Salem Municipal Airport
Master Plan—Phase II and Runway Needs Assessment

Salem Municipal Airport
Salem, OR

Prepared by

Mead & Hunt

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Prepared for
The City of Salem

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Introduction

Background

Master Plan Update Phase II and Runway Needs Assessment (MPU-II) builds upon Master Plan Update Phase I (MPU-I), and expands the focus from runway length and critical aircraft to other airfield components at Salem Municipal Airport (SLE). MPU-I determined that SLE needs to extend the primary runway to accommodate aircraft operations. The Federal Aviation Administration (FAA) Seattle Airports District Office issued a statement of concurrence with the findings of MPU-I. MPU-I is included in **Appendix A**.

Purpose

FAA airport master planning process assists airports with expansion and improvement plans that meet aviation demand and safety requirements. FAA Advisory Circular (AC) 150/5070-6B *Airport Master Plans* provides a flexible framework for the preparation of planning documents to aid in efficient use of funds for public-use airport improvements. Airport master plans consider guidance contained in AC 150/5300-13 *Airport Design,* AC 150/5325-4B *Runway Length Requirements for Airport Design,* and other FAA documents.

The City of Salem initiated MPU-II to address current and future opportunities and challenges posed by changing regional and national aviation trends. The previous SLE Master Plan was completed in 1998. MPU-II updates sections of the 1998 Plan and performs new analyses. The intent of MPU-II is to resolve current and anticipated planning and engineering issues so that the Airport can continue to accommodate regional aviation demand.

Stakeholder Involvement and Education Process

A Planning Advisory Committee (PAC) was formed by the City of Salem to assist with the development of the Airport Master Plan Phase II by assessing Airport and Community issues. PAC membership was determined by the City of Salem. Members include neighborhood groups, local businesses, airport users, airport businesses, and City of Salem staff. The PAC acted as a sounding board for proposed improvements, and a conduit for information between various interest groups throughout the community. Three PAC meetings were held to provide interaction between airport staff, PAC members, and the consultant team. These meetings were scheduled to coincide with milestones in the planning process, and used to solicit information and responses from airport staff and the PAC regarding information presented by the consultant team. PAC meetings were open to the public, and were advertised by the City of Salem.

In addition to the PAC, MPU-II focused on public communication and outreach. Public open houses were held to help educate the public on airport issues and airport planning. Three public open houses were advertised and occurred during the development of MPU-II. Information and documents were provided at the meetings and on a project website.

Organization

MPU-II is organized into seven chapters, arranged in the following manner:

- **Chapter 1: Inventory**
  The Inventory chapter documents airport history, existing airport facilities, and aviation activities. Data in the Inventory Chapter will be used in subsequent chapters. Socioeconomic data for the Salem Metropolitan Statistical Area is included in the Inventory Chapter.
- **Chapter 2: Environmental Overview**
  The Environmental Overview chapter documents environmental conditions and constraints at SLE. Environmental constraints are used to evaluate improvement alternatives. The Environmental Overview chapter includes a summary of SLE's spill prevention, containment, and countermeasures plan, a wetland assessment, and a biological assessment.
- **Chapter 3: Aviation Activity Forecasts**
  The Aviation Activity Forecasts chapter includes 20-year projections of SLE's aircraft operations, based aircraft, passenger enplanements, and cargo volume. Multiple forecasts are prepared based on national and local trends, and a preferred forecast is selected. Aviation Activity Forecasts are reviewed and approved by the FAA.
- **Chapter 4: Runway Needs Assessment**
  The Runway Needs Assessment chapter develops and evaluates alternatives for a runway extension at SLE, considering airfield facilities, design surfaces, property requirements, anticipated development constraints, and potential environmental impacts associated with a runway extension.
- **Chapter 5: Facility Requirements and Improvement Alternatives**
  The Facility Requirements chapter evaluates the ability of existing airfield facilities to handle the forecasted level of demand. Improvement Alternatives presents development scenarios to meet SLE's anticipated facility requirements. Improvement alternatives are developed considering existing and expected operational, environmental, and financial factors, and a preferred alternative is selected.
- **Chapter 6: Land Use and Noise**
  The Land Use chapter and Noise documents the existing local, state, and federal land use regulations and guidance associated with airport land use compatibility. The noise section presents noise regulations and guidance, and compares noise exposure levels for 2008 with projected noise exposure levels for 2028.
- **Chapter 7: Capital Improvement Plan**
  The Capital Improvement Plan allows SLE to set priorities, identify expected projects and timeline, and plan appropriate funding. The Capital Improvement Plan includes cost estimates for the preferred improvement alternatives, and identifies funding sources for improvements.

Appendices

The following documents assisted in the preparation of MPU-II, and are included as appendices at the end of the document.

- **Appendix A: Airport Layout Plan**
- **Appendix B: Master Plan Update Phase I**
- **Appendix C: Wetland Review**
- **Appendix D: Archaeological Survey**
- **Appendix E: FAA Forecasting**
- **Appendix F: Integrated Noise Model Input**

Chapter 1

Inventory

1. Introduction

This chapter provides inventory and background information on Salem Municipal Airport (SLE), also known as McNary Field. The chapter documents existing facilities at SLE, and will be used as a baseline for activity forecasts, facility requirements, and improvement alternatives.

This chapter looks beyond SLE's property boundary, into the Salem Metropolitan Statistical Area (Salem MSA). The Salem MSA analysis intends to identify demographic trends within the community that SLE serves.

This chapter is organized into the following sections.

- Airside Facilities and Equipment
- Design Standards and Surfaces
- Passenger Terminal
- Surface Transportation
- Airport Property
- Demographics

1.1 Airport History and Role

SLE was built in 1929. The U.S. Army Air Force took control of the Airport in 1941, and SLE became a training facility for the 356th Fighter Squadron (356 FS). The 356 FS flew the P-51 Mustang and the P-47 Thunderbolt in Europe during World War II.

SLE was named McNary Field in 1944, after Oregon Senator Charles L. McNary. Scheduled commercial airline service began in 1946, operated by United Airlines Freight Services using Douglas DC-3 aircraft. Airfield and airport facilities were added over time, including a fire station in 1966, and the air traffic control tower in 1973. The passenger terminal building was expanded in 2010.

SLE is owned and operated by the City of Salem, and supports aviation activity including scheduled commercial cargo airlines, non-scheduled commercial charter airlines, and general aviation (GA) users. The Oregon National Guard's Salem Army Aviation Support Facility #1 (AASF) is located on the northeast side of the airfield. The Airport had scheduled commercial passenger airline service from 2007 to 2008, and again in 2011.

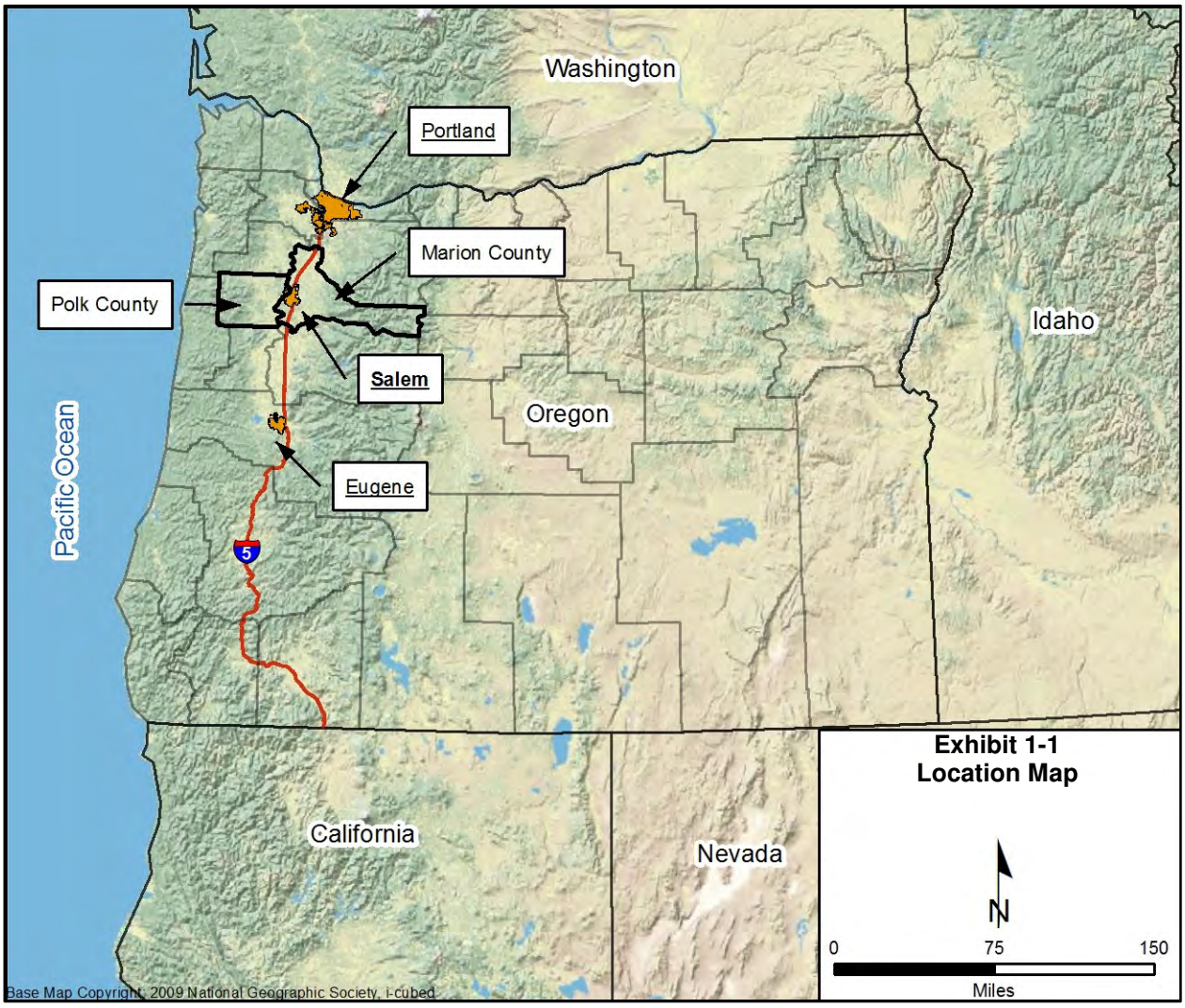
SLE is part of the FAA National Plan of Integrated Airport Systems (NPIAS), which the FAA uses to identify "public use airports that are significant to national air transportation, and therefore, eligible to receive grants under the Federal Aviation Administration Airport Improvement Program." NPIAS includes all airports with commercial service, high capacity reliever airports in metropolitan areas, and select general aviation airports. To qualify for NPIAS, a general aviation airport must be located at least 20 miles from the closest NPIAS airport, and have at least 10 based aircraft. Reliever and commercial service airports have additional requirements.

SLE is designated as a Primary airport in the FAA's 2011-2015 NPIAS Report, which means that SLE had more than 10,000 annual passenger enplanements. SLE exceeded 10,000 passenger enplanements in 2008. Due to the exit of scheduled commercial passenger airline operations from SLE in 2011, it is possible that SLE will be reclassified as a Reliever airport, which means that that it is located in a metropolitan area, has 100 or more based aircraft, or has 25,000 annual itinerant operations.

SLE is categorized as a Category I Commercial Service Airport by the Oregon Department of Aviation (ODA) 2007 Oregon Aviation Plan (2007 OAP). The 2007 OAP states that Category I Commercial Service Airports "support some commercial airline service in additional to a full range of general aviation aircraft." It is likely that ODA will reclassify SLE if scheduled commercial passenger airline service does not return by the next update of the OAP.

1.2 Airport Location and Property

Salem is the capital city of Oregon, and located in Marion and Polk counties. Salem is 50 miles south of Portland, Oregon, and 65 miles north of Eugene, Oregon along Interstate 5. The Airport is located within the Salem's city limits in Marion County. A location map is included in **Exhibit 1-1**.



The Airport is located on 750 acres, southwest of the freeway entrance ramps at Mission Street SE and Interstate 5. The Airport is bordered by Mission Street SE to the north, Airway Drive SE to the south, Turner Road SE to the east, and 25th Street SE to the west. The Airport is two miles southeast of downtown Salem.

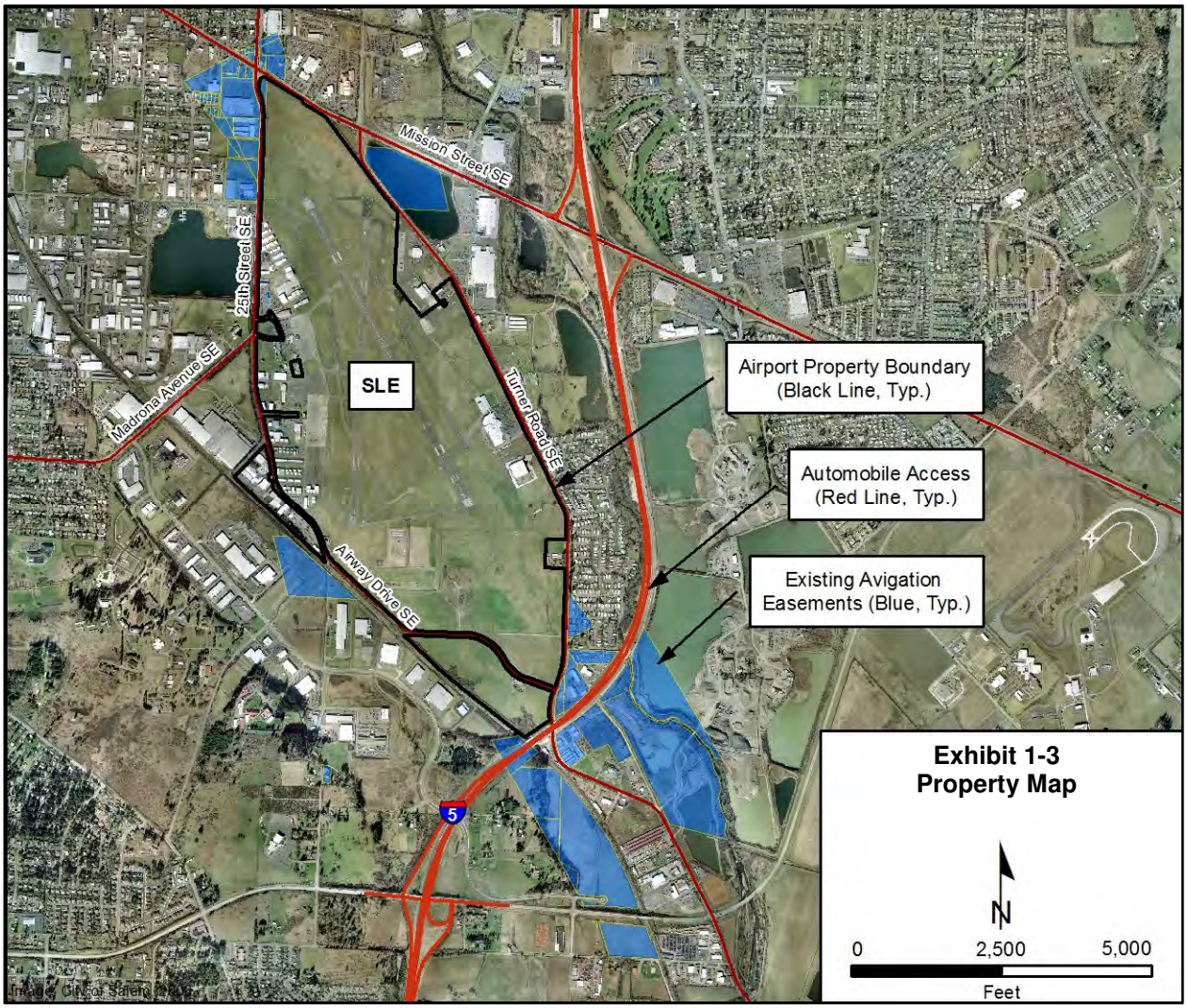
Airport facilities are accessible by automobile from the roads surrounding the airfield. Public transit to the Airport is provided by the Salem Cherrióts bus service, which stops 1,000 feet from the passenger terminal building on Madrona Avenue SE. There are no sidewalks on Madrona, or the east side of 25th Street SE. The nearest passenger rail station is two miles northwest at the Salem Amtrak station. Airport facilities are accessible by bike, with bike lanes along Mission Street SE, Madrona Avenue SE, and the north portion of Turner Road SE. The City of Salem is upgrading their bike plan in 2011, which may include a shared use bike and pedestrian path on 25th Street SE and Airway Drive.

A local road map is included in **Exhibit 1-2**.

1.2.1 Airport Property

An airport's area of influence extends beyond its property boundaries due to the nature of aircraft operations. The FAA requires airports to work with municipalities and property owners to keep airspace outside of airport property clear of hazards to air navigation. In addition to property owned directly by the City of Salem, owners of several parcels near the Airport signed avigation easements with the City in the 1960's and 1970's. Avigation easements permit property owners to continue to use their land pursuant to local zoning code, and allow the City to limit the height of structures, terrain, and vegetation to keep the airspace safe for aircraft operations.

Airport property and avigation easements are shown in **Exhibit 1-3**, and a description of the avigation easements is included on the Airport Layout Plan, included in **Appendix B**.



2. Airfield Facilities and Equipment

Airfield facilities and equipment support the continued safety and utility of the Airport. These facilities are maintained to meet FAA standards and serve airport users. They include runways, navigational aids, taxiways, aircraft rescue and firefighting (ARFF) facilities, maintenance and operations facilities, aircraft storage, fixed base operators (FBO), and other airport businesses. The airfield at SLE has an airport traffic control tower (ATCT), passenger terminal building, and hangars in the northwest; FBOs and airport businesses to the southwest; and the Oregon ANG and airport businesses to the east. An overview of airfield facilities is included in **Exhibit 1-4**.

Airport Property Boundary
Army National Guard
Business-Blue (Typ.)
Taxiway B
Taxiway M
Wind Indicator
Taxiway B
Runway 13-31 5,811' x 150'
Runway 16-34 5,145' x 100'
Wind Indicators
Calibration Pad
ASOS
Taxiway F
Private Hangar-Red (Typ.)
Taxiway A
Taxiway R
Taxiway C
ARFF
Passenger Terminal Building
ATCT
Taxiway C
FBO-Green (Typ.)
Tie-down Space Yellow (Typ.)
Image: City of Salem, 2008
Exhibit 1-4
Airfield Overview
0 500 1,000
Feet

2.1 Runways, Navigational Aids, and Instrument Procedures

Runways, navigational aids (NAVAIDs), and instrument procedures transition aircraft between flight and the ground. These facilities make the key phases of flight possible, and support airport safety and utility.

2.1.1 Runways

SLE has two runways. Runway 13-31 is 5,811 feet long and 150 feet wide. Runway 16-34 is 5,145 feet long and 100 feet wide. Both runways are paved with grooved asphalt. Runway End 13 has non-precision instrument runway markings, an omni-directional approach lighting system (ODALS), runway end identifier lights (REIL), and a four-light Visual Approach Slope Indicator (VASI). Runway End 31 has precision instrument runway markings, and a medium intensity approach lighting system with runway alignment lights (MALSR). The instrument landing system serving Runway End 31 includes a glide slope antenna (GS) located adjacent to the runway, and a localizer antenna (LOC) located beyond Runway End 13. Runway 13-31 has high-intensity runway edge lights (HIRL), and both ends have runway markings that support non-precision instrument approach procedures. Runway 16-34 has REIL and four-light precision approach path indicators (PAPI) at both runway ends, and medium intensity runway edge lights (MIRL).

Runway characteristics are presented in **Table 1-1**.

Table 1-1: Runway Characteristics

Runway End	Length x Width	Lighting	NAVAIDS		Weight Bearing Capacity (thousands of pounds)
			Visual	Electronic	
13	5,811'x150'	HIRL	ODALS, REIL, VASI		100S, 122D, 185DT
31			MALSR	LOC, GS	
16	5,145'x100'	MIRL	REIL, PAPI		30S, 60D, 100DT
34			REIL, PAPI		
Aircraft Landing Gear Configuration: S-Single Wheel, D-Dual Wheel, DT-Dual Tandem,					

Source: FAA Airport Facility Directory, December 2010

2.1.2 Navigational Aids

NAVAIDs provide guidance and positional information to aircraft. NAVAIDs can be airborne or located on the ground, and visual or electronic. NAVAIDs include lighting systems, radio beacons, signage, global positioning satellites, and pavement markings. NAVAIDs can transmit weather and airport operational information, and allow pilots to operate in periods of reduced visibility.

In addition to the NAVAIDs associated with the runways, SLE is equipped with an automated surface observation system (ASOS), an ATCT, a rotating beacon, three wind indicators, and a compass calibration pad. Weather and runway information are broadcast over SLE's automated terminal information system (ATIS) radio frequency. Pilots flying instrument approach procedures use the Corvallis and Newberg very-high frequency omni-direction range (VOR) NAVAIDs, owned and operated by the FAA, and located off airport property.

2.1.3 Aircraft Instrument Procedures

Aircraft instrument procedures include departure procedures, and instrument approach procedures (IAPs). Instrument procedures help maintain safe and orderly aircraft operations during periods of reduced visibility.

Departure procedures guide aircraft from the runway into the enroute phase of flight. SLE has one departure procedure: Salem Three Departure.

IAPs consist of a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight rules (IFR) conditions from the beginning of the initial approach to a landing, or to a point from which a landing can be made visually. Approach procedures are classified as *precision instrument*, with both horizontal and vertical guidance; *non-precision instrument*, with only horizontal guidance; and *visual*, without positional guidance.

SLE has three non-precision IAPs: two into Runway End 31, and one into Runway End 13. Runway End 31 has one precision IAP. The area navigation (RNAV) global positioning system (GPS) IAP into Runway End 31 features satellite-based vertical guidance, which requires specialized aircraft equipment to utilize. It is considered a non-precision approach.

A summary of the IAPs is presented in **Table 1-2**.

Table 1-2: Instrument Approach Procedures

Runway End	Technology	Type	Minimum Decision Altitude*	Visibility Minimum*
13	LOC BC	Non-Precision	800' MSL/ 596' AGL	1 ½ Miles
31	LOC/DME	Non-Precision	780' MSL/ 596' AGL	1 Mile
31	RNAV (GPS)—LPV	Non-Precision	414' MSL/ 200' AGL	½ Mile
31	ILS	Precision	414' MSL/ 200' AGL	½ Mile

AGL—Above Ground Level
BC—Back Course
DME—Distance Measuring Equipment
GPS—Global Positioning System
LOC—Localizer
LPV—Localizer Performance with Vertical Guidance
MSL—Mean Sea Level
RNAV—Area Navigation

*: Values for Category C Aircraft

Source: FAA Terminal Procedures Publication, December 2010

2.2 Taxiways

Taxiways facilitate the transfer of aircraft between the runways and aircraft parking facilities. SLE has taxiway access to Runway Ends 16, 31, and 34. Runway End 13 has taxiway access from the east side.

Taxiway widths are presented in **Table 1-3**.

Table 1-3: Taxiways

Taxiway	Width	Taxiway	Width
A	60 feet	K	60 feet
B	50 feet	L	20 feet
C	50 feet	M	45 feet
F	50 feet	N	50 feet
G	50 feet	Q	50 feet
H	50 feet	R	50 feet
J	60 feet		

Source: 1998 ALP, Updated in 2000

2.3 Aircraft Rescue and Firefighting

Aircraft rescue and firefighting (ARFF) requirements are determined by an airport's ARFF Index, as defined by Federal Aviation Regulation (FAR) Part 139.315. SLE is an ARFF Index B airport, which FAR Part 139.315 defines as having at least five average daily departures by aircraft that are "at least 90 feet but less than 126 feet in length." FAR Part 139.317 requires Index B airports to have either "one vehicle carrying at least 500 pounds of sodium-based dry chemical, halon 1211, or clean agent and 1,500 gallons of water and the commensurate quantity of [aqueous film forming foam agent] for foam production," or two vehicles where one carries the extinguishing agents and one carries the water and aqueous film forming foam agent in the quantities mentioned.

The ARFF station at SLE is a dual purpose fire station staffed by the Salem Fire Department. The station has two ARFF trucks, and one fire truck that serves the City of Salem. The ARFF vehicles meet FAR Part 139.317 Index B requirements.

2.4 Airport Employees

Airport maintenance, operations support, and snow removal are conducted by airport employees. Airport offices are located in the passenger terminal building. Automobiles and tractors owned by the airport are parked on the aircraft apron to the south of the passenger terminal building.

2.5 Aircraft Storage Facilities

Aircraft storage facilities are used by based and transient aircraft at SLE. Based aircraft are aircraft that hangar or tie-down at an airport, and are primarily stored in T-hangars and box hangars. Transient aircraft are aircraft that are based at another airport that have landed at SLE, and generally use tie-down spaces on the aircraft parking aprons. There are tie-down spaces on the aircraft parking aprons on the southwest side of the airfield. Larger aircraft parking spaces are provided near the passenger terminal building. New hangars are being developed on the south side of the airfield, between Runway Ends 31 and 34. Garmin Ltd. has one box hangar on the east side of the airfield.

Aircraft storage is presented in **Table 1-4**.

Table 1-4: Aircraft Storage

Area	Box Hangars	T-hangar Units	Tie-Down Positions
Northwest	46	0	4
Southwest	80	14	117
East	1	0	0
Airport Total	127	14	121

Source: Mead & Hunt, October, 2010

2.6 Fixed Base Operators

Fixed base operators (FBOs) are airport businesses that provide aircraft charter and rental, parts and maintenance, fuel, and flight training. There are five FBOs located on the west side of the airfield at SLE. Salem Aviation Fueling, Salem Air Center, and Salem Flight Training are located in the same building. FBOs are presented in **Table 1-5**.

Table 1-5: Fixed Base Operators

Business	Services
Salem Aviation Fueling	Fuel (Jet A and 100 LL) Aircraft Parking
Salem Air Center	Aircraft Rental and Charter Aircraft Repair and Maintenance
Salem Flight Training	Aircraft Rental Flight Instruction
VAL Avionics	Aircraft Avionics Repair and Maintenance
Sun Quest Executive Charters	Aircraft Charter

Source: Mead & Hunt, October, 2010

Fuel services are offered by Salem Aviation Fueling, which operates a self-serve 100LL above-ground fuel tank on the southwest side of the airfield, and a fuel farm located on the northwest side of the airfield that offers Jet A and 100LL fuel. Salem Aviation Fueling has two Jet A fuel trucks, and two 100LL fuel trucks that provide mobile fueling services. Several private hangars have fuel tanks not included in this summary. Fuel facilities are presented in **Table 1-6**.

Table 1-6: Airport Fuel Facilities

Business	Fuel Type	Container Type
Salem Air Center	100LL	Above Ground Tank 1 @ 12,500 gallons Above Ground Tank 1 @ 6,000 gallons Truck, 2 @ 750 gallons
	Jet A	Above Ground Tank 1 @ 20,000 gallons Truck, 2 @ 3,000 gallons

Source: Tennant Interview, November 2010

2.7 On-Airport Businesses

On-airport businesses at SLE include a restaurant, and the Oregon Department of Aviation administrative offices on the southwest side of the airfield. The shipping company FedEx is located north of the passenger terminal building on the northwest side of the airfield. The Oregon Department of Forestry operates four aircraft out of a hangar on the northwest side of the airfield. Car rental companies Hertz, Budget, and Avis are located inside the passenger terminal building, and store their vehicles in airport parking lots. Hertz Car Sales of Salem has a facility located on 25th Street SE. The navigation and communications company Garmin Ltd. has hangars and a research and development facility on the east side of the airfield.

2.8 Army National Guard

The Oregon Army National Guard (ORANG) maintains the Salem AASF #1 on the northeast side of the airfield. Units stationed at AASF #1 include the 641st Medical Battalion and the 249th Theater Aviation Battalion, whose primary roles include search and rescue, command and control operations, and airlift. These units are trained to respond to situations involving weapons of mass destruction. The units at AASF #1 operate 12 UH-60 Blackhawk helicopters, four OH-58 Kiowa helicopters, one C-23 Sherpa aircraft, and one C-12 Huron aircraft. The long-range plan for AASF #1 indicates that the U.S. Department of Defense plans to base fifteen UH-60s, four LUH-72 Lakota helicopters, and one C-12 at SLE.

3. Design Standards and Surfaces

Airport design surfaces are described in FAA Advisory Circular (AC) 150/5300-13, *Airport Design*. Additional surfaces associated with the runways are found in FAR Part 77. The purpose of design surfaces is to protect aircraft and airspace, and to safely accommodate aircraft operations. Key airport design surfaces include the Runway Safety Areas (RSA), Runway Object Free Areas (ROFA), Runway Protection Zones (RPZ), and Precision Obstacle Free Zones (POFZ). The design standard dimensions are determined by the airport reference code (ARC), determined by the dimensions of the most demanding aircraft to use the airport. ARC categories are presented in **Table 1-7.**

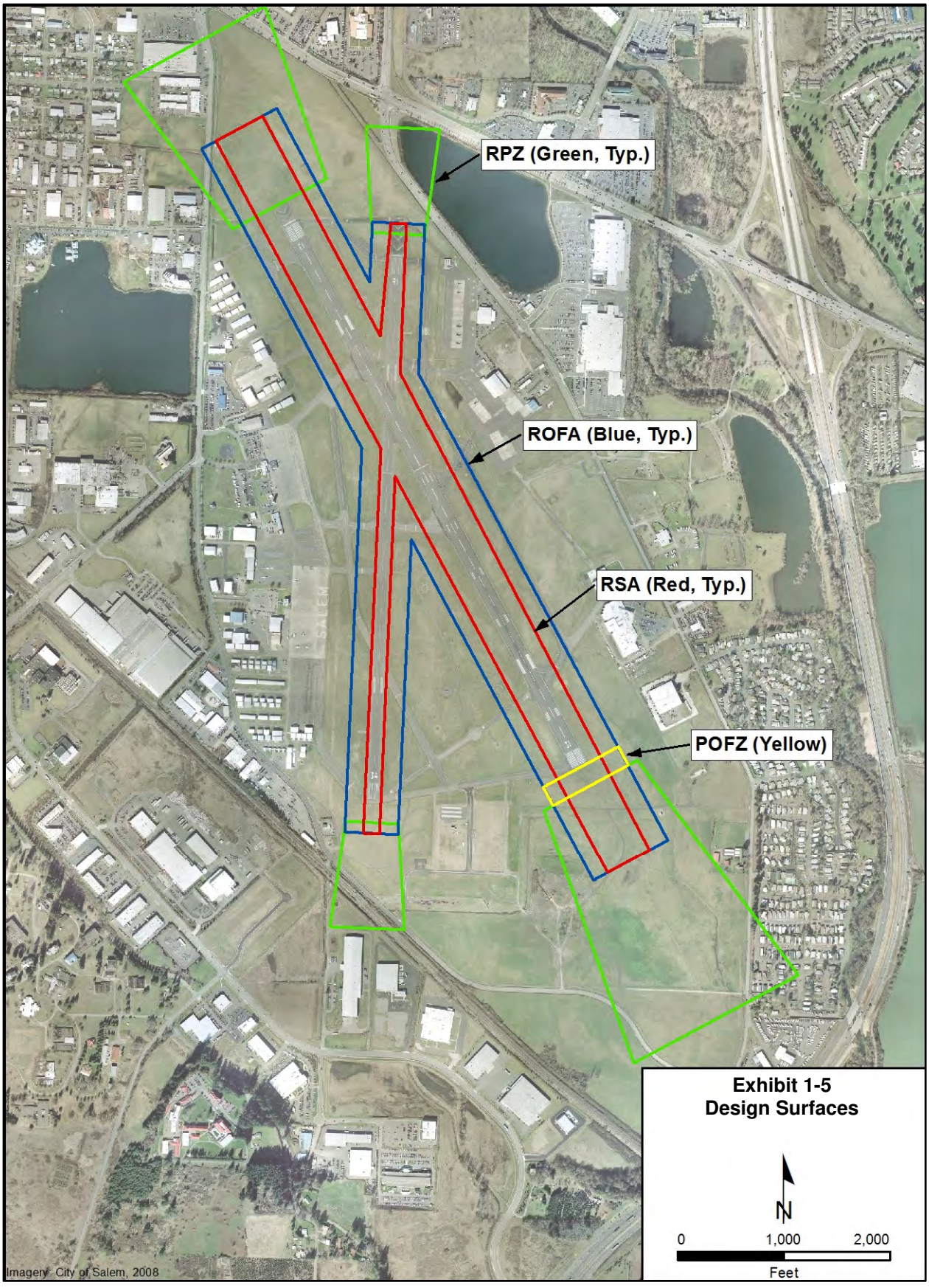
Table 1-7: Airport Reference Code (ARC) Categories		
Approach Category	**Approach Speed (knots)**	
A	Less than 91	
B	91 or greater, but less than 121	
C	121 or greater, but less than 141	
D	141 or greater, but less than 166	
E	166 or greater	
Design Group	**Wingspan (feet)**	**Tail Height (feet)**
I	<49	<20
II	49 - <79	20 - <30
III	79 - <118	30 - <45
IV	118 - <171	45 - <60
V	171 - <214	60 - <66
VI	214 - <262	66 - <80

Source: FAA AC 150/5300-13 Airport Design Change 18

The dimensions of design surfaces are based on the runway ARCs, which are based on the 1998 Airport Layout Plan, updated in 2000. The ARC of Runway 16-34 is B-II, and the critical aircraft is the Cessna Citation II/Bravo. The ARC of Runway 13-31 is C-II, and the critical aircraft is the Dassault Falcon 7X. The ARC for the Airport is the greater of the two runways, which is C-II. Design surfaces are presented in **Table 1-8**, and shown in **Exhibit 1-5**.

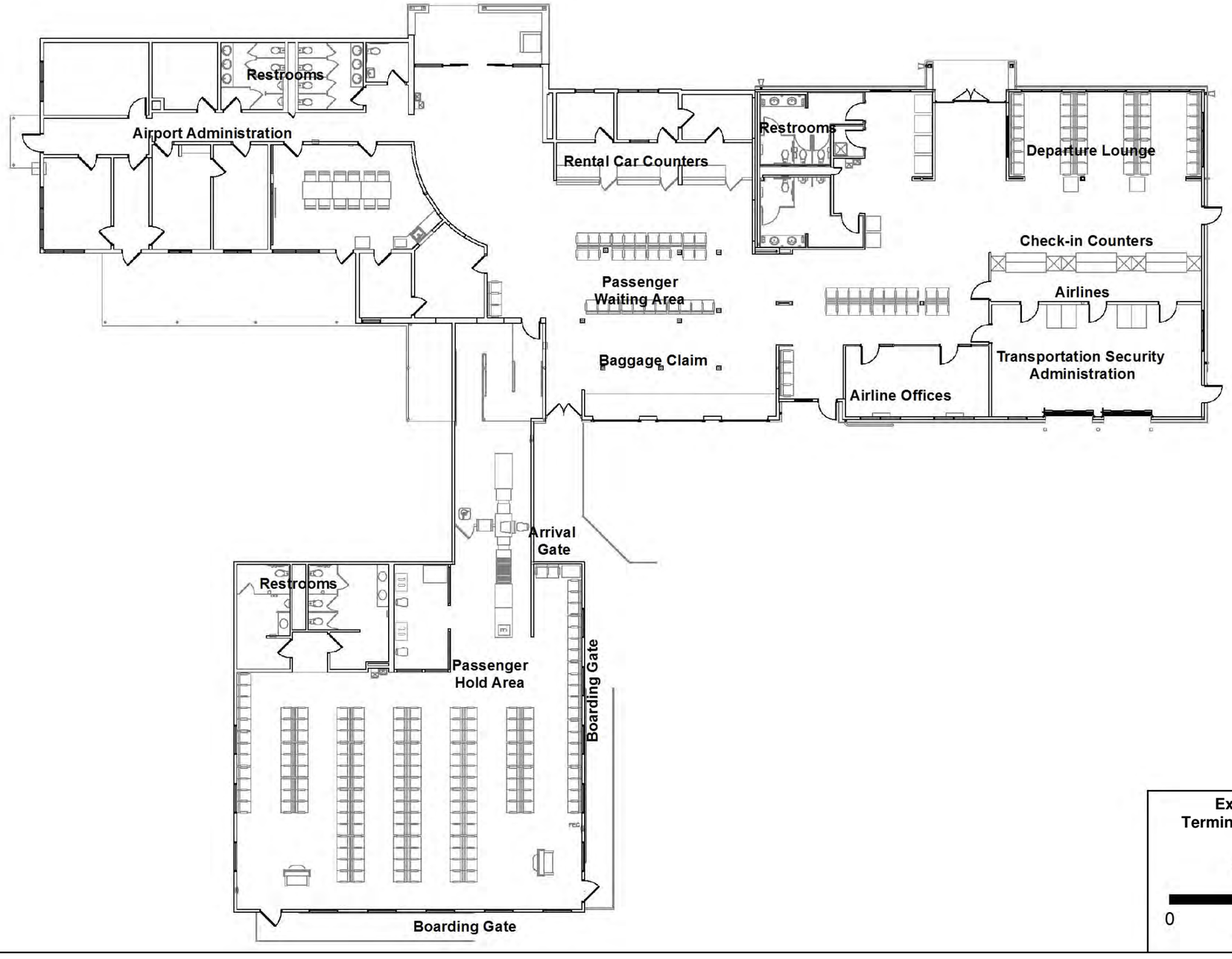
Table 1-8: Runway Design Surfaces		
Runway	**Surface**	**Dimensions (Length x Width)**
13-31	RSA	1000 ft beyond runway end x 500 ft*
	ROFA	1000 ft beyond runway end x 800 ft*
13	RPZ	1700 ft x 1000 ft x 1510 ft
31	RPZ	1000 ft x 2500 ft x 1750 ft
	POFZ	200 ft x 800 ft
16-34	RSA	300 ft beyond runway end x 150 ft*
	ROFA	300 ft beyond runway end x 500 ft*
	RPZ	1000 ft x 500 ft x 700 ft

Source: FAA AC 150/5300-13, Change 18 *: Surfaces extend full runway length.


RPZ (Green, Typ.)
ROFA (Blue, Typ.)
RSA (Red, Typ.)
POFZ (Yellow)
Imagery: City of Salem, 2008
Exhibit 1-5
Design Surfaces
N
0
1,000
2,000
Feet

4. Passenger Terminal

The passenger terminal building is located on the northwest side of the airfield, and contains airline and passenger facilities, Transportation Security Administration screening facilities, airport management offices, and car rental counters. In 2010, the terminal building was expanded by 5,000 square feet, and is capable of handling up to three airlines. The terminal building has a floor area of 15,000 square feet. The terminal building floor plan is included in **Exhibit 1-6**.


Restrooms
Airport Administration
Rental Car Counters
Restrooms
Departure Lounge
Check-in Counters
Airlines
Passenger
Waiting Area
Baggage Claim
Transportation Security
Administration
Airline Offices
Arrival
Gate
Restrooms
Passenger
Hold Area
Boarding Gate
Boarding Gate
Exhibit 1-6
Terminal Floor Plan
N
0
15
30
Feet

5. Socioeconomic Trends

Socioeconomic data are provided by the economic forecasting firm Woods & Poole. Preliminary socioeconomic analysis was performed during Master Plan Update Phase I (MPU-I). Socioeconomic analyses compare the growth in population, gross product, and income within the Salem Metropolitan Statistical Area (Salem MSA) to the growth rates of these socioeconomic indicators in Oregon and the U.S. The U.S. Census bureau defines the Salem MSA as Polk and Marion counties. Employment by industry identifies the major employers in the Salem MSA, and the growth by industry sector.

5.1 Population

The population of the Salem MSA has grown at a greater rate than the populations of Oregon and the U.S. The population levels and compound annual growth rates (CAGR) for the Salem MSA, Oregon, and the U.S. between 1990 and 2008 are presented in **Table 1-9**.

Table 1-9: Population			
Year	**Salem MSA**	**Oregon**	**U.S.**
1990	279,862	2,860,375	249,622,814
2000	348,216	3,430,828	282,171,936
2008	391,680	3,790,060	304,059,724
CAGR 1990-2008	1.9%	1.6%	1.1%

Source: Woods & Poole

5.2 Gross Product

A method of measuring the productivity of a geography is through its gross product. The gross product is the total market values of goods and services produced annually within a statistical area. Gross regional product (GRP) in the Salem MSA and gross state product (GSP) Oregon have grown more quickly than the U.S. gross domestic product (GDP) since 1990. Gross product is presented in **Table 1-10**.

Table 1-10: Gross Product (Millions of 2008 Dollars)			
Year	**Salem MSA GRP**	**Oregon GSP**	**U.S. GDP**
1990	$7,135	$87,080	$8,776,250
2000	$10,690	$138,905	$12,047,400
2008	$13,575	$167,090	$14,395,320
CAGR 1990-2008	3.6%	3.7%	2.8%

Source: Woods & Poole, U.S. Bureau of Labor Statistics Consumer Price Index Inflation Calculator

5.3 Per Capita Income

Per capita income is the average amount of money one person makes in a statistical area. The per capita income of the Salem MSA has grown more slowly than that of Oregon and the U.S. Per capita income levels are presented in **Table 1-11**.

Table 1-11: Per Capita Income (2008 Dollars)			
Year	**Salem MSA**	**Oregon GSP**	**U.S. GDP**
1990	$22,323	$24,251	$26,226
2000	$26,506	$30,457	$32,352
2008	$27,753	$32,064	$35,438
CAGR 1990-2008	1.2%	1.6%	1.7%

Source: Woods & Poole, U.S. Bureau of Labor Statistics Consumer Price Index Inflation Calculator

5.4 Employment by Industry

Employment by industry provides a cross section of how Salem's workforce has developed over time. Industries that have seen the highest rates of growth include the management, education, and administrative sectors. Federal jobs, utilities, and manufacturing have seen a decline in the number of employees since 1990. Total employment has grown at a CARG of two percent between 1990 and 2008. Employment by industry figures are presented in **Table 1-12**.

Table 1-12: Employment by Industry				
Industry	**1990**	**2000**	**2008**	**CAGR**
Management	394	711	1,540	7.9%
Education	1,816	3,135	4,697	5.4%
Administrative	4,246	7,727	10,282	5.0%
Transportation and Warehousing	2,269	3,771	4,839	4.3%
Construction	6,977	11,096	13,311	3.7%
Healthcare	13,767	18,660	24,196	3.2%
Arts and Entertainment	1,930	3,003	3,085	2.6%
Professional and Technical Services	5,560	7,361	8,738	2.5%
Other	7,253	9,302	10,839	2.3%
Accommodation and Food Services	8,084	10,572	11,899	2.2%
Mining	286	411	406	2.0%
Information	1,472	2,391	2,080	1.9%
Retail	16,614	20,747	22,742	1.8%
State and Local Government	29,337	36,055	39,650	1.7%
Wholesale Trade	3,678	4,214	4,877	1.6%
Finance and Insurance	4,845	6,013	6,200	1.4%
Real Estate	5,684	6,908	6,538	0.8%
Agriculture	9,290	9,488	10,608	0.7%
Forestry	5,260	4,277	5,871	0.6%
Manufacturing	14,651	16,193	14,309	-0.1%
Utilities	430	398	407	-0.3%
Federal Civil	1,827	1,702	1,608	-0.7%
Federal Military	1,385	1,154	1,133	-1.1%
Total Employment	147,055	185,289	209,855	2.0%

Source: Woods & Poole

6. Aviation Activity History

Aviation activity history considers past activity at SLE in terms of passenger enplanements, aircraft operations, based aircraft, and air cargo. These numbers will provide the activity baseline for the aviation activity forecasts in **Chapter 2**. Historical data comes from the 2010 FAA Terminal Area Forecast (TAF) database, and the U.S. Department of Transportation (USDOT) Research and Innovative Technology Administration (RITA) Bureau of Transportation Statistics (BTS).

In 2008, unscheduled commercial, GA, and military aircraft operated at SLE. Scheduled commercial passenger airline services began in 2007 before being suspended in 2008. Scheduled commercial passenger airline service returned to SLE briefly in 2011. It is anticipated that scheduled commercial passenger airline service will return to SLE; however, no commitment by an airline has been made.

The base year for the forecasts is 2008, which was the most recent year data was completely available for MPU-I, included in **Appendix A**. Although the base year is 2008, elements of subsequent chapters generated with supplemental data use 2009 and 2010 versions when available to reflect most recent information.

6.1 Based Aircraft

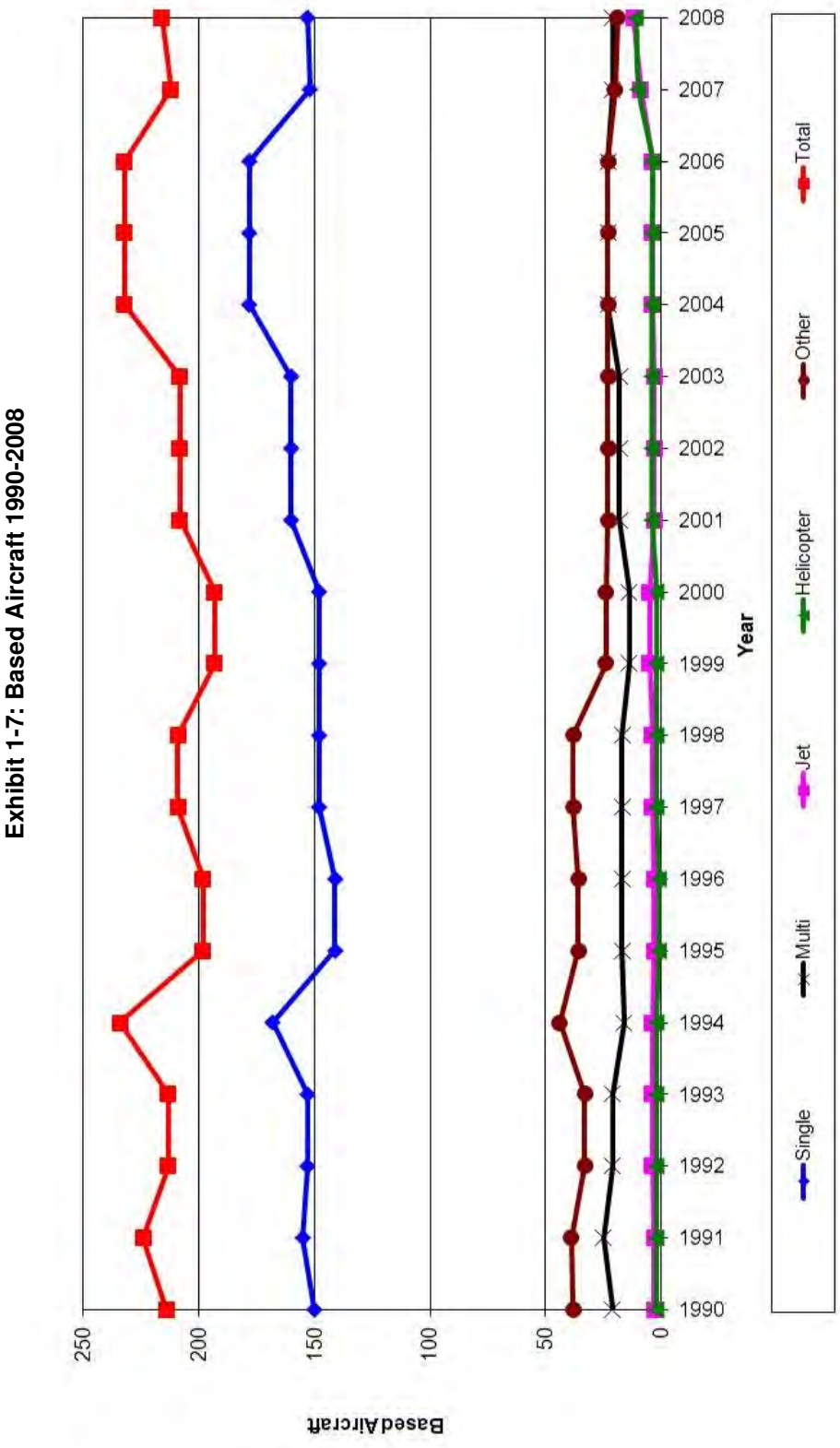
Based aircraft are those that hangar or tie-down at SLE. Based aircraft are categorized as *single-engine, multi-engine, jet, helicopter,* and *other*. Single-engine aircraft are the dominant aircraft on the field with 70 percent of the based aircraft total in 2008. Based aircraft records from 1990 to 2008 are presented in **Table 1-13** and **Exhibit 1-7**.

Table 1-13: Based Aircraft

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
1990	150	21	3	2	38	214
1991	155	25	3	2	39	224
1992	153	21	4	2	33	213
1993	153	21	4	2	33	213
1994	168	16	4	2	44	234
1995	141	17	3	1	36	198
1996	141	17	3	1	36	198
1997	148	17	4	2	38	209
1998	148	17	4	2	38	209
1999	148	14	5	2	24	193
2000	148	14	5	2	24	193
2001	160	18	3	4	23	208
2002	160	18	3	4	23	208
2003	160	18	3	4	23	208
2004	178	23	4	4	23	232
2005	178	23	4	4	23	232
2006	178	23	4	4	23	232
2007	152	21	9	10	20	212
2008	153	21	12	11	19	216
CAGR	0.1%	0%	8%	10%	-3.8%	0.1%

Source: 2010 TAF, MPU-I

Exhibit 1-7: Based Aircraft 1990-2008



6.2 Enplanements

An enplanement is the act of a passenger boarding an aircraft. Passenger enplanements are reported to the U.S. Department of Transportation and the FAA by the airlines. Enplanement figures do not include non-revenue passengers and aircraft crew. Enplanements are categorized as *air carrier, commuter,* and *air taxi.* The FAA defines *air carrier* enplanements as those that occur on "U.S. commercial air carriers and international enplanements for both U.S. and foreign flag carriers submitted to the U.S. Department of Transportation." Enplanements that occur on "airlines whose primary function is to provide passenger feed to mainline carriers, regardless of aircraft size" are classified as *commuter* if the service was scheduled, and classified as *air taxi* if the service was non-scheduled, and conducted on demand. Enplanement data from 1990 to 2008 is presented in **Table 1-14,** and **Exhibit 1-8**.

Table 1-14: Enplanements

Year	Air Carrier	Commuter	Air Taxi	Total
1990	0	0	694	694
1991	2,250	1,590	0	3,840
1992	2,660	1,219	0	3,879
1993	2,945	2,207	0	5,152
1994	1,925	822	0	2,747
1995	2,159	0	16	2,175
1996	1,582	0	16	1,598
1997	1,085	0	0	1,085
1998	584	0	0	584
1999	0	0	32	32
2000	0	0	32	32
2001	0	0	32	32
2002	0	0	273	273
2003	0	0	273	273
2004	0	0	273	273
2005	0	0	273	273
2006	0	0	273	273
2007	0	8,194	273	8,467
2008	222	19,310	273	19,805
CAGR	N/A	N/A	N/A	20%

Source: 2010 TAF

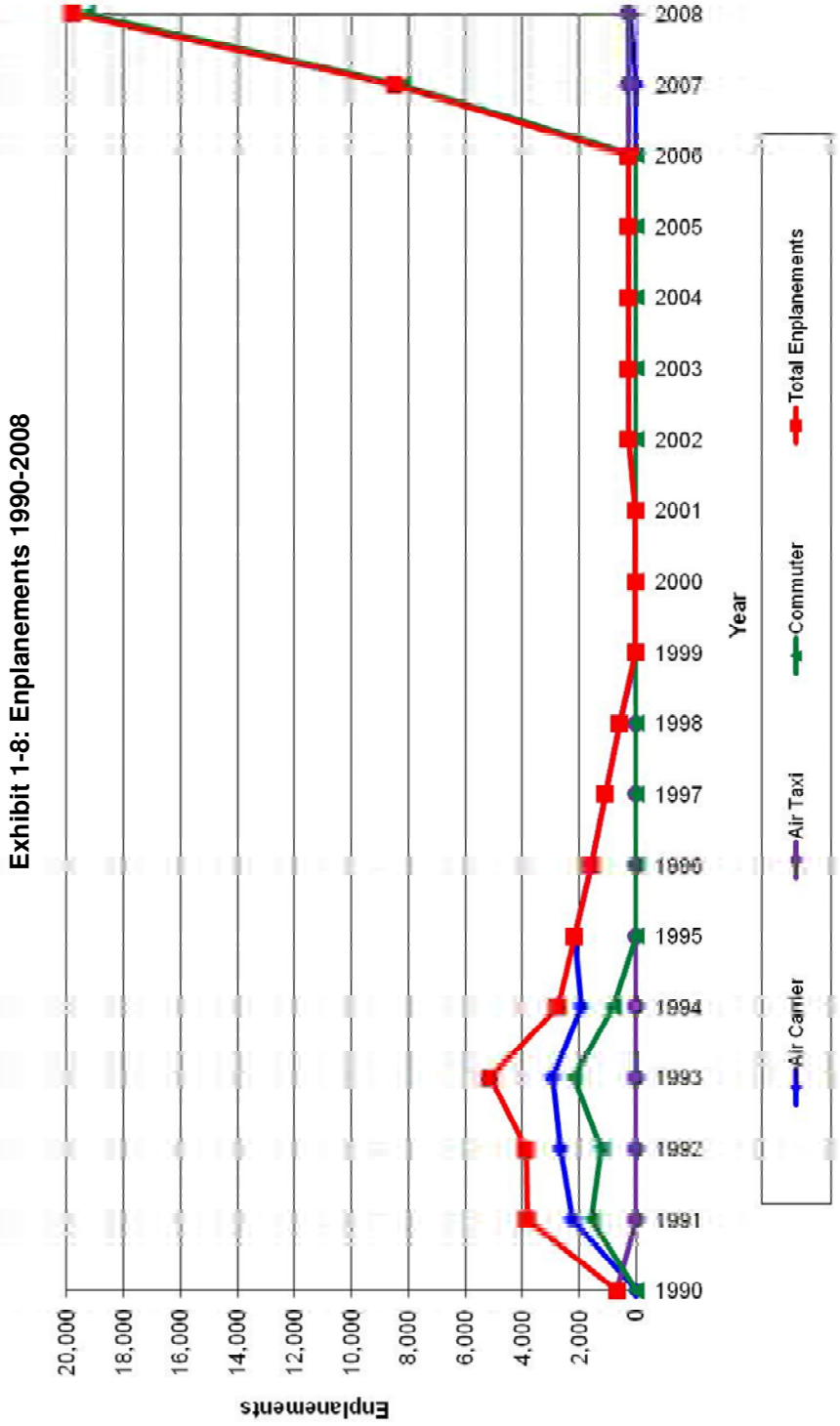


Exhibit 1-8: Enplanements 1990-2008
Enplanements
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Year
2008
2007
2006
2005
2004
2003
2002
2001
2000
1999
1998
1997
1996
1995
1994
1993
1992
1991
1990
Total Enplanements
Commuter
Air Taxi
Air Carrier

6.3 Aircraft Operations

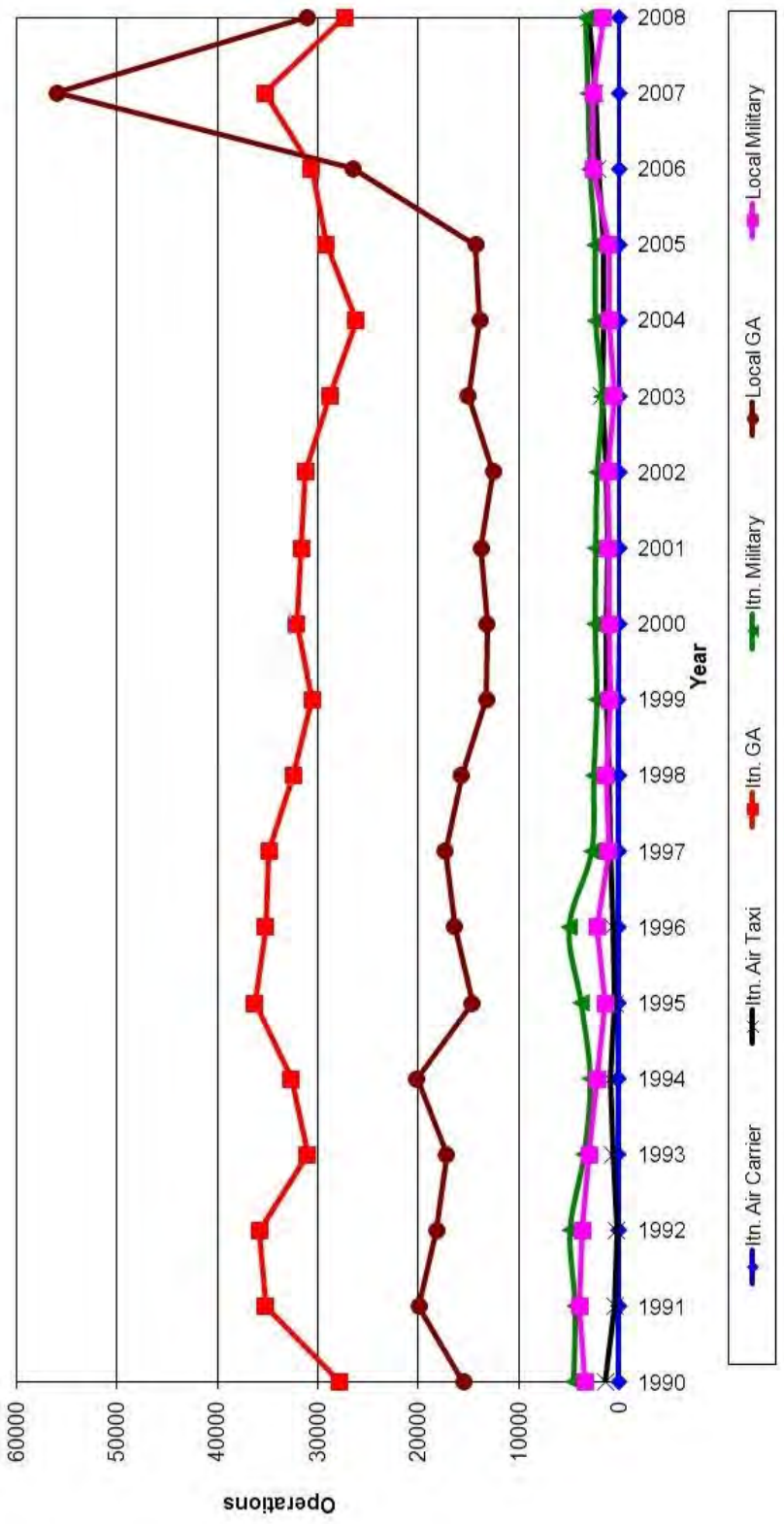
An aircraft operation is a take-off, landing, missed approach, or a touch-and-go. Operations are classified as *local,* where the aircraft stays in the vicinity of the airport, and *itinerant* (Itn.), where the aircraft takes off from, or lands at another airport. Operations are also classified by purpose. *Air carrier* operations are conducted by scheduled commercial passenger airline aircraft with more than 60 seats, *air taxi* operations are conducted by commercial passenger airline aircraft with 60 or fewer seats, and *military* operations are conducted by aircraft the belong to the U.S. armed forces. *GA* operations represent non-scheduled commercial passenger airline and non-military aircraft operations. Aircraft operations grew dramatically in 2007 on account of a helicopter flight training school, which ceased operation in 2008. Aircraft operations records between 1990 and 2008 are presented in **Table 1-15** and **Exhibit 1-9**.

Table 1-15: Aircraft Operations

Year	Itn. Air Carrier	Itn. Air Taxi	Itn. GA	Itn. Military	Local GA	Local Military	Total
1990	45	1,396	27,816	4,601	15,494	3,401	52,753
1991	45	467	35,186	4,451	19,978	3,937	64,064
1992	62	247	35,802	4,958	18,177	3,708	62,954
1993	153	685	31,043	3,567	17,186	3,047	55,681
1994	99	926	32,678	2,943	20,173	2,240	59,059
1995	113	452	36,260	3,855	14,641	1,430	56,751
1996	89	688	35,207	5,062	16,399	2,202	59,647
1997	59	909	34,875	2,786	17,336	1,074	57,039
1998	49	1,003	32,425	2,588	15,694	1,368	53,127
1999	134	1,335	30,580	2,283	13,249	963	48,544
2000	20	1,365	32,098	2,448	13,166	1,014	50,111
2001	2	1,196	31,626	2,390	13,775	1,090	50,079
2002	1	1,268	31,241	2,249	12,541	1,143	48,443
2003	0	1,757	28,825	1,757	15,014	505	47,858
2004	0	1,552	26,217	2,426	13,907	1,006	45,108
2005	8	1,579	29,184	2,471	14,294	1,072	48,608
2006	2	2,156	30,661	2,973	26,519	2,629	64,940
2007	0	2,404	35,282	3,156	55,985	2,605	99,432
2008	20	2,985	27,322	3,404	31,046	1,633	66,410
CAGR	-4.4%	4.3%	-0.1%	-1.7%	3.9%	-4.0%	1.3%

Source: 2010 TAF

Exhibit 1-9: Aircraft Operations 1990-2008



6.4 Air Cargo

Air cargo service at SLE is provided by FedEx Express via its contract carrier Empire Airlines, and by UPS via its contract carrier Ameriflight. FedEx operates a package sorting and distribution center on the northwest side of the Airport. UPS operates on an aircraft parking apron. Empire Airline's operating certificate requires air cargo data to be reported the USDOT. Ameriflight has a different operating certificate, and does not report cargo volume to the USDOT. Empire Airlines enplaned and deplaned air cargo volume is presented in **Table 1-16**.

Table 1-16: Air Cargo

Year	Cargo Volume (Pounds)
2003	199,384
2004	209,839
2005	310,256
2006	570,296
2007	603,124
2008	397,507
CAGR	15%

Source: USDOT

7. Summary

A summary of the facilities available at SLE is presented in **Table 1-17**.

Table 1-17: Major Facilities Summary

Runways

- Runway 13-31: 5,811ft x 150ft
- Runway 16-34: 5,145ft x 100ft

Runway Navigational Aids

- Runway 13
  - Non-precision Instrument Runway Markings
  - High Intensity Runway Lights (HIRL)
  - Omnidirectional Approach Lighting System (ODALS)
  - Runway End Identifier Lights (REIL)
  - Visual Approach Slope Indicator (VASI)
- Runway 31
  - Precision Instrument Runway Markings
  - Instrument Landing System (ILS)
  - Medium Intensity Approach Lighting System w/ Runway Alignment Indicator Lights (MALSR)
  - High Intensity Runway Lights (HIRL)
- Runway 16
  - Non-precision Runway Markings
  - Medium Intensity Runway Lights (MIRL)
  - Runway End Identifier Lights (REIL)
  - Precision Approach Path Indicator (PAPI)
- Runway 34
  - Non-precision Runway Markings
  - Medium Intensity Runway Lights (MIRL)
  - Runway End Identifier Lights (REIL)
  - Precision Approach Path Indicator (PAPI)

Airport Navigational Aids

- Airport Traffic Control Tower (ATCT)
- Automated Surface Observation System (ASOS)
- Automated Terminal Information System (ATIS)
- Wind Indicators
- Rotating Beacon
- Compass Calibration Pad

Instrument Approach Procedures

- Runway 13
  - LOC BC
- Runway 31
  - ILS or LOC
  - RNAV (GPS) LPV
  - LOC/DME

Instrument Departure Procedures

- Salem Three Departure

Building Area

- Northwest airfield
  - Passenger Terminal
  - FedEx
  - Oregon Department of Forestry
  - Air Traffic Control Tower
  - Aircraft Rescue and Fire Fighting
  - Hangars
  - Hertz, Budget, and Avis car rentals
  - Hertz Car Sales of Salem
- Southwest airfield
  - Restaurant
  - Oregon Department of Aviation
  - FBOs
  - Hangars
- East airfield
  - Oregon Army National Guard
  - Garmin, Ltd.

Fixed Base Operators (FBOs)

- Salem Aviation Fueling
- Salem Air Center
- Salem Flight Training
- VAL Avionics
- Sun Quest Executive Charters
- Fuel
  - 100LL (full- and self-service)
  - Jet A (full-service)

Emergency and Security

- ARFF Index B
- Airport Maintenance and Snow Removal

Chapter 2

Environmental Overview

1. Introduction

This chapter provides an overview of environmental conditions to be considered at Salem Municipal Airport (SLE). Conditions are determined by existing studies and database review, photography and map interpretation, agency correspondence, and local knowledge. Fieldwork was performed for archaeological, wetland, and biological categories. A review of environmental compliance is presented, and environmental conditions for the National Environmental Policy Act of 1969 (NEPA) categories are summarized.

This chapter is not intended to satisfy environmental clearance requirements outlined in Federal Aviation Administration (FAA) Order 1050.1E, *Environmental Impacts and Procedures*. This chapter is a summary of existing conditions, and will not fulfill the requirements of NEPA. A federally funded airport project is considered a *federal action*, and requires formal NEPA compliance documentation.

Environmental considerations are used to evaluate airport improvement alternatives. When environmental constraints are identified, airport improvement alternatives are developed to avoid and minimize impacts to the environment.

This chapter is organized into the following sections.

- Environmental Compliance Review
- Wetland Review
- Biological Assessment
- Floodplain Assessment
- Cultural Resource Assessment
- Other Environmental Categories

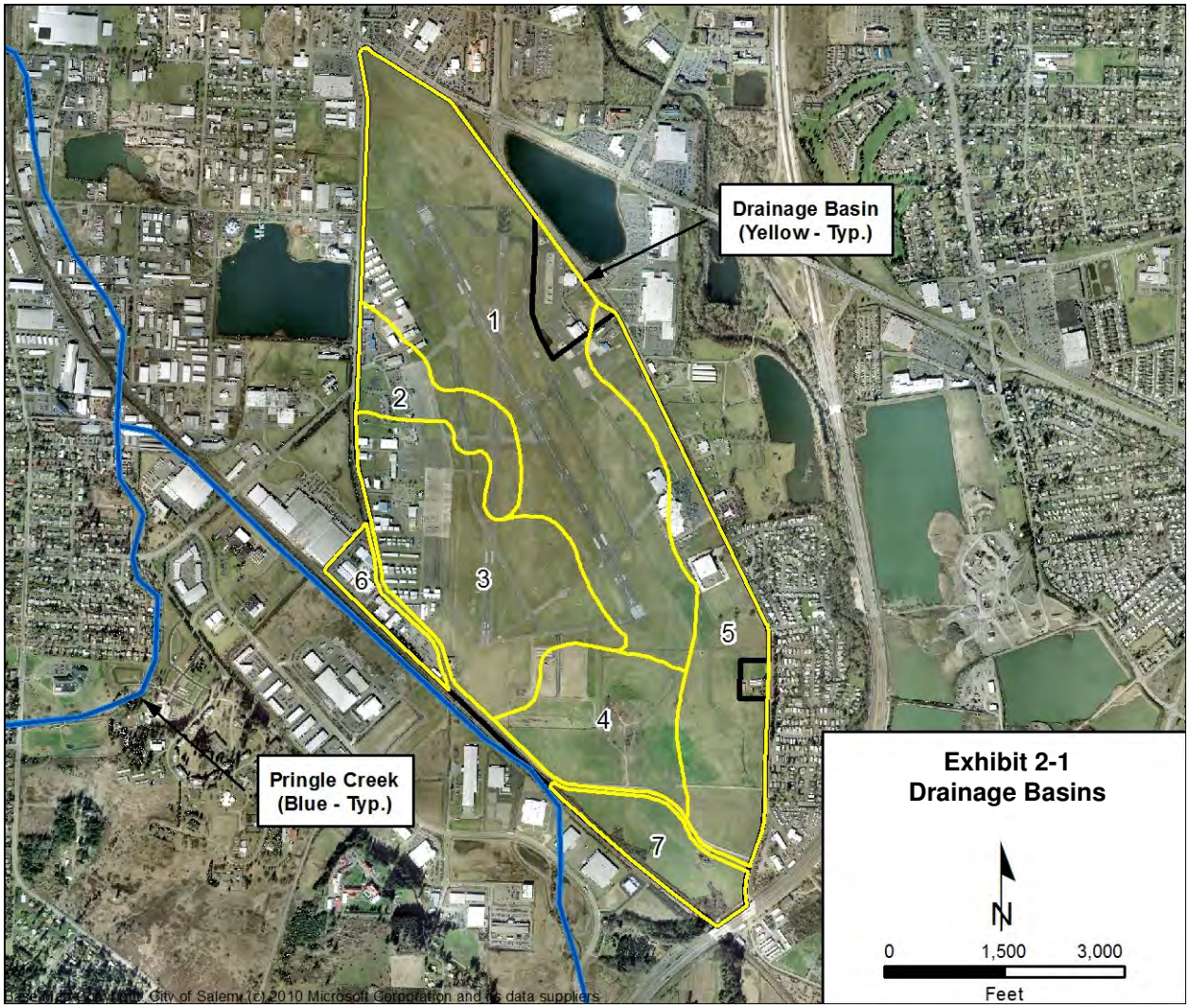
2. Airport Pollution Discharge and Storm Water

As required by the Oregon Department of Environmental Quality (DEQ), SLE is permitted under the National Pollutant Discharge Elimination System (NPDES) General Permit 1200-Z, Permit File No. 106923 (Permit). In December 2010, the City of Salem Public Works Department developed a Storm Water Pollution Control Plan (SWPCP) for the Airport. The SWPCP consists of the following items.

- A list of potential sources of storm water pollutants associated with industrial activities at SLE,
- Preventative measures to reduce the amount of hazardous materials exposed to storm water runoff,
- Control measures used to contain a spill or treat contaminated runoff,
- Response procedures in the event of an uncontrolled spill or discharge, and,
- Inspection, testing and monitoring procedures for storm water.

Fueling, aircraft maintenance and de-icing activities have a high potential to impact storm water and runoff water quality. Airport tenant Valmont Industries possesses a 1200-Z Industrial Storm Water Permit, and the other airport tenants are covered by the SWPCP.

The SWPCP identifies seven drainage basins on airport property. Drainage basins are shown in **Exhibit 2-1**



Airfield pollutants of concern include aircraft fuel, detergent runoff from aircraft cleaning, solvents and lubricants from aircraft maintenance, deicing fluid, and paint. The SWPCP indicates that the majority of runoff at SLE flows into grass-lined drainage ditches. Some biofiltration, where storm water is filtered by soil and plants, is accomplished as storm water passes through the grass-lined drainage ditches.

Under the general conditions of the SWPCP, five drainage outfalls are sampled four times a year, analyzing for copper, lead, zinc, mercury, pH, suspended solids, oil and grease, and E. Coli. Two sample sites are located in Drainage Basin 1. Drainage Basins 2, 3, and 4 have one sample site each. Drainage Basins 5, 6, and 7 are not sampled because they do not contain industrial activities and are not required to be monitored. Benchmark guideline concentrations are included in the NPDES 1200-Z permit. If sampling results exceed benchmark values, the Airport should conduct a Benchmark Compliance Evaluation which is to be be submitted to DEQ.

Under the SWPCP, the Airport has developed Best Management Practices (BMPs) that include procedures to prevent toxic and hazardous substances from reaching receiving waters. BMPs being implemented include guidelines pertaining to pesticide use, aircraft and equipment maintenance, fuel truck unloading, vehicle and equipment fueling, materials storage, security, erosion control measures, waste disposal, and general good housekeeping practices.

The Airport's operations staff is trained for spill prevention and response. SLE does not store oil products at a volume that would require development of a Spill, Prevention, Control, and Countermeasure (SPCC) Plan. Fueling is conducted by the fixed base operator (FBO) which maintains spill prevention controls, and provides annual training on safe fueling operations. The FBO maintains a SPCC separate from the Airport.

Cannon's Pond is a DEQ regulated land fill site on Airport property. Cannon's Pond is located on the south side of the airfield, between the extended centerlines of Runway Ends 31 and 34. Cannon's Pond site is used for segregation of debris collected by street sweepers, and hydro-trucks.

3. Wetland Review

A wetland review, included in **Appendix C**, was completed in November 2010. The wetland review consisted of document review, and a field survey of 277 acres north of Runway End 31, and south of the intersection of Runway 13-31 and Runway 16-34. Wetland delineation is expected to be required as part of the NEPA process for airport improvements. Oregon Department of State Lands (DSL) permits wetland removal and fill, and the U.S. Army Corps of Engineers permits fill activities occurring in wetlands that feed into, or are supplied by, waters of the state.

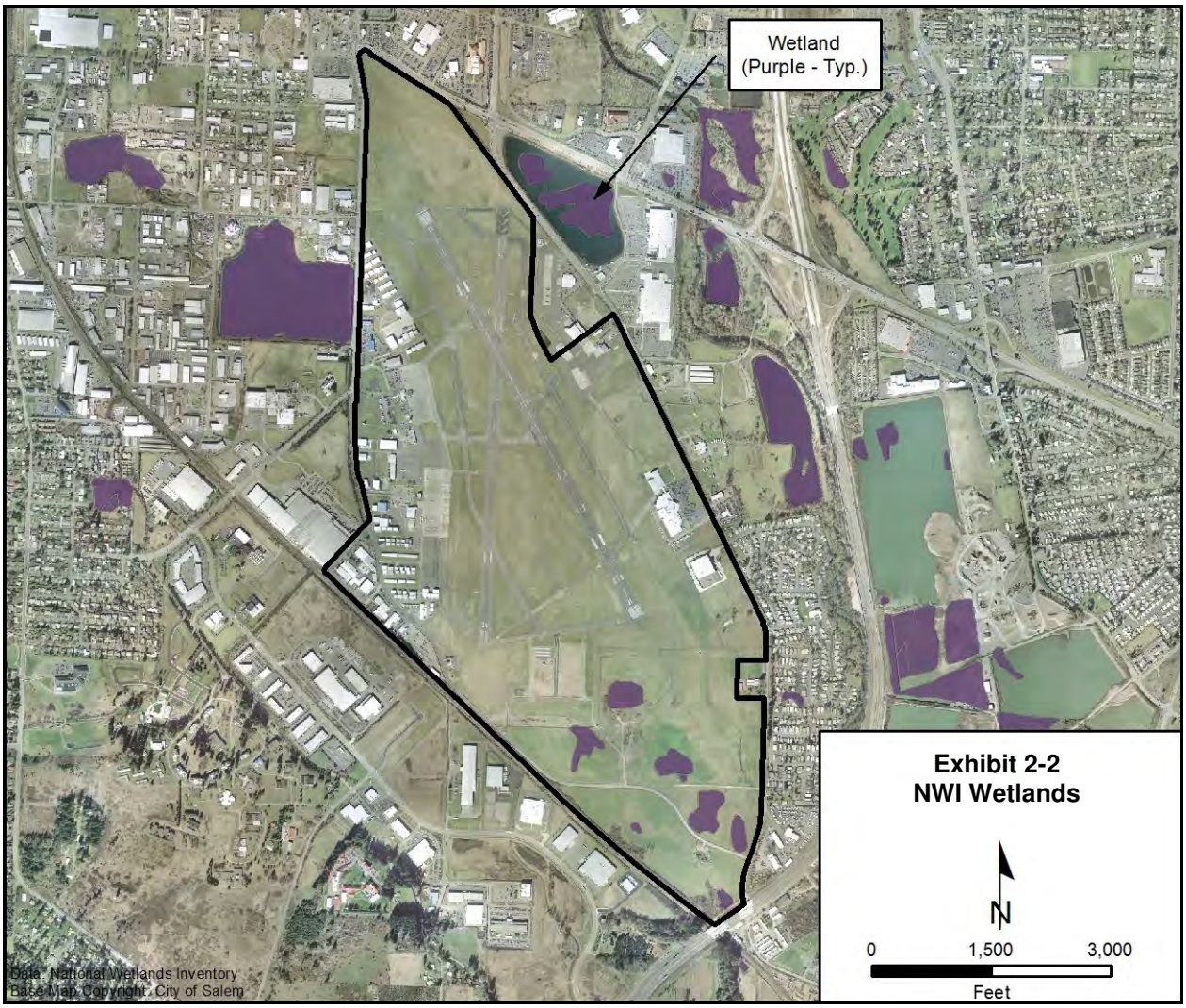
Wetland location information, gathered from the National Wetlands Inventory (NWI), indicates that there are nine acres of freshwater emergent wetland, three acres of freshwater forested/shrub wetland, and three acres of freshwater pond on airport property. The wetland review indicates that wetland vegetation, including needle spikerush (*Eleocharis acicularis),* spreading rush (*Juncus patens*), and reed canarygrass (*Phalaris arundinacea*) were observed.

The City of Salem conducted a wetland inventory in 2005 in the southwest side of the airfield near Taxiway R. Within airport property, wetland areas were found in the ditch west and south of the hangar development area and two depression areas less than one half acre in size. DSL reviewed and concurred with the findings of the inventory in 2006.

The wetland review concluded that multiple wetlands are expected to be found in the survey area if wetland delineation is conducted. The wetland review anticipates that multiple wetlands are expected to be located in the southwestern area of the airfield, and that there is a lesser likelihood of wetlands being found in the northern part of the airfield.

The NEPA process requires wetland review and impact analysis for airport improvements.

NWI wetland locations are shown in **Exhibit 2-2**.


Wetland
(Purple - Typ.)
Exhibit 2-2
NWI Wetlands
N
0
1,500
3,000
Feet
Data: National Wetlands Inventory
Base Map Copyright: City of Salem

4. Biological Assessment

Elements of the biological assessment include air quality, biotic communities, and threatened and endangered species.

4.1. Air Quality

The Clean Air Act of 1970, as amended (CAA), is codified in Title 42 of the U.S. Code (USC) Chapter 85. Under the CAA, the U.S. Environmental Protection Agency (EPA) has authority to establish standards for national air quality, and regulate emissions of air quality pollutants through permitting. The DEQ is responsible for issuing permits for pollution emitting sources at the state level, and for obtaining state-wide compliance with the requirements of the CAA.

EPA has identified standards for six pollutants known as criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), lead (Pb), and two types of particulate matter (PM_{10} and $PM_{2.5}$). The standards for these pollutants are defined in the National Ambient Air Quality Standards (NAAQS). An area that does not meet the NAAQS is known as a nonattainment area. Each state is required to have a state implementation plan (SIP) to bring nonattainment areas into compliance with NAAQS. A nonattainment area that comes into compliance with the NAAQS is classified as a maintenance area.

Before allocating federal funds for airport construction projects, FAA reviews environmental documents to ensure compliance with applicable SIPs. Per section 176(c) of the CAA, "No department, agency, or instrumentality of the federal government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not conform to an implementation plan."

Oregon Administrative Rules (OAR) Divisions 200, 202, and 204 pertain to air quality. These regulations grant the DEQ authority to issue permits for certain high emission industries, and monitor the NAAQS. DEQ standards for criteria pollutants match those of the NAAQS, except for SO_2. In Oregon, SO_2 thresholds are 0.02 parts per million (ppm) for the annual average, and 0.5 ppm for the 3-hour average, and 0.10 ppm for 24-hour average. NAAQS and DEQ air quality standards are presented in **Table 2-1**.

Table 2-1: National Ambient Air Quality Standards			
Pollutant	**Period**	**Threshold**	
		NAAQS	**DEQ**
CO	1-hour	35.0 ppm	
	8-hour	9.0 ppm	
Pb	Calendar Quarter	1.5 µg/m^3	
NO_2	Annual	0.053 ppm	
O_3	8-hour	0.08 ppm	
SO_2	Annual Average	0.03 ppm	0.02 ppm
	3-Hour	0.5 ppm	
	24-Hour	0.14 ppm	0.10 ppm
$PM_{2.5}$	24 Hour	35.0 µg/m^3	
	Annual Average	15.0 µg/m^3	
PM_{10}	24 Hour	150.0 µg/m^3	

PPM: Parts Per Million

µg/m^3: Micrograms per Cubic Meter

Source: Oregon Department of Environmental Quality

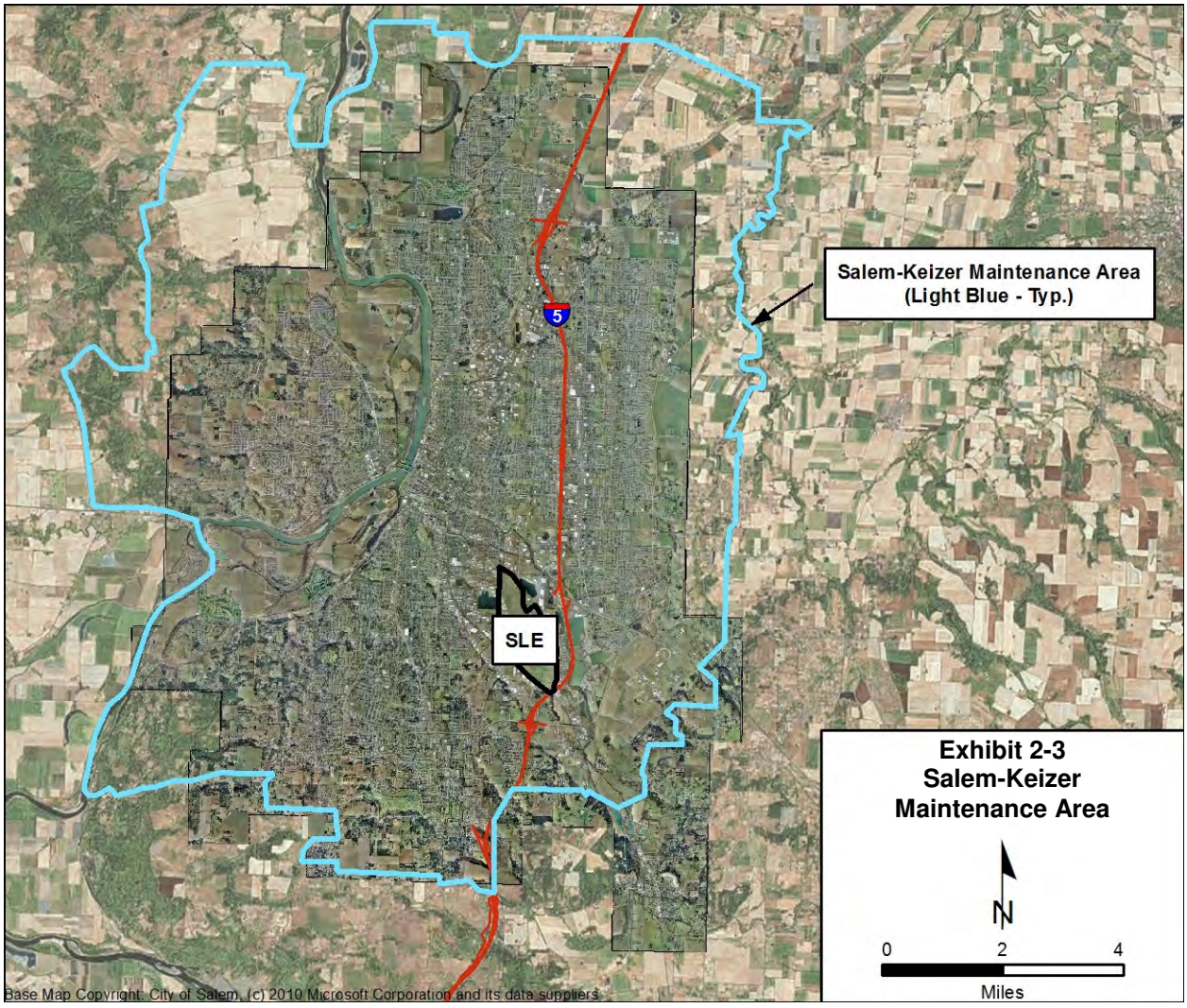
SLE is in maintenance areas for ozone and carbon monoxide. The 2007 *Salem-Keizer Area Ozone Maintenance Plan* (2007 Ozone Plan) is the SIP that addresses ozone levels in the City of Salem. The 2007 Ozone Plan reports that Salem was designated as a nonattainment area for ozone in 1978. Salem was still considered a nonattainment area for ozone following amendments to the CAA in 1990, although designation included the footnote of incomplete data. Salem has not had an ozone violation since 1996, and became a maintenance area in 2004.

The 2007 *Salem-Keizer Area Carbon Monoxide Limited Maintenance Plan* (2007 CO Plan) is the SIP that addresses CO levels in Salem. Salem was designated as a nonattainment area for CO in 1978. DEQ introduced an attainment plan for Salem in 1980. Salem achieved compliance with the NAAQS for CO and became a maintenance area in 1987.

The 2007 Ozone Plan and 2007 CO Plan define standards for maintaining compliance with the NAAQS. As projects are developed at SLE, consideration should be given to potential impacts during construction and operation of the projects.

The NEPA process requires air quality review and impact analysis for airport improvements.

The Salem-Keizer Maintenance Area is shown in **Exhibit 2-3**



4.2 Biotic Resources

Biotic resources relate to the natural environment. This includes plant and animal species, their habitats, and other areas of naturally occurring vegetation or hydrologic features such as lakes and rivers. Elements pertinent to biotic resources are discussed in other sections, including Wetlands in **Section 3**, and Water Quality in **Section 7.9**. These elements are excluded from this section.

A formal biological assessment is expected to be conducted during environmental documentation.

The NEPA process requires biotic resources review and impact analysis for airport improvements.

4.3 Threatened and Endangered Species

Threatened and endangered species can be impacted by airport projects through disruption or removal of habitat, alteration of drainage, and creation of migratory barriers. Federally funded projects are required to avoid or mitigate impacts to these species and their habitat. This section identifies which state and federally listed species potentially occur at SLE.

The NEPA process requires threatened and endangered species review and impact analysis for airport improvements.

4.3.1 Vegetation

The Nelson's checkermallow (*sidalcea nelsoniana*) is a member of the mallow family with pinkish-purplish flowers clustered at the end of two- to four-foot tall stems. The Nelson's checkermallow was nationally listed as threatened under the Federal Endangered Species Act in 1993, and is listed as threatened by Oregon Department of Fish and Wildlife (ODFW). This plant is the subject of a 2008 ODFW Recovery Plan, which includes identifying existing Nelson's checkermallow population areas, and re-introducing the plant within its historic range. The Nelson's checkermallow has been identified on southern airport property; however, habitat delineation has not occurred.

4.3.2 Birds

The Streaked horned lark (*Eremophila alpestris strigata*), a federal candidate for threatened listing and a state species of concern; White-topped aster (*Sericocarpus rigidus*), a federal species of concern and state listed threatened species; and Willamette Valley larkspur (*Delphinium oreganum*), a federal species of concern and state candidate for listing; have been observed in the vicinity of the Airport in the past decade. Marion County is home to the Northern spotted owl (*Strix occidentalis caurina*), a federally-listed threatened species. It is not known whether any spotted owl habitat exists on the Airport; however the City of Salem Natural Resource Specialist considers spotted owl habitat unlikely on airport property.

4.3.3 Fish

Fish Distribution maps indicate that spring and fall Chinook salmon (*Oncorhynchus tshawytscha*) and Winter steelhead (*Oncorhynchus mykiss*) may use portions of Pringle Creek. Outfalls from Drainage Basins 1, 2, and 6 drain to Pringle Creek (**Exhibit 2-1**). The Oregon chub (*Oregonichthys crameri*) is a federally listed threatened species residing in Marion County, but it is unknown whether it resides in bodies of water affected by the hydrology of the Airport.

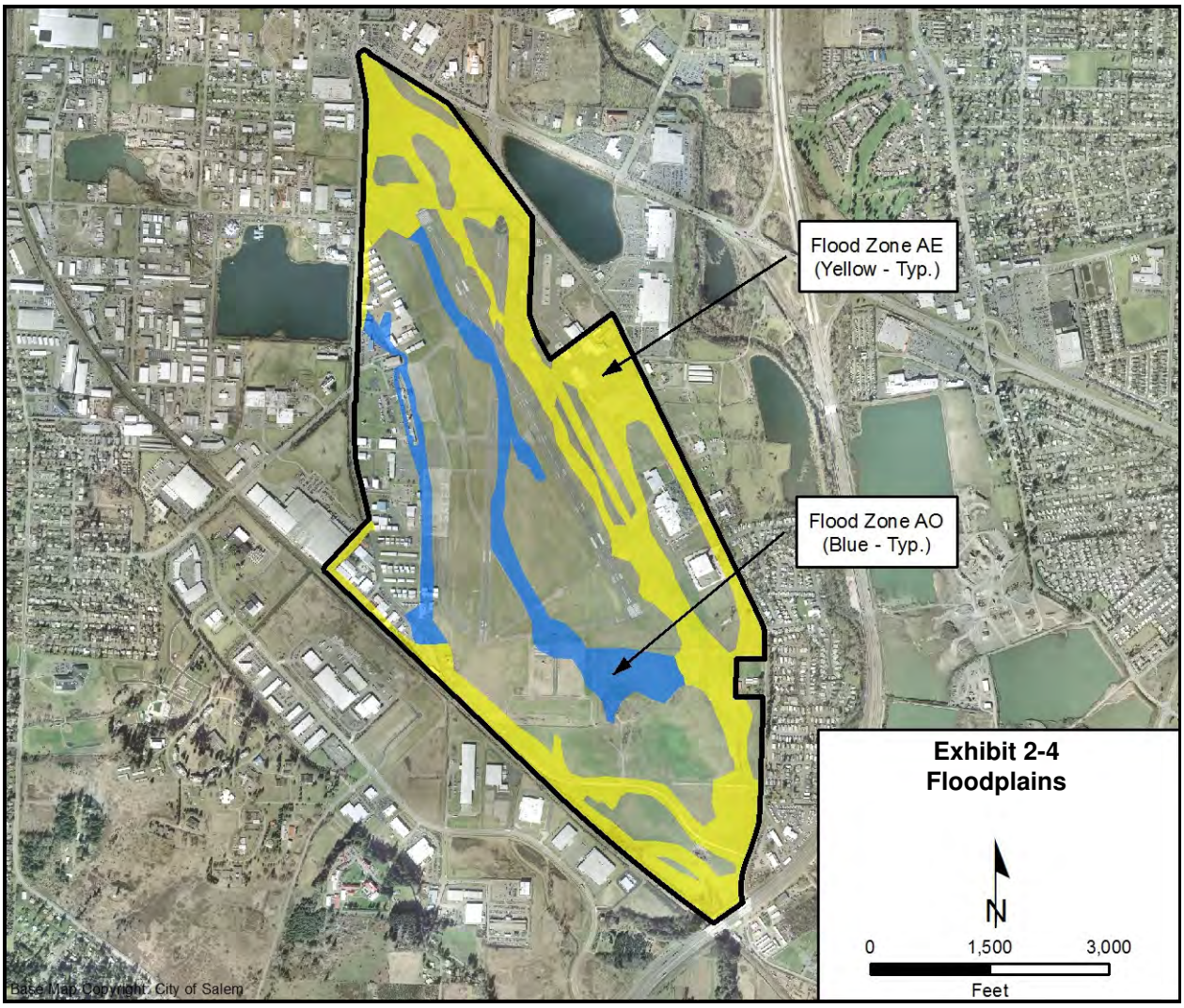
5. Floodplain Assessment

There are 306 acres classified by the Federal Emergency Management Agency (FEMA) as "high risk" floodplains in Flood Zone AE and Flood Zone AO within airport property. FEMA defines Flood Zone AE as "the base floodplain where base flood elevations are provided," and Flood Zone AO as "river or stream flood hazard areas, and areas with a 1 percent or greater change of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage." On airport property there are 241 acres classified as Flood Zone AE, and 65 acres classified as Flood Zone AO.

Development at SLE is expected to include grading and cut and fill activities on existing floodplains. Development that impairs floodplains ability to handle high water levels may require mitigation.

The NEPA process requires floodplain review and impact analysis for airport improvements, and a detailed floodplain study is recommended during design of airfield improvements.

Floodplains are shown in **Exhibit 2-4**.


Flood Zone AE
(Yellow - Typ.)
Flood Zone AO
(Blue - Typ.)
Exhibit 2-4
Floodplains
N
0
1,500
3,000
Feet
Base Map Copyright: City of Salem

6. Cultural Resource Assessment

An archaeological survey to determine the likelihood for the presence of cultural resources at SLE was completed in November 2010. The archaeological survey consisted of a review of historical records, and an automobile and pedestrian survey of the airfield.

Review of records maintained by the Oregon State Historic Preservation Office indicate that cultural resource surveys have been completed for projects around the Airport, but not on airport property. One cultural resource site on airport property was reported in the 1970's without exact location data. The nearest known cultural resource site is located within 0.25 miles of SLE.

The archaeological survey recommended the following.

- An archaeological site has previously been recorded on SLE property, but the pedestrian survey did not locate the site. An intensive pedestrian survey should be preformed.
- SLE meets the 50 years or older age requirement for the National Register of Historic Places. Documentation and determination of eligibility should be completed.

The NEPA process requires cultural resource review and impact analysis for airport improvements.

The Archaeological Reconnaissance Summary is included in **Appendix D.**

7. Other Environmental Categories

NEPA considers environmental categories in addition to wetlands, biological resources, floodplains, and cultural resources. The following section describes additional environmental categories that relate to SLE.

7.1 Coastal Resources

Coastal resources are protected by the Coastal Barriers Resources Act of 1982, as amended (CBRA) and the Coastal Zone Management Act of 1972, as amended (CZMA). The CBRA applies to coastal barriers in the Atlantic and Gulf coasts, and in the Great Lakes. CBRA is not applicable to SLE. CZMA applies to land within Oregon's Coastal Zone, administered by the Department of Land Conservation and Development. The coastal zone extends from the Pacific Coast to the crest of the Oregon Coastal Mountain Range, located west of SLE. The CZMA is not applicable to SLE.

The NEPA process requires coastal resources review and impact analysis for airport improvements.

7.2 Compatible Land Use

Compatible land use protects the health, safety, and welfare of those living and working near SLE, while protecting airspace for safe and efficient aircraft operations. Examples of land use considered not compatible with airport operations include places of public assembly, schools, hospitals, residential dwellings, and land uses that emit smoke, dust, glare, and attract wildlife. Strategies for achieving land use compatibility are provided in the 2003 Oregon Department of Aviation *Airport Land Use Compatibility Guidebook*, and the 2011 Washington State Department of Transportation *Airports and Compatible Land Use Guidebook*, summarized in **Chapter 6**.

The NEPA process requires compatible land use review and impact analysis for airport improvements.

7.3 Construction Impacts

On-airport construction activities can impact surrounding communities through the generation of noise, dust, debris, and emissions. FAA Order 1050.1E, Appendix A, Section 5.3 states that "construction impacts alone are rarely significant pursuant to NEPA," but construction impacts can cause a project to exceed acceptable impact thresholds in other impact categories.

The NEPA process requires construction impact review and impact analysis for airport improvements.

7.4 Department of Transportation Act, Section 4(f)

Section 4(f) resources include publicly-owned parks; recreational areas; wildlife and waterfowl refuge of national, state, or local significance; and land of a historic site of national, state, or local significance. Projects that occur within the existing fence-line at SLE are not expected to impact Section 4(f) resources because this property is inaccessible to the public without clearance.

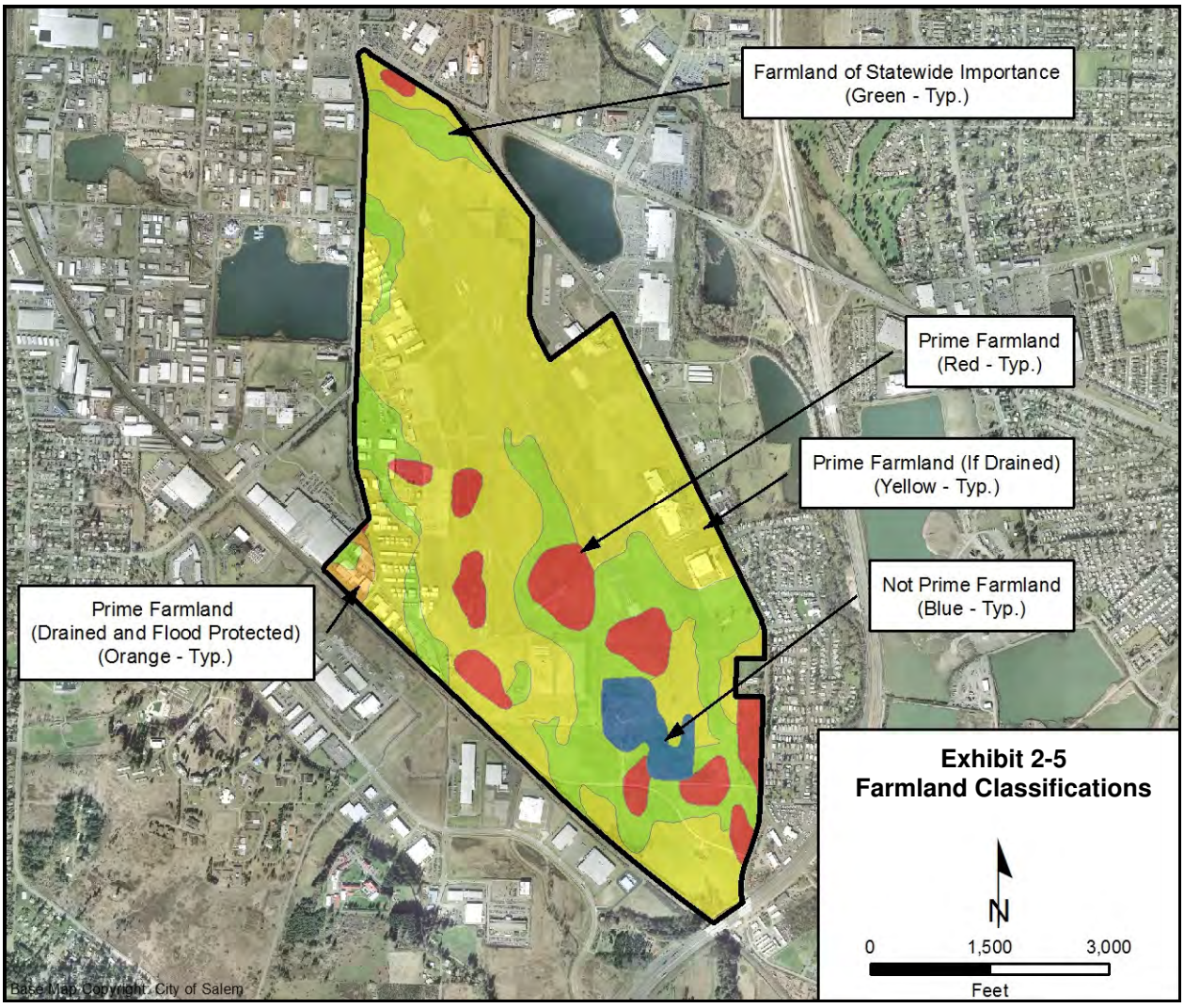
The NEPA process requires Department of Transportation Act, Section 4(f) review and impact analysis for airport improvements.

7.5 Farmland Conversion

The Farmland Protection Policy Act, part of the Agriculture and Food Act of 1981, as amended, protects conversion of important farmlands to non-agricultural use. Important farmlands include pasturelands, croplands, and forests (even if zoned for development) considered to be prime, unique, and statewide or locally important lands, determined by soil type. U.S. National Resources Conservation Service (NRCS) data indicates there are 71 acres on airport property classified as prime farmland, and 168 acres of soil classified as farmland of state importance. NRCS notes that 459 acres would be considered prime farmland if drained, and six acres would be considered prime farmland if drained and either protected from flooding or not frequently flooded. SLE's property was not used for agricultural purposes in 2011.

The NEPA process requires farmland conversion review and impact analysis for airport improvements.

Farmland classifications are shown in **Exhibit 2-5**.



7.6 Light Emissions and Visual Impacts

Light emitting sources at SLE include airfield lighting, aircraft approach lighting, parking lot lighting, and building lighting. Airfield improvement projects can alter the location and intensity of light emitting sources, which may change the impact on properties around the Airport. Airport improvement projects that impact light emitting sources at SLE should be analyzed to determine potential impact, and mitigation techniques such as shielding or angular adjustments.

FAA Order 1050.1E, Appendix A comments that "visual, or aesthetic, impacts are inherently more difficult to define because of the subjectivity involved. Aesthetic impacts deal more broadly with the extent that the development contrasts with the existing environment and whether the jurisdictional agency considers this contrast objectionable."

The NEPA process requires light emissions and visual impacts review and impact analysis for airport improvements.

7.7 Natural Resources and Energy Supply

FAA Order 1050.1E states that airport improvement projects "will be examined to identify any proposed major changes in stationary facilities or the movement of aircraft and ground vehicles that would have a measurable effect on local supplies of energy or natural resources." FAA Order 1050.1E requires coordination with environmental stakeholders and energy producers should potential impacts be identified. FAA Order 1050.1E, Appendix A, Section 13 identifies two applicable polices regarding energy supplies, natural resources, and sustainable design. Executive Order 13123, *Greening the Government through Efficient Energy Management*, encourages the expansion of the use of renewable energy, and requires federal agencies to reduce petroleum use, energy use, air emissions, and water consumption.

Energy supply considerations include aircraft fueling facilities and utility connections. Most fueling, except small tank self fueling, is conducted by the FBO. SLE receives power from the Portland General Electric utility company. Water and sanitary sewer services are provided by the City of Salem. Coordination with utility providers may be necessary during airport improvement project development.

The NEPA process requires natural resources and energy supply review and impact analysis for airport improvements.

7.8 Noise

Aircraft noise influences the Airport's relationship with the surrounding community. A noise analysis that compares aircraft noise contours from 2008 to forecasted aircraft noise contours from 2028 has been performed as part of MPU-II. The noise analysis is presented in **Chapter 6**.

The NEPA process requires noise review and impact analysis for airport improvements.

7.9 Socioeconomic Impacts, Environmental Justice, Children's Environmental Health and Safety Risks

Council on Environmental Quality regulations in Title 40 of the Code of Federal Regulations (CFR), Section 1508, requires environmental documents prepared for federally funded projects to address potential social impacts. The evaluation of a proposed project on the human environment should address the following items.

- Disproportionate impacts to low-income and minority populations,
- Potential relocation of homes or businesses,
- Division or disruption of an established community,
- Disruptions to orderly planned development,
- Notable project-related changes in employment, and
- Impacts on health and safety risks to children.

7.9.1 Socioeconomic Impacts

FAA Order 1050.1E states, "If acquisition of real property or displacement of persons is involved, 49 CFR Part 24, *Implementing the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended, must be met for federal projects and projects involving federal funding. Otherwise, the FAA, to the fullest extent possible, observes all local and State laws, regulations, and ordinances concerning zoning, transportation, economic development, housing, etc. when planning, assessing, or implementing the [airport improvement project]."

The expected social impacts to be considered at SLE are those associated with relocation or other community disruption, transportation, planned development, and employment. The need for special relocation advisory services to be provided, if any, for the elderly, handicapped, or illiterate regarding interpretation of benefits or other assistance is expected to be assessed by environmental documents of airport improvement projects.

The NEPA process requires socioeconomic impacts review and impact analysis for airport improvements.

7.9.2 Environmental Justice

FAA Order 1050.1E states, "Executive Order 12898, Federal *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and Department Of Transportation Order 5610.2, *Environmental Justice*, require FAA to provide for meaningful public involvement by minority and low-income populations and analysis, including demographic analysis, that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse."

If an impact would affect low income or minority populations at a disproportionately higher level than it would other population segments, an environmental justice impact is likely. In such cases, the environmental documents are expected to include the following.

- Demographic information about the affected populations,
- Information about the population(s) that have an established use for the significantly affected resource, or to whom that resource is important (i.e., subsistence fishing),
- Provide results of analysis to determine if a low income or minority population using that resource sustains more of the impact than any other population segments,
- Identify disproportionately affected low income and minority populations,
- Discuss alternatives that would reduce the effect on those populations, and
- Describe possible mitigation to reduce the effect on the disproportionately affected low income and minority populations.

