized as a taxiway at night.

Runway 14R-32L has pavement strength of 100,000 pounds SWL. The runway pavement has also been strength-rated at 200,000 pounds DWL and 400,000 pounds DTWL, and 400,000 pounds DDWL.

Runway 9-27 (The Assault Strip)

According to the Airport Facility Directory, the runway is 3,500 feet long and 90 feet wide; however, there are no runway markings and the ends have not been officially surveyed. Tire track marks on the runway show that more than 4,000 feet is utilized at times. The runway is constructed of concrete and is in good condition.

Runway 9-27 is somewhat unique in that it is available for use only by the military. Specifically, it is utilized by Joint Base Lewis-McChord for C-17 training operations. This runway was constructed by the military. This runway supports short landing and takeoff training operations primarily by C-17 aircraft which tends to leave heavy amounts of tire rubber on the runway. The Airport maintenance staff will periodically remove the rubber build-up.

The runway does not have edge lighting; however, the military does use the runway extensively at night. There are special lights set to the sides of the beginning and end of the runway to permit nighttime landing training operations in which pilots are to touch down within a 500-foot space on the runway.

This runway serves an important national security function as there is only a handful of pure assault landing runways in the country. This assault strip is the only one located at a non-military installation.

TAXIWAYS

The taxiway system at Grant County International Airport, as illustrated on **Exhibit 1N**, consists of partial parallel, connecting, access, and entrance/exit taxiways. The following is a discussion of the taxiways which was first documented in the 2005 Master Plan study.

Taxiway Alpha (A): connects the terminal and aprons with Runway 32R and Taxiway B and is the most frequently used taxiway on the Airport. It is 75 feet wide with two pavement sections. The westerly 4,000-foot long section consists of a 16-inch thick PCC, 25-foot wide center keel panel, and 25-foot wide panels on each side with a thickness that varies from 16 inches at the inner edge to 14 inches at the outer edge (14"-16"-14"). The easterly 1,465-foot long section has one 14-inch thick, 25-foot wide PCC center panel, and a 25-foot panel on each side where the thickness varies from 13 inches on the inside edge to 11 inches on the outside edge (11"-13"-11"). The north side of Taxiway A has edge lighting while the south side, which merges with the terminal area apron, does not. Because it is only partially lit and adjacent to large parking aprons, visiting aircraft occasionally become disoriented at night.

Taxiway Bravo (B): connects Taxiway A and aprons with Runway 4 and is used extensively by Big Bend Community College trainers and other small aircraft. It is 75 feet wide and consists of a 600-foot long section that is 16-inch thick PCC in the center 25-foot panel and is thickened in the edge panels from 16 inches at the inside edge to 18 inches at the outside edge (18"- 16"-18") and a 1,300-foot long section of the 11"-13"-14" PCC pavement configuration described for Taxiway A. It has edge lighting.

Taxiway Charlie (C): connects the southwest end of Runway 4-22 to the southwest end of Runway 18-36 and the northeast end of Runway 18-36 with Taxiway D. It is 75 feet wide and consists of 4,900 feet of 8"-6"-8" PCC with an asphalt concrete overlay 6 to 8 inches thick at the center and 4 inches thick at the outside edge. It has edge lighting and presents no operational problems.

Taxiway Delta (D): connects Taxiway C to the intersection with Runway 14L-32R. It is 75 feet wide and consists of 600 feet of 8"-6"-8" PCC with a 4-inch nominal asphalt concrete overlay. It has edge lighting. Taxiway D was recently rehabilitated and is considered to be in excellent condition.

Taxiway Echo (E): connects between Runway 14L-32R and Runway 14R-32L. It is 75 feet wide and consists of 4,150 feet of the 14"-16"-14" PCC pavement configuration, including Runway 14R-32L. It has edge lighting.

Taxiway Foxtrot (F): used only occasionally as a taxiway. Most of the time, it is designated as Runway 9-27 and is used for military training. It connects Taxiway D and Runway 14L-32R with the northeast end of Runway 4-22. It is 75 feet wide and consists of 5,620 feet of 10-1/2-inch thick PCC pavement. It has no lighting. Most of the pavement surface is not visible from the control tower due to terrain, however, aircraft are visible.

Taxiway Golf (G): used only occasionally and connects the northeast end of Runway 4-22 to the southeast end on Runway 14L-32R. It serves the Boeing hangar and the airport industrial park on the east side of the airport. It is 75 feet wide and consists of 8,150 feet of 8"-6"-8" PCC with a 4-inch thick asphalt overlay. It has no lighting. An overlay or other rehabilitation would be required for more extensive use. This taxiway is considered in poor condition.

Taxiway Hotel (H): located near the approach end of Runway 32R off of Taxiway G and provides access to the alert hangars. The taxiway is 75 feet wide and has no lighting.

Taxiway India (I): was at the approach end of Runway 32R connecting to the military alert pads (i.e., Christmas Tree), but has since been deactivated.

Taxiway Juliet (J): located parallel to a portion of Runway 4-22. It connects from Taxiway B to a point approximately 1,100 feet from the mid-field intersection with Runway 14L-32R. The taxiway has recently been relocated to meet FAA standards.

HOLD APRONS

Hold aprons are designated areas on the airfield typically located at the end of taxiways near the runway end thresholds. The ATCT will instruct pilots to stop their aircraft on the hold apron until it is safe for the aircraft to proceed to the runway for take-off. Pilots may also utilize hold aprons, with authorization from the ATCT, for final pre-flight checks and run-ups.

There are three hold aprons on the airfield. The first is adjacent to Taxiway B and it is approximately 10,600 square yards of concrete pavement. The next is adjacent to Taxiway E and it is approximately 24,500 square yards of concrete. The third hold apron is located at the east end of the terminal area apron. This apron encompasses approximately 8,000 square yards of concrete. It should be noted that the third hold apron is not officially designated as a hold apron but space is available to serve this function.

PAVEMENT CONDITION

According to Public Law 103-305, any airport requesting Federal funds for a project to replace or reconstruct a pavement under the airport grant assistance program must have implemented a pavement maintenance program. The law states that airport sponsors must provide assurances or certifications that an airport has implemented an effective airport pavement maintenance management system (PMMS) before an airport will be considered for funding of pavement replacement or reconstruction projects.

WSDOT has developed an ongoing pavement management system that benefits all airports in the state. The state contracts with a qualified pavement inspection company which assesses airport pavements on a regular schedule. The most recent inspection at Grant County International Airport was in September 2012.

Pavements are ranked based on observed condition. Each section of pavement is assigned a Pavement Condition Index (PCI) value from 0-100. Generally, the runways and taxiways should be maintained at a 70 PCI or better. Other pavements should be at a PCI of 55 or better.

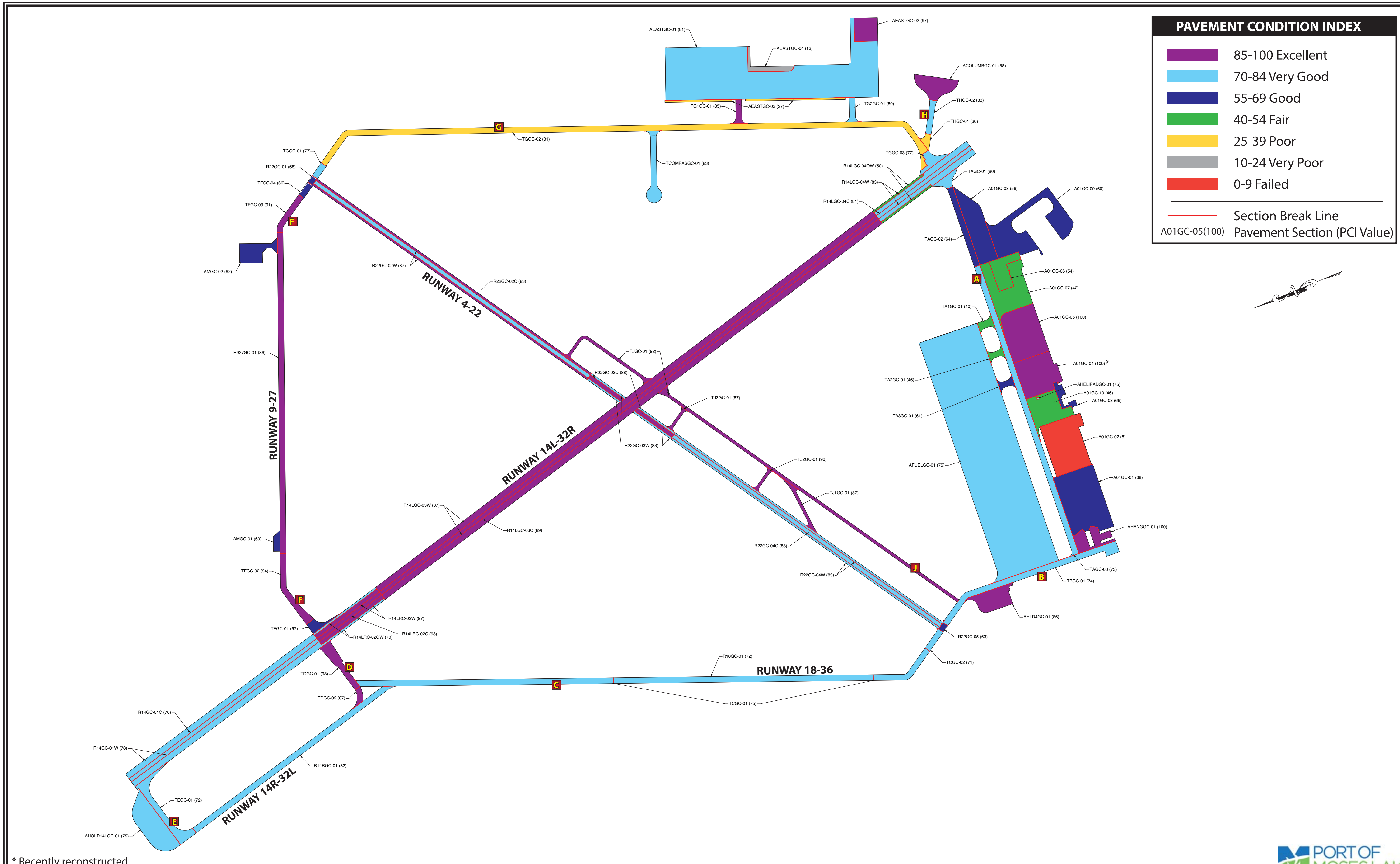
Exhibit 1P presents the PCI map for Grant County International Airport which was published in January 2013. There are several areas of concern including Taxiway G and portions of the main terminal area apron.

PAVEMENT MARKINGS

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on an airport. Runway 14L-32R has precision runway markings which identify the runway centerline, runway edge, threshold, landing designation, touchdown zone, and aiming points. Crosswind Runway 4-22 has nonprecision markings which include runway centerline, runway edge, threshold, landing designation, and touchdown zone.

Both of these runways have Land and Hold Short Operations (LAHSO) markings. These markings are located on each runway approximately 300 feet from the center of the intersection of the two runways. When instructed to do so, pilots are requested to land and then hold short of these markings. This procedure is typically instituted if another aircraft is using the crossing runway.

Runway 18-36 and parallel Runway 14R-32L have basic markings that include runway centerline, runway edge, and landing designation markings. Both runways have chevrons



Source: Washington State Department of Transportation Aviation: Pavement Evaluation Program (Nov. 2012)

PORT OF MOSES LAKE

Exhibit 1P
PAVEMENT CONDITION

leading to the runway threshold to indicate where the beginning of the runway is located. Runway 9-27 does not have any markings.

Taxiway centerline markings are provided to assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway/taxilane edges. Taxiway markings also include aircraft holding positions prior to entering the runway environment.

All taxiways providing access to the primary runway have enhanced taxiway centerline markings. The enhanced markings are wider dashed black and yellow markings on both sides of the taxiway centerline marking. These markings are intended to alert pilots that the taxiway is approaching a runway intersection.

The edge limits of the taxiways are marked with a dashed yellow line. This marking is important because there are areas where wide pavement expanses serve multiple uses. For example, Taxiway A and the terminal apron are one continuous pavement area. It is the pavement marking that segments the pavement for safe usage as both a taxiway and an aircraft parking apron.

Hold lines are marked on those taxiways leading to runways. The hold lines are comprised of two solid yellow lines followed by two dashed yellow lines. The hold lines on taxiways leading to an intersection with a runway are preceded by runway designation markings consisting of white lettering on a red background. A summary of the hold line locations is presented in **Table 1G**.

The pavement surfaces in proximity to the ILS serving Runway 32R are marked with ILS critical area markings. Pilots must hold short of these markings when the ILS is in use.

Prior to the landing thresholds of the primary and crosswind runways, there is approximately 1,000 feet of paved overrun area. These overrun areas are marked with lead-in chevrons identifying the areas as unusable.

Other pavement markings at the Airport include airport vehicle service road markings, aircraft tie-down positions, and various aircraft circulation centerlines. An area immediately adjacent to the terminal building is marked with a red restricted area marking. This area is intended to be secure for commercial aircraft parking, loading, and unloading.

TABLE 1G
Taxiway Hold Position Markings
Grant County International Airport

Taxiway (Location)	Distance to Rwy Centerline	Runway
Twy A	297'	32R
Twy B	308'	4
Twy C (SW)	260'	4
Lead-in Twy C (SW)	620'	36
Lead-in Twy C (NE)	1,567'	18
Twy C (NE)	560'	32L
Twy D	340'	32L
Twy D	294'	32R
Twy E	360'	14R
Twy E	351'	14L
Twy F (NW)	354'	14L
Twy F (SE)	262'	22
Twy G	262'	22
Twy G	355'	32R
Twy H	306'	32R
Acute-angled Twy J (J-1)	487' or 238'	4
Twy J (J-2)	263'	4
Twy J (J-3)	263'	4
Twy J (J-4)	263'	22
Twy J (W of Midfield)	313'	32R
Twy J (E of Midfield)	315'	32R

Note: Lead-in Taxiway F to Runway 9-22 is unmarked. This runway is reserved for military training only.
Source: Airport Certification Manual

AIRFIELD LIGHTING AND SIGNAGE

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the Airport for this purpose. These lighting systems, categorized by function, are summarized as follows. All lighting at the Airport is adequately shielded or adjusted to prevent interference with air traffic control or aircraft operations.

Identification Lighting: The location of an airport at night is universally identified by a rotating beacon. The rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at Grant County International Airport is located on top of an industrial building (building 5825) at the southeast corner of the Airport, just north of the Genie Industries manufacturing facility.

Runway and Taxiway Lighting/ Signage: Runway and taxiway edge lighting utilizes light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for safe operations during night and/or times of low visibility in order to maintain safe and efficient access to and from the runways and aircraft parking areas.

Primary Runway 14L-32R is equipped with white high intensity runway lights (HIRL). The edge lights are located 154 feet from the runway centerline. Amber caution zone lighting is provided for the last 2,000 feet on both ends of the runway. Runway 4-22 has white medium intensity runway lights (MIRL) with amber caution zone lighting for the last 2,000 feet on both ends. Runway 18-26 has MIRL. Runway 9-27 has no edge lighting. Parallel Runway 14R-32L has blue taxiway lighting, thus at night this runway serves as a taxiway only.

Taxiway edge lighting is blue in color and mounted on frangible bases. Taxiways A, B, C, D, E, and J have medium intensity taxiway lighting (MITL). Reflectors are installed at the west end of Taxiway D at the triangle pavement area. Only the northern side of Taxiway A has edge lighting. The south side of Taxiway A is equipped with edge reflectors. Taxiways F, G, and H are unlit.

The Airport also has a runway/taxiway signage system. The presence of runway/taxiway signage is necessary for the safe and efficient operation of an airport. The signage system installed at the Airport includes runway and taxiway designations, holding positions, instrument landing system (ILS) critical areas, routing/directional, runway end and exits, and runway distance remaining signs (primary and crosswind runways).

The terminal area apron is served by lighting from light stands. Apron edge taxilanes have no edge lighting other than the north side of Taxiway A, which is lit.

Distance-to-Go Signs: Runways 14L-32R and 4-22 are equipped with distance-to-go lighted signs. These signs are set to the side of the runway and spaced every 1,000 feet. A number on each sign represents the distance in 1,000-foot increments to the runways end.

Land and Hold Short Lights (LAHSO)

Approximately 300 feet from the intersection of Runway 14L-32R and Runway 4-22 are LAHSO marking and lighting. The tower controllers may instruct pilots to land on any of these four runways and hold short of the intersection. The lighting consists of a line of in-pavement white pulsating lights intended to alert pilots of the LAHSO hold point.

NAVIGATIONAL AIDS (NAVAIDS)

Grant County International Airport is equipped with a variety of navigational aids which support pilot operations both at the Airport and in the vicinity. **Table 1H** lists the various NAVAIDS and the ownership of these systems.

TABLE 1H
Airport NAVAIDs
Grant County International Airport

Navigational Aid (NAVAID)	Ownership	
	Airport	FAA
VHF omnidirectional range with distance measuring equipment (VOR/DME)		x
Instrument Landing System (ILS)		x
Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR)		x
Non-Directional Beacon (NDB)		x
Airport Surveillance Radar (ASR)		x
Localizer antenna		x
Airport Traffic Control Tower (ATCT)		x
Automated Surface Observing System (ASOS)		x
Radar Termination Range (RTR)		x
Runway Visibility Range (RVR)		x
Precision Approach Path Indicator (PAPI) - Rwy 32R	x	
PAPI- Rwy 14L		x
Runway End Identifier Lights (REIL) - Rwy 14L	x	
PAPI - Rwy 4		x
Visual Approach Slope Indicator (VASI) - Rwy 22		x
REIL - Rwy 4	x	
REIL - Rwy 22	x	
Windsocks	x	
Segmented Circle	x	

Source: Airport Certification Manual

Visual Approach Slope Lighting: A PAPI-4L is located on the left side of Runways 14L 32R, and 4. These four-box units provide for a 3.0-degree glide slope. When the system of red and white lights is interpreted by the pilot, they are given an indication of being above, below, or on the designated descent path to the runway threshold. A PAPI system has a range of five miles during the day and up to twenty miles at night. Runway 22 is equipped with a VASI-4L system. None of the other runways have visual approach slope lighting systems.

All visual approach slope aids are owned and maintained by the FAA except for the PAPI serving Runway 32R, which is owned by the Port of Moses Lake.

Runway End Identification Lighting: REILs provide rapid and positive identification of the approach ends of a runway. The REIL consists of two synchronized flashing lights, located laterally on each side of the runway end, facing the approaching aircraft. A REIL system has been installed on the ends of Runways 14L, 4, and 22.

The REILs are owned and maintained by the Port of Moses Lake.

Approach Lighting Systems: Approach lighting systems (ALS) are used in the approaches to runways as adjuncts to electronic navigational aids for the final portion of IFR approaches and visual guides for nighttime approaches under VFR conditions. The approach lighting system provides the pilot with visual cues concerning aircraft alignment, roll, height, and position relative to the threshold. The instrument landing system (ILS) approaches to Runway 32R are enhanced with the medium intensity approach lighting system with runway end alignment lights (MALSR).

The MALSR is owned and maintained by the FAA.

After-Hours Lighting: When the ATCT is closed, the airfield lights are turned off except on Runway 4-22. All navigational aids, including PAPIs, VASIs, and REILs, are left on. The MALSR on the approach to Runway 32R can be activated by pilots utilizing CTAF at night.

Obstruction Lighting: Objects that penetrate the FAR Part 77 imaginary surfaces associated with the airport are considered obstructions. As determined by the FAA, obstructions are to be removed, marked, or lighted. Obstructions at the Airport are clearly identified with red obstruction lights as required by the FAA. There are obstruction lights atop the following structures: Glide Slope antenna, Building 4006, Rod on Anemometer, VOR/DME, Localizer antenna, Localizer vault, Rod on Ceilometer, Windsocks, ATCT, and the ASR.

Emergency Generators: The Airport maintains a diesel generator as a secondary power source to commercial power for runways and taxiways. The FAA maintains a battery backup system for NAVAIDS. The tower has a dedicated backup diesel generator.

WEATHER AND COMMUNICATION AIDS

Grant County International Airport is equipped with eight wind socks including a lighted wind sock positioned within the segmented circle. The wind socks provide information to pilots regarding wind conditions, such as direction and intensity.

The Airport is served by an ATCT which is owned and operated by the FAA. It is located north of the Airport terminal building. The tower operates from 6:00am to 10:00pm daily. The tower can be contacted on frequency 118.25 MHz (East) or 128.0 MHz (West). Approach control can be contacted via frequency 126.4 MHz. Tower departure control can be contacted via 126.4 MHz. Tower ground control can be reached on 121.9 MHz and clearance delivery is available via frequency 121.9 MHz.

The Airport is equipped with an Automated Terminal Information Service (ATIS). ATIS broadcasts are updated hourly and provide arriving and departing pilots with the current surface weather conditions, communication frequencies, and other important airport-specific information. The ATIS frequency at Grant County International Airport is 119.05 MHz.

The Airport has access to the common advisory traffic frequency (CTAF). This radio frequency (118.25 MHz) is used by pilots in the vicinity of the airport to communicate with each other about approaches to or departures from the airport when the airport traffic control tower is closed. In addition, a UNICOM frequency is also available (122.95 MHz.), where a pilot can obtain information pertaining to the airport. Pilots can contact the Seattle Center – Air Route Traffic Control Center (Approach Control: 134.35 MHZ; Departure Control: 134.35 MHz) if needed, usually when the tower is closed at Grant County International Airport. The primary responsibility of Seattle Center is sequencing and separation of over-flights, arrivals, and departures, in order to provide safe, orderly, and expeditious flow of aircraft filed under instrument flight rules.

The Airport is equipped with an Automated Surface Observing System (ASOS). An ASOS will automatically record weather conditions such as temperature, dew point, wind speed, altimeter setting, visibility, sky condition, and precipitation. The ASOS updates observations each minute, 24 hours a day, and this information is available by phone or it is also available via the ATIS frequency. **Table 1J** summarizes the various weather and navigational aid frequencies and phone numbers available at Grant County International Airport.

TABLE 1J
Airport Communications and Weather Aids
Grant County International Airport

Communication Type	Frequency
UNICOM: Universal Communication	122.95 MHz
ATIS: Automated Terminal Information Service	119.05 MHz
CTAF: Common Traffic Advisory Frequency	118.25 MHz
ATCT: Airport Traffic Control Tower (East)	118.25 MHz (6:00am-10:00pm)
ATCT: Airport Traffic Control Tower (West)	128.0 MHz (6:00am-10:00pm)
MWH Ground Control	121.9 MHz (6:00am-10:00pm)
MWH Approach	126.4 MHz (6:00am-10:00pm)
MWH Departure	126.4 MHz (6:00am-10:00pm)
Seattle ARTCC Approach	134.35 MHz (10:00pm-6:00am)
Seattle ARTCC Departure	134.35 MHz (10:00pm-6:00am)
Emergency	121.5 MHz
ASOS: Automated Surface Observing System	509-762-5082

ARTCC: Air Route Traffic Control Center
MWH: Grant County International Airport

Source: Airport/Facility Directory - Northwest U.S. (Effective August 22, 2013); Airport records.

AREA AIRSPACE AND AIR TRAFFIC CONTROL

The *Federal Aviation Administration* (FAA) *Act of 1958* established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS covers the common network of U.S. airspace, including: air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. The system also includes components shared jointly with the military.

AIRSPACE STRUCTURE

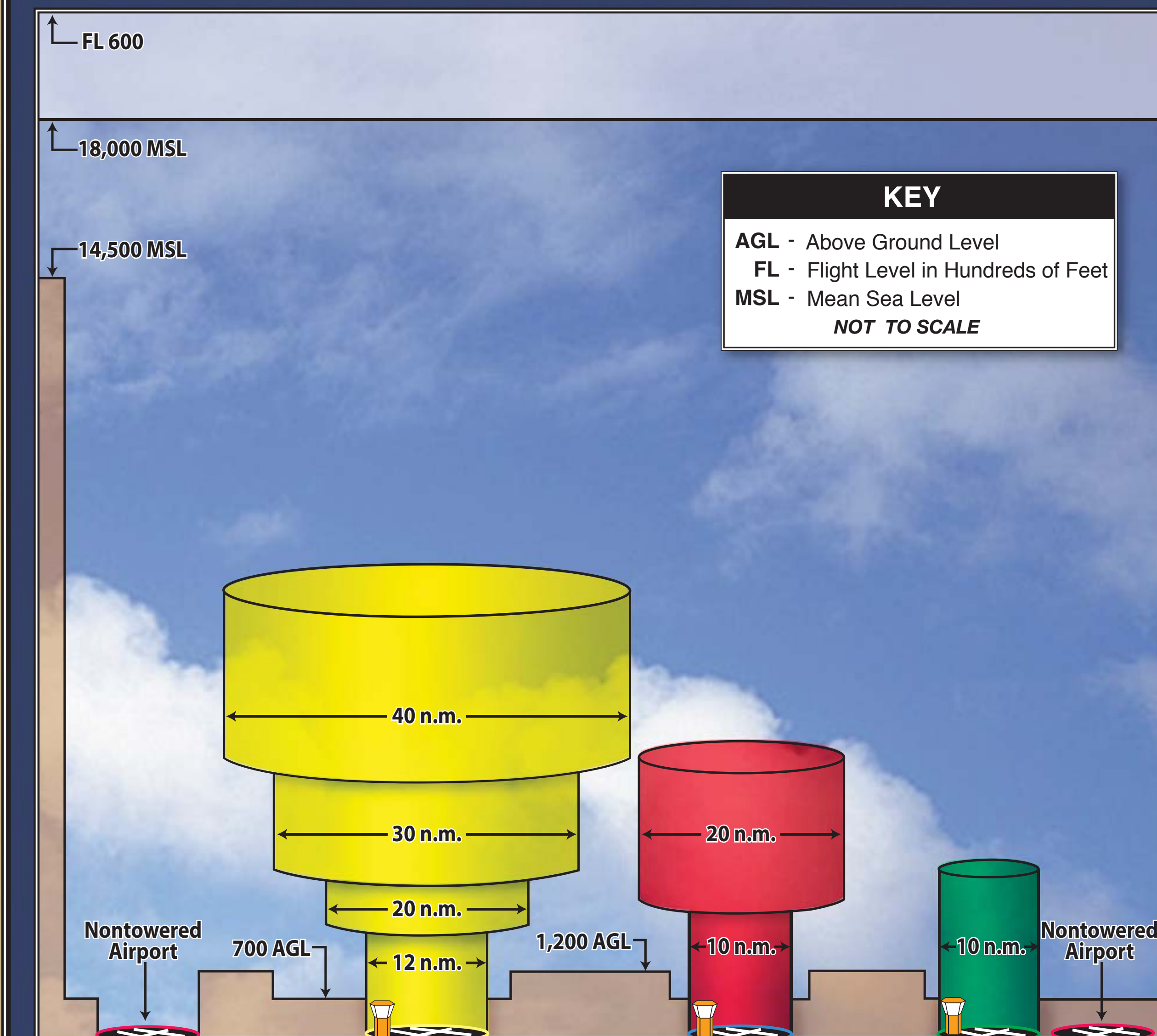
Airspace within the United States is broadly classified as either controlled or "uncontrolled." The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated in the United States, as shown on **Exhibit 1Q**. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control. Airspace in the vicinity of Grant County International Airport is also depicted on **Exhibit 1Q**.

Class A Airspace: Class A airspace includes all airspace from 18,000 feet mean sea level (MSL) to flight level (FL) 600 (60,000 feet MSL). This airspace is designated in Federal Aviation Regulation (F.A.R.) Part 71.193, for positive control of aircraft. The Positive Control Area (PCA) allows flights governed only under IFR operations. The aircraft must have special radio and navigation equipment, and the pilot must obtain clearance from an air traffic control (ATC) facility to enter Class A airspace. In addition, the pilot must possess an instrument rating.

Class B Airspace: Class B airspace has been designated around some of the country's busiest commercial service airports, such as Seattle-Tacoma International Airport. Class B airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at busy commercial service airports. This airspace is the most restrictive controlled airspace encountered by pilots operating under visual flight rules (VFR). There is no Class B airspace in the immediate vicinity of Grant County International Airport.

In order to fly within Class B airspace, an aircraft must be equipped with special radio and navigation equipment and must obtain clearance from air traffic control. Moreover, a pilot must have at least a private pilot's certificate or be a student pilot who has met the requirements of F.A.R. Part 61.95, which requires special ground and flight training for the Class B airspace. Helicopters do not need special navigation equipment or a transponder if they operate at or below 1,000 feet and have made prior arrangements in the form of a Letter of Agreement with the FAA controlling agency. Aircraft are also required to have and utilize a Mode C transponder within a 30-nautical-mile (nm) range of the center of the Class B airspace. A Mode C transponder allows the ATCT to track the altitude of the aircraft.

Class C Airspace: The FAA has established Class C airspace at 120 airports around the country, as a means of regulating air traffic in these areas. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at some commercial service airports. In order to fly inside Class C airspace, the aircraft must have a two-way radio, an encoding transponder, and have established communication with ATC. Aircraft may fly below the floor of the Class C airspace, or above the Class C airspace ceiling without establishing communication with ATC. Spokane International Airport, and adjacent Fairchild Air Force Base, has Class C airspace.



CLASSIFICATION	DEFINITION
CLASS A	Generally airspace above 18,000 feet MSL up to and including FL 600.
CLASS B	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports.
CLASS C	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports.
CLASS E	Generally controlled airspace that is not Class A, Class B, Class C, or Class D.
CLASS G	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E.

Source: "Airspace Reclassification and Charting Changes for VFR Products," National Oceanic and Atmospheric Administration, National Ocean Service. Chart adapted by Coffman Associates from AOPA Pilot, January 1993.

AIRSPACE CLASSIFICATION

Source: Seattle Sectional Charts, US Department of Commerce, National Oceanic and Atmospheric Administration, May-December 2013

VICINITY AIRSPACE

PORT OF MOSES LAKE

Exhibit 1Q
AIRSPACE CLASSIFICATION
AND VICINITY AIRSPACE

Class D Airspace: Class D airspace is controlled airspace surrounding airports with an ATCT. At Grant County International Airport, the Class D airspace constitutes a cylinder with a horizontal radius of 5.7 nm from the airport, extending from the surface up to a designated vertical limit of 3,700 feet MSL. If an airport has an instrument approach or departure procedure in place, the Class D airspace may extend along the approach or departure path.

Exhibit 1Q shows the Class D airspace surrounding Grant County International Airport and is described in FAA Order JO 7400.9S, *Air Traffic*, as follows: "That airspace extending upward from the surface to and including 3,700 feet MSL within a 5.7-mile radius of the Grant County International Airport, excluding that airspace within an area bounded by a line beginning at latitude 47°11'31"N., longitude 119°10'59"W., to latitude 47°09'59"N., longitude 119°14'55"W., to latitude 47°07'34"N., longitude 119°14'55"W., thence counterclockwise via a 5.7-mile radius of the Grant County International Airport to the point of beginning. This Class D airspace area is effective during the specific dates and times established in advance by a Notice to Airmen. The effective date and time will thereafter be continuously published in the Airport/Facility Directory."

Class E Airspace: Class E airspace consists of controlled airspace designed to contain IFR operations near an airport, and while aircraft are transitioning between the airport and enroute environments. Unless otherwise specified, Class E airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be in contact with air traffic control when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio communications with air traffic control facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist.

Class E airspace is in effect at Grant County International Airport when the tower is closed. The Class E airspace is described as follows: "That airspace extending upward from 700 feet above the surface within a 16.6-mile radius of Grant County International Airport, and within a 16.6-mile radius of the Ephrata VORTAC; that airspace extending upward from 1,200 feet above the surface bounded on the north by latitude 47°45'00"N., on the east by the 45.3-mile radius of Fairchild AFB, on the southeast by V-204, on the south by V-298, and on the west by longitude 120°00'04"W.

Class G Airspace: Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlaying Class E airspace (700 to 1,200 feet above ground level [AGL]). When the tower is closed, the airspace surrounding the Airport reverts to Class G from the surface to 700 feet MSL.

SPECIAL USE AIRSPACE

Special use airspace is defined as airspace where activities must be confined because of their nature or where limitations are imposed on aircraft not taking part in those activities.

Military Operating Areas (MOA): This special use airspace is established outside positive control areas to separate/segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. MOAs are established to contain certain military activities such as air combat maneuvers, air intercepts, acrobatics, etc. There are several MOA's (Okanogan A, Okanogan A&B, Okanogan A&C, Roosevelt A&B) located to the immediate north of Grant County. These MOAs generally encompass airspace from 300 feet AGL to 9,000 feet MSL. Official NOTAMs are typically issued prior to use. The primary users of these MOAs are military installations to the east and west. These MOAs are relatively distant from Grant County International Airport and have little effect on air traffic in the immediate vicinity of the Airport.

Military Training Routes: Military training routes (MTRs) are designated airspace that has been generally established for use by high performance military aircraft to train below 10,000 feet AGL and in excess of 250 knots. There are VR (visual) and IR (instrument) designated MTRs. MTRs with no segment above 1,500 feet AGL will be designated with the "VR" or "IR," followed by a four digit number (e.g., VR1257). MTRs with one or more segments above 1,500 feet AGL are identified by the route designation followed by a three digit number (e.g., VR540). The arrows on the route show the direction of travel. There are several MTRs in the vicinity of the Airport, including VR1350 and IR327.

Victor Airways: For aircraft arriving or departing the regional area using very high frequency omni-directional range (VOR) facilities, a system of Federal Airways, referred to as Victor Airways, has been established. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet AGL to 18,000 feet MSL and extend between VOR navigational facilities. There are several Victor Airways in the vicinity of the Airport including V281, V357, and V497.

Restricted Airspace: No person may operate an aircraft within a restricted area between the designated altitudes and during the time of designation without advanced permission of the using and controlling agency. The closest Restricted Area is R-6714A and its various components. The designated altitude is from the surface to FL 290 and it is enforced continuously. This restricted airspace is utilized primarily by Joint Base Lewis-McChord.

National Security Areas: A national security area (NSA) consists of airspace of defined vertical and lateral dimensions established at locations where there is a requirement for increased security of ground facilities. The purpose of such national security areas is to request pilot cooperation by voluntarily avoiding flight through the NSA. When circumstances dictate a need for a greater level of security, flight in an NSA may be temporarily prohibited. The Hanford, Washington National Security Area airspace is approximately 40 miles to the south of Moses Lake. The U.S. Department of Energy is the primary agency utilizing the airspace. This airspace is restricted from the surface to 1,800 feet MSL.

AIRSPACE CONTROL

The FAA has established 21 Air Route Traffic Control Centers (ARTCC) throughout the continental United States to control aircraft operating under IFR within controlled airspace and while enroute. An ARTCC assigns specific routes and altitudes along Federal Airways to maintain separation and orderly traffic flow. Seattle Center controls enroute airspace in the Moses Lake region.

The ARTCC delegates certain airspace to local terminal facilities which assume responsibility for the orderly flow of air traffic arriving and departing major terminals. The Grant County International Airport ATCT, approach, and departure control operates between the hours of 6:00 a.m. and 10:00 p.m. The Seattle ARTCC provides approach and departure control services when the tower is closed. Flight plans can be opened or closed utilizing the Seattle Flight Service Station (FSS).

INSTRUMENT NAVIGATIONAL AIDS

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Grant County International Airport include a non-directional beacon (NDB), a very high frequency omni-directional range (VOR) facility, and the global positioning system (GPS). All navigational aids at the airport are owned and maintained by the FAA.

The NDB transmits nondirectional radio signals whereby the pilot of an aircraft, equipped with direction-finding equipment, can determine their bearing to or from the NDB facility in order to track to the beacon station. The closest NDB facility to Grant County International Airport is the Pelly NBD located 5.9 nm to the southeast.

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR-DME) to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. The Moses Lake VOR-DME is located at the airport. The Ephrata VORTAC is located 11 nm to the northwest. The Wenatchee VOR-DME is located 38 nm to the west-northwest.

GPS is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from a NDB or VOR, in that pilots are not required to navigate using a specific facility. GPS uses satellites placed in orbit around the earth to transmit electronic radio signals, which pilots of properly equipped aircraft use to determine altitude, speed, and other navigational information. With GPS, pilots can directly navigate to any airport in the country and are not required to navigate using a specific navigation facility.

A Ground Based Augmentation System (GBAS) is available to pilots of properly equipped aircraft for approaches to Grant County International Airport. The GBAS system, formerly known as the Local Area Augmentation System (LAAS), provides enhancement to the GPS signals in the local area. With the GBAS, additional ground-based navigation systems, such as a glide slope antenna, are not required. GBAS provides for highly accurate approaches (within one meter accuracy) and greater approach flexibility including curved approaches. The GBAS system at the airport was installed by an Airport business to support the variety of flight testing conducted at the Airport. There are no published instrument approaches using the GBAS system.

Many commercial service airports are equipped with an Instrument Landing System (ILS). The ILS is comprised of a localizer antenna, a glideslope antenna, and a MALSR. Approaches utilizing the ILS can be completed when cloud ceilings are as low as 200 feet and visibility is down to ½-mile. Runway 32R at the Airport is equipped with an ILS approach. The ILS equipment is owned and maintained by the FAA.

INSTRUMENT FLIGHT PROCEDURES

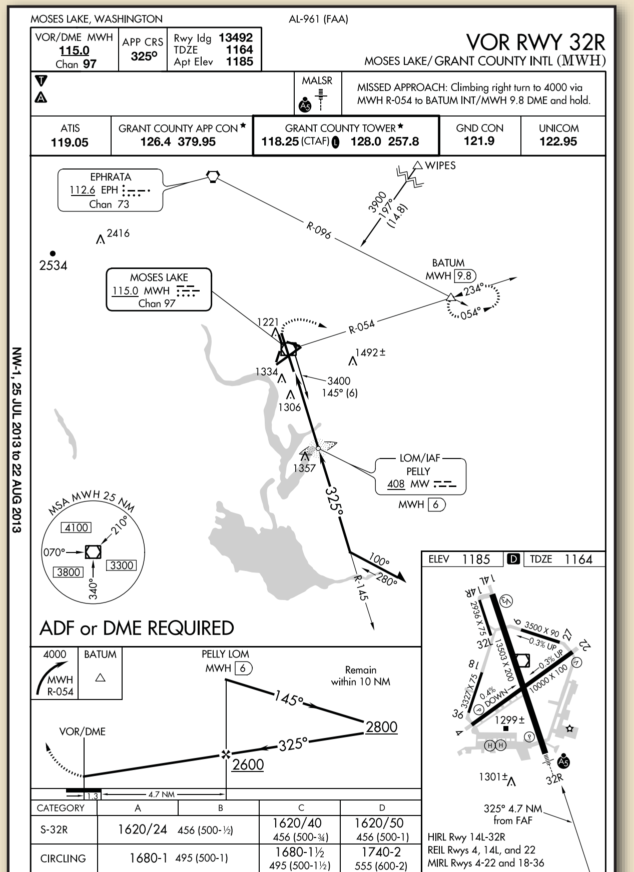
Flight procedures are a set of predetermined maneuvers established by the FAA, using electronic or visual navigational aids that assist pilots in locating and landing or departing from an airport. For Grant County International Airport, there are instrument approach procedures and departure procedures as shown on **Exhibit 1R**.

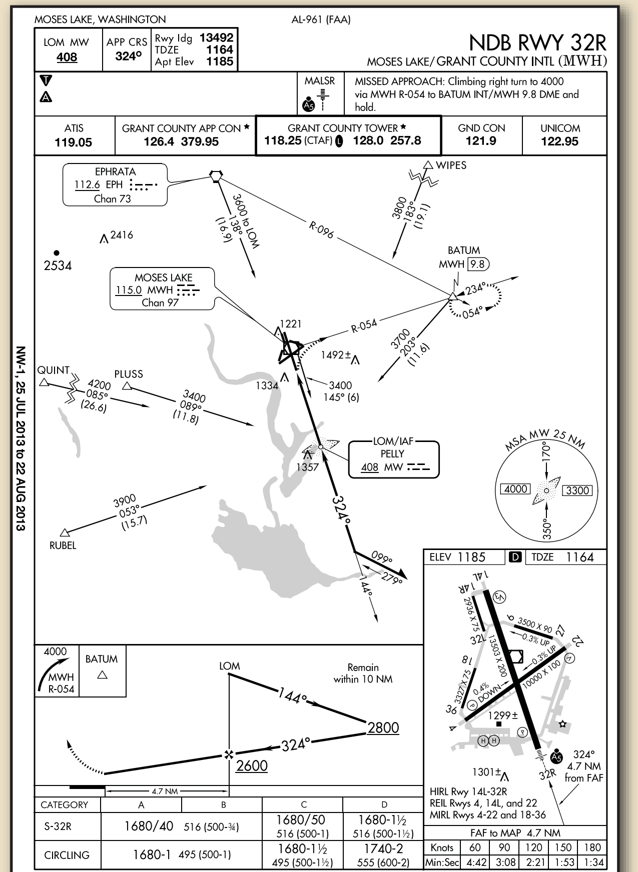
Instrument Approach Procedures

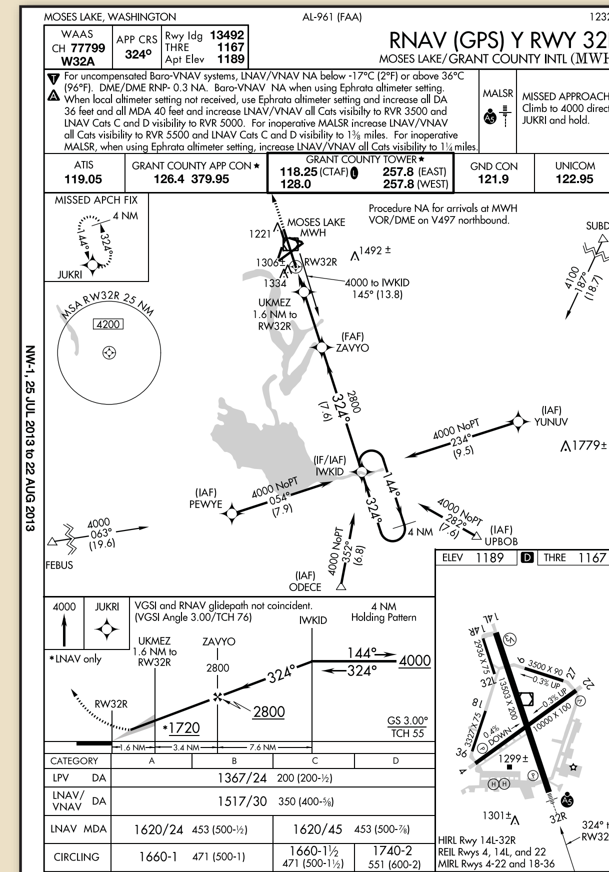
The capability of an instrument approach procedure is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance the pilot must be able to see in order to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach.

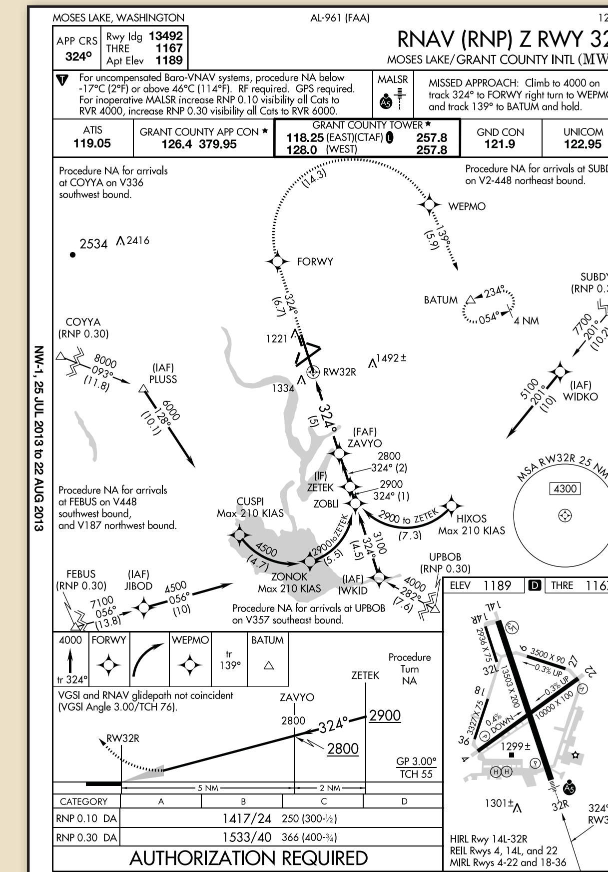
The most sophisticated of these instrument approach procedures is the precision approach to Runway 32R. Precision instrument approaches provide vertical descent information and course guidance information to the pilot. This approach permits pilots of aircraft with suitable equipment to land when cloud ceilings are as low as 200 feet AGL and visibility is as low as ½-mile. Several non-precision approaches, which provide course guidance to the pilot, are also available with visibility minimums as low as ¾-mile. **Exhibit 1S** presents a summary of the instrument approach minimums for the Airport.

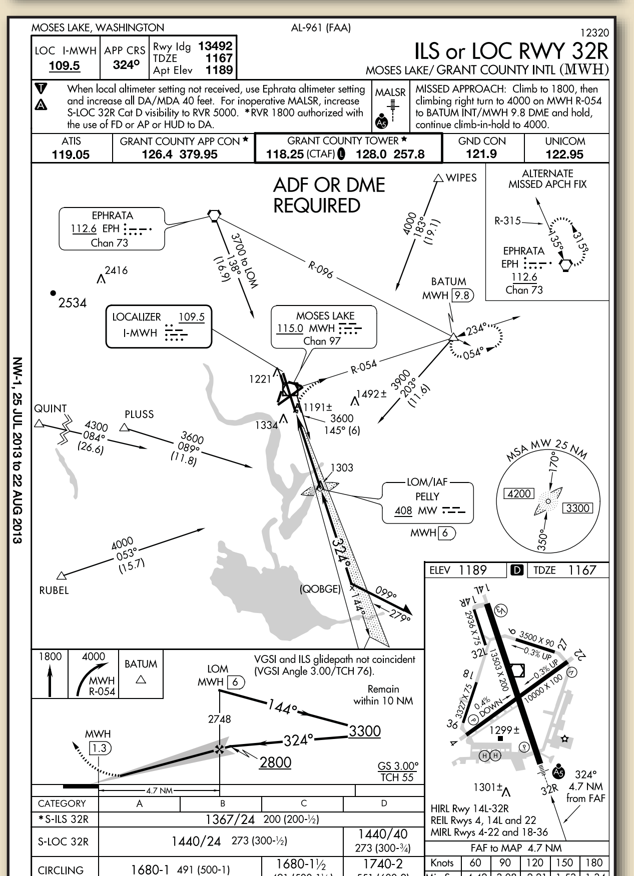
INSTRUMENT APPROACH PROCEDURES

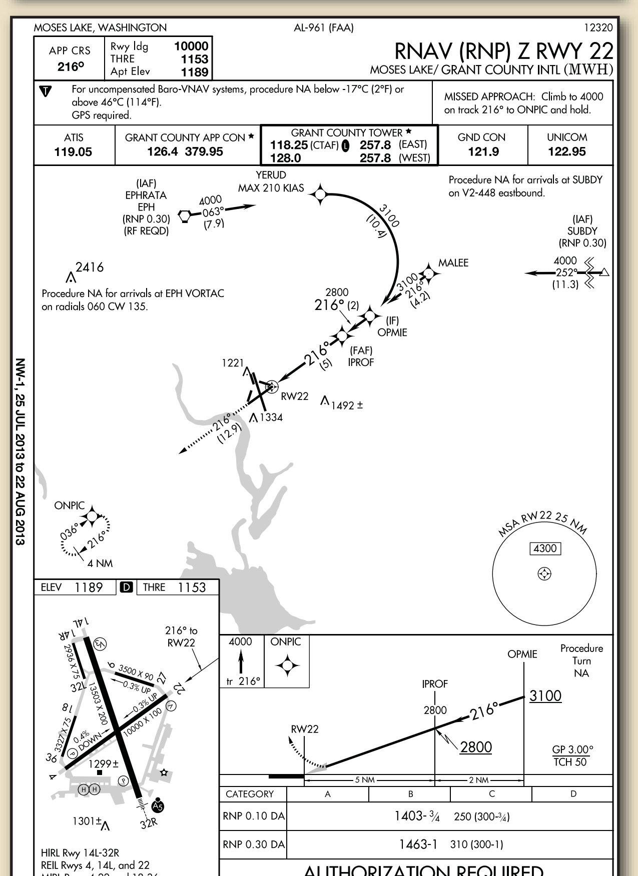


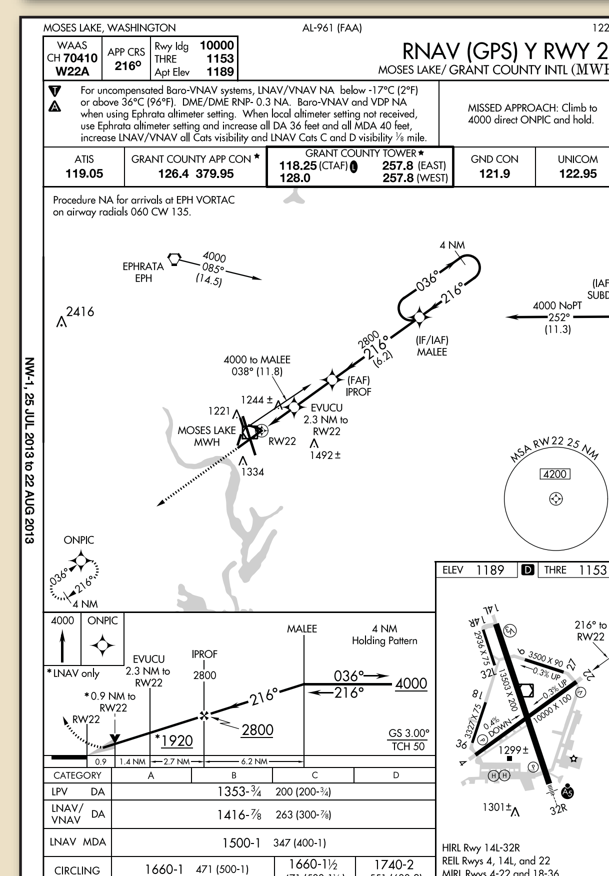












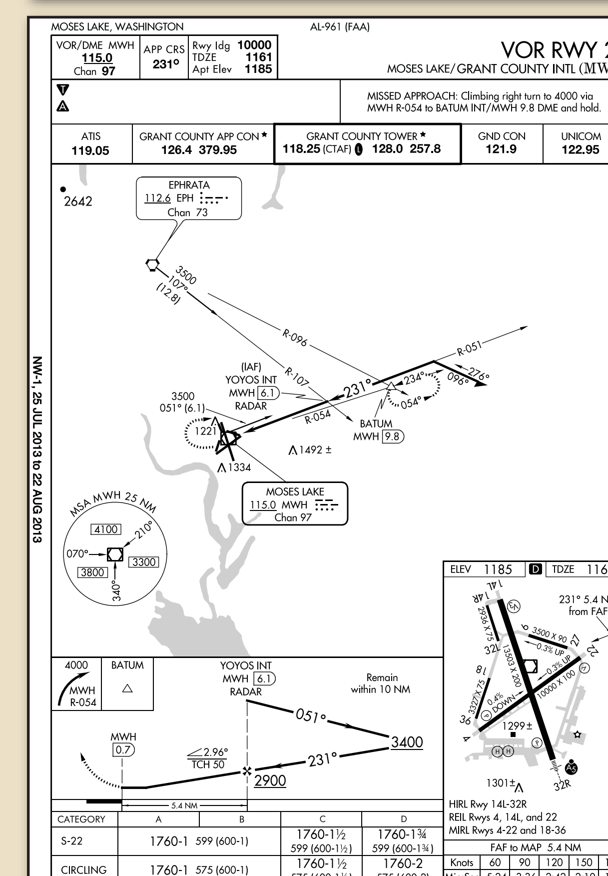
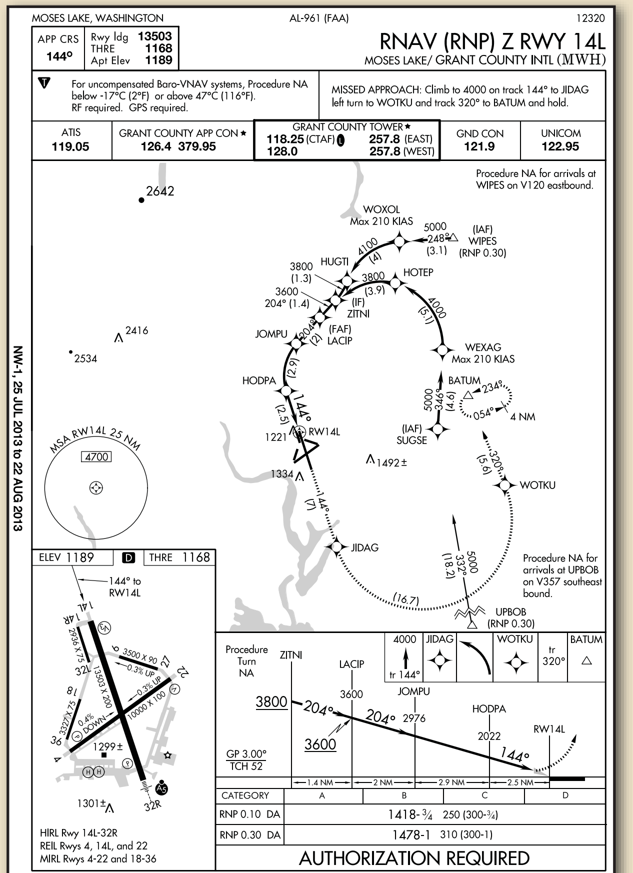
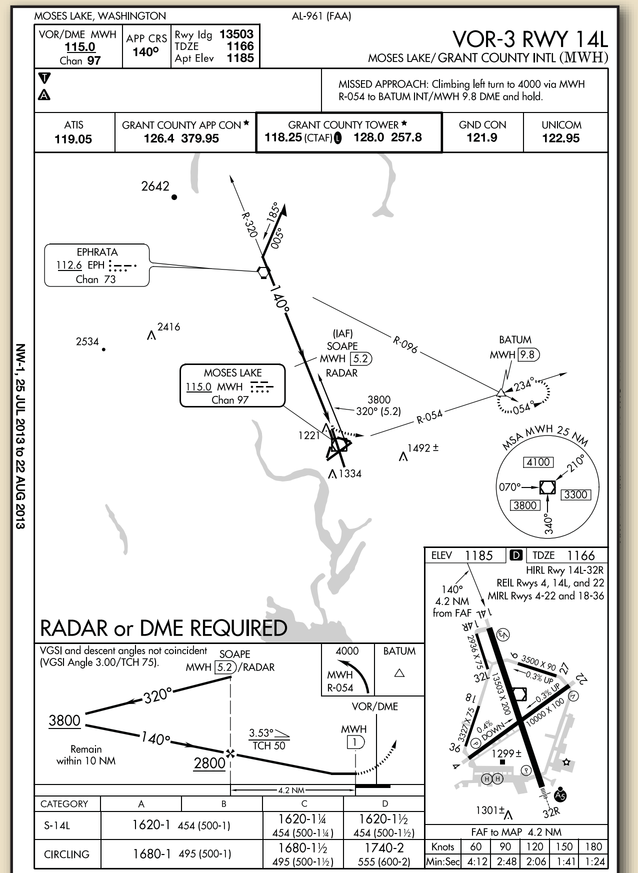
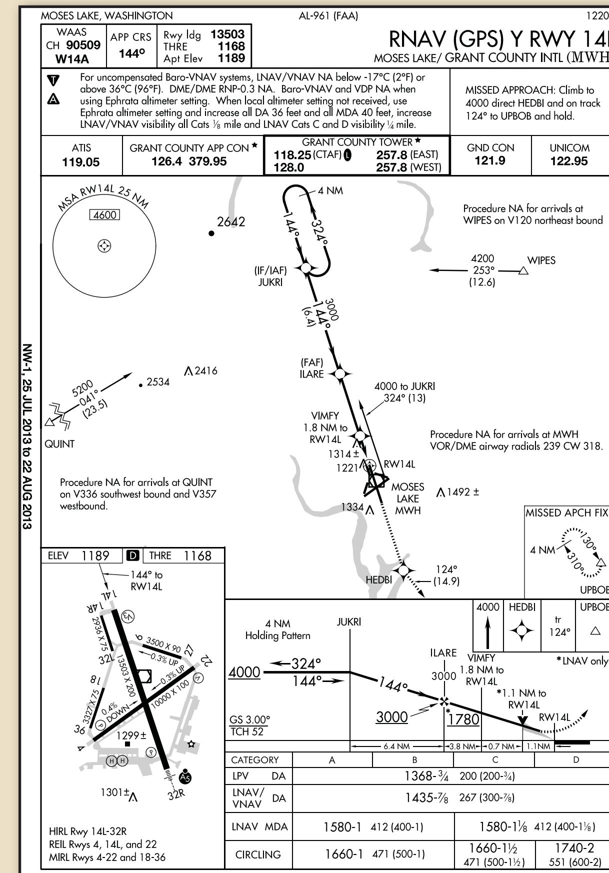


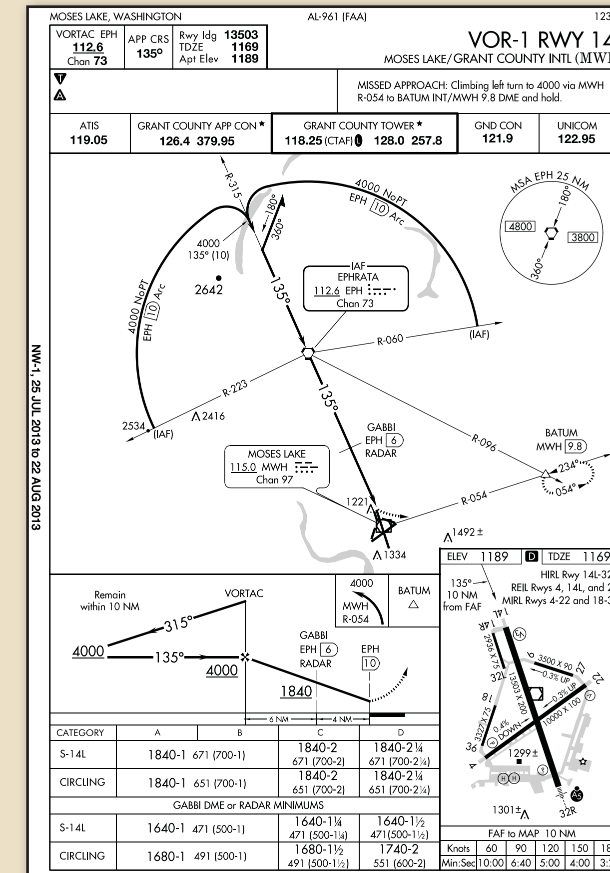
Exhibit 1R
INSTRUMENT PROCEDURES

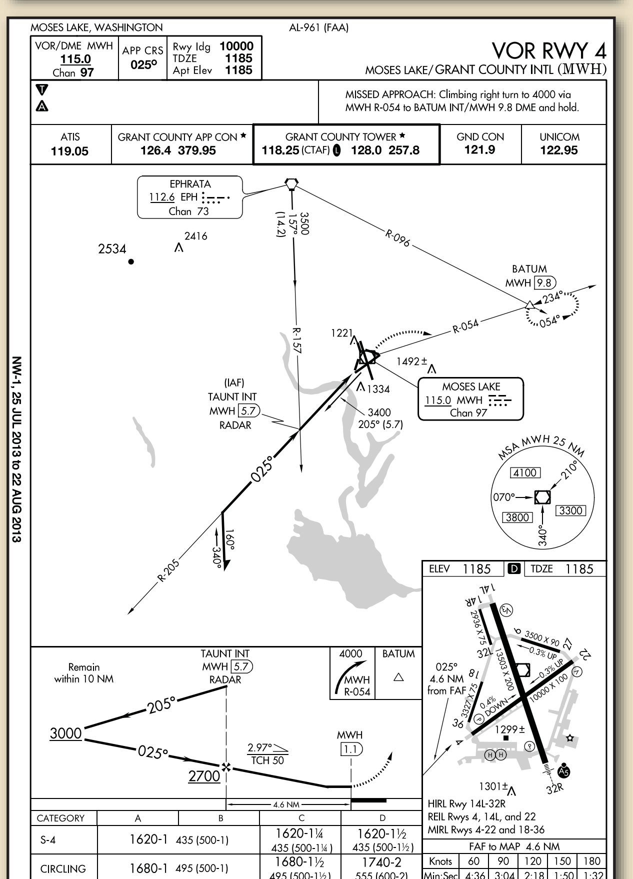
INSTRUMENT APPROACH PROCEDURES

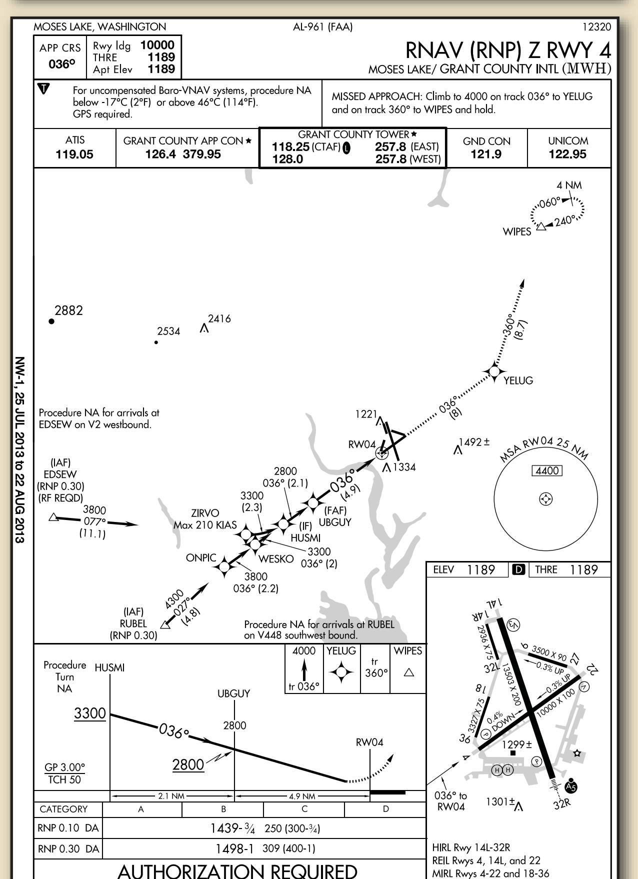


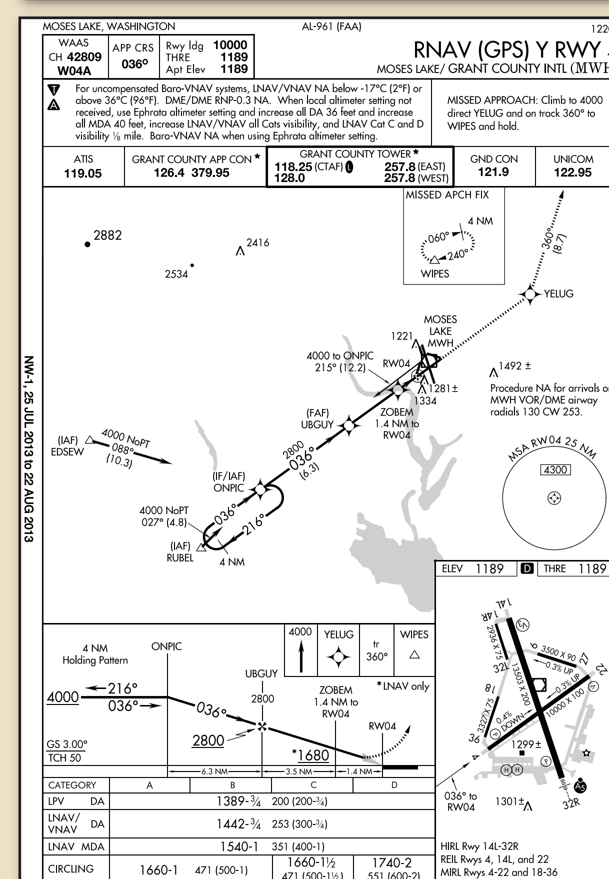


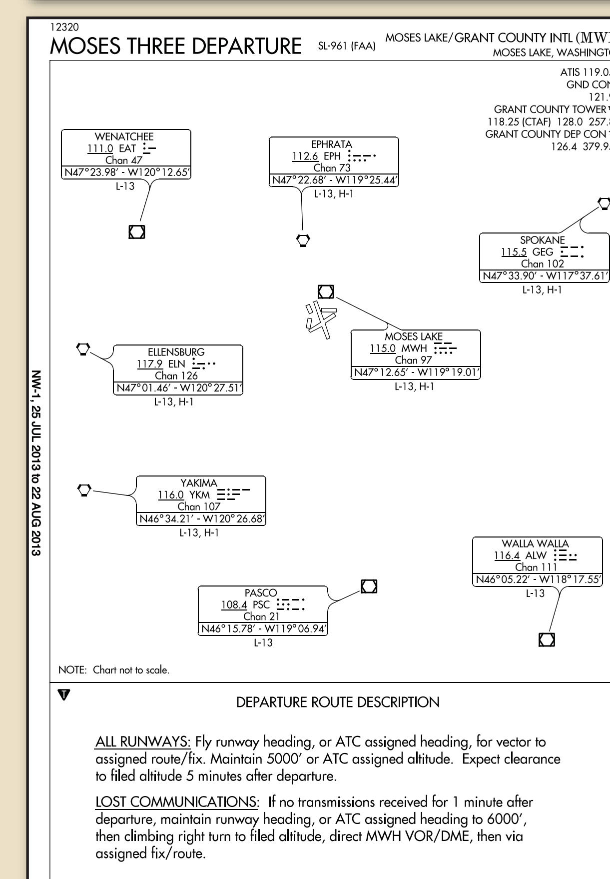












	WEATHER MINIMUMS BY AIRCRAFT TYPE			
	Category A	**Category B**	**Category C**	**Category D**
ILS or LOC Rwy 32R				
ILS Straight-In 32R	200'/ ½-mile			
LOC Straight-In 32R	273'/ ½-mile			273'/ ¾-mile
Circling	491'/1-mile		491'/1 ½-mile	551'/2-mile
RNAV (RNP) Z Rwy 14L				
RNP 0.10 DA	250'/ ¾-mile			
RNP 0.30 DA	310'/1-mile			
RNAV (RNP) Z Rwy 22				
RNP 0.10 DA	250'/ ¾-mile			
RNP 0.30 DA	310'/1-mile			
RNAV (RNP) Z Rwy 32R				
RNP 0.10 DA	250'/ ½-mile			
RNP 0.30 DA	366'/ ¾-mile			
RNAV (RNP) Z Rwy 4				
RNP 0.10 DA	250'/ ¾-mile			
RNP 0.30 DA	309'/1-mile			
RNAV (GPS) Y Rwy 14L				
LPV	200'/ ¾-mile			
LNAV/VNAV	267'/ ⅞-mile			
LNAV MDA	412'/1-mile		412'/1 ⅛-mile	
Circling	471'/1-mile		471'/1 ½-mile	551'/2-mile
RNAV (GPS) Y Rwy 4				
LPV	200'/ ¾-mile			
LNAV/VNAV	253'/ ¾-mile			
LNAV MDA	351'/1-mile			
Circling	471'/1-mile		471'/1 ½-mile	551'/2-mile
RNAV (GPS) Y Rwy 22				
LPV	200'/ ¾-mile			
LNAV/VNAV	263'/ ⅞-mile			
LNAV MDA	347'/1-mile			
Circling	471'/1-mile		471'/1 ½-mile	551'/2-mile
RNAV (GPS) Y Rwy 32R				
LPV	200'/ ½-mile			
LNAV/VNAV	350'/ ⅝-mile			
LNAV MDA	453'/ ½-mile		453'/ ⅞-mile	
Circling	471'/1-mile		471'/1 ½-mile	551'/2-mile
VOR-1 Rwy 14L				
Straight-In Rwy 14L	671'/1-mile		671'/2-mile	671'/2 ¼-mile
Circling	651'/1-mile		651'/2-mile	651'/2 ¼-mile
GABBI DME or RADAR MINIMUMS				
Straight-In Rwy 14L	471'/1-mile		471'/1 ¼-mile	471'/1 ½-mile
Circling	491'/1-mile		491'/1 ½-mile	551'/2-mile
VOR-3 Rwy 14L				
Straight-In Rwy 14L	454'/1-mile		454'/1 ¼-mile	454'/1 ½-mile
Circling	495'/1-mile		495'/1 ½-mile	555'/2-mile
VOR Rwy 4				
Straight-In Rwy 4	435'/1-mile		435'/1 ¼-mile	435'/1 ½-mile
Circling	495'/1-mile		495'/1 ½-mile	555'/2-mile
VOR Rwy 22				
Straight-In Rwy 22	599'/1-mile		599'/1 ½-mile	599'/1 ¾-mile
Circling	575'/1-mile		575'/1 ½-mile	575'/2-mile
VOR Rwy 32R				
Straight-In Rwy 32R	456'/ ½-mile		456'/ ¾-mile	456'/1-mile
Circling	495'/1-mile		495'/1 ½-mile	555'/2-mile
NDB Rwy 32R				
Straight-In Rwy 32R	516'/ ¾-mile		516'/1-mile	516'/1 ½-mile
Circling	495'/1-mile		495'/1 ½-mile	555'/2-mile

Aircraft Categories are based on 1.3 times the stall speed in landing configuration as follows:

Category A: 0-90 knots (e.g., Cessna 172)
Category B: 91-120 knots (e.g., Beechcraft KingAir)
Category C: 121-140 knots (e.g., Canadair Challenger)
Category D: 141-166 knots (e.g., Gulfstream IV)

Abbreviations:

DA - Decision Altitude
GPS - Global Positioning System
ILS - Instrument Landing System
LNAV/RNAV/VNAV - A technical variant of GPS
LPV - Localizer Performance with Vertical Guidance
RNP - Radio Navigation Performance (Requires specific aircraft equipment)

Note: (xxx/ x-mile) = Visibility/Cloud ceiling height
Source: U.S. Terminal Procedures, Northwest Region (Effective August 22, 2013)

Visual flight Procedures

Most flights at the Airport are conducted under visual flight rules (VFR). Under VFR flight, the pilot is responsible for collision avoidance. Typically, the pilot will make radio calls announcing the position of the aircraft relative to the airport and the intentions of the pilot.

In most situations, under VFR and basic radar services, the pilot is responsible for navigation and choosing the arrival and departure flight paths to and from the airport. The results of individual pilot navigation for sequencing and collision avoidance are that aircraft do not fly a precise flight path to and from the airport. Therefore, aircraft can be found flying over a wide area around the airport for sequencing and safety reasons.

While aircraft can be expected to operate over most areas of the airport, the density of aircraft operations is higher near the airport. This is the result of aircraft following the established traffic patterns for the airport. The traffic pattern is the traffic flow that is prescribed for aircraft landing or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

a. Upwind Leg - A flight path parallel to the landing runway in the direction of landing.

b. Crosswind Leg - A flight path at right angles to the landing runway off its upwind end.

c. Downwind Leg - A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.

d. Base Leg - A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

e. Final Approach - A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway.

Essentially, the traffic pattern defines which side of the runway aircraft will operate. Traditionally, a left-hand traffic pattern is standard. At Grant County International Airport, Runways 32R, 22, 18, 14R, and 27 have non-standard right-hand traffic patterns. For these runways, aircraft make right turns throughout pattern operation. The traffic patterns for the airport were designed to further separate aircraft activity to the greatest extent practicable. For example, local training activity using Runway 18-36 is kept to the west of the Airport.

While the traffic pattern defines the direction of turns that an aircraft will follow on landing or departure, it does not define how far from the runway an aircraft will operate. The distance laterally from the runway centerline an aircraft operates or the distance from the end of the runway is at the discretion of the pilot, based on the operating characteristics of the aircraft, number of aircraft in the traffic pattern, and meteorological conditions. The actual ground location of each leg of the traffic pattern varies from aircraft operation to aircraft operation for the reasons of safety, navigation, and sequencing described above. The distance that the downwind leg is located laterally from the runway will vary based mostly on the speed of the aircraft. Slower aircraft can operate closer to the runway as their turn radius is smaller.

The published traffic pattern altitude at the airport is 811 feet above the ground (or 2,000 feet MSL) when on the downwind leg. The traffic pattern altitude is established so that aircraft have a predictable descent profile on base leg to final for landing. The tower controllers may instruct pilots to follow a different traffic pattern altitude as necessary.

Arrival and Departure Flight Procedures

In more congested airspace, pilots may be instructed to utilize standard terminal arrival (STAR) or departure procedures. There is one departure procedure (Moses Three Departure) published for Grant County International Airport. The FAA is continually updating instrument approaches to airports.

LOCAL OPERATING PROCEDURES

The Airport publishes various notices to pilots to alert them to procedures that are specific to Grant County International Airport. The following is a list of these notices:

a) Flocks of large birds in the vicinity of the airport.
b) Heavy jet training from the surface to 5,000 feet within 25 miles of the airport. Possible wake turbulence from larger aircraft using Runway 14L-32R and Runway 9-27.
c) Runway 18-36 is available for air carrier size aircraft for taxiway movement only.
d) Taxiway G is unlighted.
e) Distance-to-go markers available for Runway 14L-32R and Runway 4-22.
f) Runway 9-27 used as an assault strip by C-17 aircraft.
g) Extensive heavy military jet night training from 7:00pm to 3:00am daily. Announce landing intentions on CTAF when tower is closed.
h) Runway 9-27 and Taxiway F are not visible from tower.

AIRPORT SERVICE AREA

Grant County International Airport is quite unique among airports classified as general aviation by the FAA. While it does serve a general aviation function on a local level, it has a significant impact on both the state and national/international levels as well. As a result, the airport might be considered to have three distinct service areas: local, state, and national/international.

LOCAL GENERAL AVIATION SERVICE AREA

On the local level, the general aviation service area may be loosely defined as the geographical area from which current and future aviation demand (particularly based aircraft) is most likely to originate. Many factors can contribute to the definition of an airport's service area. A primary factor is the proximity, capability, and level of services offered by other area airports. Another factor is the actual location of where based aircraft owners live or work in proximity to an airport.

Regional Airports

A review of public use airports within the vicinity of Grant County International Airport has been made to identify and distinguish the type of air service provided in the area surrounding the airport. Information pertaining to each airport was obtained from FAA records.

Moses Lake Municipal Airport (W20) is a public use general aviation facility located approximately 5 nm to the southeast of Grant County International Airport. The airport has a single runway, Runway 16-34, that is 2,513 feet long and 50 feet wide. There are approximately 56 based piston-powered general aviation aircraft. There are also 15 based ultralights at the airport. There are no instrument approaches to the airport. The airport experiences approximately 21,000 annual operations by small general aviation aircraft.

Ephrata Municipal Airport (EPH) is a general aviation facility located approximately 10 nm to the northwest. The airport provides three runways with primary Runway 3-21 measuring 5,500 feet long and 75 feet wide. The crosswind Runway 11-29 is 3,843 feet long by 60 feet wide. Runway 4-22 is parallel to Runway 3-21 and measures 3,467 feet long and 150 feet wide. This runway is heavily utilized by glider activity. Runway 21 is outfitted with a nonprecision instrument approach providing for visibility minimums as low as ¾-mile. Runway 3 has a nonprecision instrument approach with 1-mile visibility minimums. There are nearly 73 based aircraft, 50 of which are gliders. The airport experiences approximately 135,000 annual operations.

Pangborn Municipal Airport (EAT) is a commercial aviation facility located approximately 38 nm to the west in Wenatchee, WA. The airport currently has commercial service to Seattle provided by Horizon Air. The airport experiences approximately 50,000 annual enplanements. The airport is served by two intersecting runways. Primary Runway 12-30 is 5,700 feet long and 150 feet wide. Crosswind Runway 7-25 is 4,460 feet long and 75 feet wide. There are approximately 117 based aircraft including nine jets, five helicopters, 11 gliders, and two ultralights. The airport experiences approximately 40,000 annual operations.

Other Area Airports: There are numerous other public use airports in the vicinity of Grant County International Airport. These include Wilson Creek Airport (5W1), located approximately 15 nm to the northeast, and Warden Airport (2S4) located 18 nm to the southeast.

In addition, there are several private use landing strips including Gregg Farm Airport (79WA), Stillwater Creek Airport (04WN), and Christensen Field Airport (8WA6). These private airports can generally be described as agricultural use landing strips or single user private airports.

The general aviation service area for Grant County International Airport can be loosely defined as the whole of Grant County. The level of services desired by aircraft owners will certainly have a significant influence on where they choose to base. For general aviation users, the proximity to the airport will also be a significant influence. Therefore, like most general aviation airports, the service area may be generally defined as the county in which the airport is located; in this case, Grant County.

STATEWIDE AIRPORT SERVICE AREA

Grant County International Airport has a reach that far exceeds the traditional boundaries of a general aviation airport. Because of the significant assets of the Airport, especially the runways as well as the accommodating nature of the community for aviation activity (even at night), the Airport is utilized by aircraft based all around the state. Two entities in particular, Boeing and the military, are heavy users of the Airport.

Boeing's major manufacturing facilities are located in the Seattle area. Most aircraft that come off the assembly line will conduct flight tests at the Airport. It is not uncommon to see multiple transport type aircraft, such as Boeing 747s, and 787s, operating at the Airport on a daily basis.

Military activity at the Airport is ever-present. There are three military installations based in the State of Washington that utilize the Airport for frequent training activities which serves national defense needs.

Fairchild Air Force Base is located approximately 70nm to the east near Spokane. KC-135 Stratotanker refueling aircraft frequently utilize the Airport for training purposes.

Joint Base Lewis-McChord (JBLM) is located 130nm to the west near Tacoma. C-17 Globemaster III training activity from this installation is most common. Pilots of these aircraft frequently utilize the assault strip (Runway 9-27).

Whidbey Island Navy Air Station is located approximately 150nm to the west in Oak Harbor. This facility currently supports MH-60S Seahawk helicopters, EA-18G Growler, EA-6B Prowler, P-3C Orion, EP-3E Aries II, and C-9 Skytrain aircraft. All of these aircraft utilize the Airport for training activities.

NATIONAL/INTERNATIONAL AIRPORT SERVICE AREA

For more than 40 years, Japan Airlines conducted their entire large transport aircraft pilot training at the Airport. While JAL no longer trains pilots at the Airport, the residual impact of that relationship has been profoundly beneficial to the community. Numerous international businesses, especially Japanese-based companies, have established operations in and around Moses Lake. Services available, such as the foreign trade zone and the U.S. Customs and Border Protection service, also lend to the international nature of the Airport.

Therefore, Grant County International Airport is truly national/international in its scope and serves a national/international service area. As a result, the nature of not only the local or state economy, but also the international economy, will impact aviation activity at the Airport.

LANDSIDE FACILITIES

Landside facilities are the facilities that support the aircraft and pilot/passenger handling functions. These facilities include the passenger terminal complex, cargo facilities, general aviation facilities, and support facilities, such as fuel storage, automobile parking, roadway access, and aircraft rescue and firefighting.

AIRCRAFT APRONS/RAMPS

Aircraft aprons/ramps are pavement areas that are separated from aircraft taxiways and movement areas. The aprons facilitate the safe and efficient transition of passengers from the airside element (runway and taxiways) to the landside element. Aprons provide access to hangars and provide for short term and long term aircraft parking. The usable portion of an apron consists of those pavement areas where aircraft can park. This typically does not include taxilanes or access pavement immediately fronting a hangar.

As is typical of former military installations, there are vast expanses of apron pavement at Grant County International Airport. Because the aprons are large, the use of the apron varies across the apron expanse. In total, there is approximately 800,000 square yards of apron pavement serving the airport. **Exhibit 1T** identifies the aprons and ramps at the Airport.

Fueling Apron

North of Taxiway A is a large apron encompassing approximately 275,000 square yards of pavement. This apron has available an underground hydrant fueling system which connects directly to the large fuel storage tanks located to the immediate southeast of the Airport.

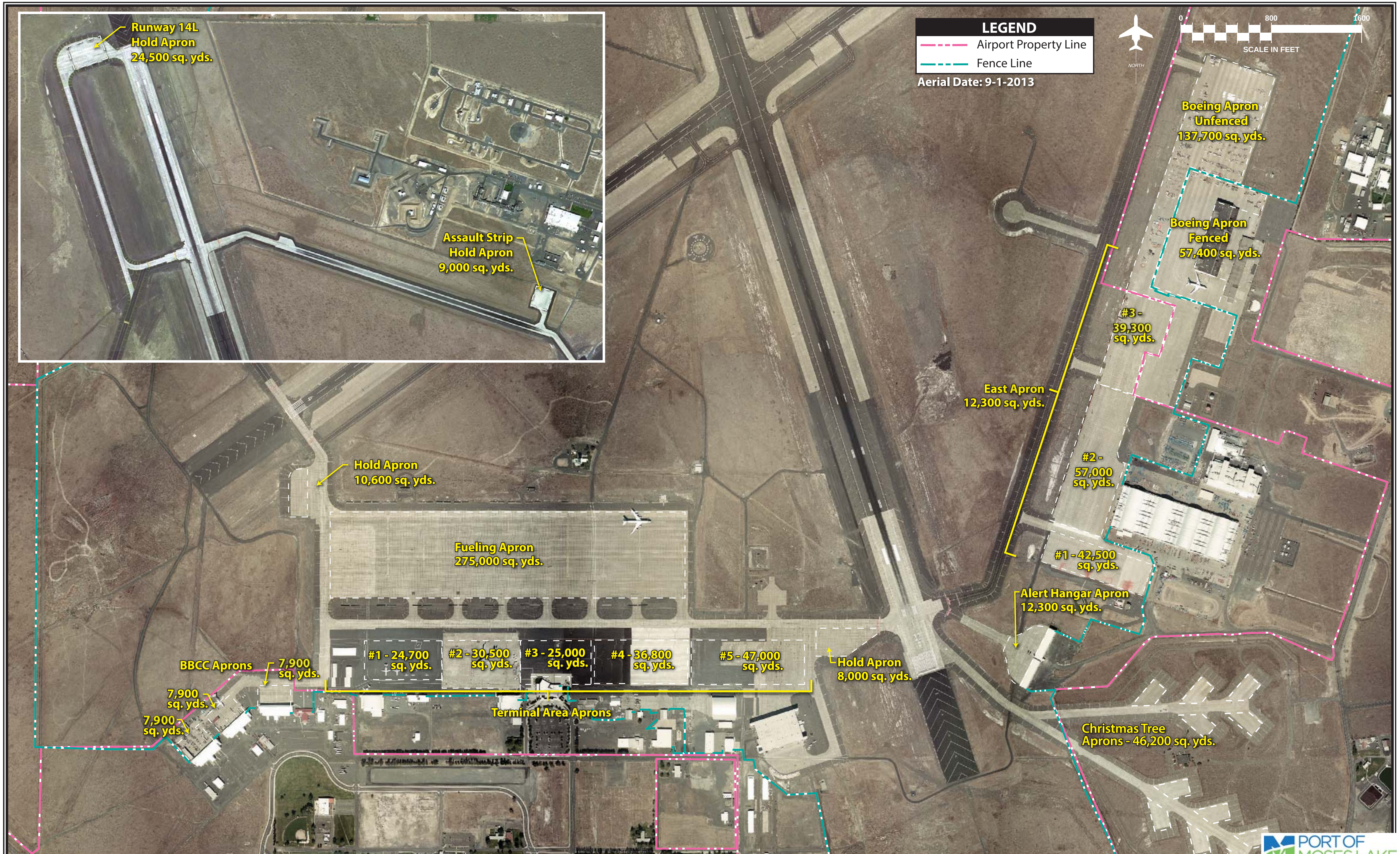


Exhibit 1T
AIRCRAFT APRONS AND RAMPS

This apron most recently accommodated the KC-135 aircraft from Fairchild Airport Force Base in Spokane when the pavements were being resurfaced there. For the previous decades, it served as the fueling location for Japan Airlines when they were training pilots of 747's and other aircraft. Currently, this apron is available for short and long term aircraft parking.

Adjacent to this apron are several blast deflection fences and a de-fueling facility with two storage tanks.

Terminal Area Apron

The terminal area apron encompasses the flight line immediately south of Taxiway A. In total, there is more than 164,000 square yards of pavement. The terminal area apron has several segments currently serving a variety of purposes.

Segment #1 on the west end is utilized by one of the airport fixed base operators. There are 25 aircraft tie-down positions marked on the pavement. Segment #2 is currently utilized by an airport business that recycles aircraft. This pavement is in poor condition so using the pavement to recycle aircraft is appropriate because it would otherwise be vacant (and non-revenue producing). Segment #3 is the apron area serving the terminal building. There are 11 aircraft parking positions and two helicopter parking positions marked. Segment #4 has been recently reconstructed and now has a load bearing capacity of one million pounds. Segments #4 and #5 are utilized for aircraft parking and circulation.

Big Bend Community College Aprons

Big Bend Community College owns three hangars and associated aprons. The easternmost apron is primarily utilized for ingress/egress to the hangar and is not utilized for aircraft tie-down parking. The center hangar and apron are utilized for aircraft maintenance education. The westernmost hangar and apron are not utilized for aviation education. The apron itself is utilized for vehicle parking. These aprons are not on Airport property.

Alert Hangar Apron

There are several connected box hangars located in proximity to the Runway 32R threshold. These hangars were originally utilized located in such a manner to allow rapid response fighter aircraft access to the runway. Fronting these hangars is a large apron area encompassing approximately 12,300 square yards of pavement. One of the Airport FBOs operates out of these hangars.

"Christmas Tree" Aprons

The "Christmas Tree" aprons are so nicknamed because of their appearance from the air. There are 11 smaller aprons extending from a taxiway. During the Cold War, B-52 bombers would be poised on alert, ready for immediate departure if needed. Each of the smaller aprons is approximately 4,200 square yards. In total, there is approximately 46,200 square yards of pavement available. The Christmas Tree aprons are located on private property and are outside the airport perimeter fence. The taxiway providing access has been marked as closed.

East Aprons

The east area apron can be divided into three apron segments. Segment #1 is currently utilized by the U.S. Forest Service (USFS). A variety of aerial tankers will load fuel and fire retardant at this location during forest firefighting season. Segments #2 and #3 are public apron space. The available east apron space encompasses approximately 138,800 square yards of pavement.

Boeing Aprons

The Boeing Company owns a significant portion of property, including apron areas on the east side of the airport. Approximately 57,400 square yards of the Boeing apron is fenced. The remaining 137,700 square yards is utilized for Boeing activity, including outside storage.

PASSENGER TERMINAL BUILDING

Grant County International Airport has a commercial passenger terminal building that was originally constructed in 1998. This modern terminal facility was completed at a time when the Airport was experiencing increasing passenger activity. The building also houses the Port administration offices. At 30,000 square feet in size, the terminal building is fully capable of accommodating any anticipated return to commercial service.

The terminal building currently provides office space for one of the airport FBOs, the U.S. Customs and Border Protection service, Port administration, and a restaurant/deli.

Passenger Convenience

With the passage of the *FAA Modernization and Reform Act of 2012* (Section 131 of Public Law 112-95), Congress has mandated that airport master plan studies include analysis of passenger convenience related to the terminal complex. Passenger convenience will be perceived differently by every passenger at every phase of travel. It is a function of a passenger's trip purpose, demographic characteristics, place of residence, and travel habits. Guidance on the Implementation of the Act is included in Change 2 of Advisory Circular (AC) 150/5060-6B, *Airport Master Plans*.

According to the AC, "Planners should consider the services provided to travelers at various points within the terminal building, the degree of congestion, and waiting and processing times. Shorter wait times, intuitive wayfinding, shorter walking distances, airport amenities and ambiance, and reliable flight information will all contribute to passengers feeling as if they have had a successful travel experience. Providing resources to make passenger wait time more productive or more entertaining will improve passenger perception of their journeys. Examples include dedicated work areas, power connections, Wi-Fi, full-service concessions, exhibits, and entertainment."

Access to airport facilities is defined by the convenience of the airport layout for passengers, especially those with mobility and sensory impairments, the elderly, families with small children, and non-English speaking passengers. Passengers should be able to access the airport, the landside area, terminal building, and connections between each in a seamless flow.

The terminal building provides a relatively seamless flow for both enplaning and deplaning passengers. Enplaning passengers enter the terminal building on the east end and immediately encounter the ticket counters. From there passengers can immediately enter the security checkpoint and the passenger hold room. Deplaning passengers enter the terminal building on the west side of the terminal building from the aircraft apron. These passengers enter into the public greeting/waiting lobby. Baggage claim and the rental car counters are available in this area. The overall terminal building flow limits the potential interactions of enplaning and deplaning passengers appropriately.

FIXED BASE OPERATOR (FBO) AND SPECIALTY OPERATORS

Grant County International Airport currently has two fixed base operators – Million Air and Columbia Pacific Aviation. Million Air essentially has the Jet fuel concession, including a contract for military fueling, and Columbia Pacific Aviation provides a full range of general aviation services, including fuel (AvGas) line services, pilot services, aircraft storage, transient aircraft parking, and maintenance.

AIRPORT HANGARS AND BUILDINGS

There are a variety of structures located on the property of the Grant County International Airport. These buildings have both aviation and non-aviation uses. Generally, airport facilities can be classified as either "aviation related' or "non-aviation/revenue support." Aviation-related structures typically include hangars and they have access to the runway/taxiway system. In essence, these facilities should be utilized by those needing access to the runway system. Non-aviation/revenue support facilities are those that would generally have a function that does not need access to the runway system. **Exhibit 1U** presents a location map and picture of the major structures on airport property.

The availability of leasable aircraft hangar space is important if an airport is to satisfy future demand for such space. The Airport offers a variety of general aviation hangar types. The ownership and management (leasing) of the hangars varies as well.

Aviation interests can vary greatly; therefore, it is important for an airport to offer a variety of aircraft storage options. Typically an airport will offer some mix of T-hangars, box hangars, and conventional hangars. T-hangars are smaller structures intended to accommodate a single smaller aircraft. Box hangars are larger clear-span hangars, typically no larger than 60 feet by 60 feet (3,600 square feet). These hangars are primarily utilized by individuals for storage of their aircraft; however, some aviation businesses may operate from a box hangar. Conventional hangars are the large clear-span hangars which typically house aviation businesses, such as an FBO or maintenance operation. Conventional hangars are also utilized for bulk aircraft storage, whether itinerant or long term.

For general aviation aircraft storage needs, there are three T-hangar structures (buildings 400, 402, 403) at the north end of the terminal area apron. These hangars encompass approximately 31,000 square feet of space and 26 individual storage units.

The alert hangars (building 4006), located at the end of Taxiway H, are utilized for general aviation aircraft storage and aircraft maintenance by the airport FBO, Columbia Pacific Aviation. These hangars encompass approximately 44,000 square feet of hangar space. This FBO also utilizes two connected conventional hangars (building 404) on the west terminal area apron encompassing approximately 5,500 square feet each.

There are four hangars (buildings 2106, 2107, 2113, 2111) located east of the terminal building. These aviation hangars encompass approximately 18,000 square feet of hangar space.

There are multiple large conventional hangars on the airfield as well. These include building 401 (10,000 sf), building 408 (10,000 sf), building 2203 (10,000 sf), and building 3401 (100,000 sf). These hangars are typically utilized by Airport FBOs or other Airport businesses needing the space.

Big Bend Community College owns three large hangars at the west end of the terminal area apron. One of these hangars is used exclusively for aircraft storage in support of their aviation programs. This hangar, encompassing approximately 29,000 square feet, currently stores 28 general aviation aircraft.

Other hangars of note include the 427,000 square-foot Genie Industries manufacturing facility, and the 154,000 square-foot Chemi-Con facility. These hangars are outside the airport fence but located on airport property. It is not anticipated that these hangar will revert to aviation uses. Boeing owns a large hangar (170,000 square feet) on the east apron

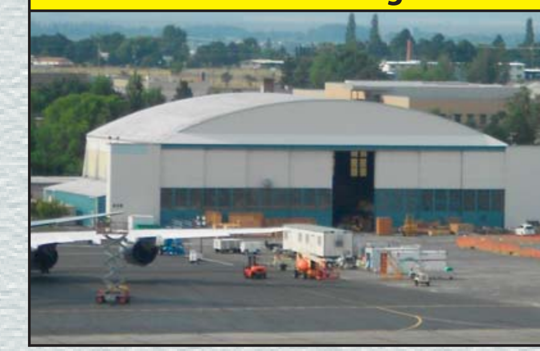
AVIATION RELATED BUILDINGS

1202 - Terminal Building

400 - General Aviation T-Hangar

404 - Columbia Pacific Aviation/FBO

408 - Conventional Hangar



2101 - Aircraft Rescue Fire-Fighting Facility (ARFF)

2203 - Conventional Hangar

3401 - Conventional Hangar

4006 - Alert Hangars

PORT OF MOSES LAKE

Exhibit 1U
BUILDING INVENTORY

NON-AVIATION REVENUE SUPPORT BUILDINGS

2301

2322 - Privately Owned

2322 and 2321

2501

2504

2521

2701

2702

2701 and 2703

2801

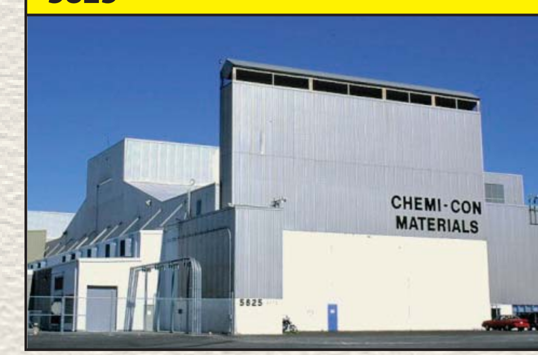
2802

2901and 2903

3303

5820 - Genie

5825



OTHER BUILDINGS

401 - Conventional Hangar

402 - General Aviation T-Hangar

403 - General Aviation T-Hangar

2106 - Box Hangar

2107 - Box Hangar

PORT OF MOSES LAKE

13-MP-01-15-09/17/13

2110 - Airside Building

2204 - Airport Maintenance

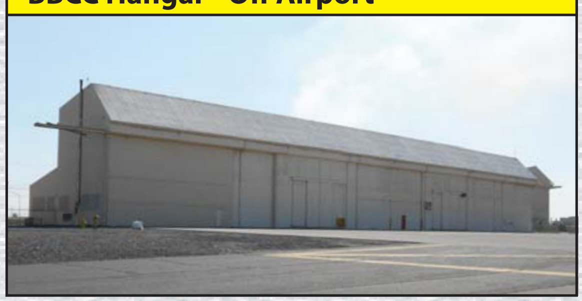
2205 - Airport Maintenance Shop

2206 - Airport Maintenance

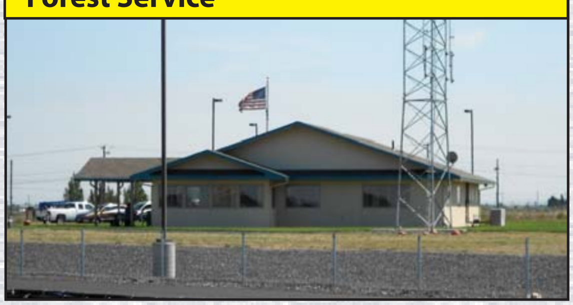
Boeing Hangar - Off Airport

3000 - Big Bend Community College (BBCC) Office - Off Airport

BBCC Hangar - Off Airport



Forest Service



Forest Service Ramp

PORT OF MOSES LAKE

Exhibit 1U (continued)
BUILDING INVENTORY

which is located outside airport property. This hangar is used sparingly for aircraft parts storage.

AIRPORT SUPPORT FACILITIES

Several support facilities serve as critical links in providing the necessary efficiency to aircraft ground operations, such as aircraft rescue and fire-fighting (ARFF), airport maintenance, and fuel storage.

Aircraft Rescue and Firefighting Facilities (ARFF)

Part 139 airports are required to provide aircraft rescue and firefighting (ARFF) services during air carrier operations. Each certificated airport maintains equipment and personnel based on an ARFF index established according to the length of aircraft and scheduled daily flight frequency. There are five indices, A through E, with A applicable to the smallest aircraft and E the largest (based on aircraft length). Grant County International Airport falls within ARFF Index A, which is based on the 30-passenger EMB 120 as the last scheduled air carrier to operate at the Airport. To maintain the Part 139 operating certificate, Grant County International Airport is required to maintain a fleet of equipment and properly trained personnel consistent with this standard. Upon request, ARFF Index level E can be provided.

The Airport ARFF facility is centrally located to the airfield immediately east of the Airport terminal building. This facility is owned by the Port of Moses Lake. The ARFF facility houses the following equipment:

- 2011 Rosenbauer Panther (Excellent condition) with capacities of:
  - 1,500 gallons of water
  - 230 gallons of aqueous film forming foam (AFFF)
  - 500 pounds of Dry Chemical

- 1993 GMC 1-ton Rapid Intervention Vehicle (RIV) (Fair condition) with capacities of:
  - 450 pounds of Dry Chemical
  - 100 gallons of 3% AFFF/water mix

- 1990 Oshkosh T-1500 Crash Truck (Poor condition) with capacities of:
  - 1,500 gallons of water
  - 205 gallons of 3% AFFF
  - 500 pounds of Dry Chemical

- 1988 Oshkosh T-3000 Crash Truck (Fair/Poor condition) with capacities of:
  - 3,000 gallons of water
  - 410 gallons of 3% AFFF
  - 500 pounds of Halon

All vehicles are painted in a bright yellowish-green color in order to provide optimum visibility. The fire station has five bays which permits all ARFF vehicles to be removed from the elements when not in use.

The fire station is staffed with firefighters who are Rural Metro Fire Department employees, 24 hours per day. At least three firefighters are on duty for any given shift. All ARFF personnel are equipped with proper protective clothing and gear, including a self-contained breathing apparatus, small rescue tools, and personal distress alarm. ARFF personnel are provided initial training, recurrent annual training, as well as annual live-fire training at a designated ARFF Training Center.

The Port of Moses Lake has mutual aid agreements with the Grant County Fire District No. 5 and the City of Moses Lake Fire Department for the purpose of securing to each the benefits of mutual aid in fire protection, in the protection of life and property from fire and in firefighting.

Maintenance Facilities

The Airport utilizes three buildings (# 2204, 2205, and 2206) for storage and repair of airport maintenance equipment. Equipment such as mowers and runway sweepers are located at this facility.

Fuel Storage

The Airport has ample fuel storage capacity. The Port of Moses Lake owns two large fuel storage tanks. These tanks are located near the intersection of 20th Avenue and Randolph Road, approximately ½-mile south of the terminal building. There is underground piping from these tanks that serves the hydrant fueling system located under the large apron just north of Taxiway A. These tanks have a Jet A fuel capacity of nearly 3.5 million gallons.

Million Air, one of two airport FBO's, has four Jet A fuel delivery trucks. They have a total capacity of 30,000 gallons. Million Air primarily serves military and general aviation refueling needs.

Columbia Pacific Aviation, the second Airport FBO, has two static storage tanks. The Jet A tank has a capacity of 10,000 gallons and the AvGas tank has a capacity of 12,000 gallons. Columbia Pacific Aviation has a fleet of eight fuel delivery trucks. The four Jet A trucks have a combined capacity of 29,000 gallons. The four AvGas trucks have a combined capacity of 8,750 gallons.

Big Bend Community College supplies its own fuel for their flight training activity. They have two 500 gallon tanks dedicated for AvGas.

Boeing has two large Jet A storage tanks at the Airport. Combined these tanks have a capacity of 420,000 gallons. These tanks are not currently in use.

In total, there is over 3.5 million gallons of storage capacity for Jet A fuel and 21,750 gallons for AvGas. Exclusive of the big tanks owned by the Port (#24 and #38) the fuel storage capacity of Jet A fuel is 69,000 gallons. **Table 1K** summarizes fuel storage capacity at the Airport.

TABLE 1K
Fuel Storage Capacity
Grant County International Airport

Identifier	Type	Ownership	Capacity
Port of Moses Lake			
Big Tank 1 (#24)	Jet A	Port	1,151,897 gal
Big Tank 2 (#38)	Jet A	Port	2,284,380 gal
Subtotal			3,436,277 gal
Million Air			
Truck 1	Jet A	Million Air	10,000 gal
Truck 2	Jet A	Million Air	10,000 gal
Truck 3	Jet A	Million Air	5,000 gal
Truck 4	Jet A	Million Air	5,000 gal
Subtotal			30,000 gal
Columbia Pacific Aviation			
Tank 1	Jet A	CPA	10,000 gal
Tank 2	AvGas	CPA	12,000 gal
Truck 1	Jet A	CPA	10,000 gal
Truck 2	Jet A	CPA	10,000 gal
Truck 3	Jet A	CPA	5,000 gal
Truck 4	Jet A	CPA	4,000 gal
Truck 5	AvGas	CPA	5,000 gal
Truck 6	AvGas	CPA	1,000 gal
Truck 7	AvGas	CPA	750 gal
Truck 8	AvGas	CPA	2,000 gal
Subtotal			59,750 gal
Big Bend Community College			
Tank 1	AvGas	BBCC	500 gal
Tank 2	AvGas	BBCC	500 gal
Subtotal			1,000 gal
TOTAL CAPACITY			**3,527,027 gal**

Source: Airport records

There are three defueling storage tanks at the Airport. The Port of Moses Lake own one with a 12,000 gallon capacity. Million Air owns two, each with a 7,895 gallon capacity.

Vehicle Airfield Access and Perimeter Fencing

Ground vehicles authorized by the Airport to operate on movement and safety areas are limited to those vehicles necessary for airport operations. This includes Airport-owned vehicles with ATCT radio and rooftop beacon, authorized FAA staff, FBO operations vehicles (in approved areas), and authorized construction vehicles. Other individuals who need access to the movement and safety areas are escorted by authorized, qualified personnel. Individuals seeking unescorted access to the movement and safety area are required to successfully complete the Grant County International Airport Pedestrian and Ground Vehicle training course prior to being granted unescorted access.

The entire perimeter of the Airport is fenced with six-foot, six-gauge chain-link fencing with three strands of barbed-wire at the top. There are five (5) card-activated, electronically-operated airfield perimeter gates that serve as primary entrances/exits to the airport for most employees, tenants, and airport users. The five drive-through gates are at the following locations:

1) Gate A-1: North end of Patton Blvd.
2) Gate A-2: North end of 26th Ave NE
3) Gate A-4: Northeast corner of building 404
4) Gate A-6: North end of 30th Ave NE.
5) Gate A-37: North end of 22nd Ave NE.

All other airfield perimeter gates are either Port of Moses Lake-controlled gates or tenant-controlled gates. Gate access is restricted to only those individuals with an operational requirement to access the airfield. Signage on all primary gates reads: "RESTRICTED AREA – Authorized personnel only beyond this point. TSR Part 1542 approved identification badge required. Offenders subject to arrest and prosecution under RCW Chap 9A.52 – Port of Moses Lake 509.762.5363."

Signage is posted on the fence every 100 feet, along the entire airfield perimeter fence line, containing the notice: "NO TRESSPASSING – THIS PROPERTY IS PATROLLED." The airport fencing complies with TSA Security requirements in TSR part 1542.