In cases where FAA finds a significant impact, but determines that mitigation would reduce that impact below the applicable significance threshold, the environmental document should describe how mitigation would reduce the impact to less than significant and verify that the project would not result in disproportionately high and adverse affects on low income and minority populations. Demographic information for the Salem Metropolitan Statistical Area (MSA), which consists of Marion and Polk counties, is presented in **Table 2-2**.

The NEPA process requires environmental justice review and impact analysis for airport improvements.

Table 2-2: 2008 Salem MSA Demographics

Category	Marion County	Polk County	Salem MSA
Population			
Total Population	314,606	77,074	391,680
White (Non-Hispanic)	226,946	64,483	291,429
Black (Non-Hispanic)	3,890	638	4,528
Native American (Non-Hispanic)	4,225	1,501	5,725
Asian American and Pacific Islander (Non-Hispanic)	7,937	1,611	9,548
Hispanic or Latino	71,609	8,841	80,450
Poverty			
Total Number of Households	115,669	29,283	144,952
Average Persons Per Household	2.7	2.6	2.7
Households with Income Below Poverty Threshold[1]	21,010	5,870	26,884

1: 2008 Poverty Threshold for a Family of 3: $17,600 of Household Income, U.S. Department of Health and Human Services
Source: Woods & Poole, 2010

7.9.3 Children's Environmental Health and Safety Risks

FAA Order 1050.1E states "Pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* Federal agencies are directed, as appropriate and consistent with the agency's mission, to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Environmental health risks and safety risks include risks to health or to safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to."

There are three elementary schools, one middle school, and one high school within two miles of the Airport. Environmental documents for airport improvement projects should investigate whether a potential project could present any of the above mentioned risks to children through the environmental impacts of such a project.

The NEPA process requires children's environmental health and safety risks review and impact analysis for airport improvements.

7.10 Water Quality

Airport activities can affect water quality when storm water runoff carries contaminants from paved surfaces into creeks and rivers. To address the issues of controlled drainage and clean water, this section provides an overview of water resources near the Airport.

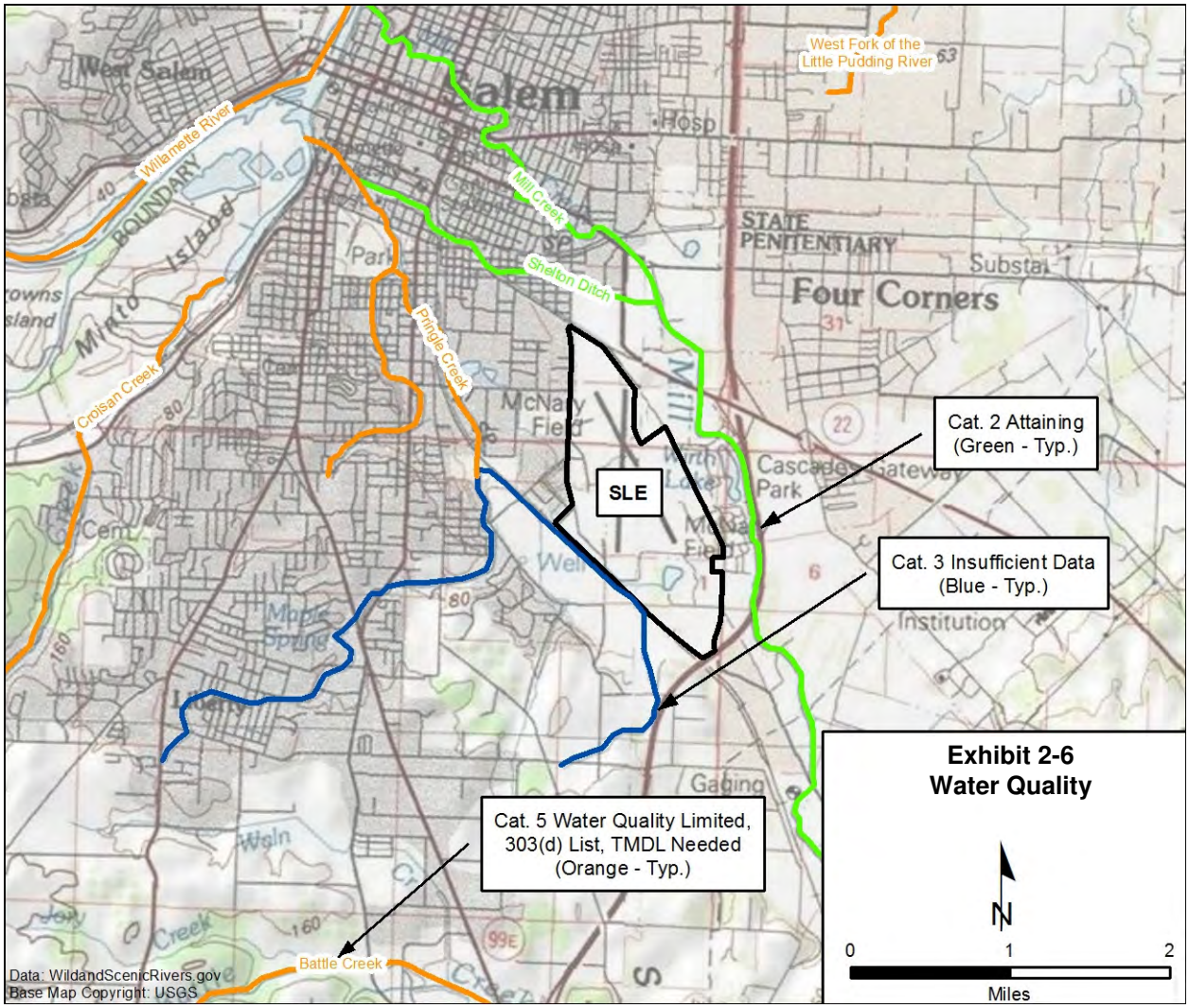
Water quality in Oregon is managed by the DEQ. The DEQ reports the condition of Oregon's water quality to the Environmental Protection Agency (EPA) every two years. Lakes, rivers, and streams are classified as Category 1 through Category 5, defined as the following.

- Category 1: All standards are met. (Not used in the report)
- Category 2: Attaining—Some of the pollutant standards are met.
- Category 3: Insufficient data to determine whether a standard is met.
- Category 3B: Potential concern—Some data indicate nonattainment of a criterion, but data are insufficient to assign to another category.
- Category 4: Water is water quality limited, but a total maximum daily load (TMDL) is not needed.
- Category 4A: TMDL approved—TMDLs needed to attain applicable water quality standards have been approved.
- Category 4B: Other pollution control requirements are expected to address all pollutants and will attain water quality standards.
- Category 4C: Impairment is not caused by a pollutant (e.g., flow or lack of flow is not considered a pollutant).
- Category 5: Water is water quality limited, and a TMDL is needed, Section 303 (d) lists.

There are rivers and streams that fall into Categories 2, 3, and 5 near SLE. DEQ does not identify lakes of concern near SLE.

The NEPA process requires water quality review and impact analysis for airport improvements.

Water Quality of rivers and streams near the Airport shown in **Exhibit 2-6**.

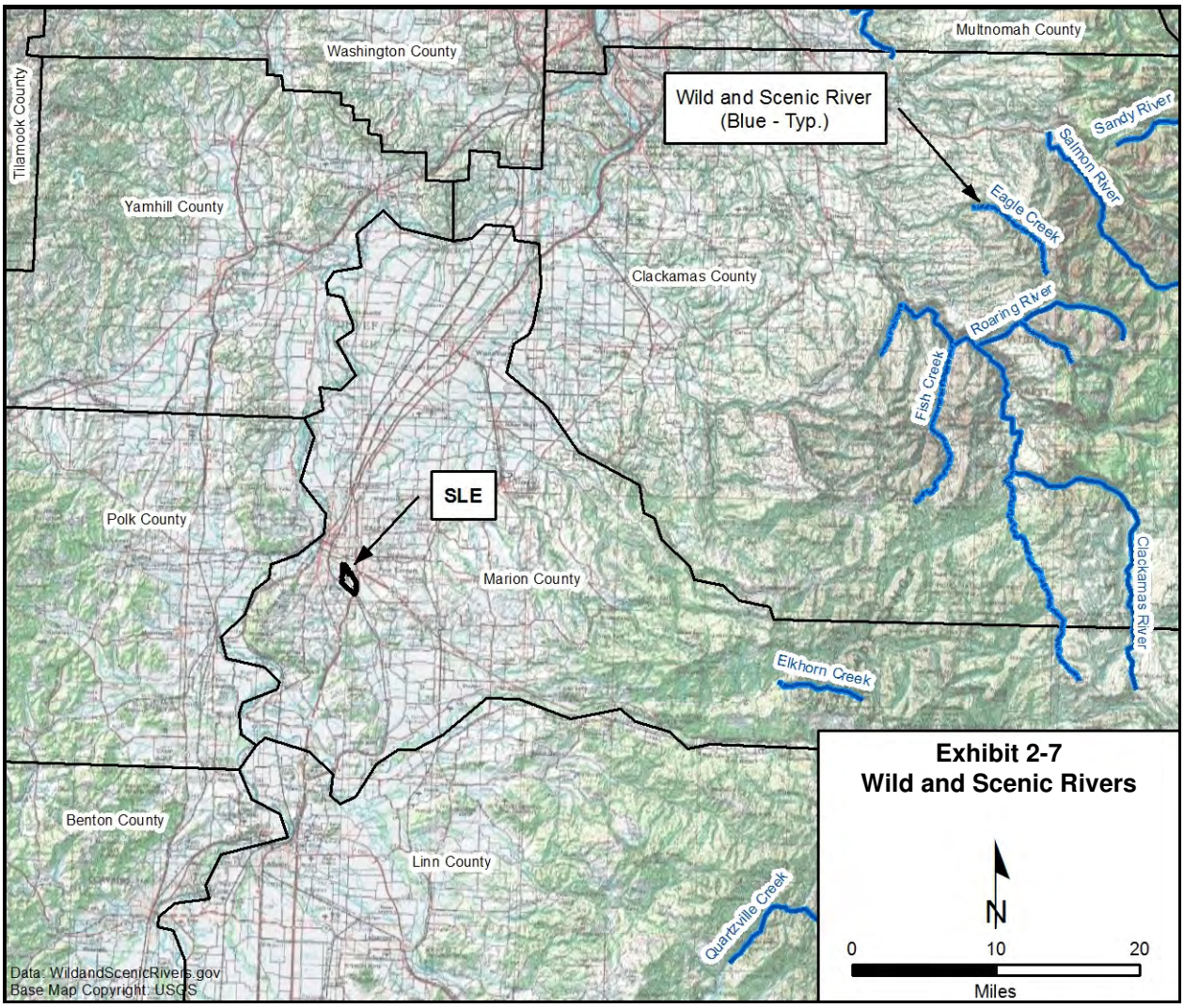


7.11 Wild and Scenic Rivers

Wild Rivers are free of obstructions such as canals and dams, and normally so remote as to only be accessible by trail. Scenic Rivers are free of obstructions, have undeveloped shorelines, but may have road access. Wild and Scenic Rivers are protected by the 1968 Wild and Scenic Rivers Act. Wild and Scenic Rivers are managed by the Bureau of Land Management, the National Park Service, the U.S. Fish and Wildlife Service, and the U.S. Forest Service. The nearest Wild and Scenic River to SLE is Elkhorn Creek, located 30 miles east of the Airport.

The NEPA process requires wild and scenic rivers review and impact analysis for airport improvements.

Wild and Scenic Rivers are shown in **Exhibit 2-7**.



8. Summary

The environmental overview has reviewed environmental categories that must be analyzed under the requirements of NEPA. Analysis in accordance with NEPA requirements is expected to be completed as airport improvement projects approach construction. The following is a summary potential areas of concern identified in the environmental overview.

- Wetlands—Multiple wetlands expected on the southwestern airfield
- Air Quality—Maintenance area for ozone and carbon monoxide
- Threatened and Endangered Species—Nelson's checkermallow habitat on the southern airfield; Northern spotted owl, Streaked horn lark, White-topped aster, Willamette Valley larkspur, Chinook salmon, Winter steelhead, and Oregon chub habitat in Marion County
- Floodplain—241 acres classified as Flood Zone AE, and 65 acres classified as Flood Zone AO
- Cultural Resources—SLE meets age requirement for National Register of Historic Places, eligibility should be determined

Other environmental categories were reviewed. Preliminary analysis of these categories did not suggest areas of particular concern; however, analysis in accordance with NEPA regulations is expected to be required for airport improvement projects.

Chapter 3

Aviation Activity Forecasts

1. Purpose, Goals, and Process

This chapter contains forecast of aviation activity at the Salem Municipal Airport (SLE). These forecasts will form the basis of Master Plan (Plan) elements, including demand-driven airport facility improvements, environmental evaluation, business and financial planning, and land use compatibility planning.

SLE features cargo, military and general aviation (GA) activity, and supported scheduled commercial passenger airline service until 2008, and Seaport until 2011. It is anticipated that scheduled commercial passenger airline service will return to SLE within the forecast period. These users require facilities for safe and efficient operations. The design and development of these facilities is correlated with aviation activity forecasts. These forecasts will help plan improvements, enable the Airport to obtain funding, prepare a budget, and manage resources.

This chapter forecasts the following activities: passenger enplanements, aircraft operations, based aircraft, and air cargo volume. Methods of forecasting are applied to each activity, and the results are compared with the Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) to select preferred forecasts.

The forecasts are based on historical activity from 2003 to 2008. 2008 was the most recent year of data available when this plan was initiated. Other time periods were considered, but this time period reflects the establishment of scheduled commercial passenger airline service, and how growth trends were impacted by the rising price of aviation fuel, new security procedures, and economic recession.

Aviation activity forecasts must be approved by the FAA. FAA forecast documentation and approval is included in **Appendix E**.

1.1 Methodologies

Forecast methodologies consider historical trends for SLE; FAA forecasts for national trends; and trends pertaining to historical and future socioeconomic activity. Activity levels generated by each methodology are presented in the following sections. The preferred methodology is selected at the end of each section.

1.1.1 Base Year

The base year for the forecasts is 2008, to keep the forecasts consistent with Master Plan Update Phase I (MPU-I). Although the base year is 2008, forecasts generated with supplemental data use 2009 and 2010 versions when available to reflect current information. The forecast period is 20 years, with reporting periods at five-year intervals for 2013, 2018, 2023, and 2028. Preferred forecasts are extended 50 years to provide a long-term forecast for SLE.

1.1.2 Compound Annual Growth Rate

Compound annual growth rate (CAGR) forecasting utilizes historical data to establish the growth rate for future years. CAGR is determined by the first and last years in the historical period, and the length of time between these years. CAGR is not affected by anomalies within the historical data, unless they occur during the first or last year. Future values are determined by applying the CAGR to a base level of activity and projecting levels for the desired number of years.

1.1.3 2009 FAA Terminal Area Forecast

The FAA Terminal Area Forecast (TAF) is an annual publication that outlines the FAA's future expectations for airports in the National Plan of Integrated Airport Systems. The 2009 TAF serves as the baseline for forecasting methodologies. Data from the 2009 TAF generates the growth rates and ratios used to forecast future aviation activity indicators. Forecasts are compared with the 2009 TAF, and the FAA generally requires preferred forecasts to be within ten percent of the TAF for the five-year and ten-year reporting periods. The 2009 TAF is used to analyze historical correlation between aviation activity indicators and the independent variables in the forecast methodologies.

1.1.4 FAA Aerospace Forecast

The FAA Aerospace Forecast is an annual publication that outlines the FAA's expectations for the future of the national airspace system. The FAA Aerospace Forecast considers national activity, instead of activity at specific airports which is forecasted by the TAF. This plan utilizes the FAA Aerospace Forecast 2010-2030 (Aerospace Forecast) to develop the Market Share, and Trend by National Activity Indicator.

SLE's market share corresponds to the percentage SLE contributes to the national total of an activity indicator, found by dividing SLE's level of a given activity by the national total for that year. Data from 2003 to 2008 are averaged to determine SLE's average market share. The Aerospace Forecast projects the activity indicator, and the expected national total is multiplied by SLE's market share percentage to determine future SLE activity.

Trend by National Activity Indicator forecasts use CAGRs in the Aerospace Forecast to project SLE's future activity. This forecast does not take into account historical activity at SLE, but instead relies on FAA projections of future national trends.

1.1.5 Socioeconomic Trends

Socioeconomic trends forecasts compare data from the Salem Metropolitan Statistical Area (Salem MSA), which consists of Marion and Polk counties, to aviation activity levels at SLE. Data for the socioeconomic indicators from 2008 are used to establish a ratio, which is applied to forecasted levels for the socioeconomic indicators (provided by the economic forecasting firm Woods & Poole) to determine aviation activity levels. This method utilizes the population and per capita income to develop Passenger Enplanement, GA Operations, Based Aircraft, and Air Cargo forecasts. Gross regional product is used to develop Air Cargo forecasts.

Socioeconomic forecasting for per capita income establishes a ratio between an aviation activity level and a dollar of average per capita income in the Salem MSA.

Socioeconomic forecasting for population establishes a ratio between the level of aviation activity and the number of people living in the Salem MSA. The level of aviation activity is divided by the population of the Salem MSA, which establishes the ratio of the aviation activity level per person.

Socioeconomic forecasting for gross regional product establishes a ratio between the level of aviation activity and the dollar value of goods produced in the Salem MSA.

1.1.6 Method Selection

The preferred forecast is selected based on analysis of the variables that went into the forecasts. Past and future behavior of these variables is compared to national and local trends. This analysis helps determine if the variables used during forecasting are appropriate for the conditions at SLE and nationwide.

Correlation between the variables is also analyzed. A correlation analysis produces a number called a correlation coefficient. This number is between -1 and 1. A correlation coefficient of -1 indicates strongly correlated variables that are decreasing in value. A correlation coefficient of 1 indicates strongly correlated variables that are increasing in value. A correlation coefficient of 0 indicates that the two variables are not likely correlated with one another. The correlation coefficient scale is presented in **Table 3-1**.

Table 3-1 Correlation Coefficient Scale

-1 to >-.7	-.7-< to <-5	-.5 to .5	.5 < to <.7	.7 to 1
Strong	Moderate	Low	Moderate	Strong

Correlation does not indicate causation; a high correlation coefficient does not prove that the behavior of one variable directly impacts the behavior of another. Correlation does indicate that the variables may be related, or may be caused by a similar third variable. An example of this is per capita income and population within an area increasing because of a high-paying employer located in the area. Income and population are both increasing and would show strong correlation, but the reason both are increasing is the presence of the employer, the third variable.

1.2 Review of Previous Forecasts

Two previous forecasts and one air service report are reviewed to provide a basis for comparison. The Oregon Department of Aviation (ODA) Oregon Aviation Plan (2007 OAP) was published in 2007. The previous Airport Master Plan Update was published in 1998 (MPU-1998). The forecasts are compared to 2008 aviation activity indicator records.

1.2.1 Oregon Department of Aviation Oregon Aviation Plan

The 2007 OAP has a base year of 2005, and forecasted aviation activity to 2025. 2007 OAP anticipated a 2.8 percent CAGR for passenger enplanements, a 2.1 percent CAGR for aircraft operations, and a 1.1 percent CAGR for based aircraft. Using these CAGRs, 2008 forecast values from 2007 OAP can be compared to actual 2008 values. The comparison between 2007 OAP and actual values is presented in **Table 3-2**.

Table 3-2: 2007 OAP and Actual Activity Indicators—2008

Forecast	Passenger Enplanements	Aircraft Operations	Based Aircraft
2007 OAP	40,729	51,808	239
2009 TAF	29,773	65,107	216
Difference	36.8%	-20.4%	10.8%

Source: 2009 TAF, USDOT, ODA

2007 OAP anticipated greater growth in enplanements and based aircraft than 2008 records indicate; however, 2007 OAP did not anticipate that aircraft operations at SLE would grow so quickly.

1.2.2 1998 Airport Master Plan Update

MPU-1998 has a base year of 1995, and forecasted aviation activity to 2015. MPU-1998 anticipated a 1.2 percent CAGR for aircraft operations, and a 1.4 percent CAGR for based aircraft. MPU-1998 did not forecast enplanements. Using these CAGRs, 2008 forecasts values from MPU-1998 can be compared to actual 2008 values. The comparison between MPU-1998 and actual values are presented in **Table 3-3**.

Table 3-3: MPU-1998 and Actual Activity Indicators—2008

Forecast	Aircraft Operations	Based Aircraft
MPU-1998	71,780	223
2009 TAF	64,107	216
Difference	10.2%	3.2%

Source: 2009 TAF, MPU-1998

MPU-1998 anticipated that aircraft operations and based aircraft would grow at a greater rate than actual.

1.2.3 2007 Northwest Regional Air Service Initiative

The Northwest Regional Air Service Initiative (NWRASI) analyzed the true market for scheduled commercial passenger airline service at SLE and 11 other airports. The NWRASI provides information for enplanement forecasts, and scheduled commercial passenger aircraft operations forecasts.

2. Passenger Enplanements

A *passenger enplanement* (enplanement) represents the act of a passenger boarding an aircraft. Enplanement figures are collected by the U.S. Department of Transportation (USDOT) for passengers on flights operated by scheduled commercial passenger airlines, and by non-scheduled charter flights operated by aircraft with more than 30 seats.

In 2011, national trends indicate that airlines are offering fewer flights per day on larger aircraft than before to control expenses. Concerns over the price of oil are echoed throughout airline growth projections. This concern and increased attention to maintaining profitability as the U.S. recovers from the 2008 economic recession have slowed airline expansion plans in many parts of the country. Enplanement forecasts are expected to be conservative at SLE, and across the country.

As indicated in **Chapter 1**, SLE had scheduled commercial passenger airline service between 1991 and 1998, then again from 2007 to 2008, and in 2011. The absence of scheduled commercial passenger airline service between 1999 and 2006 limits the data available to generate growth rate forecasts and socioeconomic ratios. Enplanement forecasts consider historical enplanement levels from 2007 to 2008, which are the two most recent consecutive years with scheduled commercial passenger airline service. Historical enplanements are presented in **Table 3-4**.

Table 3-4: Historical Enplanements

Year	Enplanements
2006	0
2007	12,921
2008	14,834
CAGR	15%

Source: USDOT

It is anticipated that scheduled commercial passenger airline service will return to SLE during the forecast period; however, it is not possible to identify the airlines, aircraft, and destinations. Should U.S. airlines maintain profitability experienced in 2010, they may investigate new routes or reestablish routes that were discontinued as a result of the 2008 national economic recession. Enplanement forecasts generated as part of this Plan anticipate that growth in the local and national economy will stimulate the demand for air service at SLE, and encourage scheduled commercial passenger airlines to begin operation during the forecast period.

The FAA categorizes enplanements as *air carrier* and *commuter*. *Air carrier* enplanements are those that occur on aircraft with more than 60 seats, and *commuter* enplanements are those that occur on aircraft with 60 or fewer seats. USDOT data shows 100 percent of enplanements at SLE occurred on *commuter* aircraft in 2007 and 2008. For this reason, Plan enplanement forecasts do not distinguish between *air carrier* and *commuter* enplanements until the preferred enplanement forecast is selected in **Section 2.7**.

2.1 Passenger Enplanements—2009 TAF

The 2009 TAF forecasts no growth for enplanements, and anticipates that enplanements will decline to 38 percent of 2008 levels. The enplanement forecast from the 2009 TAF is presented in **Table 3-5**.

Table 3-5: 2009 TAF Forecast

Year	Enplanements
2008	14,834
2013	5,673
2018	5,673
2023	5,673
2028	5,673
CAGR	-4.7%

Source: 2009 TAF, USDOT

In the 2009 TAF forecast, SLE would likely see limited scheduled commercial passenger airline service by an airline operating smaller aircraft than the 50-seat Bombardier CRJ-500's used by Delta Airlines at SLE between 2007 and 2008. 5,673 enplanements is comparable to a 9-seat aircraft operating an average of 2.4 departures per week at a 70 percent load factor, similar to the scheduled commercial passenger airline service offered by Seaport Airlines in 2011.

The TAF is the preferred enplanement forecast. The enplanement forecast comparison is presented in **Section 2.7**.

2.2 Passenger Enplanements—Growth Rate

The Growth Rate Forecast carries forward the 15 percent CAGR experienced by SLE between 2007 and 2008. The Growth Rate Forecast generates the highest enplanement numbers of the enplanement forecasts considered. The Growth Rate Forecast is presented in **Table 3-6**.

Table 3-6: Growth Rate Forecast

Year	Enplanements
2008	14,834
2013	29,585
2018	59,004
2023	117,677
2028	234,694
CAGR	15%

Source: USDOT

The 15 percent CAGR can be justified by the size of SLE's true market, but further analysis is necessary before the Growth Rate Forecast can be adopted. Growth rate over two years is not sufficient to project 20 years of activity. Trends observed by the Growth Rate Forecast are expanded in the Master Plan Forecast in **Section 2.6.** The Growth Rate Forecast is not the preferred enplanement forecast. The enplanement forecast comparison is presented in **Section 2.7**.

2.3 Passenger Enplanements—Population

The Population Forecast anticipates that population growth in the Salem MSA will increase the number of enplanements. The average enplanements per capita ratio was 0.04 between 2007 and 2008. This ratio has been applied to forecasts for the population of the Salem MSA. The Population Forecast is presented in **Table 3-7**.

Table 3-7: Population Forecast

Year	Salem MSA Population	Enplanements
2008	391,680	14,834
2013	417,132	14,900
2018	443,353	15,900
2023	469,942	16,800
2028	491,528	17,600
CAGR	1.1%	0.9%

Source: 2009 TAF, Woods & Poole
Operations per Capita Ratio: 0.04

The Population Forecast is not the preferred enplanement forecast. The Enplanement Forecast selection and preference is presented in **Section 2.7.**

2.4 Passenger Enplanements—Per Capita Income

SLE averaged 0.5 enplanements per dollar of average per capita income in the Salem MSA. The per capita income of the Salem MSA is anticipated to grow at a CAGR of 0.6 percent through to 2028. The Per Capita Income Forecast is presented in **Table 3-8**.

Table 3-8: Per Capita Income Forecast

Year	Per Capita Income	Enplanements
2008	$26,981	14,834
2013	$27,451	14,100
2018	$28,975	14,900
2023	$30,770	15,800
2028	$32,367	16,600
CAGR	0.9%	0.6%

Source: 2009 TAF, Woods & Poole
Enplanements per Dollar of PCI Ratio: 0.5
Currency in 2004 Dollars

Per capita income is an indicator of the economic health and stability of a community. In terms of forecasting enplanements, the Salem MSA's forecasted growth in per capita income suggests that the region will see growth in higher paying jobs, which will cause the average per capita income to tend upwards.

Higher paying jobs can be an indicator of increased disposable income in the Salem MSA, which may increase the demand for vacation and leisure travel. **Chapter 1** indicates that the fastest growing job segments in the Salem MSA include *Management* and *Professional and Technical Services.* These industries tend to involve high levels of business travel, which will further stimulate demand for scheduled commercial passenger airline service.

The Per Capita Income Forecast is not the preferred enplanement forecast. The Enplanement Forecast selection and preference is presented in **Section 2.7**.

2.5 Passenger Enplanements—Market Share

SLE averaged 40.6 enplanements per million national domestic enplanements between 2007 and 2008. This ratio is multiplied by the U.S. domestic enplanement forecast from the Aerospace Forecast to determine SLE's enplanements. The Market Share Forecast is presented in **Table 3-9**.

Table 3-9: Market Share Forecast

Year	U.S. Enplanements (Millions)	Enplanements
2008	681.3	14,834
2013	687.3	14,000
2018	777.4	15,800
2023	884.7	18,000
2028	997.9	20,300
CAGR	1.9%	1.6%

Source: FAA

The Aerospace Forecast anticipates that national domestic enplanements will grow at a CAGR of 1.6 percent through 2028. Growth in domestic enplanements is a result of economic recovery and scheduled commercial passenger airline expansion. The Market Share Forecast anticipates that this growth and recovery will be experienced in the Salem MSA, stimulating the demand for scheduled commercial passenger airline service.

The Market Share Forecast is not the preferred enplanement forecast. The Enplanement Forecast selection and preference is presented in **Section 2.7**.

2.6 Passenger Enplanements—Master Plan Forecasts

Two Master Plan enplanement forecasts are presented, based on the NWRASI. The NWRASI calculated SLE's true market, the number of potential passengers near the Airport, to be 2,451,941 passengers, and indicated that Seattle and San Francisco were the most economically viable markets for scheduled commercial passenger airline service. The true market of SLE, as identified in the NWRASI, supports enplanement growth beyond what historical trends indicate. The Master Plan forecasts generate enplanement projections by assigning load factors (the number of seats occupied versus the number of seats available) and flight frequencies to economically viable markets.

Aggressive and conservative Master Plan enplanement forecasts are generated. Enplanement levels generated by the Master Plan enplanement forecasts identify three types of scheduled commercial passenger airlines that may serve SLE: *commuter airlines* connecting to commercial hubs in the Pacific Northwest, *regional airlines* connecting to airline hubs on the west coast, and *niche market low cost carriers (NMLCC),* connecting to leisure destinations.

Commuter carrier Seaport Airlines operated scheduled commercial airline service to SLE from 2011 to 2012, using 9-seat Pilatus PC-12 aircraft. *Commuter airlines* using 9-seat aircraft can efficiently operate at SLE using existing facilities, while larger aircraft used by *regional airlines* and *NMLCCs* may require a longer runway. MPU-I provided justification for a longer runway, which is expected to be implemented in the near-term so that larger aircraft will be able to operate at SLE during the forecast period.

The underlying methodology and scenarios of the Master Plan forecasts are explained in the following sections.

2.6.1 Master Plan—Aggressive Forecast

The Master Plan—Aggressive Forecast is presented in **Table 3-10**.

Table 3-10: Master Plan—Aggressive Forecast

Year	Enplanements
2008	14,834
2013	19,900
2018	58,700
2023	96,900
2028	167,300
CAGR	13%

Source: 2009 TAF

The Master Plan—Aggressive Forecast projects *NMLCC* airlines will initiate service at SLE by 2013. *Commuter airlines* will continue to offer similar service to what began in 2011, targeting business travelers by offering multiple daily frequencies on small aircraft. *NMLCC's* generally operate few flights per week with large aircraft. This allows *NMLCCs* to operate with high load factors. The enplanement forecast for 2013 projects that a *commuter airline* will offer four flights per day on a nine-seat aircraft with a load factor of 60 percent. This generates 7,900 *commuter* enplanements. A *NMLCC* will operate two departures per week on a 150-seat aircraft, with a load factor of 80 percent. This generates 12,000 *NMLCC* enplanements.

Successful scheduled commercial passenger airline service may encourage competition. In 2018, *Commuter airline* enplanements will remain at 7,900, with 4 daily flights on a nine-seat aircraft and a 60 percent load factor. The Master Plan—Aggressive Forecast projects that a *regional airline* will return to SLE by 2018, operating two flights per day on a 50-seat aircraft, with a load factor of 70 percent. The new service generates 25,600 *regional airline* enplanements. Building on success, a *NMLCC* may add an additional destination on a 150-seat aircraft. Load factors for the two destinations remain at 80 percent, which generates 25,200 *NMLCC* enplanements on four weekly flights.

By 2023, the Master Plan—Aggressive Forecast projects that *commuter airline* operations will remain at four flights per day on nine-seat aircraft, but load factor will increase to 65 percent. The increased load factor generates 8,600 *commuter airline* enplanements. *Regional airline* operations are projected to expand to a second destination at two flights per day, maintaining 70 percent load factors on 50-seat aircraft. The additional destination generates 51,100 *regional airline* enplanements. *NMLCC* operations are projected to expand to three destinations, while maintaining two weekly flights to each on 150-seat aircraft with an 80 percent load factor. The additional destination generates 37,200 *NMLCC* enplanements.

By 2028, *commuter airlines* will transition from nine-seat aircraft to 50-seat aircraft, maintaining four daily flights and a 70 percent load factor. The increased aircraft size generates 51,100 *commuter airline* enplanements. *Regional airlines* will maintain two destinations, but increase flight frequency to three times daily to each destination. *Regional airlines* will continue to use 50-seat aircraft, with a load factor of 70 percent. The increase in flight frequencies generates 76,600 *regional airline* enplanements.

NMLCCs are often hesitant to provide too many seats in a market in the interest of keeping load factors high. The Master Plan—Aggressive Forecast projects that *NMLCCs* will continue to provide two flights per week to three destinations, using 150-seat aircraft. Load factors are projected to increase to 85 percent without the introduction of additional seats to satisfy demand. The increased load factor generates 39,600 *NMLCC* enplanements.

The Master Plan—Aggressive Forecast is not the preferred enplanement forecast. The Enplanement Forecast selection and preference is presented in **Section 2.7**.

2.6.2 Master Plan—Conservative Forecast

The Master Plan—Conservative Forecast is presented in **Table 3-11**.

Table 3-11: Master Plan—Conservative Forecast

Year	Enplanements
2008	14,834
2013	5,000
2018	17,000
2023	40,000
2028	46,000
CAGR	5.8%

Source: 2009 TAF

The Master Plan—Conservative Forecast projects that the *commuter* airlines will continue to serve SLE in 2013 with three flights per day on 9-seat aircraft, with a load factor of 60 percent. This generates 5,000 *commuter* enplanements. 2013 enplanements are lower than 2008 enplanements because the air carrier and aircraft size have changed. Enplanement levels are forecasted to meet and exceed 2008 enplanement levels by 2018.

Successful scheduled *commuter* airline service may encourage a new airline to enter the market by 2018. *Commuter airline* enplanements are expected to remain at 5,000, with three daily flights on a nine-seat aircraft with a 60 percent load factor. The Master Plan—Conservative Forecast projects that a *NMLCC* airline will initiate service at SLE by 2018, operating two flights per day on a 150-seat aircraft, with a load factor of 80 percent. The new service generates 12,000 *NMLCC* enplanements.

The Master Plan—Conservative Forecast projects that *commuter airline* operations will remain at three flights per day on nine-seat aircraft in 2023, with 5,000 forecasted enplanements. Continued success of *commuter* and *NMLCC* airlines may result in a *regional airline* initiating operations at SLE by 2023. *Regional airline* operations are projected to consist of two flights per day to one destination on a 50-seat aircraft with a load factor of 65 percent. *Regional airline* activity produces 23,000 enplanements. *NMLCC* activity remains at two weekly departures on 150-seat aircraft with an 80 percent load factor, generating 12,000 enplanements.

By 2028, *commuter airlines* will change two daily departures on 30-seat aircraft to two daily departures on 50-seat aircraft, and load factor will increase to 65 percent. The two remaining daily departures will use 30-seat aircraft at a 60 percent load factor. This will produce 36,874 enplanements. *Regional airlines* will maintain two destinations and two flights per day at an average load factor of 65 percent, which is expected to produce 34,326 enplanements. *NMLCC* activity remains at two weekly departures, generating 12,000 enplanements.

The Master Plan—Conservative Forecast is not the preferred enplanement forecast. The Enplanement Forecast selection and preference is presented in **Section 2.7**.

2.7 Passenger Enplanements—Method Comparison and Preference

The 2009 TAF, Growth Rate, Population, Per Capita Income, Market Share, Master Plan—Aggressive, and Master Plan—Conservative forecasts are reasonable projections for future enplanements at SLE.

The Population, Per Capita Income, and Market Share represent the mid-growth scenarios for enplanements at SLE. Due to the absence of enplanements between 1999 and 2006, correlation between the independent variables in these forecasts and historical enplanements is limited. Enplanement history correlated most strongly with SLE's market share with a 0.6 correlation coefficient, which indicates a positive correlation as national domestic enplanements increase, so do enplanements at SLE. The mid-growth forecasts are considered, but rejected in favor of a forecast that takes into account the Salem MSA's potential to attract air service as described by the NWRASI.

The Growth Rate, Master Plan—Aggressive, and Master Plan—Conservative forecasts represent the high-growth scenarios. The Growth Rate Forecast generated the highest enplanement numbers of the enplanement forecasts, but it is not selected as the preferred forecast. The Growth Rate Forecast does not provide enough historical contexts to be considered the preferred forecasting method. Other historically based forecasts are driven by variables with more than two years of historical records. The Growth Rate Forecast is considered when analyzing air service potential and generating the Master Plan Forecast.

The Master Plan—Aggressive, Master Plan—Conservative, and 2009 TAF Forecasts are considered for the preferred forecast. The growth rates projected by the Master Plan forecasts are supported by the true market analysis in the NWRASI. The 2007 OAP enplanement forecast projected a CAGR of 2.8 percent for SLE from 2005 to 2025, which would produce 111,500 enplanements in 2028. The Master Plan-Aggressive forecasts exceed the 2007 OAP, but are closer to the 2007 OAP projection than the mid-growth scenarios. The Master Plan forecasts do not project enplanements based on past trends.

The Master Plan—Conservative Forecast projects slower enplanement growth than the Master Plan—Aggressive forecast because it accounts for the existing and forecasted conservative nature of the scheduled commercial passenger airline industry. The Master Plan—Aggressive forecast is supported by the NWRASI, but it is expected that the Master Plan—Conservative Forecast better reflects airline optimism for network expansion. Unlike trend-based forecasting methodologies that assume no change in facilities, the Master Plan—Conservative Forecast includes proposed runway and airport facility improvements that are expected to attract interest of passenger airlines.

The Master Plan—Aggressive and Master Plan—Conservative forecasts are projections of what could happen if scheduled commercial passenger airline service returns and grows at SLE; however, due to the absence of historical supporting data, they are not the preferred enplanement forecasts.

The 2009 TAF forecasts low growth, but given what information is known about existing scheduled commercial passenger airline service potential at SLE, it is the preferred forecast. The 2009 TAF forecast reflects the fleet and frequency types of airlines that have been inquiring about offering scheduled commercial passenger airline service to SLE, including operators of 9-seat aircraft conducting short-haul flights to larger metropolitan areas in the Pacific Northwest.

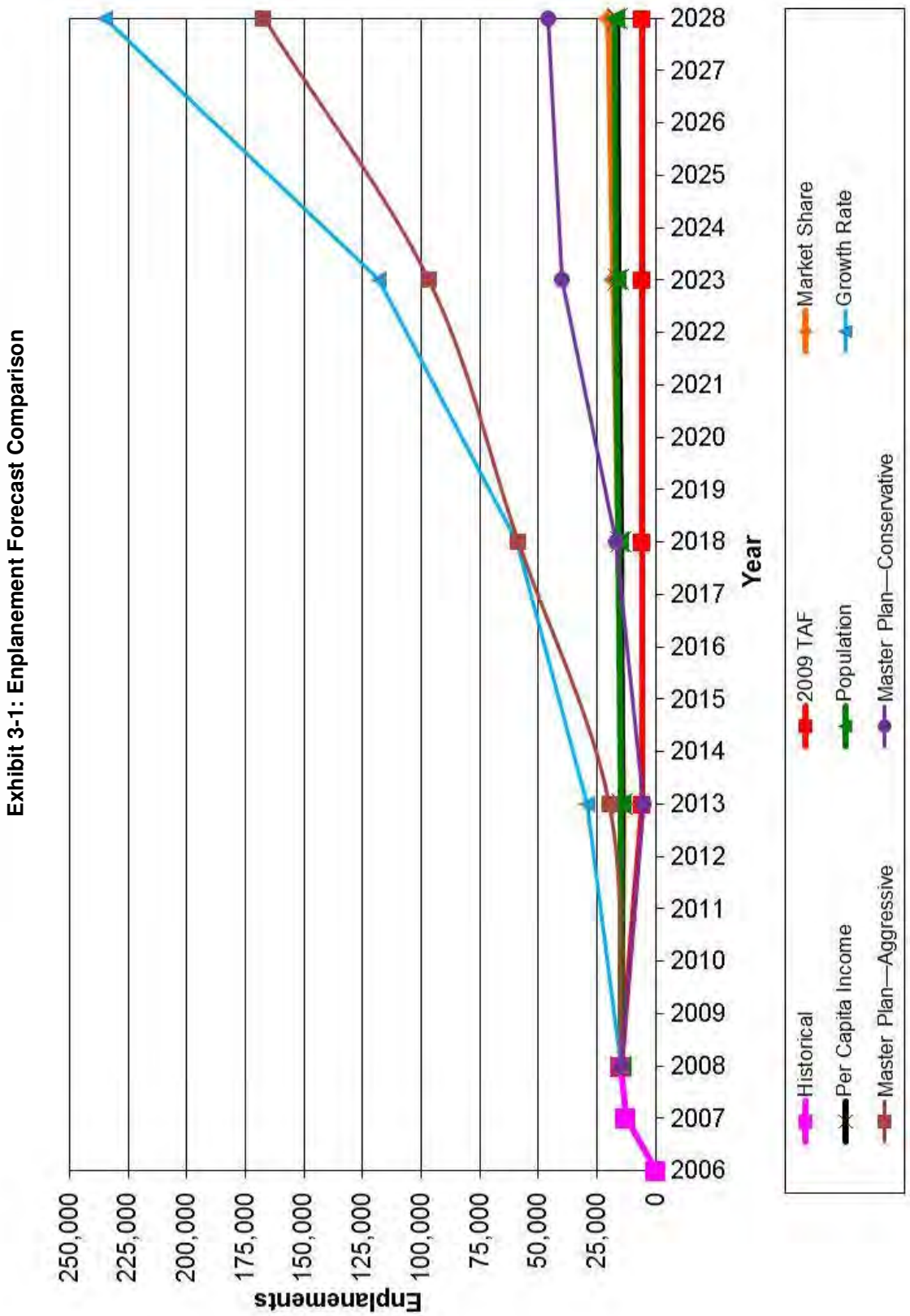
Enplanement forecasts are presented in **Table 3-12**, and shown in **Exhibit 3-1**.

Table 3-12: Passenger Enplanement Forecast Comparison

Year	2009 TAF	Growth Rate	Population	Per Capita Income	Market Share	Master Plan—Aggressive	Master Plan—Conservative
2008	14,834	14,834	14,834	14,834	14,834	14,834	14,834
2013	5,673	29,600	14,900	14,100	14,000	19,900	5,000
2018	5,673	59,100	15,900	14,900	15,800	58,700	17,000
2023	5,673	118,000	16,800	15,800	18,000	96,900	40,000
2028	5,673	235,000	17,600	16,600	20,300	167,300	46,000
CAGR	-4.7%	15%	0.9%	0.6%	1.6%	13%	5.8%

Source: 2009 TAF, USDOT, Woods & Poole

Exhibit 3-1: Enplanement Forecast Comparison



3. Aircraft Operations

An aircraft operation (operation) is a take-off, landing, missed approach, or a touch-and-go. Operations are classified as *local*, where the aircraft stays in the vicinity of the airport, and *itinerant*, where the aircraft takes off from or lands at another airport. The Operations Forecast includes *commercial operations*, conducted by scheduled commercial passenger airline or scheduled commercial cargo airlines; *GA operations*, conducted on a non-scheduled, or for-hire basis; and *military operations*, which are those conducted under the authority of the U.S. Department of Defense.

3.1 Scheduled Commercial Operations

Scheduled commercial operations include scheduled commercial passenger airline operations, and scheduled commercial air cargo airline operations. Non-scheduled, or on-demand flights are considered GA operations, forecasted in **Section 3.2.**

SLE had scheduled commercial passenger airline operations from 2007 to 2008, and again in 2011. SLE has existing scheduled commercial air cargo operations. It is anticipated that scheduled commercial passenger airline operations will return to SLE during the 20-year planning period, and scheduled commercial air cargo operations will continue. Scheduled commercial operations are based on the number provided by the 2009 TAF. The Scheduled Commercial Operations Forecast is presented in **Table 3-13**.

Table 3-13: Scheduled Commercial Operations Forecast

TAF Classification	Typical Aircraft	2008	2013	2018	2023	2028
Air Taxi	Pilatus PC-12	1,702	1,875	2,123	2,401	2,715
Air Carrier	Boeing MD-83	20	17	17	17	17
Total Operations		1.722	1,902	2,140	2,418	2,732

Source: FAA

3.2 GA Operations

GA operations represented 90 percent of the 65,107 operations at SLE in 2008. It is anticipated that GA will remain the primary source of aircraft operations at SLE for the 20-year planning period. The GA operations forecasts build upon the operations forecast produced during MPU-I. The MPU-I forecast provides a detailed look at operations by critical aircraft, but does not include smaller aircraft that make up a large portion of SLE's operations. Historical itinerant and local GA operations are presented in **Table 3-14**.

Table 3-14: Historical GA Operations

Year	Itinerant	Local	Operations
2003	28,825	15,014	43,839
2004	26,217	13,907	40,124
2005	29,184	14,294	43,478
2006	30,661	26,519	57,180
2007	35,282	55,985	91,267
2008	27,322	31,046	58,368
CAGR	-1.1%	16%	5.9%

Source: 2009 TAF

Growth in GA operations between 2003 and 2008 can be attributed to growth in local operations. 2007 saw GA operations increase by 34,087 due to a helicopter pilot training center at SLE. The helicopter pilot training center went out of business in 2008, and operations returned to a more moderate growth rate. The CAGR between 2003 and 2008 is 5.9 percent.

GA operations forecast methodologies include those based on historical performance (Growth Rate, Operations per Based Aircraft), those based on socioeconomic forecasts (Per Capita Income, Population), and those based on national FAA forecasts (TAF, Market Share, Aerospace Forecast).

3.2.1 GA Operations—MPU-I

The MPU-I Forecast included activity projections for the critical design aircraft at SLE, which are business jets with an airport reference code of C-II. These aircraft are the most demanding aircraft that operate at SLE, and were used to evaluate the need for a runway extension at the Airport. Critical design aircraft operations forecasts generated in MPU-I are included in the following GA operations forecasts. The MPU-I Critical Design Aircraft Operations Forecast is included in **Table 3-15**.

Table 3-15: MPU-I Critical Design Aircraft Operations Forecast

Year	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Operations
	75% of Fleet	Remaining 25% of Fleet		
2008	1,358	272	52	1,682
2013	1,460	288	54	1,802
2018	1,664	306	62	2,032
2028	2,112	344	76	2,532
CAGR	2.2%	1.2%	1.9%	2.1%

Source: MPU-I

3.2.2 GA Operations—2009 TAF

The 2009 TAF forecasts growth in GA operations. The type of GA operations shifts in the 2009 TAF, going from a higher number of local operations to similar itinerant and local operations. The 2009 TAF is presented in **Table 3-16**.

Table 3-16: GA Operations—2009 TAF

Year	Itinerant	Local	Operations
2008	27,322	31,046	58,368
2013	25,703	25,300	51,003
2018	27,704	27,403	55,107
2023	29,860	29,680	59,540
2028	32,184	32,147	64,331
CAGR	0.8%	0.2%	0.5%

Source: 2009 TAF

The TAF is not the preferred GA operations forecast. The GA Operations Forecast selection and preference is presented in **Section 3.2.9**.

3.2.3 GA Operations—Growth Rate

The Growth Rate Forecast carries forward the historical growth rates of local and itinerant operations. The Growth Rate Forecast is presented in **Table 3-17**.

Table 3-17: GA Operations—Growth Rate

Year	Itinerant	Local	Operations
2008	27,322	31,046	58,368
2013	26,000	65,000	91,000
2018	25,000	133,000	158,000
2023	24,000	275,000	299,000
2028	23,000	568,000	591,000
CAGR	-0.9%	16%	12.3%

Source: 2009 TAF

The Growth Rate Forecast produces a high number of local operations because the application of local GA operations historical 16 percent CAGR. This rate of growth and the number of aircraft operations are unsustainable.

The Growth Rate forecast is not the preferred GA operations forecast and has been eliminated from further consideration. The GA Operations Forecast selection and preference is presented in **Section 3.2.9.**

3.2.4 GA Operations—Operations per Based Aircraft

The Operations per Based Aircraft (OPBA) Forecast correlates GA operations to the number of based aircraft at SLE. The OPBA ratio is found by dividing annual GA operations by the number of based aircraft at SLE. SLE had an average of 253.1 OPBA between 2003 and 2008. This ratio uses the preferred based aircraft forecast, found in **Section 4.8**, to forecast GA operations. The OBPA Forecast is presented in **Table 3-18**.

Table 3-18: GA Operations—OPBA

Year	Based Aircraft	Operations
2008	216	58,368
2013	240	61,000
2018	250	64,000
2023	260	66,000
2028	270	69,000
CAGR	1.1%	0.8%

Source: 2009 TAF
OPBA Ratio: 253.1

The OPBA Forecast anticipates a 0.8 percent CAGR in GA operations between 2008 and 2028. GA operations grow more slowly than the preferred based aircraft forecast because the OPBA ratio is skewed by a high number of GA operations in 2007, the result of a spike caused by flight training. Flight training declined after 2008 due to the national economic recession.

The OPBA Forecast is not the preferred GA operations forecast. The GA Operations Forecast selection and preference is presented in **Section 3.2.9**.

3.2.5 GA Operations—Population

The Population Forecast correlates GA operations with the population of the Salem MSA. The Population Forecast is a result of the GA operations per capita ratio, which is found by dividing the number of GA operations by the population of the Salem MSA. The operations per capita ratio was 0.2 between 2003 and 2008. This ratio is multiplied by Salem MSA population forecasts to provide the number of GA operations. The Population Forecast is presented in **Table 3-19**.

Table 3-19: GA Operations—Population

Year	Salem MSA Population	Operations
2008	391,680	58,368
2013	417,132	62,000
2018	443,353	66,000
2023	469,942	70,000
2028	491,528	73,000
CAGR	1.1%	1.1%

Source: 2009 TAF, Woods & Poole
GA operations per Capita Ratio: 0.2

The Population Forecast anticipates a 1.1 percent CAGR in GA operations between 2008 and 2028. The Population Forecast does not imply that new residents in the Salem MSA will increase the number of GA operations, but population growth is generally indicative of economic growth, which may increase GA operations.

The Population Forecast is not the preferred GA operations forecast. The GA Operations Forecast selection and preference is presented in **Section 3.2.9**.

3.2.6 GA Operations—Per Capita Income

The Per Capita Income (PCI) Forecast correlates GA operations with PCI in the Salem MSA. The PCI ratio was an average of 2.1 between 2003 and 2008. The PCI Forecast is presented in **Table 3-20**.

Table 3-20: GA Operations—PCI

Year	Per Capita Income	Operations
2008	$26,981	58,368
2013	$27,451	57,000
2018	$28,975	60,000
2023	$30,770	64,000
2028	$32,367	67,000
CAGR	0.9%	0.7%

Source: 2009 TAF, Woods & Poole
Operations per Dollar of PCI Ratio: 2.1
Currency in 2004 Dollars

The PCI Forecast anticipates that GA operations at SLE will grow at a CAGR of 0.7 percent between 2008 and 2028. Comparing growth in GA operations to growth in PCI does not imply that increased disposable income as a result of an increased in PCI will be spent on GA activity. Instead, the PCI Forecast anticipates that the increase in PCI relates to economic growth, which may increase GA operations.

The PCI Forecast is not the preferred GA operations forecast. The GA Operations Forecast selection and preference is presented in **Section 3.2.9**.

3.2.7 GA Operations—Market Share

The Market Share Forecast correlates GA operations at SLE with national GA operations from the Aerospace Forecast. SLE's market share was an average of 1.7 GA operations per 1,000 national GA operations between 2003 and 2008. The Market Share Forecast is presented in **Table 3-21**.

Table 3-21: GA Operations—Market Share

Year	National GA Operations (Thousands)	Operations
2008	31,688.0	58,368
2013	28,120.2	47,000
2018	29,954.4	50,000
2023	31,945.4	54,000
2028	34,140.3	57,000
CAGR	0.37%	-0.12%

Source: FAA
Average Market Share: 1.7/1,000

The Market Share Forecast anticipates a decline in GA operations at SLE between 2008 and 2013, then growth. Unlike in the Aerospace Forecast, 2028 GA operations at SLE do not exceed 2008 GA operations. The market share ratio was skewed by the spike in SLE's low market share between 2003 and 2006, which averaged 1.2 GA operations per 1,000 national GA operations between 2003 and 2005. SLE's market share between 2006 and 2008 was 2.1 GA operations per 1,000 national GA operations.

The Market Share Forecast is not the preferred GA operations forecast. The GA Operations Forecast selection and preference is presented in **Section 3.2.9**.

3.2.8 GA Operations—Aerospace Forecast

The Aerospace Forecast is not impacted by historical trends at SLE, but instead forecasts based on FAA forecasts. The Aerospace Forecast anticipates that national itinerant GA operations will grow at a CAGR of 1.3 percent between 2010 and 2020, and at a CAGR of 1.1 percent between 2020 and 2030. The Aerospace Forecast anticipates that national local GA operations will grow at a CAGR of 1.2 percent between 2010 and 2020, and at a CAGR of 1.1 percent between 2020 and 2030. The CAGRs are applied to SLE's 2008 base year to forecast GA operations. The Aerospace Forecast is presented in **Table 3-22**.

Table 3-22: GA Operations—Aerospace Forecast

Year	Itinerant	Local	Operations
2008	27,322	31,046	58,368
2013	30,000	33,000	63,000
2018	32,000	35,000	67,000
2023	33,000	37,000	70,000
2028	35,000	39,000	74,000
CAGR	1.2%	1.2%	1.1%

Source: FAA

The Aerospace Forecast anticipates that the recovery of national GA operations will be led by itinerant operations. It is anticipated that many GA operations will be conducted by business travelers whose needs cannot be met by commercial aviation. The Aerospace Forecast anticipates that total GA operations will increase at a CAGR of 1.1 percent between 2008 and 2028. Local GA operations will remain the dominant category despite the higher growth rate of itinerant GA operation between 2010 and 2020.

The Aerospace Forecast is the preferred GA operations forecast. The GA Operations Forecast selection and preference is presented in **Section 3.2.9**.

3.2.9 GA Operations—Method Comparison and Preference

GA operations forecasts are presented in **Table 3-23**, and shown in **Exhibit 3-2**. The Growth Rate Forecast represents the high-growth scenario and is eliminated from further consideration. The OPBA, Population, PCI, and Aerospace forecasts represent the mid-growth scenarios, and are retained for further analysis. The TAF and Market Share Forecasts anticipate an initial decline in GA operations. The TAF returns to growth by 2028 but the Market Share Forecast does not exceed 2008 GA operations levels during the 20-year forecast period. The TAF and Market Share forecasts are the low-growth scenarios, and are not the preferred forecast.

The two historical variables that create the OPBA forecasts, GA operations and based aircraft, have a correlation coefficient of -0.4. This is not a strong correlation coefficient, indicating that there are likely other variables that have a greater impact on GA operations than the number of based aircraft at SLE. GA operations at SLE were highly influenced by the presence of flight training, as seen by the spike in local operations in 2007. This spike further distorts the OPBA ratio. For these reasons, the OPBA Forecast is not the preferred forecast.

Growth in the population of the Salem MSA and growth in GA operations at SLE have a correlation coefficient of 0.7, which is considered high. This suggests that growth in the population of the Salem MSA and growth in GA operations have been related historically, but it does not indicate that population growth causes growth in GA operations.

The variables in the PCI Forecast, PCI and GA operations, have a correlation coefficient of 0.3, which is considered low. The likely cause of this is that the PCI of the Salem MSA and GA operations have alternated between growth and decline at different years from one another. Although both variables show growth between 2003 and 2008, GA operations grew consistently during this period while PCI fluctuated.

The Aerospace Forecast does not consider historical GA operations, but instead analyzes growth in other sectors of the U.S. economy to project the future of GA operations in the U.S. The Aerospace Forecast has national perspective that is insensitive to local factors influencing GA operations. In the case of SLE, the growth expected in the population and PCI socioeconomic variables support the findings of the Aerospace Forecast.

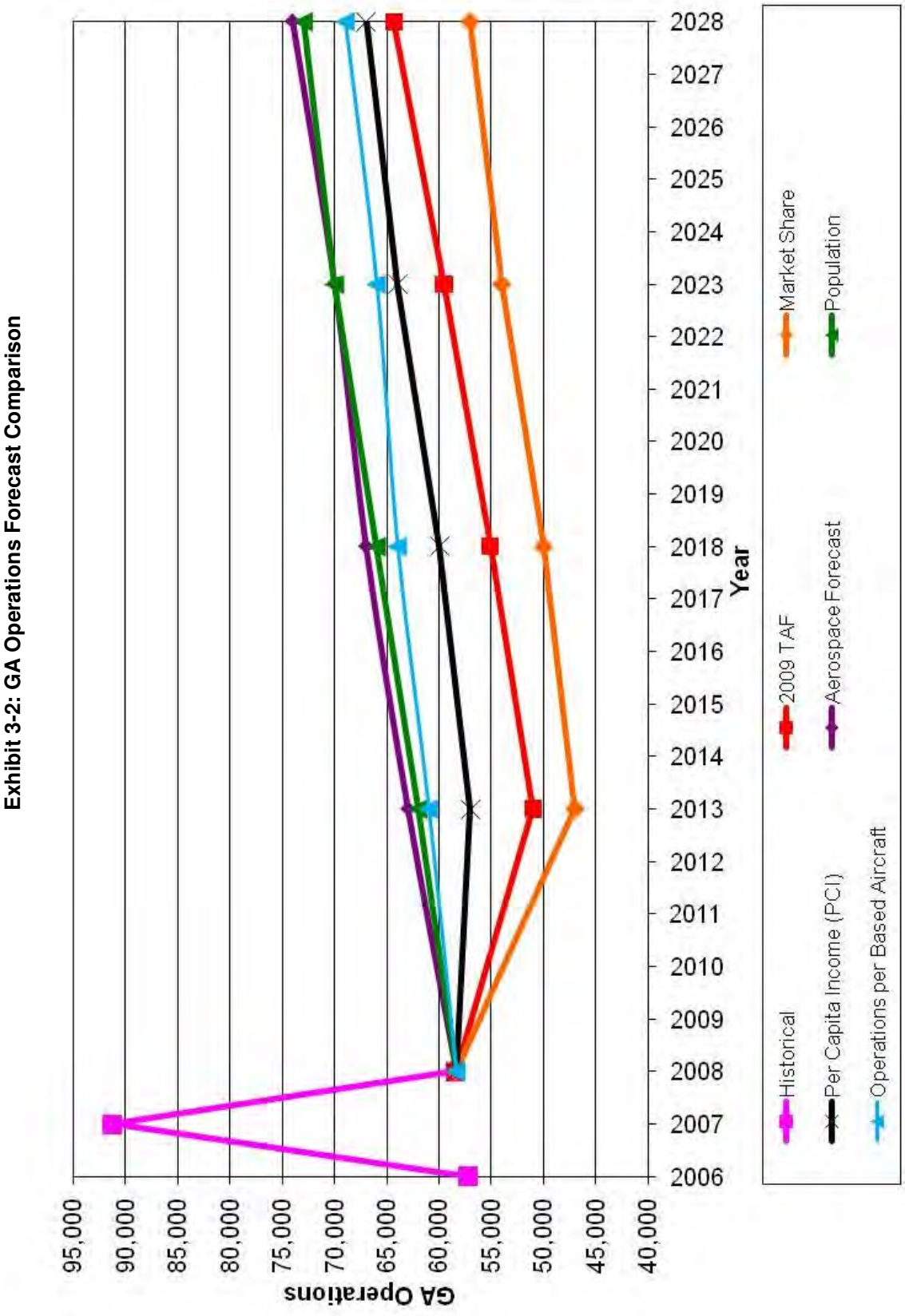
The Preferred GA Operations Forecast is the Aerospace Forecast. Although the Population Forecast shows strong correlation with GA operations, it is unlikely that growth in population alone will generate more GA operations. The Aerospace Forecast represents the FAA's projection of national GA operations, which takes into account growth in several areas of the U.S. economy. Socioeconomic forecasts for the Salem MSA reflect similar growth, which supports the Aerospace Forecast.

Compared to the preferred forecast, the 2007 OAP growth rate for GA operations at SLE was 2.1 percent. By 2028, the 2007 OAP GA Operations Forecast forecasts 69,940 GA operations.

Table 3-23: GA Operations Forecast Comparison						
Year	**TAF**	**OPBA**	**Population**	**PCI**	**Market Share**	**Aerospace**
2008	58,368	58,368	58,368	58,368	58,368	58,368
2013	51,003	61,000	62,000	57,000	47,000	63,000
2018	55,107	64,000	66,000	60,000	50,000	67,000
2023	59,540	66,000	70,000	64,000	54,000	70,000
2028	64,331	69,000	73,000	67,000	57,000	74,000
CAGR	0.5%	0.8%	1.1%	0.7%	-0.1%	1.1%

Source: 2009 TAF, FAA, Woods & Poole

Exhibit 3-2: GA Operations Forecast Comparison



3.3 Military Operations

Decisions made by the U.S. Department of Defense, and not socioeconomic activities, drive military operations. Military operations plans are not public information; therefore the 2009 TAF is used as the preferred forecast for military operations. The Military Operations Forecast is presented in **Table 3-24**.

Table 3-24: Military Operations

Year	Itinerant Military	Local Military	Total Military
2008	3,404	1,633	5,037
2013	1,773	606	2,379
2018	1,773	606	2,379
2023	1,773	606	2,379
2028	1,773	606	2,379
CAGR	-3.2%	-4.8%	3.7%

Source: 2009 TAF

3.4 Preferred Operations Forecast

The preferred operations forecasts are combined, and presented in the same format at the TAF. The TAF does not have a category for scheduled cargo operations, so scheduled cargo operations are combined with itinerant commuter operations. The Preferred Operations Forecast is presented in **Table 3-25**.

Table 3-25: Preferred Operations Forecast

Year	Itinerant Air Carrier	Itinerant Air Taxi	Itinerant GA	Itinerant Military	Local GA	Local Military	Total
2008	20	1,702	27,322	3,404	31,046	1,633	65,127
2013	17	1,875	30,000	1,773	33,000	606	67,271
2018	17	2,123	32,000	1,773	35,000	606	71,519
2023	17	2,401	33,000	1,773	37,000	606	74,797
2028	17	2,715	35,000	1,773	39,000	606	79,111
CAGR	-0.8%	2.4%	1.2%	-3.2%	1.2%	-4.8%	1.0%

4. Based Aircraft

Based aircraft represent those that hangar and tie-down at SLE. Based aircraft counts come from the 2009 TAF and MPU-I. The TAF categorizes base aircraft as *single-engine, multi-engine, jet, helicopter,* and *other. Single-* and *multi-engine* aircraft include propeller-driven turbine and piston aircraft; *jet* aircraft include those with turbine jet engines; *helicopter* includes rotorcraft; and *other* includes gliders and hot air balloons. 2003 to 2007 based aircraft counts come from the 2009 TAF. 2008 based aircraft counts come from MPU-I. Historical based aircraft are presented in **Table 3-26**.

Table 3-26 Historical Based Aircraft

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2003	160	18	3	4	23	208
2004	178	23	4	4	23	232
2005	178	23	4	4	23	232
2006	178	23	4	4	23	232
2007	152	21	9	10	20	212
2008	153	21	12	11	19	216
CAGR	0.7%	3.1%	32%	22%	-3.8%	0.8%

Source: 2009 TAF, MPU-I

The fastest growing based aircraft categories are *jet* and *helicopter* traffic. *Single-* and *multi-engine* aircraft show moderate growth, and *other* aircraft have declined at 3.8 percent since 2003.

In 2008, *single-engine* represented 70.8 percent of the SLE fleet, *multi-engine* represented 9.7 percent, *jet* represented 5.6 percent, *helicopters* represented 5.1 percent, and *other* represented 8.8 percent. These proportions are maintained for the forecast methods with the exception of the 2009 TAF and Aerospace Forecast.

4.1 Based Aircraft—2009 TAF

The 2009 TAF forecasts growth in based aircraft. *Helicopter* and *Other* aircraft have the highest CAGRs at 1.2 percent, and *Jet* aircraft decline before returning to 2008 levels in 2028, resulting in no growth. The 2009 TAF is presented in **Table 3-27**.

Table 3-27: 2009 TAF Based Aircraft

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2008	153	21	12	11	19	216
2013	160	20	9	11	21	221
2018	171	21	10	14	22	238
2023	181	22	11	14	23	251
2028	191	23	12	14	24	264
CAGR	1.1%	0.5%	0%	1.2%	1.2%	1%

Source: 2009 TAF, MPU-I

The TAF is not the preferred based aircraft forecast. The Based Aircraft Forecast selection and preference is presented in **Section 4.7**.

4.2 Based Aircraft—Growth Rate

The Growth Rate Forecasts carries forward the historical growth rates of the based aircraft categories. The Growth Rate Forecast is presented in **Table 3-28**.

Table 3-28: Growth Rate Based Aircraft

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2008	153	21	12	11	19	216
2013	146	25	48	30	16	265
2018	140	29	192	83	13	457
2023	134	33	768	229	11	1,175
2028	128	39	3,072	629	9	3,877
CAGR	-0.9%	3.1%	32%	22%	-3.8%	16%

Source: 2009 TAF, MPU-I

The Growth Rate Forecast produces high *jet* and *helicopter* forecasts. Total based aircraft grow by 16 percent, and total based aircraft reach 3,877 in the forecast period, which is 1.4 percent of the U.S. GA fleet for 2028, according to the Aerospace Forecast. This growth is seen as unsustainable for a 20-year forecast period.

The Growth Rate Forecast is not the preferred forecast, and is dismissed from further consideration.

4.3 Based Aircraft—Population

The Population Forecast anticipates that based aircraft will increase with the population of the Salem MSA. The Population Forecast is a result of the based aircraft per 1,000 residents ratio, found by dividing the number of based aircraft by every 1,000 people living in the Salem MSA. Between 2003 and 2008, the average ratio was 0.6 based aircraft per 1,000 residents of the Salem MSA. This ratio is multiplied by Salem MSA population forecasts from Woods & Poole to forecast the number of based aircraft. The Population Forecast is presented in **Table 3-29**.

Table 3-29: Population Based Aircraft

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2008	153	21	12	11	19	216
2013	191	26	15	14	24	270
2018	205	28	16	15	26	290
2023	213	29	17	15	26	300
2028	227	31	18	16	28	320
CAGR	2%	2%	2%	2%	2%	2%

Source: 2009 TAF, MPU-I, Woods & Poole
Based Aircraft per 1,000 residents ratio: 0.6

The Population Forecast anticipates a 2 percent CAGR in based aircraft between 2008 and 2028. The historical correlation coefficient between the Salem MSA population and SLE based aircraft is -.2, which is considered low. Based aircraft at SLE have been decreasing since 2004, while population has been growing.

The Population Forecast is not the preferred based aircraft forecast. The Based Aircraft Forecast selection and preference is presented in **Section 4.7**.

4.4 Based Aircraft—Per Capita Income

The Per Capita Income (PCI) Forecast anticipates that based aircraft will increase with the PCI in the Salem MSA. The PCI Forecast is a result of the based aircraft per 1,000 dollars of PCI in the Salem MSA, which was an average of 8.6 between 2003 and 2008. The PCI Forecast is presented in **Table 3-30**.

Table 3-30: Per Capita Income Based Aircraft

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2008	153	21	12	11	19	216
2013	156	21	12	11	19	220
2018	170	23	13	12	21	240
2023	177	24	14	13	22	250
2028	184	25	14	13	23	260
CAGR	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%

Source: 2009 TAF, MPU-I, Woods & Poole
Based Aircraft per $1,000 of PCI ratio: 8.6

The PCI forecast anticipates a 0.9 percent CAGR in based aircraft between 2008 and 2028. The historical correlation coefficient between the Salem MSA PCI and SLE based aircraft is -0.6, which is considered moderate. Based aircraft at SLE have been decreasing since 2004, while PCI has been growing.

The PCI Forecast is not the preferred based aircraft forecast. The Based Aircraft Forecast selection and preference is presented in **Section 4.7**.

4.5 Based Aircraft—Market Share

The Market Share Forecast anticipates that based aircraft at SLE will maintain a fixed share of national based aircraft fleet. SLE's market share was an average of 1.7 GA operations per 1,000 national GA operations between 2003 and 2008. The Market Share Forecast is presented in **Table 3-31**.

Table 3-31: Market Share Based Aircraft

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2008	153	21	12	11	19	216
2013	170	23	13	12	21	240
2018	177	24	14	13	22	250
2023	184	25	14	13	23	260
2028	191	26	15	14	24	270
CAGR	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%

Source: FAA, MPU-I

The Market Share Forecast anticipates a 1.1 percent CAGR between 2008 and 2028. The historical correlation coefficient between the SLE based aircraft fleet and the national GA fleet was 0.4, which is considered low. The national GA fleet decreased in 2005 and 2008 versus the previous year, and SLE's based aircraft fleet has been decreasing since 2005.

The Market Share Forecast is the preferred based aircraft forecast. The Based Aircraft Forecast selection and preference is presented in **Section 4.7**.

4.6 Based Aircraft—Aerospace Forecast

The Aerospace Forecast is not impacted by historical trends at SLE, and instead forecasts based on FAA forecasts. Growth rates for each aircraft category are presented for two intervals: 2010 to 2020, and 2020 to 2030. The Aerospace Forecast applies the FAA growth rates to the based aircraft fleet at SLE. The Aerospace Forecast is presented in **Table 3-32**.

Table 3-32: Aerospace Forecast Based Aircraft

Year	Single-Engine	Multi-Engine	Jet	Helicopter	Other	Total
2008	153	21	12	11	19	216
2013	156	21	15	13	19	224
2018	160	22	18	15	19	234
2023	172	22	22	17	19	252
2028	179	22	27	19	19	267
CAGR	0.8%	0.3%	4.2%	2.8%	-0.1%	1.1%

Source: FAA, MPU-I

The Aerospace forecast anticipates that *jet* aircraft will see the highest rate of growth. This is supported by anticipation that business travel will be the fastest GA sector to recover from the 2008 economic recession. *Helicopters* are also expected to be bolstered by the demand for business travel. Recreational aircraft in the *other* category expect a modest decline nationwide. *Single-* and *multi-engine* aircraft are expected to grow more quickly between 2020 and 2030 than between 2010 and 2020.

The Aerospace Forecast is not the preferred based aircraft forecast. The Based Aircraft Forecast selection and preference is presented in **Section 4.7**.

4.7 Based Aircraft—Method Comparison and Preference

The Growth Rate forecast has been removed from further consideration. The remaining based aircraft forecasts are presented in **Table 3-33**, and shown in **Exhibit 3-3**. The Growth Rate Forecast represents the high-growth scenario and is eliminated from further consideration. The Population Forecast represents the mid-growth scenario, and the other forecasts represent the low-growth scenarios. The mid- and low-growth scenarios are considered for the preferred forecast.

Growth in the population of the Salem MSA and growth in SLE's based aircraft fleet have a historical correlation coefficient of -0.2, which is considered low. This suggests that fluctuation in the population of the Salem MSA and SLE's based aircraft fleet are not impacted by the same variables, and are not likely related. The forecasted growth in local population indicates that the Salem MSA may see growth in other economic indicators which may increase the demand for private aircraft; however, the correlation coefficient suggests that demand will not be purely based on population.

Growth in PCI and growth in SLE's based aircraft fleet have a correlation coefficient of -0.6, which is considered moderate. Both PCI and based aircraft have fluctuated between growth and decline, but not during the same year. Between 2003 and 2008, when PCI changed, the number of based aircraft changed in a similar manner one to two years later. This indicates that these variables may be related, either directly or through a third variable. A decline in average PCI indicates a loss of high-paying jobs, or the addition of lower-paying jobs. If the decline in PCI is caused by the loss of high-paying jobs, economic conditions may have forced aircraft owners to sell their aircraft or relocate to another airport.

The variables of the Market Share Forecast have a correlation coefficient of 0.4, which is considered low. The national GA fleet has been growing annually since 2003 while SLE saw a decline in the number of based aircraft in 2006. Although SLE has been regaining market share, the 2006 decline has reduced the average carried forward in the Market Share Forecast. Although the minor decline reduced SLE's average Market Share, the Market Share Forecast is still trending up.

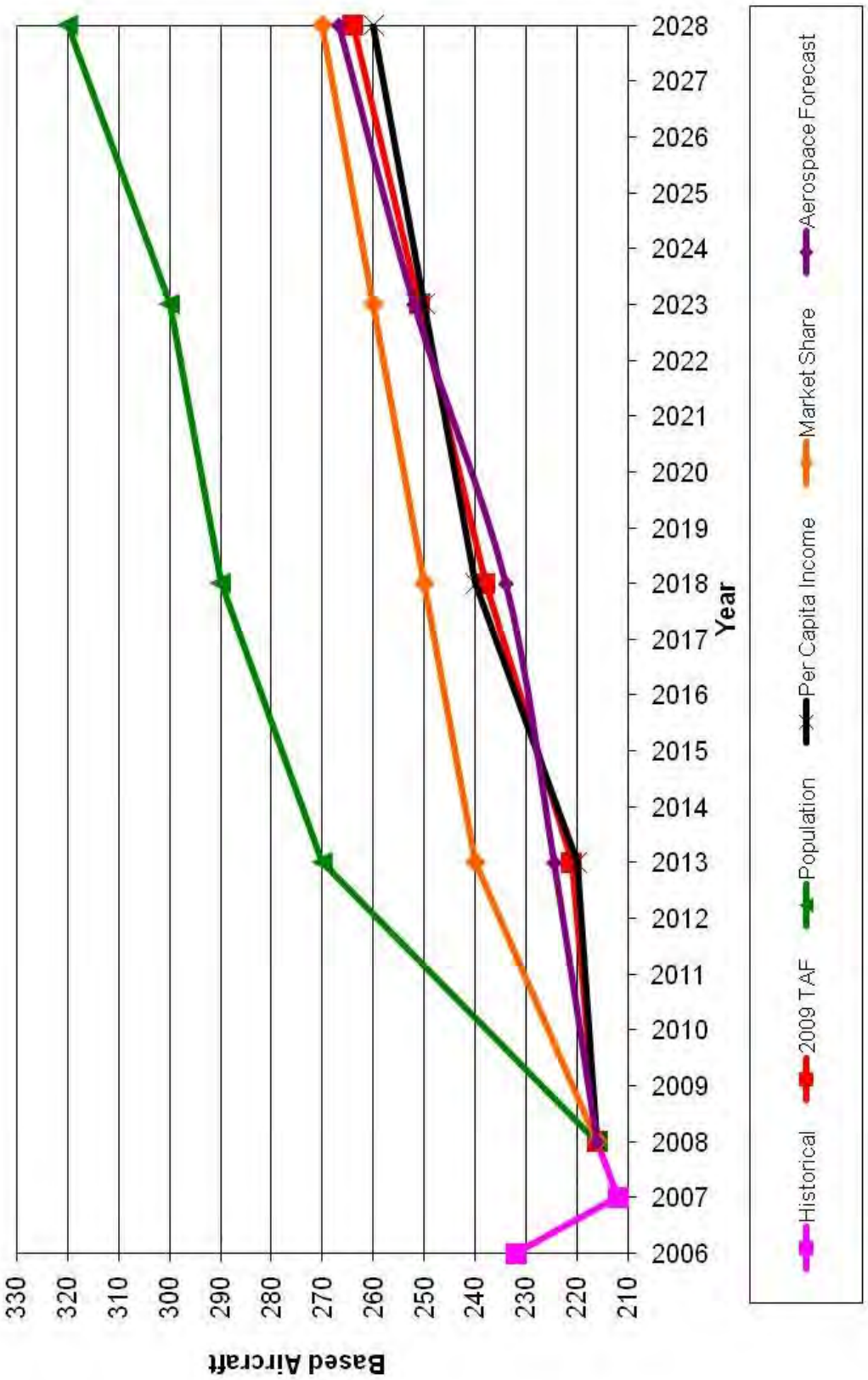
The Aerospace Forecast analyzes each aircraft category as opposed to the fleet as a whole. The Aerospace Forecast reflects FAA expectations that business GA, led by *jet* and *helicopter* traffic, will recover more quickly than the remaining categories of GA. The Aerospace Forecast is unaffected by fluctuations in SLE's GA fleet, which impact the remaining forecasts. The Aerospace Forecast does not take into account SLE's market share, which is an indicator of local and national competition for based aircraft.

The Market Share Forecast is the Preferred Based Aircraft Forecast. The Market Share Forecast considers what percentage of the GA fleet SLE will capture in relation to competing airports, while taking into account FAA forecasts pertaining to the future of the national GA fleet. The 1.1 percent CAGR of the Market Share Forecast matches the 2007 OAP based aircraft forecast for SLE.

Table 3-33: Based Aircraft Forecast Comparison

Year	2009 TAF	Population	PCI	Market Share	Aerospace
2008	216	216	216	216	216
2013	221	270	220	240	224
2018	238	290	240	250	234
2023	251	300	250	260	252
2028	264	320	260	270	267
CAGR	1%	2%	0.9%	1.1%	1.1%

Exhibit 3-3: Based Aircraft Forecast Comparison



5. Air Cargo

Air cargo transports goods and mail to Salem. FedEx, with flights operated by Empire Airlines, is SLE's scheduled cargo carrier with a dedicated cargo facility at the Airport. The facility processes freight and mail. Charter cargo carrier Ameriflight carries air cargo as needed for UPS. Charter cargo carriers are not required to report cargo volume to the USDOT. The FAA classifies air cargo as *mail* or *freight*, and tracks cargo volume in pounds. Mail is transported in an arrangement between the U.S. Postal Service and FedEx. Scheduled commercial passenger airlines transport some cargo, but volumes have dropped nationwide due to increased security screening requirements.

Air Cargo volumes between 2003 and 2008 are considered in the forecasting process and presented in **Table 3-34**.

Table 3-34: Historical Air Cargo Volume

Year	Pounds Inbound	Pounds Outbound	Pounds
2003	49,840	149,544	199,384
2004	55,229	154,610	209,839
2005	78,034	232,222	310,256
2006	138,838	431,458	570,296
2007	127,205	475,919	603,124
2008	23,190	374,317	397,507
CAGR	-14%	20%	15%

Source: *USDOT*

Between 2003 and 2008, SLE shipped more cargo than it received. This is partially due to FedEx's route structure where air cargo from smaller Oregon communities is consolidated at SLE before going to FedEx's Portland hub. It is anticipated that cargo volume will be similarly split in the future. Air cargo is forecasted for inbound and outbound volume.

5.1 Air Cargo—Growth Rate

The Growth Rate Forecasts carries forward the historical cargo volume growth rate. The Growth Rate Forecast is presented in **Table 3-35**.

Table 3-35: Air Cargo—Growth Rate

Year	Pounds
2008	397,507
2013	793,000
2018	1,580,000
2023	3,150,000
2028	6,281,000
CAGR	15%

Source: *USDOT*

The Growth Rate Forecast produces a high volume of air cargo. It is unlikely that the Salem MSA can sustain this type of cargo volume, which would be common at a minor FedEx hub airport.

The Growth rate forecast is not the preferred forecast, and is dismissed from further consideration.

5.2 Air Cargo—Gross Regional Product

The Gross Regional Product (GRP) Forecast anticipates that cargo volume will increase with the GRP of the Salem MSA. The GRP Forecast is a result of the pounds of cargo per million dollars of GRP ratio, which is found by dividing the historical cargo volume by the Salem MSA's GRP, measured in millions of 2004 dollars. Between 2003 and 2008, the average ratio was 33.47 pounds of per million dollars in GRP. This ratio is multiplied by the Salem MSA GRP forecasts from Woods & Poole to forecast cargo volume. This GRP Forecast is presented in **Table 3-36**.

Table 3-36: Air Cargo—Gross Regional Product

Year	GRP (Millions)	Pounds
2008	$11,906	397,507
2013	$12,743	427,000
2018	$14,162	474,000
2023	$15,770	528,000
2028	$17,188	576,000
CAGR	1.9%	1.9%

Source: USDOT, Woods & Poole
Pounds/ million dollars in GRP ratio: 33.47
Currency in 2004 Dollars

The GRP Forecast anticipates a 1.9 percent CAGR in cargo volume between 2008 and 2028. The historical correlation coefficient between the Salem MSA GRP and SLE cargo volume is 0.7, which is considered high. Industry rule of thumb typically associates cargo volume with GRP, as it is a measure of a region's productivity.

The GRP Forecast is the preferred cargo forecast. The Air Cargo Forecast selection and preference is presented in **Section 5.7**.

5.3 Air Cargo—Population

The Population Forecast anticipates that cargo volume will increase with the population of the Salem MSA. The Population Forecast is a result of the pounds of cargo per capita ratio, found by dividing the pounds of air cargo by the population of the Salem MSA. Between 2003 and 2008, the average ratio was 1.007 pounds of cargo per capita. This ratio is multiplied by Salem MSA population forecasts from Woods & Poole to forecast the cargo volume. The Population Forecast is presented in **Table 3-37**.

Table 3-37: Air Cargo—Population

Year	Population	Pounds
2008	391,680	397,507
2013	417,132	421,000
2018	443,353	447,000
2023	469,942	474,000
2028	491,528	496,000
CAGR	1.1%	1.1%

Source: USDOT, Woods & Poole
Pounds per capita ratio: 1.007

The Population Forecast anticipates a 1.1 percent CAGR in cargo volume between 2008 and 2028. The historical correlation coefficient between the Salem MSA population and cargo volume at SLE is 0.7, which is considered high.

The Population Forecast is not the preferred cargo forecast. The Air Cargo Forecast selection and preference is presented in **Section 5.7**.

5.4 Air Cargo—Per Capita Income

The Per Capita Income (PCI) Forecast anticipates that cargo volume will increase with the average PCI in the Salem MSA. The PCI forecast is a result of the pounds of cargo per dollar of PCI ratio, which was 14.2 between 2003 and 2008. The PCI Forecast is presented in **Table 3-38**.

Table 3-38: Air Cargo—Per Capita Income

Year	Per Capita Income	Pounds
2008	$26,981	397,507
2013	$27,451	389,000
2018	$28,975	411,000
2023	$30,770	436,000
2028	$32,367	459,000
CAGR	0.9%	0.7%

Source: USDOT, Woods & Poole
Pounds of cargo per dollar of PCI ratio: 14.2
Currency in 2004 Dollars

The PCI Forecast anticipates a 0.7 percent CAGR between 2008 and 2028. The historical correlation coefficient between the Salem MSA PCI and SLE cargo volume is 0.0, which is considered low. Between 2003 and 2008, cargo volume at SLE has been growing while the Salem MSA PCI has been fluctuating.

The PCI Forecast is not the preferred cargo forecast. The Air Cargo Forecast selection and preference is presented in **Section 5.7**.

5.5 Air Cargo—Market Share

The Market Share Forecast anticipates that cargo volume at SLE will maintain a fixed share of national domestic cargo activity, measured in domestic all-freight revenue-ton miles (RTMs) which correspond to one ton of cargo, flown for one mile on an all-freight carrier between two cities in the U.S. Growth in domestic RTMs indicates increased domestic cargo activity. Cargo market share is calculated by dividing the pounds of cargo at SLE by the domestic all-freight RTMs, measured in millions. SLE's market share was 30.5 pounds of cargo per million RTMs. The Market Share Forecast is presented in **Table 3-39**.

Table 3-39: Air Cargo—Market Share

Year	Domestic All Freight RTMs (Millions)	Pounds
2008	12,258	397,507
2013	11,232	343,000
2018	12,570	384,000
2023	14,209	434,000
2028	15,974	488,000
CAGR	1.3%	1.0%

Source: FAA, USDOT
Pounds per million RTMs: 30.5

The Market Share Forecast anticipates a 1 percent CAGR between 2008 and 2028. The historical correlation coefficient is 0.3, which is considered low. Cargo volume at SLE increased from 2003 to 2007, then declined in 2008. Domestic all-freight RTMs decreased compared to previous years in 2005, 2006, and 2008.

The Market Share Forecast is not the preferred cargo forecast. The Air Cargo Forecast selection and preference is presented in **Section 5.7**.

5.6 Air Cargo—Boeing Forecast

The Boeing Air Cargo Forecast is based on the Boeing Company World Air Cargo Forecast, an annual published forecast of global cargo demand. The most recent edition is the Boeing World Air Cargo Forecast 2010-11 (Boeing Forecast). The Boeing Air Cargo Forecast functions as a market share forecast, dividing the pounds of cargo at SLE by the domestic all-freight RTMs as recorded by Boeing. The Boeing Forecast shows SLE having 21.9 pounds of cargo per million domestic all-freight RTMs. The Boeing Air Cargo Forecast is presented in **Table 3-40**.

Table 3-40: Air Cargo—Boeing Forecast

Year	Domestic All Freight RTMs (Millions)	Pounds
2008	18,245	397,507
2013	21,048	460,000
2018	24,282	531,000
2023	28,013	613,000
2028	32,318	707,000
CAGR	2.9%	2.9%

Source: Boeing Company, USDOT
Pounds per million RTMs:21.9

The Boeing Air Cargo Forecast anticipates a 2.9 percent CAGR between 2008 and 2028. The correlation coefficient is 0.8, which is considered high.

The Boeing Air Cargo Forecast is not the preferred cargo forecast. The Air Cargo Forecast selection and preference is presented in **Section 5.7**.

5.7 Air Cargo—Method Comparison and Preference

The Growth Rate forecast has been removed from further consideration. The remaining air cargo forecasts are presented in **Table 3-41**, and shown in **Exhibit 3-4**. The GRP Forecast represents the mid-growth scenario, and the remaining forecasts represent the low-growth scenarios. The mid- and low-growth scenarios are considered for the preferred forecast.

The Population Forecast featured a high correlation coefficient and produced the third highest cargo volume forecast of those considered. The high correlation coefficient indicates that growth in air cargo volume and growth in the population of the Salem MSA may be related. Analysis of other socioeconomic indicators suggests that the population of the Salem MSA is growing because productivity is growing, suggesting that jobs are available. Increased productivity is supported by the growth in PCI within the Salem MSA. Although population and cargo volume are both growing, growth in productivity and jobs may be driving both variables. GRP is a measure of productivity in the Salem MSA, and would be a better socioeconomic variable to forecast cargo volume than population.

The PCI Forecast produced the lowest CAGR between 2008 and 2028, and has a low correlation coefficient. The low growth and poor correlation coefficient suggest that air cargo volume is more of a product of productivity as opposed to the shipping needs of individuals.

The Market Share Forecast declines in 2013 before exceeding 2008 levels in 2023. This decline, combined with a low correlation coefficient, supports choosing air cargo forecasts other than the Market Share Forecast.

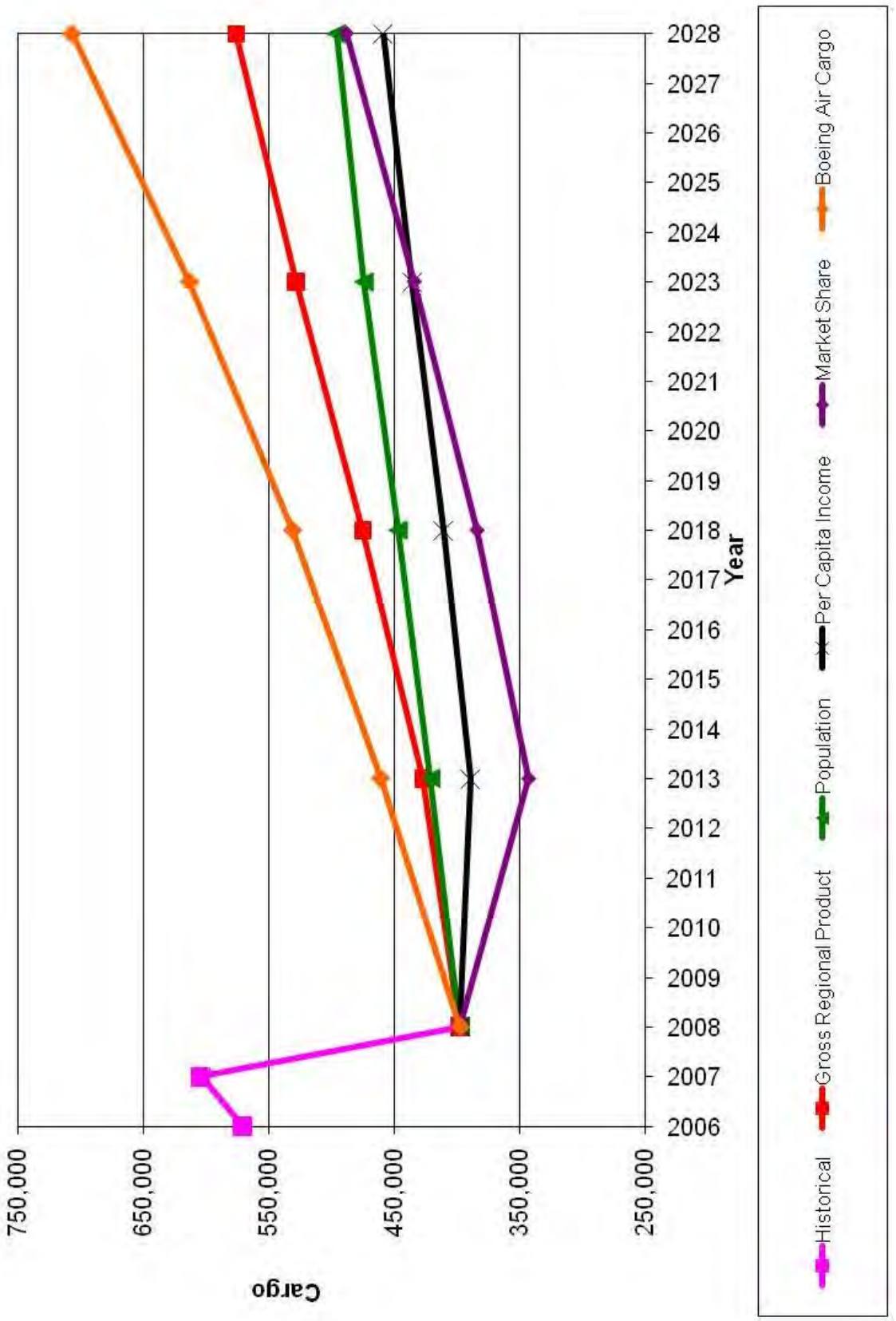
Of the forecasts considered, the Boeing Forecast projected the highest volume of air cargo at SLE and showed the highest correlation coefficient. Although the correlation indicates that growth in air cargo volume at SLE relates to national trends, an area of concern for the Boeing Forecast is that it does not take into account local trends. Although Salem historically keeps up with national trends, correlation between the population and GRP of the Salem MSA suggests that an economic downturn felt in Salem would have a greater impact on air cargo volume, even if the rest of the country's GRP and population continued to grow.

The GRP Forecast is the preferred air cargo forecast. GRP is a measure of an area's productivity, and historically GRP has correlated well with air cargo volume in the Salem MSA. An industry rule of thumb is to forecast growth in air cargo with regional productivity, and this technique was used in the Aerospace and Boeing forecasts, but on a national level. The GRP forecast is preferred because it takes national forecasting methods and focuses them on the Salem MSA.

Table 3-41: Air Cargo Forecast Comparison

Year	GRP	Population	PCI	Market Share	Boeing
2008	397,507	397,507	397,507	397,507	397,507
2013	427,000	421,000	389,000	343,000	460,000
2018	474,000	447,000	411,000	384,000	531,000
2023	528,000	474,000	436,000	434,000	613,000
2028	576,000	496,000	459,000	488,000	707,000
CAGR	1.9%	1.1%	0.7%	1.0%	2.9%

Exhibit 3-4: Cargo Forecast Comparison



6. Peak Hour Operations

Peak hour aircraft operations are used to identify potential capacity issues that may occur at high activity levels. Peak hour operations represent the busiest hour of the busiest day of the busiest month. Peak hour data comes from Salem airport traffic control tower records, with the most recent complete year being 2009. In 2009, the peak month was July, with 11.2 percent of annual operations. The peak day of the peak month had 0.006 percent of annual operations. Peak hour forecasts use 10 percent of the peak day.

Peak hour operations forecasts are presented in **Table 3-42**.

Table 3-42: Peak Hour Operations

Year	Operations	Peak Month	Peak Day	Peak Hour
2008	64,777	7,300	390	39
2013	67,271	7,600	400	40
2018	71,519	8,100	430	43
2023	74,797	8,400	450	45
2028	79,111	8,900	470	47

Peak hour forecasts are used to assess airfield facilities in **Chapter 4**.

7. Forecast Summary

A summary of the preferred forecasts from each section is presented in **Table 3-43**.

Table 3-43: Forecast Summary

Year	Enplanements	Operations	Based Aircraft	Cargo
Methodology	2009 TAF	Composite	Market Share	GRP
2008	14,834	64,777	216	397,507
2013	5,673	67,271	240	427,000
2018	5,673	71,519	250	474,000
2023	5,673	74,797	260	528,000
2028	5,673	79,111	270	576,000
CAGR	-4.7%	1.0%	1.1%	1.9%

The preferred operations forecasts represent stable growth that is anticipated at SLE. Key elements of the preferred forecast include the return of scheduled commercial passenger airline service at conservative levels of operation, and increasing cargo volumes due to growth in productivity within the Salem MSA. GA traffic is expected to conduct the majority of airport operations, increasing with corporate business travel as the national economy recovers. The preferred forecasts will determine facility requirements at SLE, which will be used to generate airport improvement alternatives. Improvement alternatives will provide users of SLE with the facilities they need for safe, efficient, and reliable operations.

Chapter 4

Runway Needs Assessment

1. Introduction

The need for runway extension is included on the 1997 Airport Layout Plan (1997 ALP), updated in 2000. The 1997 ALP shows a 700-foot extension of Runway 13-31, providing 6,511 feet in runway length. Master Plan Update Phase I (MPU-I), approved by the Federal Aviation Administration (FAA) in April 2010, provides justification for a 7,000-foot-long runway at Salem Municipal Airport (SLE) to support existing general aviation (GA) aircraft operating at the Airport. Runway improvements are complex projects that require coordination between the community and government agencies. The purpose of this chapter is to provide a preliminary evaluation of physical, environmental, and social constraints to the implementation of a 7,000 foot long runway. This analysis will assist the Airport in selecting a preferred alternative. The preferred alternative will be carried forward throughout the Master Plan Update Phase II (MPU-II), and into subsequent National Environmental Policy Act (NEPA) process and documentation for airport improvement projects.

This chapter is organized into the following sections.

- Alternatives
- Environmental Considerations
- Social Considerations
- Preferred Alternative and Summary

2. Alternatives

Six runway improvement alternatives have been developed for analysis. Alternatives 1, 2.1, 3, and 4 consider extending one existing runway end in one direction. In these alternatives, the other three runway ends remain in their existing location. Alternative 2.2 shifts Runway Ends 13 and 31, and maintains existing runway alignment. Alternative 5 considers a new runway. Aviation and design considerations of the alternatives are described in this section. Noise and land use considerations are discussed in **Section 3**. A preferred alternative is selected in **Section 4**.

Runway end relocation will require re-signing, re-marking, and re-surveying the runway. If the runway has instrument approach procedures (IAP), these will require re-issue to reflect the new runway end location. It is expected that the 7,000-foot-long runway will become the Airport's primary runway. Alternatives are designed to meet aircraft design group (ADG) III standards, defined in **Chapter 1**. Runway width is 150 feet, centerline to taxiway centerline separation is 400 feet, and taxiways are 60 feet wide. Runway safety areas (RSA) extend the runway length and 1,000 feet beyond each runway end, and are 500 feet wide. Runway object free areas (ROFA) extend the runway length and 1,000 feet beyond the runway end, and are 800 feet wide.

There are no existing obstructions to the alternative runway visibility zones. Runway centerline profile and grading is not considered. Airport traffic control tower (ATCT) line of sight from the existing ATCT facility to existing and proposed runway ends and access taxiways is considered.

Precision instrument approach capability, with visibility minimums lower than 3/4 mile, is to be maintained or added for the southern end of the runway. This will consist of appropriate instrument runway markings, a medium intensity approach lighting system with runway alignment indicator lights (MALSR), a localizer antenna beyond the northern runway end, and a glide slope antenna near the southern runway end.

Non-precision instrument approach capability, with visibility minimums not lower than 3/4 mile, is to be maintained or added for the northern end of the runway. This will consist of appropriate runway marking, and a medium intensity approach lighting system (MALS). It is recommended that both runway ends are evaluated for satellite-based IAPs.

Property acquisition or easement recommendations include the runway protection zone (RPZ) and the Federal Aviation Regulations (FAR) Part 77 transitional surface up to 50 feet in height. Existing easements, described in **Chapter 1**, are included in the analysis.

As runway improvement alternatives extend beyond existing airport property, surface transportation infrastructure is impacted. Runways, taxiways, NAVAIDs, and design surfaces (taxiway object free area (TOFA), RSA, ROFA) require clear, graded land. Roadways can be integrated into RPZ and approach lighting. Impacts to existing and planned utilities are not considered.

Environmental evaluation considers floodplains and wetlands. Other environmental categories, including air quality and water quality, and detailed evaluation of wetlands and floodplains, are to be included in the NEPA process and documentation, to be completed as a separate project.

2.1 Alternative 1

Alternative 1 extends Runway End 13 to the north by 1,189 feet. Taxiway A is extended to provide access to the west side of Runway End 13, and a new taxiway that connects to Taxiway M provides access to the east side of Runway End 13. A hold apron is located on Taxiway A at Runway End 13. The RSA and ROFA beyond Runway End 13 extend outside of existing airport property.

The instrument landing system (ILS) IAP into Runway End 31 is maintained. The localizer located beyond existing Runway End 13 is relocated. An approach lighting system is installed for Runway End 13, and existing RPZ dimensions are maintained.

The localizer, the extension of Taxiway A, the RPZ, and the approach lighting system are located outside of the existing airport property. It is anticipated that 17 acres of property will need to be controlled through acquisition or easement for Alternative 1.

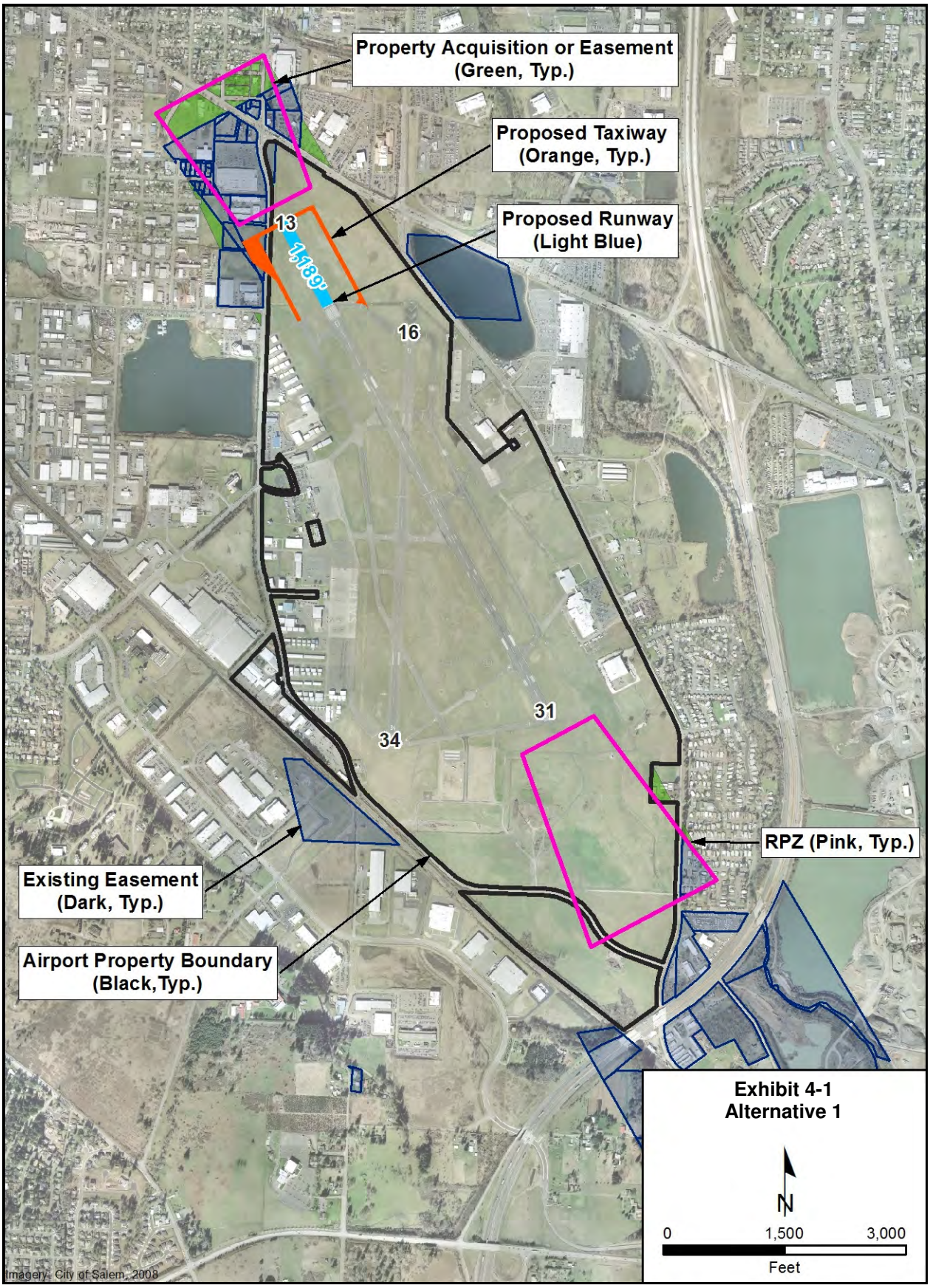
25th Street SE will need to be relocated to accommodate extended Taxiway A, RSA, ROFA, and TOFA. The approach lighting system is located south of Mission Street SE.

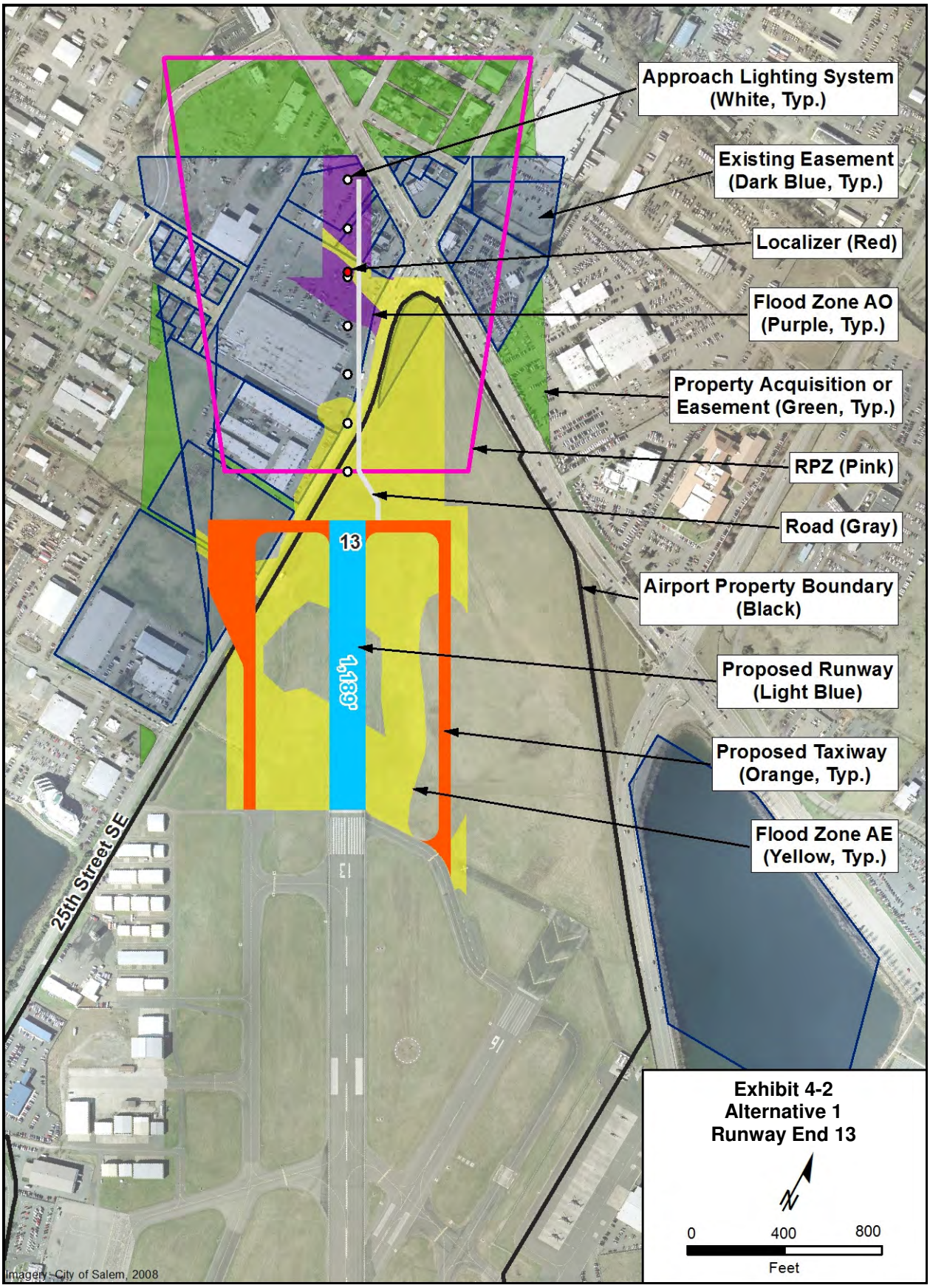
Alternative 1 affects 29 acres of flood zone AE and three acres of flood zone AO, for a total of 32 acres of floodplains within the project area. No wetland impacts are anticipated with Alternative 1.

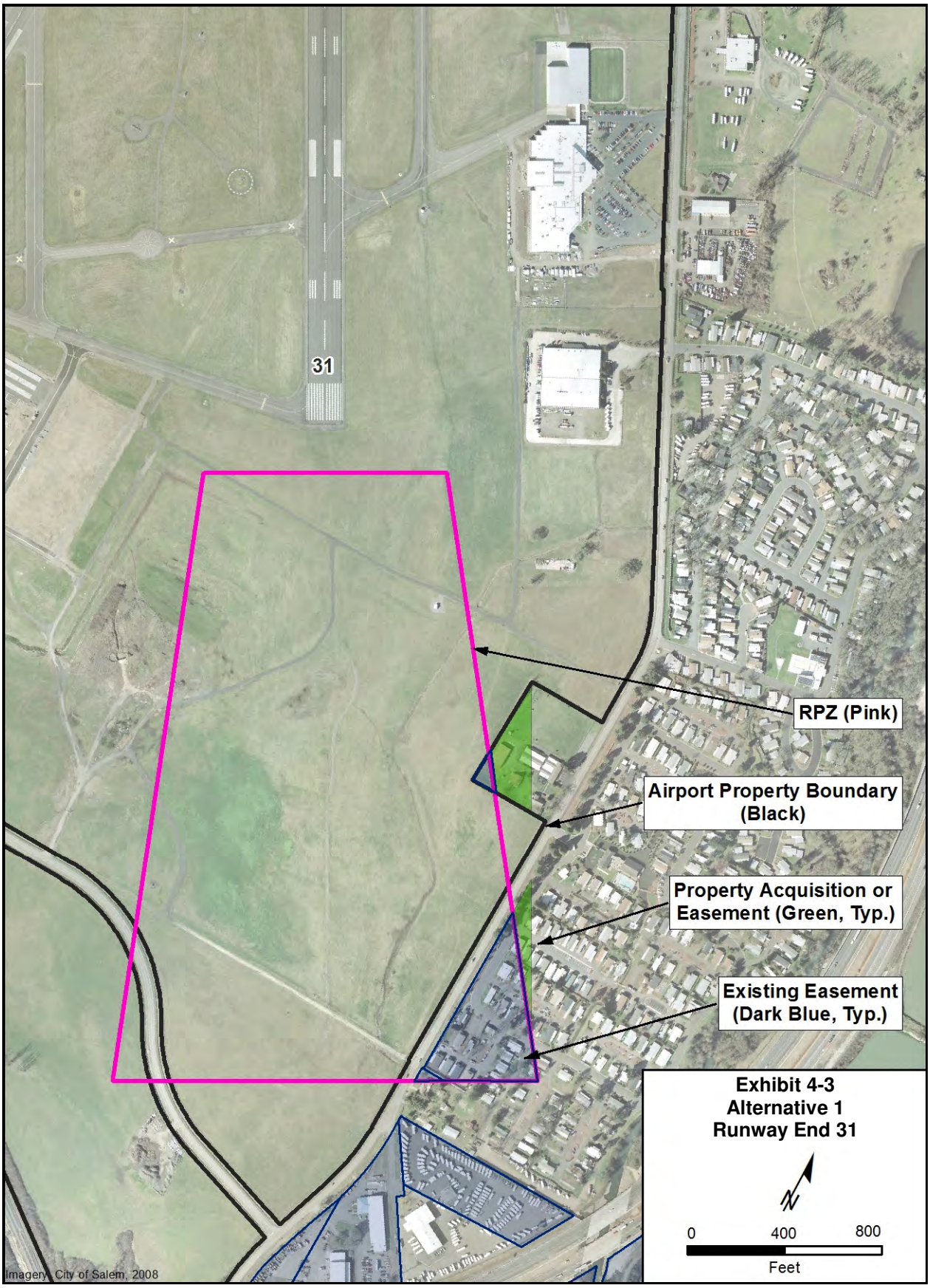
Line of sight between the ATCT and Runway End 13 may be interrupted by existing hangars.

Alternative 1 is not the preferred alternative. Reasoning is presented in **Section 4**.

Alternative 1 is presented in **Exhibit 4-1**; Alternative 1—Runway End 13 is presented in **Exhibit 4-2**; and Alternative 1—Runway End 31 is presented in **Exhibit 4-3**.


Property Acquisition or Easement (Green, Typ.)
Proposed Taxiway (Orange, Typ.)
Proposed Runway (Light Blue)
13
1,189'
16
31
34
RPZ (Pink, Typ.)
Existing Easement (Dark, Typ.)
Airport Property Boundary (Black,Typ.)
Exhibit 4-1
Alternative 1
N
0
1,500
3,000
Feet
Imagery: City of Salem, 2008


Approach Lighting System (White, Typ.)
Existing Easement (Dark Blue, Typ.)
Localizer (Red)
Flood Zone AO (Purple, Typ.)
Property Acquisition or Easement (Green, Typ.)
RPZ (Pink)
Road (Gray)
Airport Property Boundary (Black)
Proposed Runway (Light Blue)
Proposed Taxiway (Orange, Typ.)
Flood Zone AE (Yellow, Typ.)
13
1,189'
25th Street SE
Imagery - City of Salem, 2008
Exhibit 4-2
Alternative 1
Runway End 13
0
400
800
Feet


31
RPZ (Pink)
Airport Property Boundary (Black)
Property Acquisition or Easement (Green, Typ.)
Existing Easement (Dark Blue, Typ.)
Exhibit 4-3
Alternative 1
Runway End 31
0
400
800
Feet
Imagery: City of Salem, 2008

2.2 Alternative 2

Alternative 2 relocates Runway End 31, and has two variations. The existing ROFA at Runway End 13 has a fence that passes through it. FAA Advisory Circular (AC) 5300-13, *Airport Design,* states that "objects non-essential for air navigation or aircraft movement are not to be placed in the [R]OFA." Alternative 2.1 extends Runway End 31, and leaves Runway End 13 in its existing location with a fence in the ROFA. Alternative 2.2 shifts Runway End 13 to comply with ROFA standards, and extends Runway End 31.

2.2.1 Alternative 2.1

Alternative 2.1 relocates Runway End 31 to the south by 1,189 feet. Taxiway B is extended to provide access to the east side of Runway End 31, and a new taxiway that connects to Taxiway F provides access to the west side of Runway End 31. Hold aprons are located on Taxiway A at Runway End 13, and on the new taxiway at Runway End 31. The ROFA beyond Runway End 13 remains partially outside of airport property.

The glide slope antenna and approach lighting system are relocated. The RPZ is relocated with the runway, and existing dimensions are maintained. An approach lighting system is installed beyond Runway End 13. Existing RPZ dimensions and localizer location are unchanged.

The relocated RPZ and approach lighting system beyond Runway End 31 and the existing RPZ beyond Runway End 13 are located outside of airport property. It is anticipated that 12 acres of property will need to be controlled through acquisition or easement for Alternative 2.1.

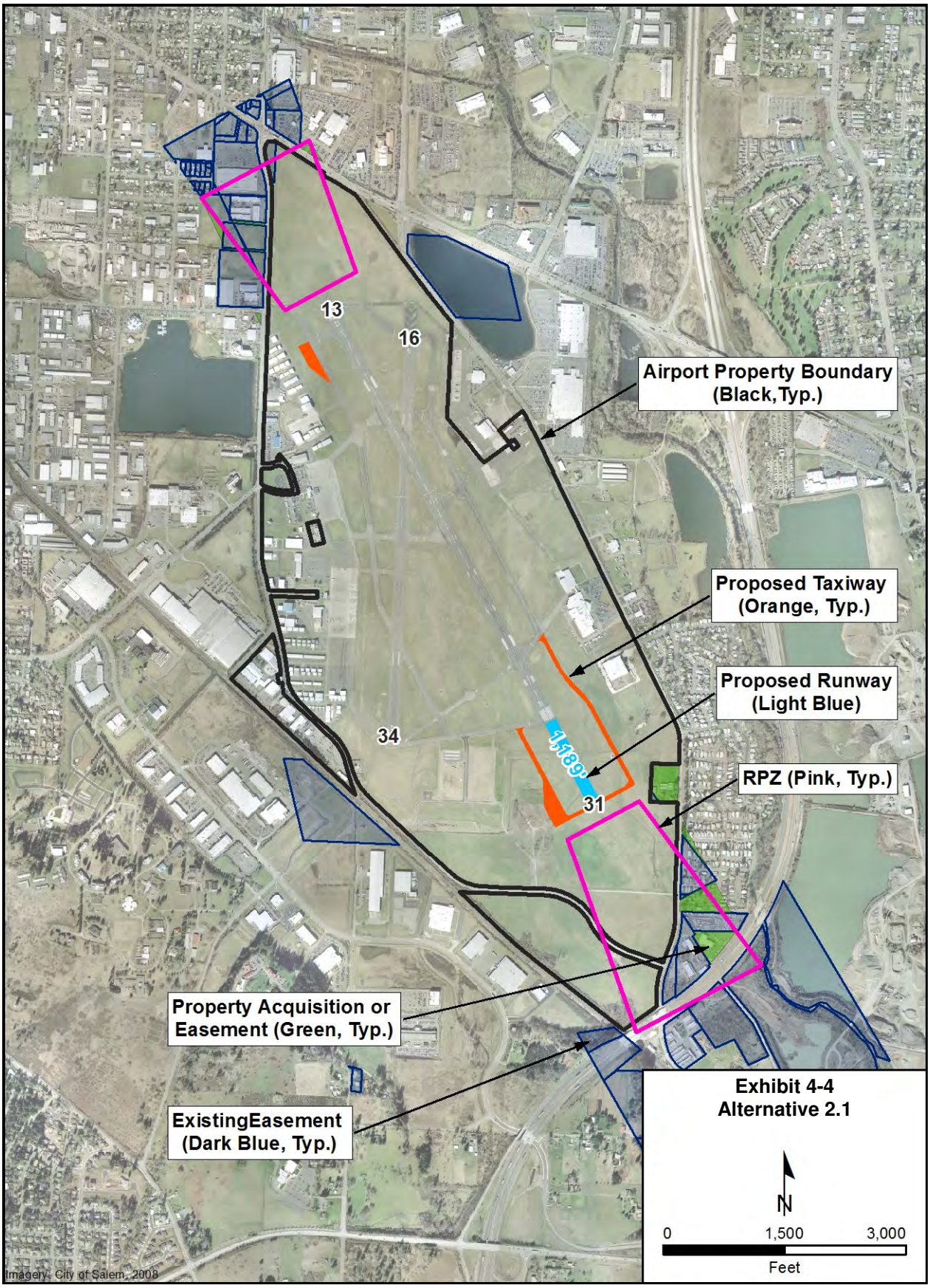
Alternative 2.1 extends the approach lighting system and RPZ beyond the airport property boundary. The last light of the approach lighting system extends to Interstate 5. The ROFA beyond Runway End 13 requires 25th Street SE to be relocated. Interstate 5 is within the RPZ beyond Runway End 31.

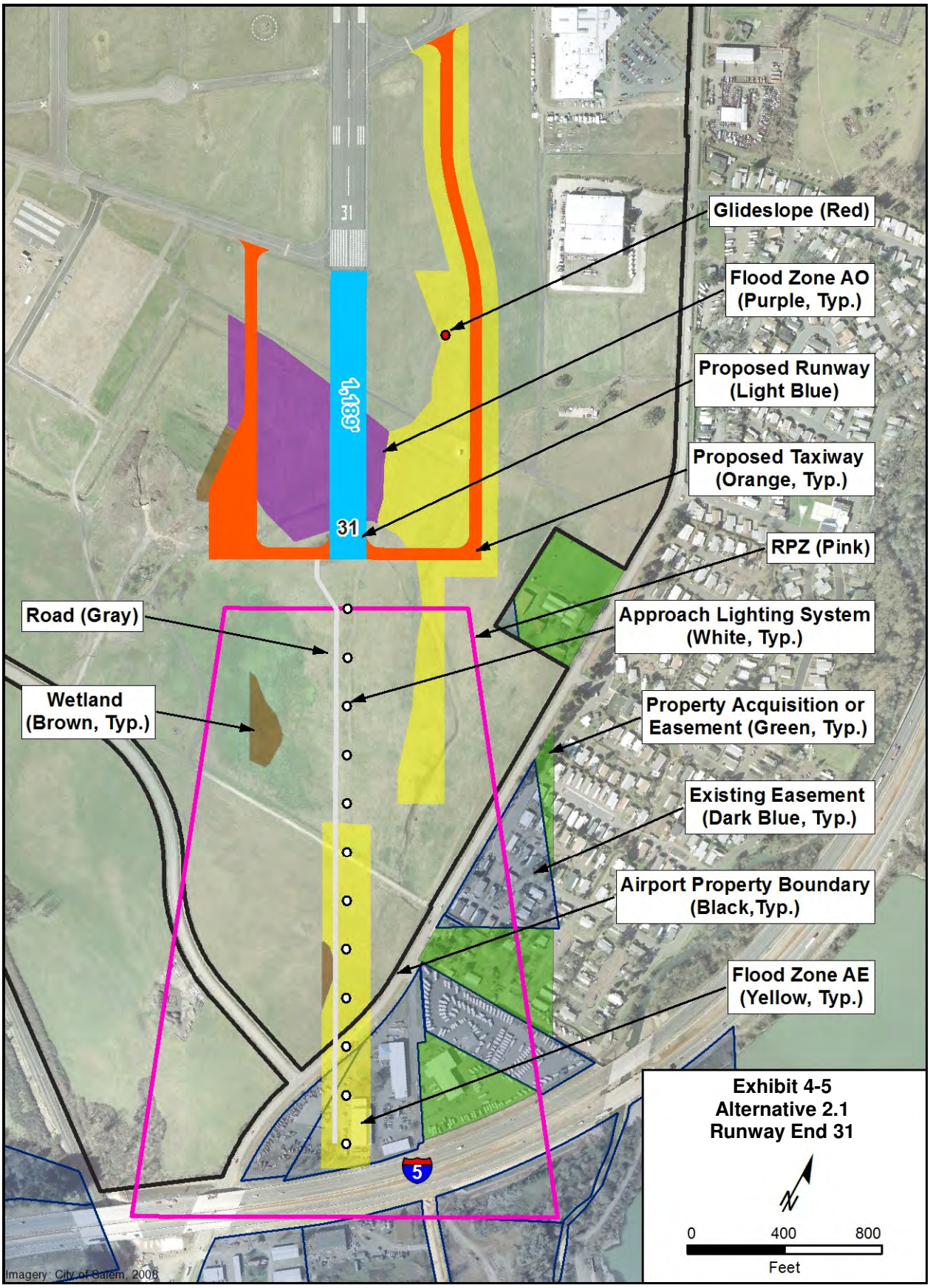
Alternative 2.1 affects 26 acres of flood zone AE and nine acres of flood zone AO, for a total of 35 acres of floodplains within the project area. Alternative 2.1 impacts 2.1 acres of known wetlands.

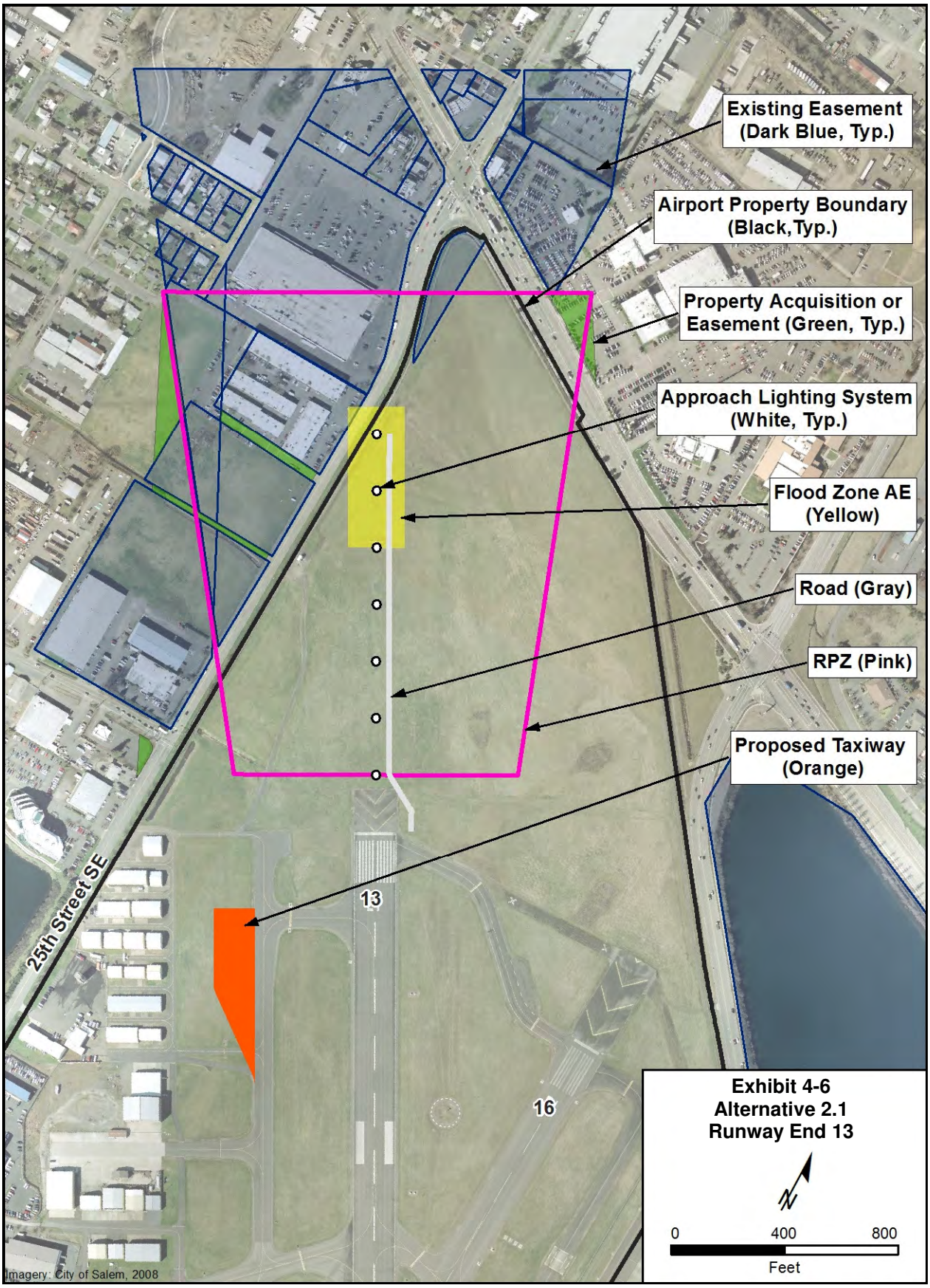
ATCT line of sight to Runway End 13 will continue to be interrupted by existing hangars. Additional ATCT line of sight impacts are not expected with Alternative 2.1.

Alternative 2.1 is not the preferred alternative. Reasoning is presented in **Section 4**.

Alternative 2.1 is presented in **Exhibit 4-4**; Alternative 2.1—Runway End 31 is presented in **Exhibit 4-5**; and Alternative 2.1—Runway End 13 is presented in **Exhibit 4-6**.


13
16
34
31
1,189'
Airport Property Boundary (Black,Typ.)
Proposed Taxiway (Orange, Typ.)
Proposed Runway (Light Blue)
RPZ (Pink, Typ.)
Property Acquisition or Easement (Green, Typ.)
ExistingEasement (Dark Blue, Typ.)
Exhibit 4-4
Alternative 2.1
N
0
1,500
3,000
Feet
Imagery: City of Salem, 2008


Glideslope (Red)
Flood Zone AO (Purple, Typ.)
Proposed Runway (Light Blue)
Proposed Taxiway (Orange, Typ.)
RPZ (Pink)
Approach Lighting System (White, Typ.)
Road (Gray)
Wetland (Brown, Typ.)
Property Acquisition or Easement (Green, Typ.)
Existing Easement (Dark Blue, Typ.)
Airport Property Boundary (Black,Typ.)
Flood Zone AE (Yellow, Typ.)
1489
31
5
Exhibit 4-5
Alternative 2.1
Runway End 31
0
400
800
Feet
Imagery: City of Salem, 2008


Existing Easement (Dark Blue, Typ.)
Airport Property Boundary (Black,Typ.)
Property Acquisition or Easement (Green, Typ.)
Approach Lighting System (White, Typ.)
Flood Zone AE (Yellow)
Road (Gray)
RPZ (Pink)
Proposed Taxiway (Orange)
25th Street SE
13
16
Imagery: City of Salem, 2008
Exhibit 4-6
Alternative 2.1
Runway End 13
0
400
800
Feet

2.2.2 Alternative 2.2

Alternative 2.2 shifts Runway End 31 to the south by 1,405 feet, and shifts Runway End 13 to the south by 216 feet. Relocation brings the ROFA beyond Runway End 13 into compliance with FAA design standards. Taxiway B is extended to provide access to the east side of Runway End 31, and a new taxiway that connects to Taxiway F provides access to the west side of Runway End 31. Hold aprons are located on Taxiway A at Runway End 13, and on the new taxiway at Runway End 31

The glide slope antenna and approach lighting system are relocated. The RPZ is relocated with the runway, and existing dimensions are maintained. An approach lighting system is installed beyond Runway End 13. Existing RPZ dimensions are maintained; however, the RPZ and localizer are shifted 216 feet to the south.

The relocated RPZ and approach lighting system are located outside of airport property. It is anticipated that 12 acres of property will need to be controlled through acquisition or easement for Alternative 2.2.

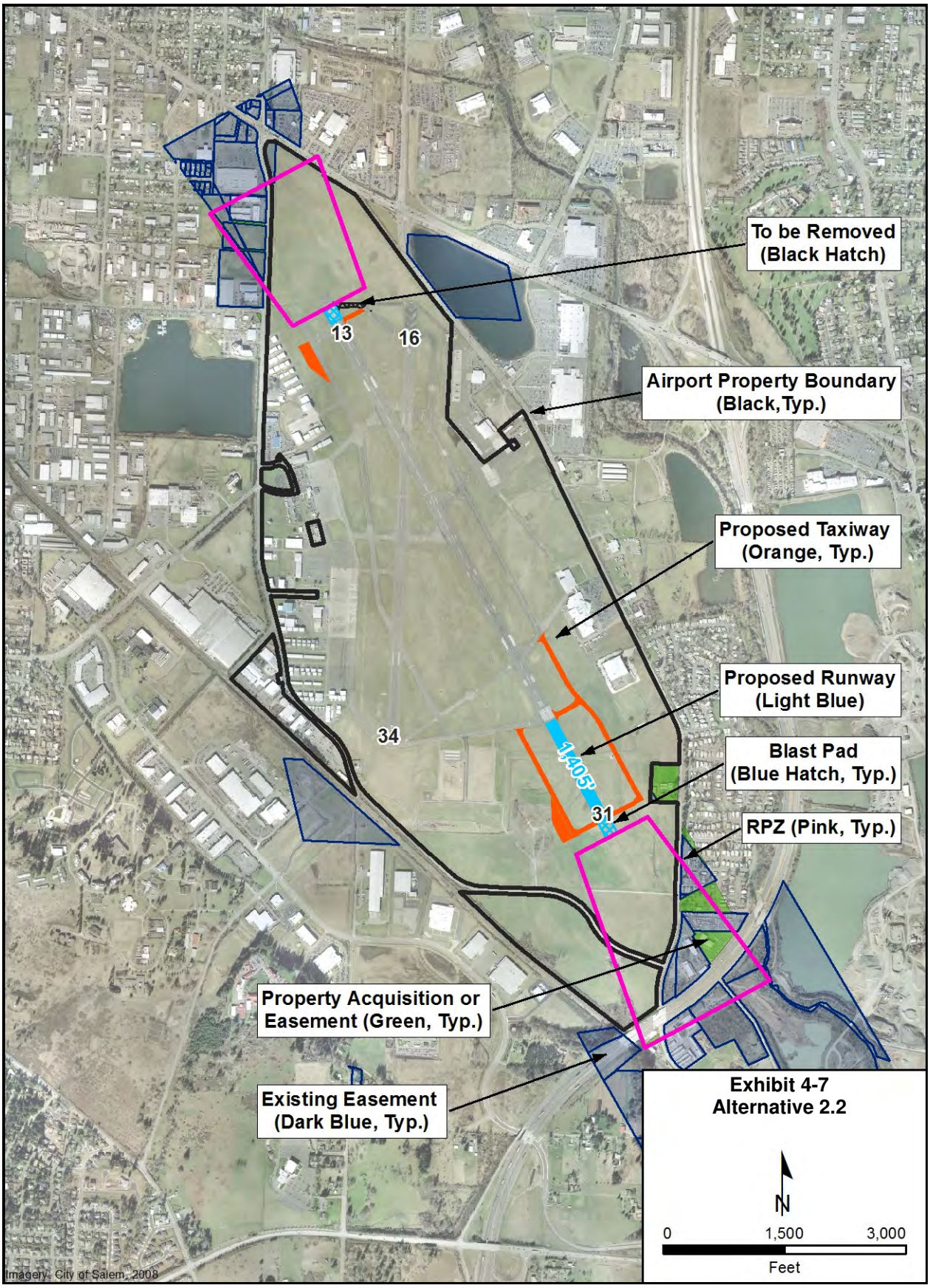
Alternative 2.2 extends the approach lighting system and RPZ beyond the airport property. The last light of the approach lighting system extends over Interstate 5. The ROFA beyond Runway Ends 13 and 31 is located within airport property. Interstate 5 is within the RPZ beyond Runway End 31.

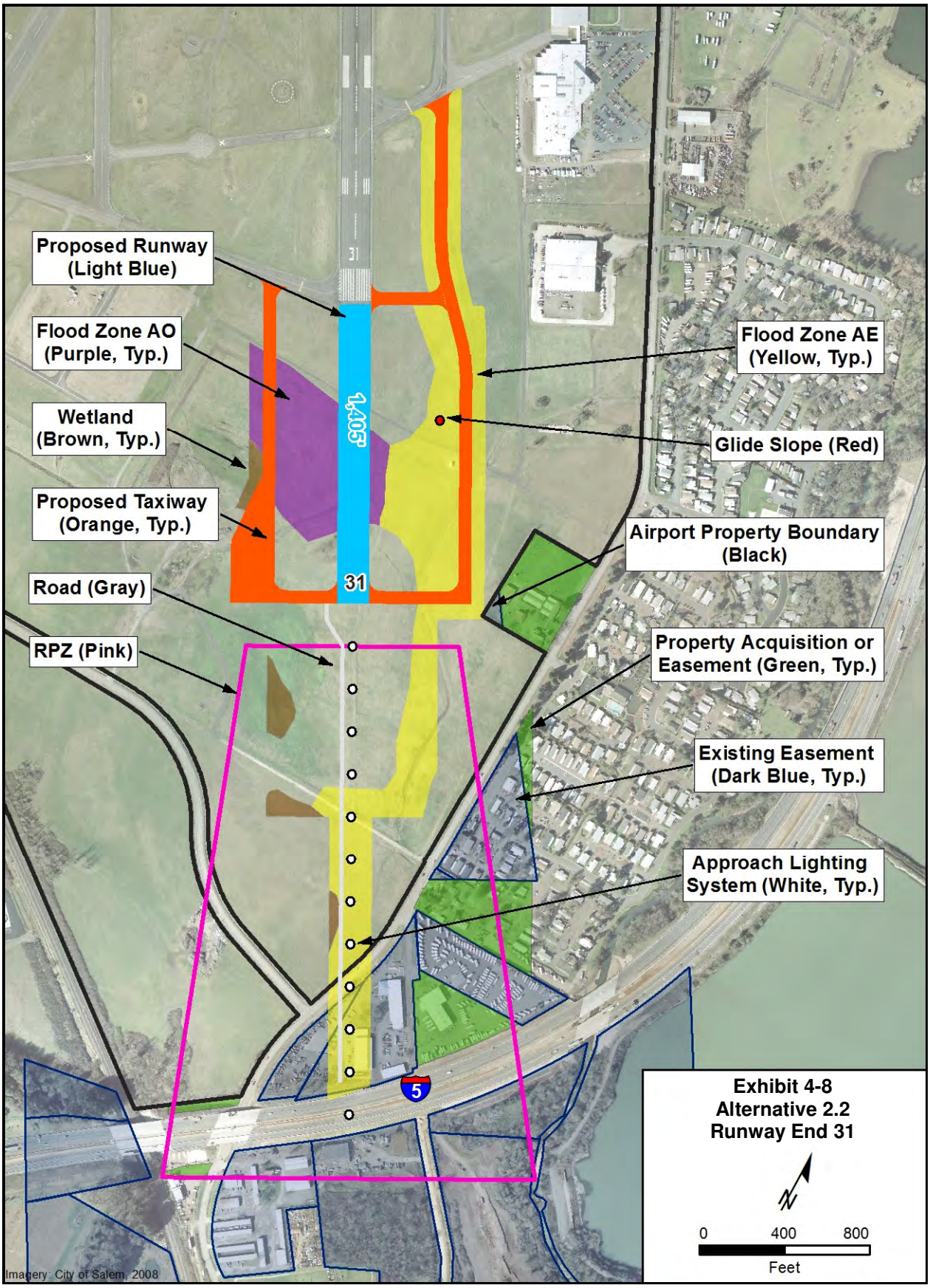
Alternative 2.2 affects 28 acres of flood zone AE and nine acres of flood zone AO, for a total of 37 acres of floodplains within the project area. Alternative 2.1 impacts two acres of known wetlands.

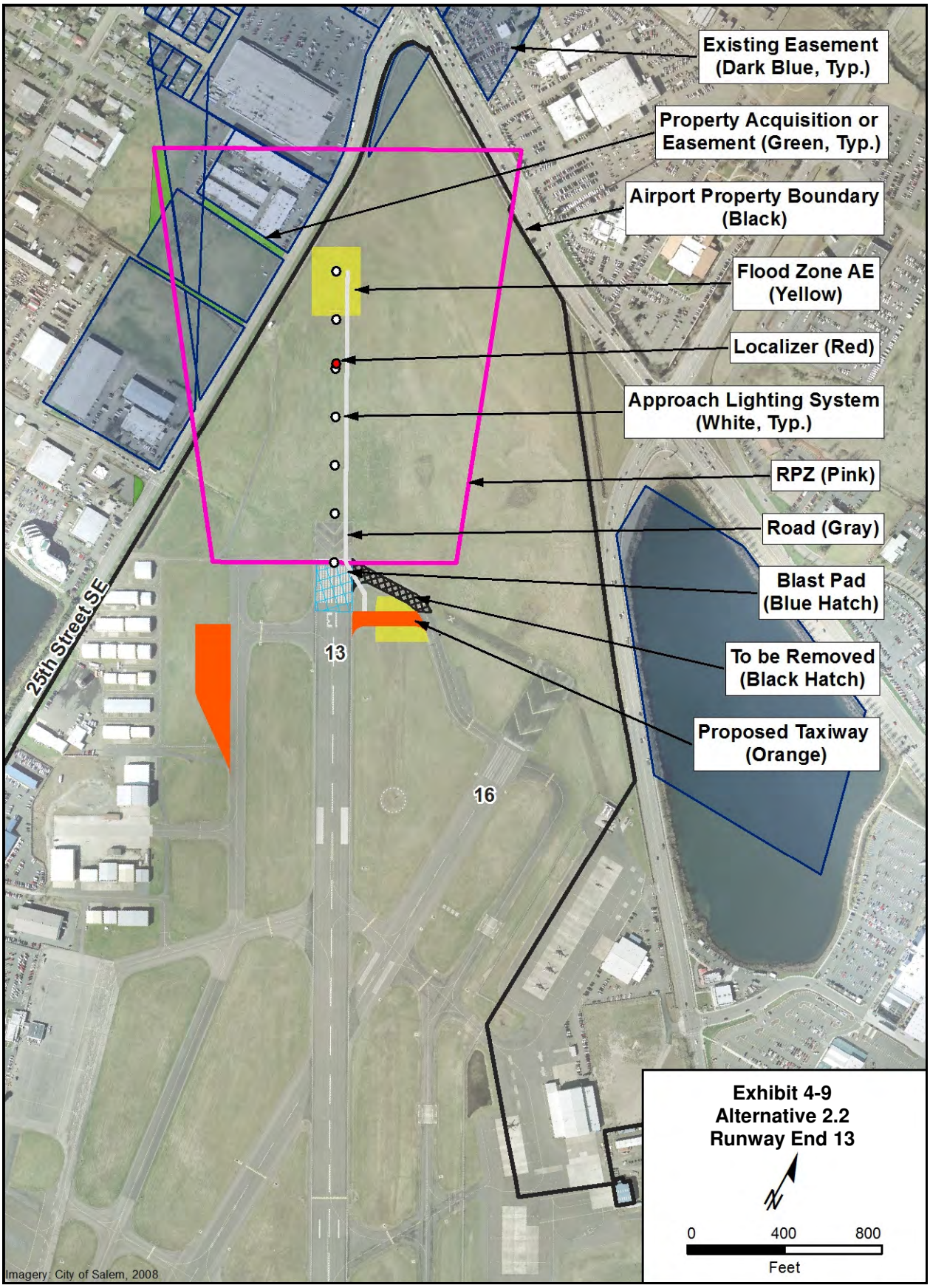
ATCT line of sight to Runway End 13 is expected to improve with Alternative 2.2. Additional ATCT line of sight impacts are not expected with Alternative 2.2.

Alternative 2.2 is the preferred alternative. Reasoning is presented in **Section 4**.

Alternative 2.2 is presented in **Exhibit 4-7**; Alternative 2.2—Runway End 31 is presented in **Exhibit 4-8**; and Alternative 2.2—Runway End 13 is presented in **Exhibit 4-9**.


To be Removed
(Black Hatch)
13
16
Airport Property Boundary
(Black, Typ.)
Proposed Taxiway
(Orange, Typ.)
Proposed Runway
(Light Blue)
34
1,405'
Blast Pad
(Blue Hatch, Typ.)
31
RPZ (Pink, Typ.)
Property Acquisition or
Easement (Green, Typ.)
Existing Easement
(Dark Blue, Typ.)
Exhibit 4-7
Alternative 2.2
N
0
1,500
3,000
Feet
Imagery: City of Salem, 2008


Proposed Runway (Light Blue)
Flood Zone AO (Purple, Typ.)
Wetland (Brown, Typ.)
Proposed Taxiway (Orange, Typ.)
Road (Gray)
RPZ (Pink)
Flood Zone AE (Yellow, Typ.)
Glide Slope (Red)
Airport Property Boundary (Black)
Property Acquisition or Easement (Green, Typ.)
Existing Easement (Dark Blue, Typ.)
Approach Lighting System (White, Typ.)
1,405'
31
5
Imagery: City of Salem, 2008
Exhibit 4-8
Alternative 2.2
Runway End 31
0
400
800
Feet


Existing Easement (Dark Blue, Typ.)
Property Acquisition or Easement (Green, Typ.)
Airport Property Boundary (Black)
Flood Zone AE (Yellow)
Localizer (Red)
Approach Lighting System (White, Typ.)
RPZ (Pink)
Road (Gray)
Blast Pad (Blue Hatch)
To be Removed (Black Hatch)
Proposed Taxiway (Orange)
25th Street SE
13
16
Imagery: City of Salem, 2008
Exhibit 4-9
Alternative 2.2
Runway End 13
N
0
400
800
Feet

2.3 Alternative 3

Alternative 3 extends Runway End 16 to the north by 1,855 feet, and widens Runway 16-34 to 150 feet. Taxiway B is extended to provide access to the east side of Runway End 16, and a new taxiway that connects to Taxiway M provides access to the west side of Runway End 16. Existing Taxiway B, between Taxiways M and N, is relocated to meet runway-taxiway centerline separation requirements. Taxiway A south of Taxiway H is removed. Taxiway F at Runway End 34 is realigned, and the compass calibration pad access taxiway is relocated. A hold apron is located at Taxiway M and Runway End 16. RSA and ROFA beyond Runway Ends 16 and 34 extend beyond airport property.

Runway End 34 has an approach lighting system beyond the runway end, and a glide slope to the east of the threshold. An approach lighting system and a localizer are located beyond relocated Runway End 16. RPZ dimensions beyond Runway End 16 are increased to support IAPs with visibility minimums not less than 3/4 mile.

Access taxiways, localizer, approach lighting system, the RPZ beyond Runway End 16, and approach lighting and RPZ beyond Runway End 34 will be located outside of airport property. It is anticipated that 168 acres of property will need to be controlled through acquisition or easement for Alternative 3.

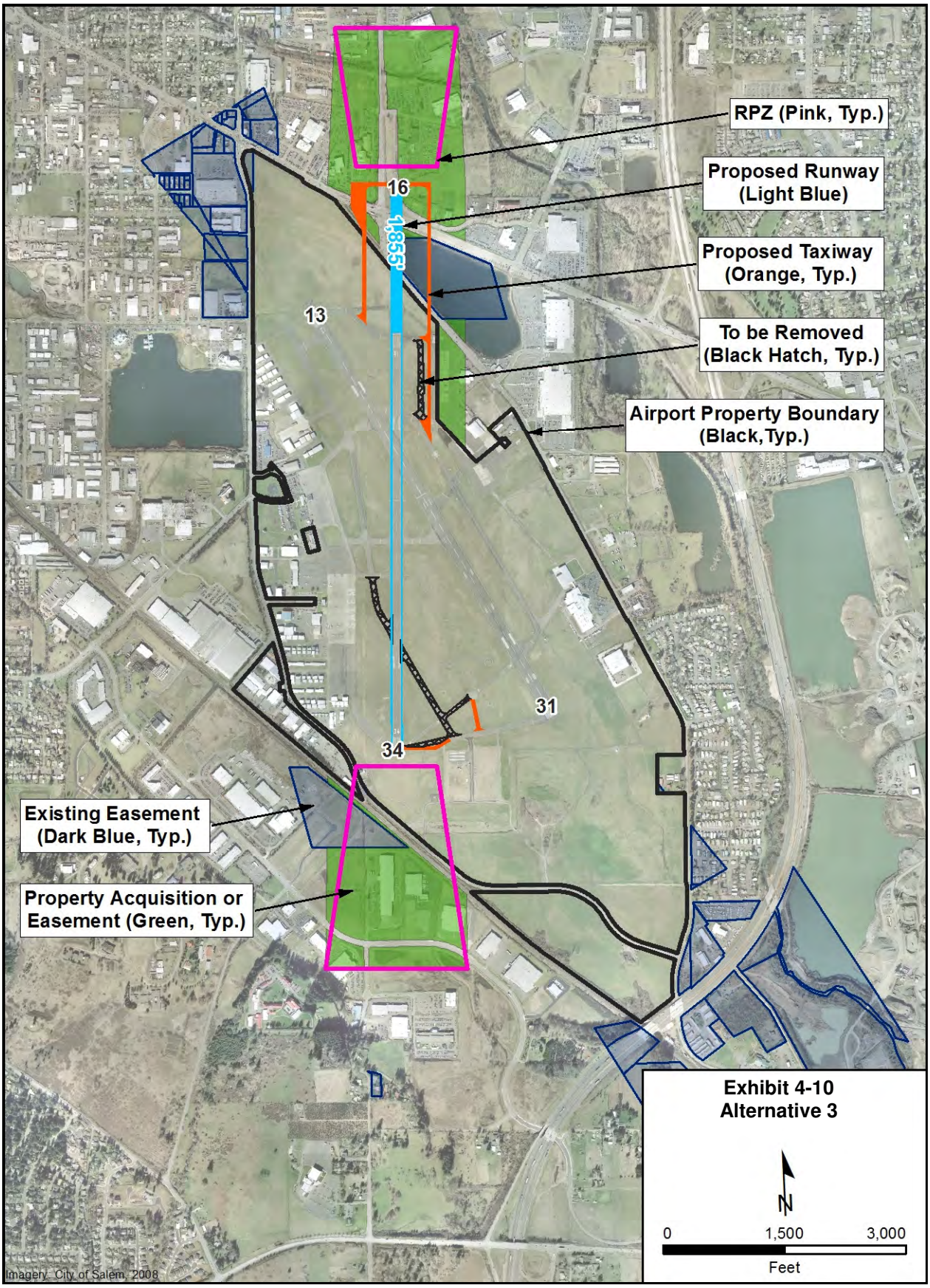
Alternative 3 runway extension facilities and design surfaces extend over Mission Street SE and Airport Road SE. Mission Street SE and Ryan Drive SE will need to be rerouted. Airport Road SE, between Militia Way SE and Mission Street SE, and a third of a mile of Turner Road SE, south or Mission Street SE, will need to be rerouted to accommodate the RSA, ROFA, and taxiway safety area (TSA). The approach lighting system, RSA, ROFA, and RPZ beyond Runway End 34 extend over Airway Drive SE, which will need to be rerouted. The Union Pacific railroad track will need to be rerouted.

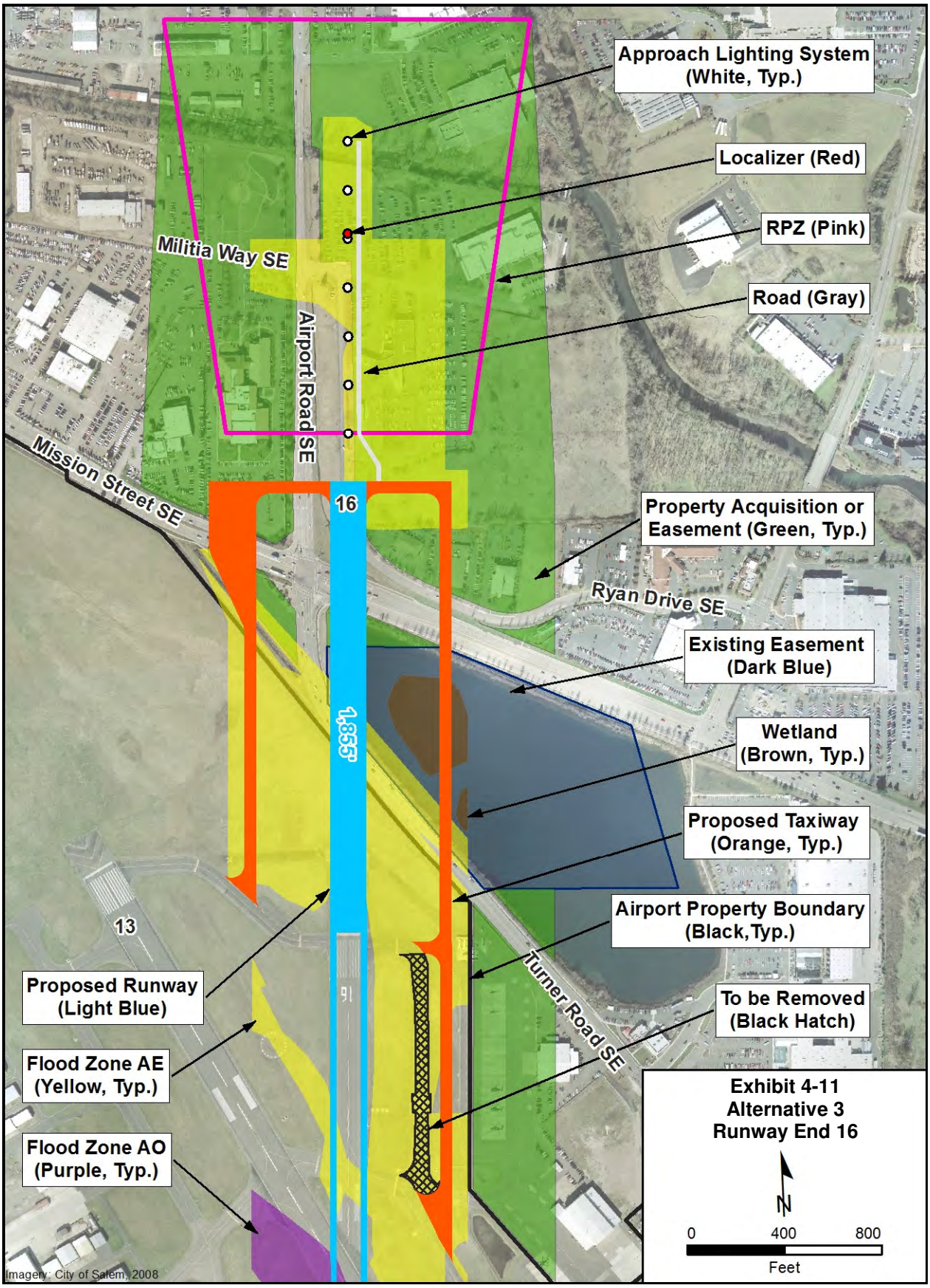
Alternative 3 affects 57 acres of flood zone AE and 15 acres of flood zone AO, for a total of 72 acres of floodplains within the project area. Alternative 3 impacts 2.5 acres of known wetlands.

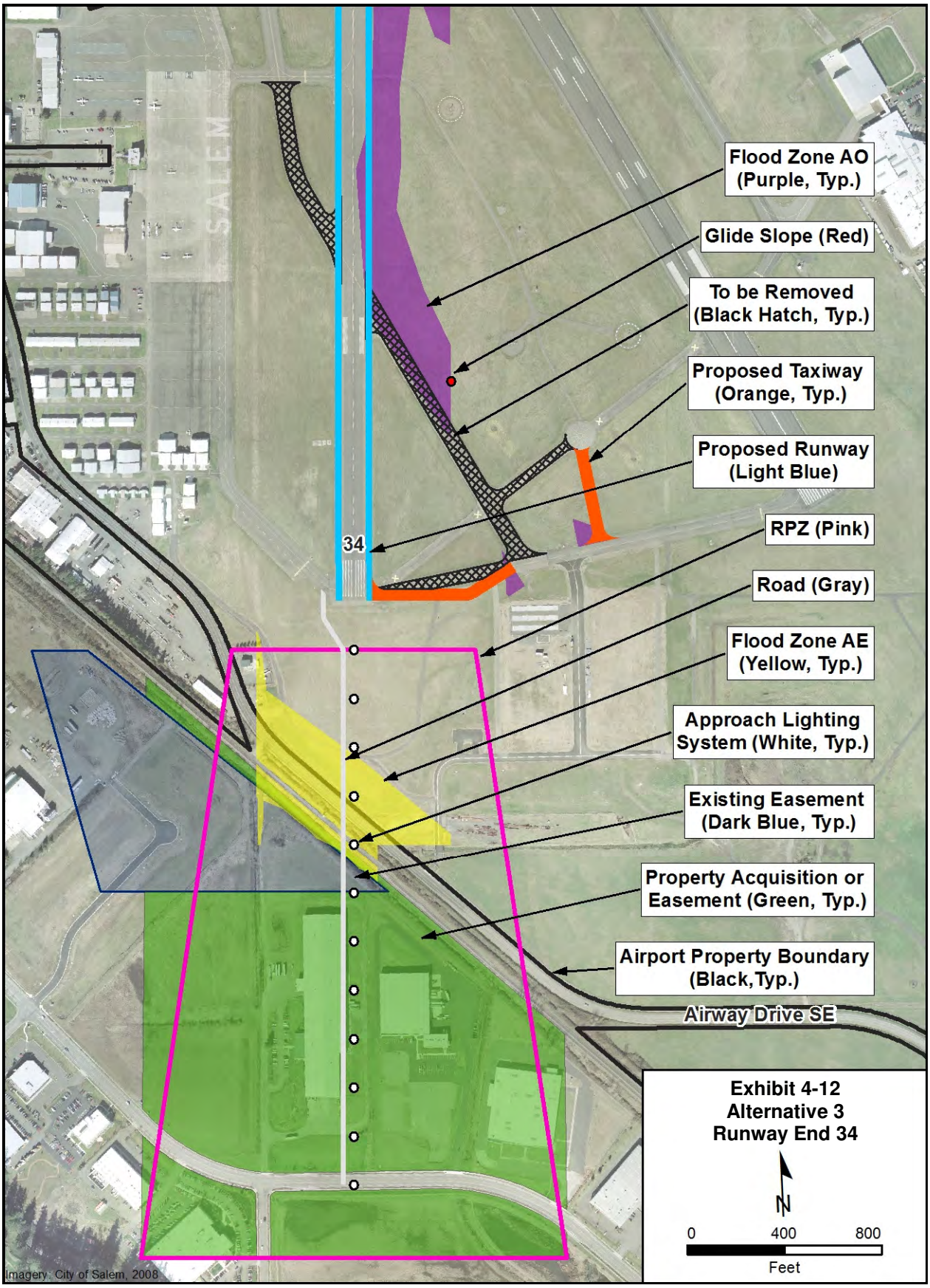
ATCT line of sight to Runway End 13 will continue to be interrupted by existing hangars. Additional ATCT line of sight impacts are not expected with Alternative 3.

Alternative 3 is not the preferred alternative. Reasoning is presented in **Section 4**.

Alternative 3 is presented in **Exhibit 4-10**; Alternative 3—Runway End 16 is presented in **Exhibit 4-11**; and Alternative 3—Runway End 34 is presented in **Exhibit 4-12**.


RPZ (Pink, Typ.)
Proposed Runway (Light Blue)
Proposed Taxiway (Orange, Typ.)
To be Removed (Black Hatch, Typ.)
Airport Property Boundary (Black,Typ.)
Existing Easement (Dark Blue, Typ.)
Property Acquisition or Easement (Green, Typ.)
16
13
1,855'
31
34
Exhibit 4-10
Alternative 3
N
0
1,500
3,000
Feet
Imagery: City of Salem, 2008


Approach Lighting System (White, Typ.)
Localizer (Red)
RPZ (Pink)
Road (Gray)
Militia Way SE
Airport Road SE
Mission Street SE
16
Property Acquisition or Easement (Green, Typ.)
Ryan Drive SE
Existing Easement (Dark Blue)
1,853
Wetland (Brown, Typ.)
Proposed Taxiway (Orange, Typ.)
13
Airport Property Boundary (Black,Typ.)
Turner Road SE
Proposed Runway (Light Blue)
To be Removed (Black Hatch)
Flood Zone AE (Yellow, Typ.)
Flood Zone AO (Purple, Typ.)
Imagery: City of Salem, 2008
Exhibit 4-11
Alternative 3
Runway End 16
N
0
400
800
Feet


Flood Zone AO (Purple, Typ.)
Glide Slope (Red)
To be Removed (Black Hatch, Typ.)
Proposed Taxiway (Orange, Typ.)
Proposed Runway (Light Blue)
RPZ (Pink)
Road (Gray)
Flood Zone AE (Yellow, Typ.)
Approach Lighting System (White, Typ.)
Existing Easement (Dark Blue, Typ.)
Property Acquisition or Easement (Green, Typ.)
Airport Property Boundary (Black,Typ.)
Airway Drive SE
34
Exhibit 4-12
Alternative 3
Runway End 34
N
0
400
800
Feet
Imagery: City of Salem, 2008

2.4 Alternative 4

Alternative 4 extends Runway End 34 by 1,855 feet, and widens Runway 16-34 to 150 feet. Taxiway A is extended to provide access to the west side of Runway End 34, and a new taxiway connected to Taxiway F provides access to the east side of Runway End 34. Existing Taxiway B between Taxiways M and N is relocated to meet runway-taxiway centerline separation requirements. Hold aprons are located on Taxiway A at Runway End 34, and on Taxiway M at Runway End 16. RSA and ROFA beyond Runway Ends 16 and 34 extend outside of airport property.

Runway End 34 has an approach lighting system beyond the runway end, and a glide slope to the east of the threshold. An approach lighting system and a localizer are located beyond relocated Runway End 16. RPZ dimensions beyond Runway End 16 are increased to support IAPs with visibility minimums not less than 3/4 mile.

Access taxiways, localizer, approach lighting, the RPZ beyond Runway End 16, and approach lighting and RPZ beyond Runway End 34 will be located outside of airport property. It is anticipated that 145 acres of property will need to be controlled through acquisition or easement for Alternative 4.

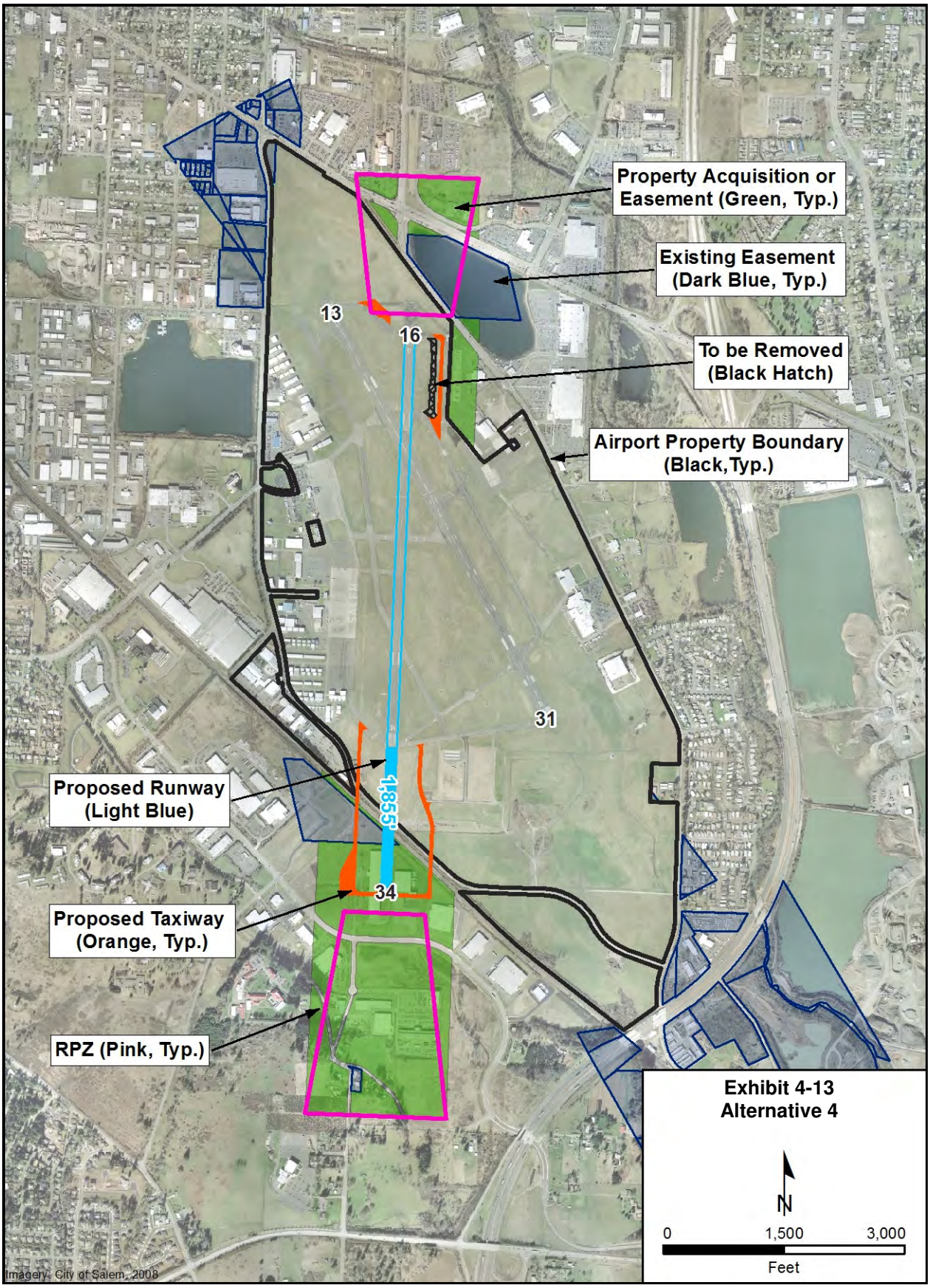
Alternative 4 runway extension, access taxiways, approach lighting system, RSA, ROFA, TOFA, RPZ, and glide slope critical area extend beyond airport property. The Union Pacific railroad track, Airway Drive SE, Fairview Industrial Drive SE, and 27th Avenue SE will need to be rerouted. Beyond Runway End 16, the last light in the approach lighting system is located on Mission Street SE. Mission Street SE and Airport Road SE are located inside of the RPZ.

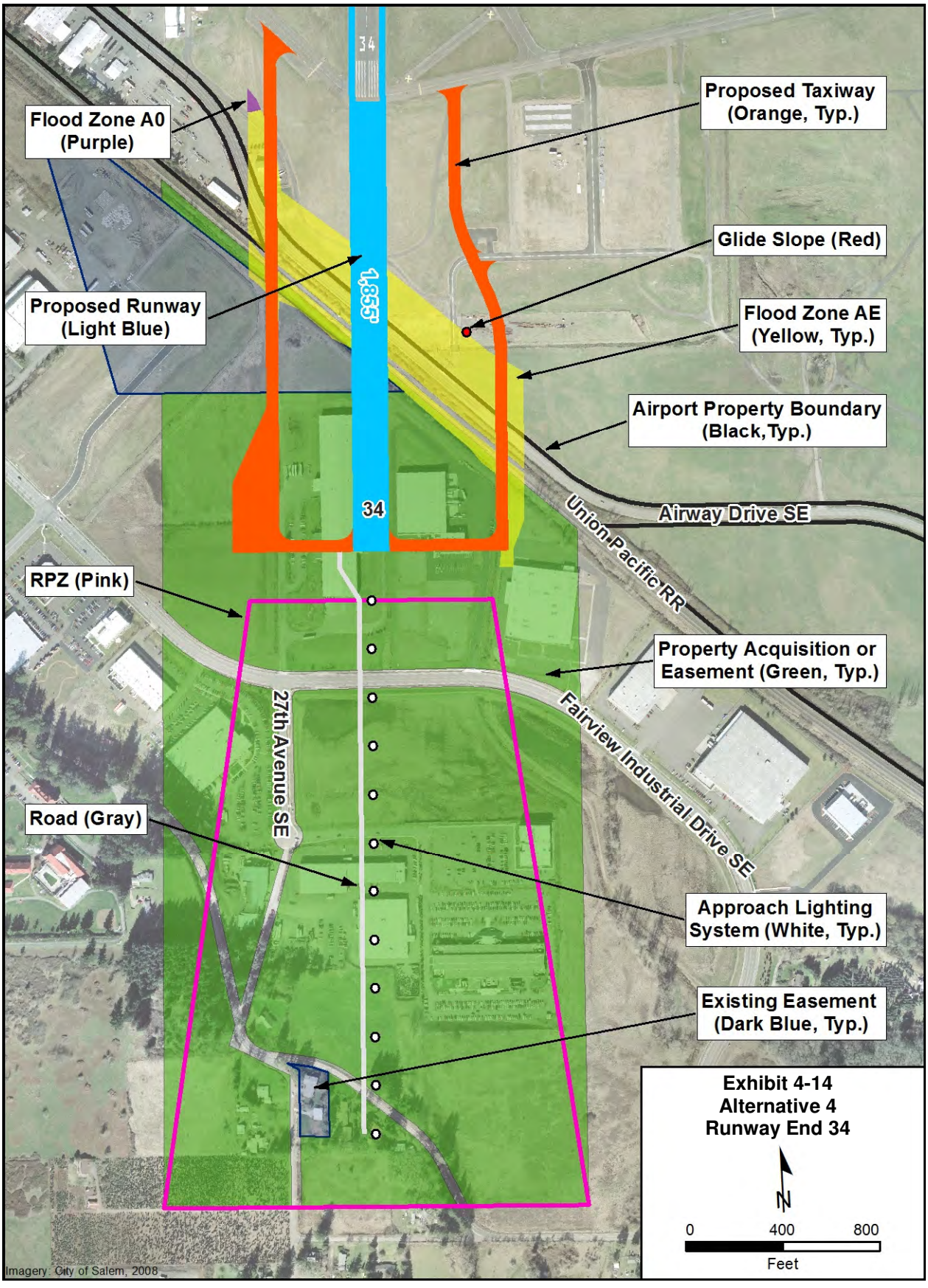
Alternative 4 affects 42 acres of flood zone AE and 15 acres of flood zone AO, for a total of 57 acres of floodplains within the project area. Alternative 4 impacts 1.4 acres of known wetlands.

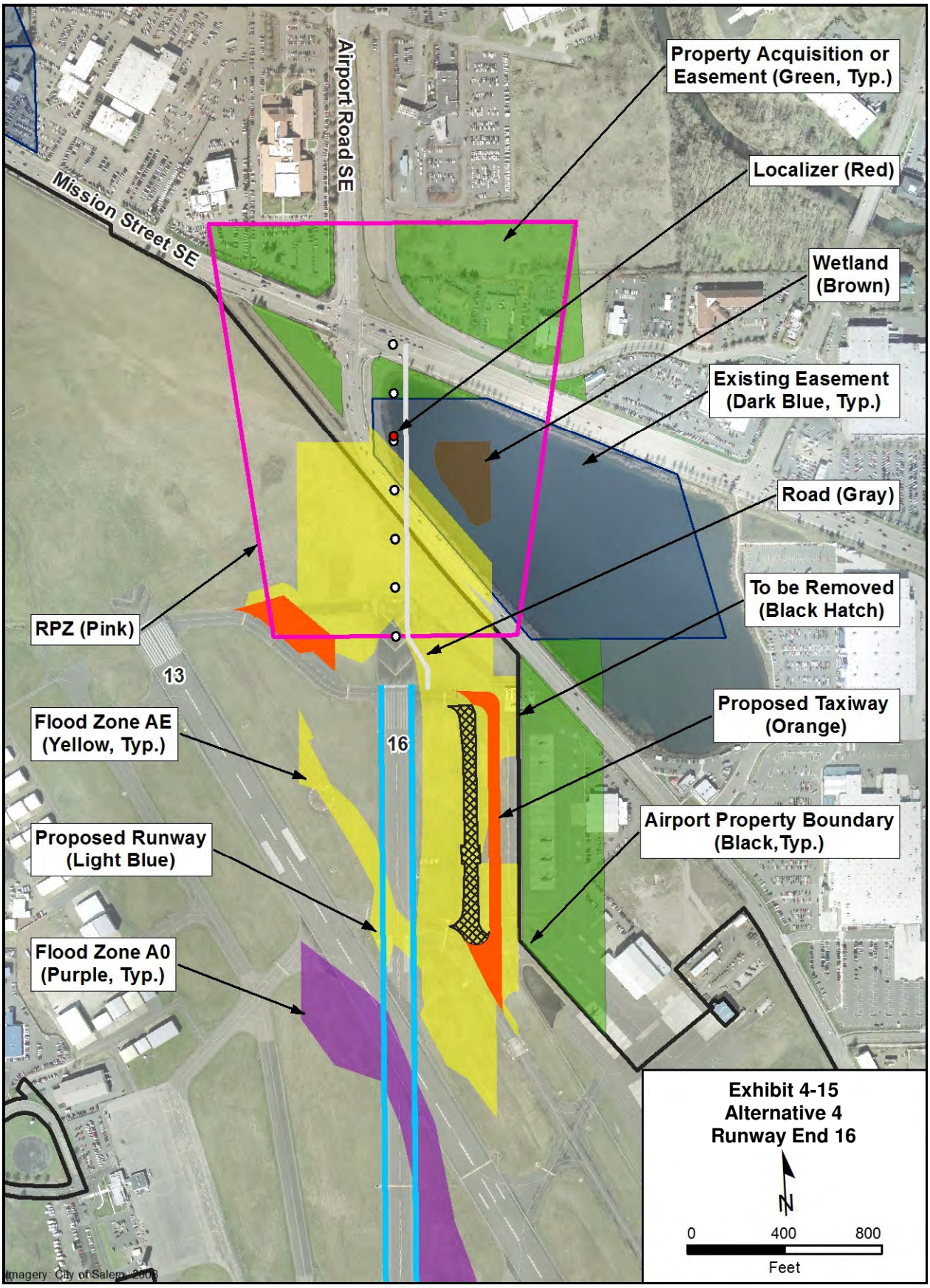
ATCT line of sight to Runway End 13 will continue to be interrupted by existing hangars. Additional ATCT line of sight impacts are not expected with Alternative 4.

Alternative 4 is not the preferred alternative. Reasoning is presented in **Section 4**.

Alternative 4 is presented in **Exhibit 4-13**; Alternative 4—Runway End 34 is presented in **Exhibit 4-14**; and Alternative 4—Runway End 16 is presented in **Exhibit 4-15**.


Property Acquisition or Easement (Green, Typ.)
Existing Easement (Dark Blue, Typ.)
To be Removed (Black Hatch)
Airport Property Boundary (Black,Typ.)
Proposed Runway (Light Blue)
Proposed Taxiway (Orange, Typ.)
RPZ (Pink, Typ.)
13
16
31
34
1,855'
Imagery: City of Salem, 2008
Exhibit 4-13
Alternative 4
N
0
1,500
3,000
Feet


Flood Zone A0 (Purple)
Proposed Taxiway (Orange, Typ.)
Glide Slope (Red)
Proposed Runway (Light Blue)
Flood Zone AE (Yellow, Typ.)
Airport Property Boundary (Black,Typ.)
Airway Drive SE
Union Pacific RR
RPZ (Pink)
Property Acquisition or Easement (Green, Typ.)
27th Avenue SE
Fairview Industrial Drive SE
Road (Gray)
Approach Lighting System (White, Typ.)
Existing Easement (Dark Blue, Typ.)
34
1,855'
34
Exhibit 4-14
Alternative 4
Runway End 34
N
0
400
800
Feet
Imagery: City of Salem, 2008


Airport Road SE
Mission Street SE
Property Acquisition or Easement (Green, Typ.)
Localizer (Red)
Wetland (Brown)
Existing Easement (Dark Blue, Typ.)
Road (Gray)
To be Removed (Black Hatch)
RPZ (Pink)
13
16
Flood Zone AE (Yellow, Typ.)
Proposed Taxiway (Orange)
Airport Property Boundary (Black,Typ.)
Proposed Runway (Light Blue)
Flood Zone A0 (Purple, Typ.)
Imagery: City of Salem, 2008
Exhibit 4-15
Alternative 4
Runway End 16
N
0
400
800
Feet

2.5 Alternative 5

Alternative 5 removes existing Runway 13-31 and 16-34, and replaces them with a new 7,000 feet long, 150 feet wide runway. Runway position and orientation attempt to minimize property acquisition or easement, building relocation, and aircraft parking relocation. Alternative 5 requires an airfield reconfiguration, including new taxiways to aircraft storage and parking areas. Access taxiways, approach lighting into the north runway end, and RSA and ROFA will remain within airport property. Hold aprons are located on the west taxiway at the north and south runway ends.

The RPZ beyond the north runway end will be located outside of airport property. Approach lighting and the RPZ beyond the south runway end will be located outside of airport property. It is anticipated that 22 acres of property will need to be controlled through acquisition or easement for Alternative 5.

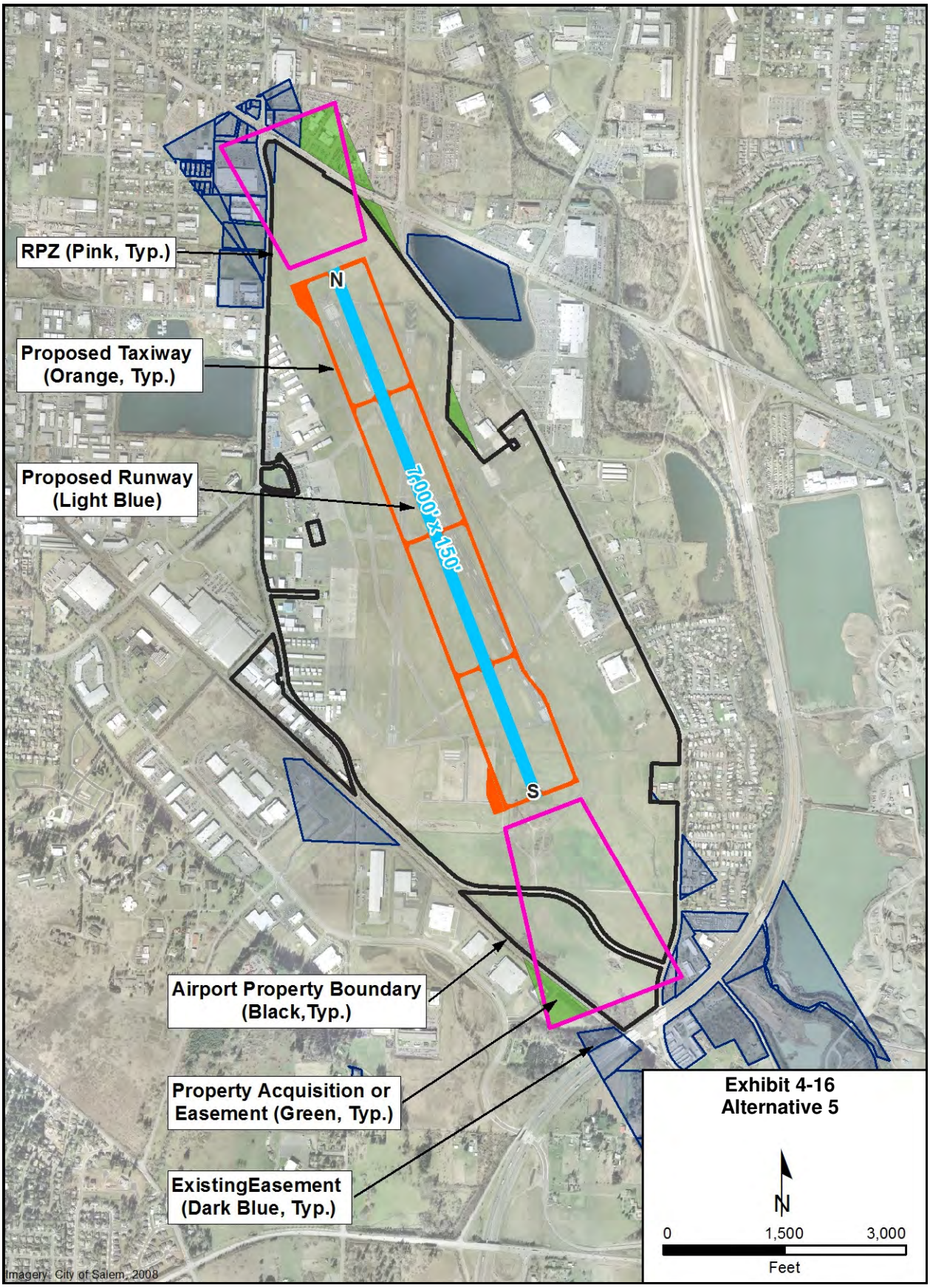
It is anticipated that no roadways will be rerouted to accommodate Alternative 5.

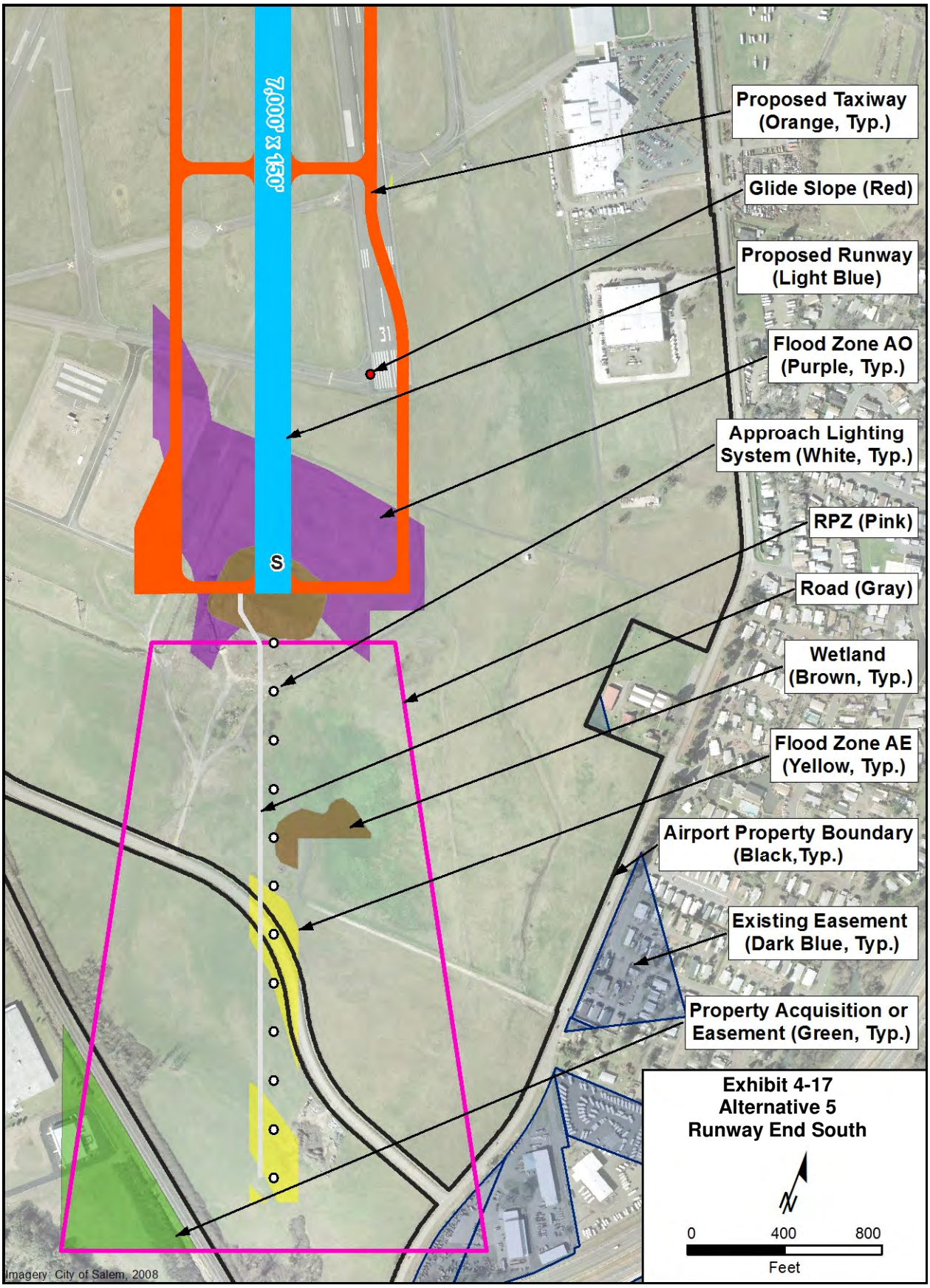
Alternative 5 affects 45 acres of flood zone AE and 34 acres of flood zone AO, for a total of 79 acres of floodplains within the project area. Alternative 5 impacts 4.3 acres of known wetlands.

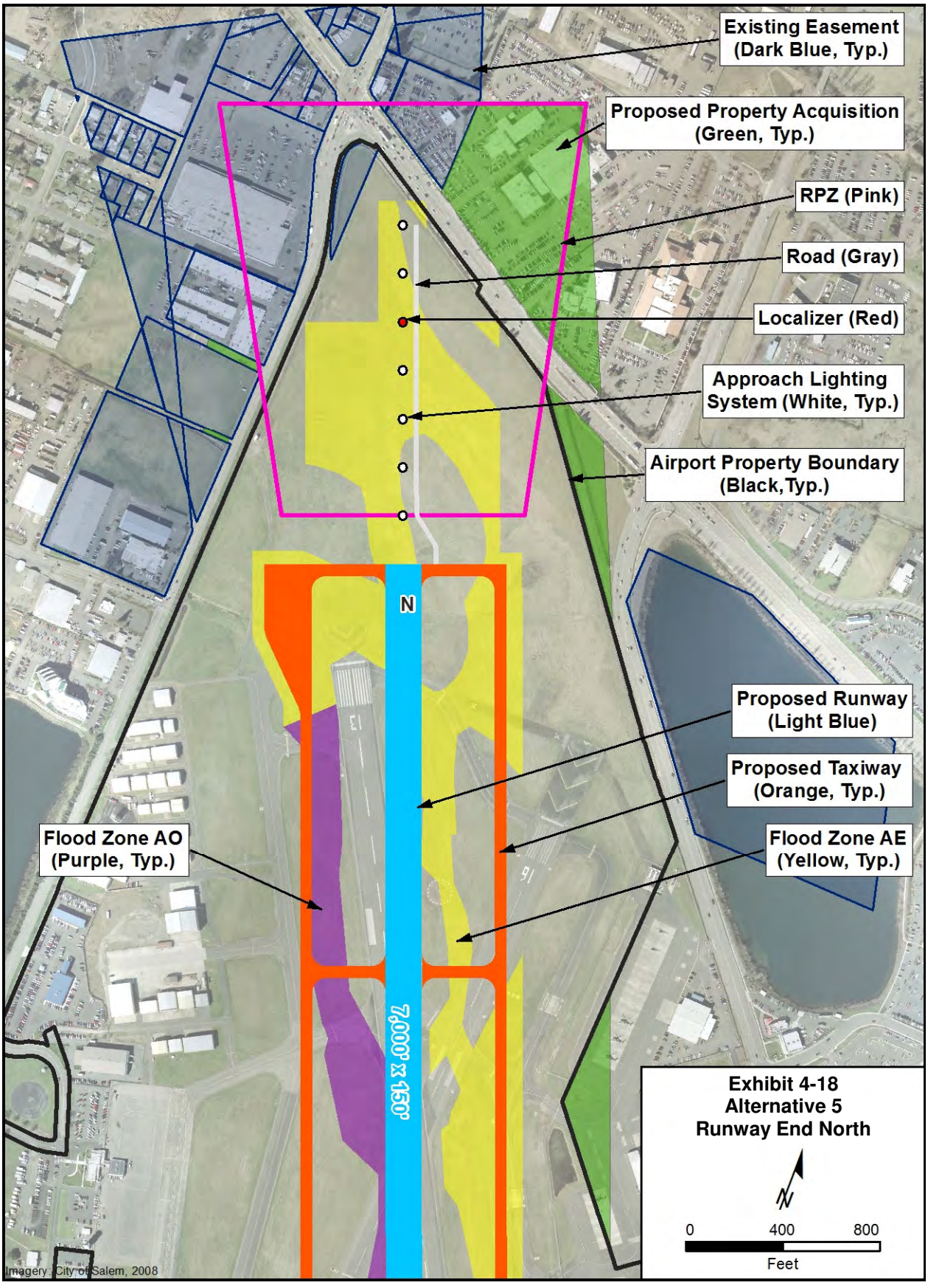
Alternative 5 is expected to have ATCT line of sight conflicts with the north and south runway ends. Removal of existing hangars at the south runway end may address potential line of sight issues.

Alternative 5 is not the preferred alternative. Reasoning is presented in **Section 4**.

Alternative 5 is presented in **Exhibit 4-16**; Alternative 5—Runway End South is presented in **Exhibit 4-17**; and Alternative 5—Runway End North is presented in **Exhibit 4-18**.


RPZ (Pink, Typ.)
Proposed Taxiway (Orange, Typ.)
Proposed Runway (Light Blue)
N
7,000' x 150'
S
Airport Property Boundary (Black,Typ.)
Property Acquisition or Easement (Green, Typ.)
ExistingEasement (Dark Blue, Typ.)
Exhibit 4-16
Alternative 5
N
0
1,500
3,000
Feet
Imagery: City of Salem, 2008


7,000' x 150'
31
S
Proposed Taxiway (Orange, Typ.)
Glide Slope (Red)
Proposed Runway (Light Blue)
Flood Zone AO (Purple, Typ.)
Approach Lighting System (White, Typ.)
RPZ (Pink)
Road (Gray)
Wetland (Brown, Typ.)
Flood Zone AE (Yellow, Typ.)
Airport Property Boundary (Black,Typ.)
Existing Easement (Dark Blue, Typ.)
Property Acquisition or Easement (Green, Typ.)
Exhibit 4-17
Alternative 5
Runway End South
0
400
800
Feet
Imagery: City of Salem, 2008


Existing Easement (Dark Blue, Typ.)
Proposed Property Acquisition (Green, Typ.)
RPZ (Pink)
Road (Gray)
Localizer (Red)
Approach Lighting System (White, Typ.)
Airport Property Boundary (Black,Typ.)
N
Proposed Runway (Light Blue)
Proposed Taxiway (Orange, Typ.)
Flood Zone AO (Purple, Typ.)
Flood Zone AE (Yellow, Typ.)
7,000' x 150'
Exhibit 4-18
Alternative 5
Runway End North
0
400
800
Feet
Imagery : City of Salem, 2008

3. Noise and Land Use Considerations

Social considerations are a preliminary assessment of the runway alternatives potential impact on the community surrounding the Airport. Impact categories include location of noise sensitive land use, such as residential development, hospitals, places of worship, and schools; and existing structures that will need to be acquired to meet FAA design standards for the RPZ, RSA, and ROFA.

3.1 Noise Sensitive Land Use

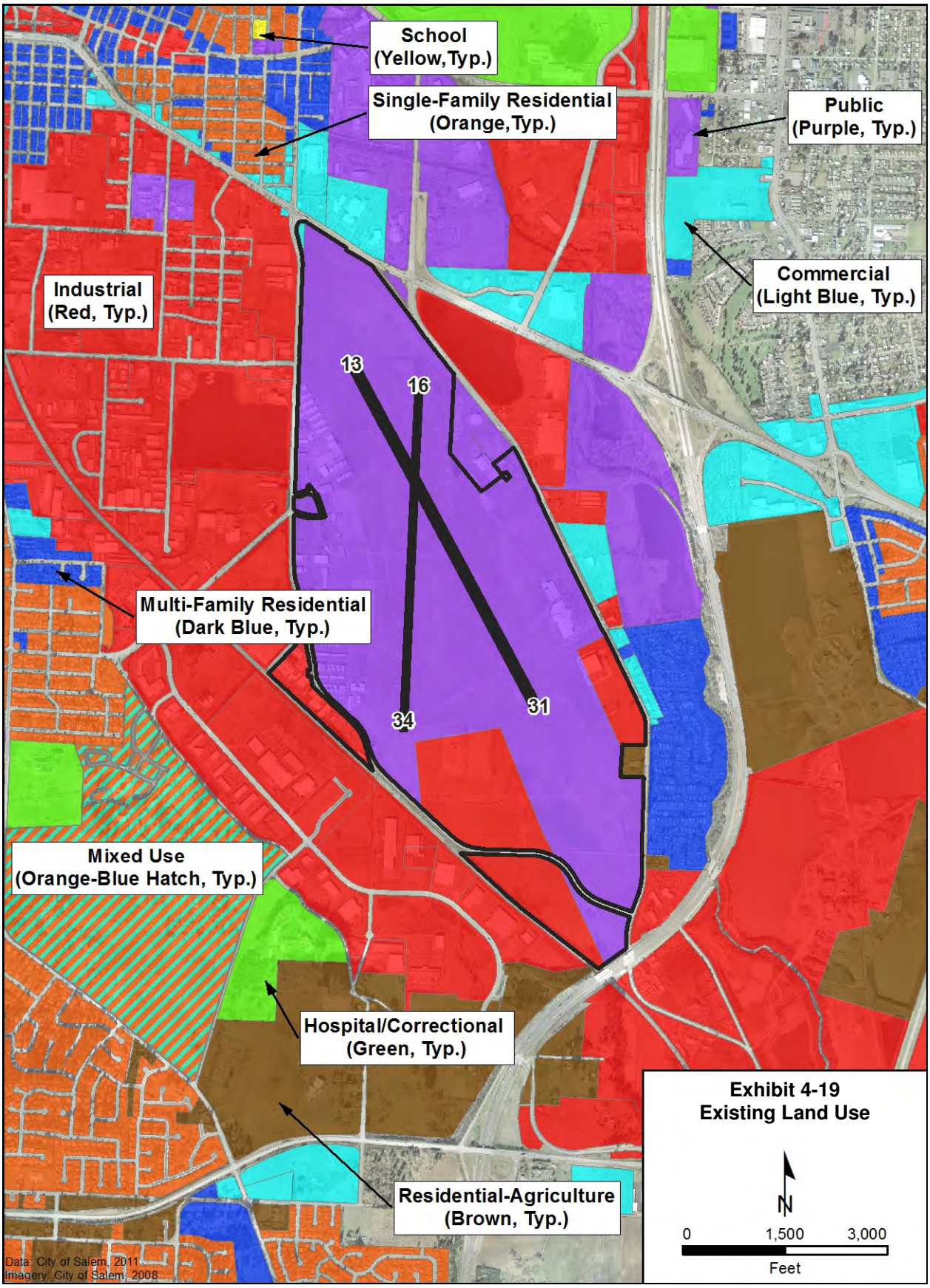
Identification of noise sensitive land use in this section considers the movement of a runway end closer to noise sensitive land use, and the change in runway utilization.

Industrial, commercial, public, and agricultural land uses are generally more compatible with aircraft operations than residential land use, schools, and hospitals. Alternative 1 extends Runway End 16 towards an elementary school and single- and multi-family residential land uses. Alternatives 2.1 and 2.2 extend Runway End 31 towards industrial and residential-agriculture land uses. No change in runway utilization is expected with Alternatives 1, 2.1, and 2.2, as existing aircraft patterns are maintained.

Alternative 3 extends Runway End 16 towards the Oregon State Penitentiary, which can be classified as a residential land use due to the nature of penitentiary operations. Alternative 4 extends Runway End 34 towards the Hillcrest Youth Correctional Facility, which can be considered a school and a residential land use. Alternatives 3 and 4 improve instrument approach capabilities of Runway 16-34, which are expected to lead to increased utilization of Runway 16-34.

Alternative 5 eliminates the existing runways; therefore, runway utilization will shift, resulting in a change of properties which see aircraft over-flight.

Existing land use is shown in **Exhibit 4-19**.


School
(Yellow, Typ.)
Single-Family Residential
(Orange, Typ.)
Public
(Purple, Typ.)
Industrial
(Red, Typ.)
Commercial
(Light Blue, Typ.)
13
16
31
34
Multi-Family Residential
(Dark Blue, Typ.)
Mixed Use
(Orange-Blue Hatch, Typ.)
Hospital/Correctional
(Green, Typ.)
Residential-Agriculture
(Brown, Typ.)
Data: City of Salem, 2011
Imagery: City of Salem, 2008
Exhibit 4-19
Existing Land Use
N
0
1,500
3,000
Feet

3.2 Land Parcel Acquisition or Easement

FAA AC 150/5300-13 states that "land uses prohibited from the RPZ are residences and places of public assembly (churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of persons typify places of public assembly)." This section considers the land parcels within the RPZs for each alternative that do not have existing avigation easements, which are shown in **Chapter 1**. Details of acquisition, easement, relocation, and demolition should be considered prior to implementation. In certain cases, only a section of a parcel is within the RPZ, and full parcel acquisition or easement is not required.

Parcels within the existing RPZs of unmodified runways are not included. Parcel acquisition or easement totals do not include analysis of FAR Part 77 surfaces, U.S. Department of Transportation Standards for Terminal Instrument Procedures (TERPS) surfaces, and AC150/5300-13 Appendix 2 threshold siting surfaces. It is recommended that RPZs be clear of objects not necessary for aircraft operations.

Parcel acquisition or easement is included in **Table 4-1**.

Table 4-1: Parcel Acquisition or Easement*

Alternative	Northern Runway End	Southern Runway End	Total
1	39	1	40
2.1	7	7	14
2.2	6	9	15
3	9	15	24
4	10	32	42
5	4	5	9

** Source: City of Salem Tax Lot Data*

Alternative 4 requires acquisition or easement of the greatest number of parcels, with 42 parcels. Alternative 5 requires acquisition or easement of the lowest amount of parcels, with nine parcels. Alternatives 1 and 3 have higher parcel acquisition or easement totals when compared to Alternatives 2.1 and 2.2.

4. Summary and Preferred Alternative

Six alternatives to meet the 7,000 foot runway length are considered. Analysis includes effects on the existing airfield, known environmental constraints, surrounding land use, transportation infrastructure, and the built environment. A summary is presented in **Table 4-2**.

Table 4-2: Runway Needs Assessment Alternative Analysis Summary

Impact Category	Alternative 1	Alternative 2.1	Alternative 2.2	Alternative 3	Alternative 4	Alternative 5
Runway End Being Extended	13	31	31	16	34	New Runway
Pavement Being Added	1,189' x 150'	1,189' x 150'	1,405' x 150'	1,855' x 150'	1,855' x 150'	7,000' x 150'
Airfield Modifications	2 Taxiways	2 Taxiways	2 Taxiways	4 Taxiways	3 Taxiways	Taxiway System
ATCT Line of Sight Conflicts	Existing Conflict	Existing Conflict	None Expected	Existing Conflict	Existing Conflict	New Conflicts
Property Acquisition or Easement	17 Acres	12 Acres	12 Acres	168 Acres	145 Acres	22 Acres
Floodplains	32 Acres	35 Acres	37 Acres	72 Acres	57 Acres	79 Acres
Wetlands	0 Acres	2.1 Acres	2.0 Acres	2.5 Acres	1.4 Acres	4.3 Acres
Noise Sensitive Land Use	Need to Assess	Similar to Existing	Similar to Existing	Need to Assess	Need to Assess	Need to Assess
Surface Transportation	Road reroute, road in RPZ	Road reroute, road in RPZ	Road in RPZ	Road closure, Road reroute, road and railroad in RPZ	Road reroute, road in RPZ, railroad in RSA, ROFA	Road in RPZ
Parcel Acquisition or Easement	40	14	15	24	42	9

Alternative 1 extends Runway End 16 towards residential development and interrupts the airport terminal's primary access road. Property acquisition or easement acreage is the third lowest of the alternatives considered; however, the number of parcels within the property acquisition or easement areas is greater than all but one of the alternatives.

Alternative 3 requires the largest acreage of property acquisition or easement compared to other alternatives, reroutes Airport Road SE, and has comparatively high wetland and floodplain impacts. Alternative 3 will change the Airport's primary runway from 13-31 to 16-34, which will change aircraft traffic patterns. Alternative 3 requires two access taxiways, and requires two existing taxiways to be realigned for the glide slope critical area. Rerouting the Union Pacific railroad should be avoided where feasible.

Alternative 4 includes the second highest property acquisition or easement acreage, and the highest parcel acquisition or easement total. Alternative 4 avoids most wetland areas, but has a high floodplain impact when compared to other alternatives. Alternative 4 reroutes three roads south of Runway End 34, and the Union Pacific railroad. Rerouting the Union Pacific railroad should be avoided where feasible.

Alternative 5 simplifies the airfield and minimizes off-airport impacts; however, Alternative 5 requires a new taxiway system and has the greatest environmental impact in the categories considered. It is anticipated that Alternative 5 will be more expensive to implement than the other alternatives and may result in airport closure during construction.

Alternatives 2.1 and 2.2 have similar effects. Property acquisition or easement for both alternatives is 12 acres. Alternative 2.1 has two fewer acres of floodplains impacts, and 0.1 more acres or wetland impacts. Alternative 2.1 has one more parcel that is recommended for acquisition or easement.

The primary difference between the two alternatives is that Alternative 2.2 addresses the ROFA that extends beyond the airport property boundary, while Alternative 2.1 does not. In Alternative 2.2, the last light of the approach lighting system beyond Runway End 31 is located on Interstate 5, while the last light of the approach lighting system beyond Runway End 31 in Alternative 2.1 is located just north of Interstate 5. It is anticipated that modifying the MALSR to avoid conflict with Interstate 5 is a better solution than rerouting 25th Street SE to avoid the ROFA, and better than having a non-standard ROFA.

Alternative 2.2 is the preferred runway alternative.

5. Preferred Alternative Modifications

The preferred alternative was modified during the ALP review process to meet future FAA RPZ guidance. In February 2012, the FAA released a draft version of updated AC 150/5300-13. One of the elements updated in Draft AC 150/5300-13 is reference to a forthcoming AC on acceptable land uses inside the RPZ. The presence of Interstate 5 inside the Runway End 31 RPZ of the preferred alternative is considered incompatible by the FAA. Modifications to the preferred alternative shift the RPZ off from Interstate 5 to meet FAA requirements.

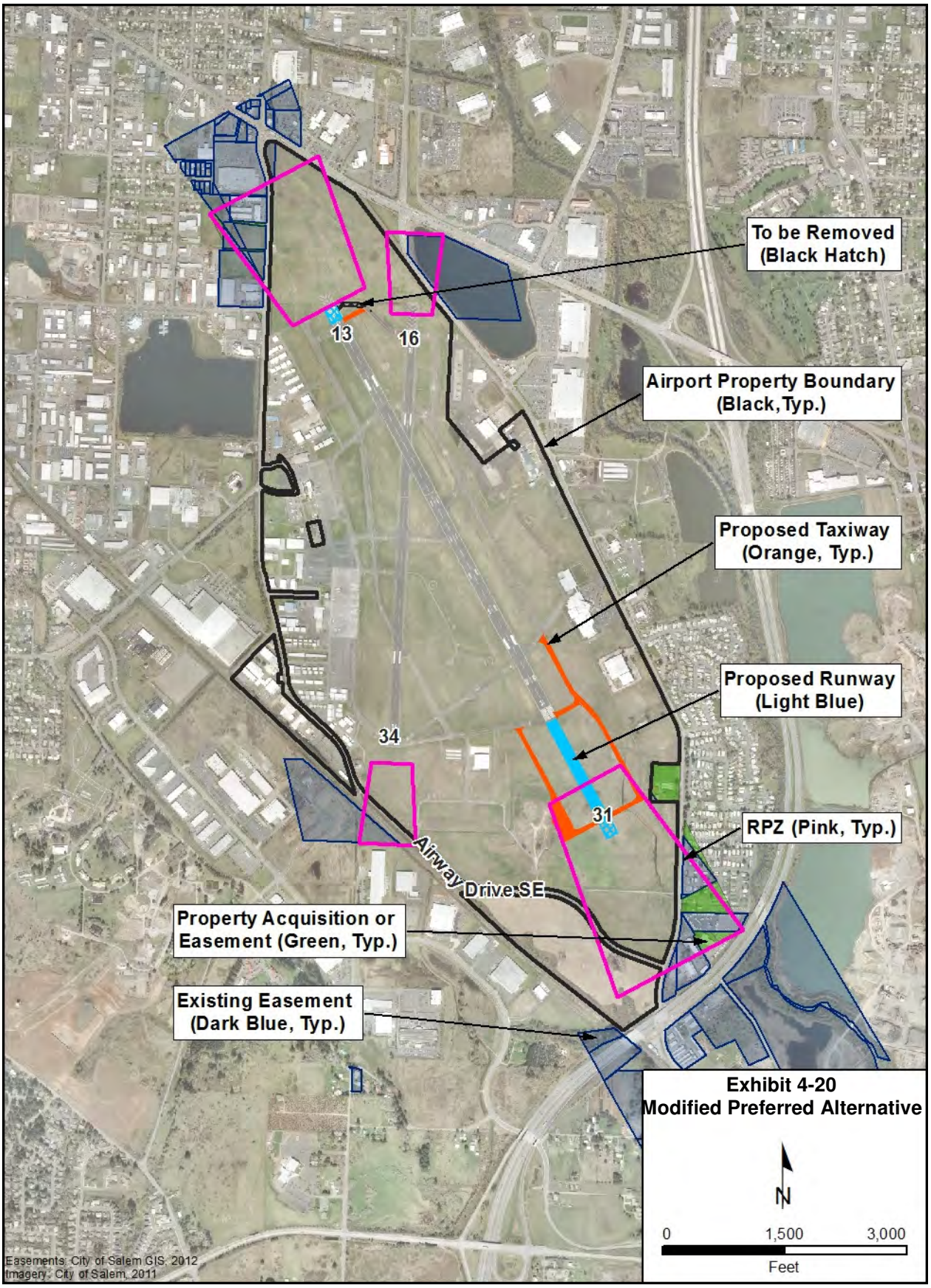
The modification to the preferred alternative uses declared distances to shift the approach RPZ away from Interstate 5. Declared distances displace the landing threshold of Runway End 31 by 712 feet. This shortens the landing distance available for aircraft using Runway End 31, but preserves takeoff run available. Aircraft generally require more runway length to takeoff than they do to land. A summary of the usable runway lengths once declared distances are applied to the preferred alternative is included in **Table 4-3**.

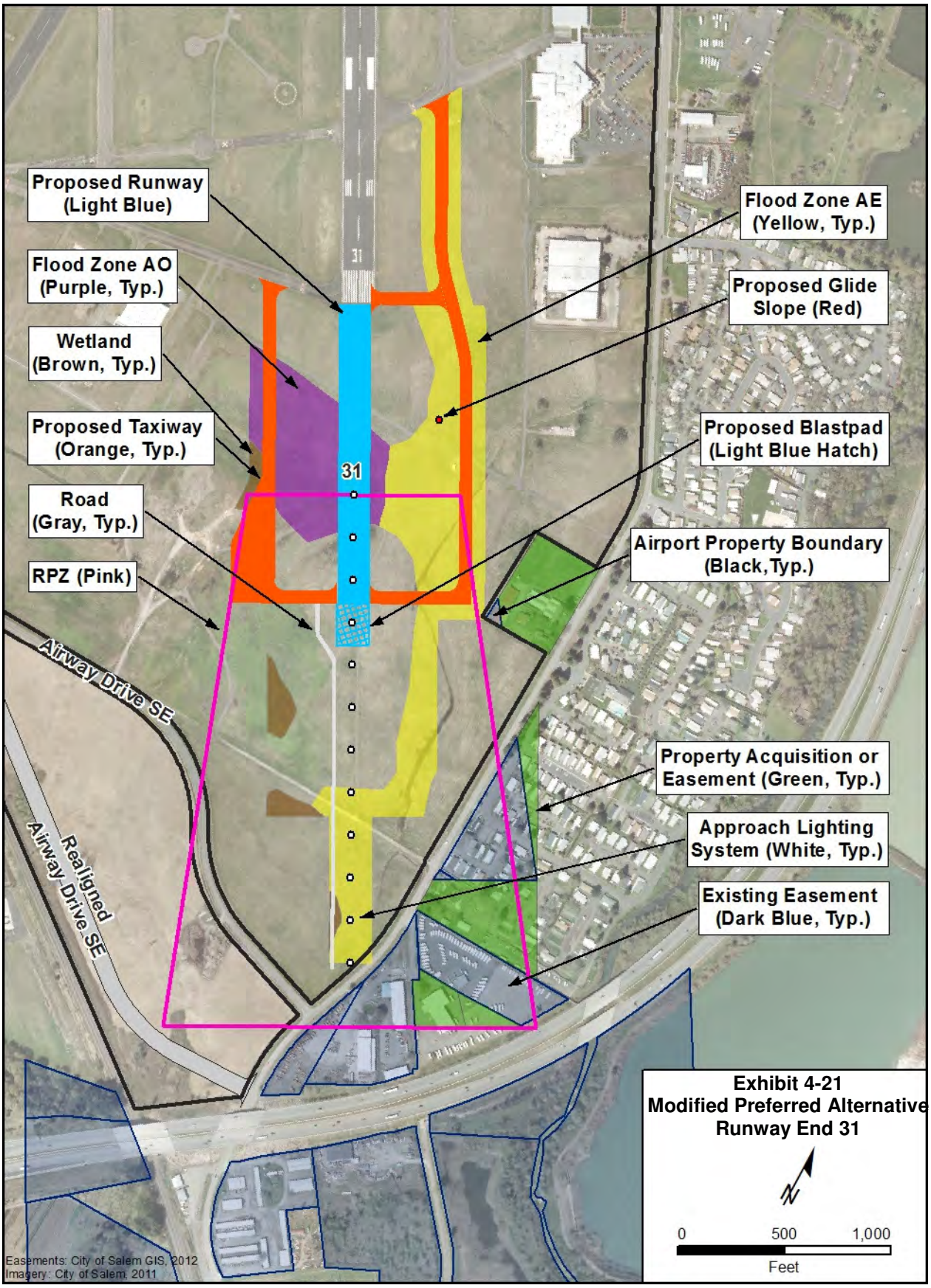
Table 4-3: Preferred Alternative Declared Distances

Runway	Takeoff Run Available	Takeoff Distance Available	Accelerate-Stop Distance Available	Landing Distance Available
13	7,000’	7,000’	7,000’	7,000’
31	7,000’	7,000’	7,000’	6,288’

Takeoff Run Available: Runway length suitable for an aircraft taking off.
Takeoff Distance Available: Takeoff run available plus remaining runway and clearway.
Accelerate-Stop Distance Available: Runway length suitable for an aircraft aborting takeoff.
Landing Distance Available: Distance from the landing threshold to the end of the runway.

The approach lighting system remains in the location identified in the preferred alternative; however, the type of lights used will be flush with the runway pavement instead of elevated for the first 600 feet from the runway end. The glide slope is not shifted as far to the south to accommodate the threshold displacement. The proposed east side taxiway is designed to accommodate the relocated glide slope’s critical area. The City of Salem plans to realign Airway Drive to the south to keep it clear of the RPZ to satisfy future FAA guidance. The modified preferred alternative is included in **Exhibit 4-20** and **Exhibit 4-21**.