Utilities

The availability and capacity of the utilities serving the Airport are factors in determining the development potential of the Airport property, as well as the land immediately adjacent to the facility. Of primary concern in the inventory investigation is the availability of water, sewer, gas, communications, and power sources.

Power: The Grant County Public Utility District (GCPUD) supplies electrical power to the airport. Services are from a GCPUD substation a half-mile east of the airport on Stratford Road. The distribution system is underground in airport operational areas and above-ground elsewhere. The GCPUD operates two hydro-electric dams on the Columbia River that provide low cost, reliable, and readily available electricity to Grant County businesses. According to the Council for Community and Economic Research, Grant County residents pay an average of 4.2 cents per kilowatt hour compared to the national average of 11.8 cents, with industrial rates still lower.

Fiber Optics Telecommunication Network: GCPUD provides wholesale telecommunications services utilizing a fiber optic system with internet speeds up to 100mbps. The GCPUD utilizes a fiber optic network, as opposed to less reliable copper cables, since glass fibers are less susceptible to electrical interference.

Water: The City of Moses Lake owns and operates the Airport water system. This system is integrated and connected to the main municipal services. The Airport water system includes five wells. Treatment consists of chlorination at the wells. Two of the wells were out of service, pending their being sealed off from contaminated groundwater; they were reactivated in 1992 and 1993.

The capacity of the Airport elevated storage tanks is 1,370,000 gallons. The city is planning additional storage capacity by constructing a new 1,370,000 gallon elevated storage tank in the residential area, located south of the Airport. This will provide approximately 2,800,000 gallons of total storage capacity for the airport, local industries, and adjacent residences.

Sanitary Sewer: The city also owns and operates the domestic sanitary sewage treatment plant at the airport. Sewage is collected from the developed areas and treated at the former Larson AFB sewage treatment plant. The plant is located at the intersection of Tyndall and Randolph Roads. It was upgraded in 1973 to provide primary treatment in filtration basins. The current loading of the plant is about 750,000 gallons per day (mgd). Upgrading and expansion of the plant for permit renewal has been completed.

In 1992, sanitary sewer service (6" force main) was extended along Randolph Road to the new Rocket Research and TK Holding (Takata) complex.

Industrial Wastewater Treatment: The Port of Moses Lake operates an industrial wastewater treatment system to serve industries on and adjacent to the Airport and industrial park. The facility was originally constructed in 2000 and consists of a gravity collection system, a lift station, pressure transmission line, a 27 million gallon storage lagoon, a freshwater well, and 124 acres of irrigated cropland. Monthly and annual reports are provided to the state Department of Ecology on its operation.

The facility treats the wastewater flows from the major industries at the Port, including Chemi-Con Materials, Moses Lake Industries, SGL/BMW Automotive Carbon, Genie/Terex, AstaReal, Inc. and others. Current volume is 30 million gallons per year. Current and new industries are expected to expand production in the near future. To accommodate this growth, as well as provide capacity for new users, the Port of Moses Lake is planning to double the size of the system in 2013-2014.

Other Utilities: Century Link provides telephone service. The Cascade Natural Gas Company serves the east side of the airport and the City of Moses Lake. Surface storm drainage to French drains is predominant on the airport. Around the airfield ramps, there are underground storm drainage collection systems. Solid waste is collected and removed by a private contractor and disposed at a public off-site landfill.

Airport Recycling

Section 133 of the *FAA Modernization and Reform Act* established that airport master plans must address certain issues related to solid waste recycling at airports. The issues to be addressed include:

a) The feasibility of solid waste recycling at the airport;
b) Minimizing the generation of solid waste at the airport;
c) Operation and maintenance requirements;
d) A review of waste management contracts; and
e) The potential for cost savings or the generation of revenue.

The Port of Moses Lake only controls solid waste recycling within the terminal building. The primary tenants in the terminal building include Million Air (FBO), airport café, and administration offices. The only recycling program currently available is for cardboard, which is collected in containers provided on-site. Other materials must be taken off-site to a collection facility. There are no current recycling/waste management performance targets in place at the Airport.

Garbage service for the Port of Moses Lake is provided by Consolidated Disposal, the company providing garbage service to the businesses and residences of Grant County. The Port itself has one 6 cubic-yard garbage dumpster and a cardboard recycling dumpster. Cardboard recycling is the only recycling service currently provided by Consolidated Disposal. The Airport Maintenance Department has one 8 cubic-yard garbage dumpster. All dumpsters are emptied once a week. The Port also keeps a metal recycling dumpster that goes to the local scrap metal dealer. The only other waste generated by the Port is from the ARFF Training Center on the airport's western boundary. Every year, several 55-gallon drums are filled with "sludge" containing water, burnt fuel, AFFF, and sediment. The Airport maintains the lab reports as to the contents of the sludge. The sludge is non-regulated waste that is removed from the Airport to a proper recycling facility.

During the development of this Airport Master Plan, a solid waste recycling plan for the Airport, which incorporates a waste audit, a review of waste management contracts, recycling feasibility, a plan to minimize solid waste generation, operational and maintenance requirements, and the potential for cost savings or revenue generated, will be developed.

AIRPORT PLANS

The Airport maintains various plans designed to enhance the airports capability to address various regulations and issues the airport may face. Some of the plans are required as part of the overall airport certification manual.

Snow and Ice Control Plan

Grant County International Airport is located in a region that experiences snow and icing condition in the winter months. As such the ability to remove snow and ice from the runway and taxiway pavements is necessary. Various snow removal equipment (SRE) is housed at the airport maintenance facility and listed in **Table 1L**. The airport maintains a Snow and Ice Control Plan as part of the overall airport certification manual.

The snow removal plan may be activated when accumulations exceed one half (½) inch of wet or one (1) inch of dry snow. Priorities for snow removal are closely based on the priorities listed in FAA AC 150/5200-30C, *Airport Winter Safety and Operations*. The most critical portions of the aircraft movement area and supporting facilities are classified as Priority 1 with other areas to be cleared in their order of importance.

- Priority 1: The primary runway (Runway 14L32R) with taxiway turnoffs, access taxiways leading to the terminal, terminal(s), and cargo ramp(s), ARFF station, emergency responder parking area and gate A-1 access, emergency service roads, NAVAIDs, and other areas deemed essential such as fueling areas and airport security/surveillance roads.
- Priority 2: Crosswind/secondary runways (Runways 4-22, 18-36, 9-27, 14R-32L) and their respective taxiways, remaining aircraft movement areas, commercial ramps, access roads to secondary facilities, and airfield facilities not essential to flight operations.
- Priority 3: These areas include refueling areas, perimeter roads, remaining ramps and FBO parking areas.
- Priority 4: Airside, non-aviation use including remaining vehicle roads.

Procedurally, the first area to be cleared is from the ARFF building to the taxiways and runways. Next is clearing the precision instrument runway, Runway 14L-32R. If commercial air service is impacted then the next priority is clearing from the commercial apron to Taxiway A to the Runway 32R threshold. FBO aprons are designated the next priority to accommodate transient aircraft. Remaining portions of Taxiway A from Taxiway B to Runway 32R should then be cleared. Clearing access to the FAA control tower is the next priority. **Exhibit 1V** presents the snow removal plan.

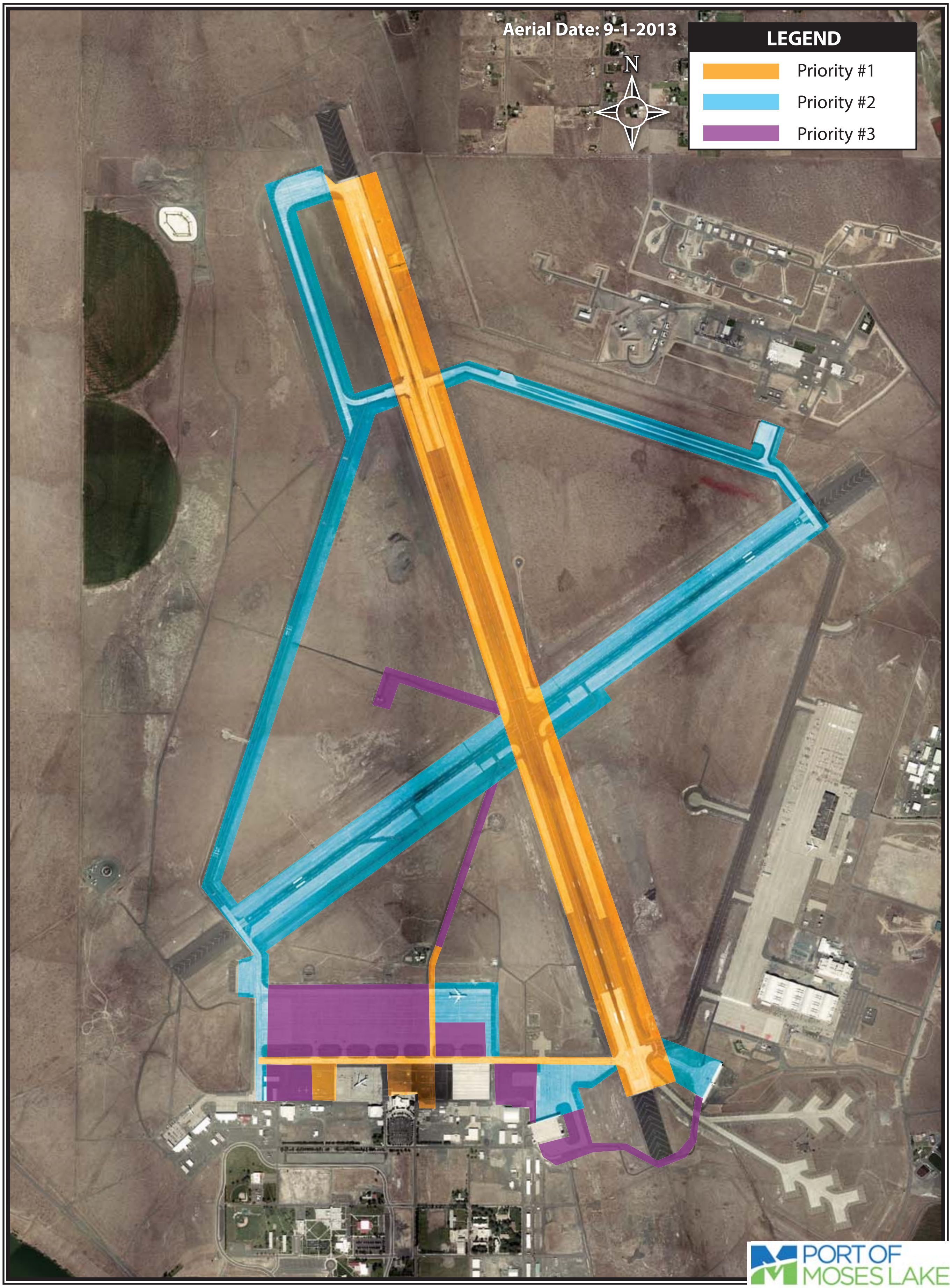


Exhibit 1V
SNOW REMOVAL PLAN

TABLE 1L
Snow Removal Equipment Inventory
Grant County International Airport

Identifier	Description	Condition
A-4	1983 Oshkosh Snow Blower	Fair
A-5	2006 Oshkosh Snow Blower	Like New
A-13	1975 GMC Snowplow, 11' blade	Poor Condition
A-16	FWD Snowplow, 19' blade	Poor Condition
A-18	1976 GMC Snowplow, 11' blade	Poor Condition
A-21	1976 GMC Snowplow, 11' blade	Poor Condition
A-73	1976 Mack Truck Snowplow, 19' blade	Poor Condition
A-75	1981 Mack Truck Snowplow, 19' blade	Poor Condition
A-77	1982 Mack Truck Snowplow, 19' blade	Poor Condition
A-78	2006 Oshkosh Plow, 20' blade	Like New
A-96	1978 Sicard Snow Blower	Poor Condition

Source: Airport Certification Manual

Spill Prevention, Control and Countermeasure Plan (SPCC)

The Airport maintains a SPCC plan which was adopted by the Port of Moses Lake in April 2010. The SPCC regulations strive to prevent oil from entering navigable waters through prevention, control, and mitigation of oil spills. SPCC plans are required for facilities that store oil and oil-containing products exceeding certain capacity thresholds where there is a possibility that an oil spill would reach navigable water. The statutory authority for SPCC regulations is derived from the *Clean Water Act of 1977* and its amendments, primarily the *Water Quality Act of 1987*, and the *Oil Pollution Act of 1990*.

Wildlife Hazard Management Plan (WHMP)

Grant County International Airport has in effect a WHMP that conforms to the requirements of CFR Title 14 FAR part 139.337. The WHM manual is intended specifically for the airport's use to monitor and reduce wildlife hazards. The WHMP was adopted in July 2010.

The species generally considered to present the greatest threat to aviation at the Airport are birds with flocking tendencies or of relatively large size, such as waterfowl, gulls, pigeons, starlings, and raptors. Large mammals such as deer, bear, and coyote may also present an extreme hazard, although they are not as common at the Airport as birds because the Airport has a well maintained perimeter fence.

Appropriate procedures are in place for the identification and mitigation of wildlife hazards whenever they are detected or whenever airport management has been advised that hazardous conditions exits. The plan outlines steps for monitoring, documenting, and reporting potential wildlife hazards and strikes at the Airport. Protocols for responding to hazardous wildlife situations are presented, including roles and responsibilities of airport personnel.

Airport Emergency Plan (AEP)

The Airport has an Airport Emergency Plan (AEP) in place to comply with CFR 14 Part 139.325 as administered by the FAA. The purpose of the AEP is to outline the responsibilities, duties and procedures by participating agencies to ensure the efficient accomplishment of operations during an emergency on the airport or surrounding area. The Port of Moses Lake has adopted the National Incident Management System (NIMS) as the standard for incident management at the airport, which includes the use of the Incident Command System (ICS).

As noted previously, the Airport is currently classified as ARFF Index A, which establishes the minimum firefighting capability for the airport. The ARFF index system is based on the length of the largest commercial aircraft in scheduled service conducting at least five landing per day. While the Airport no longer has scheduled commercial service, maintaining a robust ARFF capability is important for the Port of Moses Lake. While the Airport is ARFF Index A, the Airport is frequently used by heavy military and commercial aircraft on a daily basis. Therefore, an emergency involving a heavy aircraft is just as possible as any of the smaller aircraft that use the facility. Utilizing resources in the region, the airport is capable of providing firefighting services to meet ARFF Index E, if necessary.

SOCIOECONOMIC PROFILE

This section of the Master Plan will establish baseline socioeconomic information. When planning for the future of the Airport, it is important to have an understanding of the local economy and the historic trends in economic indicators. The most common economic indicators are changes in population, employment, and income. Where possible, it is preferred to utilize local data sources because they typically will incorporate any special local circumstances. Where detailed, recent and consistent local data cannot be found, the FAA has approved several specific sources of demographic data, including the U.S. Census bureau and various private firms, including Woods & Poole Economics.

DEMOGRAPHICS

Table 1M shows historical demographic data for population, employment, and income for Grant County and Washington State. Since 1990, the Grant County population has grown by more than 67 percent, outpacing the State of Washington by more than 41 percent. It is estimated that the Grant County population in April of 2013 was 91,800. On an average annual basis, Grant County population is growing rapidly at 2.37 percent, while the State of Washing is growing annually at 1.58 percent.

Employment in Grant County has also been robust since 1990, growing at an annual rate of 2.03 percent. By comparison, the State of Washington has grown at a slightly slower pace of 1.44 percent annually.

Per capita personal income in Grant County has lagged behind that of the state since 1990. Annual income growth for Grant County has is 1.47 percent, while for the State of Washington it has been somewhat higher at 1.71 percent. The income disparity is somewhat of a double-edged sword. Potential employers clearly find Grant County attractive as evidenced by the significant growth in employment; however, commensurate increases in overall income have not been fully realized. At the same time, the cost of living in Grant County is much lower than in other areas of the state, particularly major urban areas such as Seattle.

TABLE 1M
Historic Demographic Data
Grant County and Washington State

Year	Grant County	AAGR*	Washington	AAGR*
Population				
1990	54,798	NA	4,866,659	NA
1995	64,099	3.19%	5,396,569	2.09%
2000	74,698	3.11%	5,894,143	1.78%
2005	80,121	1.41%	6,298,816	1.34%
2010	89,120	2.15%	6,724,540	1.32%
2013 (est.)	91,800	1.49%	6,882,400	1.17%
% increase/22 year AAGR	67.52%	2.37%	41.42%	1.59%
Employment				
1990	27,947	NA	2,842,499	NA
1995	34,236	4.14%	3,101,327	1.76%
2000	37,731	1.96%	3,522,928	2.58%
2005	38,862	0.59%	3,683,547	0.90%
2010	41,768	1.45%	3,793,568	0.59%
2013 (est.)	43,467	2.01%	3,894,171	1.32%
% increase/22 year AAGR	55.53%	2.03%	37.00%	1.44%
Income (PCPI-Per Capita Personal Income in $2005)				
1990	$20,188	NA	$27,206	NA
1995	$21,780	1.53%	$28,970	1.26%
2000	$23,105	1.19%	$36,084	4.49%
2005	$24,138	0.88%	$36,766	0.38%
2010	$27,139	2.37%	$38,338	0.84%
2013 (est.)	$27,812	1.23%	$39,502	1.51%
% increase/22 year AAGR	37.77%	1.47%	45.20%	1.71%

*AAGR: Average Annual Growth Rate as calculated from previous interval.
Sources: Population from Washington Office of Financial Management; Employment and Income from Woods & Poole Economics - Complete Economic Demographic Data Source (CEDDS-2013)

LOCAL ECONOMY

The Port of Moses Lake stands as an aviation, manufacturing, and technology hub in the Pacific Northwest. The Port has available 240 acres of aircraft ramp space and more than one million square feet of building space (both aviation and non-aviation). The Port encompasses more than 4,700 acres of land, of which 3,500 is dedicated to airport use. More than 1,200 acres are specifically zoned for aviation or industrial uses. The following is a discussion of the major industries on and around the Port of Moses Lake, followed by a list of major employers in Grant County.

Aerospace Industries

Aviation Technical Services (ATS) is the largest third party, single site transport aircraft maintenance provider in North America servicing more than 450 aircraft per year. Clients include Southwest Airlines, UPS, Alaska Airlines, Greenpoint Technologies, and the military.

AeroTEC is a Seattle-based aircraft testing and certification company that is currently expanding its presence at the Airport. Current efforts include initial testing of the new split scimitar winglet for Boeing 737 retrofits that increase fuel efficiency by over two percent.

Sonico Inc. provides flight line maintenance, aircraft storage, and space for large spare parts inventory. Clients include many major U.S. airlines including United, Delta, American, US Airways, and Continental.

Boeing Inc. is a significant user of the Airport. Many Boeing aircraft manufactured in the State of Washington will be flight-tested at the Airport. This includes passenger, cargo, and military aircraft. Boeing owns a significant land and hangar interest on the east side of the Airport which includes 120 acres of land and a 170,000 square-foot hangar.

Military/Defense is also a significant presence at the airport. The proximity of Joint Base Lewis-McChord, Fairchild Air Force Base, and Whidbey Island Naval Air Station makes the Airport an ideal location for military training activity.

Manufacturing Companies

Genie/Terex produces aerial work platforms and other lift equipment. Genie's main manufacturing facility is located on the east side of the Airport where they employ nearly 1,000 people.

Chemi-Con is a subsidiary of Nippon Chemi-Con, producing aluminum electrolytic capacitors.

Takata Industries manufactures propellant and airbag systems for use in the global automotive industry. They employ over 300 people at their facility located on the north side of the airport.

Moses Lake Industries, a division of Tama Chemicals, is a manufacturer of high purity chemicals for semiconductors. Products are used for silicon wafer fabrication, packaging, and other applications.

SLG/BMW Automotive Carbon Fibers is the only facility of its kind in the U.S. The SLG/BMW plant manufactures the automotive carbon fiber thread for new electric vehicles.

REC Silicon is a production plant for polysilicon that is used in the production of solar panels. The facility at Moses Lake focuses on transportation and distribution of base chemicals. The company is one of the largest employers in Grant County.

AstraREAL is a Japan-based biotech company that broke ground on a new facility in 2013. The company will produce the anti-aging medicine astaxanthin.

Technology Companies

World-class technology companies have developed server farms across Grant County due to the mass availability of open land and low cost of electricity. RS Titan is located directly adjacent to the Port and has significant expansion capacity. This data center enables Ask.com to support its growing query volume and supports additional computing power for processor-intensive search services such as Ask 3D. Other companies with data and server farms in the area include Yahoo!, Microsoft, Dell, and Intuit.

Grant County Major Employers

Grant County, Washington has positioned itself as a major hub for a wide variety of businesses in central Washington. As indicated, many of these businesses have chosen to locate at the Port of Moses Lake. Still, many others, located throughout Grant County, employ many people and support economic development in the region. **Table 1N** presents a list of the major employers in Grant County as compiled by the Grant County Economic Development Council.

TABLE 1N
Major Employers in Grant County (Updated July 2012)

Employer Name	Location	Industry	Function	Employees
Genie Industries, Inc.	**Moses Lake**	**Aerial Work Platforms**	**Branch Manufacturing Plant**	**1,250**
Moses Lake School District	Moses Lake	Education	Headquarters	951
Grant County PUD	Ephrata	Electric Utility	Headquarters	722
Grant County Government	Ephrata	Government	Headquarters	633
Wal-Mart	County Wide	General Retail/Grocery Retail	Retail Outlet	615
REC Silicon	**Moses Lake**	**Polysilicon Manufacturing**	**Branch Manufacturing Plant**	**500**
LambWeston/BSW	Warden	Frozen Potato Processing	Headquarters	500
Samaritan Healthcare	Moses Lake	Health Care	Headquarters	473
ConAgra Foods, Inc.	Quincy	Frozen Potato Processing	Branch Manufacturing Plant	460
J.R. Simplot Co.	Moses Lake	Potato Products	Branch Processing Plant	375
Quincy Foods, LLC	Quincy	Frozen Vegetable Processing	Headquarters	370
Quincy School District	Quincy	Education	Headquarters	369
Takata Corporation	**Moses Lake**	**Automotive Air Bags**	**Branch Processing Plant**	**353**
Ephrata School District	Ephrata	Education	Headquarters	315
National Frozen Foods	Moses Lake	Corn & Pea Processing	Branch Processing Plant	275
Confluence Health Clinic	Moses Lake	Health Care	Headquarters	260
Moses Lake Industries, Inc.	**Moses Lake**	**Industrial Chemicals**	**Headquarters**	**240**
Moses Lake Community Health	Moses Lake	Health Care	Headquarters	260
Washington Potato Co.	Warden	Potato Flake Processing	Branch Processing Plant	190
D & L Foundry, Inc.	Moses Lake	Manhole Cover Manufacturing	Headquarters	184
Big Bend Community College	**Moses Lake**	**Education**	**Headquarters**	**180**
Columbia Basin Hospital	Ephrata	Health Care	Headquarters	170
Columbia Colstor	Quincy	Cold Storage	Warehousing & Storage	160
Eldorado Stone	Royal City	Stone & Brick Processing	Branch Manufacturing Plant	125
International Paper	Moses Lake	Corrugated Box Manufacturing	Branch Manufacturing Plant	100
Home Depot	Moses Lake	Home Building & Repair Retail	Retail Outlet	97
SGL Automotive Carbon Fiber	**Moses Lake**	**Carbon Fiber**	**Headquarters**	**80**
Celite Corp.	Quincy	Mineral Processing	Branch Processing Plant	70
Eckenberg Hay	Mattawa	Hay Cubes	Headquarters	60
El Oro Agribeef	Warden	Cattle Feed	Headquarters	60
Chemi-Con Materials Corp.	**Moses Lake**	**Electrolytic Aluminum Foil**	**Branch Processing Plant**	**55**
Wahluke Produce	Mattawa	Agricultural See Processing	Headquarters	50
Western Polymer Corp.	Moses Lake	Potato Starch	Headquarters	49
Akzo Nobel Pulp & Chemicals Inc.	Moses Lake	Sodium Chloride	Branch Manufacturing Plant	40

Note: Bold are companies located within the Port of Moses Lake
Source: Grant County EDC accessed on 9.25.13 at www.grantedc.com

Employment by Sector

Grant County, Washington has long had a significant agricultural base. In 2010, agriculture represented more than 17 percent of the total employment. The next highest industry was manufacturing. **Table 1P** presents employment by industry sector for Grant County, Washington.

TABLE 1P
Employment by Sector
Grant County

	1980	1990	2000	2005	2010	2010 Percent	AAGR 1980-2010
TOTAL EMPLOYMENT	**24,051**	**27,947**	**37,731**	**38,862**	**41,768**	**100.00%**	1.86%
Farm	5,170	5,162	6,210	6,152	7,364	17.63%	1.19%
Forestry, Fishing, and Other	1,194	1,840	1,968	1,722	1,538	3.68%	0.85%
Mining	29	40	66	78	145	0.35%	5.51%
Utilities	26	29	25	22	39	0.09%	1.36%
Construction	893	1,263	1,357	1,633	1,750	4.19%	2.27%
Manufacturing	1,847	2,722	4,893	3,759	4,272	10.23%	2.83%
Wholesale Trade	1,227	1,083	1,283	1,136	1,412	3.38%	0.47%
Retail Trade	2,424	2,888	3,882	4,069	3,993	9.56%	1.68%
Transportation and Warehousing	744	816	999	1,216	1,342	3.21%	1.99%
Information	81	111	258	249	249	0.60%	3.81%
Finance and Insurance	462	410	636	680	1,038	2.49%	2.74%
Real Estate, Rental and Lease	605	538	860	1,035	1,322	3.17%	2.64%
Professional and Technical Services	350	485	729	851	959	2.30%	3.42%
Management of Companies	9	13	18	31	34	0.08%	4.53%
Administrative and Waste Services	451	597	1,017	1,333	1,072	2.57%	2.93%
Educational Services	68	95	164	165	280	0.67%	4.83%
Health Care and Social Assistance	1,214	1,683	2,490	3,125	2,442	5.85%	2.36%
Arts, Entertainment and Recreation	190	244	389	455	433	1.04%	2.78%
Accommodation and Food Service	1,009	1,298	1,765	2,007	2,283	5.47%	2.76%
Other Services except Government	786	1,113	1,563	1,708	1,703	4.08%	2.61%
Federal Civilian Government	897	774	730	628	710	1.70%	-0.78%
Federal Military	218	292	274	266	277	0.66%	0.80%
State and Local Government	4,157	4,451	6,155	6,542	7,111	17.02%	1.81%

Source: Woods & Poole Economics - Complete Economic Demographic Data Source (CEDDS-2013)

DOCUMENT SOURCES

As previously mentioned, a variety of different sources were utilized in the inventory process. The following listing reflects a partial compilation of these sources. This does not include data provided by the Airport management as part of their records, nor does it include Airport drawings and photographs which were referenced for information. On-site inventory and interviews with staff tenants also contributed to the inventory effort.

Airport/Facility Directory, Northwest U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, Effective August 22, 2013.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration (2013-2017).

U.S. Terminal Procedures, Northwest U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, Effective August 22, 2013.

Seattle Sectional Chart, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Effective May 30, 2013.

Master Plan Update – Grant County International Airport, URS Corp., October 2005.

2013 Complete Economic and Demographic Data Source (CEDDS), Woods & Poole Economics Inc., Washington D.C., 2013.

A number of Internet sites were also used to collect information for the inventory chapter. These include the following:

Grant County International Airport:
http://www.portofmoseslake.com/

City of Moses Lake:
http://www.cityofml.com

Grant County, Washington:
http://www.co.grant.wa.us

Grant County Economic Development Council:
http://www.grantedc.com/

Washington State Department of Transportation (WSDOT) – Aviation:
http://www.wsdot.wa.gov/aviation

FAA:
www.faa.gov

Air Carrier Activity Information System (ACAIS):
www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger

U.S. Bureau of Labor Statistics:
www.bls.gov/

U.S. Census Bureau:
www.census.gov

AirNav:
www.airnav.com

Chapter Two

AVIATION DEMAND FORECAST

Chapter Two

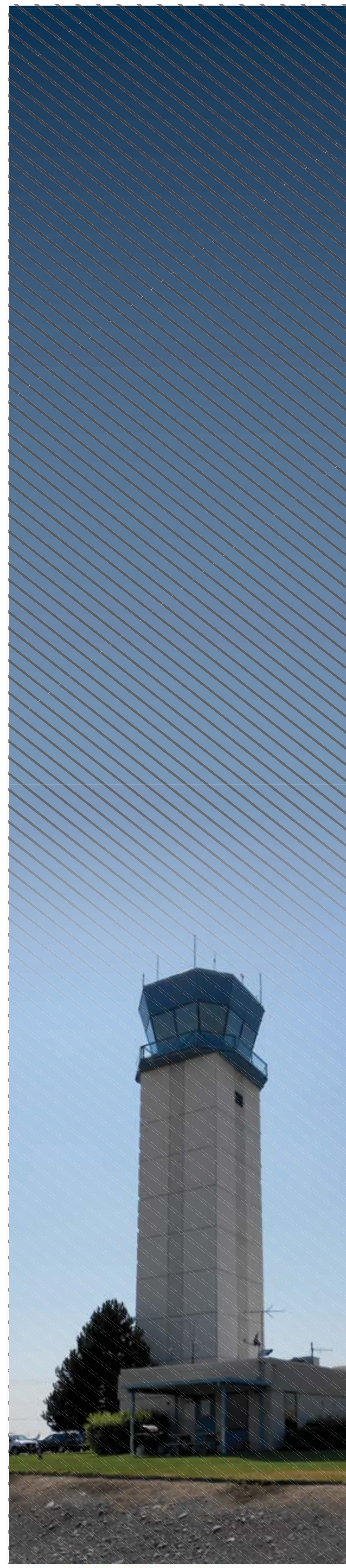
AVIATION DEMAND FORECAST

An important factor when planning the future needs of an airport involves a definition of aviation demand that may reasonably be expected to occur in both the near term (five years) and long term (20 years). For a general aviation airport such as Grant County International Airport (MWH), forecasts of based aircraft and operations (takeoffs and landings) serve as the basis for facility planning.

The Federal Aviation Administration (FAA) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. The FAA reviews such forecasts with the objective of comparing them to the FAA *Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). In addition, aviation activity forecasts are an important input to the benefit-cost analyses associated with some airport development projects.

FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems*, dated December 4, 2004, states that forecasts should be:

- Realistic
- Based on the latest available data
- Reflective of current conditions at the airport
- Supported by information in the study
- Able to provide adequate justification for airport planning and development



PORT OF MOSES LAKE

AIRPORT MASTER PLAN

The forecast process for an Airport Master Plan consists of a series of basic steps that vary in complexity depending upon the issues to be addressed and the level of effort required. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and evaluation and documentation of the results. FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, outlines seven standard steps involved in the forecast process, including:

1) **Identify Aviation Activity Measures**: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.

2) **Review Previous Airport Forecasts**: May include the FAA *Terminal Area Forecast*, state or regional system plans, and previous master plans.

3) **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.

4) **Select Forecast Methods**: There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.

5) **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate for reasonableness.

6) **Summarize and Document Results**: Provide supporting text and tables as necessary.

7) **Compare Forecast Results with FAA's TAF**: Follow guidance in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems*. In part, the Order indicates that forecasts should not vary significantly from the TAF. When there is a greater than 10 percent variance, supporting documentation should be supplied to the FAA.

The aviation demand forecasts are then submitted to the FAA for their approval. According to FAA AC 150/5070-6B, *Airport Master Plans*, forecasts for operations and based aircraft for general aviation airports are considered to be consistent with the TAF if they meet the following criteria:

Where the 5- or 10-year forecasts exceed 100,000 total annual operations or 100 based aircraft:

a) Forecasts differ by less than 10 percent in the 5-year forecast and 15 percent in the 10-year period, or
b) Forecasts do not affect the timing or scale of an airport project, or
c) Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3C.

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty. Therefore, it is important to remember that forecasts are to serve only as guidelines, and planning must remain flexible enough to respond to a range of unforeseen developments.

The following forecast analysis for Grant County International Airport was produced following these basic guidelines. Existing forecasts are examined and compared against current and historic activity. The historical aviation activity is then examined along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation-demand projections for the Airport that will permit Airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast.

Beyond five years, the predictive reliability of the forecasts can diminish. Therefore, it is prudent for airports to update the forecasts, reassess the assumptions originally made, and revise the forecasts based on the current airport and industry conditions. Facility and financial planning usually require at least a 10-year preview, since it often takes several years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors are known to influence the aviation industry and can have significant impacts on the extent and nature of activity occurring in both the local and national markets. Technological advances in aviation have historically altered and will continue to change the growth rates in aviation demand over time. A recent example is the substantial growth in the production and delivery of business jet aircraft, which resulted in a growth rate that far exceeded expectations. Such changes are difficult to predict, but over time, reasonable growth trends can be identified. Using a broad spectrum of demographic, economic, and industry data, forecasts for Grant County International Airport have been developed.

For each aviation demand indicator, such as based aircraft and operations, several forecasts are developed. These several forecasts are presented to define a reasonable planning envelope. The selected forecast for a particular demand indicator may be one of the forecasts or it may be an average of all the reasonable forecasts. Several standard statistical methods have been employed to generate various projections of aviation demand.

Trend series projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical demand data and then extending them into the future, a basic trend line projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection does serve as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of a direct relationship between two separate sets of historic data. Should there be a reasonable correlation between the data, further evaluation using regression analysis may be employed.

Regression analysis measures the statistical relationship between dependent and independent variables, yielding a "correlation coefficient." The correlation coefficient (Pearson's "r") measures the association between changes in a dependent variable and independent variable(s). If the r-squared (r^2) value (coefficient determination) is greater than 0.90, it indicates good predictive reliability. A value below 0.90 may be used with the understanding that the predictive reliability is lower.

Historical growth analysis is a simple forecasting method in which the historical average annual growth rate is identified, and then extended out to forecast years. This analysis method assumes factors that impacted growth in the past will continue into the future.

Market share analysis involves a historical review of airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as trend line projections, but can provide a useful check on the validity of other forecasting techniques.

Utilizing these statistical methods, available existing forecasts, and analyst expertise, forecasts of aviation demand for Grant County International Airport have been developed. The remainder of this chapter presents the aviation demand forecasts and includes activity in two broad categories: based aircraft and annual operations.

FAA AVIATION FORECASTS

The forecasts developed for the Airport must consider national, regional, and local aviation trends. The national aviation forecast information is primarily sourced from the *FAA Aerospace Forecast: Fiscal Years 2013-2033*. This information is utilized both in statistical analysis and to aid the forecast preparer in making any manual adjustments to the forecasts as necessary.

The aviation industry in the United States has experienced an event-filled decade. Since the turn of the century, the industry has faced impacts of the events of September 11, 2001, scares from various pandemics such as SARS, the bankruptcy of various air carriers and the mergers of others, all-time high fuel prices, and a serious economic downturn with global ramifications. The Bureau of Economic Research has determined that the worst economic recession in the post-World War II era began in December 2007 and lasted until mid-2009. Eight of the world's top 10 economies were in recession by January 2009.

As the recession began, unemployment in the United States was at 5.0 percent. While it grew through 2008, unemployment intensified in 2009 until peaking at 10.1 percent in October, although the recession officially ended in June of that year. As of August 2013, the unemployment rate stood at 7.3 percent. While the U.S. economy has been in recovery, it has been a slow process when compared to historical trends.

This recession did not face the high inflationary environment of the recession in the early 1980s or the high-energy costs of the mid-1970s recession. While recessions during the post-war era have averaged 10 months in duration, this one lasted 19 months. The economic recovery has been slow to materialize, which stunts growth in aviation demand.

GENERAL AVIATION FORECASTS

Following years of decline, the general aviation industry was revitalized with the passage of the *General Aviation Revitalization Act* in 1994, which limited the liability on general aviation aircraft to 18 years from the date of manufacture. This legislation sparked an interest to renew the manufacture of general aviation aircraft due to the reduction in product liability, as well as renewed optimism for the industry. The high cost of product liability insurance had been a major factor in the decision by many American aircraft manufacturers to slow or discontinue the production of general aviation aircraft.

The FAA forecasts the fleet mix and hours flown for single engine piston aircraft, multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and others (gliders and balloons). The FAA forecasts "active aircraft," not total aircraft. An active aircraft is one that is flown at least one hour during the year. **Exhibit 2A** presents the historical and forecast U.S. active general aviation aircraft.

U.S. Active General Aviation Aircraft

	2012 Estimate	2018	2023	2028	2033
FIXED WING					
Piston					
Single Engine	135,935	131,095	128,200	127,115	129,040
Multi-Engine	15,600	15,165	14,605	14,085	13,650
Turbine					
Turboprop	9,670	10,650	11,595	12,665	13,740
Turbojet	11,890	14,420	16,895	20,285	24,620
ROTORCRAFT					
Piston	3,765	4,400	4,885	5,415	5,970
Turbine	6,900	8,415	9,705	11,110	12,585
EXPERIMENTAL					
	24,410	26,250	27,745	29,370	30,980
SPORT AIRCRAFT					
	6,825	7,890	8,680	9,460	10,245
OTHER					
	5,675	5,635	5,605	5,575	5,545
TOTAL	**220,670**	**223,920**	**227,915**	**235,080**	**246,375**

Source: FAA Aerospace Forecasts, Fiscal Years 2013-2033.

Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

PORT OF MOSES LAKE

Exhibit 2A
U.S. ACTIVE GENERAL AVIATION AIRCRAFT FORECASTS

After growing rapidly for most of the decade, the demand for business jet aircraft has slowed over the past few years as the industry has been hard hit by the economic recession. Nonetheless, the FAA forecast calls for robust growth in the long-term, driven by higher corporate profits and continued concerns about safety, security, and flight delays. Overall, business aviation is projected to outpace personal/recreational use.

General aviation activity trends tend to closely match national economic trends. From 2008 through 2011, total operations by general aviation aircraft have declined annually. The FAA forecasts a return to growth in 2012 with an average annual growth rate of 0.4 percent through 2033.

The active general aviation fleet is projected to increase at an average annual rate of 0.5 percent through 2033, growing from a 2012 estimate of 220,670 to 246,375 in 2033. The turbine fleet, including helicopters, is forecast to grow annually at 2.8 percent, with the fixed-wing jet segment increasing at 3.5 percent annually.

Piston-powered aircraft are projected to decrease from the 2012 estimate of 155,300 through 2028, with declines in both single and multi-engine fixed wing aircraft but growth in piston helicopters. Starting in 2029, active piston-powered aircraft are forecast to increase to 148,660 by 2033, still below the current number in the fleet. Fixed-wing single and multi-engine piston aircraft are forecast to decline annually at 0.2 percent and 0.6 percent, respectively.

The FAA began tracking the light sport aircraft segment of the general aviation fleet in 2005. At the end of 2012, a total of 6,825 aircraft were estimated in this category. By 2033, a total of 10,245 light sport aircraft are forecast to be in the fleet. This represents a 2.0 percent annual growth rate.

Experimental aircraft, typically identified as home-built aircraft, represented 24,410 aircraft in 2012. The FAA forecasts continued growth in this segment to a total of 30,980 by 2033 for an annual growth rate of 1.1 percent.

General Aviation Aircraft Shipments and Revenue

The economic recession beginning in late 2007 has had a negative impact on general aviation aircraft production and the industry has been slow to recover. Aircraft manufacturing declined sharply in 2009 and has been slow to recover. Since reaching a high of 4,277 aircraft manufactured in 2007, only 2,133 were manufactured in 2012. According to the General Aviation Manufacturers Association (GAMA), while manufacturing was relatively flat in 2012, year-over-year, there is optimism that aircraft manufacturing will stabilize and return to growth in 2013 and beyond. **Table 2A** presents historical data related to general aviation aircraft shipments and billings.

TABLE 2A
Annual General Aviation Airplane Shipments
Manufactured Worldwide and Factory Net Billings

Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
1994	1,132	544	77	233	278	3,638
1995	1,251	605	61	285	300	4,125
1996	1,437	731	70	320	316	4,745
1997	1,840	1043	80	279	438	6,932
1998	2,457	1508	98	336	515	8,227
1999	2,808	1689	112	340	667	11,120
2000	3,147	1,877	103	415	752	12,984
2001	2,998	1,645	147	422	784	13,327
2002	2,677	1,591	130	280	676	11,295
2003	2,686	1,825	71	272	518	9,453
2004	2,963	1,999	52	321	591	11,226
2005	3,590	2,326	139	375	750	14,350
2006	4,054	2,513	242	412	887	17,958
2007	4,277	2,417	258	465	1,137	20,940
2008	3,972	1,943	176	538	1,315	23,827
2009	2,283	893	70	446	874	19,032
2010	2,023	781	108	368	767	19,300
2011	2,120	761	137	526	696	18,600
2012	2,133	790	91	580	672	18,445

SEP - Single Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Turbofan/Turbojet

Source: General Aviation Manufacturers Association 2012 Statbook

Business Jets: In 2012, business jet deliveries declined for a fourth consecutive year to 672 compared to 696 units in 2011, a 3.6 percent decrease. Demand was much stronger in 2011 for large-cabin business jets, driven more heavily by emerging markets than it was for medium and light business jets. In addition, the relatively high number of airplanes on the used market over the past couple of years continued to have a dampening effect on business jet shipments this year.

Turboprops: Turboprop deliveries increased in 2012 to 580 units compared to 526 deliveries in 2011. It should be noted that agricultural turboprops are included in 2011 and 2012 but not previous years.

Pistons: Overall deliveries of piston fixed-wing aircraft (single and multi-engine) declined in 2012 to 881 from 898 in 2011. The recession took a great toll on piston manufacturers as evidenced by the significant decrease in deliveries since 2006. In 2006, there were 2,755 piston aircraft delivered. By 2009, deliveries were below 1,000 annually and have remained there since.

Bombardier, a business jet manufacturer, publishes an annual industry outlook regarding the business aircraft industry. They indicate that the business jet industry is progressing well on a prolonged and gradual recovery from the steep industry downturn of 2009-2010. Positive market indicators include stock market improvements, increases in corporate profitability, increases in the number of very wealthy individuals, continued growth in the U.S. economy, and increases in the number of business jet orders. International markets, notably China, the Middle East, and Latin America were all very active for business jet orders in 2012. Overall demand for large cabin business jets continues to outpace light business jets.

COMMERCIAL AIRCRAFT FORECASTS

The FAA's commercial aviation forecasts and assumptions are developed from econometric models that explain and incorporate emerging trends for the different segments of the industry. In addition, the commercial aviation forecasts are considered unconstrained in that they assume there will be sufficient infrastructure to handle the projected levels of activity. These forecasts do not assume further contractions of the industry through bankruptcy, consolidation, or liquidation. They also do not assume any drastic changes in federal government operations.

The FAA forecast a variety of factors related to commercial aviation including passenger enplanements, system capacity (available seat miles/revenue passenger miles/average aircraft size), load factors, trip length, and revenue-ton-miles (air cargo). Perhaps the most relevant commercial aircraft forecast done by the FAA is the commercial aircraft fleet since many of these aircraft will operate at the airport during testing.

Grant County International Airport is greatly impacted by the relative strength of the commercial aviation market because of the frequent use of the airport by Boeing. This includes both commercial and military aircraft. Therefore, the forecast growth in commercial aircraft is an indicator of growth in activity levels at the Airport.

The U.S. commercial fleet mix is undergoing transformation. The mainline carriers are retiring older, less fuel efficient aircraft (e.g., 737-300/400/500 and MD-80) and replacing them with more technologically advanced A320 and 737-700/ 800/ 900 aircraft. The regional carriers are growing their fleet of 70- and 90-seat regional jets and reducing their fleet of 50-seat jets.

According to the FAA forecasts, the number of U.S. commercial aircraft is forecast to grow from 7,025 in 2012 to 8,554 in 2033, an average annual growth rate of 0.9 percent or 73 aircraft annually. The mainline air carrier passenger fleet (narrow-body and wide-body aircraft with 90 or greater seating capacity) is forecast to grow from 3,782 in 2012 to 4,907 in 2033. The regional carriers are forecast to grow from 2,403 aircraft in 2012 to 2,436 by 2033. Dedicated air cargo aircraft are forecast to grow from a 2012 total of 840 to 1,211 by

2033. **Exhibit 2B** shows the historical and forecast U.S. commercial passenger aircraft fleet.

WORLD COMMERCIAL AIRCRAFT FLEET (BOEING FORECAST)

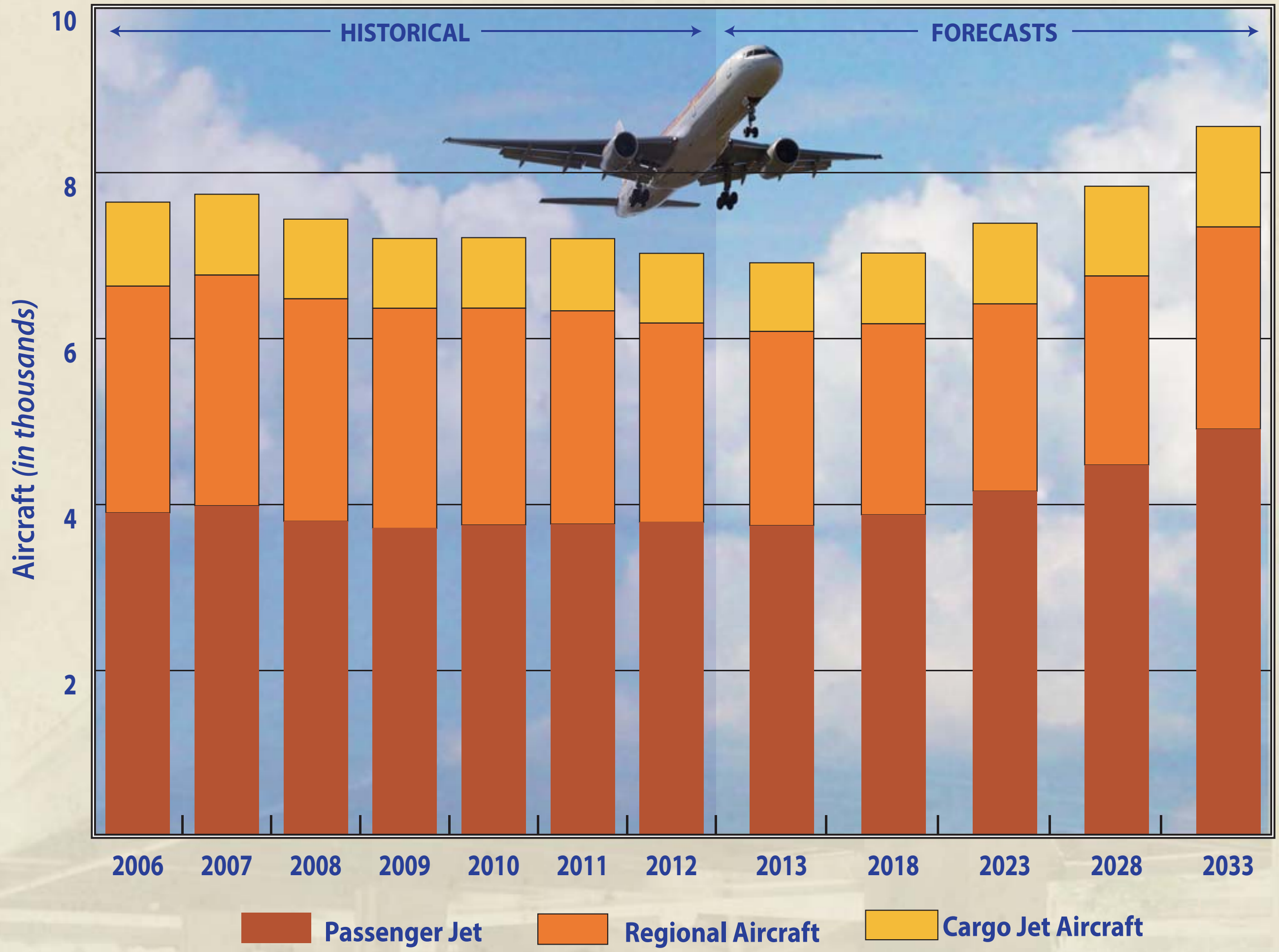
Boeing publishes an annual long-term market forecast to help shape internal product strategy, and to help airlines, suppliers, and the financial community, make informed decisions. The most recent forecasts cover the years from 2012 to 2032. Boeing forecasts a long-term demand for 35,280 new airplanes. Approximately 70 percent of these new deliveries are forecast to be single-aisle aircraft, reflecting growth in various emerging markets, especially China, South Asia, Southeast Asia, Asia Pacific, and Africa. **Exhibit 2C** presents information related to Boeing's historical orders and deliveries, as well as their worldwide forecast for transport aircraft, which includes passenger, cargo, and military aircraft.

By 2032, Boeing forecasts that the worldwide commercial fleet will grow an average of 3.6 percent annually to double in size from 20,310 airplanes in 2012 to 41,240 in 2032. Of this total, 15,800 aircraft are forecast to be retired with 1,450 of them to be converted to freighter aircraft. New deliveries total 35,280 worldwide.

Total orders for Boeing aircraft are on the rise following a steep downturn that coincided with the international recession of 2008-2009. In 2009, Boeing only received 246 orders for aircraft, the lowest total since 1994 (125). By 2012, aircraft orders had climbed to a new high of 1,338. By September 2013, Boeing had logged 1,023 new orders and are on pace to set a new record high. Deliveries are also increasing rapidly with 601 in 2012. This is the second highest number of deliveries (620 in 1999) within the last 20 years. **Table 2B** presents a history of worldwide commercial jet deliveries and Boeing's share.

The prospects for Boeing appear quite positive, particularly on the international market. That portion of new aircraft manufactured by Boeing in the State of Washington will likely utilize Grant County International Airport for testing of most aircraft.

Deloitte is an international company that produces market watch reports for various industries. One such report, *2013 Global Aerospace and Defense Industry Outlook*, presents a very optimistic view of commercial aircraft manufacturing. According to the report, "The commercial aircraft segment is experiencing a virtually unprecedented and prolonged up-cycle, as demonstrated by recent increases in production by both Boeing and Airbus. This trend is being driven by growth in passenger travel demand particularly in Asia and the Middle East, as well as the need for more fuel efficient aircraft."



	PASSENGER JET AIRCRAFT			CARGO JET AIRCRAFT		REGIONAL AIRCRAFT		
Year	Large Narrowbody	Large Widebody	Regional Jets	Large Narrowbody	Large Widebody	Less than 40 seats	Over 40 seats	Total U.S. Commercial Aircraft
2000	3,749	713	26	674	390	1,623	651	7,826
2012 (est)	3,148	524	110	265	575	677	1,726	7,025
2018	3,113	625	136	253	600	558	1,744	7,029
2023	3,277	755	126	288	684	437	1,821	7,388
2033	3,722	1,059	126	333	878	142	2,294	8,554
AAGR 2012-2033	0.8%	3.4%	0.6%	1.1%	2.0%	-7.2%	1.4%	0.9%

AAGR: Average Annual Growth Rate
Source: FAA Aerospace Forecast: Fiscal Years 2013-2033

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BOEING HISTORICAL ORDERS

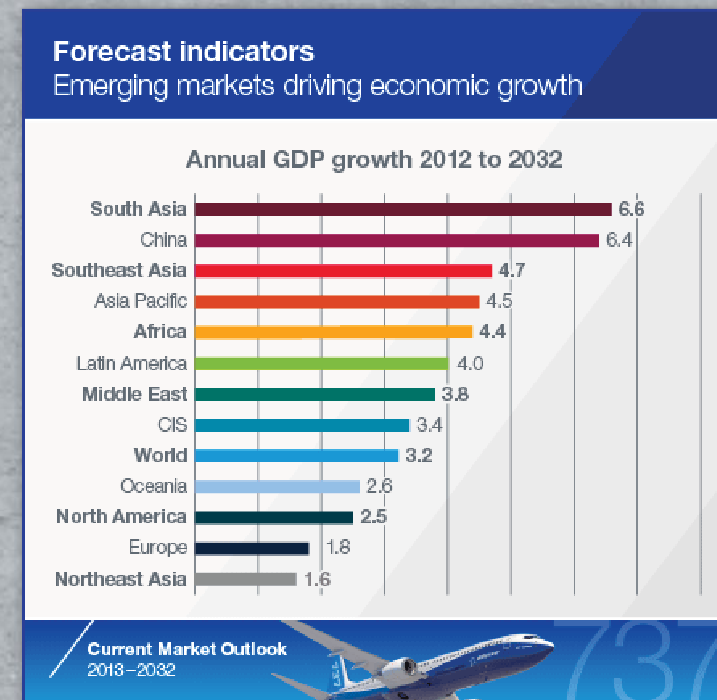
Year	AIRCRAFT TYPE 717	737	747	757	767	777	787	Order Total
2013*	0	842	5	0	0	44	132	1023
2012	0	1184	7	0	22	75	50	1338
2011	0	590	7	0	42	194	45	878
2010	0	475	1	0	3	75	36	590
2009	0	180	5	0	7	30	24	246
2008	0	455	2	0	24	39	59	579
2007	0	732	20	0	36	110	284	1182
2006	0	704	54	0	10	76	100	944
2005	0	546	48	0	19	153	197	963
2004	8	151	10	0	8	42	52	271
2003	8	204	4	7	11	13	0	247
2002	32	162	17	0	8	32	0	251
2001	3	188	16	37	40	30	0	314

BOEING HISTORICAL DELIVERIES

Year	AIRCRAFT TYPE 717	737	747	757	767	777	787	Delivery Total
2013*	0	330	16	0	17	73	40	476
2012	0	415	31	0	26	83	46	601
2011	0	372	9	0	20	73	3	477
2010	0	376	0	0	12	74	0	462
2009	0	372	8	0	13	88	0	481
2008	0	290	14	0	10	61	0	375
2007	0	330	16	0	12	83	0	441
2006	5	302	14	0	12	65	0	398
2005	13	212	13	2	10	40	0	290
2004	12	202	15	11	9	36	0	285
2003	12	173	19	14	24	39	0	281
2002	20	223	27	29	35	47	0	381
2001	49	299	31	45	40	61	2(MD-11)	527

*Through September 2013
Source: Boeing Orders and Deliveries, accessed on 10.10.13 (http://www.boeing.com/boeing/commercial/cmo/index.page?)

FORECAST INDICATORS



FORECAST

Airplanes in service
2012 and 2032

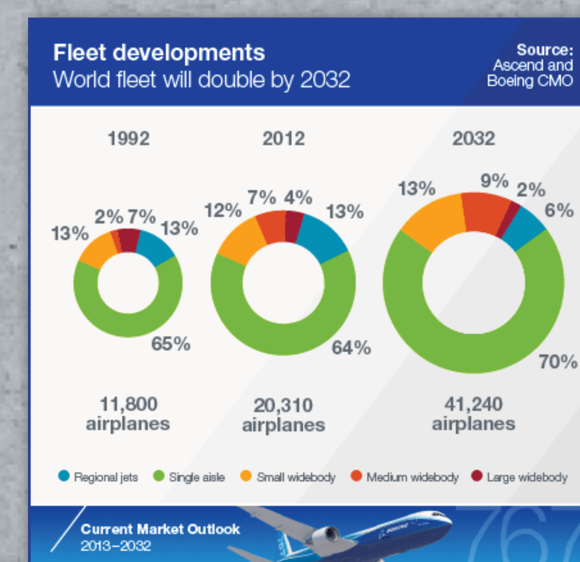
Size	2012	2032
Large widebody	780	910
Medium widebody	1,520	3,610
Small widebody	2,310	5,410
Single aisle	13,040	29,130
Regional jets	2,660	2,180
Total	20,310	41,240

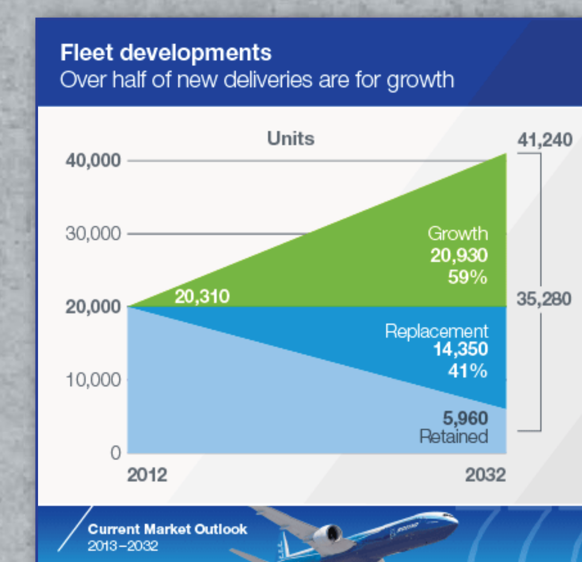
Demand by size
2013 to 2032

Size	New airplanes	Value ($B)
Large widebody	760	280
Medium widebody	3,300	1,090
Small widebody	4,530	1,100
Single aisle	24,670	2,290
Regional jets	2,020	80
Total	35,280	4,840

*$ values throughout the CMO are catalog prices.

Current Market Outlook
2013–2032





PORT OF MOSES LAKE

Exhibit 2C
BOEING WORLDWIDE
GROWTH FORECAST

TABLE 2B
Commercial Jet Deliveries
Boeing and Worldwide

Year	Worldwide Deliveries	Boeing Deliveries	Boeing Percent
2000	1103	489	44%
2001	1197	527	44%
2002	999	381	38%
2003	917	281	31%
2004	929	285	31%
2005	939	290	31%
2006	1042	398	38%
2007	1124	441	39%
2008	1080	375	35%
2009	1164	481	41%
2010	1106	462	42%
2011	1167	477	41%
2012	1309	601	46%
AAGR	1.33%	1.60%	

Source: SpeedNews.com; Boeing

UNMANNED AIRCRAFT SYSTEMS (UAS)

The following is excerpted and summarized from the *FAA Aerospace Forecast: Fiscal Years 2013-2033.* The Teal Group provided much of the information in the following UAS discussion.

Unmanned Aircraft Systems (UAS) are currently the most dynamic growth sector within the aviation industry and have two distinctive characteristics. First, they have no human pilot/operator onboard and second, they are remotely operated by a pilot using data link transmissions. Worldwide annual spending on research, development, testing, and evaluation procurement is forecast to increase from $6.6 billion in 2013, to $11.4 billion in 2022 for all UAS. Over the next ten years, total UAS spending worldwide is forecast at $89.1 billion.

Most UAS were initially developed for military applications but have great potential for cross-over to commercial and civil markets. The most popular military UAS use is for reconnaissance and surveillance, so it is presumed that these types of operations would be adopted more quickly. As such, it is expected that search and rescue will be an extremely viable application for UAS.

In 2009, the FAA created the Unmanned Aircraft Program Office (UAPO) to integrate UAS safely and efficiently into the National Airspace System and coordinate all FAA certification and operational policy activities related to UAS. In October 2010, the UAPO published a

Civil/Public UAS roadmap to clarify the path toward certification and operation of UAS in the NAS. The FAA is continuing to develop a plan to accelerate the integration of civil UAS into the NAS.

With all the possible applications for unmanned aircraft, the FAA forecasts the largest near-term growth in civil/ commercial unmanned operations will be in the area of Small Unmanned Aircraft Systems (SUAS). The FAA is continuing to make a significant effort to develop the necessary regulatory framework for Small Unmanned Aircraft Systems to operate. The regulatory framework will include standards, airworthiness criteria, certification, and procedures for sense-and-avoid systems, as well as protocols to be used for the certification of command control and communication systems in the defined flight environment.

It is expected that the civil UAS markets will evolve within the constraints of the regulatory and airspace requirements. Once enabled, commercial markets will develop and demand will be created for additional UAS and the accompanying services they can provide. Once enabled, it is estimated that roughly 7,500 commercial UAS would be viable at the end of five years (2018).

As discussed in Chapter One, the Port of Moses Lake is a partner in the Pacific NW Unmanned Aircraft Systems Flight Center, which is the consortium submitting for consideration as one of the six FAA UAS test sites. (Note: The Airport was not one of the six selected sites.)

SOCIOECONOMIC PROJECTIONS

The socioeconomic conditions provide an important baseline for preparing aviation demand forecasts. Local socioeconomic variables such as population, employment, and income are indicators for understanding the dynamics of the community and can relate to local trends in aviation activity. Analysis of the demographics of the airport service area will give a more comprehensive understanding of the socioeconomic situations affecting the region which supports Grant County International Airport. The following is a summary of the historical demographic trends presented in Chapter One, as well as forecasts of those socioeconomic characteristics.

Table 2C summarizes historical and forecast population, employment, and income estimates for Grant County and the State of Washington. Over the next 20 years, the population of Grant County is projected to add 34,478 people. This equates to an average annual growth rate of 1.6 percent. Employment is projected to grow at 1.36 percent annually. Income for Grant County is projected to grow at 1.49 percent annually. While employment and income growth projections are similar to those for the state, population growth in the county is projected to exceed the state growth rate.

TABLE 2C
Demographic Trends and Forecast

	HISTORIC				FORECAST			
	2000	2010	2013	AAGR 2000-2013	2018	2023	2033	AAGR 2013-2033
Grant County								
Population	74,698	89,120	91,800	1.60%	100,694	109,067	126,278	1.60%
Employment	37,731	41,768	43,467	1.09%	46,524	49,663	56,255	1.36%
Income (PCPI)	$23,105	$27,139	$27,812	1.44%	$29,574	$31,917	$37,584	1.49%
Washington State								
Population	5,894,143	6,724,540	6,882,400	1.20%	7,253,535	7,638,405	8,350,295	0.99%
Employment	3,522,928	3,793,568	3,894,171	0.77%	4,212,143	4,553,131	5,312,443	1.54%
Income (PCPI)	$36,084	$38,338	$39,502	0.70%	$41,560	$44,641	$52,478	1.44%

AAGR: Average annual compound growth rate

PCPI: Per Capita Personal Income ($2005)

Sources: Population from Washington Office of Financial Management; Employment and Income from Woods & Poole Economics - Complete Economic Demographic Data Source (CEDDS-2013)

COMMERCIAL AIRLINE POTENTIAL

Grant County International Airport is not currently served by a scheduled commercial airline. In the past, a significant demand has existed for service to and from the Airport. As noted previously on Exhibit 1H, from 1995 through 2001, the Airport had more than 10,000 annual enplanements. Airports that reach this threshold receive a minimum $1 million entitlement from the FAA for capital improvements. From 2000 through 2010, the airport had less than 5,000 enplanements. Service was ultimately discontinued in June 2010.

Grant County International Airport could see a return of commercial service in the future. They have a state-of-the-art commercial terminal building and the apron space to accommodate renewed service. The Airport has maintained its Part 139 operating certificate and has an on airport ARFF facility. The runways are well maintained and can accommodate any aircraft manufactured.

The primary challenge to renewed service is the availability of service in the region. Commercial service is currently available at Pangborn Memorial Airport in East Wenatchee (70 miles to the west); Tri-Cities Airport in Pasco (70 miles to the south); Spokane International Airport (100 miles to the east).

The commercial airline industry has evolved significantly in the past decade. Service to smaller communities has been reduced or eliminated. The service area of airports has expanded as travelers are more willing to drive significant distances to take advantage of lower fares. For some airports, the passenger catchment area can be up to a three hour drive.

While there are challenges for renewed commercial service at Grant County International Airport, it is feasible. For planning purposes an enplanement forecast has been developed for this Master Plan and is presented in **Table 2D**. The forecast is based primarily on historical comparison of the number of local enplanements as a percentage of national enplanements as documented by the FAA.

TABLE 2D
Commercial Enplanement Forecast
Grant County International Airport

Year	U.S. Domestic Enplanements (millions)	Grant County International Airport Enplanements	Percent of National Enplanements
1995	531.1	10,831	0.002039%
1996	558.1	10,837	0.001942%
1997	577.8	11,468	0.001985%
1998	590.4	11,436	0.001937%
1999	610.9	11,861	0.001942%
2000	641.2	10,634	0.001658%
2001	625.8	11,534	0.001843%
2002	575.1	5,667	0.000985%
2003	587.8	4,976	0.000847%
2004	628.5	4,906	0.000781%
2005	669.5	4,822	0.000720%
2006	668.4	4,966	0.000743%
2007	690.1	730	0.000106%
2008	680.7	1,369	0.000201%
2009	630.8	2,920	0.000463%
2010	635.2	1,442	0.000227%
Constant Market Share of 1995-2005 Average			
2018	736.9	11,173	0.001516%
2023	809.1	12,268	0.001516%
2033	961.0	14,571	0.001516%
Increasing Market Share (Recapture High Share of National Enplanements)			
2018	736.9	11,790	0.001600%
2023	809.1	14,564	0.001800%
2033	961.0	21,142	0.002200%

From 1995 to 2001, enplanements and the Airport's market share of national enplanements were fairly steady. There was an average of 11,229 enplanements and an average market share of U.S. enplanements of 0.001907 percent. From 2002-2006 the airport enplanements and market share of U.S. enplanements were approximately half of the previous timeframe.

Utilizing historical airport enplanement levels as a percentage of U.S. enplanements, two forecasts were developed. The first considers the Airports average market share of U.S.

enplanements from 1995 to 2005, which was 0.001516 percent. This results in 11,173 enplanements by 2018 and 14,571 by 2033. The second considers an increasing market share that ultimately recaptures the high market share of Airport enplanements to U.S. national enplanements (approximately 0.0022 percent). This forecast results in 11,790 enplanements by 2018 and 21,142 by 2033. For planning purposes, the increasing market share enplanement forecast will serve as the selected forecast for commercial airline potential.

In today's commercial service industry, it is common for communities to provide incentives for airlines to initiate service. This is often in the form of direct subsidies and marketing support. The most important factor in creating and sustaining scheduled air service is the frequency of flights and air fares. Competitive fares will attract travelers who normally drive to other airports while the frequency of flights offered will make travel more convenient.

The reality is that Grant County's location and market size present many challenges to air service potential. However, the proper service with connecting hub capabilities may lead to a sustainable air service program at the Airport.

GENERAL AVIATION FORECASTS

To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. Indicators of general aviation demand include:

- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Peaking Period Operations

The remainder of this chapter will examine historical trends with regard to these areas of general aviation and project future demand for aviation activity at the Airport. The forecasts, once approved by the FAA, will become the basis for planning future facilities, both airside and landside, at the Airport.

REGISTERED AIRCRAFT FORECAST

The number of based aircraft is the most basic indicator of general aviation demand at an airport. By first developing a forecast of based aircraft, other demand segments can be projected utilizing the forecast trend in based aircraft. One method of forecasting based aircraft is to first examine local aircraft ownership by reviewing aircraft registrations in the region. **Table 2E** presents historical data regarding aircraft registered in Grant County, Washington, which approximates the general aviation service area for the Airport.

TABLE 2E
Registered Aircraft Fleet Mix in Grant County, WA

Year	Single Engine Piston	Multi-Engine Piston	Jet	Turboprop	Helicopter	Other	Total
1994	183	13	0	4	6	9	215
1995	197	14	0	6	7	10	234
1996	193	13	0	8	8	9	231
1997	208	12	1	7	7	11	246
1998	211	14	2	7	6	13	253
1999	215	13	2	7	6	13	256
2000	214	19	3	6	8	19	269
2001	206	17	3	9	5	23	263
2002	209	17	3	9	5	23	266
2003	208	10	4	15	5	19	261
2004	210	10	2	12	5	18	257
2005	219	10	2	13	5	14	263
2006	225	10	1	8	5	13	262
2007	229	9	1	6	5	19	269
2008	222	9	2	11	4	24	272
2009	229	10	0	10	4	26	279
2010	240	11	0	11	4	24	290
2011	244	13	0	12	3	24	296
2012	239	15	0	13	2	25	294
Average Annual Growth Rate from 1994 to 2012:							1.66%

Note: 'Other' includes gliders, balloons, ultralights, gyroplanes, and powered parachutes.
Source: FAA Aircraft Registry Database; FAA Census of U.S. Civil Aircraft

Grant County has seen steady growth in the number of aircraft registered to addresses in the county. In 1994, there were 215 aircraft registered, and by 2012, this figure had grown to 294, an annual growth rate of 1.66 percent. Utilizing the historical registered aircraft data, several projections have been developed.

Table 2F summarizes the results of a time-series trend line analysis and several regression analyses. None of these resulted in an r^2 value above 0.90. Essentially, the historical trend in registered aircraft did not correlate well with the aviation demand factors analyzed. The factors considered included forecasts of active aircraft in the U.S. general aviation fleet, as well as population, employment, and income. Therefore, the resulting registered aircraft forecasts arrived at through analytical means (regression and time-series analysis) are not considered reliable and were not utilized in the registered aircraft forecast.

TABLE 2F
Grant County Registered Aircraft Analytical Analysis

2012 Registered Aircraft: 294	r^2	2018	2023	2033	AAGR 2012-2033
TIME-SERIES					
Year - Time Series	0.6589	305	319	347	0.79%
REGRESSION VARIABLES					
Year, U.S. Active Aircraft, Pop., Emp., PCPI	0.8967	316	339	381	1.25%
Year, U.S. Active Aircraft, Pop., PCPI	0.8935	318	341	382	1.26%
Year, U.S. Active Aircraft, Pop., Emp.	0.8918	313	336	380	1.22%
Year, Pop., Emp., PCPI	0.8553	310	332	380	1.23%
Year, Pop., Emp.	0.8546	309	331	380	1.22%
Year, Pop., PCPI	0.8365	313	336	383	1.26%
Year, Pop.	0.8152	310	332	380	1.23%
U.S. Active Aircraft, Pop., Emp., PCPI	0.8100	317	335	363	1.01%
U.S. Active Aircraft, Pop., PCPI	0.8074	315	333	361	0.98%
Average*	**0.8512**	**314**	**335**	**377**	**1.18%**

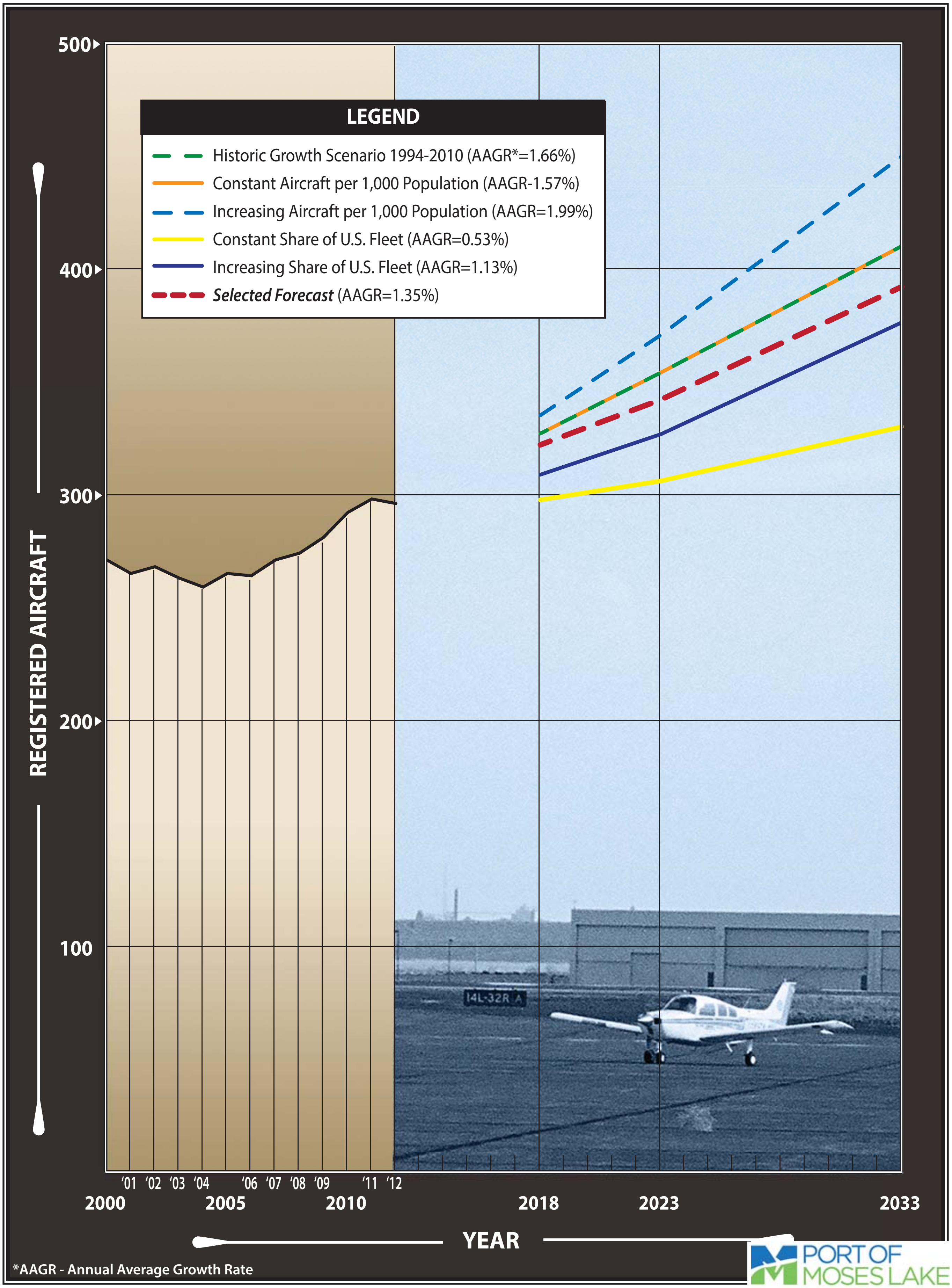
*Average does not include Time Series Regression
Source: Coffman Associates analysis

Several additional forecasting methods were then employed to arrive at a reasonable 20-year forecast of registered aircraft in the county. These forecasts are presented in **Exhibit 2D**. The first forecast utilizes historical growth trend line analysis to project a straight trend line into the future. The historic average annual growth rate of 1.66 percent is simply extrapolated into the future.

The next two forecasts consider the relationship between historical registered aircraft and the population. By maintaining the same ratio of aircraft per 1,000 people, a long term forecast emerges. The second forecast considers an increasing ratio of aircraft to the population. In the recent past, from 2008-2011 for example, the aircraft to population ratio has increased; therefore, an increasing ratio forecast should be considered.

Two additional forecasts have been developed utilizing a market share ratio of the active U.S. general aviation fleet as forecast by the FAA. In 2012, the Grant County registered aircraft represented 0.1332 percent of the total general aviation fleet of 220,670. This was the second highest ratio of the last 12 years (2011 being the highest). By maintaining this ratio as a constant, a long term forecast emerges. Because the ratio of Grant County registered aircraft to total U.S. general aviation aircraft has been growing for the past several years, an increasing market share forecast has also been developed.

Each of the market share forecasts appears reasonable. Since the precise nature of the future economy cannot be known, an approximate average of the five forecasts has been chosen as the selected forecast of registered aircraft for Grant County. This results in registered aircraft increasing from 294 currently to 320 in the next five years, 340 in 10 years, and 390 in 20 years. These registered aircraft forecasts will be one element considered in the based aircraft forecasts to follow.



Source: Coffman Associates analysis.

PORT OF MOSES LAKE

Exhibit 2D
GRANT COUNTY
REGISTERED AIRCRAFT FORECAST

BASED AIRCRAFT FORECASTS

Prior to generating statistical forecasts of based aircraft for the Airport, it is important to establish the current number of based aircraft at the Airport. Until recently, the FAA has not required airports to maintain annual based aircraft figures. For this study, individual aircraft were physically counted in 2013 to establish a baseline of based aircraft. Currently, there are a total of 81 aircraft based at the Airport. This total is comprised of 73 single engine piston aircraft, three multi-engine aircraft, three turboprops, and two helicopters. Historical based aircraft information for the Airport is much less reliable.

Existing Forecasts

There are two sets of current based aircraft forecasts available for analysis. The first is the FAA's *Terminal Area Forecast* (TAF). The TAF is a generalized annual forecast of Airport activity produced by the FAA. It can be used for long term planning when other statistical measures support its forecasts. The primary function of the TAF is not for airport planning at all; instead, it is used by the FAA as a tool to establish various work load measures. Nonetheless, the TAF is an important starting point when forecasting aviation demand on the local level.

The TAF for Grant County International Airport indicates there are only 37 aircraft based at the Airport currently. The physical count conducted in 2013 showed that there are 81 aircraft based at the Airport. Therefore, the TAF is not considered a reasonable forecast for based aircraft at the Airport.

The second existing forecast of based aircraft is the Airport Master Plan completed in 2005. The base year of these forecasts was 2001 when 96 based aircraft were identified. The long term based aircraft forecast figure was 113 by the year 2021. **Table 2G** shows the two existing forecasts of based aircraft, interpolated and extrapolated to the plan years of this Master Plan.

TABLE 2G
Existing Based Aircraft Forecasts
Grant County International Airport

Existing Projection Source	Base Year of Study (Based Aircraft)	2012	2018	2023	2033	AAGR
2013 FAA Terminal Area Forecast (TAF)	2012 (37)	37	40	42	43	0.72%
2005 Master Plan	2001 (96)	106	111	115	122	0.75%

AAGR: Average annual growth rate
Note: Projections adjusted to plan years of this study.
Source: FAA TAF and 2005 Master Plan; Coffman Associates analysis

Based Aircraft Distribution Forecast

The first forecast generated for based aircraft utilizes the previously determined forecast of registered aircraft for Grant County. This is a distributive forecast that recognizes that there are several capable public use general aviation airports in Grant County. By taking the forecast number of registered aircraft and distributing a relative percent as based aircraft, a forecast emerges.

Grant County International Airport accounted for 27.55 percent of the registered aircraft in Grant County. The other main public use general aviation airports, Moses Lake Municipal and Ephrata Municipal Airport, accounted for a combined 38.78 percent. Presumably, a significant portion of the remaining aircraft registered in the county are based at small private landing strips. Some are likely based at airports located outside the county and perhaps outside the state. Nonetheless, the relative distribution of registered aircraft provides insight into the based aircraft market.

By maintaining a constant market share of registered aircraft, a forecast of based aircraft is presented. For Grant County International Airport, this forecast results in 88 based aircraft by 2018, 94 by 2023, and 107 based aircraft by 2033. **Table 2H** presents this analysis.

TABLE 2H
Based Aircraft System Distribution for Grant County
Grant County International Airport

Year	Grant County Registered Aircraft	Aircraft Based at MWH	Percent of Grant County Registered Aircraft Based at MWH	Aircraft Based at W20	Aircraft Based at EPH	Percent of Grant County Registered Aircraft Based at W20 and EPH
2012	294	81	27.55%	41	73	38.78%
Selected Forecast - Constant Market Share						
2018	320	88	27.55%	45	79	38.78%
2023	340	94	27.55%	47	84	38.78%
2033	390	107	27.55%	54	97	38.78%
AAGR 2012-2033:		1.33%		1.32%	1.36%	

MWH: Grant County International Airport
W20: Moses Lake Municipal Airport
EPH: Ephrata Municipal Airport

Source: Coffman Associates analysis

Comparative Based Aircraft Forecasts

As a point of comparison, the forecast growth rates of several sources of aviation demand have been applied to the known current based aircraft figure of 81 aircraft. These are presented in **Table 2J**. All of the comparative forecasts presented in the table have been set to a baseline of 81 based aircraft, as physically counted by Airport management in 2013.

From there, several available growth rates or elements related to aviation demand have been applied.

TABLE 2J
Based Aircraft Growth Rate Forecasts
Grant County International Airport

	2012 (Base Year)	2018	2023	2033	AACGR 2012-2033
Projections					
2013 FAA MWH TAF Based Aircraft Growth Rate	81	85	88	94	0.71%
2013 FAA State TAF Based Aircraft Growth Rate	81	86	91	100	1.01%
2013 FAA Active Aircraft Forecast Growth Rate	81	83	86	90	0.50%
2005 Master Plan Based Aircraft Growth Rate	81	85	89	96	0.81%
Grant County Population Growth Rate	81	89	96	113	1.60%
Grant County Employment Growth Rate	81	88	94	108	1.38%
Grant County Income Growth Rate	81	89	95	111	1.51%
Grant County Registered Aircraft Growth Rate*	**81**	**88**	**94**	**107**	**1.33%**

AAGR: Average annual growth rate
*Selected Based Aircraft Forecast
Source: Coffman Associates analysis

The first forecast considers the growth rate associated with the FAA TAF for the Airport, which is 0.71 percent annually. The next forecast considers the statewide TAF growth rate in based aircraft (1.01%). The third considers the FAA forecast growth rate for active general aviation aircraft in the U.S. fleet (0.5%). The fourth considers the growth rate from the previous Airport Master Plan (0.81%) as extrapolated to the plan years of this Master Plan.

Three additional forecasts consider a direct relationship with population, employment, and income forecast growth. The last forecast presented applies the growth rate derived from the forecast of registered aircraft previously presented.

Each of these appears to verify that the distribution forecast previously presented is viable. There does not appear to be any significant outliers that would call into question the selected forecast of based aircraft.

SELECTED BASED AIRCRAFT FORECAST

The first forecast presented which distributes the forecast of registered aircraft to the airports in Grant County is the selected forecast. This forecast utilizes current FAA data of registered aircraft, applies statistical methods using variables known to influence aircraft ownership, and distributes those aircraft to the public use general aviation airports in Grant County.

The following is the based aircraft forecast for Grant County International Airport to be utilized for this Airport Master Plan:

- **Short Term – 88**
- **Intermediate Term – 94**
- **Long Term - 107**

The selected forecast falls within the planning envelope and is considered reasonable when compared to other existing forecasts. The average annual growth rate over the next 20 years is 1.33 percent. **Exhibit 2E** presents the based aircraft forecasts and the selected forecasts.

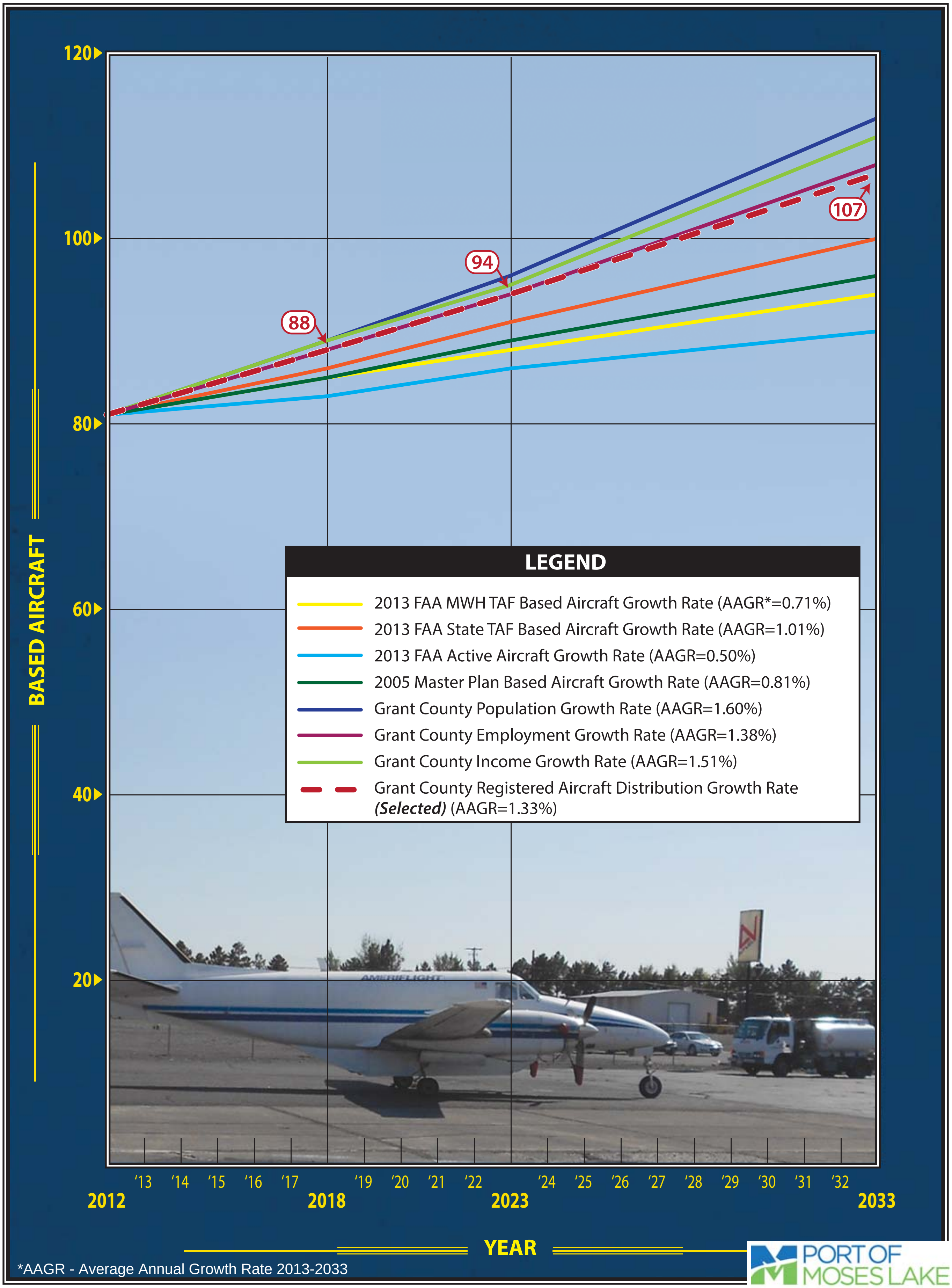
BASED AIRCRAFT FLEET MIX PROJECTION

Knowing the aircraft fleet mix expected to base at an airport is necessary to properly plan facilities that will best serve the level of activity and the type of activities occurring at the airport. The existing based aircraft fleet mix is comprised of 73 single engine aircraft, three multi-engine piston aircraft, three turboprops and two helicopters.

Several factors must be considered when projecting a future fleet mix. As discussed previously, on the national level, the growth areas for the general aviation fleet are in turbine-powered aircraft (business jets and helicopters), while piston-powered aircraft are forecast to remain relatively flat.

On a more local level, the fleet mix for registered aircraft in Grant County dating back to 1994 were identified previously in **Table 2C**. Piston-powered aircraft have consistently accounted for 85-90 percent of registered aircraft. There are currently 13 registered turboprops and two helicopters. No business jets are currently registered in the county. The "Other" category represents 8.5 percent of county aircraft registrations. These include gliders, ultralights, balloons, and powered parachutes. These aircraft are not anticipated to base at Grant County International Airport in any significant numbers.

Table 2K presents the forecast fleet mix of based aircraft for the Airport. The fleet mix trend closely mirrors the pattern of county registered aircraft and the national trends of the past 18 years. Single engine piston aircraft are forecast to continue to account for the vast majority of based aircraft, while modestly decreasing as a percentage of the total based aircraft. Other categories of aircraft are forecast to grow modestly. With the continued growth of business and industry in Grant County, the forecast indicated a potential increase in turboprops and business jets to the Airport.



Source: Coffman Associates analysis.

Exhibit 2E
BASED AIRCRAFT FORECASTS

TABLE 2K
Based Aircraft Fleet Mix
Grant County International Airport

Aircraft Type	2013	Percent	2018	Percent	2023	Percent	2033	Percent
Single Engine Piston	73	90.12%	76	86.36%	78	82.98%	84	78.50%
Multi-Engine Piston	3	3.70%	4	4.55%	4	4.26%	4	3.74%
Turboprop	3	3.70%	4	4.55%	5	5.32%	6	5.61%
Jet	0	0.00%	1	1.14%	2	2.13%	3	2.80%
Helicopters	2	2.47%	2	2.27%	3	3.19%	5	4.67%
Other/Experimental	0	0.00%	1	1.14%	2	2.13%	5	4.67%
Total	**81**	**100.00%**	**88**	**100.00%**	**94**	**100.00%**	**107**	**100.00%**

Source: Coffman Associates analysis

ANNUAL OPERATIONS

The airport traffic control tower (ATCT) located on the Airport collects information regarding aircraft operations (takeoffs and landings). Aircraft operations are reported in four general categories: air carrier, air taxi, general aviation, and military. Air carrier operations are those aircraft with 59+ passenger seats and/or more than 18,000 pounds payload. Air taxi operations have fewer than 59 passenger seats and/or less than 18,000 pounds payload. General aviation operations include a wide range of activity from personal to business and corporate uses. Military operations include those operations conducted by various branches of the U.S. military. Each of these categories of operations will be forecast independently, and then combined to show a total operations forecast.

Aircraft operations are further classified as local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Generally, local operations are characterized by training operations. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Typically, itinerant operations increase with business and commercial use since business aircraft are used primarily to transport passengers from one location to another.

Exhibit 1H, presented previously, showed the historical operations by category at Grant County International Airport since 1990. In 2012, the airport experienced 58,878 operations. Of this total, 43 percent were itinerant in nature and 57 percent were local operations. Total operations appear to have leveled off at around 60,000 for the past several years; however, prior to 2005 the Airport regularly experienced more than 100,000 annual operations. In the 1990s, the airport experienced, on average, nearly 137,000 annual operations. **Table 2L** presents the last 10 years of tower operations counts.

As of this writing (October 2013), tower operations data is available through August 2013. It became clear that the Airport was on track to far exceed the 2012 operations figure. As a result, a 12-month estimate for 2013 operations is considered. The 12-month total from September 2012 through August 2013 is shown to represent the 2013 total operations. As can be seen, the Airport is on pace to realize more than 72,000 operations in 2013, which is a significant increase from the 2012 figure. It appears that the Airport is beginning to realize an increasing trend in operations toward levels experienced before the recession of 2008-2009.

TABLE 2L
Historical Operations
Grant County International Airport

	Itinerant Operations					Local Operations			
Year	Air Carrier	Air Taxi	General Aviation	Military	Total	Civil	Military	Total	Total Operations
2013[1]	8,094	2,359	16,626	7,730	34,809	27,915	9,729	37,644	72,453
2012[2]	4,362	2,403	12,172	6,266	25,203	25,078	8,597	33,675	58,878
2011[2]	6,188	2,360	12,136	14,708	35,392	19,164	4,772	23,936	59,328
2010	5,248	2,099	12,828	10,504	30,679	20,401	5,967	26,368	57,047
2009	5,175	2,637	13,735	8,208	29,755	22,041	11,519	33,560	63,315
2008	5,753	2,346	15,166	7,970	31,235	24,295	14,995	39,290	70,525
2007	9,362	2,335	13,879	9,887	35,463	19,308	16,428	35,736	71,199
2006	11,594	3,997	15,179	8,858	39,628	20,108	19,265	39,373	79,001
2005	7,015	4,926	18,227	7,444	37,612	25,940	16,979	42,919	80,531
2004	10,122	4,868	21,340	9,815	46,145	33,703	24,055	57,758	103,903

[1] September 2012 through August 2013
[2] Local operations from August 2011 through June 2012 were not properly counted by the ATCT. Local operations counts for August 2012-June 2013 were used to update 2011 and 2012.

Source: Federal Aviation Administration (FAA) - Air Traffic Activity System (ATADS)

Nighttime Operations

Grant County International Airport has an air traffic control tower which is open from 6:00am to 10:00pm. When the tower is closed, the Airport continues to experience significant aviation activity. While most general aviation airports might expect 1-3 percent additional itinerant operations when a tower is closed, Grant County International Airport experiences an increase of at least 10 percent above tower-counted operations.

The primary source of nighttime operations is military training activity from Joint Base Lewis-McChord. According to base representatives, C-17 aircraft perform at least 50 landings per week when the tower is closed. This equates to 5,200 additional annual operations at the Airport. This activity primarily takes place on Runway 9-27, the military assault strip.

The operations forecasts to follow will be developed considering actual tower operations counts as the baseline. Nighttime operations, including both military and itinerant general aviation operations, will then be added.

EXISTING TOTAL OPERATIONS FORECASTS

There are two primary existing forecasts of total operations for Grant County International Airport which are presented in **Table 2M**. The first is the FAA TAF which is produced annually. The second is the forecast from the previous airport master plan which has a base year of 2001 and is thus somewhat dated.

TABLE 2M
Existing Total Operations Forecasts
Grant County International Airport

Year	Actual ATCT Count	FAA TAF	2005 Master Plan[3]
2000	125,156	128,800	74,935 (2001)
2012	58,878[1]	30,545	120,230
2013	72,453[2]	32,310	121,073
2018		32,938	125,287
2023		33,592	134,484
2033		35,001	173,420
AAGR 2013-2033		0.40%	1.81%

[1] Local operations from August 2011 through June 2012 were not properly counted by the ATCT. Local operations counts for August 2012-June 2013 were used to update 2011 and 2012.
[2] September 2012 through August 2013
[3]2005 Master Plan figures extrapolated to plan years.
ATCT: Air traffic control tower
TAF: FAA *Terminal Area Forecast*
AAGR: Average annual growth rate
Source: Airport records

The TAF estimates only 32,310 total operations for 2013. This is clearly not a reliable figure for the airport since the tower count for 2012 was 58,878 and for 2013, it is 72,453. (Note: At the time of this writing, the 2013 operations count is a 12-month total from September 2012 through August 2013). The average annual growth rate from the TAF was 0.40 percent.

The 2005 Master Plan had a base forecast year of 2001, so they are somewhat dated. At the time, the Airport was realizing total operations well over 100,000 annually. For the last eight years, the airport has averaged approximately 67,000 annual operations. As can be seen from the table, the 2005 master plan forecast approximately 121,000 operations for 2013. This is approximately 50,000 more than has been counted by the tower. The average annual growth rate from 2013-2033 was 1.81 percent.

GENERAL AVIATION OPERATIONS FORECAST

Distinguishing between local and itinerant operations is an important consideration for future facility planning. An airport with a large percentage of local operations may be in need of more aircraft storage units or fuel facilities, for example. A high level of itinerant operations may be an indicator of a need for more transient apron, overnight storage, or improved navigational aids. The following sections will present a forecast envelope for general aviation, air taxi, military, and air carrier operations. These will then be combined for a total operations forecast.

Itinerant General Aviation Operations Forecast

Itinerant general aviation activity at the Airport has declined steadily in recent years. This corresponds with an overall decrease nationally. However, 2013 looks to realize a significant upward trend. There are several indicators that might suggest a potential upswing in itinerant general aviation activity will continue into the future. Positive factors include a slowly improving economy and a history at the airport of much higher itinerant general aviation operations.

In 2013, the Airport had 16,626 itinerant general aviation operations. This is an eight-year high. From 2006-2012, itinerant general aviation operations were relatively flat averaging less than 14,000 annually. From 2000-2005, the airport averaged more than 24,000 annual itinerant general aviation operations. Much of the decline likely is attributable to the recession of 2008-2009. A return to more typical levels looks to have begun in 2013.

A total of five forecasts of general aviation itinerant operations are presented on **Exhibit 2F**. The first two forecasts consider the Airport's historical market share of total U.S. itinerant general aviation operations. The first forecast reflects a moderately increasing market share, which is cautiously optimistic that the 2013 figure truly represents a trend toward normal activity levels. This forecast results in the airport growing to 19,650 annual itinerant general aviation operations by 2033. This figure remains well below what the Airport was experiencing in the early 2000s. For comparison purposes, a constant market share forecast is presented next. This forecast shows very little growth, yet it is fairly representative of the years from 2006 to 2012.

The next two forecasts consider the ratio of itinerant general aviation operations to based aircraft at the airport. Comparison to based aircraft is a common aviation forecasting technique; however, it should be noted that the forecast results include all itinerant general aviation activity, not just that activity by based aircraft. In 2001, the previous Master Plan showed that there were 280 itinerant general aviation operations per based aircraft. In 2013, this figure has decreased to 205. The first forecast utilizing itinerant general aviation operations per based aircraft maintains this ratio as a constant. The result is approximately 22,000 itinerant general aviation operations by 2033.

The second forecast utilizing operations per based aircraft considers an increasing ratio up to 250 itinerant general aviation operations per based aircraft. The result is an annual

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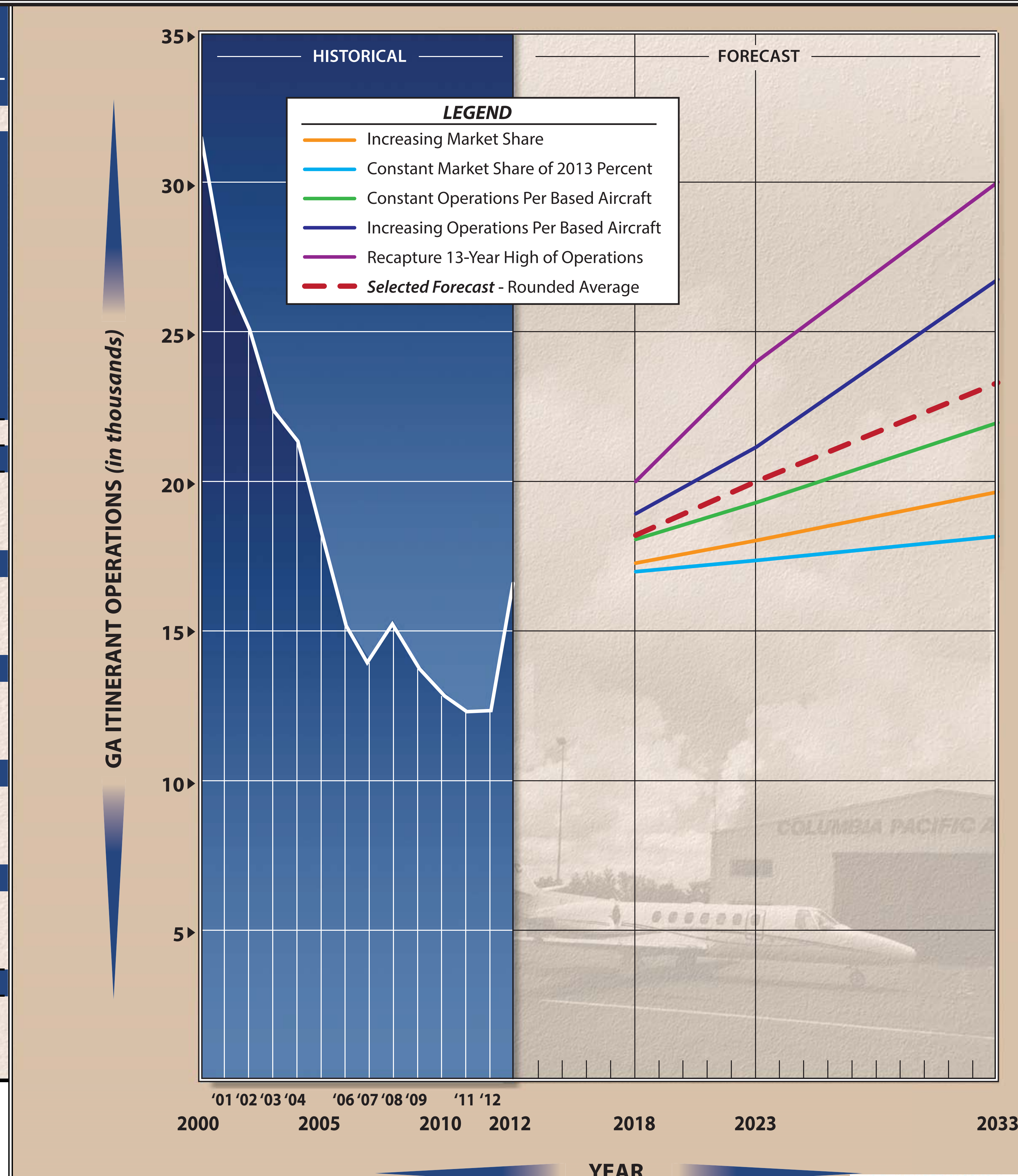
Year	MWH GA Itinerant Ops[1]	US GA Itinerant Ops[2]	Market Share Itinerant Ops	MWH Based Aircraft[3]	Itinerant Ops Per Based Aircraft
2000	31,489	22,844,100	0.1378%		
2001	26,907	21,433,300	0.1255%	96	280
2002	25,076	21,450,500	0.1169%		
2003	22,361	20,231,300	0.1105%		
2004	21,340	20,007,200	0.1067%		
2005	18,227	19,303,200	0.0944%		
2006	15,179	18,707,100	0.0811%		
2007	13,879	18,575,200	0.0747%		
2008	15,166	17,492,700	0.0867%		
2009	13,735	15,571,100	0.0882%		
2010	12,828	14,863,900	0.0863%		
2011	12,136	14,527,900	0.0835%		
2012	12,172	14,521,700	0.0838%		
2013 [4]	16,626	14,387,400	0.1156%	81	205
Increasing Market Share (AAGR = 0.84%)					
2018	17,270	14,697,600	0.1175%	88	196
2023	18,027	15,022,400	0.1200%	94	192
2033	19,650	15,719,600	0.1250%	107	184
Constant Market Share of 2013 Percent (AAGR = 0.44%)					
2018	16,984	14,697,600	0.1156%	88	193
2023	17,360	15,022,400	0.1156%	94	185
2033	18,165	15,719,600	0.1156%	107	170
Constant Operations Per Based Aircraft (AAGR = 1.40%)					
2018	18,063	14,697,600	0.1229%	88	205
2023	19,294	15,022,400	0.1284%	94	205
2033	21,963	15,719,600	0.1397%	107	205
Increasing Operations Per Based Aircraft (AAGR = 2.41%)					
2018	18,920	14,697,600	0.1287%	88	215
2023	21,150	15,022,400	0.1408%	94	225
2033	26,750	15,719,600	0.1702%	107	250
Recapture 13-Year High of Operations (AAGR = 3.00)					
2018	20,000	14,697,600	0.1361%	88	227
2023	24,000	15,022,400	0.1598%	94	255
2033	30,000	15,719,600	0.1908%	107	280
Selected Forecast - Rounded Average (AAGR = 1.70%)					
2018	18,200	14,697,600	0.1238%	88	207
2023	20,000	15,022,400	0.1331%	94	213
2033	23,300	15,719,600	0.1482%	107	218

[1] Historical data from ATCT records as reported to FAA.
[2] FAA Aerospace Forecasts 2013-2033
[3] 2001 count from previous 2005 master plan, 2013 count from airport physical count
[4] Tower count from September 2012 through August 2013
AAGR = Average Annual Growth Rate from 2013 to 2033



Source: Coffman Associates analysis

PORT OF MOSES LAKE

Exhibit 2F
ITINERANT GA
OPERATIONS FORECAST

growth rate of 2.41 percent and 26,750 operations by 2033. This figure is in the range of what was experienced in the early 2000s.

The last forecast of itinerant general aviation operations considers the potential for the airport to recapture the high level of itinerant operations experienced within the last 13 years. In 2000, the Airport had over 31,000 annual itinerant general aviation operations. The recapture forecast reflects a 2033 estimate of 30,000.

These five forecasts of itinerant general aviation operations create the planning envelope. The selected forecast is the average of these forecasts. By averaging the forecasts, the unknown future economic aviation environment is considered. By 2018, itinerant general aviation operations are estimated at 18,200 annually. By the long term, 23,300 annual itinerant general aviation operations are estimated. The overall average annual growth rate of this forecast is 1.70 percent.

Local General Aviation Operations

With 81 based aircraft, the vast majority of which are piston-powered aircraft, and the presence of the flight program at Big Bend Community College (BBCC), local general aviation operations will continue to be a significant contributor to overall activity at the Airport. In 2013, the ATCT documented 27,915 local general aviation operations. From 2007 to 2011, the airport averaged 21,000 local general aviation operations, which corresponds approximately to the national economic recession. From 2000 to 2006, the Airport averaged more than 36,000 local general aviation operations. Clearly, the Airport is beginning to experience a return to the more normal levels of the early and mid-2000s.