To be Removed (Black Hatch)
13
16
Airport Property Boundary (Black, Typ.)
Proposed Taxiway (Orange, Typ.)
Proposed Runway (Light Blue)
34
31
RPZ (Pink, Typ.)
Airway Drive SE
Property Acquisition or Easement (Green, Typ.)
Existing Easement (Dark Blue, Typ.)
Exhibit 4-20
Modified Preferred Alternative
N
0
1,500
3,000
Feet
Easements: City of Salem GIS, 2012
Imagery: City of Salem, 2011


Proposed Runway (Light Blue)
Flood Zone AO (Purple, Typ.)
Wetland (Brown, Typ.)
Proposed Taxiway (Orange, Typ.)
Road (Gray, Typ.)
RPZ (Pink)
Flood Zone AE (Yellow, Typ.)
Proposed Glide Slope (Red)
Proposed Blastpad (Light Blue Hatch)
Airport Property Boundary (Black,Typ.)
Property Acquisition or Easement (Green, Typ.)
Approach Lighting System (White, Typ.)
Existing Easement (Dark Blue, Typ.)
31
Airway Drive SE
Realigned Airway Drive SE
Exhibit 4-21
Modified Preferred Alternative
Runway End 31
N
0
500
1,000
Feet
Easements: City of Salem GIS, 2012
Imagery: City of Salem, 2011

Chapter 5

Facility Requirements and Improvement Alternatives

Facility Requirements and Improvement Alternatives

1. Introduction

This chapter identifies facility recommendations and requirements to accommodate the forecasted level of demand at Salem Municipal Airport (SLE). These recommendations and requirements are developed in coordination with the aviation activity forecasts in **Chapter 3**, Airport management and stakeholder comments, and Federal Aviation Administration (FAA) Advisory Circulars (AC) 150/5070-6B *Airport Master Plans*, AC 150/5300-13 *Airport Design*, and AC 150/5060-5 *Airport Capacity and Delay*. Additional technical guidance comes from AC 150/5360-9, *Planning and Design of Airport Terminal Buildings at Non-hub Locations*.

Airport improvement alternatives are developed to meet the forecasted facility requirements, and are presented at the end of each section. In situations where there is one feasible improvement course, one development scenario is presented.

Requirements and improvement alternatives associated with runway facilities are included in **Chapter 4**.

This chapter is organized into the following sections.

- Airport and Airfield Facilities
- Passenger Terminal
- Property
- Summary

1.1 Evaluation Criteria

Airport development alternatives are based on the following criteria.

- The movement of aircraft in the air and on the ground is a primary consideration. Safety is a priority, as is conformance with FAA standards for separation, clearance, and dimension.
- Alternatives are evaluated for compatibility with the existing airfield, aircraft operations, and with implementation phasing. Potential of expansion beyond planned levels is considered.
- Accessibility and convenience to Airport users, operators, pilots, passengers, and employees is evaluated. Accessibility and convenience affect public perception of SLE, and influence the Airport's operational efficiency.

2. Airport and Airfield Facilities

Airfield facilities are designed to accommodate the critical aircraft design group (ADG), identified in Master Plan Update—Phase I (MPU-I) as a mix of ADG I, II, and III, as described in **Chapter 1**. The ADG may differ for each facility. Airfield facility requirements are developed for each of the Airport's following functional areas.

- Runway Capacity
- Taxiway System
- Navigational Aids and Airport Traffic Control Tower
- Aircraft Rescue and Firefighting
- Airport Maintenance
- Aircraft Parking and Storage
- Fixed Base Operators and Airport Businesses

The existing and planned airport reference code (ARC) at SLE is C-II, defined in **Chapter 1**. It is recommended that future facility developments are designed to meet ADG III standards where feasible, to accommodate existing GA and forecasted scheduled commercial passenger airline aircraft. Design surfaces and standards are used to develop and evaluate runway improvement alternatives in **Chapter 4**. Existing and planned design surfaces are shown on the Airport Layout Plan (ALP).

2.1 Runway Capacity

AC 150/5060-5 defines capacity as "a measure of the maximum number of aircraft operations which can be accommodated on the airport or airport component in an hour." Methodology used to quantify capacity focuses on annual service volume (ASV). AC 150/5060-5 defines ASV as "a reasonable estimate of an airport's annual capacity. It accounts for difference in runway use, aircraft mix, weather conditions, etc. that would be encountered over a year's time."

ASV is calculated by pairing SLE's runway configuration to layouts in AC 150/5060-5, and generating a fleet mix index. The fleet mix index is the number of operations by aircraft that weigh more than 12,500 pounds but less than 300,000 pounds, designated as *C*; plus three times the number of operations by aircraft that weigh over 300,000 pounds, designated as *D;* divided by the airport's annual operations. Annual operations are the sum of operations conducted by single-engine aircraft that weigh 12,500 pounds or less, designated as *A;* multi-engine aircraft that weigh 12,500 pounds or less designated as *B;* and *C,* and *D* aircraft. The runway configurations in AC 150/5060-5 have hourly capacities for visual flight rules (VFR) and instrument flight rules (IFR) operations, and ASV based on the fleet mix index.

Most aircraft operations at SLE are conducted by aircraft in the *A* weight class, such as the Cessna 172, and *B* weight class, such as the Cessna 402. Corporate jets, such as the Dassault Falcon 2000, and large turbo-prop aircraft, such as the Beechcraft King Air 350i fall into the *C* class. Aircraft in the *D* class include the Boeing 767 and the Airbus A340. D class aircraft generally serve long-haul commercial passenger and freight markets. SLE did not have scheduled operations by aircraft in the *D* class in 2008.

To estimate the number of operations conducted by *C* aircraft, 2009 FAA Terminal Area Forecast (2009 TAF) based aircraft counts were used to establish percentages of aircraft types. The 2009 TAF was used to maintain base year consistency with aviation activity forecasts, presented in **Chapter 3**. It is expected that *single-engine piston*, *helicopter*, and *other* aircraft weigh 12,500 pounds or less, and that *multi-engine piston* and *jet* aircraft weigh more than 12,500 pounds but less than 300,000 pounds. The 2009 TAF indicates that in 2008, 33 out of 216 based aircraft were *multi-engine piston* or *jet*, which was used to extract that 15 percent of local and itinerant general aviation (GA) operations were by *C* aircraft. It is expected that 100 percent of air carrier, air taxi, and military operations were by *C aircraft*. The fleet mix index for SLE in 2008 is 19 percent. The 2008 fleet mix index determination is presented in **Table 5-1**.

Table 5-1: 2008 Fleet Mix Index Determination

Designation	GA Operations		Military		Air Carrier	Air Taxi	Total
	Local	Itinerant	Local	Itinerant			
A & B	26,296	23,142	1,383	2,883	0	0	53,704
C	4,750	4,180	250	521	20	2,985	12,706
D	0	0	0	0	0	0	0

Fleet Mix Index: C+(3*D)= 12,706+(3*0) = 12,706
12,706/ (12,706+53,704) = **19%**

The runway configuration at SLE is most similar to Runway Use Configuration 9 in AC 150/5060-5. A fleet mix of 19 percent applied to Runway Use Configuration 9 generates an hourly capacity of 98 VFR operations and 59 IFR operations. The ASV is 230,000 operations. SLE had 66,410 operations in 2008, 29 percent of ASV. Aviation activity forecasts anticipate SLE having 82,388 operations in 2028, 35 percent of ASV.

It is expected that SLE will not require additional runways to accommodate forecasted aircraft activity.

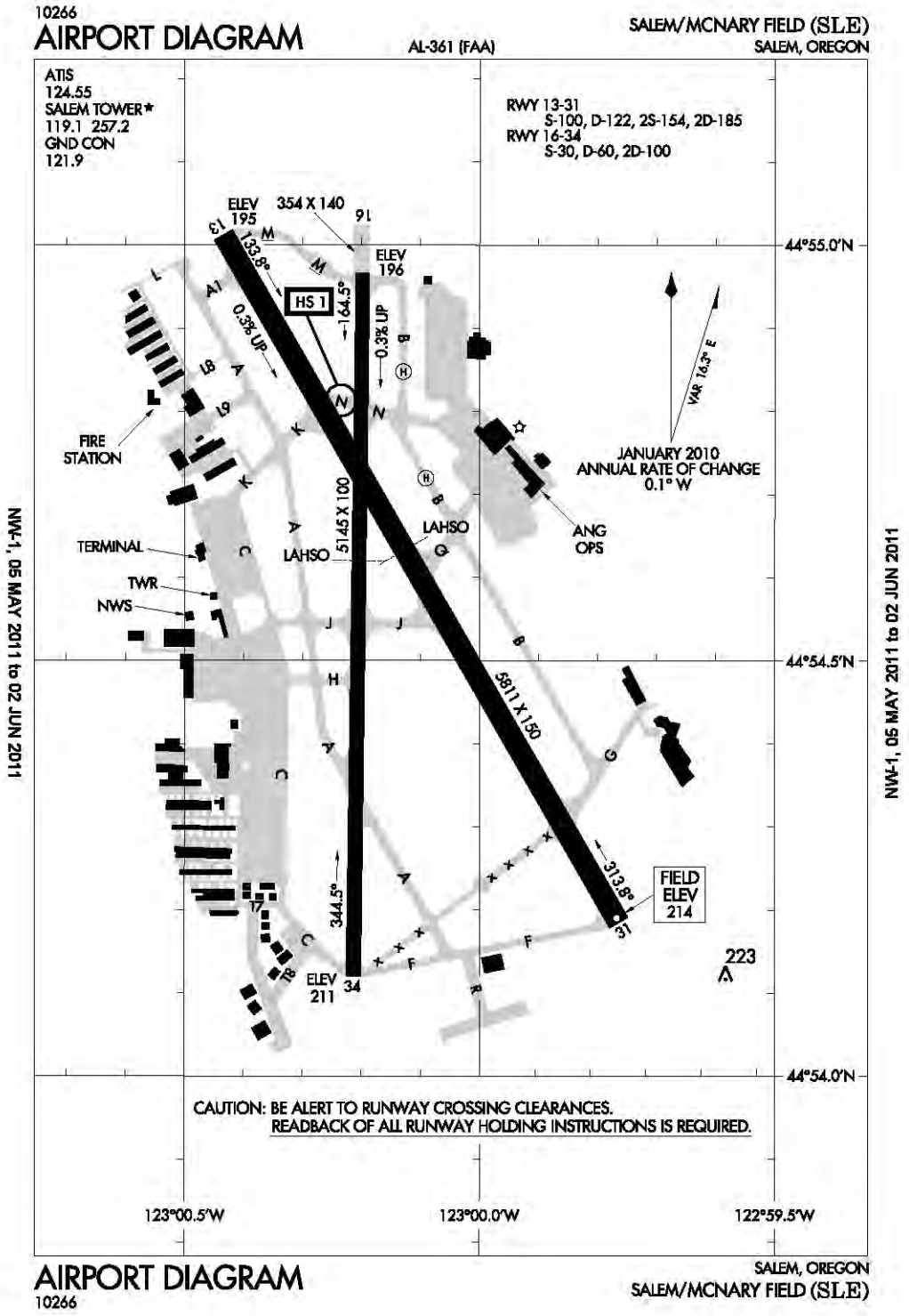
A fleet mix index of 19 produces an ASV of 230,000 for a single runway configuration. It is expected that SLE can maintain existing capacity with one runway while the other is undergoing maintenance. Differences in wind protection and instrument approach capability will limit airport capacity in certain weather conditions.

2.2 Taxiway System

The taxiway system connects the runway ends to landside facilities, which includes the passenger terminal building, aviation related businesses, and aircraft parking and storage. Taxiway facilities associated with the preferred runway improvement alternative in **Chapter 4** are incorporated into the taxiway configuration alternative. Facility requirements address taxiway width, and taxiway system layout.

Existing taxiway system configuration is presented in **Exhibit 5-1**.

Exhibit 5-1: Existing Taxiway System Configuration



Source: FAA, May 2011

2.2.1 Taxiway Width

Taxiway widths are presented in **Chapter 1**. Taxiway dimension standards in AC 150/5300-13 indicate that taxiways for ADG II should be 35 feet wide. Taxiways for ADG III should 50 feet wide, and 60 feet wide for aircraft with a wheelbase greater than 60 feet. Aircraft operating at SLE in 2008, such as the Boeing Business Jet, have a wheelbase greater than 60 feet.

Existing taxiways at SLE are at least 50 feet wide with the exception of Taxiway L. Taxiway L is primarily used by small GA aircraft, which are accommodated by the existing taxiway width.

It is recommended that future taxiways are developed to ADG III standards, with a width of 60 feet.

2.2.2 Taxiway Configuration

SLE's intersecting runways present a challenge to developing full-length parallel taxiways. The proposed taxiway layout provides parallel taxiways on both sides of the runways near Runway Ends 31 and 34, and on one side of the runways near Runway Ends 13 and 16. Planned taxiways are 60 feet wide, and existing taxiways are widened to 60 feet. Runway centerline to taxiway centerline separation is 400 feet for new taxiways, and existing taxiways closer than 400 feet are relocated.

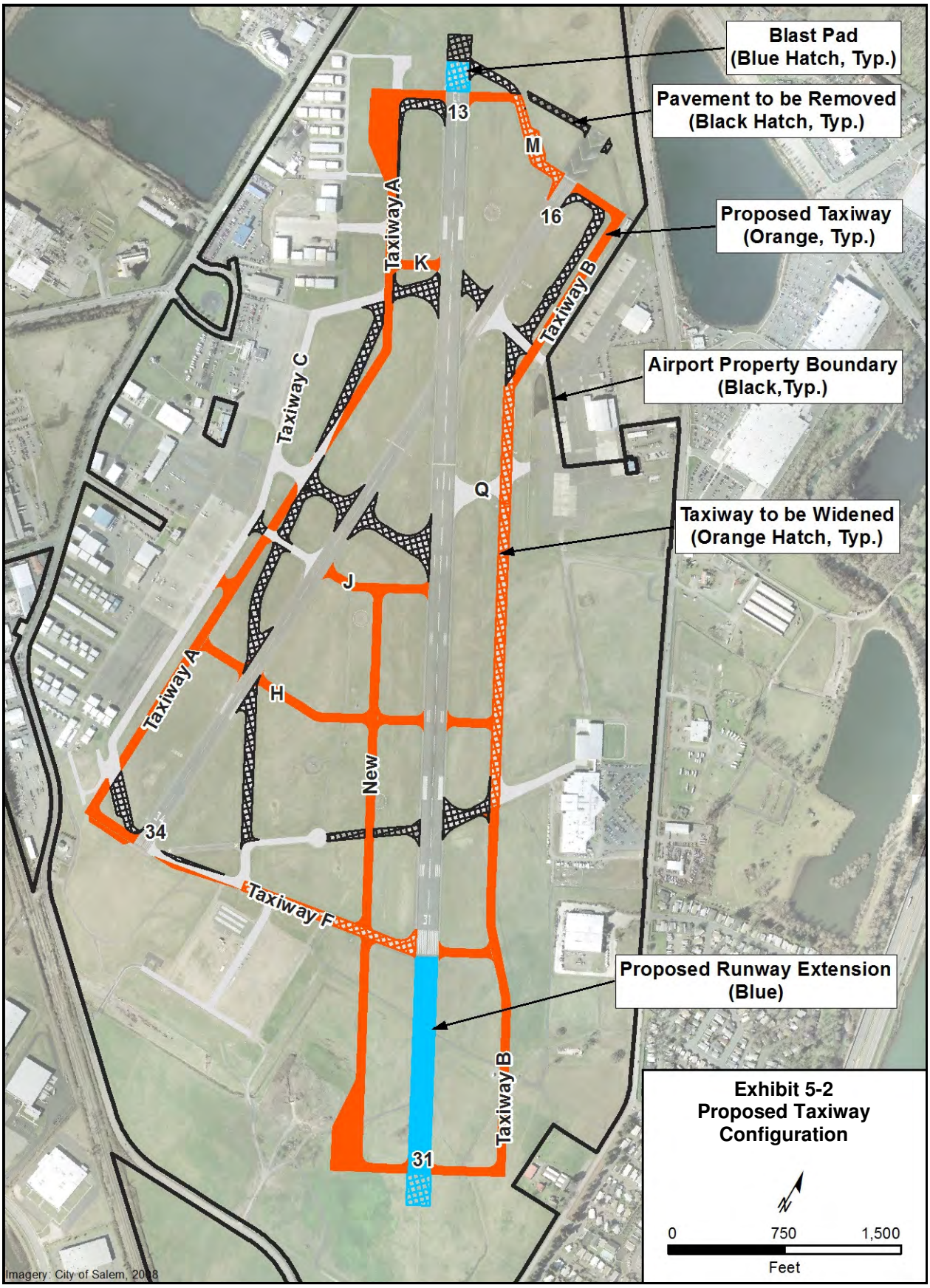
Airport traffic control tower (ATCT) staff require unobstructed line of sight to aircraft movement areas. Buildings, vegetation, and parked aircraft can interrupt ATCT line of sight. Hangar 2820, formerly used by Silver State Helicopters, on Taxiway L9 interrupts ATCT line of sight with Runway End 13. As a result, Taxiway A1 is located 315 feet from Runway End 13 to keep aircraft within ATCT line of sight. Aircraft using Runway End 13 need to back-taxi on the runway to use the full runway length. This situation is generally inconvenient and undesirable. The preferred runway alternative in **Chapter 4** relocates Runway End 13, bringing it into ATCT line of sight.

FAA Engineering Brief 75 recommends that taxiways intersect runways perpendicularly. Taxiway A does not have a perpendicular intersection with Runway 16-34, Taxiway J does not have a perpendicular intersection with Runway 13-31, and Taxiway N does not have a perpendicular intersection north of the intersection of Runway 13-31 and Runway 16-34. This location is referred to as hot-spot 1 (HS-1) on the FAA airport diagram, in **Exhibit 5-1**. Elimination of non-perpendicular intersections is a challenge to maintaining operational convenience and safety of the taxiway system. It is recommended that non-perpendicular taxiway intersections be avoided.

FAA Engineering Brief 75 recommends that aircraft parking aprons do not have taxiways that lead directly to a runway. The FAA recommends that turns be introduced to a taxi path to help reduce the chance of a pilot unfamiliar with the airport accidentally taxiing past an intersecting taxiway on onto a runway. It is recommended that taxiways that lead directly from an aircraft parking apron to a runway be realigned.

Access to the compass calibration changed from Taxiway A to Taxiway F, and the new infield taxiway that is parallel to Runway 13-31.

The proposed taxiway configuration is presented in **Exhibit 5-2**.


Blast Pad
(Blue Hatch, Typ.)
Pavement to be Removed
(Black Hatch, Typ.)
Proposed Taxiway
(Orange, Typ.)
Airport Property Boundary
(Black,Typ.)
Taxiway to be Widened
(Orange Hatch, Typ.)
Proposed Runway Extension
(Blue)
13
16
31
34
M
K
Q
J
H
New
Taxiway A
Taxiway B
Taxiway C
Taxiway F
Imagery: City of Salem, 2008
Exhibit 5-2
Proposed Taxiway
Configuration
0
750
1,500
Feet

2.2.3 Proposed Taxiway Layout

The proposed taxiway alternative realigns and replaces existing taxiways to create a partial-parallel taxiway system. Taxiway A begins at Runway End 13, parallels Runway 13-31 for 1,700 feet before turning to parallel Runway 16-34. Taxiway A continues parallel to Runway 16-34 until it reaches Runway End 34. Taxiway A replaces existing Taxiway C south of existing Taxiway K, and existing Taxiway A south of existing Taxiway K is removed. Taxiway C becomes a taxilane for the GA parking apron.

Taxiway B is relocated 100 feet farther away from the centerline of Runway 16-34 to meet the 400 feet runway centerline to taxiway centerline separation requirement. Taxiway B parallels Runway 16-34 for 1,400 feet before turning to parallel Runway 13-31. Taxiway B extends to Runway End 31, as indicated in **Chapter 4**.

Two infield taxiways are added: one parallel to Runway 13-31 from Runway End 31 to Taxiway A, and the other parallel to Runway 16-34 from Runway End 34 to Taxiway B. The intersections of the proposed taxiways and the intersection of the proposed taxiways with the runways are not perpendicular.

Taxiway F is reconfigured to provide perpendicular intersection with Runway End 34. Taxiway H is shifted south along Runway 16-34. Taxiway K east of Taxiway A is shifted towards Runway End 13.

Taxiway J and Taxiway N between Runways 13-31 and 16-34 are removed, which address HS-1.

The number of taxiways that are added, removed, and rerouted reduces applicability of the existing naming scheme. It is recommended that SLE rename taxiways in an intuitive manner to facilitate airfield navigation.

2.3 Navigational Aids and Airport Traffic Control Tower

AC 150/5070-6B, *Airport Master Plans*, defines navigational aids (NAVAIDs) as "aids to navigation [that] provide pilots with information to assist them in locating the airport and to provide horizontal and/or positional guidance during landing." The type, mission, and volume of aeronautical activity, in association with airspace, meteorological conditions, and capacity data, determine the need for NAVAIDs.

The FAA is developing the Next Generation Air Transportation System (NextGen), to transition from ground-based NAVAIDs to satellite-based global positioning system (GPS) satellites. NAVAID development is occurring simultaneously with improvements in aircraft onboard avionics. The higher precision afforded as part of NextGen is planned to reduce congestion, improve efficiency, and increase safety. As the NextGen system develops, ground-based NAVAIDs will be decommissioned with some ground-based NAVAIDs maintained as backup.

SLE's on-airport NAVAIDs, including airport lighting, the rotating beacon, wind indicators, and the automated surface observation system (ASOS) should be maintained to FAA standards for aircraft without GPS receivers, and to supplement NextGen.

It is expected that the ATCT will continue to operate at SLE, and support safe and efficient operations. Aviation activity forecasts anticipate a 1.4 percent increase in annual aircraft operations. Technological developments planned as part of NextGen will support and improve the ATCT.

It is recommended that airport improvement projects consider ATCT line of sight.

2.4 Aircraft Rescue and Firefighting

Aircraft rescue and firefighting (ARFF) facility requirements and improvement alternatives consider ARFF equipment and staff, and the location of the ARFF facility.

The FAA Reauthorization Act of 2009 called for amending ARFF standards in Federal Aviation Regulations (FAR) Part 139 to make them more similar to standards recommended by the International Civil Aviation Organization and the National Fire Protection Association. Airports across the country have indicated that these standards, which would require additional staff and faster response times, would increase operating costs. Airport Cooperative Research Program *Web-Only Document 7*, *How Proposed ARFF Standards Would Impact Airports,* suggests that increased ARFF standards may increase operating cost at an ARFF Index B airport like SLE by as much as 2.3 million dollars per year.

It is recommended that SLE monitor FAA reauthorization, and consider that ARFF requirements may increase.

2.4.1 ARFF Equipment

ARFF services are required by FAR Part 139. SLE is an ARFF Index B airport, which FAR Part 139 defines as having at least five average daily departures by aircraft that are "at least 90 feet but less than 126 feet in length." Example aircraft in ARFF Index B include the Bombardier CRJ-700 regional jet, and the Boeing 737-700. SLE's existing ARFF vehicles meet FAR Part 139 Index B requirements. It is not expected that SLE's ARFF Index will decrease from B.

Increased requirements of ARFF Index C will become effective if SLE averages five or more daily departures of an aircraft that is at least 126 feet, but less than 159 feet in length. Example aircraft in ARFF Index C include the Boeing 737-800, 737-900, and MD-80, and the Airbus A321. Scheduled commercial passenger airline service may introduce these aircraft to SLE, and increase the ARFF Index.

It is recommended that ARFF equipment be evaluated if a scheduled air carrier initiates operations at SLE with aircraft larger than 126 feet in length.

2.4.2 ARFF Facility Location

The existing ARFF facility is located on Taxiway L8, near Runway End 13 (shown in **Exhibit 5-3**). FAR Part 139 requires ARFF vehicles to reach the midpoint of the farthest runway from their storage location within 3 minutes. Extension of Runway End 31, as recommended in **Chapter 4**, will move the midpoint of Runway 13-31 800 feet farther away from the ARFF station and likely increase response time.

The ARFF facility at SLE serves the local community as Fire Station 6 of the Salem Fire Department, and requires direct access to 25th Street SE. City data indicates that Fire Station 6 is located near the center of its service area. Moving the ARFF station to the east side of the airfield would likely create a negative effect on response time for the community in the west side of its service area.

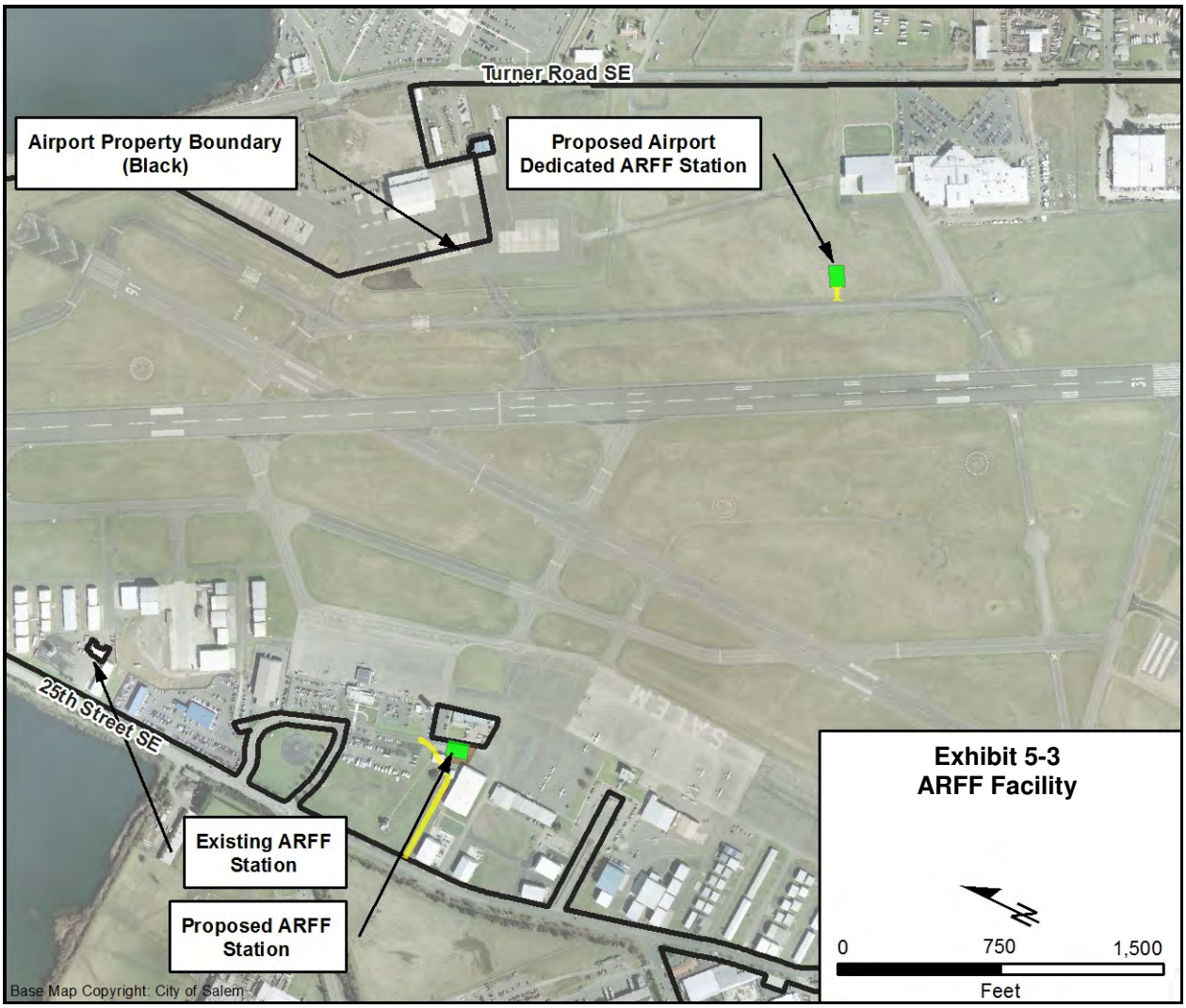
It is recommended that ARFF facility relocation alternatives move the ARFF facility to a central location on the airfield, maintain presence on the west side of the airfield, and maintain access to 25th Street SE.

2.4.3 ARFF Facility Improvement

The intent of a new ARFF facility is to provide room for expansion should additional vehicles be required, to relocate closer to the midpoint of the runways, and to maintain street access. Proposed runway extension**,** presented in **Chapter 4**, and proposed taxiway reconfiguration, presented in **Section 2.2.2**, are considered. Salem Fire Department training facilities that are co-located with the existing ARFF facility are not considered in the relocation.

ARFF facility locations were considered on the eastside and southside of the Airport. An ARFF facility on the southside of the airfield would be located farther away from runway midpoints than a centrally located ARFF facility. An ARFF facility located on the eastside of the airfield is not ideal because it would move Station 6 to the far side of its existing community service area. These alternatives were eliminated from further consideration; however, an ARFF on the eastside of the airfield may improve response time if SLE sees scheduled commercial passenger service increase to a level that justifies an ARFF facility dedicated to the Airport.

The proposed ARFF facility location is presented in **Exhibit 5-3**.



Relocation of the ARFF facility is compared to the ARFF facility's existing location. The new ARFF facility is located near to the Oregon Department of Aviation (ODA) offices. The proposed ARFF facility location will put ARFF equipment and staff closer to the runway midpoints, while maintaining access to 25th Street SE, via Aviation Loop SE. **Section 3.4** presents improvements which support the relocated ARFF.

As scheduled commercial passenger operations increase at SLE, the Airport and the City of Salem should consider an ARFF facility dedicated solely to the Airport in addition to the existing joint-use facility. This is expected to allow the joint-use facility to focus on serving the community and supporting the Airport when necessary. The airport dedicated facility will handle most aviation-related ARFF requirements.

2.5 Airport Operations

Airport maintenance equipment is stored on the apron by the passenger terminal building. Vehicles are stored outside, and equipment is stored in containers. Airport operations employees have offices in the passenger terminal building. Interviews with airport operations staff indicate that existing facilities are adequate; however, covered storage is preferred.

It is recommended that covered maintenance equipment and supply storage be included near passenger terminal building, as addressed in **Section 3**.

2.6 Aircraft Storage and Landside Development

Aircraft storage outlines facility requirements to meet the forecasted growth in based aircraft and itinerant aircraft operations. Aircraft storage is expected to occur in landside development areas on the southside and eastside of the airfield. Southside and eastside development areas are expected to accommodate businesses that are aviation related, such as fixed base operator (FBO) expansion, and non-aviation related, such as research, development, and manufacturing facilities.

2.6.1 Aircraft Storage

Based aircraft are stored in box hangars and T-hangars, and parked in tie-down spaces. Hangars are located along taxiways and taxilanes, and tie-down spaces are located on aircraft aprons. Transient aircraft park on aircraft aprons. Aviation activity forecasts anticipate a 1.1 percent annual increase in based aircraft and a 1.2 percent annual increase in itinerant GA operations.

Existing ratios between the number of based aircraft and the number of aircraft storage spaces are applied to based aircraft forecasts to determine aircraft parking and storage facility requirements. Airport stakeholders have indicated that tie-down spaces should be maintained at existing levels. This reflects the rising trend of aircraft owner preference for covered storage over open air tie-down. Hangar development is driven by aircraft operator preference; therefore, facility requirements serve to identify and protect property for future development. It is anticipated that forecasting facility requirements in this manner will help SLE maintain existing levels of service with increased aviation activity.

In 2008, SLE had 216 based aircraft, 127 box hangars, 14 T-hangar units, and 121 tie-down positions. Existing ratios of 1.7 based aircraft per box hangar, 15 based aircraft per T-hangar unit, and 1.8 based aircraft per tie-down position are maintained for the forecast years. Aircraft storage requirements are presented in **Table 5-2**.

Table 5-2: Aircraft Hangars and Tie-Down Spaces

Year	Based Aircraft	Box Hangars	T-Hangar Units	Tie-Down Spaces
2008	216	127	14	121
2013	240	150	20	121
2018	250	150	20	121
2023	260	160	20	121
2028	270	160	20	121

It is recommended that SLE add 33 box hangars to the existing 127, for a total of 160; six T-hangar units to the existing 14, for a total of 20; and maintain the existing 121 tie-down spaces.

There are two aircraft parking apron areas at SLE. GA aircraft primarily use the GA parking apron on the southwest site of the airfield. Commercial passenger service and air cargo aircraft use the passenger terminal apron, evaluated in **Section 3.3.5**.

In 2008 there was 774,000 square feet of GA parking apron, and 222,000 square feet of air carrier apron. GA apron facility requirements are developed to maintain the existing ratio of 3,600 square feet of GA apron per based aircraft. This area is expected to include taxilanes, and aircraft parking aprons. GA parking apron requirements are presented in **Table 5-3**.

Table 5-3: GA Parking Apron

Year	Based Aircraft	Tie-Down Spaces	Parking Apron Area (Square Feet)
2008	216	121	774,000
2013	240	140	860,000
2018	250	150	900,000
2023	260	150	940,000
2028	270	160	970,000

It is recommended that SLE add 196,000 square feet for GA parking apron to the existing 774,000 square feet, for a total of 970,000 square feet.

GA apron expansion is planned for the southside and eastside development areas, described in **Section 2.6.2**.

2.6.2 Landside Development

Airport development can be aviation related, like FedEx and the Salem Air Center, and non-aviation related, like Hertz Car Sales of Salem. SLE receives revenue through lease agreements with airport businesses. Airport property that is not required for aviation use can be converted to non-aviation use, depending on FAA and local approval. Non-aviation use property can be developed, generating additional revenue for the Airport. Development of airport businesses and fixed base operators (FBOs) is dependent on market conditions.

It is recommended that the Airport coordinate with the FAA and the City of Salem to develop property that will not be used for aviation purposes. Development will be influenced by local zoning and demands of property owners. City of Salem Code section 143G.030 supports development of manufacturing, wholesale trade, financial, and service businesses on airport property.

FBOs, which are aviation related businesses that specialize in aircraft service and fueling, generally prefer to locate near customer facilities such as hangars and aprons. Existing GA and commercial development is clustered on the westside of the airfield. Oregon Air National Guard (ORANG) and Garmin maintain fueling and maintenance facilities for their aircraft on the eastside of the airfield.

It is recommended that SLE plan for landside development and FBO expansion.

2.6.3 Proposed Aircraft Storage and Landside Development

Two development areas are planned: one is located on the southside of the airfield, near existing Taxiways F and R; and the other is located on the eastside of the airfield, between the ORANG and Garmin. GA apron expansion is planned to occur in the southside and eastside development areas, and along the existing GA apron.

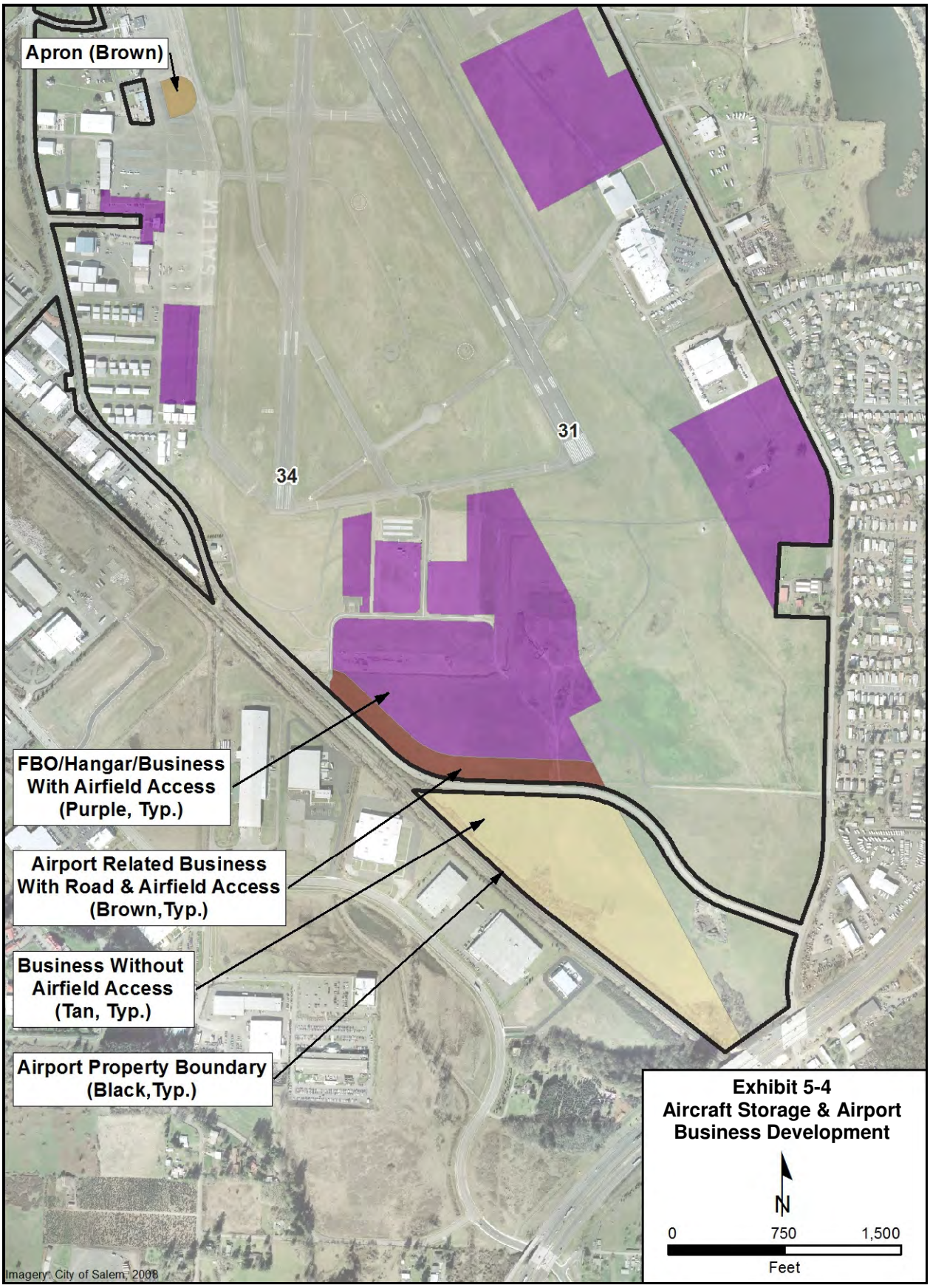
The eastside development area includes undeveloped property between ORANG and Garmin, and south of Garmin. Airfield facility requirements and improvement alternatives support development on the eastside. This property is suitable for hangars, aprons, and business development.

The eastside development area is also considered for passenger terminal building relocation, discussed in **Section 4.3**. If the passenger terminal is relocated to the eastside development area, airport development should be considered at the location of the existing passenger terminal.

The southside development area includes aviation-related development, with taxiway and road access, one existing box hangar and foundations for three T-hangar buildings. It is expected that future hangar layout will be determined by developers.

It is expected that GA activity will continue on the westside of the airfield. The location of an existing FBO on the westside of the airfield may support a new FBO, or an expansion of the existing FBO, in the southside and eastside development areas. It is expected that the location of the existing restaurant will be replaced with aviation related development, which may include FBO expansion. Relocation of the airport restaurant is discussed in **Section 3.1**.

Proposed aircraft storage and landside development is presented in **Exhibit 5-4**.


Apron (Brown)
31
34
FBO/Hangar/Business With Airfield Access (Purple, Typ.)
Airport Related Business With Road & Airfield Access (Brown,Typ.)
Business Without Airfield Access (Tan, Typ.)
Airport Property Boundary (Black,Typ.)
Exhibit 5-4
Aircraft Storage & Airport Business Development
N
0
750
1,500
Feet
Imagery: City of Salem, 2008

3. Passenger Terminal

The passenger terminal is the face of the Airport to the community, and the front door of the Airport to users. Amenities provided to the traveling public encourage use of the Airport, add value to the customer experience, and improve public perception of the Airport. The passenger terminal was expanded in 2010. The preferred passenger enplanement forecast in **Chapter 3** does not anticipate growth in enplanements, suggesting that the existing passenger terminal is adequate. This section uses the Master Plan Forecast—Conservative methodology to assess how increases in passenger demand will impact SLE. Facility requirements have been generated to meet the facility demands of this scenario.

Passenger terminal facility requirements are driven by peak passenger levels, which include enplanements and deplanements. Airline data from 2008 shows that May was the peak month, with 14 percent of the annual total. The peak day in May had three percent of the month's passengers, and the peak hour had 50 percent of the daily passengers. It is anticipated that SLE will see operations by more than one carrier, to more than one destination during the forecast period. Passenger peaking trends will be related to airline schedules. It is expected that additional flights throughout the day will spread out the passenger flows, reducing the peak hour passenger share from 50 percent to 25 percent of the peak day. Peak passenger levels are presented in **Table 5-4**.

Table 5-4: Peak Passenger Levels

Year	Annual Passengers	Peak Month Passengers	Peak Day Passengers	Peak Hour Passengers
2008	29,688	4,154	140	70
2013	10,000	1,400	50	10
2018	34,000	4,800	170	40
2023	80,000	11,200	390	100
2028	92,000	12,900	450	110

Source: USDOT

It is recommended that peak hour forecasts are evaluated as scheduled commercial passenger airline service begins and increases.

3.1 Passenger Terminal Building

Following the 2010 expansion, the passenger terminal building has a floor area of 15,000 square feet. The passenger holdroom is 3,500 square feet. Existing scheduled commercial passenger airline service does not require security screening by the Transportation Security Administration (TSA); however, it is anticipated that future air service will. A TSA security screening checkpoint (SSCP) has previously operated, and is expected to operate at the entrance to the passenger holdroom. A SSCP will create a *sterile* area, where passengers have been screened by TSA, and *non-sterile* area, where passengers have not been screened by TSA.

The terminal building consists of the following functional areas.

- Lobby and Waiting Areas
  - Sterile Area
  - Non-sterile Area
- Airline Operating Areas
  - Airline Ticket Office and Outbound Baggage (ATO)
  - Ticket Counter
  - Queuing Area
- Baggage Claim Area
- Concessions Areas
  - Restaurant
  - Cocktail lounge
  - Retail

The sterile area accommodates arriving and departing passengers that have been screened by TSA. Unscreened passengers and non-flying members of the public occupy the non-sterile lobby and waiting area when picking up or dropping off passengers, and using the rental car facilities.

Airline space requirements will depend on the number of airlines operating at the Airport, and the flight schedule. Airline space requirements should be developed in consultation with airlines. Airlines generally prefer to reduce cost by using less space, supporting smaller space requirements than those provided in AC 150/5360-9.

Baggage claim facility requirements are determined by peak hour deplaning passengers. AC 150/5360-9 does not take into account recent airline practices that discourage passengers checking bags, such as increased checked bag fees and overweight baggage fees. Fewer passengers check bags, which reduces space requirements for baggage claim return.

Demand for concessions is generally associated with growth in passenger enplanements. Concessions may include a restaurant, a cocktail lounge, and retail. The location of these facilities should be coordinated with passenger flow to maximize exposure and potential revenue. Concessions placed in the sterile passenger holdroom are generally more profitable than those in non-sterile areas; however, non-sterile facilities can also be accessed by GA users and the public.

AC 150/5360-9*, Planning and Design of Airport Terminal Building Facilities at Nonhub Locations*, and ACRP Report 25*, Airport Passenger Terminal Planning and Design*, define expected area recommendations for the functional areas. Terminal building facility recommendations are presented in **Table 5-5**.

Table 5-5: Terminal Building Facility Recommendations

Functional Area	Dimension (2008)	Dimension (2028)
Lobby and Waiting (Sterile)	3,500 Square Feet	3,500 Square Feet
Lobby and Waiting (Non-sterile)	2,000 Square Feet	2,000 Square Feet
ATO	700 Square Feet	1,800 Square Feet
Ticket Counter	36 Feet	36 Feet
Queuing Area	375 Square Feet	375 Square Feet
Baggage Claim Area	670 Square Feet	750 Square Feet
Concessions Areas	0 Square Feet	3,200 Square Feet

It is recommended that SLE maintain existing sterile and non-sterile lobby and waiting areas, ticket counter length, and queuing area. It is recommended that SLE add 1,100 square feet of ATO area to the existing 700 square feet, for a total of 1,800 square feet. It is recommended that SLE add 80 square feet of baggage claim area to the existing 670 square feet, for a total of 750 square feet. It is recommended that SLE add 3,200 square feet of concessions area to the passenger terminal building, for a total of 3,200 square feet.

3.2 Passenger Terminal Improvement Alternatives

Two improvement alternatives are presented for the passenger terminal. The improvement alternatives expand the passenger terminal to meet the facility recommendations. Automobile access and parking facility requirements and alternatives for the preferred passenger terminal alternative are included in **Section 3.3**.

Passenger terminal facility requirements recommend adding approximately 5,000 square feet of floor space to the existing 15,000 square feet, for a total of 20,000 square feet. Square footage added is expected to provide floor space for the recommended improvements. Terminal building alternatives represent potential expanded terminal building footprints; however, layout and floor plan are subject to change as scheduled commercial passenger airline service develops at the Airport. It is recommended that an architectural study, to occur as a separate project, be completed prior to design.

Covered storage for airport maintenance supplies and equipment is provided in each alternative.

3.2.1 Passenger Terminal Alternative 1

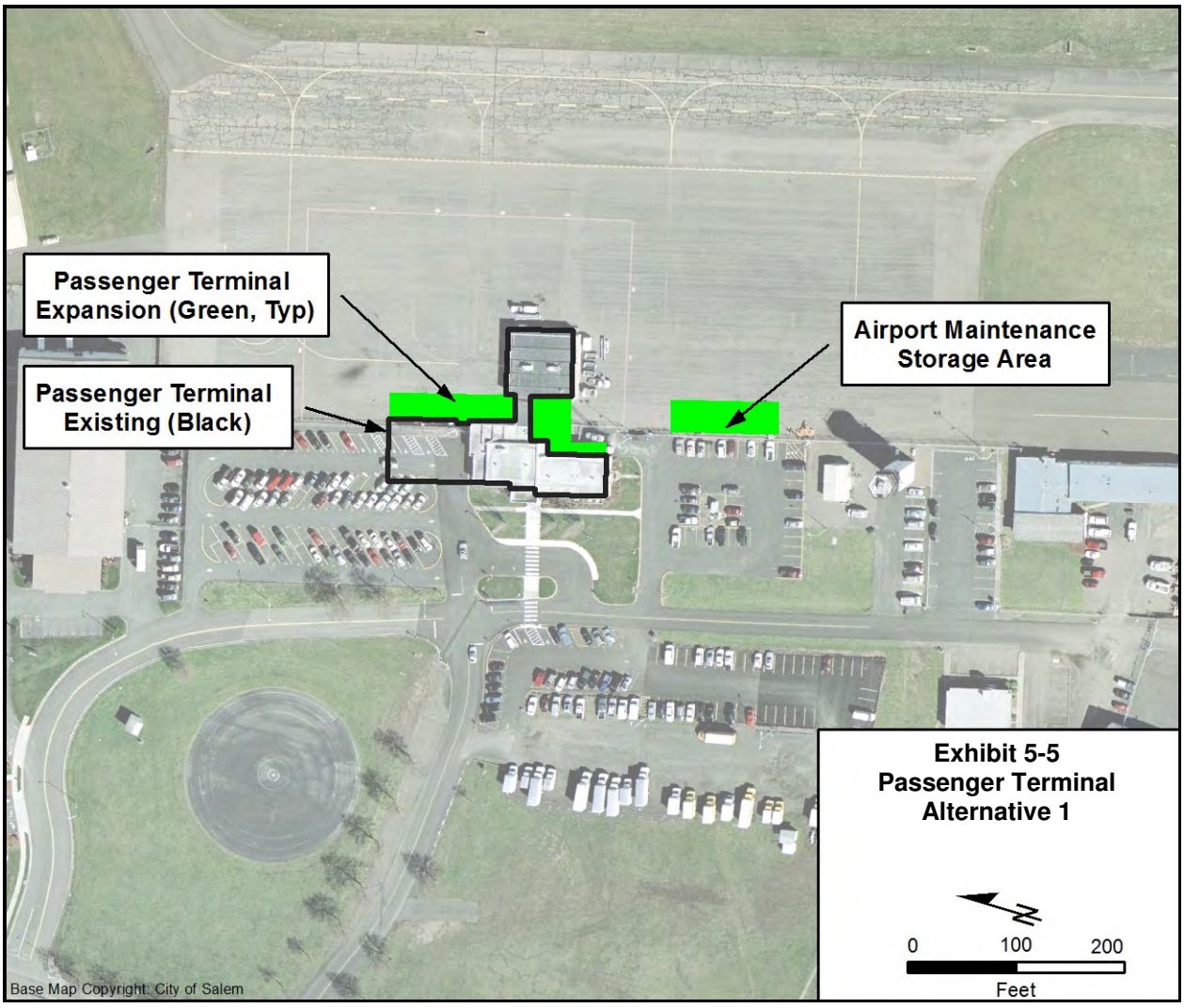
Alternative 1 adds 5,000 square feet to the north and south ends of the existing terminal building. Approximately 3,000 square feet of existing airport management offices are to be rehabilitated in Phase I. Rehabilitation is expected to consist of demolition of the existing structure, and replacement with a modern structure. Floor plan may be altered during Phase I construction. Phase II adds 1,400 square feet to the existing passenger terminal for airline offices, and baggage processing. The two phases create one passenger terminal with 21,500 feet of floor space.

Automobile access and traffic flow will continue to use 25th Street SE. Taxiway reconfiguration, presented in **Section 2.2.2**, is considered.

Alternative 1 provides SLE with the opportunity to replace much of the existing passenger terminal. Benefits may include better energy efficiency, lower operating and maintenance cost, and improved building aesthetics. Phasing of Alternative 1 will keep the existing passenger terminal operational until the first phase of Alternative 1 is complete. Phased construction is intended to minimize disruption to passenger terminal tenants and passengers.

Taxiways A and K connect the existing passenger terminal apron to Runway 13-31, which is expected to be the primary runway for scheduled commercial air carrier operations. Aircraft arriving on Runway End 31 that exit at Taxiway K will not cross Runway 16-34 when taxiing to the air carrier apron.

Alternative 1 is the preferred passenger terminal alternative. The reasoning is presented in **Section 3.2.3**. Alternative 1 is presented in **Exhibit 5-5**.


Passenger Terminal Expansion (Green, Typ)
Passenger Terminal Existing (Black)
Airport Maintenance Storage Area
Exhibit 5-5
Passenger Terminal
Alternative 1
N
0
100
200
Feet
Base Map Copyright: City of Salem

3.2.2 Passenger Terminal Alternative 2

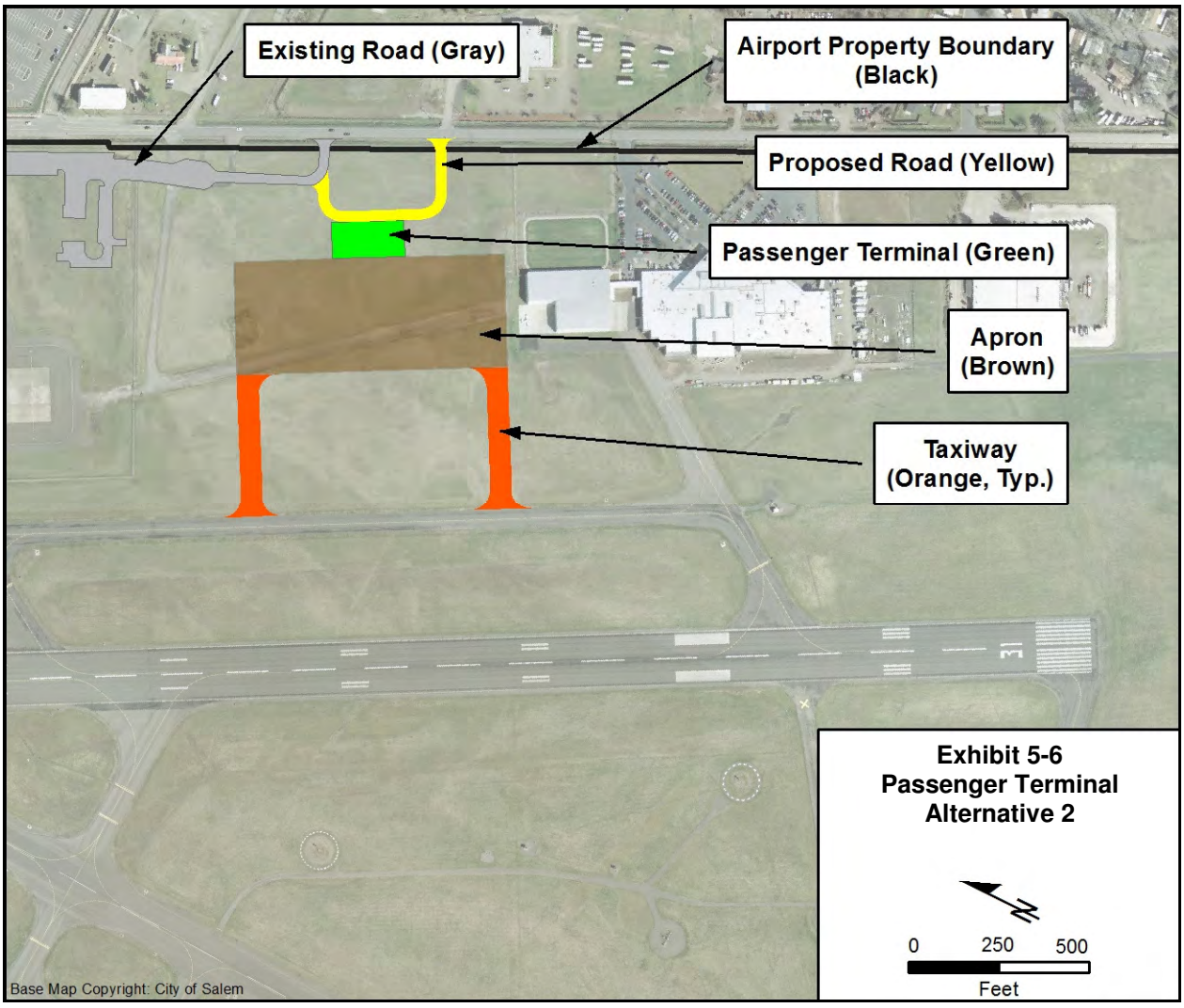
Alternative 2 relocates the passenger terminal and air carrier apron to the east side of the airfield, between the ORANG and the Garmin facilities. The terminal building location is influenced by the presence of a floodplain in this area, identified in **Chapter 2**. This area is planned for landside development in **Section 2.6.3**. Airport business development should be considered in the same location as the existing passenger terminal building if the passenger terminal building is relocated to the east side of the airfield.

Alternative 2 provides SLE with a new passenger terminal building. Benefits may include better energy efficiency, lower operating and maintenance cost, and improved building aesthetics. Automobile access to the passenger terminal building changes from 25th Street SE to Turner Road SE. Coordination with the City of Salem is necessary to provide adequate surface street capacity for the forecasted passenger flows. Airfield access changes from the west side of the airfield along Taxiways A and C to the eastside of the airfield along Taxiway B.

Alternative 2 involves removal of the existing passenger terminal building. Alternative 2 does not incorporate 2011 terminal building improvements, and will likely involve complete demolition and redevelopment of the existing terminal building area.

Alternative 2 includes a new taxiway access and air carrier apron. Aircraft landing on Runway End 31 will cross Runway 16-34 during taxi to passenger terminal in Alternative 2. Aircraft departing from Runway End 13 will need to cross Runway 16-34 on taxi from the passenger terminal.

Alternative 2 is not the preferred passenger terminal alternative. The reasoning is presented in **Section 3.2.3**. Alternative 2 is presented in **Exhibit 5-6**.



3.2.3 Passenger Terminal Alternative Comparison and Preference

The preferred passenger terminal alternative is Alternative 1.

Alternative 1 is preferred because of advantages in terminal location, existing terminal remodel and removal, airfield integration, and surface street integration. Alternative 2 provides SLE with a new passenger terminal, but will change street and airfield access, and does not have existing fueling facilities. Transporting fuel across runways in not recommended. Alternative 2 does not incorporate existing parking aprons or street access, which will require additional construction on and off airport property.

3.2.4 Air Carrier Apron and Peak Hour Demand

The air carrier apron is 750 feet wide with marking for four aircraft parking spaces. AC 150/5300-13 requires 22 feet of wingtip clearance for ADG III aircraft. The air carrier apron can accommodate four aircraft with wing spans up to 171 feet. Wing span for AGD III is 79 feet or more, but less than 118 feet. Sample ADG IV aircraft include the Boeing 767 and the Airbus A330. It is not expected that SLE will see scheduled ADG IV aircraft operations during the forecast period.

Peak hour air carrier aircraft demand uses the same methodology as peak hour passenger demand. The peak month has 14 percent of annual operations, the peak day has three percent of peak month operations, and the peak hour has 25 percent of peak day operations. Peak hour air carrier aircraft operations are presented in **Table 5-6**.

Table 5-6: Peak Air Carrier Aircraft Demand

Year	Annual Operations	Peak Month Operations	Peak Day Operations	Peak Hour Operations
2008	970	140	10	3
2013	3,100	440	20	5
2018	4,800	650	20	5
2023	5,800	850	30	8
2028	7,900	850	30	8

Source: USDOT

An aircraft operation represents a takeoff or a landing by one aircraft; therefore, the presence of one air carrier aircraft at SLE represents two operations. The eight peak hour operations in 2028 are equivalent to four aircraft arriving and departing. It is expected that existing air carrier apron space is adequate for the forecasted demand.

It is recommended that SLE maintain existing air carrier apron area. No improvement or expansion alternatives are developed.

3.3 Automobile Access and Parking

Ease of passenger terminal access and availability of parking impact public perception of an airport. Facilities that are difficult to find or crowded may cause passengers to use other airports, resulting in lost revenue and enplanements. Automobile access and parking focuses on the passenger terminal building. Parking for airport businesses is controlled by the business owners and local zoning, not the Airport.

3.3.1 Automobile Access

The Airport is located adjacent to the Interstate 5-Mission Street SE interchange, bordered by Turner Road SE to the east, and by 25th Street SE to the west. Mission Street SE has signage between Interstate 5 and 25th Street SE directing westbound traffic to the Airport. Small green signs directing traffic to the Airport are located at the intersection of Mission Street SE and 25th Street SE.

Entrance to the passenger terminal building parking lot is marked by a sign on the northeast corner of the intersection of 25th St. SE and Madrona Ave. SE. The City of Salem plans to improve the intersection of 25th St. SE and Madrona Ave. SE. Preliminary engineering documents indicate that Airport access will be unchanged by the improvement project.

Although signage is present on Mission Street SE between Interstate 5 and downtown Salem, it is small and may be difficult for visitors to spot. As scheduled commercial passenger service increases at the Airport, improved signage will likely benefit the traveling public.

It is recommended that the Airport work with the City of Salem to increase the size and visibility of directional signs to the Airport. It is recommended that the main entrance to the passenger terminal building be clearly marked.

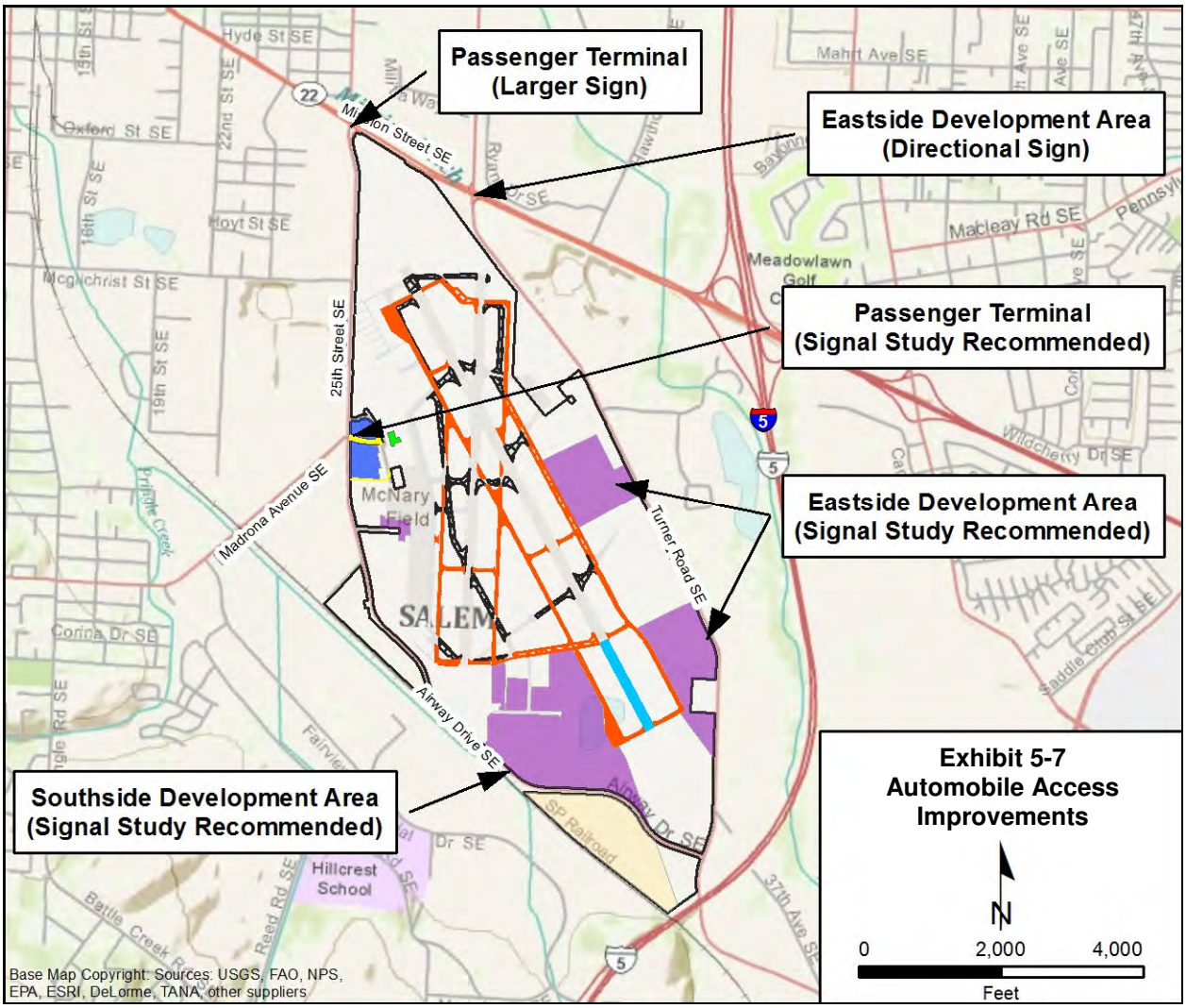
3.3.2 Automobile Access Improvements

Development of a larger passenger terminal building and associated parking facilities, the south side GA facilities, and the east side airport business development will likely increase traffic flow associated with the Airport. The City of Salem, the Oregon Department of Transportation, and the U.S. Department of Transportation—Federal Highway Administration are responsible for transportation infrastructure outside of airport property. Master Plan Update—Phase II (MPU-II) is intended to assist these organizations if preparing automobile travel forecasts for the region.

Surface streets surround the airport. Areas of interest include locations where improved directional signage or traffic signals will benefit airport users. Traffic signal installation will require a traffic study to demonstrate demand and benefit.

It is recommended that the Airport and the City of Salem coordinate to evaluate street capacity.

Automobile access areas of interest are shown in **Exhibit 5-7**.



Traffic signals are recommended for new development areas: at the airport business development areas on Turner Road SE, and at the south side GA development on Airway Drive SE. It is recommended that a traffic study be conducted at the four-way stop traffic signal at Madrona Avenue SE and 25th Street SE to evaluate the benefit of a traffic light.

Directional signage along Mission Street SE is recommended to direct traffic to the airport business development area. Airport terminal directional signage at the intersection of Mission Street SE and 25th Street SE exists; however, it is recommended that the signage becomes larger. This will assist airport users that are unfamiliar with the area in finding the passenger terminal building.

3.3.3 Automobile Parking

Automobile parking can be a large revenue generator at airports. There are 168 parking spaces surrounding the passenger terminal building at SLE. Automobile parking space demand is correlated to growth in passenger enplanements. An average growth rate of 5.8 percent, the same as the preferred passenger enplanement forecast, is applied to automobile parking space demand. Surface parking lots typically require 450 square feet per parking space, including room for automobile circulation within the lot.

SLE does not have parking lots that are segmented by trip purpose. As scheduled commercial air service increases, a move towards designated rental car, short-term, and long-term parking lots will help split parking flows. Pick-up, drop off, and commuter passengers may prefer a short-term lot near the terminal, paying more for the convenience. Niche market low-cost carrier (NMLCC) passengers may try to reduce parking expenses by using long-term lots that are further away from the passenger terminal building. Regional passengers may use either lot, depending on budget and trip duration.

The nature of scheduled commercial passenger airline service will impact parking demand. NMLCCs generally require passengers to spend three to four days at their destination due to infrequent service, placing long-term demand on airport parking facilities. Commuter and regional airlines offer more frequent service, sometimes multiple flights per day. The higher frequency of operations creates demand for short-term parking spaces near the passenger terminal facility for short trips, in addition to long-term demand for longer trips.

Automobile parking space requirements are presented in **Table 5-7**.

Table 5-7: Automobile Parking Spaces

Year	Parking Spaces	Parking Lot Area
2008 (Existing)	168 Spaces	82,200 Square Feet
2013	230 Spaces	113,000 Square Feet
2018	300 Spaces	147,000 Square Feet
2023	400 Spaces	196,000 Square Feet
2028	530 Spaces	260,000 Square Feet

Source: AC 150/5360-9

It is recommended that SLE evaluate automobile parking demand associated with new air service, and protect property near the passenger terminal building for parking lot expansion.

It is recommended that SLE add up to 362 parking spaces to the existing 168, for a total of 530. It is recommended that automobile parking impacts presented by new scheduled commercial passenger airline service be evaluated.

3.3.4 Automobile Parking Development Area

The location of the preferred passenger terminal alternative, existing hangars and airport businesses, and 25th Street SE limit property available for automobile parking development. National Weather Service (NWS) facilities were identified to be relocated on the 2000 ALP. Relocation of NWS facilities continues to be recommended.

Automobile parking alternatives are presented as areas. Automobile parking spaces per area may vary by parking lot design.

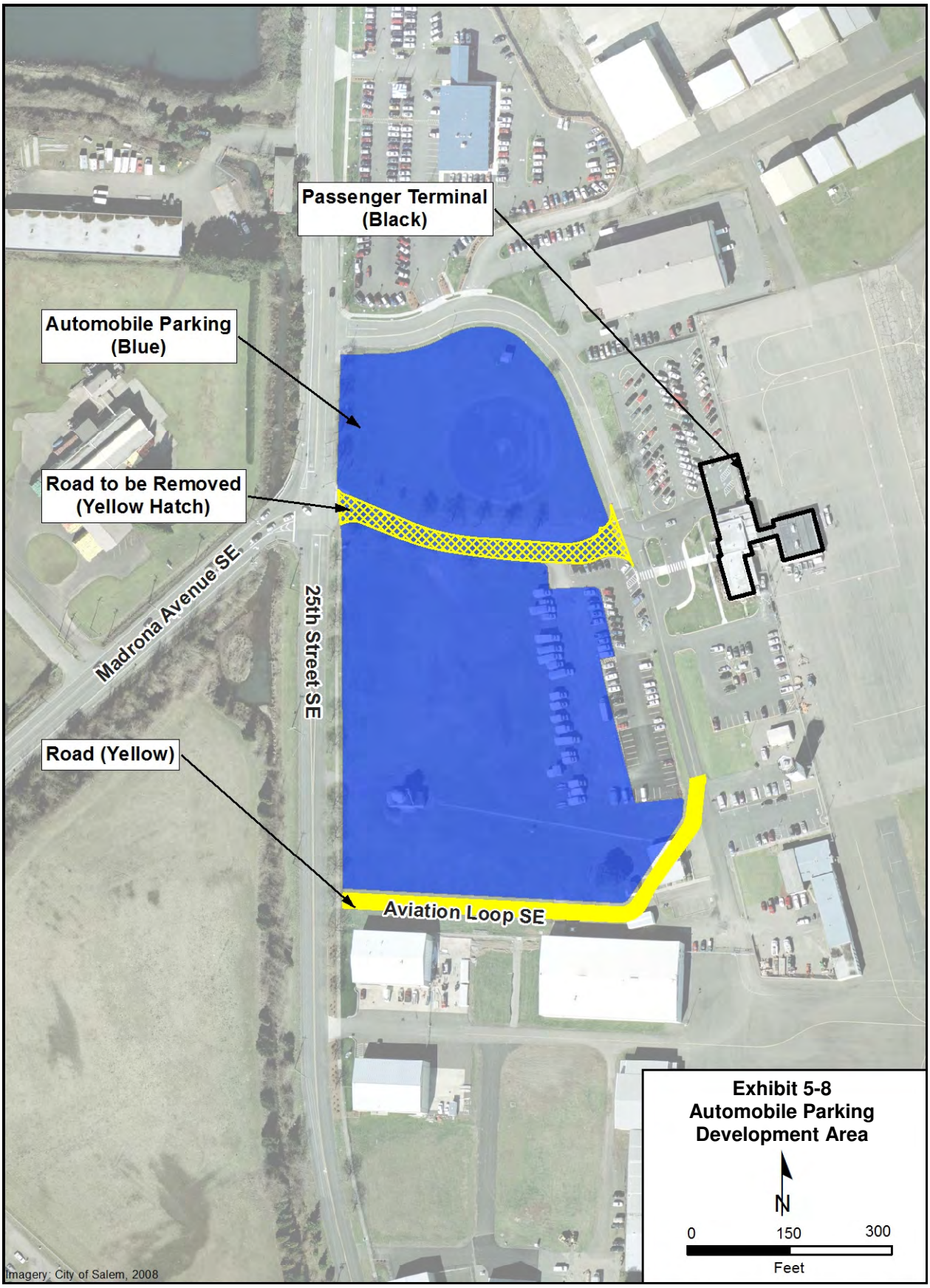
Proposed automobile parking area expansion reconfigures the Aviation Loop SE by extending the road to the south, with a loop back to 25th Street SE, and a spur to the proposed ARFF Facility location. It is recommended that the existing tie-in to Madrona Avenue SE be located father south, and the existing road that connects Aviation Loop SE to the Madrona Avenue and 25th Street SE intersection be removed. This will provide 320,000 square feet of automobile parking development area.

Relocation of Aviation Loop SE will displace the Graham Aviation Services hangar.

Rental car parking lots adjacent to the passenger terminal are maintained as Aviation Loop SE is reconfigured. Existing ATCT parking is not impacted by the proposed automobile parking development area.

The 320,000 square feet of automobile parking development area is expected to accommodate up to 700 parking spaces. It is recommended that SLE protect this property for automobile parking, and convert undeveloped areas into parking lot as needed.

Automobile parking development area is presented in **Exhibit 5-8**.


Passenger Terminal (Black)
Automobile Parking (Blue)
Road to be Removed (Yellow Hatch)
Madrona Avenue SE
25th Street SE
Road (Yellow)
Aviation Loop SE
Imagery: City of Salem, 2008
Exhibit 5-8
Automobile Parking
Development Area
N
0
150
300
Feet

4. Property

Property surrounding SLE is mostly developed. Expansion of the airfield and protection of existing imaginary surfaces will likely require acquisition and easement of developed property. SLE should coordinate with the City of Salem and adjacent property owners to acquire land use controls, such as avigation easements, in areas associated with approach to, and departure from the Airport. Avigation easements protect airports by limiting property owners to development that does not infringe on critical airspace. Avigation easements are generally less expensive than property acquisition, and permit continued occupation and development of the property by a third party.

The City of Salem has existing avigation easements beyond Runway Ends 13, 16, 31, and 34 which reduce the number of parcels impacted by proposed property acquisition or easement. In locations without existing easements, it is recommended that SLE explore land use controls when acquisition is not possible or unfeasible. A summary of properties that the Airport does not own or have easement over that are to be considered is included in **Table 5-8**. This summary does not include surface street right of way, or property owned by the Airport.

Table 5-8: Land Use Control Summary

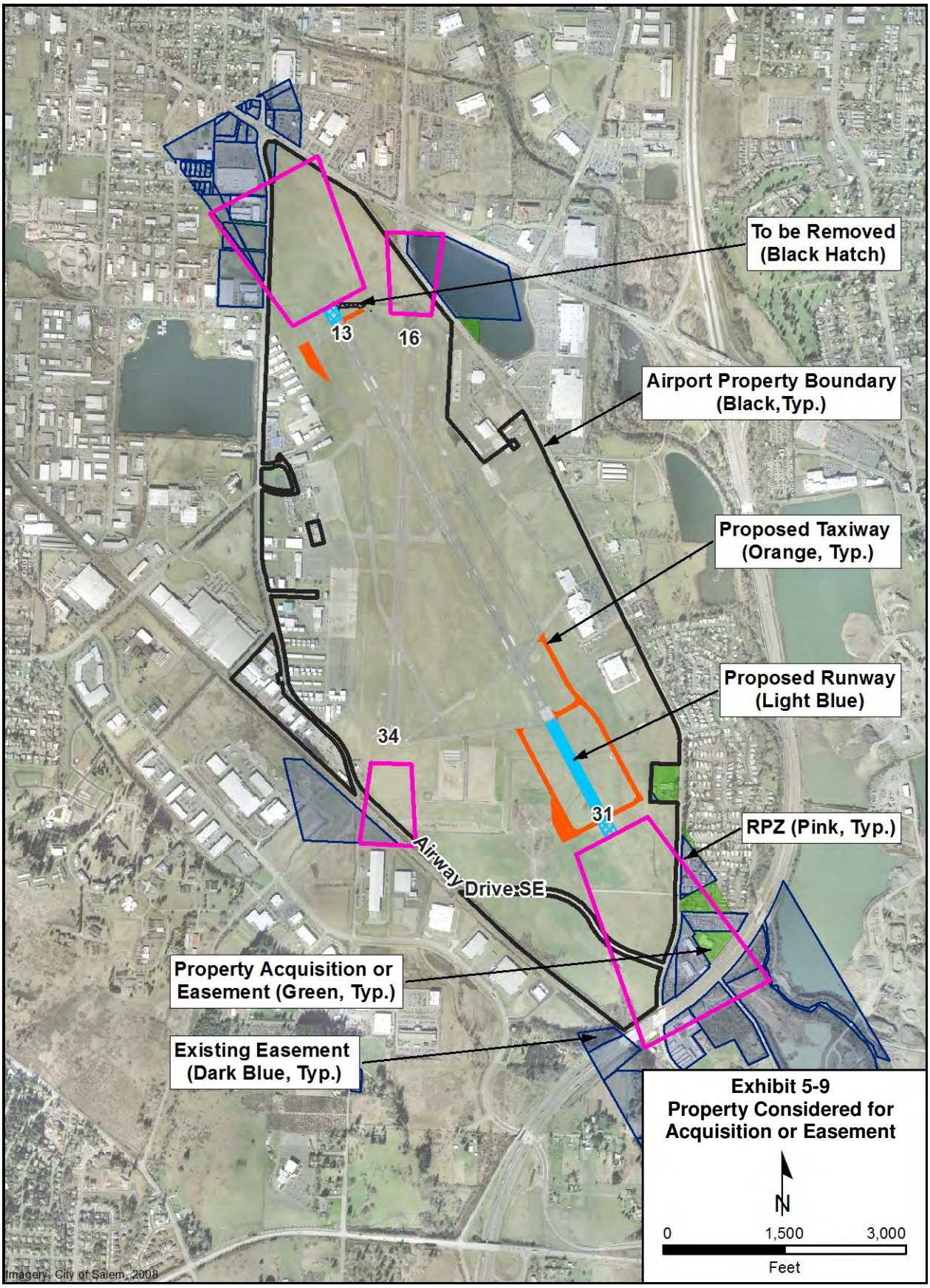
Runway End	Existing Land Use Control	Land Use Control Needed
Runway End 13	13 Acres	1 Acre
Runway End 16	16 Acres	1 Acre
Runway End 31	32 Acres	11 Acres
Runway End 34	10 Acres	0 Acres

Source: City of Salem Tax Lot GIS data

Property for acquisition or easement includes parcels outside airport property that are within the runway protection zone (RPZ) or the 50-foot height of the FAR Part 77 transitional surface. This includes 12 acres beyond the Runway Ends 13 and 31, described in **Chapter 4**, and one acre beyond Runway Ends 16 and 34.

If property is found not to be required for airport improvement projects or imaginary surfaces, it may be released from aviation use after coordination with the FAA. It is expected that the parcel of airport property south of Airway Drive SE, outside of the runway protection zone and 50-foot FAR Part 77 transitional surface, may be suitable for release. It is recommended that SLE coordinate property release with the City of Salem and the FAA.

Property considered for acquisition or easement is shown in **Exhibit 5-9**.


To be Removed (Black Hatch)
13
16
Airport Property Boundary (Black, Typ.)
Proposed Taxiway (Orange, Typ.)
Proposed Runway (Light Blue)
34
31
RPZ (Pink, Typ.)
Airway Drive SE
Property Acquisition or Easement (Green, Typ.)
Existing Easement (Dark Blue, Typ.)
Exhibit 5-9
Property Considered for Acquisition or Easement
N
0
1,500
3,000
Feet
Imagery: City of Salem, 2008

5. Summary

The following facility requirements and recommendations should be considered as airport activity increases. Phasing of improvements is driven by aviation activity forecasts. It is recommended that the forecasts are revisited prior to implementation to validate need and scale of improvements.

Airfield

- Maintain existing runway capacity
- Develop future taxiways to ADG III standards, with a width of 60 feet
- Reconfigure taxiways to a partial-parallel system
- Provided parallel taxiway intersections where possible
- Relocate taxiway leading from aprons directly to runways
- Relocate the compass calibration pad
- Maintain existing NAVAIDs to FAA standards
- Maintain ATCT line of sight to aircraft movement areas
- Monitor long-term FAA reauthorization bill for changes to ARFF requirements
- Consider relocating ARFF facility to a more centralized location
- Provide covered storage area for airport maintenance equipment and supplies
- Add 33 box hangars for a total of 160
- Add six T-hangar units for a total of 20
- Maintain the existing 121 tie-down spaces
- Add 196,000 square feet of GA parking apron for a total of 970,000 square feet
- Develop eastside and southside development areas
- Protect property for FBO expansion
- Convert property that will not be used for aviation purposes to commercial use

Passenger Terminal

- Maintain lobby and waiting areas, ticket counter length, and queuing area
- Add 1,100 square feet of ATO space, for a total of 1,800 square feet
- Add 80 square feet of baggage claim, for a total of 750 square feet
- Relocate the airport restaurant and add 3,200 square feet of concessions area
- Maintain existing terminal apron area

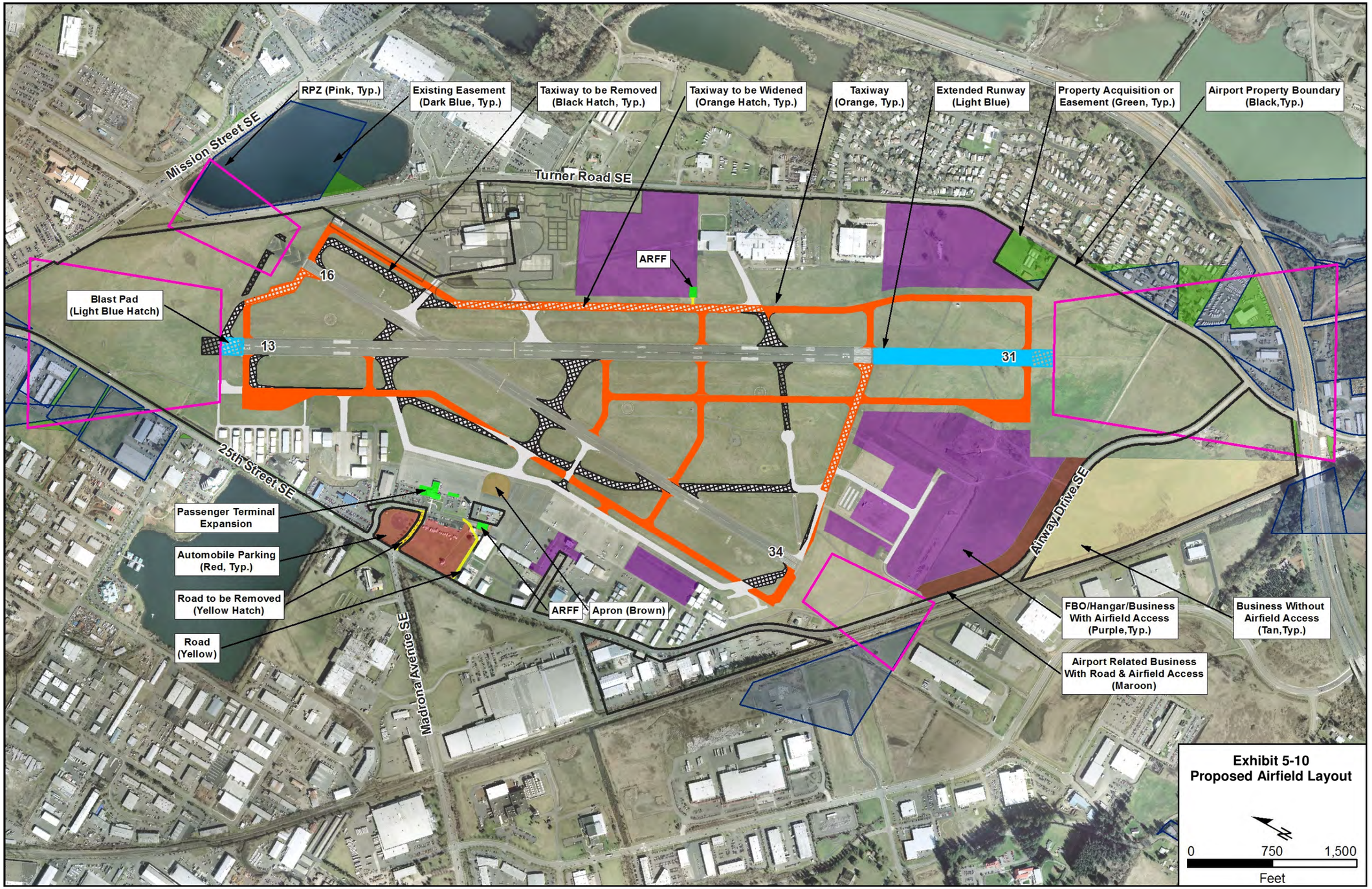
Automobile Access and Parking

- Improve passenger terminal building street signage
- Add traffic signals at southside and eastside development areas
- Add 362 parking spaces, for a total of 530
- Reconfigure Aviation Loop SE

Property

- Acquire or gain easement over 12 acres beyond Runway Ends 13 and 31, per **Chapter 4**
- Acquire or gain easement over one acre beyond Runway Ends 16 and 34
- Coordinate with stakeholders to release parcel south of Airway Drive SE

Proposed Airport layout is shown in **Exhibit 5-10**.


RPZ (Pink, Typ.)
Existing Easement (Dark Blue, Typ.)
Taxiway to be Removed (Black Hatch, Typ.)
Taxiway to be Widened (Orange Hatch, Typ.)
Taxiway (Orange, Typ.)
Extended Runway (Light Blue)
Property Acquisition or Easement (Green, Typ.)
Airport Property Boundary (Black,Typ.)
Mission Street SE
Turner Road SE
ARFF
16
Blast Pad (Light Blue Hatch)
13
31
25th Street SE
Passenger Terminal Expansion
Automobile Parking (Red, Typ.)
Road to be Removed (Yellow Hatch)
Road (Yellow)
34
Madrona Avenue SE
ARFF
Apron (Brown)
Airway Drive SE
FBO/Hangar/Business With Airfield Access (Purple,Typ.)
Business Without Airfield Access (Tan,Typ.)
Airport Related Business With Road & Airfield Access (Maroon)
Exhibit 5-10
Proposed Airfield Layout
0
750
1,500
Feet

Chapter 6

Land Use and Noise

1. Introduction

Airport land use considerations extend beyond airport property. Incompatible land use surrounding airports can impact airport operations, and compromise the health, safety, and welfare of citizens living and working near the airport. This chapter presents land use planning and zoning strategies of communities near the Salem Municipal Airport (SLE), state and federal land use compatibility guidance, and a noise analysis for existing and forecasted noise levels.

Documents reviewed include the following.

- Federal Aviation Regulation (FAR) Part 77, *Safe, Efficient Use, and Preservation of Navigable Airspace* (FAR Part 77)
- Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13, *Airport Design*
- Oregon Revised Statues (ORS)
- Oregon Administrative Rules (OAR)
- Marion County Code Title 16, *Urban Zoning*
- Marion County Comprehensive Land Use Plan, *Revised September, 2010* (Marion County Plan)
- Salem Revised Codes Section 10: Title X – Zoning (Salem Zoning)
- 2007 Salem Transportation System Plan (Salem TSP)
- 2009 Salem Area Comprehensive Plan (SACP)
- 2003 Oregon Department of Aviation Airport Land Use Compatibility Guidebook (ODA Guidebook)

2. Land Use Regulations and Guidance

Airspace protection is vital to the safety and success of any airport. Although airports are accepted as essential public facilities, their relationship with surrounding land uses can often lead to conflict. In the interest of safety for aviation and citizens living and working in the area, there are regulations and guidelines that define the types of land uses considered compatible near airports. These documents include height limits and land use recommendations.

The Airport is owned and operated by the City of Salem; however, the nature of aircraft operations extends the Airport's area of influence to other jurisdictions including the United States, the State of Oregon, and Marion County. The State of Oregon's Revised Statues and Administrative Rules regulate certain airport activities, as do FAA regulations, orders and guidelines. The Marion County and City of Salem codes and comprehensive plans are overarching planning documents for areas near the Airport. The intention of these guidelines and regulations is to enable the Airport to continue safe and efficient operations without detrimentally impacting the surrounding community.

2.1 Federal Land Use Regulations and Guidance

The FAA is responsible for administering matters of national aviation. State and local governments may not impose restrictions on development or operations at a federally funded airport through zoning laws or operational restrictions. This does not restrict what local governments may do outside of airport property, and coordination between airport management and local stakeholders is a key element to promoting compatible development. Communities may use FAA criteria, described in this section, to develop zoning regulations. Land use control and promotion of compatible land uses through zoning enhances protection for aircraft and people working and living near airports.

There are three FAA criteria that lay the foundation for airport land use compatibility planning: grant assurances, design standards, and FAR Part 77 surfaces.

2.1.1 Grant Assurances

Airport sponsors agree to federal grant assurances as part of project funding applications. Upon acceptance of grant money, these assurances are incorporated into the grant agreement, and the airport sponsor is obligated to comply with them. Grant Assurance 21, included in the September 1999 amendment to 49 USC 47107, requires all airports that accept federal money to take appropriate actions against incompatible land uses in the immediate vicinity of the airport. Such actions include adopting zoning laws, changing existing zoning, and purchasing neighboring land to protect federal investments through the maintenance of a safe operating environment.

2.1.2 Design Standards

Design standards, as defined by AC 150/5300-13, *Airport Design*, are implemented for the safe operation of an airport. These standards fulfill safety-related functions for airports and aircraft, and have a role in land use. Design surfaces include the runway safety area (RSA), runway object free area, and runway protection zone (RPZ). Design standards for Salem Airport are described in **Chapter 1**, and shown on the **Airport Layout Plan (ALP)**.

Ideally, design surfaces should be contained on airport property; however, there are often instances where design surfaces extend beyond airport property. The RPZ is an area beyond each runway end that should be clear of incompatible objects and land uses. Some objects and land uses are permitted, provided they do not attract wildlife, present a height hazard, and do not interfere with navigational aids. Land uses specifically prohibited from the RPZ include fuel storage facilities, residences, and places of public assembly (churches, schools, hospitals, office buildings, shopping centers, or other uses with similar concentrations of people). The RPZ is designed with the intent to protect people and property on the ground.

RPZs for Salem's Runway Ends 13, 16, 31, and 34 extend beyond airport property. The FAA recommends that airports acquire sufficient property interest to achieve and maintain an area that is clear of all incompatible objects and land uses. Where acquisition is impractical, avigation easements are recommended to obtain the right to limit the height of structures and vegetation within the RPZ. SLE has easements over most property in the existing RPZs.

2.1.3 FAR Part 77

FAR Part 77 establishes standards for determining and defining objects as obstructions to air navigation. While design standards contained in FAA AC 150/5300-13 are intended to protect ground areas near airports, FAR Part 77 is intended to protect airspace surrounding airports. Section 77.19, *Civil Airport Imaginary Surfaces*, establishes surfaces in relation to the airport and to each runway.

The FAA is authorized to undertake an aeronautical study to determine whether an object is a hazard to air navigation and make appropriate recommendations, but is not authorized to regulate or prohibit tall structures, limit structure heights, or determine which structures should be lighted or marked. As part of aeronautical study determinations, the FAA acknowledges that state or local authorities control the appropriate use of property beneath an airport's airspace. This reinforces the need for local land use controls to support the findings of the FAA. FAR Part 77 surfaces are explained below, and shown in **Exhibit 6-1** and **Exhibit 6-2**. FAR Part 77 surfaces for SLE are included on the **ALP**.

Primary Surface – The primary surface is longitudinally centered on a runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface is dependent on the most precise approach procedure existing or planned for either runway end.

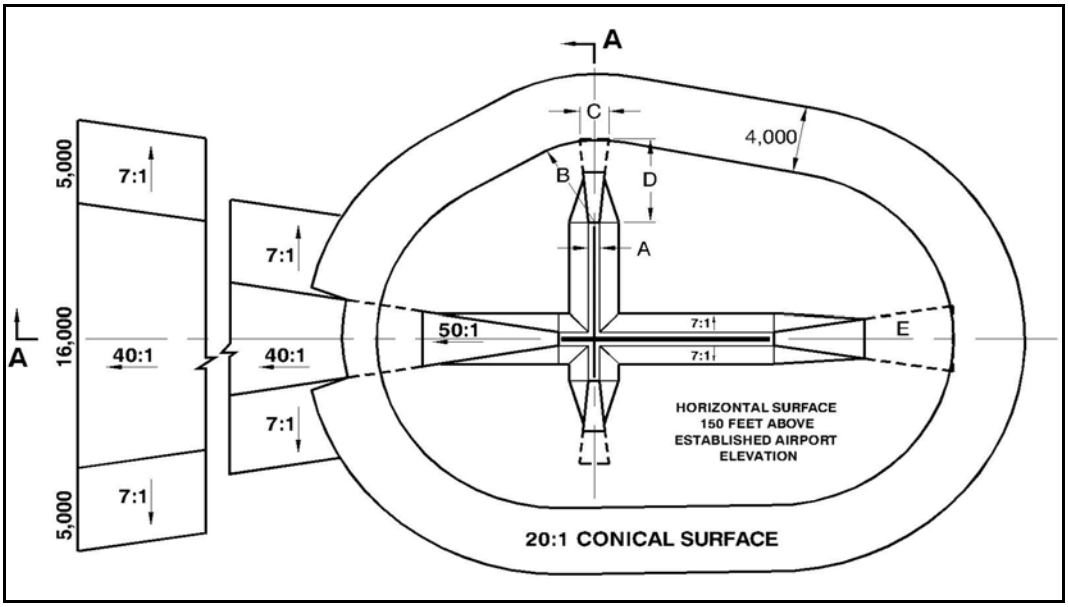
Approach Surface – The approach surface is longitudinally centered on the extended runway centerline and extends outward and upward from each end of the primary surface. The surface length, outer width, and slope are dependent on the most precise approach procedure existing or planned for the runway end.

Transitional Surface – The transitional surfaces begin at the edges of the primary and approach surfaces, extend outward and upward at right angles to the runway centerline at a 7 to 1 slope, and extend to the horizontal surface. For precision approach surfaces extending beyond the conical surface, the transitional surface extends 5,000 feet horizontally from the edge of the approach surface.

Horizontal Surface – The horizontal surface is a horizontal plane 150 feet above the established airport elevation. The perimeter is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway, and connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is 5,000 feet for utility or visual runways ends, and 10,000 feet for precision and non-precision runway ends.

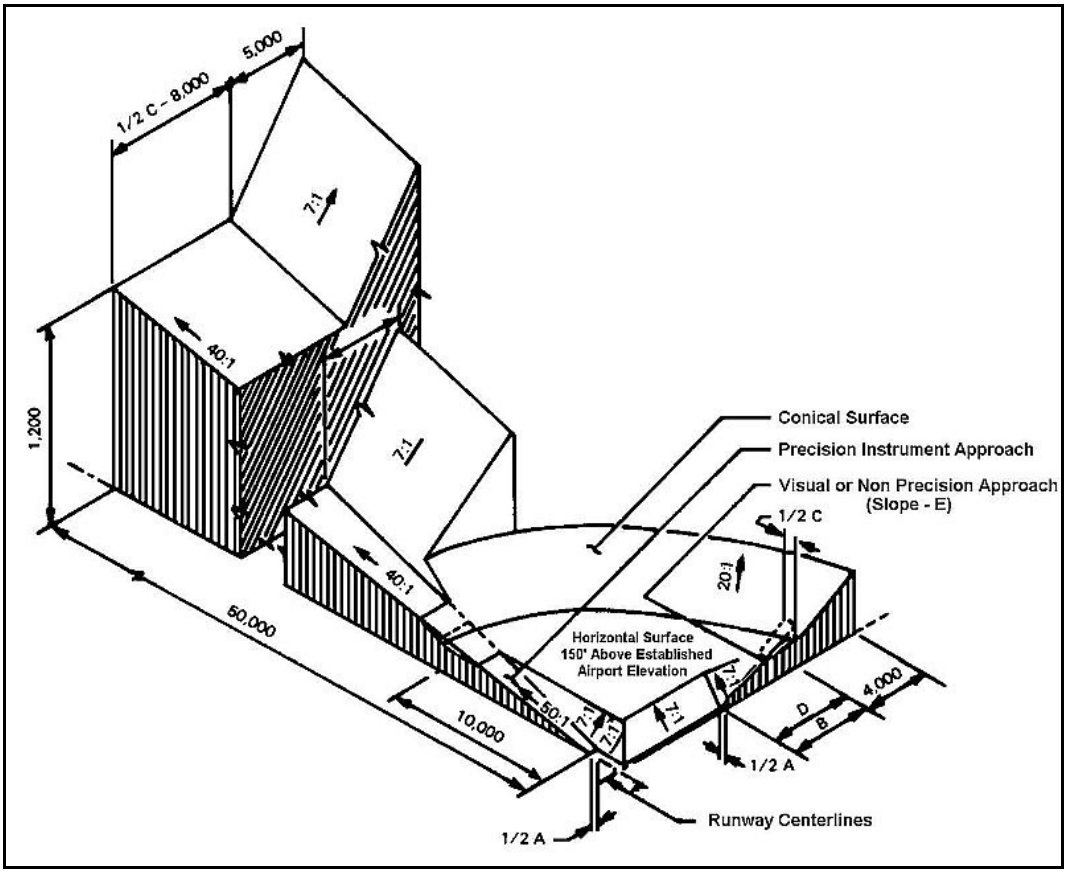
Conical Surface – The conical surface extends upward and outward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Exhibit 6-1: FAR Part 77 Surfaces – Plan View



Source: FAR Part 77

Exhibit 6-2: FAR Part 77 Surfaces – 3D Isometric View



Source: FAR Part 77

2.1.4 Wildlife Attractants

Accidents resulting from wildlife strikes have resulted in the loss of life, and billions of dollars in aircraft and property damage. Airports are often surrounded by open, undeveloped land intended to promote land use compatibility. These open areas can present potential hazards to aviation if they attract wildlife. Constructed and natural areas, such as wetlands, detention and retention ponds, waste water treatment plans, and landfills may provide ideal habitat for wildlife. These uses on and near airports can cause a hazard to safe air navigation.

AC 150/5200-33B, *Hazardous Wildlife Attractant on or near Airports,* recommends airports used by jet aircraft such as SLE have a 10,000 foot separation between aircraft operations areas, such as runways, taxiways, and parking aprons, and wildlife attractants.

2.2 State of Oregon Land Use Regulations and Guidance

The State of Oregon identifies the continued safe operation of aircraft as a state concern and has enacted statutes to guide local government planning around airports. ORS Chapter 836 addresses airport operations, and Sections 836.608, 836.610, 836.616, 836.619 and 836.623 pertain to land use around airports. While these statutes do not establish criteria or land use guidelines for land near airports, they do grant local governments the authority to create zoning ordinances tailored to local conditions. Support in interpreting and applying the laws in these statutes is provided by the Airport Planning Rule, found in OAR Chapter 660, Division 13.

ORS 836.608 requires governments to recognize airport locations in planning documents, and to depict airport locations on planning maps. ORS 836.608 establishes the process for airports to expand or add new land uses on their property. The continuation and expansion of land uses on airport property is protected by ORS 836.608, provided the use was in existence on or before 1996 and the use complies with state planning laws.

ORS 836.610 requires local governments to amend their land use regulations and comprehensive plans to be consistent with ORS 836.616 and ORS 836.619. ORS 836.616 and ORS 836.619 identify types of uses permitted on airport grounds, and require the local government to consult with the Oregon Land Conservation and Development Commission to meet standards for safe land uses near airports.

ORS 836.623 allows local governments to limit the size of water impoundments near airports to reduce the attraction of birds, thus reducing the risk of bird strikes, by requiring that no new water impoundments larger than one quarter of an acre shall be allowed on airport property, or within 5,000 feet of the runway ends.

OAR 340-035-0045, the Oregon Department of Environmental Quality's regulations for airport noise emissions, is discussed in **Section 3**.

In addition to the regulations in the ORS and OAR, the ODA Guidebook is "a working guide to be used by planners, decision makers and other interested parties, to provide information and recommendations regarding methods of addressing incompatible land uses around airports." The ODA Guidebook provides land use compatibility techniques that help local governments comply with federal regulations for FAR Part 77 and AC 150/5300-13 surfaces. The land use compatibility matrix from the ODA Guidebook is presented in **Table 6-1**. It is recommended that this matrix be used in conjunction with the ODA Guidebook Noise and Land Use matrix in **Table 6-3**.

Table 6-1: ODA Guidebook Land Use Compatibility Matrix

Land Use	Primary Surface	Transitional Surface	Horizontal Surface	Conical Surface	Approach Surface	RPZ
Residential						
Residential, other than those listed below	NC	NC	•	C	•	NC
Mobile home parks	NC	NC	•	C	•	NC
Transient lodgings	NC	NC	•	C	•	NC
Public Use						
Places of public assembly (schools, hospitals, churches, auditoriums)	NC	NC	•	C	NC	NC
Government services	NC	•	C	C	•	NC
Transportation (parking, highways, terminals)	NC	•	C	C	•	•
Commercial Use						•
Offices, business, professional	NC	•	C	C	•	NC
Wholesale, retail, building materials, hardware, and farm equipment	•	•	C	C	•	NC
Retail trade—general	•	•	C	C	•	NC
Utilities	•	•	•	•	•	•
Communication	NC	•	•	•	•	•
Manufacturing and production						•
Manufacturing—general	NC	•	•	•	•	NC
Agricultural (except livestock) and forestry	•	•	C	C	•	•
Livestock farming and breeding	NC	•	•	C	•	NC
Mining and fishing, resource production and extraction	NC	NC	•	•	•	NC
Recreational						
Outdoor sports arenas and spectator sports	NC	NC	•	C	NC	NC
Nature exhibits and zoos	NC	NC	•	C	NC	NC
Amusement parks, resorts, and camps	NC	NC	C	C	NC	NC
Golf courses	NC	NC	C	C	NC	NC
Parks	NC	•	•	•	•	•

C: Generally compatible land use
NC: Incompatible Land Use
•: Not clearly compatible or incompatible, requires specific study

Source: 2003 ODA Guidebook

2.3 County Land Use Regulations and Guidance

The Airport and adjacent property lies within the City of Salem, but properties in Marion County are beneath FAR Part 77 surfaces and the flight pattern. Coordination in land use development and compatibility standards between the City of Salem and Marion County is recommended to provide similar protections to residents on the ground, and aircraft traffic. Documents reviewed include the Marion County Code and the Marion County Plan. Polk County is also considered; however, low-altitude flight tracks and FAR Part 77 surfaces do not extend over Polk County.

2.3.1 Polk County

Polk County makes up part of the Salem Metropolitan Statistical Area, as defined by the U.S. Census Bureau. Low-altitude flight tracks, noise contours, and FAR Part 77 surfaces do not extend into Polk County, although Polk County is expected to experience occasional aircraft overflight associated with SLE.

Polk Zoning Chapter 180 provides standards for development around Independence State Airport (7S5), located nine nautical miles west of SLE in Independence, Oregon. These standards are based on FAR Part 77. SLE is not referenced specifically in the Polk Zoning. Existing and planned improvements at SLE will not cause the Airport's FAR Part 77 surfaces to extend into Polk County.

2.3.2 Marion County Code

Marion County has two types of zoning regulations: Urban Zoning, defined in Title 16 of the Marion County Code; and Rural Zoning, defined in Title 17 of the Marion County Code. Property near SLE in Marion County and within the City of Salem's urban growth boundary (UGB) is subject to Urban Zoning regulations. Property outside of the City of Salem's UGB is subject to Rural Zoning regulations. The Airport's area of influence does not extend outside of the Salem UGB.

Marion County Code Title 16.21, *Airport Overlay Zone* protects airspace associated with FAR Part 77 surfaces from height obstructions. Three development districts are established in Marion County Code Title 16.21.030 (for properties within the Salem UGB) and Title 17.177.030 (for properties outside of the Salem UGB) that provide land use guidelines under different parts of an airport's FAR Part 77 surfaces. Marion County airport districts are defined in **Table 6-2**.

Table 6-2: Marion County Airport Districts		
District	**Associated Part 77 Surface(s)**	**General Land Use Guidelines**
Airport Development District	Primary Transitional Approach	• Structures may not penetrate Part 77 • May not cause interfering glare • Wildlife attractants and water impoundments may not be within 10,000 feet of a runway • No places of public assembly without a conditional use permit
Horizontal Surface District	Horizontal	• Structures may not penetrate Part 77 • Wildlife attractants and water impoundments may not be within 10,000 feet of a runway
Conical Surface District	Conical	• Structures may not penetrate Part 77

Source: Marion County Code Title 16.21.030 and Marion County Code Title 17.177.030

Nonconforming uses, including structures and natural growth, require removal, alteration, or marking and lighting to bring them into conformance with the requirements of Marion County Zoning and FAR Part 77.

2.3.3 Marion County Plan

The Marion County comprehensive plan recognizes the importance of aviation within the larger transportation network and the need to protect the airports within the county's area of influence. Marion County will review the SLE Master Plan "to ensure that the plan [is] compatible with County land use and zoning requirements." The Air, Rail, Water, Energy and Pipeline Transportation Policies of Marion County state that "the County will adopt appropriate provisions (including plans, ordinances, and intergovernmental agreements) to protect the public airports from incompatible structures and uses. These provisions will be consistent with Federal Aviation Administration guidelines"; and "the County will discourage noise sensitive uses from locating in close proximity to public airports."

2.4 City of Salem Land Use Regulations and Guidance

The City of Salem is the Airport sponsor and has jurisdiction over property surrounding SLE. Land use controls are defined in Salem Zoning, and future land use plans are included in the 2009 Salem Area Comprehensive Plan (SACP).

2.4.1 Salem Revised Codes

Chapter 125 of the Salem Revised Codes defines the Airport Overlay Zone, which has the same dimensions as the FAR Part 77 surfaces. The Airport Overlay Zone establishes the criteria and regulations for what can and cannot be built around the Airport in the interest of safety.

In line with FAR Part 77, the height limitation section prohibits any structure to "be erected, altered, or repaired, and no tree shall be allowed to grow, to a height in excess of the applicable height" created by the Airport Overlay Zone. Penetrations to the Airport Overlay Zone that seek a variance may be required to mark and light the penetration if approved.

Additional land use regulation in the Airport Overlay Zone includes a hazardous uses section which prohibits creating any electrical interference with navigation signals or radio communication between the airport and aircraft; make it difficult for pilots to distinguish between airport lights and others; result in glare in the eyes of pilots using the airport; impair visibility of the airport; create bird strike hazards; or otherwise in any way endanger or interfere with the landing, takeoff, or maneuvering of aircraft intending to use the airport.

2.4.2 Salem Area Comprehensive Plan

The SACP states that "land use decisions, other than regional planning actions involving land within the Salem urban area shall be made based solely on the SACP, its plan map, and its implementing ordinances." "Regional planning actions shall be made solely on the basis of the concurrence of all the jurisdictions – City of Salem, City of Keizer, Marion County, and Polk County."

SACP Sections J.25, J.26, and J.27 pertain to SLE. Goals include "land use around the Airport shall be required to provide an environment compatible with the airport and its operations and which will not be adversely affected by noise and safety problems." Water impoundments are not permitted within 10,000 of the runway ends, commercial land uses and other land uses that involve high concentrations of people are "prohibited within the clear zones of the runways at [SLE], to avoid danger to the public safety by potential aircraft accidents." The Airport Master Plan is adopted by the SACP as a separate planning document.

2.4.3 Salem Transportation System Plan

The 2007 Salem TSP states that "the scope of the Salem [TSP] does not cover Airport and Land Use Policies." Instead, the Salem TSP includes land use compatibility strategies from the SACP. Although the Airport does not have a dedicated section in the Salem TSP, the relation of SLE to the movement of freight in the City of Salem is mentioned in Salem TSP Chapter 13, which states that "the City shall promote the utilization of air freight services by continuing to provide and maintain facilities at [SLE] that enable the operation of private air freight providers."

3. Aircraft Noise

Aircraft noise is another dimension of airport land use compatibility. Noise analysis identifies properties that may experience higher average exposure to aircraft noise than the surrounding area. This section presents noise regulations and guidance, and compares noise exposure levels for 2008 with projected noise exposure levels for 2028. Noise exposure levels are determined for annual averages, and presented as contours. Runway improvements from **Chapter 4** are included in the 2028 noise analysis.

3.1 Federal Noise Regulations and Guidance

To evaluate noise impacts, the FAA, the Environmental Protection Agency, and the Department of Housing and Urban Development have established the 65 decibel day-night average sound level (65 DNL) as a threshold for determination of significant noise impacts resulting from airport improvement projects. Airports may use FAA funds to acquire property or implement noise mitigating building materials inside for noise sensitive land uses inside of the 65 DNL contour. The FAA may fund the acquisition of noise sensitive land uses outside of the 65 DNL contour if the Airport plans to replace these uses with non-noise sensitive land uses. FAA Order 5100.38C, *Airport Improvement Program Handbook*, states that federal participation in land acquisition outside of the 65 DNL contour generally occurs in "areas of moderate noise exposure (i.e. DNL 64-55 dB)." In order to qualify for federal assistance, mitigation measures proposed by the Airport must meet criteria found in FAR Part 150.

AC 150/5020-1, *Noise Control and Compatibility Planning* states that "through cooperative efforts on both the local and national levels, much has been accomplished in limiting the growth and spread of noise compatibility problems. Actions have included limits upon noise emissions by new aircraft, provisions for retirement or retrofit with quieter engines of the noisiest transport aircraft, and an environmental review process for airport development projects." It is expected that as the national general aviation (GA) fleet modernizes, noisier aircraft will be replaced with quieter aircraft.

3.2 State of Oregon Noise Regulations and Guidance

OAR 340-035-0045 contains State of Oregon criteria for airport noise. The State of Oregon uses the 55 DNL contour to represent the "airport noise criterion." The airport noise criterion does not indicate liability or legal obligation on the part of the airport; instead defines the "airport noise impact boundary," which is used to identify noise sensitive properties near the airport that may experience regular aircraft noise exposure. Noise sensitive properties are defined as "real property normally used for sleeping, or normally used as schools, churches, hospitals, or public libraries."

OAR 340-035-0045 recognizes that the location of noise sensitive properties within the airport noise impact boundary may be out of the control of the airport operator, and recommends coordination between the airport, local governments, and aircraft operators to mitigate noise exposure to noise sensitive properties.

Chapter 6 of the ODA Guidebook includes techniques for establishing compatible land use, including comprehensive planning to protect against future incompatibility, and fee-simple land acquisition, easements, and transfer of development rights to protect against existing land use incompatibility.

Chapter 3 of the ODA Guidebook evaluates land use compatibility within different noise levels. This analysis is intended to be used in conjunction with the land use compatibility matrix based on FAR Part 77 surfaces, presented in **Table 6-1**. In instances where the two matrices offer contradictory information, it is recommended that the more stringent guideline be implemented in the interest of promoting land use compatibility.

The Noise and Land Use compatibility matrix classifies objects as compatible (Y), incompatible (N), or subject to a noise level reduction (NLR), specified in decibels (dB). Compatibility may be contingent on other factors, indicated by superscript notes. These factors include the following, taken from the 2003 ODA Guidebook.

1. When the community determines that residential or school uses must be allowed, measure to achieve an outdoor to indoor NLR or at least 25 dB and 30dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR or 20dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and not normally assume mechanical ventilation and closed windows year round. The use of NLR criteria will not, however, eliminate outdoor noise problems.
2. Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is receive, office areas, noise-sensitive areas, or where the normal noise level is low.
3. Measure to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is receive, office areas, noise-sensitive areas, or where the normal noise level is low.
4. Measure to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is receive, office areas, noise-sensitive areas, or where the normal noise level is low.
5. Land use is compatible provided special sound reinforcement systems are installed.
6. Residential buildings require an NLR of 25 dB.
7. Residential buildings require an NLR of 30 dB.
8. Residential buildings are not permitted.

The noise and land use compatibility matrix from the ODA Guidebook is included in **Table 6-3**.

Table 6-3: ODA Guidebook Noise and Land Use Compatibility Matrix						
	Sound Level (DNL)					
Land Use	**Below 65**	**65-70**	**70-75**	**75-80**	**80-85**	**Over 85**
Residential, other than mobile homes	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Offices, business, and professional	Y	Y	25	30	N	N
Wholesale and retail, building materials, hardware, and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade, general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
Manufacturing—general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical manufacturing	Y	Y	25	30	N	N
Agricultural and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells and amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusement parks, resorts, and camps	Y	Y	Y	N	N	N
Riding stables and water recreation	Y	Y	25	30	N	N

Source: 2003 ODA Guidebook

3.3 Noise Analysis and Methodology

Noise contours are developed for 2008 and 2028. These years represent the base year and extent of the FAA approved aviation activity forecasts in **Chapter 3**. Noise exposure levels are determined for annual averages, and presented as contours representing 65 DNL and 55 DNL noise levels. Differences between the 2008 and 2028 noise contours are used to evaluate existing areas of concern, and potential areas that may require noise compatibility planning. Proposed runway configuration in **Chapter 4** is used in the 2028 analysis.

The FAA's Integrated Noise Model (INM) is the accepted industry tool for evaluating aircraft noise. The INM requires information concerning the number of aircraft operations, the types of aircraft (fleet mix), the time (day or night), runway utilization, and the typical flight tracks. Coordination with airport staff, airport traffic control tower (ATCT) staff, and aviation activity forecasts provides information to model noise exposure levels at SLE. Data input into INM are included in **Appendix D**. The INM and this analysis do not include noise monitoring and field observations.

3.3.1 Aircraft Fleet Mix

SLE has a diverse fleet mix, including military and civil aircraft. Aircraft range from small, single-engine general aviation aircraft such as the Cessna 172 to corporate jet aircraft such as the Dassault Falcon 700. Military helicopters use helipads in addition to runways, which influences noise patterns around the Oregon National Guard facility. The airport accommodates civil helicopter traffic and scheduled commercial air freight. Scheduled commercial passenger airline service existed at SLE in 2008, but has been suspended. SLE's fleet mix was provided by airport staff, the fixed base operator, and the FAA enhanced traffic management system database.

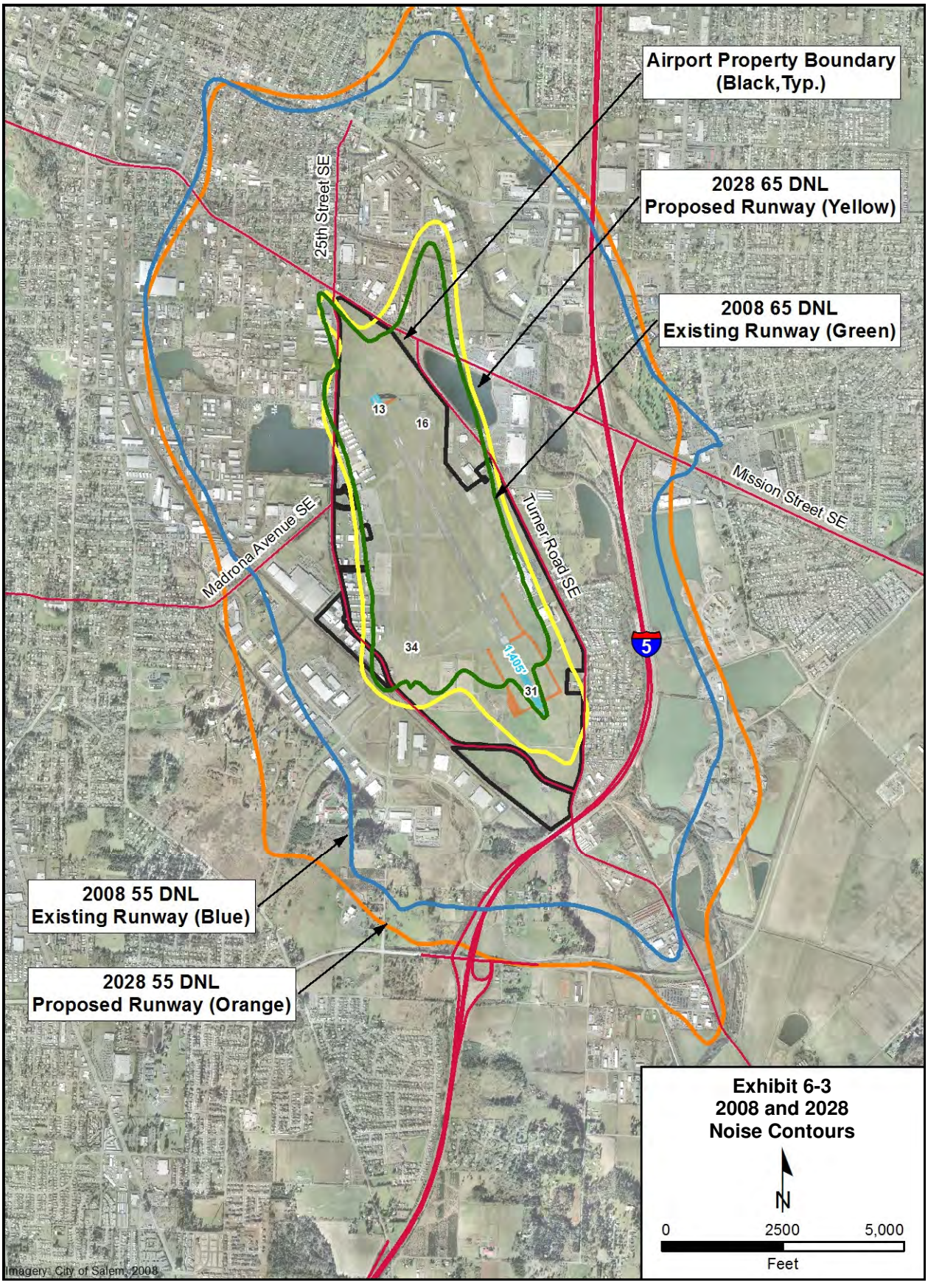
3.3.2 Aircraft Operations

The frequency of aircraft operations are based on the FAA-approved aviation activity forecasts, presented in **Chapter 3**. Aircraft operations are categorized as approach, departure, and touch and go. ATCT staff estimate that 25 percent of operations are touch and go. Remaining operations are divided into arrivals and departures, and then categorized by runway end. ATCT estimates that 10 percent of aircraft operations occur on Runway End 16; 20 percent occur on Runway End 13; 30 percent occur on Runway End 31; and 40 percent occur on Runway End 34. High altitude enroute over-flights and aircraft operating near, but not at, SLE are not included in this analysis.

3.3.3 Daytime-Nighttime Operations

The INM assigns "penalties" to nighttime operations, occurring between 10:00 p.m. and 7:00 a.m., because aircraft noise is perceived to be louder at night when ambient sound levels are lower. The ATCT is closed during nighttime; however, airport user and ATCT estimates suggest that 95 percent of aircraft operations occur during the daytime and five percent occur during the nighttime.

Existing and forecasted noise contours are shown in **Exhibit 6-3**.


Airport Property Boundary (Black, Typ.)
2028 65 DNL Proposed Runway (Yellow)
2008 65 DNL Existing Runway (Green)
2008 55 DNL Existing Runway (Blue)
2028 55 DNL Proposed Runway (Orange)
25th Street SE
Madrona Avenue SE
Turner Road SE
Mission Street SE
13
16
34
31
5
1405'
Exhibit 6-3
2008 and 2028
Noise Contours
N
0
2500
5,000
Feet
Imagery: City of Salem, 2008

Noise contours shift south beyond Runway End 13, 31, and 34 from 2008 to 2028. The shift in noise exposure beyond these runway ends represents a shift from populated areas to less developed areas. Noise contours beyond Runway End 16 shift north from 2008 to 2028 due to departures on Runway End 34 increasing. The 2008 and 2028 65 noise contours are primarily located on airport property. The 55 DNL contour along Mission Street SE moves to the west as military helicopter operations are forecasted to decline by the FAA. Growth and decline of military operations are determined by the Department of Defense, and may not correspond to economic and market trends like civil aircraft and helicopter operations.

4. Summary

Land use compatibility regulations and guidance, including noise contours, zoning codes, comprehensive plans, and state guidebooks, are presented to assist the City of Salem in making land use policy decisions near SLE. This chapter is intended to be a tool for the Airport, the City of Salem, and Marion County to use when evaluating development proposals near the Airport.

Land use compatibility guidance is primarily intended to help communities plan future land use. Existing land uses may be considered incompatible; however, these land uses are and have been exposed to aircraft operations for many years as the Airport has existed since 1929. The FAA expects that as the GA and commercial airline fleets modernize, the average aircraft noise exposure will continue to decrease as it has over recent decades. In instances of existing incompatible land use, guidance generally recommends that policy makers keep existing incompatibilities from growing in size.

Land use compatibility tools are of the most value when used prior to development. Here stakeholders have the opportunity to consider potential benefits and costs of development before construction begins. Compatibility measures are generally more costly, and more difficult to implement when development has occurred. It is recommended that the City of Salem use the existing and forecasted noise contours when planning future development. Siting land uses compatible with aircraft operations and noise contours will help preserve the operational utility of SLE. Citizens living and working near the Airport will benefit, and SLE can continue serving the community as a transportation node and economic engine.

Chapter 7

Capital Improvement Program

Capital Improvement Program

1. Introduction

This chapter presents an overview of the near-term capital improvement program (CIP) for the Salem Municipal Airport (SLE). The CIP allows the Airport to set priorities, identify expected projects and timeline, and plan for appropriate funding. The CIP assigns cost estimates to near-term improvement projects identified in **Chapter 5**, identifies funding sources, and assigns priority. The CIP is a tool that airport management can use to plan budgets and apply for state and federal grants to fund the planned improvement projects. Expected local matches for the improvement projects will be communicated with the City of Salem, and considered in the City's budgeting process.

Cost estimates and funding sources are not final until project implementation, and do not represent commitment or support from any agency to fund the projects described herein.

The chapter is organized in the following sections.

- Funding Sources
- Project Description
- Capital Improvement Plan

The CIP includes projects from 2012 through 2020. Projects are assigned to a year to indicate preference and priority; however, the Airport may alter project implementation scheduling. **Chapter 5**, Facility Requirements and Improvement Alternatives, identifies improvement projects that will be required when the Airport reaches a certain activity level. Aviation activity forecasts in **Chapter 3** are used to identify when activity levels will trigger an improvement project. Projects may need to be delayed or expedited as actual activity varies from forecasted activity.

2. Funding Sources

Airport improvement projects are funded through a variety of sources. The Airport receives annual airport improvement program (AIP) entitlement money from the FAA for being part of the FAA National Plan of Integrated Airport Systems (NPIAS). Airports in NPIAS with fewer than 10,000 passenger enplanements receive $150,000 per year in AIP entitlement. AIP Entitlement funding levels grow as enplanement levels exceed 10,000 per year. The return of scheduled commercial passenger air service to SLE is not known at this time. AIP Entitlement Funding is assumed to be $150,000 in the CIP, although the Airport has residual AIP entitlement funds from when SLE has scheduled commercial passenger service to use on near-term projects. Projects funded with AIP entitlement money require the airport sponsor to fund at least five percent of the project cost.

The Airport can request additional FAA funding from the AIP discretionary program for projects that cost more than available AIP entitlement funds. AIP discretionary funding is not guaranteed, and SLE competes with airports nationwide for AIP discretionary funding. Regulations and requirements for the use of AIP entitlement and discretionary funding are included in FAA Order 5100.38C, *Airport Improvement Program Handbook*. Projects funded with AIP discretionary money require the airport sponsor to fund at least five percent of the project cost.

When scheduled commercial passenger service returns to SLE, the Airport will be eligible to collect passenger facility charges (PFCs). PFCs are levied on commercial airline tickets on a per-passenger basis. The Airport is authorized to use PFCs for improvement projects that benefit the traveling public by providing safety, capacity, and efficiency. PFC funding levels vary based on the number of enplaning passengers at the Airport. PFCs open another source of funding for certain airport improvement projects.

The local match can come from the local and state agencies, including the City of Salem and the Oregon Department of Aviation (ODA) Pavement Management Program (PMP). PMP is a source of funding for airport improvement projects that include preventative maintenance. Local match is required to use PMP funds. PFCs can be used as local match on certain projects.

In addition to ODA PMP, state funding may come from the *Connect*Oregon program. *Connect*Oregon describes itself as “a lottery-bond-based initiative […] to invest in air, rail, marine, and transit infrastructure.” Projects funded by *Connect*Oregon are intended to improve “the connections between the highway system and the other modes of transportation to better integrate the components of the system, improve flow of commerce, and remove delays.” Distribution of *Connect*Oregon funds must be approved by the state legislature, and have been issued in 2005, 2007, 2009, and 2011. *Connect*Oregon funds may not be used for more than 80 percent of the project cost.

*Connect*Oregon funds are distributed to successful applicants across the state, and the program requires that each of the five Oregon regions receives at least 10 percent of available funding. Potential projects are ranked by importance and priority, and the highest ranked projects for each region receive funding.

Some projects have funding that is not identified. It is expected that funding sources will be identified closer to project implementation.

3. Project Description

The following is a summary of airport improvement projects over the next nine years, and their expected time of implementation. Projects are broken down by year to indicate phasing and priorities. Some reorganization of projects may occur as funding and priorities change.

3.1 2012

There are three airport improvement projects planned for 2012, including two lighting projects, and replacing runway hold signs on Runway 13-31. Edge lights on Runway 13-31 and associated access taxiways are beyond life cycle and beginning to require extensive maintenance. The electrical vault is nearing capacity and requires evaluation. It is expected that continued maintenance without replacement will lead to reliability issues

In 2009 the FAA Runway Safety Action Team (RSAT) completed a report on SLE. One of the recommendations from the RSAT report was that the illumination of the Runway 13-31 hold signs needs to be a constant intensity. In addition, existing signs are beyond their lifecycle and should be replaced

3.2 2013

There is one design project planned for 2013, associated with the Runway 13-31 extension project. The environmental process began in 2011 and is expected to be completed in January 2013. The project is described in detail in **Chapter 4**, and includes a 1,405 foot extension of Runway End 31, and a 216 foot relocation of Runway End 13. Approach lighting, instrument landing system equipment, runway lights, and runway marking will need to be relocated and replaced. Taxiway improvements will occur as part of this project.

3.3 2014

There is one airport improvement project planned for 2014; the construction of Runway 13-31 extension and associated improvements. Cost estimates presented include parallel taxiways on the west side of extended Runway End 31, relocation of the medium intensity approach lighting system with runway alignment indicator lights (MALSR) and glideslope, and a new precision approach path indicators (PAPI).

Design and construction costs may be reduced by modifying the initial construction as not all elements included in the cost estimate are necessary for safe operation of the runway, although they will improve access and efficiency. It is recommended that the Airport work with engineering staff and the FAA to determine which elements will be included in the initial construction. For this CIP, the east parallel taxiway and hold apron on the west parallel taxiway are identified as separate projects to the runway extension.

3.4 2015

There is one airport improvement project planned for 2015; design and engineering for the GA apron rehabilitation.

3.5 2016

There is one airport improvement project planned for 2016, which will improve the existing GA aprons. The south and north GA aprons have outlived their lifecycles and are at risk of failing. The Master Plan has recommended that these aprons be improved to support heavier aircraft as SLE experiences growth in corporate general aviation activity. In addition, the south GA apron is unlit, which presents safety concerns given the diverse fleet mix at SLE. The south GA apron improvement project will install lights in this area, and overlay the existing aprons.

3.6 2017

There is one airport improvement project planned for 2017. It is expected that the Department of Environmental Quality will enforce new requirements for the collection and treatment of propylene glycol, a common fluid used to deice aircraft during winter operations. The Airport does not have an existing containment facility and will need one to meet the new requirements. This project will include design and construction.

3.7 2018

There are two airport improvement projects planned for 2018, including the purchase and installation of an emergency generator, and the completion of an Airports Geographic Information System (Airports GIS) project. The Airport has no existing emergency generator which puts basic computing, lighting, and communication as risk in the event of a power outage.

It is recommended that the airport layout plan be updated after the major facility improvements including runway, taxiway and GA apron improvements have been completed. Airports GIS is part of the FAA's Next Generation National Airspace System (NextGen), and includes a process of collecting airport data that meets accuracy requirements of FAA stakeholders. Airports GIS is intended to improve efficiency and accuracy of future airport improvement projects, and reduced duplicative surveying efforts from project to project.

3.8 2019

There is one airport improvement project planned for 2019. The east parallel taxiway will be extended Runway 13-31 provides additional access to Runway End 31, and improves airfield circulation. This new development will support business development on the east side of the Airport.

3.9 2020

There is one airport improvement project planned for 2020; a hold apron on the west parallel taxiway to Runway End 31 will allow turbo-prop aircraft to perform pre-departure checks without obstructing Runway access.

4. Capital Improvement Program

The CIP includes cost estimates and potential funding sources for airport improvement projects. Cost estimates were developed in 2011 dollars. Funding sources and cost estimates are subject to revision. The CIP is presented in **Table 7-1**.

Table 7-1: Capital Improvement Program: 2012-2018

Projected Year	Project	Estimated Cost*	Funding Percentage					Funding Source				
			*Connect*Oregon and State PMP	FAA Entitlement	FAA Discretionary	Local Match	Unidentified	*Connect*Oregon and State PMP	FAA Entitlement	FAA Discretionary	Local Match	Unidentified
2012	Rehabilitate Runway Lighting & Electrical Vault	$350,000	80%	0%	0%	20%	0%	$280,000	$0	$0	$70,000	$0
	Rehabilitate Taxiway Lighting	$500,000	0%	95%	0%	5%	0%	$0	$475,000	$0	$25,000	$0
	Replace Runway 13-31 Signs	$350,000	0%	0%	95%	5%	0%	$0	$0	$332,500	$17,500	$0
2013	Extend Runway 13-31 (Design and Engineering)	$3,500,000	12%	86%	0%	2%	0%	$420,000	$2,996,000	$0	$84,000*	$0
2014	Extend Runway 13-31 (Construction)	$10,500,000	21%	1%	74%	4%	0%	$2,180,000	$150,000	$7,734,000	$436,000*	$0
2015	Apron Rehabilitation (Design and Engineering)	$315,000	80%	0%	0%	20%	0%	$252,000	$0	$0	$63,000	$0
2016	Apron Rehabilitation (Construction)	$2,650,000	0%	6%	89%	5%	0%	$0	$150,000	$2,368,000	$132,000	$0
2017	Deicing Containment Facility	$470,000	0%	32%	63%	5%	0%	$0	$150,000	$296,000	$24,000	$0
2018	Emergency Generator	$480,000	0%	2%	93%	5%	0%	$0	$8,000	$448,000	$24,000	$0
	Update Airport Layout Plan	$400,000	0%	36%	63%	2%	0%	$0	$142,000	$250,000	$8,000	$0
2019	East Parallel Taxiway	$3,700,000	0%	4%	0%	5%	91%	$0	$150,000	$0	$185,000	$3,365,000
2020	Hold Apron	$900,000	0%	17%	0%	5%	78%	$0	$150,000	$0	$45,000	$705,000
Total		**$24,115,000**	**13%**	**18%**	**47%**	**5%**	**17%**	**$3,132,000**	**$4,371,000**	**$11,428,500**	**$1,113,500**	**$4,070,000**

Values in calculated in 2011 dollars. Cost estimates and funding sources are subject to revision. Numbers may not add exactly due to rounding.
**:Local match for runway extension represents 20 percent of ConnectOregon funds used that year.*

Appendices

Appendix A
Master Plan Update—Phase I

Prepared by Mead & Hunt, Inc.
May 2010

Salem Municipal Airport

Salem, Oregon

Master Plan Update – Phase I

May 2010

Prepared for

The City of Salem

Prepared by

Mead & Hunt

Salem Municipal Airport

Master Plan Update – Phase I

Prepared for
The City of Salem

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Background

Salem Municipal Airport (SLE), also known as McNary Field, is located in Marion County, Oregon, two miles southeast of downtown Salem. The Airport opened in 1928, and is currently owned and operated by the City of Salem. SLE primarily supports general aviation, military, and air cargo aircraft operations. Until the economic downturn of 2008, SLE also supported commercial passenger service by Delta Airlines. In 2009, SLE was designated as a General Aviation airport by the Federal Aviation Administration (FAA) National Plan of Integrated Airport Systems (NPIAS). In 2010, SLE will be designated as a Primary airport.

Purpose

The FAA airport master planning process assists airports with expansion and improvement plans that meet aviation demand and safety requirements. FAA Advisory Circular (AC) 150/5070-6B *Airport Master Plans* provides a flexible framework for the preparation of planning documents to aid in efficient use of funds for public-use airport improvements. Airport master plans also consider guidance contained in AC 150/5300-13 *Airport Design,* AC 150/5325-4B *Runway Length Requirements for Airport Design,* and other assorted FAA documents.

The City of Salem initiated this Master Plan Update – Phase I (Plan) in an effort to address current and future challenges posed by changing regional and national aviation trends. The previous SLE Master Plan was completed in 1997. This Plan updates sections of the 1997 Plan and performs new analyses. The intent of the Plan is to resolve current and anticipated planning and engineering issues, which is vital to ensuring the Airport continues to accommodate regional aviation demand. Mead & Hunt is assisting the City in preparing this Plan.

SLE intends to continue to encourage aviation and related economic activity in the region. In order to determine facility improvements required to accommodate projected future activity, it is necessary to understand the types and extent of current aviation activity. The primary purpose of the Plan is to assess the aviation activity and runway needs of SLE's aircraft operators, build documented justification for runway improvements, and establish a Purpose and Need statement to defend the NEPA process for proposed improvement actions. Future phases of the Plan will present and analyze facility improvement alternatives, and select a preferred alternative.

Organization

Phase I of the Plan is organized into three chapters, arranged in the following manner:

- **Chapter 1: Facilities, Operators, & Activity** – This chapter presents information on existing Airport facilities and operations, which are important inputs for activity forecasts, facility requirements, and proposed improvements.

- **Chapter 2: Aviation Activity Forecasts** – Near-term (5 years), mid-term (10 years), and long-term (20-year) forecasts of operations by the Airport's critical design aircraft are developed using several methodologies.

- **Chapter 3: Facility Requirements** – Based on the forecasts presented in Chapter 2, this chapter provides justification for a 7,000-foot primary runway length at SLE. FAA acceptance of this runway length justification was received via correspondence dated April 27, 2010.

This chapter provides background information on weather, facilities, procedures, and aviation activity at Salem Municipal Airport (SLE). Aviation activity at SLE in 2008 is presented, and will be used as a baseline activity year for forecasts and facility requirements.

1.1 Weather Profile

Weather conditions affect aircraft and airport operations. This section discusses wind and climate characteristics at SLE.

1.1.1 Location & Climate

SLE sits on about 750 acres on the southeastern edge of the City of Salem at an elevation of 214 feet above mean sea level (MSL). Salem is located in the Willamette River Valley, approximately 60 miles east of the Pacific Ocean and 50 miles south of Portland. The Willamette Valley is formed by the Coast Range on the west and the Cascade Range on the east. A monthly climate summary, based on weather data collected at SLE from 1928 to 2005, is shown in **Table 1-1**.

Table 1-1: SLE Monthly Climate and Precipitation Averages, 1928-2005

Month	Mean Maximum Temperature	Mean Minimum Temperature	Average Precipitation	Average Snowfall
January	46.1˚ F	32.9˚ F	6.3”	3.2”
February	51.0˚ F	34.3˚ F	4.8”	1.5”
March	55.8˚ F	36.4˚ F	4.3”	0.5”
April	61.3˚ F	38.9˚ F	2.6”	0.0”
May	68.1˚ F	43.6˚ F	2.1”	0.0”
June	74.1˚ F	48.4˚ F	1.4”	0.0”
July	82.1˚ F	51.3˚ F	0.4”	0.0”
August	82.0˚ F	51.3˚ F	0.6”	0.0”
September	76.5˚ F	47.5˚ F	1.4”	0.0”
October	64.6˚ F	42.1˚ F	3.3”	0.1”
November	52.7˚ F	37.4˚ F	5.9”	0.2”
December	47.0˚ F	34.5˚ F	7.2”	1.4”
Annual	**63.4˚ F**	**41.5˚ F**	**40.2”**	**6.9”**

Source: Western Regional Climate Center (www.wrcc.dri.edu)

Precipitation causes wet and/or slippery runway conditions, which reduce aircraft braking performance and increase required runway length. According to the Western Regional Climate Center, SLE averages approximately 40 inches of annual precipitation, with approximately 70 percent of annual precipitation falling between November and March. SLE averages just over a half foot of snow per year.

The mean daily maximum temperature of the hottest month at an airport is used in conjunction with field elevation and runway gradient to calculate aircraft performance and required runway length. According to the Western Regional Climate Center, July is the hottest month at SLE, with a mean daily maximum temperature of 82.1°F. The mean daily minimum temperature of the coldest month is 32.9°F in January.

1.1.2 Wind

The historical pattern of prevailing winds influences desirable runway orientation and runway usage. Because crosswinds pose a hazard to safe operations of aircraft, particularly to small and light aircraft, an airport's primary runway should be aligned with the prevailing wind. Wind coverage is the average percentage of time that a runway or grouping of runways is not subjected to crosswinds of magnitude greater than the allowable crosswind component for each runway. FAA defines the desirable minimum wind coverage of an airport's runway configuration as 95 percent of wind velocity and direction observations over the most recent 10-year period.

The allowable crosswind component used to compute the wind coverage for a given runway is based on the Airport Reference Code (ARC) of the most demanding aircraft expected to use the runway. The FAA assigns an ARC to an aircraft relative to the aircraft's approach category (based on approach speed) and design group (based on wingspan and tail height). Approach category and design group definitions are listed in **Table 1-2.**

Table 1-2: Airport Reference Code (ARC) Categories

Approach Category	**Approach Speed (knots)**	
A	Less than 91	
B	91 or greater, but less than 121	
C	121 or greater, but less than 141	
D	141 or greater, but less than 166	
E	166 or greater	
Design Group	**Wingspan (feet)**	**Tail Height (feet)**
I	<49	<20
II	49 - <79	20 - <30
III	79 - <118	30 - <45
IV	118 - <171	45 - <60
V	171 - <214	60 - <66
VI	214 - <262	66 - <80

Source: FAA AC 150/5300-13 Airport Design

The FAA sets the allowable crosswind component for ARCs A-I and B-I at 10.5 knots; 13 knots for ARCs A-II and B-II; 16 knots for ARCs A-III, B-III, and C-I through D-III; and 20 knots for ARCs A-IV through D-VI. The current and planned ARC for each runway at SLE is shown in **Table 1-3**.

Table 1-3: SLE Runway ARCs

Runway	Current ARC	Planned ARC
13/31	C-II	C-II
16/34	B-II	B-II

Source: 2000 SLE Airport Layout Plan

Wind data is reported to the National Oceanic and Atmospheric Administration (NOAA) by an Automated Surface Observing System (ASOS) located at SLE. Wind data from 1999 to 2008 is grouped for four ceiling and visibility categories:

- All-Weather: All wind observations.
- Visual Flight Rules (VFR): Wind observations in conditions where cloud ceiling is greater than or equal to 1,000 feet and visibility is greater than or equal to 3 miles. These conditions occurred approximately 96 percent of the time from 1999 to 2008 at SLE.
- Instrument Flight Rules (IFR): Wind observations in conditions where cloud ceiling is less than 1,000 feet and/or visibility is less than 3 miles, but cloud ceiling is greater than or equal to 200 feet and visibility is greater than or equal to 0.5 miles. These conditions occurred approximately three percent of the time from 1999 to 2008 at SLE.
- Closed: Wind observations in conditions where cloud ceiling is less than or equal to 200 feet and/or visibility is less than or equal to 0.5 miles. These conditions occurred approximately one percent of the time from 1999 to 2008 at SLE.

FAA's Airport Design for Microcomputers software was used to determine the wind coverage for SLE's runway orientations, both individually and combined. The results are shown in **Table 1-4**.

Table 1-4: Wind Coverage Analysis				
Crosswind Component	**Weather Condition**	**Runway 13/31**	**Runway 16/34**	**Combined**
10.5 knot	All Weather	96.96%	98.28%	99.03%
	VFR	96.79%	98.17%	98.97%
	IFR	99.08%	99.69%	99.81%
13 knot	All Weather	98.86%	99.16%	99.68%
	VFR	98.79%	99.11%	99.66%
	IFR	99.66%	99.85%	99.91%
16 knot	All Weather	99.83%	99.90%	99.97%
	VFR	99.82%	99.89%	99.97%
	IFR	99.89%	99.95%	99.97%
20 knot	All Weather	99.98%	99.99%	100.00%
	VFR	99.98%	99.99%	100.00%
	IFR	99.95%	99.97%	99.98%

Sources: NOAA National Climatic Data Center (1999-2008), FAA Airport Design for Microcomputers

Considered separately, Runway 13/31 and Runway 16/34 provide adequate wind coverage for all aircraft and weather condition categories. However, Runway 16/34 provides superior wind coverage to Runway 13/31 for all aircraft and weather condition categories. When combined, the two runways provide at least 98.97 percent wind coverage for all aircraft.

1.2 Airfield Facilities & Procedures

This section describes current facilities and procedures at SLE. The focus of the section is on airside facilities, as these facilities are most relevant to aviation activity and aircraft operations.

1.2.1 Runways

SLE has two runways. Runway 13/31 is typically used more often for larger commercial, cargo, military, and general aviation (GA) aircraft operations, due to its longer length, instrument procedures, better lighting, and greater weight bearing capacities. GA operations are all civil operations other than scheduled commercial service and non-scheduled commercial service for hire. Runway 16/34 is typically used by smaller GA aircraft, but is also used by larger aircraft in windy conditions. **Table 1-5** lists runway characteristics, and **Exhibit 1-1** shows the airport layout.

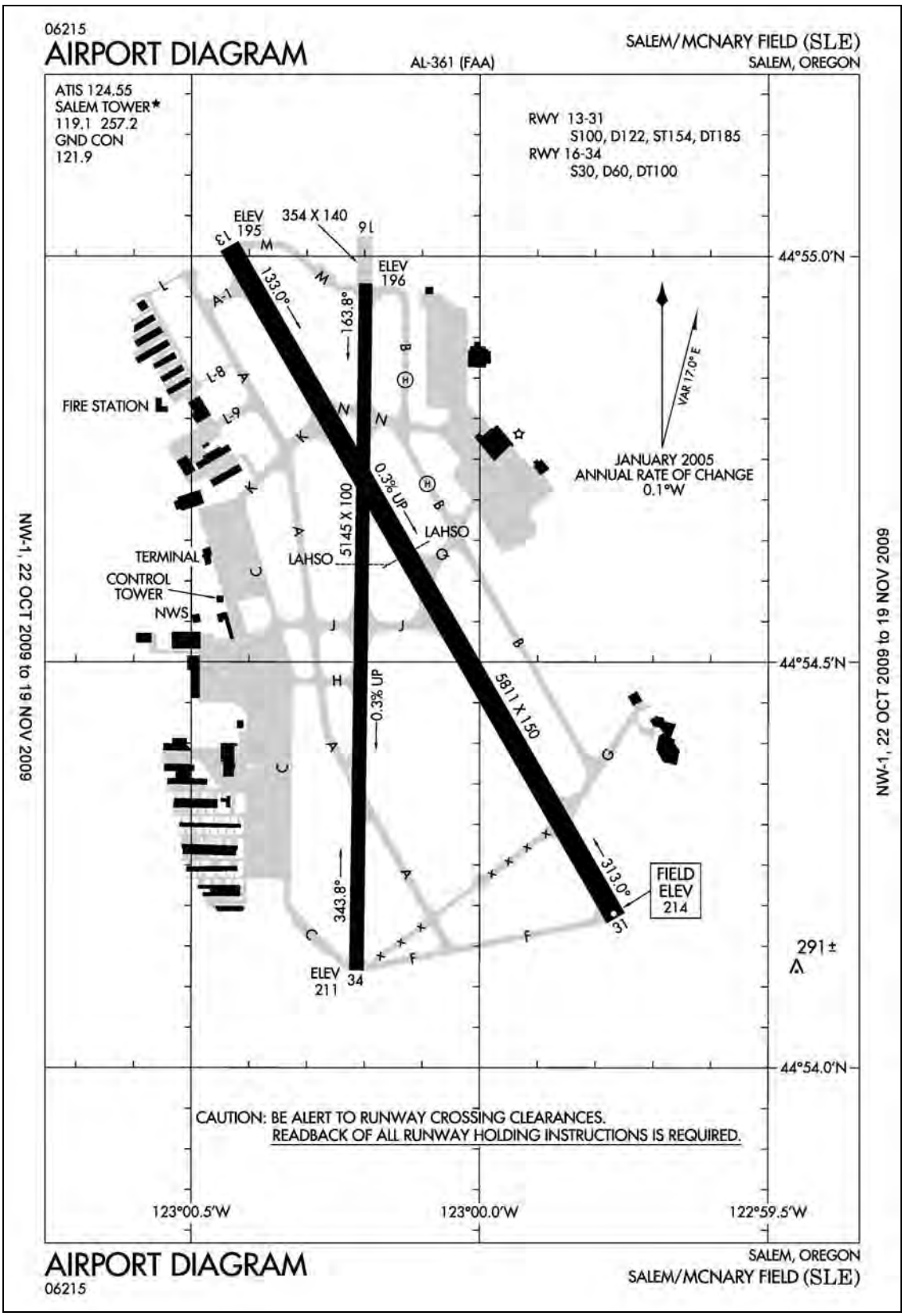
Table 1-5: SLE Runway Characteristics				
Runway	**Length x Width**	**Lighting**	**Visual Glide Slope Indicator**	**Weight-Bearing Capacity (thousands of pounds)**
13	5,811' x 150'	ODALS, REIL, HIRL	VASI	100S/122D/154ST/185DT
31		MALSR, HIRL	None	
16	5,145' x 100'	REIL, MIRL	PAPI	30S/60D/100DT
34		REIL, MIRL	PAPI	
Source: FAA Airport/Facility Directory, 22 OCT 2009 to 17 DEC 2009				
HIRL/MIRL: High/Medium Intensity Runway Lighting **REIL:** Runway End Identification Lights **MALSR:** Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights **ODALS:** Omnidirectional Approach Lighting System **VASI:** Visual Approach Slope Indicator **PAPI:** Precision Approach Path Indicator **Weight-Bearing Capacity**: S-Single Wheel, D-Dual Wheel, ST- Single Tandem, DT- Dual Tandem				

Runway lighting systems enable aircraft to use runways at night and during periods of low visibility, and assist instrument landings. HIRL and MIRL outline the boundary of the runway, and REIL identify the runway ends. ODALS and MALSR are approach lighting systems, consisting of a series of lights located beyond the runway ends.

Visual glide slope indicators help pilots monitor their angle of descent on approach to a runway. A PAPI consists of two or four red and white lights aligned horizontally and perpendicular to the runway, while a VASI consists of two parallel bars of two lights perpendicular to the runway.

The weight-bearing capacity of a runway is not a limit on the size of aircraft that can use the runway, but an indication of the size of aircraft for which the runway was designed. Continuous use by aircraft heavier than the weight-bearing capacity can result in increased runway maintenance and premature replacement. In general, single and dual wheel gear equipped aircraft are light aircraft, and single/dual tandem gear equipped aircraft are heavier aircraft.

Exhibit 1-1: Airport Diagram



Source: FAA Airport/Facility Directory, 22 OCT 2009 to 17 DEC 2009

1.2.2 Instrument Approach Procedures

An instrument approach procedure (IAP) is a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight rules (IFR) conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. IAPs are generated by the FAA, and provided by communication between electronic satellite and radio-based technology, and aircraft equipment. IAPs are categorized by aircraft size, and by the minimum visibility and cloud ceiling conditions under which an aircraft can utilize the IAP for landing operations. IAPs are classified as *precision instrument,* with both horizontal and vertical guidance; *non-precision instrument*, with horizontal guidance; and *visual,* without positional guidance. **Table 1-6** lists the available IAPs at SLE.

Table 1-6: SLE Instrument Approach Procedures

Approach Name	TCH	GSA	Visibility Minimum	Cloud Ceiling Minimum
ILS/LOC RWY 31	42 feet AGL	3.00˚	1/2 mile	200 feet
RNAV (GPS) RWY 31	42 feet AGL	3.00˚	1/2 mile	200 feet
LOC/DME RWY 31	55 feet AGL	3.50˚	1 & 1/4 miles	600 feet
LOC BC RWY 13	51 feet AGL	3.20˚	1 & 3/4 miles	800 feet

Source: FAA U.S. Terminal Procedures, 2009 OCT 22 to 2009 NOV 19

Note: Alternate minimums may apply under Instrument Meteorological Conditions.

Minimums are for Category D aircraft. Minimums may be lower for smaller aircraft.

ILS: Instrument Landing System
LOC: Localizer
RNAV: Area Navigation
GPS: Global Positioning System
DME: Distance Measuring Equipment
LOC BC: Localizer Backcourse
TCH: Threshold Crossing Height
GSA: Glideslope Angle
AGL: Above Ground Level

SLE has two non-precision IAPs and two precision IAPs, which direct aircraft on approach to Runway 13/31. Runway End 13 offers three IAP options for Airport operators, and Runway End 31 offers one. Runway 16/34 is a visual runway, and has no instrument approach procedures.

1.2.3 Air Traffic Control Tower (ATCT)

SLE is a controlled airfield with an on-site Airport Traffic Control Tower (ATCT) located approximately 1,000 feet west of Runway 16/34. The ATCT is operational daily from 7 AM to 9 PM. Controllers in the ATCT provide instructions to aircraft to maintain adequate aircraft separation in the air and on the ground. The ATCT location and height provides controllers with sufficient visibility of most controlled movement areas, including the runway, taxiways, terminal area, and airspace in the Airport vicinity.

1.2.4 Fixed Base Operators (FBOs)

SLE has four FBOs. Salem Aviation Fueling provides fueling services, bottled and bulk oxygen, and overnight tie-down rental. Salem Air Center provides aircraft airframe, power plant, and interior service, as well as aircraft rental and sales. VAL Avionics provides avionics service and aviation accessory sales. Sun Quest provides jet charter service.

1.3 Airport Operator Activity

This section provides an overview of aviation activity at SLE in calendar year 2008, with focus on GA and charter jet aircraft activity, as these are the most demanding aircraft regularly operating at SLE. Historical operations information was collected from the following sources.

- **FAA Terminal Area Forecast (TAF):** The TAF is the FAA annual report of historical aviation data and forecasts for all airports included in the NPIAS. The TAF is prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements, and to provide information for use by state and local authorities, the aviation industry, and the public. Historical TAF operation counts for FAA-towered airports such as SLE are based on air traffic controller takeoff and landing counts.
- **T-100 Air Carrier Statistics:** Domestic air carrier data is reported monthly by both U.S. and foreign air carriers to the U.S. Department of Transportation (DOT) on Form 41 (T-100). This data includes carrier name, origin airport, destination airport, aircraft type, freight and mail weight, number of passengers, available passenger seats, scheduled departures, performed departures, and flight hours.
- **Flightaware:** Flightaware is a company that offers live, online flight tracking data for aircraft whose pilots file IFR flight plans. Flightaware data includes aircraft registration and owner information, aircraft type, origin airport, destination airport, departure date and time, and arrival date and time. Flightaware data does not constitute a complete record of aviation activity at an airport, as aircraft flying VFR flight plans are not included, and many aircraft owners request that their aircraft information be blocked to protect their privacy.
- **FBO:** Fuel service records kept by Salem Aviation Fueling were analyzed to identify jet aircraft operators and operational frequency. One fuel purchase record is interpreted to represent two aircraft operations (one takeoff and one landing) at SLE.
- **Airport Operator Survey:** Airport operator survey forms were prepared and distributed to approximately 100 local (based at SLE) and transient (based at another airport) jet aircraft operators in October 2009. The survey instrument is included in **Appendix A**. The survey was also made available in the airport terminal, on-airport businesses, and the Airport website. The survey solicited information about users' current and desired aircraft, operating weights, haul lengths, insurance requirements, historical operations, and estimated future operations.

1.3.1 TAF Operations Overview

TAF operational data is broken into *itinerant* and *local* categories. Itinerant operations are takeoffs and landings for flights going from one airport to another. Local operations are takeoffs and landings by aircraft operating in the traffic pattern within sight of the tower, aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport. TAF data and forecasts include itinerant activity by *air carrier*, *air taxi/commuter*, *GA*, and *military* aircraft, and local activity by *civil* and *military* aircraft. The TAF does not break down operations by engine type or aircraft make and model. The definitions for the TAF activity categories are as follows.

- **Air Carrier Operations:** Takeoffs and landings of commercial aircraft with seating capacity of more than 60 seats.

- **Commuter Operations:** Takeoffs and landings by aircraft with 60 or fewer seats that transport passengers on scheduled commercial flights.
- **Air Taxi Operations:** Takeoffs and landings by aircraft with 60 or fewer seats conducted on non-scheduled or for-hire commercial flights.
- **Itinerant GA Operations:** Takeoffs and landings for flights going from one airport to another by civil aircraft not classified as commercial.
- **Local Civil Operations:** Takeoffs and landings for flights originating and terminating at the same airport by civil aircraft not classified as commercial.
- **Military Operations:** Takeoffs and landings by military aircraft.

TAF operational data for 2008 is shown in **Table 1-7**.

Table 1-7: 2008 TAF SLE Operations Data

Operation Type	Number of Operations
Itinerant	
Air Carrier	20
Air Taxi/Commuter	2,985
GA	27,322
Military	3,404
Total Itinerant Operations	**33,731**
Local	
Civil	31,046
Military	1,633
Total Local Operations	**32,679**
Total Annual Operations	**66,410**

Source: December 2009 FAA TAF

According to the TAF, there were 66,410 aircraft operations at SLE in 2008. Itinerant GA and local civil operations accounted for 88% of operations. Itinerant and local military operations, conducted primarily by the Oregon Military Department, accounted for eight percent of operations. The remaining four percent of operations were conducted by air carrier and air taxi/commuter aircraft.

1.3.2 Based Aircraft Overview

Based aircraft are aircraft permanently stationed at an airport. SLE hosts a variety of civil and military aircraft owned by individuals, groups, businesses, and government. Based aircraft at SLE are shown in **Table 1-8**.

Table 1-8: SLE Based Aircraft	
Aircraft Type	**Number of Aircraft**
GA Single Engine	153
GA Multi-Engine	21
GA Jet Aircraft	12
GA Helicopters	11
Gliders	1
Military	18
Total Based Aircraft	**216**

Sources: FAA Form 5010-1, FBO Records, Salem Army Aviation Support Facility Master Plan

Note: GA single engine and multi-engine aircraft include both piston- and turboprop-powered aircraft.

While the majority of the based aircraft at SLE are GA single engine aircraft, the Airport also hosts GA multi-engine aircraft, GA jet aircraft, GA helicopters, and military aircraft.

1.3.3 Based GA Jet Aircraft Activity

There were 11 based GA jet aircraft at SLE in 2008. Based GA jet aircraft operators at SLE include local businesses and aircraft management companies. Ten of the GA jets were large aircraft, and one was a small aircraft. The FAA defines *large* aircraft as those with a maximum certificated takeoff weight (MTOW) greater than 12,500 pounds, and defines *small* aircraft as those with a MTOW less than or equal to 12,500 pounds. Based GA jet aircraft operations for 2008 are shown in **Table 1-9** by aircraft type and classification.

Table 1-9: 2008 SLE Based GA Jet Aircraft Activity		
Aircraft Type	**Number of Aircraft**	**Number of Operations**
Large Aircraft		
Beechjet 400A	3	350
Challenger 300	1	38
Citation II/Bravo	5	570
Citation Sovereign	1	0
Falcon 2000	1	200
Large Aircraft Total	**11**	**1,158**
Small Aircraft		
Citation Mustang	1	0
Small Aircraft Total	**1**	**0**
Grand Total	**12**	**1,158**

Sources: Flightaware, FBO Records, Airport Operator Survey

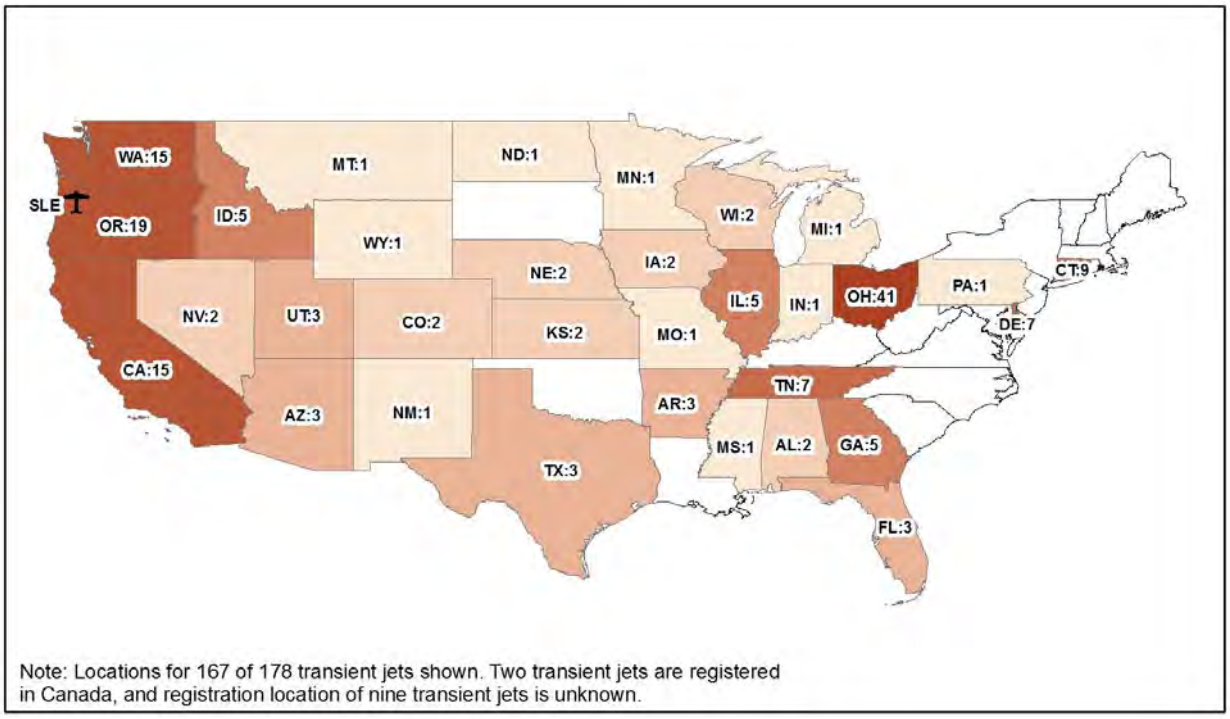
Ten based GA jets conducted a combined 1,158 operations at SLE in 2008. These operations were conducted by large aircraft, with origin and destination airports throughout the U.S. and Canada. Although the Citation Sovereign and Citation Mustang were not operated in 2008, it is expected that they will be operated in the future. Detailed operations data by individual aircraft is contained in **Appendix B**.

1.3.4 Transient GA and Charter Jet Aircraft Activity

This section describes operations by transient GA and charter jet aircraft at SLE in 2008. *Transient* aircraft are aircraft not based at the Airport, but that use the Airport. Transient GA and charter jet operators at SLE include small businesses, large corporations, fractional aircraft ownership companies, charter operators, flight training businesses, government agencies, medical evacuation teams, and recreational pilots. Transient jet operations by commercial passenger and air cargo carriers will be considered in a separate section, and not included here.

Based on analysis of Airport Operator Survey responses, FBO records, and Flightaware data, 178 transient GA and charter jet aircraft operated at SLE in 2008. Some of the jets operated at SLE on a regular basis, while others used the Airport only once. It is difficult to discern the base airport of transient aircraft; the registrant address listed for the aircraft tail number in the FAA registration database is an approximation. The 178 jets are registered in 32 states in the U.S. and two provinces in Canada, with most of them registered in the Western, Midwestern, and Southeastern U.S. A breakdown of 2008 transient jet aircraft registrations by state is shown in **Exhibit 1-2**.

Exhibit 1-2: 2008 SLE Transient GA and Charter Jet Registrations by State



Sources: FBO Records, Flightaware, Airport Operator Survey, FAA Aircraft Registration Database

States with the most registrations for transient GA and charter jets operating at SLE in 2008 included Ohio (41), Oregon (19), Washington (15), California (15), Connecticut (9), Tennessee (7), Delaware (7), Illinois (5), Georgia (5), and Idaho (5).

Transient GA and charter jets operating at SLE in 2008 included 38 aircraft makes and models. Transient GA and charter jet aircraft operations for 2008 are shown in **Table 1-10** by aircraft type and classification.

Table 1-10: 2008 SLE Transient GA and Charter Jet Aircraft Types and Operations		
Aircraft Type	**Number of Aircraft**	**Number of Operations**
Large Aircraft		
Beechjet 400A	18	44
Boeing 737	2	18
Challenger 300	1	8
Challenger 600	9	20
Citation CJ3	7	24
Citation Excel	10	26
Citation II/Bravo	19	80
Citation III	1	2
Citation Sovereign	2	4
Citation V/Encore	11	36
Citation X	2	4
Falcon 10	1	2
Falcon 20	1	4
Falcon 2000	2	8
Falcon 50	3	14
Falcon 900	3	12
Gulfstream G100	3	16
Gulfstream G150	3	6
Gulfstream G200	7	20
Gulfstream II	3	6
Gulfstream III	3	8
Gulfstream IV	6	18
Gulfstream V	1	2
Hawker 800	4	8
Hawker 800XP	1	2
Israel 1124 Westwind	2	8
Learjet 25	1	2
Learjet 31A	6	38
Learjet 35	13	56
Learjet 45	8	18
Learjet 60	4	10
Large Aircraft Total	**157**	**524**
Small Aircraft		
Citation CJ1	8	42
Citation CJ2	3	6
Citation I	1	2
Citation I/SP	4	8
Citation Mustang	3	6
Eclipse 500	1	2
Raytheon 390 Premier I	1	4
Small Aircraft Total	**21**	**70**
Grand Total	**178**	**594**

Source: FBO Records, Flightaware, Airport Operator Survey, FAA Aircraft Registration Database

There were a total of 594 operations by transient GA and charter jet aircraft at SLE in 2008, with each aircraft averaging approximately three operations each. Most of these operations were conducted by large jet aircraft, with origin and destination airports throughout the U.S. and Canada. The most frequently operated transient GA and charter jet aircraft types included the Citation II/Bravo (80), the Learjet 35A (56), the Beechjet 400A (44), the Citation CJ1 (42), the Learjet 31A (38), and the Citation V/Encore (36). Detailed operations data by individual aircraft is contained in **Appendix B**.

1.3.5 Commercial Passenger and Cargo Carrier Activity

T-100 data includes information on flights conducted by commercial passenger and cargo carriers. A summary of the T-100 data for SLE in 2008 is shown in **Table 1-11**.

Table 1-11: 2008 SLE T-100 Air Carrier Statistics

Carrier	Aircraft Type	Operations Scheduled	Operations Performed	Total Passengers	Load Factor
Delta Airlines [1]	CRJ-200ER	970	970	29,773	61.5%
Federal Express [2]	Cessna Caravan 208	750	750	N/A	N/A

Source: U.S. DOT Bureau of Transportation Statistics T-100

[1] Conducted by contract carrier Skywest Airlines, service discontinued in October 2008

[2] Conducted by contract carrier Empire Airlines

From January to mid-October 2008, Delta Airlines contract carrier Skywest Airlines provided passenger service twice daily on weekdays and once daily on weekends to and from Salt Lake City. Throughout 2008, Federal Express contract carrier Empire Airlines conducted daily cargo flights, Monday through Saturday, to and from the FedEx regional feeder hub at PDX via other Oregon cities.

1.3.6 Military Activity

SLE is home to the Oregon Military Department's Salem Army Aviation Support Facility (AASF #1), located on the northeast side of the airfield. The AASF #1 supports the 641st Medical Evacuation Battalion and the 249th Theatre Aviation Battalion and associated companies, whose purpose is to provide aircraft movement to support medical evacuation; command, control and communications; and organic airlift. The AASF #1 is also involved in counter drug operations, organizational support aircraft operations, contractor support, and weapons of mass destruction civil support. In 2008, the facility hosted 18 based aircraft, including 12 UH-60 Blackhawk helicopters, four OH-58 Kiowa helicopters, one C-23 Sherpa fixed-wing aircraft, and one C-12 Huron fixed-wing aircraft. According to the 2008 AASF #1 Master Plan, the facility expects to host 20 aircraft in the long term, including 15 Blackhawks, four LUH-72 Lakota helicopters, and one Huron. Military operations will not be quantified or forecasted as part of this Plan.

1.4 Summary

Historical aviation activity presented in this chapter will be used to develop near-term, mid-term, and long-term critical design aircraft activity forecasts. Airfield facilities at SLE support a wide range of civil and military aviation activity. However, the critical design aircraft are expected to be large GA and charter jets. Operations by large GA and charter jet aircraft at SLE in 2008 are summarized in **Table 1-12**.

Table 1-12: 2008 SLE Large GA and Charter Jet Aircraft Types and Operations

Aircraft Type	Number of Aircraft	Number of Operations
Beechjet 400A	21	394
Boeing 737	2	18
Challenger 300	2	46
Challenger 600	9	20
Citation CJ3	7	24
Citation Excel	10	26
Citation II/Bravo	24	650
Citation III	1	2
Citation Sovereign	3	4
Citation V/Encore	11	36
Citation X	2	4
Falcon 10	1	2
Falcon 20	1	4
Falcon 2000	3	208
Falcon 50	3	14
Falcon 900	3	12
Gulfstream G100	3	16
Gulfstream G150	3	6
Gulfstream G200	7	20
Gulfstream II	3	6
Gulfstream III	3	8
Gulfstream IV	6	18
Gulfstream V	1	2
Hawker 800	4	8
Hawker 800XP	1	2
Israel 1124 Westwind	2	8
Learjet 25	1	2
Learjet 31A	6	38
Learjet 35	13	56
Learjet 45	8	18
Learjet 60	4	10
Total	**168**	**1,682**

There were 1,682 operations by 168 large GA and charter jet aircraft at SLE in 2008. This activity will provide a baseline for critical design aircraft activity forecasts. Other aviation activity described in this chapter will not be carried forward into the forecasts.

Critical design aircraft activity forecasts provide the basis for determining airport facility requirements, analyzing facility improvement alternatives, and assessing effects of proposed improvements. Forecasts based on industry standard methodologies are needed for informed, effective decisions related to new or expanded airport facilities.

This chapter presents near-term (five-year), intermediate-term (10-year), and long-term (20-year) SLE activity forecasts, and identifies a preferred forecast. Forecasts are limited to those for operations by critical design aircraft, identified in Chapter 1 as those requiring demanding runway length. The forecasts require Federal Aviation Administration (FAA) approval, and will play a key role in the Purpose and Need statement for projects requiring documentation in accordance with the National Environmental Policy Act (NEPA). Forecasts are developed using guidance contained in FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*.

2.1 Forecast Background

This section presents recent national aviation industry trends and local socioeconomic trends. This information provides background for critical design aircraft activity forecasts.

2.1.1 FAA Aerospace Forecast FY2009-2025

SLE serves primarily general aviation (GA) and charter aircraft, including single-engine piston, multi-engine piston, turboprop, and turbojet aircraft. National GA and charter trends influence critical design aircraft activity at SLE, and these trends are considered in the development of critical design aircraft activity forecasts.

Each year, the FAA publishes its national aviation industry outlook in the *FAA Aerospace Forecast* (*Forecast*). The *Forecast* includes historic and forecasted aviation activity, aircraft deliveries, active aircraft fleet size and mix, aircraft hours flown, and FAA air traffic control workload. The *Forecast* is based on industry data from aircraft manufacturers, passenger and cargo airlines, trade organizations, and the annual FAA *General Aviation and Air Taxi Activity and Avionics Survey*, and also takes into account general economic indicators, such as gross domestic product (GDP) and commodity prices. SLE critical design aircraft activity forecasts consider national GA and charter trends and forecasts presented in the *FAA Aerospace Forecast FY2009-2025*.

According to the *Forecast*, the market for GA and charter products and services showed mixed results in 2008. U.S. manufacturers delivered 3,079 GA and charter aircraft in 2008, 6.1% fewer than in 2007, the first decrease since 2003. This is attributed to a decline in small piston aircraft deliveries, as turbojet and turboprop deliveries were up 17.2% and 14.8%, respectively. The *Forecast* estimates the active national GA and charter fleet increased 1.0% in 2008.

The *Forecast* projects the national GA and charter fleet to grow at a compound annual growth rate (CAGR) of 1.0% over the 17-year forecast period, from an estimated 234,015 aircraft in 2008 to 275,230 in 2025. The turbine-powered fleet is projected to grow faster than the piston-powered fleet, with a 3.2% CAGR over the forecast period, and the turbine jet fleet is projected to increase at a 4.8% CAGR. According to the *Forecast*, corporate staff safety and security concerns, as well as increasing flight delays at some U.S. airports, "have made fractional, corporate, and on-demand charter flights practical alternatives to commercial air travel."

The *Forecast* projects annual GA and charter hours flown to grow at a 1.8% CAGR from 2009 to 2025. A large part of the expected increase is attributed to growth in hours flown by business and corporate aircraft, with hours flown by turbine aircraft projected to increase at a 3.6% CAGR, compared to 0.4% for piston-powered aircraft. Jet aircraft hours flown are expected to grow at a 5.2% CAGR. Increases in jet hours are attributed to a growing business jet fleet, especially increases in fractional ownership fleet and activity levels. According to the *Forecast*, business jet aircraft in fractional ownership fly an average of 800 annual hours, compared with an average of 380 annual hours for the national business jet fleet as a whole.

Activity at the 264 FAA and 239 contract air traffic control tower (ATCT) airports totaled 58.5 million operations in 2008, down 4.3% from 2007. The *Forecast* projects total aviation activity at towered airports to decline by 5.7% in 2009, with activity growth returning in 2010 at 0.9%. Total activity growth is then expected to vary between 1.3% and 1.9% per year from 2011 to 2025, reaching 69.6 million operations in 2025. GA activity at towered airports is expected to decline by 6.2% in 2009, increase by 0.1% in 2010, and increase at a 0.6% CAGR from 2011 to 2025. Charter activity at towered airports is expected to decline by 6.4% in 2009, increase by 0.7% in 2010, and increase at a 1.4% CAGR from 2011 to 2025.

2.1.2 Local Socioeconomic Trends

SLE is the largest airport in the Salem Metropolitan Statistical Area (MSA), which is defined by the U.S. Census Bureau as the entirety of Marion and Polk Counties. Local socioeconomic trends affect based and transient aircraft operators. Socioeconomic trends occurring in the Salem MSA are considered in the development of critical design aircraft activity forecasts. Salem MSA historic and projected population figures, developed by the economic forecasting firm Woods & Poole, are presented and compared with statewide and national population figures in **Table 2-1**.

Table 2-1: Historic and Projected Population			
Year	**Salem MSA**	**Oregon**	**U.S.**
Historic			
1990	279,862	2,860,375	249,622,814
2000	348,216	3,430,828	282,171,936
2008	391,680	3,790,060	304,059,724
CAGR 1990-2008	1.89%	1.58%	1.10%
Projected			
2013	417,132	4,032,725	319,189,413
2018	443,353	4,282,839	334,925,342
2028	496,939	4,794,237	367,311,456
CAGR 2008-2028	1.20%	1.18%	0.95%

Source: Woods & Poole

Note: Projected 2028 population interpolated by Mead & Hunt from 2025 and 2030 Woods & Poole forecasts. CAGR percentages interpolated by Mead & Hunt from Woods & Poole data.

Since 1990, Salem MSA population has increased at a more rapid CAGR (1.89%) than both statewide and national population (1.58% and 1.10%, respectively). In the next twenty years, the Salem MSA population is expected to increase at a similar CAGR to statewide population (1.20% and 1.18%, respectively), but at a more rapid CAGR than national population (0.95%).

Gross regional product (GRP) is the total market value of goods and services produced annually within a metropolitan area. Salem MSA historic and projected GRP is presented and compared to Oregon gross state product (GSP) and U.S. GDP in **Table 2-2**.

Table 2-2: Historic and Projected GRP, GSP, and GDP, in millions of 2008 dollars			
Year	**Salem MSA**	**Oregon GSP**	**U.S. GDP**
Historic			
1990	7,135	87,080	8,776,250
2000	10,690	138,905	12,047,400
2008	13,575	167,090	14,395,320
CAGR 1990-2008	3.64%	3.69%	2.79%
Projected			
2013	14,535	177,100	15,352,730
2018	16,140	195,585	16,994,010
2028	20,015	239,355	20,846,440
CAGR 2008-2028	1.96%	1.81%	1.87%

Source: Woods & Poole, U.S. Bureau of Labor Statistics Consumer Price Index Inflation Calculator

Note: Projected 2028 GRP, GSP, and GDP interpolated by Mead & Hunt from 2025 and 2030 Woods & Poole forecasts. CAGR percentages interpolated by Mead & Hunt from Woods & Poole data.

Since 1990, Salem MSA GRP has grown at a similar CAGR to Oregon GSP (3.64% and 3.69%, respectively), and at a faster CAGR than U.S. GDP (2.79%). Over the next 20 years, Salem MSA GRP is expected to grow at a faster CAGR (1.96%) than both Oregon GSP and U.S. GDP (1.81% and 1.87%, respectively).

2.2 Critical Design Aircraft Forecast Categories

The critical design aircraft for SLE are large GA and charter jet aircraft. AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides separate runway length determination procedures for two categories of large aircraft; *Large Aircraft with a Maximum Certificated Takeoff Weight (MTOW) up to and including 60,000 Pounds*, and *Large Aircraft with a MTOW of More than 60,000 Pounds*.

AC 150/5325-4B also provides separate runway length charts for two subcategories of *Large Aircraft with a MTOW up to and including 60,000 Pounds*: *Aircraft that Make up 75% of the Fleet* (75% of Fleet) and the *Remaining 25% of Aircraft that Make up 100% of the Fleet* (Remaining 25% of Fleet). The 75% of Fleet aircraft are defined as those requiring less than 5,000 feet of runway at mean sea level and the standard day temperature (SDT) of 59^{o} F. The Remaining 25% of Fleet aircraft are defined as those requiring at least 5,000 feet of runway at mean sea level and the SDT of 59^{o} F, and make up 100% of *Large Aircraft with a MTOW up to and including 60,000 Pounds* when combined with the 75% of Fleet aircraft. Aircraft within the two subcategories are listed in Tables 3-1 and 3-2 of AC 150/5325-4B.

Nineteen of SLE's 31 critical design aircraft are 75% of Fleet aircraft, seven are Remaining 25% of Fleet aircraft, and five are *Large Aircraft with a MTOW of More than 60,000 Pounds*. Of the 1,682 operations conducted at SLE in 2008 by the critical design aircraft, 1,358 were conducted by 75% of Fleet aircraft, 272 were conducted by Remaining 25% of Fleet aircraft, and 52 were conducted by *Large Aircraft with a MTOW of More than 60,000 Pounds*. Critical design aircraft operations in 2008 are presented by category, Airport Reference Code (ARC), and MTOW in **Table 2-3**. The critical design aircraft activity forecasts presented in subsequent sections separate critical design aircraft operations into these three categories.

Table 2-3: 2008 SLE Critical Design Aircraft Operations by Category, ARC, and MTOW			
Aircraft Type	**Number of Operations**	**ARC**	**MTOW**
75% of the Fleet of Large Aircraft with a MTOW up to and including 60,000 Pounds			
Citation CJ3	24	B-II	13,870 lbs
Citation II/Bravo	650	B-II	14,800 lbs
Learjet 25	2	C-I	15,000 lbs
Learjet 31A	38	C-I	15,500 lbs
Beechjet 400A	394	C-I	16,100 lbs
Citation V/Encore	36	B-II	16,630 lbs
Learjet 35	56	D-I	18,300 lbs
Falcon 10	2	B-I	18,740 lbs
Citation Excel	26	B-II	20,000 lbs
Learjet 45	18	C-I	21,500 lbs
Citation III	2	B-II	22,000 lbs
Israel 1124 Westwind	8	C-I	23,500 lbs
Gulfstream G100	16	C-II	24,650 lbs
Gulfstream G150	6	C-II	26,150 lbs
Falcon 20	4	B-II	28,660 lbs
Citation Sovereign	4	B-II	30,300 lbs
Falcon 50	14	B-II	38,800 lbs
Challenger 300	46	B-II	38,850 lbs
Falcon 900	12	B-II	45,500 lbs
75% of Fleet Total	**1,358**		
Remaining 25% of the Fleet of Large Aircraft with a MTOW up to and including 60,000 Pounds			
Learjet 60	10	C-I	23,500 lbs
Hawker 800	8	C-II	27,400 lbs
Hawker 800XP	2	C-II	28,000 lbs
Gulfstream G200	20	C-II	35,600 lbs
Falcon 2000	208	B-II	35,800 lbs
Citation X	4	C-II	36,100 lbs
Challenger 600	20	C-II	40,125 lbs
Remaining 25% of Fleet Total	**272**		
Large Aircraft with a MTOW Greater than 60,000 Pounds			
Gulfstream II	6	D-II	65,500 lbs
Gulfstream III	8	C-II	69,700 lbs
Gulfstream IV	18	D-II	73,200 lbs
Gulfstream V	2	D-III	89,000 lbs
Boeing 737	18	C-III	115,500 lbs
Greater than 60,000 Pounds Total	**52**		
Grand Total	**1,682**		

Sources: AC 150/5325-4B Runway Length Requirements for Airport Design, AC 150/5300-13 Airport Design, FAA Aircraft Characteristics Database, Aviation Week & Space Technology Aerospace Sourcebook 2008, Aircraft Manufacturer Websites

2.3 Critical Design Aircraft Activity Forecasts

This section presents critical design aircraft operations forecasts, developed utilizing five methodologies, including historic operations trend, Terminal Area Forecast (TAF)-based, market share, population-based, and GRP-based methodologies.

2.3.1 Historic Operations Trend Forecast

Historic operations trends provide insight into potential future operations. Historic SLE critical design aircraft operations from 2000 to 2007 were determined using the FAA Enhanced Traffic Management System Counts (ETMSC) database, which breaks down monthly flight plan records by airport, aircraft type, and user category (there are no ETMSC records available previous to 2000). Historic SLE critical design aircraft operations are presented in **Table 2-4**.

Table 2-4: Historic SLE Critical Design Aircraft Operations

Year	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
	75% of Fleet	Remaining 25% of Fleet		
2000	772	288	34	1,094
2001	696	234	38	968
2002	736	226	28	990
2003	662	214	56	932
2004	722	260	42	1,024
2005	920	298	44	1,262
2006	1,230	324	44	1,598
2007	1,378	292	50	1,720
2008	1,358	272	52	1,682
CAGR 2000-2008	7.31%	-0.71%	5.45%	5.52%

Source: FAA ETMSC, Airport Operator Survey, Flightaware, FBO Records

Following a period of stability in critical design aircraft operations from 2000 to 2004, operations by 75% of Fleet aircraft almost doubled from 2004 to 2007. Operations by Remaining 25% of Fleet aircraft remained relatively stable from 2000 to 2008, while operations by *Large Aircraft with a MTOW Greater than 60,000 Pounds* increased gradually. Critical design aircraft operations declined slightly from 2007 to 2008, largely in response to the national economic downturn. However, there has been an overall positive trend in critical design aircraft operations between 2000 and 2008, with a 5.52% CAGR.

The historic operations trend forecast projects SLE critical design aircraft operations based on operations trends from 2000 to 2008. The historic operations trend forecast is presented in **Table 2-5**.

Table 2-5: Historic SLE Operations Trend Critical Design Aircraft Operations Forecast

Year	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
	75% of Fleet	Remaining 25% of Fleet		
2008	1,358	272	52	1,682
2013	1,516	258	58	1,832
2018	1,984	258	76	2,318
2028	2,666	258	102	3,026
CAGR 2008-2013	2.22%	-1.02%	2.22%	1.73%
CAGR 2013-2018	5.52%	0%	5.52%	4.81%
CAGR 2018-2028	3.00%	0%	3.00%	2.70%

Source: Mead & Hunt

In line with *FAA Aerospace Forecast FY2009-2025* expectations, the historic operations trend forecast projects a five percent decline in critical design aircraft operations in 2009 and no growth in 2010. From 2011 to 2018, the forecast projects the return of annual 5.52% operations growth for 75% of Fleet aircraft and *Large Aircraft with a MTOW Greater than 60,000 Pounds*. After 2018, the forecast projects a more modest three percent CAGR for operations by these two aircraft categories, to account for long-term fluctuations in activity. The forecast projects stable operations by Remaining 25% of Fleet aircraft after 2010.

The historic operations trend forecast projects 1,832 critical design aircraft operations in 2013, 2,318 critical design aircraft operations in 2018, and 3,026 critical design aircraft operations in 2028.

2.3.2 TAF-Based Forecast

The TAF is developed by the FAA using historic relationships between airport activity measures, and local and external factors that influence aviation activity. The TAF does not forecast operations by aircraft type, but does forecast itinerant GA and charter operations. Local operations are not considered under this methodology, as the vast majority of SLE critical design aircraft operations are itinerant. CAGRs found in the TAF are used to create this TAF-based critical design operations forecast. TAF itinerant GA and charter operations forecasts for SLE are presented in **Table 2-6**.

Table 2-6: SLE TAF Itinerant GA and Charter Operations Forecasts

Year	Itinerant GA Operations	Charter Operations	Total
2008	27,322	2,015	29,337
2013	25,703	1,875	27,578
2018	27,704	2,123	29,827
2028	32,184	2,715	34,899
CAGR 2008-2013	-1.21%	-1.43%	-1.23%
CAGR 2013-2018	1.51%	2.52%	1.58%
CAGR 2018-2028	1.51%	2.49%	1.58%

Source: December 2009 FAA TAF, U.S. DOT Bureau of Transportation Statistics T-100

Note: CAGR percentages interpolated by Mead & Hunt from TAF data.

The TAF projects a -1.23% CAGR for itinerant GA and charter operations from 2008 to 2013, a 1.58% CAGR from 2013 to 2018, and a 1.58% CAGR from 2018 to 2028. The TAF-based forecast projects SLE critical design aircraft operations to grow at the same CAGRs projected by the TAF for itinerant GA and charter operations. This forecast is conservative, as the *Forecast* expects jet aircraft operations to increase at a faster rate than piston aircraft operations, but the TAF combines operations by aircraft with different engine types. The TAF-based forecast is presented in **Table 2-7**.

Table 2-7: TAF-Based Critical Design Aircraft Operations Forecast

	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	
Year	75% of Fleet	Remaining 25% of Fleet		Total
2008	1,358	272	52	1,682
2013	1,278	256	50	1,584
2018	1,382	278	54	1,714
2028	1,616	324	62	2,002
CAGR 2008-2013	-1.23%	-1.23%	-1.23%	-1.23%
CAGR 2013-2018	1.58%	1.58%	1.58%	1.58%
CAGR 2018-2028	1.58%	1.58%	1.58%	1.58%

Source: Mead & Hunt

The TAF-based forecast projects 1,584 critical design aircraft operations in 2013, 1,714 critical design aircraft operations in 2018, and 2,002 critical design aircraft operations in 2028.

2.3.3 Market Share Forecast

An airport's market share is the relationship between its aviation activity and a larger aggregate aviation activity measure, such as state, regional, or national aviation activity. For the aggregate measure, this market share forecast utilizes national forecasts for itinerant GA and charter operations at towered airports contained in *FAA Aerospace Forecast FY2029-2025*. Local operations are not considered under this methodology, as the vast majority of SLE critical design aircraft operations are itinerant. These forecasts are presented in **Table 2-8**.

Table 2-8: National Itinerant GA and Charter Operations Forecasts at Towered Airports

Year	Itinerant GA Operations	Charter Operations	Total
2008	17,367,900	10,977,700	28,345,600
2013	16,785,000	10,952,000	27,737,000
2018	18,136,900	11,694,400	29,831,300
2028	21,806,200	13,317,300	35,123,500
CAGR 2008-2013	-0.68%	-0.05%	-0.43%
CAGR 2013-2018	1.56%	1.32%	1.47%
CAGR 2018-2028	1.86%	1.31%	1.65%

Source: *FAA Aerospace Forecast FY2009-2025*

Note: *FAA Aerospace Forecast FY2009-2025* projects operations through 2025. Operations forecasts for 2028 extrapolated by Mead & Hunt. CAGR percentages interpolated by Mead & Hunt from *FAA Aerospace Forecast* data.

The *Forecast* projects a -0.43% CAGR for national itinerant GA and charter operations from 2008 to 2013, a 1.47% CAGR from 2013 to 2018, and a 1.65% CAGR from 2018 to 2025.

The market share forecast projects SLE critical design aircraft activity to grow at the same CAGRs projected by the *Forecast* for national itinerant GA and charter activity at towered airports, which results in a constant SLE market share from 2008 to 2028. This forecast is conservative, as the *Forecast* expects jet aircraft operations to increase at a faster rate than piston aircraft operations, but combines operations by aircraft with different engine types. The market share forecast is presented in **Table 2-9**.

Table 2-9: SLE Market Share Critical Design Aircraft Operations Forecast

Year	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
	75% of Fleet	Remaining 25% of Fleet		
2008	1,358	272	52	1,682
2013	1,330	266	50	1,646
2018	1,430	286	54	1,770
2028	1,684	336	64	2,084
CAGR 2008-2013	-0.43%	-0.43%	-0.43%	-0.43%
CAGR 2013-2018	1.47%	1.47%	1.47%	1.47%
CAGR 2018-2028	1.65%	1.65%	1.65%	1.65%

Source: Mead & Hunt

The market share forecast projects 1,646 critical design aircraft operations in 2013, 1,770 critical design aircraft operations in 2018, and 2,084 critical design aircraft operations in 2028.

2.3.4 Socioeconomic Forecasts: Population-Based and GRP-Based

Recent SLE critical design aircraft operations growth has coincided with growth in Salem MSA population and GRP. Historic levels of critical design aircraft operations are compared with population and GRP to develop forecasts of future operations, based on the ratio of operations to these socioeconomic variables. Historic and projected SLE critical design aircraft operations per thousand people in the Salem MSA are presented in **Table 2-10**.

Table 2-10: SLE Critical Design Aircraft Operations per Thousand People in the Salem MSA

Year	Large Aircraft with a MTOW Up to and Including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
	75% of Fleet	Remaining 25% of Fleet		
Historic				
2000	2.22	0.83	0.10	3.15
2008	3.47	0.69	0.13	4.29
Projected				
2013	3.50	0.69	0.13	4.32
2018	3.75	0.69	0.14	4.58
2028	4.25	0.69	0.15	5.09

Source: FAA ETMSC, Airport Operator Survey, Flightaware, FBO Records, Woods & Poole

Critical design aircraft operations per thousand people increased from 3.15 in 2000 to 4.29 in 2008. The population-based forecast projects critical design aircraft operations per thousand people to increase from 4.29 in 2008 to 4.32 in 2013, 4.58 in 2018, and 5.09 in 2028. The population-based forecast is presented in **Table 2-11**.

Table 2-11: SLE Population-Based Critical Design Aircraft Operations Forecast

Year	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
	75% of Fleet	Remaining 25% of Fleet		
2008	1,358	272	52	1,682
2013	1,460	288	54	1,802
2018	1,664	306	62	2,032
2028	2,112	344	76	2,532
CAGR 2008-2013	1.46%	1.15%	0.84%	1.39%
CAGR 2013-2018	2.65%	1.22%	2.72%	2.43%
CAGR 2018-2028	2.41%	1.18%	2.06%	2.22%

Source: Mead & Hunt

The population-based forecast projects 1,802 critical design aircraft operations in 2013, 2,032 critical design aircraft operations in 2018, and 2,532 critical design aircraft operations in 2028.

Historic and projected SLE critical design aircraft operations per million dollars of Salem MSA GRP are presented in **Table 2-12**.

Table 2-12: SLE Critical Design Aircraft Operations per Million Dollars of Salem MSA GRP

Year	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
	75% of Fleet	Remaining 25% of Fleet		
Historic				
2000	0.072	0.027	0.003	0.102
2008	0.100	0.020	0.004	0.124
Projected				
2013	0.105	0.020	0.004	0.129
2018	0.110	0.020	0.004	0.140
2028	0.120	0.020	0.005	0.150

Source: FAA ETMSC, Airport Operator Survey, Flightaware, FBO Records, Woods & Poole, U.S. Bureau of Labor Statistics Consumer Price Index Inflation Calculator

Critical design aircraft operations per million dollars of Salem MSA GRP increased from 0.102 in 2000 to 0.124 in 2008. The GRP-based forecast projects critical design aircraft operations per million dollars of GRP to increase from 0.124 in 2008 to 0.129 in 2013, 0.140 in 2018, and 0.0150 in 2028. The GRP-based forecast is presented in **Table 2-13**.

Table 2-13: GRP-Based Critical Design Aircraft Operations Forecast

Year	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
	75% of Fleet	Remaining 25% of Fleet		
2008	1,358	272	52	1,682
2013	1,526	292	58	1,876
2018	1,776	324	66	2,166
2028	2,402	400	100	2,902
CAGR 2008-2013	2.36%	1.43%	2.26%	2.21%
CAGR 2013-2018	3.08%	2.10%	2.57%	2.91%
CAGR 2018-2028	3.06%	2.14%	4.25%	2.97%

Source: Mead & Hunt

The GRP-based forecast projects 1,876 critical design aircraft operations in 2013, 2,166 critical design aircraft operations in 2018, and 2,902 critical design aircraft operations in 2028.

2.3.5 Forecast Comparison

The five critical design aircraft operations forecasts are summarized and compared in **Table 2-14** and **Exhibit 2-1**.

Table 2-14: SLE Critical Design Aircraft Operations Forecast Comparison

Forecast	2008	2013	2018	2028	CAGR 2008-2028
Historic Trend Forecast	1,682	1,832	2,318	3,026	2.98%
Market Share Forecast	1,682	1,646	1,770	2,084	1.08%
TAF-Based Forecast	1,682	1,582	1,710	2,002	0.87%
Population-Based Forecast	1,682	1,802	2,032	2,532	2.07%
GRP-Based Forecast	1,682	1,876	2,166	2,902	2.76%

Forecasted critical design aircraft operations range from 1,582 to 1,876 in 2013, from 1,710 to 2,318 in 2018, and from 2,002 to 3,026 in 2028. Forecasted CAGR for 2008 to 2028 ranges from 0.87% to 2.98%.

The historic operations trend forecast is eliminated from consideration, as it is more aggressive than the other forecasts. The market share forecast is eliminated from consideration, as it is more conservative than the other forecasts and does not consider local factors. The TAF-based, population-based, and GRP-based forecasts provide reasonable expectations for future SLE critical design aircraft operations.

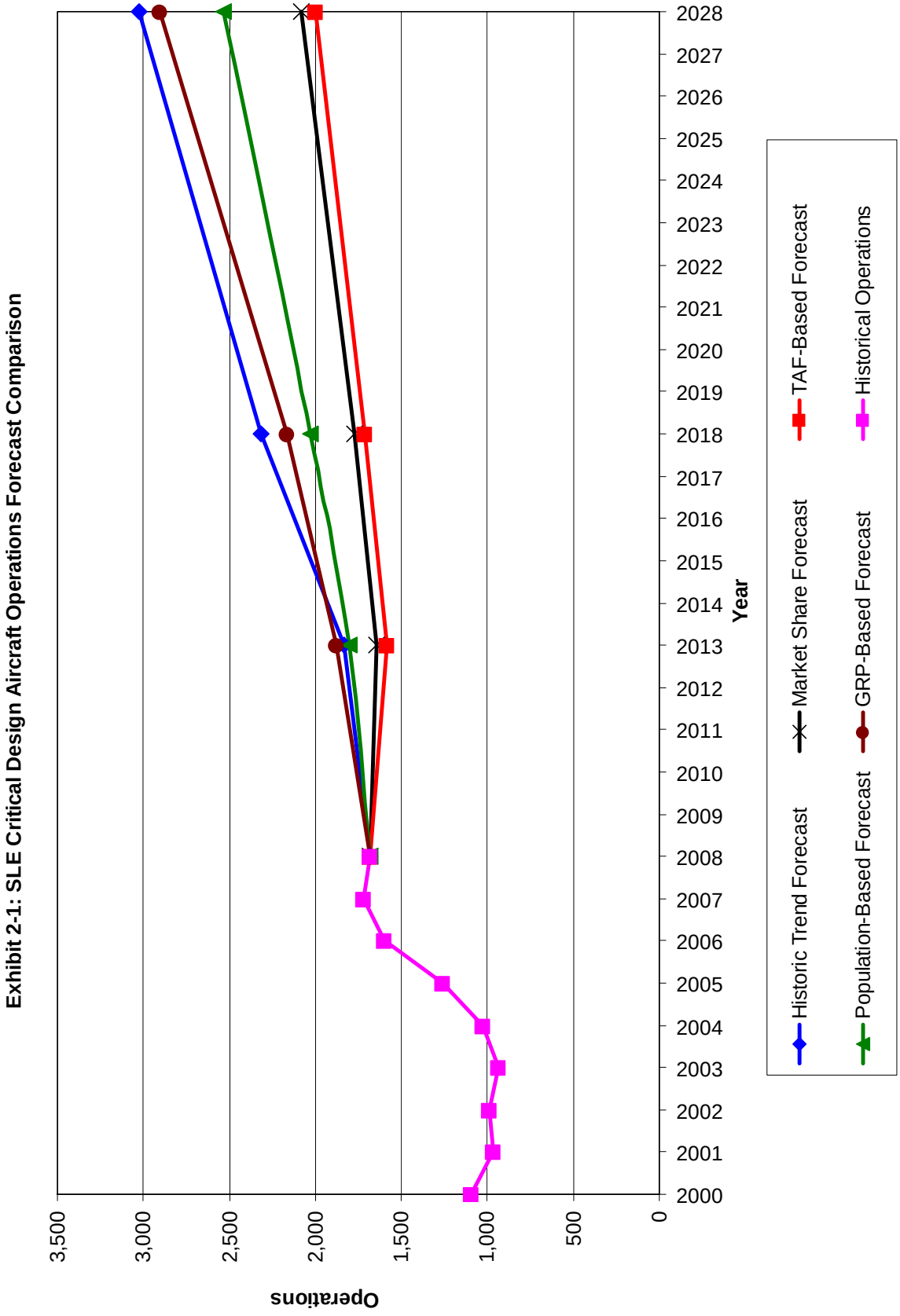


Exhibit 2-1: SLE Critical Design Aircraft Operations Forecast Comparison
Operations
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Year
2028
2027
2026
2025
2024
2023
2022
2021
2020
2019
2018
2017
2016
2015
2014
2013
2012
2011
2010
2009
2008
2007
2006
2005
2004
2003
2002
2001
2000
Historic Trend Forecast
Market Share Forecast
TAF-Based Forecast
Population-Based Forecast
GRP-Based Forecast
Historical Operations

2.4 Preferred Forecast

The population-based forecast is selected as the *preferred* critical design aircraft operations forecast, as it is not as aggressive as the GRP-based forecast, but not as conservative as the TAF-based forecast. The GRP-based forecast will be retained as the *high* critical design aircraft operations forecast, and the TAF-based forecast will be retained as the *low* critical design aircraft operations forecast. The high, preferred, and low critical design aircraft operations forecasts are presented in **Table 2-15**.

Table 2-15: High, Preferred, and Low Critical Design Aircraft Operations Forecasts

Year	Forecast	Large Aircraft with a MTOW up to and including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
		75% of Fleet	Remaining 25% of Fleet		
2013	High	1,526	292	58	1,876
	Preferred	**1,460**	**288**	**54**	**1,802**
	Low	1,278	256	50	1,584
2018	High	1,776	324	66	2,166
	Preferred	**1,664**	**306**	**62**	**2,032**
	Low	1,382	278	54	1,714
2028	High	2,402	400	100	2,902
	Preferred	**2,112**	**344**	**76**	**2,532**
	Low	1,616	324	62	2,002

The preferred critical design aircraft operations forecast will provide the basis for determining facility requirements in Chapter 3.

This chapter determines the required near-term primary runway length at Salem Municipal Airport (SLE). Runway length requirements for federally-funded runway projects are determined using procedures outlined in Advisory Circular (AC) 150/5325-4B, *Runway Length Requirements for Airport Design.* AC 150/5325-4B, Paragraph 101, states the goal of the AC is "to construct an available runway length for new runways or extensions to existing runways that is suitable for the forecasted critical design aircraft." The five-step runway length requirement determination procedure is as follows.

- **Step One:** Identify Critical Design Aircraft
- **Step Two:** Identify Aircraft that Require Longest Runway Lengths
- **Step Three:** Determine Method for Establishing Required Runway Length
- **Step Four:** Select Unadjusted Required Runway Length
- **Step Five:** Apply Necessary Adjustments

This chapter utilizes the five-step procedure to determine the required primary runway length at SLE, and also determines the appropriate Airport Reference Code (ARC) for primary runway design standards.

3.1 Step One: Identify Critical Design Aircraft

The first step in the runway length requirement determination procedure is "to identify the list of critical design aircraft that will make regular use of the proposed runway for an established planning period of at least five years." For federally-funded runway projects, AC 150/5325-4B, Paragraph 102(a)(8), establishes a required "substantial use threshold" of 500 or more annual itinerant operations by an individual aircraft, or category of aircraft with similar operating characteristics. These aircraft must "make regular use of the proposed runway for an established planning period of at least five years" (the phrase "regular use" is quantified by the phrase "substantial use"). This makes near-term (five-year) forecasts of critical design aircraft operations the main determinant of runway length requirements. The list of critical design aircraft at SLE, established in Chapter 2, includes 1,682 operations in 2008 by 31 large general aviation (GA) and charter jet aircraft types.

It is necessary for planning purposes to identify the critical design aircraft ARC, as this ARC determines required airfield design standards associated with future airfield improvements. The number of 2008 critical design aircraft and operations at SLE by ARC category are presented in **Table 3-1**.

Table 3-1: 2008 SLE Critical Design Aircraft and Operations by ARC

ARC	Number of Aircraft	Number of Operations
B-I	1	2
B-II	68	1,026
C-I	42	470
C-II	32	84
C-III	2	18
D-I	13	56
D-II	9	24
D-III	1	2
Total	**168**	**1,682**

Sources: FBO Records, Flightaware, Airport Operator Survey, FAA Aircraft Registration Database, AC 150/5300-13 *Airport Design*, FAA Aircraft Characteristics Database

To determine the appropriate ARC for the primary runway at SLE, a breakdown of 2008 critical design aircraft and operations by approach category and design group is presented in **Table 3-2**.

Table 3-2: 2008 SLE Critical Design Aircraft and Operations by Approach Category and Design Group

Approach Category	Number of Aircraft	Number of Operations
B	69	1,028
C	76	572
D	23	82
Total	**168**	**1,682**
Design Group	**Number of Aircraft**	**Number of Operations**
I	56	528
II	109	1,134
III	3	20
Total	**168**	**1,682**

The most demanding critical design aircraft approach category using SLE on a regular basis (500 annual operations) is approach category C, and the most demanding design group using SLE on a regular basis is design group II. Based on critical design aircraft, the appropriate ARC for the primary runway is C-II.

Consideration should be given to existing and future commercial passenger and military aircraft with more demanding ARCs. If commercial passenger service is reintroduced at SLE, airlines are expected to utilize C-III aircraft such as the CRJ-900 or MD-83. Transient military aircraft operating at SLE are also expected to have a more demanding ARC than C-II.

3.2 Step Two: Identify Aircraft that Require Longest Runway Lengths

The second step in the runway length requirement determination procedure is to identify the aircraft, or grouping of aircraft with similar performance characteristics and operating weights, which will require the longest runway lengths. Near-term forecasts for the three critical design aircraft categories described in Chapter 2 are presented in **Table 3-3**.

Table 3-3: SLE Critical Design Aircraft Operations Preferred Forecast

Year	Large Aircraft with a MTOW Up to and Including 60,000 Pounds		Large Aircraft with a MTOW Greater than 60,000 Pounds	Total
	75% of Fleet	Remaining 25% of Fleet		
Historic: 2008	1,358	272	52	1,682
Near-Term: 2013	1,460	288	54	1,802
Intermediate-Term: 2018	1,664	306	62	2,032
Long-Term: 2028	2,112	344	76	2,532

The only category of large GA and charter jet aircraft that exceeds the "substantial use threshold" of 500 forecasted annual operations in the near-, intermediate-, and long-term is 75% of Fleet of *Large Aircraft with a MTOW Up to and Including 60,000 Pounds*. Required runway lengths for 75% of Fleet aircraft only satisfy the operational requirements aircraft within the 75% of Fleet category, while required runway lengths for the Remaining 25% of Fleet satisfy the operational requirements of all *Large Aircraft with a MTOW Up to and Including 60,000 Pounds*. Remaining 25% of Fleet aircraft operations are counted towards the "substantial use threshold" for 75% of Fleet runway length requirements, but 75% of Fleet aircraft operations are not counted towards the "substantial use threshold" for the Remaining 25% of Fleet runway length requirements. This is because Remaining 25% of Fleet aircraft typically have more demanding runway requirements than 75% of Fleet aircraft.

Since the projected 288 operations in 2013 by the Remaining 25% of Fleet aircraft do not exceed the "substantial use threshold" of 500 annual operations for federally-funded runway projects, Remaining 25% of Fleet runway length requirements are not justified in the near-term. Because there are projected to be a total of 1,748 operations by *Large Aircraft with a MTOW up to and Including 60,000 Pounds* – 1,460 of which are expected to be conducted by 75% of Fleet aircraft and 288 of which are expected to be conducted by Remaining 25% of Fleet aircraft – 75% of Fleet runway length requirements are justified in the near-term.

3.3 Step Three: Determine Method for Establishing Required Runway Length

The third step in the runway length requirement determination procedure is to determine the method that will be used for establishing the required runway length. For *Large Aircraft with a MTOW up to and Including 60,000 Pounds*, detailed runway length requirement documentation from each aircraft manufacturer is *not* required. Requirements are instead determined by a family grouping method, using performance charts contained in AC 150/5325-4B. This method will be used to establish the required primary runway length at SLE.

3.4 Step Four: Select Unadjusted Required Runway Length

The fourth step in the runway length requirement determination procedure is to select the unadjusted required runway length from the appropriate performance charts. For *Large Aircraft with a MTOW up to and Including 60,000 Pounds*, the required runway length is determined according to a family grouping of aircraft having similar performance characteristics and operating weights. This method yields required runway lengths for two distinct family groupings within the 75% of Fleet and Remaining 25% of Fleet subcategories, further dividing operations by *Large Aircraft with a MTOW up to and Including 60,000 Pounds* based on useful loads. Useful load is the difference between the maximum allowable structural gross weight and the operating empty weight of an aircraft. In short, useful load consists of passengers, cargo, and useable fuel. The FAA provides four family groupings for which runway length requirements are determined under this method: *75% of Fleet at 60% Useful Load*, *75% of Fleet at 90% Useful Load*, *Remaining 25% of Fleet at 60% Useful Load*, and *Remaining 25% of Fleet at 90% Useful Load*. AC 150/5325-4B, Paragraph 303(b)(2), states that 100% Useful Load performance charts are not provided because most aircraft used to develop the charts are climb-limited at MTOW.

Required runway length for a family grouping of aircraft is based not only on aircraft operating characteristics and useful loads, but also site specific airport factors. The site specific factors required to utilize the performance charts in AC 150/5325-4B are mean maximum daily temperature of the hottest month, and airport elevation. According to the Western Regional Climate Center, the mean daily maximum temperature of the hottest month at SLE (July) is 82.1° F. According to the FAA Airport/Facility Directory, the airport elevation at SLE is 214' above mean sea level (MSL). These factors are applied to the AC 150/5325-4B performance charts for the four family groupings of *Large Aircraft with a MTOW up to and Including 60,000 Pounds* in **Exhibit 3-1** to determine the required runway lengths at SLE for these family groupings. The performance chart results are presented in **Table 3-4**.

Table 3-4: Unadjusted SLE Runway Length Requirements for *Large Aircraft with a MTOW up to and Including 60,000 Pounds*

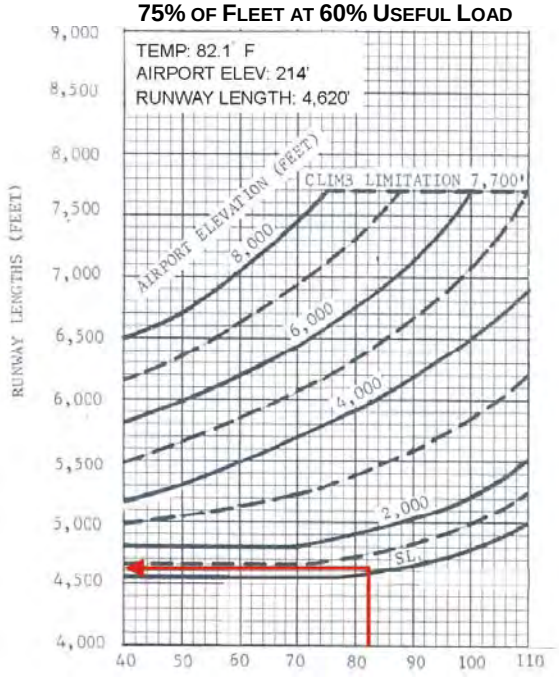
Family Grouping	Unadjusted Runway Length Requirement
75% of Fleet at 60% Useful Load	4,620 feet
75% of Fleet at 90% Useful Load	6,170 feet
Remaining 25% of Fleet at 60% Useful Load	5,160 feet
Remaining 25% of Fleet at 90% Useful Load	7,690 feet

Source: AC 150/5325-4B, *Runway Length Requirements for Airport Design*

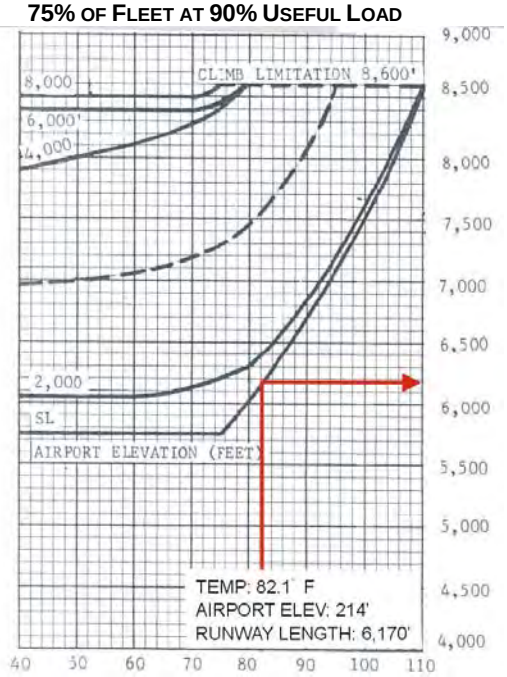
As established by Step Two, 75% of Fleet runway length requirements are justified in the near-term by 1,748 forecasted operations in 2013 by *Large Aircraft with a MTOW up to and Including 60,000 Pounds*. The typical useful loads for operations by *Large Aircraft with a MTOW up to and Including 60,000 Pounds* determine the required runway length of 75% of Fleet aircraft at SLE. AC 150/5325-4B, Paragraph 303, states that the 60% Useful Load curve "is to be used for those airplanes operating with no more than a 60% load factor." As a result, all operations with useful loads up to and including 60% qualify for inclusion in the 75% of Fleet at 60% Useful Load grouping, and all operations with useful loads above 60% qualify for inclusion in the 75% of Fleet at 90% Useful Load family grouping.

Exhibit 3-1: Performance Charts for *Large Aircraft with a MTOW Up to and Including 60,000 Pounds*

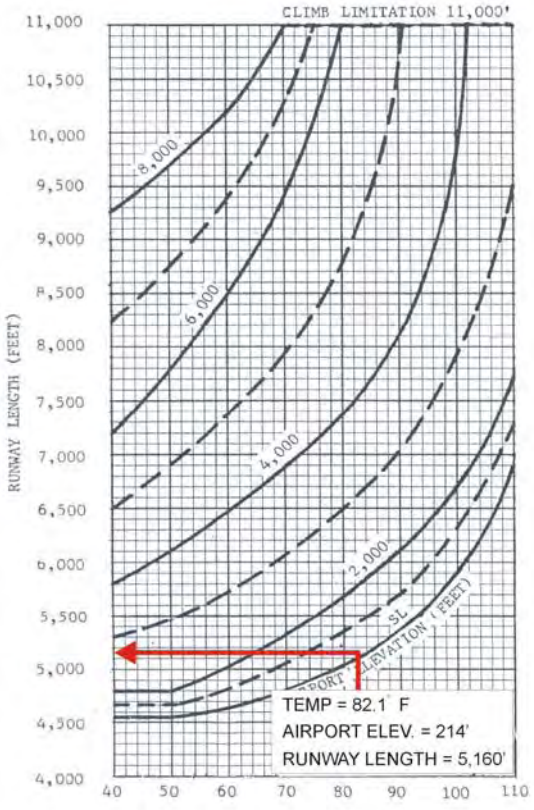
75% OF FLEET AT 60% USEFUL LOAD



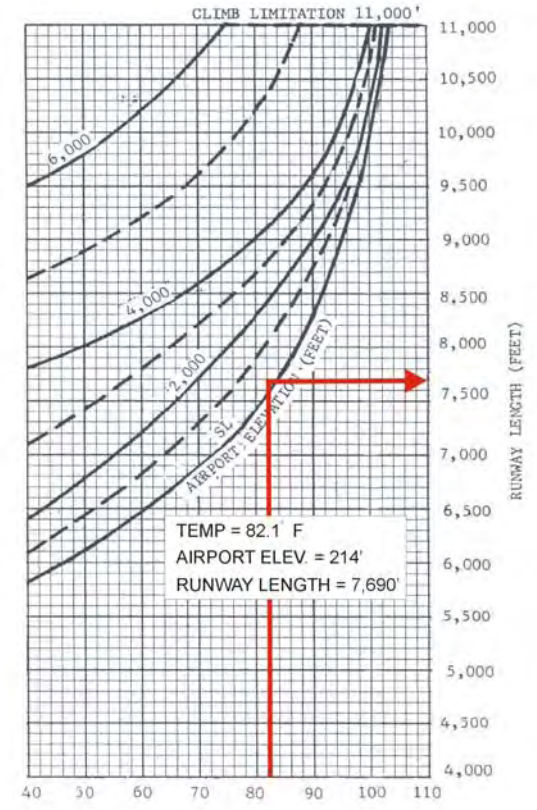
75% OF FLEET AT 90% USEFUL LOAD



REMAINING 25% OF FLEET AT 60% USEFUL LOAD



REMAINING 25% OF FLEET AT 90% USEFUL LOAD



Source: AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Note: X-axis value is mean daily maximum temperature of the hottest month of the year, in degrees Fahrenheit

AC 150/5325-4B, Paragraph 103, states that "the design objective for the main primary runway is to provide a runway length for all aircraft that will regularly use it without causing operational weight restrictions." SLE critical design aircraft operators have a variety of flight purposes, origins, and destinations, with different haul length and useful load requirements. The large number of critical design aircraft operators at SLE, as well as proprietary data concerns, makes it difficult to determine a typical useful load. However, Flightaware data and transient operator aircraft registration locations indicate that origins and destinations for most 2008 SLE critical design aircraft operations were outside Oregon, ranging from Washington and California to the rest of the United States and Canada. Interstate and international operations typically necessitate high useful loads. Furthermore, Airport and FBO staff indicates that many critical design aircraft operators are required to reduce their aircraft's useful load to conduct operations at SLE, due to inadequate runway length given weather conditions at the time of desired operation. During such situations, payload and fuel load are reduced, which reduces the aircraft's non-stop range, and necessitates an additional fuel stop en route to the operator's final destination. Based on Airport operator correspondence, FBO records, and Airport staff observations, critical design aircraft operators have preferred useful loads in excess of 60%.