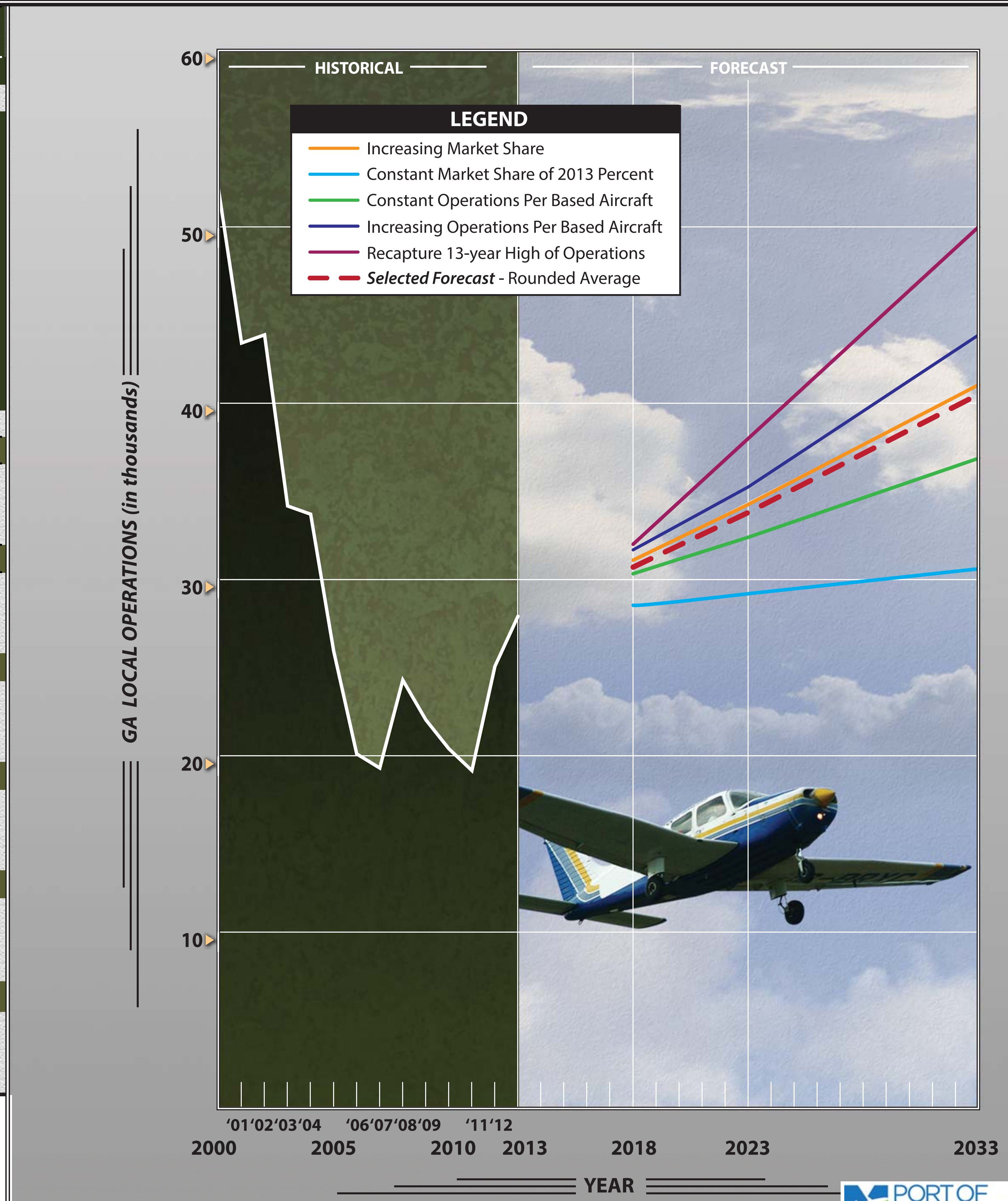
Forecasting of local general aviation operations follows much the same methodology as for itinerant general aviation operations. Both a constant and an increasing market share forecast, utilizing the FAA forecast of national local general aviation operations, are presented. Two forecasts analyzing the ratio of based aircraft to local general aviation operations are also developed. Then, a forecast to recapture the 13-year high is presented. **Exhibit 2G** presents these forecasts, as well as the selected forecast.

An additional factor considered in the local general aviation forecast is the potential growth in activity from BBCC. Currently, the college has approximately 80 students in the aviation program. The program has a capacity of up to 120. Therefore, the college is capable of accommodating additional students.

The selected forecast is, once again, an average of the several forecasts presented. In the short term, local general aviation operations are forecast to increase from 27,915 in 2013 to 30,700 in 2018. By 2023, local general aviation operations are forecast to increase to 33,800 annually. By the long term, local general aviation operations are estimated at

Year	MWH GA Local Ops[1]	US GA Local Ops[2]	Market Share Local Ops	MWH Based Aircraft[3]	Local Ops Per Based Aircraft
2000	52,124	17,034,400	0.3060%		
2001	43,408	16,193,700	0.2681%	96	452
2002	43,874	16,172,800	0.2713%		
2003	34,168	15,292,700	0.2234%		
2004	33,703	14,960,400	0.2253%		
2005	25,940	14,843,600	0.1748%		
2006	20,108	14,365,400	0.1400%		
2007	19,308	14,556,800	0.1326%		
2008	24,295	14,081,200	0.1725%		
2009	22,041	12,448,000	0.1771%		
2010	20,401	11,716,300	0.1741%		
2011	19,164	11,437,000	0.1676%		
2012	25,078	11,608,300	0.2160%		
2013[4]	27,915	11,698,100	0.2386%	81	345
Increasing Market Share (AAGR = 1.95%)					
2018	31,095	11,959,700	0.2600%	88	353
2023	34,255	12,234,100	0.2800%	94	364
2033	41,040	12,824,900	0.3200%	107	384
Constant Market Share of 2013 Percent (AAGR = 0.46%)					
2018	28,539	11,959,700	0.2386%	88	324
2023	29,194	12,234,100	0.2386%	94	311
2033	30,604	12,824,900	0.2386%	107	286
Constant Operations Per Based Aircraft (AAGR = 1.40%)					
2018	30,327	11,959,700	0.2536%	88	345
2023	32,395	12,234,100	0.2648%	94	345
2033	36,875	12,824,900	0.2875%	107	345
Increasing Operations Per Based Aircraft (AAGR = 2.29%)					
2018	31,680	11,959,700	0.2649%	88	360
2023	35,250	12,234,100	0.2881%	94	375
2033	43,870	12,824,900	0.3421%	107	410
Recapture 13-year High of Operations (AAGR = 2.96%)					
2018	32,000	11,959,700	0.2676%	88	364
2023	38,000	12,234,100	0.3106%	94	404
2033	50,000	12,824,900	0.3899%	107	467
Selected Forecast - Rounded Average (AAGR = 1.88%)					
2018	30,700	11,959,700	0.2567%	88	349
2023	33,800	12,234,100	0.2763%	94	360
2033	40,500	12,824,900	0.3158%	107	379

[1] Historical data from ATCT records as reported to FAA.
[2] FAA Aerospace Forecasts 2013-2033
[3] 2001 count from previous 2005 master plan, 2013 count from airport physical count
[4] Tower count from September 2012 through August 2013
AAGR = Average Annual Growth Rate from 2013 to 2033



Source: Coffman Associates analysis

PORT OF MOSES LAKE

Exhibit 2G
LOCAL GA
OPERATIONS FORECAST

13MP01-1R-09/17/13

40,500 annual operations. This forecast results in an average annual growth rate of 1.88 percent.

AIR TAXI OPERATIONS FORECAST

The air taxi category includes aircraft involved in on-demand passenger transport, small parcel transport, air ambulance, and some fractional ownership aircraft. Air taxi is regulated under Federal Aviation Regulations (FAR) Part 135.

In 2013, the tower reported 2,359 air taxi operations, which represented a slight decrease over 2012 when there were 2,403. From 2000 to 2005, the airport averaged more than 5,000 annual air taxi operations. National air taxi operations declined significantly following the national recession of 2008-2009 and have been slow to recover. In fact, the FAA forecasts a continued decline through 2025.

Several forecasts of potential future air taxi activity have been developed and are presented on **Exhibit 2H**. The air taxi forecasts consider the Airport's market share of national air taxi operations and the ratio of air taxi operations to based aircraft at the Airport. When developing a market share forecast of air taxi operations for the Airport with national FAA forecasts, the declining national forecasts have the effect of limiting potential growth for the Airport. However, local conditions, such as the rapidly growing business/industry environment in the region, could lead to additional air taxi activity.

The Airport is well-positioned to attract a growing number of air taxi operations, particularly from the fractional/commuter business segment. The region supports a significant number of large corporations, which are more likely to utilize private aviation. The services offered at the Airport, such as the Million Air FBO, cater to this class of business traveler. Therefore, a growth scenario for air taxi operations at the Airport is reasonable.

The selected forecast is an average of the five forecasts developed. By 2018, air taxi operations are forecast to reach 2,600 and by the long term 3,400.

MILITARY OPERATIONS FORECAST

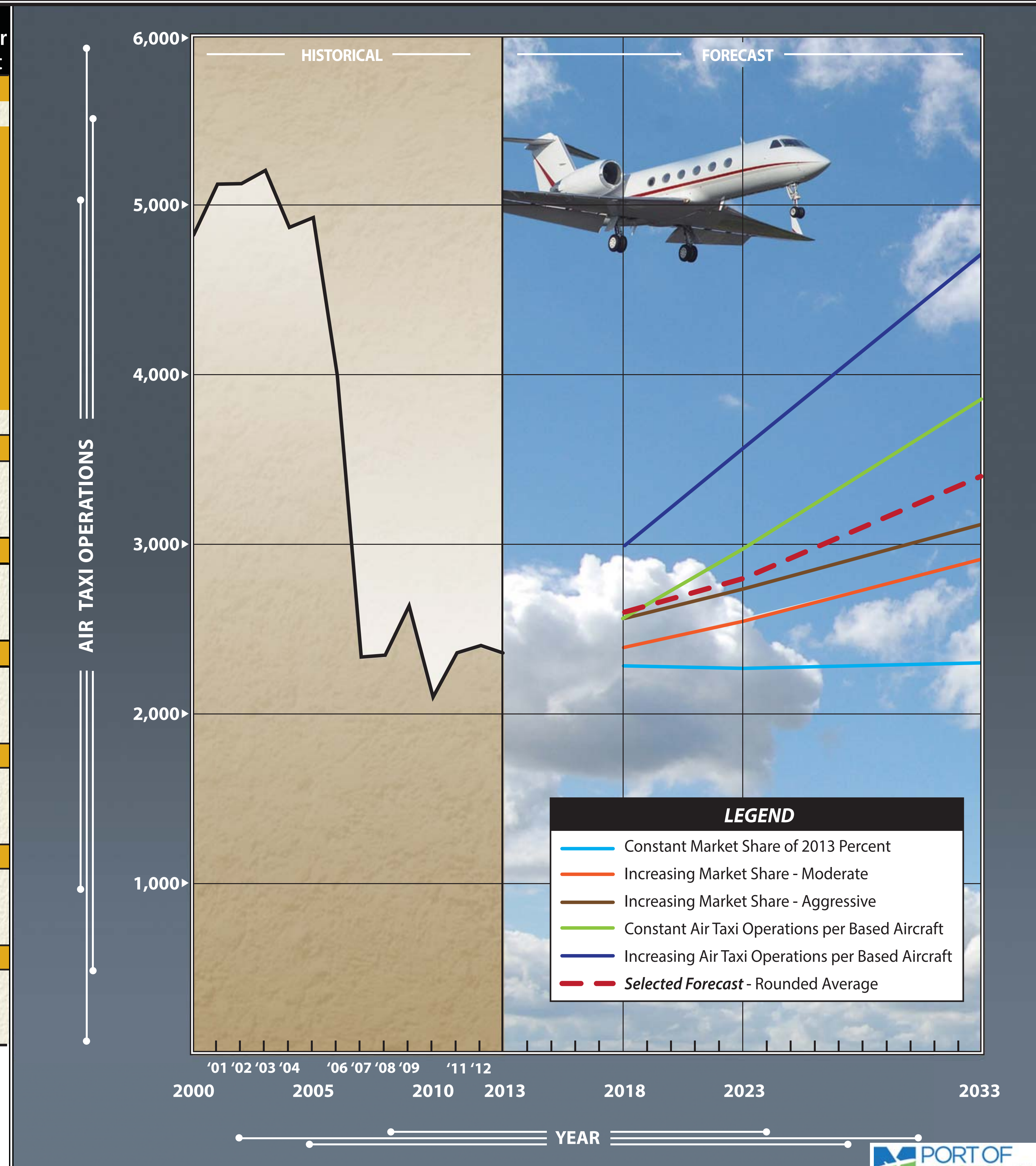
Grant County International Airport has a significant level of military operations. As discussed at length in Chapter One, there are three military installations in the State of Washington that utilize the airport for flight training. The Airport has a dedicated military use assault strip, Runway 9-27. The Airport also has very long runways that facilitate a wide variety of flight training options for large military aircraft.

Forecasting military operations presents several challenges. The first is the fact that the mission of the military can change unexpectedly leading to spikes in activity. A second is

13MP01-1R-09/17/13

Year	MWH GA Air Taxi Ops[1]	US Air Taxi Ops[2]	Market Share Air Taxi Ops	MWH Based Aircraft[3]	Air Taxi Ops Per Based Aircraft
2000	4,823	10,760,500	0.0448%		
2001	5,123	10,952,900	0.0468%	96	53
2002	5,126	11,148,700	0.0460%		
2003	5,204	11,348,000	0.0459%		
2004	4,868	11,550,900	0.0421%		
2005	4,926	11,757,400	0.0419%		
2006	3,997	11,967,600	0.0334%		
2007	2,335	11,667,300	0.0200%		
2008	2,346	11,032,100	0.0213%		
2009	2,637	9,520,800	0.0277%		
2010	2,099	9,410,400	0.0223%		
2011	2,360	9,278,500	0.0254%		
2012	2,403	8,994,400	0.0267%		
2013[4]	2,359	8,822,600	0.0267%	81	29
Constant Market Share of 2013 Percent (AAGR = -0.15%)					
2018	2,283	8,539,300	0.0267%	88	26
2023	2,268	8,488,000	0.0267%	94	24
2033	2,289	8,568,900	0.0267%	107	21
Increasing Market Share - Moderate (AAGR = 1.06%)					
2018	2,391	8,539,300	0.0280%	88	27
2023	2,546	8,488,000	0.0300%	94	27
2033	2,913	8,568,900	0.0340%	107	27
Increasing Market Share - Aggressive (AAGR = 2.49%)					
2018	2,562	8,539,300	0.0300%	88	29
2023	2,971	8,488,000	0.0350%	94	32
2033	3,856	8,568,900	0.0450%	107	36
Constant Air Taxi Operations per Based Aircraft (AAGR = 1.40%)					
2018	2,563	8,539,300	0.0300%	88	29
2023	2,738	8,488,000	0.0323%	94	29
2033	3,116	8,568,900	0.0364%	107	29
Increasing Air Taxi Operations per Based Aircraft (AAGR = 3.52%)					
2018	2,992	8,539,300	0.0350%	88	34
2023	3,572	8,488,000	0.0421%	94	38
2033	4,708	8,568,900	0.0549%	107	44
Selected Forecast - Rounded Average (AAGR = 1.84%)					
2018	2,600	8,539,300	0.0304%	88	30
2023	2,800	8,488,000	0.0330%	94	30
2033	3,400	8,568,900	0.0397%	107	32

[1] Historical data from ATCT records as reported to FAA.
[2] FAA Aerospace Forecasts 2013-2033
[3] 2001 count from previous 2005 master plan, 2013 count from airport physical count
[4] Tower count from September 2012 through August 2013
AAGR = Average Annual Growth Rate from 2013 to 2033



Source: *Coffman Associates analysis*

PORT OF MOSES LAKE

Exhibit 2H
AIR TAXI
OPERATIONS FORECAST

that the FAA forecast of military activity is essentially a flat line through the forecast period. Therefore, the recent history of military activity is an especially important consideration.

In 2013, the Airport experienced 17,459 operations by military aircraft when the tower was open. This figure represents an increase of nearly 3,000 operations over 2011. As recently as 2008, there were nearly 23,000 military operations and in 2004, there were nearly 34,000 military operations. Military activity at the Airport is a constant presence.

Two market share forecasts of military operations have been developed. The first might be considered a low range forecast that assumes a slow return to recent levels of activity. This forecast projects approximately 20,638 military operations by 2018; 23,216 by 2023; and 28,375 by 2033.

The second forecast considers a return to levels typically experienced prior to 2008. Between 2001 and 2008, the Airport averaged almost 28,000 annual military operations with over 30,000 from 2002 to 2004. This forecast results in a long term forecast of 32,244 military operations, which is still below the 2004 high of 33,870. The selected forecast is an average of the two market share forecasts. **Exhibit 2J** presents the military operations forecasts.

As noted previously, the military also utilizes the Airport when the tower is closed. Staff at Joint Base Lewis-McChord indicated that they perform approximately 5,200 C-17 operations annually when the tower is closed. A forecast using the tower baseline counts will first be developed, and then nighttime operations will be added.

TOTAL OPERATIONS FORECAST

Exhibit 2K summarizes the selected operations forecast for Grant County International Airport. In the short term, operations are forecast to increase from 78,253 in 2013 to 87,600 in 2018. By 2033, total operations are forecast to reach 120,200 annual operations.

The total operations forecasts include the nighttime adjustment discussed previously. At least 5,400 military operations occur when the tower is closed. Some additional itinerant activity by air taxi and general aviation aircraft may also occur when the tower is closed. At other general aviation airports, the nighttime figure typically ranges from one to three percent. An estimate of two percent is used for air taxi and itinerant general aviation nighttime activity.

COMPARISON TO THE TAF

The FAA will review the forecasts of this Airport Master Plan and compare them to the TAF. Where the 5- or 10-year forecasts exceed 100,000 total annual operations or 100 based

13MP01-1R-09/17/13

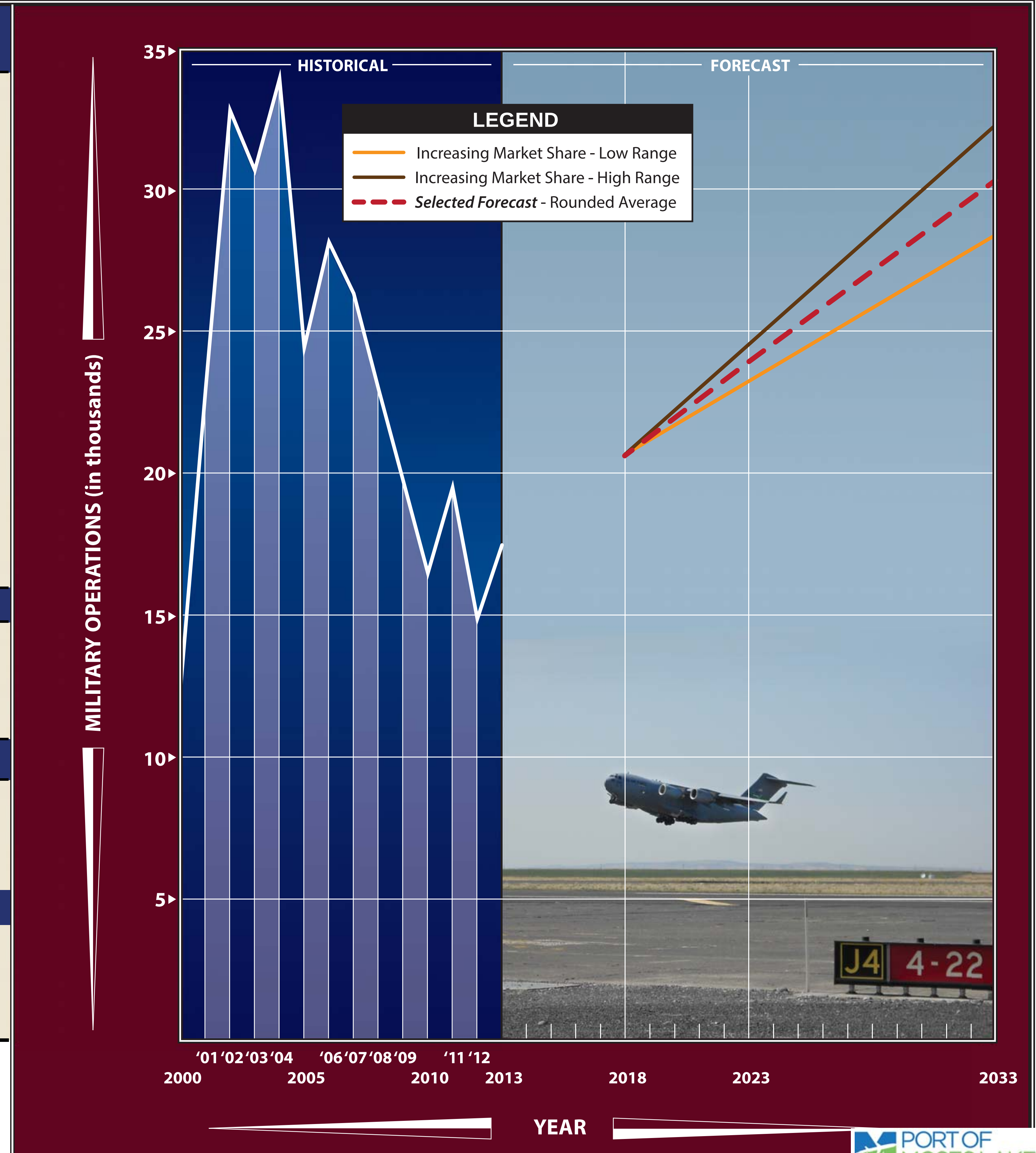
Year	MWH Military Ops[1]	US Military Ops[2]	Market Share Military Ops
2000	12,492	2,888,000	0.4325%
2001	22,847	2,869,000	0.7963%
2002	32,758	2,850,100	1.1494%
2003	30,657	2,831,300	1.0828%
2004	33,870	2,812,600	1.2042%
2005	24,423	2,794,100	0.8741%
2006	28,123	2,775,700	1.0132%
2007	26,315	2,719,500	0.9676%
2008	22,965	2,530,600	0.9075%
2009	19,727	2,585,500	0.7630%
2010	16,471	2,606,900	0.6318%
2011	19,480	2,630,300	0.7406%
2012	14,863	2,578,800	0.5764%
2013[3]	17,459	2,579,800	0.6768%
Increasing Market Share - Low Range (AAGR = 2.46%)			
2018	20,638	2,579,700	0.8000%
2023	23,216	2,579,600	0.9000%
2033	28,375	2,579,500	1.1000%
Increasing Market Share - High Range (AAGR = 3.11%)			
2018	20,638	2,579,700	0.8000%
2023	24,506	2,579,600	0.9500%
2033	32,244	2,579,500	1.2500%
Selected Forecast - Rounded Average (AAGR = 2.54%)			
2018	20,600	2,579,700	0.6319%
2023	23,900	2,579,600	0.7055%
2033	30,300	2,579,500	0.8684%

[1] Historical data from ATCT records as reported to FAA.

[2] FAA Aerospace Forecasts 2013-2033

[3] Tower count from September 2012 through August 2013

AAGR = Average Annual Growth Rate from 2013 to 2033



Source: Coffman Associates analysis

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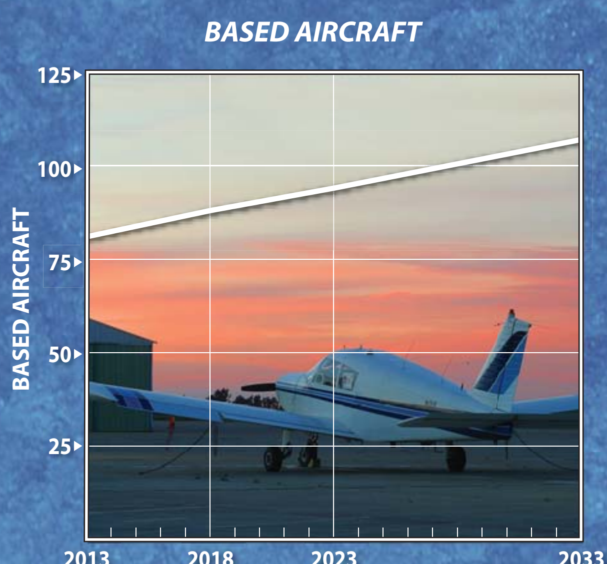
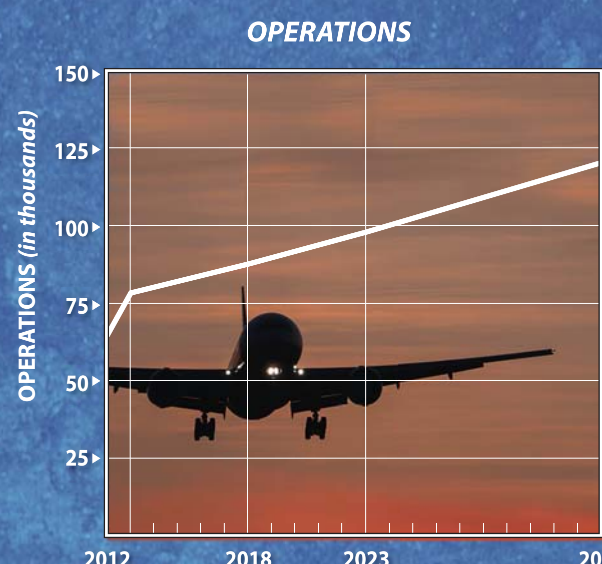
Exhibit 2J
MILITARY OPERATIONS FORECAST

DESCRIPTION	ACTUAL 2012[1]	ACTUAL 2013[2]	FORECAST 2018	FORECAST 2023	FORECAST 2033	AAGR 2013-2033
ANNUAL OPERATIONS						
Air Carrier						
Itinerant	1,745	3,238	3,800	4,600	6,700	3.70%
Local	2,617	4,856	5,800	6,900	10,000	3.68%
General Aviation						
Itinerant	12,172	16,626	18,200	20,000	23,300	1.70%
Local	25,078	27,915	30,700	33,800	40,500	1.88%
Military						
Itinerant	6,266	7,730	8,200	9,600	12,100	2.27%
Local	8,597	9,729	12,400	14,300	18,200	3.18%
Air Taxi (Itinerant)	2,403	2,359	2,600	2,800	3,400	1.84%
Total Itinerant	22,586	29,953	32,800	37,000	45,500	2.11%
Total Local	36,292	42,500	48,900	55,000	68,700	2.43%
Subtotal Operations	58,878	72,453	81,700	92,000	114,200	2.30%
Nighttime Adjustment						
Military						
Itinerant	2,200	2,200	2,200	2,200	2,200	0.00%
Local	3,200	3,200	3,200	3,200	3,200	0.00%
GA (Itinerant) (2%)	200	300	400	400	500	2.59%
Air Taxi (Itinerant) (2%)	100	100	100	100	100	0.00%
TOTAL OPERATIONS	***64,578***	***78,253***	***87,600***	***97,900***	***120,200***	***2.17%***
PEAKING OPERATIONS CHARACTERISTICS						
Peak Month (July - 13%)		10,173	11,388	12,727	15,626	2.17%
Busy Day		583	653	730	896	2.17%
Design Day		339	380	424	521	2.17%
Design Hour (21%)		71	80	89	109	2.17%
BASED AIRCRAFT						
Single Engine		73	76	78	84	0.70%
Multi-engine		3	4	4	4	1.45%
Turboprop		3	4	5	6	NA
Business Jet		0	1	2	3	NA
Helicopter		2	2	3	5	4.69%
Experimental/Other		0	1	2	5	NA
TOTAL BASED AIRCRAFT		***81***	***88***	***94***	***107***	***1.40%***





[1] Local operations from August 2011 through June 2012 were not properly counted by the ATCT. Local operations counts for August 2012 - June 2013 were used to update 2011 and 2012.
[2] Tower count from September 2012 through August 2013.

PORT OF MOSES LAKE

Exhibit 2K
FORECAST SUMMARY

aircraft, the FAA prefers that the forecasts differ by less than 10 percent in the 5-year period and 15 percent in the 10-year period. Where the forecasts do differ, supporting documentation should be provided.

Table 2N presents a direct comparison of the 2013 TAF to the forecasts in this Master Plan. As can be seen, the new Master Plan forecasts far exceed the TAF forecasts. The primary reason for this is that the TAF has incorrect baseline figures for both operations and based aircraft. In 2013, the TAF forecast 32,310 operations when the actual number was 78,253 (72,453 tower operations and 5,800 nighttime operations). The selected forecast reflects an annual growth rate of 2.17 percent. The long term forecast of 120,200 annual operations was frequently achieved between 1990 and 2000, and from 2001 to 2004, more than 100,000 annual operations were common.

The based aircraft total also exceeds the 5- and 10-year TAF totals. Clearly, this is because the TAF has a 2013 base year of only 37 based aircraft, when visual inspection determined that there were 81. By the long term, the master plan has a forecast of 107 based aircraft, which reflects an annual growth rate of 1.4 percent.

TABLE 2N
Forecast Comparison to the *Terminal Area Forecast*
Grant County International Airport

Year	MWH Operations	2013 FAA TAF	Percent Difference
TOTAL OPERATIONS			
2012	64,578[1]	30,545	71.6%
2013	78,253[2]	32,310	83.1%
2018	87,600	32,938	90.7%
2023	97,900	33,592	97.8%
2033	120,200	35,001	109.8%
AAGR 2013-2033	2.17%	0.40%	
BASED AIRCRAFT			
2013	81	37	74.6%
2018	88	40	75.0%
2023	94	42	76.5%
2033	107	43	85.3%
AAGR 2013-2033	1.40%	0.75%	

[1] Local operations from August 2011 through June 2012 were not properly counted by the ATCT. Local operations counts for August 2012-June 2013 were used to update 2011 and 2012. Includes nighttime operations of 5,800.
[2] September 2012 through August 2013. Includes nighttime operations of 5,800.
Source: Coffman Associates analysis

ANNUAL INSTRUMENT APPROACHES (AIAs)

An instrument approach, as defined by the FAA, is "an approach to an airport with the intent to land an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude." To qualify as an instrument approach, aircraft must land at the airport after following one of the published instrument approach procedures. Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport's requirements for navigational aid facilities. Practice or training approaches do not count as annual AIAs.

While AIAs can be partially attributed to weather, they may be expected to increase as transient operations and operations by more sophisticated aircraft increase through the planning period. For this reason, AIA projections consider a constant percentage of 2.0 percent of annual itinerant operations. The projections are presented in **Table 2P**.

TABLE 2P
Annual Instrument Approaches (AIAs)
Grant County International Airport

Year	AIAs	Itinerant Operations	Ratio
2013	698	32,553	2.00%
2018	710	35,500	2.00%
2023	794	39,700	2.00%
2033	966	48,300	2.00%

Source: Coffman Associates analysis

PEAKING CHARACTERISTICS

Many aspects of facility planning relate to levels of peaking activity – times when an airport is busiest. For example, the appropriate size of a terminal building can be estimated by determining the number of people that could reasonably be expected to use the facility at a given time. The following planning definitions apply to the peak periods:

- **Peak Month** -- The calendar month when peak aircraft operations occur.
- **Design Day** -- The average day in the peak month.
- **Busy Day** -- The busy day of a typical week in the peak month.
- **Design Hour** -- The peak hour within the design day.

It is important to note that only the peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. The peak period forecasts represent reasonable planning standards that can be applied without overbuilding or being too restrictive.

The ATCT collects operational data that includes hourly, daily, monthly, and annual operations. In 2013, the peak month for operations was July when the tower counted 9,400 operations. When adjusting for additional nighttime activity, it is estimated that there were 10,173 operations in July. The peak month represented 13 percent of annual operations in 2013, which is about what the normal peak month percent has been for several years.

The design day is equal to the number of operations in the peak month divided by the number of days in the month (30) for a design day of 339.

The busy day is determined by first averaging the peak day of each week of the peak month and dividing by the number of operations for the four-week period. In this case, busy day operations represent, on average, 24.6 percent of weekly operations. By then multiplying the busy day percent by the number of days in the week (7), a busy day factor of 1.72 is determined (24.6*7=1.72). The busy day factor is then applied to the design day to determine the busy day operations number, which is 583.

The design hour is 71, which is determined by multiplying the design day the average peak hour (20.97 percent). The average peak hour was determined from hourly operations counts provided by the tower. The peak hour percent is somewhat higher than a typical general aviation airport, an indication of a clustering of activity around certain times during the day. Utilizing these factors, the peaking characteristics for the future can be estimated as shown in **Table 2Q**.

TABLE 2Q
Total Peak Operations Forecast
Grant County International Airport

	2013	2018	2023	2033
Annual Operations (Including Nighttime Activity)	78,253	87,600	97,900	120,200
Peak Month (13%)	10,173	11,388	12,727	15,626
Busy Day	583	653	730	896
Design Day	339	380	380	521
Design Hour (21%)	71	80	80	109

Source: Coffman Associates analysis

SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the next 20 years at Grant County International Airport. **Exhibit 2K** presents a summary of the aviation demand forecasts. The baseline year for forecast data is 2013. The forecasting effort extends 20 years to the year 2033.

General aviation activity often trends with national and local economies. The country was in a recessionary period from December 2007 through the third quarter of 2009 and has been slow to recover. Activity at both commercial service airports and general aviation airports has been down. Grant County International Airport has, to date, weathered the economic downturn fairly well. The number of based aircraft has remained fairly steady.

Forecasts of aviation activity, including based aircraft and operations, are key to determining future facility requirements. There are currently 81 aircraft based at the Airport, and this is forecast to grow to 107 aircraft by 2033. The Airport experienced 78,253 operations in 2013. This is forecast to grow to approximately 120,200 operations annually by 2033.

The fleet mix operations, or type and frequency of aircraft use, is important in determining facility requirements and environmental impacts. While single engine piston-powered aircraft are expected to represent the majority of based aircraft, the long term forecast considers the possibility of six additional turboprop aircraft and three business jets by 2033.

The next step in the Master Plan process is to use the forecasts to determine development needs for the Airport through 2033. Chapter Three – Facility Requirements will address the critical design aircraft and the applicable design standards. Airside elements, such as safety areas, runways, taxiways, lighting, and navigational aids, as well as landside requirements, including hangars, aircraft aprons, and support services will be addressed.

As a general observation, Grant County International Airport is well-positioned for growth into the future. The remaining portions of the Master Plan will lay out how that growth can be accommodated in an orderly, efficient, and cost-effective manner.

PORT OF MOSES LAKE

Chapter Three

AIRPORT FACILITY REQUIREMENTS

Chapter Three

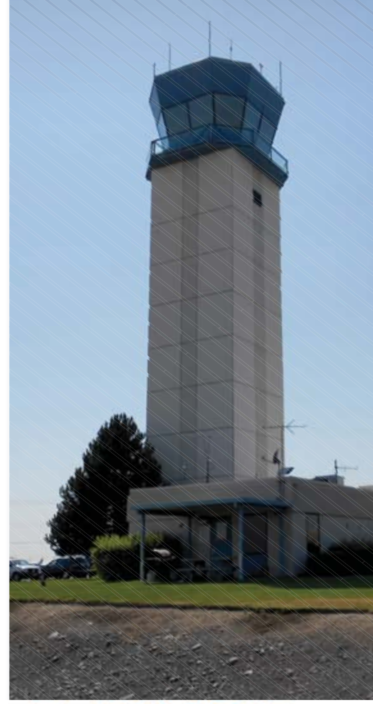
AIRPORT FACILITY REQUIREMENTS

To properly plan for the future of Grant County International Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve the identified demand. This chapter uses the results of the forecasts presented in Chapter Two, as well as established planning criteria, to determine the airside (i.e., runways, taxiways, navigational aids, marking and lighting) and landside (i.e., hangars, aircraft parking apron, and automobile parking) facility requirements.

The objective of this effort is to identify, in general terms, the adequacy of the existing airport facilities and outline what new facilities may be needed, and when these may be needed to accommodate forecast demands. Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Four - Alternatives to determine the most cost-effective and efficient means for implementation.

The facility requirements for the Airport were evaluated using guidance contained in several Federal Aviation Administration (FAA) publications, including the following:

- Advisory Circular (AC) 150/5300-13A, *Airport Design*
- AC 150/5060-5, *Airport Capacity and Delay*
- AC 150/5325-4B, *Runway Length Requirements for Airport Design*
- AC 150/5360-13 *Planning and Design Guidelines for Airport Terminal Facilities,*
- Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*
- FAA Order 5090.3C *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS).*



PORT OF MOSES LAKE

AIRPORT MASTER PLAN

PLANNING HORIZONS

An updated set of aviation demand forecasts for Grant County International Airport has been established. The activity forecasts include annual operations, based aircraft, fleet mix, and peaking characteristics. With this information, specific components of the airfield and landside system can be evaluated to determine their capacity to accommodate future demand.

Cost-effective, efficient, and orderly development of an airport should rely more upon actual demand at an airport than on a time-based forecast figure. In order to develop a master plan that is **demand-based** rather than time-based, a series of planning horizon milestones have been established that take into consideration the reasonable range of aviation demand projections. The planning horizons are the Short Term (approximately years 1-5), the Intermediate Term (years 6-10), and the Long Term (years 11-20), as shown in the forecast summary in **Table 3A**.

TABLE 3A
Activity Forecast Summary
Grant County International Airport

	Actual		Forecast		
ANNUAL OPERATIONS	**2012[1]**	**2013[2]**	**Short Term**	**Intermediate Term**	**Long Term**
Air Carrier					
Itinerant	1,745	3,238	3,800	4,600	6,700
Local	2,617	4,856	5,800	6,900	10,000
General Aviation					
Itinerant	12,172	16,626	18,200	20,000	23,300
Local	25,078	27,915	30,700	33,800	40,500
Military					
Itinerant	6,266	7,730	8,200	9,600	12,100
Local	8,597	9,729	12,400	14,300	18,200
Air Taxi (Itinerant)	2,403	2,359	2,600	2,800	3,400
Total Itinerant	22,586	29,953	32,800	37,000	45,500
Total Local	36,292	42,500	48,900	55,000	68,700
Subtotal Operations	58,878	72,453	81,700	92,000	114,200
Nighttime Adjustment					
Military					
Itinerant	2,200	2,200	2,200	2,200	2,200
Local	3,200	3,200	3,200	3,200	3,200
GA (Itinerant) (2%)	200	300	400	400	500
Air Taxi (Itinerant) (2%)	100	100	100	100	100
TOTAL OPERATIONS	**64,578**	**78,253**	**87,600**	**97,900**	**120,200**
PEAKING OPERATIONS CHARACTERISTICS					
Peak Month (July 12%)		10,173	11,388	12,727	15,626
Busy Day		583	653	730	896
Design Day		339	380	424	521
Design Hour (17.5%)		71	80	89	106
BASED AIRCRAFT		**81**	**88**	**94**	**107**

[1] Local operations from August 2011 through June 2012 were not properly counted by the ATCT. Local operations counts for August 2012-June 2013 were used to update 2011 and 2012.
[2] September 2012 through August 2013

It is important to consider that the actual activity at the Airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand. It is important for the plan to accommodate these changes so that Airport officials can respond to unexpected changes in a timely fashion.

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

AIRCRAFT AND AIRPORT CLASSIFICATION

The FAA has established several aircraft classification systems that group aircraft types based on their performance (approach speed in landing configuration) and on design characteristics (wingspan and landing gear configuration). These classification systems are used to determine the appropriate airport design standards for specific airport elements such as runways, taxiways, taxilanes, and aprons.

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use the airport. The critical design aircraft is used to define the design parameters for the airport. In most cases, the design aircraft is a composite aircraft representing a collection of aircraft classified by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). FAA AC 150/5300-13A, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 3A**:

- ***Aircraft Approach Category (AAC):*** A grouping of aircraft based on a reference landing speed (VREF), if specified, or if VREF is not specified, 1.3 times stall speed (VSO) at the maximum certificated landing weight. VREF, VSO, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.

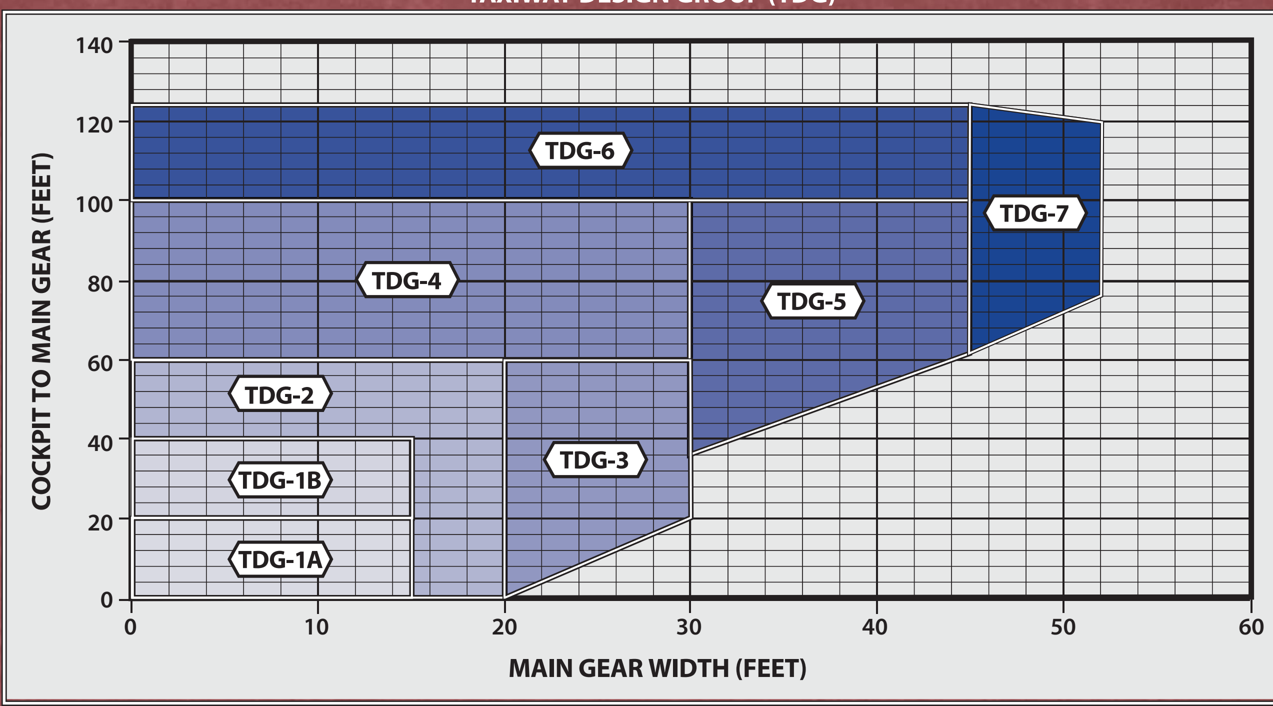
The AAC generally refers to the approach speed of an aircraft in landing configuration. The higher the approach speed, the more restrictive the applicable design standards. The AAC, depicted by a letter A through E, is the aircraft approach category and relates to aircraft approach speed (operational characteristic). The AAC generally applies to runways and runway-related facilities such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

AIRPLANE DESIGN GROUP (ADG)		
Group #	**Tail Height (ft)**	**Wingspan (ft)**
I	<20	<49
II	20-<30	49-<79
III	30-<45	70-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

VISIBILITY MINIMUMS	
RVR (ft)	**Flight Visibility Category (statute miles)**
VIS	3-mile or greater visibility minimums
5,000	Lower than 3 miles but not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile (APV ≥ ¾ but < 1-mile)
2,400	Lower than ¾-mile but not lower than ½-mile (CAT-I PA)
1,600	Lower than ½-mile but not lower than ¼-mile (CAT-II PA)
1,200	Lower than ¼-mile (CAT-III PA)

TAXIWAY DESIGN GROUP (TDG)



KEY

APV: Approach Procedure with Vertical Guidance
PA: Precision Approach
RVR: Runway Visual Range
TDG: Taxiway Design Group

PORT OF MOSES LAKE

Source: FAA AC 150/5300-13A, Airport Design

Exhibit 3A
AIRCRAFT CLASSIFICATION PARAMETERS

- ***Airplane Design Group (ADG)***: A classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used.

The ADG, depicted by a Roman numeral I through VI, relates to aircraft wingspan or tail height (physical characteristic). The ADG influences design standards for taxiway safety area (TSA), taxiway object free (TOFA), taxilane object free area, apron wingtip clearance, and various separation distances.

- ***Taxiway Design Group (TDG)***: A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

The TDG relates to the undercarriage dimensions of the design aircraft. Taxiway/taxilane width and fillet standards, and in some instances, runway to taxiway and taxiway/taxilane separation requirements are determined by TDG. It is appropriate for taxiways to be planned and built to different TDG standards based on expected use.

The TDG standards are based on the Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and, in some cases, the separation distance between parallel taxiways/taxilanes. Other taxiway elements such as the taxiway safety area (TSA), taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces.

Exhibit 3B summarizes the classification of the most common jet aircraft in operation today. Generally, business jets will fall in approach categories B and C, while commercial aircraft will fall in C and D. Business jets typically have slower approach speeds as compared to commercial transport aircraft. Recreational and business piston and turboprop aircraft will generally fall in approach categories A and B and airplane design groups I and II.

AIRPORT AND RUNWAY CLASSIFICATION

These classifications, along with the aircraft classifications defined previously, are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.

Airport Reference Code (ARC)**:** An airport designation that signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport. The airport reference code identified in the previous Master Plan was ARC D-V.

Runway Design Code (RDC): A code signifying the design standards to which the runway is to be built. The RDC is based upon planned development and has no operational compo-

TURBINE AIRCRAFT CLASSIFICATION

AIRCRAFT	AAC	ADG	TDG
Eclipse 500	A	I	1
Premier 390	B	I	1
Beechjet 400, T-1, Hawker 400	B	I	1
Cessna 500, 501, Citation I, SP	B	I	1
Cessna Mustang 510	B	I	1
Cessna 525, 526, CitationJet, CJ1	B	I	1
Embraer Phenom 100	B	I	1
Falcon 10	B	I	1

AIRCRAFT	AAC	ADG	TDG
Cessna 525A (CJ2)	B	II	2
Cessna 525B (CJ3)	B	II	2
Cessna Citation II Bravo 550, SP	B	II	2
Cessna Citation V, Ultra, Encore 560	B	II	2
Cessna 560 XLS	B	II	2
Cessna Citation III, VI, VII, 650	B	II	2
Cessna Citation Sovereign 680	B	II	3
Falcon 20, **50,** 900, 2000	B	II	2
Embraer Phenom 300	B	II	2

AIRCRAFT	AAC	ADG	TDG
BAe HS 125-1, 2, 3, 400, 600	C	I	2
BAe HS 125, 700, 800, Hawker 800	C	I	2
Learjet 23, 24, 25, 28	C	I	1
Learjet 31 A/B	C	I	1
Learjet 35, 36, **45**, 55	C	I	2
Lear 60	C	I	4
IAI Westwind	C	I	2

AIRCRAFT	AAC	ADG	TDG
IAI Astra 1125	C	II	2
Cessna Citation 750 (X)	C	II	3
Challenger 300	C	II	3
Challenger 600, 601, 604	C	II	3
Lockheed 1329 Jetstar	C	II	3
Gulfstream III, G300, G-1159	C	II	3
Hawker 800XP, 1000, 4000	C	II	3
Falcon 900EX, F-Series	C	II	3
Embraer ERJ 135, 140, 145	C	II	3
Canadair CRJ 200, 700, 900	C	II	3

AIRCRAFT	AAC	ADG	TDG
Gulfstream G150	D	II	3
Gulfstream II, G200	D	II	3
Gulfstream IV, G400	D	II	3
IAI Galaxy, Gulfstream G200	D	II	3

AIRCRAFT	AAC	ADG	TDG
Global Express, 5000	C	III	3
Gulfstream V, 550, 650	C	III	3
Falcon 7FX	C	III	3
B727-200	C	III	5
B-737-100, 200, 300, 400, 500, 600, 700	C	III	3
MD-81, 82, 87, 90	C	III	4
A318, A319, A320	C	III	3
A321	C	III	5
Embraer 170, 175, 190, 195	C	III	3
B-737-800, 900	D	III	3
MD-83, 88	D	III	4

AIRCRAFT	AAC	ADG	TDG
B-707	C	IV	5
B-757-200	C	IV	5
B-767-200, 300	C	IV	5
B-787 -800	C	IV	5
B-777-200	C	V	6
A330-200F	C	V	5
A330-200, 300	C	V	6

AIRCRAFT	AAC	ADG	TDG
MD-11	D	IV	6
DC-10	D	IV	5
B-747-100,200,300,400	D	V	6
B-757-300	D	IV	5
B-777-300	D	V	6
A340-200,300,500,600	D	V	6
A350-900	D	V	6

AIRCRAFT	AAC	ADG	TDG
B-747 -8, F	D	VI	6
B-767-200ER, 300ER, 400	D	VI	5
A380-800	D	VI	7

KEY: **AAC** - Aircraft Approach Category (based on approach speed); **ADG** - Airplane Design Group (based on wingspan); **TDG** - Taxiway Design Group (based on width/length of landing gear)
Note: Plane pictured is in bolded text.

Exhibit 3B
EXAMPLE TURBINE
AIRCRAFT CLASSIFICATION

nent. The RDC is comprised of the AAC, the ADG, and the RVR (as defined by the instrument approach visibility minimums).

Approach and Departure Reference Codes (APRC/DPRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway. Like the RDC, the APRC is composed of the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway where no special operating procedures are necessary, as opposed to the RDC which is based upon planned development with no operational component. The APRC/DPRC for a runway is established based upon the minimum runway to taxiway centerline separation. The DPRC represents those aircraft that can take off from a runway while any aircraft are present on adjacent taxiways, under particular meteorological conditions, with no special operational procedures necessary. The DPRC is composed of the AAC and ADG only.

The AAC, ADG, and RVR are combined to form the RDC of a particular runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the visibility minimums expressed by runway visual range (RVR) values in feet of 1,200 (⅛-mile), 1,600 (¼-mile), 2,400 (½-mile), 4,000 (¾-mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component should read “VIS” for runways designed for visual approach use only. Generally, runway standards are related to aircraft approach speed, aircraft wingspan, and designated or planned approach visibility minimums.

CRITICAL DESIGN AIRCRAFT

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use the airport. The critical design aircraft is used to define the design parameters for an airport. In some cases, the design aircraft is a composite aircraft representing a collection of aircraft classified by the three parameters: AAC, ADG, and TDG. In the case of an airport with multiple runways, a design aircraft is selected for each runway.

The first consideration is the safe operation of aircraft likely to use an airport. Any operation of an aircraft that exceeds design criteria of the airport may result in either an unsafe operation or a lesser safety margin; however, it is not the usual practice to base the airport design on an aircraft that uses an airport infrequently.

The design aircraft is defined as the most demanding category of aircraft, or family of aircraft, which conducts at least 500 itinerant operations per year at the airport. Planning for future aircraft use is of particular importance since the design standards are used to plan separation distances between facilities. These future standards must be considered now to ensure that short term development does not preclude the long range potential needs of the airport.

AIRPORT DESIGN AIRCRAFT

The Airport experiences activity by the largest commercial transport aircraft in the fleet such as Boeing 737, 747, 767, 777, and 787. Boeing uses the Airport for testing of these large aircraft under a variety of conditions, including maximum loading. Boeing was contacted to provide an estimate of the number of operations by aircraft type at Grant County International Airport. While the flight test program (including the number and location of operations) can vary tremendously for each aircraft, an estimate was provided and is shown in **Table 3B**.

TABLE 3B
Potential Boeing Operations By Aircraft Type
Grant County International Airport

Aircraft Type	Aircraft Production By Month	Potential Operations By Month per Aircraft at MWH	Total Potential Annual Operations
B-737	33	264	3,168
B-747	1.5	16	192
B-767	1.5	12	144
B-777	8.3	66	792
B-787	7	52	624

Source: Chief Pilot Boeing Company.

The Airport also experiences frequent activity by large military aircraft such as the C-17 Globemaster III and the KC-135 Stratotanker. However, it should be noted that the critical design aircraft must be a civilian aircraft for master plans funded by the FAA, such as this one. Therefore, the design aircraft cannot be a military aircraft for projects funded by FAA.

The FAA maintains the Enhanced Traffic Management System Count (ETMSC) database which documents certain aircraft operations at certain airports. Information is added to the ETMSC database when pilots file flight plans and/or when flights are detected by the National Airspace System, usually via radar. It includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to factors such as incomplete flight plans and limited radar coverage, ETMSC data does not account for all aircraft activity at an airport by a given aircraft type. Therefore, it is likely that there are more operations (touch and go's, for example) at the airport than are captured by this methodology.

Exhibit 3C presents the ETMSC activity for heavy commercial jets at Grant County International Airport from 2000 and 2005 through 2013. As can be seen, the full range of Boeing aircraft operates at the airport frequently. In 2013, the FAA database captured 2,894 itinerant operations by large transport category aircraft. Boeing 747 models accounted for 238 operations, and Boeing 777 models accounted for 592 operations.

While not counted in this critical design aircraft determination, the ETMSC database does capture itinerant military activity. The C-17 Globemaster III, which has a design code of C-IV, accounted for 1,496 for operations in 2013. Other military aircraft that registered oper-

AAC/ ADG	Aircraft Type	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013*
C-III	B-727	38	32	22	4	2	2	2	-	-	-
	B-737 (100, 200)	48	20	-	24	38	4	-	8	12	10
	B-737 (300)	4	4	2	2	6	6	2	-	-	4
	B-737 (400, 500, 600)	58	14	30	2	2	4	2	-	4	4
	B-737 (700)	380	292	378	398	280	170	78	98	84	122
	MD-81, 82, 87, 90	14	10	-	-	-	-	-	-	-	-
	A318, A319, A320	-	-	-	-	-	-	4	2	-	-
	Total C-III	*542*	*372*	*432*	*430*	*328*	*186*	*88*	*108*	*100*	*140*
C-IV	B-707	-	20	42	20	12	4	4	4	-	-
	B-757 (200, 300)	226	22	16	8	10	6	4	2	0	2
	B-767 (200, 300)	106	52	84	74	48	78	52	76	78	88
	B-787 (800)	-	-	-	-	-	2	272	518	314	382
	Total C-IV	*332*	*94*	*142*	*102*	*70*	*90*	*332*	*600*	*392*	*472*
C-V	B-777 (200)	234	208	184	112	106	152	78	50	64	254
	TOTAL C-V	*234*	*208*	*184*	*112*	*106*	*152*	*78*	*50*	*64*	*254*
D-III	B-737 (800)	592	274	560	650	498	780	606	602	890	1304
	B-737 (900)	28	6	34	84	70	134	52	48	90	148
	MD-83, 88	-	2	-	-	-	-	-	-	-	-
	Total D-III	*620*	*282*	*594*	*734*	*568*	*914*	*658*	*650*	*980*	*1452*
D-IV	MD-11	14	-	-	-	2	-	-	-	-	-
	DC-10	12	2	2	-	-	-	-	4	10	4
	Total D-IV	*26*	*2*	*2*	*0*	*2*	*0*	*0*	*4*	*10*	*4*
D-V	B-747 (100, 200, 300, 400)	196	74	120	142	82	50	20	10	12	14
	B-777 (300)	30	118	190	130	172	198	144	178	234	338
	Total D-V	*226*	*192*	*310*	*272*	*254*	*248*	*164*	*188*	*246*	*352*
D-VI	B-747 (8/F)	-	-	-	-	-	-	268	4	36	224
	B-767 (200ER, 300ER, 400)	254	-	-	-	6	-	-	2	-	-
	AN-124/225	-	-	-	-	2	-	-	-	2	-
	Total D-VI or larger	*254*	*0*	*0*	*0*	*8*	*0*	*268*	*6*	*38*	*224*
Total Itinerant Jet Operations Captured		**2,208**	**1,148**	**1,662**	**1,650**	**1,334**	**1,590**	**1,588**	**1,602**	**1,820**	**2,894**

TOTAL BY CLASSIFICATION

	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013*
Aircraft Approach Category										
C	1,108	674	758	644	504	428	498	758	556	866
D	1,100	474	904	1,006	830	1,162	1,090	844	1,264	2,028
Airplane Design Group										
III	1,162	654	1,026	1,164	896	1,100	746	758	1,080	1,592
IV	358	96	144	102	72	90	332	604	402	476
V	460	400	494	384	360	400	242	238	310	606
VI	254	0	0	0	8	0	268	6	38	224

* September 2012-August 2013
Source: FAA Enhanced Traffic Management System (ETMSC) database.

Exhibit 3C
ESTIMATED OPERATIONS
BY COMMERCIAL TRANSPORT JETS

ations in 2013 included the KC-135 (36), T-38 Talon (64), F-18 Hornet (154), F5 Freedom Fighter (22), and the A6-Prowler (136).

In 2013, activity by aircraft in AAC D accounted for a total of 2,028 operations. The highest ADG with over 500 operations was ADG V with 606 in 2013. Therefore, the appropriate design aircraft for Grant County International Airport is those falling in AAC/ADG D-V. The most representative aircraft would be the Boeing 777-300. The TDG of this aircraft is 6. **Therefore, the current design aircraft for the Airport is best described as D-V-6 (Reference Ex. 3A).**

RUNWAY DESIGN AIRCRAFT

Each runway is assigned an RDC. The RDC relates to specific FAA design standards that should be met in relation to each runway.

Runway 14L-32R Design Aircraft

Runway 14L-32R is the primary runway and should be designed to accommodate the critical design aircraft. This runway is 13,503 feet long and has a precision CAT-I (½-mile visibility minimums and 200-foot cloud ceilings) instrument approach to Runway 32R. **Therefore, the applicable RDC is D-V-2400**. This RDC determination is supported by current activity levels as determined previously, and it corresponds to the airport reference code identified on the previous airport layout plan (ALP).

Runway 4-22 Design Aircraft

The classification for a crosswind runway is influenced by the nature of crosswinds potentially affecting aircraft operating at an airport and by current operations. A crosswind runway should be made available when the primary runway does not provide at least 95 percent wind coverage. Since the primary runway at the Airport provides 92.6 percent coverage, the crosswind runway should be maintained. Runway 4-22 actually provides the greatest overall wind coverage at 95.77 percent at 10.5 knots. In effect, this runway can serve as a secondary primary runway (Reference Exhibit 3E).

Operationally, the crosswind runway is frequently utilized by the same large commercial transport aircraft as the primary runway. At 10,000 feet in length, the runway serves as an adequate backup to the primary runway. The current ALP on record identifies Runway 4-22 in design category C-III. The approach to the Runway 4 end has non-precision instrument approaches with visibility minimums as low as ¾-mile.

It is not necessary to design the crosswind runway to the same dimensional standards as the primary runway; however, where possible it should be able to serve as an adequate backup. Therefore, Runway 4-22 is planned to continue to serve large commercial transport aircraft. **The current RDC is C-III-4000, which is best represented by the Boeing 737-700.**

Runway 18-36 Design Aircraft

Runway 18-36 is the designated general aviation runway which is located west of the primary runway. This runway is 3,327 feet long and 75 feet wide. This is the runway primarily used by student pilots and other general aviation operators. The previous ALP classified this runway as B-II. This is a visual runway with no instrument approaches. **The current RDC for Runway 18-36 is B-II-VIS.**

Runway 14R-32L Design Aircraft

Runway 14R-32L is a shorter parallel to the primary runway, and it is 2,936 feet long and 75 feet wide. This runway is a visual runway with no instrument approaches. It does not have standard runway edge lights; instead, it is equipped with blue taxiway edge lights. As a result, the runway is only available in daylight conditions for use as a runway.

The previous ALP classified this runway as B-II. **The current RDC for Runway 14R-32L is B-II-VIS.**

Runway 9-27 Design Aircraft

Runway 9-27 is the military assault strip. It is primarily maintained by the military and is available for their exclusive use. The runway measures 3,500 feet by 90 feet, is not equipped with runway edge lights, and it has no instrument approaches.

The previous ALP classified this runway as B-II. This runway is heavily utilized by C-17 aircraft in numbers that far exceed the 500 operations threshold. **Based on current activity levels, the RDC for this runway would be C-IV-VIS**.

FUTURE DESIGN AIRCRAFT

As documented in Chapter Two, operations are forecast to grow over the 20-year planning horizon; however, the mix of aircraft types is anticipated to remain largely unchanged. The Airport will continue to be utilized by all sectors of aviation including air carrier, air taxi, general aviation, and military. The frequency of these operations may increase somewhat, but the size of the design aircraft for the airport and each runway is not anticipated to change. **Therefore, the overall design aircraft for the airport will remain D-V-6 as represented by the B-777-300.**

The AAC and ADG design components for each Runway RDC are anticipated to remain unchanged. The RVR (visibility component) may change based on analysis and recommendations regarding potential instrument approach capability.

AIRFIELD CAPACITY

Airfield capacity is measured in a variety of different ways. The **hourly capacity** measures the maximum number of aircraft operations that can take place in an hour. Very rarely will any runway reach its absolute capacity, so this measuring tool is not an effective way to determine airfield needs. The airfield **annual service volume (ASV)** is an annual level of service that is used to define airfield congestion and delay as a runway nears its hourly capacity. The airfield's calculated ASV is not the point at which gridlock occurs; rather, it is the point at which operational delays become exponential. **Aircraft delay** is the total delay incurred by aircraft using the airfield during a given timeframe. FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, provides a methodology for examining the operational capacity of an airfield for planning purposes. This analysis takes into account specific factors about the airfield. These various factors are depicted in **Exhibit 3D**. The following describes the input factors as they relate to Grant County International Airport:

CAPACITY FACTORS

- **Runway Configuration –** Grant County International Airport has an unusual and complex runway configuration. There are five runways, some of which converge in the same general location. Operationally, several runways can be in use at the same time. Parallel Runway 14R-32L is not considered in the capacity analysis because it is so infrequently used and is being considered for closure.

- **Runway Use –** Runway use will be controlled by wind and/or airspace conditions. The direction of takeoffs and landings are generally determined by the speed and direction of the wind. It is generally safest for aircraft to take-off and land into the wind, avoiding a crosswind (wind that is blowing perpendicular to the travel of the aircraft) or tailwind components. Runway 18-36 is utilized the most, estimated at 52 percent of the time, serving mostly general aviation aircraft. Runway 9-27 is the second most utilized at 23 percent. Runway 9-27 is exclusively used by the military. Primary Runway 14L-32R is used approximately 16 percent of the time. Usage for Runway 4-22 is estimated at slightly less than eight percent, and parallel Runway 14R-32L is estimated at less than one percent of activity. **Table 3C** shows the estimated runway use percentages.

05MP14-3C-6/3/09

AIRFIELD LAYOUT

Runway Configuration

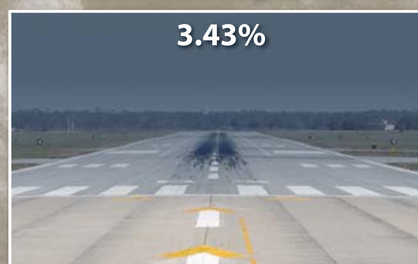
Runway Use

Number of Exits

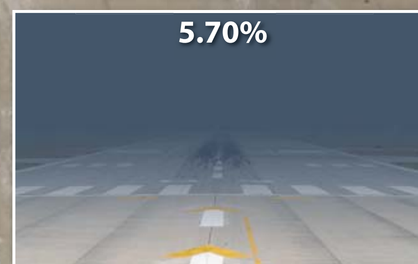
WEATHER CONDITIONS

VMC (VFR)
Visual Meteorological Conditions

IMC (IFR)
Instrument Meteorological Conditions



PVC
Poor Visibility Conditions



AIRCRAFT MIX

Category A & B Aircraft
(less than 12,000 lbs.)

Category C Aircraft
(12,500 - 300,000 lbs.)

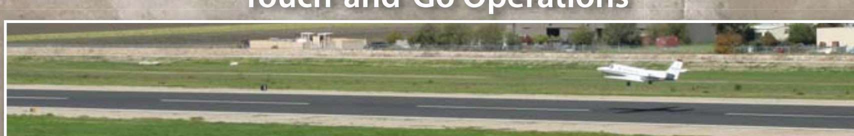
Category D Aircraft
(over 300,000 lbs.)

OPERATIONS

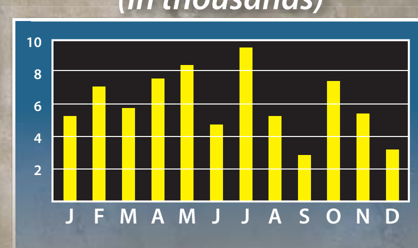
Arrivals

Departures

Touch-and-Go Operations



Total Annual Operations
(in thousands)



PORT OF MOSES LAKE

VFR: Visual Flight Rules; **IRF**: Instrument Flight Rules

Exhibit 3D
AIRFIELD CAPACITY ELEMENTS

TABLE 3C Runway Usage Estimate Grant County International Airport	R 14L-32R	R 18-36	R 9-27	R 4-22	R 14R-32L
Estimated Runway Use Percent By Operation Type					
Air Carrier					
Itinerant	90.00%			10.00%	
Local	90.00%			10.00%	
General Aviation					
Itinerant		90.00%		9.00%	1.00%
Local		90.00%		9.00%	1.00%
Military					
Itinerant	15.00%		79.00%	5.00%	1.00%
Local	15.00%		79.00%	5.00%	1.00%
Air Taxi (Itinerant)	80.00%	20.00%			
Runway Use Operations Count 2013					
Air Carrier					
Itinerant	2,914			324	
Local	4,370			486	
General Aviation					
Itinerant		15,233		1,523	169
Local		25,124		2,512	279
Military					
Itinerant	1,490		7,845	497	99
Local	1,939		10,214	646	129
Air Taxi (Itinerant)	1,967	492			
TOTALs	12,680	40,849	18,059	5,988	676
% of Time Used	**16.20%**	**52.20%**	**23.08%**	**7.65%**	**0.86%**

Source: Interviews with ATCT staff and airport management

The availability of instrument approaches is also considered. Runways 14L-32R and 4-22 are the two instrument capable runways. Runway 32R is equipped with a CAT-I ILS, which provides the best visibility and cloud ceiling minimums. On a day with particularly poor conditions, this runway would be utilized exclusively.

- **Exit Taxiways** – Exit taxiways have a significant impact on airfield capacity since the number and location of exits directly determines the occupancy time of an aircraft on the runway. For Grant County International Airport, those taxiway exits (located between 3,000 and 5,500 feet from the runway threshold) count in the capacity determination. Landings to either end of Runway 14L-32R have one exit for capacity calculation. Landings to Runway 4 have three exits, while landings to Runway 22 have two. Landings to the remaining three runways have zero taxiways exits for capacity calculations.

- **Weather Conditions** – The Airport operates under visual flight rules (VFR) 90.88 percent of the time. When cloud ceilings are between 500 and 1,000 feet and visibility is between one and three miles, instrument flight rule (IFR) conditions apply, which is approximately 3.43 percent of the year. Poor visibility conditions (PVC) apply when cloud ceilings are below 500 feet and visibility is below one mile. PVC conditions occur 5.7 percent of the year. **Table 3D** summarizes the weather conditions between 2001 and 2011.

TABLE 3D Annual Weather Conditions Grant County International Airport				
Condition	**Cloud Ceiling**	**Visibility**	**Observations**	**Percent**
Visual (VFR)	>1,000'	> 3 mi.	70,084	90.88%
Instrument (IFR)	≤ 1,000' and > 500'	≤ 3 mi. and Vis > 1 mi.	2,642	3.43%
Poor Visibility (PVC)	≤ 500'	≤ 1 mi.	4,394	5.7%
		TOTAL	**77,120**	**100.00%**
Source: National Oceanic and Atmospheric Administration (NOAA). Ten years of data from the on-airport ASOS from 2003-2013.				

- **Aircraft Mix –** Aircraft mix for the capacity analysis is defined in terms of four aircraft classes. Classes A and B consist of small and medium-sized propeller and some jet aircraft, all weighing 12,500 pounds or less. These aircraft are associated primarily with general aviation activity, but do include some air taxi, air cargo, and commuter aircraft. Class C consists of aircraft weighing between 12,500 pounds and 300,000 pounds, which include most turboprops, business jets and medium-sized commercial transport aircraft. Class D aircraft consists of large aircraft weighing more than 300,000 pounds, such as Boeing 747, 777, and 787 aircraft. The percentage of Class C and D aircraft is most critical in the capacity analysis. The FAA capacity model uses a factor of three for Class D aircraft due to their larger separation requirements (which reduces overall capacity). Overall, Class C and three times Class D operations represent 30.21 percent currently and is forecast to grow to 38.81 percent in the long term, as shown in **Table 3E**.

TABLE 3E Percent Class C and (3)*D Aircraft Mix Grant County International Airport				
Condition	**2013**	**Short**	**Intermediate**	**Long**
Visual (VFR)	32.0%	33.7%	35.9%	40.8%
Instrument (IFR)	16.8%	17.9%	19.2%	22.2%
Poor Visibility (PVC)	3.5%	6.9%	7.4%	8.7%
Combined	30.21%	32.00%	34.05%	38.81%
Source: FAA AC 150/5060-5. Airport Capacity and Delay				

- **Percent Arrivals –** The percent of aircraft arrivals is the ratio of landing operations to the total operations for an airport. This percent is considered due to the fact that aircraft approaching an airport for landing require more runway occupancy time than an aircraft departing the airfield. The FAA methodology used herein provides for computing airfield capacity with a 40, 50, or 60 percent of arrivals figure.

For a general aviation airport, the percent of aircraft arrivals is not a significant factor. In the capacity analysis, the percent of arrivals is used to look at times when there is a large arrival or departure push. For example, at commercial service airports a peak departure time would most likely be seen in the first few hours of the day, while peak arrival times might occur later in the evenings. However, since a value has to be included in the capacity calculations, a 50 percent arrival value was utilized as an average or neutral effect for Grant County International Airport

- **Touch-and-Go Activity –** Touch-and-go training activity has the effect of increasing capacity since runway dwell times are shorter. Air carrier, military, and general aviation aircraft all perform touch-and-go's at the Airport. It is estimated that 90 percent of local activity is touch-and-go in nature. The touch-and-go percent is calculated as approximately 42 percent of total air carrier, military and general aviation operations.

- **Peak Period Operations –** For the airfield capacity analysis, average daily operations and average peak hour operations during the peak month, as calculated in the previous chapter, are utilized. Typical operations activity is important in the calculation of an airport's annual service volume as "peak demand" levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times throughout the year.

CALCULATION OF AIRFIELD CAPACITY

The preceding information was used in conjunction with the airfield capacity methodology developed by the FAA to determine airfield capacity and delay for Grant County International Airport. The following sections outline the analysis.

Hourly Runway Capacity

The first step in determining annual service volume involves the computation of the hourly capacity of each runway configuration. The percentage use of each runway, the amount of touch-and-go training activity, and the number and locations of runway exits become important factors in determining the hourly capacity of each runway configuration.

Hourly Capacity = C x T x E
C = Hourly Capacity Base T = Touch-and Go Factor E = Taxiway Exit Factor

The best hourly capacity determined from FAA AC 150/5060-5, *Airport Capacity and Delay*, is 148 for south flow situations utilizing Runway 14L and 9. Including calm wind conditions (6 knots or less), this configuration accounts for 73 percent of runway use. East flow situations utilizing Runways 9 and 4 also provides an hourly capacity of 148, but accounts for only 2.8 percent of runway usage. A north flow situation using a runway configuration of 32R and 36 provides an hourly capacity of 137 with a runway use of 10.8 percent. A west flow situation utilizing Runways 27 and 22 results in an hourly capacity of 110 and a runway use of 4.2 percent. The remaining activity is IFR and PVC in nature and is allocated to a a north flow situation for Runway 32R and 4 for IFR and Runway 32R for PVC. These situations account for a total of 9.2 percent of runway usage.

The base hourly capacity figures are then weighted based on the aircraft mix index. Grant County International Airport has a high mix percent of Class C and D aircraft. This has the effect of decreasing capacity due to longer runway dwell times and greater separation requirements. This is particularly true in IFR and PVC conditions. The current weighted hourly capacity is estimated at 93.

Annual Service Volume (ASV)

Once the hourly capacity is known, the annual service volume can be determined. Annual service volume is calculated by the following equation:

Annual Service Volume = C x D x H	
C =	weighted hourly capacity
D =	ratio of annual demand to average daily demand during the peak month
H =	ratio of average daily demand to average peak hour demand during the peak month

Following this formula, the current annual service volume for the Airport has been calculated at 102,000 operations. Utilizing operational projections for the short term, the calculated ASV would decrease to 100,000. The reduced ASV is primarily due to the increase in operations by Class C and D aircraft. The projected increase in Class C and D aircraft operations for the intermediate and long term planning horizons would result in a reduced airfield ASV of 99,000 and 96,000 annual operations respectively.

Delay

As the number of annual aircraft operations approaches the airfield’s ASV, increasing amounts of delay to aircraft operations will occur. Delays occur to arriving and departing aircraft in all weather conditions. Arriving aircraft delays result in aircraft holding outside of the airport traffic area while in the air. Departing aircraft delays result in aircraft holding on the ground until released by the airport traffic control tower (ATCT).

Currently, total annual delay at the Airport is estimated at 652 hours, which equates to 30 seconds per aircraft operation. During peak periods, average delay could be five to ten times higher. As the demand/capacity ratio increases, average delay grows exponentially. By the long term, average delay could reach six minutes per operation. It should be noted that delay can be a matter of perception. Often delay will be indiscernible to pilots because tower routing and sequencing will typically accommodate the delay.

The FAA threshold for significant delay is four minutes. The alternatives chapter will present various capacity improvements. Improvements could include additional taxiway exits or different runway orientations, for example.

CAPACITY SUMMARY

Given the factors outlined above, the airfield ASV is estimated at 102,000. The ASV does not indicate a point of absolute gridlock for the airfield; however, it does represent the point at which operational delay for each aircraft operation will increase exponentially. The current operations level for the Airport represents 77 percent of the airfield's ASV. By the end of the planning period, total annual operations are anticipated to exceed 125 percent of the airfield's ASV. **Table 3F** summarizes the capacity analysis for the Airport.

FAA Order 5090.3B, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. This is an approximate level to begin the detailed planning of capacity improvements. At the 80 percent level, the planned improvements should be under design or construction. Based on current and projected operations developed for this study, improvements specifically designed to enhance capacity should be considered. The alternatives chapter will discuss a variety of options.

TABLE 3F
Airfield Demand/Capacity Summary
Grant County International Airport

	PLANNING HORIZON			
	Current	**Short Term**	**Intermediate Term**	**Long Term**
Operational Demand				
Annual	78,253	87,600	97,900	120,200
Design Hour	71	80	89	109
Capacity				
Annual Service Volume (Operations)	102,000	100,000	99,000	96,000
Percent Capacity	76.72%	87.60%	98.89%	125.21%
Weighted Hourly Capacity	93	92	90	87
Delay				
Per Operation (Minutes)	0.5	1.2	2.4	6
Total Annual (Hours)	652	1,752	3,916	12,020

Source: FAA AC 150/5060-5, Airport Capacity and Delay

AIRFIELD REQUIREMENTS

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

- Runway Configuration
- Runway Dimensional Standards
- Runways
- Taxiways
- Navigational Approach Aids
- Lighting, Marking, and Signage

RUNWAY CONFIGURATION

The Airport is currently served by a five-runway system, which was originally constructed by the federal government in support of military aviation training during World War II. Like many of these WWII era aviation facilities, there are more runways than would be considered if construction were to occur today. However, the availability of these runways creates unique economic development opportunities which are not necessarily limited to on-Airport businesses.

Primary Runway 14L-32R is 13,503 feet long and 200 feet wide. The runway was originally 500 feet wide but has been narrowed over the years. The runway is orientated in a northwest to southeast manner. This runway serves primarily large commercial transport and military aircraft. It is estimated that this runway is used approximately 16 percent of the time.

Crosswind Runway 4-22 is 10,000 feet long and 100 feet wide and is oriented in a southwest to northeast manner. These two runways intersect at their approximate midpoint, creating a visual 'X' when viewed from the air. This runway accommodates a mix of commercial transport, military, and general aviation activity. The runway is estimated to be in use approximately eight percent of the time.

Runway 18-36 is the general aviation training runway and measures 3,327 feet in length and 75 feet in width. The runway is roughly oriented in a north to south manner and is situated to the west of the primary runway. Runway 18-36 is the most heavily used runway accounting for approximately 52 percent of total operations. Most of the operations to this runway are by general aviation or air taxi aircraft.

Runway 14R-32L is located 1,031 feet parallel and to the west of the primary runway and is 2,936 feet long and 75 feet wide. The runway is rarely used as a runway and is primarily used as a taxiway to access the Runway 14L threshold. In fact, the edge lights are blue in color indicating a taxiway; therefore, the runway is only available as a runway during daylight hours. This runway is rarely used as a runway, accounting for less than one percent of total operations.

Runway 9-27 is 3,500 feet long and 90 feet wide and is oriented in an east to west manner. This runway is available for the exclusive use of the military. The most common activity is training by C-17 aircraft. Because of the high volume of military activity, this runway accounts for approximately 23 percent of total operations.

For the operational safety and efficiency of an airport, it is desirable for the primary runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off.

FAA Advisory Circular 150/5300-13A, *Airport Design,* indicates that the number of runways should be sufficient to meet air traffic demands, including arrivals, departures, and aircraft mix at peak volume. The number of runways needed may also be affected by the need to overcome environmental impacts or minimize the effects of adverse wind conditions.

The FAA recommends that a crosswind runway be made available when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed on the basis of the crosswind component not exceeding 10.5 knots (12 mph) for RDC A/B-I, 13 knots (15 mph) for RDC A/B-II, and 16 knots (18 mph) for RDC A/B-III, C/D-I through C/D-III.

Weather data specific to the Airport was obtained from the National Oceanic Atmospheric Administration (NOAA) National Climatic Data Center. This data was collected from the on-field automated surface observing system (ASOS) over a continuous 10-year period from 2003 to 2013. A total of 170,120 observations of wind direction and other data points were made.

Runway 14L-32R provides 92.6 percent wind coverage for 10.5 knot crosswinds, 95.7 percent coverage at 13 knots, and 98.51 percent at 16 knots. Runway 4-22 provides for 95.77 percent wind coverage at 10.5 knots, 97.9 percent at 13 knots, and 99.41 percent at 16 knots. Runway 18-36 provides 94.73 percent wind coverage for 10.5 knot crosswinds, 96.9 percent coverage at 13 knots, and 98.75 percent at 16 knots. Runway 9-27 provides for provides 93.25 percent wind coverage for 10.5 knot crosswinds, 96.3 percent coverage at 13 knots, and 99.08 percent at 16 knots. In instrument flight conditions (visibility less than three miles and/or cloud ceilings lower than 1,000 feet), each runway provides for greater than 95 percent wind coverage for each crosswind component. **Exhibit 3E** presents both the all-weather and IFR wind rose for the Airport.

Future Runway Configuration

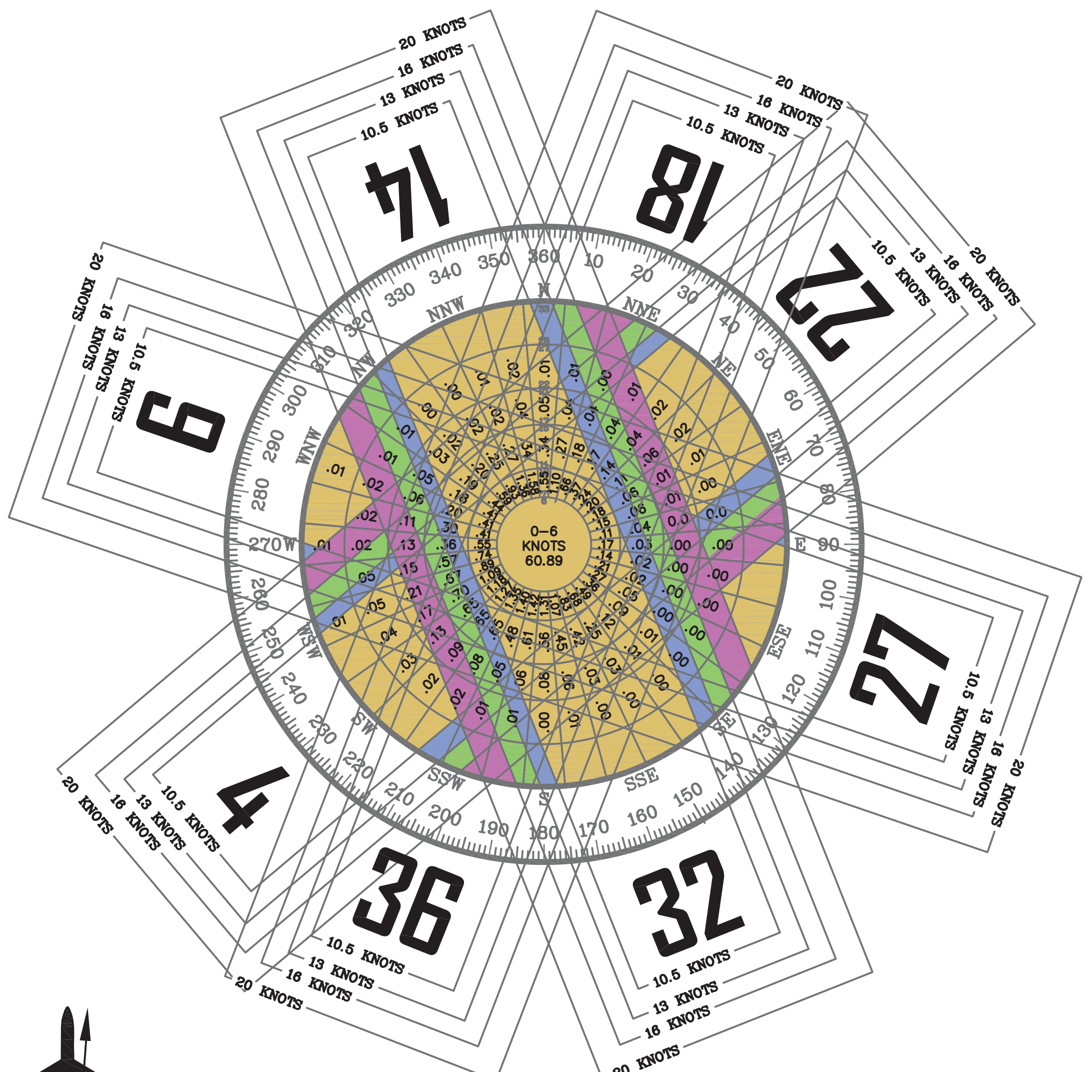
Grant County International Airport receives a widely diverse mix of aircraft types operating at the airport, including frequent activity by the largest commercial transport and military aircraft produced. Each runway tends to serve a specific segment of this activity. No additional runways need to be planned at this time to accommodate forecast growth in operations.

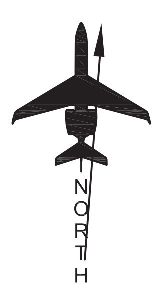
Reducing the number of runways should be considered. Parallel Runway 14R-32L is used as a runway infrequently. It is primarily used as a taxiway to access the Runway 14L threshold. The edge lighting for this runway is actually blue in color indicating a taxiway. Consideration will be given to ultimately converting Runway 14R-32L back to a taxiway.

Runway 4-22 is a moderately used crosswind runway; however, it provides the best wind coverage of any of the runways (over 95 percent). As a crosswind runway, it technically needs to be designed to accommodate only small general aviation aircraft (those in RDC A/B-I). However, operationally, it provides an important back-up capability to the primary runway. There will be times when the primary runway is closed, perhaps for an extended period of time, typically for maintenance, repair, or reconstruction. It is recommended that this runway remain operational with the capability to accommodate the majority of aircraft

ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 4–22	*95.77%*	*97.9%*	*99.41%*	*99.86%*
Runway 9–27	*93.25%*	*96.30%*	*99.08%*	*99.79%*
Runway 14–32	*92.60%*	*95.70%*	*98.51%*	*99.54%*
Runway 18–36	*94.73%*	*96.90%*	*98.75%*	*99.60%*
All Runways	*99.98%*	*100%*	*100%*	*100%*





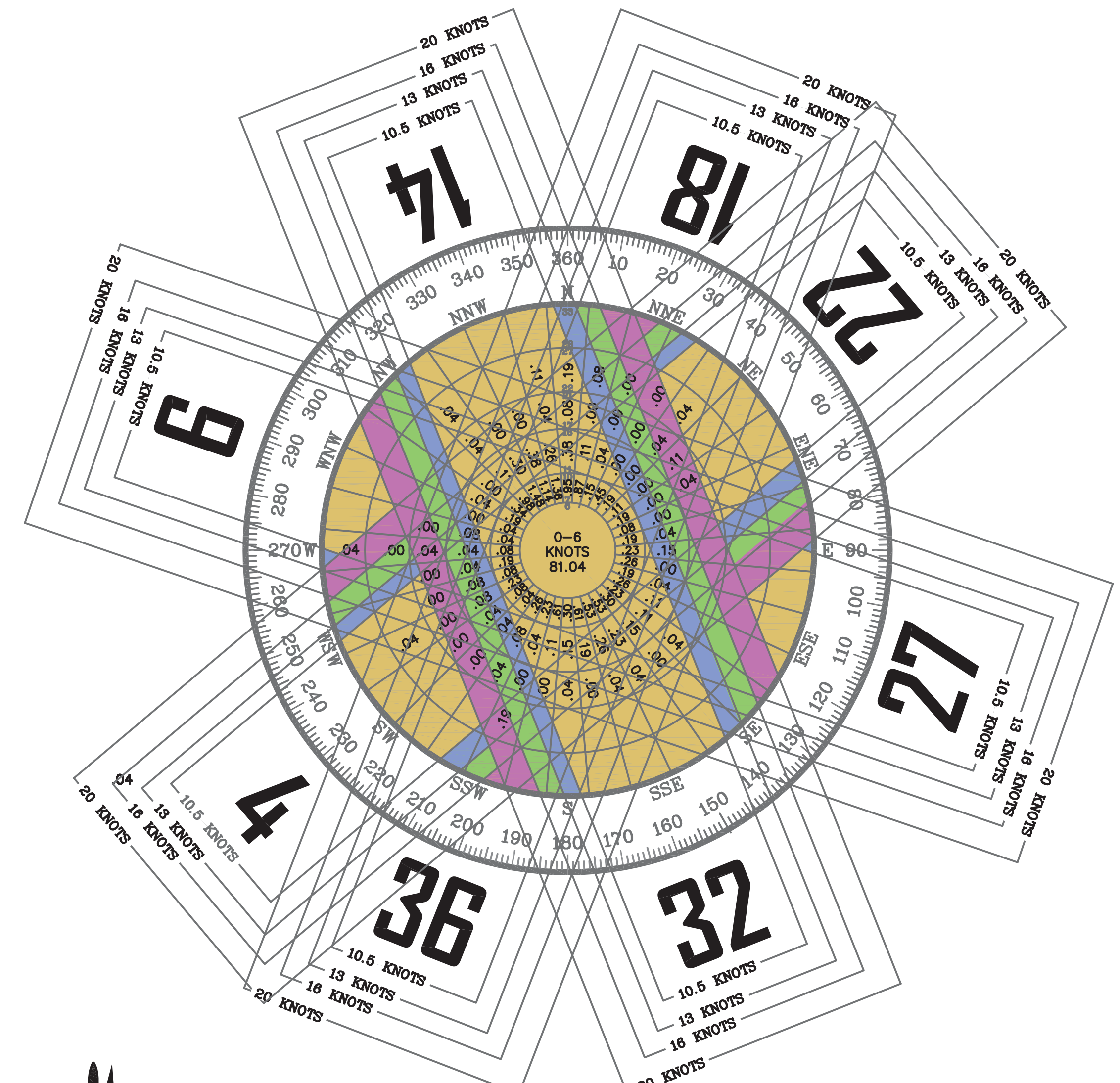
Magnetic Declination
15° 32' East (July 2013)
Annual Rate of Change
00° 10.0' West (July 2013)

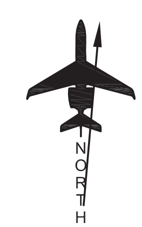
SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Grant County Intl. Airport
Moses Lake, WA

OBSERVATIONS:
77,120 All Weather Observations
2003–2012

IFR WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 4–22	*97.2%*	*98.49%*	*99.52%*	*99.83%*
Runway 9–27	*96.35%*	*97.69%*	*99.03%*	*99.37%*
Runway 14–32	*98.24%*	*98.85%*	*99.26%*	*99.63%*
Runway 18–36	*98.77%*	*99.25%*	*99.74%*	*99.88%*
All Runways	*100%*	*100%*	*100%*	*100%*





Magnetic Declination
15° 32' East (July 2013)
Annual Rate of Change
00° 10' West (July 2013)

SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Grant County Intl. Airport
Moses Lake, Washington

OBSERVATIONS:
2,642 IFR Observations
2003–2012

PORT OF MOSES LAKE

operating at the airport on a frequent basis. This would include large commercial transport aircraft such as the Boeing fleet of aircraft.

Runway 18-36 represents the most heavily used runway at the airport serving primarily general aviation aircraft. The availability of this runway significantly reduces the interaction of smaller and slower general aviation aircraft with large commercial transport and military aircraft. The presence of this runway increases the safety margin for both the airfield and the airspace. Runway 18-36 should be planned to be maintained in its current capacity as the general aviation runway. In the alternatives chapter, consideration will be given to the potential to reorient Runway 18-36 to be parallel to Runway 14-32. Reorientation of the runway would further separate general aviation aircraft and large transport aircraft utilizing Runway 14-32.

Runway 14L-32R is the primary runway and it provides the only precision instrument approach available at the airport with the ILS to Runway 32R. This runway should be maintained to serve the critical design aircraft (B-747-8).

Runway 9-27 is available for the exclusive use of the military, and as such, is a revenue generator for the airport through landing fees. Expenses associated with the runway have long been shared by the Port and the military. The FAA has not contributed to the maintenance of this runway. For planning purposes, Runway 9-27 is planned to continue in its current role of accommodating military training.

RUNWAY DIMENSIONAL STANDARDS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions that could affect their safe operation. These include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zone (RPZ). Also established are separation standards between various airport elements.

Dimensional standards for the various safety areas and separation distances associated with the runways are a function of the type of aircraft expected to use the runways as well as the instrument approach capability. **Exhibit 3F** presents the FAA design standards as they apply to the runways at Grant County International Airport.

The entire RSA, ROFA, and ROFZ must be under the direct ownership of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. The RPZ should also be under airport ownership. An alternative to outright ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in places which ensure the RPZ remains free of incompatible development. The various Airport surfaces are presented on **Exhibit 3G**.

	Runway 14L-32R	Runway 4-22	Runway 18-36	Runway 14R-32L	Runway 9-27
Approach Reference Code (APRC)	D-VI-2400	D-IV-4000 D-V-4000	B-II-VIS	B-II-VIS	D-IV-VIS
Departure Reference Code (DPRC)	D-VI	D-IV D-V	B-II	B-II	D-IV D-V
Runway Design Code (RDC)	D-V-2400	C-III-4000	B-II-VIS	B-II-VIS	C-IV-VIS
Design Aircraft	D-V-6	C-III-3	B-II-2	B-II-2	C-IV-5
Example Aircraft	777-300	737-700	King Air 200	King Air 200	C-17
Visibility Minimums	½-Mile (32R)/ ¾-Mile(32R)	¾-Mile	Visual	Visual	Visual
RUNWAY DESIGN					
Runway Width	150*	100	75	75	150
Runway Shoulder Width	35	25	10	10	25
RUNWAY PROTECTION					
Runway Safety Area (RSA)					
Width	500	500	150	150	500
Length Beyond Departure End	1,000	1,000	300	300	1,000
Length Prior to Threshold	600	600	300	300	600
Runway Object Free Area (ROFA)					
Width	800	800	500	500	800
Length Beyond Departure End	1,000	1000	300	300	1,000
Length Prior to Threshold	600	600	300	300	600
Runway Obstacle Free Zone (ROFZ)					
Width	400	400	400	400	400
Length Beyond End	200	200	200	200	200
Precision Obstacle Free Zone (POFZ)					
Width	800	NA	NA	NA	NA
Length	200	NA	NA	NA	NA
Approach Runway Protection Zone (RPZ)					
Length	1,700 (14L)/ 2,500 (32R)	1,700	1,000	1,000	1,700
Inner Width	1,000	1,000	500	500	500
Outer Width	1,510 (14L)/ 1,750(32R)	1,510	700	700	1,010
Departure Runway Protection Zone (RPZ)					
Length	1,700	1,700	1,000	1,000	1,700
Inner Width	500	500	500	500	500
Outer Width	1,010	1,010	700	700	1,010
RUNWAY SEPARATION					
Runway Centerline to:					
Holding Position	262	250	200	200	250
Parallel Taxiway	400	400	240	240	400
Aircraft Parking Area	500	250	250	250	250

RDC and RRC are comprised of the Aircraft Approach Category (AAC), the Airplane Design Group (ADG), and the Runway Visibility Range (RVR)

Design Aircraft is comprised of the AAC, ADG, and the Taxiway Design Group (TDG)

Note: All dimensions in feet

* Current width of 200' recommended to be maintained.

Source: FAA AC 150/5300-13A, Airport Design

PORT OF MOSES LAKE

Exhibit 3F

DESIGN STANDARDS

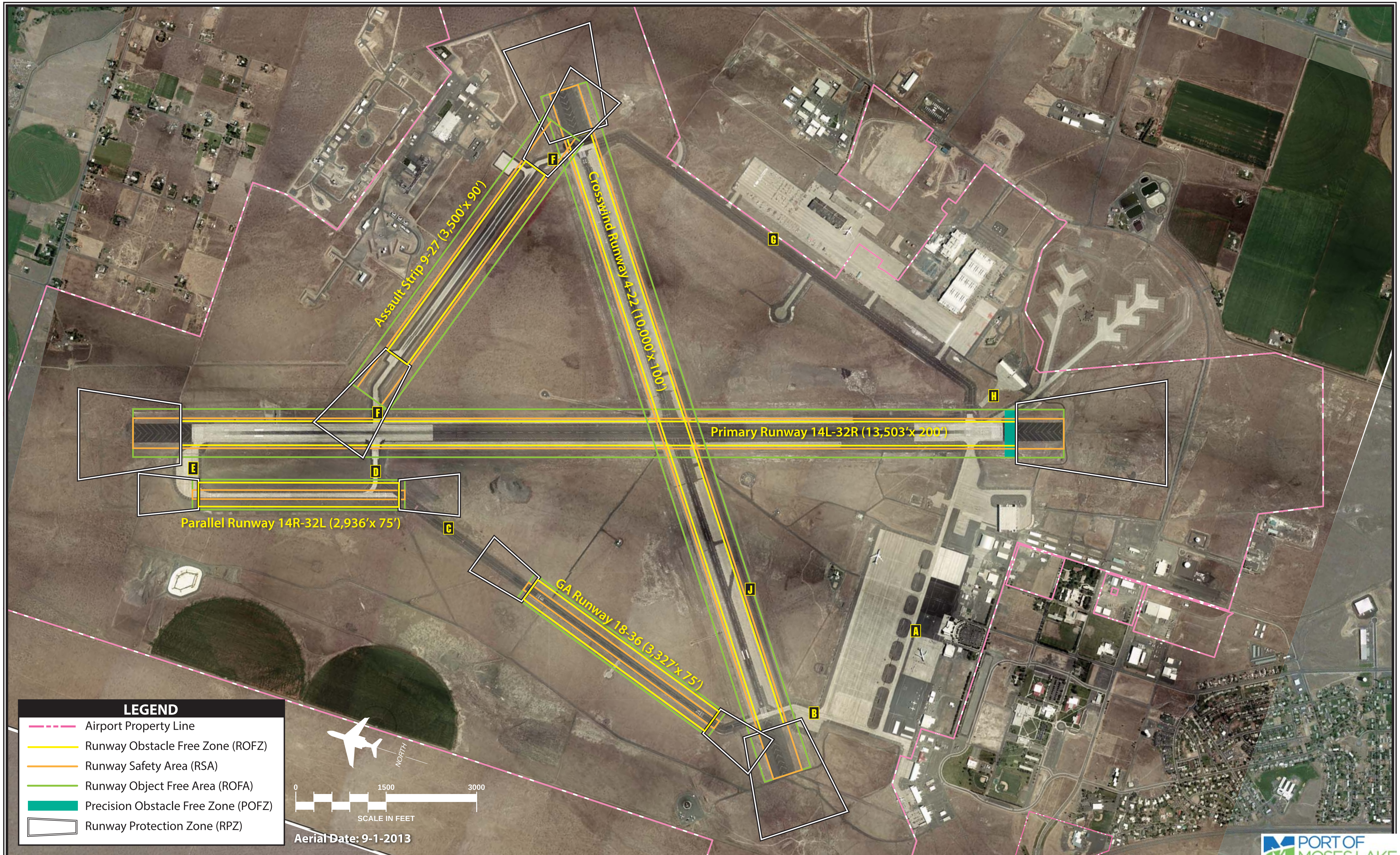


Exhibit 3G
RUNWAY SAFETY AREAS

Runway Safety Area (RSA)

The RSA is defined in FAA Advisory Circular (AC) 150/5300-13A, *Airport Design,* as a "surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of undershoot, overshoot, or excursion from the runway." The RSA is centered on the runway and dimensioned in accordance to the approach speed of the critical design aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the design aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose such as runway edge lights or approach lights.

The FAA has placed a higher significance on maintaining adequate RSA at all airports. Under Order 5200.8, effective October 1, 1999, the FAA established the *Runway Safety Area Program.* The Order states, "The objective of the Runway Safety Area Program is that all RSAs at federally-obligated airports…shall conform to the standards contained in Advisory Circular 150/5300-13, *Airport Design*, to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airport and perform airport inspections.

The RSA standards are met for all runways at Grant County International Airport.

Runway Object Free Area (ROFA)

The ROFA is "a two-dimensional ground area, surrounding runways, taxiways, and taxilanes, which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting)." The ROFA does not have to be graded and level like the RSA; instead, the primary requirement for the ROFA is that no object in the ROFA penetrates the lateral elevation of the RSA. The ROFA is centered on the runway, extending out in accordance to the critical design aircraft utilizing the runway.

The ROFA standards are met for all runways at Grant County International Airport.

Runway Obstacle Free Zone (ROFZ)

The ROFZ is an imaginary volume of airspace which precludes object penetrations, including taxiing and parked aircraft. The only allowance for ROFZ obstructions is navigational aids mounted on frangible bases which are fixed in their location by function, such as airfield signs. The ROFZ is established to ensure the safety of aircraft operations. If the ROFZ is obstructed, the airport's approaches could be removed or approach minimums could be increased.

The ROFZ standards are met for all runways at Grant County International Airport.

A precision obstacle free zone (POFZ) is further defined for runway ends with a precision approach, such as the ILS approach to Runway 32R. The POFZ is 800 feet wide and extends from the runway threshold to a distance of 200 feet. The POFZ is in effect when the following conditions are met:

a) The runway supports a vertically guided approach.
b) Reported ceiling is below 250 feet and/or visibility is less than ¾-mile.
c) An aircraft is on final approach within two miles of the runway threshold.

When the POFZ is in effect, a wing of an aircraft holding on a taxiway may penetrate the POFZ; however, neither the fuselage nor the tail may infringe on the POFZ.

The POFZ standards are met for all applicable runways at Grant County International Airport.

Runway Protection Zones (RPZ)

The RPZ is a trapezoidal area centered on the runway, typically beginning 200 feet beyond the runway end. The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses, in order to enhance the protection of people and property on the ground. The RPZ is comprised of the central portion of the RPZ and the controlled activity area. The central portion of the RPZ extends from the beginning to the end of the RPZ, is centered on the runway, and is the width of the ROFA. The controlled activity area is any remaining portions of the RPZ. The dimensions of the RPZ vary according to the visibility minimums serving the runway and the type of aircraft (design aircraft) operating on the runway.

While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 150/5300-13A, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements.
- Irrigation channels as long as they do not attract birds.
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator.
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable.
- Unstaffed navigational aids (NAVAIDs) and facilities, such as required for airport facilities that are fixed-by-function in regard to the RPZ.

Any other land uses considered within RPZ land owned by airport sponsors must be evaluated and approved by the FAA Office of Airports. The FAA has published the *Interim Guidance on Land Uses within a Runway Protection Zone* (9.27.2012), which identifies several potential land uses that must be evaluated and approved prior to implementation. The specific land uses requiring FAA evaluation and approval include:

- Buildings and structures (examples include, but are not limited to: residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.)

- Recreational land use (examples include, but are not limited to: golf courses, sports fields, amusement parks, other places of public assembly, etc.)
- Transportation facilities. Examples include, but are not limited to:
  - -- Rail facilities - light or heavy, passenger or freight
  - -- Public roads/highways
  - -- Vehicular parking facilities
- Fuel storage facilities (above and below ground)
- Hazardous material storage (above and below ground)
- Wastewater treatment facilities
- Above-ground utility infrastructure (i.e., electrical substations), including any type of solar panel installations.

The *Interim Guidance on Land within a Runway Protection Zone* states, "RPZ land use compatibility also is often complicated by ownership considerations. Airport owner control over the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses."

Currently, the RPZ review standards are applicable to any new or modified RPZ. The following actions or events could alter the size of an RPZ, potentially introducing an incompatibility:

- An airfield project (e.g., runway extension, runway shift).
- A change in the critical design aircraft that increases the RPZ dimensions.
- A new or revised instrument approach procedure that increases the size of the RPZ.
- A local development proposal in the RPZ (either new or reconfigured).

Since the *Interim Guidance* only addresses new or modified RPZs, existing incompatibilities are essentially grandfathered under certain circumstances. While it is still necessary for the airport sponsor to take all reasonable actions to meet the RPZ design standard, FAA funding priority for certain actions, such as relocating existing roads in the RPZ, will be determined on a case-by-case basis.

All of the RPZs at the Airport currently meet design standards.

Runway/Taxiway Separation

The design standards for the separation between runways and parallel taxiways are a function of the critical design aircraft and the instrument approach visibility minimum. There are only two taxiways at the airport that run parallel to a runway. Taxiway J is a partial parallel to Runway 4-22 situated 400 feet from the runway. This meets the design standard for this runway. At night, parallel Runway 14R-32L is used as a parallel taxiway to the primary runway. It is separated from the runway by 1,031 feet, thereby exceeding the separation standard of 400 feet.

All runway/taxiway separation standards are met at the Airport.

RUNWAY DESIGN STANDARDS

The adequacy of the existing runway system at Grant County International Airport has been analyzed from a number of perspectives, including runway orientation and adherence to safety area standards. From this information, requirements for runway improvements were determined for the airport. Runway elements such as length, width, and strength are now presented.

Runway Length

The determination of runway length requirements for airports is based on five primary factors:

- Mean maximum temperature of the hottest month
- Airport elevation
- Runway gradient
- Critical aircraft type expected to use the runway (RDC)
- Stage length of the longest nonstop destination (specific to larger aircraft)

The mean maximum daily temperature of the hottest month at Grant County International Airport is 88.9 degrees Fahrenheit (F), which occurs in July. The Airport elevation is 1,185 feet above mean sea level (MSL). The runway elevation difference between the high and low points is nine feet for Runway 14L-32R, 35 feet for Runway 4-22, one foot for Runway 14R-32L, 14 feet for Runway 9-27, and zero feet for Runway 18-36. The RDC for each runway was previously presented on **Exhibit 3F**. As noted previously, Boeing performs flight testing at the Airport. This includes operating under maximum loading conditions. As a result, haul length is not particularly relevant for runway length determination.

Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length needs. Airplanes operate on a wide variety of available runway lengths. Many factors will govern the suitability of those runway lengths for aircraft such as elevation, temperature, wind velocity, aircraft operating weight, wing flap settings, runway condition (wet or dry), runway gradient, vicinity airspace obstructions, and any special operating procedures. Airport operators can pursue policies that can maximize the suitability of the runway length. Policies such as area zoning and height and hazard restrictions can protect an airport's runway length. Airport ownership (fee simple or easement) of land leading to the runway's ends can reduce the possibility of natural growth or man-made obstructions. Planning of runways should include an evaluation of aircraft types expected to use the airport, or a particular runway now and in the future. Future plans should be realistic and supported by the FAA approved forecasts and should be based on the critical design aircraft (or family of aircraft).

The first step in evaluating runway length is to determine general runway length requirements for the majority of aircraft operating at the Airport. The majority of operations are conducted using smaller single engine piston-powered aircraft weighing less than 12,500 pounds. Following guidance from AC 150/5325-4C, *Runway Length Recommendations for Airport Design*, to accommodate 95 percent of small aircraft with less than 10 passenger seats, a runway length of 3,500 feet is recommended. To accommodate 100 percent of these small aircraft, a runway length of 4,100 feet is recommended. Small aircraft with 10 or more passenger seats require a runway length of 4,400 feet.

Runway length requirements for all aircraft with a maximum certified takeoff weight of 12,500 pounds or greater should be determined using flight planning manuals from the manufacturer under maximum loading conditions. For business jets, runway length requirements can be generalized as follows. A typical small/medium sized business jet will need somewhere between 4,800 and 7,000 feet of runway length at Grant County International Airport. Larger business jets will typically need between 5,700 and 8,600 feet.

Each aircraft manufacturer publishes an airport planning manual which documents various specifications for the aircraft. Included are performance specifications, including take-off length estimates. Under most circumstances, take-off length will be the most demanding. Per FAA guidance, runway length estimates of 30 feet or greater are to be rounded up to the nearest one-hundredth. **Table 3G** presents the estimated maximum runway length requirements for typical commercial transport aircraft that currently operate at the Airport.

The aircraft needing the most runway length at the Airport is the High Gross Weight (HGW) variant of the Boeing 777-200, which needs up to 15,300 feet of runway length. The Boeing 777-300 has a recommended runway length of 13,500 feet. The Boeing 747-8 and the 787-8 have recommended lengths of 12,700 feet. As can be seen from the table, combined, these aircraft have accounted for nearly 1,200 operations in 2013.

Runway 14L-32R Length

Runway 14L-32R is the primary runway and it is 13,503 feet long. For a general aviation airport, this is exceptionally long. However, at Grant County International Airport, this length is necessary to accommodate the critical design aircraft. This runway should be maintained at its current length in order to continue to accommodate the length needs of the critical design aircraft.

TABLE 3G
Maximum Runway Length Requirements
Grant County International Airport

Aircraft Type	Airport Reference Code	Maximum Take-off Weight (lbs)	Recommended Runway Length (ft)	Minimum Number of Operations in 2013*
B737-200	C-III	115,500	10,700	0
B737-300	C-III	138,500	12,200	10
B737-400	C-III	150,000	11,300	4
B737-500	C-III	133,500	9,900	0
B737-600	C-III	145,500	8,200	0
B737-700	C-III	145,500	10,800	122
B737-800	D-III	174,200	9,000	1,304
B737-900	D-III	174,200	11,900	148
A320	C-III	172,000	8,100	0
MD-83	D-III	160,000	9,200	0
B707-420	C-IV	310,000	10,600	0
B757-200	C-IV	255,000	8,800	2
B767-200	C-IV	315,000	6,500	88
B767-200ER	C-IV	350,000	9,000	Included in B767-200
B767-300	C-IV	361,000	10,300	Included in B767-200
B767-400ER	D-IV	450,000	12,800	0
B747-400	D-V	875,000	12,000	14
B747-400F	D-V	875,000	12,100	Included in B747-400
B747-400ERF	D-V	910,000	12,600	Included in B747-400
B747-8F	D-VI	987,000	11,500	224
B777-200	C-V	545,000	9,100	254
B777-200 HGW	C-V	656,000	15,300	Included in B777-200
B777-300	D-V	660,000	13,500	338
B787-8	C-IV	502,500	12,700	382

ER-Extended Range; F-Freighter, HGW-High Gross Weight
*FAA Enhanced Traffic Flow Management System (ETMSC) database

Source: AC 150/5325-4C, Runway Length Recommendation for Airport Design; Aircraft Planning Manuals

Runway 4-22 Length

Crosswind Runway 4-22 is 10,000 feet long. As discussed previously, a crosswind runway at the Airport technically needs to account for small general aviation aircraft, which are more susceptible to crosswinds. Runway 4-22, however, provides important back-up capability for the Airport. For those times when the primary runway is closed, typically due to maintenance activity, Runway 4-22 can be utilized. This capability is a very important consideration due to the frequency of activity by large commercial transport aircraft.

Planning for an extension of this runway to bring it up to the capability of the primary runway is not considered reasonable. While it is true that if the primary runway were closed, certain types of activity may not be able to be completed as desired, the Airport should not be expected to meet all eventualities, especially if they are infrequent. Therefore, at 10,000 feet in length, it is possible that Boeing may not be able to conduct fully loaded testing of certain aircraft on this runway, but they will still be able to conduct the vast majority of typical flight testing.

It is recommended that this runway remain operational with the capability to accommodate the majority of aircraft operating at the Airport on a frequent basis. This would include large commercial transport aircraft such as the Boeing fleet of aircraft. Therefore, Runway 4-22 is recommended to be maintained at its current length of 10,000 feet.

Runway 18-36 Length

At 3,327 feet in length, Runway 18-36 is intended to accommodate a large portion of the small aircraft fleet. As noted previously, a runway intended to accommodate all piston powered aircraft (10 or fewer seats) is recommended for a length of 4,400 feet. However, at Grant County International Airport, there are other runways that can accommodate any piston aircraft. Runway 18-36 has a distinct role at the Airport to accommodate piston powered flight training. At the current runway length, this role is preserved. Therefore, the existing runway length is recommended to be maintained.

Runway 14R-32L Length

Runway 14R-32L is 2,936 feet long and it serves a dual purpose as a taxiway providing access to the Runway 14L threshold. As noted previously, the edge lighting is blue, which indicates a taxiway. At its current length, this runway would typically be limited to small general aviation aircraft. As such, this runway is redundant since Runway 18-36 already provides this dedicated capability. If this runway is to be preserved as a runway, the length is adequate; however, the alternatives chapter of this plan will consider the implications of potentially closing the runway.

Runway 9-27 Length

Runway 9-27 is approximately 3,500 feet long and is available for the exclusive use of the military. This runway is minimally maintained by the Port (occasional rubber removal), and FAA has not participated financially in its maintenance. Any adjustments to the length should be a decision made by the military, in consultation with the Port, based on mission needs.

Runway Length Summary

Grant County International Airport has a tremendous asset in its runways and their length. While many other communities that have inherited former military airfields have struggled to maintain longer runways, let alone justify the length, the Port of Moses Lake has successfully implemented an economic development plan that takes advantage of and generates revenue from the runways.

Boeing has had a presence at the Airport for several decades and they continue to perform flight testing at the Airport. One of the reasons is the length of the runways. Boeing is able to perform a full range of testing, including touch-and-go's, full-stop, and fully loaded. For some of the tests, the full length of Runway 14L-32R is needed and for others it provides an additional margin of safety.

The runways are also used by the military. It is not uncommon to see KC-135 Stratotanker aircraft utilizing the Airport. In fact, in 2011, when the runway at Fairchild Air Force Base was being reconstructed, the entire fleet of KC-135s was relocated to Grant County International Airport. These aircraft have long runway length requirements.

Four of the five runways serve a distinct role at the Airport and should be maintained at their current length. Runway 14R-32L is somewhat redundant as a runway, and it serves as a taxiway currently. The alternatives chapter will discuss the advantages and disadvantages of maintaining Runway 14R-32L. One possible recommendation would be to close the runway and convert it to dedicated taxiway use. Another would be to maintain it as a runway, provided it meets all necessary design standards.

Runway Width

The width of the runway is a function of the airplane design group (ADG) for each runway. Each runway currently meets this standard. At 200 feet wide, Runway 14L-32R exceeds the standard by 50 feet. However, it should be noted that if the RDC for the runway were to transition to D-VI, then the width requirement will also transition to 200 feet. In 2013, there were 224 operations documented by D-VI aircraft. To fully accommodate these aircraft now and into the future, and to spare the expense of narrowing the runway and relocating the edge lights, it is recommended to maintain Runway 14L-32R at a width of 200 feet.

At 100 feet in width, Runway 4-22 meets the design standard for RDC C-III. There are two scenarios under which the width requirement would change to 150 feet. The first is if the instrument visibility minimums were to be lowered from the current ¾-mile to ½-mile or less. The second is if the design aircraft for this runway were to transition to one with a maximum certified takeoff weight of more than 150,000 pounds.

Runways 18-36 and 14R-32L are 75 feet wide, which meets standard, and both should be maintained. Runway 9-27 is 90 feet wide, which does not meet an FAA design standard; however, since the runway is available for the exclusive use of the military, it does not have to meet FAA requirements.

Runway Strength

An important feature of airfield pavement is its ability to withstand repeated use by aircraft. Current pavement strengths at the Airport were previously documented on Exhibit 1N. Runway 14L-32R is the primary runway and has the greatest pavement strength rating at 600,000 pounds for an aircraft with a dual double tandem landing gear configuration, such as the Boeing 747. The strength rating for all runways is adequate and should be maintained.

Line of Sight and Gradient

FAA has instituted various line of sight requirements to facilitate coordination among aircraft and between aircraft and vehicles that are operating on active runways. This allows departing and arriving aircraft to verify the location and actions of other aircraft and vehicles on the ground that could create a conflict.

Individual Runways

Line of sight standards for an individual runway are based on whether there is a parallel taxiway available. If a parallel taxiway is available, thus facilitating faster runway exit times, then any point five feet above the runway centerline must be mutually visible, with any other point five feet above the runway centerline that is located at a distance of less than half the length of the runway. If a parallel taxiway is not available, then these points must be mutually visible over the length of the entire runway.

Runway 14L-32R does not meet the standard for individual runway visibility. Essentially, the runway has a hump in it which prevents full visibility. To accommodate this situation, the runway is closed to regular traffic when the tower is closed. If a parallel taxiway were available, then the runway would meet standard. The alternatives chapter will examine options to remedy this non-standard situation.

All other individual runways meet line of sight requirements.

Intersecting Runways

Between intersecting runways, such as Runways 14L-32R and 4-22, a runway visibility zone is established (RVZ). Any point five feet above the runway centerline within the RVE must be mutually visible with any other point five feet above the centerline of the crossing runway within the RVZ. For these two runways, the RVZ is established by connecting imaginary points on the runways that are located half the distance from each threshold to the runway intersection. The RVZ for these two runways meets design standards.

TAXIWAY DESIGN STANDARDS

The design standards associated with taxiways are determined by the taxiway design group (TDG) and the airplane design group (ADG) of the critical design aircraft that would potentially use that taxiway. **Table 3H** presents the various taxiway design standards to be applied at the Airport.

TABLE 3H
Taxiway Design Standards

Applicable Runway	Rwys 18-36/ 14R-32L	Rwy 4-22	Rwy 9-27	Rwy 14L-32R
STANDARDS BASED ON WINGSPAN (ADG)	**ADG II**	**ADG III**	**ADG IV**	**ADG V**
Taxiway Protection				
Taxiway Safety Area (TSA) width	79'	118'	171'	214'
Taxiway Object Free Area (TOFA) width	131'	186'	259'	320'
Taxilane Object Free Area width	115'	162'	225'	276'
Taxiway Separation				
Taxiway Centerline to:				
Fixed or Movable Object	65.5'	93'	129.5'	160'
Parallel Taxiway/Taxilane	105'	152'	215'	267'
Taxilane Centerline to:				
Fixed or Movable Object	57.5'	81'	112.5'	138'
Parallel Taxilane	97'	140'	198'	245'
Wingtip Clearance				
Taxiway Wingtip Clearance	26'	34'	44'	53'
Taxilane Wingtip Clearance	18'	23'	27'	31'
STANDARDS BASED ON TDG	**TDG 2**	**TDG 3**	**TDG 4**	**TDG 5/6**
Taxiway Width Standard	35'	50'	50'	75'
Taxiway Edge Safety Margin	7.5'	10'	10'	15'
Taxiway Shoulder Width	10'	20'	20'	25'/35'

ADG: Airplane Design Group
TDG: Taxiway Design Group
Source: FAA AC 150/5300-13A, Airport Design

Taxiway Width Standards

The design aircraft for the Airport and for Runway 14L-32R falls in classification D-V-6; therefore, the taxiways that may potentially support aircraft within TDG-6 should be at least 75 feet wide. Taxiways associated with a design aircraft in TDG-3 (such as Runway 4-22) should be at least 50 feet wide. Taxiways associated with a design aircraft in TDG-2 (Runways 18-36 and 14R-32L) should be 35 feet wide. Taxiways associated with TDG-4 (Runway 9-27) should be 50 feet wide.

All taxiways at the airport are 75 feet wide except for Taxiway J, the partial parallel taxiway to Runway 4-22, which is 35 feet wide. All taxiways may at times support a critical design aircraft in D-V-6, except Taxiways C and J. These taxiways should be 35 and 50 feet wide, respectively.

Future planning will consider widening Taxiway J from 35 feet to 50 feet to fully accommodate a critical design aircraft in TDG-3. All other taxiways meet the necessary width design standards.

Other Taxiway Design Considerations

FAA AC 150/5300-13A, *Airport Design*, provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as, "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft."

The taxiway system at Grant County International Airport generally provides for the efficient movement of aircraft; however, recently published AC 150/5300-13A, *Airport Design*, provides recommendations for taxiway design. The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation:

1. **Taxi Method**: Taxiways are designed for "cockpit over centerline" taxiing, with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate judgmental over-steering which is when the pilot must intentionally steer the cockpit outside the marked centerline in order to assure the aircraft remains on the taxiway pavement.

2. **Steering Angle**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.

3. **Three-Node Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot a maximum of three choices of travel. Ideally, these are right and left angle turns and a continuation straight ahead.

4. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.

5. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.
   - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple using the "three node" concept.
   - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.
   - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences, and through a reduction in air traffic controller workload.
   - *Avoid "High Energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the run-

way, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.

- *Increase Visibility*: Right angle intersections, both between taxiways and runways, provide the best visibility. Acute angle runway exits provide for greater efficiency in runway usage, but should not be used as runway entrance or crossing points. A right angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
- *Avoid "Dual Purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
- *Indirect Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
- *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.

6. **Runway/Taxiway Intersections**:
   - *Right Angle*: Right angle intersections are the standard for all runway/taxiway intersections, except where there is a need for a high-speed exit. Right angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs so they are visible to pilots.
   - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage.
   - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.

7. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
   - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and makes lighting and marking more difficult.
   - *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout that forces pilots to make a conscious decision to turn.
   - *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

FAA AC 150/5300-13A, *Airport Design* states that, "existing taxiway geometry should be improved whenever feasible, with emphasis on designated hot spots. To the extent practicable, the removal of existing pavement may be necessary to correct confusing layouts.

There are several taxiway locations at Grant County International Airport that will be analyzed in the alternatives section of this Master Plan for compliance to the recommended taxiway design standards. **Exhibit 3H** identifies the locations.

Runway 14R-32L also serves as a taxiway and does not provide 90-degree threshold entrance taxiways. This design is to be avoided.

Taxiway C is a lead-in taxiway to both ends of Runway 18-36. Runway threshold entrance taxiways should be at 90 degrees to provide pilot peripheral views. If feasible, 90-degree threshold entrance taxiways should be considered.

There are no threshold taxiway entrances to the Runway 32R threshold; however, Taxiways A and G enter the runway at a distance of approximately 500 feet from the runway end.

Taxiway A enters Runway 32R directly from the main terminal area apron. FAA design criteria would recommend a more intuitive turn onto Taxiway A prior to proceeding toward the runway.

Taxiway F is a lead-in taxiway to both ends of Runway 9-27. This is the same scenario as Taxiway C and Runway 18-36. Since Runway 9-27 is for military use only, the need to redesign the threshold entrance taxiway is a low priority.

The alternatives chapter will examine possible taxiway geometry changes that would improve pilot situational awareness and reduce potential pilot confusion. Any changes will consider the reasonableness of each alternative in terms of cost and benefit.

Hot Spots

The FAA identifies various hot spots on the airfield. These are locations that FAA believes may be potentially confusing to pilots. The first FAA identified hot spot is the location of the hold line on Taxiway C leading south to the threshold for Runway 18. This hold line is located 1,568 feet short of the Runway 18 threshold. The second is that Runway 9-27 has no runway markings and non-standard lighting; however, this runway is exclusively for military use.

Taxilane Design Considerations

Taxilanes are distinguished from taxiways in that they do not provide access to or from the runway system directly. Taxilanes typically provide access to hangar areas. As a result, taxilanes can be designed to varying design standards depending on the type of aircraft utilizing the taxilane. For example, a taxilane leading to a T-hangar area only needs to be designed to accommodate those aircraft typically accessing a T-hangar.

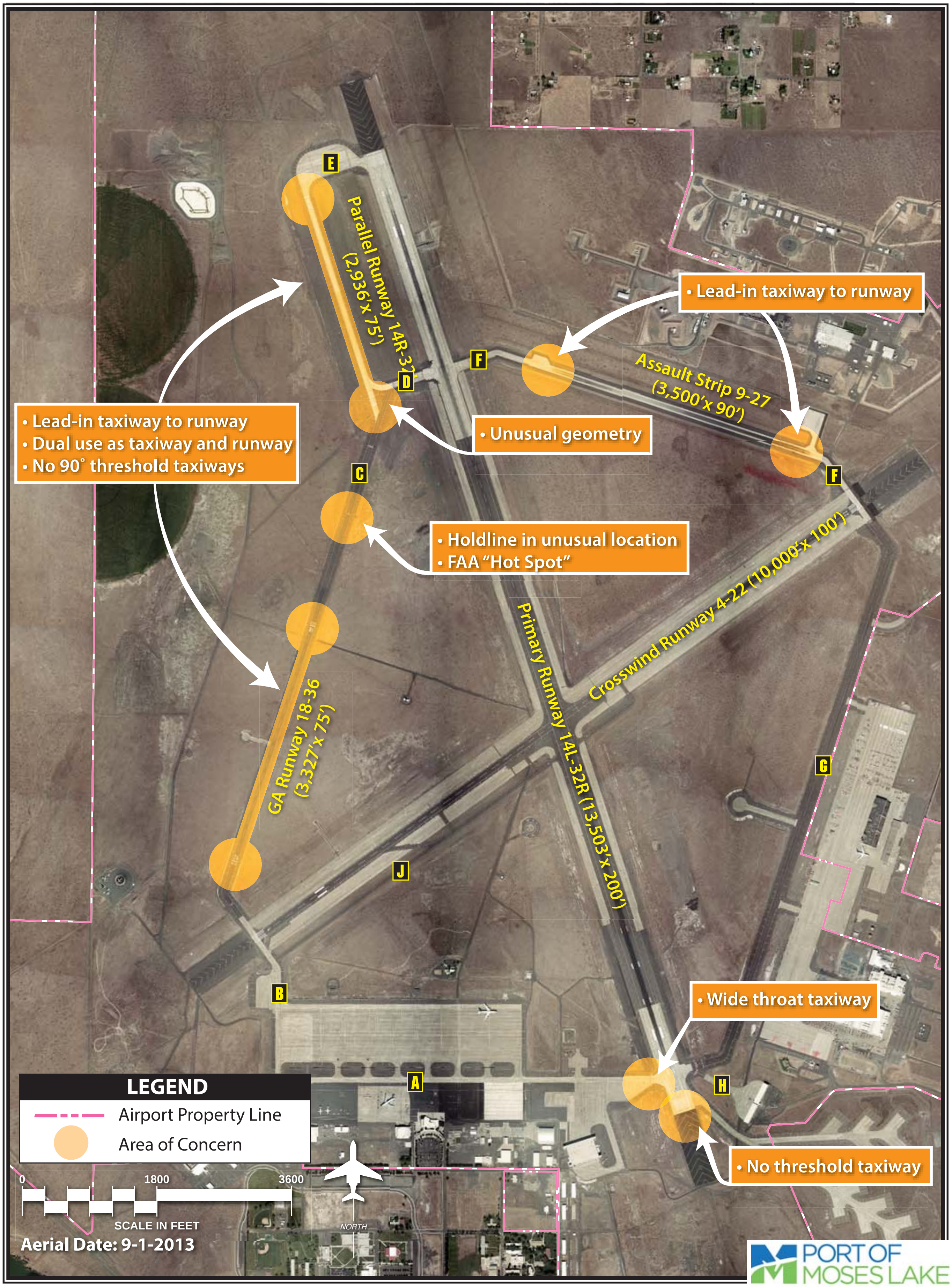


Exhibit 3H
TAXIWAY AREAS OF CONCERN

At Grant County International Airport, most of the taxiways leading from the runway system terminate at the large apron areas. Only that portion of Taxiway B south of the intersection with Taxiway A might be considered a taxilane. This portion of Taxiway B is adjacent to the T-hangars and provides a taxilane object free area of approximately 150 feet, which can accommodate aircraft in ADG II. It would be unusual for any large transport aircraft to need access this area.

INSTRUMENT NAVIGATIONAL AIDS

Instrumentation for runways is important when weather conditions are less than visual (three-mile visibility, 1,000-foot cloud ceilings). Instrumentation can be classified as precision, nonprecision, and visual.

The Airport has a sophisticated precision ILS (CAT-I) instrument approach to Runway 32R. This approach provides for visibility minimums as low as ½-mile and cloud ceilings down to 200 feet. The combination of a glide slope antenna, localizer antenna, and approach lighting system form the ILS.

Several instrument approaches to the Airport are based on the constellation of global positioning system (GPS) satellites. The first considered is the LPV (Localizer Performance with Vertical Guidance) instrument approach with CAT-I minimums that is available to Runway 32R. This approach provides both vertical and horizontal guidance for approaching aircraft without the need for extensive ground-based equipment. Runways 14L, 4, and 22 also have LPV instrument approaches; however, the visibility component provides for ¾-mile visibility minimums and 200-foot cloud ceilings.

Recently, the FAA has begun introducing GPS based instrument approaches with curved approach paths. These Required Navigation Performance (RNP) instrument approaches are available to Runways 14L, 32R, 4, and 22. The visibility minimums are ¾-mile with 250–foot cloud ceilings for Runways 14L, 4, and 22. The RNP for Runway 32R benefits from the presence of the approach lighting system and thus has a ½-mile visibility minimum with 250-foot cloud ceilings.

Runways 18-36, 14R-32L, and 9-27 are each visual runways only and do not have instrumentation available.

Grant County International Airport may benefit from improvements to the instrument approaches at the Airport since non-visual conditions occur nearly 10 percent of the year. The alternatives chapter will examine the possibility of ½-mile visibility and 200-foot cloud ceilings for approaches to Runways 14L, 4, and 22. Additional instrumentation is not considered necessary for Runways 18-36, 14R-32L and 9-27 because the primary and crosswind runways can accommodate most eventualities.

VISUAL NAVIGATION AIDS

The Airport beacon is located on the east side of the Airport on top of an industrial building (building #5825). The location of the beacon is somewhat unusual in that it is not in the terminal area and it is on a building that is leased. If the beacon needs to be replaced, consideration should be given to relocating it to the south terminal area. Until such a time, it should be maintained in working condition.

As discussed in Chapter One – Inventory, Runways 14L, 32R and 4 are equipped with PAPIs. Runway 22 is equipped with VASIs. These systems are typical for jet capable runways. The PAPIs should be maintained. VASIs are considered an older technology and when replacement is necessary, they are typically replaced with PAPIs. Future planning will consider replacement of the VASIs with PAPIs.

Runway end identification lights (REIL) are strobe lights set to either side of the runway. These lights provide rapid identification of the runway threshold. REILs should be installed at runway ends not currently providing an approach lighting system but supporting instrument operations. Runways 14L, 4 and 22 are currently equipped with REILs. These systems should be maintained.

Intermediate (MALS, SSALS and SALS) or Basic (ODALS) Approach Lighting Systems (ALS) are required for runways with instrument approaches providing visibility minimums of less than one-mile. Therefore, a basic or intermediate ALS should be planned for existing approaches to Runways 14L, 4, and 22. When planning ½-mile visibility minimums to these runways, a full approach lighting system (ALFS-1, ALFS-2, SSALR, or MALSR) is required. ALS will be planned for Runways 14L, 4, and 22 based on the analysis completed in the alternatives chapter. The existing MALSR serving Runway 32R should be maintained.

WEATHER AND COMMUNICATION AIDS

Grant County International Airport has eight windsocks strategically located for the greatest pilot visibility. These wind indicators should be maintained.

Grant County International Airport is equipped with an Automated Surface Observing System (ASOS). This is an important system that automatically records weather conditions such as wind speed, wind gust, wind direction, temperature, dew point, altimeter setting, visibility, fog/haze condition, precipitation, and cloud height. This information is then transmitted at regular intervals. Aircraft in the vicinity can receive this information if they have their radio tuned to the correct frequency. In addition, pilots and individuals can call a published telephone number and receive the information via an automated voice recording. This system should be maintained through the planning period.

The Airport has an airport traffic control tower (ATCT) which is open from 6:00 a.m. to 10:00 p.m. daily. The tower staff provides important safety functions and should be maintained. **Exhibit 3J** presents a summary of the airside recommendations for Grant County International Airport.

RUNWAYS

	AVAILABLE	SHORT TERM	LONG TERM
RUNWAY 14L-32R	**Runway 14L-32R**	**Runway 14L-32R**	**Runway 14L-32R**
	RDC D-V-2400 RRC D-V-2400 13,503' x 200' 85-S; 155-D; 320-DT; 600-DDT Standard RSA, OFA, OFZ, POFZ, RPZ Precision markings HIRL	RDC D-V-2400 RRC D-V-2400 13,503' x 200' Maintain Maintain Maintain Maintain	RDC D-V-2400 RRC D-V-2400 13,503' x 200' Maintain Maintain Maintain Maintain
RUNWAY 4-22	**Runway 4-22**	**Runway 4-22**	**Runway 4-22**
	RDC C-III-4000 RRC C-III-4000 10,000' x 100' 75-S; 100-D; 175-DT; 475-DDT Standard RSA, OFA, OFZ, RPZ Non-precision marking MIRL	RDC C-III-4000 RRC C-III-4000 10,000' x 100' Maintain Maintain Maintain Maintain	RDC C-III-4000 RRC C-III-4000 10,000' x 100' Maintain Maintain Maintain Maintain
RUNWAY 18-36	**Runway 18-36**	**Runway 18-36**	**Runway 18-36**
	RDC B-II-VIS RRC B-II-VIS 3,327' x 75' 75-S; 170-D; 300-DT; 400-DDT Standard RSA, OFA, OFZ, RPZ Basic markings MIRL	RDC B-II-VIS RRC B-II-VIS 3,327' x 75' Maintain Maintain Maintain Maintain	RDC B-II-VIS RRC B-II-VIS 3,327' x 75' Maintain Maintain Maintain Maintain
RUNWAY 14R-32L	**Runway 14R-32L**	**Runway 14R-32L**	**Runway 14R-32L**
	RDC B-II-VIS RRC B-II-VIS 2,936' x 75' 100-S; 200-D; 400-DT; 400-DDT Standard RSA, OFA, OFZ, RPZ Basic markings MIRL	Maintain or Consider Closure	Maintain or Consider Closure
RUNWAY 9-27	**Runway 9-27**	**Runway 9-27**	**Runway 9-27**
	RDC C-IV-VIS RRC C-IV-VIS 3,500' x 90' 100-S; 150-D; 270-DT; 475-DDT Standard RSA, OFA, OFZ, RPZ No markings Non-standard lighting	Military use exclusively. Runway not eligible for Federal grant funding. Design subject to military training/readiness requirements.	

TAXIWAYS

	AVAILABLE	SHORT TERM	LONG TERM
	TDG-6/TDG-3 Taxiways A-H are 75' wide Taxiway J is 35' wide MITL Hot Spot and layout deficiencies	TDG-6/TDG-3 Maintain to meet TDG-6 Maintain Maintain Correct Hot Spot	TDG-6/TDG-3 Maintain to meet TDG-6 Consider widening to 50' to meet TDG-3 Maintain Redesign geometry concerns

INSTRUMENT NAVIGATION AND WEATHER AIDS

	AVAILABLE	SHORT TERM	LONG TERM
	ASOS, 8 lighted windsocks, segmented circle, beacon, ATCT	Maintain	Maintain
	Runway 14L-32R	**Runway 14L-32R**	**Runway 14L-32R**
	½-mile CAT-I ILS Rwy 32R ½-mile RNP (GPS) Rwy 32R ½-mile LPV (GPS) Rwy 32R ¾-mile LPV (GPS) Rwy 14L ¾-mile RNP (GPS) Rwy 14L	Maintain Maintain Maintain Consider ½-mile LPV (GPS) Rwy 14L Consider ½-mile RNP (GPS) Rwy 14L	Maintain Maintain Maintain Maintain Maintain
	Runway 4-22	**Runway 4-22**	**Runway 4-22**
	¾-mile LPV (GPS) Rwy 4-22 ¾-mile RNP (GPS) Rwy 4-22	Consider ½-mile LPV (GPS) Rwy 4 Consider ½-mile RNP (GPS) Rwy 4	Maintain Maintain
	Runway 18-36	**Runway 18-36**	**Runway 18-36**
	Visual Only	Maintain	Maintain
	Runway 14R-32L	**Runway 14R-32L**	**Runway 14R-32L**
	Visual Only	Maintain	Maintain
	Runway 9-27	**Runway 9-27**	**Runway 9-27**
	Visual Only	Improve to meet military needs	Improve to meet military needs

VISUAL AIDS

	AVAILABLE	SHORT TERM	LONG TERM
	**Runway 14L-32R**	**Runway 14L-32R**	**Runway 14L-32R**
	PAPI-4L MALSR (32R) REIL (Rwy 14L)	Maintain Consider MALSR (14L) Maintain	Maintain Maintain Maintain
	Runway 4-22	**Runway 4-22**	**Runway 4-22**
	PAPI-4L (Rwy 4)/VASI-4L (Rwy 22) REIL (Rwy 4-22) MALSR (NA)	Maintain/Maintain Maintain Maintain	Maintain/Upgrade to PAPI-4L Maintain Consider MALSR (4-22)
	Runway 18-36	**Runway 18-36**	**Runway 18-36**
	None	None	None
	Runway 14R-32L	**Runway 14R-32L**	**Runway 14R-32L**
	None	None/Consider Closure	None/Consider Closure
	Runway 9-27	**Runway 9-27**	**Runway 9-27**
	None	Improve to meet military needs	Improve to meet military needs

KEY

ASOS - Automated Surface Observation System
LPV - GPS with Localizer Performance and Vertical Guidance
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL/HIRL - Medium/High Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
NPI - Non-precision Instrument
OFA - Object Free Area
OFZ/POFZ - Obstacle Free Zone/Precisian Obstacle Free Zone
PAPI - Precision Approach Path Indicator
RDC - Runway Design Code
REIL - Runway End Identification Lights
RNP - GPS with Required Navigation Performance
RPZ - Runway Protection Zone
RRC - Runway Reference Code
RSA - Runway Safety Area
TDG - Taxiway Design Code
VOR - Very-High Frequency Omni-Directional Radar
##-S/D/DT - Runway Strength Rating in Thousands of Pounds for Single (S), Dual (D), Dual Tandem (DT, and Double Dual Tandem (DDT) Wheel Struts

PORT OF MOSES LAKE

Exhibit 3J
AIRSIDE RECOMMENDATIONS

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for the handling of aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacity of the various components of each element was examined in relation to projected demand to identify future landside facility needs. This includes components for general aviation needs such as:

- Aircraft Hangars
- Aircraft Parking Aprons
- General Aviation Terminal Building Services
- Auto Parking and Access
- Airport Support Facilities

HANGARS

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation, whether single or multi-engine aircraft, is toward more sophisticated aircraft (and, consequently, more expensive aircraft); therefore, many aircraft owners prefer enclosed hangar space to outside tie-downs.

The demand for aircraft storage hangars is dependent upon the number and type of aircraft expected to be based at the airport in the future. However, hangar development should be based upon actual demand trends and financial investment conditions.

While a majority of aircraft owners prefer enclosed aircraft storage, a number of based aircraft owners may still tie-down outside (due to the lack of hangar availability, hangar rental rates, and/or operational needs). Therefore, enclosed hangar facilities do not necessarily need to be planned for each based aircraft. At Grant County International Airport, nearly all aircraft are stored in a covered facility and outside aircraft tie-down storage is typically temporary. For planning purposes, 95 percent of based aircraft are considered to be permanently housed in an enclosed hangar.

There are three general types of aircraft storage hangars: T-hangars, box hangars, and conventional hangars. T-hangars are similar in size and will typically house a single engine piston-powered aircraft. Some multi-engine aircraft owners may elect to utilize these facilities as well. There are typically many T-hangar units "nested" within a single structure. There are 18 T-hangar units at the Airport, encompassing an estimated 31,000 square feet of floor space. For determining future aircraft storage needs, a planning standard of 1,200 square feet per based aircraft is utilized for T-hangars.

Box hangars are open-space facilities with no interfering supporting structure. Box hangars can vary in size and can either be attached to others or be standalone hangars. Typically, box hangars will house larger multi-engine, turboprop, or jet aircraft. There are several box hangars with estimated space for 22 aircraft and a total of approximately 54,800 square feet of floor space. For future planning, a standard of 2,500 square feet per aircraft is utilized for box hangars.

Conventional hangars are the familiar large hangars with open floor plans that can store several aircraft. There are four conventional hangars, currently utilized by Airport businesses and are not utilized for bulk aircraft storage. Future planning will consider T-hangars and box hangars for permanent aircraft storage. The conventional hangars will be considered for business lease.

Table 3J presents aircraft storage needs based on the demand forecasts. Assumptions have been made on owner preferences for a hangar type based on trends at general aviation airports. All turboprops, business jets, and helicopters are assumed to be stored in box hangars. T-hangars are assumed to house single engine piston aircraft and a small portion of multi-engine piston aircraft.

It is estimated that there is 85,800 square feet of hangar storage space available currently. In the short term, the total storage space is adequate; however, the mix of box hangars to T-hangars may not meet the specific needs of users. In the future, additional T-hangar space and box hangar space should be made available as growth in based aircraft occurs. Over the 20-year planning horizon, 22,000 square feet of T-hangar space and 19,200 square feet of box hangar space are estimated to be needed for aircraft storage needs.

TABLE 3J
Hangar Storage Needs
Grant County International Airport

	Currently Supply	Short Term	Intermediate Term	Long Term	Total Need Less Current Supply
Based Aircraft	81	88	94	107	
Aircraft to be Hangared*	49	56	61	74	25
T-Hangar Positions	18	39	41	44	26
Box Hangar Positions	22	15	20	30	8
Conventional Hangar Positions	0	0	0	0	0
Hangar Area Requirements					
T-Hangar Area	31,000	47,000	49,000	53,000	22,000
Box Hangar Area	54,800	39,000	51,000	74,000	19,200
Conventional Hangar Area	0	0	0	0	0
Total Storage Area (s.f.)	**85,800**	**86,000**	**100,000**	**127,000**	**41,200**

*Does not include 28 aircraft owned and housed by Big Bend Community College
Source: Coffman Associates analysis.

Hangar requirements are general in nature and are based on standard hangar size estimates and typical user preferences. If a private developer desires to construct or lease a large hangar to house one plane, any extra space in that hangar may not be available for other aircraft. The actual hangar area needs will be dependent on the usage within each hangar.

AIRCRAFT PARKING APRON

The aircraft parking apron is an expanse of paved area intended for aircraft parking and circulation. Typically, a main apron is centrally located near the airside entry point, such as the terminal building or FBO facility. Ideally, the main apron is large enough to accommodate transient airport users as well as a portion of locally based aircraft. Often, smaller aprons are available adjacent to FBO hangars and at other locations around an airport. An aircraft parking apron should provide space for the number of locally based aircraft that are not stored in hangars, transient aircraft, and for maintenance activity. The apron layout at the Airport follows this typical pattern.

Exhibit 1R previously documented the various aircraft aprons at the Airport. The aprons are expansive as is typical of former military airfields. The current specific usage of the airports provides a baseline of apron availability. Certain areas, such as the apron immediately in front of the terminal building, are utilized by transient airport users. Other apron areas, such as in front of the FBO Columbia Pacific Aviation, are available for aircraft tie-down.

The number of spaces available for itinerant and local aircraft parking is variable at the Airport because of the vast availability of aprons. Estimates of available spaces have been made based on current markings on the pavement. It is estimated there are 20 existing tie-down positions, nine transient piston positions, eight transient business jet positions, and 75 commercial transport positions. The commercial transport positions include five on the terminal area apron and 70 on the fueling apron.

FAA Advisory Circular 150/5300-13A, *Airport Design*, suggests a methodology by which transient apron requirements can be determined from knowledge of busy-day operations. At Grant County International Airport, the number of itinerant spaces required is estimated at 13 percent of the busy-day itinerant operations (233 x 0.13 = 30). This results in a current need for 30 itinerant aircraft parking spaces. Of this total, approximately 30 percent are assumed for business jets and commercial transport aircraft. The remaining 40 percent are for transient piston aircraft.

A planning criterion of 800 square yards per aircraft was applied to determine future transient apron area requirements for single and multi-engine aircraft. For turboprops and business jets (which can be much larger), a planning criterion of 1,600 square yards per aircraft position was used. For commercial transport aircraft, a planning criterion of 4,000 square yards was used. The current need for transient apron area is estimated at 60,700 square yards. By the long term planning period, approximately 93,200 square yards is estimated to be needed.

The results of the transient apron calculations indicate a potential need for additional apron area dedicated to piston sized aircraft. Transient positions for business jets and commercial transport aircraft appear adequate through the long term planning period. Therefore, if more transient piston aircraft positions are needed, it may simply be a matter of utilizing other excess apron areas temporarily. No additional apron should be considered to meet the calculated transient aircraft needs.

Local aircraft tie-down needs are derived from the estimated number of based aircraft which will tie-down, plus an additional ten spaces. The additional spaces allow for an unexpected influx of aircraft or, more typically, for the temporary movement of aircraft into and out of hangars. It is estimated there is a current need for 14 tie-down positions and a long term forecast of 15 positions. Approximately 20 positions are available; thus, local tie-down positions are adequate through the long term.

While the Airport has adequate apron area to accommodate local and transient activity, new development may require additional apron area based on business needs. **Table 3K** presents the calculated aircraft apron needs for the Airport.

TABLE 3K
Aircraft Apron Requirements
Grant County International Airport

			FORECAST		
	Currently Available (Est)	**Current Need (2013)**	**Short Term**	**Intermediate Term**	**Long Term**
Local Apron Positions	20	14	14	15	15
Local Apron Area (s.y.)	20,000	16,800	18,700	19,100	20,000
Transient Apron Positions					
Piston	9	12	14	15	19
Business Jet	8	9	10	11	14
Commercial Transport*	75	9	10	11	14
Total Transient Positions	92	30	34	38	47
Transient Apron Area (s.y.)					
Piston	9,700	9,700	10,900	12,100	14,900
Business Jet	34,600	14,600	16,300	18,200	22,400
Commercial Transport	440,500	36,400	40,700	45,600	55,900
Total Transient Apron Area (s.y.)	484,800	60,700	67,900	75,900	93,200
Total Apron Area (s.y)	504,800	77,500	86,600	95,000	113,200

*Includes fueling apron
Source: Coffman Associates analysis

The 275,000 square yard fueling apron was heavily utilized for more than 40 years by Japan Airlines through 2009. It was then used heavily in 2010 and 2011 by Fairchild Air Force Base when they relocated their fleet of KC-135 aircraft to the Airport while their runway was being reconstructed. Currently, this apron is lightly utilized.

The previous Master Plan for the Airport considered utilizing this apron for construction of additional conventional hangars. This possibility and others will be considered in the alternatives chapter. It will be important to identify the highest and best use of this expanse of pavement.

TERMINAL BUILDING FACILITIES

Grant County International Airport has a state of the art commercial terminal building which was constructed in 1998. This analysis of terminal facility needs will be focused on those functions necessary to accommodate general aviation activity at the Airport.

General aviation terminal facilities have several functions. Space is necessary for a pilots' lounge, flight planning, concessions, management, and storage. More advanced airports will have leasable space in the terminal building for such features as a restaurant, FBO line services, and other needs. This space is not necessarily limited to a single, separate terminal building, but can include space offered by FBOs in their hangars for these functions and services.

The methodology used in estimating general aviation terminal facility needs is based on the number of airport users expected to utilize general aviation facilities during the design hour. General aviation terminal space requirements were then based upon providing 120 square feet per design hour itinerant passenger. Design hour itinerant passengers are determined by multiplying design hour itinerant operations by the number of passengers on the aircraft (multiplier). An increasing passenger count (from 1.9 to 2.3) is used to account for the likely increase in the number of passengers utilizing general aviation services. **Table 3L** outlines the general aviation terminal facility space requirements for the Airport.

TABLE 3L
General Aviation Terminal Area Facilities
Grant County International Airport

	Existing	Short Term	Intermediate Term	Long Term
Design Hour Operations	71	80	89	109
Design Hour Itinerant Operations	28	32	36	44
Multiplier	1.9	2.0	2.1	2.3
Total Design Hour Itinerant Passengers	54	64	75	100
Terminal Building Public Space (s.f.)	12,000[1]	7,700	9,000	12,000

[1]Estimate includes FBO and Port space available for general aviation use.
Source: Coffman Associates analysis

It is estimated that 12,000 square feet is available for general aviation terminal services currently. This includes space available at the FBOs and crossover space within the commercial terminal building, such as restrooms, lounges, and the restaurant. Terminal building calculations based on forecast general aviation activity indicates the existing facilities are adequate through the long term planning period.

The Airport terminal building is the entrance to the community for most air passengers utilizing the Airport. It should be assumed that these passengers include decision-makers who may be considering investment in the community. Therefore, it is recommended that the airport sponsor be cognizant of the appearance of the Airport and the terminal building in particular. Some communities will provide a separate general aviation terminal building, which may include additional amenities such as a restaurant or community conference room.

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airside or landside facilities have also been identified. These other areas provide certain functions related to the overall operation of the Airport.

Vehicle Parking Requirements

Planning for adequate automobile parking is a necessary element for any airport. Parking needs can effectively be divided between transient airport users, locally based users, and airport business needs. Transient users include visitors and employees of the airport. Locally based users primarily include those attending to their based aircraft. Airport businesses need parking to accommodate employees and customers. A planning standard of 1.9 times the design hour passenger count provides the minimum number of vehicle spaces needed for transient users. Locally based parking spaces are calculated as one-half the number of based aircraft. Airport business parking needs should be based on the needs of the individual business and are not specifically included in this analysis.

A planning standard of 315 square feet per space is utilized to determine total vehicle parking area necessary, which includes area needed for circulation and handicap clearances. Parking requirements for the Airport are summarized in **Table 3M**.

TABLE 3M
GA Vehicle Parking Requirements
Grant County International Airport

	Current Need	Short Term	Intermediate Term	Long Term
Design Hour Itinerant Passengers	54	64	75	100
VEHICLE PARKING SPACES				
GA Itinerant Spaces	103	122	142	191
GA Based Spaces	40	44	47	54
Airport Business/Office Parking Spaces	Individual Business Decision			
Total Parking Spaces	143	166	189	244
VEHICLE PARKING AREA				
GA Itinerant Parking Area (s.f.)	32,300	38,000	45,000	60,000
GA Based Parking Area (s.f.)	12,600	14,000	15,000	17,000
Airport Business Parking Area (s.f.)	Individual Business Decision			
Total Parking Area (s.f.)	44,900	52,000	60,000	77,000

Source: Coffman Associates analysis

The terminal building parking lot provides over 300 individual parking spaces and eight dedicated handicap spaces. This exceeds the long term need for itinerant parking spaces.

The challenge with vehicle parking that it should be in close proximity to airport services or to an aircraft owner's hangar. In an effort to limit the level of vehicle traffic on the aircraft movement areas, many general aviation airports are providing separate parking in support of facilities with multiple aircraft parking positions, such as T-hangars. Vehicle parking spaces will be considered in conjunction with additional facility needs in the alternatives chapter.

Airport Access Roads

As documented in Chapter One – Inventory, access to the airport is readily available via surface streets. Access onto the airfield is strictly limited to authorized personnel in accordance to FAR Part 139 standards. The west side of the Airport is only accessible via the secured portion of the airfield and requires appropriate authorization. If the west side were to support development, additional roads would need to be constructed.

Aircraft Rescue and Firefighting Facilities (ARFF)

Part 139 airports, such as Grant County International Airport, are required to provide aircraft rescue and firefighting (ARFF) services during commercial air carrier operations. Currently, the airport does not have scheduled commercial service. Nonetheless, the Airport maintains a fleet of ARFF vehicles and staff to respond to airport emergencies. Maintaining the ARFF station provides a service that many operators at the airport desire. Current equipment and firefighting agents meet ARFF Index A requirements, and ARFF Index E can be met upon request. The availability of the on-field ARFF station is an asset to the airport and should be maintained.

On-airport access roads are normally needed to provide unimpeded two-way access for ARFF equipment to potential accident areas. These roads should be connected to the operational surfaces, to the extent practicable, to facilitate rapid movement of ARFF vehicles and any other emergency equipment. It is recommended that the entire RSA and RPZ be accessible to ARFF vehicles so that no part of the RSA or RPZ is more than 330 feet from either an all-weather road or a paved operational surface. When an ARFF access road crosses a safety area, the safety area design standards for grading should still be met. Ideally, ARFF access roads should be controlled by the airport and limited to ARFF vehicles.

Grant County has an effective system of on-airport access roads which provide access to all areas of the Airport. The access road system should be maintained.

Fuel Storage

The Airport has ample fuel storage capability, especially for Jet A fuel. The Port of Moses Lake owns two large Jet A fuel storage fuel tanks, one with a capacity of 1.15 million gallons and the other with a capacity of 2.28 million gallons. These large tanks are connected to a hydrant fueling system located at the large fueling apron at the Airport.

Million Air, one of the Airport FBOs, has four Jet A fuel delivery trucks with a total capacity of 30,000 gallons. The other FBO, Columbia Pacific Aviation, has a static Jet A storage tank with a capacity of 10,000 gallons and fuel delivery trucks with a combined Jet A capacity of 29,000 gallons. Columbia Pacific Aviation has a static AvGas tank with a 12,000-gallon capacity and truck capacity of 8,750 gallons. Excluding the large Port-owned tanks, the airport has a total capacity of 69,000 gallons for Jet A and 21,750 gallons for AvGas.

Additional fuel storage capacity should be planned when the Airport is unable to maintain an adequate supply and reserve. While each airport (or FBO) determines their own desired reserve, a 14-day reserve is common for general aviation airports. When additional capacity is needed, it should be planned in 10,000- to 12,000-gallon increments which can accommodate common fuel tanker trucks that have typically have an 8,000-gallon capacity.

Forecasting fuel demand for the Airport is complicated by the large spikes in demand. As can be seen, the airport sold over 8.6 million gallons of Jet A in 2011 and another 3.5 million gallons in 2010. These spikes were due in large part to the temporary relocation of the KC-135 aircraft from Fairchild AFB. These aircraft have since returned to the base, and fuel demand leveled out to slightly less than one million gallons in 2012.

The forecast for fuel demand is based primarily on the forecast growth in aviation activity. By the long term planning period, it is estimated that 1.5 million gallons of Jet A and 250,000 gallons of AvGas would be sold. When calculating a 14-day supply, regular storage capacity of 58,000 gallons for Jet A and 10,000 gallons for AvGas is required. **Table 3N** presents the historical and forecast fuel demand for the Airport.

TABLE 3N
Fuel Usage Forecast in Gallons
Grant County International Airport

	Fuel Consumption		**14-Day Supply**	
Time Frame	Jet A	AvGas	Jet A	AvGas
2008	1,004,986	74,814	38,653	2,877
2009	638,064	312,805	24,541	12,031
2010*	3,568,444	72,644	137,248	2,794
2011*	8,627,502	52,044	331,827	2,002
2012	948,570	147,209	36,483	5,662
FORECAST				
Short Term	1,100,000	175,000	42,308	6,731
Intermediate Term	1,200,000	200,000	46,154	7,692
Long Term	1,500,000	250,000	57,692	9,615
Current Capacity				
Current Capacity w/o Big Tanks	69,000	21,750	2,654	837
Current Capacity with Big Tanks	3,505,277	21,750	134,818	837

*KC-135 fleet temporarily based at the airport.
Source: Airport records; Coffman Associates analysis

The management of the airport has indicated that there may be significant expenses associated with maintaining the big storage tanks. As a result, demand analysis considers the possibility of one or both of the big tanks being decommissioned. In this potential scenario, the airport would still meet forecast demand for both Jet A and AvGas. One challenge would be the fact that Million Air, as the primary Jet A fuel vendor, does not have static storage tanks. If the big tanks were decommissioned, then it would be recommended that additional Jet A static fuel storage be made available.

In addition, the airport provides a unique service in that it can currently provide very high volumes of fuel and that fuel can be delivered efficiently through the hydrant system. For some operators, Japan Airlines and Fairchild AFB, this has been a tremendous benefit. The availability of large volumes of fuel is an asset the airport should weigh against the cost of decommissioning one or both of the big fuel tanks. If no operator needing high volumes of fuel is on the horizon, and the cost of maintaining the big tanks is too high, then consideration should be given to decommissioning one or both of the big tanks.

Another factor to consider is any planned use for the fueling apron. As discussed, the previous master plan identified a portion of the fueling apron for hangar development. If this concept, or a variation, is continued in this master plan, then some portion of the hydrant fueling system would likely be unavailable. This would reduce the capacity of the apron for fueling and presumably reduce the need for both of the big tanks.

Snow Removal Equipment (SRE) Building

Airport operators use costly pieces of complex and technologically advanced equipment for the control of snow, slush, and ice on the nation's airports. To protect and service this expensive investment, specifically designed maintenance buildings with adequate storage areas are needed.

Guidance regarding SRE buildings is provided in FAA AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*. According to the AC, Grant County International Airport would fall within the "Large Airport" category. This definition is based on the airport having more than one million square feet of runway surface (the airport has nearly 4.5 million square feet). For Large Airports, a dedicated SRE building should be at least 12,000 square feet in size. The airport is in need of a facility to house snow removal equipment and agents. In the alternatives chapter, potential locations will be identified in accordance with siting and design requirements.

Maintenance Equipment Needs

The airport maintains various apparatus needed for the maintenance of the airport. This equipment should be maintained in good working order. Replacement of older equipment should be scheduled at regular intervals. The airport is in need of a specialized vehicle that can serve the dual function of removing/applying pavement paint and removing rubber. Rubber removal is particularly important at the airport because of the heavy usage of the runways by large commercial transport and military aircraft.

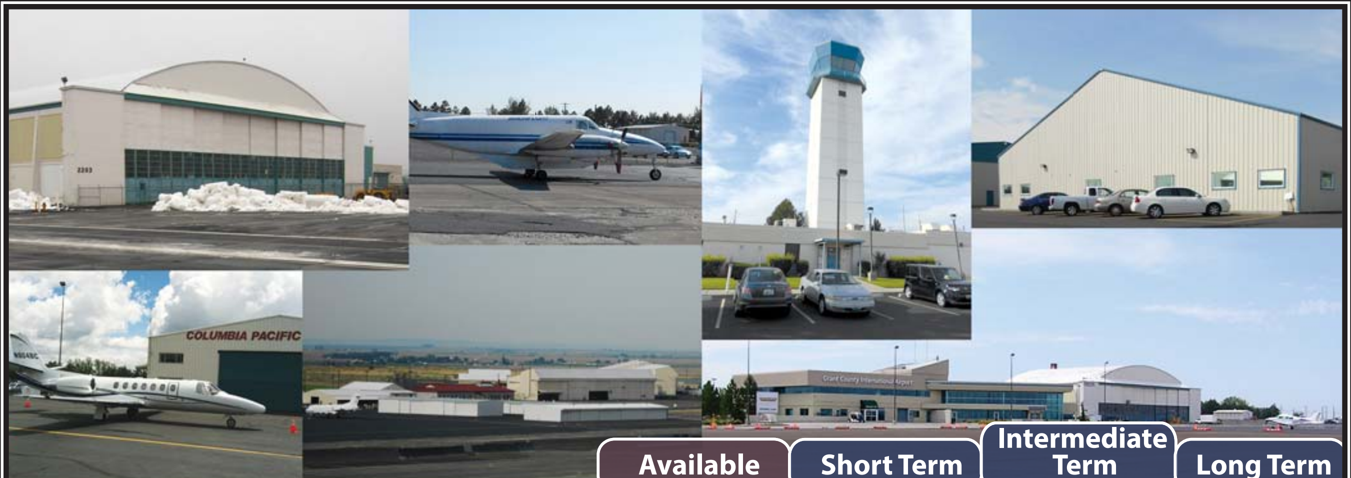
Perimeter Fencing

The airport has perimeter fencing that meets standards for Part 139 airports. The fencing should be maintained.

A summary of landside recommendations is presented on **Exhibit 3K**.

SUMMARY

The intent of this chapter has been to outline the facilities required to meet potential aviation demand projected for Grant County International Airport for the next 20 years. In an effort to provide a more flexible master plan, the yearly forecasts from Chapter Two have been converted to planning horizon levels. The short term roughly corresponds to a five-



	Available	Short Term	Intermediate Term	Long Term
Based Aircraft	***81***	***88***	***94***	***107***
AIRCRAFT TO BE HANGARED*				
Single Engine	42	46	47	51
Multi-Engine	5	4	4	4
Turboprop	0	2	3	6
Jet	0	1	2	3
Helicopter	2	2	3	5
Other/Experimental	0	1	2	5
Total to be Hangared	49	56	61	74
HANGAR POSITIONS				
T-Hangars Positions	18	39	41	44
Box Hangar Positions	22	15	20	30
HANGAR AREA				
T-Hangars (s.f.)	31,000	47,000	49,000	53,000
Executive Box Hangar (s.f.)	54,800	39,000	51,000	74,000
AIRCRAFT PARKING				
Local Apron Positions	20	14	15	15
Local Apron Area (s.y.)	20,000	18,700	19,100	20,000
Transient Apron Positions	92	34	38	47
Piston Transient Positions	8	10	11	14
GA Turbine Transient Positions	9	14	15	19
Commercial Transport Positions	75	10	11	14
Transient Apron Area (s.y.)	484,800	67,900	75,900	93,200
Piston Transient Apron Area (s.y.)	9,700	10,900	12,100	14,900
GA Turbine Transient Apron Area (s.y.)	34,600	16,300	18,200	22,400
Commercial Transport Apron Area (s.y.)	440,500	40,700	45,600	55,900
AUTO PARKING				
Total Spaces	143 (Current Need)	166	189	244
Total Area (s.f.)	44,900 (Current Need)	52,000	60,000	77,000
GENERAL AVIATION TERMINAL BUILDING				
Area (s.f.)	approx. 12,000	7,700	9,000	12,000
ADDITIONAL LANDSIDE NEEDS				
Snow Removal Equipment Building (12,000 sf)				
Paint and Rubber Removal Vehicle				

*BBCC aircraft not included.

PORT OF MOSES LAKE

Exhibit 3K
LANDSIDE RECOMMENDATIONS

year timeframe, the intermediate term is approximately 10 years, and the long term is 20 years. By utilizing planning horizons, airport management can focus on demand indicators for initiating projects and grant requests rather than on specific dates in the future.

AIRSIDE

On the airside, the runways and taxiways are the primary concern. Each runway at Grant County International Airport serves a distinct segment of aviation. Primary Runway 14L-32R is the longest runway and is heavily used by large commercial transport aircraft. Runway 4-22 is the crosswind runway which serves as a backup to the primary runway. Runway 18-36 is the general aviation runway primarily serving local training activity. Runway 14L-32R is a short parallel runway which also serves as a taxiway to access the Runway 14L threshold. Runway 9-27 is the military assault strip available for the exclusively use of the military. Each of the runways meets the applicable design standards. The length of each runway is required to meet the needs of the design aircraft for that runway.
Each of the runways should be maintained to accommodate its design aircraft, with the exception of Runway 14R-32L. This runway is somewhat redundant with Runway 18-36. Runway 14R-32L is not properly lit for use as a runway at night and it has a dual use as a taxiway, which should be avoided. Therefore, consideration will be given to potentially closing this runway.

Consideration should be given to improving the instrument approach capability for approaches to Runways 4, 22, and 14L. Currently, instrument approach visibility minimums are as low as ¾-mile for these runways. With the addition of a MALSR (approach lighting system), visibility minimums could be as low as ½-mile. The potential impact of improved instrument approaches will be examined in the alternatives chapter.

Taxiway geometry has been identified by the FAA as an area where safety improvements on airports can be made. Through redesign of various taxiways and intersections, the FAA desires to limit potential pilot confusion. Several taxiways at Grant County International Airport do not meet desired geometric standards. Some standards of note are 90-degree runway threshold taxiways, elimination of taxiways that lead directly to runway thresholds, and elimination of wide expanses of taxiway pavement adjacent to runways.

LANDSIDE

On the landside, the airport is fortunate to have inherited numerous buildings and aprons from when the airport was constructed to serve military purposes. At the same time, the maintenance costs can be a drain on airport cash flow. One excellent benefit is the ability to adapt to the needs of the airport users. For example, just to the north of the terminal building is a large apron area that is in failing condition. Recently, this apron area has been leased for the purpose of recycling large transport aircraft.

Following FA guidance, calculations were made regarding future needs for hangars and aprons. It is estimated that there may be a need for additional T-hangars and box hangars in the future. There may be a need for more designated transient aircraft parking apron. As these needs arise, the airport has the flexibility to re-mark apron area as necessary. Therefore, no additional apron area is anticipated in the 20-year scope of the master plan.

Specialized equipment and storage buildings are necessary for some airports. Grant County International Airport is in need of a dedicated facility for snow removal equipment. It is also in need of a paint/rubber removal vehicle.

The next chapter, Chapter 4 - Alternatives, will examine potential improvements to the airfield system and the landside. Most of the alternatives discussion will focus on those capital improvements that would be eligible for federal grant funds. Other projects of local concern will also be presented. On the landside, several facility layouts that meet the forecast demands over the next 20 years will be presented. Ultimately, an overall airport layout that presents a vision beyond the 20-year scope of the master plan will be developed.

Chapter Four

ALTERNATIVES

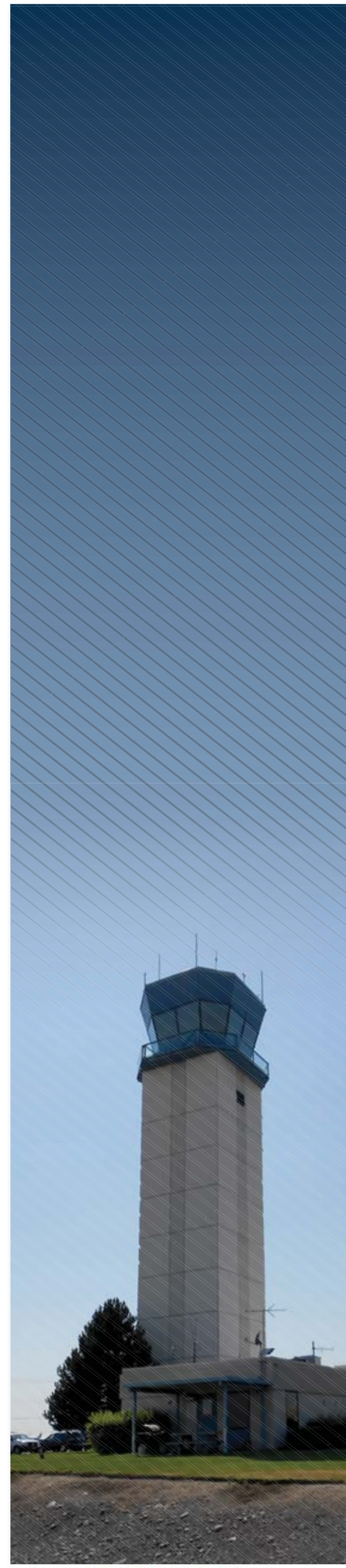
Chapter Four

ALTERNATIVES

In the previous chapter, airside and landside facilities required to satisfy the demand through the long range planning period were identified. The next step in the planning process is to evaluate reasonable ways these facilities can be provided. There can be numerous combinations of design alternatives, but the alternatives presented here are those with the perceived greatest potential for implementation.

Any development proposed for a Master Plan is evolved from an analysis of projected needs for a set period of time. Though the needs were determined by utilizing industry accepted statistical methodologies, unforeseen future events could impact the timing of the needs identified. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands for the next 20 years. However, no plan of action should be developed which may be inconsistent with the future goals and objectives of the Port of Moses Lake, which has a vested interest in the development and operation of the Airport.

The development alternatives for Grant County International Airport can be categorized into two functional areas: the **airside** (runways, navigational aids, taxiways, etc.) and **landside** (hangars, apron, and terminal area). Within each of these areas, specific capabilities and facilities is required or desired. In addition, the utilization of airport property to provide revenue support for the airport and to benefit the economic development and well-being of the region must be considered.



PORT OF MOSES LAKE

AIRPORT MASTER PLAN

Each functional area interrelates and affects the development potential of the others. Therefore, all areas are examined individually and then coordinated as a whole to ensure that the final plan is functional, efficient, and cost-effective. The total impact of all these factors on the existing Airport must be evaluated to determine if the investment in Grant County International Airport will meet the needs of the community, both during and beyond the 20-year planning period.

The alternatives considered are compared using environmental, economic, and aviation factors to determine which of the alternatives will best fulfill the local aviation needs. With this information, as well as input from various airport stakeholders, a final airport concept can evolve into a realistic development plan.

AIRPORT DEVELOPMENT OBJECTIVES

It is the goal of this effort to produce a balanced development plan to best serve forecast aviation demands. However, before defining and evaluating specific alternatives, airport development objectives should be considered. As owner and operator, the Port of Moses Lake provides the overall guidance for the operation and development of the Airport. It is of primary concern that the Airport is marketed, developed, and operated for the betterment of the community and its users. With this in mind, the following development objectives have been defined for this planning effort:

- To develop a facility with a focus on self-sufficiency in both operational and developmental cost recovery.
- To develop a safe, efficient, and attractive aviation facility in accordance with applicable federal, state, and local regulations.
- To develop a balanced facility that is responsive to the current and long term needs of all classes of airport users.
- To be reflective and supportive of the long term planning efforts currently applicable to the region.
- To preserve and protect public and private investments in existing airport facilities.
- To ensure that future development is environmentally compatible.

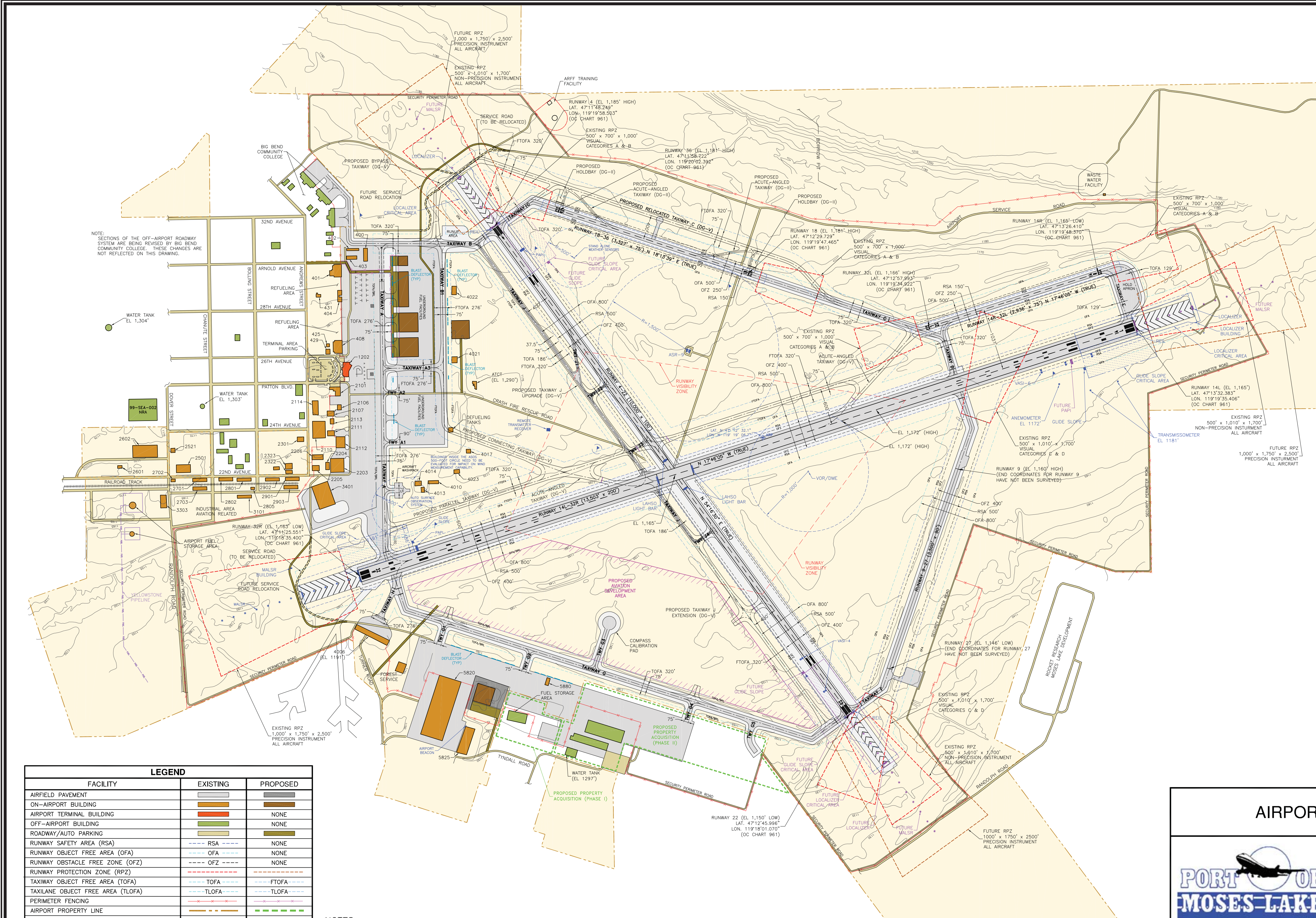
REVIEW OF THE PREVIOUS AIRPORT PLAN

The last Master Plan was concluded in 2005 and included data gathered and analyzed from 2001 to 2003. **Table 4A** is a summary of the major findings addressed in the alternatives chapter of the 2005 Master Plan. **Exhibit 4A** presents the ALP that resulted from the 2005 master planning effort.

TABLE 4A
Summary of Capital Decisions from 2005 Master Plan
Grant County International Airport

Facility/Program	Conclusion
Runways	Existing GA Runway (18-36) alignment retained. Remove future Runway 16-34 from the ALP. All other runways remain.
Taxiways	West airfield parallel taxiway (ADG V) for Runway 18-36 (west side) recommended with two high-speed exits (ADG II). Runway 4 threshold bypass taxiway recommended (ADG II). Runway 14L-32R parallel taxiway with high-speed exits recommended. Extension of high-speed exit taxiway from Runway 14L-32R to large aircraft apron recommended. Extension recommended of parallel Taxiway J to Runway 22 threshold, widen Taxiway J and two exit taxiways to ADG V standards (75'), add high-speed exit taxiway to Runway 4 at 7,500 feet from threshold.
Airfield Navigational Aids	Instrument approach procedure and equipment recommended for Runway 4. Precision RPZ recommended for Runways 14L, 4, and 22. Upgrade ASOS to ASOS-III.
Airfield Markings	Existing adequate. Future pavements to be appropriately striped.
Transient Aircraft Parking	Existing adequate.
Based Aircraft Apron/Tiedowns	Existing adequate.
Based Aircraft Hangars	Existing adequate. Growth areas identified for in-fill.
Aircraft Fueling	Existing adequate.
Helicopter Facilities	Existing adequate.
Maintenance Facilities	Existing adequate.
ARFF Facilities	Existing adequate.
Landside Development	Major airfield change with possible partial closure of Taxiway G resulting in new area created for landside development initiatives. In-fill identified for existing areas. Purchase opportunity identified in area adjacent to east airport.
Airport Access	Existing adequate. Access to be provided in new development areas.
Pavement Maintenance	Immediate - Rehabilitate Runway 14L-32R, construct Runway 9-27 shoulders (Completed).
	Short-term - rehabilitate the south and west apron areas and airport service roads. Reconstruct Taxiway D (Completed).
Land Acquisition/Easements	Easements adequate. Land acquisition opportunities identified in east airport area.

Source: 2005 Airport Master Plan, URS Corp (Exhibit 5-1)



AIRPORT FACILITIES

#	DESCRIPTION
400	GENERAL AVIATION T-HANGAR
401	JAKE JACOBSEN
402	GENERAL AVIATION T-HANGAR
403	GENERAL AVIATION T-HANGAR
404	COLUMBIA PACIFIC AVIATION
408	SONICO, INC.
425	OPEN
429	SONICO, INC.
431	MICHAEL BURGESS
1202	TERMINAL BUILDING
2101	AIRCRAFT RESCUE FIRE FIGHTING FACILITY
2106	AIR AMERICA
2107	R.L. BUCK AIRCRAFT REPAIR
2110	INLAND MECHANICAL
2111	INLAND MECHANICAL – SHOP
2112	OPEN
2113	MONTGOMERY WATSON
2114	EFTC
2203	US AIR FORCE/McCHORD HANGAR
2204	AIRPORT MAINTENANCE
2205	AIRPORT MAINTENANCE SHOP
2206	AIRPORT MAINTENANCE
2301	ENGLAR FOOD LABORATORY
2322	ENGLAR FOOD LABORATORY
2323	OPEN
2501	OPEN
2521	AGRON CORPORATION
2601	EASTERN WA LOGISTICS
2602	WEINSTEIN BEVERAGE
2701	WAREHOUSE
2703	WAREHOUSE
2801	MOSES LAKE SCHOOL DISTRICT
2802	MOSES LAKE SCHOOL DISTRICT
2805	PORT OF MOSES LAKE
2901	FAMILY SERVICES OF GRANT COUNTY
2902	PAC COCA COLA
2903	SONICO, INC.
3101	LYLE RAUGUST
3303	ADVANCE SILICON MAT
3401	JAPAN AIR LINES (JAL) HANGAR
4006	WAREHOUSE
4010	OPEN
4013	OPEN
4014	PUMPHOUSE NO. 1
4017	AIRFIELD LIGHTING VAULT
4021	PUMPHOUSE NO. 2
4022	PUMPHOUSE NO. 3
4023	OPEN
5325	OPEN
5820	GENIE
5825	CHEMI-CON MATERIALS CORP.
5880	LIVESTOCK EXPORT AREA
–	–

LEGEND

FACILITY	EXISTING	PROPOSED
AIRFIELD PAVEMENT		
ON-AIRPORT BUILDING		
AIRPORT TERMINAL BUILDING		NONE
OFF-AIRPORT BUILDING		NONE
ROADWAY/AUTO PARKING		
RUNWAY SAFETY AREA (RSA)	RSA	NONE
RUNWAY OBJECT FREE AREA (OFA)	OFA	NONE
RUNWAY OBSTACLE FREE ZONE (OFZ)	OFZ	NONE
RUNWAY PROTECTION ZONE (RPZ)		
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	FTOFA
TAXILANE OBJECT FREE AREA (TLOFA)	TLOFA	TLOFA
PERIMETER FENCING		
AIRPORT PROPERTY LINE		
VASI		
PAPI		
MALS-R		
REIL		
HOLDING POSITION MARKING		
WIND SOCK		NONE
SEGMENTED CIRCLE		NONE
TOPOGRAPHIC CONTOUR		NONE

NOTES

1. FOR AIRPORT DATA, REFER TO SHEET 2 OF 22.
2. THIS MAP HAS BEEN SCANNED AND CONVERTED FROM A HARD COPY OF THE PREVIOUS AIRPORT LAYOUT PLAN (1994). AS A RESULT, EXACT POSITIONING OF ITEMS IS NOT GUARANTEED. SOME LOCATIONS AND LAYOUTS ARE ESTIMATES ONLY. THIS BASE SHOULD NOT BE USED AS A REPLACEMENT FOR AN OFFICIAL SURVEY MAP OF THE AIRPORT.

FEDERAL AVIATION ADMINISTRATION APPROVAL
THIS AIRPORT DRAWING IS APPROVED BY:
SIGNATURE: ____ DATE: ____
NAME: ____
TITLE: ____

PORT OF MOSES LAKE COMMISSION APPROVAL
THIS AIRPORT DRAWING IS APPROVED BY:
SIGNATURE: ____ DATE: ____
NAME: ____
TITLE: ____

REVISIONS				
NO.	DESCRIPTION	BY	APP.	DATE

AIRPORT LAYOUT PLAN

PORT OF MOSES LAKE

GRANT COUNTY INTERNATIONAL AIRPORT

URS 1501 4TH AVENUE SUITE 1400, SEATTLE, WASHINGTON 98101 206.438.2700

DESIGNED BY:	RLO	DATE: OCTOBER 2005
DRAWN BY:	RLO	
CHECKED BY:	GEM	SHEET 3 OF 22
PROJECT MANAGER:	JJY	

PORT OF MOSES LAKE

Exhibit 4A
2005 MASTER PLAN

RUNWAYS

The 2005 Master Plan concluded that Runway 18-36 should be retained in its existing (current) alignment primarily because the tower has been able to implement operational procedures that allow it to function somewhat independently of Runway 14L-32R. Essentially, the tower has instituted modified traffic pattern procedures for users of Runway 18-36 (primarily BBCC) that allows for simultaneous operations to Runway 14L-32R. All other runways were recommended to remain in their current configuration.

TAXIWAYS

Several recommendations were made regarding the taxiway system at the Airport. A parallel taxiway was planned at a separation distance of 400 feet to be located west of Runway 18-36. This taxiway would provide access to both thresholds of the runway and ultimately reconnect with Taxiway C north of the runway. The planned taxiway would begin at an intersection with Taxiway B, near the refueling apron and extend around the RSA associated with Runway 4-22. The taxiway was planned to be 75 feet wide (ADG V) with 35-foot wide (ADG II) connectors to Runway 18-36.

A 75-foot wide (ADG V) parallel taxiway was planned for the west side of primary Runway 14L-32R at a separation distance of 600 feet. Two high-speed exits were planned, including one extending from the runway to the north edge of the refueling apron where new hangar development was planned.

Taxiway J was planned to be widened from 35 feet to 75 feet and extended to the Runway 22 threshold.

Taxiway G was planned to be closed from the taxilane leading to the U.S. Forest Service operation to the Runway 22 threshold.

AIRFIELD NAVIGATIONAL AIDS

The previous Master Plan included a precision instrument approach to Runway 4 to increase IFR capacity at the Airport. It also included planned precision instrument approaches to Runways 14L and 22; however, these were considered long term objectives. Planning for precision instrument approaches to Runways 14L and 22 would require implementation of larger RPZs, which would permit protection of a larger space for land use compatibility on the approaches to these runway ends. In addition, the ASOS was planned to be upgraded to an ASOS-III.

LANDSIDE DEVELOPMENT

The previous Master Plan considered closing much of Taxiway G, which would permit future development west of Taxiway G. In-fill development was identified for existing areas. Acquisition of the Boeing property on the east side of the Airport was also recommended.

PAVEMENT MAINTENANCE

Rehabilitation of Runway 14L-32R was identified as an immediate need. This project was undertaken in 2005 with a 2004 grant from the FAA. Short term needs included rehabilitation of the south and west apron areas and portions of the Airport service roads. Taxiway D needed to be reconstructed. These projects have since been undertaken.

AIRSIDE PLANNING ALTERNATIVES

Generally, airside issues relate to those elements that contribute to the safe and efficient transition of aircraft and passengers from air transportation to the landside facilities at the Airport. This includes the established design standard for the Airport and runways, the instrument approach capability, the capacity of the airfield, the length and strength of the runways, and the layout of the taxiways. Each of these elements was introduced in the previous chapters. **Exhibit 4B** presents a summary of the primary airside and landside planning issues to be considered.

Not all airside or landside elements will require a detailed alternatives analysis. The alternatives analysis is reserved for presenting viable solutions to specific problems. For those airside or landside elements where only one solution is reasonable or where no alternative is necessary, an explanatory narrative will be provided.

RUNWAY 18-36 ORIENTATION

Runway 18-36 is the general aviation runway which is 3,327 feet long and 75 feet wide. The 1994 Airport Master Plan recommended re-orientating this runway to a heading of 16-34, with a shift of the south end threshold approximately 400 feet to the east. This plan was reevaluated in the 2005 Master Plan and it was recommended to leave the runway in its current location. The primary reason for the original plan to reorient the runway was to provide greater separation between operations on Runway 18-36 and primary Runway 14L-32R. At the time of the 2005 Master Plan, the tower had instituted an operational procedure that allows both runways to operate concurrently, thus eliminating the need for a re-orientation of Runway 18-36. This procedure remains in place as of this writing; however, where possible, the FAA would prefer that there not be a need for a special operating procedure.

AIRSIDE PLANNING CONSIDERATIONS

RUNWAYS

- Runway 18-36 Orientation: Mitigation of non-standard lead-in taxiways. Address special tower operating procedure.
- Runway 14L-36R Line-of-sight: Consider alternatives to allow this runway to be available 24-hours a day including removing the hump, providing a full length parallel taxiway, and/or other administrative alternatives.
- Runway 4-22: Consider potential full length parallel taxiway.
- Runway 14R-32L: Options to mitigate lead-in taxiways including consideration of converting to a taxiway full time.

TAXIWAYS

- Taxiway G: Prioritize pavement rehabilitation.
- Hot Spots: Provide mitigation options for airfield Hot Spots.

OTHER AIRFIELD ISSUES

- Prioritize potential instrument approach improvements.
- Prioritize pavement maintenance (runways, taxiways, aprons).

LANDSIDE PLANNING CONSIDERATIONS

- **Separation of Activity Levels:** Plan future facilities so that similar activity types are grouped together in order to limit interaction of large and small aircraft.
- **Facility Layout:** Maximize airport property for aviation related development.
- **Airport Land Uses:** Designate airport land uses for aviation and non-aviation related uses.
- **Strategic Land Acquisition:** Identify any adjacent lands that should be acquired (or brought into the airport from the Port) for the protection of safe aviation activity.
- **Hangar Area Access:** Provide public access to airport hangars (current and planned) intended for business activity.
- **Long Term Vision:** Provide a long term facility layout for the airport beyond the 20-year scope of this master plan in order to preserve the viability of the airport.

PORT OF MOSES LAKE

Exhibit 4B
PLANNING CONSIDERATIONS

Exhibit 4C presents a graphic of the operating procedure. Aircraft taking off on Runway 36 are instructed to turn left prior to crossing over Runway 14R-32L. This procedure allows operations on Runway 14L-32R to continue while Runway 36 is in use. The procedure has the benefit of allowing the tower to operate the two runways somewhat independent of one another.

Currently, access to both ends of Runway 18-36 is via a lead-in taxiway, which is a non-standard condition. Lead-in taxiways can lead to pilot situational confusion and runway incursions. Lead-in taxiways are a significant safety issue and a high priority for the FAA. Resolution of the lead-in taxiway layout for Runway 18-36 is likely a higher priority than resolving the special operating procedure.

Current ALP Layout for Runway 18-36

The current ALP for the Airport provides for a west side parallel taxiway, situated 400 feet, centerline to centerline, from the runway. The taxiway is planned to extend from the refueling apron, around the extended RSA of Runway 4, and then north to be parallel to Runway 18-36. There are two high-speed taxiway exits and threshold taxiways. The planned parallel taxiway at the north end is shown to extend beyond the lateral end of the runway, north approximately 1,000 feet, and then curving back to reconnect with Taxiway C beyond the end of the Runway 18 RPZ. There are also two hold aprons planned which are located on the interior of the threshold access taxiways. The taxiway connector from the Runway 4 threshold is also extended to intersect with the parallel taxiway, providing a second access point to the planned parallel taxiway.

Several elements of this taxiway layout no longer meet FAA design standards. The taxiway that extends from the refueling apron around the Runway 4 extended RSA does not meet design standards for an end-around taxiway (EAT). EATs should be designed in such a manner that specific clearance from the tower is not required. The design standards for an EAT require that an aircraft tail remain clear of the 40:1 departure surface. Utilizing a tail height of 65 feet (B-747-400), the EAT should be at least 2,600 feet from the end of Runway 4. The sides of an EAT must flair-out in order to be outside the departure surface as well.

The taxiway shown on the current ALP is more appropriately defined as a bypass taxiway. It would allow pilots a direct route to Runway 18-36 without the need to cross the threshold of Runway 4. This can be an important safety consideration, as catastrophic accidents have occurred in the recent past because of pilot confusion as to which runway they are approaching and departing from. The bypass taxiway could only be utilized when Runway 4-22 is not in use; otherwise, the taxiing aircraft may penetrate surfaces associated with Runway 4-22, thus creating an unsafe condition.

The short taxiway connector from the Runway 4 threshold to the parallel taxiway duplicates the purpose of the bypass taxiway. This connector also traverses the RPZ for Runway 36. Thus, the connector taxiway could only be used when Runway 18-36 is not in use.

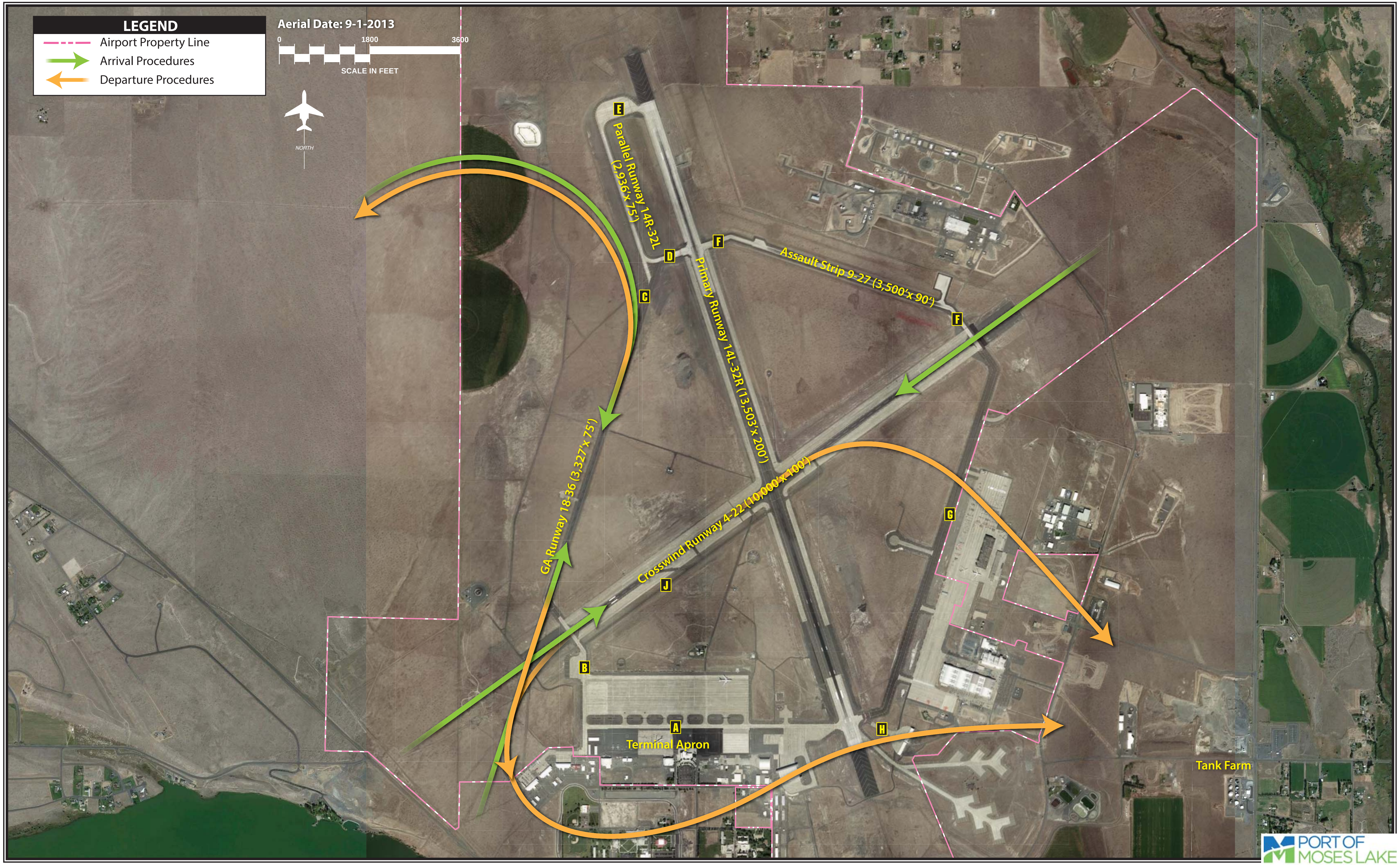


Exhibit 4C
SPECIAL OPERATING PROCEDURES

That portion of the existing Taxiway C that is a lead-in taxiway to Runway 18 is shown to remain in place on the ALP. By leaving this portion of Taxiway C in place, the non-standard lead-in condition is not resolved. In fact, Taxiway C from the Runway 18 threshold to Taxiway D, would not be needed at all, especially if a parallel taxiway to Runway 14L-32R were constructed.

Finally, the bypass taxiway and parallel taxiway are planned at a width of 75 feet, which exceeds the design standard of 35 feet. The additional width was intended to allow large transport aircraft to taxi to the Runway 14L threshold; however, the ALP also shows a taxiway parallel to Runway 14L-32R, which would eliminate the need for the parallel taxiway to Runway 18-36 to be 75 feet wide.

Maintaining the layout for Runway 18-36 as shown on the current ALP is not recommended as it does not address either the non-standard lead-in taxiways or the special operating procedure. In addition, the planned taxiway to Runway 18-36 exceeds the necessary design standards.

Option 1 – West Side Runway/Convert Current Runway to Taxiway

This alternative considers converting Runway 18-36 back to a taxiway and constructing a new general aviation runway to be located 400 feet to the west. At 400 feet of separation, proper wing-tip clearances can be maintained between large commercial transport aircraft utilizing Taxiway C and general aviation aircraft on the runway. By converting the runway to a taxiway and maintaining its 75-foot width, it can serve two distinct purposes:

1. As a parallel taxiway to the relocated general aviation runway;
2. As a primary access taxiway for all airport operators, including large commercial transport aircraft, to access the Runway 14L threshold.

This option would eliminate the current lead-in taxiway configuration, while preserving and enhancing the usefulness of Taxiway C. Large transport aircraft utilizing Taxiway C would be better separated from general aviation aircraft and the relocated Runway 18-36 would be able to be support operations while Taxiway C is being utilized.

This option would necessitate maintaining the special tower operating procedure which requires those utilizing Runway 36 for departures to the north, to turn to the west prior to reaching parallel Runway 14R-32L. This procedure would continue to be in effect only when instructed to do so by tower personnel. **Exhibit 4D** presents Option 1.

Option 2 – West Side Parallel with Bypass Taxiway

Option 2 considers utilizing the concept of a bypass taxiway to provide access to a parallel taxiway serving Runway 18-36. In this concept, the bypass taxiway is planned at a width of

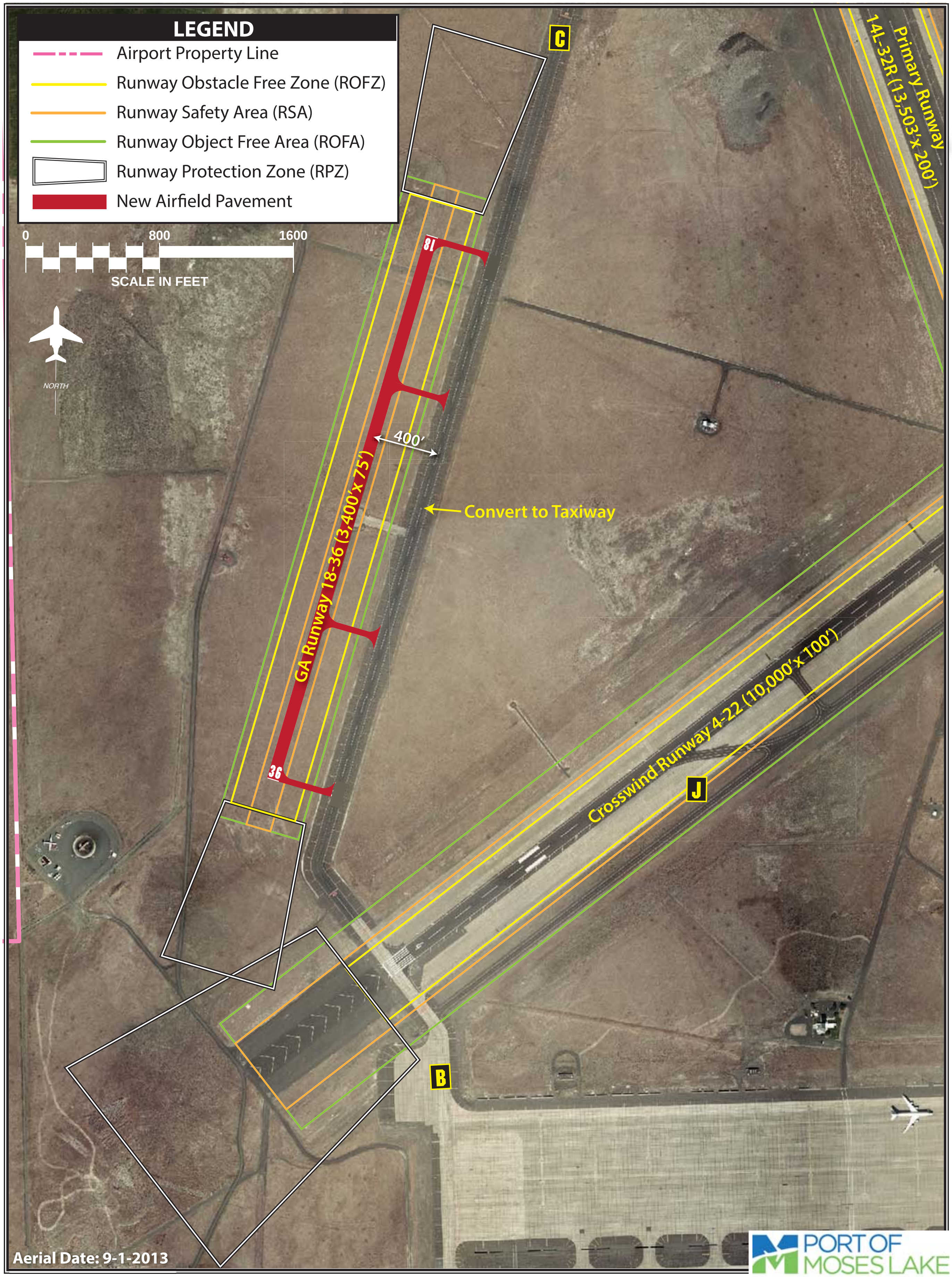


Exhibit 4D
OPTION 1 - RUNWAY 18-36

35 feet which meets the design standard for ADG II aircraft. By limiting the possible bypass taxiway to general aviation aircraft in ADG II, aircraft could taxi around Runway 4 even if Runway 4-22 were in use because the tail height would be below the departure surface. This is also the design group for Runway 18-36. As noted previously, the bypass taxiway provides for a dedicated taxiway to access Runway 18-36, thus reducing the potential for pilots to inadvertently utilize the wrong runway.

The parallel taxiway is planned at a separation distance of 300 feet, which exceeds the design standard of 240 feet. The additional separation is intended to preserve the potential for instrument approaches to Runway 18-36 with visibility minimums as low as ¾-mile. By planning the parallel taxiway at 300 feet, the airport will avoid the possibility of having to relocate the taxiway in the future and the possibility of improved visibility minimums is preserved.

This alternative considers lengthening Runway 18-36 to 3,400 feet from 3,327 feet. The purpose of the lengthening is simply to make the runway more uniform. At 3,400 feet, elements such as edge lighting can fully meet design recommendations for a light every 200 feet. Any aircraft that needs or desires more than a 3,400-foot long runway can utilize one of the others available for civilian use. **Exhibit 4E** presents this alternative.

Option 3 – Reorient and Relocate Runway 18-36

The next alternative for Runway 18-36 attempts to address both the non-standard lead-in taxiways and the special operating procedure by relocating the runway to be parallel to Runway 14L-32R. While there are several potential locations for a parallel runway, the location selected for consideration takes advantage of the existing taxiway system. The south end of the relocated runway would begin at an intersection with Taxiway J, which would serve as the threshold taxiway. From the Taxiway J threshold, the runway would extend 3,400 feet to the northwest, parallel to Runway 14L-32. The parallel runway would be separated from Runway 14L-32R by approximately 3,445 feet. In this location, the runway is clear of the ASR critical area and the RSA, OFA, and RPZ all remain on undeveloped Airport property.

One point of consideration is that the approach to the south end of the runway would have aircraft travelling over the terminal area. The Part 77 Approach Surface with a slope of 20:1 would be approximately 150 feet above the ground at the terminal building. The potential layout fully meets design standards, but the traffic pattern for the relocated runway would be different. **Exhibit 4F** presents Option 3.

Option 4 – Close Runway 18-36

The next option to consider is the possibility of shifting all general aviation traffic to Runway 4-22 and converting the existing runway back to a taxiway. This option would elimi-

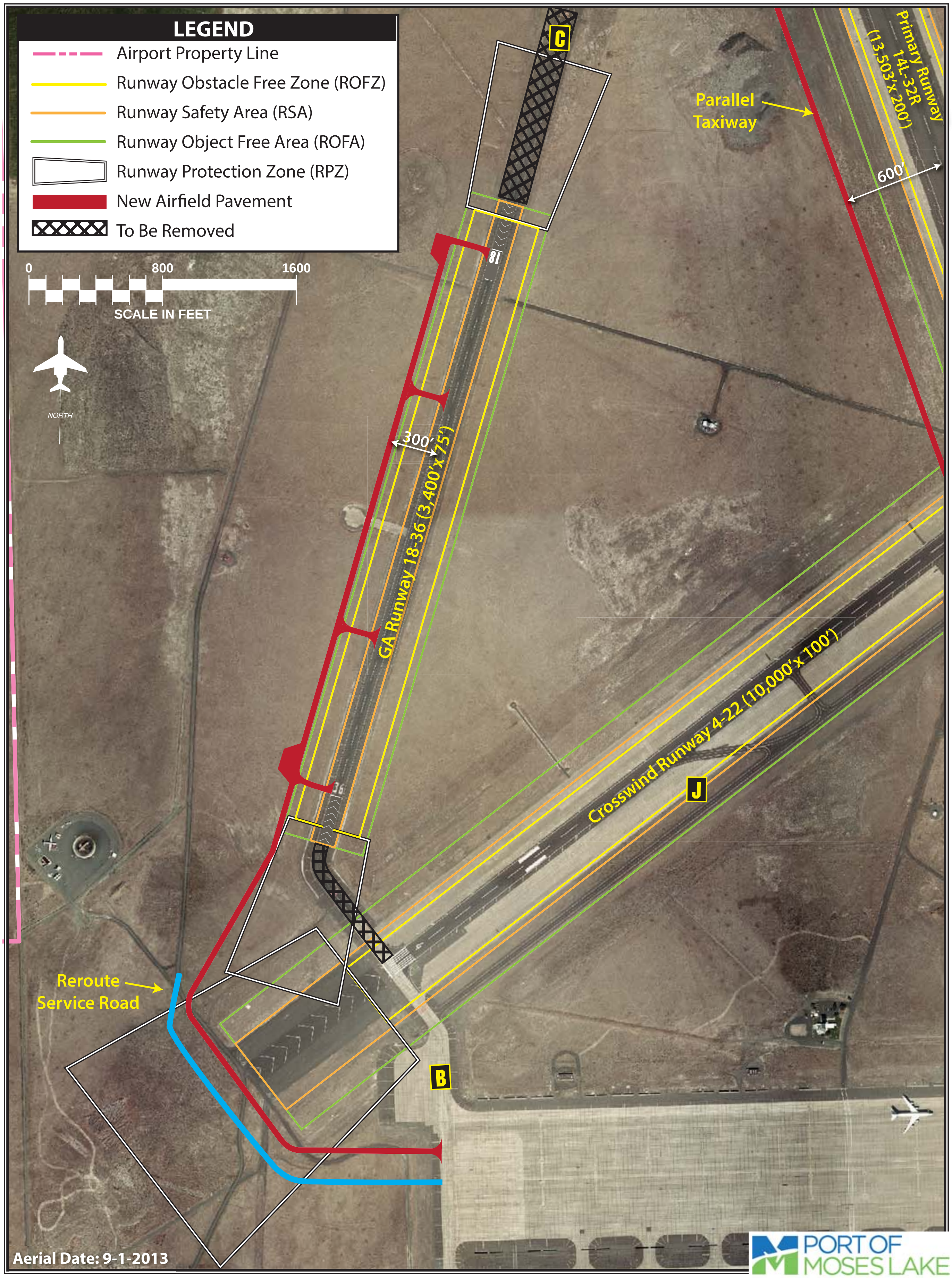


Exhibit 4E
OPTION 2 - RUNWAY 18-36

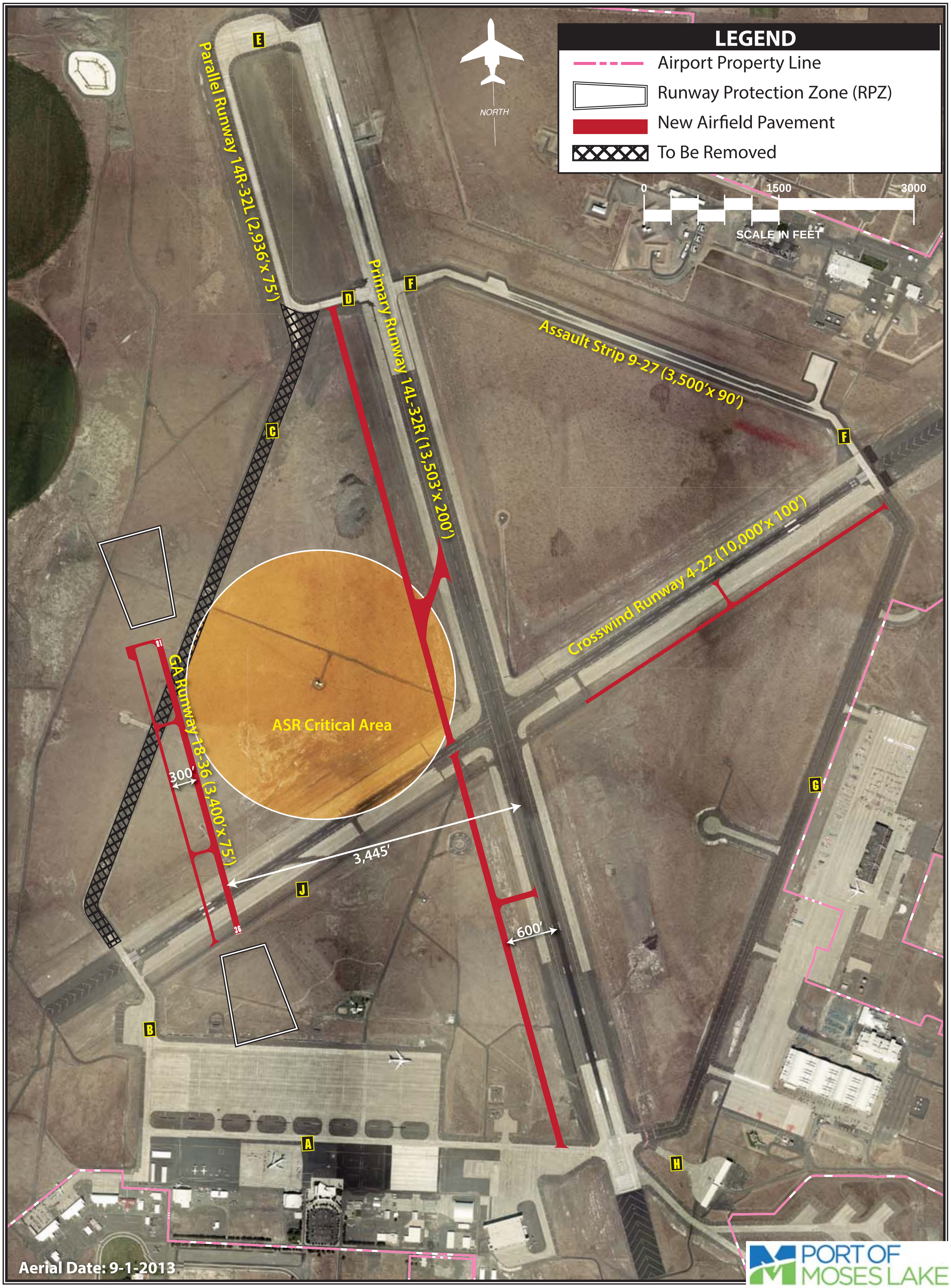


Exhibit 4F

OPTION 3 - RUNWAY 18-36

nate both the lead-in taxiways and the special tower operating procedure. This option would place small aircraft operations on the runway with the best wind coverage, thus reducing the crosswind components which impact small aircraft to a greater degree than larger aircraft. This is also likely the most cost-effective option since no new pavement would be necessary.

There is a significant disadvantage to this solution as well. The current use of Runway 18-36 permits the tower to segregate operations of small general aviation aircraft (especially student pilots) from the frequent operations by large transport aircraft on Runway 14L-32R and Runway 4-22. The traffic pattern for aircraft on Runway 18-36 is to the west of the airport, while the traffic pattern for Runway 14L-32R is to the east. This pattern procedure effectively separates large and small aircraft activity. Tower management has indicated that it is a real benefit to separate activity by large and small aircraft.

Shifting general aviation traffic to Runway 4-22 would necessarily mean that large and small aircraft would be intermixed to a much greater extent, thus increasing the potential for incursions or accidents. To some degree, the current operating environment creates two airports, one for general aviation training traffic and one for all other traffic, including frequent activity (including training) by large commercial transport aircraft. While this operating environment is somewhat unusual, it does increase safety, especially at this Airport with such a large mix of commercial transport aircraft.

Option 5 – Do Nothing

The last option considered is the possibility of leaving both the orientation and the lead-in taxiways for Runway 18-36 in place. Naturally, this would be the most cost-effective option; however, it does not address either the special operating procedure due to the runway orientation or the non-standard lead-in taxiways (aligned taxiways). Choosing to not address a known non-standard condition within the master plan document could leave the airport sponsor open to litigation if an accident occurred. Therefore, it is not recommended to maintain the current situation in the plan.

Summary

Primarily due to the presence of non-standard lead-in taxiways to Runway 18-36, a mitigation plan should be shown on the airport layout plan. This is a safety issue identified by the FAA Runway Safety Area Team (RSAT) and shown as 'Hot Spots' in FAA publications. While less critical, if feasible, the existing special operating procedure for aircraft operating on Runway 18-36 should be mitigated as well. Under the current operating environment, the special operating procedure is desired because it segregates large and small aircraft, thus improving safety margins. Five possible options have been presented and are summarized in **Table 4B**.

TABLE 4B
Runway 18-36 Options
Grant County International Airport

Option	Description	Mitigates Lead-in Taxiways	Mitigates Special Tower Operating Procedure
Baseline	Maintain Current ALP Concept	No	No
1	West Side Parallel with Bypass Taxiway	Yes	No
2	West Side Runway	Yes	No
3	Reorient and Relocate Runway	Yes	Yes
4	Close Runway 18-36	Yes	Yes
5	Do-Nothing	No	No

Source: Coffman Associates

Those options that do not present a viable plan for removing the lead-in taxiways to Runway 18-36 should not be considered further. It is the responsibility of the airport sponsor and the FAA to have a plan on the ALP to address non-standard conditions. The reality is that the availability of funding may extend the timeframe for implementing a resolution.

Neither maintaining the current ALP configuration nor doing nothing to address the issues identified is considered acceptable. Options 1-4 are viable and should be considered by the FAA, the Port of Moses Lake, and the Airport Technical Advisory Committee (ATAC). The recommended master plan concept, to be presented in Chapter Five, will present the preferred option.

RUNWAY 14L-32R LINE-OF-SIGHT

Runway 14L-32R is the primary runway at the Airport and it supports the only precision instrument approach with an ILS on the Runway 32 end. A major area of concern for this runway is the existing line-of-sight issue. As discussed in Chapter Three – Facility Requirements, the runway does not meet line-of-sight design standards. FAA AC 150/5300-13A, *Airport Design*, states:

1) Runways without Full Parallel Taxiways: Any point 5 feet above the runway centerline must be mutually visible with any other point 5 feet above the runway centerline.

2) Runways with a Full Parallel Taxiway: Any point 5 feet above the runway centerline must be mutually visible with any other point 5 feet above the runway centerline that is located at a distance that is less than one half the length of the runway.

The lack of line-of-sight has a significant effect on the operational use of the runway. Currently, the runway is closed to civilian operations at 10:00pm when the tower closes.

Therefore, the primary runway which supports the only ILS at the airport is not available from 10:00pm to 6:00am.

Exhibit 4G shows the runway profile and the location of the line-of-sight issue. The following discusses several options to address the Runway 14L-32R line-of-sight issue.

Option 1 – Remove the Hump in Runway 14L-32R

The first potential solution to the line-of-sight issue would be to remove the hump in Runway 14L-32R. Approximately 3,600 feet from the Runway 14L threshold and extending approximately 3,100 feet southeast is a gradual hump in the runway which prevents the runway from meeting the line-of-sight design standard. This option considers a project to essentially lower this portion of the runway. It is estimated that 85,000 cubic yards of material would have to be excavated. This includes an additional depth of two feet to accommodate the reconstructed portion of the runway.

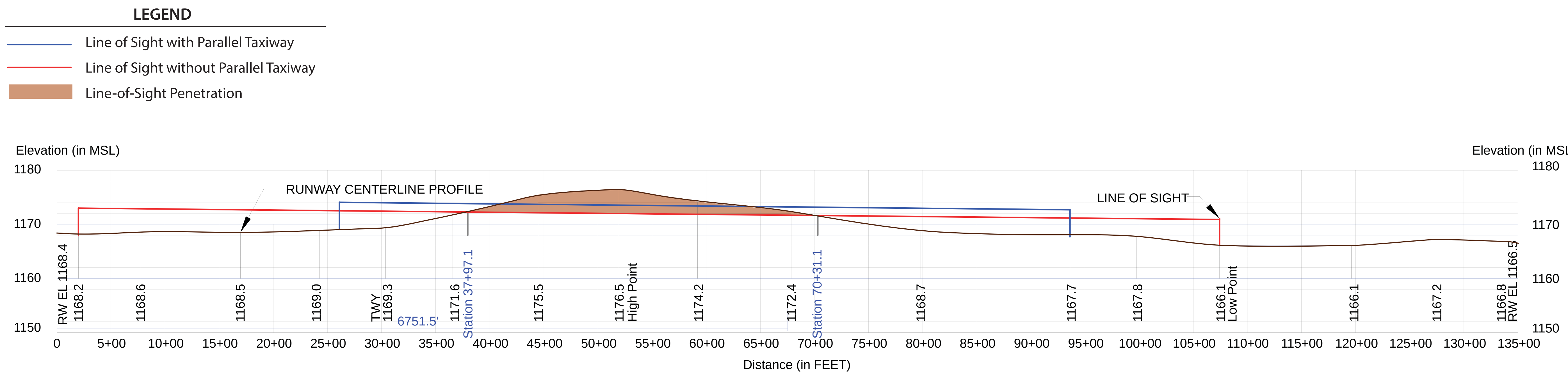
Option 2 – Construct Parallel Taxiway

The next option to address the line-of-sight issue for Runway 14L-32R is the possibility of constructing a parallel taxiway. Due to the geometry of the runway, a full length parallel taxiway would not solve the line-of-sight issue. According to FAA design standards, the presence of a parallel taxiway means any two points, five feet above the runway centerline, must be mutually visible "at a distance that is less than one half the length of the runway."

When examining the runway profile, two points on either side of the hump would not be mutually visible even if the distance between the two points is less than half the length of the runway. This is shown on **Exhibit 4G** with a blue line. Therefore, construction of a parallel taxiway to Runway 14L-32R would not resolve the line-of-sight issue. In fact, the presence of a parallel taxiway does very little to reduce the amount of excavation necessary to meet the standard. Additional analysis will consider a possible parallel taxiway to Runway 14L-32R in order to improve aircraft movement efficiency and airfield capacity.

Option 3 – Shorten the Runway

Consideration was given to the impacts if Runway 14L-32R were shortened in such a manner that the line-of-sight issue was resolved. To accomplish this, the runway would have to be shortened by approximately 3,500 feet leaving only 9,500 feet available. The runway would have to be shortened at the north end, which would leave the new threshold without 90-degree taxiway entrances. Therefore, in conjunction with a runway shortening project, additional taxiways would have to be constructed.



PORT OF MOSES LAKE

Exhibit 4G
RUNWAY 14L-32R
LINE-OF-SIGHT

As discussed in Chapter Three – Facility Requirements, the full length of the runway is needed to accommodate existing activity by large air transport aircraft which represent the critical design aircraft. FAA guidance indicates that they will not typically support shortening a runway to a length below what is necessary to accommodate activity by the critical aircraft. Therefore, shortening the runway is not considered a viable option.

Option 4 – Do Nothing

The last option considered is the feasibility of planning no changes and leaving in place the line-of-sight issue for Runway 14L-32R. As this is the primary runway which accommodates significant and frequent activity by large transport aircraft, it should be planned to meet design standard to the greatest extent practicable. By doing nothing, overall airfield capacity will continue to suffer and the runway may continue to be closed when the tower is closed. As such, planning no action to remedy the line-of-sight issue is not recommended.

Runway 14L-32R Line-of-Sight Summary

Often in the alternatives analysis, it is necessary to present options that are not feasible, in order to eliminate them from further consideration. Such is the case regarding the line-of-sight issue for Runway 14L-32R. Four different options were considered but only one leads to the desired outcome, which is to meet FAA design standard. Therefore, it is recommended that the airport and the FAA plan for a project that would remove the hump from Runway 14L-32R. By removing the line-of-sight issue, the primary runway at the Airport will meet design standard and it can remain operational 24-hours a day.

RUNWAY 32R THRESHOLD ACCESS

According to FAA design standard, it is preferred for threshold taxiways to enter the runway at a 90-degree angle. This design provides full peripheral views for pilots. Runway 32R does not have threshold taxiways. Taxiways A and G provide an entrance to the runway approximately 500 feet from the Runway 32R landing threshold. Three options are considered to address the current layout for the Runway 32R threshold taxiways.

Option 1 – Construct Taxiways

The first option is to plan construction of partial parallel taxiways that would lead to 90 degree threshold taxiways for Runway 32R. Such a project would likely not provide a reasonable return on investment. Approximately 15,300 square yards of taxiway pavement would have to be constructed. A portion of Taxiway H, approximately 3,500 square yards, would have to be removed. In addition, Taxiway H would extend directly to the end of the new threshold taxiway, which is not recommended; therefore, the remaining portion of Taxiway H would likely have to be relocated in order to provide access from the alert hangars to Taxiway G.

Option 2 – Shorten Runway

Another option would be to physically shorten the runway by approximately 500 feet so that the existing runway entrance points at Taxiways A and G become the threshold entrance taxiways. The entrance to the runway at Taxiway A is not quite 90 degrees, so some remarking of the pavement could be necessary. The ILS equipment and the approach lighting system would have to be relocated. All instrument approach procedures to this runway would have to be recalibrated and republished (a process that can take up to two years). Since it has been determined that the critical design aircraft, at times, requires the full runway length, shortening the runway is not the recommended course of action.

Option 3 – Do Nothing

A final option is to take no action. Operationally, aircraft enter Runway 32R via Taxiway A or Taxiway G and begin their takeoff run from that point. At this entrance point, there is 13,000 feet of runway length available for takeoff. This length can accommodate every aircraft that might use the runway, even under the extremes of heavy loading and hot temperatures. For those occasions when an operator might need the additional 500 feet of length, they can back-taxi onto the runway end with tower clearance. Nonetheless, this option may be viable due to the probable high cost and limited benefit of other options. Concurrence of this option should be obtained from the FAA and noted on the ALP.

RUNWAY 4-22 – DESIGN STANDARDS

Several options need to be considered with regard to Runway 4-22. Currently, the runway is identified with an RDC of C-III-4000. The runway is 100 feet wide and 10,000 feet long. It is the runway with the best overall wind coverage. The runway is served by a 5,900-foot long partial parallel taxiway that extends from the Runway 4 threshold. The taxiway is 35 feet wide with four taxiway exits.

Runway Length Options

As discussed in the Facility Requirements chapter, this runway provides a critical service to airport operators in that it is the back-up to the primary runway. Particularly during maintenance, the primary runway could be closed for long periods of time. In addition, Runway 4-22 is the only runway that can accommodate the critical design aircraft to any degree, when the tower is closed, which is every night from 10:00 pm to 6:00 am. Therefore, the length of the runway should be maintained as recommended.

Technically, the length of Runway 4-22 exceeds that recommended by the FAA for a crosswind runway at the Airport. As discussed in the Facility Requirements chapter, a crosswind runway to accommodate aircraft in design category A/B-I is what is required. Therefore, when the line-of-sight issue is resolved for Runway 14L-32R, the nighttime need for Runway 4-22 becomes less acute. If maintaining the full runway length for its back-up capability is not justification alone, then the FAA may choose to limit potential future funding of some portion of Runway 4-22. Regardless of where future funding for maintaining Runway 4-22 comes from, it should be shown at full length on the airport layout plan.

Parallel Taxiway Option

Taxiway J is 400 feet from Runway 4-22, centerline to centerline, which meets design standard for the design aircraft in ADG III. The width of Taxiway J is 35 feet, which does not meet the 50-foot standard for the critical design aircraft for this runway (Boeing 737-700). If the Boeing 737-700 remains the critical design aircraft for this runway, then the taxiway should be planned to be widened to 50 feet.

The previous ALP for the Airport included extending Taxiway J for the full length of the runway. From an efficiency of movement and layout perspective, this would make sense. Aircraft needing to access Runway 22 for departure must either back-taxi on the runway for a distance of 4,100 feet or utilize Taxiway G. Currently, Taxiway G is in poor condition and it could potentially be closed in the future. Possible extension of Taxiway J is likely a low priority because of the activity levels on the runway, but it should be maintained on the ALP for future consideration.

RUNWAY 14R-32L

Runway 14R-32L is 2,936 feet long and 75 feet wide. It is situated parallel to the northern portion of primary Runway 14L-32R and is separated by 1,031 feet. It is underutilized as a runway (accounting for less than two percent of total airport operations) and is currently only available for daytime use. The runway also serves as a taxiway providing the only access to the Runway 14L threshold. It is lighted as a taxiway.

There are several features of the runway geometry that are not in compliance with FAA design standards or recommendations. The following should be considered in application to Runway 14R-32L:

1. Both ends of the runway are accessible by taxiways aligned with the runway (lead-in taxiways). Aligned taxiways are prohibited according to Paragraph 416 of FAA AC 150/5300-13A, *Airport Design*.
2. The FAA does not support "dual-use" pavements (i.e. a pavement serving as both a runway and a taxiway). According to the AC (Paragraph 401.b.5.f), "A runway should always be clearly identified as a runway and only a runway."
3. FAA design standards indicate that "each runway end must be served by an entrance taxiway, which also serves as the final exit taxiway. Connect entrance taxiways to the runway end at a right angle." (Paragraph 410.a).
4. When wake turbulence is a concern, parallel runways should provide at least 2,500 feet of separation (Paragraph 316.a.2) otherwise the runways are treated as a single operational runway by tower personnel. With large commercial transport aircraft frequently utilizing the primary runway, wake turbulence is a factor.

While there are existing design deficiencies related to Runway 14R-32L, the presence of the runway can be an asset to the Airport. It may be desirable to direct some of the noisier aircraft to this runway alignment in order to limit noise impacts to airport neighbors, for example.

Option 1 - Close Runway/Maintain as Taxiway

There are essentially two options regarding the disposition of Runway 14R-32L. One option is to maintain it as a taxiway and remove its runway designation; the other option is to maintain the current condition.

Closing the runway and maintaining it as a taxiway would meet design standards that eliminate the dual use pavement and lead-in taxiways (i.e., the FAA 'Hot Spot' designation could be removed). The pavement would have to remain in place in order to continue to provide taxiway access to the Runway 14L threshold. Maintaining the pavement as a runway would address neither the non-standard lead-in taxiways nor the 'Hot Spot' designation.

Option 2 – Construct Parallel Taxiway

A second option is to maintain the runway and plan for the construction of a parallel taxiway. A presence of a parallel taxiway would remedy the existing non-standard conditions.

The likely location of a parallel taxiway would be between the two runways. Planning standards indicate that a parallel runway should be at least 240 feet from the runway. In this case, consideration is given to planning a parallel taxiway at a separation of 431 feet. This would place the parallel taxiway 600 feet from the primary runway. The greater separation is intended to allow a potential parallel taxiway to primary Runway 14L-32R to continue to an intersection with Taxiway E. Essentially this creates a full parallel taxiway to both the primary runway and the parallel runway.

Option 3 – Do Nothing

The do-nothing option would also maintain Runway 14R-32L as a runway. The do-nothing option would mean that no corrective planning is considered for the current non-conforming conditions. FAA concurrence to maintain the current condition would be required.

INSTRUMENT APPROACHES

Instrument approach procedures, as previously described in the Inventory chapter, are critical to extending the usefulness of an airport in times of poor weather. Instrument approaches are particularly important for airports serving jet operations. At Grant County International Airport, where large commercial transport aircraft are tested, the availability of the full range of instrument approaches is desired.

Runway 32R provides an instrument landing system (ILS) which provides visibility minimums of ½-mile and cloud ceilings of 200 feet, often referred to as CAT-I minimums. Runways 4, 22, and 14L each has non-precision instrument approaches with ¾-mile visibility minimums. Approaches to Runway 18-36 and 14R-32L are visual only.

The previous ALP included planned CAT-I instrument approaches to Runways 4, 22, and 14L. This plan should be maintained; however, implementation may be a lower priority because of the generally good weather in the region. The benefit of maintaining CAT-I instrument approach potential is the ability of the Airport to protect the approaches and the RPZ to a greater degree (through land use planning). When developing the Airport Master Plan, it is important to consider the future potential for RPZ size so that incompatibilities are not introduced that would preclude improvements to the instrument approaches.

Instrument approach capabilities are rapidly advancing with the current FAA implementation of NextGen technologies. Utilizing the existing constellation of GPS positioning satellites, visibility minimums are improving. Ultimately, it is realistic to consider even lower visibility minimums without the need for an extensive array of ground-based equipment.

Current standards indicate that an approach lighting system is required in order for visibility minimums to be improved from ¾-mile to ½-mile. Therefore, a medium intensity approach lighting system with runway alignment indicator lights (MALSR) would be necessary for the approaches to Runways 4, 22, and 14L in order to get down to ½-mile visibility minimums.

NAVIGATION AIDS

Certain approach aids provide information to pilots to indicate if they are on the correct glide path and alignment to the runway for landing. Visual approach aids are typically provided for instrument-capable runway ends that do not already have an approach lighting system. Runway 22 is equipped with a visual approach slope indicator VASI system. In 2013, the FAA replaced the VASI light system on the approach to Runway 14L with a precision approach slope indicator (PAPI-4L) system. The more advanced PAPI system is also available on the approach to Runway 4 and 32R. As the VASIs become outdated, they should be planned to be replaced with PAPI systems. Visual approach aids are not planned to Runways 18-36 and 14R-32L.

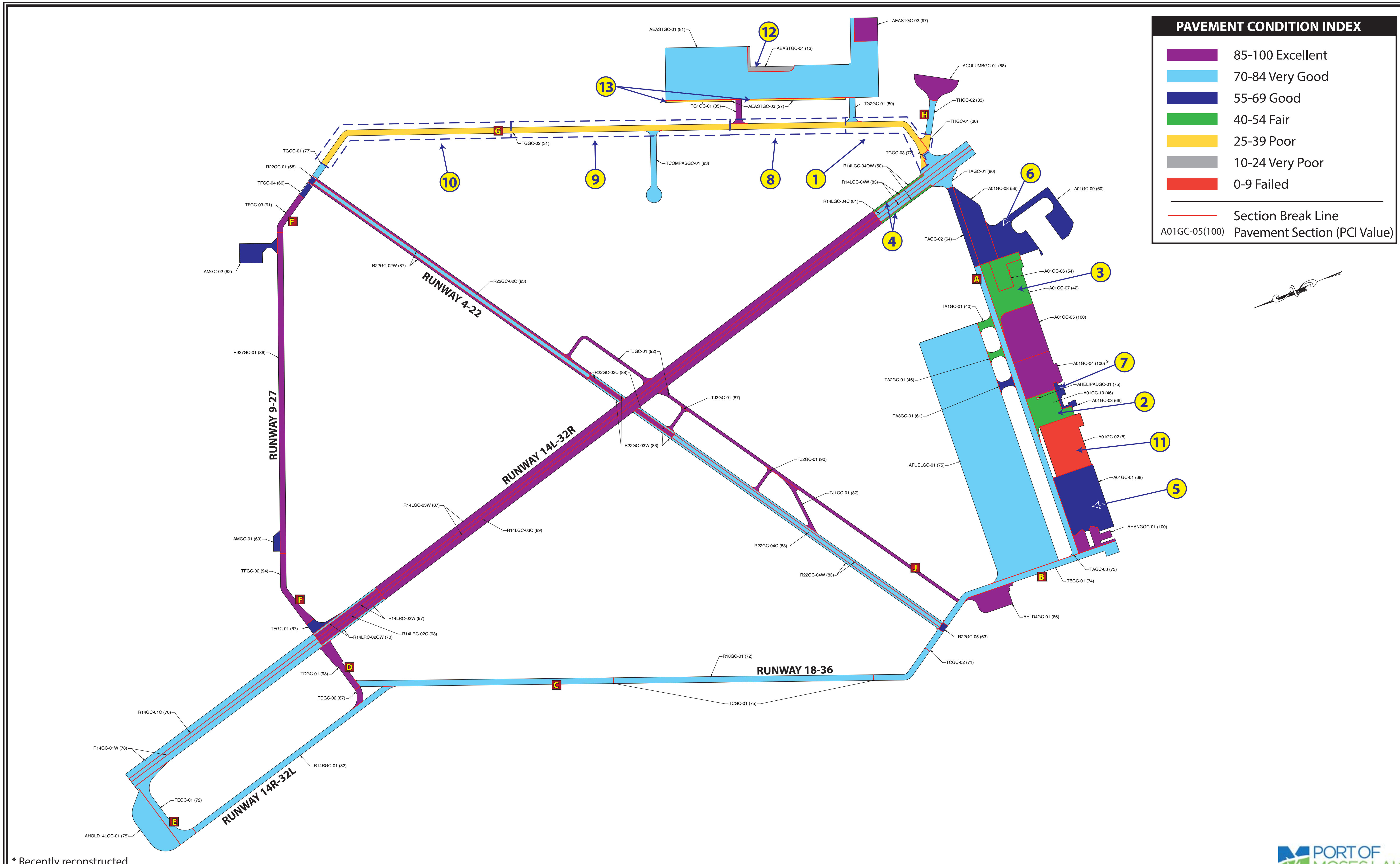
PAVEMENT REHABILITATION PRIORITIES

The airport is required, through its grant assurances with the FAA, to properly maintain the aircraft movement areas on the airport. As discussed in Chapter 1 – Inventory, WSDOT provides regular inspection of the pavements at Washington State airports, including Grant County International Airport. Generally, pavements should be rehabilitated based on greatest need; however, due to the reality of FAA funding availability, it is necessary for airports to prioritize pavement maintenance. **Exhibit 4H** presents a rehabilitation priority plan for the taxiways and aprons at the Airport. The runways are in very good condition but regular maintenance should be undertaken to preserve their condition for as long as possible.

Taxiway Rehabilitation Priorities

Taxiway G is the most underutilized taxiway on the airfield. It provides access to the apron areas on the east side of the Airport. This pavement is currently in poor condition and in need of significant rehabilitation if it is to be maintained. Taxiway G provides access to the Boeing facility at the airport, which is mostly utilized for storage of equipment, and the U.S. Forest Service at the south end of the taxiway. Due to the underutilization of the taxiway, it is prudent to prioritize any significant rehabilitation as shown on **Exhibit 4H**.

The south portion of Taxiway G provides access to the U.S. Forest Service apron and facilities. This portion should be considered the highest priority because there are active users. The next highest priority is that portion of Taxiway G from the first apron entrance to the second apron entrance. The next highest priority is the portion from the second apron entrance to the third, and the lowest priority is the remaining portion connecting from the third apron entrance to the Runway 22 threshold. Over time, those portions of Taxiway G that are not rehabilitated will deteriorate further. At some point, for safety reasons, some portions of Taxiway G may have to be closed if they are not rehabilitated.



Source: Washington State Department of Transportation Aviation: Pavement Evaluation Program (Nov. 2012)

Exhibit 4H
PAVEMENT CONDITION PRIORITY

The taxiway system at Grant County International Airport generally provides for the efficient movement of aircraft to and from the runways. FAA AC 150/5300-13A, *Airport Design*, instituted new design standards for taxiways, some of which impact planning for the Airport.

Several of the taxiway issues have already been addressed in conjunction with runway alternatives. By closing and converting Runway 14R-32L back to a taxiway, the lead-in taxiway and FAA 'Hot Spots' will be resolved. By planning to relocate Runway 18-36 or build a parallel taxiway, the same non-standard issues will be resolved. The possibility of threshold taxiways for Runway 32R has also been discussed.

Runway 4-22 currently has a partial parallel taxiway. The current ALP considers extending this taxiway to the Runway 22 threshold. This option should be maintained if the runway is to be maintained to accommodate the current critical design aircraft in C-III. Extending this taxiway is likely a low priority due the activity levels the runway supports.

The current ALP considered converting the north portion of the refueling apron to a taxiway that would ultimately connect with a parallel taxiway planned for Runway 14L-32R. By creating this taxiway, a large portion of the refueling apron can be made available for hangar development with potential public road access.

The previous ALP also considered constructing a full length parallel taxiway to Runway 14L-32R. This taxiway should be considered for capacity and efficiency reasons. The dwell time on the runway, as determined by the availability of exit taxiways, is a significant factor in determining the airfield capacity. Currently, there are no properly located taxiway exits from the primary runway which is a severe constraint on capacity.

Apron Rehabilitation Priorities

Generally, the main terminal area apron is the highest priority as it serves as the commercial center of the airport. It supports numerous airport businesses including both Airport FBOs. Maintenance of the terminal area apron should follow the priority ranking identified by the pavement condition report shown on **Exhibit 4H**. The highest priority apron areas are those that are actively supporting regular aviation activity. The apron rehabilitation priorities are based on the condition index.

It should be noted that a portion of the main terminal area apron is considered to be failed pavement. This area is currently utilized for large aircraft deconstruction and recycling, work that can significantly damage the pavement. Therefore, while the pavement is failed, it is currently under lease. Major rehabilitation should be delayed until such time that the lease is not renewed..

LANDSIDE PLANNING CONSIDERATIONS

Generally, landside issues relate to those airport facilities necessary, or desired, for the safe and efficient parking and storage of aircraft, movement of passengers and pilots to and from aircraft, airport land use, and overall revenue support functions. In addition, elements such as fueling capability, availability of services, and emergency response are also considered in the landside functions.

Landside planning issues, summarized on **Exhibit 4B**, will focus on facility locating options following a strategy of separating activity levels. To maximize airport efficiency, it is important to locate facilities intended to serve similar functions close together. For example, it makes sense to plan T-hangar structures in a designated area rather than haphazardly building them as needed on the next available parcel at an airport. It is also important to plan for facilities that airport users desire and to group those facilities together, whether they are T-hangars, box hangars, or larger conventional hangars.

The orderly development of the airport terminal area (those areas parallel to the runways and along the flight line) can be the most critical, and probably the most difficult development to control on the airport. A development approach of "taking the path of least resistance" can have a significant effect on the long term viability of an airport. Allowing development without regard to a functional plan can result in a haphazard array of buildings and small ramp areas, which will eventually preclude the most efficient use of valuable space along the flight line.

Activity in the terminal area should be divided into three categories at an airport. The high-activity area should be planned and developed as the area providing aviation services on the airport. An example of a high-activity area is the aircraft parking apron, which provides outside storage and circulation of aircraft. Large conventional hangars housing fixed base operators (FBOs), other airport businesses, or those used for bulk aircraft storage would be considered high-activity uses. A conventional hangar structure in the high-activity area should be a minimum of 6,400 square feet (80 feet by 80 feet). If space is available, it is more common to plan these hangars for up to 200 feet by 200 feet. The best location for high-activity areas is along the flight line near midfield, for ease of access to all areas of the airfield.

The medium-activity category defines the next level of airport use and primarily includes corporate aircraft operators that may desire their own box or conventional hangar storage on the airport. A hangar in the medium-activity use area should be at least 50 feet by 50 feet, or a minimum of 2,500 square feet. The best location for medium-activity use is off the immediate flight line, but still with ready access to the runway/taxiway system. Typically, these areas will be adjacent to high-activity areas. Parking and utilities, such as water and sewer, should also be provided in this area.

The low-activity use category defines the area for storage of smaller single and twin-engine aircraft. Low-activity users are personal or small business aircraft owners who prefer individual space in T-hangars or small box hangars. Low-activity areas should be located in less conspicuous areas or to the ends of the flight line. This use category will require electricity, but may not require water or sewer utilities.

In addition to the functional compatibility of the terminal area, the proposed development concept should provide a first-class appearance for Grant County International Airport. Consideration to aesthetics should be given high priority in all public areas, as many times the airport can serve as the first impression a visitor may have of the community.

Generally, the existing development at the Airport has followed the strategy of separating activity levels. The terminal building is centrally located on the main apron. Several conventional hangars are located to the sides of the terminal building providing aviation services. General aviation hangars are grouped and set further to the sides.

VEHICULAR ACCESS AND PARKING

A planning consideration for any airport master plan is the segregation of vehicles and aircraft operational areas. This is both a safety and security consideration for the airport. Aircraft safety is reduced and accident potential increased when vehicles and aircraft share the same pavement surfaces. Vehicles contribute to the accumulation of debris on aircraft operational surfaces, which increases the potential for foreign object debris (FOD) damage, especially for turbine-powered aircraft. The potential for runway incursions is increased, as vehicles may inadvertently access active runway or taxiway areas if they become disoriented once on the air operations area (AOA). Airfield security may be compromised as there is loss of control over the vehicles as they enter the AOA. The greatest concern is for public vehicles, such as delivery vehicles and visitors, which may not fully understand the operational characteristics of aircraft and the markings in place to control vehicle access. The best solution is to provide dedicated vehicle access roads to each landside facility that is separated from the aircraft operational areas with security fencing.

The segregation of vehicle and aircraft operational areas is supported by FAA guidance established in June 2002 and amended in March 2008. FAA AC 150/5210-20, *Ground Vehicle Operations on Airports*, states, "The control of vehicular activity on the airside of an airport is of the highest importance." The AC further states, "An airport operator should limit vehicle operations on the movement areas of the airport to only those vehicles necessary to support the operational activity of the airport." Grant County International Airport has full perimeter fencing with numerous secure access gates. The perimeter fencing meets FAA standards for commercial certificated airports (Part 139).

Consideration of any new hangars or facilities on the Airport should also consider providing dedicated vehicle parking. While it is preferable to completely separate vehicles from the AOA, including taxi-lanes, this is not always feasible, especially at general aviation airports. It is common for airport tenants to access their hangar by traversing the AOA. Therefore, a balance must be achieved that permits airport tenants to access their hangars, while reducing the potential for the public to inadvertently access the AOA.

The landside options for the Airport have been developed to reduce the need for vehicles to cross apron or taxiway areas. Dedicated vehicle parking areas, which are outside the airport fence line, are considered for potential hangars.

LANDSIDE LAYOUT ALTERNATIVES

As presented in Chapter Three – Facility Requirements, additional general aviation aircraft hangar storage area is recommended to accommodate forecast growth in based aircraft. An additional 41,200 square feet of hangar space (T- and box hangar) is forecast to be needed to accommodate potential growth in based aircraft. While the forecasts indicate there may be a demand for additional aircraft storage hangars, airport management is not required to construct hangars.

An industrial facility such as Grant County International Airport may choose to place limited financial resources into projects that are more aligned with the mission of the Airport. While supporting general aviation activity is important, especially the Big Bend Community College program, industrial aviation is a primary focus. Indeed, Moses Lake Municipal Airport is in close proximity and may be better positioned to accommodate growth in based general aviation activity.

DEVELOPMENT AREAS

Generally, airport property must be used for aviation-related purposes. Property that is unable to be used for aviation purposes can be utilized for certain airport compatible non-aviation purposes. Aviation-related purposes are considered any use that directly supports or utilizes aircraft; essentially, any business or function that requires access to the runway and taxiway system. Non-aviation uses are those that do not require access to the runway and taxiway system but are compatible with airport activity.

Exhibit 4J presents a generalized map of the Airport segmented into four land use categories. The yellow areas are specific object clearing areas that must be maintained clear except for those elements necessary for the safe operations of aircraft (e.g., edge lights, navaids, etc.) These areas include the runway object free area, taxiway object free area, runway protection zones, navaid critical areas, and the runway visibility zone.

The areas outlined in blue are those areas that can be utilized for aviation-related development. The areas in pink are those areas that are not contiguous to the primary airport property and can, therefore, be utilized for non-aviation development. The areas in purple are properties adjacent to the Airport that should be considered for acquisition and then utilized for aviation-related purposes.

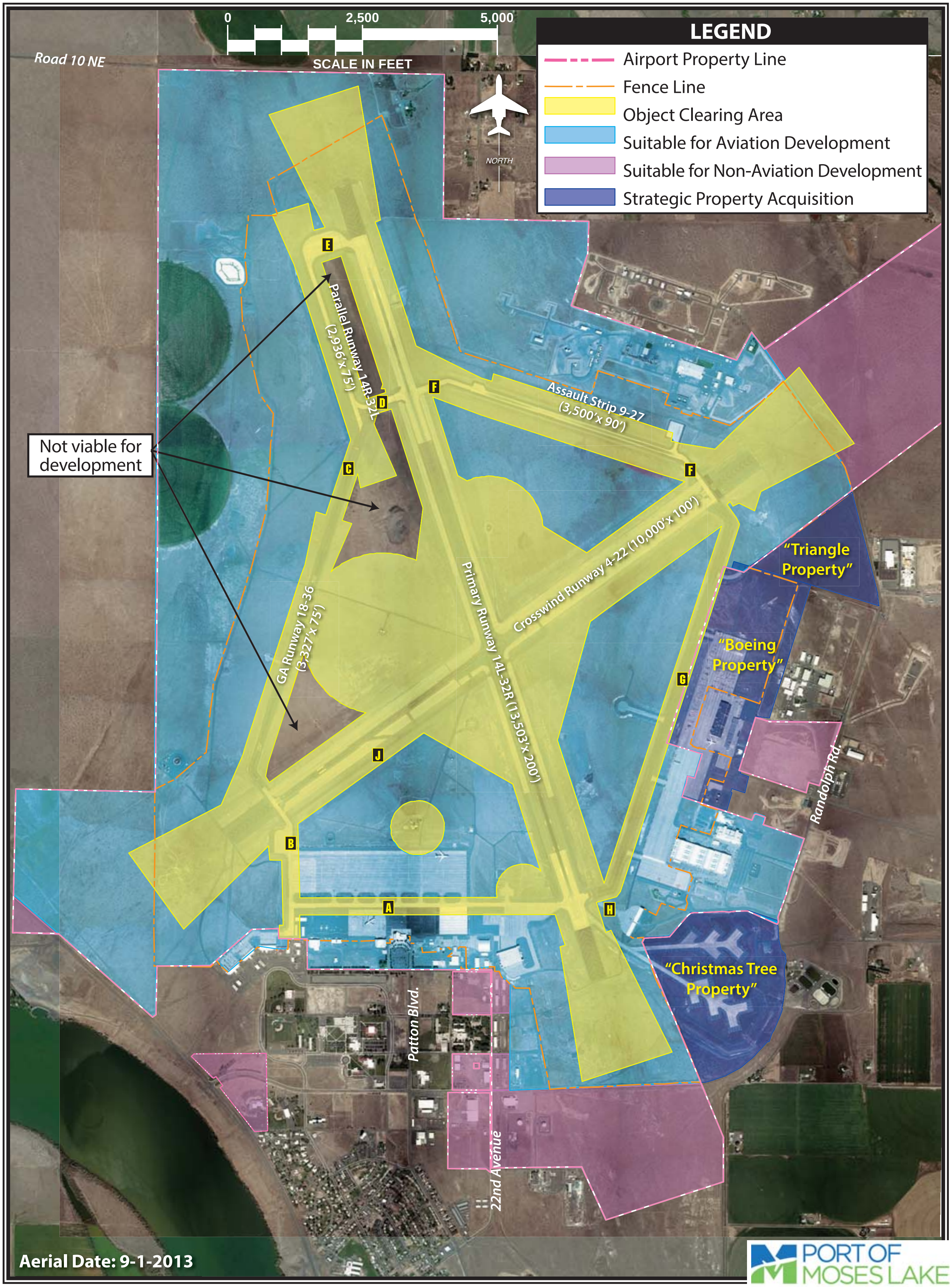


Exhibit 4J
DEVELOPMENT AREAS, CONSTRAINTS AND PROPERTY ACQUISITION

With this baseline of understanding about Airport property, various options for facility development can be considered. It should be understood that depictions of specific hangar size or location are meant to be conceptual in nature and do not limit the Port in terms of acceptable development. For example, depiction of a large 200-foot by 200-foot conventional hangar does not constrain what can be constructed in that location. If a different hangar size or a different use altogether becomes the highest and best use for that location, as long as it is aviation-related, then it is acceptable. In addition, certain temporary (typically, five years or less) non-aviation activity may be acceptable on aviation designated areas.

TERMINAL AREA DEVELOPMENT OPTIONS

The main terminal area should be reserved for aviation-related development. **Exhibit 4K** presents several conceptual development options. The first options considered are for additional aircraft storage intended for general aviation type aircraft. Currently these facilities are located on the west end of the main terminal area apron. Because of this, it is logical to utilize this general location for additional general aviation hangars as necessary.

Option 1 is to extend taxilanes south from the main apron between buildings 401 and 404. This land is undeveloped but it is in close proximity to existing utilities.

Option 2 considers utilizing an undeveloped area immediately west of the main terminal area apron for additional hangars. This location is west of the existing T-hangars and would include construction of new taxilanes and the extension of new utilities.

The undeveloped area between buildings 404 and 408 is prime apron frontage which should be reserved for high activity uses such as large conventional hangars. The exhibit shows two large conventional hangars in this location.

The area to the east of the terminal building currently supports several Airport businesses. Infill opportunities are available for hangar construction in this general location. Optimal hangar types would be box or conventional for Airport businesses or corporate aviation.

The area south of building 2203 is where Airport operations are centered, including three buildings. Airport management has indicated a need for additional equipment storage capability which is shown on the exhibit.

SOUTH TERMINAL AREA DEVELOPMENT OPTIONS

The area south of building 3401 is available for aviation development. **Exhibit 4L** presents one potential layout to accommodate additional large conventional hangars. When planning such hangars, it is important to analyze any development limitations particularly when the location is in proximity to a runway. In this case, the development area is adja-

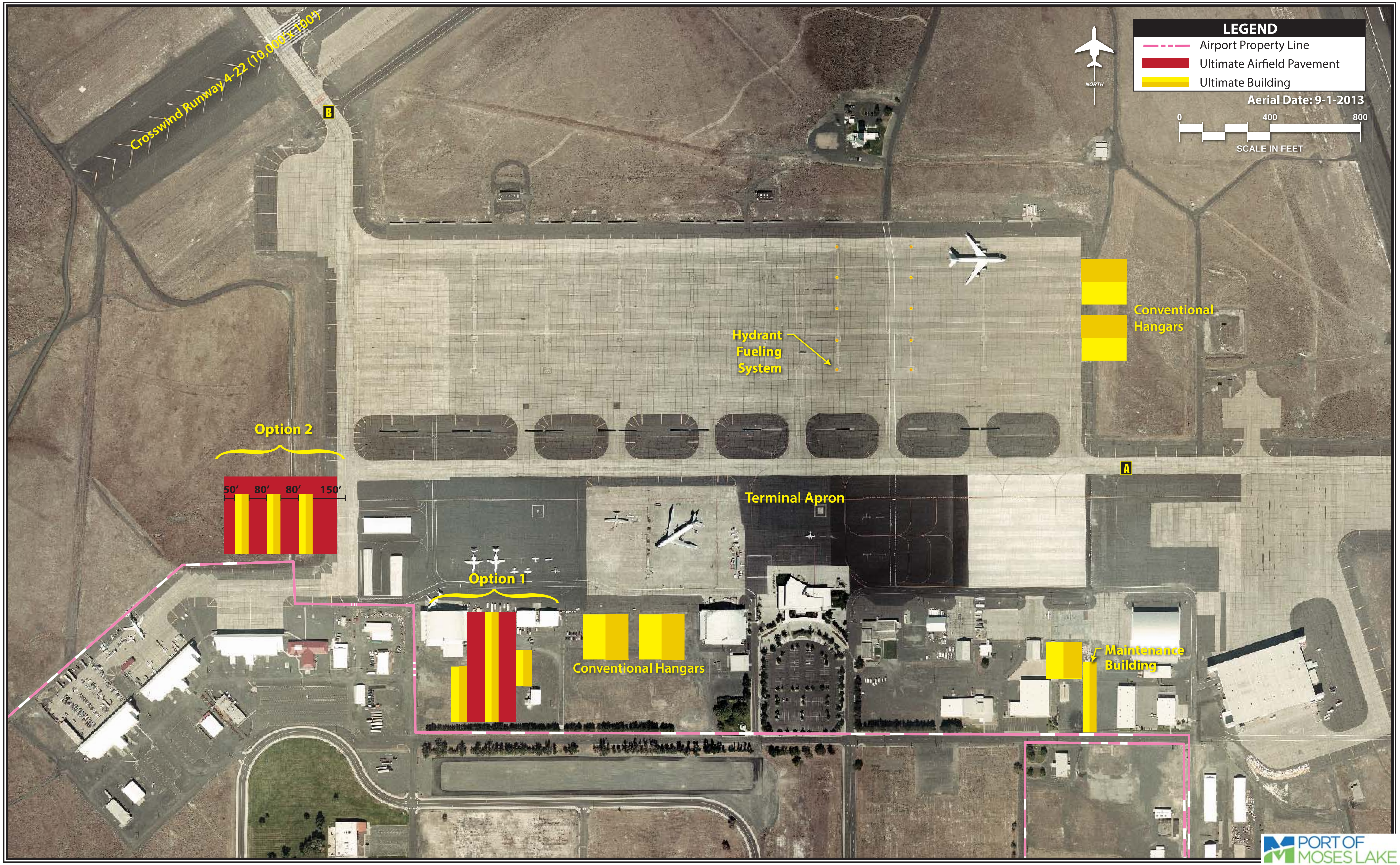
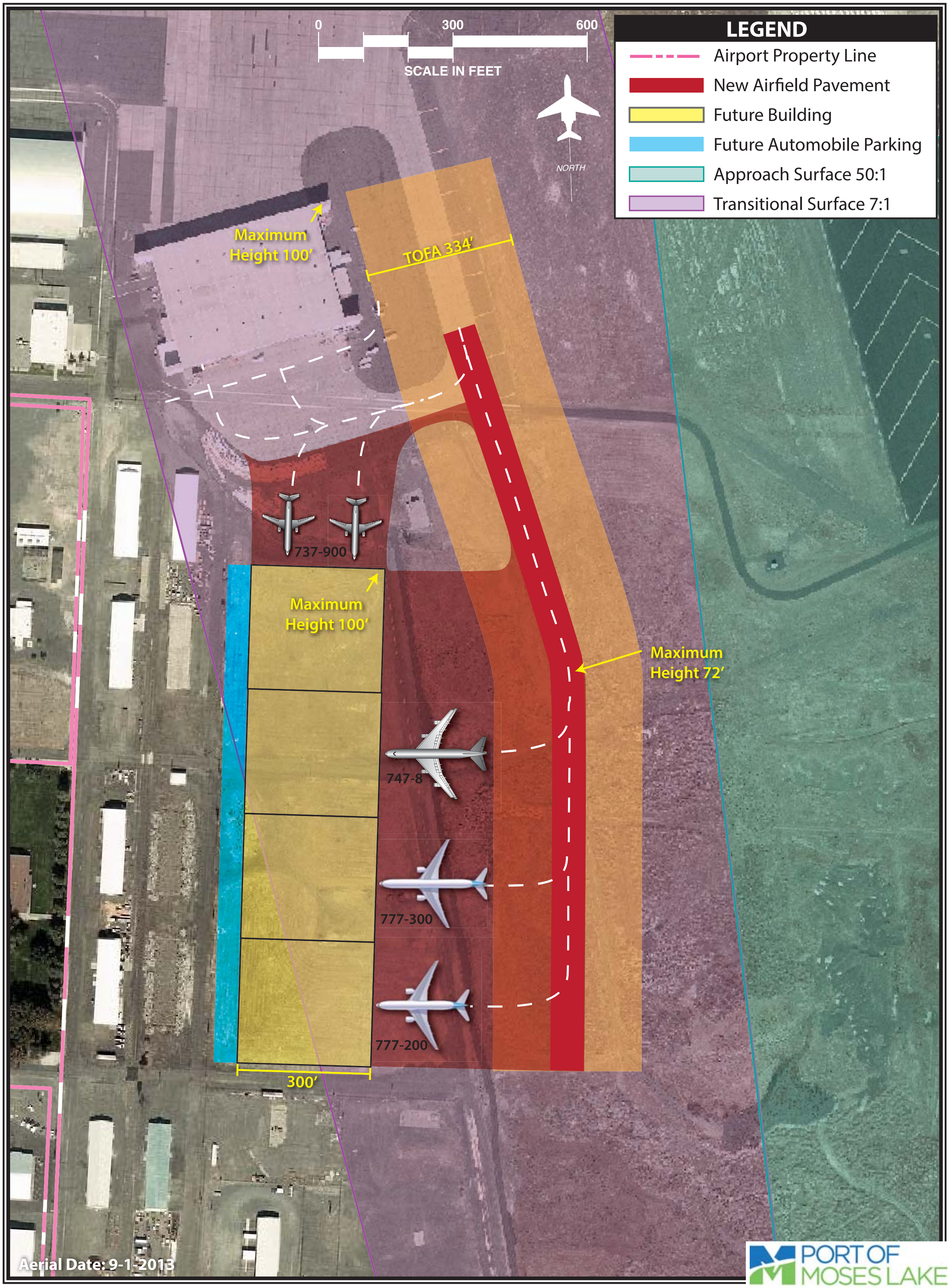


Exhibit 4K
MAIN TERMINAL
AREA DEVELOPMENT



PORT OF MOSES LAKE

Exhibit 4L
SOUTH TERMINAL
AREA HANGARS

cent to the approach to Runway 32R. There are several imaginary surfaces in the area that should remain clear in order to protect the airspace.

In this location, the controlling imaginary surface is the transitional surface. The transitional surface extends from the edge of the primary surface (surrounding the runway) and the approach surface (leading to the runway) at a 7:1 ratio. Any new construction, or movable objects such as aircraft, should not penetrate these surfaces.

The northernmost of the hangars shown on the exhibit would need to be to no taller than 100 feet in order to remain clear of the transitional surface. The connected hangars extending to the south could be progressively taller.

EAST APRON AREA DEVELOPMENT OPTIONS

The east side of the Airport also supports aviation-related uses currently. The south portion of the east apron is utilized by the U.S. Forest Service during firefighting season for refueling and loading of aerial tanker fire suppression agents. Grant County International Airport is a significant base of operations for the U.S. Forest Service. All aircraft types, including large DC-10s, are serviced at this location. As long as the U.S. Forest Service is a tenant in good standing, this portion of the east apron should be maintained to accommodate this tenant.

An undeveloped parcel is available for infill development just north of the Genie manufacturing facility.

The area to the west of Taxiway G was identified for potential aviation-related development in the previous Master Plan. This area encompasses approximately 215 acres. This parcel presents a unique economic development opportunity for the Airport. There are not many large parcels of this size at airports. This parcel could, for example, accommodate large aviation manufacturing facilities. It could also be developed on an as-needed basis for individual hangar construction as shown on **Exhibit 4M**.

Public road access to hangars should be provided when feasible. The previous Master Plan provided this access by extending a road between the alert hangars and the U.S. Forest Service apron that then crossed Taxiway G. For this road to allow public access, Taxiway G would have to be closed at this location. Closing Taxiway G at this location would essentially cut off the U.S. Forest Service from the Runway 32R threshold and force long taxi routes. A new public road access point is considered at the north end of the east apron. Locating the access point here would permit aircraft taxiing to the south to utilize Taxiway G.

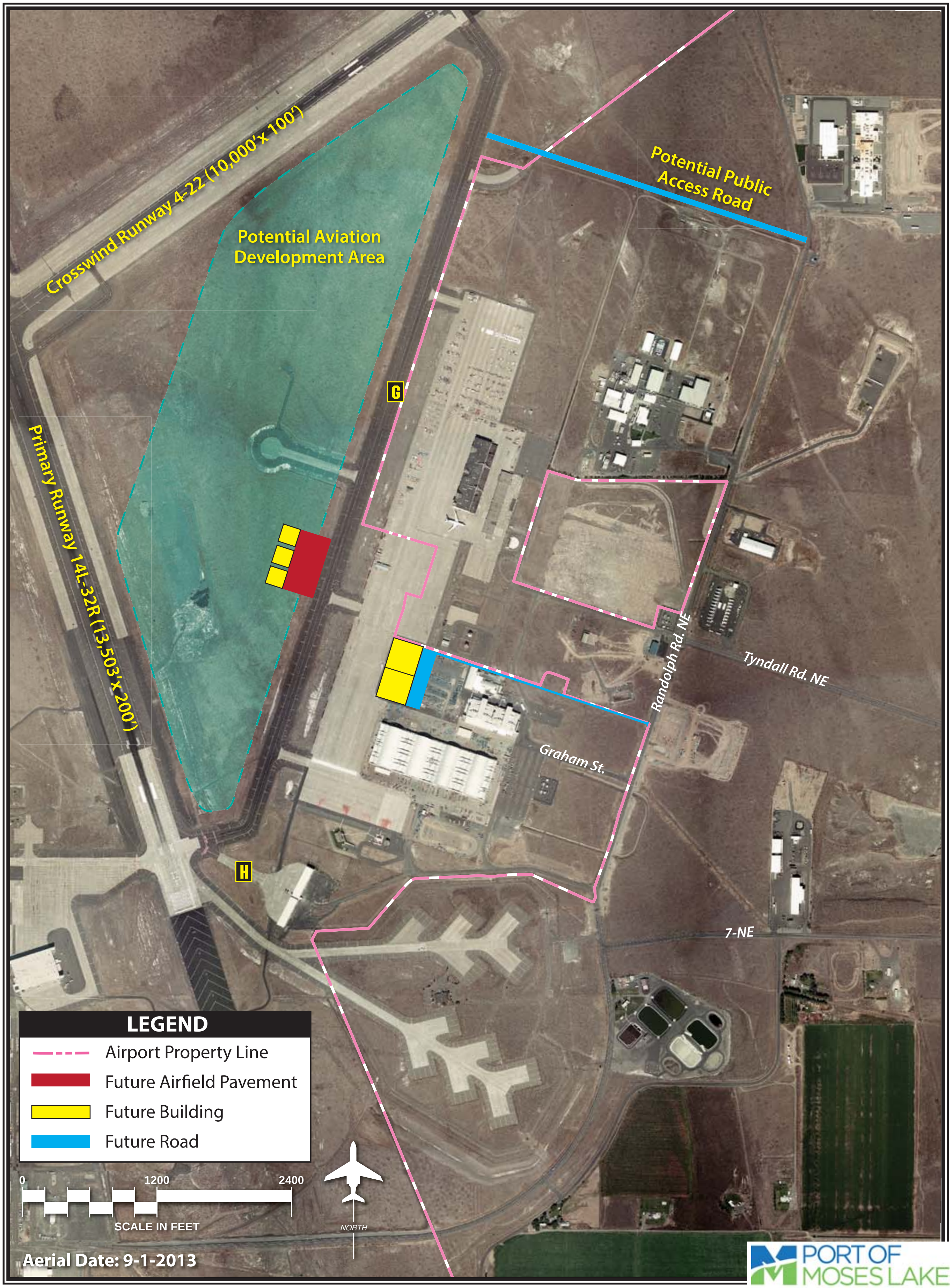


Exhibit 4M
EAST AIRPORT
DEVELOPMENT AREA

REFUELING APRON DEVELOPMENT OPTIONS

The refueling apron encompasses approximately 275,000 square yards of pavement with 10 in-ground fueling hydrants. This apron has been a significant asset for the Airport. Japan Airlines utilized the apron for aircraft refueling and preparation in relation to their pilot training program. More recently, Fairchild Air Force Base utilized the apron for basing KC-135 refueling tankers while their runway was being reconstructed. Any future use should be aviation-related as the apron provides direct access to the runway and taxiway system. Consideration should also be given to preserving the in-ground hydrant system as this is a unique asset for the Airport.

The previous Master Plan considered the potential for this apron to accommodate new hangar construction. That plan included a public access road which necessitated relocating Taxiway A to the north edge of the apron. This layout meets design standards and is an option for inclusion within this planning effort.

The exhibit includes additional hangar development options, including at the eastern edge of the apron. Providing public road access to these hangars would be challenging. Development of hangars in this location should take into consideration the intended use of the hangar so that public access is not required. Without public road access, those accessing the hangar would have to be properly badged to be allowed access to the airside of the Airport.

In the short term, the apron could be utilized for the temporary storage of aircraft. It is common for air carriers to retire or rotate aircraft in service. This type of economic activity would generate revenue for the Airport.

STRATEGIC PROPERTY ACQUISITION

Any master planning effort should consider the long term property needs of an airport. Typically, airports should look to own the approaches to the runway and any property that provides direct access to the runway and taxiway system.

The approaches to the runways are owned by the Port, including full ownership of current and future runway protection zones. There are three parcels of property on the east side of the airport that have direct access to the runway and taxiway system but are not owned by the airport. If any of these parcels should become available for sale, the Airport should consider acquisition.

Acquisition of property is eligible for FAA funding if that property is necessary for immediate aviation related purposes. The FAA does not support "banking" of property for possible future aviation uses.

The properties identified are the 'Christmas Tree' aprons, the Boeing property, and the north 'Triangle' property. The 'Christmas Tree' aprons have an obvious aviation purpose as there is an existing taxiway accessing the Airport. This taxiway is closed currently; however, it could be restored in the future. The Boeing property encompasses a large hangar and a significant apron area on the east side of Taxiway G. The 'Triangle' property also has potential access to Taxiway G.

ALTERNATIVES SUMMARY

Planning future Airport development of both the airside and landside is important because individual actions taken in one area can impact the potential for other options in the future. Therefore, it is important to examine alternative development options in order to maximize a precious resource, which is land on an Airport.

On the airside, a major objective of the alternatives analysis is to resolve any existing non-standard design layouts. There are several on the airfield, including Runway 18-36, which have lead-in taxiways and are a dual-use pavement (serves as both a runway and a taxiway). Runway 14R-32L has the same design issues.

Runway 14L-32R is the primary runway which has a significant line-of-sight issue. Essentially, the runway has a hump in it which prevents it from meeting design standards. Options, including removing the hump, constructing a parallel taxiway, or shortening the runway, were considered. Removing the hump is the recommended option. Other airside considerations include taxiway 'Hot Spots,' and pavement preservation priorities.

On the landside, options were considered for future development areas. The options for hangar development follow a philosophy of planning similar activity levels in the same location in order to provide a safer movement environment. As such, any future general aviation facilities, such as T-hangars, should be planned in the same general location as the existing T-hangars. Likewise, high-activity conventional hangars should be planned to be more centrally located facing the main apron areas.

After review by the PAC, a recommended concept will be presented in the next chapter. Elements, such as compliance with FAA standards and on-airport land use, will also be addressed.

Chapter Five

RECOMMENDED MASTER PLAN CONCEPT

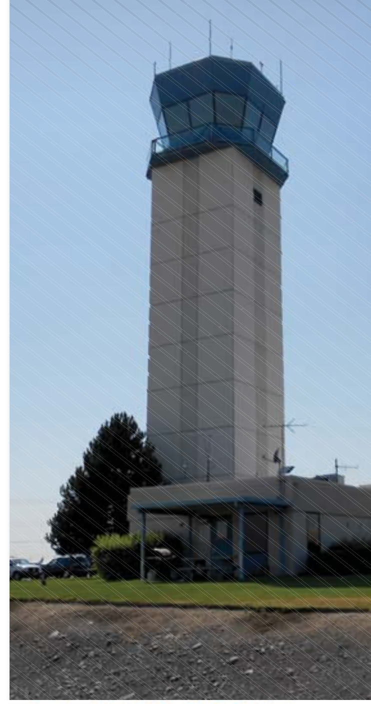
CHAPTER FIVE

RECOMMENDED MASTER PLAN CONCEPT

The airport master planning process for Grant County International Airport (MWH) has evolved through the development of forecasts of future demand, an assessment of future facility needs, and an evaluation of airport development alternatives, to meet those future facility needs. The planning process has included the development of three sets of draft working papers which were presented to the Aviation Technical Advisory Committee (ATAC) and discussed at several coordination meetings.

The ATAC is comprised of several constituencies with an investment or interest in the Airport. These groups included representatives from the Federal Aviation Administration (FAA), the Port of Moses Lake, Grant County, the City of Moses Lake, Washington State Department of Transportation - Aviation (WSDOT), airport businesses, and local and national aviation associations. This diverse group has provided extremely valuable input into the recommended plan.

In the previous chapter, several development alternatives were analyzed to explore options for the future growth and development of the Airport. The development alternatives have been refined into a single recommended concept for the Master Plan. This chapter describes, in narrative and graphic form, the recommended direction for the future use and development of the Airport.



PORT OF MOSES LAKE

AIRPORT MASTER PLAN

The recommended Master Plan concept, as shown on **Exhibit 5A**, presents the ultimate configuration for the Airport which preserves and enhances the role of the Airport while meeting FAA design standards. A phased program to implement the recommended development concept is presented in Chapter Six - Capital Improvement Program. The following sub-sections will describe the recommended Master Plan concept in detail.

The Airport is classified by the FAA as a general aviation airport and it is included in the *National Plan of Integrated Airport Systems* (NPIAS). NPIAS airports are considered important to the national aviation infrastructure and, as such, are eligible for development grant funding from the FAA. The FAA has further categorized the Airport as a "Regional" general aviation facility. In the recent past, the Airport was classified as a "Commercial Service" facility; however, the Airport has not had regularly scheduled passenger service since 2010.

AIRSIDE CONCEPT

The airside plan generally considers those improvements related to the runway and taxiway system. Activity at the Airport is anticipated to grow modestly through the 20-year planning horizon of this Master Plan study. The Airport is projected to continue to serve the full range of general aviation aircraft as well as substantial activity levels by large commercial transport aircraft (mostly Boeing test flights) and military operations.

RUNWAY CONFIGURATION

The Airport is currently served by a five-runway system, which was originally constructed by the federal government in support of military aviation training during World War II. Like many WWII-era aviation facilities, there are more runways than would be considered if construction were to occur today. However, the availability of these runways creates unique economic development opportunities which the Airport sponsor has been able to maximize.

Primary Runway 14L-32R is 13,503 feet long and 200 feet wide. The runway was originally 500 feet wide, but has been narrowed over the years. The runway is orientated in a northwest to southeast manner. This runway serves primarily large commercial transport and military aircraft which includes a significant number of training operations by Boeing.

Crosswind Runway 4-22 is 10,000 feet long and 100 feet wide and is oriented in a southwest to northeast manner. These two runways intersect at their approximate midpoint, creating a visual 'X' when viewed from the air. This runway accommodates a mix of commercial transport, military, and general aviation aircraft. This runway provides an important option for operators because the primary runway is not available at night when the tower is closed because it does not meet the FAA's line-of-sight requirements.

Runway 18-36 is the general aviation training runway, measuring 3,327 feet in length and 75 feet in width. The runway is roughly oriented in a north to south manner and is situated to the

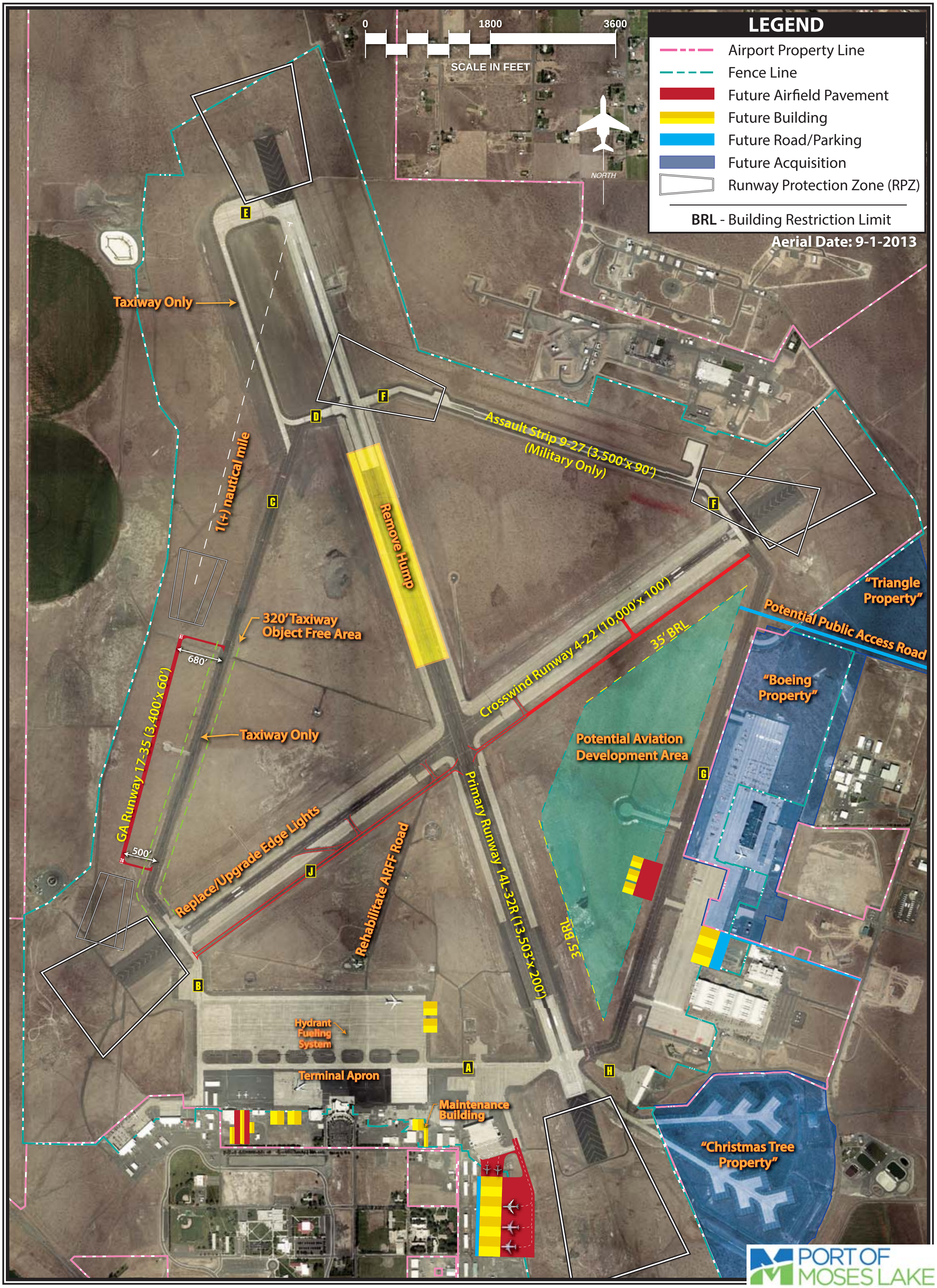


Exhibit 5A
RECOMMENDED ULTIMATE CONCEPT

west of the primary runway. Runway 18-36 is the most heavily used runway at the Airport, accounting for more than 50 percent of total operations.

Runway 14R-32L is located 1,031 feet parallel and to the west of the primary runway and is 2,936 feet long and 75 feet wide. This runway is rarely used as a runway and is primarily used as a taxiway to access the Runway 14L threshold. In fact, the edge lights are blue in color, indicating a taxiway. Therefore, the runway is only available as a runway during daylight hours. This runway is planned to ultimately be closed as a runway and dedicated for taxiway use in order to meet current design standards.

Runway 9-27 is 3,500 feet long and 90 feet wide and is oriented in an east to west manner. This runway is available for the exclusive use of the military. The most common activity is training by C-17 aircraft. This runway has not been eligible for FAA grant funding due to its use exclusively by the military. In the past, the military has funded various repairs and improvements.

RUNWAY DIMENSIONAL STANDARDS

The FAA has established design criteria to define the physical dimensions of runways and taxiways, as well as the imaginary surfaces surrounding them which protect the safe operation of aircraft at airports. These design standards also define the separation criteria for the placement of landside facilities.

As discussed previously, the design criteria primarily center on an airport's critical design aircraft. The critical aircraft is the most demanding aircraft or family of aircraft which currently, or are projected to, conduct 500 or more operations (take-offs and landings) per year at an airport. Factors included in airport design are an aircraft's wingspan, approach speed, tail height and, in some cases, the instrument approach visibility minimums for each runway. The FAA has established the Runway Design Code (RDC) to relate these design aircraft factors to airfield design standards. The most restrictive RDC is also considered the overall Airport Reference Code (ARC).

Analysis conducted in Chapter Three - Facility Requirements concluded that the current and future RDC for Runway 14L-32R falls in D-V. For Runway 4-22, the current RDC is C-III. Both of these runways are intended to accommodate activity by larger commercial transport aircraft. Runway 18-36 is the general aviation runway and the RDC is currently classified as B-II. Ultimately, this runway is planned to be relocated and designed to B-I (small aircraft) standards. Runway 14R-32L is currently designed to B-II standards, but is planned to be utilized exclusively as a taxiway and the runway is planned to be closed. To the greatest extent feasible, those airfield elements associated with each runway should be planned to meet the respective design standards. The applicable design standards were previously presented in Exhibit 3F.

While airfield elements, such as safety areas, must meet design standards associated with the applicable RDC, landside elements can be designed to accommodate specific categories of aircraft. For example, a taxilane into a T-hangar area only needs to meet the object free area (OFA) width standard for smaller single and multi-engine piston aircraft expected to utilize the taxilane, not those standards for the larger transport jets representing the overall critical aircraft for the Airport.

RUNWAY 14L-32R

Runway 14L-32R is the primary runway at the Airport. At 13,503 feet in length, it is heavily utilized by the Boeing Company for frequent test flights of new aircraft, including some of the largest passenger aircraft manufactured. The test flights encompass a wide variety of potential conditions, including operating fully loaded. The economy of the State of Washington and the nation benefits greatly from being home to arguably the premier aircraft manufacturer in the world. Grant County International Airport plays an important and significant role in the manufacturing process.

It is quite unusual for a general aviation airport to be able to justify such a long runway. In fact, many commercial service airports have had difficulty justifying longer runways as airline fleet mixes have changed over the years, particularly the last decade which saw substantial growth in the use of smaller regional aircraft. Grant County International Airport, however, serves a unique role in the national aviation system. The frequent operations by Boeing necessitate and justify the current length of the primary runway.

Runway 14L-32R was originally 500 feet wide but has been narrowed to 200 feet which exceeds the 150-foot wide design standard. As documented on Exhibit 3C, there were at least 224 operations by the Boeing 747-8F, which falls in design group D-VI and has a runway width standard of 200 feet. It is recommended that the current width of the runway be maintained to provide an additional safety margin for both the design aircraft (D-V) and the standard safety margin for activity by those aircraft in D-VI.

Runway Edge Lighting and Signs

The edge lighting for Runway 14L-32R is currently nonstandard as it is positioned 55 feet from the runway edges. The design standard is for edge lighting to be not more than 10 feet from the marked edge of a runway. The FAA has granted a modification to design standards to allow the edge lights to remain in their current location indefinitely (Source: FAA Modification to Standards, Dated May 4, 1994, Study No. 94-SEA-020-NRA).

The location of distance-to-go-signs and runway exit signs are 110 feet from the edge of the runway. The design standard is for these signs to be within 60 feet of the runway edge stripe and within 35 to 60 feet of the runway edge lights. The FAA has granted a modification to design standards to allow the signs to remain in their current location indefinitely (Source: FAA Modification to Standards, Dated August 30, 2002, Study No. 2002-ANM-4082-NRA).

Both of these FAA-approved modifications to standards (See **Appendix D**) are based upon a runway width of 200 feet. Any planned modification to the width of the runway would necessitate a revision to the modification to standards or may necessitate the costly relocation of the runway edge lights, distance-to-go markers, and exit signs. For these reasons, the existing width of the runway is planned to remain at 200 feet.

Line-of-Sight

Runway 14L-32R does not meet design standard for line-of-sight as discussed at length in the Alternatives chapter. To summarize the standard, any two points situated five feet above the runway must be mutually visible when a parallel taxiway is not available (as is the case at the Airport). Currently, there is a hump in the runway that prevents it from meeting the standard. The consequence of not meeting standard is that the runway is closed to civilian operations when the control tower is closed (10:00 p.m. to 6:00 a.m.). This results in the Airport's primary runway, which has the only precision instrument approach, and which is the only runway that can fully accommodate the critical design aircraft, being closed at night.

Four alternatives were considered to address the line-of-sight issue:

a) Remove the hump;
b) Construct a parallel taxiway;
c) Shorten the runway; or
d) Do nothing.

The presence of a parallel taxiway permits the application of a less restrictive line-of-sight design standard where any two points, situated five feet above the runway, must be mutually visible over a distance of only half the runway length. Even with a parallel taxiway, this standard cannot be met and a portion of the hump would still have to be removed to meet standard.

Shortening the runway was not considered feasible because the full length of the runway is justified by the activity of the critical design aircraft. According to FAA guidance, they do not typically support shortening a runway to a length below what is necessary to accommodate the critical design aircraft.

The "do nothing" alternative was not considered going forward because it does not address the significant current operating constraints. The runway would continue to be closed when the tower is closed and the only precision approach at the Airport would continue to be unavailable during these times.

The only option considered feasible is to remove the hump in the runway, which would provide the desired outcome of meeting the line-of-sight standard and permitting the runway to be operational when the tower is closed.

A project to remove the hump from Runway 14L-32R will require the runway to be closed for a period of time. Several businesses located at the Airport specialize in maintenance, repair, and after-market modification to all aircraft types including large wide-body commercial transport type aircraft. It is imperative that this operational capability is maintained during construction. The most likely resolution would be for these aircraft to use Runway 4-22 provided it is capable of accommodating this temporary activity. The specifics of the construction program, including alternate runway use, are developed during the engineering and design.

Runway 32R Threshold Access

As discussed in the Alternatives chapter, FAA design standards indicate that it is preferable for there to be a 90-degree entrance taxiway to the runway threshold. Currently, there is no direct access to the Runway 32R threshold, meaning operators desiring to depart from the threshold must back-taxi on the runway for a distance of approximately 500 feet.

Several options were considered, including constructing new threshold taxiways, shortening the runway, and a "do nothing" option. Due to the probable high cost to construct partial parallel and threshold taxiways as compared to the limited benefit, this option is not carried through to the recommended concept. Shortening the runway so that Taxiways A and G form the threshold taxiways was also not considered further because the full length of the runway is necessary to accommodate the critical design aircraft. The preferred option is to maintain the current configuration.

RUNWAY 4-22

Runway 4-22 is the crosswind runway measuring 10,000 feet in length and 100 feet in width. The runway is served by a 35-foot wide partial parallel taxiway extending from the Runway 4 threshold for a length of 5,900 feet. This runway provides an important back-up capability to the primary runway, particularly when the primary runway is undergoing maintenance/rehabilitation. More importantly, Runway 4-22 is the only runway capable of accommodating the airport critical design aircraft when the tower is closed.

As discussed in the Alternatives chapter, the current length of Runway 4-22 exceeds that recommended in FAA guidance for a crosswind runway. The length of a crosswind runway is a function of the wind coverage of the primary runway. It is small general aviation aircraft (A/B-I) that may at times experience excessive crosswinds that would make operating on the primary runway more difficult. Therefore, FAA guidance suggests a crosswind length that would accommodate these aircraft and is estimated at a length of 4,400 feet.

Under the existing circumstances, Runway 4-22 is planned to remain at its current length in order to continue to make the Airport available on a 24-hour basis. When the line-of-sight issue on the primary runway is resolved, the nighttime need for Runway 4-22 becomes less acute. If maintaining the full length of Runway 4-22 for its back-up capability is not justification alone, then the FAA may choose to limit potential future funding of some portion of the runway. At this point, the Port of Moses Lake would need to make a decision regarding their financial capability to maintain the entire runway length.

RUNWAY 18-36

The future disposition of Runway 18-36 was analyzed extensively in the Alternatives chapter. This runway occupies a portion of Taxiway C, which provides the only access to the threshold of primary Runway 14L-32R. Current design standards do not promote dual use pavements (pavements used as both a taxiway and runway). Current design standards also indicate that taxiway access to runway thresholds should be at 90-degree angles.

In addition to the concerns about the geometry of the runway, operation of the runway concurrently with the primary runway requires a special operating procedure (see Appendix B). The special operating procedure has been instituted because the Runway 18 end is currently less than one nautical mile from the intersection with the centerline of Runway 14L-32R. If it were more than one nautical mile, the two runways could operate simultaneously without the special operating procedure.

The current ALP for the Airport maintains Runway 18-36 in its current location; however, it plans for a future parallel taxiway located 400 feet to the west. Access to the parallel taxiway is from a planned new taxiway that extends from the fueling apron around Runway 4 to a connection with the planned parallel taxiway.

The conclusion from the Alternatives discussion is that the ALP layout for Runway 18-36 must be modified because of changes in the design standards since the ALP was developed. The ALP layout does not address the nonstandard lead-in taxiways, the dual use pavement, or the special operating procedure. Therefore, the following five options were considered:

a) Relocate the runway to the west;
b) Modified ALP layout with a west side taxiway;
c) Relocate and reorient the runway to be parallel to the primary runway;
d) Close the runway; or
e) Do nothing

Option A is the recommended option which relocates Runway 18-36 to the west with some modification of the layout that was presented in the Alternatives chapter. This option preserves the important role of this runway to accommodate general aviation activity, which accounts for greater than 50 percent of total operations. Also preserved is the commitment to educational uses of the Airport when the property was deeded. At that time, specific accommodation was made to encourage aviation education at the Airport. This option also provides a resolution to both the nonstandard geometry and the special operating procedure.

The recommended plan for Runway 18-36 considers relocating it to the west and slightly canting the Runway 18 end to the northwest.. The relocated runway is planned to be 3,400 feet in length and 60 feet wide and designed to ARC B-I (small aircraft standards). In this location and at this length, the Runway 18 threshold will be more than one nautical mile from the intersection with Runway 14L-32R, thus eliminating the need for the special operating procedure. Access to the runway would be from two 90-degree threshold taxiways emanating from Taxiway C. The planned relocated runway will also preserve the capability of segregating large and small aircraft operations, which is an important safety consideration for the tower and the Airport.

For this option to work, it was necessary to plan the relocated runway to B-I (small aircraft) standards rather than maintaining the current B-II standards. The staff of the community college aviation department was consulted to determine what negative impacts this might have. Through those interviews it was determined that a runway length of anything less than 3,400 feet could be problematic. **Exhibit 5B** shows the revised layout for relocated Runway 18-36 as compared to the layout considered in the Alternatives Chapter.

Option B was not considered because it did not resolve the dual use pavement issue and it was considered potentially too costly compared to the recommended option. Option C was not considered further primarily because of cost, but also because of the impact to Runway 4-22 and the likely increase in overflights of the terminal area. Option 4 was not considered further primarily because of the safety concern of intermixing small and large aircraft operations. This is somewhat unique to this Airport because of the high volume of activity by large transport aircraft. Finally, Option 5, the "do nothing" alternative, was discounted because it does not provide any solution to the nonstandard geometry or the special operating procedure.

RUNWAY 14R-32L

The deficiencies of Runway 14R-32L were discussed in the Alternatives chapter and are outlined as follows:

a) Both ends of the runway have aligned taxiways (lead-in);
b) It is a dual use pavement serving as both a runway and a taxiway;
c) The entrance to the runway ends is not at a 90-degree angle; and
d) The lack of separation distance from the primary runway makes wake turbulence a concern.

Runway 14R-32L is underutilized, accounting for less than two percent of overall operations. It is actually a taxiway (continuation of Taxiway C) and the edge lights are blue, indicating a taxiway. It is recommended that Runway 14R-32L ultimately revert to a full-time taxiway. This solution resolves all of the nonstandard conditions. To fully convert the runway to a taxiway, the runway designations, threshold bars, chevrons, and the runway centerline will need to be removed. The timing of this project may be subject to the availability of FAA grant funding.

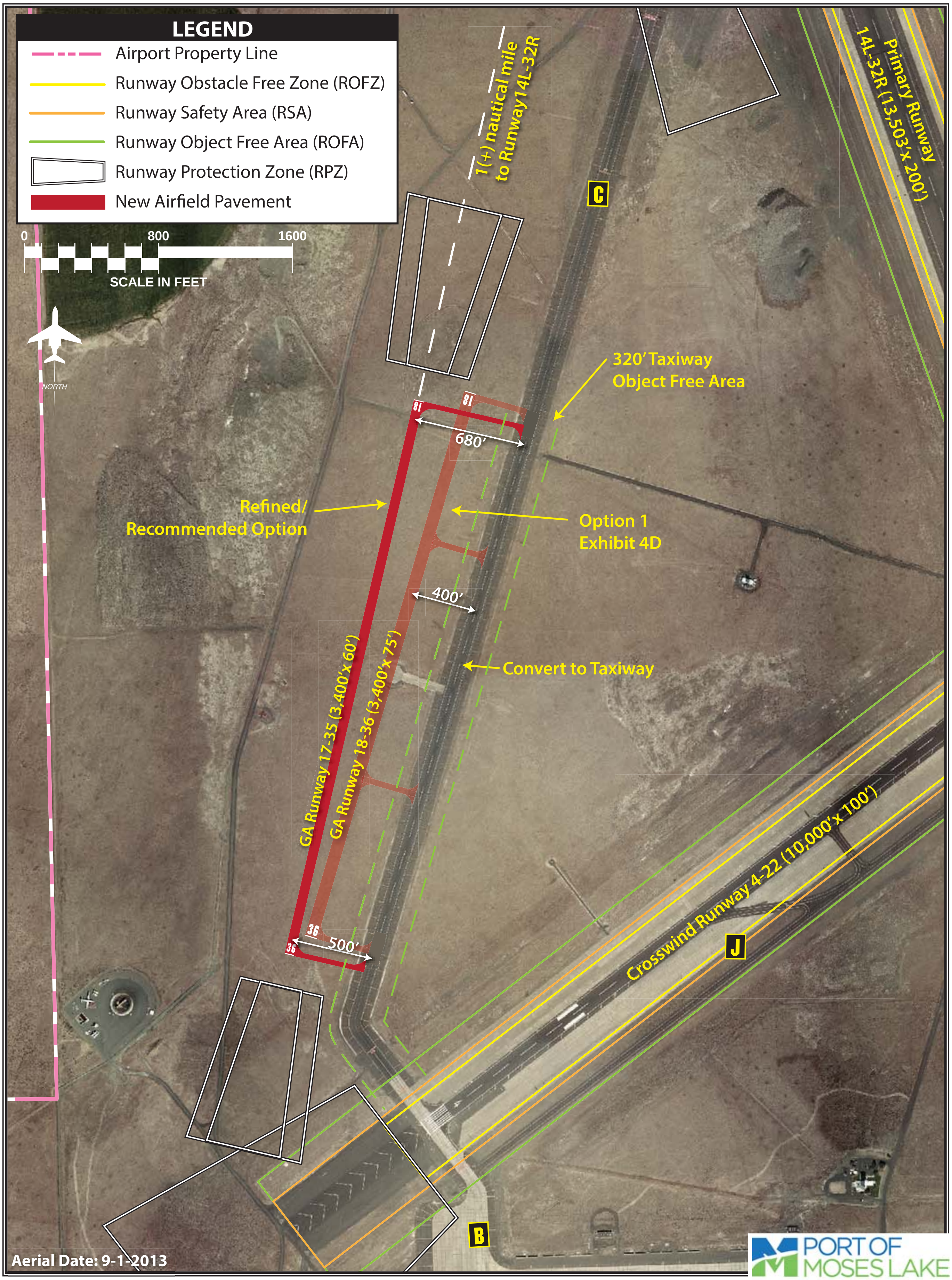


Exhibit 5B
RUNWAY 18/36
- LOCATION REFINEMENT

Consideration was given to the possibility of maintaining the runway and meeting design standards. The method to do this would be to construct a parallel taxiway. Constructing a parallel taxiway likely would not meet a cost/benefit threshold because of the low utilization of this surface as a runway.

RUNWAY 9-27

Runway 9-27 is available for the exclusive use of the military and it is heavily used. The military has invested significantly in the maintenance of this runway over the years. This runway is planned to remain in its current role and is not planned for any improvements funded by FAA grants.

TAXIWAYS

Two new taxiways are planned at the Airport. The first is the potential extension of Taxiway J to the Runway 22 threshold, and the second is a taxiway extension to the southeast terminal area.

Taxiway J is the 35-foot wide, 5,900-foot long, partial parallel taxiway to Runway 4-22. The RDC is C-III, which indicated a need for a 50-foot wide taxiway. From an efficiency of movement and layout perspective, consideration is given to widening and extending this taxiway to the Runway 22 threshold. Currently, access to the Runway 22 threshold is only available from Taxiway G or via back-taxi on the runway. Ultimately, Taxiway G could be truncated to allow development to the west of the taxiway. If this happens, then the need for taxiway access to Runway 22 becomes more important. Current planning considers widening Taxiway J to 50 feet and extending it to the Runway 22 threshold.

The planned improvements to Taxiway J would best serve operators as long as the runway is the only option for the critical design aircraft when the tower is closed. That means widening and extending the taxiway is a current need. However, once the hump is removed from the primary runway, thereby allowing nighttime operations by the critical design aircraft, the need for Runway 4-22 to support operations by the critical design aircraft becomes less urgent.

TAXILANES

Taxilanes generally provide access to hangar facilities. Taxilanes can be designed to support the likely users of the taxilane and do not have to be designed to the critical design aircraft standards. Two new taxilanes are planned to extend south from the western portion of the main apron. This area is generally utilized by general aviation aircraft. The planned taxilanes would accommodate ADG II wingspans (up to 79 feet).

INSTRUMENT APPROACHES

Grant County International Airport provides some of the most advanced instrument approach procedures available. Runway 32R provides a CAT-I Instrument Landing System (ILS) that is planned to be maintained. Analysis in the Alternatives chapter considered the addition of ILS approaches to Runway 14L, 4 and 22, which would require the installation of extensive ground based navigation systems including an approach lighting system. Each of these runways currently provides at least ¾-mile visibility minimums with cloud ceilings as low as 250 feet.

The recommended plan for approach instrumentation is to maintain what is currently available and pursue any improvements that do not require expensive ground based equipment. With predominately mild and sunny weather conditions, justification for new ILS approaches appears remote. Advancements in GPS technology have already lowered visibility minimums in recent years and this trend is anticipated to continue.

RUNWAY STRENGTH

As indicated in the Facility Requirements chapter, the strength of the runways is adequate. The Airport recently completed a reconstruction of a portion of the main apron that allows for aircraft weighing up to one million pounds. If such heavy aircraft were to utilize the main runway on a regular basis, then it should be considered for additional load bearing capacity. The relocated Runway 18-36 is planned to accommodate 12,500 pounds for single wheel loads and 20,000 pounds for dual wheel loads.

RUNWAY SAFETY AREAS

The Facility Requirements chapter discussed the requirements for the runway safety area (RSA), object free area (OFA), and obstacle free zone (OFZ). Each of these currently meets design standard and will be maintained. If Runway 18-36 is relocated, the design standards for ARC A/B-I (small aircraft) should be met.

RUNWAY PROTECTION ZONES

The RPZ is a trapezoidal area beginning 200 feet beyond the runway ends. The function of the RPZ is to protect people and property on the ground. Typically, this is achieved through airport ownership of the RPZs, although proper land use control measures, such as easements, are acceptable. The RPZs should be cleared of any incompatible objects or activities. Prohibited land uses include residences and places of public assembly such as churches, schools, hospitals, office buildings, and shopping centers.

The FAA recommends that airport sponsors own in fee simple the RPZ property. When fee simple ownership is not currently feasible, positive land use measures should be implemented in order to protect the airport from encroachment by incompatible land uses or obstructions.

In September of 2012, the FAA published *Interim Guidance on Land Uses within a Runway Protection Zone*. The guidance addresses action necessary for new or modified RPZs. Any action that would introduce new land use incompatibilities into the RPZ will have to be specifically reviewed and approved by the FAA. Airport sponsors should follow existing guidance for meeting RPZ design standards for existing incompatibilities.

The existing RPZs meet design standards. When Runway 18-36 is relocated, the associated RPZ will also meet standard. The RPZs associated all other runways are planned to remain the same size as they are currently.

HOT SPOT MITIGATION

The FAA identifies two "hot spots" at the Airport, as previously shown on Exhibit 3H. The first is described as an unusual hold line location on Taxiway C, which is 1,568 feet short of the Runway 18 threshold. This hold line is in place to ensure that any aircraft taxiing south on Taxiway C hold short of the Runway 18 RPZ and remain outside of the operating environment for Runway 18-36. This hot spot will be resolved when Runway 18-36 is relocated to the west.

The second hot spot is to alert pilots to the operational limitation of Runway 9-27 as a military use only runway. It also notes that the runway has no markings and has non-standard runway lights. Since Runway 9-27 is exclusively used by the military, all design features associated with it are determined by military necessity. No effort has been made to plan for improvements applying FAA design standards. The military would be responsible for any alternations to this runway.

VISUAL NAVIGATION AIDS

The airport beacon is currently located atop an industrial building located in the east terminal area. This location is acceptable; however, if and when the beacon needs to be replaced, consideration should be given to relocating it to the main terminal area. Modern beacons typically are located atop a dedicated pole which is hinged to allow easy access for maintenance.

Runway ends 14L, 32R, and 4 are each served by precision approach path indicator (PAPI) lighting systems which provide pilots visual cues indicating if they are on the correct glide path to the runway touchdown zone. These systems are planned to be maintained. Runway 22 is equipped with a visual approach slope indicator (VASI) system, which is older technology. In the future, the VASI should be replaced with a PAPI system. The VASI is owned by the FAA, so it would be the FAA's responsibility to replace the VASI at the appropriate time.

Runway 32R has available a medium intensity approach lighting system with runway alignment indicator lights (MALSR). This system is utilized in conjunction with the glide slope and localizer antenna to provide the ILS approach to the runway. Consideration was given to upgrading the instrument approaches to Runway 14L, 4 and 22 with ILS systems. Advancements in GPS based instrument approaches such as localizer performance with vertical guidance (LPV) and required navigation performance (RNP) provides adequate minimums for the Airport. As a result, no new ground based navigational aids are planned at this time.

Runway end identification lights (REIL) are strobe lights set to the side of the runway which provide rapid identification of the landing threshold. REILs are normally provided for instrument capable runways when an approach lighting system is not available. Runway ends 14L, 4, and 22 are each outfitted with REILs which should be maintained. No new REILs are planned.

PROPERTY ACQUISITION

Planning for growth of an airport includes the consideration of strategic property acquisition of adjacent lands in order to allow for facility expansion or for the protection of the function and role of the airport. The FAA supports and provides reimbursement for necessary property acquisition. The reimbursements are provided when the land is needed for airport development or protection. The FAA supports and funds immediate land acquisition needs, but does not support "land-banking" of property that may or may not be needed in the future.

Three parcels have been identified for potential future property acquisition: the "Triangle" property, the "Boeing" property, and the "Christmas Tree" property. The primary reason these three properties have been identified for acquisition is because each can provide ready access to the runway and taxiway system, meaning the best use is likely aviation related.

The challenge for the Airport is the cost of acquisition and the fact that these properties may not be needed for aviation purposes for some time. The Airport has ample property available for development. Thus, FAA would likely consider funding acquisition as a low priority. If the Port of Moses Lake were to acquire the property, when it is converted to an aviation use, they could then seek reimbursement (provided the current regulations are still in effect).

AIRSIDE CONCLUSION

Grant County International Airport is unique among general aviation airports in that their critical design aircraft falls in design category D-V, which includes some of the largest transport aircraft such as the Boeing 777. Most of the operations by large transport aircraft are conducted by the Boeing Company for testing. Most of the aircraft manufactured by Boeing in Washington State are test flown at Grant County International Airport.

There are several areas with regard to the airside where the existing configuration does not meet FAA design standards. The most important of these is the fact that primary Runway 14L-32R does not meet standards for line-of-sight because of a hump in the runway. The consequence of this condition is that the runway is closed when the tower is closed. This means the primary runway, with the Airport's only precision instrument approach, is unavailable to the critical design aircraft when the tower is closed. Following analysis of several alternatives to mitigate the line-of-sight issue, it is recommended that the Airport and the FAA pursue a project to remove the hump in the runway.

Another airside issue addressed in the recommended concept is the geometry of Runway 18-36 and Runway 14R-34L. As dual use pavements (used both as a runway and a taxiway) they do not meet design standards. However, the proposed resolution for each runway is different.

Runway 18-36 is the most heavily used runway at the Airport, accounting for more than 50 percent of total operations. Following analysis of several alternatives, it is recommended that Runway 18-36 be relocated approximately 700 feet to the west and outfitted with runway threshold entrance taxiways. By relocating the runway in this manner, the existing runway can be dedicated for use as a taxiway and the dual use issue is resolved. The relocated runway is also shifted approximately 200 feet to the south in order to permit it to be utilized at the same time as the primary runway, thus separating operations by small general aviation aircraft and large transport category aircraft utilizing the primary runway.

Runway 14R-32L is recommended to be closed as a runway and the pavement maintained as a taxiway. This pavement provides the only access to the Runway 14L threshold and it is currently lighted as a taxiway. This is seen as the most economical resolution to the geometric deficiencies of the runway, especially considering its low utilization rate.

With these planned improvements at Grant County International Airport, the airside system would conform to all FAA design standards.

LANDSIDE CONCEPT

The primary goal of landside facility planning is to provide adequate aircraft storage space to meet forecast needs, while also maximizing operational efficiencies and land uses. Also important is identifying the overall land use classification of airport property in order to preserve the aviation purpose of the airport well into the future. Achieving these goals yields a development scheme which segregates aircraft activity levels while maximizing the airport's revenue potential. **Exhibit 5A** also presents a large scale view of the planned landside development for the airport.

There are an unlimited number of potential facility layout concepts that could be considered. Several potential layouts were presented in the previous chapter. The future layout depicted is a compilation of the alternatives presented, as well as the previous airport layout plan.

The plan presented maximizes potential aviation development space which is in close proximity to existing facilities. It also follows the design philosophy of co-locating facilities which would be intended for similar levels of activity. This philosophy considers reserving flight line property for high activity conventional hangars. Medium activity box hangars are also grouped together and somewhat removed from the flight line. Low activity T-hangars are also co-located and are set the farthest from the runway.

For the most part, new development is planned in close proximity to existing facilities in order to take advantage of existing infrastructure availability and reduce future development costs.

The following goals were high priorities when developing the recommended landside concept:

- Maximize existing development areas.
- Group planned new development by facility type.
- Locate high activity hangars on the flight line.
- Separate public vehicles from the airfield operations area.
- Provide dedicated vehicle parking for new and existing hangars where feasible.

HANGARS

In the Facility Requirements chapter, it was estimated that for the Airport to accommodate potential demand for general aviation aircraft storage facilities, additional hangar space in the form of T-hangars and box hangars would be necessary. An additional 26 T-hangar spaces and eight box hangar spaces were estimated.

The Alternatives chapter presented several options for locating these additional hangars. Following input from the Port of Moses Lake and the ATAC, a plan has been put forward that is shown on **Exhibit 5A**.

The plan calls for locating any new general aviation hangars on the west end of the Airport, co-located with existing general aviation hangars. Two taxilanes are planned to extend to the south from the main terminal area apron between the hangars currently housing one of the Airport FBOs (#401 and 404). These taxilanes would provide access to a central T-hangar structure and box hangars on the opposite side of the taxilanes.

Additional conventional hangar construction is also considered. At the Airport, hangars of this type are typically leased to a single entity for use as an aviation business, rather than for bulk storage of general aviation aircraft. Several locations have been identified for potential future conventional hangar construction.

The fuel apron is capable of supporting additional hangar construction. As an example, two large conventional hangars are shown at the east end of the fuel apron. This location is acceptable; however, dedicated public road access is not considered. Therefore, a suitable tenant would be one that had limited need for public access.

In the south terminal area, a series of large conventional hangars is planned. As shown, there are four hangars, each encompassing approximately 90,000 square feet of floor space. Analysis in the Alternatives chapter indicated that the location of these planned hangars is acceptable as none of the imaginary surfaces surrounding the runway system would be penetrated. The existing taxilane is planned to be extended to provide access to this hangar development area.

At the east terminal apron area, east of Taxiway G, two new conventional hangars are planned. This location is acceptable; however, an access road would also need to be constructed.

Finally, consideration was given to the infield area located to the west of Taxiway G. This area presents a unique development opportunity in that approximately 215 acres of aviation land is available. When considering a 35-foot high building restriction line, approximately 202 acres could be available for hangar and building construction, with the remaining 13 acres available for apron area (subject to height restrictions). There are not many airports in the country that could support an aviation business needing such a large parcel of aviation land.

The exhibit shows three example hangars facing Taxiway G, but it should be understood that the entire area could support hangars and that a specific layout should be the subject of consultation with the developer.

VEHICULAR ACCESS AND PARKING

A planning consideration for any airport master plan is the segregation of vehicles from aircraft operational areas. This is both a safety and security consideration for an airport. Aircraft safety is reduced and accident potential increased when vehicles and aircraft share the same pavement surfaces. Vehicles contribute to the accumulation of debris on aircraft operational surfaces, which increases the potential for Foreign Object Debris (FOD), which can be especially damaging to turbine-powered aircraft. The potential for runway incursions is also increased, as vehicles may inadvertently access an active runway or taxiway area if they become disoriented once on the air operations area (AOA). Airfield security may be compromised as there is loss of control over the vehicles as they enter the secure AOA. The greatest concern is for public vehicles, such as delivery vehicles and visitors, which may not fully understand the operational characteristics of aircraft and the markings in place to control vehicle access. The best solution is to provide dedicated vehicle access roads to each landside facility that is separated from the aircraft operational areas with security fencing.

The segregation of vehicle and aircraft operational areas is supported by FAA guidance established in June 2002. FAA AC 150/5210-20, *Ground Vehicle Operations on Airports* states, "The control of vehicular activity on the airside of an airport is of the highest importance." The AC further states, "An airport operator should limit vehicle operations on the movement areas of the airport to only those vehicles necessary to support the operational activity of the airport."

The landside alternative for Grant County International Airport has been developed to reduce the need for vehicles to enter the AOA. Dedicated vehicle parking areas, which would be outside the planned airport perimeter fence, are considered for all potential hangars.

Vehicle access to the infield area to the west of Taxiway G would be necessary when this area is developed. Currently, the infield area is enclosed by Taxiway G and Runways 14L-32R and 4-22. As shown on the exhibit, a dedicated access road is planned at the north end of the infield area parcel. This road is planned to be outside the security fencing, thus permitting public access without any special badging or security constraints. The planned access road would cross the northern part of Taxiway G, effectively closing it at this point.

Closing Taxiway G at the north end to facilitate public road access to the infield area should only be considered if the economic benefit to the Airport of developing the infield area outweighs the need for Taxiway G to extend to the Runway 22 threshold. Currently, only the southern portion of Taxiway G is utilized with any regularity. The middle and northern portions are used sparingly. Taxiway G is in poor condition currently and is planned for rehabilitation only as is necessary. Essentially, the master plan concept leaves open the possibility of development of the infield area and providing public road access in the future.

AIRCRAFT APRONS

As a former military airfield, the Airport has an abundance of paved apron areas. This fact presents challenges, especially when it comes to the cost of properly maintaining the aprons. Airport management has made significant strides to monetize the aprons, including leasing one portion of the terminal area which is in poor condition for aircraft recycling purposes. This activity can further damage the pavement, which makes this lease especially beneficial since the pavement is already in poor condition.

The only new apron areas are associated with planned new hangar development. As previously discussed, the south terminal area is planned to accommodate several large conventional hangars. The space between the planned access taxiway and the hangars is considered for apron frontage to the hangars.

All existing pavements at the Airport are planned to be maintained and utilized to the maximum extent practical. The CIP included in the master plan will present a prioritized and phased plan to rehabilitate the Airport's aprons.

TERMINAL BUILDING FACILITIES

The Port of Moses Lake constructed a state of the art commercial passenger terminal building in 1998 to support existing and growing commercial passenger service. Passenger service has since discontinued. The terminal building currently houses the administration offices, a deli/restaurant, an FBO, and offices for U.S. Customs and Border Protection. The terminal building is capable of being utilized for scheduled passenger service again should it return.

General aviation airports should make certain services available to airport users. These include flight planning, pilot lounge, restrooms, administrative offices, restaurants, and in some cases, community meeting facilities. All of these services are available at the Airport. No additional terminal building space is necessary to accommodate current or planned activity at the Airport.

LAND USE CONSIDERATIONS

Identifying existing and planned land uses, both on and off the Airport, is an important consideration. By understanding the issues related to land use in the area, the airport sponsor and those municipal jurisdictions in the vicinity of the airport can take proactive steps to protect the airport from incompatible land uses. There are three basic categories of land use to consider:

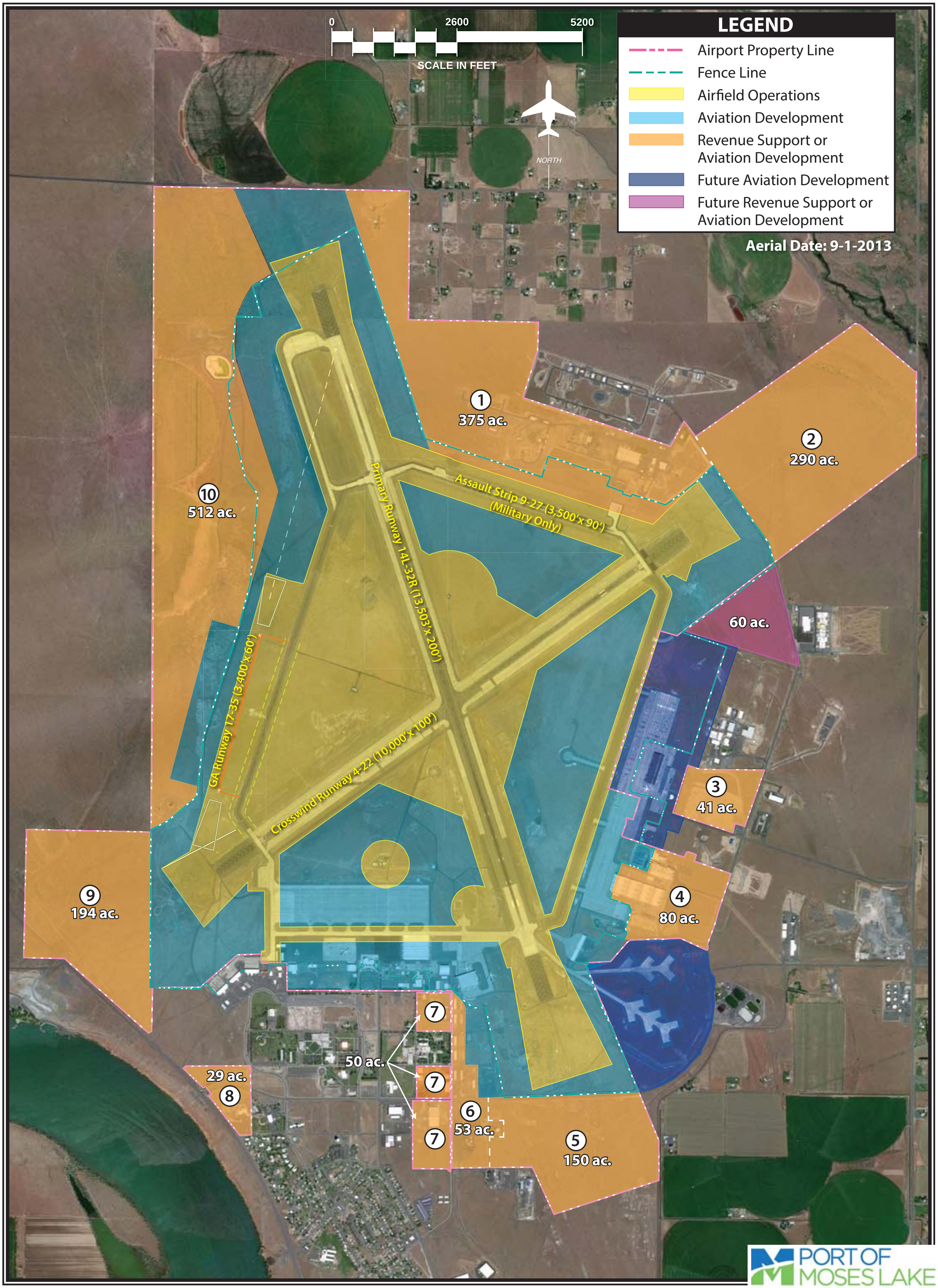
- On-Airport Land Use
- Off-Airport Land Use Compatibility
- Height and Hazard Zoning

ON-AIRPORT LAND USE

The objective of on-airport land use planning is to coordinate uses of airport property in a manner that is both functional with the design of the airport and compatible with the airport environs. There are two primary considerations for on-airport land use planning. First is to secure those areas essential to the safe and efficient operation of the airport. Second is to determine compatible land uses for the balance of the property which would be most advantageous to the airport and the community.

The FAA views airport property as either aeronautical or non-aeronautical. Aeronautical use is defined as all activities that involve or are directly related to the operation of aircraft. Essentially, aeronautical uses are those that require access to the runway and taxiway system. Non-aeronautical uses are those that do not need runway and taxiway access. For example, a business that manufactures aircraft component parts but delivers those parts by ground would be non-aeronautical in nature.

The Port of Moses Lake encompasses more than 4,500 acres. For on-airport land use planning purposes, the property can be classified as the Airfield Operations area, the Aviation Development area, and the Revenue Support area. **Exhibit 5C** presents the suggested on-airport land use map for the Airport based on the recommended master plan concept.



PORT OF MOSES LAKE

Exhibit 5C
ON-AIRPORT LAND USE

Airfield Operations (AO)

The Airfield Operations area is that portion of airport property that encompasses the major airside elements such as runways, taxiways, runway safety area, runway object free area, runway obstacle free zone, runway protection zone (on airport property), taxiway safety area, taxiway object free area, navigational aids and their critical areas, and the runway visibility zone. The Airfield Operations area is intended to provide for safe and efficient aircraft taxiing, take-off, and landing.

Aviation Development (AD)

The Aviation Development area is defined as those areas that must be reserved for development that needs access to the Airfield Operations area. In general, current and future aircraft access must be preserved in these areas.

Typical uses permitted in the Aviation Development area includes:

1. Transportation terminals
   a) Commercial airlines
   b) Commuter airlines
   c) Cargo airlines (freight terminals)
   d) Fixed base operators
   e) Specialized aviation service operations
   f) Aircraft maintenance
   g) Aircraft equipment sales/rentals
   h) Food and beverage retail sales
   i) Retail fueling services
   j) Vehicle parking
2. Warehouses
   a) Aircraft hangars
3. Vocational schools
   a) Flight training

Other uses may include:

1. Revenue Support: Certain non-aviation related uses may be permissible within the Aviation Development area provided they are temporary (five years or less) in nature and can be removed in a timely manner to allow for aviation development (i.e., agricultural activities).

Generally, those areas adjacent to the runways and taxiways are identified for current and future aviation development. Enough property has been reserved to accommodate future parallel taxiways, aprons, hangar development and vehicle parking lots. Typically, this is approximately 1,200 feet from the centerline of a runway or taxiway. Property in proximity to existing aprons is also reserved for aviation development.

The "Christmas Tree" and "Boeing" property are both considered for future property acquisition and aviation uses. Both are improved to meet certain aviation needs. Were they to be acquired, they could provide additional aviation economic development opportunities for the Airport.

Revenue Support (RS)

The revenue support classification includes all potential development that is compatible with airport activities but is unlikely to require access to the runway and taxiway system. This classification may include both aviation and non-aviation development.

Typical revenue support land uses may include:

1) Airport related facilities.
2) Research facilities, testing laboratories, and facilities for the manufacturing, processing, and/or assembly of products.
3) Warehouses
4) Vocational schools
5) Eating and drinking establishments

Several parcels of airport property have been identified for potential revenue support functions. **Table 5A** presents a summary of these parcels and each is described in greater detail below.