Weight restrictions resulting from inadequate runway length have a significant impact on operators' ability to maximize efficiency by taking off with an ideal fuel, passenger, and cargo load. Reduction in passenger and/or cargo load reduces operator revenues, and acquiring fuel at another airport en route to the final destination is inconvenient for both the operator and its customers, and results in additional operating costs. Because such weight restrictions exist, and because "the design objective for the main primary runway is to provide a runway length for all aircraft that will regularly use it without causing operational weight restrictions", the 6,170-foot length shown in Table 3-4 for the family grouping 75% of Fleet at 90% Useful Load of *Large Aircraft with a MTOW up to and Including 60,000 Pounds* is selected as the unadjusted required runway length at SLE. This length is 359 feet longer than the existing primary runway length of 5,811 feet. Detailed support for use of 75% of Fleet at 90% Useful Load performance charts is presented in **Appendix C**, *Useful Loads and Weather Conditions*.

3.5 Step Five: Apply Necessary Adjustments

The fifth step in the runway length determination procedure is to apply necessary adjustments to the unadjusted runway length selected in Step Four. The AC 150/5325-4B performance charts assume zero wind, a zero effective runway gradient, and a dry runway surface. Allowable adjustments include those for non-zero effective runway gradients for all critical design aircraft, and for wet or slippery runway conditions for jet critical design aircraft. There is no allowable adjustment for wind.

AC 150/5325-4B provides an adjustment for effective runway gradient, because downhill takeoffs and landings require additional runway length. The runway gradient adjustment adds 10 feet in required runway length for each one foot difference between the highest and lowest point on the runway centerline. According to the 2000 Airport Layout Plan, the lowest point on Runway 13/31 is at 191 feet MSL and the highest point is at 210 feet MSL, resulting in a maximum difference in runway centerline elevation of 19 feet. This difference allows for the addition of 190 feet to the unadjusted required runway length selected in Step Four. Required runway lengths for the four family groupings of *Large Aircraft with a MTOW up to and Including 60,000 Pounds*, adjusted for runway gradient, are presented in **Table 3-5**.

Table 3-5: SLE Runway Length Requirements for *Large Aircraft with MTOW up to and Including 60,000 Pounds,* Adjusted for Effective Runway Gradient	
Family Grouping	**Runway Length Requirement Adjusted for Runway Gradient**
75% of Fleet at 60% Useful Load	4,810 feet
75% of Fleet at 90% Useful Load	6,360 feet
Remaining 25% of Fleet at 60% Useful Load	5,350 feet
Remaining 25% of Fleet at 90% Useful Load	7,880 feet

Source: AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Adjusted for effective runway gradient, the required runway length at SLE is 6,360 feet for 75% of Fleet at 90% Useful Load. This length is 549 feet longer than the existing primary runway length of 5,811 feet.

AC 150/5325-4B provides an adjustment for jet aircraft landing operations under wet or slippery runway conditions, because these conditions negatively affect aircraft braking performance. For runway lengths obtained from the 60% Useful Load curves in Exhibit 3-1, and adjusted for runway gradient in Table 3-5, the increase provided for landing operations is 15% or up to a 5,500-foot runway length, whichever is less. If the gradient-adjusted runway length exceeds 5,500 feet, no adjustment is provided. For runway lengths obtained from the 90% Useful Load curves and adjusted for runway gradient, the increase provided for landing operations is 15% or up to a 7,000-foot runway length, whichever is less. If the gradient-adjusted runway length exceeds 7,000 feet, no adjustment is provided. The resulting required runway lengths for the four family groupings of *Large Aircraft with a MTOW up to and Including 60,000 Pounds*, adjusted for wet or slippery runway conditions and effective runway gradient, are presented in **Table 3-6**.

Table 3-6: SLE Runway Length Requirements for *Large Aircraft with MTOW up to and Including 60,000 Pounds,* Adjusted for Wet or Slippery Runway Conditions and Effective Runway Gradient	
Family Grouping	**Runway Length Requirement Adjusted for Wet or Slippery Runway Conditions and Effective Runway Gradient**
75% of Fleet at 60% Useful Load	5,332 feet
75% of Fleet at 90% Useful Load	7,000 feet
Remaining 25% of Fleet at 60% Useful Load	5,500 feet
Remaining 25% of Fleet at 90% Useful Load	7,880 feet

Source: AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Adjusted for wet or slippery runway conditions, the required runway length at SLE is 7,000 feet for the 75% of Fleet at 90% Useful Load family grouping of *Large Aircraft with a MTOW up to and Including 60,000 Pounds*. This length is 1,189 feet longer than the existing primary runway length of 5,811 feet. Additional support for use of the 15% wet or slippery runway condition adjustment is presented in **Appendix C**, *Useful Loads and Weather Conditions*.

3.6 Summary

Historic 2008 SLE critical design aircraft operations, and the preferred near-term forecast of operations, demonstrate there currently are and will continue to be at least 500 annual critical design aircraft operations that require a longer runway, exceeding the FAA's "substantial use threshold" of 500 annual operations. Based on the method outlined in the FAA's AC 150/5325-4B, a primary runway length of 7,000 feet is justified for accommodating the family grouping 75% of Fleet at 90% Useful Load at SLE, which is the family grouping of SLE critical design aircraft with over 500 annual operations that will require the longest runway length. A 7,000-foot primary runway length is justified by 1,748 forecasted operations in 2013 by *Large Aircraft with a MTOW up to and Including 60,000 Pounds*.

Based on the forecasts and facility requirements, a 7,000-foot primary runway is appropriate for ARC C-II aircraft, for both the near- and long-term. SLE should implement a 7,000-foot primary runway to accommodate ARC C-II aircraft. Implementation is expected to require the relocation of existing navigational aids and amendments to existing instrument approach and departure procedures. The 2008 airport operator activity presented in Chapter 1, the critical design aircraft activity forecasts presented in Chapter 2, and the facility requirements analysis presented in this Chapter will be used to develop a Purpose & Need statement for runway improvements, as required under the National Environmental Policy Act.

3.7 FAA Concurrence

Correspondence from the FAA Seattle Airports District Office, dated April 27, 2010, concurs with the near-term runway length requirement of 7,000 feet presented in this chapter, noting that the justification for a 7,000-foot runway documented in this Master Plan Update is adequate. This correspondence is presented in **Appendix F**.

Appendix A / Airport Operator Survey Form

SALEM/McNARY FIELD
SALEM, OREGON
AIRPORT OPERATOR SURVEY
OCTOBER 2009

Salem/McNary Field (SLE) is investigating the need for possible improvements to Runway 13/31. To better understand and accommodate Airport user needs, it is requested that you or a qualified representative complete this survey. Survey data is expected to be used to support proposed airfield improvements to the Federal Aviation Administration (FAA) and Oregon Department of Aviation (ODA). This survey does not constitute an operational commitment on your part. It is only being used to allow the Airport to plan for and implement improvements for the safe accommodation of users like you.

Please return the completed survey to:

Evan Barrett
Mead & Hunt, Inc.
201 NE Park Plaza Drive, Suite 167
Vancouver, Washington 98684-5878

Please direct questions and concerns to:

Evan Barrett
Phone: 952-941-5619 ext. 220
Fax: 952-941-5622
Email: evan.barrett@meadhunt.com

An online version of the survey is available at:
http://www.cityofsalem.net/visitors/Airport/Pages/AirportMasterPlanUpdate.aspx.

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1. What brings you to SLE? Please check all that apply.

☐ Business ☐ Pleasure ☐ Training
☐ Cargo Shipment ☐ Maintenance ☐ Other (please specify) _____

2. What aircraft makes(s) and model(s) do you currently use to operate at and visit SLE, and where are they based? Please be specific.

Current Aircraft Makes & Models	N-Number	Where is aircraft based?
1.		
2.		
3.		

3. What are your frequent origins and destinations to and from SLE, and your typical gross takeoff weights?

Aircraft Model	Frequent Origins/Destinations	Takeoff Weight (lbs.)
1.		
2.		
3.		

4. Do you have any plans to acquire additional aircraft? If so what make(s) and model(s) are you considering?

_____

_____

5. How many operations did you conduct at Salem/McNary Field in 2008, and how many operations have you conducted so far in 2009? An operation equals one takeoff **or** one landing, therefore, one trip to and from the airport would count for **two** operations.

Aircraft Model	2008 Total Operations	2009 YTD Operations
1.		
2.		
3.		
Total		

6. How many operations for each aircraft make and model do you estimate you will conduct at SLE five years from now (2014)?

Aircraft Model	Estimated 2014 Operations
1.	
2.	
3.	
Total	

7. Are SLE's runway lengths adequate for your most demanding aircraft at maximum desirable weight, in either wet/icy conditions or hot conditions? (check one for each)

	Length	Adequate if wet/icy?		Adequate if hot?	
Runway 13-31	5,811'	YES ☐	NO ☐	YES ☐	NO ☐
Runway 16-34	5,145'	YES ☐	NO ☐	YES ☐	NO ☐

Do you currently make aircraft performance concessions to operate at SLE? YES ☐ NO ☐

If yes, under what conditions? (wet/icy, hot, weather)_____

If runway lengths are not adequate,

Affected aircraft makes/models_____

Operation affected (takeoff, landing, both)_____

Required runway length at SLE for wet/icy takeoff_____

What weight penalty must be cut at SLE for wet/icy takeoff_____

Required runway length at SLE for wet/icy landing_____

What weight penalty must be cut at SLE for wet/icy landing_____

Required runway length at SLE for hot takeoff_____

What weight penalty must be cut at SLE for hot takeoff_____

Required runway length at SLE for hot landing_____

What weight penalty must be cut at SLE for hot landing_____

Please provide copies of aircraft performance/takeoff/landing charts.

8. Does your insurance company require a longer length for your current and/or desired aircraft? If so, what is the required length for which aircraft?

_____

_____

_____

9. Does your company policy require a longer length for your current and/or desired aircraft? If so, what is the required length for which aircraft?

_____

_____

_____

10. Please provide any other information or comments you feel would benefit the airport and proposed improvements. Include improvements you would like to see at the airport, such as instrumentation and navigational aids. If necessary, please continue your comments on the back side of this survey form, or on an additional survey form.

_____

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_____

_____

_____

11. Please provide your contact information.

Name: _____

Title: _____

Company: _____

Address: _____

_____

Phone: _____

E-Mail: _____

Date: _____

The information you provide is beneficial, and greatly appreciated. Thank you.

Appendix B / 2008 Individual GA and Charter Jet Aircraft Operations

2008 GA and Charter Jet Aircraft Operations by Owner and Aircraft Type						
Owner	**City**	**State**	**Ident**	**Aircraft Type**	**2008 Operations**	**Based or Transient**
GBMCC LLC	Salem	OR	N399RA	Beechjet 400A	50	Based
Curry Architecture LLC	Salem	OR	N500LJ	Beechjet 400A	150	Based
Colson & Colson General Contractor Inc	Salem	OR	N975RD	Beechjet 400A	150	Based
Not Assigned/Reserved (Formerly Sunwest Management)			N629GB	Challenger 300	38	Based
Saratoga Inc	Lebanon	OR	N100Y	Citation II/Bravo	132	Based
VIPS Industries	Salem	OR	N17DM	Citation II/Bravo	94	Based
On Eagles Wings I LLC	Salem	OR	N458N	Citation II/Bravo	110	Based
Shilo Management Corp	Portland	OR	N495MH	Citation II/Bravo	80	Based
Sunwest Management Inc	Salem	OR	N628GB	Citation II/Bravo	154	Based
R2MH Jet Air LLC	Albany	OR	N530RM	Citation Mustang	0	Based
Saratoga Inc	Lebanon	OR	N200Y	Citation Sovereign	0	Based
Brenden Norman L	Salem	OR	N150BC	Falcon 2000	200	Based
				Based Jet Total	**1,158**	
Suntrust Leasing Corp	Birmingham	AL	N446M	Beechjet 400A	4	Transient
FlightWorks	Kennesaw	GA	FWK93	Beechjet 400A	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA116	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT406	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT413	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT424	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT439	Beechjet 400A	4	Transient
Flight Options	Richmond Heights	OH	OPT443	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT452	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT454	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT459	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT466	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT470	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT686	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT710	Beechjet 400A	4	Transient
Flight Options	Richmond Heights	OH	OPT755	Beechjet 400A	2	Transient
Flight Options	Richmond Heights	OH	OPT798	Beechjet 400A	4	Transient
Not Assigned/Reserved (Formerly Flight Options)			N436LX	Beechjet 400A	2	Transient
Shangri La Entertainment, c/o AvJet Corp	Burbank	CA	N2121	Boeing 737	2	Transient
Xtra Airways	Elko	NV	Several	Boeing 737	16	Transient
GeoDuck Aviation II LLC	Seattle	WA	N731DC	Challenger 300	8	Transient
Flying M LLC	Irvine	CA	N677LM	Challenger 600	2	Transient
Gap Inc	San Bruno	CA	N812G	Challenger 600	2	Transient
Furniture Row Leasing LLC	Englewood	CO	N601FR	Challenger 600	4	Transient
CEF 2002 Aircraft	Fairfield	CT	N571BA	Challenger 600	2	Transient
Airgas Inc	New Castle	DE	N601AF	Challenger 600	2	Transient
Otter Inspirations LLC	Boca Raton	FL	N100QR	Challenger 600	2	Transient
Caesh Air LLC	St. Charles	IL	N710HL	Challenger 600	2	Transient
Caterpillar Inc	Peoria	IL	N793CT	Challenger 600	2	Transient
Costco	Issaquah	WA	N82CW	Challenger 600	2	Transient
Strom Management	Boca Raton	FL	N252NT	Citation CJ1	2	Transient
Jacksons Food Stores Inc	Meridian	ID	N484J	Citation CJ1	12	Transient
Garmin International Inc	Olathe	KS	N888GL	Citation CJ1	2	Transient
Buckle Inc	Kearney	NE	N326B	Citation CJ1	2	Transient
JHRD Investments LLC	Redmond	OR	N149WW	Citation CJ1	2	Transient
Wilson Construction Co	Canby	OR	N415CS	Citation CJ1	4	Transient
Cascade Honey B LLC	Puyallup	WA	N525JW	Citation CJ1	16	Transient
JCL Avitaion	Jackson	WY	N525PB	Citation CJ1	2	Transient
Diane S. Lake-CA LLC	Bakersfield	CA	N350BV	Citation CJ2	2	Transient
Western Oilfields Supply Co	Bakersfield	CA	N592DR	Citation CJ2	2	Transient
D&H Airways LLC, c/o Lextron	Greeley	CO	N7XE	Citation CJ2	2	Transient
CitationAir	Greenwich	CT	FIV 417	Citation CJ3	2	Transient
Micron Leasing Inc	Wilmington	DE	N325RC	Citation CJ3	2	Transient
Flightcraft Inc	Portland	OR	CSK33	Citation CJ3	8	Transient
Space Shuttle Aircraft Leasing Co II LLC	Salem	OR	N941AM	Citation CJ3	2	Transient
KOAV LLC	Maryville	TN	N1CH	Citation CJ3	6	Transient
CMH Homes Inc	Maryville	TN	N1KA	Citation CJ3	2	Transient
CMH Homes Inc	Maryville	TN	N7CH	Citation CJ3	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA588	Citation Excel	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA595	Citation Excel	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA602	Citation Excel	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA603	Citation Excel	4	Transient
Netjets Aviation Inc.	Columbus	OH	EJA608	Citation Excel	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA630	Citation Excel	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA643	Citation Excel	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA645	Citation Excel	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA681	Citation Excel	2	Transient

2008 GA and Charter Jet Aircraft Operations by Owner and Aircraft Type						
Owner	**City**	**State**	**Ident**	**Aircraft Type**	**2008 Operations**	**Based or Transient**
Management West LLC	Aurora	OR	N567MC	Citation Excel	6	Transient
Jet Version Inc	New Castle	DE	N102VP	Citation I	2	Transient
FTM Air LLC	Fargo	ND	N501AF	Citation I/SP	2	Transient
Flightcraft Inc	Portland	OR	CSK30	Citation I/SP	2	Transient
North West Air Travel LLC	Portland	OR	N363TD	Citation I/SP	2	Transient
Wellons Inc	Vancouver	WA	N707WW	Citation I/SP	2	Transient
American Care Air Inc	Poway	CA	N41SM	Citation II/Bravo	2	Transient
CitationAir	Greenwich	CT	FIV339	Citation II/Bravo	4	Transient
CitationAir	Greenwich	CT	FIV342	Citation II/Bravo	2	Transient
Sierra Tango One LLC, Corporate Trust Center	Wilmington	DE	N91VB	Citation II/Bravo	2	Transient
Professional Office Services Inc	Waterloo	IA	N550GH	Citation II/Bravo	2	Transient
Idaho Power Company	Boise	ID	N521TM	Citation II/Bravo	10	Transient
Idaho Potato Packers Corp	Blackfoot	ID	N565NC	Citation II/Bravo	4	Transient
Par Air	Muskegon	MI	N33EK	Citation II/Bravo	2	Transient
Wood I Fly LLC	Plato	MN	N550PW	Citation II/Bravo	2	Transient
National City Commercial Capital Corp	Cincinnati	OH	N202AV	Citation II/Bravo	20	Transient
Flightcraft Inc	Portland	OR	CSK26	Citation II/Bravo	2	Transient
Murphy Co	Eugene	OR	N26CV	Citation II/Bravo	2	Transient
Roseburg Forest Products Co	Roseburg	OR	N30RL	Citation II/Bravo	4	Transient
California Oregon Broadcasting Inc	Medford	OR	N656PS	Citation II/Bravo	4	Transient
HCE Leasing LLC	Cleveland	TN	N219LC	Citation II/Bravo	2	Transient
U.S. Department of Justice	Fort Worth	TX	N45678	Citation II/Bravo	2	Transient
Wells Fargo Bank Northwest NA Trustee	Salt Lake City	UT	N543SC	Citation II/Bravo	8	Transient
Apple Air LLC	Yakima	WA	N813JD	Citation II/Bravo	4	Transient
Unknown Owner			N548N	Citation II/Bravo	2	Transient
Moran Foods Inc	Earth City	MO	N174VP	Citation III	2	Transient
E&J Logistics LLC	Glendale	CA	N178SF	Citation Mustang	2	Transient
Genesis Resources	Flowood	MS	N22EM	Citation Mustang	2	Transient
Unknown Owner			N996CM	Citation Mustang	2	Transient
Cancelled/Not Assigned (Formerly Cessna Aircraft Co.)	Wichita	KS	N223SV	Citation Sovereign	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA359	Citation Sovereign	2	Transient
J.R. Simplot Co.	Boise	ID	N174JS	Citation V/Encore	2	Transient
CFAM GP LLC	Melba	ID	N21LJ	Citation V/Encore	4	Transient
CC Services Inc	Bloomington	IL	N591CF	Citation V/Encore	14	Transient
Netjets Aviation Inc.	Columbus	OH	EJA304	Citation V/Encore	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA319	Citation V/Encore	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA337	Citation V/Encore	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA366	Citation V/Encore	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA379	Citation V/Encore	2	Transient
Solaire LLC	Corvallis	OR	N560PK	Citation V/Encore	2	Transient
CMH Homes Inc	Maryville	TN	N560CH	Citation V/Encore	2	Transient
Reserved			N568CH	Citation V/Encore	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA983	Citation X	2	Transient
Not Assigned/Reserved			N755PT	Citation X	2	Transient
Meyer Shari Trustee	Wickenburg	AZ	N85SM	Eclipse 500	2	Transient
Pilot Corp	Knoxville	TN	N231JH	Falcon 10	2	Transient
Pilot Corp	Knoxville	TN	N81P	Falcon 20	4	Transient
FlightWorks	Kennesaw	GA	FWK659	Falcon 2000	2	Transient
Sentry Aviation Services LLC	Stevens Point	WI	N515PV	Falcon 2000	6	Transient
Executive Jet Management	Cincinnati	OH	EJM54	Falcon 50	2	Transient
MidAmerican Energy	Des Moines	IA	N96UT	Falcon 50	10	Transient
Phifer Wire Products Inc.	Tuscaloosa	AL	N54YR	Falcon 50	2	Transient
Executive Jet Management	Cincinnati	OH	EJM88	Falcon 900	2	Transient
Scotts Co LLC	Marysville	OH	N900MG	Falcon 900	4	Transient
Sentry Aviation Services LLC	Stevens Point	WI	N31D	Falcon 900	6	Transient
General Electric Capital Corp	Danbury	CT	N809JW	Gulfstream G100	6	Transient
Transcendent Investments LLC	Tualatin	OR	N541RL	Gulfstream G100	4	Transient
American Aviation LLC	Eugene	OR	N777AM	Gulfstream G100	6	Transient
Integral Resources LLC	Modesto	CA	N451R	Gulfstream G150	2	Transient
DB Aviation "Northshore"	Waukegan	IL	NSH850	Gulfstream G150	2	Transient
Wells Fargo Bank Northwest NA Trustee	Salt Lake City	UT	N150GD	Gulfstream G150	2	Transient
GC Air LLC	Danbury	CT	N815JW	Gulfstream G200	6	Transient
GC Air LLC	Danbury	CT	N816JW	Gulfstream G200	4	Transient
FlightWorks	Kennesaw	GA	FWK200	Gulfstream G200	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA725	Gulfstream G200	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA731	Gulfstream G200	2	Transient
Netjets Aviation Inc.	Columbus	OH	EJA739	Gulfstream G200	2	Transient
RX Choice Inc	Camp Hill	PA	N916GB	Gulfstream G200	2	Transient
Kaiser Air, Inc. "Kaiser"	Oakland	CA	KAI45	Gulfstream II	2	Transient
Long Charter Air LLC	Lithonia	GA	N747NB	Gulfstream II	2	Transient

2008 GA and Charter Jet Aircraft Operations by Owner and Aircraft Type						
Owner	**City**	**State**	**Ident**	**Aircraft Type**	**2008 Operations**	**Based or Transient**
Bopper Airways LLC, c/o Indianapolis Colts Inc.	Indianapolis	IN	N91NA	Gulfstream II	2	Transient
Quikrete Aircraft Leasing	Atlanta	GA	N111FA	Gulfstream III	2	Transient
AC Travel LLC, c/o Aero Air LLC	Hillsboro	OR	N388MM	Gulfstream III	4	Transient
MWDC Texas Inc	Houston	TX	N973MW	Gulfstream III	2	Transient
DSA Aviation LLC	Scottsdale	AZ	N128TS	Gulfstream IV	6	Transient
PK Aire Inc	Beverly Hills	CA	N144PK	Gulfstream IV	2	Transient
Ponderosa Asset LLC	Oxford	CT	N888ZF	Gulfstream IV	4	Transient
Ninety Eight Aviation LLC	Fort Myers	FL	N984JW	Gulfstream IV	2	Transient
ME Leasing LLC	Henderson	NV	N817ME	Gulfstream IV	2	Transient
Netjets Aviation Inc.	Columbus	OH	N420QS	Gulfstream IV	2	Transient
Costco	Issaquah	WA	N83CW	Gulfstream V	2	Transient
Jet 4 You LLC	Missoula	MT	N125CK	Hawker 800	2	Transient
Flight Options	Richmond Heights	OH	OPT809	Hawker 800	2	Transient
Flight Options	Richmond Heights	OH	OPT830	Hawker 800	2	Transient
Wells Fargo Bank Northwest NA Trustee	Salt Lake City	UT	N26ME	Hawker 800	2	Transient
Avjet Corp	Burbank	CA	N409AV	Hawker 800XP	2	Transient
Crown Air LLC	Bend	OR	N525AK	Israel 1124 Westwind	4	Transient
Kal Kustom NW Inc	Salem	OR	N700MD	Israel 1124 Westwind	4	Transient
L&C Canada Coastal Aviation Inc.	Sidney	BC	CFPUB	Learjet 25	2	Transient
Not Assigned/Reserved			N31WU	Learjet 31A	6	Transient
GC Air LLC	Danbury	CT	N352EF	Learjet 31A	2	Transient
Dulcich Jet LLC	Clackamas	OR	N535PS	Learjet 31A	4	Transient
OB Air LLC	Bellevue	WA	N240B	Learjet 31A	20	Transient
WTB Financial Corp	Spokane	WA	N531TS	Learjet 31A	2	Transient
Not Assigned/Reserved (Formerly Galvin Flying Service)			N31MU	Learjet 31A	4	Transient
DSA Aviation LLC	Scottsdale	AZ	N129TS	Learjet 35	6	Transient
Clay Lacy Aviation	Van Nuys	CA	N354CL	Learjet 35	2	Transient
Clay Lacy Aviation	Van Nuys	CA	N364CL	Learjet 35	2	Transient
B&E Houck Leasing LLC	Dover	DE	N35NK	Learjet 35	2	Transient
Med Air LLC	Wilmington	DE	N55FN	Learjet 35	2	Transient
CFF Air Inc	Wilmington	DE	N568PA	Learjet 35	2	Transient
AMTS Aircraft Holdings LLC	Sugar Grove	IL	N70AX	Learjet 35	2	Transient
Global Holding Corp, c/o Global Aviation	Hillsboro	OR	N367DA	Learjet 35	16	Transient
Executive Flight	East Wenatchee	WA	N350EF	Learjet 35	4	Transient
Executive Flight	East Wenatchee	WA	N354EF	Learjet 35	2	Transient
CL Air LLC	Seattle	WA	N387HA	Learjet 35	4	Transient
Executive Flight	East Wenatchee	WA	N683EF	Learjet 35	8	Transient
Not Assigned/Reserved (Formerly Superior Air Center)			N35AX	Learjet 35	4	Transient
Walmart	Bentonville	AR	N183CM	Learjet 45	2	Transient
Walmart	Bentonville	AR	N451WM	Learjet 45	2	Transient
Walmart	Bentonville	AR	N452CJ	Learjet 45	2	Transient
Waterway Plastics	Oxnard	CA	N140WW	Learjet 45	2	Transient
ConAgra Foods Inc	Omaha	NE	N865CA	Learjet 45	2	Transient
Ewing Irrigation Products Inc	Albuquerque	NM	N300AA	Learjet 45	2	Transient
Airwolff III LLC	Portland	OR	N800WC	Learjet 45	2	Transient
MCCKC LLC	Bellevue	WA	N838TH	Learjet 45	4	Transient
Peter Capone Design LLC	Santa Ynez	CA	N692PC	Learjet 60	2	Transient
FN Aircraft Corp	Winnipeg	Manitoba	C-FRGY	Learjet 60	4	Transient
Bombardier FlexJet	Richardson	TX	LXJ259	Learjet 60	2	Transient
Hawkeye Airplane Inc	Kirkland	WA	N464TF	Learjet 60	2	Transient
TNC Equipment LLC	Yakima	WA	N508RN	Raytheon 390 Premier I	4	Transient
				Transient Jet Total	**594**	

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May 2010

Appendix C / Useful Loads and Weather Conditions

This appendix provides support for use of 75% of Fleet at 90% Useful Load family grouping runway length requirements at Salem Municipal Airport (SLE). Advisory Circular (AC) 150/5325-4B, *Runway Length Requirements for Airport Design*, Paragraph 303, states that 60% useful load curves are "to be used for those airplanes operating with no more than a 60% useful load factor." As a result, all operations by general aviation (GA) and charter jet *Large Aircraft with a Maximum Certificated Takeoff Weight (MTOW) up to and Including 60,000 Pounds* at useful loads greater than 60% qualify for inclusion in the 75% of Fleet at 90% Useful Load family grouping.

This appendix also discusses airport operator comments related to useful loads, inadequate runway length, and weather conditions, and provides support for use of the 15% wet and slippery runway condition adjustment for runway length requirements.

C.1 Operator Comments

As presented in Chapter 1, airport operator survey forms were distributed to based and transient jet aircraft operators in October 2009, and were also made available in the Airport terminal, on-Airport businesses, and the Airport website. The survey solicited information about operators' current and desired aircraft, historical operations, and estimated future operations. Follow-up phone interviews were conducted with based jet aircraft operators in February 2010. This section presents operator comments, received through the survey and follow-up interviews, related to useful loads, inadequate runway length, and weather conditions.

The operator of three CitationJets, identifiers N1CH, N7CH, and N1KA, and a Citation V, identifier N560CH, all based in Knoxville, Tennessee, indicated they currently make aircraft performance concessions to operate on Runway 13/31, and will look at all options available before flying into SLE. The operator indicated that an additional 1,000 feet of runway length would eliminate issues on wet/icy days. The operator expects the addition of a larger aircraft to its fleet by 2014. According to written correspondence, a longer runway would help them fill up with fuel and fly non-stop back to Tennessee. The operator expects this will not be possible with a heavy aircraft on a hot day at SLE.

The operator of a Gulfstream G200, identifier N702QS, based in Columbus, Ohio, indicated the existing Runway 13/31 length is inadequate when wet/icy, and marginally adequate on hot days.

The operator of a Falcon 50, identifier N96UT, and a Falcon 50EX, identifier N789ME, both based in Des Moines, Iowa, indicated a longer runway would be beneficial.

The operator of a Citation Excel, identifier N823QS, based in Columbus, Ohio, indicated they currently make aircraft performance concessions to operate on Runway 13/31, and that the existing runway length is inadequate when wet/icy and on hot days.

The operator of a Challenger 604, identifier N437MC, based in Omaha, Nebraska, indicated they currently make aircraft performance concession to operate on Runway 13/31 due to runway length and weather considerations. The operator indicated the existing Runway 13/31 length is inadequate when icy, and may be inadequate on hot days, depending on mission length.

The operator of a Beechjet 400A, identifier N439LX, based in Cleveland, Ohio, indicated the existing Runway 13/31 length may be inadequate if wet/icy.

The operator of two Gulfstream G100s, identifiers N809JW and N810JW, and two Gulfstream G200s, identifiers N815JW and N816JW, all based in Klamath Falls, Oregon, indicated they currently make aircraft performance concessions to operate on Runway 13/31, and that the runway length is inadequate when wet/icy and on hot days.

The operator of an Embraer 135, identifier N913LX, and a Beechjet 400A, identifier N413LX, both based in Cleveland, Ohio, indicated the existing Runway 13/31 length is inadequate when wet/icy.

The operator of a CitationJet, identifier N484J, based in Boise, Idaho, indicated they currently make aircraft performance concessions to operate on Runway 13/31, and that the runway length is inadequate when wet/icy and on hot days.

The operator of a Falcon 2000, identifier N156BC, and two Beechjet 400As, identifiers N500LJ and N975RD, all based at SLE, indicated they currently make aircraft performance concessions to operate on Runway 13/31, and that the runway length is inadequate when wet/icy and on hot days. For some missions to eastern Canada, this operator has required additional refueling stops en route due to runway length and weather conditions at SLE. A letter from this operator supporting a runway length increase at SLE is contained in **Appendix D**.

The operator of a Citation II, identifier N495MH, based at SLE, indicated wet/icy runway conditions have the greatest impact on their runway length requirements. On trips to the east coast, there have been instances where they have carried a less than desirable fuel load, requiring additional refueling stops en route due to runway length and weather conditions at SLE.

The operator of a Citation Sovereign, identifier N200Y, and a Citation II, identifier N100Y, both based at SLE, indicated wet/icy and hot conditions can have negative impacts on their operations due to inadequate runway length. The operator indicated that they have to use less than desired fuel load on the Sovereign due to runway length and weather conditions approximately 10% of the time.

C.2 2008 Based Jet Aircraft Takeoff Useful Loads

This section describes the typical useful loads for takeoffs by SLE based jet aircraft in 2008. AC 150/5325-4B, Paragraph 303(b)(1), states that an aircraft's useful load is "the difference between the maximum allowable structural gross weight and the operating empty weight. A typical operating empty weight includes the airplane's empty weight, crew, crew baggage and other supplies, removable passenger service equipment, removable emergency equipment, engine oil, and unusable fuel. In other words, useful load consists of passengers, cargo, and usable fuel." As presented in Chapter 1 and Appendix B, there were ten based jet aircraft, representing four distinct aircraft makes and models, with a combined 579 takeoffs at SLE in 2008. Maximum allowable structural gross weights, operating empty weights, and maximum useful loads for these makes and models are presented in **Table C-1**.

Table C-1: 2008 Based Jet Aircraft Operating Weight Specifications

Aircraft Make/Model	Maximum Allowable Structural Gross Weight	Operating Empty Weight	Maximum Useful Load
Citation II/Bravo	14,800	8,800	6,000
Beechjet 400A	16,100	10,050	6,050
Challenger 300	38,850	23,500	15,350
Falcon 2000	41,000	22,360	18,640

Sources: Aviation Week & Space Technology Aerospace Sourcebooks, Aircraft Manufacturers, Operator Interviews

Notes: Weights in pounds. Operating weight specifications may vary depending on aircraft model year.

Based jet aircraft operators were contacted in February 2010 to determine their typical 2008 operating weights and useful loads. Operator interview summaries and a letter of support for a runway length increase at SLE are contained in **Appendix D**. The following subsections present the typical useful loads for based jet aircraft takeoffs in 2008.

C.2.1 Citation II/Bravo Typical Useful Loads for Takeoffs

There were five based Citation II/Bravo aircraft that conducted a combined 285 takeoffs at SLE in 2008. The typical useful loads for these operations are presented in **Table C-2**.

Table C-2: Based Citation II/Bravo Typical Useful Loads for Takeoffs

FAA Identifier	2008 Takeoffs	Typical Useful Load	Useful Load Capacity	Percent Useful Load
N458N	28	6,000	6,000	100%
N17DM	23	6,000	6,000	100%
N100Y	66	5,460	6,000	91%
N628GB	77	4,800	6,000	80%
N495MH	40	4,800	6,000	80%
N458N	27	4,100	6,000	68%
N17DM	24	4,100	6,000	68%
Total Takeoffs	285			

Sources: Aviation Week & Space Technology Aerospace Sourcebooks, Aircraft Manufacturers, Operator Interviews

Notes: Weights in pounds. Typical useful loads and useful load percentages calculated by Mead & Hunt based on operator input and published aircraft specifications.

The operator of N458N and N17DM indicates that approximately 50% of their takeoffs occur at maximum certificated takeoff weight (MTOW), while the remaining 50% occur at approximately 12,500 to 13,300 pounds total weight. For this remaining 50% of operations, a total takeoff weight of 12,900 pounds is used for calculation of a typical useful load of 4,100 pounds. Based on operator input, it is expected that this operator conducted 51 takeoffs at 100% useful load and 51 takeoffs at 68% useful load in 2008.

The operator of N100Y indicates their takeoffs typically occur with full fuel and an approximate payload of 600 pounds. In some circumstances they may take off with less fuel; however, it is their operational preference to conduct operations with full fuel whenever possible. For calculations in Table C-2, a full fuel load of 4,860 pounds and a payload of 600 pounds are used, resulting in a typical useful load of 5,460 pounds. Based on operator input, it is expected that this operator conducted 66 takeoffs at 91% useful load in 2008.

The operator of N628GB and N495MH indicates it is their operational preference to take off with at least 75% fuel, if possible. This operator indicates a typical useful load of 4,800 pounds for takeoffs. Based on operator input, it is expected that this operator conducted 77 takeoffs at 80% useful load in 2008.

It is expected that 285 takeoffs by SLE-based Citation II/Bravo aircraft were conducted at greater than 60% useful load in 2008.

C.2.2 Beechjet 400A Typical Useful Loads for Takeoffs

There were three based Beechjet 400A aircraft that conducted a combined 175 takeoffs at SLE in 2008. The typical useful loads for these operations are presented in **Table C-3**.

Table C-3: Based Beechjet 400A Typical Useful Loads for Takeoffs

FAA Identifier	2008 Takeoffs	Typical Useful Load	Useful Load Capacity	Percent Useful Load
N399RA	25	6,050	6,050	100%
N500LJ	75	6,050	6,050	100%
N975RD	75	6,050	6,050	100%
Total Takeoffs	175			

Sources: Aviation Week & Space Technology Aerospace Sourcebooks, Aircraft Manufacturers, Operator Interviews

Notes: Weights in pounds. Typical useful loads and useful load percentages calculated by Mead & Hunt based on operator input and published aircraft specifications.

The operator of N399RA indicates that they will take off at MTOW in almost every circumstance. Based on operator input, it is expected that this operator conducted 25 takeoffs at 100% useful load in 2008.

The operator of N500LJ and N975RD indicates that they will invariably take off with full fuel and payload. Based on operator input, it is expected that this operator conducted 150 takeoffs at 100% useful load in 2008.

It is expected that 175 takeoffs by SLE-based Beechjet 400A aircraft were conducted at greater than 60% useful load in 2008.

C.2.3 Challenger 300 Typical Useful Loads for Takeoffs

There was one based Challenger 300 aircraft that conducted 19 takeoffs at SLE in 2008. The typical useful loads for these operations are presented in **Table C-4**.

Table C-4: Based Challenger 300 Typical Useful Loads for Takeoffs

FAA Identifier	2008 Takeoffs	Typical Useful Load	Useful Load Capacity	Percent Useful Load
N629GB	19	12,500	15,350	81%

Sources: Aviation Week & Space Technology Aerospace Sourcebooks, Aircraft Manufacturers, Operator Interviews

Notes: Weights in pounds. Typical useful loads and useful load percentages calculated by Mead & Hunt based on operator input and published aircraft specifications.

The operator of N629GB indicates it is their operational preference to take off with at least 75% fuel, if possible. This operator indicates a typical useful load of 12,500 pounds for takeoffs. Based on operator input, it is expected that this operator conducted 19 takeoffs at 81% useful load in 2008.

C.2.4 Falcon 2000 Typical Useful Loads for Takeoffs

There was one based Falcon 2000 aircraft that conducted 100 takeoffs at SLE in 2008. The typical operating weights for these operations are presented in **Table C-5**.

Table C-5: Based Falcon 2000 Typical Useful Loads for Takeoffs

FAA Identifier	2008 Takeoffs	Typical Useful Load	Useful Load Capacity	Percent Useful Load
N150BC	100	13,040	18,640	70%

Sources: Aviation Week & Space Technology Aerospace Sourcebooks, Aircraft Manufacturers, Operator Interviews

Notes: Weights in pounds. Typical useful loads and useful load percentages calculated by Mead & Hunt based on operator input and published aircraft specifications.

The operator of N629GB indicates their takeoffs typically occur with a 9,500 pound fuel load and a payload of six to seven passengers, with an average 400 pounds of baggage and cargo per passenger. The weight of six passengers was calculated based on the standard average summer adult passenger weight of 190 pounds, as specified by AC 120-27D, *Aircraft Weight and Balance Control*, resulting in a typical total passenger weight of 1,140 pounds, and a typical total baggage and cargo weight of 2,400 pounds. For calculations in Table C-2, this payload of 3,540 pounds and the typical fuel load of 9,500 pounds are used, resulting in a typical useful load of 13,040 pounds. Based on operator input, it is expected that this operator conducted 100 takeoffs at 70% useful load in 2008.

C.2.5 Based Jet Takeoff Useful Load Summary

Based jet takeoffs for 2008 are summarized by typical useful load in **Table C-6**.

Table C-6: Summary of Based Jet Takeoffs by Typical Useful Load

Typical Useful Load	2008 Takeoffs
100%	226
91%	66
81%	19
80%	117
70%	100
68%	51
Total	**579**

It is expected that 579 takeoffs by based GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds* at SLE were conducted at greater than 60% useful load in 2008. A useful load of greater than 60% makes these operations eligible for inclusion in the 75% of Fleet at 90% Useful Load family grouping.

C.3 New Based Jet Aircraft

There are three jet aircraft expected in the 2010 based fleet that did not operate at SLE in 2008. A Citation Sovereign was delivered to the Saratoga fleet in April 2009. It is expected that a Hawker 850XP will be delivered to the Colson Enterprises fleet in the spring of 2010, and a Falcon 7X will be delivered to this fleet by the fall of 2010. Maximum allowable structural gross weights, operating empty weights, and maximum useful loads for these three aircraft makes and models are presented in **Table C-7**.

Table C-7: New Based Jet Aircraft Operating Weight Specifications

Aircraft Make/Model	Maximum Allowable Structural Gross Weight	Operating Empty Weight	Maximum Useful Load
Hawker 850XP	28,000	16,400	11,600
Citation Sovereign	30,300	17,720	12,580
Falcon 7X	69,000	34,072	34,928

Sources: Aviation Week & Space Technology Aerospace Sourcebooks, Aircraft Manufacturers, Operator Interviews

Notes: Weights in pounds. Operating weight specifications may vary depending on aircraft model year.

Typical operating weights and operational frequencies for these aircraft are uncertain at this point, as the Citation Sovereign has flown few missions thus far, and the Hawker 850XP and Falcon 7X pilots are currently in training. However, the addition of these demanding aircraft to the based jet fleet should be considered in planning for future facilities.

C.4 2008 Transient Jet Aircraft Takeoff Useful Loads

Because fuel load comprises the majority of an aircraft's useful load, it is likely that takeoffs conducted following refueling stops are conducted above 60% useful load. This section describes the estimated useful loads for takeoffs by transient GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds* at SLE in 2008. As presented in Chapter 1 and Appendix B, there were 287 takeoffs conducted at SLE by 178 transient GA and charter jet aircraft in 2008. As presented in Chapter 2, 236 of these 287 takeoffs were conducted by 142 *Large Aircraft with a MTOW up to and Including 60,000 Pounds*. Of these 236 takeoffs, 155 involved a refueling stop at the Salem Aviation Fueling FBO. These 155 takeoffs were conducted by 102 different aircraft representing 23 aircraft makes and models. These makes and models, and their operating weight specifications, are presented in **Table C-8**.

Table C-8: Transient GA and Charter Jet Large Aircraft with a MTOW up to and Including 60,000 Pounds with Refueling Stops at SLE in 2008

Aircraft Make/Model	Maximum Allowable Structural Gross Weight	Operating Empty Weight	Maximum Useful Load	Usable Fuel Capacity Weight	Fuel Capacity as Percent of Maximum Useful Load
Gulfstream G200	35,600	19,950	15,650	15,315	98%
Gulfstream G150	26,150	15,100	11,050	10,465	95%
Challenger 300	38,850	23,500	15,350	14,446	94%
Gulfstream G100	24,800	14,635	10,165	9,562	94%
Learjet 60	23,750	14,985	8,765	8,078	92%
Learjet 45	20,750	14,145	6,605	6,060	92%
Citation X	36,100	21,700	14,400	13,201	92%
Citation Sovereign	30,300	17,720	12,580	11,450	91%
Hawker 800	27,400	16,250	11,150	9,939	89%
Citation CJ3	13,870	8,300	5,570	4,809	86%
Citation Excel	20,000	11,910	8,090	6,881	85%
Falcon 50	39,900	21,170	18,730	15,841	85%
Israel 1124 Westwind	23,500	13,250	10,250	8,612	84%
Citation V/Encore	16,630	9,977	6,653	5,547	83%
Falcon 900	46,700	23,645	23,055	19,220	83%
Challenger 600	41,400	23,385	18,015	14,980	83%
Hawker 800XP	28,000	15,670	12,330	10,212	83%
Citation II/Bravo	14,800	8,800	6,000	4,925	82%
Beechjet 400A	16,100	10,915	5,185	4,254	82%
Falcon 2000	41,000	22,360	18,640	14,904	80%
Falcon 20	28,660	16,600	12,060	9,309	77%
Falcon 10	18,740	10,760	7,980	6,033	76%
Learjet 35	18,500	10,022	8,478	6,327	75%
Learjet 31A	17,000	11,214	5,786	4,210	73%
Citation III	22,000	11,670	10,330	7,326	71%

Sources: Aviation Week & Space Technology Aerospace Sourcebooks, Aircraft Manufacturers

Note: Weights in pounds. Usable fuel capacity weights calculated using the conversion factor 6.84 pounds per Jet A fuel gallon.

Airport staff indicates that many operators of these aircraft not only used SLE in 2008, but also in 2009 and 2010. As presented in Table C-8, usable fuel capacity makes up the majority of the maximum useful load for these 23 aircraft makes and models, with usable fuel capacity ranging from 71% of maximum useful load for the Citation III, to 98% of maximum useful load for the Gulfstream G200. Because usable fuel makes up the majority of useful load, fuel largely determines the useful load percentage for operations by these aircraft. For the 155 takeoffs by transient GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds* that involved a refueling stop at SLE, expected useful loads are determined in this section based on aircraft manufacturer specifications and FBO fueling records.

FBO fueling records were analyzed to determine the amount of fuel taken on at SLE prior to each of the 155 takeoffs conducted by these aircraft. FBO staff indicates they will generally attempt to sell the aircraft operator as much fuel as possible; however, the amount of fuel taken on is generally limited by either the runway length and weather conditions at SLE, or the targeted landing weight at the aircraft's destination airport. FBO staff does not determine the amount of fuel on board the aircraft prior to fueling. However, FBO staff estimates that an aircraft will generally contain between 30% and 50% of usable fuel capacity prior to refueling. For the purpose of this analysis, it is estimated that each aircraft had 40% usable fuel capacity on board prior to refueling at SLE. The actual amount of fuel taken on at SLE is added to 40% usable fuel capacity to determine the estimated usable fuel load for each takeoff.

Payload for individual operations is difficult to estimate, given the variety of transient flight purposes and propriety data concerns. For the purpose of this analysis, it is estimated that the payload for each takeoff included five passengers, with 50 pounds of baggage and cargo per passenger. This estimate is based on the configurability of all 23 aircraft makes and models for greater than five passenger seats, the typical payloads for based jet aircraft operators, and standard average baggage weights specified in AC 120-27D, *Aircraft Weight and Balance Control*. Passenger weight is calculated based on the standard average summer adult passenger weight of 190 pounds specified in AC 120-27D, resulting in a total estimated payload of 1,200 pounds per operation. The sum of usable fuel load and payload is then compared to the maximum useful load of the aircraft to determine an estimated useful load percentage for each operation. Calculations are contained in **Appendix E**.

Based on the methodology described in this section and the calculations in Appendix E, it is expected that 129 of the 155 takeoffs by transient GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds* involving a refueling stop at SLE were conducted at greater than 60% useful load. A useful load of greater than 60% makes these 129 takeoffs eligible for inclusion in the 75% of Fleet at 90% Useful Load family grouping. A total of 107 takeoffs by transient GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds* – the sum of the remaining 26 takeoffs that occurred after a refueling stop and the 81 takeoffs that did not involve a refueling stop – are expected to have occurred at less than 60% useful load, making them ineligible for inclusion in the 75% of Fleet at 90% Useful Load family grouping.

C.5 2008 Based and Transient Jet Aircraft Landing Useful Loads

It is difficult to determine typical useful loads for landing operations. Landing useful loads are not quantified in this appendix, because operators indicate that only a minimum useful load, not a typical useful load, can be identified for landings. This is because, to a greater extent than takeoff useful loads, landing useful loads vary due to factors including haul length, daylight, weather, and runway surface condition.

In 2008, there were 579 landings by based GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds*, and 236 landings by transient GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds*. Due to the difficulty of determining landing useful loads, it is uncertain whether these 815 landings are considered eligible for inclusion in the 75% of Fleet at 90% Useful Load family grouping. However, because these 815 operations are considered critical design aircraft operations, and because a portion of them likely occurred at greater than 60% useful load, they should be taken into consideration in planning for future facilities.

C.6 Wet and Slippery Runway Condition Adjustment

AC 150/5325-4B, Paragraph 304(b), states that, "by regulation, the runway lengths for turbojet powered airplanes obtained from the 90 percent useful load curves are increased by 15% or up to 7,000 feet, whichever is less", to allow for wet and slippery runway conditions. The facility requirements analysis presented in Chapter 3 utilizes this adjustment to arrive at the required runway length of 7,000 feet at SLE. This section provides additional support for the use of this adjustment by demonstrating the frequency of wet and slippery runway conditions at SLE, and discussing recently issued FAA recommendations.

Daily summary data recorded at the SLE Automated Surface Observation System (ASOS) from 1999 to 2008 was obtained from the National Oceanic and Atmospheric Administration (NOAA) to determine the frequency of measurable precipitation during this period. Annual days with measurable precipitation are presented in **Table C-9**.

Table C-9: Annual Days with Measurable Precipitation

Year	Days with Precipitation	Percentage of Year
2008	143	39%
2007	140	38%
2006	144	39%
2005	137	38%
2004	151	41%
2003	162	44%
2002	134	37%
2001	150	41%
2000	151	41%
1999	163	45%
Average	**148**	**40%**

Source: SLE Summary of the Day, NOAA National Climatic Data Center

There was an annual average of 148 days with measurable precipitation from 1999 to 2008 at SLE, indicating primary Runway 13/31 was wet or slippery approximately two out of every five days during this period. On those days, critical design aircraft braking performance was likely reduced, and required runway length was likely increased.

The use of the 15% adjustment is further supported by FAA Safety Alert for Operators (SAFO) 06012, *Landing Performance Assessments at Time of Arrival (Turbojets)*, issued August 31, 2006. SAFO 06012 is the result of an accident audit conducted following the landing overrun of a Southwest Airlines Boeing 737-700 at Chicago Midway Airport in December 2005. SAFO 06012 recommends that flight crews determine the actual landing distance required based on conditions existing at the time of arrival, as distinct from conditions presumed at the time of dispatch, and that all FAR Part 121, 135, 125, and 91 subpart K turbojet operators add 15% to that distance. According to SAFO 06012, this 15% margin is considered by the FAA as the minimum acceptable safety margin for normal operations.

C.7 Summary

Operations by GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds* are summarized in **Table C-10** based on their eligibility for inclusion in the 75% of Fleet at 90% Useful Load family grouping.

Table C-10: 2008 Operations by GA and Charter Jet Large Aircraft with a MTOW up to and Including 60,000 Pounds by Eligibility for Inclusion in the 75% of Fleet at 90% Useful Load Family Grouping

Operation Type	Eligible Operations	Ineligible Operations	Eligibility Uncertain
Based Jet Takeoffs	579	0	0
Based Jet Landings	0	0	579
Transient Jet Takeoffs	129	107	0
Transient Jet Landings	0	0	236
Total	**708**	**107**	**815**

Based on operator input regarding typical operating weights, 579 based jet takeoff operations are eligible for inclusion in the 75% of Fleet at 90% Useful Load family grouping. Based on aircraft manufacturer specifications and FBO staff input regarding refueling operations, 129 transient jet takeoffs are eligible for inclusion in the 75% of Fleet at 90% Useful Load family grouping. Due to the difficulty of determining landing useful loads, it is uncertain whether 815 based and transient jet landing operations are eligible for inclusion in the 75% of Fleet at 90% Useful Load family grouping.

Based on the analysis in this appendix, 708 of 815 takeoffs by GA and charter jet *Large Aircraft with a MTOW up to and Including 60,000 Pounds* at SLE in 2008 were conducted at greater than 60% useful load, which exceeds the "substantial use threshold" of 500 or more annual itinerant operations required for federally-funded projects.

Appendix D / Based Jet Aircraft Operator Correspondence

Colson & Colson
GENERAL CONTRACTOR INC.

April 1st, 2010

Alan Alexander
Airport Administrator
McNary Field
Salem, Oregon

Mr. Alexander.

As you know, our company recently added another aircraft to our fleet. We now operate a Hawker 400A, a Hawker 800XP, and a Falcon 2000, all based at McNary Field (KSLE.) The scheduled delivery date for our Falcon 7X is now September of this year.

The company is expanding, in spite of the current economic conditions, and our flying has increased dramatically over the last 6 months. Aircraft usage is forecast to continue to grow over the next 18 months.

2 of our current airplanes (the Falcon 2000 and the Hawker 800XP) are runway-limited at higher takeoff weights with Salem's 5,811 foot runway. The Falcon 7X will also be runway-limited at high takeoff weights.

As you might imagine, we wholeheartedly support the proposed runway length increase.

Thank you.

J.P. McLaughlin
Chief Pilot
Colson & Colson Construction

Telephone memo

Mead & Hunt, Inc.

Call To: J.P. McLaughlin, Chief Pilot Company: Colson Enterprises

Call From: Evan Barrett Time: 4:15pm CST

Date: February 23, 2010

Project: Salem Master Plan Update – Phase 1

Subject: Jet Aircraft Operating Weights

This phone conversation was initiated to provide support for Chapter 3, *Facility Requirements*, by requesting operating weight information from this based jet aircraft operator.

Mr. McLaughlin is currently the chief pilot for Colson Enterprises. In 2008, he operated three jet aircraft based at Salem Municipal Airport (SLE): two Beechjet 400As, identifiers N500LJ and N975RD, and one Falcon 2000, identifier N150BC. He expects the delivery of two new jet aircraft to their fleet in 2010, a Falcon 7X and a Hawker 850XP.

Mr. McLaughlin said the Beechjet 400As have a maximum fuel load of 4,912 pounds, and the Falcon 2000 has a maximum fuel load of 12,154 pounds. He said that the Beechjets invariably take off with maximum fuel, and that the Falcon has a typical takeoff fuel load of 9,500 pounds. For landing operations, the preferred minimum fuel load is 1,500 pounds for the Beechjets and 2,500 pounds for the Falcon. However, these aircraft will typically land with additional fuel in poor weather conditions and at night.

Mr. McLaughlin identified an approximate maximum payload of 2,000 pounds for the Beechjets and 4,000 pounds for the Falcon. When asked for a typical operating payload for each aircraft, he identified a typical load of 4 passengers with 200 pounds of cargo each for the Beechjets, and 6 to 7 passengers with 400 pounds of cargo each for the Falcon.

Mr. McLaughlin said hot conditions can have negative impacts for operations by the three aircraft, due to inadequate runway length. Icy and wet conditions can also have negative impacts for the Falcon. He said that for some missions to eastern Canada additional fuel stops have been needed due to weather conditions at SLE. This operator provided a letter on April 1, 2010, supporting a runway length increase at SLE, which is contained in this Appendix.

Telephone Memorandum

Telephone memo

Mead & Hunt, Inc.

Call To: Clint Scovell, Chief Pilot

Company: Shilo Management Corp

Call From: Evan Barrett

Time: 4pm CST

Date: February 23, 2010

Project: Salem Master Plan Update – Phase 1

Subject: Jet Aircraft Operating Weights

This phone conversation was initiated to provide support for Chapter 3, *Facility Requirements*, by requesting operating weight information from this based jet aircraft operator.

Mr. Scovell is currently the chief pilot for Shilo Management Corp. Shilo owns one jet aircraft based at Salem Municipal Airport (SLE), a Citation II, identifier N495MH. Mr. Scovell was formerly the chief pilot for Sunwest Management, which also currently owns a Citation II, identifier N628GB, based at SLE. In 2008, Sunwest also owned a Challenger 300, identifier N629GB, which was based at the SLE but has since been sold. Mr. Scovell has operated these three aircraft.

Mr. Scovell said the Citation II has a maximum fuel load of 4,800 pounds, and the Challenger 300 has a maximum fuel load of 14,150 pounds. He said that these aircraft do not typically take off from the Airport with a full fuel load, but it is preferred that the aircraft take off with at least 75% fuel, if possible. The actual fuel amount used depends on weather conditions and the length of the mission's first leg. The fuel floor for landing operations is approximately 1,000 pounds for the Citation II and 2,000 pounds for the Challenger 300.

Mr. Scovell could not identify a maximum payload for the aircraft, but provided a maximum takeoff weight of 14,800 pounds for the Citation II and 38,500 pounds for the Challenger 300. When asked for a typical operating payload for each aircraft, Mr. Scovell provided a typical useful load (fuel + payload) of 4,800 pounds for the Citation II and 12,500 pounds for the Challenger 300.

Mr. Scovell said wet and icy conditions have the most impact on his runway length requirements. He said there have been some instances where he has had to carry less than desirable fuel on trips to the east coast, requiring an additional fueling stop en route. Mr. Scovell indicated that fog is often a problem at the airport, and that runway centerline lighting and improved approach lighting systems would be beneficial.

Telephone Memorandum

Telephone memo

Mead & Hunt, Inc.

Call To: Rob McCracken, Chief Pilot

Company: Sun Quest Executive Air Charter

Call From: Evan Barrett

Time: 4:30pm CST

Date: February 23, 2010

Project: Salem Master Plan Update – Phase 1

Subject: Jet Aircraft Operating Weights

This phone conversation was initiated to provide support for Chapter 3, *Facility Requirements*, by requesting operating weight information from this based jet aircraft operator.

Mr. McCracken is currently the chief pilot for the northwest headquarters of Sun Quest Executive Air Charter. The company's home office is located in Van Nuys, CA. In 2008, he operated two Citation II jet aircraft based at Salem Municipal Airport (SLE), identifiers N458N and N17DM, which have identical performance characteristics. One of the jets is a FAR Part 135 certificated charter aircraft, and the other is operated under FAR Part 91. Sun Quest also leases additional aircraft based at other airports.

Mr. McCracken said the Citation II has a maximum fuel load of 5,008 pounds. He said that the typical takeoff fuel load depends on the mission, and that he will not fuel the aircraft until he knows the weather conditions at SLE, along his planned route, and at his destination. However, he said he will always take off with the maximum fuel load if it is possible. For landing operations, the fuel load depends on the mission, but that the maximum total aircraft weight for these operations is 12,700 pounds.

Mr. McCracken could not identify a typical payload. However, he said that for long flights, which he identified as anything over 2 hours, he will take off at the maximum takeoff weight of 14,500 pounds. Long flights account for approximately 50% of their operations. For the remaining 50% of takeoff operations, he will take off at a total aircraft weight of approximately 12,500 to 13,300 pounds. He said that their operations rarely include less than 5 passengers.

Telephone Memorandum

Telephone memo

Mead & Hunt, Inc.

Call To: Lisa Dahl, Chief Pilot

Company: Saratoga Inc.

Call From: Evan Barrett

Time: 4:00pm CST

Date: February 24, 2010

Project: Salem Master Plan Update – Phase 1

Subject: Jet Aircraft Operating Weights

This phone conversation was initiated to provide support for Chapter 3, *Facility Requirements*, by requesting operating weight information from this based jet aircraft operator.

Ms. Dahl is currently the chief pilot for Saratoga Inc. In 2008, she operated one Citation II jet aircraft, identifier N100Y, based at Salem Municipal Airport (SLE). Saratoga has since added a Citation Sovereign, identifier N200Y, to its fleet in April 2009.

Ms. Dahl said the Citation II has a maximum fuel load of 4,860 pounds, and the Citation Sovereign has a maximum fuel load of 11,123 pounds. She said that they will typically conduct all operations in both aircraft with a full fuel load. The only exceptions include very short legs where they will exceed maximum landing weight at their destination (approximately 20% of operations), or at high temperatures where aircraft performance concerns predominate. For landing operations, the preferred minimum fuel load is 1,500 pounds for the Citation II and 2,500 pounds for the Citation Sovereign, although actual fuel load depends on the specific mission.

Ms. Dahl identified an approximate maximum full-fuel payload of 1,000 pounds for the Citation II and 2,000 pounds for the Citation Sovereign. When asked for a typical operating payload for each aircraft, she identified a typical payload (passengers + cargo) of 600 pounds for the Citation II and 1,200 pounds for the Citation Sovereign.

Ms. Dahl said that hot, wet, and icy conditions can have negative impacts for operations by both aircraft, due to inadequate runway length. While this is unusual for the Citation II, they have to use a less than desired fuel load in the Sovereign because of weather conditions approximately 10% of the time.

Telephone Memorandum

Telephone memo

Mead & Hunt, Inc.

Call To: Wayne Cartwright, Chief Pilot Company: Lessee for GBMCC LLC

Call From: Evan Barrett Time: 4:15pm CST

Date: February 24, 2010

Project: Salem Master Plan Update – Phase 1

Subject: Jet Aircraft Operating Weights

This phone conversation was initiated to provide support for Chapter 3, *Facility Requirements*, by requesting operating weight information from this based jet aircraft operator.

Mr. Cartwright is currently operates one Beechjet 400A, identifier N399RA, based at Salem Municipal Airport (SLE). He operated this aircraft at SLE in 2008.

Mr. Cartwright said they will take off at the maximum takeoff weight of 16,000 pounds in almost every circumstance. For landing operations, the preferred minimum fuel load is 1,000 pounds, with a minimum preferred landing weight of 12,000 pounds.

Mr. Cartwright said there are eight passenger seats in the Beechjet, and the number of passengers on their flights varies considerably. He identified five passengers as an average load.

Telephone Memorandum

Appendix E / 2008 Estimated Useful Load Percentages for Takeoffs by Transient GA and Charter Large Aircraft with a MTOW up to and Including 60,000 Pounds that Involved a Refueling Stop at SLE

2008 Estimated Useful Load Percentages for Takeoffs by Transient GA and Charter Large Aircraft with a MTOW up to and Including 60,000 Pounds that Involved a Refueling Stop at SLE													
Takeoff Operation	**Owner**	**Ident**	**Aircraft Type**	**Refueling Stop**	**Maximum Usable Fuel (gal)**	**Estimated Fuel Load on Landing at SLE (gal)**	**Actual Fuel Taken On at SLE (gal)**	**Estimated Fuel Load on Takeoff from SLE (gal)**	**Estimated Takeoff Fuel Load Weight (lbs)**	**Estimated Payload (lbs)**	**Estimated Useful Load (lbs)**	**Maximum Useful Load (lbs)**	**Estimated Useful Load Pct**
Estimated Greater than 60% Useful Load Takeoff Operations by Transient GA or Charter Large Aircraft with a MTOW up to and Including 60,000 Pounds that Involved a Refueling Stop at SLE													
1	Flight Options	OPT424	Beechjet 400A	1 of 1	622	249	136	385	2,632	1,200	3,832	6,050	63.3%
2	Flight Options	OPT433	Beechjet 400A	1 of 1	622	249	317	566	3,870	1,200	5,070	6,050	83.8%
3	Flight Options	OPT436	Beechjet 400A	1 of 1	622	249	215	464	3,172	1,200	4,372	6,050	72.3%
4	Flight Options	OPT439	Beechjet 400A	1 of 3	622	249	247	496	3,391	1,200	4,591	6,050	75.9%
5	Flight Options	OPT439	Beechjet 400A	2 of 3	622	249	268	517	3,535	1,200	4,735	6,050	78.3%
6	Flight Options	OPT439	Beechjet 400A	3 of 3	622	249	227	476	3,254	1,200	4,454	6,050	73.6%
7	Flight Options	OPT443	Beechjet 400A	1 of 1	622	249	317	566	3,870	1,200	5,070	6,050	83.8%
8	Suntrust Leasing Corp	N446M	Beechjet 400A	1 of 2	622	196	426	622	4,254	931	5,185	6,050	85.7%
9	Suntrust Leasing Corp	N446M	Beechjet 400A	2 of 2	622	108	514	622	4,254	931	5,185	6,050	85.7%
10	Flight Options	OPT452	Beechjet 400A	1 of 1	622	249	266	515	3,521	1,200	4,721	6,050	78.0%
11	Flight Options	OPT454	Beechjet 400A	1 of 1	622	249	356	605	4,137	1,048	5,185	6,050	85.7%
12	Flight Options	OPT459	Beechjet 400A	1 of 1	622	249	235	484	3,309	1,200	4,509	6,050	74.5%
13	Flight Options	OPT470	Beechjet 400A	1 of 1	622	132	490	622	4,254	931	5,185	6,050	85.7%
14	Flight Options	OPT798	Beechjet 400A	1 of 2	622	249	230	479	3,275	1,200	4,475	6,050	74.0%
15	Flight Options	OPT798	Beechjet 400A	2 of 2	622	249	207	456	3,118	1,200	4,318	6,050	71.4%
16	Netjets Aviation Inc.	EJA116	Beechjet 400A	1 of 1	622	0	625	622	4,254	931	5,185	6,050	85.7%
17	Airgas Inc	N601AF	Challenger 600	1 of 1	2,190	540	1,650	2,190	14,980	1,200	16,180	18,015	89.8%
18	Flying M LLC	N677LM	Challenger 600	1 of 1	2,190	876	1,200	2,076	14,200	1,200	15,400	18,015	85.5%
19	Caterpillar Inc	N793CT	Challenger 600	1 of 1	2,190	876	630	1,506	10,301	1,200	11,501	18,015	63.8%
20	KOAV LLC	N1CH	Citation CJ3	1 of 2	703	281	200	481	3,291	1,200	4,491	5,570	80.6%
21	KOAV LLC	N1CH	Citation CJ3	2 of 2	703	281	200	481	3,291	1,200	4,491	5,570	80.6%
22	CMH Homes Inc	N1KA	Citation CJ3	1 of 1	703	281	300	581	3,975	1,200	5,175	5,570	92.9%
23	CitationAir	FIV417	Citation CJ3	1 of 1	703	281	390	671	4,591	979	5,570	5,570	100.0%
24	CMH Homes Inc	N7CH	Citation CJ3	1 of 1	703	281	410	691	4,728	842	5,570	5,570	100.0%
25	Space Shuttle Aircraft Leasing Co II LLC	N941AM	Citation CJ3	1 of 1	703	281	150	431	2,949	1,200	4,149	5,570	74.5%
26	Netjets Aviation Inc.	EJA304	Citation Excel	1 of 1	1,006	402	510	912	6,241	1,200	7,441	8,090	92.0%
27	Netjets Aviation Inc.	EJA588	Citation Excel	1 of 1	1,006	402	150	552	3,778	1,200	4,978	8,090	61.5%
28	Netjets Aviation Inc.	EJA602	Citation Excel	1 of 1	1,006	402	520	922	6,309	1,200	7,509	8,090	92.8%
29	Netjets Aviation Inc.	EJA603	Citation Excel	1 of 2	1,006	402	425	827	5,659	1,200	6,859	8,090	84.8%
30	Netjets Aviation Inc.	EJA603	Citation Excel	2 of 2	1,006	402	427	829	5,673	1,200	6,873	8,090	85.0%
31	Netjets Aviation Inc.	EJA608	Citation Excel	1 of 1	1,006	402	280	682	4,668	1,200	5,868	8,090	72.5%
32	Netjets Aviation Inc.	EJA630	Citation Excel	1 of 1	1,006	402	390	792	5,420	1,200	6,620	8,090	81.8%
33	Netjets Aviation Inc.	EJA643	Citation Excel	1 of 1	1,006	402	140	542	3,710	1,200	4,910	8,090	60.7%
34	Netjets Aviation Inc.	EJA645	Citation Excel	1 of 1	1,006	402	210	612	4,189	1,200	5,389	8,090	66.6%
35	Netjets Aviation Inc.	EJA681	Citation Excel	1 of 1	1,006	402	520	922	6,309	1,200	7,509	8,090	92.8%
36	National City Commercial Capital Corp	N202AV	Citation II/Bravo	1 of 10	720	288	100	388	2,654	1,200	3,854	6,000	64.2%
37	National City Commercial Capital Corp	N202AV	Citation II/Bravo	2 of 10	720	288	250	538	3,680	1,200	4,880	6,000	81.3%
38	National City Commercial Capital Corp	N202AV	Citation II/Bravo	3 of 10	720	288	150	438	2,996	1,200	4,196	6,000	69.9%
39	National City Commercial Capital Corp	N202AV	Citation II/Bravo	4 of 10	720	288	151	439	3,003	1,200	4,203	6,000	70.0%
40	National City Commercial Capital Corp	N202AV	Citation II/Bravo	5 of 10	720	288	225	513	3,509	1,200	4,709	6,000	78.5%
41	National City Commercial Capital Corp	N202AV	Citation II/Bravo	6 of 10	720	288	250	538	3,680	1,200	4,880	6,000	81.3%
42	National City Commercial Capital Corp	N202AV	Citation II/Bravo	7 of 10	720	288	100	388	2,654	1,200	3,854	6,000	64.2%
43	National City Commercial Capital Corp	N202AV	Citation II/Bravo	8 of 10	720	288	225	513	3,509	1,200	4,709	6,000	78.5%
44	National City Commercial Capital Corp	N202AV	Citation II/Bravo	9 of 10	720	288	225	513	3,509	1,200	4,709	6,000	78.5%
45	National City Commercial Capital Corp	N202AV	Citation II/Bravo	10 of 10	720	288	100	388	2,654	1,200	3,854	6,000	64.2%
46	Par Air	N33EK	Citation II/Bravo	1 of 1	720	288	300	588	4,022	1,200	5,222	6,000	87.0%
47	CitationAir	FIV339	Citation II/Bravo	1 of 1	720	288	300	588	4,022	1,200	5,222	6,000	87.0%
48	American Care Air Inc	N41SM	Citation II/Bravo	1 of 1	720	288	430	718	4,911	1,089	6,000	6,000	100.0%
49	U.S. Department of Justice	N45678	Citation II/Bravo	1 of 1	720	122	598	720	4,925	1,075	6,000	6,000	100.0%
50	Idaho Power Company	N521TM	Citation II/Bravo	1 of 5	720	288	200	488	3,338	1,200	4,538	6,000	75.6%
51	Idaho Power Company	N521TM	Citation II/Bravo	2 of 5	720	288	100	388	2,654	1,200	3,854	6,000	64.2%
52	Idaho Power Company	N521TM	Citation II/Bravo	3 of 5	720	288	100	388	2,654	1,200	3,854	6,000	64.2%
53	Idaho Power Company	N521TM	Citation II/Bravo	4 of 5	720	288	200	488	3,338	1,200	4,538	6,000	75.6%
54	Idaho Power Company	N521TM	Citation II/Bravo	5 of 5	720	288	100	388	2,654	1,200	3,854	6,000	64.2%
55	Wells Fargo Bank Northwest NA Trustee	N543SC	Citation II/Bravo	1 of 1	720	288	250	538	3,680	1,200	4,880	6,000	81.3%
56	Professional Office Services Inc	N550GH	Citation II/Bravo	1 of 1	720	288	420	708	4,843	1,157	6,000	6,000	100.0%
57	Wood I Fly LLC	N550PW	Citation II/Bravo	1 of 1	720	277	443	720	4,925	1,075	6,000	6,000	100.0%

2008 Estimated Useful Load Percentages for Takeoffs by Transient GA and Charter Large Aircraft with a MTOW up to and Including 60,000 Pounds that Involved a Refueling Stop at SLE													
Takeoff Operation	Owner	Ident	Aircraft Type	Refueling Stop	Maximum Usable Fuel (gal)	Estimated Fuel Load on Landing at SLE (gal)	Actual Fuel Taken On at SLE (gal)	Estimated Fuel Load on Takeoff from SLE (gal)	Estimated Takeoff Fuel Load Weight (lbs)	Estimated Payload (lbs)	Estimated Useful Load (lbs)	Maximum Useful Load (lbs)	Estimated Useful Load Pct
58	Idaho Potato Packers Corp	N565NC	Citation II/Bravo	1 of 2	720	288	350	638	4,364	1,200	5,564	6,000	92.7%
59	Idaho Potato Packers Corp	N565NC	Citation II/Bravo	2 of 2	720	288	200	488	3,338	1,200	4,538	6,000	75.6%
60	Sierra Tango One LLC	N91VB	Citation II/Bravo	1 of 1	720	274	446	720	4,925	1,075	6,000	6,000	100.0%
61	Cancelled/Not Assigned	N223SV	Citation Sovereign	1 of 1	1,674	670	540	1,210	8,274	1,200	9,474	12,580	75.3%
62	Netjets Aviation Inc.	EJA337	Citation V/Encore	1 of 1	811	324	105	429	2,937	1,200	4,137	6,653	62.2%
63	Netjets Aviation Inc.	EJA358	Citation V/Encore	1 of 1	811	324	325	649	4,442	1,200	5,642	6,653	84.8%
64	Netjets Aviation Inc.	EJA366	Citation V/Encore	1 of 1	811	324	240	564	3,860	1,200	5,060	6,653	76.1%
65	Netjets Aviation Inc.	EJA379	Citation V/Encore	1 of 1	811	324	250	574	3,929	1,200	5,129	6,653	77.1%
66	Solaire LLC	N560PK	Citation V/Encore	1 of 1	811	324	160	484	3,313	1,200	4,513	6,653	67.8%
67	Reserved	N568CH	Citation V/Encore	1 of 1	811	324	450	774	5,297	1,200	6,497	6,653	97.7%
68	CC Services Inc	N591CF	Citation V/Encore	1 of 7	811	324	447	771	5,276	1,200	6,476	6,653	97.3%
69	CC Services Inc	N591CF	Citation V/Encore	2 of 7	811	324	470	794	5,434	1,200	6,634	6,653	99.7%
70	CC Services Inc	N591CF	Citation V/Encore	3 of 7	811	324	474	798	5,461	1,192	6,653	6,653	100.0%
71	CC Services Inc	N591CF	Citation V/Encore	4 of 7	811	324	271	595	4,073	1,200	5,273	6,653	79.3%
72	CC Services Inc	N591CF	Citation V/Encore	5 of 7	811	324	420	744	5,092	1,200	6,292	6,653	94.6%
73	CC Services Inc	N591CF	Citation V/Encore	6 of 7	811	324	302	626	4,285	1,200	5,485	6,653	82.4%
74	CC Services Inc	N591CF	Citation V/Encore	7 of 7	811	309	502	811	5,547	1,106	6,653	6,653	100.0%
75	Not Assigned/Reserved	N755PT	Citation X	1 of 1	1,930	772	1,000	1,772	12,120	1,200	13,320	14,400	92.5%
76	Netjets Aviation Inc.	EJA983	Citation X	1 of 1	1,930	772	625	1,397	9,555	1,200	10,755	14,400	74.7%
77	Pilot Corp	N81P	Falcon 20	1 of 2	1,361	544	425	969	6,631	1,200	7,831	12,060	64.9%
78	Pilot Corp	N81P	Falcon 20	2 of 2	1,361	544	650	1,194	8,170	1,200	9,370	12,060	77.7%
79	Sentry Aviation Services LLC	N515PV	Falcon 2000	1 of 3	2,179	872	825	1,697	11,605	1,200	12,805	18,640	68.7%
80	Sentry Aviation Services LLC	N515PV	Falcon 2000	2 of 3	2,179	872	807	1,679	11,482	1,200	12,682	18,640	68.0%
81	Sentry Aviation Services LLC	N515PV	Falcon 2000	3 of 3	2,179	872	736	1,608	10,996	1,200	12,196	18,640	65.4%
82	Phifer Wire Products Inc.	N54YR	Falcon 50	1 of 1	2,316	926	1,100	2,026	13,861	1,200	15,061	18,730	80.4%
83	Sentry Aviation Services LLC	N31D	Falcon 900	1 of 3	2,810	1,124	826	1,950	13,338	1,200	14,538	23,055	63.1%
84	Sentry Aviation Services LLC	N31D	Falcon 900	2 of 3	2,810	1,124	785	1,909	13,058	1,200	14,258	23,055	61.8%
85	Scotts Co LLC	N900MG	Falcon 900	1 of 2	2,810	1,124	1,229	2,353	16,095	1,200	17,295	23,055	75.0%
86	Scotts Co LLC	N900MG	Falcon 900	2 of 2	2,810	1,124	754	1,878	12,846	1,200	14,046	23,055	60.9%
87	Netjets Aviation Inc.	EJA731	Gulfstream G200	1 of 1	2,239	896	1,050	1,946	13,308	1,200	14,508	15,650	92.7%
88	Jet 4 You LLC	N125CK	Hawker 800	1 of 1	1,453	581	450	1,031	7,053	1,200	8,253	11,150	74.0%
89	Avjet Corp	N409AV	Hawker 800XP	1 of 1	1,493	597	650	1,247	8,531	1,200	9,731	12,330	78.9%
90	Kal Kustom NW Inc	N700MD	Israel 1124 Westwind	1 of 2	1,259	504	350	854	5,839	1,200	7,039	10,250	68.7%
91	OB Air LLC	N240B	Learjet 31A	1 of 10	616	246	100	346	2,369	1,200	3,569	5,786	61.7%
92	OB Air LLC	N240B	Learjet 31A	2 of 10	616	246	100	346	2,369	1,200	3,569	5,786	61.7%
93	OB Air LLC	N240B	Learjet 31A	3 of 10	616	246	367	613	4,196	1,200	5,396	5,786	93.3%
94	OB Air LLC	N240B	Learjet 31A	4 of 10	616	246	150	396	2,711	1,200	3,911	5,786	67.6%
95	OB Air LLC	N240B	Learjet 31A	5 of 10	616	246	125	371	2,540	1,200	3,740	5,786	64.6%
96	OB Air LLC	N240B	Learjet 31A	6 of 10	616	246	266	512	3,505	1,200	4,705	5,786	81.3%
97	OB Air LLC	N240B	Learjet 31A	7 of 10	616	246	125	371	2,540	1,200	3,740	5,786	64.6%
98	OB Air LLC	N240B	Learjet 31A	8 of 10	616	246	150	396	2,711	1,200	3,911	5,786	67.6%
99	Not Assigned/Reserved	N31MU	Learjet 31A	1 of 1	616	246	100	346	2,369	1,200	3,569	5,786	61.7%
100	Not Assigned/Reserved	N31WU	Learjet 31A	1 of 2	616	246	275	521	3,566	1,200	4,766	5,786	82.4%
101	Not Assigned/Reserved	N31WU	Learjet 31A	2 of 2	616	246	100	346	2,369	1,200	3,569	5,786	61.7%
102	GC Air LLC	N352EF	Learjet 31A	1 of 1	616	246	100	346	2,369	1,200	3,569	5,786	61.7%
103	Dulcich Jet LLC	N535PS	Learjet 31A	1 of 2	616	246	300	546	3,737	1,200	4,937	5,786	85.3%
104	Dulcich Jet LLC	N535PS	Learjet 31A	2 of 2	616	246	200	446	3,053	1,200	4,253	5,786	73.5%
105	DSA Aviation LLC	N129TS	Learjet 35	1 of 1	925	370	526	896	6,129	1,200	7,329	8,478	86.4%
106	Executive Flight	N350EF	Learjet 35	1 of 2	925	370	497	867	5,930	1,200	7,130	8,478	84.1%
107	Executive Flight	N350EF	Learjet 35	2 of 2	925	370	237	607	4,152	1,200	5,352	8,478	63.1%
108	Clay Lacy Aviation	N354CL	Learjet 35	1 of 1	925	370	200	570	3,899	1,200	5,099	8,478	60.1%
109	Not Assigned/Reserved	N35AX	Learjet 35	1 of 1	925	370	275	645	4,412	1,200	5,612	8,478	66.2%
110	B&E Houck Leasing LLC	N35NK	Learjet 35	1 of 1	925	370	473	843	5,766	1,200	6,966	8,478	82.2%
111	Global Holding Corp	N367DA	Learjet 35	1 of 1	925	370	290	660	4,514	1,200	5,714	8,478	67.4%
112	CL Air LLC	N387HA	Learjet 35	1 of 3	925	370	368	738	5,048	1,200	6,248	8,478	73.7%
113	CL Air LLC	N387HA	Learjet 35	2 of 3	925	365	560	925	6,327	1,200	7,527	8,478	88.8%
114	CL Air LLC	N387HA	Learjet 35	3 of 3	925	370	200	570	3,899	1,200	5,099	8,478	60.1%
115	Med Air LLC	N55FN	Learjet 35	1 of 1	925	148	777	925	6,327	1,200	7,527	8,478	88.8%

2008 Estimated Useful Load Percentages for Takeoffs by Transient GA and Charter Large Aircraft with a MTOW up to and Including 60,000 Pounds that Involved a Refueling Stop at SLE													
Takeoff Operation	**Owner**	**Ident**	**Aircraft Type**	**Refueling Stop**	**Maximum Usable Fuel (gal)**	**Estimated Fuel Load on Landing at SLE (gal)**	**Actual Fuel Taken On at SLE (gal)**	**Estimated Fuel Load on Takeoff from SLE (gal)**	**Estimated Takeoff Fuel Load Weight (lbs)**	**Estimated Payload (lbs)**	**Estimated Useful Load (lbs)**	**Maximum Useful Load (lbs)**	**Estimated Useful Load Pct**
116	CFF Air Inc	N568PA	Learjet 35	1 of 1	925	173	752	925	6,327	1,200	7,527	8,478	88.8%
117	Executive Flight	N683EF	Learjet 35	1 of 3	925	370	494	864	5,910	1,200	7,110	8,478	83.9%
118	Executive Flight	N683EF	Learjet 35	2 of 3	925	370	220	590	4,036	1,200	5,236	8,478	61.8%
119	AMTS Aircraft Holdings LLC	N70AX	Learjet 35	1 of 1	925	370	503	873	5,971	1,200	7,171	8,478	84.6%
120	Waterway Plastics	N140WW	Learjet 45	1 of 1	886	354	476	830	5,680	925	6,605	6,605	100.0%
121	Walmart	N183CM	Learjet 45	1 of 1	886	198	688	886	6,060	545	6,605	6,605	100.0%
122	Walmart	N451WM	Learjet 45	1 of 1	886	241	645	886	6,060	545	6,605	6,605	100.0%
123	Walmart	N452CJ	Learjet 45	1 of 1	886	286	600	886	6,060	545	6,605	6,605	100.0%
124	MCCKC LLC	N838TH	Learjet 45	1 of 2	886	354	250	604	4,134	1,200	5,334	6,605	80.8%
125	ConAgra Foods Inc	N865CA	Learjet 45	1 of 1	886	354	450	804	5,502	1,103	6,605	6,605	100.0%
126	FN Aircraft Corp	C-FRGY	Learjet 60	1 of 2	1,181	472	383	855	5,851	1,200	7,051	8,765	80.4%
127	FN Aircraft Corp	C-FRGY	Learjet 60	2 of 2	1,181	472	430	902	6,172	1,200	7,372	8,765	84.1%
128	Bombardier FlexJet	LXJ259	Learjet 60	1 of 1	1,181	472	500	972	6,651	1,200	7,851	8,765	89.6%
129	Peter Capone Design LLC	N692PC	Learjet 60	1 of 1	1,181	472	380	852	5,830	1,200	7,030	8,765	80.2%
Estimated Less than or equal to 60% Useful Load Takeoff Operations by Transient GA and Charter Large Aircraft with a MTOW up to and Including 60,000 Pounds that Involved a Refueling Stop at SLE													
1	Flight Options	OPT466	Beechjet 400A	1 of 1	622	249	87	336	2,297	1,200	3,497	6,050	57.8%
2	GeoDuck Aviation II LLC	N731DC	Challenger 300	1 of 1	2,112	845	100	945	6,462	1,200	7,662	15,350	49.9%
3	CEF 2002 Aircraft	N571BA	Challenger 600	1 of 1	2,190	876	150	1,026	7,018	1,200	8,218	18,015	45.6%
4	Furniture Row Leasing LLC	N601FR	Challenger 600	1 of 2	2,190	876	150	1,026	7,018	1,200	8,218	18,015	45.6%
5	Furniture Row Leasing LLC	N601FR	Challenger 600	2 of 2	2,190	876	100	976	6,676	1,200	7,876	18,015	43.7%
6	Caesh Air LLC	N710HL	Challenger 600	1 of 1	2,190	876	300	1,176	8,044	1,200	9,244	18,015	51.3%
7	Costco	N82CW	Challenger 600	1 of 1	2,190	876	100	976	6,676	1,200	7,876	18,015	43.7%
8	Apple Air LLC	N813JD	Citation II/Bravo	1 of 1	720	288	50	338	2,312	1,200	3,512	6,000	58.5%
9	Moran Foods Inc	N174VP	Citation III	1 of 1	1,071	428	150	578	3,956	1,200	5,156	10,330	49.9%
10	J.R. Simplot Co.	N174JS	Citation V/Encore	1 of 1	811	324	50	374	2,561	1,200	3,761	6,653	56.5%
11	Netjets Aviation Inc.	EJA319	Citation V/Encore	1 of 1	811	324	75	399	2,732	1,200	3,932	6,653	59.1%
12	Pilot Corp	N231JH	Falcon 10	1 of 1	882	353	100	453	3,097	1,200	4,297	7,980	53.8%
13	Sentry Aviation Services LLC	N31D	Falcon 900	3 of 3	2,810	1,124	668	1,792	12,257	1,200	13,457	23,055	58.4%
14	FlightWorks	FWK200	Gulfstream G200	1 of 1	2,239	896	200	1,096	7,494	1,200	8,694	15,650	55.6%
15	Netjets Aviation Inc.	EJA725	Gulfstream G200	1 of 1	2,239	896	200	1,096	7,494	1,200	8,694	15,650	55.6%
16	Netjets Aviation Inc.	EJA739	Gulfstream G200	1 of 1	2,239	896	100	996	6,810	1,200	8,010	15,650	51.2%
17	RX Choice Inc	N916GB	Gulfstream G200	1 of 1	2,239	896	150	1,046	7,152	1,200	8,352	15,650	53.4%
18	Flight Options	OPT809	Hawker 800	1 of 1	1,453	581	200	781	5,343	1,200	6,543	11,150	58.7%
19	Kal Kustom NW Inc	N700MD	Israel 1124 Westwind	2 of 2	1,259	504	200	704	4,813	1,200	6,013	10,250	58.7%
20	OB Air LLC	N240B	Learjet 31A	9 of 10	616	246	50	296	2,027	1,200	3,227	5,786	55.8%
21	OB Air LLC	N240B	Learjet 31A	10 of 10	616	246	50	296	2,027	1,200	3,227	5,786	55.8%
22	DSA Aviation LLC	N129TS	Learjet 35	1 of 2	925	370	160	530	3,625	1,200	4,825	8,478	56.9%
23	DSA Aviation LLC	N129TS	Learjet 35	2 of 2	925	370	120	490	3,352	1,200	4,552	8,478	53.7%
24	Clay Lacy Aviation	N364CL	Learjet 35	1 of 1	925	370	150	520	3,557	1,200	4,757	8,478	56.1%
25	Executive Flight	N683EF	Learjet 35	3 of 3	925	370	159	529	3,618	1,200	4,818	8,478	56.8%
26	MCCKC LLC	N838TH	Learjet 45	2 of 2	886	354	50	404	2,766	1,200	3,966	6,605	60.0%

Notes

Maximum Usable Fuel is based on published aircraft manufacturer specifications.
Estimated Fuel Load on Landing at SLE is calculated as 40% of Maximum Usable Fuel. Where Fuel Taken On at SLE exceeds 60% Maximum Usable Fuel, Estimated Fuel Load on Landing at SLE is the difference between Maximum Usable Fuel and Fuel Taken On at SLE.
Actual Fuel Taken On at SLE is based on actual FBO fueling records.
Estimated Fuel Load at Takeoff from SLE is the sum of Estimated Fuel Load on Landing at SLE and Actual Fuel Taken On at SLE.
Estimated Takeoff Fuel Load Weight is calculated using the conversion factor 6.84 pounds per Jet A fuel gallon.
Estimated Payload is five passengers with 50 pounds of luggage each (1,200 pounds total).
Passenger weight is calculated based on the standard average summer adult passenger weight of 190 pounds, as specified by AC 120-27D,*Aircraft Weight and Balance Control*.
Where Estimated Payload is less than 1,200 pounds, the aircraft is estimated to takeoff at maximum takeoff weight.
Estimated Useful Load is the sum of Estimated Takeoff Fuel Load Weight and Estimated Payload.
Maximum useful load is the difference between the published manufacturer specifications for maximum allowable structrual gross weight and operating empty weight.
Estimated Useful Load Percentage is the ratio of Estimated Useful Load to Maximum Useful Load.

Appendix F / FAA Runway Length Concurrence

U.S. Department
of Transportation

**Federal Aviation
Administration**

Seattle Airports District Office
1601 Lind Avenue, S. W., Ste 250
Renton, Washington 98055-4056

27 April, 2010

Mr. Alan Alexander
Airport Administrator
City of Salem
555 Liberty Street SE Rm 330
Salem, OR 97301-3503

Dear Mr. Alexander:

Airport Improvement Program (AIP) Project Number 3-41-0055-016
Approval of Runway Length Justification Documents – McNary Field Airport Master Plan Update

I have reviewed both the Facility Requirements and Useful Loads and Weather Conditions Chapters (3 & 4) submitted by your Consultants.

I concur with the aforementioned documentation that adequate justification exists for the additional runway length sought at Salem's McNary Field. Please keep in mind, however, that this acceptance does not necessarily mean that the Federal Aviation Administration will commit to providing funding for this desired runway extension project or related infrastructure improvements.

If you have any questions, please feel free to contact me at: 425.227.2649 or by e-mail at: bruce.fisher@faa.gov.

Sincerely,

Bruce C. Fisher
Airport Planner, Oregon / Idaho

cc: Mr. Damon Smith, PE, Mead & Hunt, Inc.

Appendix B
Airport Layout Plan

Prepared by Mead & Hunt, Inc.
January 2012

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

August 16, 2012

Mr. John Paskell
Airport Administrator
City of Salem, McNary Field
2990 25th St., SE
Salem, OR 97302

Dear Mr. Paskell,

The Salem Airport Layout Plan (ALP) dated August, 2012 and submitted by Mead & Hunt, Inc., is hereby approved. A signed copy of the ALP is enclosed.

This approval considers only the safety, utility, and efficiency of the Salem Airport, and is conditioned on acknowledgment that any development on airport property requiring federal environmental approval must receive such written approval from the Federal Aviation Administration (FAA) prior to commencement of the subject development. This ALP approval is also conditioned on acceptance of the plan under local land use laws. We encourage appropriate agencies to adopt land use and height restrictive zoning based on the plan since action toward this end is a prerequisite of the Airport Improvement Program (AIP). Grant Assurance 21, Compatible Land Use, requires airport sponsors to take appropriate action, 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 the arrival and departure of aircraft. The FAA recognizes residential development adjacent to the airport property as an incompatible land use.

Approval of the plan does not indicate that the United States will participate in the cost of any development proposed. When airport construction, alteration, or deactivation is undertaken, such action requires notification and review in accordance with the provisions of Part 77 and Part 157 of the Federal Aviation Regulations.

Please attach this letter to the approved Airport Layout Plan and retain it in the airport files for future use under the Airport Improvement Program.

Sincerely,

Carol A. Suomi
Manager, Seattle Airports District Office

Encl: McNary Field ALP dtd Aug 2012

cc:
Mr. Damon Smith, Mead & Hunt, Inc.

AIRPORT LAYOUT PLAN

FOR THE

SALEM AIRPORT - McNARY FIELD

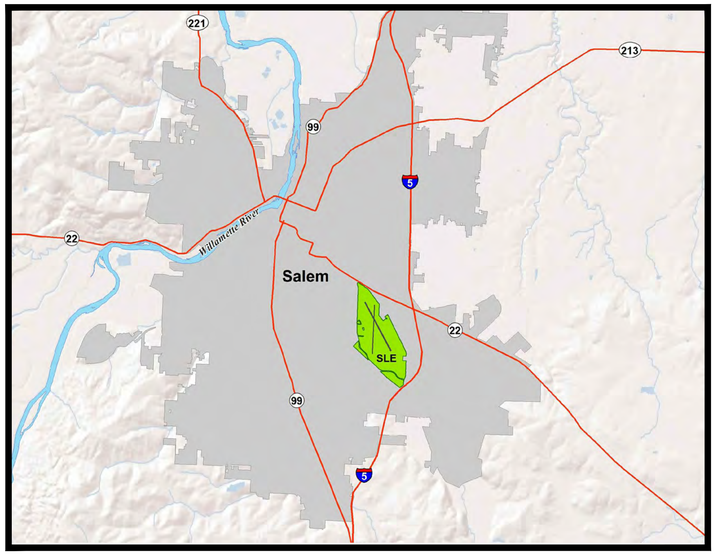
SALEM, OREGON

LOCATION MAP

AUGUST 2012

INDEX TO SHEETS

1. COVER
2. EXISTING AIRPORT LAYOUT PLAN
3. FUTURE AIRPORT LAYOUT PLAN
4. AIRPORT DATA SHEET
5. AIRPORT NOISE CONTOURS
6. EXISTING RUNWAY 13/31 - INNER APPROACH PLAN
7. FUTURE RUNWAY 13/31 - INNER APPROACH PLAN
8. EXISTING RUNWAY 16/34 - INNER APPROACH PLAN
9. FUTURE RUNWAY 13/31 - PLAN & PROFILE
10. EXISTING RUNWAY 16/34 - PLAN & PROFILE
11. FUTURE RUNWAY 13 - APPENDIX 2 SURFACES
12. FUTURE RUNWAY 31 - APPENDIX 2 SURFACES
13. F.A.R. PART 77 AIRSPACE
14. F.A.R. PART 77 AIRSPACE
15. EXHIBIT 'A' - AIRPORT PROPERTY MAP



VICINITY MAP

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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

COVER

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 1 OF 15

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EXISTING RWY 16
APPENDIX 2
20:1 APPROACH SURFACE
400' x 1,500' x 1,000',
cont. 1,000' x 10,000'

EXISTING RWY 16
FAR PART 77
20:1 APPROACH SURFACE
500' x 1,500' x 5,000'

EXISTING RWY 16 RPZ
500' x 700' x 1,000'

EXISTING RUNWAY END 13
RUNWAY LOW POINT
LAT. 44° 55' 00.7399"
LONG. 123° 00' 26.1159"
ELEV. 194.7'
STA. 97+84

EXISTING RUNWAY END 16
RUNWAY LOW POINT
LAT. 44° 54' 58.0012"
LONG. 123° 00' 11.8921"
ELEV. 195.8'
STA. 100+00

AIRPORT REFERENCE POINT
LAT. 44° 54' 34.338"
LONG. 123° 00' 08.985"

EXISTING RUNWAY END 31
RUNWAY & AIRPORT HIGH POINT
LAT. 44° 54' 11.0105"
LONG. 122° 59' 45.8551"
ELEV. 213.6'
STA. 150+95

EXISTING RWY 31
FAR PART 77
50:1 APPROACH SURFACE
1,000' x 16,000' x 50,000'

EXISTING RWY 31
APPENDIX 2
34:1 APPROACH SURFACE
800' x 3,800' x 10,000'

EXISTING RWY 31 RPZ
1,000' x 1,750' x 2,500'

OREGON ARMY
NATIONAL GUARD

RWY 16/34 ROFA 500' x 300'

RWY 16/34 RSA 150' x 300'

50' TXY B

45° TXY M

30° TXY H

50' TXY G

50' TXY J

50' TXY B

GLIDESLOPE &
CRITICAL AREA

RWY 13/31 ROFA 800' x 1000'

RWY 13/31 RSA 500' x 1000'

LOCALIZER &
CRITICAL AREA
ODALS & 50:1 APPROACH
LIGHT PLANE

RWY 13/31 EXISTING 5,811' x 150' TRUE BEARING 150° 05' 01.8" / 330° 05' 30.2"

MALSR & 50:1 APPROACH LIGHT PLANE

RWY 13/31 RSA 500' x 1000'

RWY 13/31 ROFA 800' x 1000'

PRECISION OFZ
200' X 800'

400'

60' TXY A

60' TXY J

RWY 16/34 EXISTING 5,115' x 100' TRUE BEARING 150° 16' 23.1" / 330° 16' 22.4"

NON-STANDARD
CONDITION # 1

NON-STANDARD
CONDITION # 2

230' TXL

50' TXL

60' TXY K

ARFF
FACILITY

FBO

500'
ASOS
CRITICAL AREA

COMPASS
CALIBRATION
PAD

50' TXY F

60' TXL B

50' TXY C

50' TXY L

RWY 16/34 RSA 150' x 300'

RWY 16/34 ROFA 500' x 300'

EXISTING RWY 34 RPZ
500' x 700' x 1,000'

EXISTING RWY 34
APPENDIX 2
20:1 APPROACH SURFACE
400' x 1,500' x 1,000',
cont. 1,000' x 10,000'

EXISTING RWY 34
FAR PART 77
20:1 APPROACH SURFACE
500' x 1,500' x 5,000'

EXISTING RWY 13 RPZ
1,000' x 1,510' x 1,700'

EXISTING RWY 13
APPENDIX 2
20:1 APPROACH SURFACE
800' x 3,800' x 10,000'

EXISTING RWY 13
FAR PART 77
34:1 APPROACH SURFACE
1,000' x 4,000' x 10,000'

AIRPORT
TRAFFIC
CONTROL
TOWER

PASSENGER
TERMINAL
BUILDING

EXISTING RUNWAY END 34
RUNWAY HIGH POINT
LAT. 44° 54' 07.2020"
LONG. 123° 00' 12.8565"
ELEV. 211.1'
STA. 151+45

Airport Road
Turner Road
25th Street
Mission Street
Madrona Avenue
Ewald Avenue
Fairview Industrial Drive
Airway Drive
Interstate 5
Railroad

EXISTING	LEGEND
	AIRPORT PROPERTY LINE
	AVIGATION EASEMENT *
	AIRFIELD PAVEMENT
	BUILDINGS
	AIRPORT REFERENCE POINT
	ROTATING BEACON
	RUNWAY END IDENTIFIER LIGHTS (REIL)
	THRESHOLD LIGHTS
	WIND INDICATOR
	AUTOMATED SURFACE OBSERVING SYSTEM
	PRECISION APPROACH PATH INDICATOR (PAPI)
	VISUAL APPROACH SLOPE INDICATOR (VASI)
RSA	RUNWAY SAFETY AREA (RSA)
RPZ	RUNWAY PROTECTION ZONE (RPZ)
ROFA	RUNWAY OBJECT FREE AREA (ROFA)
RVZ	RUNWAY VISIBILITY ZONE (RVZ)
BRL	BUILDING RESTRICTION LINE (BRL)
	NAVAID CRITICAL AREAS
	FAR PART 77 SURFACE
	APPENDIX 2 SURFACE

NON-STANDARD CONDITION	DISPOSITION
1. RUNWAY OBJECT FREE AREA (ROFA) AT RUNWAY END 13 IS OUTSIDE OF AIRPORT PROPERTY. PENETRATIONS INCLUDE 25th STREET AND FENCE.	RUNWAY END 13 TO BE RELOCATED 216 FEET TO THE SOUTH.
2. NORTH SEGMENT OF TAXIWAY A NEAR RUNWAY END 13 DOES NOT MEET FAA DESIGN CRITERIA FOR RUNWAY TO PARALLEL TAXIWAY SEPARATION. EXISTING CENTERLINE SEPARATION IS 390 FEET AND 400 FEET IS REQUIRED.	TAXIWAY A TO BE RELOCATED TO MEET FAA DESIGN STANDARDS.

* AVIGATION EASEMENTS EXTEND BEYOND SHEET BOUNDARY. EASEMENTS ARE ILLUSTRATED ON THE EXHIBIT 'A' - AIRPORT PROPERTY MAP, SHEET 16.

MAGNETIC DECLINATION 16°03'E
TRUE NORTH
AUG. 2011
0°8'W/YR CHANGE

0 400 800
FEET

1			
2			
3			
4			
5			

AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

EXISTING AIRPORT LAYOUT PLAN

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 2 OF 15

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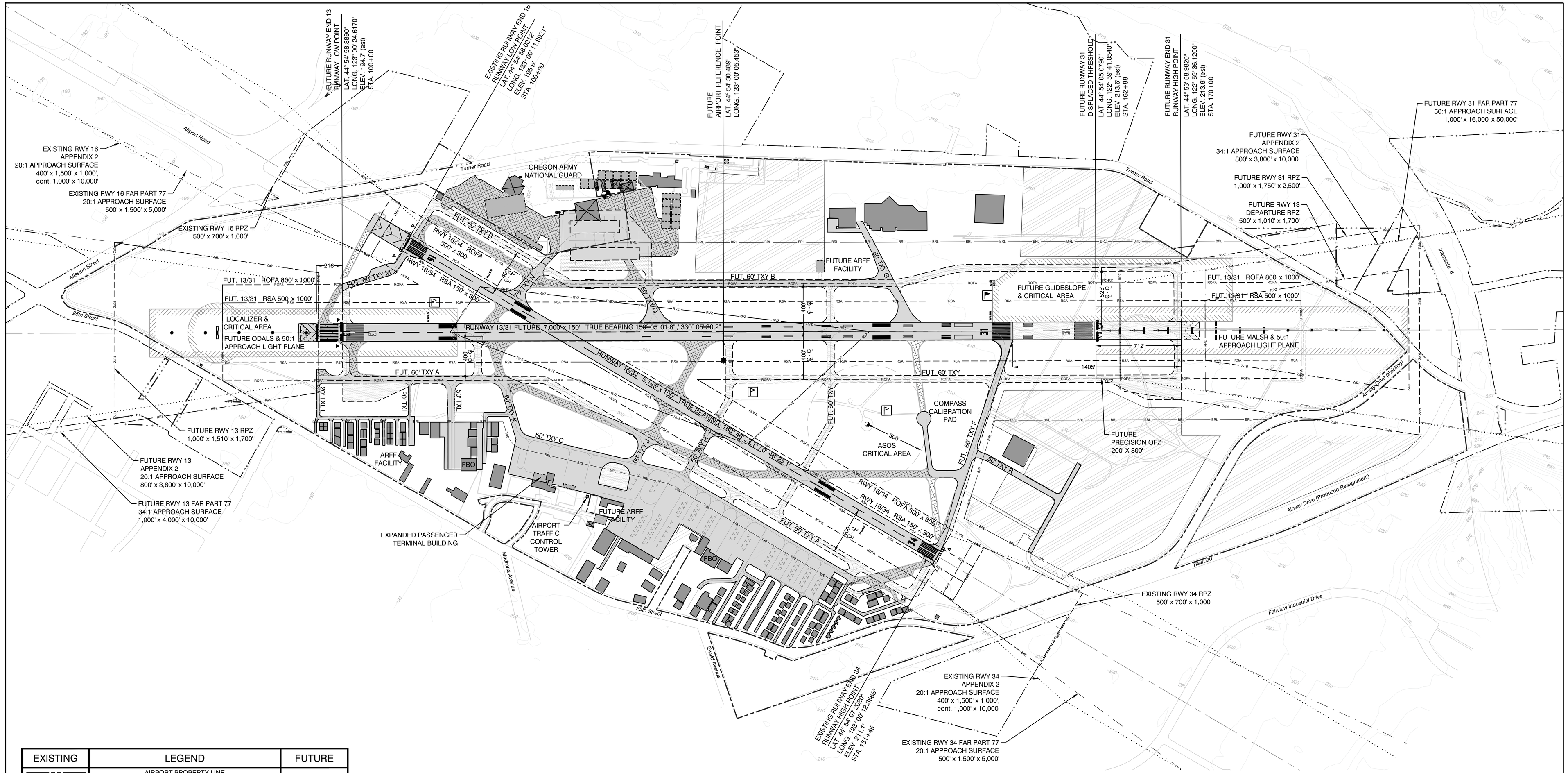
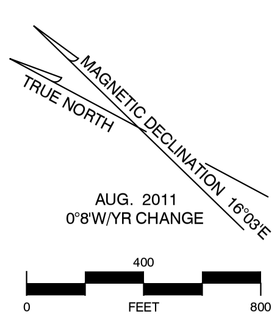


EXISTING	LEGEND	FUTURE
	AIRPORT PROPERTY LINE	
	AVIGATION EASEMENT *	
	FUTURE PROPERTY OR EASEMENT	
	AIRFIELD PAVEMENT	
	BUILDINGS	
	BUILDING - TO BE REMOVED	
	AIRPORT REFERENCE POINT	
	ROTATING BEACON	
	RUNWAY END IDENTIFIER LIGHTS (REIL)	
	THRESHOLD LIGHTS	
	WIND INDICATOR	
	AUTOMATED SURFACE OBSERVING SYSTEM	
	PRECISION APPROACH PATH INDICATOR (PAPI)	
	VISUAL APPROACH SLOPE INDICATOR (VASI)	
RSA	RUNWAY SAFETY AREA (RSA)	RSA
RPZ	RUNWAY PROTECTION ZONE (RPZ)	RPZ
ROFA	RUNWAY OBJECT FREE AREA (ROFA)	ROFA
RVZ	RUNWAY VISIBILITY ZONE (RVZ)	RVZ
BRL	BUILDING RESTRICTION LINE (BRL)	BRL
	NAVAID CRITICAL AREAS	
	FAR PART 77 SURFACE	
	APPENDIX 2 SURFACE	
	PAVEMENT TO BE REMOVED	
	FUTURE DEVELOPMENT AREAS	



* AVIGATION EASEMENTS EXTEND BEYOND SHEET BOUNDARY. EASEMENTS ARE ILLUSTRATED ON THE EXHIBIT 'A' - AIRPORT PROPERTY MAP, SHEET 16.