TABLE 5A
Suggested Revenue Support Land
Grant County International Airport

ID[1]	Description	Approximate Size in Acres
1	Current non-aviation and vacant land adjacent to military Runway 9-27	375
2	Property disconnected from the airport by Randolph Road	290
3	Property disconnected from the airport by Boeing-owned land	41
4	Current long term non-aviation leases (Genie Industries and Nippon Chemi-Con)	80
5	Property disconnected from the airport by Randolph Road	150
6	Existing non-aviation land uses	53
7	Property disconnected from the airport by 22nd Ave.	50
8	Property disconnected from the airport	27
9	Property likely never to be used for aviation purposes due to distance from runways	194
10	Current non-aviation use (water treatment facility) and too distant from runways	572
Total Acres Identified for Revenue Support Land Uses		**1,832**
11	Future acquisition: "Triangle Property"	60

[1]ID refers to Exhibit 5C

1) This area is adjacent Runway 9-27, which is available for the exclusive use of the military. A large portion of the property is leased by Takata Industries. Those undeveloped areas not in close proximity to the north end of Runway 14L-32R are classified for revenue support.

2) This property is physically disconnected from airport property by Randolph Road. This area is along the extended runway centerline, so any future development must remain below the imaginary approach surfaces leading to the runway.
3) This property is physically disconnected from the rest of Airport property because of the Boeing property. If the Boeing property were to be acquired, then it becomes a more realistic possibility for this property to be connected to the runway and taxiway system; however, there is plenty of other land that could be developed first.
4) This property is unusual in that two businesses occupy former hangars and use them for non-aviation purposes. Under normal circumstances, this property would logically fall in the aviation use category; however, the economic benefit to both the Airport and the region outweighs the potential aeronautical benefit. Genie Industries is the region's largest employer with 1,250 employees, and Nippon Chemi-Con has 55 employees.
5) This property is physically disconnected from the Airport by Randolph Road. As this property is on the extended runway centerline, the Airport should be cognizant of compatibility and height limitations for any development.
6) This property currently has numerous facilities providing revenue support to the Airport.
7) These three parcels are located on the west side of 22nd Avenue and are physically disconnected from the Airport.
8) This parcel is physically disconnected from the Airport and is ideal for revenue support purposes.
9) This property is somewhat distant from the runways and taxiways. A new taxiway extending a length of 2,500 feet would be necessary to access this parcel. Therefore, this property is best planned for revenue support land uses.
10) Property on the west side of the airport is undeveloped except for the water treatment facility, which is a non-aviation revenue producing use.
11) The "Triangle Property" on the east side of the Airport is identified for acquisition in the future. It could be considered for either aviation or non-aviation development.

ON-AIRPORT LAND USE OBLIGATIONS

The Airport has accepted grants for capital improvements from the FAA. As such, the Airport sponsor has agreed to certain grant assurances. Grant assurances related to land use assure that airport property will be reserved for the benefit of the airport and the community. If the Airport sponsor wishes to sell (release) airport land or lease airport land for a non-aeronautical purpose (land use change), they must petition the FAA for approval. The Airport Layout Plan and the Airport Property Map must then be updated to reflect the sale or land use change of the identified property.

Release of Airport Property

A release of airport property would entail the sale of land that is not needed for aeronautical purposes currently or into the future. The following documentation is required to be submitted to the FAA for consideration of a land release:

1. What is requested?
2. What agreement(s) with the United States are involved?
3. Why is the release, modification, reformation, or amendment requested?
4. What facts and circumstances justify the request?
5. What requirements of state or local law or ordinance should be provided for in the language of an FAA-issued document if the request is consented to or granted?
6. What property or facilities are involved?
7. How the property was acquired or obtained by the airport owner.
8. What is the present condition and what present use is made of any property or facilities involved?
9. What use or disposition will be made of the property or facilities?
10. What is the appraised fair market value of the property or facilities? Appraisals or other evidence are required to establish fair market value.
11. What proceeds are expected from the use or disposition of the property and what will be done with any net revenues derived?
12. A comparison of the relative advantage or benefit to the airport from sale or other disposition as opposed to retention for rental income.

Each request should have a scaled drawing attached showing all airport property and airport facilities which are currently obligated for airport purposes by agreements with the United States. Other exhibits supporting or justifying the request, such as maps, photographs, plans and appraisal reports should be attached as appropriate.

Land Use Change

A land use change permits land to be leased for non-aeronautical purposes. A land use change does not authorize the sale of airport land. Leasing airport land to produce revenue from non-aeronautical uses allows the land to earn revenue for the airport and it serves the interests of civil aviation contributing to the self-sufficiency of the Airport. Airport sponsors may petition for a land use change for the following purposes:

- So that land that is not needed for aeronautical purposes can be leased to earn revenue from non-aeronautical uses. This is land that is clearly surplus to the airport's aviation needs.

- So that land that cannot be used for aeronautical purposes can be leased to earn revenue from non-aviation uses. This is land that cannot be used by aircraft or where there are barriers or topography that prevents an aviation use.

- So that land that is not presently needed for aeronautical purposes can be rented on a temporary basis to earn revenue from non-aviation uses.

A land use change will not be approved by the FAA if the land has a present or future airport or aviation purpose, meaning the land has a clear aeronautical use. If land is needed for aeronautical purposes, a land use change is not justified. Ordinarily, land on or in proximity to the flight line and airport operations area is needed for aeronautical purposes and should not be used or planned for non-aviation purposes.

The proceeds derived from the land use change must be used exclusively for the benefit of the airport and may not be used for a non-airport purposes. The proceeds cannot be diverted for non-airport uses or for general economic development unrelated to the airport.

Generally, a land use change of airport property will be reviewed on a case-by-case basis at the time the change is necessary. However, the airport land use drawing, which is included as part of the airport layout plan set, shows those areas likely eligible for release from obligation or a land use change.

Concurrent and Interim Uses of Aeronautical Land

Airport sponsors are obligated to pursue policies that contribute to the self-sufficiency of the airport. The FAA will consider requests to use aviation land for non-aviation revenue producing purposes in pursuit of this goal under certain circumstances. These requests fall into two general categories: concurrent use and interim use.

If aeronautical land is to remain in use for its primary purpose but also be used for compatible revenue producing non-aeronautical purposes, this is considered a concurrent use. An example of a concurrent use is farming of low-growing crops within an RPZ. At Grant County International Airport, they have an opportunity to recycle construction debris, including concrete and rock, which has been deposited on land that is currently designated as the RPZ for the approach to Runways 4 and 32R. An appropriate concurrent use would be to extract the construction debris and suitable material for the production of gravel, provided the RPZ meets design standards now and in the future.

The FAA may consent to the interim use (not more than five years) of aeronautical land for non-aeronautical revenue producing purposes. Interim use represents a temporary arrangement; therefore, it must be anticipated that the interim use will end and the land will be returned to aeronautical use. If the proposed non-aeronautical use will involve granting a long-term lease or constructing improvements, it will be difficult, if not impossible, to recover the land on short notice if it is needed for aeronautical purposes.

Both concurrent and interim uses must not degrade the aeronautical utility of the land. Typically improved aeronautical land/facilities are not eligible for non-aeronautical uses. Neither concurrent nor interim uses require a formal FAA release of property or a land use change; however, FAA approval of the non-aeronautical use is required.

On-Airport Land Use Summary

Part of the master plan identifies any property on the Airport that could be released or be subject to a land use change. The Airport sponsor may desire to market certain portions of property to both aeronautical and non-aeronautical businesses. Aeronautical businesses are defined as those that require access to the runway/taxiway system. Non-aeronautical businesses would include all other types of businesses and public institutions that are permissible under local zoning which is compatible in close proximity of the Airport. The FAA has the authority to review and approve any requests to change the status of all or a portion of Airport property.

OFF-AIRPORT LAND USE COMPATIBILITY

Land use compatibility is the responsibility of the airport sponsor and must be pursued in order to comply with FAA grant assurances. In effect since 1964, Grant Assurance 21, *Compatible Land Use*, implementing Title 49 United States Code (U.S.C.) § 47107 (a) (10), requires, in part, that the sponsor:

> *"…take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft."*

Grant Assurance 20, *Hazard Removal and Mitigation*, states that the airport sponsor:

> *"…will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, lighting, or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards."*

In all cases, the FAA expects a sponsor to take appropriate actions to the extent reasonably possible to minimize incompatible land uses. FAA Order 5190.6B, *Airport Compliance Manual*, provides guidance on land use compatibility and other airport compliance issues.

The FAA provides further guidance in Advisory Circular (AC) 150/5200-33, *Hazardous Wildlife Attractants on or Near Airports*. The distance between the airport movement areas and wildlife attractants should be at least 10,000 feet for airports serving turbine-powered aircraft (such as Grant County International Airport) and should include approach and departure airspace to a distance of five miles. Examples of potential wildlife attractants (particularly for birds) include landfills, waste water treatment facilities, lakes, and wetlands.

HEIGHT AND HAZARD LAND USE ZONING

The Port of Moses Lake, City of Moses Lake, and Grant County have worked together to ensure that land uses in the vicinity of the Airport are compatible in nature by implementing height and hazard zoning for the protection of the Airport. These entities utilized guidance provided by the FAA in the Code of Federal Regulations (CFR) Part 77, *Objects affecting Navigable Airspace* to develop the height and hazard zoning. The guidance is flexible enough to account for planned changes in the future layout of the Airport. Nonetheless, it is good practice for the airport sponsor to review the local zoning ordinances to be sure it still applies to the new master plan layout. The Airport Airspace Drawing, which is included as part of the Airport Layout Plan drawing set, may be the basis for an updated height and hazard zoning ordinance, should that be needed.

SUMMARY

The recommended master plan concept has been developed with significant input from the ATAC. The ATAC included representation from the Port of Moses Lake, FAA, Washington Department of Transportation – Aviation of Division, airport management, airport businesses and airport users. This plan provides the necessary development to accommodate and satisfy the anticipated growth over the next 20 years and beyond.

The Airport currently meets design standards for its critical aircraft (that grouping of similar aircraft types that account for 500 or more annual operations) in ARC D-V. The representative aircraft is the Boeing 777. The future critical aircraft is planned to remain in the same design category.

On the airside, the most significant project planned is the removal of the hump in Runway 14L-32R. Once the hump is removed, the runway will meet the line-of-sight design standard. This will, in turn, permit the runway to remain open when the tower is closed, thus making the runway available to all aircraft, including the critical design aircraft, on a 24-hour basis.

Another significant project is the planned relocation of Runway 18-36. Currently, this runway does not meet design standard because it is co-located on Taxiway C, creating a dual use pavement. The runway also has lead-in taxiways, rather than standard 90-degree threshold entrance taxiways. In addition, the runway is currently located too close to Runway 14L-32R, which necessitates a special operating procedure from the tower. The new location for the runway would remove the need for the special operating procedure.

Runway 18-36 is planned to be relocated 700 feet to the west and approximately 200 feet to the south. The relocated runway is planned at a length of 3,000 feet and a width of 60 feet and applies design standards associated with RDC A/B-I (small aircraft). The runway is planned with pavement strength of 12,500 pounds single wheel load and 20,000 pounds dual wheel load.

Runway 14R-32L currently operates as both a taxiway and a runway and it has lead-in taxiways. This runway is planned to be closed, with the pavement being remarked as a taxiway so it can continue to provide access to the Runway 14L-32R threshold.

On the landside, consideration was given to locations for future development. Any new general aviation hangars are planned in the west terminal area. A taxilane is planned to extend south from the apron between two FBO hangars. This taxilane would provide access to potential T-hangars and box hangars.

Several locations were identified for potential large conventional hangar development. The east end of the fuel apron was identified as suitable for development. A new taxilane is planned to access future development in the south terminal area. Two new hangars are planned on the east apron, and the infield area to the west of Taxiway G is identified as a unique development opportunity with approximately 215 acres of aviation land available.

An on-airport land use plan has also been developed. Airport property encompasses more than 4,500 acres currently. Suitable areas have been identified for airfield operations, aviation development, and revenue support. Generally, all land within a reasonable distance to the runway and taxiway system (approximately 1,200 feet) is reserved for aviation development. Other more distant or inaccessible property is suggested for revenue support development which would include compatible non-aviation development.

As mentioned, the Airport has an abundance of property; however, there are several parcels in close proximity to the runway and taxiway system that are considered for acquisition. This includes the “Christmas Tree” property, the “Boeing” property, and the “Triangle” property. The “Christmas Tree” and “Boeing” property would be planned for aviation uses in the future. The “Triangle” property is planned for revenue support or aviation uses.

Overall, the following specific development strategies have emerged from the master planning process:

1) Eliminate the line-of-sight issue from Runway 14L-32R by removing the hump.
2) Relocate Runway 18-36.
3) Close Runway 14R-32L.
4) Phased preservation of Taxiway G.
5) Locate future general aviation hangars to the west near existing facilities.
6) Extend a taxiway to the south terminal area to accommodate future conventional hangars.
7) Provide access to the infield area, west of Taxiway G, to facilitate aviation-related development.

The next chapter of the Master Plan will present both a short term capital improvement program (CIP) and a 20-year long term CIP. Strategies for funding the recommended improvements and a reasonable schedule for undertaking the projects will be presented.

Chapter Six

CAPITAL IMPROVEMENT PROGRAM

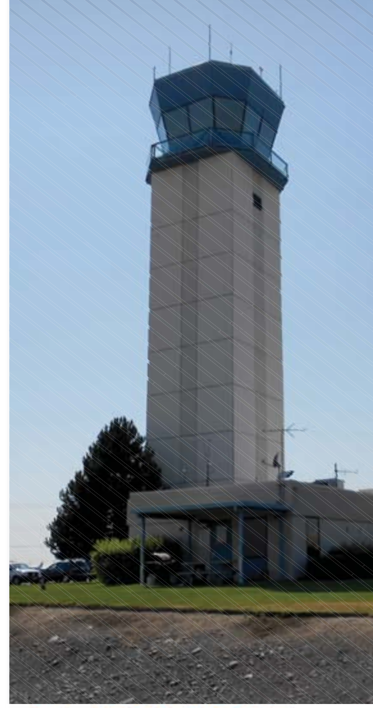
Chapter Six

CAPITAL IMPROVEMENT PROGRAM

The analyses completed in the preceding chapters, evaluated development needs at the Airport over the next 20 years based on forecast activity and operational efficiency. Next, basic economic, financial, and management rationale is applied to each development item so that the feasibility of each item contained in the plan can be assessed.

The presentation of the capital improvement program (CIP) has been organized into two sections. First, the airport development schedule and CIP cost estimate is presented in narrative and graphic form. Second, capital improvement funding sources on the federal, state, and local levels are identified and discussed.

The CIP is developed following FAA guidelines for Master Plans and primarily identifies those projects that are likely eligible for FAA grant funding. Several projects of importance to the Airport are also presented but they are shown with no FAA financial participation.



PORT OF MOSES LAKE

AIRPORT MASTER PLAN

AIRPORT DEVELOPMENT SCHEDULES AND COST SUMMARIES

Now that the recommended concept has been developed and specific needs and improvements for the Airport have been established, the next step is to determine a realistic implementation timeline and associated costs for the plan. The recommended improvements are grouped by planning horizon: short term, intermediate term, and long term. The short term planning horizon CIP is further subdivided into yearly increments. **Table 6A** summarizes key activity milestones for the three planning horizons.

TABLE 6A
Forecast Summary by Planning Horizon
Grant County International Airport

	Base Year (2013)[1]	Short Term	Intermediate Term	Long Term
ANNUAL OPERATIONS				
Air Carrier				
Itinerant	3,238	3,800	4,600	6,700
Local	4,856	5,800	6,900	10,000
General Aviation				
Itinerant	16,926	18,600	20,400	23,800
Local	27,915	30,700	33,800	40,500
Air Taxi				
Itinerant	2,459	2,700	2,900	3,500
Military				
Itinerant	9,930	10,400	11,800	14,300
Local	12,929	15,600	17,500	21,400
Total Itinerant Operations	32,553	35,500	39,700	48,300
Total Local Operations	45,700	52,100	58,200	71,900
TOTAL OPERATIONS	**78,253**	**87,600**	**97,900**	**120,200**
BASED AIRCRAFT	**81**	**88**	**94**	**107**

[1] September 2012 through August 2013
Source: Coffman Associates

A key aspect of this Master Plan is the use of demand-based planning milestones. Many projects should be considered based on actual demand levels. As short term horizon activity levels are reached, it will then be time to program for the intermediate term based upon the next activity milestones. Similarly, when the intermediate term milestones are reached, it will be time to program for the long term activity milestones.

Many development items included in the recommended concept will need to follow these demand indicators. For example, the plan includes construction of new aprons and taxilanes. Based aircraft will be the primary indicator for these projects. If based aircraft growth occurs as projected, additional hangars should be constructed to meet the demand. Often, this potential growth is tracked with a hangar waiting list. If growth slows or does not occur as forecast, some projects may be delayed. As a result, capital expenditures are planned to be made on an as-needed basis, which leads to a more responsible use of capital assets.

Because of economic realities, few general aviation airports are constructing hangars on their own, instead relying on private developers. In some cases, private developers can keep construction costs lower, which in turn lowers the monthly fee necessary to amortize a loan. To the greatest extent possible, private development of all hangar types should be supported and promoted by the airport sponsor. The CIP for the Airport assumes that all future hangars would be constructed through public/private partnerships. This assumption does not preclude the possibility of the Airport constructing new hangars.

The airport sponsor's responsibility related to new hangars is to provide public access taxilanes, typically in conjunction with FAA development grants. These taxilanes are then able to be utilized by hangar tenants for aircraft access to the runway/taxiway system. The CIP presented in this Master Plan includes construction of several taxilanes.

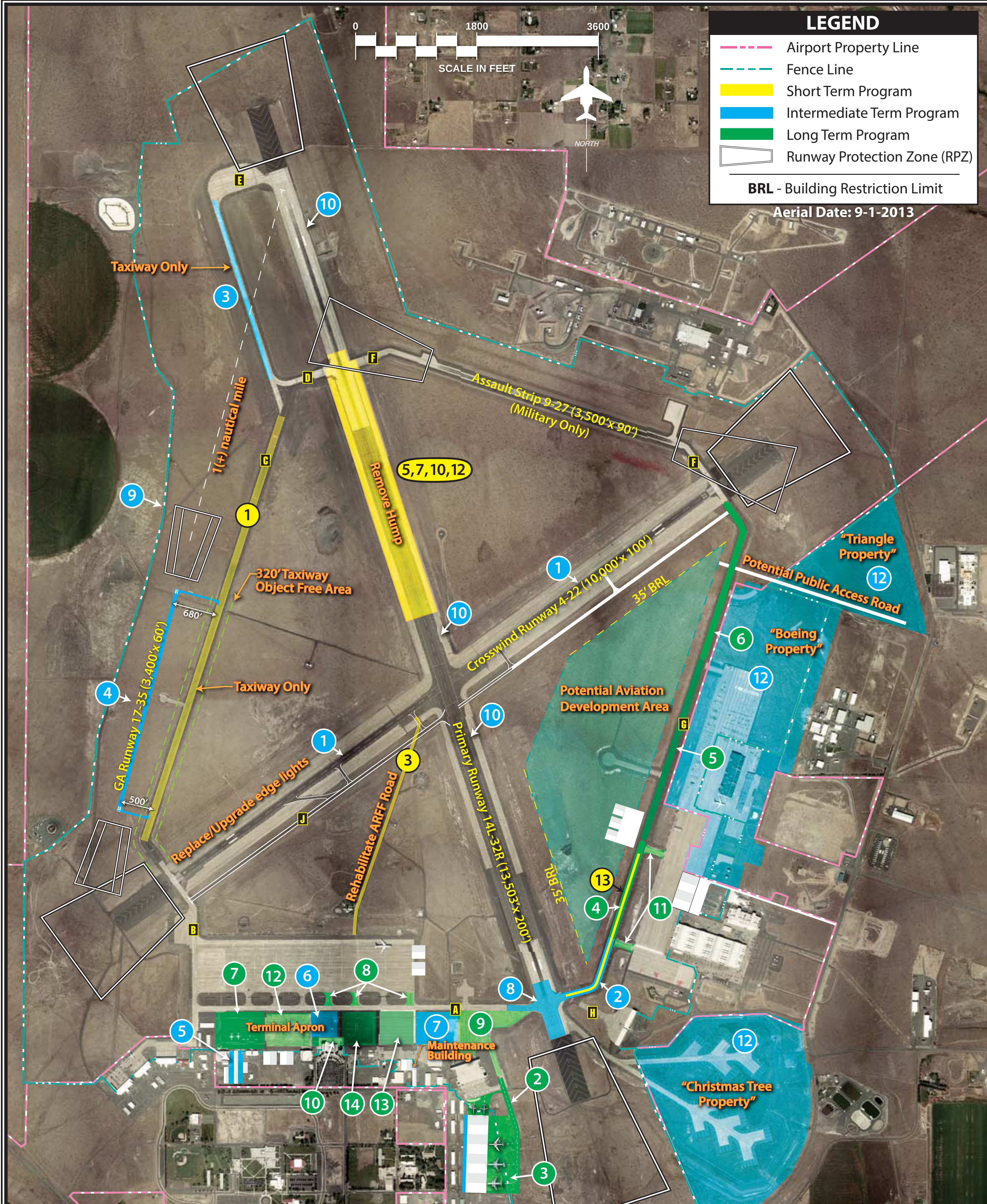
Not all projects identified are necessary to meet projected demand. Other projects are necessary to enhance the safety of the airport, maintain existing infrastructure, meet FAA design standards, or for future planning.

As a master plan is a conceptual document, implementation of the capital projects should only be undertaken after further refinement of their design and costs through architectural and engineering analyses. Moreover, some projects may require additional infrastructure improvements (i.e., drainage improvements, extension of utilities, etc.) that may increase the estimated cost of the project or increase the timeline for completion. Some projects may also require environmental documentation prior to design.

Once a list of necessary projects was identified and refined, project-specific cost estimates were developed. The cost estimates include design, engineering, construction administration, and contingencies that may arise on the project. Capital costs presented here should be viewed only as estimates subject to further refinement during design. Nevertheless, these estimates are considered sufficient for planning purposes. Cost estimates for each of the development projects in the CIP are in current (2014) dollars. **Exhibit 6A** presents the 20-year CIP for the Airport and a graphic showing the phased approach to implementation.

The FAA utilizes a national priority ranking system to help objectively evaluate potential airport projects. Projects are weighted toward safety, infrastructure preservation, meeting design standards, and capacity enhancement. The FAA will participate in the highest priority projects before considering lower priority projects, even if a lower priority project is considered a more urgent need by the local sponsor. Nonetheless, the project should remain a priority for the airport and funding support should continue to be requested in subsequent years.

The following sections will describe in greater detail the projects identified for the Airport over the next 20 years. The short term (0-5 years) projects are presented in yearly increments and refer to the federal fiscal year (October-September). The intermediate (years 6-



	PROJECT DESCRIPTION	PROJECT COST	FAA GRANT ELIGIBLE	TOTAL LOCAL
SHORT TERM PROGRAM (0-5 YEARS)				
2014				
1	Rehabilitate Taxiway C (Asphalt slurry seal)	$495,000	$445,500	$49,500
2	Pavement Preservation Maintenance (NP)	$50,000	$0	$50,000
2014	*Subtotal*	*$545,000*	*$445,500*	*$99,500*
2015				
3	Rehabilitate ARFF Access Road	$320,000	$288,000	$32,000
4	Pavement Preservation Maintenance (NP)	$50,000	$0	$50,000
2015	*Subtotal*	*$370,000*	*$288,000*	*$82,000*
2016				
5	Preliminary Design/Environmental Runway 14L-32R Hump	$167,000	$150,300	$16,700
6	Pavement Preservation Maintenance (NP)	$50,000	$0	$50,000
2016	*Subtotal*	*$217,000*	*$150,300*	*$66,700*
2017				
7	Runway 14L-32R Hump Removal for Line-of-Sight, Full Design	$600,000	$540,000	$60,000
8	Snow Plows (2) (NP)	$840,000	$756,000	$84,000
9	Pavement Preservation Maintenance (NP)	$50,000	$0	$50,000
2017	*Subtotal*	*$1,490,000*	*$1,296,000*	*$194,000*
2018				
10	Runway 14L-32R Remove Hump for Line-of-Sight, Construction (Phase 1)	$8,750,000	$7,875,000	$875,000
11	Pavement Preservation Maintenance (NP)	$50,000	$0	$50,000
2018	*Subtotal*	*$8,800,000*	*$7,875,000*	*$925,000*
2019				
12	Remove Runway 14L-32R Hump for Line-of-Sight, Construction (Phase 2)	$8,750,000	$7,875,000	$875,000
13	Taxiway G Reconstruction (Phase 1 - Design)	$350,000	$315,000	$35,000
14	Pavement Preservation Maintenance (NP)	$50,000	$0	$50,000
2019	*Subtotal*	*$9,150,000*	*$8,190,000*	*$960,000*
TOTAL SHORT TERM PROGRAM		**$20,572,000**	**$18,244,800**	**$2,327,200**
INTERMEDIATE TERM PROGRAM (6-10 YEARS)				
1	Replace/Upgrade Rwy 4-22 Edge Lighting to LED	$520,000	$468,000	$52,000
2	Taxiway G Reconstruction (Phase 1 - Construction)	$4,900,000	$4,410,000	$490,000
3	Convert Runway 14R-32L to Taxiway	$170,000	$153,000	$17,000
4	Relocate Runway 18-36	$3,000,000	$2,700,000	$300,000
5	General Aviation Hangar Taxilanes, Design/Construction	$410,000	$369,000	$41,000
6	Terminal Apron Rehabilitation (#2)	$2,800,000	$2,520,000	$280,000
7	Terminal Apron Rehabilitation (#3)	$6,100,000	$5,490,000	$610,000
8	Runway 32R End Pavement Rehabilitation	$440,000	$396,000	$44,000
9	Install Wildlife Deterrent Fabric	$310,000	$279,000	$31,000
10	Runway 14L-32R Edge Lighting and Shoulder Replacement	$5,900,000	$5,310,000	$590,000
11	Snow Plows (2) (NP)	$840,000	$756,000	$84,000
12	Acquire Property (3 Parcels)	$0	$0	$0
13	Pavement Preservation Maintenance (NP)	$250,000	$0	$250,000
TOTAL INTERMEDIATE TERM PROGRAM		**$25,640,000**	**$22,851,000**	**$2,789,000**
LONG TERM PROGRAM (11-20 YEARS)				
1	Master Plan Update (NP)	$400,000	$360,000	$40,000
2	Taxilane to South Terminal Area	$1,900,000	$1,710,000	$190,000
3	South Terminal Area Aprons	$16,200,000	$14,580,000	$1,620,000
4	Taxiway G Reconstruction (Phase 2)	$4,400,000	$3,960,000	$440,000
5	Taxiway G Reconstruction (Phase 3)	$7,300,000	$6,570,000	$730,000
6	Taxiway G Reconstruction (Phase 4)	$6,900,000	$6,210,000	$690,000
7	Terminal Apron Rehabilitation (#5)	$1,800,000	$1,620,000	$180,000
8	Fuel Apron Entrance Connectors to Taxiway A	$750,000	$675,000	$75,000
9	Terminal Apron Rehabilitation (#6)	$3,200,000	$2,880,000	$320,000
10	Terminal Apron Rehabilitation (#7)	$100,000	$90,000	$10,000
11	East Apron Taxilane Connectors	$360,000	$324,000	$36,000
12	Terminal Apron Reconstruction	$8,800,000	$7,920,000	$880,000
13	Terminal Apron Rehabilitation	$420,000	$378,000	$42,000
14	Terminal Apron Rehabilitation	$740,000	$666,000	$74,000
15	Pavement Preservation Maintenance (NP)	$500,000	$0	$500,000
TOTAL LONG TERM PROGRAM		**$53,770,000**	**$47,943,000**	**$5,827,000**
TOTAL PROGRAM COSTS		**$99,982,000**	**$89,038,800**	**$10,943,200**

Note: Totals may not equal due to rounding
NP - Not Pictured

Exhibit 6A
PROJECT PHASING AND
CAPITAL IMPROVEMENT PROGRAM

10) and long term (years 10-20) are grouped by local priority. While the CIP shows the priority ranking of the projects, the list should be evaluated and revised on a regular basis.

SHORT TERM IMPROVEMENTS

The projects identified for the short term planning period have been prioritized based on Airport need and potential to be funded. If any of these projects cannot be funded in the timeframe indicated, the airport sponsor should consider the project for the following year.

The major objective of the short term CIP is to address the line-of-sight issue for Runway 14L-32R. As discussed at length previously in this Master Plan, the fact that the primary runway does not meet the line-of-sight standards has led to the closure of the runway when the ATCT is closed (10:00 pm-6:00 am). This is a significant concern as the Airport's primary runway, which supports the only precision instrument approach, is not available to the critical design aircraft when the tower is closed.

The Airport undertakes annual pavement preservation projects. In some years these projects may be more extensive, while in other years there may be little expenditure in this regard. For each year of the CIP, a place holder is included which identifies $50,000 of local funding annually for pavement preservation purposes.

2014 Projects

The first project identified is rehabilitation of Taxiway C. This project is necessary as a pavement preservation measure. The FAA has already offered a grant for this project in fiscal year 2014.

2015 Projects

Rehabilitation of the Airport Rescue and Fire Fighting (ARFF) service road, which provides access to the intersection of the two main runways, is planned for 2015. This project is necessary to maintain adequate ARFF response times as required for Part 139 certificated airports.

2016 Projects

This year marks the beginning of a multi-year process to remove the hump in Runway 14L-32R. In 2015, a preliminary design project is considered in conjunction with appropriate environmental study. This project would involve the consulting airport engineer performing preliminary design analysis for the hump removal and on the pavement condition at the intersection with Taxiway D and F. The goal of this project is to succinctly identify the methodology for removing the runway hump, which may include improvements to the intersection. An anticipated deliverable from this project is a detailed budget for the runway hump removal project.

2017 Projects

In 2017, the development of the formal engineering and design documents for the runway hump removal project are planned.

As documented in the Inventory chapter of this Master Plan, the Airport's snow removal equipment is aging. In order to maintain adequate snow removal capability, it is recommended that the Airport acquire replacement equipment. In 2017, acquisition of two replacement snow plows is considered. It should be noted that the Airport is currently in need of four replacement snow plows; however, the planned acquisition has been split between the short and intermediate planning terms in order to provide a more realistic reflection of potential funding availability, which takes into consideration other funding requests included in the CIP.

2018 Projects

The beginning of construction for the Runway 14L-32R hump removal project is planned in 2017. This project is planned in two phases over two construction seasons due to the complexities involved. While a conservative approach to phasing of this project has been presented, it is feasible that this project could be accomplished in one construction season.

The Airport supports several businesses including Boeing, AeroTEC, and Aviation Technical Services, which all require runways with the capability to support frequent activity by wide-body aircraft. The construction phase of the hump removal project must be coordinated in such a manner that this capability is preserved during construction. The most likely method would be for them to use Runway 4-22.

2019 Projects

The first project in 2018 is construction of Phase 2 of the runway hump removal project.

The next project related to the rehabilitation of Taxiway G is considered in 2019. Taxiway G is currently in poor condition and would normally be the next pavement surface due for major rehabilitation. However, much of the taxiway is underutilized; therefore, a phased approach to rehabilitation of Taxiway G is presented.

The southern portion of Taxiway G, extending from the intersection with Runway 32R to the second apron connection is planned for engineering and design. This portion of the taxiway is the most utilized, primarily by the U.S. Forest Service, a seasonal tenant based on the east apron area. The portion of Taxiway G between the first two apron connections has a slightly lower utilization rate, but it is likely more cost-efficient to include it in this design phase, even though rehabilitation of this portion is not planned to immediately follow. Rehabilitation of that portion of Taxiway G from the runway to the first apron connector is planned to follow design immediately.

Short Term Summary

The short term CIP program for the Airport is heavily focused on fixing the line-of-sight issue for Runway 14L-32R. This project is anticipated to cost approximately $20 million, which will require significant FAA grant participation. As a result, only a few other priority projects have been considered for the short term planning period. These include pavement maintenance, acquisition of replacement snow removal equipment, and upgrading the Runway 4-22 edge lights.

The short term projects total approximately $20.6 million. Approximately $18.3 million is eligible for FAA grant funding. The remaining $2.3 million would be the responsibility of the local airport sponsor. The local sponsor share may include participation by the Washington State Department of Transportation - Aviation (WSDOT).

INTERMEDIATE TERM IMPROVEMENTS

Intermediate term projects generally relate to those planned for years six through 10 of the CIP. Due to the fluid nature of funding availability and the possibility of changing priorities, these projects have been grouped together. While they are generally listed in order of priority, circumstances should be analyzed at the time to determine which projects should be pursued first.

The first project of the intermediate term is an upgrade of the edge lights for Runway 4-22. This project would replace old lighting fixtures that are at the end of their life cycle with more efficient and longer lasting LED lighting.

The next project considered is the reconstruction of the south portion of Taxiway G from the intersection with Runway 32R to the first apron connector. This is the portion of Taxiway G that is most heavily utilized, especially by the U.S. Forest Service. This pavement should be capable of withstanding repeated use by the fleet of aerial tankers utilized.

The next project is to convert parallel Runway 14R-32L to taxiway use exclusively. This project is necessary in order to meet FAA design standards which do not support dual use pavements or lead-in taxiways. As noted previously, this runway is only available during visual daylight hours and its edge lighting is blue, indicating a taxiway. Once the runway markings are removed, the pavement should be remarked as a taxiway and it should be utilized to continue to provide access to the Runway 14L threshold.

The timing for closing Runway 14R-32L is currently shown in the intermediate planning horizon. The FAA may desire to see the current non-standard condition resolved sooner, perhaps to coincide with any planned overlay, maintenance or remarking efforts.

The next project considered is the relocation of Runway 18-36. This runway currently occupies a portion of Taxiway C, much like parallel Runway 14R-32L, and is therefore a dual use pavement with lead-in taxiways. The presence of the runway on the taxiway creates an FAA identified "Hot Spot" with an unusual hold line located 1,568 feet from the Runway 18 threshold. The hold line is so situated to prevent aircraft from entering the operating environment of Runway 18-36 by keeping aircraft outside the Runway 18 RPZ. The location of Runway 18-36 also necessitates a Special Operating Procedure (see Appendix B) which essentially requires aircraft departing Runway 36 to turn west prior to crossing Runway 14L-32R.

Following extensive analysis in the Alternatives and Recommended Concept chapters, the planned solution to these issues is to relocate Runway 18-36 to the west. The relocated runway is planned to continue to primarily accommodate small general aviation (less than 12,500 pounds). The geometry of the relocated runway is planned to change with the runway measuring 3,000 feet in length with a 60-foot width. The relocated runway is shifted approximately 700 feet to the west and approximately 200 feet to the south in order to provide at least one nautical mile from the Runway 18 threshold to the intersection with the centerline of Runway 14L-32R. With this distance, the tower can operate both runways simultaneously and the Special Operating Procedure would no longer be necessary.

The next project is the first intended to meet forecast growth in demand by based aircraft owners. A new taxilane is planned to extend from the western portion of the main apron to provide access to potential general aviation hangar development. This is a suitable location for new general aviation development as it is co-located with existing general aviation infrastructure. Hangar construction would not normally be eligible for grant funding and is assumed to be undertaken by a private developer; however, it is an option for the Airport to construct any future hangars.

A major portion of both the intermediate and long term CIP is rehabilitation of airfield pavements, especially the apron areas, based on the pavement condition. The pavements at the Airport have been evaluated for condition and useful life by WSDOT. The preservation timeline for these pavements essentially follows those recommendations. These include several sections of the main terminal area apron and the taxiway intersection with Runway 32R.

Intrusion of wildlife onto the Airport has been a problem in the past. The Airport has long maintained a CIP item for the installation of additional wildlife deterrent fabric. This project calls for the installation of 16,000 feet of wildlife deterrent fabric on the existing west side perimeter fence.

The next project considered is relocation and upgrade of the edge lights for Runway 14L-32R. The existing location of the edge lights is non-standard; however, the Airport has been granted an indefinite modification to standards by the FAA (see Appendix D). Therefore, relocating the edge lights may not be a high priority. Replacing the edge lights with more efficient LED lighting is also considered.

The intermediate term also considers the acquisition of two more replacement snow plows. As noted previously, the existing equipment is aging and is in need of replacement.

The last project considered is the acquisition of several adjacent parcels that occupy property that could be utilized for aviation-related development. As shown on the CIP, it is anticipated this would be a local cost, which would be subject to reimbursement from the FAA at a time that it was developed for aviation purposes.

The intermediate term CIP program for the Airport includes several important projects including the relocation of Runway 18-36 and rehabilitation of deteriorating aprons. The intermediate term projects total approximately $25.6 million. Approximately $22.9 million is eligible for FAA grant funding. The remaining $2.8 million would be the responsibility of the local airport sponsor. The local sponsor share may include participation by WSDOT.

LONG TERM IMPROVEMENTS

Long term projects are those generally considered for years 10 through 20. The long term projects are heavily focused on major pavement preservation efforts but also include construction of a new taxiway leading to the south terminal area.

The first project considered is an update to this Master Plan. As has historically been the case, the aviation industry is subject to change and the Airport priorities may change over time as well. Typically, it is prudent to revisit the Airport Master Plan every seven to ten years; therefore, a Master Plan Update is planned in the long term planning horizon.

The next project in the long term is the extension of a taxilane to provide access to planned development in the south terminal area. This taxilane is designed to meet the standards for the critical design aircraft (D-V) and the development area it would access is planned for large conventional hangars. It is presumed that the Airport's success at attracting aviation businesses that cater to operators of large commercial transport aircraft will lead to a need to develop this area.

As currently considered, the south terminal area would be accessible to the public so the aprons leading to any new hangars are considered eligible for FAA grants. It is feasible that the aprons would be leased, which would make the apron construction ineligible for FAA funding.

Continued rehabilitation and reconstruction of Taxiway G is planned for the long term planning horizon. Overall, preservation of Taxiway G is planned in a phased approach. The southern portions of the taxiway were planned for rehabilitation in the intermediate term because of the higher utilization rate for this section. The long term plan considers two northern sections. The prioritization is based on existing usage of Taxiway G, which could change in the future. If, for example, Boeing were to re-open their east apron facility, thus increasing aircraft movements, then rehabilitation of Taxiway G should be moved up in priority.

The Airport should also monitor progress toward making the infield area to the west of Taxiway G available for aviation development. If this area attracts large scale development, public road access may be necessary. This access road is planned at the north end of Taxiway G, which would make preservation of a portion of the taxiway unnecessary.

The remaining projects identified for the long term planning period are related to major pavement rehabilitation of aprons and taxiways.

The long term projects total approximately $53.8 million, of which approximately $47.9 million is eligible for FAA funding. Approximately $5.8 million would be the responsibility of the airport sponsor which may include participation by WSDOT.

CAPITAL IMPROVEMENT SUMMARY

The CIP is intended as a road map of Airport improvements to help guide the Airport sponsor, the FAA, and WSDOT on needed projects. The plan as presented will meet the forecast demand over the next 20 years and, in many respects, beyond. The first five years of the CIP are separated into yearly installments, and the intermediate and long term projects are grouped together, respectively. The sequence of projects may change due to availability of funds or changing priorities. Nonetheless, this is a comprehensive list of capital projects the Airport should consider in the next 20 years.

The total 20-year CIP proposes approximately $100.0 million in airport development needs. Of this total, approximately $89.0 million would be eligible for FAA grant funding. The local funding requirement for the proposed 20-year CIP is $11.0 million which may include WSDOT participation.

As noted previously, the project to remove the hump from Runway 14L-32R will require the runway to be closed for a period of time. Several businesses located at the Airport specialize in maintenance, repair, and after-market modification to all aircraft types including large wide-body commercial transport type aircraft. It is imperative that this operational capability is maintained during construction. The most likely resolution would be for these aircraft to use Runway 4-22 provided it is capable of accommodating this temporary activity. The specifics of the construction program, including alternate runway use are developed during the engineering and design.

CAPITAL IMPROVEMENT FUNDING SOURCES

There are generally four sources of funds used to finance airport development: airport cash flow, revenue and general obligation bonds, federal/state/local grants, and passenger facility charges (PFCs), which are reserved for commercial service airports. Access to these sources of financing varies widely among airports, with some large airports maintaining substantial cash reserves and most small commercial service and general aviation airports often requiring subsidies from local and state governments to fund operating expenses and to finance modest improvements.

Financing capital improvements at the Airport will not rely solely on the financial resources of the Airport or the taxpayers. Capital improvement funding is available through various grant-in-aid programs on both the state and federal levels. Historically, Grant County International Airport has received federal and state grants. While some years more funds could be available, the CIP was developed with project phasing in order to remain realistic and within the range of anticipated grant assistance. The following discussion outlines key sources of funding potentially available for capital improvements at Grant County International Airport.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public-use airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. The most recent legislation affecting federal funding, the *FAA Modernization and Reform Act of 2012*, was enacted on February 17, 2012.

The law authorizes the FAA's Airport Improvement Program (AIP) at $3.35 billion for fiscal years 2012 through 2015. Eligible airports, which include those in the *National Plan of Integrated Airport Systems* (NPIAS), such as Grant County International Airport, can apply for airport improvement grants. **Table 6B** presents the approximate distribution of the AIP funds. Currently, Grant County International Airport is eligible to apply for grants which may be funded through state apportionments, the small airport fund, and/or discretionary categories.

Funding for AIP-eligible projects is undertaken through a cost-sharing arrangement in which FAA provides up to 90 percent of the cost and the airport sponsor invests the remaining 10 percent. In exchange for this level of funding, the airport sponsor is required to meet various Grant Assurances, including maintaining the improvement for its useful life, usually 20 years.

TABLE 6B
Federal AIP Funding Distribution

Funding Category	Percent of Total	Funds*
Apportionment/Entitlement		
Passenger Entitlements	29.19%	$977,865,000
Cargo Entitlements	3.00%	$100,500,000
Alaska Supplemental	0.65%	$21,775,000
State Apportionment for Nonprimary Entitlements	10.35%	$346,725,000
State Apportionment Based on Area and Population	9.65%	$323,275,000
Carryover	10.77%	$360,795,000
Small Airport Fund		
Small Hubs	1.67%	$55,945,000
Nonhubs	6.68%	$223,780,000
Nonprimary (GA and Reliever)	3.34%	$111,890,000
Discretionary		
Capacity/Safety/Security/Noise	11.36%	$380,560,000
Pure Discretionary	3.79%	$126,965,000
Set Asides		
Noise	8.40%	$281,400,000
Military Airports Program	0.99%	$33,165,000
Reliever	0.16%	$5,360,000
Totals	100.00%	$3,350,000,000

* FAA *Modernization and Reform Act of 2012*
AIP: Airport Improvement Program
Source: FAA Order 5100.38C, Airport Improvement Program Handbook

The source for AIP funds is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances, in part, the operation of the FAA. It is funded by user fees, including taxes on airline tickets, aviation fuel, and various aircraft parts.

Apportionment (Entitlement) Funds

Federal AIP funds are distributed each year by the FAA from appropriations by Congress. A portion of the annual distribution is to primary commercial service airports based upon minimum enplanement levels of at least 10,000 passengers annually. If the airport exceeds the enplanement threshold, then it would receive a minimum of $1 million. Other entitlement funds are distributed to cargo service airports, states and insular areas (state apportionment), and Alaska airports.

General aviation airports included in the NPIAS can receive up to $150,000 each year in Non-Primary Entitlement (NPE) funds. These funds can be carried over and combined for up to four years, thereby allowing for completion of a more expensive project. In the past, Grant County International Airport has received NPE funding.

The FAA also receives a state apportionment based on a federal formula that takes into account area and population. The FAA then distributes these funds for projects at various airports throughout the state.

Small Airport Fund

If a large or medium hub commercial service airport chooses to institute a PFC, which is a fee of up to $4.50 on each airline ticket, for funding of capital improvement projects, then their apportionment is reduced. A portion of the reduced apportionment goes to the small airport fund. The small airport fund is reserved for small-hub primary commercial service airports, non-hub commercial service airports, and general aviation airports.

Discretionary Funds

The remaining AIP funds are distributed by the FAA based on the priority of the project for which they have received a request for federal assistance through discretionary apportionments. A national priority ranking system is used to evaluate and rank each airport project. Those projects with the highest priority from airports across the country are given preference in funding. High priority projects include those related to meeting design standards, safety enhancements, and capacity improvements.

Under the AIP program, examples of eligible development projects include the airfield, public aprons, and access roads. Additional buildings and structures may be eligible if the function of the structure is to serve airport operations in a non-revenue generating capacity, such as maintenance facilities. Some revenue-enhancing structures, such as T-hangars, may be eligible if all airfield improvements have been made; however, the priority ranking of these facilities is very low.

Whereas entitlement monies are guaranteed on an annual basis, discretionary funds are not assured. If the combination of entitlement, discretionary, and airport sponsor match does not provide enough capital for planned development, projects may be delayed.

Set-Aside Funds

Portions of AIP funds are set-asides designed to achieve specific funding minimums for noise compatibility planning and implementation, select former military airfields (Military Airport Program), and select reliever airports. Grant County International Airport does not qualify for set-aside funding.

FAA Facilities and Equipment (F&E) Program

The Airway Facilities Division of the FAA administers the Facilities and Equipment (F&E) Program. This program provides funding for the installation and maintenance of various navigational aids and equipment of the national airspace system. Under the F&E program, funding is provided for FAA Airport Traffic Control Towers (ATCTs), enroute navigational aids, on-airport navigational aids, and approach lighting systems.

While F&E still installs and maintains some navigational aids, on-airport facilities at general aviation airports have not been a priority. Therefore, airports often request funding assistance for navigational aids through AIP and then maintain the equipment on their own. The ownership and maintenance of navigational aids at the Airport is split between the FAA and the Airport. The Airport owns and maintains the Runway 32R PAPI, and the REILs serving Runways 14L, 4 and 22, as well as the windsocks and segmented circle. The FAA owns and maintains all other navigational aids (see Table 1H).

Guidance on the eligibility of a project for federal AIP grant funding can be found in FAA Order 5100.38C, *Airport Improvement Handbook,* which can be accessed at:
http://www.faa.gov/airports/aip/aip_handbook/.

STATE AID TO AIRPORTS

The State of Washington recognizes the valuable contribution to the state's transportation economy that airports make. WSDOT administers several programs to help maintain airports in the state.

Pavement Management System

Approximately every five years, WSDOT conducts a system-wide (100 airports) study of pavement to assess the relative condition of pavements for selected Washington airports. The program serves as a tool to identify system pavement needs, shape programming decisions for federal and state grant aid, provide information for legislative decision-making, and assist airport sponsors in making informed planning decisions. The program also develops accurate pavement inventories and identifies necessary maintenance, repair, rehabilitation, and reconstruction projects.

Grant County International Airport is included in the state's pavement management system. The pavement condition maps for the Airport were utilized in the development of the CIP included in this Master Plan. There is no cost to the airports for the pavement assessment.

This is an extremely beneficial program to the airports in the state. This program helps airports in the state meet federal grant assurances which require airports to monitor and maintain their pavement infrastructure. This program also helps WSDOT and the airport sponsors when making capital improvement decisions.

Airport Aid Program

The Airport Aid Program has two categories of funding. The first provides half of the local match, or five percent, for FAA-funded projects. The second category allows for WSDOT to fund airport projects directly. Direct funding is only available for those projects that the FAA is unable to fund in the current cycle. The maximum amount WSDOT can award to an individual airport sponsor is $250,000, which requires a local match of five percent.

WSDOT provides grants for capital improvements to many of the state's 138 public airports. The program is funded through an 11-cents-per gallon fee on aviation fuel, along with aircraft registration fees. Historically, $1 million per year is invested in the state's aviation system through the Airport Aid Program.

WSDOT Aviation Airport Aid grant funds may be used for the planning, acquisition, construction, improvement, and maintenance of airports. All project work must be available for public use and be shown on the approved Airport Layout Plan (ALP). All projects must also be included in WSDOT's five-year Statewide Capital Improvement Program (SCIP).

For airports that are included in the federal NPIAS, the airport must demonstrate that it has pursued federal funding through FAA before WSDOT will consider issuing a grant for the project (other than matching funds to AIP grants).

Some of the commonly eligible items for state/local-only funded projects are:

- Approach aids (e.g., AWOS, REILS, VGSI, etc.).
- Obstruction surveys for new or improved instrument approach procedures – must be accomplished in accordance with FAA Advisory Circular 150/5300-18B.
- New construction to include the extension, strengthening or widening of a runway, taxiway or aircraft parking apron.
- Reconstruction, resurfacing, application of seal coats and sealing pavement joints and cracks of runways, taxiways, and aircraft parking aprons.
- Runway and taxiway pavement markings.
- Runway safety areas.
- Lighting of a runway, taxiway, or apron.
- Marking of a runway, taxiway, or apron.
- Installation of rotating beacon and lighted wind cone and segmented circle.
- Obstruction removal (one-time removal, airport sponsor must maintain) including power line removal, relocation or burial, obstruction lighting and marking.
- New access and service roads.
- Fencing.
- Construction supervision and materials testing.

- Utilities removal, relocation and/or replacement if required to accomplish a development project.
- Engineering design costs if accomplished subsequent to the execution date of the grant agreement.
- Airport Master Planning and Airport Layout Plans (ALPs).

Some of the commonly ineligible items for state/local-only funded projects are:

- Airport or heliport facilities under exclusive lease or monopoly control of private individuals or corporations or otherwise unavailable for public use.
- Spare parts beyond those needed for testing equipment purchased under a grant.
- Landscaping that is not affected by the funded project.
- Landscaping beyond what is needed for erosion control.
- Projects that could be considered "maintenance" in nature. (For example, cleaning culverts and manholes, repair of culverts and manholes, patching potholes, repairing fence, cleaning sediment/debris from ditches, refreshing existing painted markings).
- Off-airport work that is not specifically called out in the project component.
- Funding for pavement rehabilitation that has not been adequately maintained by the airport.
- Updates to any project plans, documents, or studies due to lack of progress.
- Funding for a taxiway which serves a private facility.
- Improvements to accommodate private development.
- Aircraft Rescue and Fire Fighting (ARFF) equipment and facilities.
- Construction or purchase from a private entity, facilities capable of producing revenue that can amortize the construction cost such as but not limited to:
- Hangars (all types).
- Terminal buildings and associated security systems.
- Fuel facilities.
- Routine and low-cost maintenance work (e.g., weed spraying, mowing, sweeping, snow plowing, etc.).

WSDOT will not accept grant requests for construction projects starting prior to the date authorized in the solicitation for grant applications. Also, WSDOT will not reimburse an airport sponsor for work completed prior to the authorized date.

Applications for emergency projects will be considered by WSDOT should an emergent situation warrant immediate intervention, particularly events impacting airport safety. Emergency projects may be defined as the result of an unanticipated act of nature, vandalism, or an unintentional accident that has caused either the damage or destruction of an airport facility. Further, the impact of the event interferes with the safe operation of the airport. The airport owner must further demonstrate a valid need to take immediate action to repair or restore an airport facility damaged or destroyed by an act of nature, vandalism, or accident. Airport facilities that have been allowed to deteriorate over time due to normal wear, use, or inadequate maintenance shall not constitute an emergency. Approval for grant funds for emergent projects will be contingent on documentation of need, WSDOT concurrence, and availability of funds.

Additional guidance on the WSDOT grant programs can be found in the *WSDOT Airport Aid Grant Procedures Manual* accessible at: http://www.wsdot.wa.gov/aviation/.

Other Washington Funding Sources

In 2005, the Washington Legislature directed the Joint Legislative Audit & Review Committee (JLARC) to assemble an inventory of state grant and loan programs that assist local governments and others in developing their infrastructure. The inventory includes 75 separate programs. These programs provided more than $1 billion in grants and loans for infrastructure projects in 2005. The inventory is organized into three volumes. Potential sources for transportation infrastructure grants and loans are identified in volume two. More information on these programs can be found at the following web site: http://www.leg.wa.gov/JLARC/AuditAndStudyReports/2006/Pages/06-11.aspx.

The Washington Department of Commerce also provides guidance and grant assistance in several areas that could be beneficial to airports. This includes land use planning, infrastructure planning, and assistance with public financing of public projects. Further information can be obtained at the following web site: http://www.commerce.wa.gov/site/657/default.aspx.

LOCAL FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. One goal for the Airport is to generate enough revenue to cover all operating and capital expenditures. As with many general aviation airports, this is not always possible and other financing methods will be needed.

The Port of Moses Lake is a special purpose district under Washington State law (Chapter 53 RCW), created by a community vote in 1965 for the purpose of operating the Grant County International Airport and developing surrounding areas to support economic development. As owner and manager of the Airport, the Port of Moses Lake has relative independence from state and local governments, but also has the responsibility to manage its own budget. The Port of Moses Lake's financial independence rests largely on its ability to issue its own debt, in the form of general revenue bonds, as well as a limited authority to impose taxes within the district and upon airport patrons and users in order to fund capital projects at the Airport. The Port of Moses Lake receives its operational and capital funding from certain state and local programs, including a property tax mil levy on the residents of the district, as well as from self-generated income such as land leases, hangar leases, landing fees, fuel flowage fees, etc., which allow the Port of Moses Lake to operate as a financially self-sustaining public enterprise.

Other sources of development funding are available, including leasehold financing which refers to a developer or tenant financing improvements under a long term ground lease. The obvious advantage of such an arrangement is that it relieves the Port of Moses Lake of all responsibility for raising the capital funds for improvements. However, the private development of facilities on a ground lease, particularly on property owned by a quasi-governmental agency, produces a unique set of concerns.

In particular, it may be more difficult to obtain private financing as only the improvements and the right to continue the lease can be claimed in the event of a default. Ground leases normally provide for the reversion of improvements to the airport at the end of the lease term, which reduces their potential value to a lender taking possession. Also, companies that want to own their property as a matter of financial policy may not locate where land is only available for lease.

Net Cash Flow

Exhibit 6B presents the historical net cash flow for the Port of Moses Lake. Revenue generated from investment income, taxes, or grants is not included in the operating revenue. Expenses from depreciation are not included.

As can be seen from the table, the Port of Moses Lake has historically operated with a net positive cash flow. This has allowed the Port of Moses Lake to leverage more than $24 million in grant matches since 1999 (see Table 1C). Provided revenues and expenses grow in a manner similar to the last ten years, the Port of Moses Lake should be in a position to provide matching funds for the CIP presented in this Master Plan.

The operations of the Port of Moses Lake generate revenues, which are secured by federal grant assurances to be utilized at the Port of Moses Lake properties. All receipts, excluding bond proceeds or related grants and interest, are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as bonds remain outstanding, or for additions or improvements to airport facilities.

All general aviation airports should establish standard basis rates for various leases. All lease rates should be set to adjust to a standard index, such as the Consumer Price Index, to assure that fair and equitable rates continue to be charged into the future. The condition and location of hangar space should also be considered when establishing the lease rates. Standard basis rates should be established for Port-owned hangars, terminal building office space, and ground leases. Fuel flowage fees and aircraft tie-down fees should also be uniform.

Financial Summary

The above financial discussion is intended to show that the operation of Grant County International Airport meets various requirements and goals set forth by the FAA.

CATEGORY	HISTORICAL 2004	HISTORICAL 2008	HISTORICAL 2013	FORECAST 2014-2018 Average	FORECAST 2019-2023 Average	FORECAST 2024-2033 Average
Operation Revenues						
Airport Operations	$853,433	$916,686	$1,072,829	$997,854	$1,080,278	$1,217,812
Property Lease/ Rental Operations	$1,949,761	$2,478,171	$3,302,354	$4,006,337	$5,154,741	$7,582,900
Commissions/General and Admisitrative	$1,021	$1,408	$1,262	$ -	$ -	$ -
Other: Expense Reimbursement	$88,922	$81,771	$76,705	$73,179	$ -	$ -
Total	***$2,893,137***	***$3,478,036***	***$4,453,150***	***$5,077,370***	***$6,235,019***	***$8,800,712***
Operation Expenses						
General Operations	$812,426	$789,685	$1,314,664	$1,525,783	$1,902,313	$2,664,413
Maintenance	$878,939	$847,730	$1,569,665	$1,681,870	$2,111,001	$2,987,655
General and Administrative	$719,673	$854,723	$1,006,238	$1,078,625	$1,242,551	$1,540,159
Total	***$2,411,038***	***$2,492,138***	***$3,890,567***	***$4,286,278***	***$5,255,866***	***$7,192,226***
Additional Considerations						
Investment Income	$253,574	$355,215	$203,838	$193,600	$200,000	$200,000
Taxes Levied for General Purposes	$797,629	$1,021,927	$1,579,043	$1,785,002	$2,149,819	$2,317,110
Gain on Disposition of Assets	$510	$9,242	$ -	$ -	$ -	$ -
Interest Expense (2004-2012)	$(525,510)	$(384,872)	$(172,284)	$ -	$ -	$ -
Debt Service (Principal & Interest 2014-2023)	$ -	$ -	$ -	$(683,691)	$(241,078)	$ -
Capital Contributions/ Contribution in Aid of Construction	$(345,973)	$(194,523)	$ -	$(438,933)	$(454,920)	$(579,170)
Net Cash Flow	***$1,187,329***	***$2,168,517***	***$2,345,464***	***$1,588,526***	***$2,632,974***	***$3,546,425***

Assumptions:

Revenue and expense projections based upon average annual growth rate, then adjusted using CPI in historical years

Airport operations revenue projected at annual rate of 1.6%

Property lease/rental operations revenue projected at annual rate of 5.17%

General operations expense projected at annual rate of 4.51%

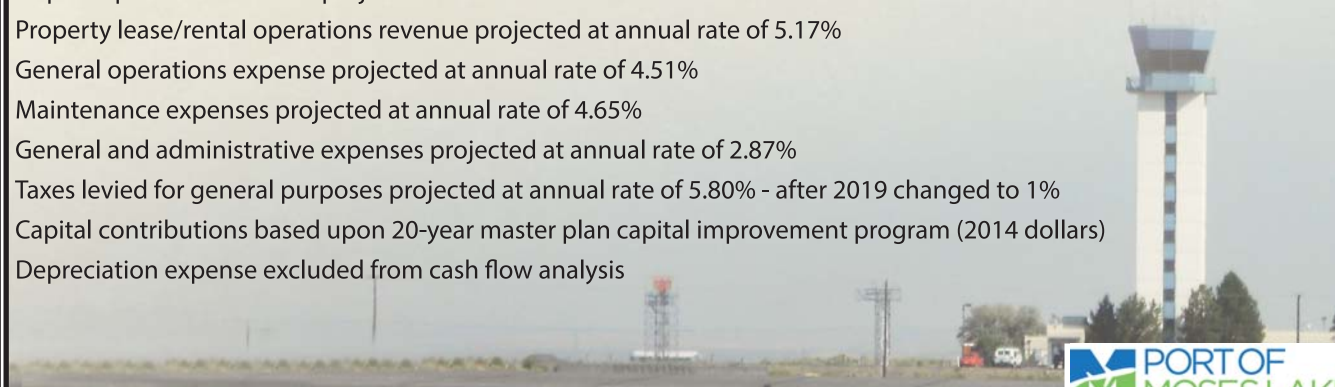
Maintenance expenses projected at annual rate of 4.65%

General and administrative expenses projected at annual rate of 2.87%

Taxes levied for general purposes projected at annual rate of 5.80% - after 2019 changed to 1%

Capital contributions based upon 20-year master plan capital improvement program (2014 dollars)

Depreciation expense excluded from cash flow analysis



PORT OF MOSES LAKE

Source: Airport Financial Records

Exhibit 6B
NET CASH FLOW

Grant Assurance #24 – Fee and Rental Structure: Requires the airport sponsor to set fee, lease rates, and other charges that are directed at making the airport as self-sustaining as possible. Airport sponsors must impose fair market value charges for noncommercial uses of airport property, but aeronautical user charges may be less than fair market value. As demonstrated, the fee and rental structure for airport property and facilities is fair and equitable.

Grant Assurance #25 – Airport Revenues: Restricts the use of airport revenues generated by the airport and local taxes on aviation fuel to be expended for the capital or operating costs of the airport, the local airport system, or other facilities owned or operated by the airport sponsor, which directly and substantially relate to the actual air transportation of passengers or property or noise mitigation efforts. Under the *Single Audit Act of 1984*, the airport must conduct an annual audit and assure the government that airport funds have been properly used. In general, revenue generated by the airport may not be diverted to functions unrelated to the operation and maintenance of the airport. Examples of revenue diversion include:

a) General economic development;
b) Marketing and promotional activities unrelated to the airport;
c) Payments in lieu of taxes or other assessments that exceed the value of services;
d) Payments to compensate sponsoring governmental bodies for lost tax revenues exceeding stated tax rates; and
e) Direct or indirect payments of airport revenues beyond that which is required to pay for services and facilities provided to the airport.

The Port of Moses Lake meets all requirements for financial auditing.

SOLID WASTE RECYCLING PLAN

This section presents a Solid Waste Recycling Plan (Plan) for Grant County International Airport which meets the requirements of Section 133 of the *FAA Modernization and Reform Act* of 2012. Consistent with Section 133, the Plan addresses the following issues:

- The feasibility of solid waste recycling at the airport;
- Minimizing the generation of solid waste at the airport;
- Operation and maintenance requirements;
- A review of waste management contracts; and
- The potential for cost savings or the generation of revenue.

The Port of Moses Lake only controls solid waste collection and recycling in the terminal building, at the airport maintenance facilities, and at the ARFF facility. All other tenants on the Airport contract independently with Consolidated Disposal Service (CDSI), the company providing waste disposal and recycling services to much of Grant County. The tenants within the terminal building include: Million Air (the fixed base operator), the airport café, and administration offices. The Port of Moses Lake has a six-yard dumpster at the terminal building for trash and a separate dumpster for cardboard recycling. The airport maintenance facility has an eight-yard dumpster for trash and a metal recycling dumpster. The trash and recycling dumpsters are emptied once each week. The ARFF facility collects used oil for recycling.

Grant County has established goals in the *Grant County Solid Waste Management Plan Update – May 2008* to increase the amount of recyclable materials in the County from an estimated 19 percent to 40 percent through a three-tiered effort over multiple years. The existing landfill is near Ephrata and had an estimated life of 20 years (in 2008). Multiple drop box sites have been located throughout the County; however, several of these locations are scheduled to close on July 1, 2014. The landfill and all drop box sites accept recycling in addition to trash. County-wide events are held two or three times each year to accept household hazardous waste.

The County's three-tiered recommendations for increasing the percentage of waste material to be recycled included:

First Tier:

- Develop a more extensive education and promotion campaign;
- Improve and expand collection and recycling drop-off sites;
- Expand paper collection to more commercial customers; and
- Provide on-site technical assistance to commercial customers.

It was estimated that these efforts would increase the recycling rate by 6 percent.

Second Tier:

- Expand drop-off sites to accept wood and organic waste;
- Develop a construction and debris (C&D) and glass drop-off facility at the landfill;
- Implement a pay-as-you throw rate structure.

It was estimated that these additional programs would increase the recycling rate by 11 percent.

Third Tier:

- Support efforts to increase organics recycling in Grant County by expanding compost facilities and developing a residential curbside compost program.

It was estimated that this program would increase the recycling rate by 5 percent.

The total six-year cost projections for the recommended programs included operation and capital costs, with the most costly items being the annual operating costs associated with the C&D and glass drop-off facility at the landfill and the residential curbside compost program. The operating costs for the C&D/glass drop-off facility were assigned to years 4 through 6, while the operating cost of the residential organics collection was assigned in year 6.

ESTABLISHING A RECYCLING PROGRAM FOR THE AIRPORT

The Environmental Protection Agency (EPA) has developed a multi-step program for establishing a successful airport recycling program:

- Obtain commitment from upper management;
- Organize a green team/recycling coordinator;
- Identify types and sources of waste;
- Asses current waste collection contracts;
- Develop a plan;
- Educate staff and customers;
- Monitor and refine the plan;
- Measure performance;
- Promote successes; and
- Expand the program.

Management support is crucial to developing and sustaining the recycling program since management must authorize team members' time commitment, responsibilities, and financial investment. Case studies from other airports have indicated that programs can be successful regardless of the size of the airport.

A "green team" may consist of individuals from the Airport's tenants, and help in the implementation of the recycling program. Since Grant County has undertaken a recycling program, it may be helpful to include a representative from the Solid Waste Advisory Committee (organized for the *Solid Waste Management Plan Update*) in getting the Airport's program underway. This person would be knowledgeable of local haulers and material markets. The recycling coordinator will help organize, execute, and evaluate the recycling program.

A waste assessment provides qualitative and quantitative data and a baseline to measure progress in future years. Specifically, it will help answer the following questions:

- What areas on the airport generate waste;
- What recyclable material is generated;
- What type of waste is generated in each area;
- How much waste is generated; and
- What are the costs for trash and recycling containers, hauling, and disposal.

Three primary approaches to conducting the waste assessment:

- Records examination;
- Facility walk-through; or
- Waste sort.

Each of the three approaches provides strengths and limitations. The records examination requires the least time and effort but lacks quantitative data for specific waste components. The facility walk-through allows first-hand examination of facility operations but limited identification of wastes generated. The waste sort provides quantitative data on total waste generated but requires more time and effort than other approaches.

The Port of Moses Lake has a contract with CDSI for waste collection and recycling (cardboard only). The total annual cost is $6,800, with cardboard recycling contributing $180 per year of the total cost. Additional costs may be accrued if trash is taken to the Transfer Center. The CDSI Transfer and Recycling Center is located at 9524 Road 7 NE, between Randolph Road and Stratford Road, immediately adjacent to the eastern perimeter of the airport property. This facility accepts the following waste materials:

- Corrugated cardboard;
- Newspaper;
- Aluminum cans;
- Glass bottles and jars;
- Waste oil;
- Used automobile batteries;
- Scrap metal (fee);
- Latex paint;
- Appliances (fee); and
- Used antifreeze.

Since this facility is also designated as an E-Cycle Washington Collection site, it offers free recycling of laptops, e-readers, all-in-ones, computer towers, monitors, and televisions to households, small businesses, small governments, special purpose districts, school districts, and non-profits.

The City of Moses Lake offers all residents a commingled curbside recycling program. This program accepts plastics, newspaper and mixed paper, and metal and aluminum cans. It also accepts corrugated cardboard and glass bottles and jars if they are placed in separate containers. The Airport falls outside of the City collection area (which only extends to Randolph Road).

A recycling directory provides other options for waste recycling to residents of Grant County and the Moses Lake area. Grant County encourages residents to reduce waste by recycling, choosing items with the least amount of packaging, removing oneself from junk mail lists, leaving grass clippings on the yard, donating unwanted items to Goodwill or local thrift shops, and cutting back on subscriptions to newspapers and magazines.

Since the Port of Moses Lake only controls a limited number of tenants through their waste contract, the initial target for recyclable materials should be the EPA's "big five"—paper, plastic, glass, cardboard, and aluminum. Of these five categories, the two providing substantial environmental benefits and possible financial return include corrugated cardboard and aluminum. With corrugated cardboard already being collected in a separate dumpster at the terminal building, a separate recycling stream should be initially established for aluminum cans. Separate bins may also be considered for paper, plastic, and glass in the terminal building. However, since CDSI does not offer commercial collection (other than for corrugated cardboard), the recyclables will need to be collected and dropped at the Recycling Center on a regularly scheduled basis by the Port of Moses Lake.

The best collection bins should have clear labeling and design features that limit contamination. Placement of bins in high traffic areas and next to trash cans will also reduce contamination. Since Grant County has already established goals for increasing the percentage of recyclable materials in the waste stream, the Airport should adopt similar goals.

Educating tenants and customers of the availability of recycling in the terminal building is also important. Informational signs should be placed near the bins and external publicity through press releases to local news media should be used to inform local residents.

The recycling coordinator will need to monitor use of the bins, collections schedules, and educational material. Regular visual inspection of dumpsters and trash cans can identify early problems. The amount of recycling material collected should be monitored and recorded to determine the effectiveness of the program. Many customers of airport services have come to expect recycling bins in public places. A successful program reflects positively on the airport's environmental stewardship, and it encourages employees and customers to continue to contribute to the program's growth.

The following resources will aid the Airport in establishing a successful recycling program:

- *Recycling, Reuse and Waste Reduction at Airports: A Synthesis Document*. Prepared by the Office of Airports, Federal Aviation Administration, April 24, 2013. Accessible at: http://www.faa.gov/airports/resources/publications/reports/environmental/media/RecyclingSynthesis2013.pdf

- *Developing and Implementing an Airport Recycling Program*. Prepared by the Environmental Protection Agency (EPA 530-K-08-002). April, 2009. Accessible at: http://www.epa.gov/wastes/conserve/tools/rogo/documents/airport-recycling-guide.pdf

SUMMARY

The best means to begin implementation of the recommendations in this Master Plan is to first recognize that planning is a continuous process that does not end with completion and approval of this document. The issues upon which this Master Plan is based will remain valid for a number of years. Of particular importance is to address any issues that do not confirm to FAA standards. This includes removal of the line-of-sight issue for Runway 14L-32R, relocation of Runway 18-36, and closure of parallel Runway 14R-32L. The primary goal is for the Airport to best serve the air transportation needs of the region, while continuing to be economically self-sufficient.

The actual need for facilities is most appropriately established by airport activity levels rather than a specified date. For example, projections have been made as to when additional general aviation hangars may be needed at the Airport. In reality, however, the timeframe in which the development is needed may be substantially different. Actual demand may be slower to develop than expected. On the other hand, high levels of demand may establish the need to accelerate development. Although every effort has been made in this master planning process to conservatively estimate when facility development may be needed, aviation demand will dictate when facility improvements need to be implemented.

The real value of a usable master plan is in keeping the issues and objectives in the minds of the managers and decision-makers so that they are better able to recognize change and its effect. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in this Master Plan will impact the time period that the plan remains valid. The demand-based format used in this plan is intended to reduce the need for formal and costly updates by simply adjusting the timing. Updating can be done by the manager, thereby improving the plan's effectiveness.

In summary, the planning process requires airport management to consistently monitor the progress of the Airport in terms of aircraft operations and based aircraft. Analysis of aircraft demand is critical to the timing and need for new airport facilities. The information obtained from continually monitoring Airport activity will provide the data necessary to determine if the development schedule should be accelerated or decelerated.

PORT OF MOSES LAKE

Appendix A

GLOSSARY OF TERMS

Glossary of Terms

A

ABOVE GROUND LEVEL: The elevation of a point or surface above the ground.

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): See declared distances.

ADVISORY CIRCULAR: External publications issued by the FAA consisting of nonregulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

AIR CARRIER: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

AIRCRAFT: A transportation vehicle that is used or intended for use for flight.

AIRCRAFT APPROACH CATEGORY: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- Category A: Speed less than 91 knots.
- Category B: Speed 91 knots or more, but less than 121 knots.
- Category C: Speed 121 knots or more, but less than 141 knots.
- Category D: Speed 141 knots or more, but less than 166 knots.
- Category E: Speed greater than 166 knots.

AIRCRAFT OPERATION: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

AIRCRAFT OPERATIONS AREA (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

AIRCRAFT RESCUE AND FIRE FIGHTING: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

AIRFIELD: The portion of an airport which contains the facilities necessary for the operation of aircraft.

AIRLINE HUB: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

AIRPLANE DESIGN GROUP (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- Group I: Up to but not including 49 feet.
- Group II: 49 feet up to but not including 79 feet.
- Group III: 79 feet up to but not including 118 feet.
- Group IV: 118 feet up to but not including 171 feet.
- Group V: 171 feet up to but not including 214 feet.
- Group VI: 214 feet or greater.

AIRPORT AUTHORITY: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

AIRPORT BEACON: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

AIRPORT CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

AIRPORT ELEVATION: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

AIRPORT IMPROVEMENT PROGRAM: A program authorized by the Airport and Airway

Improvement Act of 1982 that provides funding for airport planning and development.

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRPORT LAYOUT PLAN (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

AIRPORT LAYOUT PLAN DRAWING SET: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

AIRPORT MASTER PLAN: The planner's concept of the long-term development of an airport.

AIRPORT MOVEMENT AREA SAFETY SYSTEM: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

AIRPORT OBSTRUCTION CHART: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an airport.

AIRPORT REFERENCE CODE (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

AIRPORT REFERENCE POINT (ARP): The latitude and longitude of the approximate center of the airport.

AIRPORT SPONSOR: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

AIRPORT SURFACE DETECTION EQUIPMENT: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

AIRPORT SURVEILLANCE RADAR: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER: A facility which provides en route air traffic control service to aircraft operating on an IFR flight plan within controlled airspace over a large, multi-state region.

AIRSIDE: The portion of an airport that contains the facilities necessary for the operation of aircraft.

AIRSPACE: The volume of space above the surface of the ground that is provided for the operation of aircraft.

AIR TAXI: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

AIR TRAFFIC CONTROL: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the en route phase of flight.

AIR TRAFFIC CONTROL SYSTEM COMMAND CENTER: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

AIR TRAFFIC HUB: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

AIR TRANSPORT ASSOCIATION OF AMERICA: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

ALERT AREA: See special-use airspace.

ALTITUDE: The vertical distance measured in feet above mean sea level.

ANNUAL INSTRUMENT APPROACH (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

APPROACH LIGHTING SYSTEM (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach and landing.

APPROACH MINIMUMS: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

APPROACH SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

APRON: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

AREA NAVIGATION: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

AUTOMATED TERMINAL INFORMATION SERVICE (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

AUTOMATIC WEATHER OBSERVATION STATION (AWOS): Equipment used to automatically record weather conditions (i.e. cloud height, visibility, wind speed and direction, temperature, dew point, etc.)

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

AVIGATION EASEMENT: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

B

BASE LEG: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

BASED AIRCRAFT: The general aviation aircraft that use a specific airport as a home base.

BEARING: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

BLAST FENCE: A barrier used to divert or dissipate jet blast or propeller wash.

BLAST PAD: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

C

CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

CARGO SERVICE AIRPORT: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

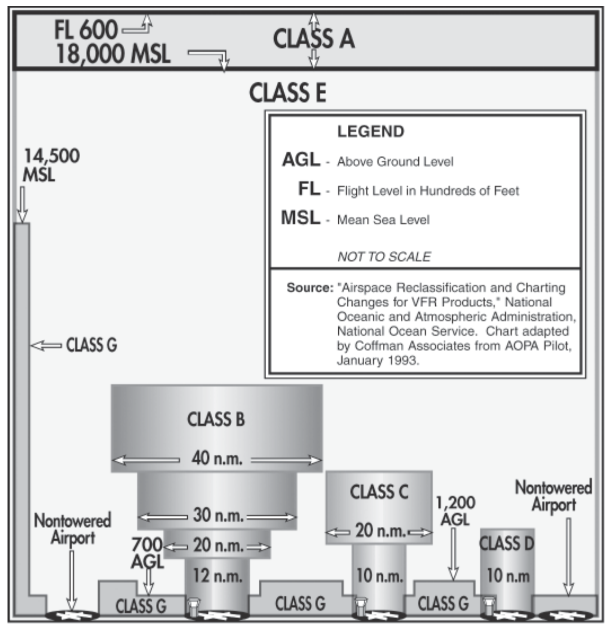
CATEGORY I: An Instrument Landing System (ILS) that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 200 feet above the horizontal plane containing the runway threshold.

CATEGORY II: An ILS that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 100 feet above the horizontal plane containing the runway threshold.

CATEGORY III: An ILS that provides acceptable guidance information to a pilot from the coverage limits of the ILS with no decision height specified above the horizontal plane containing the runway threshold.

CEILING: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

CIRCLING APPROACH: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.



CLASS A AIRSPACE: See Controlled Airspace.

CLASS B AIRSPACE: See Controlled Airspace.

CLASS C AIRSPACE: See Controlled Airspace.

CLASS D AIRSPACE: See Controlled Airspace.

CLASS E AIRSPACE: See Controlled Airspace.

CLASS G AIRSPACE: See Controlled Airspace.

CLEAR ZONE: See Runway Protection Zone.

COMMERCIAL SERVICE AIRPORT: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

COMMON TRAFFIC ADVISORY FREQUENCY: A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

COMPASS LOCATOR (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

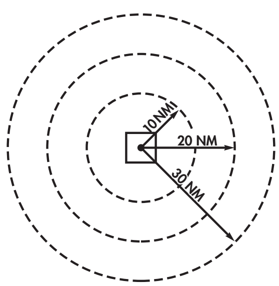
CONICAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONTROLLED AIRPORT: An airport that has an operating airport traffic control tower.

CONTROLLED AIRSPACE: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- **CLASS A**: Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

- **CLASS B**: Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.



- **CLASS C**: Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

- **CLASS D**: Generally, that airspace from the surface to 2,500 feet above the air port elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure . Unless otherwise authorized, all persons must establish two-way radio communication.

- **CLASS E**: Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

- **CLASS G**: Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.

CONTROLLED FIRING AREA: See special-use airspace.

CROSSWIND: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

CROSSWIND COMPONENT: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

D

DECIBEL: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

DECISION HEIGHT/DECISION ALTITUDE: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

DECLARED DISTANCES: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- **TAKEOFF RUNWAY AVAILABLE (TORA)**: The runway length declared available and suitable for the ground run of an airplane taking off.

- **TAKEOFF DISTANCE AVAILABLE (TODA)**: The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA.

- **ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)**: The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff.

- **LANDING DISTANCE AVAILABLE (LDA)**: The runway length declared available and suitable for landing.

DEPARTMENT OF TRANSPORTATION: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

DISCRETIONARY FUNDS: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

DISPLACED THRESHOLD: A threshold that is located at a point on the runway other than the designated beginning of the runway.

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.

DNL: The 24-hour average sound level, in Aweighted decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

DOWNWIND LEG: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

E

EASEMENT: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

ELEVATION: The vertical distance measured in feet above mean sea level.

ENPLANED PASSENGERS: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

ENPLANEMENT: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

ENTITLEMENT: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

ENVIRONMENTAL ASSESSMENT (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

ENVIRONMENTAL AUDIT: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects are legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

ESSENTIAL AIR SERVICE: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

FEDERAL AVIATION REGULATIONS: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

FEDERAL INSPECTION SERVICES: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

FINAL APPROACH: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

FINAL APPROACH AND TAKEOFF AREA (FATO). A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

FINAL APPROACH FIX: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

FINDING OF NO SIGNIFICANT IMPACT (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

FIXED BASE OPERATOR (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

FLIGHT LEVEL: A measure of altitude used by aircraft flying above 18,000 feet. Flight levels are indicated by three digits representing the pressure altitude in hundreds of feet. An airplane flying at flight level 360 is flying at a pressure altitude of 36,000 feet. This is expressed as FL 360.

FLIGHT SERVICE STATION: An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides pre-flight and in-flight advisory services to pilots through air and ground based communication facilities.

FRANGIBLE NAVAID: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

G

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

GENERAL AVIATION AIRPORT: An airport that provides air service to only general aviation.

GLIDESLOPE (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or

2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

GLOBAL POSITIONING SYSTEM (GPS): A system of 48 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

GROUND ACCESS: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

H

HELIPAD: A designated area for the takeoff, landing, and parking of helicopters.

HIGH INTENSITY RUNWAY LIGHTS: The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

HIGH-SPEED EXIT TAXIWAY: A long radius taxiway designed to expedite aircraft turning off the runway after landing (at speeds to 60 knots), thus reducing runway occupancy time.

HORIZONTAL SURFACE: An imaginary obstruction- limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

I

INITIAL APPROACH FIX: The designated point at which the initial approach segment begins for an instrument approach to a runway.

INSTRUMENT APPROACH PROCEDURE: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

INSTRUMENT FLIGHT RULES (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions and the type of flight plan under which an aircraft is operating.

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide Slope.
3. Outer Marker.
4. Middle Marker.
5. Approach Lights.

INSTRUMENT METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

ITINERANT OPERATIONS: Operations by aircraft that are not based at a specified airport.

K

KNOTS: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

L

LANDSIDE: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

LANDING DISTANCE AVAILABLE (LDA): See declared distances.

LARGE AIRPLANE: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

LOCAL AREA AUGMENTATION SYSTEM: A differential GPS system that provides localized measurement correction signals to the basic GPS signals to improve navigational accuracy integrity, continuity, and availability.

LOCAL OPERATIONS: Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.

LOCAL TRAFFIC: Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from the local practice areas, or aircraft executing practice instrument approach procedures. Typically, this includes touch and-go training operations.

LOCALIZER: The component of an ILS which provides course guidance to the runway.

LOCALIZER TYPE DIRECTIONAL AID (LDA): A facility of comparable utility and accuracy to a localizer, but is not part of a complete ILS and is not aligned with the runway.

LONG RANGE NAVIGATION SYSTEM (LORAN): Long range navigation is an electronic navigational aid which determines aircraft position and speed by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran is used for en route navigation.

LOW INTENSITY RUNWAY LIGHTS: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

MEDIUM INTENSITY RUNWAY LIGHTS: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MICROWAVE LANDING SYSTEM (MLS): An instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS: Aircraft operations that are performed in military aircraft.

MILITARY OPERATIONS AREA (MOA): See special-use airspace

MILITARY TRAINING ROUTE: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

MISSED APPROACH COURSE (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

1. When the aircraft has descended to the decision height and has not established visual contact; or

2. When directed by air traffic control to pull up or to go around again.

MOVEMENT AREA: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

N

NATIONAL AIRSPACE SYSTEM: The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS: The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

NATIONAL TRANSPORTATION SAFETY BOARD: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

NAUTICAL MILE: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

NAVAID: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc.)

NAVIGATIONAL AID: A facility used as, available for use as, or designed for use as an aid to air navigation.

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NON-DIRECTIONAL BEACON (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his or her bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NON-PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

NOTICE TO AIRMEN: A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

O

OBJECT FREE AREA (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

OBSTACLE FREE ZONE (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

ONE-ENGINE INOPERABLE SURFACE: A surface emanating from the runway end at a slope ratio of 62.5:1. Air carrier airports are required to maintain a technical drawing of this surface depicting any object penetrations by January 1, 2010.

OPERATION: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

OUTER MARKER (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

P

PILOT CONTROLLED LIGHTING: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

PRECISION APPROACH: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- **CATEGORY I (CAT I)**: A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.

- **CATEGORY II (CAT II)**: A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.

- **CATEGORY III (CAT III)**: A precision approach which provides for approaches with minima less than Category II.

PRECISION APPROACH PATH INDICATOR (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

PRECISION APPROACH RADAR: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

PRECISION OBJECT FREE AREA (POFA): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFA is a clearing standard which requires the POFA to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA applies to all new authorized instrument approach procedures with less than 3/4 mile visibility.

PRIMARY AIRPORT: A commercial service airport that enplanes at least 10,000 annual passengers.

PRIMARY SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

PROHIBITED AREA: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Service Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

R

RADIAL: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

REGRESSION ANALYSIS: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

REMOTE COMMUNICATIONS OUTLET (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering en route clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

REMOTE TRANSMITTER/RECEIVER (RTR): See remote communications outlet. RTRs serve ARTCCs.

RELIEVER AIRPORT: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

RESTRICTED AREA: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used en route and for approaches to an airport.

RUNWAY: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

RUNWAY ALIGNMENT INDICATOR LIGHT: A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

RUNWAY DESIGN CODE: A code signifiying the design standards to which the runway is to be built.

RUNWAY END IDENTIFICATION LIGHTING (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

RUNWAY GRADIENT: The average slope, measured in percent, between the two ends of a runway.

RUNWAY PROTECTION ZONE (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

RUNWAY REFERENCE CODE: A code signifying the current operational capabilities of a runway and associated taxiway.

RUNWAY SAFETY AREA (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

RUNWAY VISIBILITY ZONE (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of- site from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

RUNWAY VISUAL RANGE (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

S

SCOPE: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

SEGMENTED CIRCLE: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

SHOULDER: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder does not necessarily need to be paved.

SLANT-RANGE DISTANCE: The straight line distance between an aircraft and a point on the ground.

SMALL AIRCRAFT: An aircraft that has a maximum certified takeoff weight of up to 12,500 pounds.

SPECIAL-USE AIRSPACE: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- **ALERT AREA**: Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.

- **CONTROLLED FIRING AREA**: Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.

- **MILITARY OPERATIONS AREA (MOA)**: Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.

- **PROHIBITED AREA**: Designated airspace within which the flight of aircraft is prohibited.

- **RESTRICTED AREA**: Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.

- **WARNING AREA**: Airspace which may contain hazards to nonparticipating aircraft.

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

STANDARD INSTRUMENT DEPARTURE PROCEDURES: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or en route airspace.

STANDARD TERMINAL ARRIVAL ROUTE (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

STOP-AND-GO: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

STOPWAY: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

STRAIGHT-IN LANDING/APPROACH: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

T

TACTICAL AIR NAVIGATION (TACAN): An ultrahigh frequency electronic air navigation system which provides suitably-equipped aircraft a continuous indication of bearing and distance to the TACAN station.

TAKEOFF RUNWAY AVAILABLE (TORA): See declared distances.

TAKEOFF DISTANCE AVAILABLE (TODA): See declared distances.

TAXILANE: The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

TAXIWAY: A defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY DESIGN GROUP: A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

TAXIWAY SAFETY AREA (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TERMINAL INSTRUMENT PROCEDURES: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

TERMINAL RADAR APPROACH CONTROL: An element of the air traffic control system responsible for monitoring the en-route and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

TETRAHEDRON: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

THRESHOLD: The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

TOUCH-AND-GO: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and go is recorded as two operations: one operation for the landing and one operation for the takeoff.

TOUCHDOWN: The point at which a landing aircraft makes contact with the runway surface.

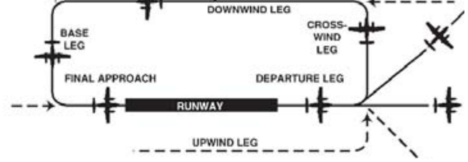
TOUCHDOWN AND LIFT-OFF AREA (TLOF): A load bearing, generally paved area, normally centered in the FATO, on which the helicopter lands or takes off.

TOUCHDOWN ZONE (TDZ): The first 3,000 feet of the runway beginning at the threshold.

TOUCHDOWN ZONE ELEVATION (TDZE): The highest elevation in the touchdown zone.

TOUCHDOWN ZONE (TDZ) LIGHTING: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100- foot intervals. The basic system extends 3,000 feet along the runway.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.



U

UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

UNCONTROLLED AIRSPACE: Airspace within which aircraft are not subject to air traffic control.

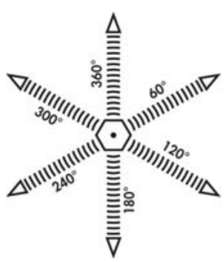
UNIVERSAL COMMUNICATION (UNICOM): A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOM's are shown on aeronautical charts and publications.

UPWIND LEG: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

V

VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/ OMNIDIRECTIONAL RANGE (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.



VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE/ TACTICAL AIR NAVIGATION (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

VICTOR AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

VISUAL APPROACH: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is on path if he sees red/white, above path if white/white, and below path if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual guide paths to the same runway.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

VISUAL METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

W

WARNING AREA: See special-use airspace.

WIDE AREA AUGMENTATION SYSTEM: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

AC: advisory circular

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automatic weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LOM: compass locator at outer marker

LORAN: long range navigation

MALS: medium intensity approach lighting system with indicator lights

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

NAVAID: navigational aid

NDB: nondirectional radio beacon

NM: nautical mile (6,076.1 feet)

NPES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rule making

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAC: planning advisory committee

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCL: pilot-controlled lighting

PIW public information workshop

PLASI: pulsating visual approach slope indicator

POFA: precision object free area

PVASI: pulsating/steady visual approach slope indicator

PVC: poor visibility and ceiling

RCO: remote communications outlet

RRC: Runway Reference Code

RDC: Runway Design Code

REIL: runway end identification lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: runway safety area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TDG: Taxiway Design Group

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: VOR and TACAN collocated

PORT OF MOSES LAKE

Appendix B

SPECIAL OPERATING PROCEDURE

Appendix B
SPECIAL OPERATING PROCEDURE

A Letter of Agreement among air traffic control, Big Bend Community College, and the Airport establishes a Special Operating Procedure (described in detail in Chapter Four - Alternatives). The procedure permits air traffic control to operate Runways 18-36 and 14L-32R simultaneously by instructing pilots to follow the specified procedures. The major effect of the procedure is that pilots departing on Runway 36 to the north must turn to the west prior to crossing parallel Runway 14R-32L. The Letter of Agreement is included in this appendix.

Also included in this appendix is FAA Memorandum, *National Transportation Safety Board Safety Recommendation A-13-024*, dated September 3, 2013. The FAA memo indicates that simultaneous operations are acceptable on runways with converging runway centerlines if the intersection is greater than one nautical mile beyond the departure end of either runway. This memo serves as the basis for the planned design and relocation of Runway 18-36.

LETTER OF AGREEMENT

EFFECTIVE: July 1, 2013

SUBJECT: Big Bend Community College Operating Procedures at Grant County Airport.

1. **PURPOSE:** This letter of agreement establishes procedures for Grant County Air Traffic Control Tower (MWH Tower) and Big Bend Community College (BBCC) aircraft operating at the Grant County Airport.

2. **CANCELLATION:** Grant County Air Traffic Control Tower and Port of Moses Lake letter of agreement dated November 1, 1997.

3. **RESPONSIBILITIES:**

a. BBCC must notify Tower of any change in operations that may necessitate a change to this Letter of Agreement.

b. Instructions received over the ATC frequencies supersede all instructions in this letter of Agreement.

4. **BACKGROUND:** Because of the high volume of training aircraft at and around the Grant County airport, pilots and controllers should expect odd requests. Requests could include: random runway assignments, random traffic pattern entries, short/extended approaches, spot landings, and multiple landings.

5. **PROCEDURE:**

a. CALL SIGNS: BBCC aircraft and MWH Tower must:

(1) Use the call sign "Big Bend" followed by the last digit or last two digits of the aircraft registration number, or as designated by BBCC. (See Attachment, Page 11)

(2) Big Bend call signs must use group form.

Example: "Big Bend Twelve"

(3) Big Bend callsigns shall only be used when VFR and in contact with MWH Tower.

(4) Use aircraft registration number when:

(a) Requesting IFR or VFR practice approaches

(b) Requesting VFR radar traffic advisories

(c) Requesting an IFR flight plan

b. CLEARANCE PROCEDURES: BBCC aircraft must:

(1) Advise Ground Control and Local Control on initial contact of direction of flight or request for touch and go's.

(2) Advise Ground Control on initial contact if requesting radar traffic advisories.

c. TAXI PROCEDURES:

(1) Runway 36 taxi procedures:

(a) When ready for departure, hold short of Runway 4 and contact tower on frequency indicated in paragraph 5.d. **Example taxi clearance: "Runway 36 taxi, hold short of Runway 4."**

d. LOCAL CONTROL FREQUENCIES: BBCC Aircraft departing contact tower:

(1) Runway 4 – 118.25

(2) Runway 22 - 128.0

(3) Runway 32R – 118.25

(4) Runway 36 – 128.0

e. DEPARTURE PROCEDURES:

NOTE: *There are no altitude restrictions on departure. Tower will issue an altitude restriction if one is needed.*

(1) Runway 4: When necessary for traffic expect the Tank Farm Departure (See paragraph 5.e.(4)(a).

(2) Runway 18 and 22: Eastbound, Expect the Tank Farm Departure (See paragraph 5.e.(4)(b)) or Left/Right crosswind departure. (See paragraph 5.e.(5))

(3) Runway 36: All departures must complete a left crosswind turn south west of the west edge of Runway 14R/32L.

(4) Tank Farm Departure:

(a) Runway 4. (See Attachment, Image 1)

1) Tower must approve an early turn out.

2) Continue runway heading until east of Runway 32R centerline.

3) Turn right direct to the *Tank Farm;* aircraft must remain south and east of Runway 27 centerline.

4) After crossing the *Tank Farm*, fly eastbound along Road 7 NE.

(b) Runway 18 or 22. (See Attachment, Image 2)

1) Cross the departure end of the runway.

2) Turn left to overfly the college; aircraft must remain east of the lake.

3) Fly directly to the numbers of Runway 32R.

4) After crossing the numbers of Runway 32R, then turn right direct to the *Tank Farm*.

5) After crossing the *Tank Farm*, fly eastbound along Road 7 NE.

(5) Left or Right Crosswind Departure, off of Runway 22:

(a) Turn crosswind to remain west of the west edge of Runway 32R until further clearance is received or until outside of the MWH Class D airspace.

f. ARRIVAL PROCEDURES:

(1) Runway 18 arrivals must keep base and final legs west of the west edge of Runway 14R/32L.

(2) Contact the tower in compliance with FAR 91.129, Operations in Class D airspace, and execute the following unless other instructions are given.

(a) From the northwest, track to *Rocky Ford*, then: (See Attachment, Image 3)

1) Runway 18: Enter a right base

2) Runway 4 and 36 – Direct the Gravel Pit. Follow route 17 to enter left base

(b) From the southwest, track to the *Blue Silos.* Direct to *West Shore* then: (See Attachment, Image 4)

1) Runway 4 – Straight in to Runway 4

2) Runway 18 – Direct to *Abeam Airman's Beach*, then enter right downwind

3) Runway 36 – Enter left base

(c) From the south, track to the *Golf Course* then: (See Attachment, Image 5)

1) Runway 4 – Enter right base

2) Runway 18 – Direct *Moses Pointe Golf Course*, then enter right downwind

3) Runway 36 – proceed straight in

(d) From the northeast, track to *Black Rock Lake.* (See Attachment, Image 6)

(e) From the southeast, track to the *Industrial Area*, then direct to the *Tank Farm*. (See Attachment Image 7)

g. HELICOPTER ONLY PROCEDURES:

(1) Taxiway G shall be the primary landing area for helicopter traffic patterns. The traffic pattern must remain south of Runway 27, southeast of Runway 22 and northeast of Runway 32R at all times. (See Attachment, Image 8)

(a) Downwind leg may be flown at pilot's discretion.

(b) Landing Taxiway G southbound.

1) Base turn must be made south of the gun bunker.

2) Crosswind turn must be made north of the T-hangers

(c) Landing Taxiway G northbound.

1) Crosswind turn must be made south of the gun bunker.

2) Base Turn must be made north of the T-hangers.

(2) Hover Practice Areas: (See Attachment, Image 9)

(a) North Hover Practice Area is an area north of Runway 4, southwest of Runway 32R, east of Runway 36 and north of the radar antenna.

(b) South Hover Practice Area is an area northwest of Runway 4, east of Runway 36, southwest of 32R, and south of the radar antenna.

Grant County Air Traffic Control Tower, Big Bend Community College, and Port of Moses Lake

6. ATTACHMENT: Aerial Graphics, Reporting Points, and Callsigns

Joe P. Carrigan Air Traffic Manager, Grant County ATCT	Patrick Jones Executive Director, Port of Moses Lake
John Swedburg Aviation Division Chairman, Big Bend Community College	Rich Mueller Director of Facilities and Operations, Port of Moses Lake

Grant County Air Traffic Control Tower and Big Bend Community College and Port of Moses Lake

Attachment 1: Aerial Graphics, Reporting Points, and Callsigns

Image 1

Tank Farm Departure off of Runway 4

Image 2

Tank Farm Departure off of Runway 18 and 22

Grant County Air Traffic Control Tower and Big Bend Community College and Port of Moses Lake

Attachment 1: Aerial Graphics, Reporting Points, and Callsigns

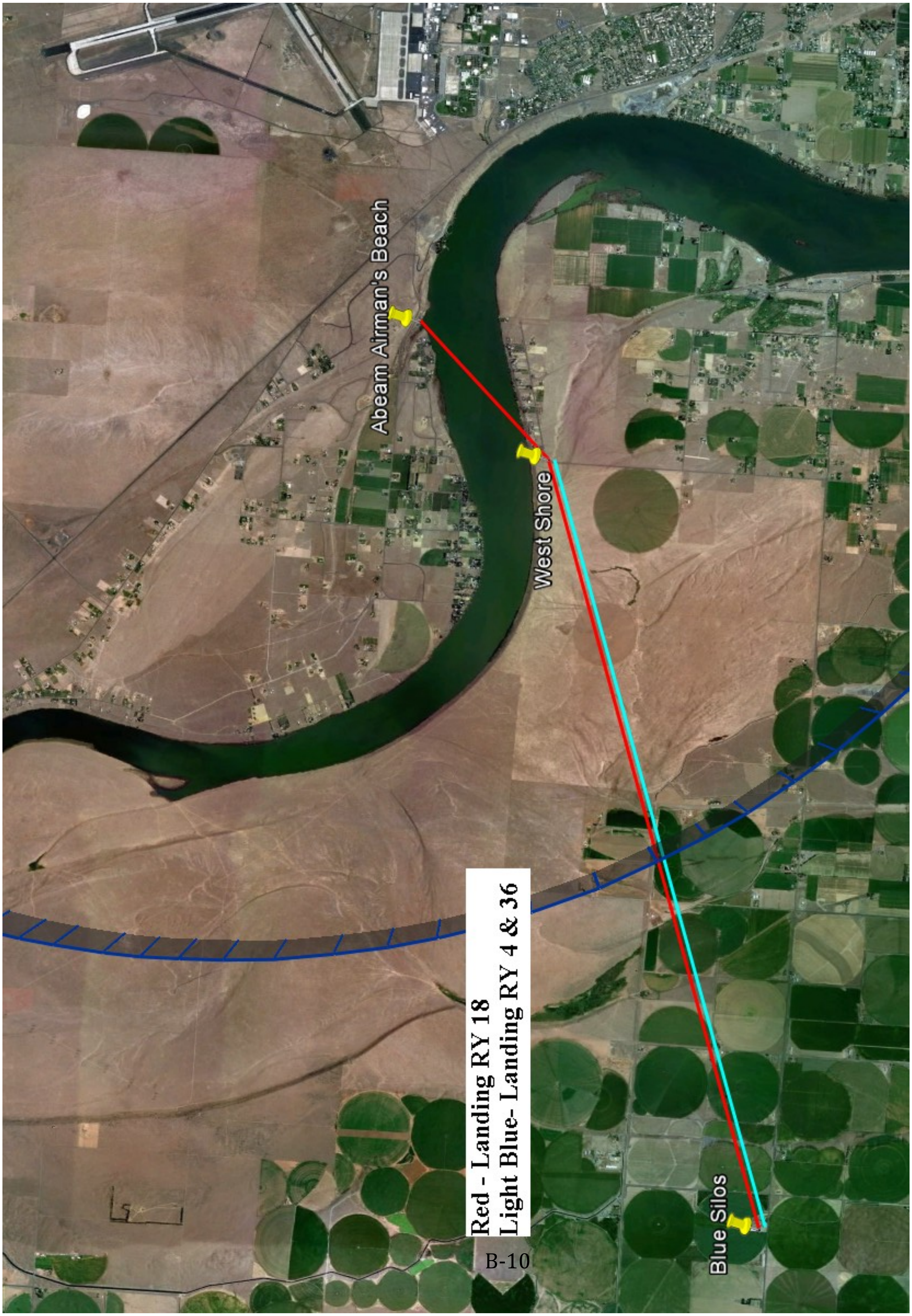
Image 3

North West Airport Arrival Area

Grant County Air Traffic Control Tower and Big Bend Community College and Port of Moses Lake

Attachment 1: Aerial Graphics, Reporting Points, and Callsigns

Image 4



South West Airport Arrival Area

Image 5

South Airport Arrival Area

Image 6

NE Arrivals Reporting point

Image 7

Tank Farm Arrival from the SE

Grant County Air Traffic Control Tower and Big Bend Community College and Port of Moses Lake

Attachment 1: Aerial Graphics, Reporting Points, and Callsigns

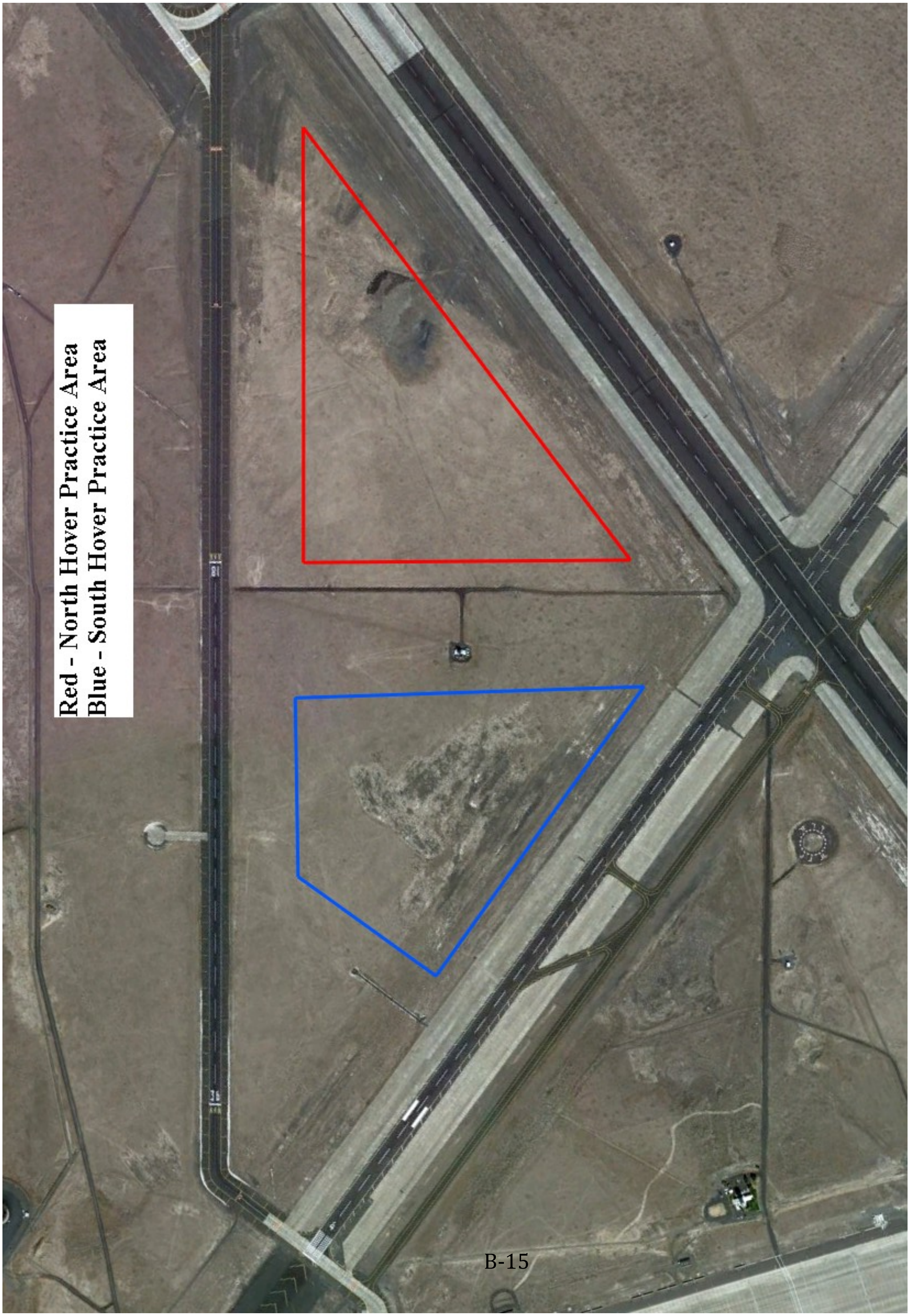
Image 8

Helicopter Pattern to Taxiway G

Grant County Air Traffic Control Tower and Big Bend Community College and Port of Moses Lake

Attachment 1: Aerial Graphics, Reporting Points, and Callsigns

Image 9



Helicopter Hover Practice Areas

REPORTING POINTS: Lat/Longs are approximate and are only given to aid in locating the points on a map.

a. Blue Silos: 47° 8’ 55.5” N/119° 29’ 47.5” W

Group of blue silos NW of the corner of RD 4 NW and Division RD N.

b. West Shore: 47° 10’ 29” N/ 119° 23’ 2” W

Corner of where Panorama Dr. meets RD E NE.

c. Rocky Ford: 47° 15’ 41.5” N/ 119° 27’ 20.5” W

Rocky Ford Creek and the intersection of 17

d. Gravel Pit: 47° 13’ 25.0” N/ 119° 24’ 0.0” W

Gravel pit SE of the corner of 17 and RD 10 NE

e. Airman’s Beach: 47° 11’ 19” N/ 119° 21’ 52” W

Inlet west of airman’s beach.

f. Golf Course: 47° 6’ 22” N/ 119° 21’ 11” W

Golf Course west of downtown and north of I90

g. Moses Pointe Golf Couse: 47° 9’ 12” N/ 119° 21’ 26” W

Northern Golf Course

h. Black Rock Lake: 47° 15’ 16” N/ 119° 10’ 36” W

Lake

i. Tank Farm: 47° 11’ 18” W/ 119° 16’ 47” W

Group of white storage tanks

j. Industrial Area: 47° 8’ 31” N/ 119° 11’ 19” W

NE Building

k. Gun Bunker: 47° 12’ 31.5’N/ 119° 17’ 51.5’W

Gun Bunker on east side of the field.