FEDERAL AVIATION ADMINISTRATION
NORTHWEST MOUNTAIN REGION
SEATTLE AIRPORTS DISTRICT OFFICE

DATE

CITY MANAGER
CITY OF SALEM

DATE

1			
2			
3			
4			
5			

AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

FUTURE AIRPORT LAYOUT PLAN

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 3 OF 15

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EXISTING AIRPORT LOCATION

AIRPORT REFERENCE POINT (ARP)	LATITUDE 44° 54' 34.338" LONGITUDE 123° 00' 08.985"
ESTABLISHED AIRPORT ELEVATION	214 FT AMSL

1. ARP DETERMINED USING FAA GEO83 PROGRAM.

EXISTING RUNWAY END COORDINATES

RUNWAY END	LATITUDE	LONGITUDE	STATION	ELEVATION	TRUE BEARING
13	44° 55' 00.7399"	123° 00' 26.1159"	97+84	194.7'	150° 05' 01.852"
31	44° 54' 11.0105"	122° 59' 45.8551"	155+95	213.6'	330° 05' 30.276"
16	44° 54' 58.0012"	123° 00' 11.8921"	100+00	195.8'	180° 46' 23.147"
34	44° 54' 07.2020"	123° 00' 12.8566"	151+45	211.1'	0° 46' 22.466"

1. EXISTING RUNWAY LATITUDE, LONGITUDE, & ELEVATION FROM FAA PUBLICATIONS.

EXISTING RUNWAY DATA

RUNWAY	LENGTH	WIDTH	HIGH POINT STA/ELEV	LOW POINT STA/ELEV	EFF. GRAD.	SURFACE	STRENGTH
13/31	5,811'	150'	155+95 213.6	97+84 194.7	0.3%	ASPHALT (GROOVED)	SNGL 100,000# DUAL 122,000# SINGLE TANDEM 154,000# DUAL TANDEM 185,000#
16/34	5,145'	100'	151+45 211.1	100+00 195.8	0.3%	ASPHALT (GROOVED)	SINGLE 30,000# DUAL 60,000# DUAL TANDEM 100,000#

1. PAVEMENT STRENGTH AS LISTED IN THE FAA AIRPORT FACILITIES DIRECTORY

EXISTING RUNWAY DESIGN STANDARDS

RUNWAY END	RUNWAY PROTECTION ZONE	SAFETY AREA		OBJECT FREE AREA		OBSTACLE FREE ZONE	
		LENGTH*	WIDTH	LENGTH*	WIDTH	LENGTH*	WIDTH
13	1,000' x 1,510' x 1,700'	1,000'	500'	1,000'	800'	200'	400'
31	1,000' x 1,750' x 2,500'						
16	500' x 700' x 1,000'	300'	150'	300'	500'	200'	250'
34	500' x 700' x 1,000'						

* LENGTH BEYOND RUNWAY END. SURFACE EXTENDS FULL RUNWAY LENGTH.

EXISTING OBSTACLE FREE ZONE

RUNWAY END	INNER-APPROACH OFZ			INNER-TRANSITIONAL OFZ			PRECISION OFZ	
	LENGTH	WIDTH	SLOPE	FULL WIDTH	END WIDTH*	HEIGHT	LENGTH	WIDTH
13	1,400'	400'	50:1	N/A	N/A	N/A	N/A	N/A
31	2,600'	400'	50:1	1,758'	1,030'	44'	200'	800'

1. INNER-APPROACH OFZ APPLIES TO RUNWAY END WITH AN APPROACH LIGHT SYSTEM.
2. INNER-TRANSITIONAL OFZ AND PRECISION OFZ APPLY TO RUNWAY END WITH A PRECISION APPROACH.

* DIMENSION REPRESENTS THE FAR END WIDTH OF THE INNER-TRANSITIONAL OFZ.

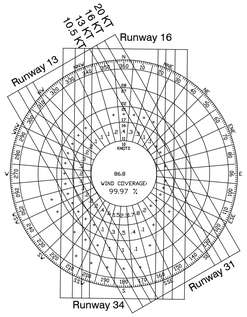
EXISTING FAR PART 77 APPROACH SURFACES

RUNWAY END	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
13	1,000' x 4,000' x 10,000'	200'	34:1
31	1,000' x 16,000' x 10,000' *	200'	50:1
16	500' x 1,500' x 5,000'	200'	20:1
34	500' x 1,500' x 5,000'	200'	20:1

* PRECISION APPROACH CONSISTS OF ADDITIONAL SURFACES, SEE PART 77 SHEET.

GENERAL NOTES

1. ALP PREPARED USING DESIGN CRITERIA FROM FAA ADVISORY CIRCULAR 150/5300-13 'AIRPORT DESIGN' CHANGE 18 AND FAR PART 77 'OBJECTS AFFECTING NAVIGABLE AIRSPACE'.
2. ALP COMPARED TO FAA PUBLICATIONS, AIRPORT/FACILITY DIRECTORY, AND TERMINAL PROCEDURES, DATED 29 JUL 2011.
3. ORTHO IMAGERY SOURCE: PROVIDED BY THE CITY OF SALEM, 2008.
4. CONTOUR SOURCE: USGS NATIONAL ELEVATION DATASET
5. ELEVATIONS (NAVD88) AND DISTANCES ARE APPROXIMATE, IN FEET.
6. FUTURE OBJECTS TO BE SITED AS PART OF FUTURE PROJECTS.
7. THERE MAY EXIST OBJECTS NOT REPRESENTED.
8. OBJECTS MAY BE REMOVED, RELOCATED, AND LIT, AS PART OF FUTURE PROJECTS, TO ACCOMMODATE AIRFIELD OPERATION AND DEVELOPMENT.



WIND ROSE
ALL WEATHER CONDITIONS

AIRPORT DATA

AIRPORT IDENTIFIER CODE	SLE
AIRPORT-OWNING MUNICIPALITY	CITY OF SALEM
COUNTY	MARION
MEAN MAXIMUM TEMPERATURE OF THE HOTTEST MONTH (JULY)	83.1° F
MAGNETIC DECLINATION	16° 03' EAST OF NORTH
RATE OF CHANGE	0° 8' WEST OF NORTH/YEAR
AIRFIELD NAVAIDS	ASOS, ROTATING BEACON, LIGHTED WIND INDICATORS, SEGMENTED CIRCLE

1. TEMPERATURE FROM NATIONAL WEATHER SERVICE, AUGUST 2011
2. MAGNETIC DECLINATION FROM NOAA, AUGUST 2011

WIND COVERAGE

RUNWAY	ALL WEATHER				IFR			
	10.5KT	13KT	16KT	20KT	10.5KT	13KT	16KT	20KT
13/31	96.96%	98.86%	99.83%	99.98%	98.08%	99.66%	99.89%	99.95%
16/34	98.28%	99.16%	99.90%	99.99%	99.69%	99.85%	99.95%	99.97%
COMBINED	99.03%	99.68%	99.97%	100.00%	99.81%	99.91%	99.97%	99.98%

1. NOAA DATA FOR SALEM AIRPORT-MCNARY FEILD, 1998-2008
2. IFR CONDITIONS: CEILING <1000' AND/OR VISIBILITY <3 MILE, BUT CEILING >OR=200' AND VISIBILITY >OR=0.5 MILE.
3. CROSSWIND COMPONENTS PER AC 150/5300-13, PAGE 10, PARA 203 B.

EXISTING CRITICAL AIRCRAFT

RUNWAY	ARC*	DESIGN AIRCRAFT	APRCH SPEED	WING SPAN	LENGTH	TAIL HEIGHT	MAXIMUM T/O WEIGHT
13/31	C-II	DASSAULT FALCON 7X	104 kts	86.0'	76.1'	25.6'	69,000#
16/34	B-II	CESSNA CITATION II	108 kts	51.75'	47.25'	15.0'	13,300#

* ARC-AIRPORT REFERENCE CODE. DESIGN AIRCRAFT DESIGNATED BY:
APPROACH SPEED: B AT LEAST 91 KNOTS, LESS THAN 121 KNOTS.
C AT LEAST 121 KNOTS, LESS THAN 141 KNOTS.
WINGSPAN: II AT LEAST 49 FEET, LESS THAN 79 FEET.

EXISTING NAVIGATIONAL AIDS

RUNWAY END	MARKING	LIGHTING	VISUAL NAVAIDS	ELECTRONIC NAVAIDS
13	NON-PREC	HIRL	REIL, ODALS, VASI-4L	LOC BC
31	PRECISION		MALSR	ILS, LOC, GPS
16	NON-PREC	MIRL	REIL, PAPI	N/A
34	NON-PREC		REIL, PAPI	N/A

EXISTING INSTRUMENT APPROACH PROCEDURES

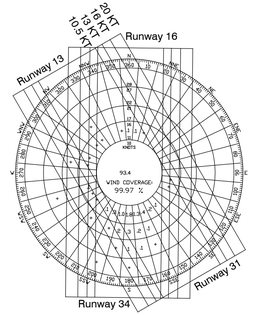
RUNWAY END	APPROACH	VISIBILITY MINIMUMS	INSTRUMENTATION	TOUCHDOWN ZONE ELEV
13	NON-PREC	3/4 MILE	LOC BC	204'
31	PRECISION	1/2 MILE	ILS, LOC, RNAV (GPS)	214'

1. AIRPORT HAS ILS OR GPS APPROACH w/ 1/2 MILE VISIBILITY MINIMUM.

EXISTING APPENDIX 2 SURFACES

RUNWAY END	CAT.	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
13	8	800' x 3,800' x 10,000'	200'	20:1
31	9	800' x 3,800' x 10,000'	200'	34:1
16	3	400' x 1,500' x 1,000' CONTINUE 1,000' x 10,000'	0	20:1
34	3	400' x 1,500' x 1,000' CONTINUE 1,000' x 10,000'	0	20:1
13/31*	11	1,000' x 10,200' x 6,466'	0	40:1
13/31*	12	600' x 21,273' x 12,000', CONTINUE 28,727' TO 50,000'	0	62.5:1

* SALEM THREE DEPARTURE PROCEDURE APPLIES TO ALL RUNWAYS.



WIND ROSE
IFR CONDITIONS

FUTURE CRITICAL AIRCRAFT

RUNWAY	ARC*	DESIGN AIRCRAFT	APRCH SPEED	WING SPAN	LENGTH	TAIL HEIGHT	MAXIMUM T/O WEIGHT
13/31	C-III	BOEING 737-700	140 kts	112.6'	110.3'	41.3'	153,000#
16/34	B-II	CESSNA CITATION II	108 kts	51.75'	47.25'	15.0'	13,300#

* ARC-AIRPORT REFERENCE CODE. DESIGN AIRCRAFT DESIGNATED BY:
APPROACH SPEED: B AT LEAST 91 KNOTS, LESS THAN 121 KNOTS.
C AT LEAST 121 KNOTS, LESS THAN 141 KNOTS.
WINGSPAN: II AT LEAST 49 FEET, LESS THAN 79 FEET.
III AT LEAST 79 FEET, LESS THAN 118 FEET.

FUTURE NAVIGATIONAL AIDS

RUNWAY END	MARKING	LIGHTING	VISUAL NAVAIDS	ELECTRONIC NAVAIDS
13	NON-PREC	HIRL	REIL, ODALS, PAPI	LOC BC
31	PRECISION		MALSR, PAPI	ILS, LOC, GPS
16	NON-PREC	MIRL	REIL, PAPI	N/A
34	NON-PREC		REIL, PAPI	N/A

FUTURE INSTRUMENT APPROACH PROCEDURES

RUNWAY END	APPROACH	VISIBILITY MINIMUMS	INSTRUMENTATION	TOUCHDOWN ZONE ELEV
13	NON-PREC	3/4 MILE	LOC BC	204'
31	PRECISION	1/2 MILE	ILS, LOC, RNAV (GPS)	214'

1. AIRPORT HAS ILS OR GPS APPROACH w/ 1/2 MILE VISIBILITY MINIMUM.

FUTURE APPENDIX 2 SURFACES

RUNWAY END	CAT.	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
13	8	800' x 3,800' x 10,000'	200'	20:1
31	9	800' x 3,800' x 10,000'	200'	34:1
16	3	400' x 1,500' x 1,000' CONTINUE 1,000' x 10,000'	0	20:1
34	3	400' x 1,500' x 1,000' CONTINUE 1,000' x 10,000'	0	20:1
13/31*	11	1,000' x 10,200' x 6,466'	0	40:1
13/31*	12	600' x 21,273' x 12,000', CONTINUE 28,727' TO 50,000'	0	62.5:1

* SALEM THREE DEPARTURE PROCEDURE APPLIES TO ALL RUNWAYS.

FUTURE RUNWAY DISPLACED THRESHOLD

RUNWAY	DISTANCE FROM RUNWAY END	LATITUDE	LONGITUDE	ELEVATION
13	N/A	N/A	N/A	N/A
31	712'	N 44° 54' 05.079"	W 122° 59' 41.054"	213.6' *

* FUTURE RUNWAY ELEVATIONS ARE ESTIMATED

FUTURE RUNWAY DECLARED DISTANCES

RUNWAY	TAKEOFF RUN AVAILABLE (TORA)	TAKEOFF DISTANCE AVAILABLE (TODA)	ACCELERATE STOP DISTANCE AVAILABLE (ASDA)	LANDING DISTANCE AVAILABLE (LDA)
13	7,000'	7,000'	7,000'	7,000'
31	7,000'	7,000'	7,000'	6,288'

FUTURE AIRPORT LOCATION

AIRPORT REFERENCE POINT (ARP)	LATITUDE 44° 54' 30.489" LONGITUDE 123° 00' 05.453"
ESTABLISHED AIRPORT ELEVATION	214 FT AMSL (est.)

1. ARP DETERMINED USING FAA GEO83 PROGRAM.

FUTURE RUNWAY END COORDINATES

RUNWAY END	LATITUDE	LONGITUDE	STATION	ELEVATION	TRUE BEARING
13	44° 54' 58.8890"	123° 00' 24.6170"	100+00	194.7*	150° 05' 01.852"
31	44° 53' 58.9820"	122° 59' 36.1200"	170+00	213.6*	330° 05' 30.276"
16	44° 54' 58.0012"	123° 00' 11.8921"	100+00	195.8'	180° 46' 23.147"
34	44° 54' 07.2020"	123° 00' 12.8566"	151+45	211.1'	0° 46' 22.466"

1. EXISTING RUNWAY LATITUDE, LONGITUDE, & ELEVATION FROM FAA PUBLICATIONS.

* FUTURE RUNWAY END ELEVATIONS ARE ESTIMATED

FUTURE RUNWAY DATA

RUNWAY	LENGTH	WIDTH	HIGH POINT STA/ELEV	LOW POINT STA/ELEV	EFF. GRAD.	SURFACE	STRENGTH
13/31	7,000'	150'	170+00 213.6	100+00 194.7	0.3%	ASPHALT (GROOVED)	SNGL 100,000# DUAL 122,000# SINGLE TANDEM 154,000# DUAL TANDEM 185,000#
16/34	5,145'	100'	151+45 211.1	100+00 195.8	0.3%	ASPHALT (GROOVED)	SINGLE 30,000# DUAL 60,000# DUAL TANDEM 100,000#

1. PAVEMENT STRENGTH AS LISTED IN THE FAA AIRPORT FACILITIES DIRECTORY

FUTURE RUNWAY DESIGN STANDARDS

RUNWAY END	RUNWAY PROTECTION ZONE	SAFETY AREA		OBJECT FREE AREA		OBSTACLE FREE ZONE	
		LENGTH*	WIDTH	LENGTH*	WIDTH	LENGTH*	WIDTH
13	1,000' x 1,510' x 1,700'						
13	500' x 1,010' x 1,700' (DEP)	1,000'	500'	1,000'	800'	200'	400'
31	1,000' x 1,750' x 2,500'						
16	500' x 700' x 1,000'	300'	150'	300'	500'	200'	250'
34	500' x 700' x 1,000'						

* LENGTH BEYOND RUNWAY END. SURFACE EXTENDS FULL RUNWAY LENGTH.

FUTURE OBSTACLE FREE ZONE

RUNWAY END	INNER-APPROACH OFZ			INNER-TRANSITIONAL OFZ			PRECISION OFZ	
	LENGTH	WIDTH	SLOPE	FULL WIDTH	END WIDTH*	HEIGHT	LENGTH	WIDTH
13		400'	50:1	N/A	N/A	N/A	N/A	N/A
31	2,600'	400'	50:1	1,758'	1,030'	44'	200'	800'

1. INNER-APPROACH OFZ APPLIES TO RUNWAY END WITH AN APPROACH LIGHT SYSTEM.
2. INNER-TRANSITIONAL OFZ AND PRECISION OFZ APPLY TO RUNWAY END WITH A PRECISION APPROACH.

* DIMENSION REPRESENTS THE FAR END WIDTH OF THE INNER-TRANSITIONAL OFZ.

FUTURE FAR PART 77 APPROACH SURFACES

RUNWAY END	DIMENSIONS	DISTANCE FROM RUNWAY END	SLOPE
13	1,000' x 4,000' x 10,000'	200'	34:1
31	1,000' x 16,000' x 10,000' *	200'	50:1
16	500' x 1,500' x 5,000'	200'	20:1
34	500' x 1,500' x 5,000'	200'	20:1

* PRECISION APPROACH CONSISTS OF ADDITIONAL SURFACES, SEE PART 77 SHEET.

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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON
AIRPORT DATA SHEET

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 4 OF 15

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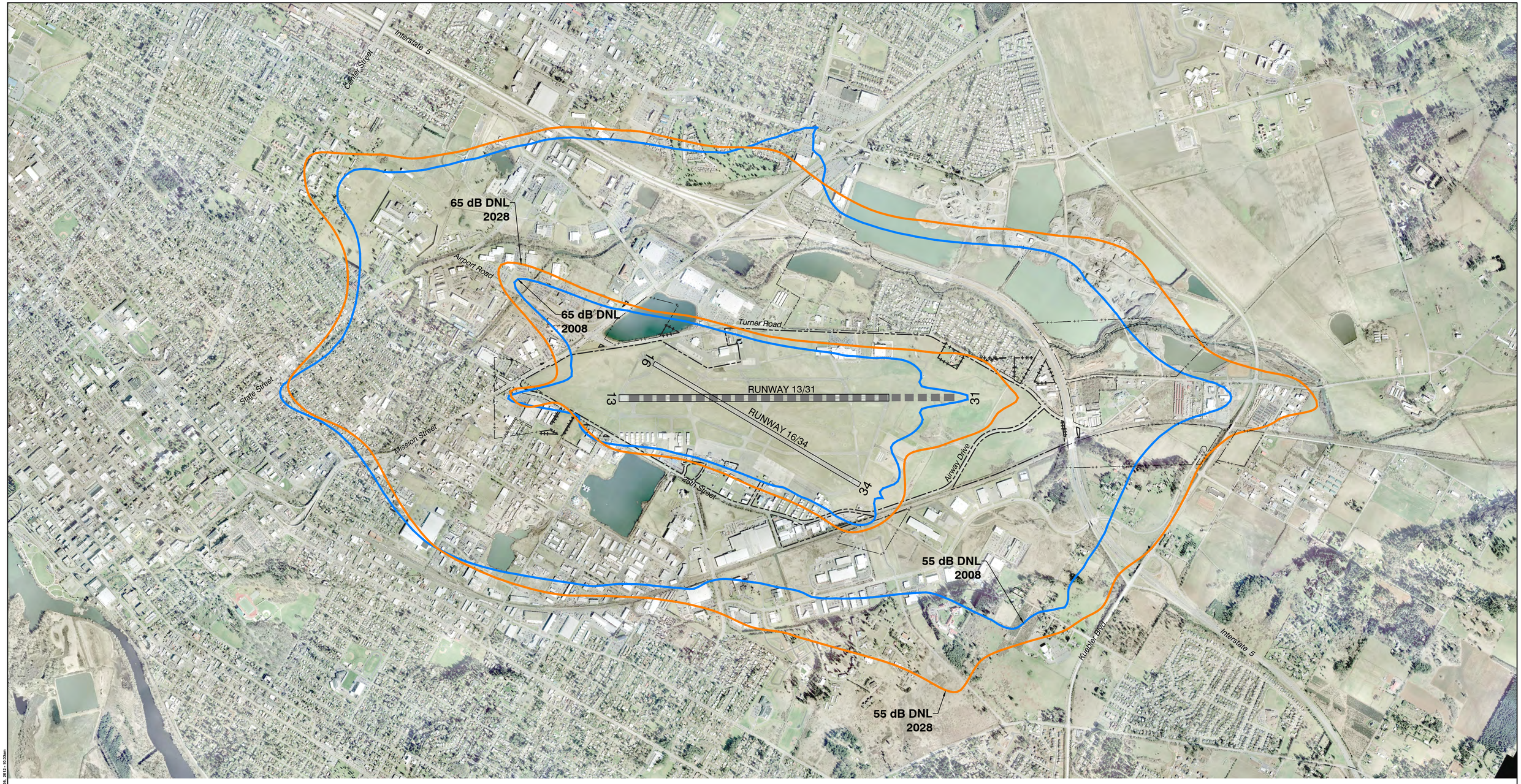

EXISTING	LEGEND	FUTURE
	AIRPORT PROPERTY LINE	
	AVIGATION EASEMENT	
	FUTURE PROPERTY OR EASEMENT	
	RUNWAYS	
	2008 AIRPORT NOISE CONTOUR	
	2028 AIRPORT NOISE CONTOUR	

NOTES

- NOISE CONTOURS GENERATED USING THE INTEGRATED NOISE MODEL 7.0B.
- FORECASTS USED FOR 2028 CONTOURS WERE APPROVED BY THE FAA (LETTER DATED AUGUST 11, 2011). FORECASTS ARE INCLUDED IN THE MASTER PLAN UPDATE - PHASE 2 (2012), CHAPTER 3.
- AERIAL PHOTO SOURCE: CITY OF SALEM, 2008

TRUE NORTH

MAGNETIC DECLINATION 16°09'E

AUG. 2011
0°8W/YR CHANGE

1,000
0 FEET 2,000

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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

AIRPORT NOISE CONTOURS

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 5 OF 15

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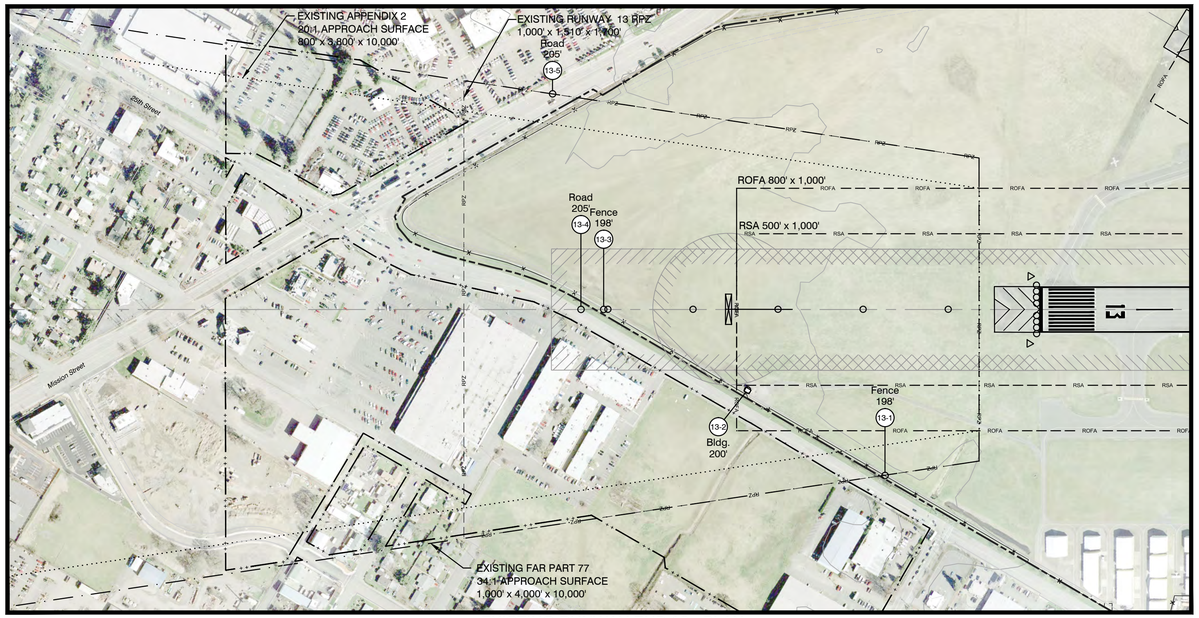
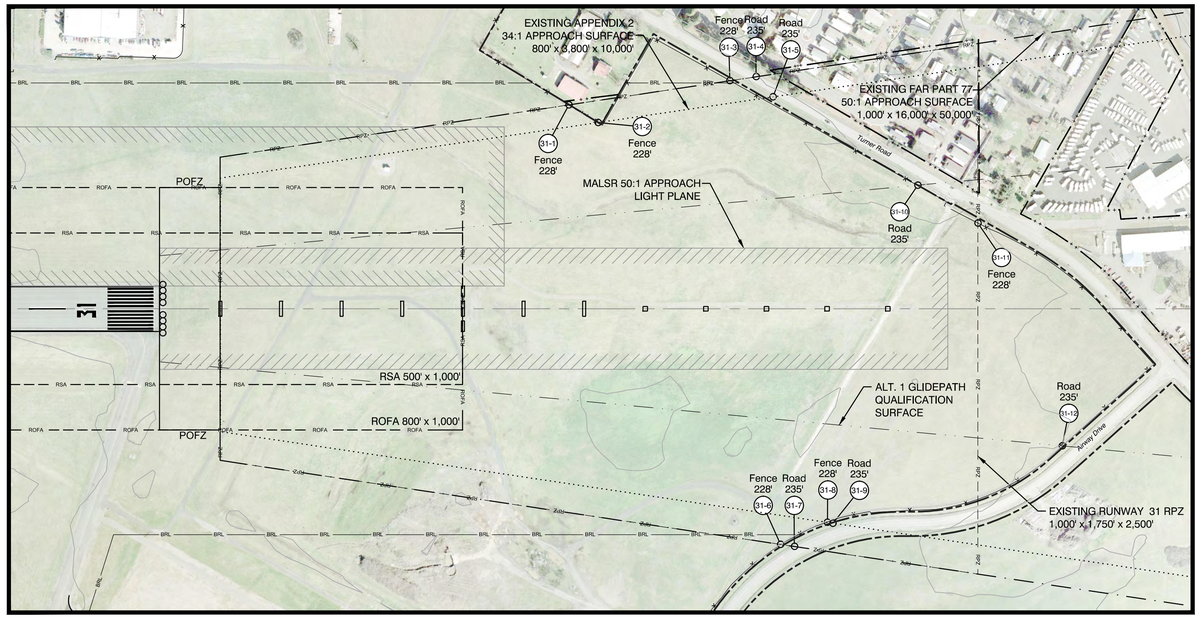
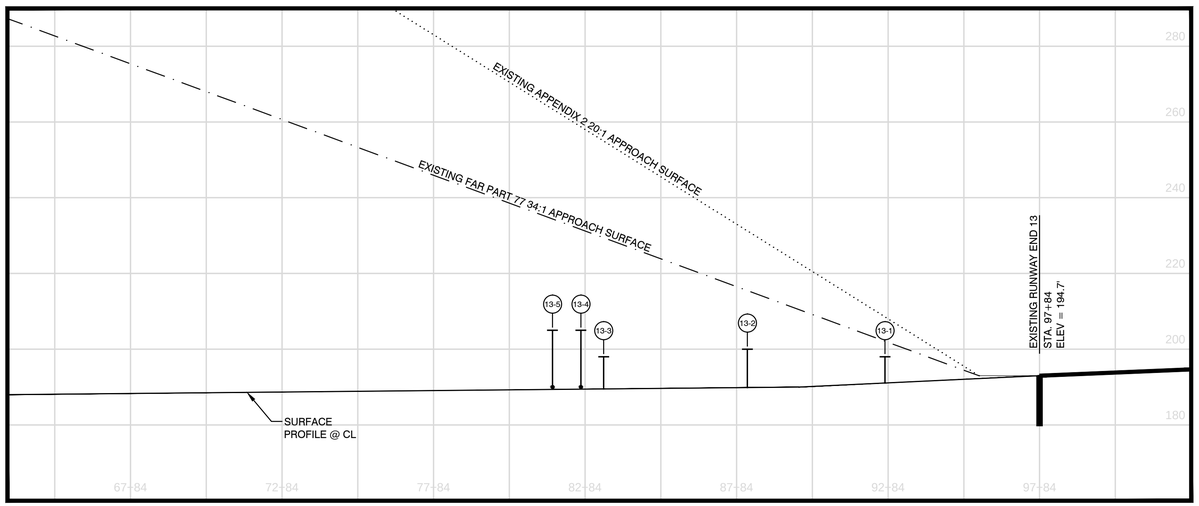


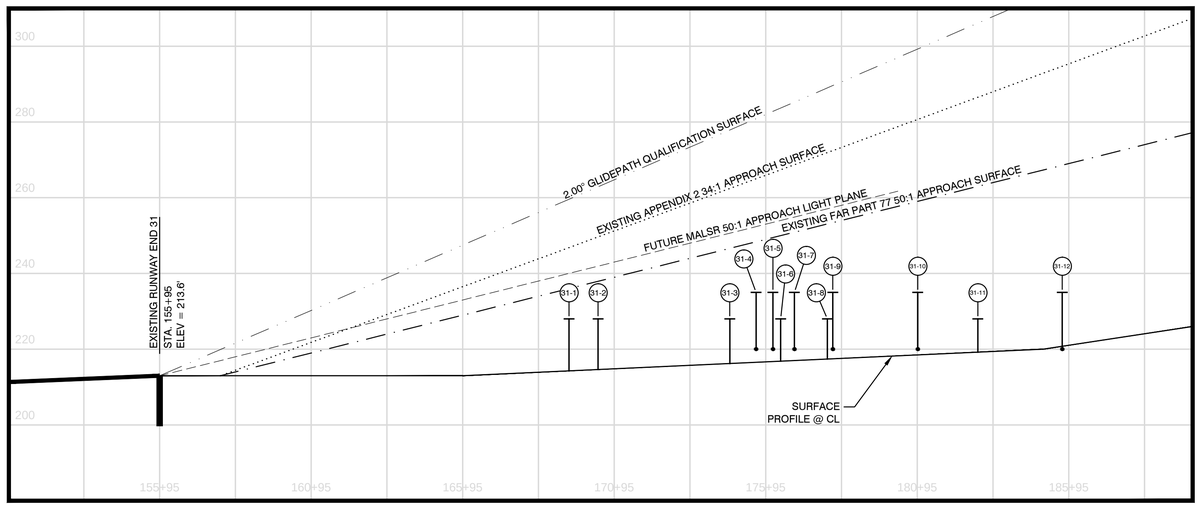
EXISTING RUNWAY END 13 - PLAN



EXISTING RUNWAY END 31 - PLAN



EXISTING RUNWAY END 13 - PROFILE



EXISTING RUNWAY END 31 - PROFILE

EXISTING	LEGEND
	AIRPORT PROPERTY LINE
	AVIGATION EASEMENT
	AIRFIELD PAVEMENT
	BUILDINGS
△	RUNWAY END IDENTIFIER LIGHTS (REIL)
○○○○	THRESHOLD LIGHTS
RSA	RUNWAY SAFETY AREA (RSA)
RPZ	RUNWAY PROTECTION ZONE (RPZ)
ROFA	RUNWAY OBJECT FREE AREA (ROFA)
RVZ	RUNWAY VISIBILITY ZONE (RVZ)
	FAR PART 77 SURFACE
	APPENDIX 2 SURFACE
	NAVAID CRITICAL AREAS
	2.00° GLIDEPATH QUALIFICATION SURFACE
	FENCE

RUNWAY 13 - OBJECTS

OBJ. #	DESCRIPTION	OBJECT ELEVATION	PART 77 APPROACH SURFACE EL.	PEN. OR CLEAR OF PART 77 APPROACH	PEN. OR CLEAR OF APNDX 2 SURFACE	DISPOSITION
13-1	FENCE	198'	202'	CLEAR 4'	CLEAR	NO ACTION
13-2	LOCALIZER BLDG.	200'	215'	CLEAR 15'	CLEAR	NO ACTION
13-3	FENCE	198'	230'	CLEAR 32'	CLEAR	NO ACTION
13-4	ROAD*	205'	231'	CLEAR 26'	CLEAR	NO ACTION
13-5	ROAD*	205'	234'	CLEAR 29'	CLEAR	NO ACTION

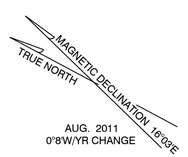
RUNWAY 31 - OBJECTS

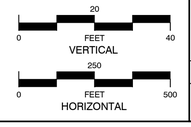
OBJ. #	DESCRIPTION	OBJECT ELEVATION	PART 77 APPROACH SURFACE EL.	PEN. OR CLEAR OF PART 77 APPROACH	PEN. OR CLEAR OF APNDX 2 SURFACE	PEN. OR CLEAR GQS SURFACE
31-1	FENCE	228'	236'	CLEAR 8'	N/A	N/A
31-2	FENCE	228'	238'	CLEAR 10'	CLEAR	N/A
31-3	FENCE	228'	247'	CLEAR 19'	N/A	N/A
31-4	ROAD*	235'	248'	CLEAR 13'	N/A	N/A
31-5	ROAD*	235'	249'	CLEAR 14'	CLEAR	N/A
31-6	FENCE	228'	250'	CLEAR 22'	N/A	N/A
31-7	ROAD*	235'	251'	CLEAR 16'	N/A	N/A
31-8	FENCE	228'	253'	CLEAR 25'	CLEAR	N/A
31-9	ROAD*	235'	253'	CLEAR 18'	CLEAR	N/A
31-10	ROAD*	235'	259'	CLEAR 24'	CLEAR	CLEAR
31-11	FENCE	228'	263'	CLEAR 35'	CLEAR	CLEAR
31-12	ROAD*	235'	269'	CLEAR 34'	CLEAR	CLEAR

NOTES

- ELEVATION VALUES ARE IN FEET ABOVE MEAN SEA LEVEL (MSL) AND NAD83. OBJECT ELEVATIONS ARE ESTIMATED AND BASED ON TOPOGRAPHIC CONTOURS.

* 15 FEET ADDED TO ROADS, 17 FEET ADDED TO INTERSTATE HIGHWAYS AND 23 FEET TO RAILROADS.





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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

EXISTING RWY 13/31 INNER-APRCH PLAN

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 6 OF 15

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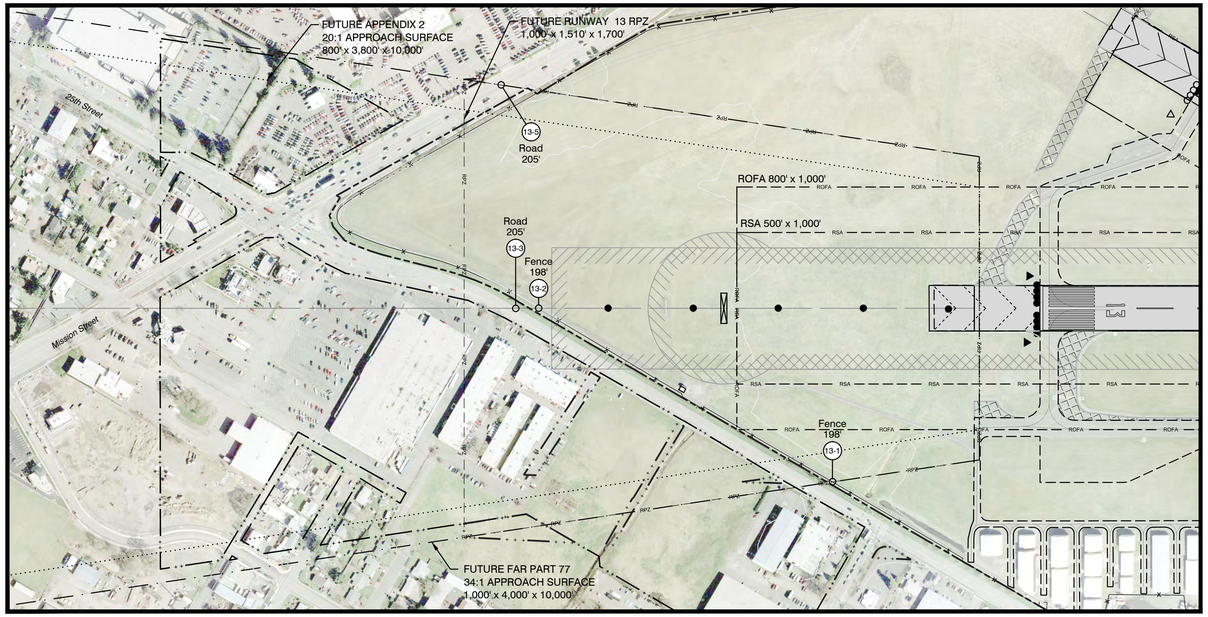
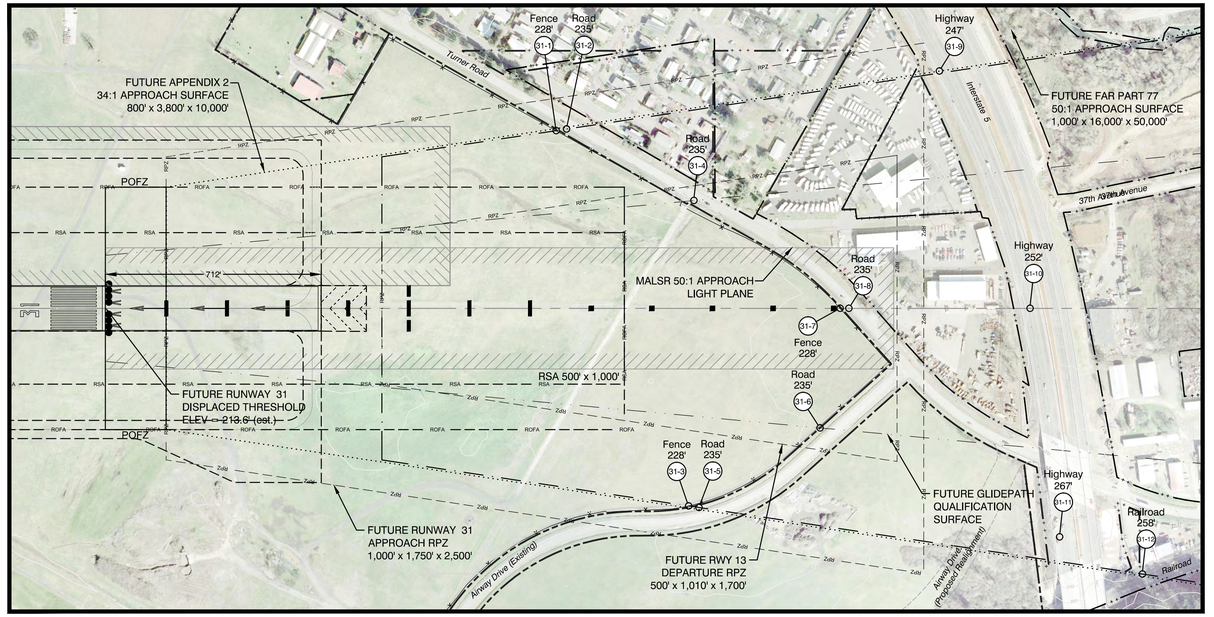
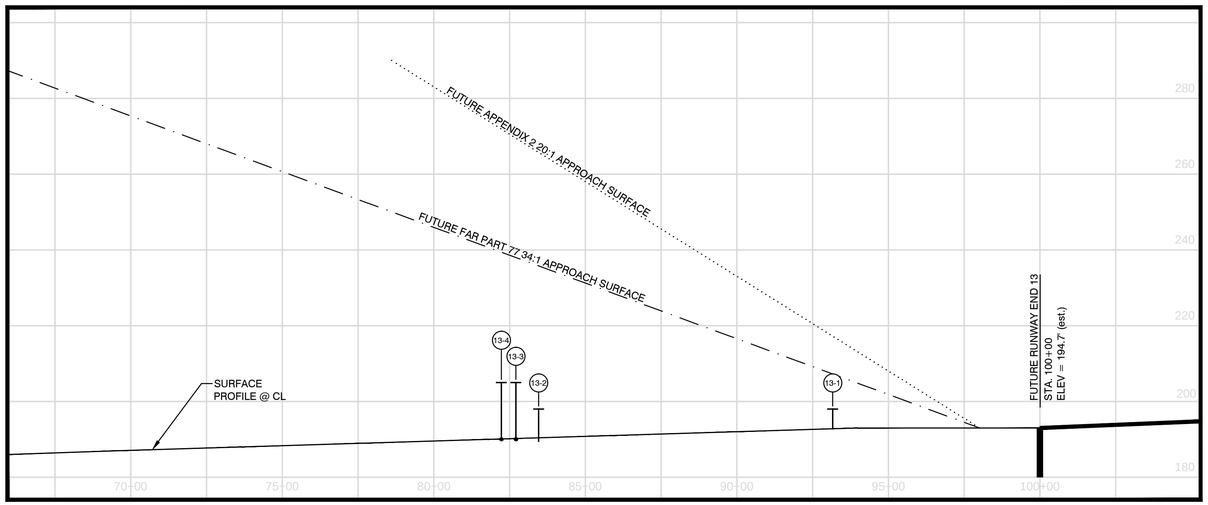


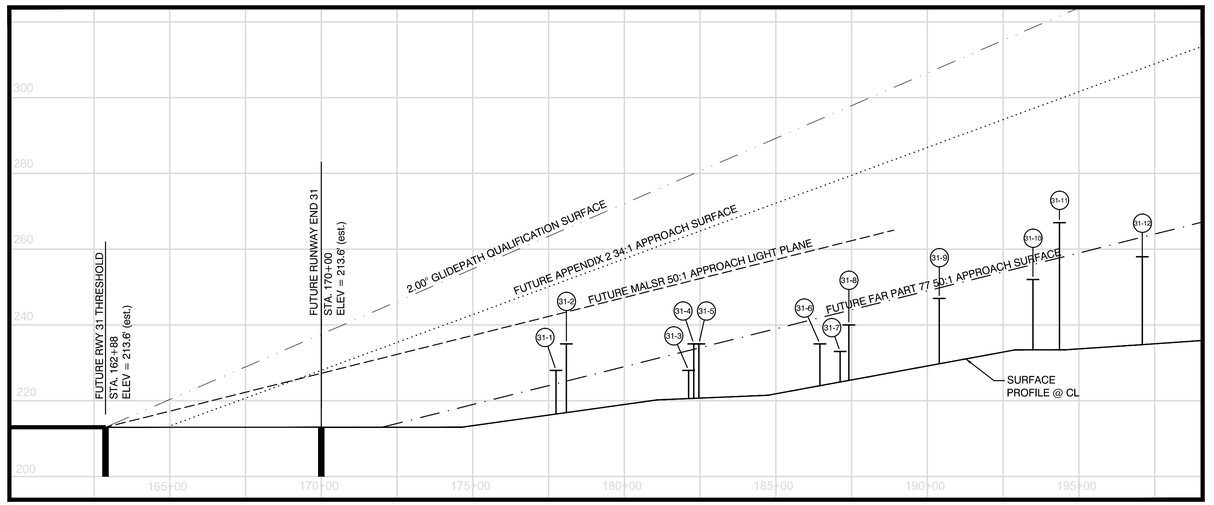
FUTURE RUNWAY END 13 - PLAN



FUTURE RUNWAY END 31 - PLAN



FUTURE RUNWAY END 13 - PROFILE



FUTURE RUNWAY END 31 - PROFILE

EXISTING	LEGEND	FUTURE
	AIRPORT PROPERTY LINE	
	AVIGATION EASEMENT	
	AIRFIELD PAVEMENT	
	BUILDINGS	
△	RUNWAY END IDENTIFIER LIGHTS (REIL)	▲
○○○○	THRESHOLD LIGHTS	●●●●
RSA	RUNWAY SAFETY AREA (RSA)	RSA
RPZ	RUNWAY PROTECTION ZONE (RPZ)	RPZ
ROFA	RUNWAY OBJECT FREE AREA (ROFA)	ROFA
RVZ	RUNWAY VISIBILITY ZONE (RVZ)	RVZ
	FAR PART 77 SURFACE	
	APPENDIX 2 SURFACE	
	NAVAID CRITICAL AREAS	
	2.00° GLIDEPATH QUALIFICATION SURFACE	
	FENCE	
	PAVEMENT TO BE REMOVED	

RUNWAY 13 - OBJECTS

OBJ. #	DESCRIPTION	OBJECT ELEVATION	PART 77 APPROACH SURFACE EL.	PEN. OR CLEAR OF PART 77 APPROACH	PEN. OR CLEAR OF APNDX 2 SURFACE	DISPOSITION
13-1	FENCE	198'	205'	CLEAR 9'	CLEAR	NO ACTION
13-2	FENCE	198'	234'	CLEAR 38'	CLEAR	NO ACTION
13-3	ROAD*	205'	236'	CLEAR 33'	CLEAR	NO ACTION
13-4	ROAD*	205'	237'	CLEAR 34'	CLEAR	NO ACTION

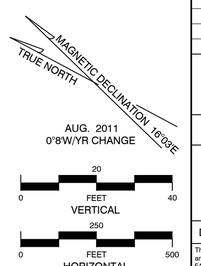
RUNWAY 31 - OBJECTS

OBJ. #	DESCRIPTION	OBJECT ELEVATION	PART 77 APPROACH SURFACE EL.	PEN. OR CLEAR OF PART 77 APPROACH	PEN. OR CLEAR OF APNDX 2 SURFACE	PEN. OR CLEAR GQS SURFACE
31-1	FENCE	228'	224'	4' PENETRATION	CLEAR	CLEAR
31-2	ROAD*	235'	225'	10' PENETRATION	CLEAR	CLEAR
31-3	FENCE	228'	233'	CLEAR 5'	CLEAR	CLEAR
31-4	ROAD*	235'	234'	1' PENETRATION	CLEAR	CLEAR
31-5	ROAD*	235'	234'	1' PENETRATION	CLEAR	CLEAR
31-6	ROAD*	235'	242'	CLEAR 7'	CLEAR	CLEAR
31-7	FENCE	233'	243'	CLEAR 10'	CLEAR	CLEAR
31-8	ROAD*	240'	244'	CLEAR 4'	CLEAR	CLEAR
31-9	HIGHWAY*	247'	250'	CLEAR 3'	CLEAR	CLEAR
31-10	HIGHWAY*	252'	255'	CLEAR 4'	CLEAR	CLEAR
31-11	HIGHWAY*	267'	258'	9' PENETRATION	CLEAR	CLEAR
31-12	RAILROAD*	258'	243'	CLEAR 5'	CLEAR	CLEAR

NOTES

- ELEVATION VALUES ARE IN FEET ABOVE MEAN SEA LEVEL (MSL) AND NAD83. OBJECT ELEVATIONS ARE ESTIMATED AND BASED ON TOPOGRAPHIC CONTOURS.
- FUTURE RUNWAY END ELEVATIONS ARE ESTIMATES.

* 15 FEET ADDED TO ROADS, 17 FEET ADDED TO INTERSTATE HIGHWAYS AND 23 FEET TO RAILROADS.



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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

FUTURE RWY 13/31 INNER-APRCH PLAN

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 7 OF 15

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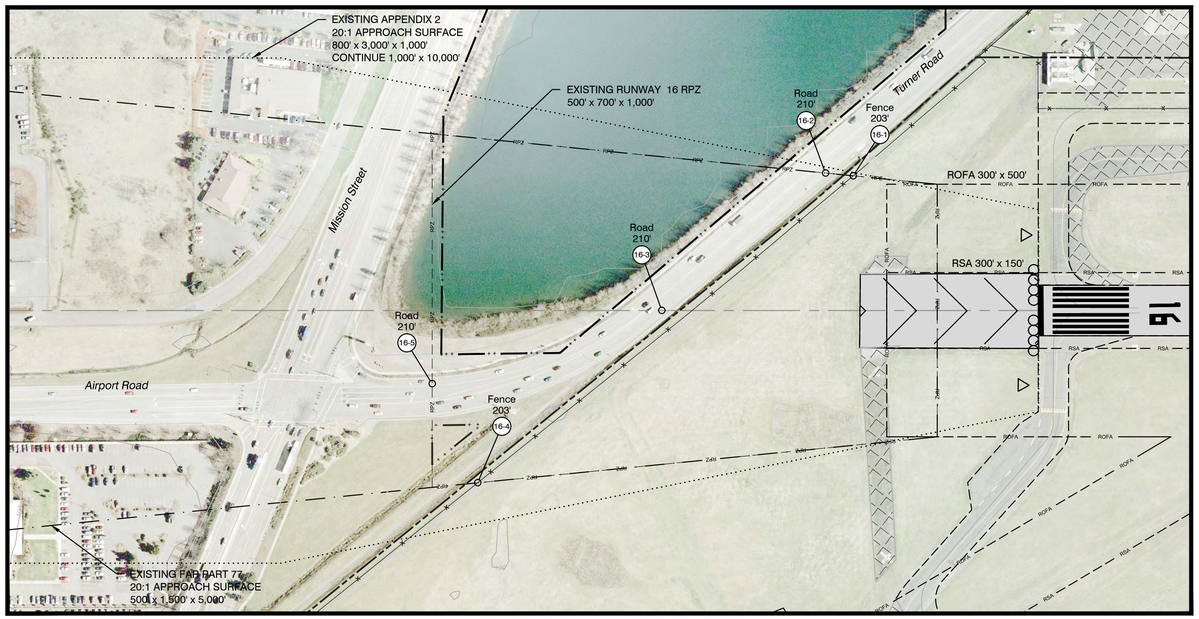
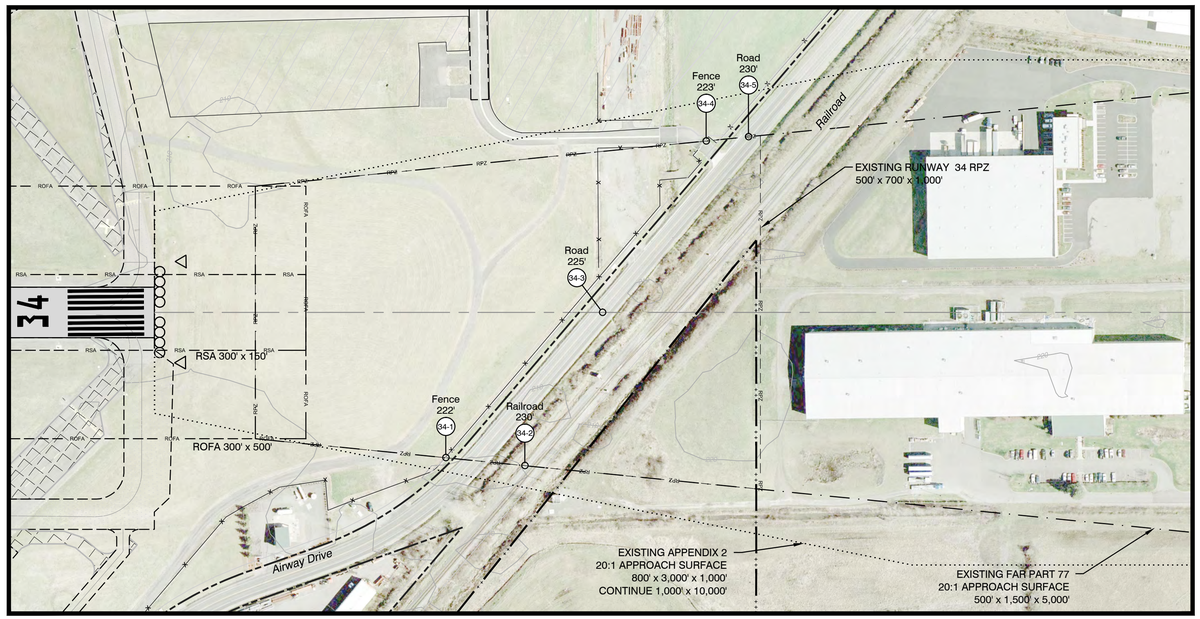
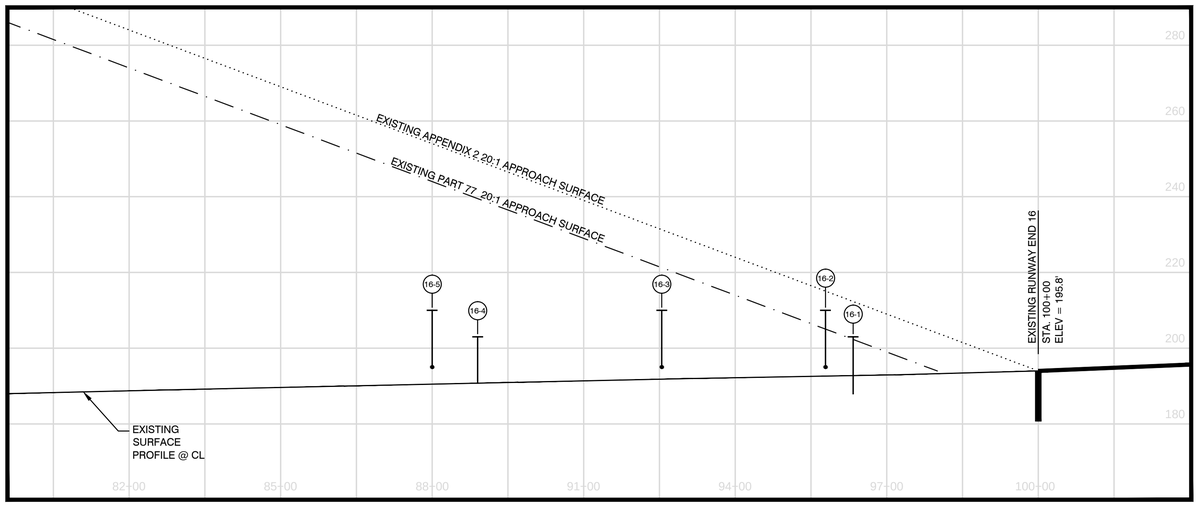


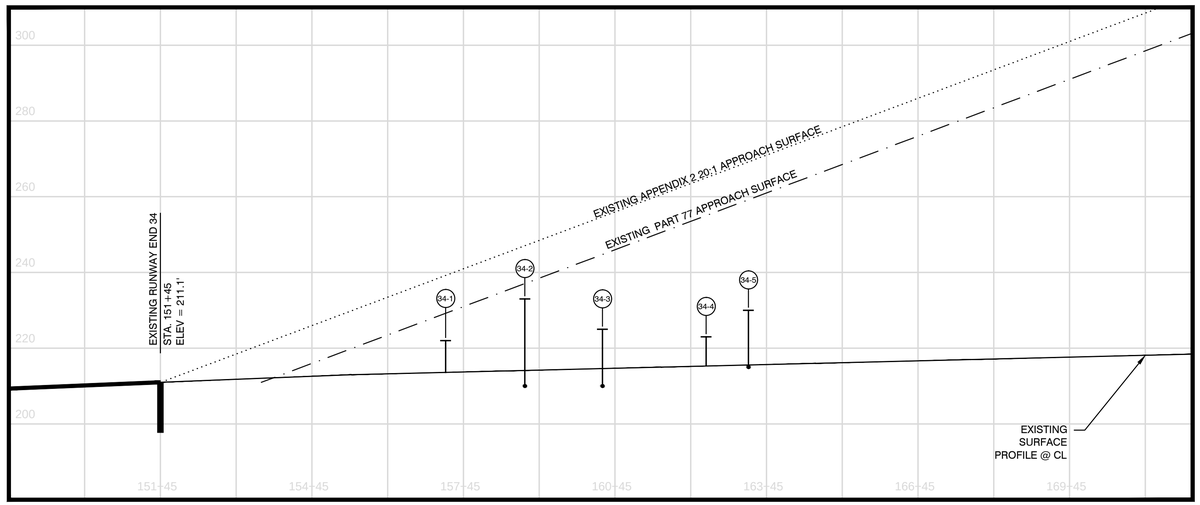
EXISTING RUNWAY END 16 - PLAN



EXISTING RUNWAY END 34 - PLAN



EXISTING RUNWAY END 16 - PROFILE



EXISTING RUNWAY END 34 - PROFILE

EXISTING	LEGEND	FUTURE
	AIRPORT PROPERTY LINE	
	AVIGATION EASEMENT	
	FUTURE PROPERTY OR EASEMENT	
	AIRFIELD PAVEMENT	
	BUILDINGS	
	BUILDING - TO BE REMOVED	
△	RUNWAY END IDENTIFIER LIGHTS (REIL)	
○○○○	THRESHOLD LIGHTS	
RSA	RUNWAY SAFETY AREA (RSA)	
RPZ	RUNWAY PROTECTION ZONE (RPZ)	
ROFA	RUNWAY OBJECT FREE AREA (ROFA)	
RVZ	RUNWAY VISIBILITY ZONE (RVZ)	
BRL	BUILDING RESTRICTION LINE (BRL)	
	NAVAID CRITICAL AREAS	
	FAR PART 77 SURFACE	
	APPENDIX 2 SURFACE	
	FENCE	
	PAVEMENT TO BE REMOVED	

RUNWAY 16 - OBJECTS

OBJ. #	DESCRIPTION	OBJECT ELEVATION	PART 77 APPROACH SURFACE EL.	PEN. OR CLEAR OF PART 77 APPROACH	PEN. OR CLEAR OF APNDX 2 SURFACE	DISPOSITION
16-1	FENCE	203'	202'	1' PENETRATION	CLEAR	NO ACTION
16-2	ROAD*	210'	205'	5' PENETRATION	CLEAR	NO ACTION
16-3	ROAD*	210'	221'	CLEAR 11'	CLEAR	NO ACTION
16-4	FENCE	203'	239'	CLEAR 36'	CLEAR	NO ACTION
16-5	ROAD*	210'	242'	CLEAR 32'	CLEAR	NO ACTION

RUNWAY 34 - OBJECTS

OBJ. #	DESCRIPTION	OBJECT ELEVATION	PART 77 APPROACH SURFACE EL.	PEN. OR CLEAR OF PART 77 APPROACH	PEN. OR CLEAR OF APNDX 2 SURFACE	DISPOSITION
34-1	FENCE	222'	229'	CLEAR 7'	CLEAR	NO ACTION
34-2	RAILROAD	230'	234'	CLEAR 4'	CLEAR	NO ACTION
34-3	ROAD*	225'	245'	CLEAR 20'	CLEAR	NO ACTION
34-4	FENCE	223'	255'	CLEAR 32'	CLEAR	NO ACTION
34-5	ROAD*	230'	259'	CLEAR 29'	CLEAR	NO ACTION

NOTES

- ELEVATION VALUES ARE IN FEET ABOVE MEAN SEA LEVEL (MSL) AND NAD83. OBJECT ELEVATIONS ARE ESTIMATED AND BASED ON TOPOGRAPHIC CONTOURS.

* 15 FEET ADDED TO ROADS, 17 FEET ADDED TO INTERSTATE HIGHWAYS AND 23 FEET TO RAILROADS.

MAGNETIC DECLINATION 16°03'E
TRUE NORTH

AUG. 2011
0°8'W/YR CHANGE

20
0 FEET 40
VERTICAL

150
0 FEET 300
HORIZONTAL

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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

EXISTING RWY 16/34 INNER-APRCH PLAN

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 8 OF 15

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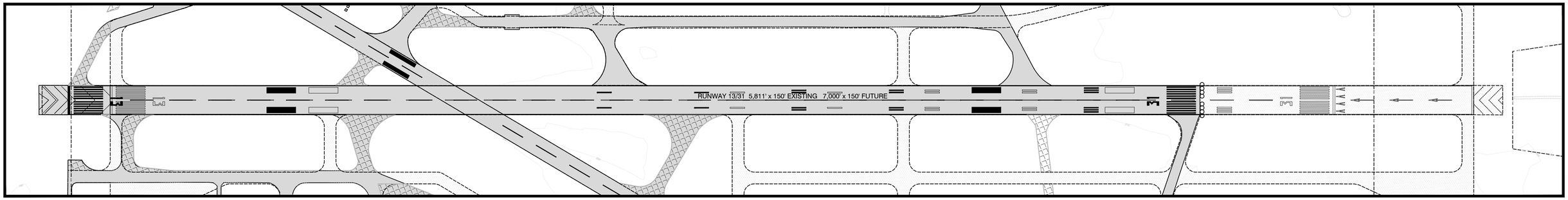
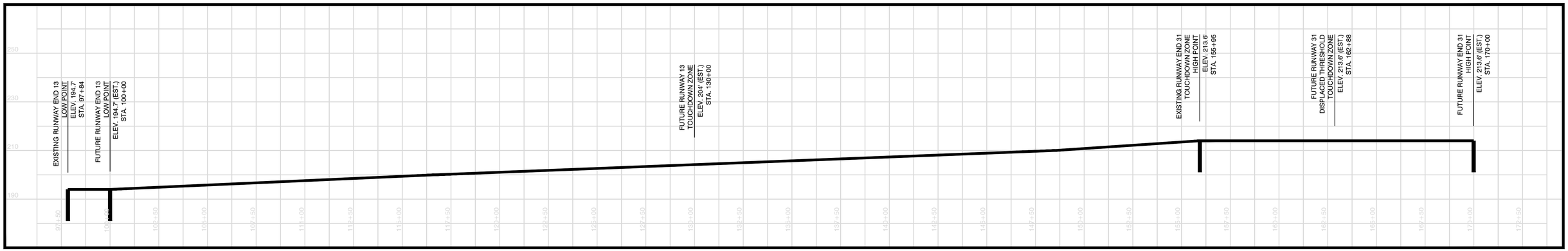


FUTURE RUNWAY 13/31 - PLAN



FUTURE RUNWAY 13/31 - PROFILE

FUTURE RUNWAY 13/31 DECLARED DISTANCES

RUNWAY 31 OPERATIONS

TORA <-- 7,000'

TODA <-- 7,000'

ASDA <-- 7,000'

LDA <-- 6,288'

RUNWAY 13 OPERATIONS

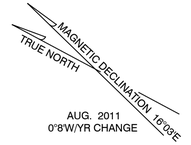
TORA --> 7,000'

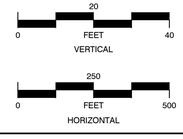
TODA --> 7,000'

ASDA --> 7,000'

LDA --> 7,000'

EXISTING	LEGEND	FUTURE
	AIRPORT PROPERTY LINE	
	AVIGATION EASEMENT	
	FUTURE PROPERTY OR EASEMENT	
	AIRFIELD PAVEMENT	
	BUILDINGS	
	BUILDING - TO BE REMOVED	
△	RUNWAY END IDENTIFIER LIGHTS (REIL)	▲
○○○	THRESHOLD LIGHTS	●●●●
□ □ □ □	PRECISION APPROACH PATH INDICATOR (PAPI)	■ ■ ■ ■
□ □	VISUAL APPROACH SLOPE INDICATOR (VASI)	
	PAVEMENT TO BE REMOVED	





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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

FUTURE RUNWAY 13/31 - PLAN & PROFILE

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 9 OF 15

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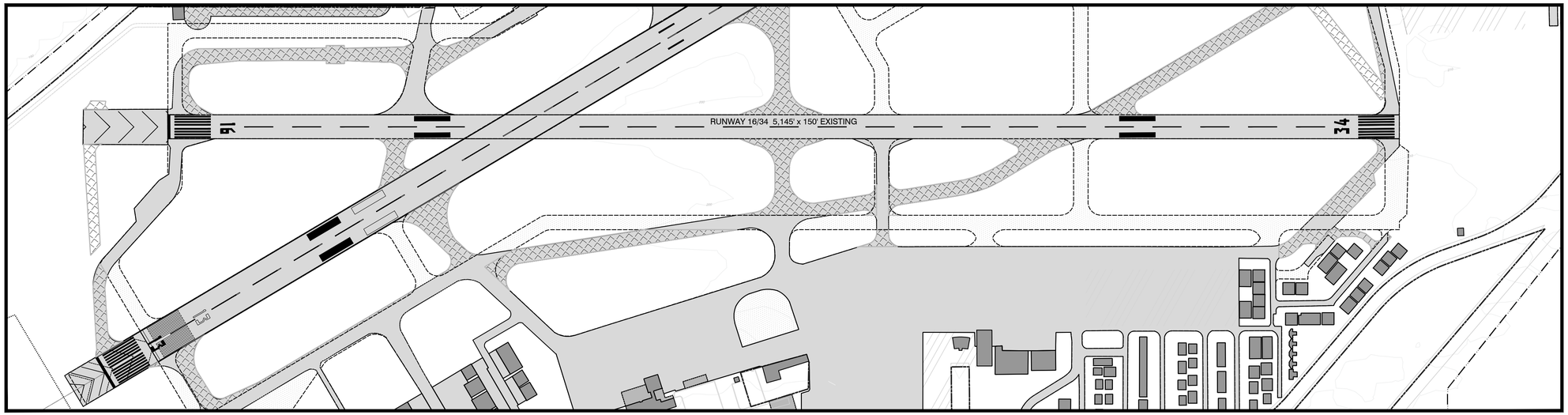
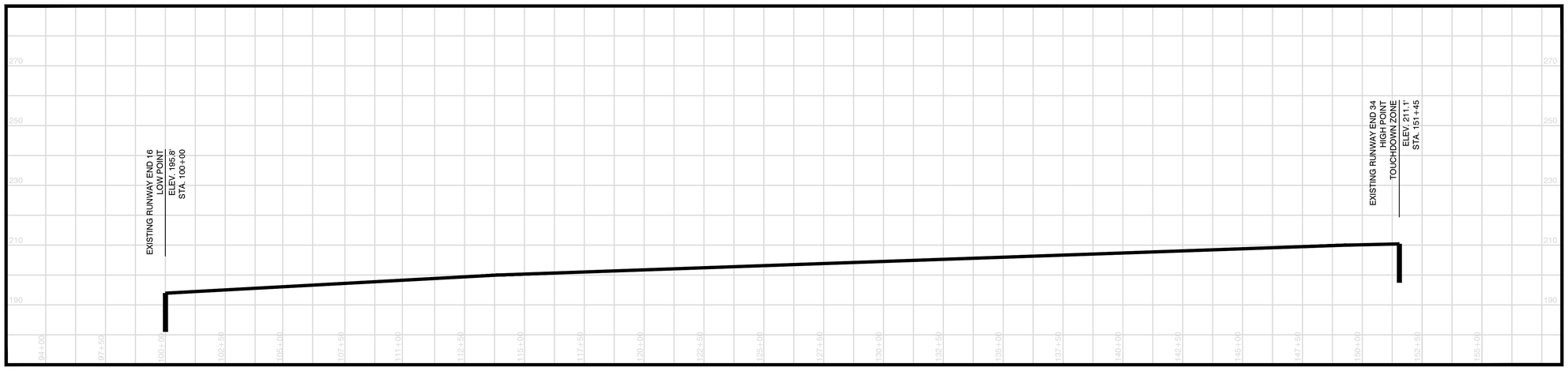


EXISTING/FUTURE RUNWAY 16/34 - PLAN



EXISTING/FUTURE RUNWAY 16/34 - PROFILE

EXISTING	LEGEND	FUTURE
	AIRPORT PROPERTY LINE	
	AVIGATION EASEMENT	
	FUTURE PROPERTY OR EASEMENT	
	AIRFIELD PAVEMENT	
	BUILDINGS	
	BUILDING - TO BE REMOVED	
△	RUNWAY END IDENTIFIER LIGHTS (REIL)	▲
○○○○	THRESHOLD LIGHTS	●●●●
□□□□	PRECISION APPROACH PATH INDICATOR (PAPI)	■■■■
□□	VISUAL APPROACH SLOPE INDICATOR (VASI)	
	PAVEMENT TO BE REMOVED	

MAGNETIC DECLINATION 16°03'E
TRUE NORTH

AUG. 2011
0°8'W/YR CHANGE

20
0 FEET 40
VERTICAL

250
0 FEET 500
HORIZONTAL

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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

EXISTING RUNWAY 16/34 - PLAN & PROFILE

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN:	DRAWN:	DATE:	SHEET
DS/BM/MH	BM	AUGUST 2012	10 OF 15

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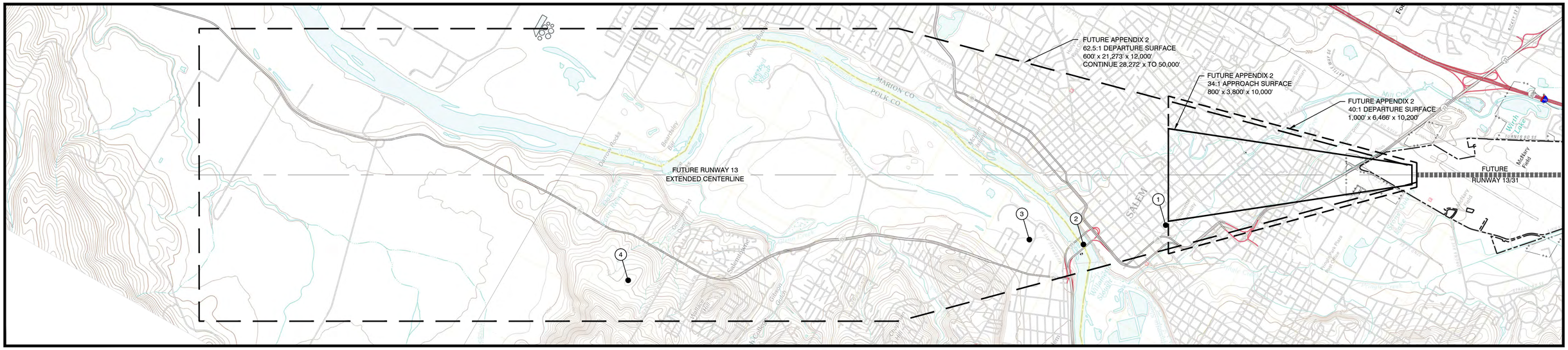
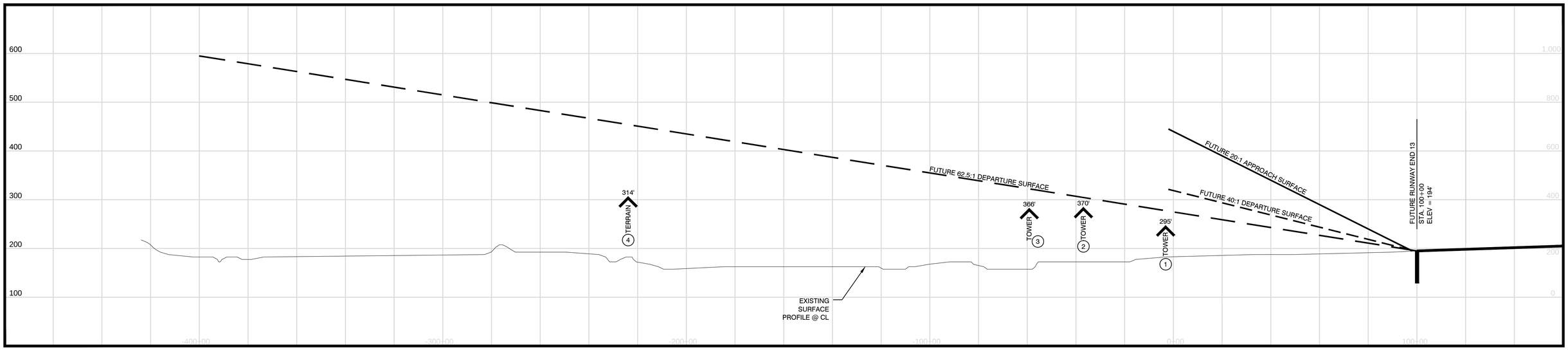


APPENDIX 2 SURFACES - FUTURE RUNWAY 13 - PLAN



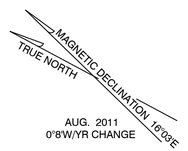
APPENDIX 2 SURFACES - FUTURE RUNWAY 13 - PROFILE

FUTURE RUNWAY 13 OBJECTS

	OBJECT	ELEVATION	62.5:1 SURFACE
1	TOWER	295'	CLEAR 60'
2	TOWER	370'	CLEAR 39'
3	TOWER	366'	CLEAR 78'
4	TERRAIN	314'	CLEAR 294'

NOTES

- FUTURE RUNWAY END ELEVATIONS ARE ESTIMATES.
- OBJECT ELEVATION DATA SOURCE: FAA ORS DIGITAL OBSTACLE FILE, STATE OF OREGON, DEC. 2010
- BASE MAP SOURCE: U.S.G.S., 7.5 MINUTE QUADRANGLE MAPS.



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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

FUTURE RUNWAY 13 - APNDX. 2 SURFACES

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 11 OF 15

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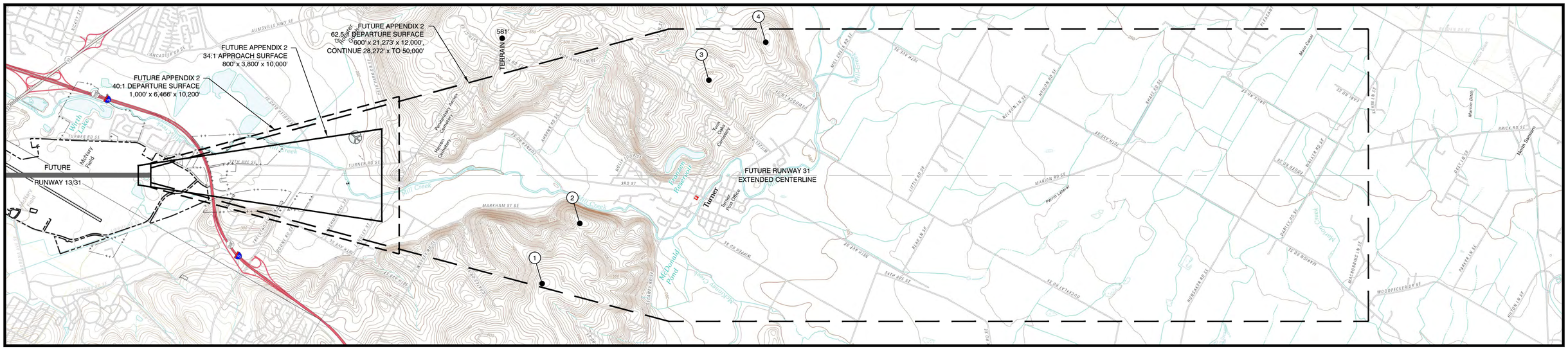
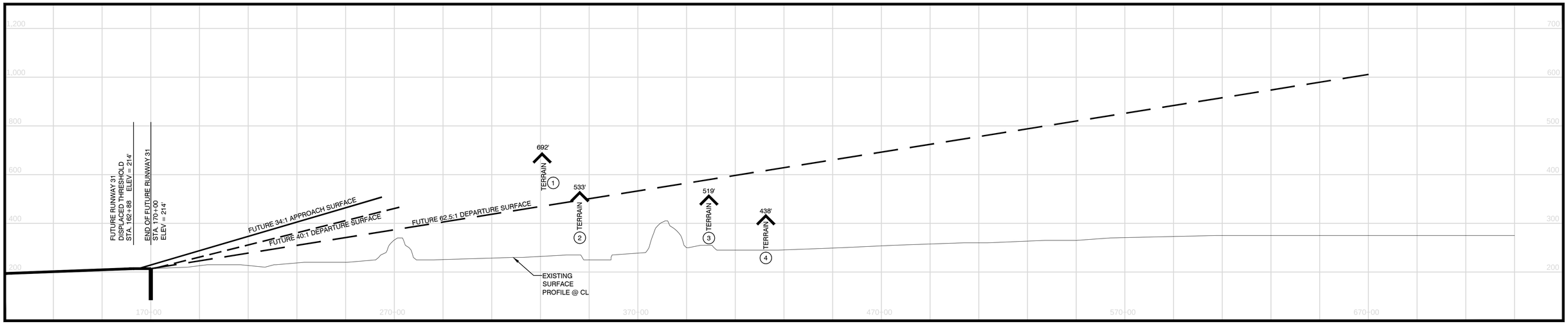


APPENDIX 2 SURFACES - FUTURE RUNWAY 31 - PLAN



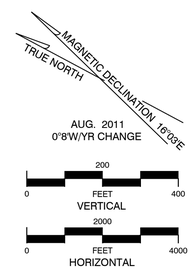
APPENDIX 2 SURFACES - FUTURE RUNWAY 31 - PROFILE

FUTURE RUNWAY 31 OBJECTS

	OBJECT	ELEVATION	62.5:1 SURFACE
1	TERRAIN	692'	PENTR. 220'
2	TERRAIN	533'	PENTR. 38'
3	TERRAIN	519'	CLEAR 60'
4	TERRAIN	438'	CLEAR 178'

NOTES

- FUTURE RUNWAY END ELEVATIONS ARE ESTIMATES.
- OBJECT ELEVATION DATA SOURCE: FAA ORS DIGITAL OBSTACLE FILE, STATE OF OREGON, DEC. 2010
- BASE MAP SOURCE: U.S.G.S., 7.5 MINUTE QUADRANGLE MAPS.



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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

FUTURE RUNWAY 31 - APNDX. 2 SURFACES

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 12 OF 15

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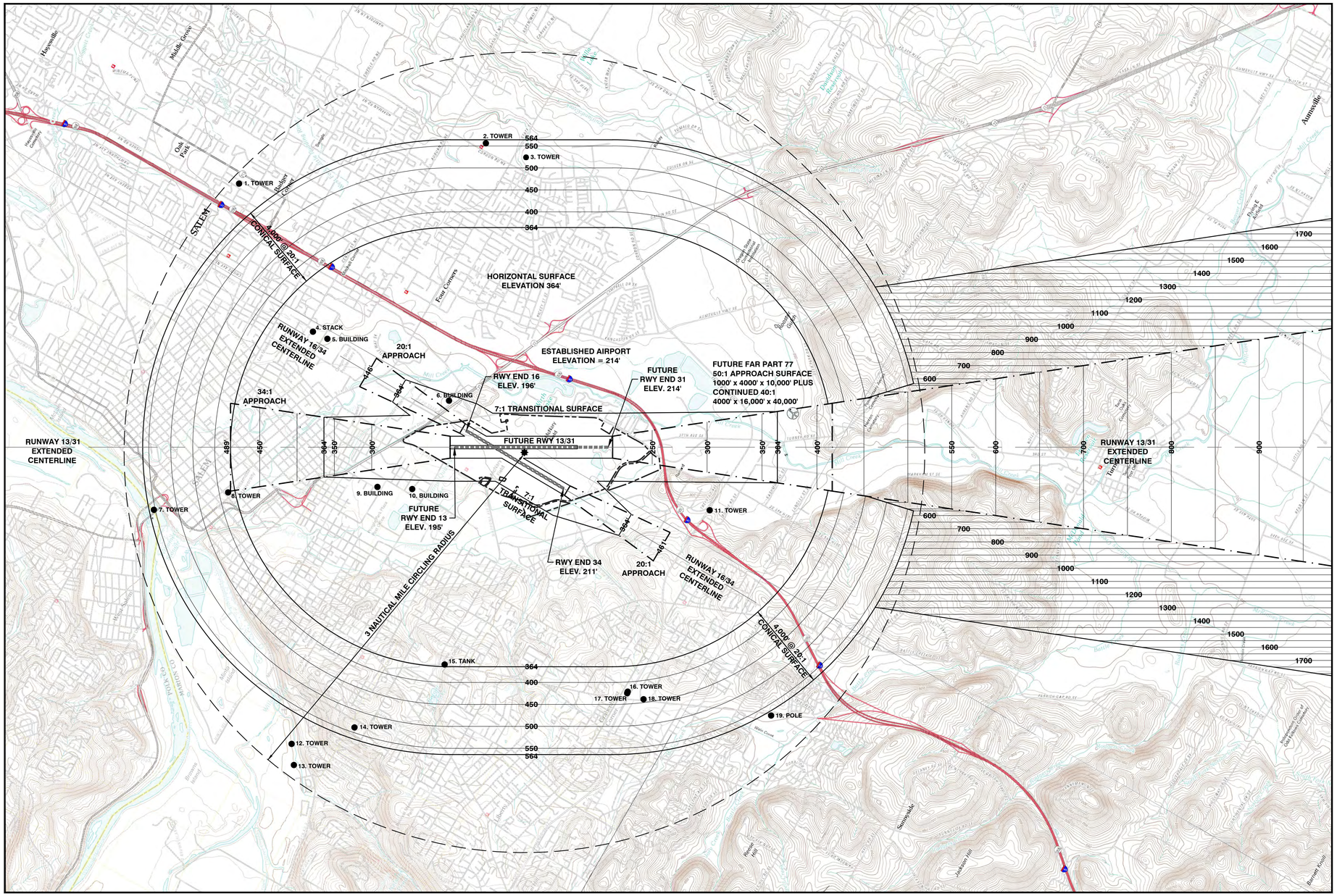

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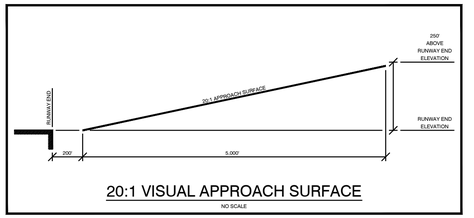
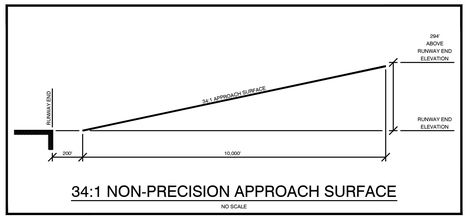


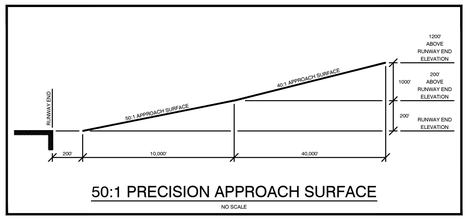
20:1 VISUAL APPROACH SURFACE

NO SCALE



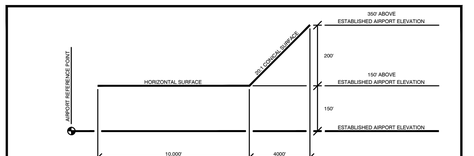
34:1 NON-PRECISION APPROACH SURFACE

NO SCALE



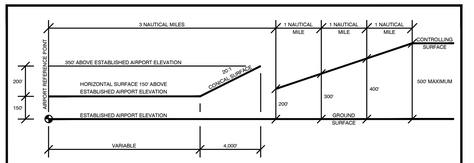
50:1 PRECISION APPROACH SURFACE

NO SCALE



HORIZONTAL AND CONICAL SURFACES

NO SCALE



HORIZONTAL, CONICAL AND CIRCLING SURFACES

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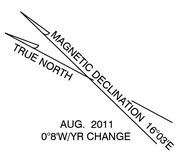

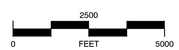

OBSTRUCTION TABLE

PNT. #	DESCRIPTION	ELEVATION (FEET MSL)	AFFECTED PART 77 SURFACE	SURFACE ELEVATION	PEN. OR CLEAR OF SURFACE VALUE	PNT. #	DESCRIPTION	ELEVATION (FEET MSL)	AFFECTED PART 77 SURFACE	SURFACE ELEVATION	PEN. OR CLEAR OF SURFACE VALUE
1	TOWER	376'	NONE	N/A	N/A	11	TOWER	366'	HORIZONTAL	364'	2' PENETRATION
2	TOWER	390'	CONICAL	560'	CLEAR 170'	12	TOWER	313'	NONE	N/A	N/A
3	TOWER	332'	CONICAL	525'	CLEAR 193'	13	TOWER	303'	NONE	N/A	N/A
4	STACK	354'	HORIZONTAL	364'	CLEAR 10'	14	TOWER	696'	CONICAL	536'	160' PENETRATION
5	BUILDING	335'	HORIZONTAL	364'	CLEAR 29'	15	TANK	455'	HORIZONTAL	364'	91' PENETRATION
6	BUILDING	222'	TRANSITIONAL	319'	CLEAR 193'	16	TOWER	563'	CONICAL	423'	140' PENETRATION
7	TOWER (OL)	370'	CONICAL	559'	CLEAR 189'	17	TOWER	556'	CONICAL	424'	132' PENETRATION
8	TOWER	295'	CONICAL	382'	CLEAR 87"	18	TOWER	575'	CONICAL	439'	136' PENETRATION
9	BUILDING	237'	HORIZONTAL	364'	CLEAR 127"	19	POLE	505'	NONE	N/A	N/A
10	BUILDING	213'	HORIZONTAL	364'	CLEAR 151'						

NOTE: (OL) SIGNIFIES STRUCTURE HAS OBSTRUCTION LIGHTING

NOTES

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- BASE MAP SOURCE: U.S.G.S., 7.5 MINUTE QUADRANGLE MAPS.

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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

F.A.R. PART 77 AIRSPACE

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 13 OF 15

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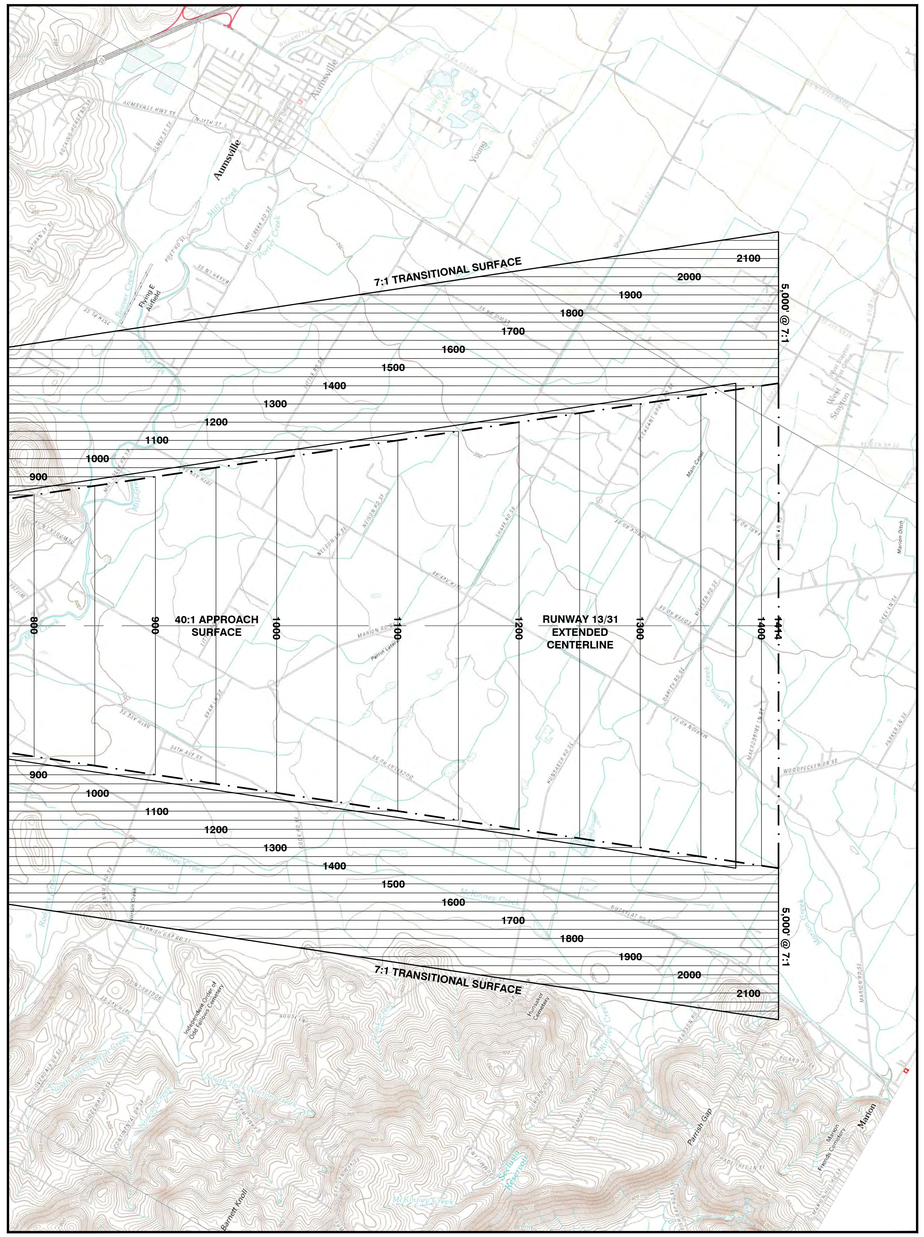

CONTINUED - SEE SHEET 13

NOTES

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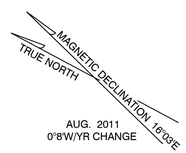
- BASE MAP SOURCE: U.S.G.S., 7.5 MINUTE QUADRANGLE MAPS.



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AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

F.A.R. PART 77 AIRSPACE

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 14 OF 15

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EASEMENTS OWNED BY CITY OF SALEM

PARCEL #	LOT	PREVIOUS OWNER	ACREAGE	INTEREST	AUDITOR FILE NO.	FAA PROJECT NO.	DATE
Parcel 1	Lot 1 Blk 6, New Haven	Donald & Sandra Davidson	0.26	Clear Zone Easement	V652 P633	9-35-035-c912	11/14/63
Parcel 2	Lot 2 Blk 6, New Haven	Arthur & Anne Zahler	0.19	Clear Zone Easement	V652 P645	9-35-035-c912	11/14/63
Parcel 3	Lot 10 Blk 6, New Haven	Delmar & Lynda Fryman	0.21	Clear Zone Easement	V679 P25	9-35-035-c912	8/3/70
Parcel 4	Lot 3 Blk 6, New Haven	Norman & Delores Schnoehelm	0.15	Clear Zone Easement	V681 P895	9-35-035-c912	4/6/70
Parcel 5	Lot 4 Blk 6, New Haven	Robert & Twilla Hamilton	0.15	Clear Zone Easement	V655 P558	9-35-035-c912	10/1/68
Parcel 6a	Portion of Lot 5, Millers Adt.	Orland & Pauline Green	0.55	Clear Zone Easement	Not recorded	9-35-035-c912	1/12/67
Parcel 6b	Portion of Lot 5, Millers Adt.	Williams Bakery	0.82	Clear Zone Easement	V655 P580	9-35-035-c912	10/10/68
Parcel 6b1	Portion of Lot 5, Millers Adt.	Unknown	--	Clear Zone Easement	--	9-35-035-c912	--
Parcel 7	Portion of Lot 5, Millers Adt.	Candalaria Investment Company	1.0	Clear Zone Easement	V642 P181	9-35-035-c912	5/25/68
Parcel 8	Portion of Lot 6, Millers Adt.	Orland & Pauline Green	10.1	Clear Zone Easement	V656 P461	9-35-035-c912	10/28/68
Parcel 9	Portion of Lot 7, Millers Adt.	Robert & Betty Cannon	--	Clear Zone Easement	V655 P565	9-35-035-c912	9/26/68
Parcel 9a	Portion of Lot 7, Millers Adt.	Douglas & Vivian Chambers	--	Clear Zone Easement	V595 P435	9-35-035-c912	10/30/64

EASEMENTS OWNED BY CITY OF SALEM (cont.)

PARCEL #	LOT	PREVIOUS OWNER	ACREAGE	INTEREST	AUDITOR FILE NO.	FAA PROJECT NO.	DATE
Parcel 9b	Portion of Lot 7, Millers Adt.	Robert & Betty Cannon	--	Clear Zone Easement	V656 P108	9-35-035-c912	9/26/68
Parcel 9-1	Portion of Lot 7, Millers Adt.	Unknown	--	Clear Zone Easement	--	9-35-035-c912	--
Parcel 9a-1	Portion of Lot 7, Millers Adt.	Douglas Chambers	--	Clear Zone Easement	--	9-35-035-c912	--
Parcel 9b	Portion of Lot 7, Millers Adt.	Robert & Betty Cannon	--	Clear Zone Easement	V656 P108	9-35-035-c912	--
Parcel 9b-1	Portion of Lot 7, Millers Adt.	Unknown	--	Clear Zone Easement	--	--	--
Parcel 10	Portion of Lot 10, Millers Adt.	T. Tosta & C. Demegossa	--	Clear Zone Easement	V642 P184	9-35-035-c912	11/20/63
Parcel 11	Portion of Lot 10, Millers Adt.	Earl & Ruby Gillaspie	--	Clear Zone Easement	V627 P202	9-35-035-c912	1/20/67
Parcel 11-1	Unknown	--	--	--	--	---	--
Parcel 12	Lot 7 Blk 1, New Haven	George & Janice Cobat	--	Clear Zone Easement	V681 P101	9-35-035-c912	3/31/70
Parcel 13	Lot 6 Blk 1, New Haven	Ronald & Sharon Smith	--	Clear Zone Easement	V655 P570	9-35-035-c912	10/3/68
Parcel 14	Lot 5 & Portion of 2, Blk 1, N.H.	Maria McWhirter	--	Clear Zone Easement	V693 P107	9-35-035-c912	10/15/70
Parcel 15	Portion of Lot 1, Blk 2, New Haven	William & Evelyn Fox	--	Clear Zone Easement	Signed, not recorded	9-35-035-c912	12/16/63
Parcel 16	Lot 4 & Portion of 2, Blk 1, N.H.	David & Patricia Frye	--	Clear Zone Easement	V652 P648	9-35-035-c912	8/28/68
Parcel 16-1	See Limits Above	Staats Corporation	41.44	Avigation & Trans. Zone Esmt.	R152 P300	6-41-0055-06	12-11-78
Parcel 17	Portion of Lot 1, Blk 1, N.H.	Albert & L. Ahlman	--	Clear Zone Easement	V667 P398	9-35-035-c912	5/28/69
Parcel 18	Lot 8 Blk 1, New Haven	Albert & L. Ahlman	--	Clear Zone Easement	V667 P398	9-35-035-c912	5/28/69
Parcel 19	Portion of Lot 9, Blk 6, N.H.	Joe & Joyce Schumaker	--	Clear Zone Easement	V652 P653	9-35-035-c912	8/28/68
Parcel 20	Portion of Lot 1,2,3 Simpsons Add. H	Sanitary Service Company	--	Clear Zone Easement	V642 P265	9-35-035-c912	1/25/68
Parcel 21	Lot 3 & Portion of 2, Blk 1, N.H.	B.L. & Alma Dent	--	Clear Zone Easement	V652 P658	9-35-035-c912	8/28/68
Parcel 22	Portion of Lot 1,2,3 Simpsons Add. H	Glen & Margaret Stevenson	--	Clear Zone Easement	V642 P196	9-35-035-c912	1/25/68
Parcel 23	Portion of Lot 2,3,4,5,6 Simpsons Add.	Merritt Truax, Inc.	--	Clear Zone Easement	V642 P193	9-35-035-c912	1/25/68
Parcel 24	Portion of Lot 10, Millers Adt.	Curly's Dairy, Inc.	--	Clear Zone Easement	V681 P519	9-35-035-c912	8/8/70
Parcel 26	Portion of Lot 5, Blk 6, N.H.	Alfred & Mildred Jones	--	Clear Zone Easement	V667 P404	9-35-035-c912	11/16/63
Parcel 28	Lots 4,5,6,7,8,9,10,11,12,13 Simpsons Add. H	Candalaria Investment Company	--	Clear Zone Easement	V655 P560	9-35-035-c912	9/9/68
Parcel 30	Lot 8 & Portion of 1, Blk 2, N.H.	Orland & Pauline Green	--	Clear Zone Easement	V626 P758	9-35-035-c912	1/12/67
Parcel 30FL	Portion of Lot 1, Blk 2, New Haven	William & Barbara Reid	--	Clear Zone Easement	V667 P393	9-35-035-c912	5/28/69
Parcel 31	Lots 4,5 Blk 3, Simpsons Add.	James & Dorthy Green	--	Clear Zone Easement	V656 P615	9-35-035-c912	11/14/68
Parcel 32	Lot 1, Portion of Lot 2 Blk 4, Simpsons Add.	Cris Seely	--	Clear Zone Easement	V656 P160	9-35-035-c912	10/18/68
Parcel 33	Lot 6 Blk 4, Simpsons Add.	Ronald & Madge Jones	--	Clear Zone Easement	V657 P752	9-35-035-c912	10/17/68
Parcel 34	Lot 8 Blk 4, Simpsons Add.	Harold & Sharon Hansen	--	Clear Zone Easement	V656 P621	9-35-035-c912	10/19/68
Parcel 35	Lot 9 Blk 4, Simpsons Add.	Ronald & Dorene Schuster	--	Clear Zone Easement	V656 P611	9-35-035-c912	10/3/68
Parcel 36	Lot 10 Blk 4, Simpsons Add.	Zona E. Frank	--	Clear Zone Easement	V656 P626	9-35-035-c912	10/26/68
Parcel SE-1	See above for Approx. Limits	Harry & Maude Behymer	--	Clear Zone Easement	V658 P683	9-35-035-c508	5/26/67
Parcel SE-2	See above for Approx. Limits	Carroll & Evelyn Robinson	4.1	Clear Zone Easement	V678 P724	9-35-035-c912	2/11/70
Parcel SE-3	See above for Approx. Limits	Skulason Finance Company	--	Clear Zone Easement	Court No. 66752	660.81	2/19/64
ODOT-1	See above for Approx. Limits	State of Oregon	--	Clear Zone Easement	v745 p281	---	1/23/73
Parcel 31-1	See above for Approx. Limits	John B. Trelstad	--	Avigation & Trans. Zone Esmt.	V751 P33	---	5/2/73
Parcel 31-2	See above for Approx. Limits	Harvey & Barbara Crawley	6.07	Avigation Easement for Approach	Reel 5 P1191	---	12/17/74
Parcel 31-3	Lots 8,9,10 Dragers Subdivision	Mellody & Stella Harmon	--	Avigation & Trans. Zone Esmt.	Reel 2 P969	8-41-0055-03	10/11/74
Parcel 31-4	Lots 11,12	John & Elizibeth Beckley	--	Avigation Easement for Approach	Reel 5 P1327	---	11/27/74
Parcel 31-5	Unknown	--	--	--	--	---	--
Parcel 31-6	See above for Approx. Limits	William & Marie Meier	--	Avigation & Trans. Zone Esmt.	V758 P267	8-41-0055-03	10/10/74
Parcel 31-7	See above for Approx. Limits	Paul & Muriel Scott	10.16	Clear Zone Easement	V715 P83	---	5/16/73
Parcel 31-8	See above for Approx. Limits	--	73.25	Avigation & Trans. Zone Esmt.	V758 P241	---	8/7/73
Parcel 31-9	See above for Approx. Limits	Janet D. Taylor	3.73	Avigation & Trans. Zone Esmt.	V750 P754	---	1/23/75
Parcel 31-10	See above for Approx. Limits	Susan E. Litchfield	2.90	Avigation & Trans. Zone Esmt.	V750 P758	---	4/30/73
Parcel 13-1	Lot 11, Millers Addition	George Buter	8.85	Avigation & Trans. Zone Esmt.	Court No. 81189	8-41-0055-03	6/28/74
Parcel 13-2	See above for Approx. Limits	Robert & Betty Cannon	3.58	Avigation & Trans. Zone Esmt.	V764 P1515	---	10/16/73
Parcel 16-1	See above for Approx. Limits	M.P. Materials	--	Avigation & Trans. Zone Esmt.	Reel 152 P303	---	12/11/78
Parcel 31-14	See above for Approx. Limits	Harlold & Elsi Wendland	--	Avigation & Trans. Zone Esmt.	Reel 7 P1671	---	12/14/74
Parcel 31-15	See above for Approx. Limits	Rex & Kathleen Morris	--	Avigation Emnt for Approach Zone	Reel 2 P4	---	10/2/74
Parcel 31-16	See above for Approx. Limits	Mount & Lillian Black	--	Avigation & Trans. Zone Esmt.	Reel 2 P476	---	9/16/74
Parcel 34-1	See above for Approx. Limits	Dennis & Kathryn Dejong	--	Avigation Emnt for Approach Zone	V755 P595	8-41-0055-03	6/16/73
Parcel 34-2	See above for Approx. Limits	State of Oregon	--	Avigation & Trans. Zone Esmt.	Reel 146 P113	---	10/6/78
Tract A-17	See above for Approx. Limits	Unknown	--	Liscenses, Permits, & Easements	V381 P583	---	1/7/48
Tract A-18	See above for Approx. Limits	Unknown	--	Liscenses, Permits, & Easements	V381 P583	---	1/7/48
Tract A-19	See above for Approx. Limits	Unknown	--	Liscenses, Permits, & Easements	V381 P583	---	1/7/48
Tract A-20	See above for Approx. Limits	Unknown	--	Liscenses, Permits, & Easements	V381 P583	---	1/7/48
Tract A-21	See above for Approx. Limits	Unknown	--	Liscenses, Permits, & Easements	V381 P583	---	1/7/48
Tract A-23	See above for Approx. Limits	Unknown	--	Liscenses, Permits, & Easements	V381 P583	---	1/7/48
SAP-1	See above for Approx. Limits	State of Oregon	1.077	Easement Deed - Powerline	V294 P328	---	12/10/43
SAW-2	See above for Approx. Limits	State of Oregon	0.403	Easement Deed - Waterline	V294 P330	---	12/10/43

PROPERTY OWNED BY CITY OF SALEM

PARCEL #	GRANTOR	TYPE OF INTEREST	ACREAGE	AUDITOR FILE NO.	DATE	FAA PROJECT NO.	DATE
A	Thomas & Viola Holman	Deeded for $10,000	±60	V203 P190	6/12/29	---	--
B	J.R. & Farris Linn	Deeded for $5,508	36.72	V203 P192	6/12/29	---	--
C	State of Oregon	Deeded for $7,200	120	V203 P193	6/12/29	---	--
D	Alice M. Horold	Deeded for $1,500	10	V196 P379	3/21/28	---	--
E	Roy & Maude Rae	Deeded for $10	31.5	V257 P522	4/10/41	---	--
F	William & Harriet Brown	Deeded for $10	42.7	V257 P545	4/14/41	---	--
G	William & Harriet Brown	Deeded for $20,000	145	V265 P582	12/17/43	---	--
H	William & Nona Clark	Deeded for $14,300	18.9	V421 P233	10/8/52	---	--
I	Donald & Verla Cannon	Court Order $152.5K	72.5	V163 P226	7/10/62	---	--
J	Wm. & Elva Brown	Ordered by Court	--	V407 P414	8/11/49	---	--
A-1	State of Oregon	Quick Claim	33.29	Civil No. 2222	10/11/43	---	--
A-2	J.R. & Farris Linn/Floyd & Helen Tharp	Quick Claim	46.5	Civil No. 2196	10/11/43	---	--
A-3	Steusloff Bros. Inc	Quick Claim	0.58	Civil No. 2223	10/11/43	---	--
A-4	State of Oregon	Quick Claim	54.52	Civil No. 2222	7/10/62	---	--
A-5	Frank Begun	Quick Claim	3.77	V289 P258	9/3/43	---	--
A-11	Barbara A. Gross	Quick Claim	2.32	Civil No. 2207	10/6/43	---	--
A-12	W.H. Haskin, James R. Barnes	Quick Claim	14.93	Civil No. 2210	10/8/43	---	--
A-13	Frank & Annie Shedeck	Quick Claim	9.24	V289 P263	9/4/43	---	--
A-14	Unknown	---	---	---	---	---	--
SE-4	State of Oregon	Deeded for $7,625	54.12	V656 P87	10/8/68	9-35-034-c508	--

PROPERTY RELEASED BY CITY OF SALEM

PARCEL #	GRANTOR	TYPE OF INTEREST	ACREAGE	TRANSFER AUDITOR FILE NO.	DATE	FAA PROJECT NO.	DATE
Tract A-17	Public Interest	Deed	32.48	V381 P 583	12/6/48	---	--
Tract A-18	Public Interest	Deed	0	V381 P 583	12/6/48	---	--
Tract A-19	Public Interest	Deed	36.47	V381 P 584	12/6/48	---	--
Tract A-20	Public Interest	Deed	0.57	V381 P 584	12/6/48	---	--
Tract A-21	Public Interest	Deed	1.02	V381 P 584	12/6/48	---	--
Tract A-22	Public Interest	Deed	1.02	V381 P 584	12/6/48	---	--
Tract A-23	Public Interest	Deed	15.89	V381 P 585	12/6/48	---	--
Tract A-24	Public Interest	Deed	1.36	V381 P 585	12/6/48	---	--
R-1	State of Oregon	Deed	2.0	Reel 435 P293	12/23/85	---	--
R-2	State of Oregon	Deed	12.42	V705 P273	6/23/71	---	--
R-3	United Growers	Deed	41.63	V595 P174	12/30/64	---	--
R-4	State of Oregon	Deed	1.06	V537 P855	9/21/60	---	--
R-5	Marion County	Deed	4.60	V504 P498	8/24/57	---	--

NOTES

- AIRPORT PROPERTY BOUNDARY SOURCE: 1999 EXHIBIT 'A' AND ALP.
- AIRPORT BOUNDARY IS NOT SURVEYED AND IS NOT A LEGAL DESCRIPTION.
- FUTURE RUNWAY PROTECTION ZONES ARE SHOWN ON THE EXHIBIT 'A'.