BBCC College Aircraft Callsigns, Type and Color

BB1	N60501	BE23	Yellow
BB2	N9182S	BE19	Blue
BB3	N60503	BE23	Blue
BB5	N6595R	BE19	Black (black spinner)
BB6	N4506M	BE19	Green
BB7	N2047A	BE19	Red
BB8	N2048A	BE19	Yellow
BB9	N6639D	BE23	Dark Green
BB10	N6010C	BE19	Blue/Black Stripe
BB11	N22711	BE19	Tan
BB12	N5012M	BE19	Black
BB13	OPS		
BB14	N3714X	BE23	Red
BB15	N3715X	BE23	Brown
BB16	N63866	BE23	Blue
BB18	N518BB	PA28	Blue
BB19	N819BA	BE19	Green
BB20	N520BB	PA28	Green
BB26	N18966	BE19	Brown/Tan
BB59	N2059L	BE19	Blue
BONANZA	N82966	BE33	Blue
BONANZA	N82964	BE33	Brown
BONANZA	N262PM	BE33	Blue/Yellow
SEMINOLE	N6084C	PA44	Red
CITABRIA	N36137	CH7	Solid Blue
FLOAT	N7911V	C180	Maroon
Helicopter	N674PB	R22	White
Helicopter	N7059S	R22	White/ Blue Stripe
Helicopter	N8038A	R22	Yellow
Helicopter	N447S	R44	Orange black
Helicopter	N7184G	R44	Red
Helicopter	N901TT	R44	Red

Underline denotes IFR capability

Federal Aviation Administration

Memorandum

Date: SEP 03 2013

To: Terminal Director of Operations

From: Terry Biggio, Vice President, Terminal Operations, AJT-0

Joseph Teixeira, Vice President, ATO Safety and Technical Training, AJI-0

Subject: National Transportation Safety Board Safety Recommendation A-13-024

On July 30, 2013, in response to National Transportation Safety Board (NTSB) Recommendation A-13-024, initial guidance was given to all Air Traffic Organization (ATO) facilities where the local airport geometry included non-intersecting converging runways whose flight paths intersected within 2NM beyond the departure end of either runway. On August 9, 2013, in recognition of the challenges associated with such a large scale change in operating practices, a decision was made to discontinue further local SRM work until a collaborative workgroup could be formed to further study the issues and make recommendations based on a thorough review of the events, available data, and existing Document Change Proposals (DCP). In addition, the collaborative workgroup was tasked to recommend standardized Safety Guidance (SG) intended to assist field facilities in conducting local SRM Panels.

Attached, please find the DCPs for FAA Order 7110.65, *Air Traffic Control*, paragraphs 1-2-1, 3-9-8, and 3-9-9 and FAA Order 7210.3, *Facility Operation and Administration*, paragraph 3-7-3 and 10-3-14. The revised DCPs change the definition of flight path for the purpose of applying intersecting runway separation procedures, to include intersecting flight paths from non-intersecting runways to 1NM beyond the departure end of either runway. These revisions include a note that identifies approved enhanced sequencing/spacing tools that are available to optimize operational efficiencies when applying these procedures.

Lists of Federal Aviation Administration facilities that meet this criterion and are required to conduct a local SRM Panel are included in Attachment 1. In addition, a standardized SG package (Attachment 2) has been developed to assist local SRM panels in conducting these reviews. An FAA/Industry workgroup is scheduled to meet on September 24 and 25, 2013. The scope of this workgroup will be to develop a strategic phased implementation schedule for these new procedures and to prioritize implementation of enhanced sequencing/spacing tools.

The DCPs are scheduled to become effective on January 1, 2014. The collaborative workgroup has recommended a phased in implementation strategy (listed below) of these procedures. Again, specific dates will be determined by the FAA/Industry workgroup.

1. Boston Logan International Airport (BOS), Charlotte Douglas International Airport (CLT), John F. Kennedy International Airport (JFK), Washington Dulles International

Airport (IAD), Houston George Bush Intercontinental Airport (IAH), McCarran International Airport (LAS), O'Hare International Airport (ORD)

2. Remaining Identified Core 30 Airports

3. Remaining Identified Airports

All Facilities requesting the development of approved enhanced sequencing/spacing tools (i.e. Arrival/Departure Window (ADW), ASDE-X Virtual Runway Intersection Points (VRIP) or Converging Runway Display Aid (CRDA) should follow the guidance contained in the attached SG. Requests for enhanced sequencing/spacing tools for specific runway combinations forwarded to ATO Safety and Technical Training, Quality Assurance Office, (AJI-12) by September 16, 2013, will be given priority consideration. Subsequent requests will be processed upon receipt. Facilities developing local procedures should follow the guidance outlined in the attached SG.

A national teleconference is scheduled for Wednesday, September 4, 2013 at 1:00 p.m. EDT to brief the field facilities on the collaborative workgroup recommendations. The teleconference dial-in number is 888-946-3510, and the passcode is 3064506. Facilities are expected to resume their local SRM activities at the conclusion of the national teleconference.

We understand some efficiency losses may result during this transition period. Our air traffic control workforce is the best in the world, and we must ensure we provide them with the appropriate operational and procedural measures that ensure we maintain the safest and most efficient National Airspace System.

Attachments:

Airports Requiring SRM Panels List
ATO Safety Guidance (ATO-SG-13-02)
FAA Order 7110.65 Para. 1-2-1 DCP
FAA Order 7110.65 Para. 3-9-8 DCP
FAA Order 7110.65 Para. 3-9-9 DCP
FAA Order 7110.65 Para. 3-7-3 DCP
FAA Order 7210.3 Para. 10-3-14 DCP

HOU	Houston Hobby
LCH	Lake Charles
MSY	Louis Armstrong INTL
MFE	McAllen FCT
MAF	Midland
NEW	New Orleans Lake Front
SJT	San Angelo FCT
SAT	San Antonio
VCT	Victoria FCT

Western Service Area:	29 Airports

Alaska District:

Airport	Name
ANC	Anchorage

Hawaii-Pacific District:

Airport	Name
HNL	Honolulu HCF
JRF	Kalaeloa FCT
LIH	Lihue FCT

Northwest District:

Airport	Name
IDA	Idaho Falls FCT
LWS	Lewiston FCT
MWH	Moses Lake Grant County
OTH	North Bend FCT
PDT	Pendleton FCT
PIH	Pocatello FCT
PDX	Portland
ALW	Walla Walla FCT

Rocky Mountain District:

Airport	Name
APA	Centinnal
COS	Colorado Springs
DEN	Denver
FTG	Front Range FCT
GTF	Great Falls
OGD	Ogden FCT
SLC	Salt Lake City

Sierra-Pacific District:

Airport	Name
CCR	Concord
APC	Napa
OAK	Oakland

PORT OF MOSES LAKE

Appendix C

FAA FORECAST APPROVAL LETTER

U.S. Department
of Transportation
**Federal Aviation
Administration**

Northwest Mountain Region
Seattle Airports District Office
1601 Lind Avenue S.W., Suite 250
Renton, Washington 98057-3356

March 7, 2014

Mr. Patrick Jones
7810 Andrews Street NE
Moses Lake, WA 98837-3204

Forecast Approval
Grant County International Airport, Moses Lake, WA
AIP- 3-53-0039-039

Dear Mr. Jones:

I have reviewed the Forecasts Chapter 2 of the Master Plan Update submitted by Coffman Associates for Grant County International Airport. The forecasts of based aircraft and aircraft operations, respectively, are hereby approved and accepted for Federal Aviation Administration (FAA) purposes. Please call me at (425)-227-1654 if I can be of further assistance.

Sincerely,

Deepa Parashar
Airport Planner, Washington

cc:
Patrick Taylor, Coffman Associates

PORT OF MOSES LAKE

Appendix D

MODIFICATION TO STANDARDS

Appendix D
MODIFICATION TO STANDARDS

FAA Order 5300.1F, *Modifications to Agency Airport Design, Construction, and Equipment Standards*, provides guidance on the procedures for an airport sponsor to petition the FAA for approval of certain local conditions that do not meet national standards. Various laws and regulations require airport conformance with current FAA standards. Modifications to national standards may be considered for a specific project where unusual conditions preclude compliance with national airport design, construction, materials, or equipment standards. At Grant County International Airport, there are two approved modification to standards, which are included in this appendix.

The first relates to the placement of runway distance-to-go signs and runway exit signs on Runway 14L-32R. The existing signs are currently located 110 feet from the runway edge stripe and the design standard is for them to be placed within 60 feet of the runway edge stripe. The FAA determined that the existing location of the signs provides adequate visibility and an acceptable level of safety, economy, durability, and workmanship. This modification to standard was approved by FAA on August 30, 2002 and is to remain indefinitely.

The second modification to standard relates to the location of the runway edge lights. By standard, runway edge lights are to be located within 10 feet of the edge of the full strength pavement. At Grant County International Airport, the edge lights for Runway 14L-32R are 50 feet from the runway edge. The FAA concurred that because the runway is used by heavy aircraft for training, moving the lights in may increase the potential of breaking the edge lights during touch-and-go operations. As a result, FAA determined that the existing location of the runway edge lights provides adequate visibility and an acceptable level of safety, economy, durability, and workmanship. This modification to standard was approved by FAA on May 4, 1994 and is to remain indefinitely.

Memorandum

U.S. Department of Transport
Federal Aviation Administration

Seattle Airports District Office
1601 Lind Avenue, S.W., Suite 250
Renton, WA 98055-4056

CONCURRENCES
ROUTING SYMBOL 621
INITIALS/SIGNATURE
DATE 9/4
ROUTING SYMBOL 600
INITIALS/SIGNATURE
DATE 8/14/03
ROUTING SYMBOL
INITIALS/SIGNATURE
DATE
ROUTING SYMBOL
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DATE

Subject: **Modification to Standard, Grant County Airport, Moses Lake, Washington Study Number 2002-ANM-4082-NRA**

Date: August 30th 2002

From: Civil Engineer, Washington Section, Seattle Airports District Office, SEA-631

Reply to: Johnson X2655

To: Manager, ANM-200
Manager, SEA-FPO
Manager, ANM-400
Manager, ANM-500

The Port of Moses Lake has requested a modification to standard relating to the placement of runway distance-to-go-signs and runway exit signs on Runway 14L-32R. The existing signs are currently located 110 feet from the runway edge stripe and AC 150/5340-18c recommends they be placed up to 60 feet from the runway edge stripe. The signs are located within 55 feet of the runway edge lights.

The existing pavement for this runway is 300 feet wide and the runway is painted and marked as a 200-foot runway. The signs were placed outside of the 300-foot pavement section, but within the 35-60 foot of the runway edge lights.

ANM- 620. Safety and Standards Branch, has inspected the runway lighting and signs and have concluded the pilots have adequate visibility of these signs and this modification provides for an acceptable level of safety.

Please have the managers listed above review and sign this modification to standards.

Sincerely,

Paul Johnson

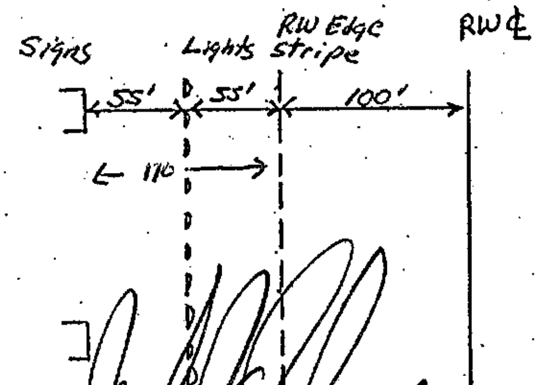
Modification of Standard

a. Facility Standard Affected: FAA Advisory Circular AC: 150/5340-18c, Standards for Airport Sign Systems.

b. Extent of Modification: The Runway 14L-32R signs are located 110 feet from the edge of the runway edge stripping. The advisory circular states that type 3 signs be located 35-60 feet from the defined edge of pavement (from the pavement edge stripe).

c. Discussion of Conditions Requiring Modification: The runway side stripes are painted 100 feet from the runway centerline. Runway edge lights are located 155 feet from the runway centerline. The signs were located 55 feet from the runway edge lights instead of 35-60 feet from the runway edge stripe as recommended by AC 150/5340-18c.. The Port of Moses Lake has requested a modification to standard to leave the signs 110 feet from the runway edge stripes instead of the 35-60 feet recommended by the AC 150/5340-18c.

d. Effect and Duration of Modification: We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship. This modification to standard shall remain indefinitely.



CONCUR: ______________________________ 2/3/03
Manager, Flight Standards Division — Date

CONCUR: ______________________________ 9/8/02
Manager, Airway Facilities Division — Date

CONCUR: ______________________________ ________
Manager, Air Traffic Division — Date

CONCUR: ______________________________ 8/14/03
Manager, Seattle Airports District Office — Date

Modification of Standard

a. Facility Standard Affected: FAA Advisory Circular AC: 150/5340-18c, Standards for Airport Sign Systems.

b. Extent of Modification: The Runway 14L-32R signs are located 110 feet from the edge of the runway edge stripping. The advisory circular states that type 3 signs be located 35-60 feet from the defined edge of pavement (from the pavement edge stripe).

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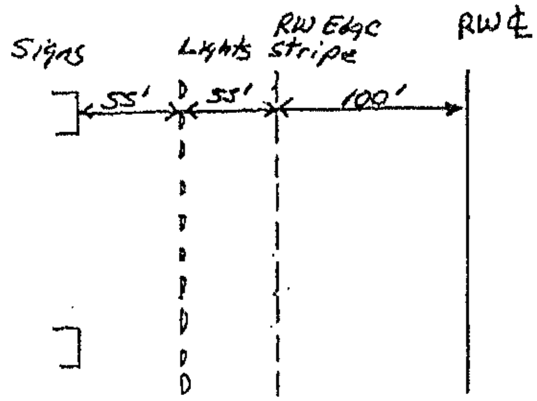
d. Effect and Duration of Modification: We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship. This modification to standard shall remain indefinitely.



CONCUR: ______________________ ______
Manager, Flight Standards Division Date

CONCUR: ______________________ ______
Manager, Airway Facilities Division Date

CONCUR: ______________________ ______
Manager, Air Traffic Division Date

CONCUR: ______________________ ______
Manager, Seattle Airports District Office Date

M E M O R A N D U M

U.S. Department of Transportation

Federal Aviation Administration

MAY 1994

RECEIVED

Subject: 94-SEA-020-NRA
Grant County Airport

Date: MAY 4,1994

Reply to Attn of: Lambert
(206) 227-2538

From: ANM-539

To: SEA-631

We have conducted an aeronautical study on the modification to standards for Grant County Airport, Moses Lake, Washington, and have no objections.

The subject proposal was coordinated with ANM-220 and ANM-460 and the proposed action has no effect on existing or planned FAA procedures or facilities.

James D. Lambert

Attachments
ANM-200 coord. Apr 21, 1994
ANM-400 coord. Apr 25, 1994
ANM-500 coord. May 4, 1994

Modification of Standard

a. Facility Standard Affected: FAA Advisory Circular AC: 150/5340-24 with change 1, Runway and Taxiway Edge Lighting System.

b. Extent of Modification: The Runway 14L-32R edge lights are located on a line 50 feet from the edge of the full strength pavement designated for runway use. The advisory circular states that the lights must not be more than 10 feet from the runway edge of full strength pavement designated for runway use.

c. Discussion of Conditions Requiring Modification: . Runway 14L-32R at Grant County Airport is ~~300~~ 200 feet wide and is used for training by airlines. The runway side stripes are currently ~~300~~ 150 feet and must be moved in to a maximum of 200 feet to meet the requirements of AC 150/5340-1G, Standards for Airport Marking. The Port of Moses Lake has requested a modification to standard to leave the lights at the edge of the pavement (50 feet from the runway side striping). This runway is used by heavy aircraft for training and moving the lights in may increase the potential of breaking the edge lights during a touch and go operations.

The Airport District Office will take action to modify the Airport Master Record, FAA Form 5010-1, to indicate the non-standard distance from the lights to the runway side stripes on approval of this modification.

d. Effect and Duration of Modification: We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship. This modification to standard shall remain indefinitely as long as the runway is used for training by heavy aircraft.

CONCUR: ______________________ 3/21/94
Manager, Flight Standards Division — Date

CONCUR: ______________________ ________
Manager, Airway Facilities Division — Date

CONCUR: ______________________ ________
Manager, Air Traffic Division — Date

CONCUR: ______________________ ________
Manager, Seattle Airports District Office — Date

Modification of Standard

a. Facility Standard Affected: FAA Advisory Circular AC: 150/5340-24 with change 1, Runway and Taxiway Edge Lighting System.

b. Extent of Modification: The Runway 14L-32R edge lights are located on a line 50 feet from the edge of the full strength pavement designated for runway use. The advisory circular states that the lights must not be more than 10 feet from the runway edge of full strength pavement designated for runway use.

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The Airport District Office will take action to modify the Airport Master Record, FAA Form 5010-1, to indicate the non-standard distance from the lights to the runway side stripes on approval of this modification.

d. Effect and Duration of Modification: We have determined that the modification will provide an acceptable level of safety, economy, durability, and workmanship. This modification to standard shall remain indefinitely as long as the runway is used for training by heavy aircraft.

CONCUR: ______________________________ Manager, Flight Standards Division — Date ________

CONCUR: [illegible signature] Manager, Airway Facilities Division — Date 4/25/94

CONCUR: [illegible signature] Manager, Air Traffic Division — Date 5-4-94

CONCUR: J. Wade Bryant — Manager, Seattle Airports District Office — Date 5/5/94

Appendix E

PORT OF MOSES LAKE APPROVAL

MINUTES of the regular meeting of the Port of Moses Lake Commission conducted on Wednesday, July 30, 2014, at the Terminal Building, Grant County International Airport.

PRESENT WERE: Commissioners Stroud Kunkle, Michael B. Conley, and David K. Jones; and Port staff Patrick Jones, Rich Mueller, Kim DeTrolio, Carol Gibson, Greg Becken, Richard Hanover, Dave Bailey and Victoria Wilkinson.

ALSO PRESENT: Patrick Taylor and Steve Wagner, Coffman Associates; Rick Hosmer, Klundt & Hosmer; Matt Davis, Sonico; Larry Godden, Million Air; Jeff Chew, iFiber One News; Alan Heroux, Vision 20/20; Tom Bennett; and Mike Donahue, Job Corp.

President Stroud Kunkle called the meeting to order at 10:00 a.m.

The minutes of the previous regular meeting, July 23, 2014, were approved as read.

The Commission, by a unanimous vote, approved for payment those vouchers described as follows: Warrant No. 47058 through 47070 including direct deposits, in the total amount of $97,700.36, Warrant No. 47071 through 47080 including direct deposits, in the total amount of $92,932.14, Warrant No. 47083 through 47152 and Warrant No. 47154 through 47159 in the total amount of $1,013,237.90, and Grain Car Warrant No. 241 in the total amount of $2,160.03.

Presentations were given as follows:

- Patrick Taylor with Coffman Associates presented the Draft Airport Master Plan/Airport Layout Plan for approval.
- Rick Hosmer with Klundt & Hosmer presented the design recommendation for the new Port Logo.
- Alan Heroux with Vision 20/20 presented the Vision 20/20 award to Patrick Jones and the Port.

RESOLUTION 1327: A resolution of the Port of Moses Lake (Grant County Port District No. 10) authorizing the submittal of an application to the Community Economic Revitalization Board (CERB) for funding the costs associated with the construction of the wide-body aircraft hangar infrastructure project.
Carried.

MOTION: Commissioner Conley moved to approve the Draft Airport Master Plan/Airport Layout Plan to be submitted to the FAA for final approval.
Carried.

MOTION: Commissioner Jones moved to adopt the recommendation for the new Port Logo.
Carried.

MOTION: Commissioner Conley moved to accept as complete the Underwing Foam Fire Suppression System Project No.13-010.
Carried.

Executive Director Jones presented his report to the Commission.

Richard Hanover briefed the Commission on the recent Farnborough Air Show.

The Port Commission adjourned to Executive Session at 11:05 a.m. for 58 minutes to discuss personnel (RCW 42.30.110g) and real estate (RCW 42.30.110c) issues.

The Commission reconvened at 11:58 a.m.

The Commission discussed the process to date for selecting an Executive Director to succeed Patrick Jones. The Commissioners then discussed the strengths of candidate Jeffrey Bishop.

MOTION: Commissioner Jones moved to select Jeff Bishop as the candidate for the Executive Director position.
Carried.

The Commissioners authorized President Kunkle to represent them in reaching an agreement with Mr. Bishop.

There being no further business, the Port Commission adjourned the meeting at 12:00 p.m.

PORT OF MOSES LAKE

David K. Jones, Secretary

ATTEST:

Stroud Kunkle, President

PORT OF MOSES LAKE

Appendix F

AIRPORT PLANS

Appendix F
AIRPORT PLANS

As part of a master plan, the Federal Aviation Administration (FAA) requires the development of several technical drawings detailing specific parts of an airport and its environs. The technical drawings are collectively referred to as the Airport Layout Plan (ALP) set. The drawings are created on a computer-aided drafting system (CAD) and serve as the official depiction of the current and planned condition of an airport. The drawings are delivered to the FAA for their review and approval. The FAA critiques the drawings from a technical perspective to be sure all applicable federal regulations are met.

The five primary functions of the ALP that define its purpose are:

1) An approved plan is necessary for the airport to receive financial assistance under the terms of the *Airport and Airway Improvement Act of 1982* (AIP), as amended, and to be able to receive specific Passenger Facility Charge funding. An airport must keep its ALP current and follow that plan, since those are grant assurance requirements of the AIP and previous airport development programs, including the *1970 Airport Development Aid Program* (ADAP) and *Federal Aid Airports Program* (FAAP) of 1946, as amended. While ALPs are not required for airports other than those developed with assistance under the aforementioned federal programs, the same guidance can be applied to all airports.

2) An ALP creates a blueprint for airport development by depicting proposed facility improvements. The ALP provides a guideline by which the airport sponsor can ensure that development maintains airport design standards and safety requirements, and is consistent with airport and community land use plans.

3) The ALP is a public document that serves as a record of aeronautical requirements, both present and future, and as a reference for community deliberations on land use proposals and budget resource planning.

4) The approved ALP enables the airport sponsor and the FAA to plan for facility improvements at the airport. It also allows the FAA to anticipate budgetary and procedural needs. The approved ALP will also allow the FAA to protect the airspace required for facility or approach procedure improvements.

5) The ALP can be a working tool for the airport sponsor, including its development and maintenance staff.

It should be noted that the FAA requires that any changes to the airfield (i.e., runway and taxiway system, etc.) be represented on the drawings. The landside configuration developed during this master planning process is also depicted on the drawings, but the FAA recognized that landside development is much more fluid and often dependent upon specific developer needs. Thus, an updated drawing set is not typically necessary for future landside alterations.

AIRPORT LAYOUT PLAN SET

The ALP set includes several technical drawings which depict various aspects of the current and future layout of the Airport. The following is a description of the ALP drawings included with this Master Plan.

AIRPORT LAYOUT PLAN DRAWING

An official Airport Layout Plan (ALP) drawing has been developed for Grant County International Airport, a draft of which is included in this appendix. The ALP drawing graphically presents the existing and ultimate airport layout plan. The ALP drawing will include such elements as the physical airport features, wind data tabulation, location of airfield facilities (i.e., runways, taxiways, navigational aids), and existing general aviation development. Also presented on the ALP are the runway safety areas, airport property boundary, and revenue support areas.

The computerized plan provides detailed information on existing and future facility layouts on multiple layers that permit the user to focus on any section of the Airport at a desired scale. The plan can be used as base information for design and can be easily updated in the future to reflect new development and more detail concerning existing conditions as made available through design surveys.

FAR PART 77 AIRSPACE DRAWING

Federal Aviation Regulation (F.A.R.) Part 77, *Objects Affecting Navigable Airspace*, was established for use by local authorities to control the height of objects near airports. The FAR Part 77 Airspace Drawing included in this Master Plan is a graphic depiction of this regulatory criterion. The FAR Part 77 Airspace Drawing is a tool to aid local authorities in determining if proposed development could present a hazard to aircraft using the Airport. The FAR Part 77 Airspace Drawing can be a critical tool for the airport sponsor's use in reviewing proposed development in the vicinity of the Airport.

The airport sponsor should do all in their power to ensure development in the vicinity of the Airport stays below the FAR Part 77 surfaces to protect the role of the Airport. The following discussion will describe those surfaces that make up the recommended FAR Part 77 surfaces at Grant County International Airport.

The FAR Part 77 Airspace Drawing assigns three-dimensional imaginary surfaces associated with the Airport. These imaginary surfaces emanate from the runway centerline(s) and are dimensioned according to the visibility minimums associated with the approach to the runway end and size of aircraft to operate on the runway. The imaginary surfaces are based on the planned future condition for the Airport. The FAR Part 77 imaginary surfaces include the primary surface, approach surface, transitional surface, horizontal surface, and conical surface. Each surface is described as follows.

Primary Surface

The primary surface is an imaginary surface longitudinally centered on the runway. The primary surface extends 200 feet beyond each runway end. The elevation of any point on the primary surface is the same as the elevation along the nearest associated point on the runway centerline. The primary surface for Runway 14L-32R and Runway 4-22 is 1,000 feet wide, as centered on the runway. The primary surface for Runway 18-36 is 250 feet wide and for Runway 9-27 it is 500 feet wide, as centered on the runway.

Approach Surface

An approach surface is also established for each runway end. The approach surface begins at the end of the primary surface and is the same width as the primary surface. It extends upward and outward from the primary surface end, and is centered along an extended runway centerline. The approach surface leading to each runway is based upon the type of instrument approach available (instrument or visual) or planned.

The approach surface for Runway 32R extends a horizontal distance of 10,000 feet at a 50:1 slope with an additional 40,000 feet at a slope of 40:1. The outer width of the approach surface is 16,000 feet. This approach surface is considered a precision approach surface which is based on the existing instrument landing system (ILS). This approach surface is also applied to Runways 14L, 4, and 22 due to the existing GPS-Required Navigation Performance (RNP) instrument approaches.

Runway 18-36 is planned as a utility runway primarily supporting aircraft weighing less than 12,500 pounds. The runway is planned to remain available for visual approaches only as pilots have other runway options in IFR conditions. The approach surface has an inner width of 250 feet and an outer width of 1,250 feet. The approach surface extends a distance of 5,000 feet at a slope ratio of 20:1.

Runway 9-27 is planned to remain a visual runway utilized by military aircraft larger than utility (>12,500 pounds). The approach surface has an inner width of 500 feet and an outer width of 1,500 feet. It extends a horizontal distance of 5,000 feet at a 20:1 slope ratio. **Table D1** summarizes the approach slope dimensions.

TABLE D1
FAR Part 77 Approach Surface Dimensions
Grant County International Airport

	Runway 14L-32R	Runway 4-22	Runway 18-36	Runway 9-27
Inner Width	1,000	1,000	250	500
Outer Width	16,000	16,000	1,250	1,500
Length	50,000	50,000	5,000	5,000
Slope Ratio[1]	50:1/40:1	50:1/40:1	20:1	20:1

[1]The 50:1 slope applies to the first 10,000 feet.
All units in feet.
Source: FAR Part 77, Objects Affecting Navigable Airspace

Transitional Surface

Each runway has a transitional surface that begins at the outside edge of the primary surface at the same elevation as the runway. The transitional surface also connects with the approach surfaces of runways with a precision approach slope. The surface rises at a slope of 7:1, up to a height 150 feet above the highest runway elevation. At that point, the transitional surface is replaced by the horizontal surface.

Horizontal Surface

The horizontal surface is established at 150 feet above the highest elevation of the runway surface. Having no slope, the horizontal surface connects the transitional and approach surfaces to the conical surface at a distance of 10,000 feet from the end of the primary surfaces of each runway.

Conical Surface

The conical surface begins at the outer edge of the horizontal surface. The conical surface then continues for an additional 4,000 feet horizontally at a slope of 20:1. Therefore, at 4,000 feet from the horizontal surface, the elevation of the conical surface is 350 feet above the highest airport elevation.

APPROACH SURFACE PROFILE DRAWINGS

The runway profile drawing presents the entirety of the FAR Part 77 approach surface to the runway ends. It also depicts the runway centerline profile with elevations. This drawing provides profile details that the Airspace Drawing does not.

The approach surface profile drawings include identified penetrations to the approach surface. Penetrations to the approach surface are considered obstructions. The FAA will determine if any obstructions are also hazards which require mitigation. The FAA utilizes other design criteria, such as the threshold siting surface (TSS) and various surfaces defined in FAA Order 8260.3B, *Terminal Instrument Procedures* (TERPS), to determine if an obstruction is a hazard.

If an obstruction is a hazard, the FAA can take many steps to protect air navigation. The mitigation options range from removing the hazard to installing obstruction lighting to adjusting the instrument approach minimums.

TERMINAL AREA DRAWING

The terminal area drawing is a larger scale plan view drawing of existing and planned aprons, buildings, hangars, parking lots, and other landside facilities. It is prepared in accordance with FAA AC 150/5300-13A, *Airport Design*.

AIRPORT LAND USE DRAWING

The objective of the Airport Land Use Drawing is to coordinate uses of the airport property in a manner compatible with the functional design of the airport facility. Airport land use planning is important for orderly development and efficient use of available space. There are two primary considerations for airport land use planning. The first is to secure those areas essential to the safe and efficient operation of the airport and the second is to determine compatible land uses for the balance of the property which would be most advantageous to the airport and community.

In the development of an airport land use plan for Grant County International Airport, the airport property was segmented into several large general tracts. Each tract was analyzed for specific site characteristics, such as tract size and shape, land characteristics, and existing land uses. The availability of utilities and the accessibility to various transportation modes were also considered. Limitations and constraints to development, such as height and noise restrictions, runway visibility zones, and contiguous land uses were analyzed next. Finally, the compatibility of various land uses in each tract was analyzed.

The depiction of on-airport land uses on this drawing has been developed taking into consideration FAA land use compliance regulations. However, the depiction is only a recommendation and any plan to utilize any airport property for other than aviation purposes will require FAA review and approval on a case-by-case basis.

The Airfield Operations category includes the immediate runway and taxiway environment and includes the Navaid critical areas, runway visibility zone, runway and taxiway safety areas, and the runway protection zones. The Airfield Operations area is reserved for facilities critical to the safe operations of aircraft on the runways and taxiways.

The Aviation Development category reserves critical space adjacent to the Airfield Operations area for aviation-specific activity. This activity includes all facilities necessary for aviation-related functions, including hangars, terminal buildings, and fuel farms. Essentially any facilities to be developed in the Aviation Development area must be intended for a function that supports the need for access to the runway and taxiway system. It should be noted that other uses compatible with airport operations may be located in the Aviation Development area on a temporary basis, usually considered five years or less. Certain concurrent uses are also permissible, such as farming or gravel extraction, within an RPZ, provided the area can simultaneously serve its primary aviation function.

The last category is the Revenue Support area. Revenue Support can include aviation facilities and non-aviation facilities. Typically, the revenue support areas would be intended to accommodate businesses that are compatible with airport activity (i.e., not noise-sensitive) and do not require access to the runway and taxiway system. Any land use that is compatible with airport activities can be located in the Revenue Support area through a long term ground lease subject to FAA approval.

AIRPORT PROPERTY MAP

The Airport Property Map provides information on property under airport control and is, therefore, subject to FAA grant assurances. The various recorded deeds that make up the airport property are listed in tabular format. The primary purpose of the drawing is to provide information for analyzing the current and future aeronautical use of land acquired with federal funds.

DEPARTURE SURFACE DRAWING

For runways supporting instrument operations, such as Runways 14L-32R and 4-22, a separate drawing depicting the departure surface is required. The departure surface, when clear, allows pilots to follow standard departure procedures. The departure surface emanates from the departure end of the runway to a distance of 10,200 feet. The inner width is 1,000 feet and the outer width is 6,466 feet. The slope of the departure surface is 40:1.

Obstacles frequently penetrate the departure surface. Where object penetrations exist, the departure procedure can be adjusted by:

a) Non-standard climb rates, and/or
b) Non-standard (higher) departure minimums.

Therefore, it is important for the airport sponsor to identify and remove departure surface obstacles whenever possible in order to enhance takeoff operations at the airport. The airport sponsor should also prevent any new obstacles from developing.

FAA ALP DISCLAIMER

The preparation of the ALP set has been supported, in part, through financial assistance from the FAA through the Airport Improvement Program (AIP). The contents do not necessarily reflect the official views or policy of the United States or FAA. Acceptance of the airport master plan does not in any way constitute a commitment on the part of the United States or FAA to participate in any development depicted on the ALP drawing, nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws.

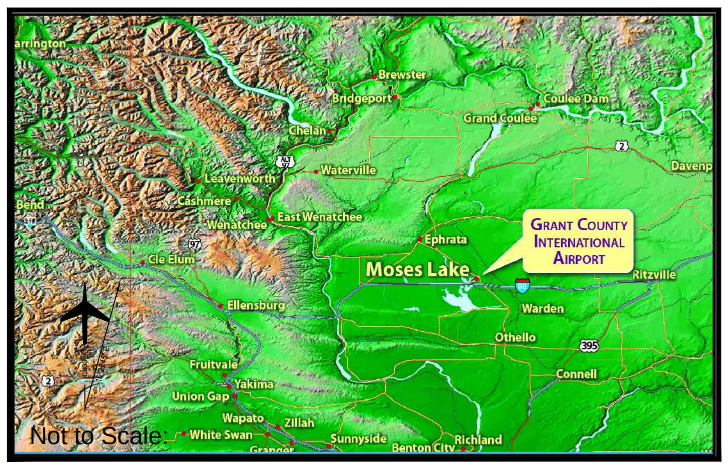
AIRPORT LAYOUT PLAN

FOR

GRANT COUNTY INTERNATIONAL AIRPORT

MOSES LAKE, WASHINGTON

VICINITY MAP



GRANT COUNTY

LOCATION MAP

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No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

GRANT COUNTY INTERNATIONAL AIRPORT

DRAFT

COVER SHEET

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014

Coffman Associates
Airport Consultants
www.coffmanassociates.com

AIRPORT DATA

OWNER: Port Of Moses Lake	CITY: Moses Lake, Wa.	COUNTY: Grant County	NPIAS CODE: GA

Grant County International Airport (MWH)		EXISTING	ULTIMATE
AIRPORT REFERENCE CODE		D-V	Same
CRITICAL DESIGN AIRCRAFT WINGSPAN / UNDERCARRIAGE / APPROACH SPEED		777-300 213' / 43.3' / 157 kts	Same
AIRPORT ELEVATION (NAVD 88)		1188.6' MSL	Same
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		88.9° F (July)	Same
STATE SERVICE ROLE		Regional Service Airport	Same
AIRPORT REFERENCE POINT (ARP)	Latitude	47° 12' 30.90" N	47° 12' 26.876" N
COORDINATES (NAD 83)	Longitude	119° 19' 08.90" W	119° 19' 06.768" W
AIRPORT INSTRUMENT APPROACH (ILS, LOC, VOR, NDB)		ILS or LOC (RWY 32R) VOR RWY 04 VOR RWY 22 VOR RWY 32R VOR-1 RWY 14L VOR-3 RWY 14L NDB RWY 32R	Same
RNAV (GPS) APPROACH		RNAV (RNP) Z RWY 04 RNAV (RNP) Z RWY 14L RNAV (RNP) Z RWY 22 RNAV (RNP) Z RWY 32R RNAV (GPS) Y RWY 04 RNAV (GPS) Y RWY 14L RNAV (GPS) Y RWY 22 RNAV (GPS) Y RWY 32R	Same
AIRPORT and TERMINAL NAVIGATIONAL AIDS See Table: Airport Facilities (FAA OWNED)		Rotating Beacon, ASOS, ATCT LOC, GS MALSR, VASI, PAPI, REIL	Same

RUNWAY COORDINATES (NAD 83)

RUNWAY END		EXISTING	ULTIMATE
Runway 14L EL. 1168.4	Latitude Longitude	47° 13' 32.367" N 119° 19' 35.431" W	Same
Runway 32R EL. 1166.5	Latitude Longitude	47° 11' 25.535" N 119° 18' 35.422" W	Same
Runway 4 EL. 1188.6	Latitude Longitude	47° 11' 48.235" N 119° 19' 58.533" W	Same
Runway 22 EL. 1153.4	Latitude Longitude	47° 12' 45.984" N 119° 18' 01.098" W	Same
xRunway 18 EL. 1185.1	Latitude Longitude	47° 12' 29.806" N 119° 19' 47.445" W	To Be Closed
xRunway 36 EL. 1184.8	Latitude Longitude	47° 11' 58.605" N 119° 20' 02.451" W	To Be Closed
Runway 14R EL. 1167.8	Latitude Longitude	47° 13' 26.489" N 119° 19' 48.448" W	To Be Closed
Runway 32L EL. 1169.6	Latitude Longitude	47° 12' 58.910" N 119° 19' 35.387" W	To Be Closed
Runway 9 EL. 1162.2	Latitude Longitude	47° 13' 03.599" N 119° 19' 00.770" W	Same
Runway 27 EL. 1152.9	Latitude Longitude	47° 12' 52.824" N 119° 18' 12.604" W	Same
uRunway 18 EL. 1186.0	Latitude Longitude	RELOCATED	47° 12' 31.32" N 119° 19' 57.04" W
uRunway 36 EL. 1184.0	Latitude Longitude	RELOCATED	47° 11' 58.930" N 119° 20' 9.905" W

TAXIWAY DESIGN GROUP

EXISTING TAXIWAY		TDG	ULTIMATE	TDG
Twy A	75' Concrete	TDG-6	Same	Same
Twy B	75' Concrete	TDG-6	Same	Same
Twy C	75' Asphalt	TDG-6	Same	Same
Twy D	75' Asphalt	TDG-6	Same	Same
Twy E	75' Concrete	TDG-6	Same	Same
Twy F	75' Concrete	TDG-6	Same	Same
Twy G	75' Asphalt	TDG-6	Same	Same
Twy H	75' Concrete	TDG-6	Same	Same
Twy J	35' Asphalt	TDG-2	50' Asphalt	TDG-3

Airport Facilities (FAA OWNED)

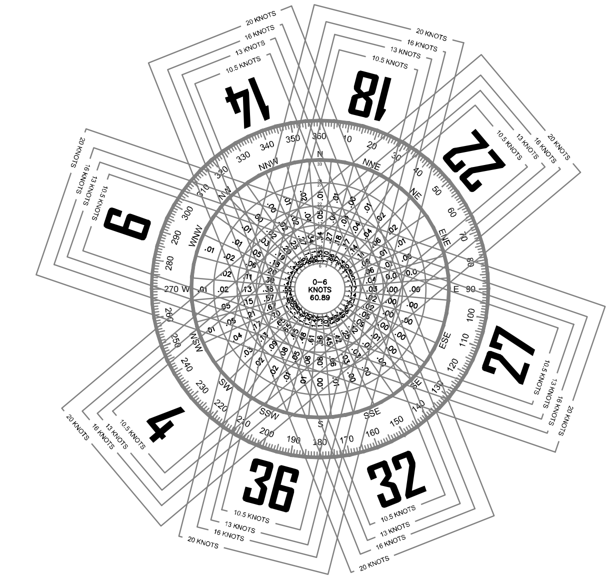
- ATCT
- NDB, ASR, VOR/DME, ASR
- ILS (Runway 14L-32R)
- PAPI-4 (Runway 14L) and MALSR (Runway 32R)
- Localizer Antenna (Runway 14L-32R)
- RTR, RVR, ASOS
- PAPI-4 (Runway 4) and VASI (Runway 22)

MODIFICATIONS TO FAA AIRPORT DESIGN STANDARDS

STANDARD MODIFIED	DESCRIPTION	AIRSPACE CASE NUMBER	APPROVAL DATE
AC 150/5340-24 chg 1 Runway Edge Lights be placed up to 10 feet from runway edge	Runway 14L-32R edge lights are 50 feet from edge	94-SEA-020-NRA	May 5, 1994
AC 150/5340-18c Type-3 signs be placed 35-60 feet from runway edge stripe	Runway 14L-32R exit signs and distance-to-go-signs are 110 feet from runway edge stripe	2002-ANM-4082-NRA	August 14, 2003

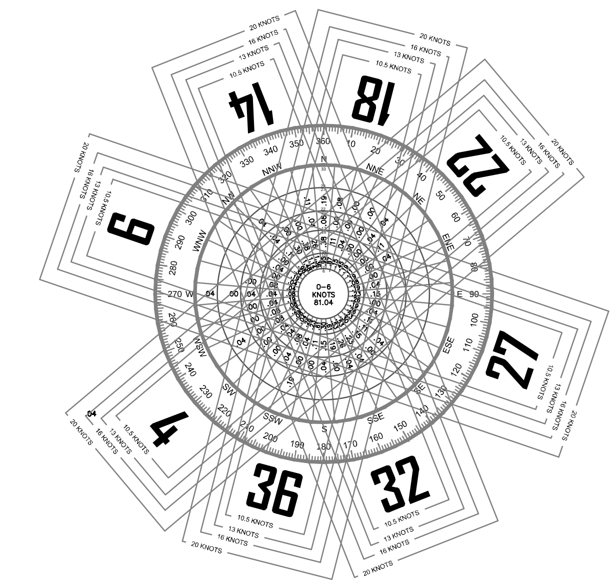
ALL WEATHER WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 4-22	95.77%	97.9%	99.41%	99.86%
Runway 9-27	93.25%	96.30%	99.08%	99.79%
Runway 14-32	92.60%	95.70%	98.51%	99.54%
Runway 18-36	95.45%	97.51%	99.05%	99.71%
All Runways	99.97%	100%	100%	100%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Grant County Intl. Airport
Moses Lake, WA

OBSERVATIONS:
77,120 All Weather Observations 2003-2012
2,642 IFR Observations 2003-2012

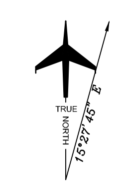


RUNWAY DATA

RUNWAY DATA	Runway 14L-32R EXISTING/ULTIMATE	Runway 4-22 EXISTING/ULTIMATE	Runway 18-36 EXISTING/ULTIMATE	Runway 14R-32L EXISTING/ULTIMATE	Runway 9-27 EXISTING/ULTIMATE	Runway 18-36 Future/Relocated
RUNWAY IDENTIFICATION	Primary	Crosswind	GA Utility / To Be Closed	Parallel / To Be Closed	Military (only)	GA Utility
DESIGN CRITICAL AIRCRAFT	D-V-6	C-III-3	B-II-2	B-II-2	C-IV-5	B-I-IA
CRITICAL DESIGN AIRCRAFT TYPE	Boeing 777-306	Boeing 737-700	King Air 200	King Air 200	C-17	King Air 100
APPROACH REFERENCE CODE (ARC)	D-VI-2400	D-IV-4000 D-V-4000	B-I-(S)-VIS	D-VI-VIS	D-VI-VIS	D-VI-VIS
DEPARTURE REFERENCE CODE (ARC)	D-VI	D-IV D-V	B-I-(S)	D-VI	D-VI	D-VI
RUNWAY DESIGN CODE (RDC)	RDC: D-V-2400	RDC: C-III-4000	RDC: B-II-VIS	RDC: B-II-VIS	RDC: C-IV-VIS	RDC: B-I-VIS
RUNWAY DIMENSIONS (L X W)	13,503' x 200' (13501.8' by Coord)	10,000' x 100' (9999.2' by Coord)	3,327' x 75' (3326.71' by Coord)	2,936' x 75' (2936.11' by Coord)	3,500' x 90' (3497.31' by Coord)	3,400' x 60' (3399.80' by Coord)
RUNWAY TRUE BEARING	MAPPING 161.27° / 341.27°	53.33° / 233.33°	197.31° / 17.31°	161.26° / 341.26°	107.31° / 287.31°	194.30° / 14.30°
RUNWAY SHOULDER WIDTH (STANDARD)	35'	35'	10'	10'	25'	10'
RUNWAY LOW POINT (NAVD 88)	1166.1' MSL	1153.4' MSL	1184.8' MSL	1167.8' MSL	1152.9' MSL	1186.0' MSL
RUNWAY MAXIMUM ELEVATION / HIGH POINT (NAVD 88)	1176.5 MSL / Ult. 1173.0 MSL	1188.6' MSL	1185.1' MSL	1169.6' MSL	1162.2' MSL	1184.0' MSL
RUNWAY LIGHTING	HIRL	MIRL	MIRL	None	None	MIRL
RUNWAY EFFECTIVE GRADIENT / MAXIMUM GRADIENT	0.0 %	0.4%	0.0 %	0.1 %	0.3 %	0.0 %
RUNWAY PAVEMENT MATERIAL / SURFACE TREATMENT	Concrete/Asphalt / Grooved 5	Asphalt / Grooved	Asphalt	Concrete	Concrete / Grooved	Asphalt
RUNWAY PAVEMENT STRENGTH (IN THOUSAND LBS.) 1	85(S), 155(D), 320(DT), 600 (DDT)	75(S), 100(D), 175(DT), 475(DDT)	75(S), 170(D), 300(DT), 400(DDT)	100(S), 200(D), 400(DT), 400(DDT)	100(S), 150(D), 270(DT), 475(DDT)	12.5(S)
RUNWAY LINE OF SIGHT REQUIREMENT MET	NO	YES	YES	YES	YES	YES
RUNWAY CENTERLINE TO PARALLEL RUNWAY CENTERLINE	1031'	N/A	N/A	700'	N/A	700'
RUNWAY PROTECTION ZONES	1000' x 1700' x 1510' (14L) 1000' x 2500' x 1750' (32R)	1000' x 1700' x 1510' (4) 1000' x 1700' x 1510' (22)	500' x 1000' x 700' (18) 500' x 1000' x 700' (36)	500' x 1000' x 700' (14R) 500' x 1000' x 700' (32L)	500' x 1700' x 1010' (9) 500' x 1700' x 1010' (27)	250' x 1000' x 450' (18) 250' x 1000' x 450' (36)
RUNWAY CENTERLINE TO PARALLEL TAXIWAY CENTERLINE	1031'	400'	N/A	N/A	N/A	N/A
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT	93'	93'	N/A	N/A	None	65.5'
TAXIWAY WIDTH (TDG) / TESM / SHOULDER WIDTH (T-SHLDR) 2	75' (TDG 6/TESM 15' /Tw-SHLDR 25')	50' (TDG 3/TESM 10'/Tw-SHLDR 20')	N/A	N/A	None	25' (TDG 1a /TESM 5'/Tw-SHLDR 10')
TAXIWAY LIGHTING	MITL	MITL	N/A	N/A	None	MITL
TAXIWAY MARKING	Centerline/Signage	Centerline/Signage	N/A	N/A	None	Centerline/Signage
TAXIWAY SURFACE MATERIAL	Asphalt/Concrete	Asphalt	N/A	Concrete	Concrete	Asphalt
TAXIWAY AND TAXILANE SAFETY AREA WIDTH	TSA 214'	TSA 118'	TSA 79'	TSA 79'	TSA 171'	TSA 49'
TAXIWAY AND TAXILANE OBJECT FREE AREA WIDTH	TOFA 320' / TL-OFA 276'	TOFA 186' / TL-OFA 162'	TOFA 131' / TL-OFA 115'	TOFA 131' / TL-OFA 115'	TOFA 259' / TL-OFA 225'	TOFA 89' / TL-OFA 79'
RUNWAY TO TAXIWAY HOLDING POSITION MARKING/SIGN	292'	262'	200'	200'	262'	150'

RUNWAY ENDS DATA	RUNWAY 14L	RUNWAY 32R	RUNWAY 4	RUNWAY 22	RUNWAY 18	RUNWAY 36	RUNWAY 14R	RUNWAY 32L	RUNWAY 9	RUNWAY 27	RUNWAY 17	RUNWAY 35
FAR PART 77 APPROACH CATEGORY (Type Used)	PIR	PIR	PIR	PIR	Visual (BV)	Visual (BV)	Visual (BV)	Visual (BV)	Visual (BV)	Visual (BV)	Visual (AV)	Visual (AV)
FAR PART 77 APPROACH SLOPE	50:1/ 40:1	50:1/ 40:1	50:1/ 40:1	50:1/ 40:1	20:1	20:1	20:1	20:1	20:1	20:1	20:1	20:1
RUNWAY DEPARTURE SURFACE (Yes / No)	Y	Y	Y	Y	N	N	N	N	N	N	N	N
RUNWAY MARKING	Precision	Precision	Nonprecision	Nonprecision	Basic (Visual)	Basic (Visual)	Basic (Visual)	Basic (Visual)	None	None	Basic (Visual)	Basic (Visual)
RUNWAY BLAST PAD	None	None	None	None	None	None	None	None	None	None	None	None
RUNWAY APPROACH VISIBILITY MINIMUMS (LOWEST)	3/4 mile	1/2 mile	3/4 mile	3/4 mile	Visual	Visual	Visual	Visual	Visual	Visual	Visual	Visual
TYPE OF AERONAUTICAL SURVEY REQUIRED	VGS	VGS	VGS	VGS	NVGS	NVGS	NVGS	NVGS	NVGS	NVGS	None	None
PRECISION OBJECT FREE ZONE (200' x 800')	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THRESHOLD SITING SURFACE OBJECTS PENETRATION	Yes	None	None	None	None	None	None	None	None	None	None	None
THRESHOLD SITING REQUIREMENTS (AC 150/5300-13A)	34:1	34:1	34:1	34:1	20:1	20:1	34:1	20:1	20:1	20:1	20:1	20:1
RUNWAY THRESHOLD DISPLACEMENT	N/A	N/A	N/A	N/A	217'	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RUNWAY DISPLACED THRESHOLD ELEVATION (NAVD 88)	N/A	N/A	N/A	N/A	11.1' MSL	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RUNWAY END ELEVATION (NAVD 88)	1168.4' MSL	1166.5' MSL	1188.6' MSL	1153.4' MSL	1185.1' MSL	1184.8' MSL	1167.8' MSL	1169.6' MSL	1162.2' MSL	1152.9' MSL	1186.0 MSL	1184.0 MSL
RUNWAY TOUCHDOWN ZONE ELEVATION (TDZE NAVD 88)	1169.2' MSL	1167.3' MSL	1188.6' MSL	1165.6' MSL	1185.1' MSL	1185.1' MSL	1169.6' MSL	1169.6' MSL	1162.2' MSL	1162.0' MSL	1186.0 MSL	1186.0 MSL
RUNWAY OBJECT FREE AREA (OFA BEYOND STOP END)	1000' x 800'	1000' x 800'	1000' x 800'	1000' x 800'	300' x 500'	300' x 500'	300' x 500'	300' x 500'	1000' x 800'	1000' x 800'	240' x 250'	240' x 250'
RUNWAY SAFETY AREA (RSA BEYOND STOP END)	1000' x 500'	1000' x 500'	1000' x 500'	1000' x 500'	300' x 150'	300' x 150'	300' x 150'	300' x 150'	1000' x 500'	1000' x 500'	240' x 120'	240' x 120'
RUNWAY OBSTACLE FREE ZONE (OFZ BEYOND STOP END)	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 400'	200' x 250'	200' x 250'
TAKEOFF RUN AVAILABLE (TORA)	13,503'	13,503'	10,000'	10,000'	3,327'	3,327'	2,936'	2,936'	3,500'	3,500'	3,400'	3,400'
TAKEOFF DISTANCE AVAILABLE (TODA)	13,503'	13,503' 6	10,000'	10,000'	3,327'	3,327'	2,936'	2,936'	3,500'	3,500'	3,400'	3,400'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	13,503'	13,503'	10,000'	10,000'	3,327'	3,327'	2,936'	2,936'	3,500'	3,500'	3,400'	3,400'
LANDING DISTANCE AVAILABLE (LDA)	13,503'	13,503' 6	10,000'	10,000'	3,327'	3,327'	2,936'	2,936'	3,500'	3,500'	3,400'	3,400'
INSTRUMENT NAVIGATIONAL AIDS	VOR RNAV (RNP) Z RNAV (GPS) Y		VOR RNAV (RNP) Z RNAV (GPS) Y	VOR RNAV (RNP) Z RNAV (GPS) Y	None	None	None	None	None	None	None	None
RUNWAY VISUAL NAVIGATIONAL AIDS and RUNWAY APPROACH LIGHTING (ALS, VGS)	REIL PAPI-4 (P4L)	MALSR PAPI-4 (P4L)	REIL PAPI-4 (P4L)	REIL VASI-4 (V4L)	None	None	None	None	None	None	None	None

1 Pavement strengths are expressed In Single (SW), Dual (DW), Dual Tandem (DT), and/or Double Dual Tandem (DDT) wheel load capacities.
2 Taxiway Width / Taxiway Design Group (TDG) / Taxiway Edge Safety Margin (TESM) / Taxiway Shoulder Width (TSW)
3 Third Party Survey Runway 4-22 & Runway 14L-32R (ANALPV 05/13/2006), Runway 14R-32L (AV 05/30/1996 NGS). Vertically Guided and Non-Vertically Guided Airport Airspace Analysis Survey criteria in AC 150/5300-18, page 89-90.
4 RDC Table 3-8. Runway design standards matrix AC 150/5300-13A, page 94.
5 First 10,000 feet of Runway 32R is grooved to width of 150 feet.
6 Landing and takeoff using Runway 32R is 11 feet shorter than the total length due to the location of the Localizer Antenna.



Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

IFR WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 4-22	97.2%	98.49%	99.52%	99.83%
Runway 9-27	96.35%	97.69%	99.03%	99.37%
Runway 14-32	98.24%	98.85%	99.26%	99.63%
Runway 18-36	98.51%	99.30%	99.76%	99.90%
All Runways	99.96%	100%	100%	100%

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.
3. NAVD 88 Datum was used for all vertical elevations and NAD 83 for all horizontal elevations.
4. See the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS for TSS Object Penetrations.

No.	REVISIONS	DATE	BY	APP'D.
	–	–	–	–
	–	–	–	–
	Airport Layout Plan Update	6/2014	CA	–

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

GRANT COUNTY INTERNATIONAL AIRPORT

AIRPORT DATA

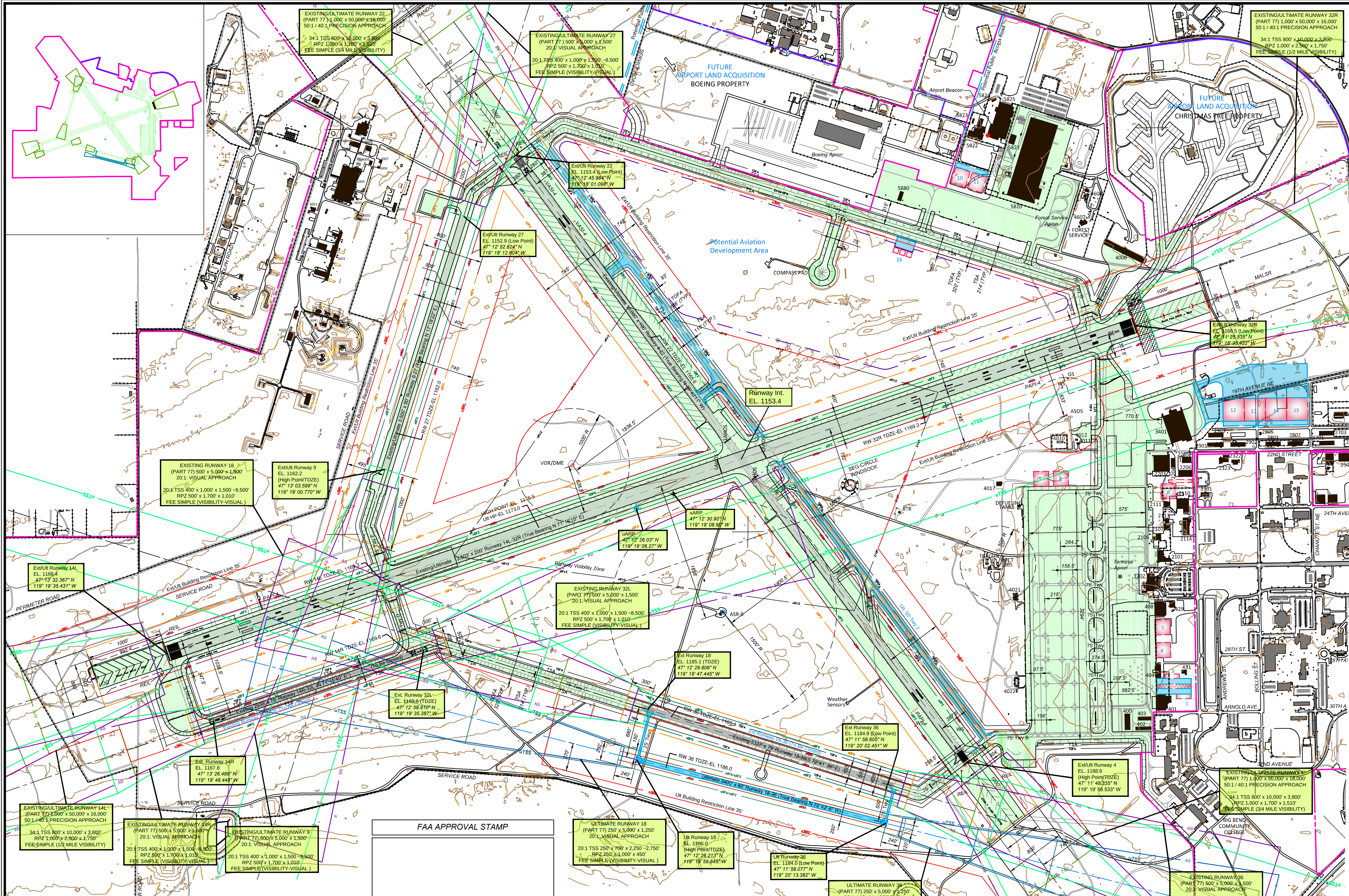
DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 Sheet 2 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com



FAA APPROVAL STAMP

FOR APPROVAL BY:

Airport Manager DATE

BUILDINGS/FACILITIES

No.	FACILITY	ELEVATION
1202	TERMINAL BUILDING	1222 MSL
1205	ATCT *	1298 MSL
101	ASR-9	1288 MSL
102	VOR/DME	1193 MSL
103	AIRPORT BEACON	-
104	SEGMENTED CIRCLE / WIND CONE	1195 MSL
400	GENERAL AVIATION T-HANGAR	1210 MSL
401	CONVENTIONAL HANGAR	1257 MSL
402	GENERAL AVIATION T-HANGAR	1207 MSL
403	GENERAL AVIATION T-HANGAR	1211 MSL
404	COLUMBIA PACIFIC AVIATION/FBO	1217 MSL
408	CONVENTIONAL HANGAR	1247 MSL
425	BUILDING	-
429	BUILDING	1196 MSL
431	BUILDING	1216 MSL
2101	AIRCRAFT RESCUE FIRE-FIGHTING (ARFF)	1199 MSL
2106	BOX HANGAR	1203 MSL
2107	BOX HANGAR	1203 MSL
2110	AIRSIDE BUILDING	1205 MSL
2111	BUILDING	1200 MSL
2113	BUILDING	1188 MSL
2114	BUILDING	1209 MSL
2203	CONVENTIONAL HANGAR	1213 MSL
2204	AIRPORT MAINTENANCE BUILDING	1189 MSL
2205	AIRPORT MAINTENANCE SHOP	1193 MSL
2206	AIRPORT MAINTENANCE BUILDING	1196 MSL
2301	BUILDING	1193 MSL
2321	BUILDING	1183 MSL
2322	BUILDING	1179 MSL
2323	BUILDING	1186 MSL
2324	BUILDING	1181 MSL
2501	BUILDING	1201 MSL
2502	BUILDING	1185 MSL
2503	BUILDING	1202 MSL
2521	BUILDING	1199 MSL
2522	BUILDING	1194 MSL
2523	BUILDING	1194 MSL
2601	BUILDING	1194 MSL
2602	BUILDING	1197 MSL
2701	BUILDING	1192 MSL
2702	BUILDING	1180 MSL
2703	BUILDING	1192 MSL
2704	BUILDING	1188 MSL
2801	BUILDING	1190 MSL
2802	BUILDING	1190 MSL
2805	BUILDING	1183 MSL
2901	BUILDING	1189 MSL
2902	BUILDING	1189 MSL
2903	BUILDING	1189 MSL
3300	FUEL STORAGE	1181 MSL
3301	FUEL STORAGE	1221 MSL
3302	FUEL STORAGE	1235 MSL
3303	BUILDING	1192 MSL
3401	CONVENTIONAL HANGAR	1239 MSL
4006	ALERT HANGARS	1193 MSL
4010	BUILDING (To Be Removed)	1181 MSL
4011	BUILDING	1180 MSL
4012	BUILDING	1177 MSL
4017	BUILDING	1192 MSL
4018	DEFUELING TANKS	N/A
4021	BUILDING	1188 MSL
4022	BUILDING (To Be Removed)	1198 MSL
4607	FOREST SERVIVE	1174 MSL
4608	BUILDING	1176 MSL
5820	GENIE	1221 MSL
5821	BUILDING	1181 MSL
5822	BUILDING	1236 MSL
5823	BUILDING	1169 MSL
5824	BUILDING	1173 MSL
5825	BUILDING	1234 MSL
6004	BUILDING	1179 MSL
6010	BUILDING	1163 MSL
6011	BUILDING	1172 MSL
6031	BUILDING	1172 MSL
6056	BUILDING	1186 MSL
6201	BUILDING	1180 MSL

* ATCT can't see Runway 9-27 pavement, but can see aircraft on the runway.

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
	SAME	AIRPORT ROTATING BEACON
	SAME	BUILDING (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING (up to 10 AGL)
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI-4)
	SAME	RUNWAY THRESHOLD LIGHTS and REIL
34 35 3 2	SAME	SECTION CORNER (None Available)
	SAME	SEGMENTED CIRCLE/WIND INDICATOR
1180	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
	SAME	PARCELS
TOFA	SAME	TAXIWAY OBJECT FREE AREA
TSA	SAME	TAXIWAY SAFETY AREA
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
xOFZ	uOFZ	RUNWAY OBSTACLE FREE ZONE (OFZ)
xRSA	uRSA	RUNWAY SAFETY AREA (RSA)
xOFA	uOFA	RUNWAY OBJECT FREE AREA (OFA)
N/A	uOFA/uOFZ	ULTIMATE OFA and ULTIMATE OFZ
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
xBRL	SAME	BUILDING RESTRICTION LINE (BRL-35')
	SAME	ASOS
xLOC	SAME	LOCALIZER CRITICAL AREA
xGS	SAME	GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
	SAME	GLIDE SLOPE ANTENNA
	SAME	MALSR APPROACH LIGHT SYSTEM
	SAME	PRECISION OBSTACLE FREE ZONE (POFZ)
		TIE-DOWNS
		PAVEMENT SHADE
	SAME	CRITICAL AREA
AS	AS	APPROACH SURFACE
xTSS	uTSS	THRESHOLD SITING SURFACE

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. *Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.*
3. *Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.*
4. *Vertical elevations in NAVD 88 Datum and horizontal elevations in NAD 83 .*
5. *See the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS for TSS Object Penetrations.*

ULTIMATE BUILDINGS/FACILITIES

No.	FACILITY	ELEVATION
1	BOX HANGAR	23' AGL
2	T-HANGAR	23' AGL
3	BOX HANGAR	23' AGL
4	CONVENTIONAL HANGAR	35' AGL
5	CONVENTIONAL HANGAR	35' AGL
6	CONVENTIONAL HANGAR	35' AGL
7	MAINTENANCE HANGAR	40' AGL
8	CONVENTIONAL HANGAR	35' AGL
9	CONVENTIONAL HANGAR	35' AGL
10	CONVENTIONAL HANGAR	35' AGL
11	CONVENTIONAL HANGAR	35' AGL
12-15	HANGARS (4 Buildings)	100' AGL
16-18	HANGARS (3 Buildings)	25' AGL

15°27'45" E
TRUE NORTH

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 600 1200 1800
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

GRANT COUNTY INTERNATIONAL AIRPORT

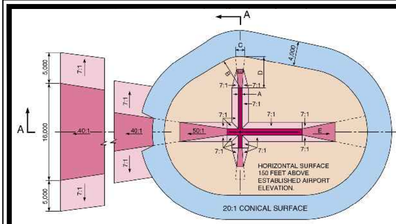
AIRPORT LAYOUT PLAN

DRAFT

Moses Lake, Washington

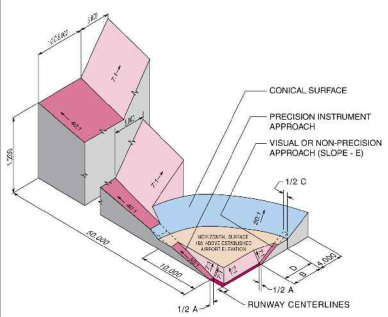
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 Sheet 3 of 26



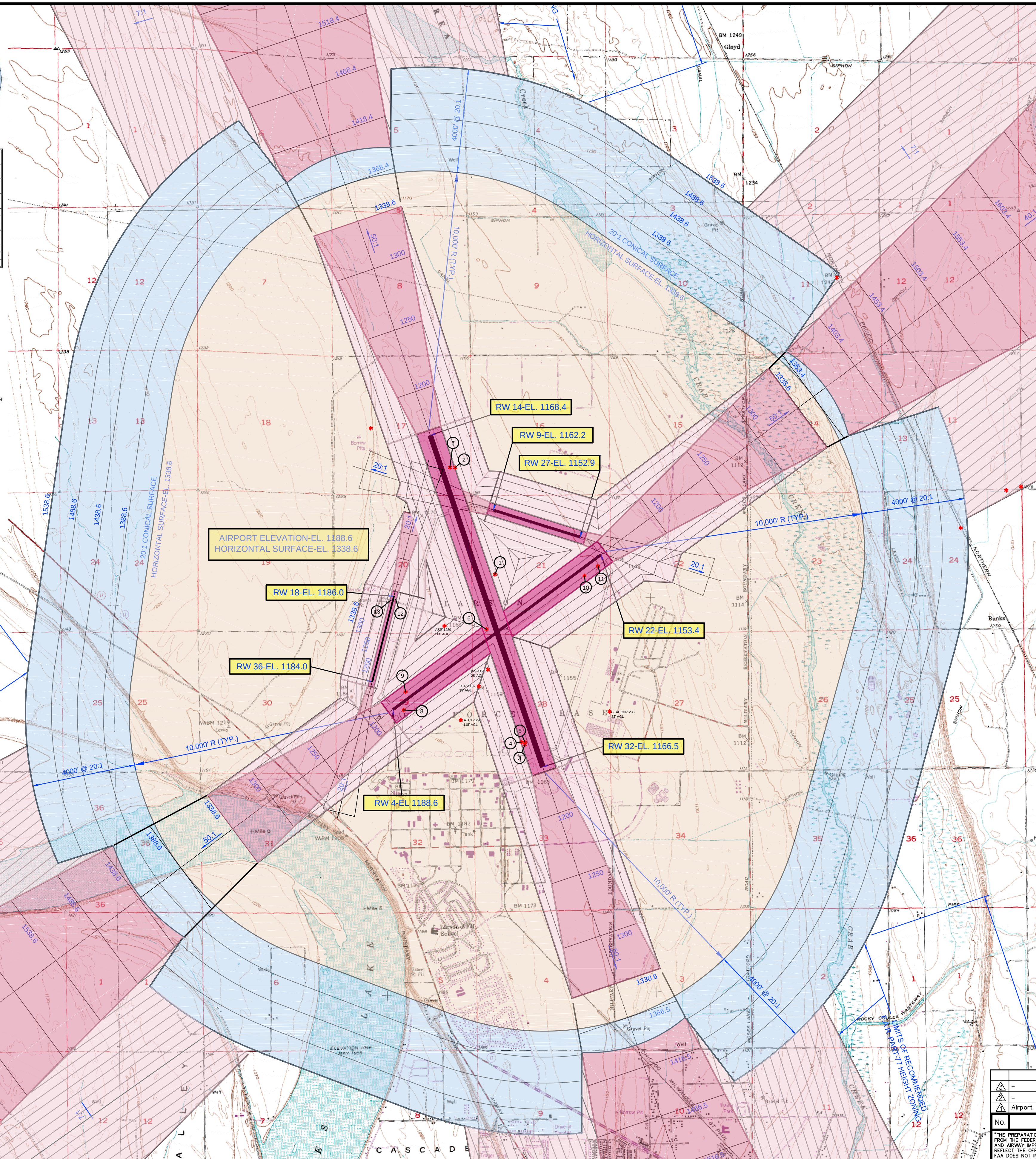
DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.



OBSTRUCTION TABLE

OBJECT DESCRIPTION/ELEVATION	OBSTRUCTED PART 77 SURFACE	PENETRATION	PROPOSED OBJECT DISPOSITION
1. VOR/DME - EL 1193 (27' AMSL)	TRANSITIONAL SURFACE	6.1'	NO ACTION
2. WINDSOCK - EL 1189 (12' AMSL)	TRANSITIONAL SURFACE	2.7'	NO ACTION
3. GLIDE SLOPE - EL 1191 (27' AMSL)	PRIMARY SURFACE	23.7'	NO ACTION
4. WINDSOCK - EL 1183 (19' AMSL)	PRIMARY SURFACE	15.8'	NO ACTION
5. POLE - EL 1174 (10' AMSL)	PRIMARY SURFACE	6.8'	REQUEST AERONAUTICAL STUDY
6. WINDSOCK - EL 1176 (12' AMSL)	PRIMARY SURFACE	6.9'	NO ACTION
7. POLE - EL 1175 (15' AMSL)	PRIMARY SURFACE	6.5'	REQUEST AERONAUTICAL STUDY
8. WINDSOCK - EL 1195 (10' AMSL)	PRIMARY SURFACE	7.4'	NO ACTION
9. WINDSOCK - EL 1194 (11' AMSL)	PRIMARY SURFACE	8'	NO ACTION
10. WINDSOCK - EL 1167 (12' AMSL)	PRIMARY SURFACE	7.4'	NO ACTION
11. POLE - EL 1161 (6' AMSL)	PRIMARY SURFACE	4.8'	REQUEST AERONAUTICAL STUDY
12. POLE - EL 1206 (20' AMSL)	PRIMARY SURFACE	20'	BURY LINE/REMOVE POLES
13. SERVICE ROAD- EL 1196 (10' AMSL)	PRIMARY SURFACE	10'	CLOSED/REMOVE ROAD

GENERAL NOTES:

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3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

OBSTRUCTION LEGEND

* OBSTRUCTION

TRUE NORTH

15°27'45" E

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 2000 4000 6000
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

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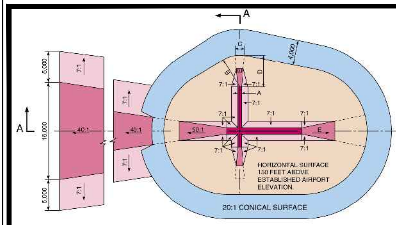
GRANT COUNTY INTERNATIONAL AIRPORT
AIRPORT AIRSPACE DRAWING
CONICAL SURFACE
DRAFT
Moses Lake, Washington

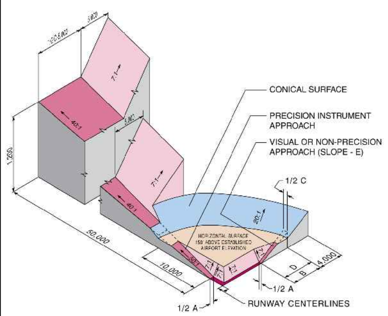
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner
June 23, 2014 Sheet 4 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com



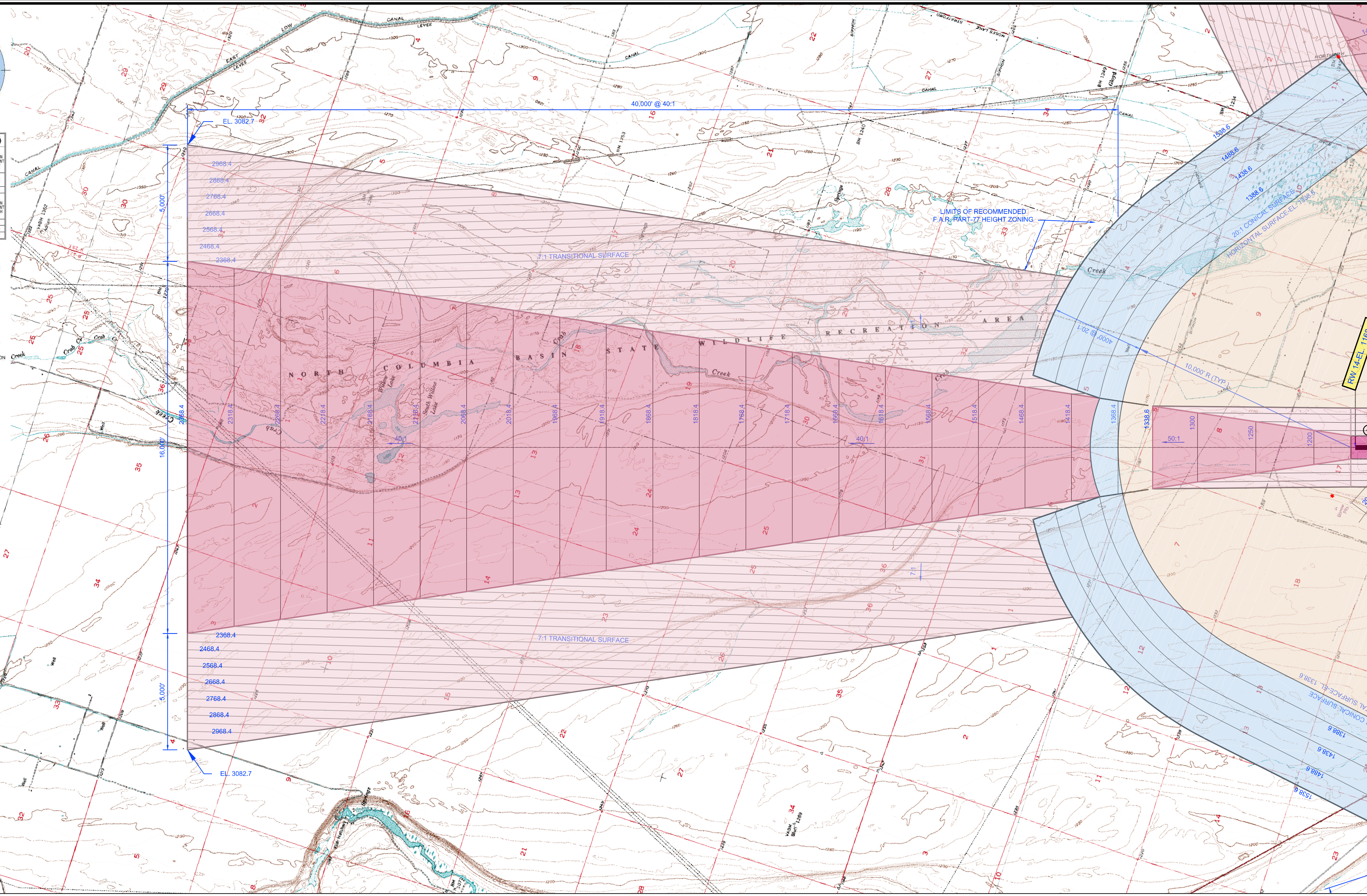
DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.



OUTER APPROACH SURFACE OBSTRUCTION TABLE			
OBJECT DESCRIPTION/ELEVATION	OBSTRUCTED PART 77 SURFACE	PENETRATION	PROPOSED OBJECT DISPOSITION
None	-	--	-

OBSTRUCTION LEGEND

- OBSTRUCTION
- TOPOGRAPHIC OBSTRUCTION

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 2000 4000 6000
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

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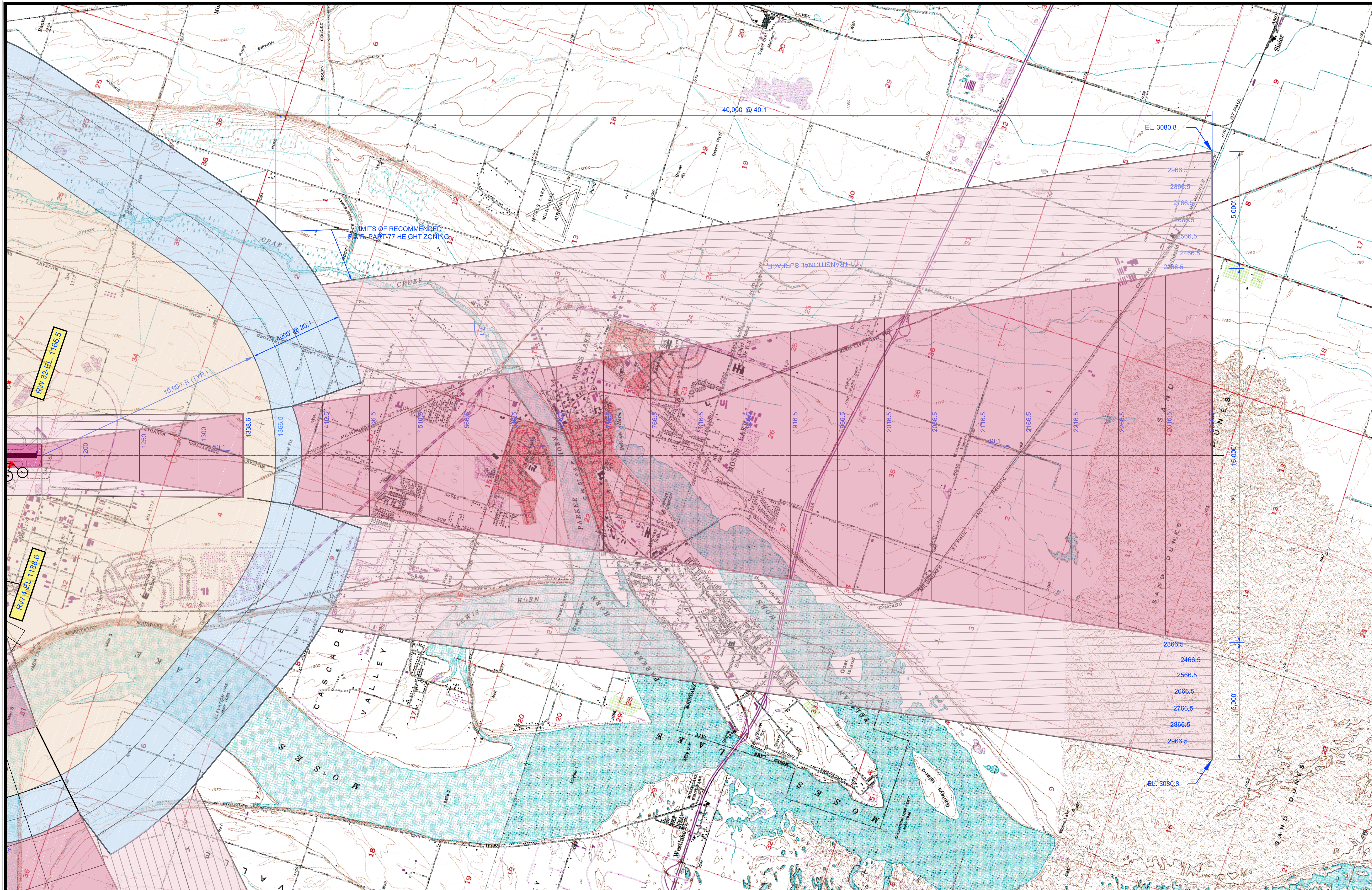
GRANT COUNTY INTERNATIONAL AIRPORT
AIRPORT AIRSPACE DRAWING
RUNWAY 14 (L) APPROACH SURFACE
Moses Lake, Washington

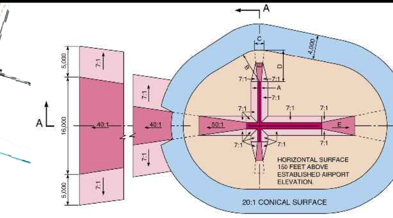
DRAFT

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 Sheet 5 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com





DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION NSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
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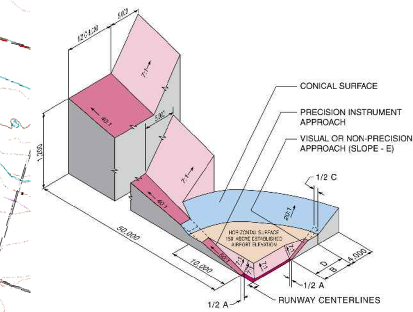
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.

GENERAL NOTES:

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OUTER APPROACH SURFACE OBSTRUCTION TABLE

OBJECT DESCRIPTION/ELEVATION	OBSTRUCTED PART 77 SURFACE	PENETRATION	PROPOSED OBJECT DISPOSITION
None	-	--	-

OBSTRUCTION LEGEND

*1	OBSTRUCTION
	TOPOGRAPHIC OBSTRUCTION

TRUE NORTH
15°27'45" E

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 2000 4000 6000
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

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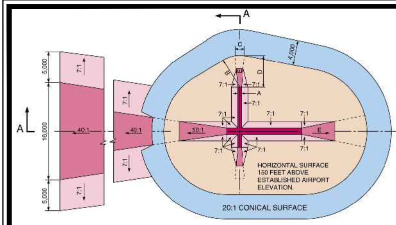
GRANT COUNTY INTERNATIONAL AIRPORT
AIRPORT AIRSPACE DRAWING
RUNWAY 32 (R) APPROACH SURFACE
Moses Lake, Washington

DRAFT

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

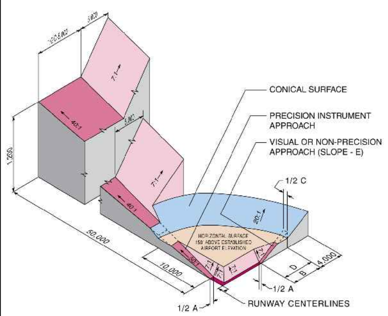
June 23, 2014 Sheet 6 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com



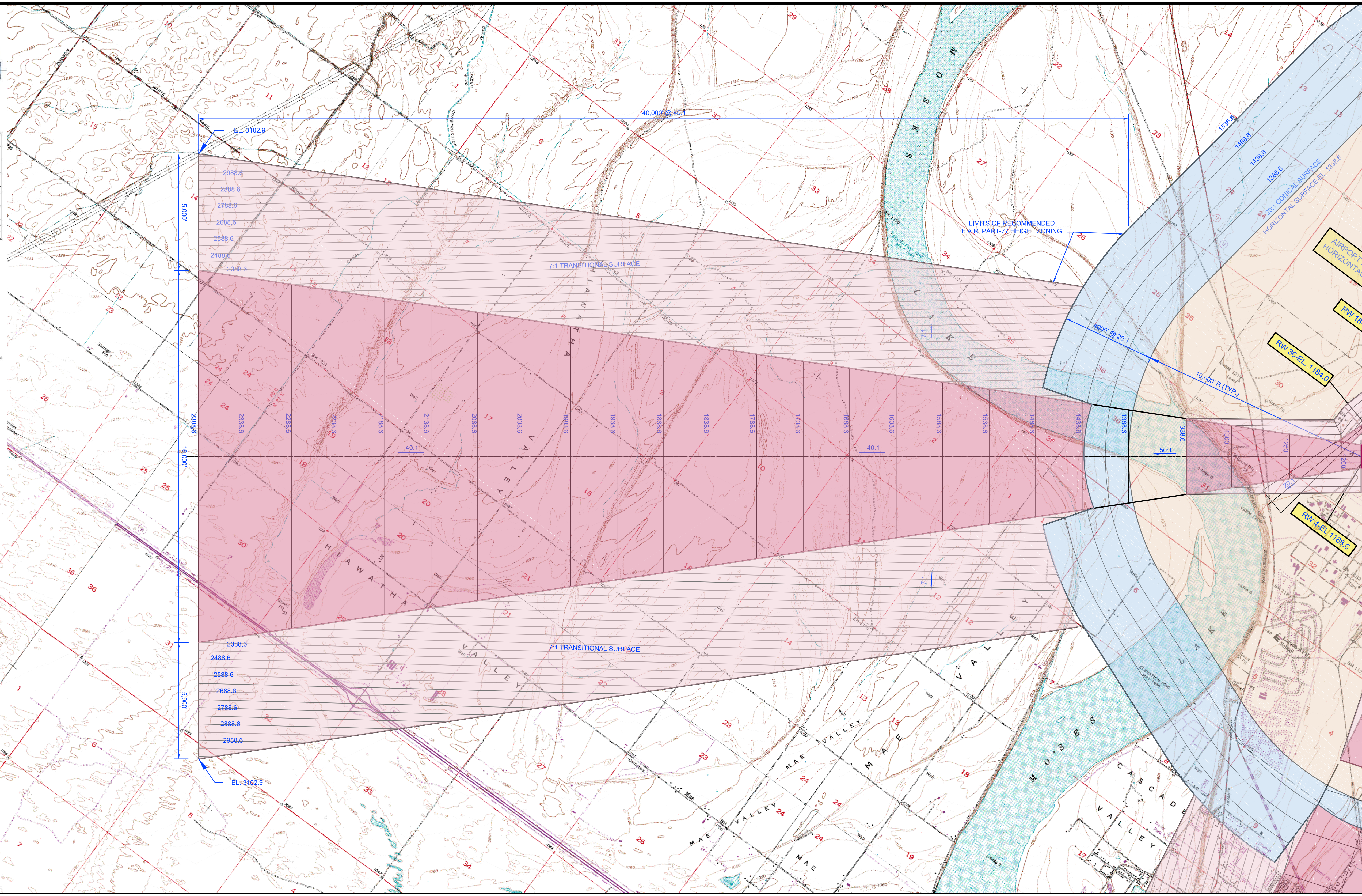
DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: 14 CFR Part 77, Section 77.25, Civil Airport Imaginary Surfaces.



OUTER APPROACH SURFACE OBSTRUCTION TABLE

OBJECT DESCRIPTION/ELEVATION	OBSTRUCTED PART 77 SURFACE	PENETRATION	PROPOSED OBJECT DISPOSITION
None	-	--	-

OBSTRUCTION LEGEND

*	OBSTRUCTION
EL. 950	TOPOGRAPHIC OBSTRUCTION

GENERAL NOTES:

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4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 2000 4000 6000
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

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GRANT COUNTY INTERNATIONAL AIRPORT
AIRPORT AIRSPACE DRAWING
RUNWAY 4 APPROACH SURFACE
Moses Lake, Washington

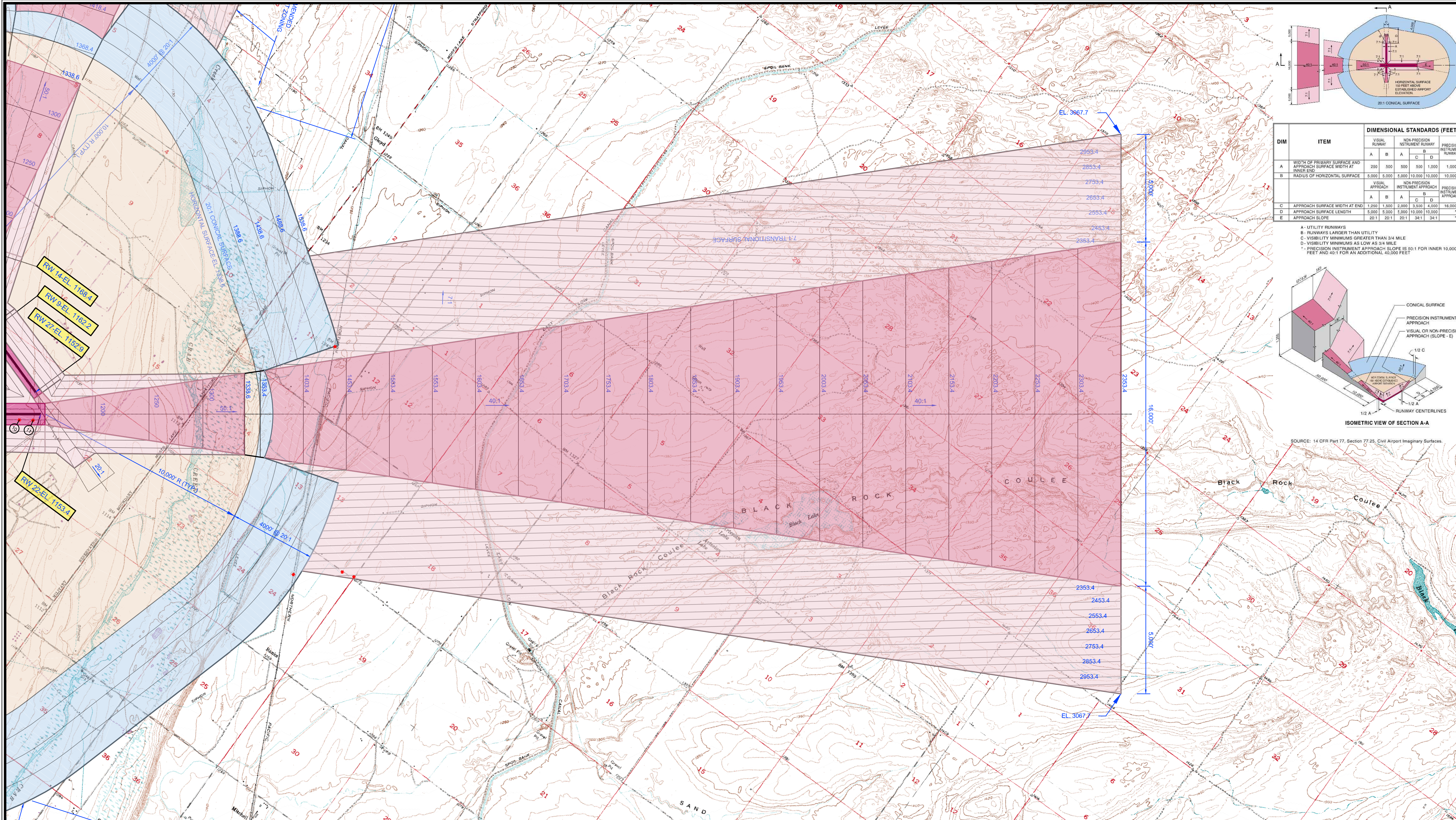
DRAFT

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 Sheet 7 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com

08/25/14 - 1:30pm - ljohnson - R:\CAD\JohnsonL\Project\Moses_Lake_MWH\ALPSET\mwh_sht4



DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION NSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B C	B D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B C	B D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

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B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

OUTER APPROACH SURFACE OBSTRUCTION TABLE

OBJECT DESCRIPTION/ELEVATION	OBSTRUCTED PART 77 SURFACE	PENETRATION	PROPOSED OBJECT DISPOSITION
None	-	--	-

OBSTRUCTION LEGEND

OBSTRUCTION

TOPOGRAPHIC OBSTRUCTION

GENERAL NOTES:

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Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 2000 4000 6000
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

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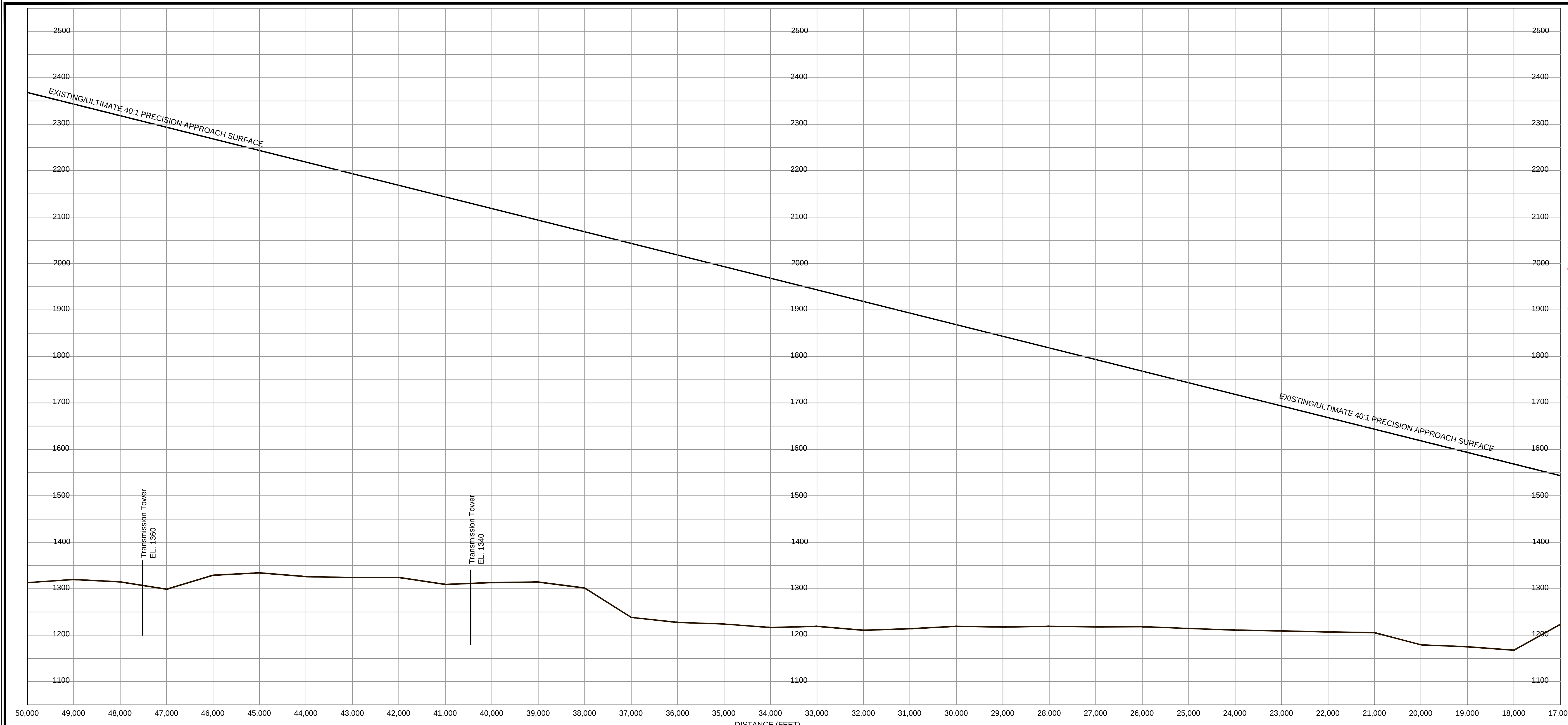
GRANT COUNTY INTERNATIONAL AIRPORT
AIRPORT AIRSPACE DRAWING RUNWAY 22 APPROACH SURFACE
Moses Lake, Washington

DRAFT

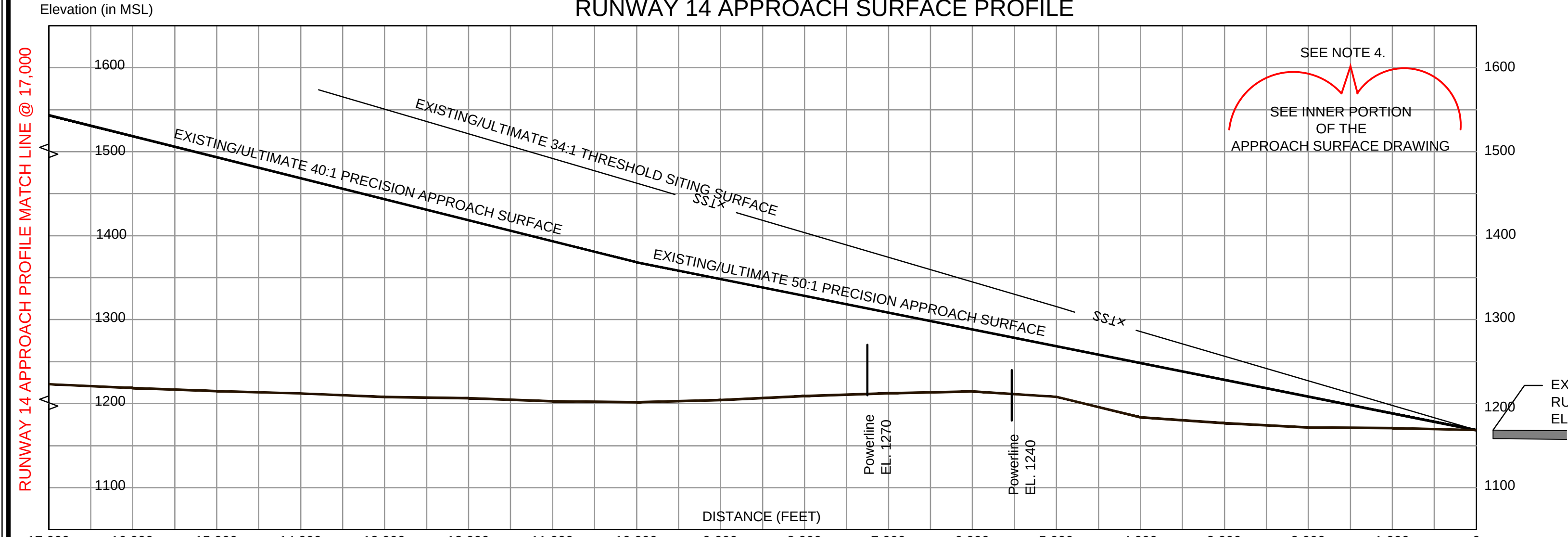
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014

Coffman Associates
Airport Consultants
www.coffmanassociates.com



RUNWAY 14 APPROACH SURFACE PROFILE



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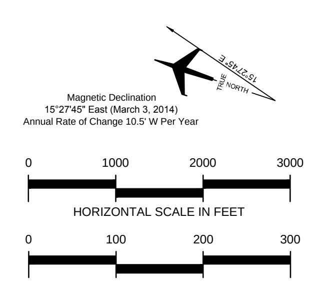
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Airport Datum in NAD-83 AND NAVD-88, USGS MAPS NAD-27.



OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	TSS Penetration	Proposed Object Disposition
- None	-	-	-	-
- -	-	-	-	-
- -	-	-	-	-

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

GRANT COUNTY INTERNATIONAL AIRPORT

RUNWAY 14 (L) PRECISION APPROACH SURFACE PROFILE

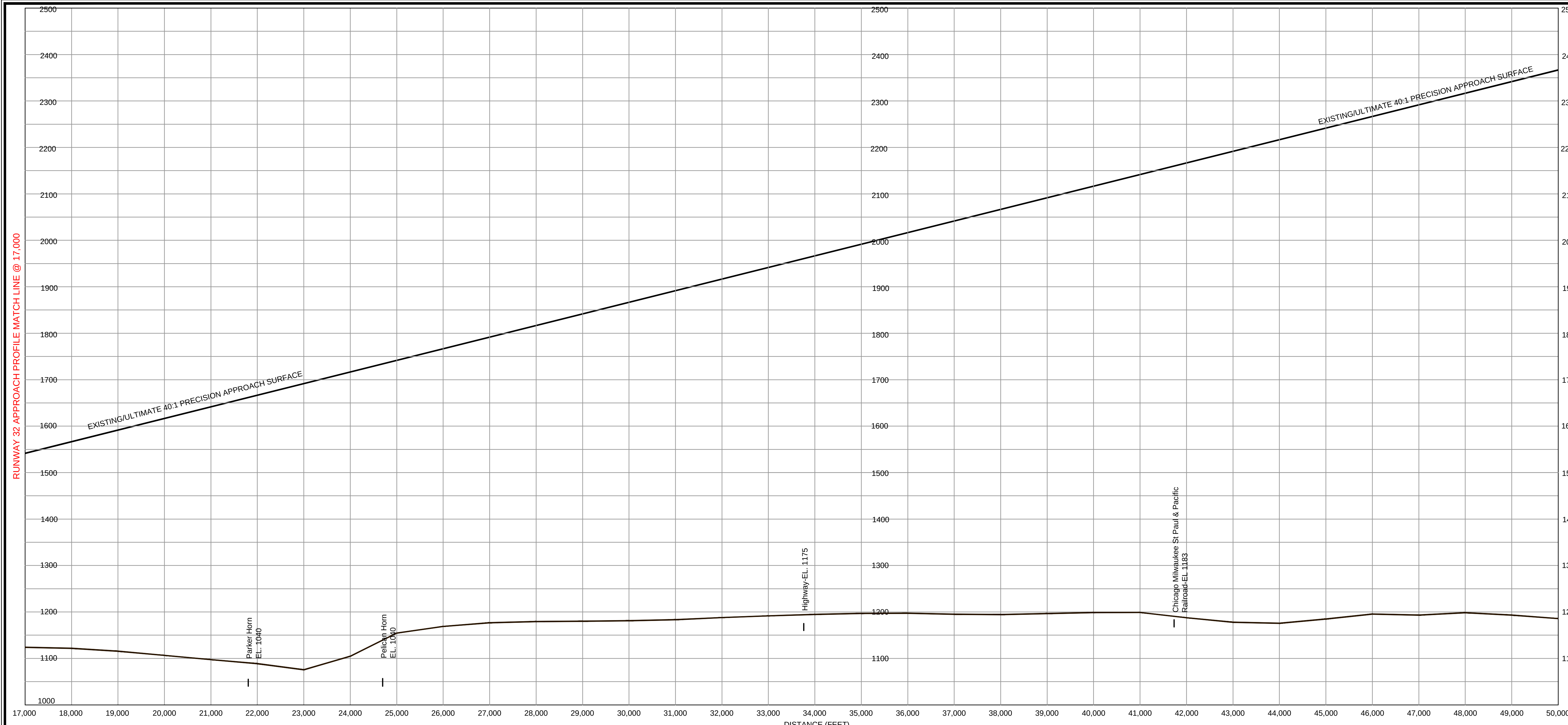
DRAFT

Moses Lake, Washington

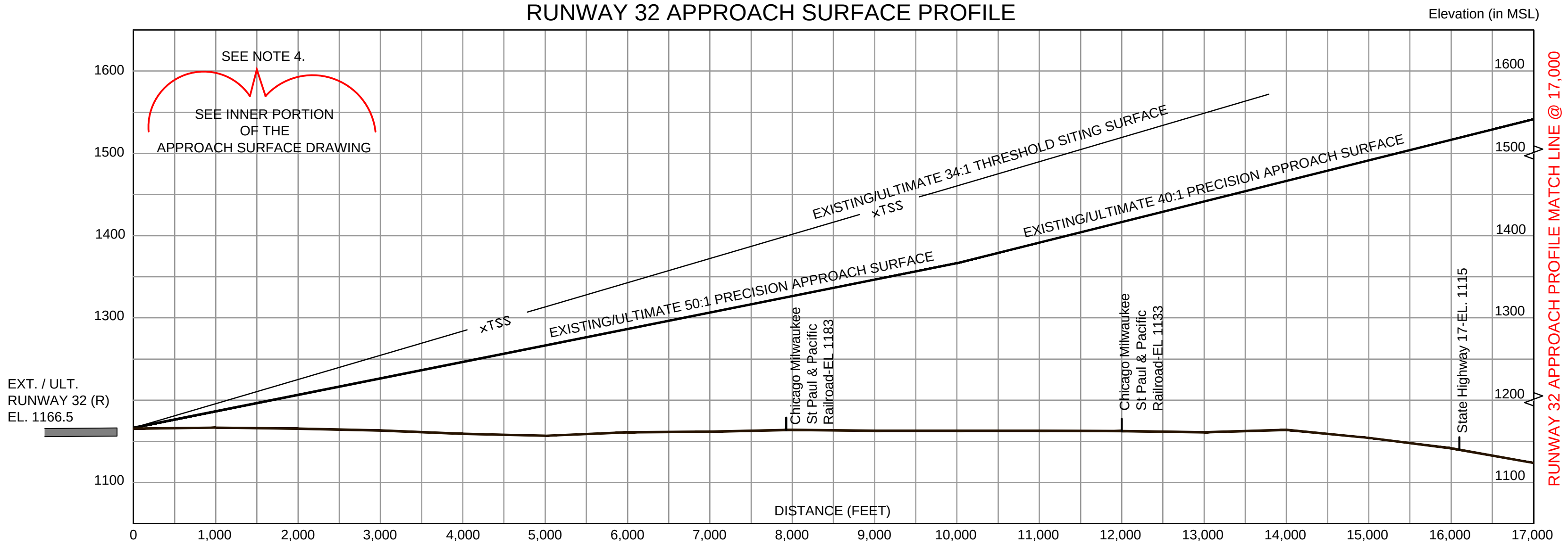
PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 | Sheet 9 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com

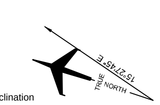


RUNWAY 32 APPROACH SURFACE PROFILE



GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Airport Datum in NAD-83 AND NAVD-88, USGS MAPS NAD-27.



Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	TSS Penetration	Proposed Object Disposition
- None	-	-	-	-
- -	-	-	-	-
- -	-	-	-	-

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

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GRANT COUNTY INTERNATIONAL AIRPORT
RUNWAY 32 (R) PRECISION APPROACH SURFACE PROFILE
Moses Lake, Washington

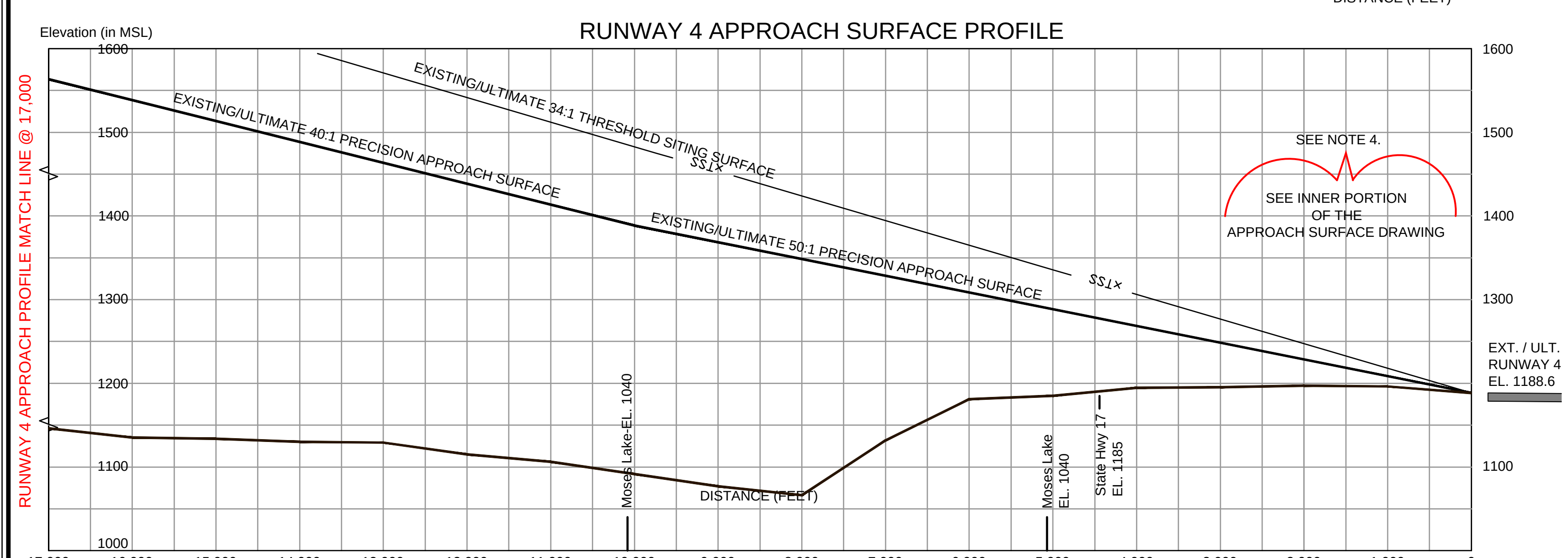
DRAFT

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014

Sheet 10 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com



GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Airport Datum in NAD-83 AND NAVD-88, USGS MAPS NAD-27.

OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	TSS Penetration	Proposed Object Disposition
- None	-	-	-	-
- -	-	-	-	-
- -	-	-	-	-

TRUE NORTH
15°27'45" E

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

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GRANT COUNTY INTERNATIONAL AIRPORT

RUNWAY 4 PRECISION APPROACH SURFACE PROFILE

DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 | Sheet 11 of 26

Coffman Associates
Airport Consultants
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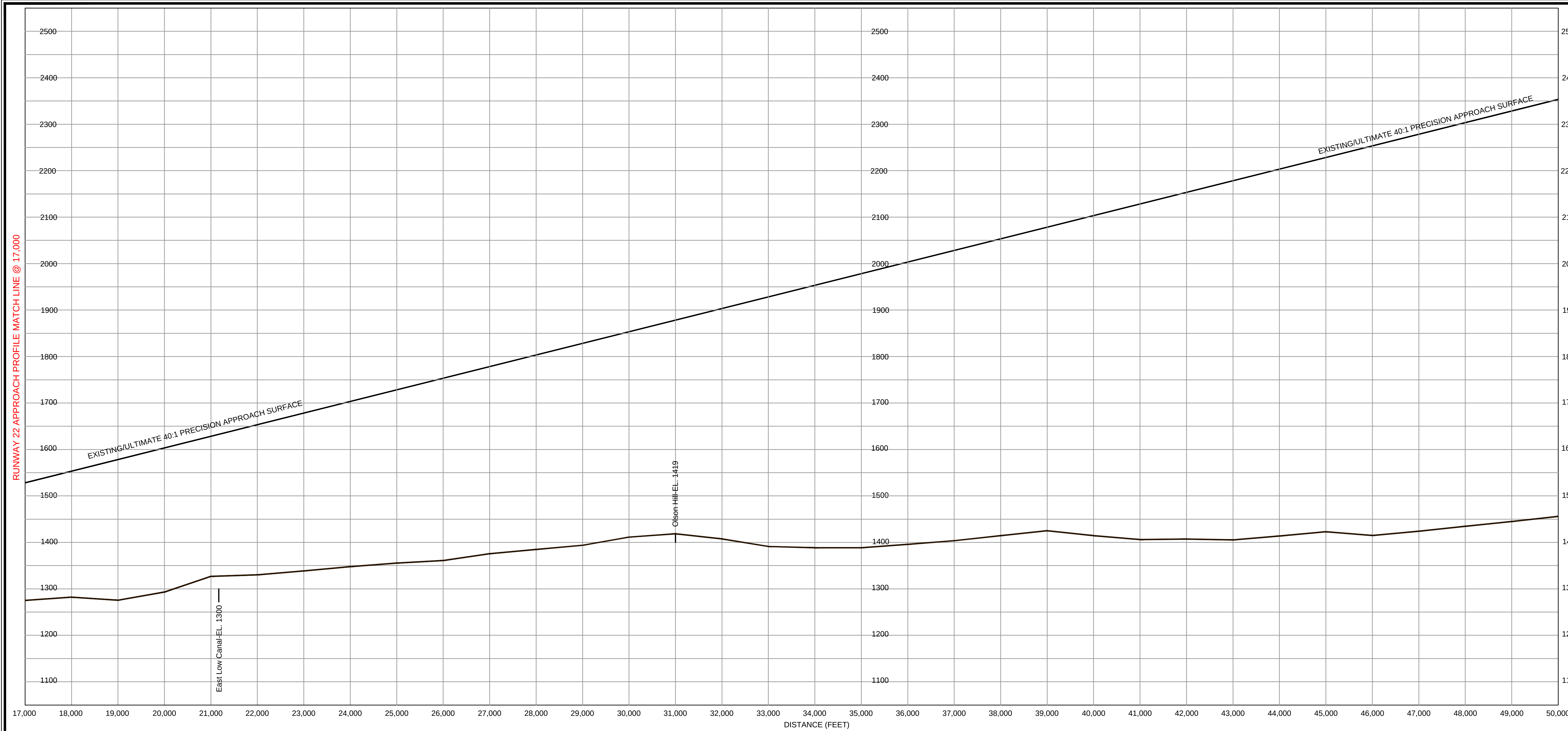
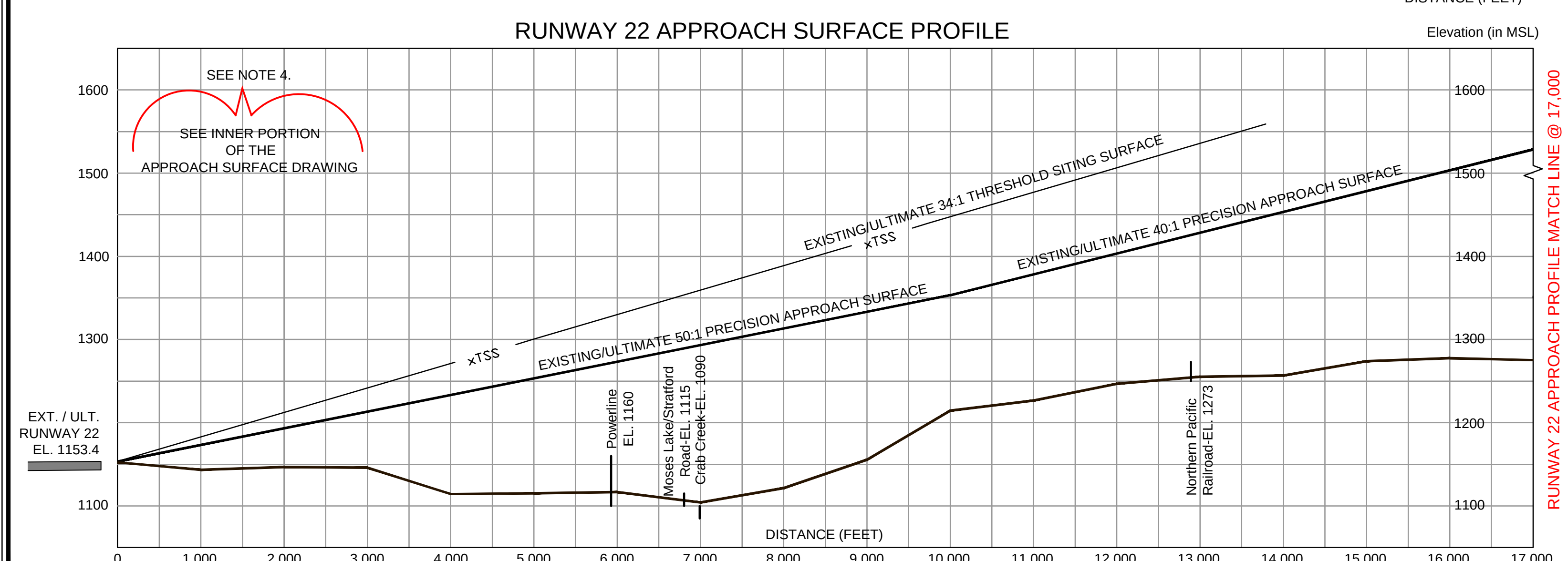
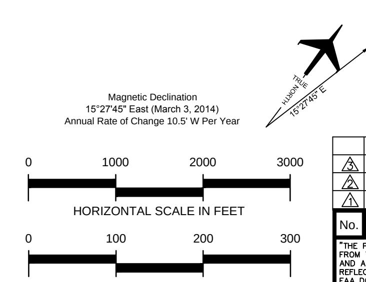


RUNWAY 22 APPROACH SURFACE PROFILE



GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
5. Airport Datum in NAD-83 AND NAVD-88, USGS MAPS NAD-27.



OBSTRUCTION TABLE

Object Description/Elevation	Obstructed Part 77 Surface	Object Penetration	TSS Penetration	Proposed Object Disposition
- None	-	-	-	-
- -	-	-	-	-
- -	-	-	-	-

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

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GRANT COUNTY INTERNATIONAL AIRPORT
RUNWAY 22 PRECISION
APPROACH SURFACE PROFILE
Moses Lake, Washington

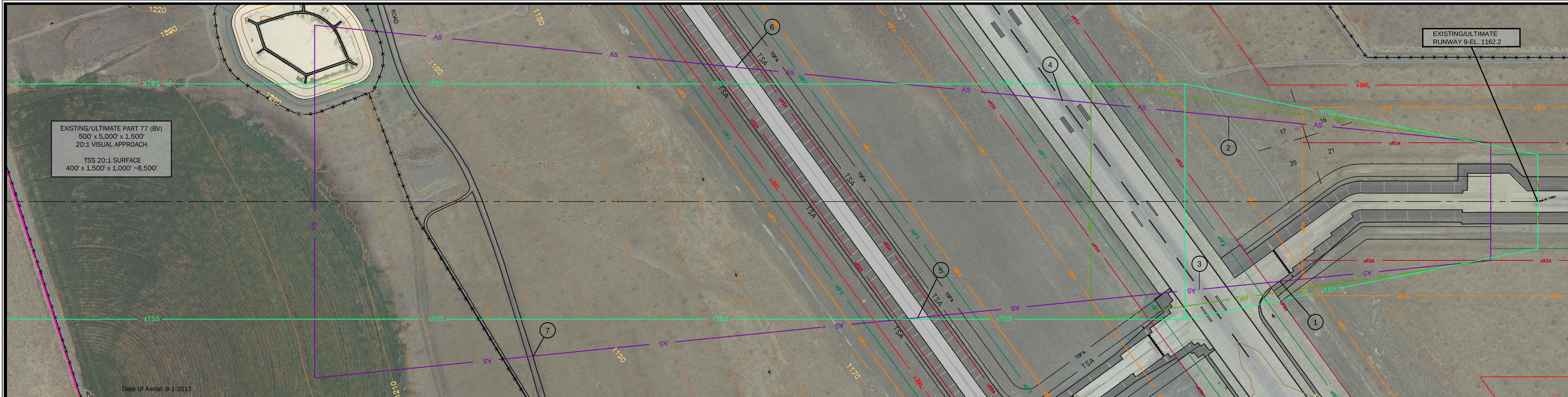
DRAFT

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

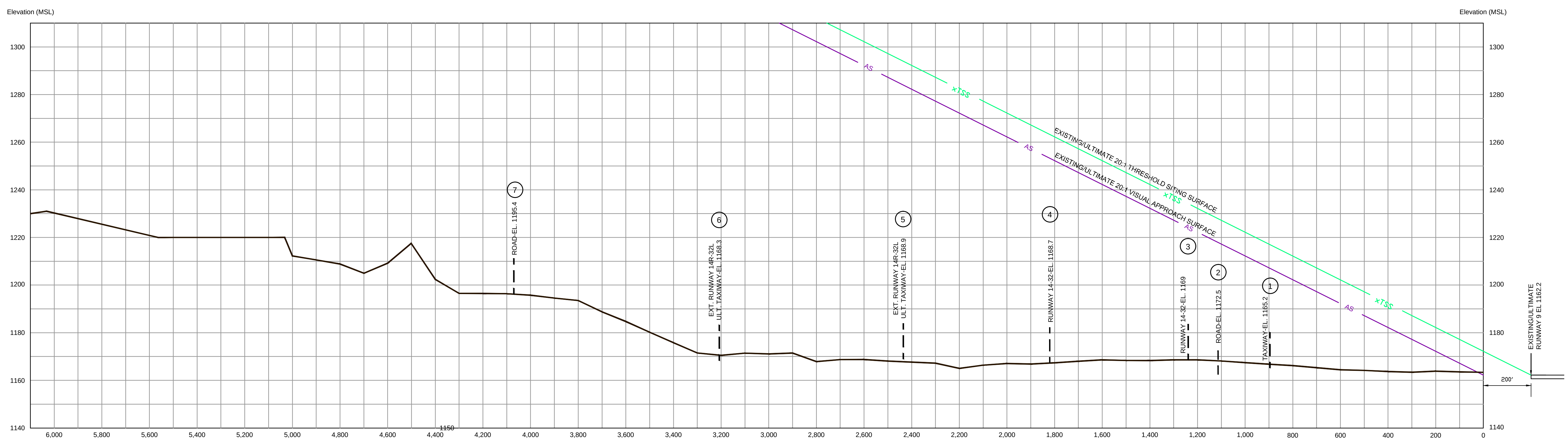
June 23, 2014

Sheet 12 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com



When the Approach Surface length is 5,000 feet, the Inner portion of the Approach surfaces and the Approach Surfaces Profiles are shown on the Visual Approach Surface Drawing.



Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 20:1	Ult. 20:1	Ext. 20:1 TSS	Ult. 20:1 TSS	
– None	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–

OBSTRUCTION TABLE

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

HORIZONTAL SCALE IN FEET: 0, 200, 400, 600

VERTICAL SCALE IN FEET: 0, 20, 40, 60

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN, NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS."

GRANT COUNTY INTERNATIONAL AIRPORT

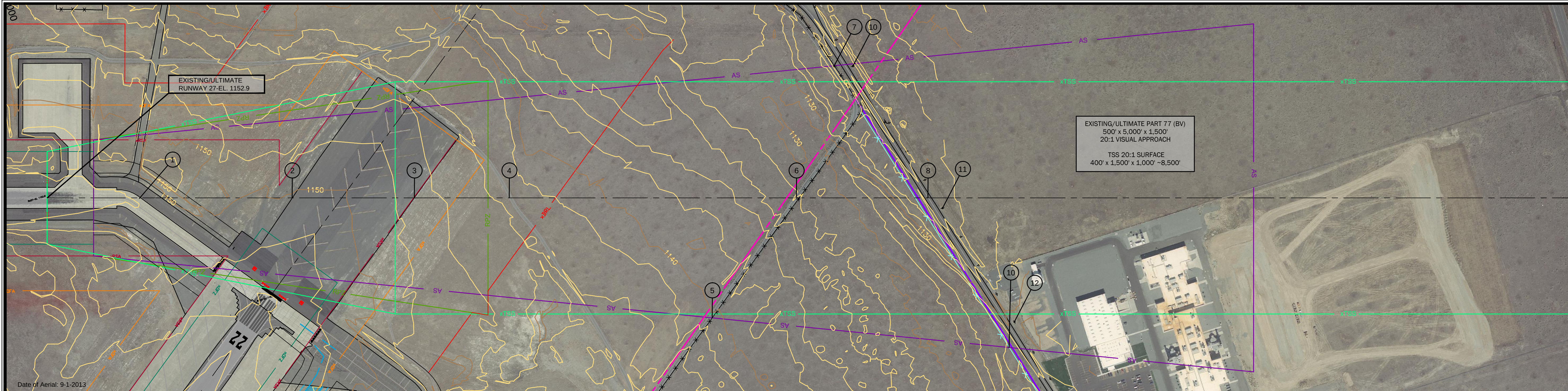
RUNWAY 9 VISUAL APPROACH SURFACE DRAWING

DRAFT

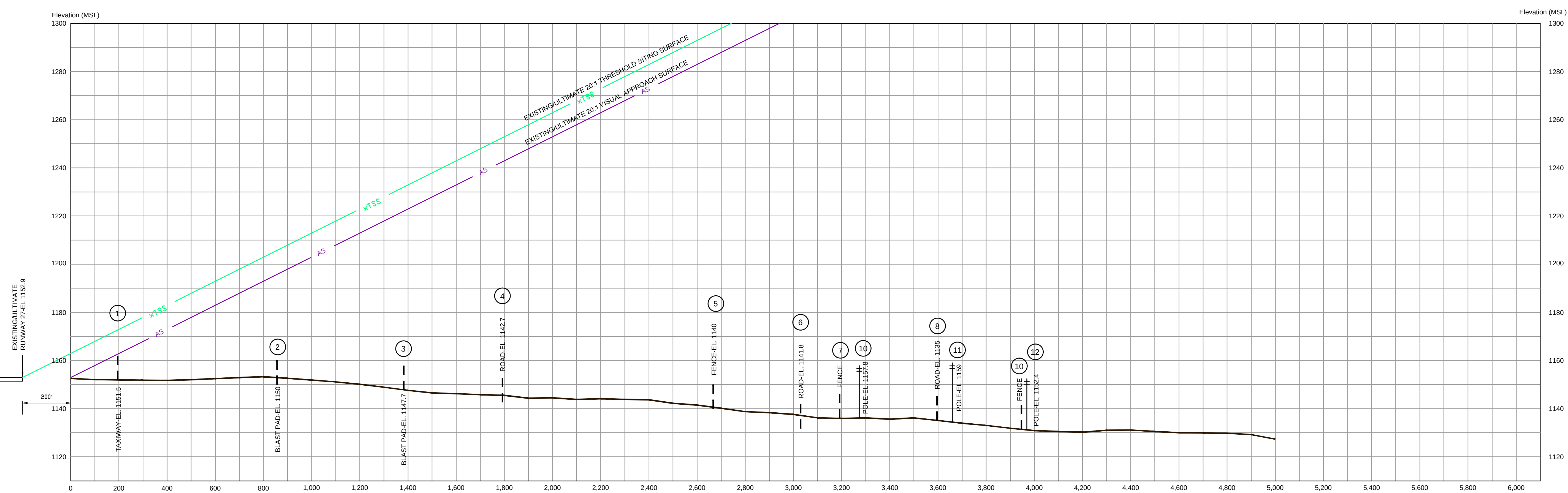
Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014



When the Approach Surface length is 5,000 feet, the Inner portion of the Approach surfaces and the Approach Surfaces Profiles are shown on the Visual Approach Surface Drawing.



OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach Ext. 20:1	Part 77 Approach Ult. 20:1	Threshold Siting Surface Ext. 20:1 TSS	Threshold Siting Surface Ult. 20:1 TSS	DESCRIPTION
– None	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

HORIZONTAL SCALE IN FEET (0, 200, 400, 600)

VERTICAL SCALE IN FEET (0, 20, 40, 60)

No.	REVISIONS	DATE	BY	APP'D.
	–	–	–	–
	–	–	–	–
	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT

RUNWAY 27 VISUAL APPROACH SURFACE DRAWING

Moses Lake, Washington

DRAFT

PLANNED BY: *Patrick C. Taylor*
DETAILED BY: *Larry D. Johnson*
APPROVED BY: *Stephen C. Wagner*

June 23, 2014 Sheet 14 of 26

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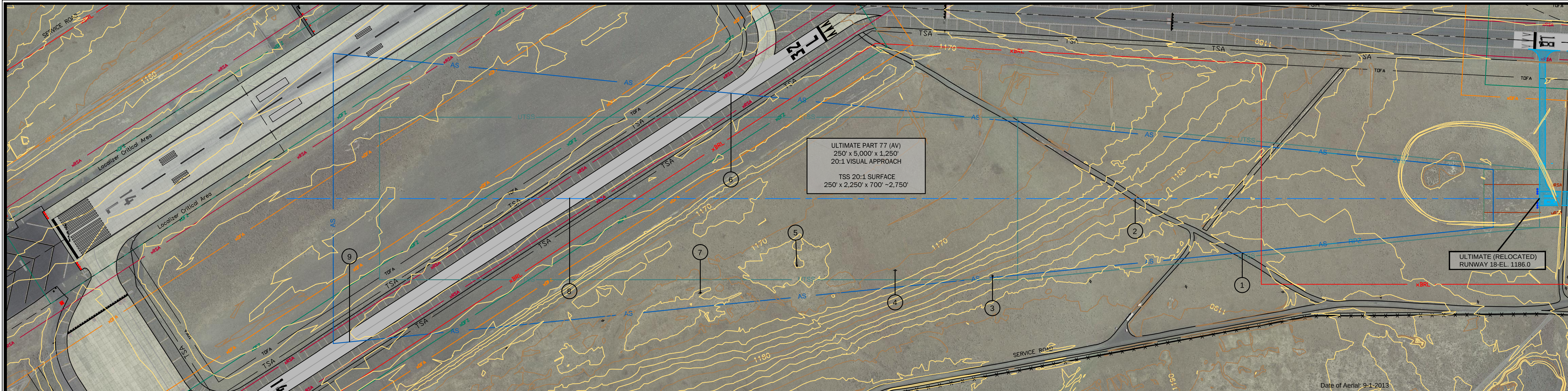
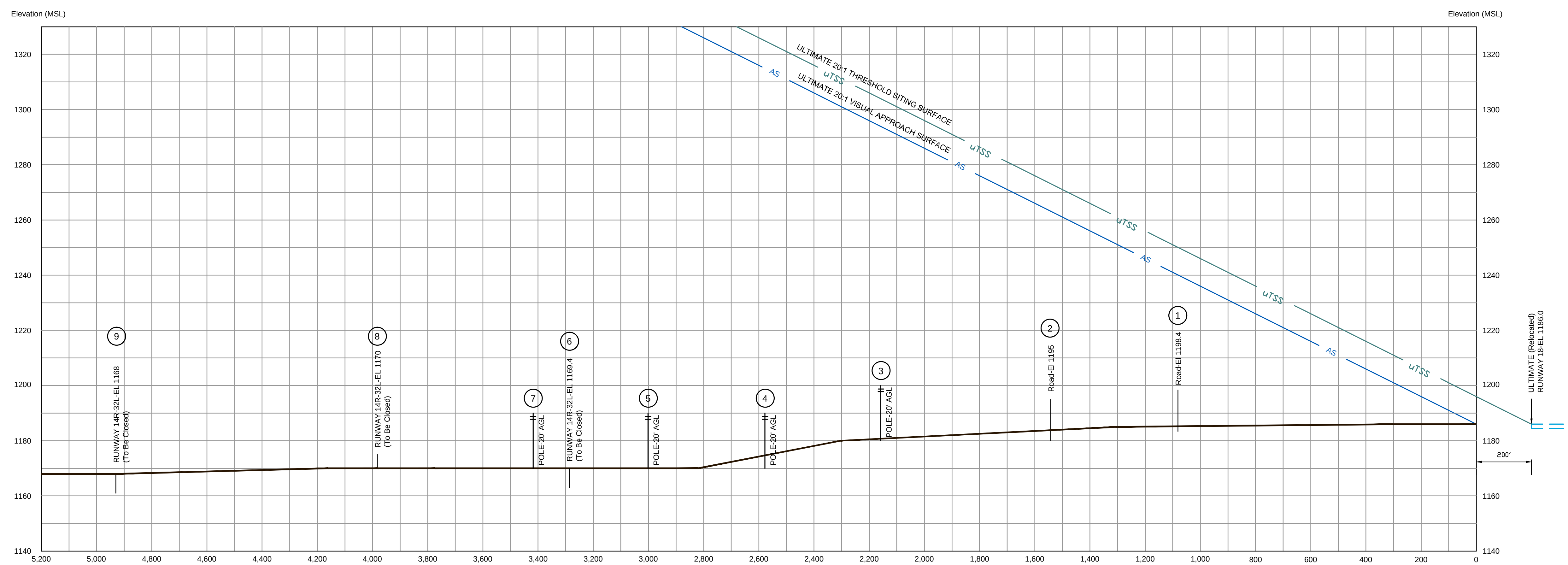


When the Approach Surface length is 5,000 feet, the Inner portion of the Approach surfaces and the Approach Surfaces Profiles are shown on the Visual Approach Surface Drawing.



Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

HORIZONTAL SCALE IN FEET

VERTICAL SCALE IN FEET

OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 20:1	Ult. 20:1	Ext. 20:1 TSS	Ult. 20:1 TSS	
– None	N/A	–	N/A	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

No.	REVISIONS	DATE	BY	APP'D.
	–	–	–	–
	–	–	–	–
	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT

RELOCATED RUNWAY 18 VISUAL APPROACH SURFACE DRAWING

Moses Lake, Washington

DRAFT

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 | Sheet 15 of 26

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Airport Consultants
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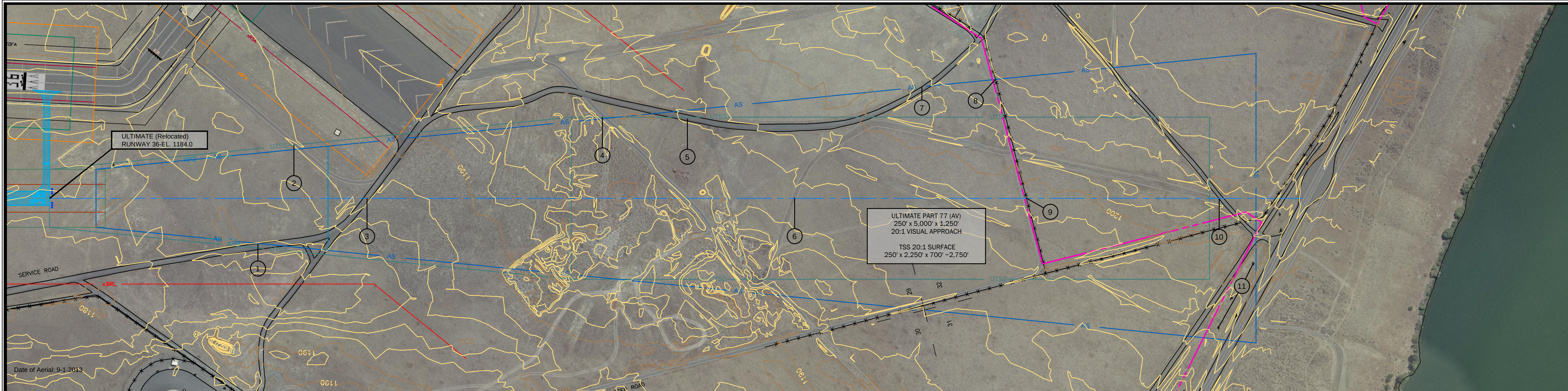
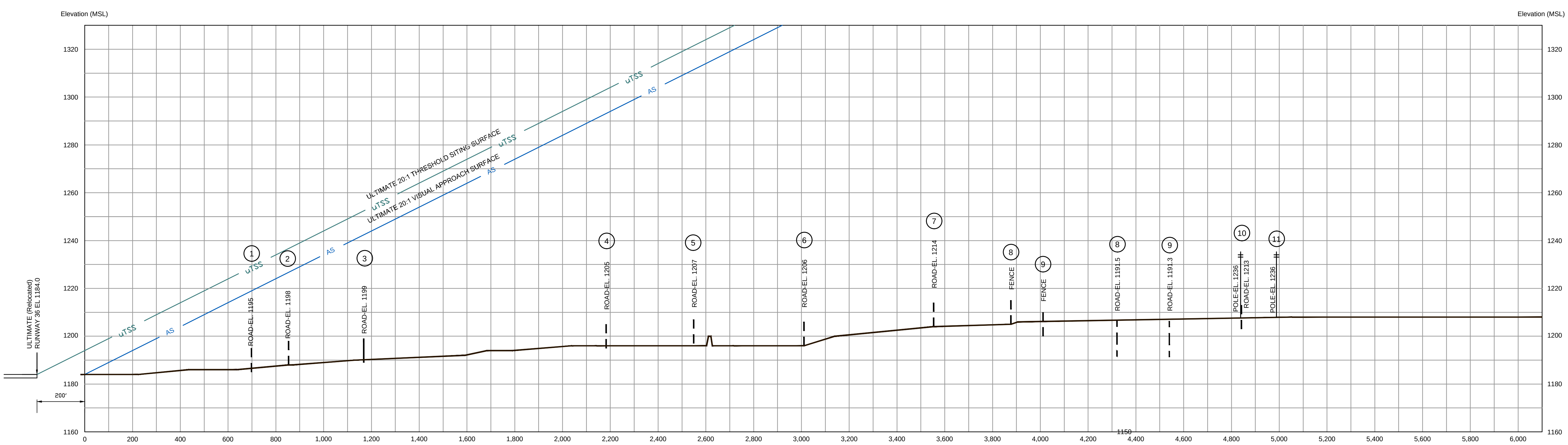
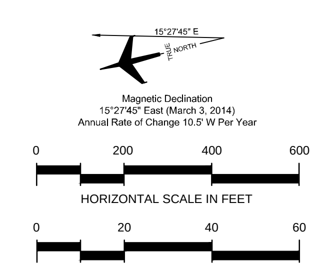


When the Approach Surface length is 5,000 feet, the Inner portion of the Approach surfaces and the Approach Surfaces Profiles are shown on the Visual Approach Surface Drawing.





OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach: Ext. 20:1	Part 77 Approach: Ult. 20:1	Threshold Siting Surface: Ext. 20:1 TSS	Threshold Siting Surface: Ult. 20:1 TSS	DESCRIPTION
– None	N/A	–	N/A	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT

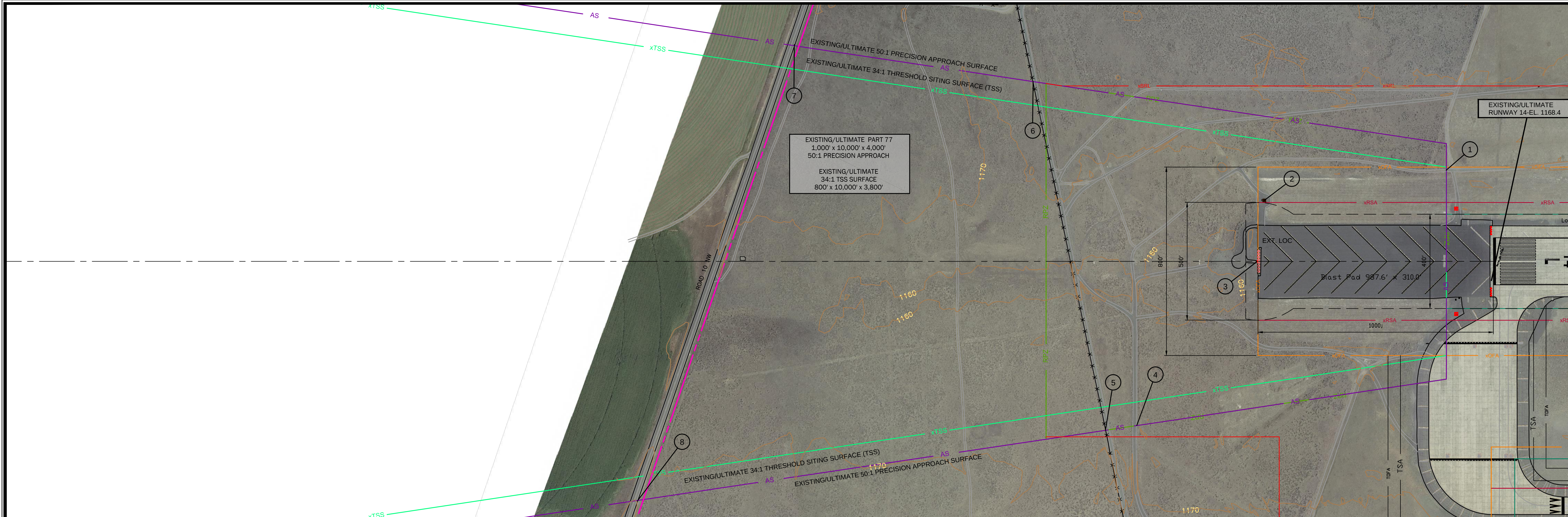
RELOCATED RUNWAY 36 VISUAL APPROACH SURFACE DRAWING

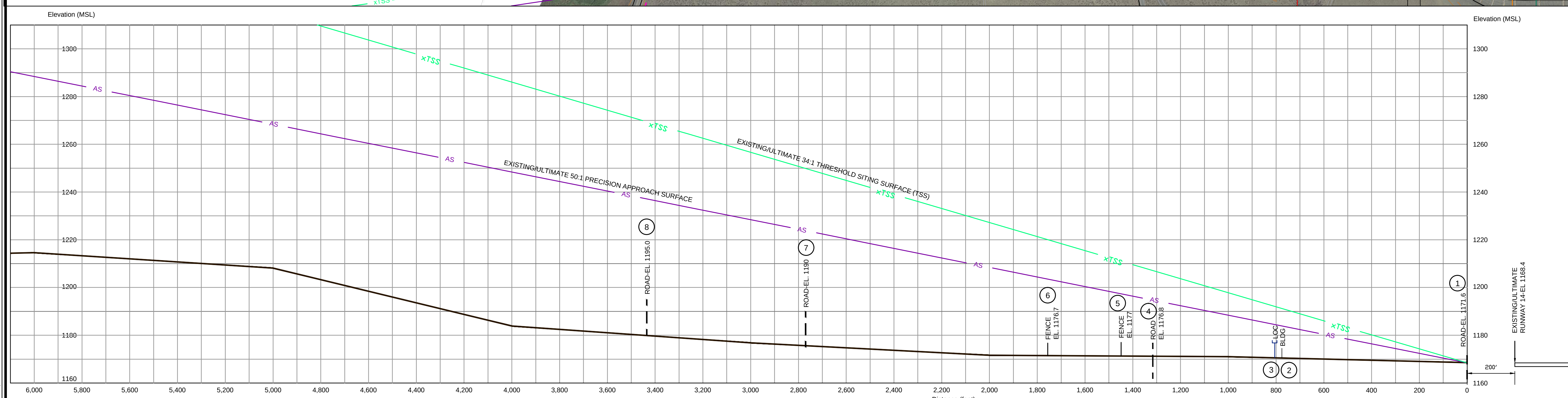
DRAFT

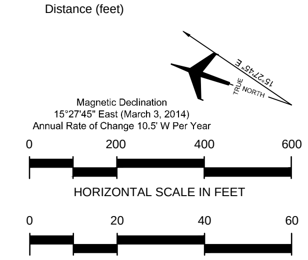
Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014







OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 50:1	Ult. 50:1	Ext. 34:1 TSS	Ult. 34:1 TSS	
1. SERVICE ROAD–EL. 1171.6	3.1'	3.1'	3.1'	3.1'	CLOSED/RELOCATE ROAD
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
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No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT

INNER PORTION OF RUNWAY 14 (L) APPROACH SURFACE DRAWING

DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014

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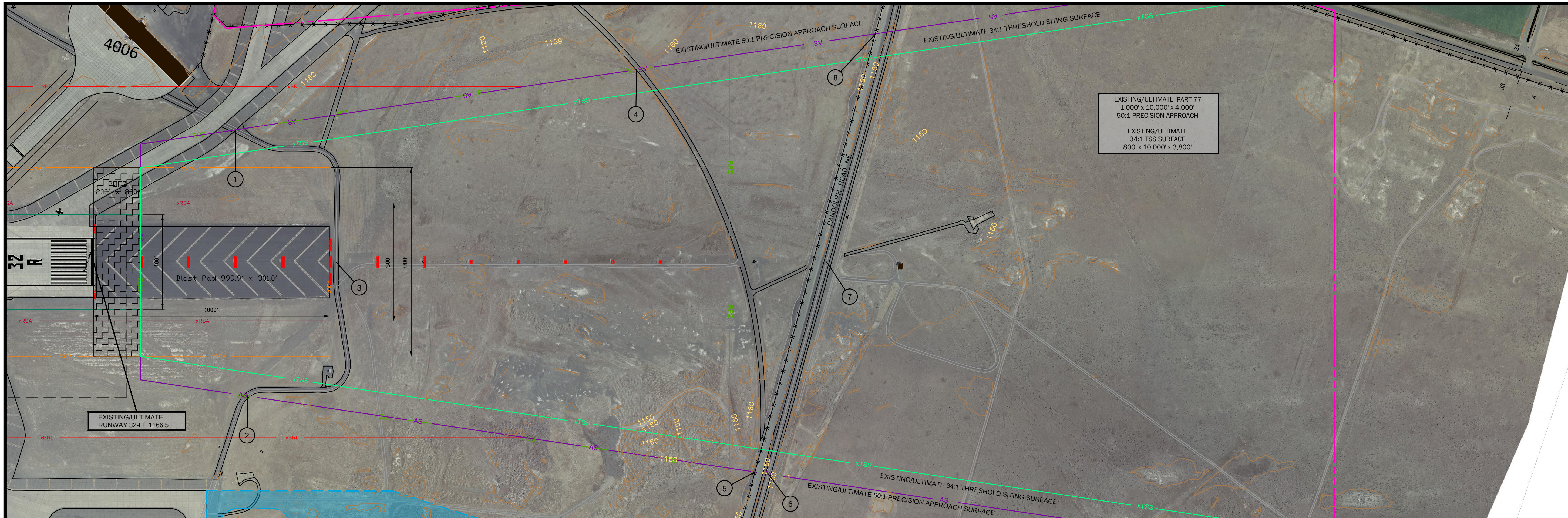

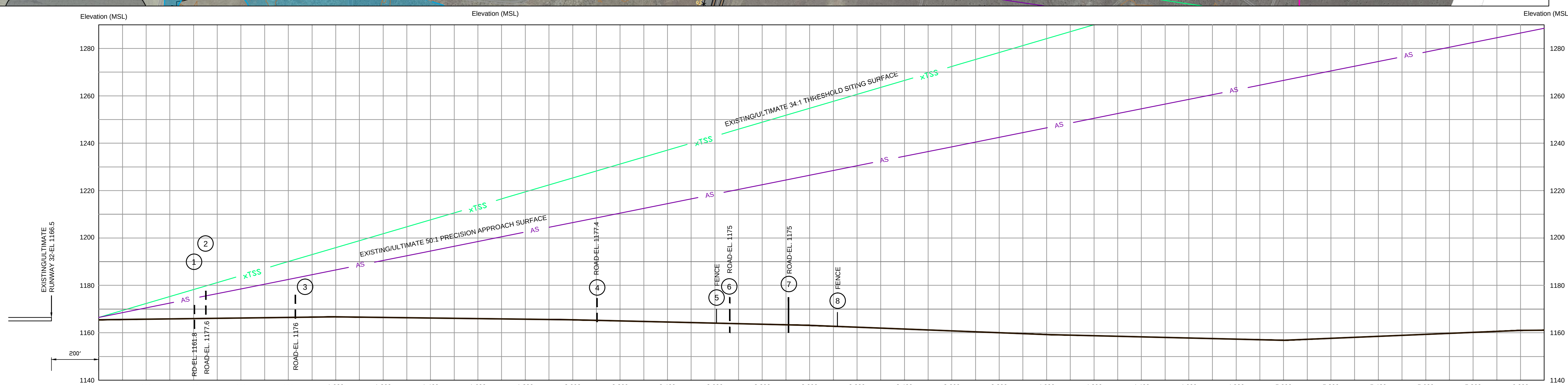

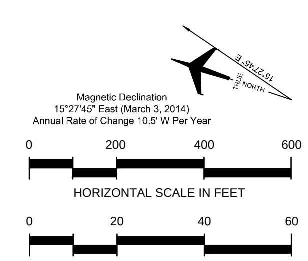

OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 50:1	Ult. 50:1	Ext. 34:1 TSS	Ult. 34:1 TSS	
2. SERVICE ROAD–1177.8	2.2'	2.2'	0'	0'	RELOCATE
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT

INNER PORTION OF RUNWAY 32 (R) APPROACH SURFACE DRAWING

DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor

DETAILED BY: Larry D. Johnson

APPROVED BY: Stephen C. Wagner

June 23, 2014

Sheet 18 of 26

Coffman Associates
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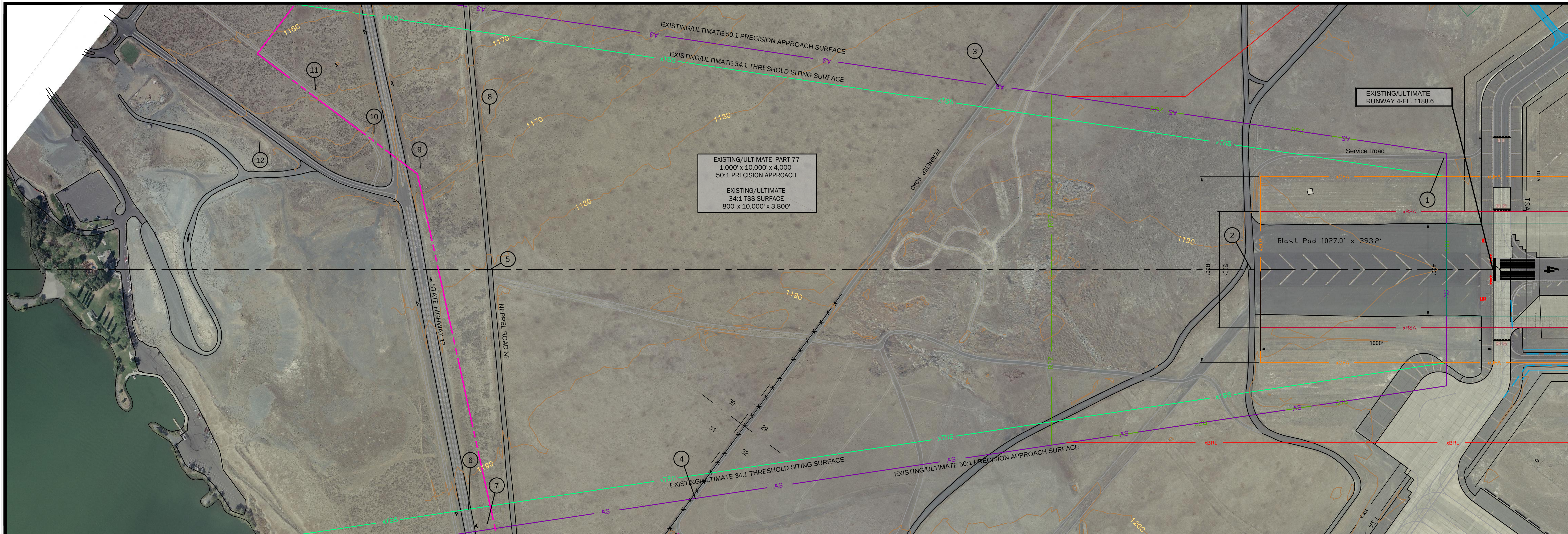

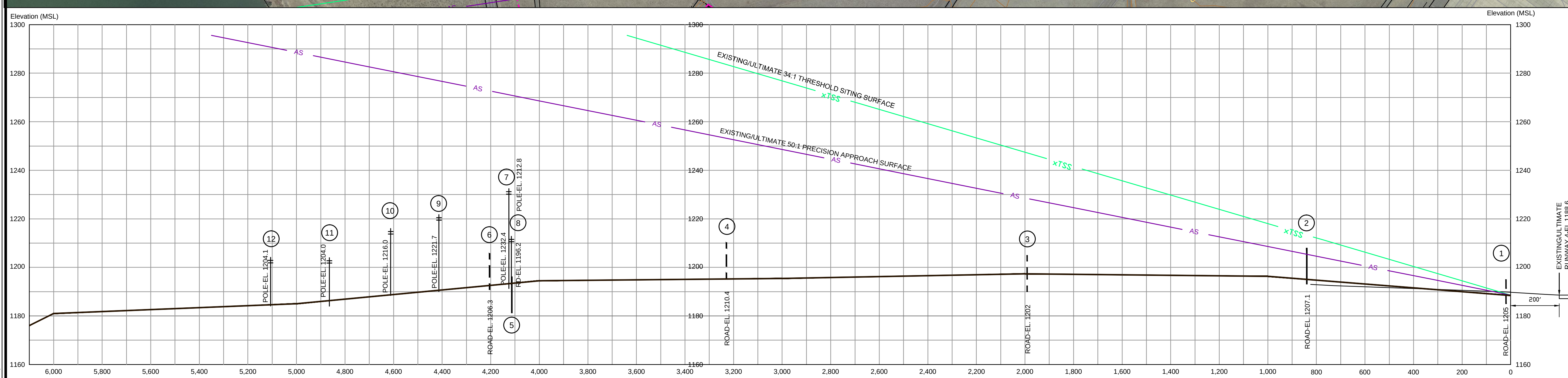

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 200 400 600
HORIZONTAL SCALE IN FEET

0 20 40 60
VERTICAL SCALE IN FEET

OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 50:1	Ult. 50:1	Ext. 34:1 TSS	Ult. 34:1 TSS	
1. ROAD–EL. 1205	6'	6'	0'	0'	RELOCATE ROAD
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

No.	REVISIONS	DATE	BY	APP'D.
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GRANT COUNTY INTERNATIONAL AIRPORT

INNER PORTION OF RUNWAY 4 APPROACH SURFACE DRAWING

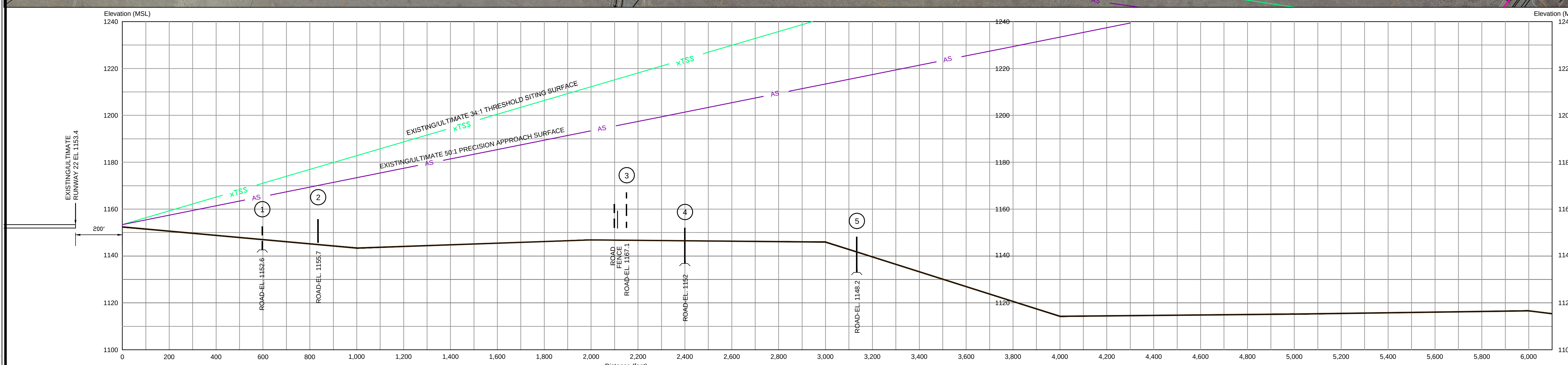
DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 | Sheet 19 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com



Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

TRUE NORTH
15°27'45" E

HORIZONTAL SCALE IN FEET

VERTICAL SCALE IN FEET

OBSTRUCTION TABLE

Objects Description/Elevation	Part 77 Approach		Threshold Siting Surface		DESCRIPTION
	Ext. 50:1	Ult. 50:1	Ext. 34:1 TSS	Ult. 34:1 TSS	
– None	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–
– –	–	–	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, are illustrated on the AIRPORT AIRSPACE DRAWING.

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1	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT

INNER PORTION OF RUNWAY 22 APPROACH SURFACE DRAWING

DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014

Coffman Associates
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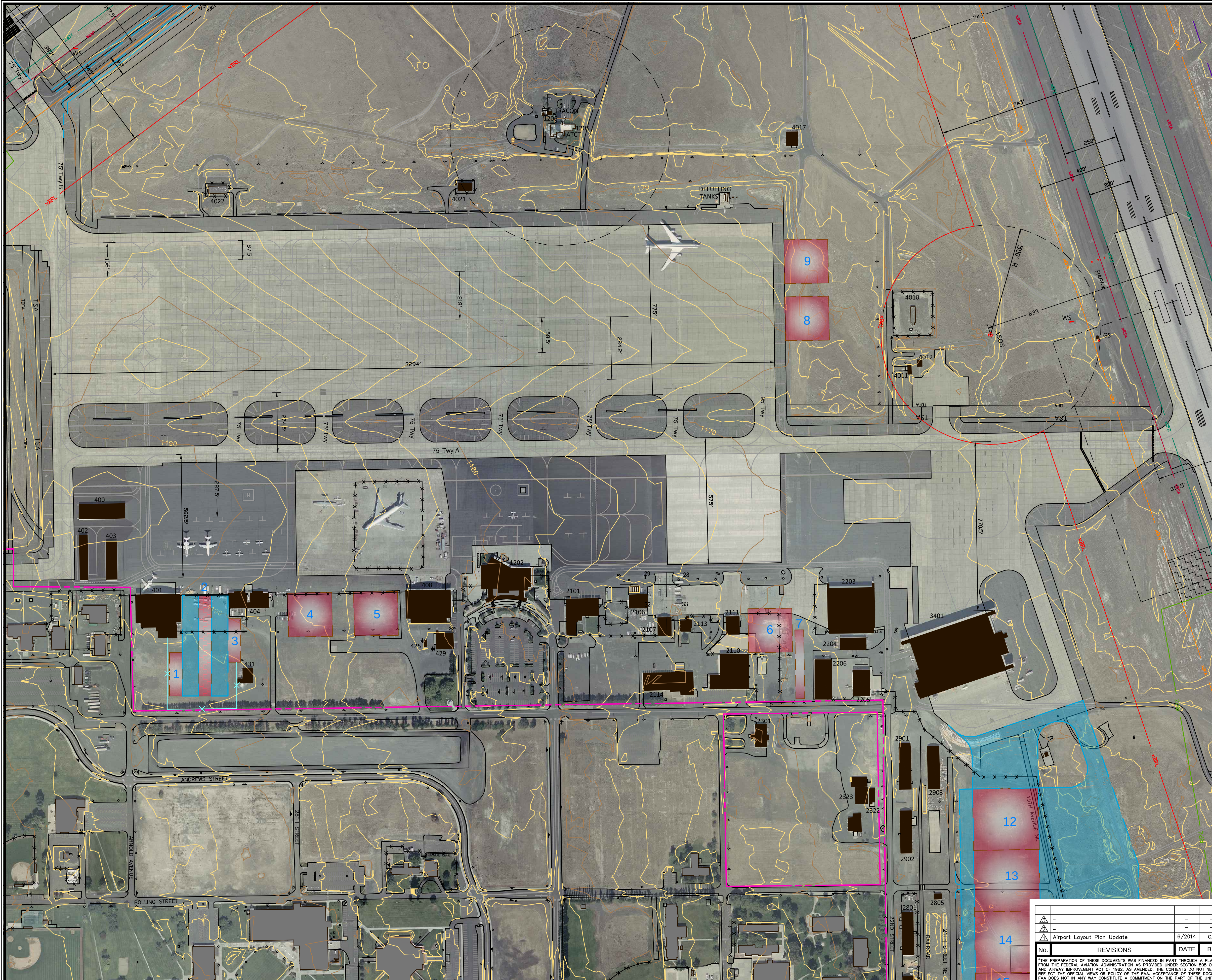

ULTIMATE BUILDINGS/FACILITIES

No.	FACILITY	ELEVATION
1	BOX HANGAR	23' AGL
2	T-HANGAR	23' AGL
3	BOX HANGAR	23' AGL
4	CONVENTIONAL HANGAR	35' AGL
5	CONVENTIONAL HANGAR	35' AGL
6	CONVENTIONAL HANGAR	35' AGL
7	MAINTENANCE HANGAR	40' AGL
8	CONVENTIONAL HANGAR	35' AGL
9	CONVENTIONAL HANGAR	35' AGL
12-15	HANGARS (4 Buildings)	100' AGL

BUILDINGS/FACILITIES

No.	FACILITY	ELEVATION
1202	TERMINAL BUILDING	1222 MSL
1205	ATCT	1298 MSL
400	GENERAL AVIATION T-HANGAR	1210 MSL
401	CONVENTIONAL HANGAR	1257 MSL
402	GENERAL AVIATION T-HANGAR	1207 MSL
403	GENERAL AVIATION T-HANGAR	1211 MSL
404	COLUMBIA PACIFIC AVIATION/FBO	1217 MSL
408	CONVENTIONAL HANGAR	1247 MSL
425	BUILDING	-
429	BUILDING	1196 MSL
431	BUILDING	1216 MSL
2101	AIRCRAFT RESCUE FIRE-FIGHTING (ARFF)	1199 MSL
2106	BOX HANGAR	1203 MSL
2107	BOX HANGAR	1203 MSL
2110	AIRSIDE BUILDING	1205 MSL
2111	BUILDING	1200 MSL
2113	BUILDING	1188 MSL
2114	BUILDING	1209 MSL
2203	CONVENTIONAL HANGAR	1213 MSL
2204	AIRPORT MAINTENANCE BUILDING	1189 MSL
2205	AIRPORT MAINTENANCE SHOP	1193 MSL
2206	AIRPORT MAINTENANCE BUILDING	1196 MSL
2301	BUILDING	1193 MSL
2321	BUILDING	1183 MSL
2322	BUILDING	1179 MSL
2323	BUILDING	1186 MSL
2324	BUILDING	1181 MSL
2801	BUILDING	1190 MSL
2802	BUILDING	1190 MSL
2805	BUILDING	1183 MSL
2901	BUILDING	1189 MSL
2902	BUILDING	1189 MSL
2903	BUILDING	1189 MSL
3401	CONVENTIONAL HANGAR	1239 MSL
4010	BUILDING	1181 MSL
4011	BUILDING	1180 MSL
4012	BUILDING	1177 MSL
4017	BUILDING	1192 MSL
4018	DEFUELING TANKS	N/A
4021	BUILDING	1188 MSL
4022	BUILDING	1198 MSL

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
	SAME	AIRPORT ROTATING BEACON
	SAME	BUILDING (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING (up to 10 AGL)
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI-4)
	SAME	RUNWAY THRESHOLD LIGHTS and REIL
34 35 3 2	SAME	SECTION CORNER (None Available)
	SAME	SEGMENTED CIRCLE/WIND INDICATOR
1180	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
	SAME	PARCELS
TOFA	SAME	TAXIWAY OBJECT FREE AREA
TSA	SAME	TAXIWAY SAFETY AREA
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
xOFZ	uOFZ	RUNWAY OBSTACLE FREE ZONE (OFZ)
xRSA	uRSA	RUNWAY SAFETY AREA (RSA)
xOFA	uOFA	RUNWAY OBJECT FREE AREA (OFA)
N/A	uOFA/uOFZ	ULTIMATE OFA and ULTIMATE OFZ
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
xBRL	SAME	BUILDING RESTRICTION LINE (BRL-35')
	SAME	ASOS
xLOC	SAME	LOCALIZER CRITICAL AREA
xGS	SAME	GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
	SAME	GLIDE SLOPE ANTENNA
	SAME	MALSR APPROACH LIGHT SYSTEM
	SAME	PRECISION OBSTACLE FREE ZONE (POFZ)
		TIE-DOWNS
		PAVEMENT SHADE
	SAME	CRITICAL AREA
AS	AS	APPROACH SURFACE
xTSS	uTSS	THRESHOLD SITING SURFACE

TRUE NORTH
15°27'45" E

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change
10.5' W Per Year

0 200 400 600
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT

TERMINAL AREA DRAWING

DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

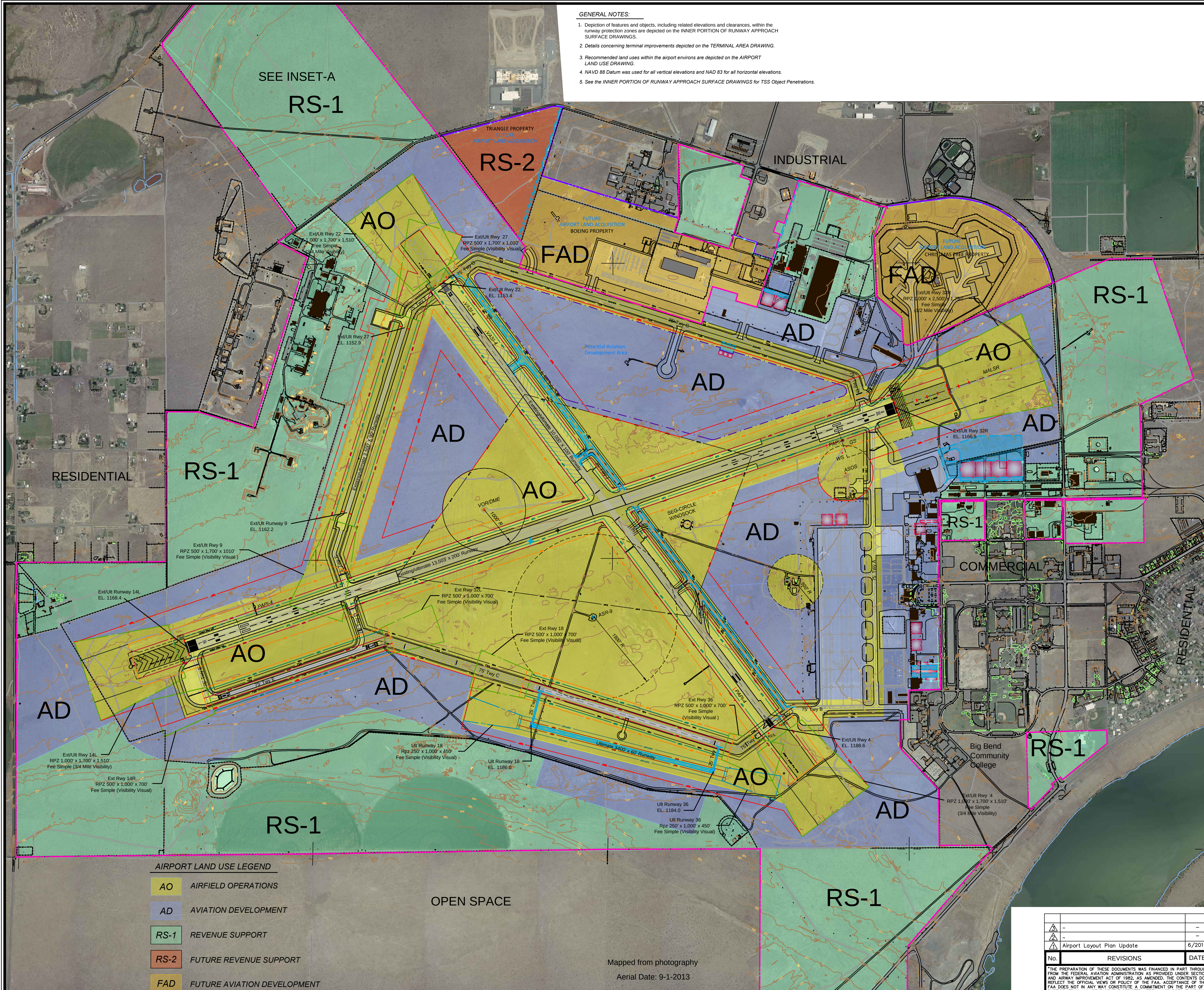
June 23, 2014

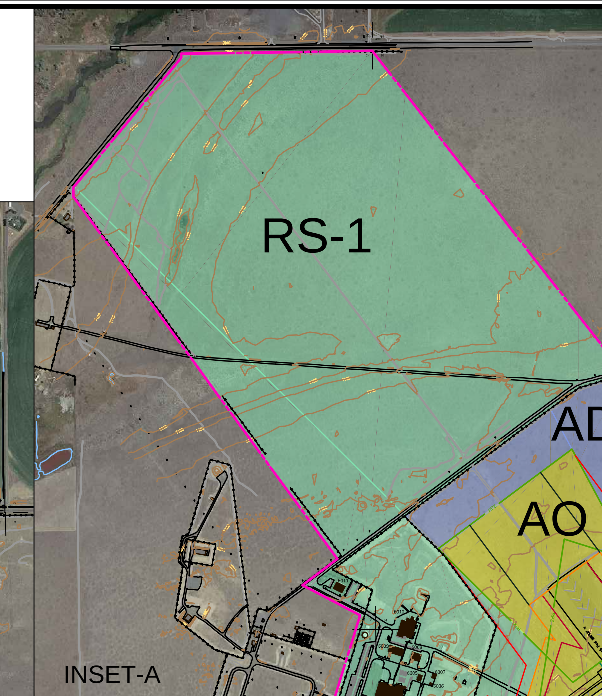
Sheet 21 of 26

Coffman Associates
Airport Consultants
www.coffmanassociates.com

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.
2. *Details concerning terminal improvements depicted on the TERMINAL AREA DRAWING.*
3. *Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE DRAWING.*
4. *NAVD 88 Datum was used for all vertical elevations and NAD 83 for all horizontal elevations.*
5. *See the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS for TSS Object Penetrations.*





LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
	SAME	AIRPORT ROTATING BEACON
	SAME	BUILDING (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING (up to 10 AGL)
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI-4)
	SAME	RUNWAY THRESHOLD LIGHTS and REIL
34 35 / 3 2	SAME	SECTION CORNER (None Available)
	SAME	SEGMENTED CIRCLE/WIND INDICATOR
1180	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
	SAME	PARCELS
TOFA	SAME	TAXIWAY OBJECT FREE AREA
TSA	SAME	TAXIWAY SAFETY AREA
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
xOFZ	uOFZ	RUNWAY OBSTACLE FREE ZONE (OFZ)
xRSA	uRSA	RUNWAY SAFETY AREA (RSA)
xOFA	uOFA	RUNWAY OBJECT FREE AREA (OFA)
N/A	uOFA/uOFZ	ULTIMATE OFA and ULTIMATE OFZ
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
xBRL	SAME	BUILDING RESTRICTION LINE (BRL-35')
	SAME	ASOS
xLOC	SAME	LOCALIZER CRITICAL AREA
xGS	SAME	GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
	SAME	GLIDE SLOPE ANTENNA
	SAME	MALSR APPROACH LIGHT SYSTEM
	SAME	PRECISION OBSTACLE FREE ZONE (POFZ)
		TIE-DOWNS
		PAVEMENT SHADE
	SAME	CRITICAL AREA

TRUE NORTH

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

No.	REVISIONS	DATE	BY	APP'D.
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GRANT COUNTY INTERNATIONAL AIRPORT

AIRPORT LAND USE DRAWING

DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 | Sheet 22 of 26

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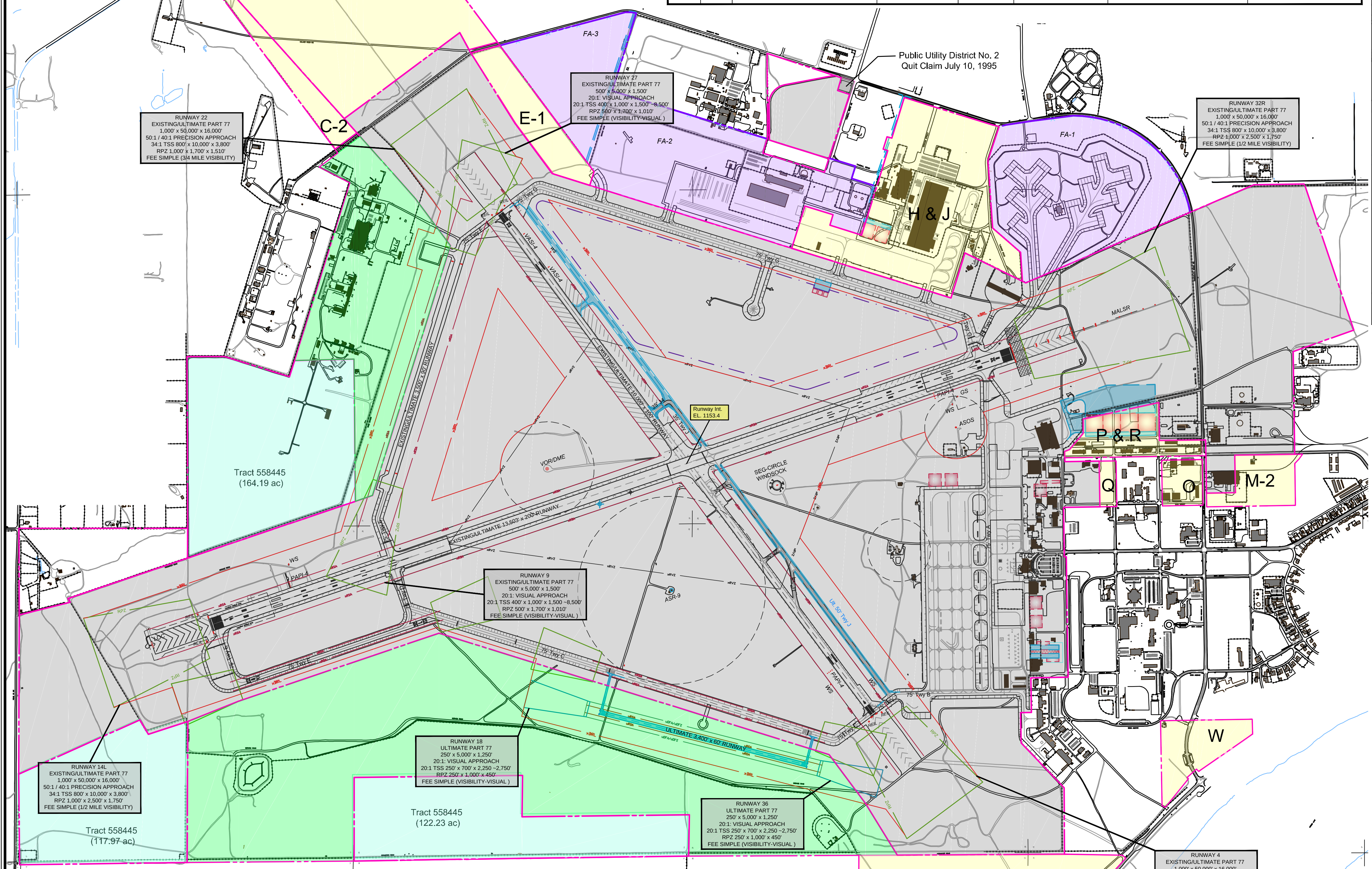
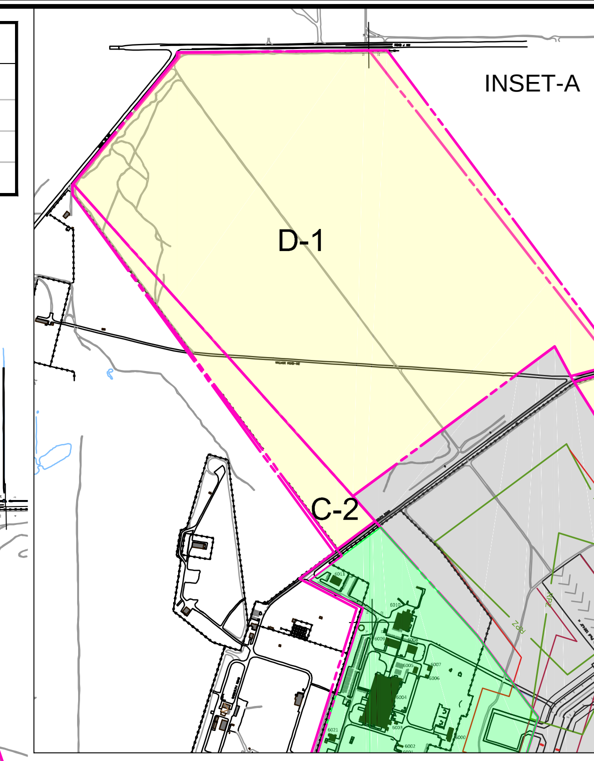
FUTURE AIRPORT PROPERTY

PARCEL	ACRES	GRANTOR	PROPERTY INTEREST	DATE ACQUIRED	BOOK/PAGE	GRANTEE	REMARKS
FA-1	134.07	CHRISTMAS TREE PROPERTY	ACQUISITION	-	-	Port of Moses Lake (Grant Co. Port District #10)	-
FA-2	150.68	BOEING PROPERTY	ACQUISITION	-	-	Port of Moses Lake (Grant Co. Port District #10)	-
FA-3	57.85	TRIANGLE PROPERTY	ACQUISITION	-	-	Port of Moses Lake (Grant Co. Port District #10)	-



INSET-A



LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		ABANDONED PAVEMENT (To Be Removed)
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
	SAME	AIRPORT ROTATING BEACON
	SAME	BUILDING (To Be Removed)
		BUILDING
	SAME	DRAINAGE
		PAVEMENT
		FENCING (up to 10 AGL)
PAPI-4	PAPI-4	NAVIGATIONAL AID INSTALLATION (PAPI-4)
	SAME	RUNWAY THRESHOLD LIGHTS and REIL
34 35 3 2	SAME	SECTION CORNER (None Available)
	SAME	SEGMENTED CIRCLE/WIND INDICATOR
1180	SAME	TOPOGRAPHY (NAVD 88)
		HOLDING POSITION MARKING
Extd OFA	SAME	EXTENDED OBJECT FREE AREA
xOFZ	uOFZ	RUNWAY OBSTACLE FREE ZONE (OFZ)
xRSA	uRSA	RUNWAY SAFETY AREA (RSA)
xOFA	uOFA	RUNWAY OBJECT FREE AREA (OFA)
N/A	uOFA/uOFZ	ULTIMATE OFA and ULTIMATE OFZ
	SAME	SURVEY MONUMENT (PACS/SACS)
		RUNWAY PROTECTION ZONE (RPZ)
xBRL	SAME	BUILDING RESTRICTION LINE (BRL-35')
	SAME	ASOS
xLOC	SAME	LOCALIZER CRITICAL AREA
xGS	SAME	GLIDE SLOPE CRITICAL AREA
	SAME	LOCALIZER ANTENNA
	SAME	GLIDE SLOPE ANTENNA
	SAME	MALSR APPROACH LIGHT SYSTEM
	SAME	PRECISION OBSTACLE FREE ZONE (POFZ)
		TIE-DOWNS
	SAME	CRITICAL AREA

AIRPORT PROPERTY

TRACT	ACRES	PARCELS	PROPERTY INTEREST	DATE ACQUIRED	BOOK/PAGE	GRANTEE	GRANTOR/REMARKS
536793	2798.16	PARCEL A & PARCEL B	Fee Simple	June 30, 1966	BOOK 42, PAGE 293-306	Port of Moses Lake (Grant Co. Port District #10)	General Service Administrator QUITCLAIM DEED
549078	697.42	PROPERTY	Fee Simple	Jan. 2, 1969	BOOK 61, PAGE 472-475	Port of Moses Lake (Grant Co. Port District #10)	General Service Administrator QUITCLAIM DEED
558445	392.33	A-3, A-7, A-11, A-15, A-16	Fee Simple	August 3, 1970	BOOK 76, PAGE 491-494	Port of Moses Lake (Grant Co. Port District #10)	General Service Administrator QUITCLAIM DEED
702603	825.20	C-2, D-1, E-1, H, J, M-2, O, P, Q, R, W,and X	Fee Simple	March 26, 1973	BOOK 322, PAGE 437-445	Port of Moses Lake (Grant Co. Port District #10)	General Service Administrator QUITCLAIM DEED

No.	REVISIONS	DATE	BY	APP'D.
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1	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT
AIRPORT PROPERTY MAP
EXHIBIT-A
DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 | Sheet 23 of 26

Coffman Associates
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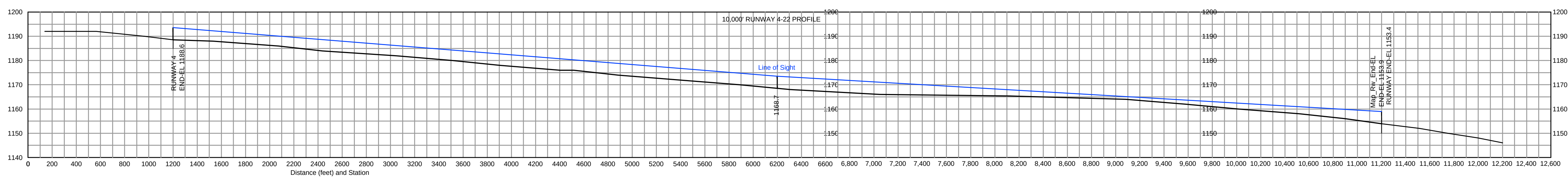
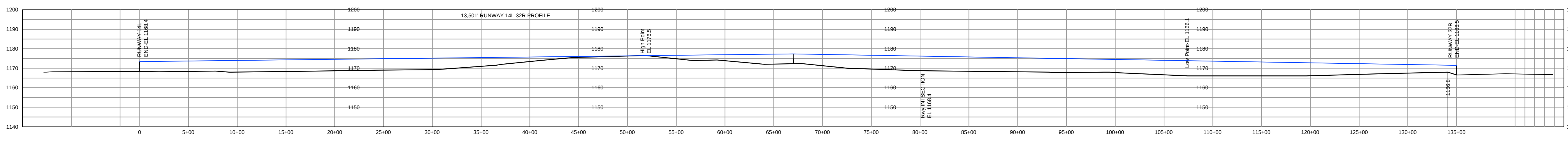
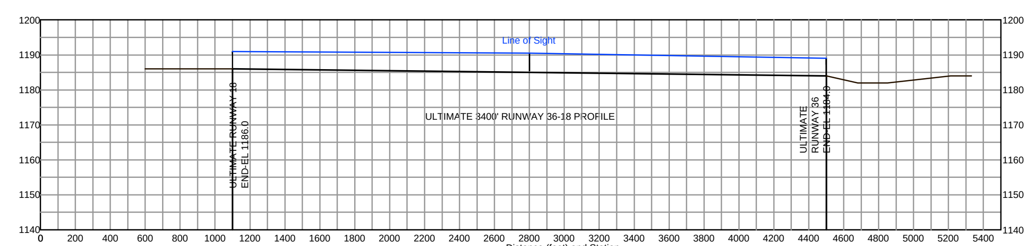
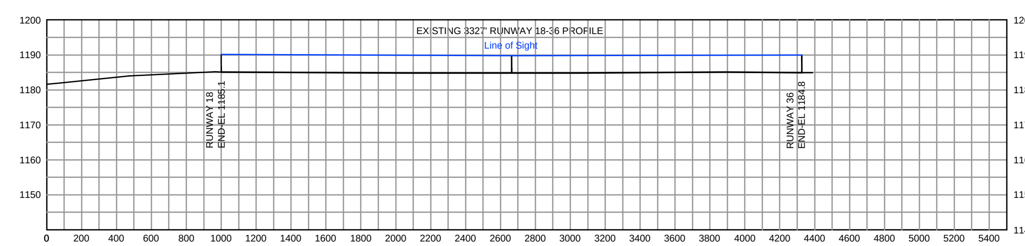
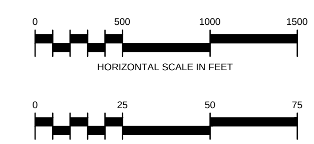
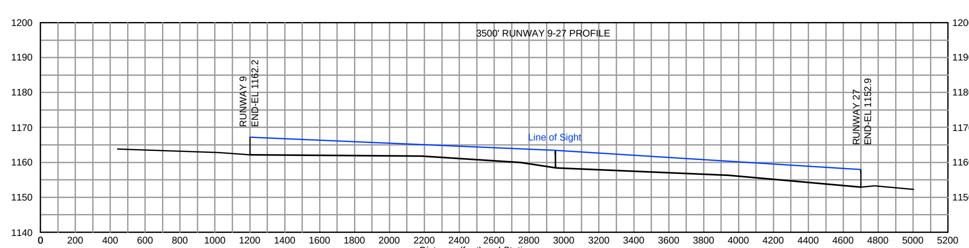


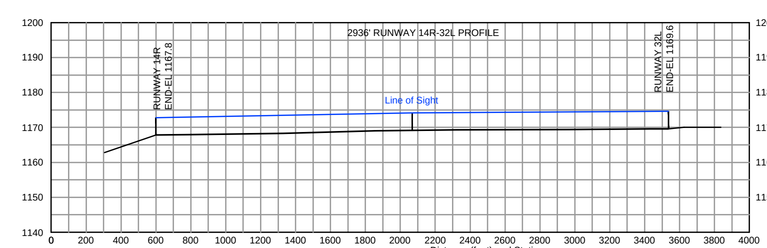












Inner-Transitional OFZ Definition, Calculations AC 150/5300-13A

c. Inner-transitional OFZ. The inner-transitional OFZ is a defined volume of airspace along the sides of the runway OFZ and inner-approach OFZ. It applies only to runways with lower than 3/4-statute mile (1 200 m) approach visibility minimums.

(1) For runways serving small airplanes exclusively, the inner-transitional OFZ slopes 3 (horizontal) to 1 (vertical) out from the edges of the runway OFZ and inner-approach OFZ to a height of 150 feet (45 m) above the established airport elevation.

(2) For runways serving large airplanes, separate inner-transitional OFZ criteria apply for Category (CAT) I and CAT II/III runways.

(a) For CAT I runways, the inner-transitional OFZ begins at the edges of the runway OFZ and inner-approach OFZ, then rises vertically for a height "H", and then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet (45 m) above the established airport elevation.

1) In U.S. customary units,
$H_{feet} = 61 - 0.094(S_{feet}) - 0.003(E_{feet})$.

2) In SI units,
$H_{meters} = 18.4 - 0.094(S_{meters}) - 0.003(E_{meters})$.

3) S is equal to the most demanding wingspan of the airplanes using the runway and E is equal to the runway threshold elevation above sea level.

(b) For CAT II/III runways, the inner-transitional OFZ begins at the edges of the runway OFZ and inner-approach OFZ, then rises vertically for a height "H", then slopes 5 (horizontal) to 1 (vertical) out to a distance "Y" from runway centerline, and then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet (45 m) above the established airport elevation.

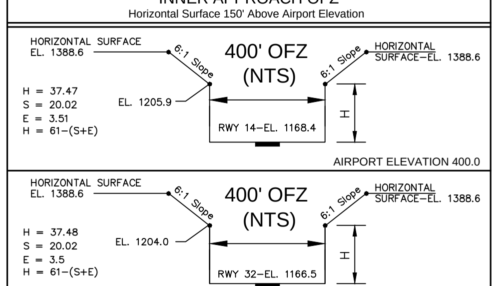
1) In U.S. customary units,
$H_{feet} = 53 - 0.13(S_{feet}) - 0.0022(E_{feet})$ and distance $Y_{feet} = 440 + 1.08(S_{feet}) - 0.024(E_{feet})$.

2) In SI units,
$H_{meters} = 16 - 0.13(S_{meters}) - 0.0022(E_{meters})$ and distance $Y_{meters} = 132 + 1.08(S_{meters}) - 0.024(E_{meters})$.

3) S is equal to the most demanding wingspan of the airplanes using the runway and E is equal to the runway threshold elevation above sea level. Beyond the distance "Y" from runway centerline the inner-transitional CAT II/III OFZ surface is identical to that for the CAT I OFZ.

INNER APPROACH OFZ

Horizontal Surface 150' Above Airport Elevation



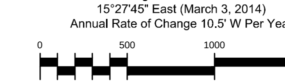
OBSTACLE FREE ZONE (OFZ)

OBJECT	OFZ SURFACE	PENETRATION	DISPOSITION
NONE			
– –	–	–	–
– –	–	–	–
– –	–	–	–

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted. Road obstructions reflect a safety clearance of 10' for dirt Roads or private Roads, 15' for noninterstate Roads, 17' for interstate Roads, and 23' for railroad.

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year



No.	REVISIONS	DATE	BY	APP'D.
3	–	–	–	–
2	–	–	–	–
1	Airport Layout Plan Update	6/2014	CA	–

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GRANT COUNTY INTERNATIONAL AIRPORT
RUNWAY 14 (L) - 32 (R)
INNER-TRANSITIONAL OFZ DRAWING
Moses Lake, Washington

DRAFT

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 | Sheet 24 of 26

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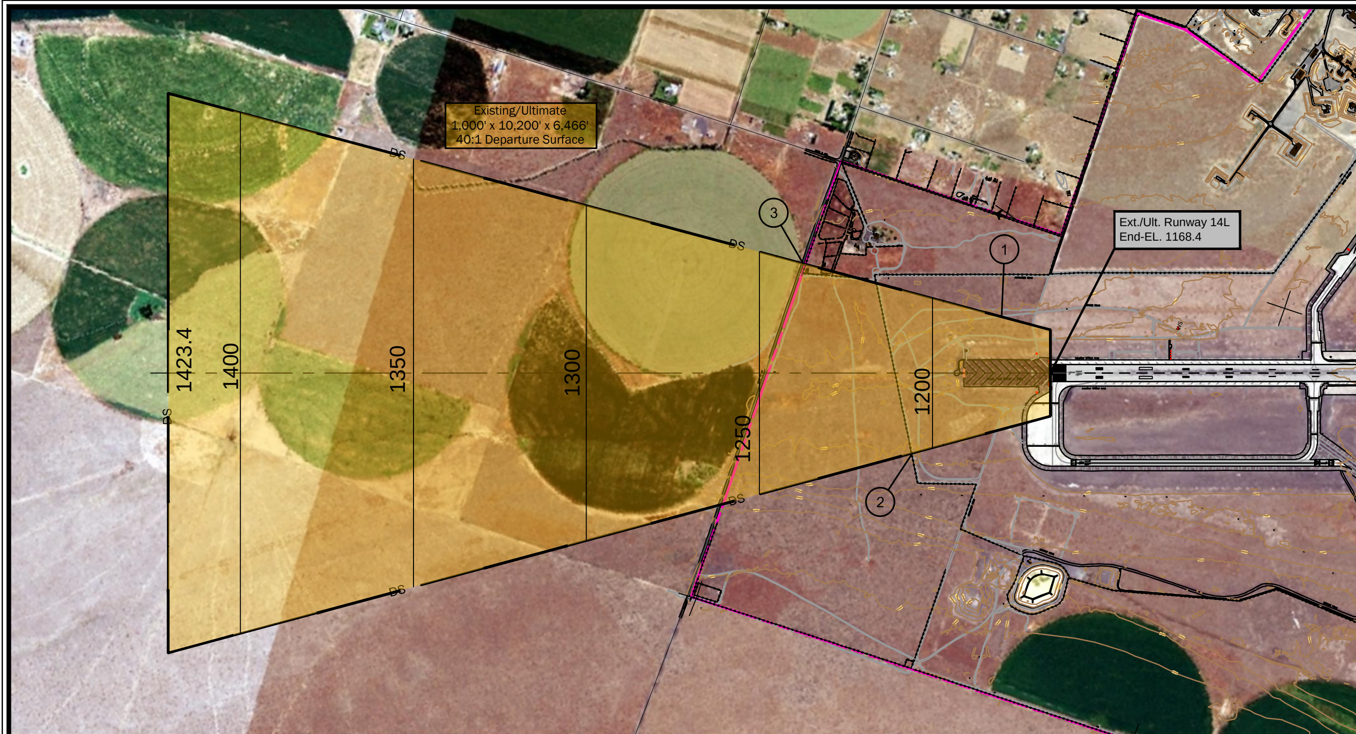
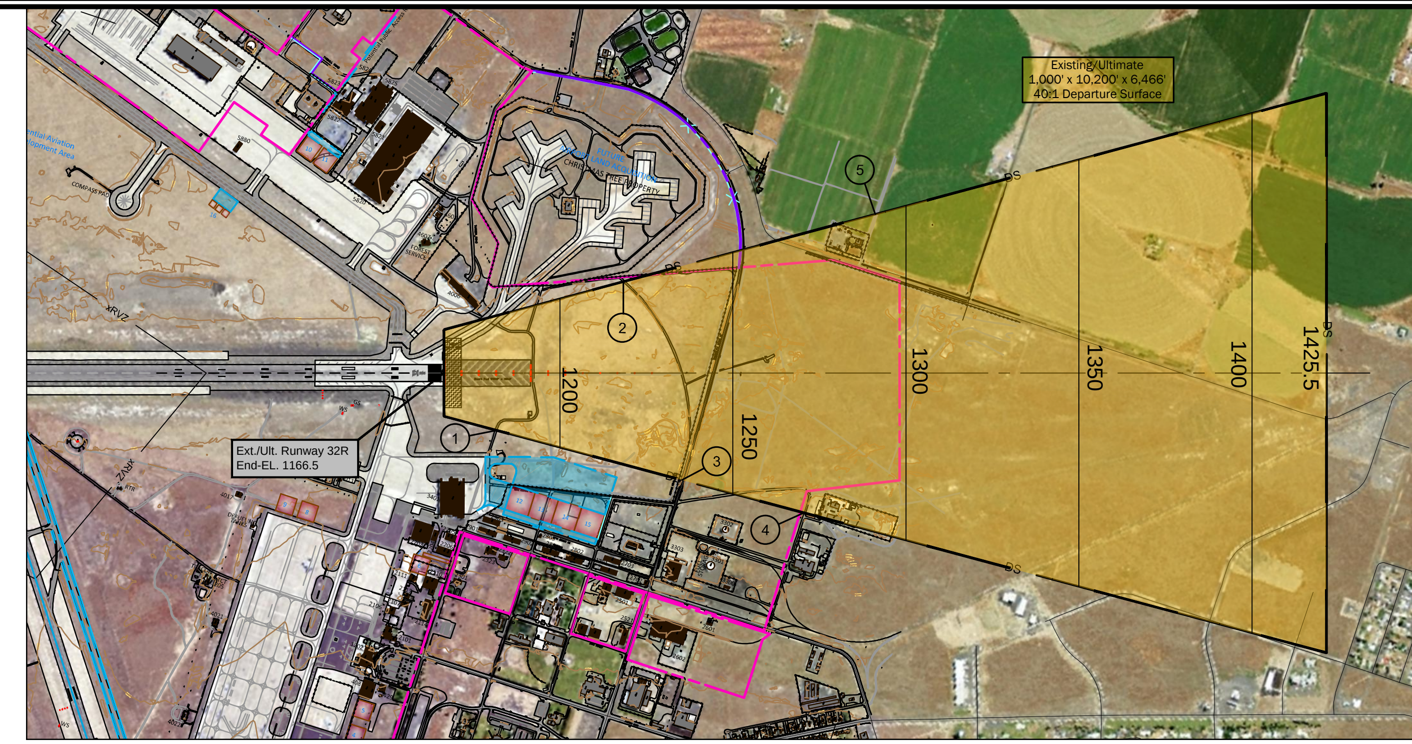
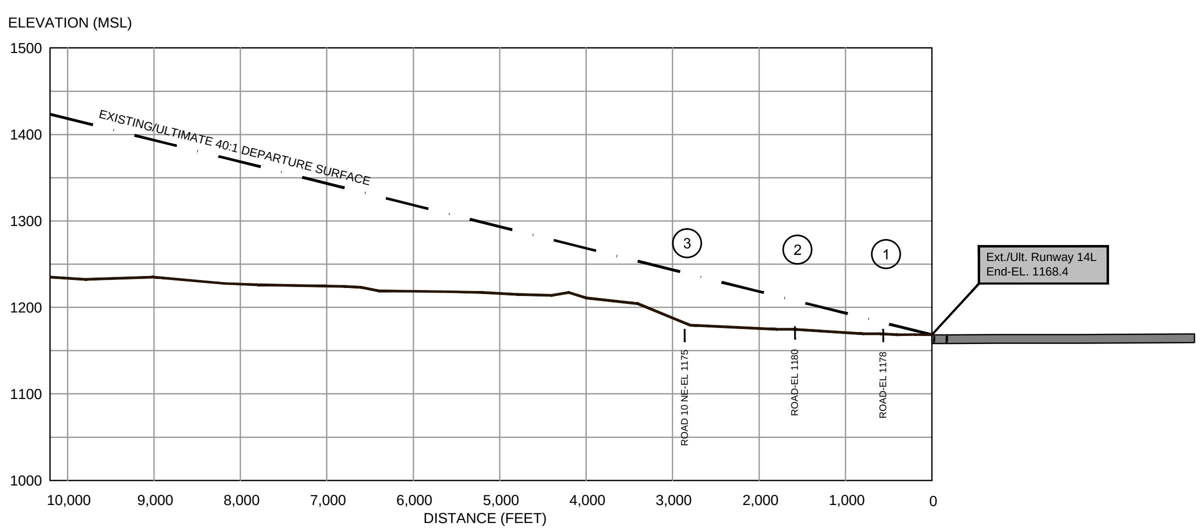
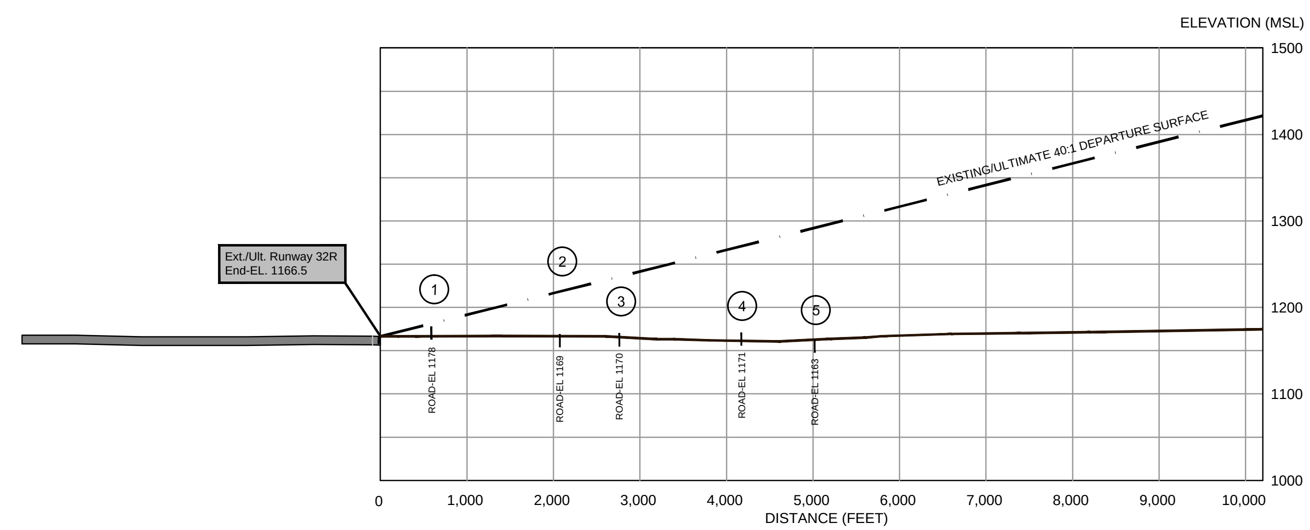






RUNWAY 14L DEPARTURE SURFACE



RUNWAY 32R DEPARTURE SURFACE

GENERAL NOTES:

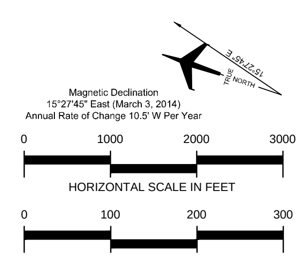
1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

OBSTRUCTION TABLE

Runway 14L Object Description/Elevation	Obstructed Surface	Object Penetration	Proposed Object Disposition
- None	-	-	-
- -	-	-	-
- -	-	-	-
- -			

OBSTRUCTION TABLE

Runway 32R Object Description/Elevation	Obstructed Surface	Object Penetration	Proposed Object Disposition
- None	-	-	-
- -	-	-	-
- -	-	-	-
- -			



No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

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GRANT COUNTY INTERNATIONAL AIRPORT
RUNWAY 14 (L) - 32 (R)
DEPARTURE SURFACE
Moses Lake, Washington

DRAFT

PLANNED BY: Patrick C. Taylor
DETAILED BY: Larry D. Johnson
APPROVED BY: Stephen C. Wagner

June 23, 2014 | Sheet 25 of 26

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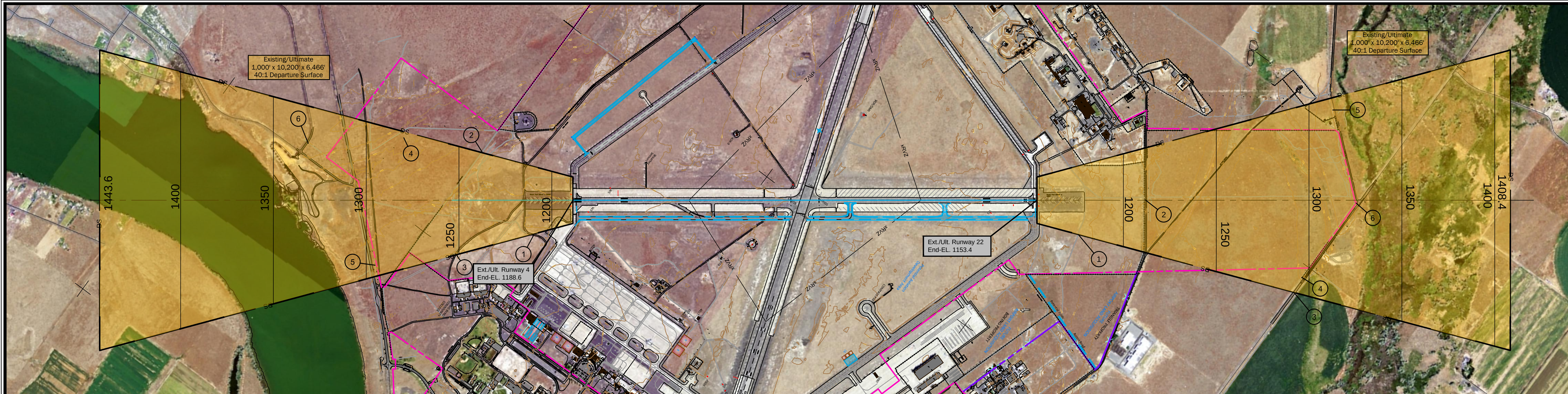
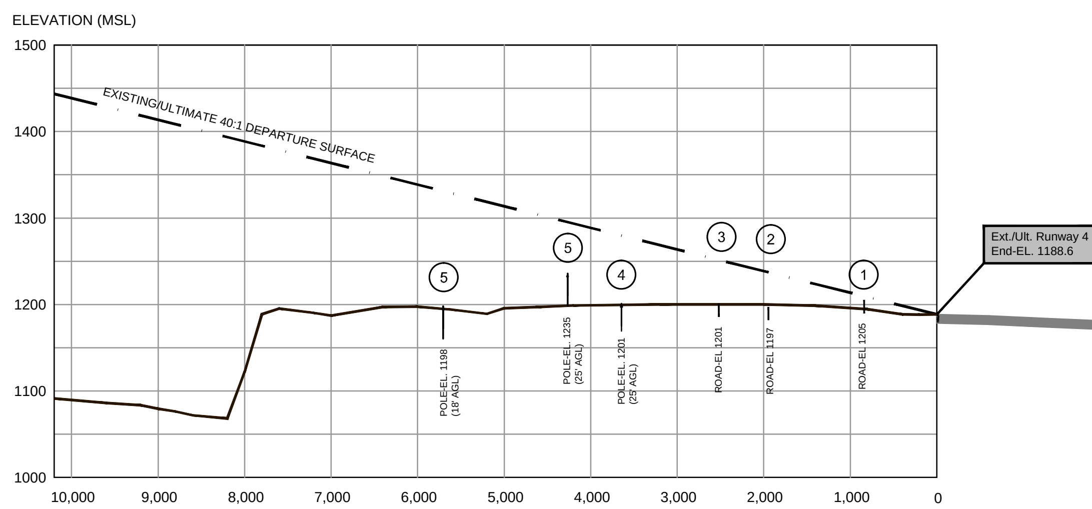
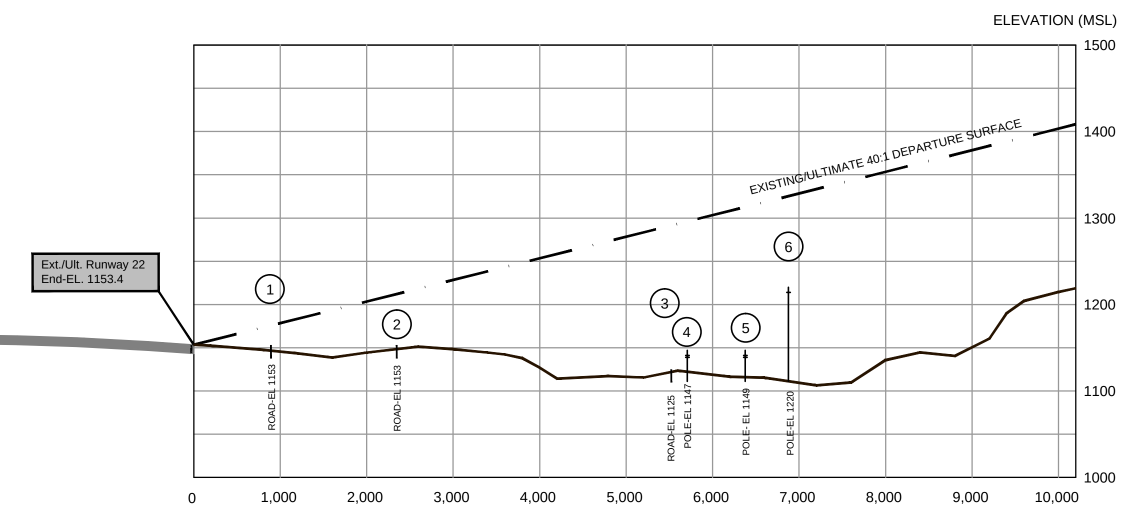




RUNWAY 4 DEPARTURE SURFACE



RUNWAY 22 DEPARTURE SURFACE

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, horizontal, and conical surfaces, are illustrated on the AIRPORT AIRSPACE DRAWINGS.
3. Depiction of features and objects within the outer portion of the approach surfaces, are illustrated on the RUNWAY APPROACH SURFACE PROFILES.
4. Depiction of features and objects within the inner portion of the approach surfaces, are illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS.

OBSTRUCTION TABLE

Runway 4 Object Description/Elevation	Obstructed Surface	Object Penetration	Proposed Object Disposition
- None	-	-	-
- -	-	-	-
- -	-	-	-
- -			

OBSTRUCTION TABLE

Runway 22 Object Description/Elevation	Obstructed Surface	Object Penetration	Proposed Object Disposition
- None	-	-	-
- -	-	-	-
- -	-	-	-
- -			

Magnetic Declination
15°27'45" East (March 3, 2014)
Annual Rate of Change 10.5' W Per Year

0 1000 2000 3000
HORIZONTAL SCALE IN FEET

0 100 200 300
VERTICAL SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
3	-	-	-	-
2	-	-	-	-
1	Airport Layout Plan Update	6/2014	CA	-

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GRANT COUNTY INTERNATIONAL AIRPORT

RUNWAY 4-22 DEPARTURE SURFACE

DRAFT

Moses Lake, Washington

PLANNED BY: Patrick C. Taylor

DETAILED BY: Larry D. Johnson

APPROVED BY: Stephen C. Wagner

June 23, 2014

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