LEGEND

EXISTING AIRPORT PROPERTY	
PARCEL BOUNDARY	
EXISTING AVIGATION EASEMENT	
FUTURE PROPERTY OR EASEMENT	
PROPERTY RELEASED BY AIRPORT	
FUTURE RUNWAY PROTECTION ZONE	RPZ

MAGNETIC DECLINATION 16°03'E
TRUE NORTH

AUG. 2011
0°8'W/YR CHANGE

600
0 FEET 1,200

1			
2			
3			
4			
5			

AIRPORT LAYOUT PLAN
SALEM AIRPORT - MCNARY FIELD
SALEM, OREGON

EXHIBIT 'A' - AIRPORT PROPERTY MAP

Mead & Hunt

CITY OF Salem AT YOUR SERVICE

DESIGN: DS/BM/MH	DRAWN: BM	DATE: AUGUST 2012	SHEET 15 OF 15

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.

C:\Users\1134bjm\appdata\local\temp\AcPublish_6040\S-SALEM-015-Exhibit A Property Map.dwg Jul 30, 2012 - 10:58am

Appendix C
Wetland Review

Prepared by Vigil-Agrimis, Inc.
December 2010

VIGIL AGRIMIS
design professionals

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MEMORANDUM

TO: Kevin Mulcaster, AICP, Mead & Hunt
FROM: Paul Agrimis, RLA, PE, PWS, Linda Mark, RG, and Mike Yun, Vigil-Agrimis, Inc.
DATE: December 16, 2010

SUBJECT: Salem Airport – McNary Field Wetland Review

INTRODUCTION

The purpose of this memo is to provide a summary of our initial wetland review for the Salem Airport-McNary Field project. The Salem Airport-McNary Field is located immediately south of Highway 22 and 0.8 miles west of Interstate 5. Vigil-Agrimis, Inc. (VAI) staff performed a brief wetland review of the 277 acre focus area, consisting of the northwest focus area (57 acres) and southeast focus area (220 acres), by using a combination of existing data (climate, aerial photography, FEMA floodplain mapping, NWI wetlands mapping, LWI Wetlands Mapping, NRCS soils mapping, site topography, and a previous wetland determination) and a one-day on-site visit (**Figure 1**).

EXISTING DATA REVIEW

Climate Data

The climate in this area is characterized by mild, wet winters, and warm, dry summers. Historic precipitation information is available from the WETS Station at the Salem Airport (**Appendix A**). Based on this station record (1971-2000), the growing season typically lasts from March through early November. Year-to-date precipitation during the three full months prior to the field visit was 7.49 inches; average precipitation during these months is 5.14 inches, yielding precipitation that was 2.35 inches above average for this time period. Precipitation during three months prior to the field visit was above the "30-percent Chance More Than" values for monthly precipitation in the WETS table. Precipitation-to-date for the month of November prior to the site visit on November 10 was above average, with 2.13 inches of precipitation, compared with an average of 1.66 inches for that time period. There was 0.66 inches of precipitation the day prior to the field visit, but there was no precipitation during the November 10, 2010 field visit. **Table 1** summarizes precipitation prior to the field visit.

Table 1. Summary of Precipitation Three Months Prior to the Wetland Review: Salem Airport, Oregon

Category	Recorded Precipitation Prior to Delineation (inches)	WETS Station Data Average Precipitation (inches)
August 2010	0.20	0.68
September 2010	2.07	1.43
October 2010	5.22	3.03
November precipitation prior to November 10, 2010 fieldwork	2.13	1.66

Source: Weather Underground (2010) and WETS Station Data (Appendix A)

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FEMA Floodplain Mapping

The FEMA 100-year floodplain of the Willamette River extends onto the Airport site (**Figure 1**). The edge of the Airport is approximately a quarter of a mile from Mill Creek to the east. Historically, many portions of the Willamette River floodplain may have been wetlands, but the Willamette River floodplain has undergone considerable alteration since the arrival of settlers in the 1800s, including alterations to increase agricultural productivity, expand urban areas, and control flooding by constructing dams. Overall, areas within the Willamette River floodplain are thought to have a higher likelihood of being wetlands than non-floodplain areas.

Soils

Soils in the study area are illustrated in **Figure 1**. The four soils present in the study area are Clackamas gravelly loam (Ck; contains hydric inclusions), Courtney gravelly silty clay loam (Cu; hydric), Sifton gravelly loam (St), and Pits. These soils are listed and described in **Table 2**.

Soils in the study area have been substantially altered from the condition described in the Soil Survey. The airport was officially dedicated in 1929 with approximately 200 acres of land. Later, in 1942, the Air Force leased the airport from the City of Salem. Currently, the airport is 751 acres and serves general aviation and the Oregon Army National Guard. During the course of the airport's history, grading and filling has occurred on the site in order to develop and maintain the airfield. These activities may have filled and/or drained some wetlands that may have previously existed on the site. These fill/grading disturbances complicate wetland delineations by altering the relationship between hydrology and consequent hydric signatures in soils. When wetland delineations are performed in the future, these alterations will have to be taken into account and the proper protocols for disturbed sites will need to be followed.

Table 2. Soils Mapped by NRCS within the Study Area

Soil Phase (Map Unit)	Hydric/Hydric Components?*	Location of Mapped Occurrence
Clackamas gravelly loam (Ck)	No/Yes, Courtney Component, terraces, 2B3, 3	Clackamas gravelly loam (Ck) is the primary soil unit mapped within the study area. It underlies most of the runway area, especially in the northern half of the airport.
Courtney gravelly silty clay loam (Cu)	Yes, terraces, 2B3, 3	Courtney gravelly silty clay loam (Cu) is more prevalent in the southern portion of the airport, where it interfingers with Ck, St, and PITS, although areas of it exist in the northern portion of the airport as well.
Sifton gravelly loam (St)	No/No	Sifton gravelly loam (St) exists in scattered small to mid-size areas of the southern airport, as well as one small area of the far northern airport.
Pits (PITS)	No	Pits exist in one area of the southern portion of the airport where considerable disturbance has occurred. On the NWI map, the Pits area is mapped as being a freshwater pond.

*As determined by the US Department of Agriculture, Natural Resource Conservation Service, http://www.or.nrcs.usda.gov/pnw_soil/or_data.html, last accessed December 13, 2010.

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Aerial Photographs

Vigil-Agrimis, Inc. obtained a digital color aerial photo of the Salem Airport (flown March 5, 2008) from the City of Salem via Mead & Hunt (**Figure 2**). The aerial photograph exhibits areas which appear to be wetter, although these wetter-looking areas don't necessarily line up with low points as indicated by the contour data. These wetter-looking areas deserve special attention in the field when the wetland delineation is performed.

Site Topography

The Salem Airport is quite flat, with a minor slope from southeast to northwest, toward the Willamette River (**Figures 1 and 2**). Elevations in the southeast focus area range from a high of 224 feet on a man-made hill to a low of 196 feet, based on two foot contour data from the City of Salem (2010). Within the northwest focus area, elevations range from a high of 190 feet to a low of 182 feet. Airport grading activities have undoubtedly changed some of the native topography by filling some depressions, trimming some raised features, creating spoil piles, and importing fill.

Previous Wetland Investigations

NWI Mapping

Existing NWI mapping (**Figure 1**) does not show any wetlands within the northeast focus area. In the southeast focus area, NWI mapping shows a series of five small freshwater emergent wetlands, one freshwater forested/shrub wetland, and one freshwater pond. During our field visit, we noted standing water (puddles), hydrophytic vegetation, and saturated soils in some of these areas, indicating a high likelihood of wetlands in these particular areas. Some of the NWI-mapped wetlands are in areas which are highly disturbed; therefore, caution will need to be employed when delineating these areas as natural soil profiles, hydrology indicators, and plant life have been altered.

LWI Mapping

A Local Wetland Inventory was completed for the Salem-Keizer area in 1999 (Schott and Lorenz, 1999). Field work was performed between August 1996 and April 1997, with most field work occurring between December 1996 and April 1997. Local Wetland Inventories do not provide accurate wetland boundaries, and do not include all wetlands under 0.5 acres, although they are a good planning tool. Wetland delineations are required for any development which may impact possible wetlands.

A close-up view of the LWI map for Salem Airport – McNary Field is located in **Figure 3** (Schott and Lorenz, 1999). The LWI found eight isolated wetlands in the southeastern portion of the Airport property; six of these wetlands appear to be within our southeast focus area. The LWI did not find any wetlands within our northwest focus area.

We did not obtain the LWI until after our field review, so we did not specifically look at areas mapped as wetlands in the LWI, except for those which generally overlap with the NWI wetlands.

Previous Wetland Determination

Fishman Environmental Services (1996) performed a Wetland Determination for three select areas of the Salem Airport in July 1996. This Wetland Determination was not submitted to the Agencies for confirmation. Their "Area 1" partially overlaps with our southeast focus area. Fishman Environmental

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Services staff found evidence of seven wetlands, including ditches, within the portion of the southeast focus area that was included within their Area 1 (see attached report in **Appendix B**). These included an excavated ditch, four small emergent wetland areas, and two forested wetland areas. Fishman Environmental Services (1996) indicated that one of the forested wetland areas (their Plot 7) and one of the small emergent wetland areas (their Plot 6) provided the most valuable habitat (least disturbed and most diverse habitat for wildlife); they found the other wetland areas to provide little habitat value due to clearing of vegetation and routine mowing. The area covered by their Wetland Determination did not cover our northeast focus area.

BRIEF FIELD REVIEW

Vigil-Agrimis, Inc. staff (Paul Agrimis, Linda Mark, and Mike Yun) performed a brief field review on November 10, 2010.

Rainy weather preceded our site visit, and there were many areas with standing water (puddles) on the site. In some areas soils were obviously saturated within the upper 12 inches, indicating the presence of wetland hydrology.

Based on limited soil probing and dug pits, soils varied from loamy soils to rounded gravels with detritus (trash) present in the soil profile indicating fill soils. The soils and hydrology on the site appear to be highly disturbed, with some obvious fill materials and some ongoing grading activities. Some of the coarse soils precluded the use of a soil probe and made digging of soil pits time consuming. Potential hydric indicators may be masked by site disturbance and the coarse substrate texture, which makes wetland identification by the Triple Parameter method more time consuming. Site vegetation disturbance is considerable due to airport mowing activities. There are many weedy plant species on the airport site in addition to native upland and wetland vegetation. A sampling of vegetation observed during our brief field review, along with its wetland indicator status, follows:

Observed wetland vegetation included (but is not limited to):

- needle spikerush (*Eleocharis acicularis* – OBL)
- bristly dog's-tail grass (*Cynosurus echinatus* – OBL)
- reed canarygrass (*Phalaris arundinacea* – FACW)
- spreading rush (*Juncus patens* – FACW)
- greensheathed sedge (*Carex feta* – FACW)
- soft rush (*Juncus effuses* – FACW)
- sedge spp. (*Carex* spp. – typically, but not always, a wetland plant)

Observed vegetation that is commonly seen in both wetlands and uplands included (but is not limited to):

- tall fescue (*Festuca arundinacea* – FAC-)
- clustered wild rose (*Rosa pisocarpa* – FAC)
- Nelson's checker-mallow (*Sidalcea nelsonian* – FAC)
- teasel (*Dipsacus sylvestris* – FAC)

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Observed vegetation that typically grows in uplands included (but is not limited to):

- Queen Anne's lace (*Daucus carota* – UPL)
- common plantain (Plantago major – FACU+)
- baldhip rose (*Rosa gymnocarpa* – FACU)
- red clover (*Trifolium pratense* – FACU)
- Dewey's sedge (*Carex deweyana* – FACU)

In addition, a number of ditches are present on the airport property. Determining whether the ditches are jurisdictional is outside the scope of this brief wetland review; however, a wetland delineation would delineate any ditches that are jurisdictional features.

SUMMARY

We expect that a full wetland delineation would find multiple jurisdictional wetlands within the 277 acre focus area of the Salem Airport. This expectation is based on a combination of our reviews of existing documentation, including: climate data, aerial photography, FEMA floodplain mapping, NWI wetlands mapping, LWI wetlands mapping, a previous wetland determination, NRCS soils mapping, and site topography, combined with our brief one-day field review. We expect that multiple wetlands would be found within the southeast focus area, and there is the possibility of mosaic wetlands in the southeast focus area. There is a lesser likelihood of wetlands in the northwest focus area, with the possible exception of areas near existing ditches. We recommend that a wetland delineation be performed for all areas that might be potentially impacted by the proposed project. By knowing the location of all wetlands, wetland impacts can be potentially avoided, or reduced, if avoidance is not practicable.

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FIGURES

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Figure 1. Salem Airport Wetland Review - Soils, NWI, FEMA Floodplain, and Contours

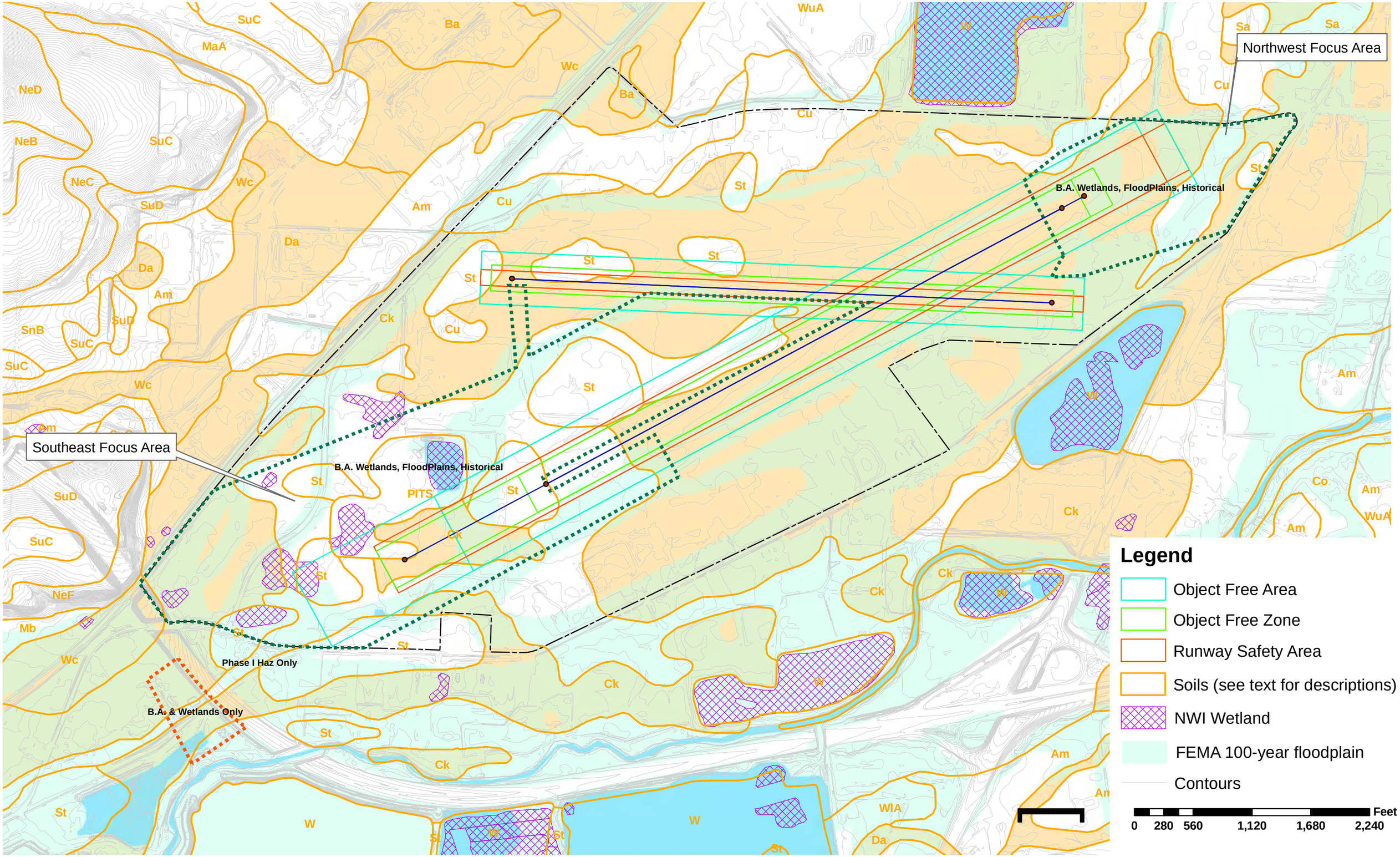


Figure 2. Salem Airport Wetland Review - Aerial Photo

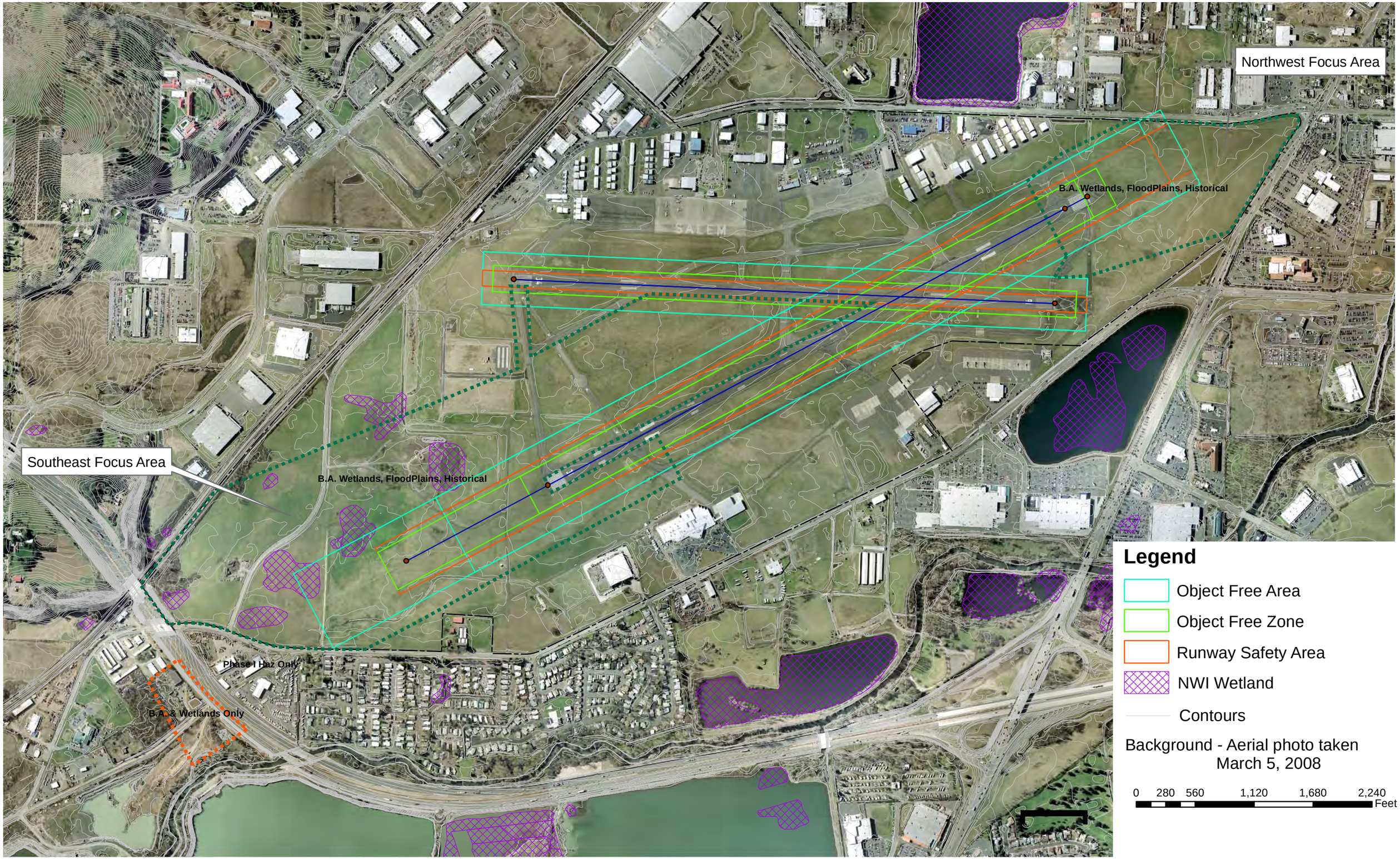
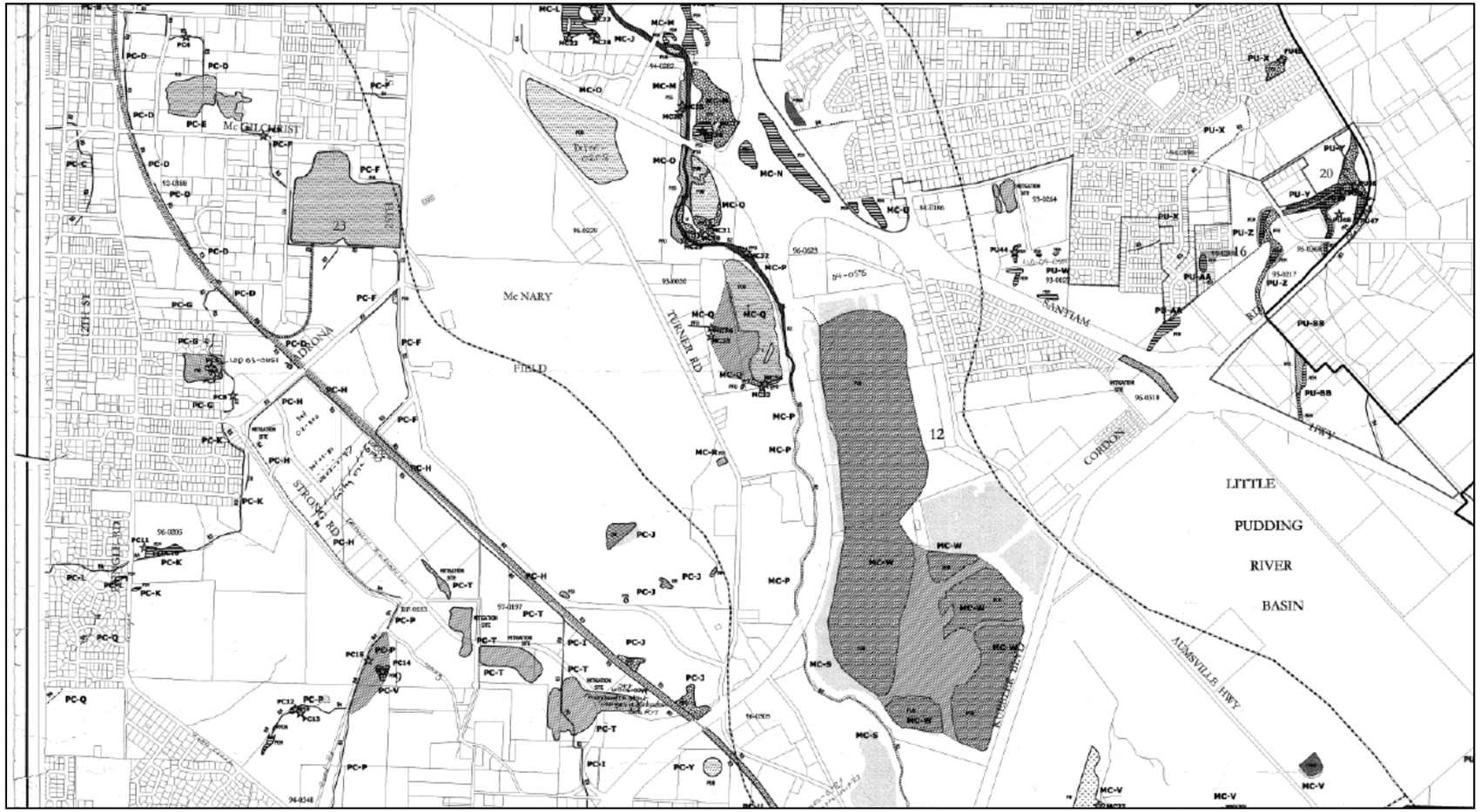


Figure 3. Close-up of LWI map (from Schott and Lorenz, 1999)



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APPENDIX A

WETS Table for Salem Airport

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WETS Station : SALEM WSO AIRPORT, OR7500 Creation Date: 09/09/2002
Latitude: 4455 Longitude: 12300 Elevation: 00200
State FIPS/County(FIPS): 41047 County Name: Marion
Start yr. - 1971 End yr. - 2000

	Temperature (Degrees F.)			Precipitation (Inches)				
					30% chance will have		avg # of days w/.1 or more	avg total snow fall
Month	avg daily max	avg daily min	avg	avg	less than	more than		
January	47.1	33.7	40.4	6.02	4.25	7.14	12	1.3
February	51.3	34.7	43.0	5.09	3.35	6.11	11	2.1
March	56.2	36.6	46.4	4.17	3.02	4.92	11	0.1
April	61.1	38.8	50.0	2.76	1.88	3.29	8	0.0
May	67.5	43.6	55.5	2.13	1.27	2.58	6	0.0
June	74.0	48.4	61.2	1.45	0.88	1.76	3	0.0
July	81.5	52.0	66.8	0.57	0.15	0.68	1	0.0
August	81.9	52.1	67.0	0.68	0.15	0.83	2	0.0
September	76.6	47.7	62.2	1.43	0.50	1.75	3	0.0
October	64.5	41.3	52.9	3.03	1.61	3.70	6	0.0
November	52.4	37.9	45.1	6.39	4.26	7.65	12	0.4
December	46.4	33.9	40.1	6.46	4.40	7.71	12	2.0
Annual	-----	-----	-----	------	34.90	44.12	--	----
Average	63.4	41.7	52.6	------	------	------	--	----
Total	-----	-----	-----	40.18	------	------	87	6.0

GROWING SEASON DATES

	Temperature		
Probability	24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *	2/17 to 11/30 287 days	3/24 to 11/ 8 229 days	4/27 to 10/17 173 days
70 percent *	2/ 7 to 12/10 307 days	3/14 to 11/19 250 days	4/21 to 10/23 185 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

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total 1928-2002 prcp

Station : OR7500, SALEM WSO AIRPORT
------- Unit = inches

yr	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	annl
28	4.83	1.29	8.00	5.21	0.45	0.85	0.05	0.00	0.78	1.78	7.15	7.64	38.03
29	2.50	1.28	2.51	4.09	1.10	1.71	0.00	0.05	0.27	1.17	0.63	11.09	26.40
30	3.98	6.43	1.93	3.95	1.75	0.99	0.01	0.01	2.03	1.92	3.75	3.30	30.05
31	6.77	3.46	6.49	3.38	0.78	3.35	0.00	0.00	1.59	4.48	7.38	10.98	48.66
32	6.08	2.00	6.06	3.38	3.06	0.22	0.65	0.54	0.01	4.33	7.96	7.77	42.06
33	9.26	4.38	5.89	0.48	4.61	1.58	0.00	0.37	2.99	3.83	1.63	17.54	52.56
34	6.40	1.59	3.89	2.33	1.35	0.34	0.30	0.27	0.43	3.64	9.49	9.38	39.41
35	4.39	4.00	6.20	1.87	0.41	0.36	0.39	0.53	1.20	3.30	2.26	5.99	30.90
36	10.22	5.57	3.13	1.13	3.41	1.11	0.49	0.00	1.49	0.21	0.48	6.37	33.61
37	6.17	10.36	3.19	7.68	1.60	4.61	0.13	0.71	0.91	3.41	11.13	13.60	63.50
38	4.48	7.60	8.42	2.27	0.78	0.08	0.36	0.06	1.38	3.68	4.26	5.18	38.55
39	6.00	5.08	2.65	0.39	0.90	0.98	0.47	1.04	0.38	2.63	0.84	10.32	31.68
40	4.75	11.66	5.94	1.99	2.17	0.07	0.62	0.00	2.36	3.79	4.55	5.03	42.93
41	4.25	1.43	1.95	1.80	3.83	0.49	0.03	1.33	2.37	2.87	5.36	8.43	34.14
42	4.79	3.10	1.27	1.74	4.58	1.69	0.92	0.04	0.01	2.04	13.38	11.70	45.26
43	4.35	4.50	6.71	2.75	1.09	3.38	0.32	2.14	0.06	6.31	2.36	5.17	39.14
44	5.27	3.53	1.64	2.75	0.93	0.50	0.05	0.05	1.97	1.54	4.30	2.67	25.20
45	5.34	5.92	6.67	2.89	4.44	0.32	0.51	0.20	2.46	1.75	10.73	6.25	47.48
46	6.57	5.77	5.82	1.14	1.15	1.28	0.72	0.09	1.89	4.55	8.04	4.45	41.47
47	3.24	3.43	5.29	2.24	0.18	3.60	1.41	0.44	1.01	11.17	3.42	4.11	39.54
48	6.73	6.35	5.01	3.85	4.15	0.38	0.60	0.52	2.60	2.26	7.56	9.14	49.15
49	0.57	12.31	3.06	1.00	2.23	0.97	0.26	0.38	1.37	2.31	5.86	M5.41	35.73
50	11.54	M6.22	M4.59	1.88	1.21	M2.79	0.18	0.35	0.84	10.74	9.67	6.10	56.11
51	9.49	5.43	4.02	0.98	2.49	0.01	0.17	M0.65	3.22	M6.52	6.99	6.73	46.70
52	6.60	4.86	M2.36	1.57	0.20	2.64	0.00	0.00	0.20	0.83	1.73	8.63	29.62
53	15.40	4.87	M4.90	M1.54	3.76	M1.22	0.00	1.65	1.59	M2.45	6.99	7.80	52.17
54	M9.60	5.87	3.02	2.70	1.34	2.47	0.31	0.72	1.28	3.45	5.07	6.26	42.09
55	2.63	2.25	3.66	5.18	1.18	1.09	0.86	0.00	2.30	M7.50	M6.22	M12.15	45.02
56	12.68	5.42	5.91	0.64	1.61	1.20	0.00	0.37	0.87	6.50	1.03	2.94	39.17
57	2.38	4.93	8.16	M1.37	2.77	2.10	0.18	0.27	0.96	2.98	3.31	8.87	38.28
58	8.80	7.04	2.50	3.71	1.38	2.53	0.00	0.03	1.00	2.23	7.18	4.71	41.11
59	11.15	4.98	4.45	1.12	2.09	1.41	0.50	0.02	2.10	1.53	2.06	3.97	35.38
60	4.41	5.41	6.99	3.50	3.59	0.47	0.00	0.65	0.65	2.75	9.45	3.24	41.11
61	4.79	10.82	8.19	3.19	2.44	0.30	0.96	0.28	M0.91	3.18	4.42	6.64	46.12
62	1.11	3.97	5.65	3.03	2.11	0.69	0.00	0.70	1.53	4.55	8.54	3.01	34.89
63	2.80	3.34	6.51	4.07	3.70	0.85	0.91	0.09	1.41	3.59	6.52	3.85	37.64
64	11.19	0.78	3.55	1.28	0.59	1.73	0.45	0.41	0.74	0.93	8.44	12.40	42.49
65	8.15	1.57	0.87	2.41	1.16	1.11	0.19	0.99	0.13	2.20	7.00	7.95	33.73
66	6.60	2.24	6.08	1.07	0.78	0.58	0.53	0.40	1.66	2.06	5.88	7.32	35.20
67	7.29	2.06	3.84	2.02	1.87	0.69	0.00	0.00	0.84	5.08	3.30	5.45	32.44
68	6.37	7.73	3.32	1.47	3.46	1.29	0.39	4.17	2.48	6.14	6.49	11.05	54.36
69	8.61	3.24	1.63	2.51	0.89	2.94	0.05	0.05	3.58	4.44	3.21	9.23	40.38
70	13.47	4.46	1.92	2.63	1.36	0.85	0.01	0.00	1.81	3.25	7.18	9.74	46.68
71	6.49	4.34	6.93	4.05	1.89	2.47	0.01	1.49	3.98	3.09	6.27	8.18	49.19
72	7.98	4.68	4.96	3.79	2.40	0.69	0.12	0.14	2.07	0.70	3.77	8.70	40.00
73	5.64	1.62	3.50	1.69	1.11	1.48	0.00	0.80	2.80	2.79	15.23	11.08	47.74

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yr	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	annl
74	10.89	5.56	7.95	1.48	0.90	0.41	1.80	0.11	0.28	2.15	7.42	6.94	45.89
75	4.96	4.68	4.22	2.20	1.66	0.81	0.51	1.96	0.00	5.51	6.06	6.07	38.64
76	5.47	6.92	3.66	2.00	1.33	1.04	0.67	1.89	1.13	1.51	1.13	1.26	28.01
77	0.88	2.83	3.33	0.62	3.76	0.73	0.26	1.70	2.36	2.37	6.19	8.73	33.76
78	5.67	3.54	1.23	3.50	2.97	0.48	1.07	2.56	2.64	0.37	4.50	2.64	31.17
79	2.84	7.19	2.17	2.82	2.20	0.65	0.30	0.70	2.19	6.06	3.83	6.95	37.90
80	6.58	4.04	3.48	3.58	1.53	1.99	0.22	0.04	1.05	1.45	5.24	10.44	39.64
81	2.09	3.29	3.45	2.06	2.19	3.33	0.15	0.00	2.78	4.63	7.54	9.73	41.24
82	6.11	6.02	2.81	3.80	0.73	1.36	0.33	0.41	1.83	3.04	4.92	9.26	40.62
83	6.00	10.57	8.56	2.72	2.12	2.48	2.63	2.09	0.32	1.31	10.06	6.49	55.35
84	2.34	5.50	4.40	3.74	3.32	4.19	0.03	0.00	1.19	4.31	12.70	3.71	45.43
85		3.44	3.80	0.93	0.65	2.42	0.32	0.20	1.25	3.17	4.81	2.51	23.50
86	6.25	8.26	2.89	1.30	2.22	0.42	1.23	0.00	3.12	2.71	7.24	3.86	39.50
87	7.67	3.52	3.98	2.36	1.52	0.26	2.51	0.15	0.14	0.47	3.00	10.92	36.50
88	6.78	0.75	3.34	3.56	2.39	1.97	0.03	0.00	0.98	0.12	9.50	3.23	32.65
89	3.57	2.79	6.47	1.06	1.08	1.03	0.77	0.48	1.03	2.50	3.09	3.95	27.82
90	8.51	5.31	2.39	1.67	1.94	1.09	0.47	0.85	0.42	5.63	4.91	2.82	36.01
91	2.42	3.72	5.18	3.84	4.51	1.55	0.11	0.67	0.04	1.70	5.94	3.73	33.41
92	4.76	4.46	0.89	4.35	0.05	1.12	0.50	0.38	0.70	3.52	4.84	7.83	33.40
93	4.77	1.61	5.12	5.64	3.59	3.17	1.05	0.40	0.01	1.11	1.26	6.84	34.57
94	4.28	4.21	2.56	2.16	1.61	1.14	0.00	0.05	1.64	7.96	7.09	4.91	37.61
95	8.63	4.35	4.44	4.41	1.29	1.48	0.36	1.29	1.81	4.07	9.07	7.28	48.48
96	8.26	13.01	3.08	5.72	3.21	0.74	0.90	0.20	1.94	4.78	10.11	15.01	66.96
97	9.07	2.08	7.32	3.41	2.71	1.86	0.36	1.13	3.81	6.45	4.40	3.16	45.76
98	9.06	6.18	4.96	1.63	5.56	0.98	0.10	0.04	0.68	2.52	11.70	8.66	52.07
99	9.61	11.40	5.06	1.35	1.90	1.43	0.15	0.68	0.09	2.44	7.26	5.38	46.75
0	7.05	6.92	2.98	1.29	1.56	0.71	0.09	0.03	0.75	2.40	2.53	3.62	29.93
1	1.81	1.22	2.82	2.49	1.45	1.89	0.24	0.78	0.57	3.35	9.02	8.03	33.67
2													

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APPENDIX B

Previous Wetland Determination

819 SE Morrison Street, Suite 310
Portland, Oregon 97214

FISHMAN ENVIRONMENTAL SERVICES, LLC
LETTER OF TRANSMITTAL

TO: Salem Airport-McNary Field
2990 25th St SE
Salem OR 97302
503-588-6314

DATE: 7.25.2000
FES JOB NUMBER: —
SENT BY: Mail

ATTENTION: Tom Long, Airport Manager
PROJECT:
SUBJECT: Wetland Determination

WE ARE SENDING YOU X attached ____ under separate cover, the following:

ITEM	COPIES	DATE	DESCRIPTION
1	1	7.19.96	Wetland Determinatai Report
2	1	5.22.95	aerial photograph - copy

These are for:
____ your information
____ your approval
____ your files
X per your request
____ your review
____ other

REMARKS: Report was never submitted for confirmation — Due to the age of report (1996) + lack of spring hydrology, the site should be looked at again.
let us know if we can help with this —

Protection of forest area at south is the ~~most~~ highest recommendation. Rest can be filled under permit with little trouble, I presume. (With mitigation, of course).

Copies to: —

Signed: C Mirth Walker
Fishman Environmental Services, LLC

Fishman Environmental Services, LLC
CONSULTANTS IN ECOLOGY AND NATURAL RESOURCE MANAGEMENT

434 NW Sixth Avenue, Suite 304
Portland OR 97209-3600
phone: 503 224 0333
fax: 503 224 1851
www.fishenserv.com

WETLAND DETERMINATION

McNARY FIELD (SALEM) AIRPORT

THREE AREAS

SALEM, OREGON

T8S / R3W / SECTIONS 1, 2 AND 12, MARION COUNTY

Prepared for:

City of Salem
and
Century West Engineering Corporation
825 NE Multnomah, Suite 425
Portland, Oregon 97232

Prepared by:

C. Mirth Walker
Fishman Environmental Services
Consultants in Ecology and Natural Resource Management
434 NW 6th Avenue, Suite 304
Portland, Oregon 97209-3600

July 1996

FES Project 96040

Printed on Recycled Paper (40% pre-consumer, 10% post-consumer)

WETLAND DETERMINATION SUMMARY

SITE NAME: McNary Field (Salem) Airport - three areas

SITE LOCATION: South of Highway 22, east of 25th St. SE and railroad tracks, north of I-5, and west of Turner Road and I-5

CLIENT: David Miller, Century West Engineering, for the City of Salem

DATE OF SITE VISIT: June 5, 1996

PROJECT STAFF: Mark Vlahakis, Soil Scientist
C. Mirth Walker, Wetlands Program Manager

FES PROJECT: 96040

SUMMARY
Fishman Environmental Services conducted a wetlands determination on three areas of the Salem Airport (McNary Field) proposed for runway and commercial development. This wetland determination was prepared to assist site development planning.

Eight wetland areas were identified on the Airport property, including two ditches. Wetlands identified include several small emergent wetland areas, one small potential emergent wetland area, two wetland ditches, an excavated scrub-shrub depressional area, and two forested wetland areas. Approximate wetland boundaries were mapped on an aerial photograph and on the enclosed site map. An existing excavated pond is being filled under permit.

Further information on the site's hydrology, soils and vegetation are in this report and on the wetland determination data sheets included in Appendix A.

1 INTRODUCTION AND BACKGROUND INFORMATION

Fishman Environmental Services (FES) was contracted by Century West Engineering to conduct a wetland determination on three specific areas of the Salem McNary Field Airport (Airport) property.

The subject site is located in T8S, R3W, in Sections 1, 2, and 12, in Marion County, Salem, Oregon (Figure 1). The site is relatively flat in the southern part. Elevation over the entire Airport site ranges from 207 feet in the south to 190 feet in the north (USGS, 1969). The general direction of drainage off the site is to the northwest towards the Willamette River. Mill Creek is to the east of the site and Mission Ditch is to the north of the site. Several quarry ponds are located immediately east and west of the site.

The U.S. Fish and Wildlife Service, as part of the National Wetland Inventory (NWI) program, has mapped several wetlands south of the runways on the subject site on the Salem East, Oregon NWI map (Figure 2). These wetlands include five circular palustrine emergent wetlands with a seasonally flooded or temporarily flooded water regime (PEMC and PEMA); one forested area with a seasonally flooded water regime (PFOC); two scrub shrub wetland ditches with a seasonally flooded water regime (PSSC); and an excavated unconsolidated bottom semipermanently flooded pond (PUBFx). The two ditches on-site have been altered into one ditch along the west property boundary (now hidden by blackberries); the excavated pond is still present and is being filled under a permit issued to the City of Salem Public Works Department (pers. comm. Ray, McNary Field facilities); the forested wetland is present; and several emergent wetlands are present.

The U.S. Soil Conservation Service has mapped Clackamas gravelly loam (map unit Ck), Courtney gravelly silty clay loam (map unit Cu), and Sifton gravelly loam (map unit St) on the subject areas of the site (Figure 3; USDA SCS, 1972). Courtney is listed as an hydric soil. A water area and gravel pit are also mapped on the site.

The subject areas of the site examined in this study are shown in Figure 4; these areas (Area 1, Area 2, and Area 3) were determined by Century West Engineering (Jay Buechler) during discussions with the City of Salem regarding proposed development plans.

2 METHODOLOGY AND SOURCE MATERIAL

The method for delineating wetlands and determining wetland boundaries was based on the routine method of the *Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). The 1987 Manual is used by both the Corps of Engineers and the Oregon Division of State Lands. Soils, vegetation, and indicators of hydrology were observed at 13 sample locations to determine the presence or absence of wetlands. Sample plot locations are shown in Figure 4. Wetland determination data sheets are included in Appendix A.

Wetlands are identified by the presence of hydrophytic (water-tolerant) vegetation, hydric (wet) soils, and wetland hydrology. Reference material used in this study included Reed's *National List of Plant Species that Occur in Wetlands: Northwest (Region 9)*, 1988, and the *1993 Supplement* to this list, where the indicator status of wetland plants are listed. These indicators include:

OBL	Obligate wetland (almost always occur in wetlands)
FACW	Facultative Wetland (usually occur in wetlands)
FAC	Facultative (equally likely to occur in wetlands or non-wetlands)
FACU	Facultative Upland (usually occur in non-wetlands)
UPL, NOL	Upland or Not Listed (almost always occur in non-wetlands)
NI	No Indicator (insufficient information available or plant is widely tolerant)

The three facultative indicator categories (FACW, FAC, FACU) may have, in addition, a positive (+) or negative (-) sign to indicate that the plant is more frequently (+) or less frequently (-) found in wetlands within the region.

Soils are examined for color and texture (sand, silt, clay, muck, peat, etc.) characteristics in the field in sample plots approximately 16 inches in depth. Colors are described with standardized color chips of hue, value, and chroma (*Munsell Soil Color Charts*, Kollmorgen Corporation, 1990 revised edition).

Hydrology is observed either directly in the field during the growing season by noting inundation or soil saturation, usually within 12 inches of the surface, or inferred from field indicators, such as water marks, drift lines, water-borne sediment deposits, drainage patterns, water-stained leaves, plant morphological adaptations, live oxidized rhizospheres, or through the use of off-site mapping techniques, such as documenting ponding, saturated soils, or vegetation stressed by wetness in aerial photographs.

The growing season is defined as that part of the year when soil temperatures at 19.7 inches below the soil surface are higher than biologic zero (5 °C or 41 °F); the growing season can be approximated by the period of time between the average dates of the first killing frost to the last killing frost, which represents a temperature threshold of 28 °F or lower at a frequency of 5 years in 10. The Marion County Area Soil Survey defines the growing season for the floor of the Willamette Valley as March 3 to November 21.

Other materials used in this study are listed in the References section.

3 HYDROLOGY

Hydrology indicators noted on the site in several areas included drainage patterns in wetlands, water-stained leaves, and very moist soils (late spring examination; saturation to surface in early spring certain). The FAC-Neutral test confirmed hydrology in several plots. The excavated square depression (Plot 10) had saturated soils to the surface. No indicators of hydrology were noted in upland areas.

4 SOILS

All soils sampled met the color indicators for hydric soils (a low chroma of 1 or a low chroma of 2 with mottles). Soils sampled in wetland areas were either a gray (10YR 5/1) very gravelly sandy clay or a very dark gray or very dark brown (10YR 3/1 or 10YR 2/2) silty clay with strong brown (7.5YR 4/6) mottles. Soils in one area determined to be upland (Plot 2) were a very dark gray (10YR 3/1) silty clay with dark brown and reddish brown (7.5YR 4/4 and 5YR 4/4) mottles at 10 inches.

5 VEGETATION

Vegetation on the site was a determining factor for the presence of uplands; much of the area examined was dominated by tall oatgrass (*Arrhenatherum elatius*, NOL), tall fescue (*Festuca arundinacea*, FAC-), perennial ryegrass (*Lolium perenne*, FACU), Italian ryegrass (*Lolium multiflorum*, NOL), and soft cheat grass (*Bromus mollis*, NOL). Emergent wetland areas were dominated by reed canarygrass (*Phalaris arundinacea*, FACW), meadow foxtail (*Alopecurus pratensis*, FACW), meadow barley (*Hordeum brachyantherum*, FACW-), one-sided sedge (*Carex unilateralis*, FACW), Kentucky bluegrass (*Poa pratensis*, FAC) (?), water foxtail (*Alopecurus geniculatus*, OBL), and common velvetgrass (*Holcus lanatus*, FAC). Forested wetland areas were dominated by black cottonwood (*Populus trichocarpa* [*balsamifera*], FAC), Pacific willow (*Salix lasiandra*, FACW+), rose (*Rosa* species), Oregon ash (*Fraxinus latifolia*, FACW), Douglas' spirea (*Spiraea douglasii*, FACW), and various sedge (*Carex*), rush (*Juncus*), and spikerush (*Eleocharis*) species. The ditch crossing a portion of Area 2 was dominated by American wintercress (*Barbarea orthoceras*, FACW+), lowland cudweed (*Gnaphalium palustre*, FAC+) and other vernal-pool type species. Vegetation noted on the subject site is listed in the following table.

Common Name	Scientific Name	Indicator
quack grass	*Agropyron repens*	FAC-
redtop	*Agrostis alba*	FAC
bentgrass	*Agrostis* species	-
hairgrass	*Aira* species	NOL
water foxtail	*Alopecurus geniculatus*	OBL
meadow foxtail	*Alopecurus pratensis*	FACW
mayweed chamomile	*Anthemis cotula*	FACU
tall oatgrass	*Arrhenatherum elatius*	NOL
American wintercress	*Barbarea orthoceras*	FACW+
soft cheat grass	*Bromus mollis*	NOL
water-starwort	*Callitriche* species	probably OBL
dense sedge	*Carex densa*	OBL
slough sedge	*Carex obnupta*	OBL
sedge	*Carex* species	-

Common Name	Scientific Name	Indicator (continued)
one-sided sedge	*Carex unilateralis*	FACW
oxeye daisy	*Chrysanthemum leucanthemum*	NOL
thistle	*Cirsium* species	-
hedge bindweed	*Convolvulus* [*Calystegia*] *sepium*	FAC
ornamental hawthorn	*Crataegus monogyna*	FACU+
Scot's broom	*Cytisus scoparius*	NOL
Queen Anne's lace	*Daucus carota*	NOL
orchard grass	*Dactylis glomerata*	FACU
creeping spikerush	*Eleocharis palustris*	OBL
California poppy	*Eschscholzia californica*	NOL
tall fescue	*Festuca arundinacea*	FAC-
Oregon ash	*Fraxinus latifolia*	FACW
lowland cudweed	*Gnaphalium palustre*	FAC+
meadow barley	*Hordeum brachyantherum*	FACW-
common velvetgrass	*Holcus lanatus*	FAC
spotted cats-ear	*Hypochaeris radicata*	NOL
soft rush	*Juncus effusus*	FACW
rush	*Juncus* species	-
Italian ryegrass	*Lolium multiflorum*	NOL
perennial ryegrass	*Lolium perenne*	FACU
reed canarygrass	*Phalaris arundinacea*	FACW
English plantain	*Plantago lanceolata*	FAC
bluegrass	*Poa* species	-
fowl bluegrass	*Poa palustris*	FAC
Kentucky bluegrass	*Poa pratensis*	FAC
black cottonwood	*Populus trichocarpa* [*balsamifera*]	FAC
Oregon white oak	*Quercus garryana*	NOL
Nootka rose	*Rosa nutkana*	FAC
rose	*Rosa* species	-
sheep sorrel	*Rumex acetosella*	FACU+
curly dock	*Rumex crispus*	FAC+
Himalayan blackberry	*Rubus discolor*	FACU
Pacific willow	*Salix lasiandra*	FACW+
Piper's willow	*Salix piperi*	FACW
Douglas' spirea	*Spiraea douglasii*	FACW
common dandelion	*Taraxacum officinale*	FACU
thyme-leaved speedwell	*Veronica serpyllifolia*	OBL
common mullein	*Verbascum thapsus*	NOL

Common Name	Scientific Name	Indicator (continued)
vetch	*Vicia* species	-
tiny vetch	*Vicia hirsuta*	NOL

6 OREGON NATIONAL GUARD PROPERTY

The Oregon National Guard Property is located immediately north of Area 3, between the runways and 25th St. SE on the east side of the Airport property (see Figure 4). Greg Mitchell, Natural Resources Specialist, Oregon Military Department (OMD), has conducted a wetland determination on this property during the spring of 1996. His report to the Division of State Lands is included in Appendix B. We have included this information because this was an area proposed for development that we were to examine, if necessary. The OMD determination concluded that wetlands were not found on the property; we concur with this finding as presented.

7 SENSITIVE SPECIES

Nelson's checker-mallow (*Sidalcea nelsoniana*) is a federally-listed and state-listed threatened species. Populations of the checker-mallow are present on the Airport property. These populations are well-mapped and monitored by the Airport in association with the US Fish and Wildlife Service. For further information regarding these plants, contact Airport Superintendent Rod Propst (503/588-6314).

8 CONCLUSION AND RECOMMENDATIONS

Area 1, south of the runways (see Figure 4), has an excavated ditch which we have mapped as wetland (Plot 1); several small emergent wetland areas (Plots 4, 5, 6, & 8) were present; one small potential emergent wetland area (Plot 3) was identified; and two forested wetland areas (Plots 7 and 9) were mapped. The existing excavated pond is being filled under permit. The potential wetland area (Plot 3) and the upland Plot 2 should be checked in early spring to confirm the presence or absence of wetland hydrology.

Area 2, on the east side of the Airport, has an excavated square scrub-shrub depressional area (Plot 10) and a drainage ditch (mapped as wetland).

Area 3, south of the Oregon National Guard facility, was upland.

The forested wetland area at the south end of the Airport (Plot 7, and adjacent emergent wetland Plot 6) displays the least disturbed, most diverse habitat and provides the most valuable habitat for

wildlife. Other wetland areas on the Airport are routinely mowed or cleared of vegetation and provide little habitat value.

If proposed site development will impact wetland areas identified in this report, we recommend that a wetland delineation be performed to fully delineate wetland boundaries.

This report should be submitted to the Oregon Division of State Lands and the U.S. Army Corps of Engineers for review and confirmation of our findings. Wetland determinations and delineations do not become jurisdictional until reviewed and confirmed by these agencies.

The services provided under this contract as described in this report include professional opinions and judgements based on data collected. These services have been provided according to generally accepted practices of the environmental profession.

Please contact the undersigned if you have any questions about the enclosed information.

C. Mirth Walker, PWS
Wetlands Program Manager

Report reviewed by:

Mark Vlahakis
Soil Scientist

9 REFERENCES

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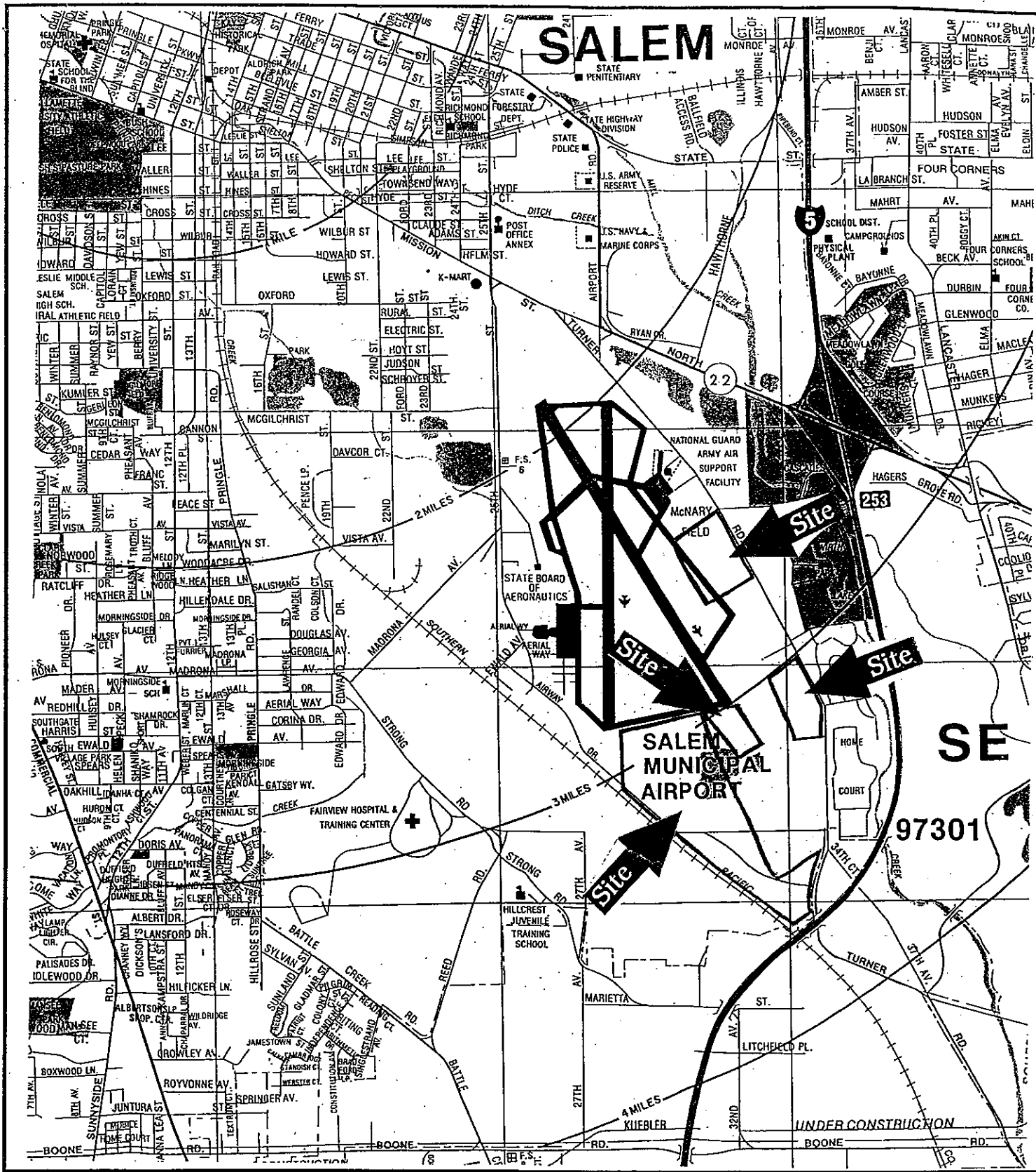
USDI Fish and Wildlife Service, Draft 1989 and no date. Salem East and Salem West, Oregon National Wetlands Inventory quadrangles, CIR 7/82, 1:58,000 and BW 9/7?, 1:80,000.

USGS, 1969, photorevised 1986, Salem East and Salem West, Oregon 7.5' topographic quadrangles.

SITE DATA

Project Name:	McNary Field (Salem) Airport Wetland Determination
Project Number:	96040
Staff:	C. Mirth Walker, Wetlands Program Manager and Mark Vlahakis, Soil Scientist
Site Visits:	June 5, 1996
Agent:	Century West Engineering Corporation Attn: David Miller, Senior Airport Planner 825 NE Multnomah, Suite 425 Portland, Oregon 97232 (503) 231-6078 Fax 231-6482
Applicant:	City of Salem
Owner:	City of Salem
Location:	South of Highway 22, east of 25th St. SE and railroad tracks, north of I-5, and west of Turner Road and I-5
Size:	Not calculated
Vegetation type:	grassland and forest
Elevation:	207 - 190 feet
Topography:	relatively flat
Drainage basin:	Mill Creek/Mission Ditch/Willamette River
Adjacent waterway:	None
Flood plain:	Probable
NWI map, desig.:	Salem East, several wetlands mapped
County:	Marion
Soils:	Courtney (hydric), Clackamas, Sifton
Tax Map, Tax Lot:	-
T/R/S:	T8S, R3W, Section 1, 2, and 12
Proposed use:	Runway extension and commercial development
Present use:	Airport property, mowed / undeveloped
Past use:	Same
Surrounding areas:	Gravel quarries, commercial, undeveloped, park, residential, infrastructure.



LEGEND

Source: Rand McNally Map of Salem, Oregon, 1990.

DRAWN:	W. Bush
APPROVED:	M. Walker
DATE:	July 1996
SCALE:	None
REVISED:	

McNARY FIELD (SALEM) AIRPORT

WETLAND DETERMINATION

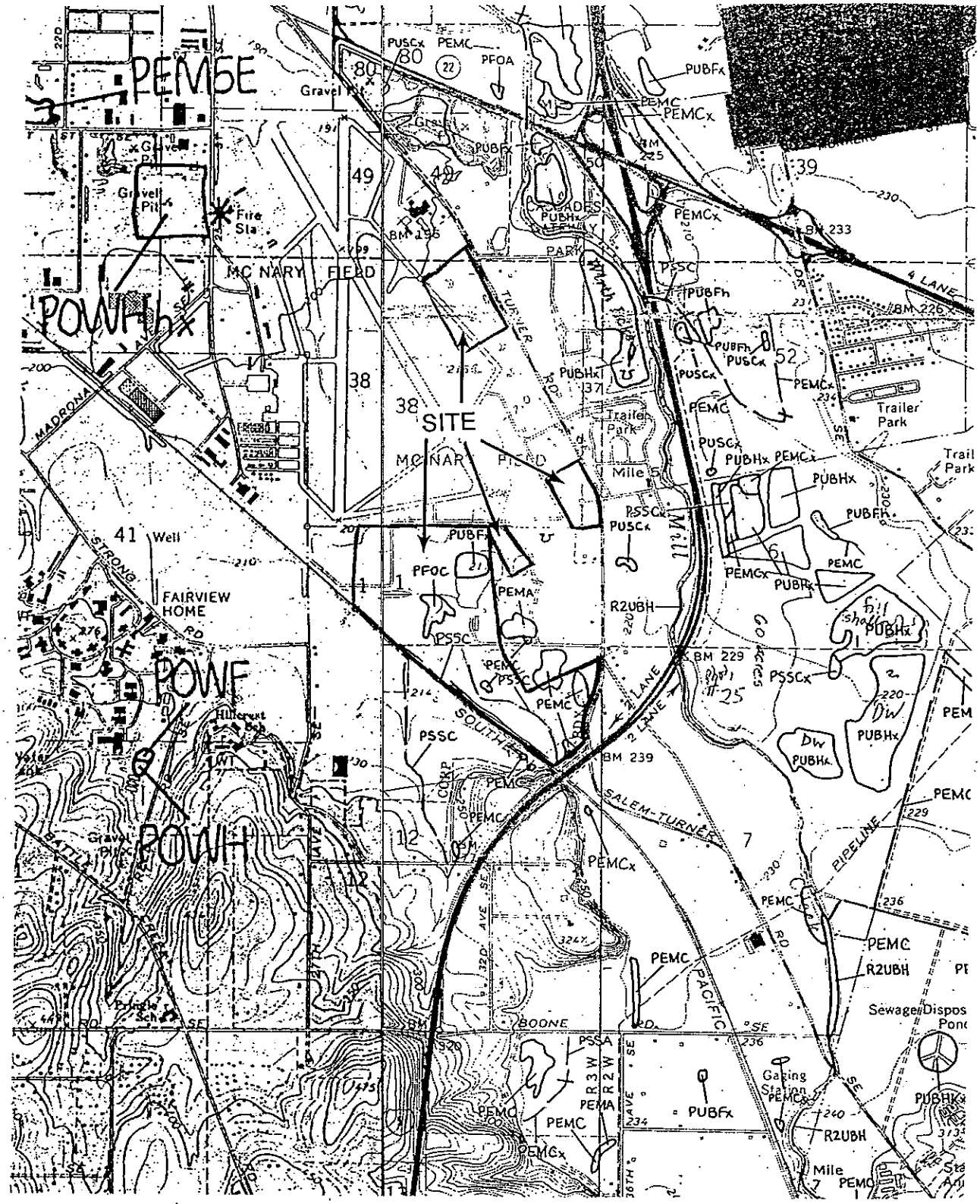
SITE LOCATION MAP

Consultants in ecology and natural resource management

Pinkham Environmental Services
434 NW Sixth Avenue • Suite 304
Portland, Oregon 97209-3600
(503)224-0333

Figure # 1

Project # 96040



LEGEND

Source:
USDI Fish & Wildlife Services
Salem East and West, Oregon NWI quadrangle, Draft 1989 and no date;
(CIR 7/82, 1:58,000 and BW 9/7?, 1:80,000)

DRAWN:	W. Bush
APPROVED:	M. Walker
DATE:	July 1996
SCALE:	1 inch=2000 feet
REVISED:	

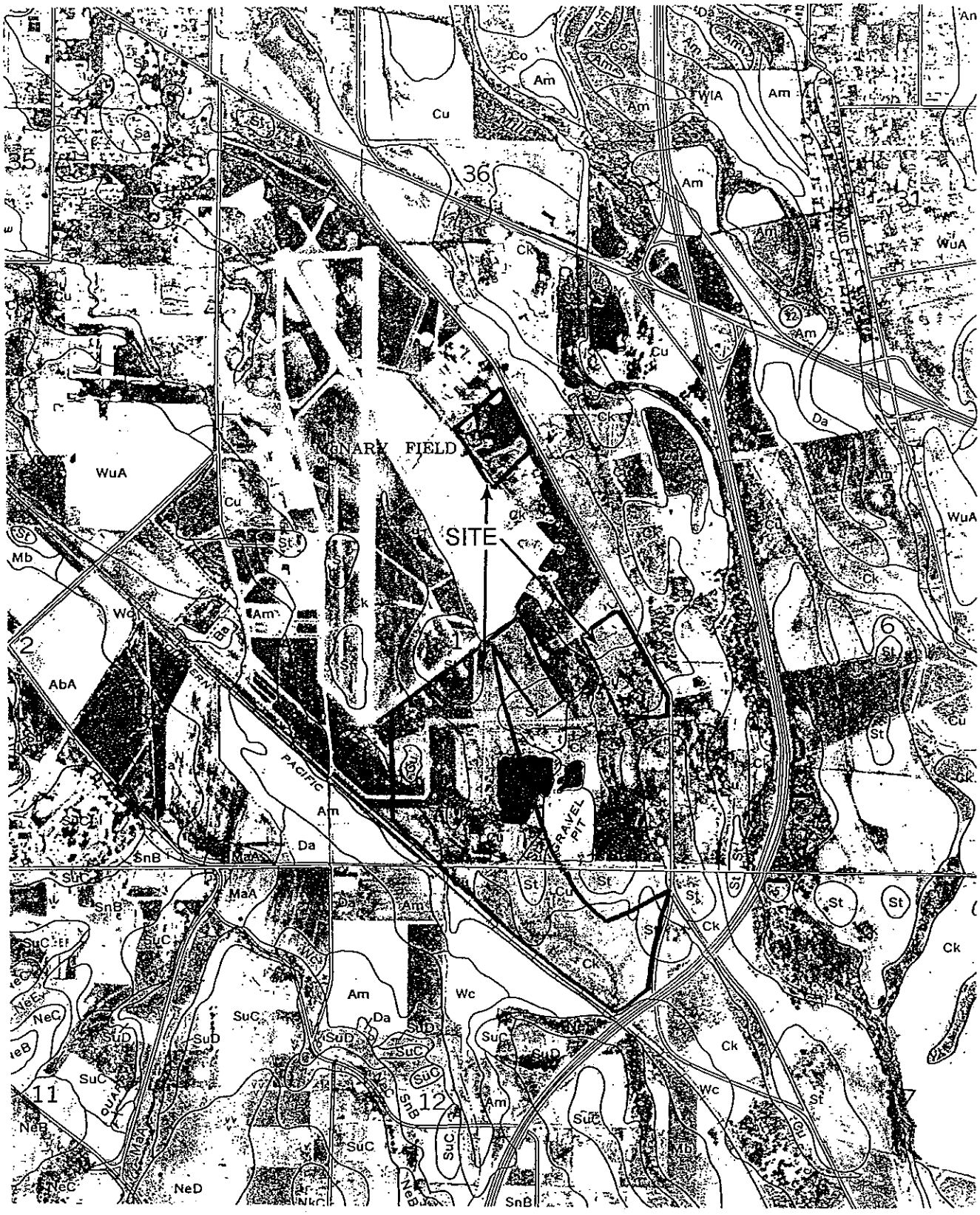
McNARY FIELD (SALEM) AIRPORT
WETLAND DETERMINATION

NATIONAL WETLAND INVENTORY MAP

Consultants in ecology and natural resource management
Fishman Environmental Services
434 NW Sixth Avenue • Suite 304
Portland, Oregon 97209-3600
(503)224-0333

Figure # 2

Project # 96040



LEGEND

Ck Clackamas gravelly loam
Cu Courtney gravelly silty clay loam
St Sifton gravelly loam

Source:
USDA SCS Soil Survey of Marion County Area, Oregon, 1972, Sheet Numbers 34 and 43.

DRAWN: W. Bush
APPROVED: M. Walker
DATE: July 1996
SCALE: 1 inch=1667 feet
REVISED:

McNARY FIELD (SALEM) AIRPORT

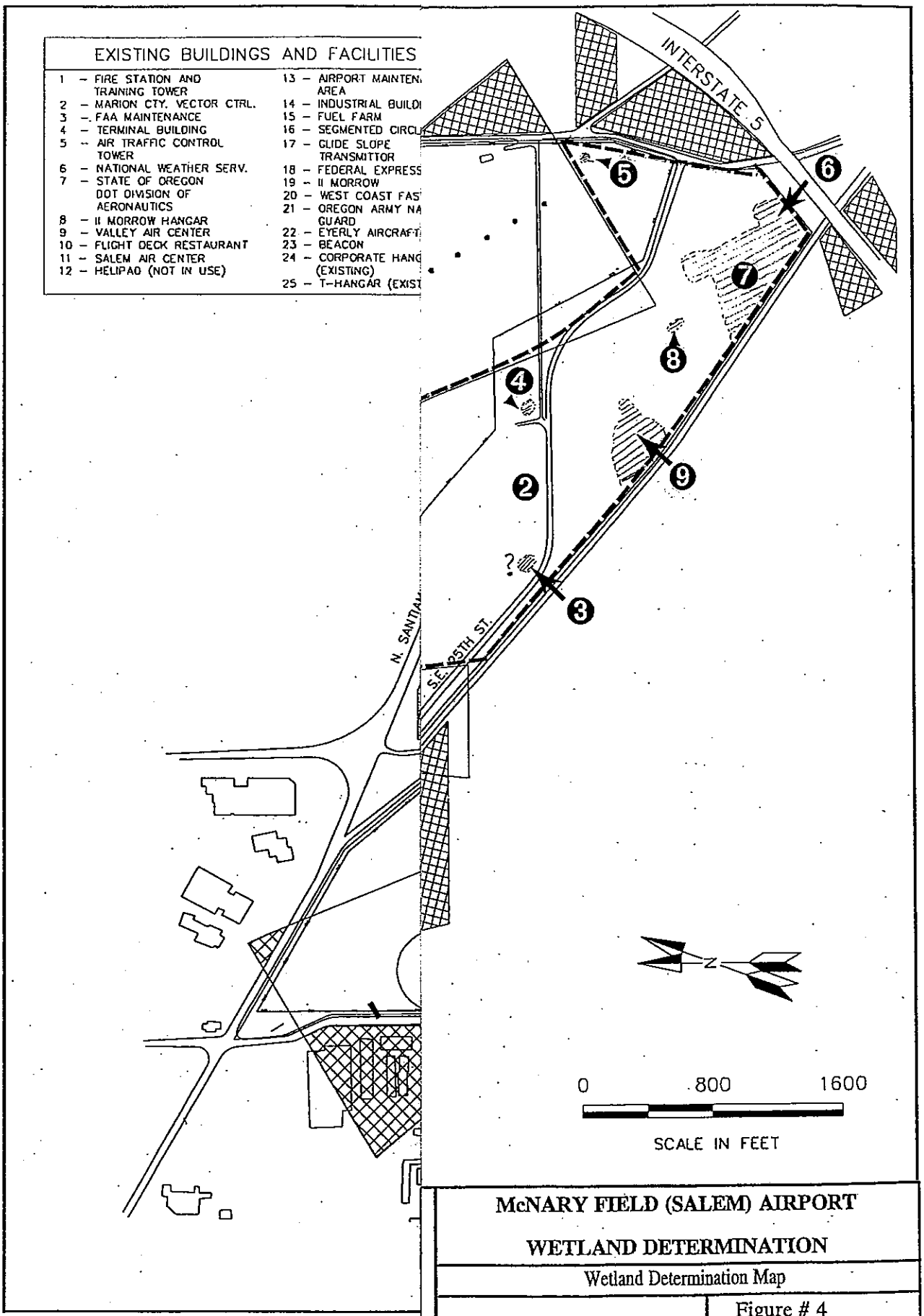
WETLAND DETERMINATION

SOILS MAP

Consultants in ecology and natural resource management
Fishman Environmental Services
434 NW Sixth Avenue • Suite 304
Portland, Oregon 97209-3600
(503)224-0333

Figure # 3

Project # 96040



4030800201 4102 4UQ_

McNARY FIELD (SALEM) AIRPORT

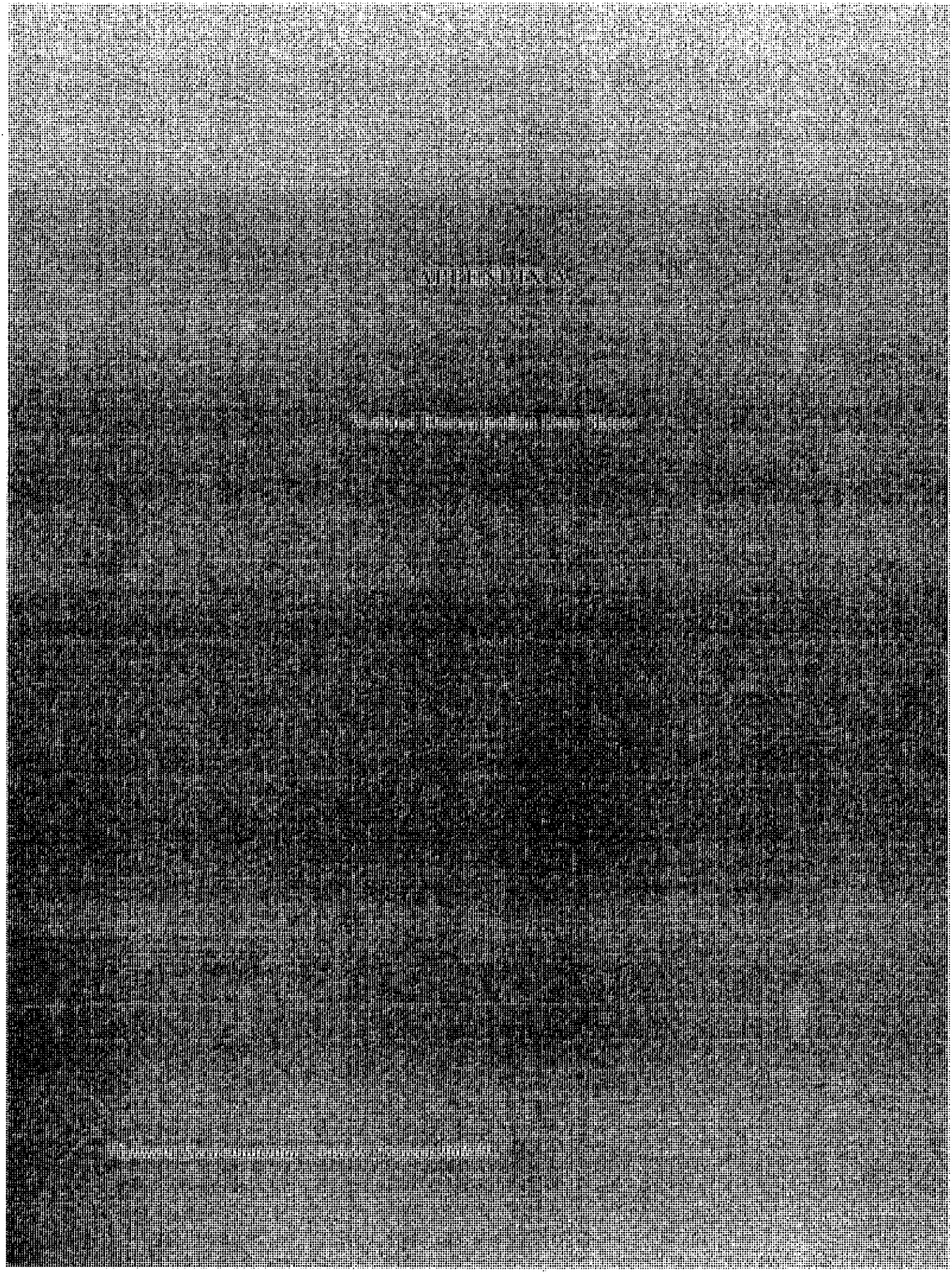
WETLAND DETERMINATION

Wetland Determination Map

July 1996

Figure # 4

Project # 96040



WETLAND DETERMINATION DATA SHEET - 1987 MANUAL Salem Airport

Project #: 96040 Site: McNary Field County: Marion State: OR Date: 6/5/96 Plot: 3A
Applicant/Owner: Century West Eng. Sect. 1 Township ___ Range ___ City: Salem
Plot Location: Area 3 - S of OR Army National Guard, E of E Taxiway
Topographic Location: flat field
Do Normal Circumstances exist on the site? (Y) N Explain: lake spring
Are soils ___ vegetation ___ hydrology ___ significantly disturbed? (N) Explain: not mowed yet

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: 100+		
1. Arrhenatherum elatius	dom	NOL
2. Dactylis glomerata	tr	FACU
3. Chrysanthemum leucanthemum	tr	NOL
4. Taraxacum officinale	tr	FACU
5. Lolium perenne	tr	FACU
6. Eschscholzia californica	tr	NOL
7.		
8.		
9.		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover:		
1. Cytisus scoparius	tr	NOL
2. Rubus discolor	tr	FACU
3.		
4.		
5.		
Tree Stratum - % total cover:		
1.		
2.		
3.		

Remarks: healthy veg.
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 0/1 = 0%
Hydrophytic Vegetation Criterion Met? YES (NO) NWI Class none

SOILS

Mapped unit name: Ck Clackamas gr. loam Matches Profile? Y N
Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer
___Histic Epipedon ___Gleyed ___Organic Streaking
___Sulfidic Odor ___Mottled (w/i 10") ___Organic Pan
___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List
Remarks: ___
Hydric Soil Criterion / Indicators Met? YES NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	___Water-stained leaves	___FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: ___	
___Sediment Deposits	Remarks: ___	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? YES NO	

DETERMINATION: Is this plot a Wetland? YES (NO)
Comments: No Hydrophytic Vegetation - all field is UPL
Determined by: Christy Walker + Mark Vlahakis Fishman Environmental Services

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: #B

Applicant/Owner: ___ Sect. 1 Township ___ Range ___ City: ___

Plot Location: Area 1 - Runway extension, S of runway

Topographic Location: ___

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? (N) Explain: Mower on the way but not mowed yet

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: 100+		
*1. Festuca arundinacea	dom	FAC-
*2. Bromis mollis	dom	NOL
*3. Lolium perenne	dom	FACU
4. Rumex acetosella	tr	FACU+
5. Poa sp	tr	?
6. Agrostis sp	tr	FAC/FACU
7. Holcus lanatus	tr	FAC
8. Dactylis glomerata	tr	FACU
9. Taraxacum officinalis	tr	FACU
Remarks: 10. Plantago lanceolata tr FACU or FAC		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1. ___	___	___
2. ___	___	___
3. ___	___	___
4. ___	___	___
5. ___	___	___
Tree Stratum - % total cover: ___		
1. ___	___	___
2. ___	___	___
3. ___	___	___

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 0/3 = 0 %

Hydrophytic Vegetation Criterion Met? YES (NO) NWI Class ___

SOILS

Mapped unit name: Cu Courtney gr SiCL (H) Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer

___Histic Epipedon ___Gleyed ___Organic Streaking

___Sulfidic Odor ___Mottled (w/i 10") ___Organic Pan

___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List

Remarks: ___

Hydric Soil Criterion / Indicators Met? YES NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	___Water-stained leaves	___FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: ___	
___Sediment Deposits	Remarks: ___	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? YES NO	

DETERMINATION: Is this plot a Wetland? YES (NO)

Comments: No indication of wetland vegetation

Determined by: CMW + MV

Fishman Environmental Services

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: C
Applicant/Owner: ~~Area~~ Sect. 1 Township ___ Range ___ City: ___
Plot Location: Area 1 - Runway Extension - Low spot
Topographic Location: 6" below grade of rest of field
Do Normal Circumstances exist on the site? Y N Explain: ___
Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
*1. Arrhenatherum elatius	60%	NOL
*2. Lolium multiflorum	20	NOL
*3. Poa pratensis	20	FAC
4. Convolvulus sepium	tr	FAC
5. Daucus carota	tr	NOL
6. Rubus discolor	tr	FACU
7. Vicia hirsuta	tr	NOL
8.		
9.		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1.		
2.		
3.		
4.		
5.		
Tree Stratum - % total cover: ___		
1.		
2.		
3.		

Remarks: Rodent holes
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 1/3 = 33%
Hydrophytic Vegetation Criterion Met? YES (NO) NWI Class ___

SOILS

Mapped unit name: CK or St/Clackamas or Sifton gr. Loam Matches Profile? Y N
Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer
___Histic Epipedon ___Gleyed ___Organic Streaking
___Sulfidic Odor ___Mottled (w/i 10") ___Organic Pan
___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List
Remarks: ___
Hydric Soil Criterion / Indicators Met? YES NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	___Water-stained leaves	___FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: ___	
___Sediment Deposits	Remarks: ___	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? YES NO	

DETERMINATION: Is this plot a Wetland? YES (NO)
Comments: Does not meet Veg. Criterion
Determined by: CMW + MW *Fishman Environmental Services*

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: 1
Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___
Plot Location: Ditch in Area 1
Topographic Location: ___
Do Normal Circumstances exist on the site? Y N Explain: ___
Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ~50%		
*1. Barbarea orthoceras	10%	FACW+
*2. unk. fine-lvd forb, delicate	10%	?
*3. Rumex crispus	5%	FAC+
*4. Veronica serpyllifolia (?)	5%	OBL
*5. Gnaphalium palustre	5%	FAC+
*6. unk. forb, villous opp lin lvs	5%	?
*7. Convolvulus sepium	5%	FAC
8. Carex sp	tr	___
9. ___	___	___

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1. Fraxinus latifolia	tr	FACW
2. ___	___	___
3. ___	___	___
4. ___	___	___
5. ___	___	___
Tree Stratum - % total cover: ___		
1. ___	___	___
2. ___	___	___
3. ___	___	___

Remarks: Bare ground
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): ___ = >50%
Hydrophytic Vegetation Criterion Met? (YES) NO at least 5/7 NWI Class ___

SOILS

Mapped unit name: Cu + St Courtney + Sifton Matches Profile? Y N
Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other
0-8	___	10YR 3/2+4/1	cmd 7.5YR 4/4 moist	gr Clay, SAB
8-14	___	10YR 5/1	— V. moist	V gr Sa Clay
___	___	___	___	___
___	___	___	___	___

___ Histosol ___ Reducing Conditions (test) ___ Hi. Organic Cont. Surf. Layer
___ Histic Epipedon X Gleyed ___ Organic Streaking
___ Sulfidic Odor ___ Mottled (w/i 10") ___ Organic Pan
___ Prob. Aquic Moisture Regime ___ Concretions (w/i 3", >2mm) ___ On Hydric Soils List
Remarks: ___
Hydric Soil Criterion / Indicators Met? (YES) NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___ Inundated	___ Oxidized Root Channels in upper 12"	___ Local Soil Survey Data
___ Saturated in upper 12"	___ Water-stained leaves	___ FAC-Neutral Test
___ Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___ Drift Lines	Other: Very moist	
___ Sediment Deposits	Remarks: ___	
X Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? (YES) NO	

DETERMINATION: Is this plot a Wetland? (YES) NO
Comments: Hydrology confined to ditch
Determined by: CMW + MV *Fishman Environmental Services*

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: 2

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: In Area 1, North of Turner Road

Topographic Location: Slight swale

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
1. Agrostis tenuis	80	FAC
2. Poa palustris	10	FAC
3. Agrostis alba	10	FAC
4. Vicia sp (white)	tr	—
5. Cytisus scoparius	tr	NOL
6. Rubus discolor	tr	FACW
7. Verbascum thapsus	tr	NOL
8.		
9.		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1. Fraxinus latifolia	tr	FACW
2.		
3.		
4.		
5.		
Tree Stratum - % total cover: ___		
1.		
2.		
3.		

Remarks: ___

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 1/1 = 100%

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class ___

SOILS

Mapped unit name: Cu or Ck Courtney or Clackamas Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other
0-2	___	10YR3/2	—, many roots	SiL gran, moi
2-12	___	10YR3/1	mfd 7.5YR 4/4 +5YR 4/4	SiC, SAB
12-18	mottled	matrix 10YR5/1 w/ coarse 7.5YR 4/6 motts		SaC, still moist all the way d
___	___	___	___	___

___ Histosol ___ Reducing Conditions (test) ___ Hi. Organic Cont. Surf. Layer

___ Histic Epipedon ___ Gleyed ___ Organic Streaking

___ Sulfidic Odor X Mottled (w/i 10") low chroma ___ Organic Pan

___ Prob. Aquic Moisture Regime ___ Concretions (w/i 3", >2mm) ___ On Hydric Soils List

Remarks: ___

Hydric Soil Criterion / Indicators Met? (YES) NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___ Inundated	___ Oxidized Root Channels in upper 12"	___ Local Soil Survey Data
___ Saturated in upper 12"	___ Water-stained leaves	___ FAC-Neutral Test
___ Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___ Drift Lines	Other: No signature on aerial photo — not stron	
___ Sediment Deposits	Remarks: enough wetland indicators	
___ Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? YES (NO)	

DETERMINATION: Is this plot a Wetland? YES (NO)

Comments: Hydrology not strong enough

Determined by: CMV & MV *Fishman Environmental Services*

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNayfield County: Marion State: ___ Date: 6/5/96 Plot: 3

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: W SW of Plot 2, N of Turner Road (Area 1)

Topographic Location: ~ 40' circular area of RCG, slightly depressional

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
*1. Phalaris arundinacea	80	FACW
2. Agrostis tenuis	10	FAC
3. Agropyron repens	10	FAC-
4. Cirsium species	tr	—
5.		
6.		
7.		
8.		
9.		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1.		
2.		
3.		
4.		
5.		
Tree Stratum - % total cover: ___		
1.		
2.		
3.		

Remarks: Veg. grubbed out 3 yrs ago

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 1/1 = 100%

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class ___

SOILS

Mapped unit name: Cu probably Courtney Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other
0-4		10YR 3/2	— slightly moist	SiL gran many roots
4-16		10YR 2/2	cf+m 7.5YR 4/6 very moist @ 12-14"	SiC SAB

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer

___Histic Epipedon ___Gleyed ___Organic Streaking

___Sulfidic Odor X Mottled (w/i 10") ___Organic Pan

___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List

Remarks: ___

Hydric Soil Criterion / Indicators Met? (YES) NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	___Water-stained leaves	___FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: Very moist @ 12-14"	
___Sediment Deposits	Remarks: ___	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? YES NO ?	

DETERMINATION: Is this plot a Wetland? YES NO — Potential wetland

Comments: Verify hydrology in earlier spring

Determined by: CMW + MV

Fishman Environmental Services

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNaryfield County: Marion State: ___ Date: 6/5/96 Plot: 4

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: S of concrete pile - old dump (Area 1)

Topographic Location: disturbed depression, ~ 50 x 75' wide, near fence

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.	*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___			Shrub/Sapling Stratum - % total cover: ___		
*1. Phalaris arundinacea	dom	FACW	1. Salix piperi	<5	
*2. Alopecurus pratensis	dom	FACW	2. Crataegus douglasii	<5	
3. Carex unilateralis	tr	FACW	3.		
4. Eleocharis palustris	tr	OBL	4.		
5. Callitriche sp.	tr	prob. OBL	5.		
6. Veronica serpyllifolia	tr	OBL	Tree Stratum - % total cover: ___		
7.			1.		
8.			2.		
9.			3.		

Remarks: matted leaves

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 2/2 = 100%

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class PEM

SOILS

Mapped unit name: CK Clackamas Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer

___Histic Epipedon ___Gleyed ___Organic Streaking

___Sulfidic Odor ___Mottled (w/i 10") ___Organic Pan

___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List

Remarks: Not sampled

Hydric Soil Criterion / Indicators Met? YES NO Assumed hydric

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	X Water-stained leaves	X FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: MOIST soils to surface	
X Sediment Deposits	Remarks: ___	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? (YES) NO	

DETERMINATION: Is this plot a Wetland? (YES) NO

Comments: disturbed from dumping activities

Determined by: CMW + MV

Fishman Environmental Services

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: ___ Plot: 5

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: SE of Intermarker Building (S. of mallow area) W of 25th

Topographic Location: (Area 1) - vernal pool-like depression ~ 40' wide

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
X 1. Hordeum brachyantherum	40	FACW-
X 2. Carex unilateralis	20	FACW
X 3. Poa pratensis (?)	20	FAC
4. Alopecurus geniculatus	5	OBL
5. Alopecurus pratensis	5	FACW
6. Juncus effusus	tr	FACW
7. Juncus species	tr	?
8. Gnaphalium palustre (?)	tr	prob FACW
9. ___	___	___

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1. ___	___	___
2. ___	___	___
3. ___	___	___
4. ___	___	___
5. ___	___	___
Tree Stratum - % total cover: ___		
1. ___	___	___
2. ___	___	___
3. ___	___	___

Remarks: ___

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 3/3 = 100

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class PEM

SOILS

Mapped unit name: St Sifton Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___

___ Histosol ___ Reducing Conditions (test) ___ Hi. Organic Cont. Surf. Layer

___ Histic Epipedon ___ Gleyed ___ Organic Streaking

___ Sulfidic Odor ___ Mottled (w/i 10") ___ Organic Pan

___ Prob. Aquic Moisture Regime ___ Concretions (w/i 3", >2mm) ___ On Hydric Soils List

Remarks: ___

Hydric Soil Criterion / Indicators Met? **YES NO** Assumed hydric

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___ Inundated	___ Oxidized Root Channels in upper 12"	___ Local Soil Survey Data
___ Saturated in upper 12"	___ Water-stained leaves	___ FAC-Neutral Test
___ Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___ Drift Lines	Other: Moist soils to surface	
___ Sediment Deposits	Remarks: ___	
X Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? (YES) NO	

DETERMINATION: Is this plot a Wetland? (YES) NO

Comments: ___

Determined by: CMW + MV *Fishman Environmental Services*

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: 6

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: S. end of airport, E of forested area, S of Turner Rd

Topographic Location: (Area 1)

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
*1. Holus lanatus	dom	FAC
*2. Alopecurus geniculatus	dom	OBL
3. Rumex crispus	tr	FACW
4. Agrostis tenuis	tr	FAC
5. Poa species	tr	?
6.		
7.		
8.		
9.		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1.		
2.		
3.		
4.		
5.		
Tree Stratum - % total cover: ___		
1.		
2.		
3.		

Remarks: WL Forest to west

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 2/2 = 100

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class PEM

SOILS

Mapped unit name: CK Clackamas Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other
0-4	___	10YR3/2	—	gr SiL, gran
4-12	___	10YR3/1	c f+m 7.5YR4/6	SiC; SAB but breaks to granular
___	___	___	___	___
___	___	___	___	___

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer

___Histic Epipedon ___Gleyed ___Organic Streaking

___Sulfidic Odor ___Mottled (w/i 10") ___Organic Pan

___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List

Remarks: friable 4-12"

Hydric Soil Criterion / Indicators Met? (YES) NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	___Water-stained leaves	X FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: slightly moist 0-4, moist 4-12"	
___Sediment Deposits	Remarks: ___	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? (YES) NO probably	

DETERMINATION: Is this plot a Wetland? (YES) NO probably wetland

Comments: ___

Determined by: CMW 4-MV *Fishman Environmental Services*

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: 7

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: Wetland Forest West of plot 6 - Black Cottonwood

Topographic Location: ___

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
1. Juncus effusus		FACW
2. Carex unilateralis		FACW
3. Carex species		?
4. Hordeum brachyantherum		FACW-
5. Eleocharis palustris		OBL
6.		
7.		
8.		
9.		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1. Rosa species		?
2. Fraxinus latifolia		FACW
3. Spirea douglasii		FACW
4.		
5.		
Tree Stratum - % total cover: ___		
1. Salix lasiandra		FACW+
2. Populus trichocarpa		FAC
3.		

Remarks: ___

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): ___ = ___

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class PFO

SOILS

Mapped unit name: CK Clackamas Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer

___Histic Epipedon ___Gleyed ___Organic Streaking

___Sulfidic Odor ___Mottled (w/i 10") ___Organic Pan

___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List

Remarks: Not sampled

Hydric Soil Criterion / Indicators Met? YES NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	___Water-stained leaves	___FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: Not sampled	
___Sediment Deposits	Remarks: ___	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? YES NO	

DETERMINATION: Is this plot a Wetland? (YES) NO

Comments: ___

Determined by: CMW + MV *Fishman Environmental Services*

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: 8

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: ~100' N of Southern BCW Forest

Topographic Location: ~25' circular Wetland depression

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
1. Barbarea orthoceras		FACW+
2. Anthemis cotula (?)		FACU
3. Alopecurus geniculatus		OBL
4.		
5.		
6.		
7.		
8.		
9.		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1. Rosa spp	prob	FAC
2.		
3.		
4.		
5.		
Tree Stratum - % total cover: ___		
1.		
2.		
3.		

Remarks: ___

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 3/4 = 75%

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class PEM

SOILS

Mapped unit name: CK or Cu Clackamas or Courtney Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer

___Histic Epipedon ___Gleyed ___Organic Streaking

___Sulfidic Odor ___Mottled (w/i 10") ___Organic Pan

___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List

Remarks: not sampled

Hydric Soil Criterion / Indicators Met? YES NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	___Water-stained leaves	___FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: ___	
___Sediment Deposits	Remarks: not sampled	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? YES NO	

DETERMINATION: Is this plot a Wetland? (YES) NO

Comments: ~25' circular depression

Determined by: CMW + MV

Fishman Environmental Services

WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: 9

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: BCW - Or. Ash Forest along west of Area 1, E of RR berm,

Topographic Location: North of other forest, depression

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils ___ vegetation ___ hydrology ___ significantly disturbed? N Explain: ___

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
1. Carex obnupta	___	OBL
2. Carex species	___	?
3.	___	___
4.	___	___
5.	___	___
6.	___	___
7.	___	___
8.	___	___
9.	___	___

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1. Spirea douglasii	___	FACW
2. Rosa nutkana	___	FAC
3.	___	___
4.	___	___
5.	___	___
Tree Stratum - % total cover: ___		
1. Populus trichocarpa	___	FAC
2. Fraxinus latifolia	___	FACW
3. Salix lasiandra	___	FACW+

Remarks: Some veg had been cleared

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): ___ = 100%

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class PFO

SOILS

Mapped unit name: Cu or Ck Courtney or Clackamas Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___
___	___	___	___	___

___Histosol ___Reducing Conditions (test) ___Hi. Organic Cont. Surf. Layer

___Histic Epipedon ___Gleyed ___Organic Streaking

___Sulfidic Odor ___Mottled (w/i 10") ___Organic Pan

___Prob. Aquic Moisture Regime ___Concretions (w/i 3", >2mm) ___On Hydric Soils List

Remarks: not sampled

Hydric Soil Criterion / Indicators Met? **YES NO**

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: ___

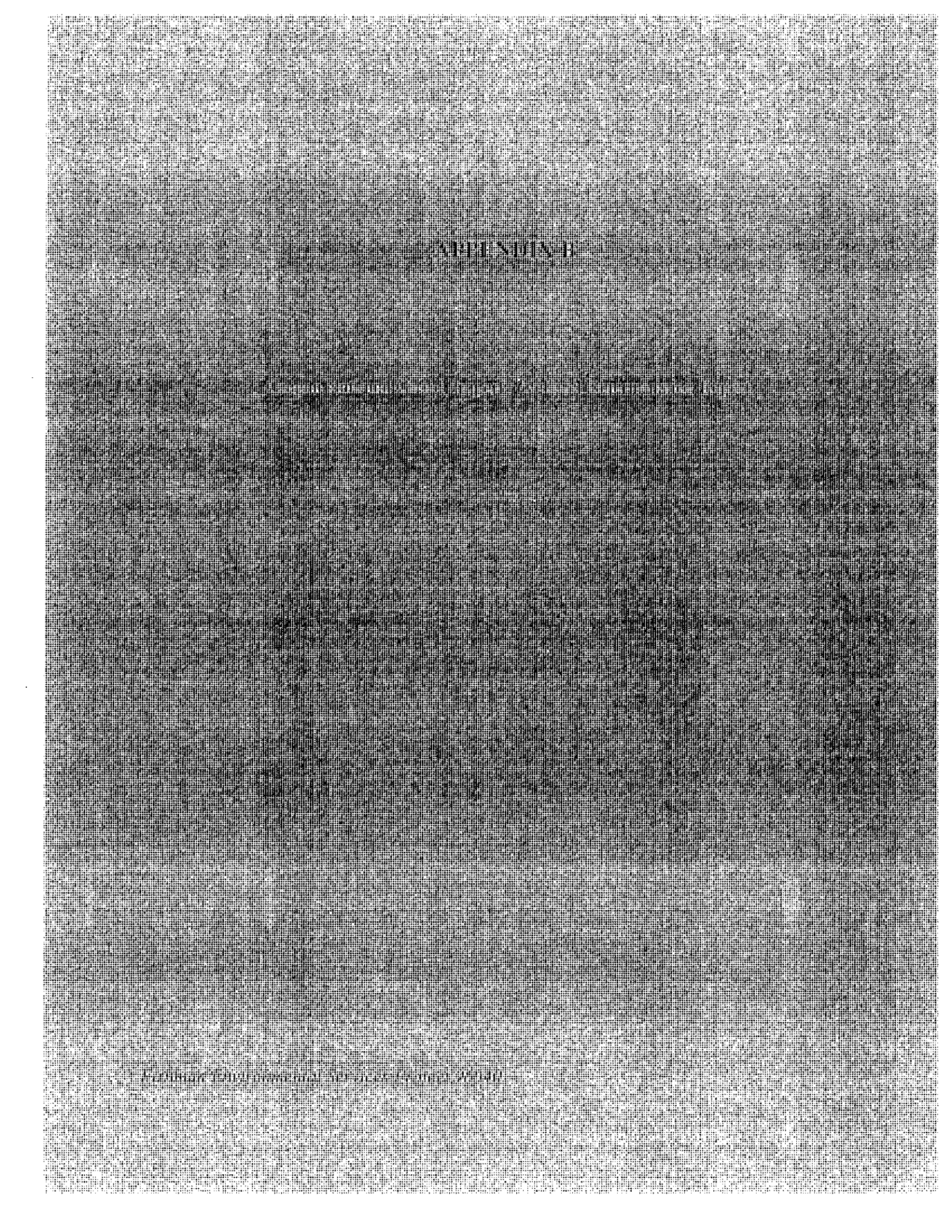
1° Indicators	2° Indicators	2° Indicators
___Inundated	___Oxidized Root Channels in upper 12"	___Local Soil Survey Data
___Saturated in upper 12"	___Water-stained leaves	___FAC-Neutral Test
___Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___Drift Lines	Other: ___	
___Sediment Deposits	Remarks: not sampled	
___Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? **YES NO**	

DETERMINATION: Is this plot a Wetland? (YES) NO

Comments: ___

Determined by: CMW & MV *Fishman Environmental Services*

APPENDIX H



WETLAND DETERMINATION DATA SHEET - 1987 MANUAL

Project #: 96040 Site: McNary Field County: Marion State: ___ Date: 6/5/96 Plot: 10

Applicant/Owner: ___ Sect. ___ Township ___ Range ___ City: ___

Plot Location: Area #2 inside Oaks; W of 25 st. SE; S. of W. Coast Fasteners Bldg

Topographic Location: Excavated square depression

Do Normal Circumstances exist on the site? Y N Explain: ___

Are soils X vegetation ___ hydrology ___ significantly disturbed? N Explain: excavated

VEGETATION

*Dominant Plant Species	% Cover	Ind.
Herb Stratum - % total cover: ___		
1. Carex species		prob FAC or wetter (?)
2. Eleocharis palustris		OBL
3. Aira species		NOL
4. Hypochaeris radicata		NOL
5.		
6.		
7.		
8.		
9.		

*Dominant Plant Species	% Cover	Ind.
Shrub/Sapling Stratum - % total cover: ___		
1. Populus trichocarpa		FAC
2. Salix piperi		FACW
3. Crataegus monogyna		FACU+
4.		
5.		
Tree Stratum - % total cover: ___		
1.		
2.		
3.		

Remarks: gravels

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 4/7 = ≥ 50%

Hydrophytic Vegetation Criterion Met? (YES) NO NWI Class PSS

SOILS

Mapped unit name: CK Clackamas Matches Profile? Y N

Taxonomy: ___ Drainage Class: ___

Depth	Horizon	Matrix Color	Mottle Abund., Size, Color, on Pores/Peds?	Texture, Struct., Other

___ Histosol ___ Reducing Conditions (test) ___ Hi. Organic Cont. Surf. Layer

___ Histic Epipedon ___ Gleyed ___ Organic Streaking

___ Sulfidic Odor ___ Mottled (w/i 10") ___ Organic Pan

___ Prob. Aquic Moisture Regime ___ Concretions (w/i 3", >2mm) ___ On Hydric Soils List

Remarks: not sampled

Hydric Soil Criterion / Indicators Met? YES NO

HYDROLOGY

Depth of inundation: ___ Depth to free water: ___ Depth to saturation: Ø

1° Indicators	2° Indicators	2° Indicators
___ Inundated	___ Oxidized Root Channels in upper 12"	___ Local Soil Survey Data
X Saturated in upper 12"	___ Water-stained leaves	___ FAC-Neutral Test
___ Water Marks	Recorded Data Available (aerials, gauge) ? - Explain: ___	
___ Drift Lines	Other: ___	
___ Sediment Deposits	Remarks: Saturated to surface	
___ Drainage Patterns	Wetland Hydrology Criterion / Indicators Met? (YES) NO	

DETERMINATION: Is this plot a Wetland? (YES) NO

Comments: Excavated for soils for floodway berm

Determined by: CMW & MV

Fishman Environmental Services

OREGON MILITARY DEPARTMENT
HEADQUARTERS, OREGON NATIONAL GUARD
1776 MILITIA WAY
P. O. BOX 14350
SALEM, OREGON 97309-5047

May 17, 1996

Installations Office

Dana Field
Wetlands Section
Oregon Division of State Lands
775 Summer Street NE
Salem, OR 97310-1337

Dear Ms. Field:

The Oregon Military Department (OMD) is proposing to develop some unimproved grassland areas at our Salem Aviation Support Facility (AASF), located next to the Salem Airport (see enclosed maps). We are proposing to grade and pave much of these areas to provide additional helicopter parking. These grasslands were investigated for the presence of jurisdictional wetlands. Our conclusion is that none of these grassland areas meet the federal criteria of a jurisdictional wetland and are not subject to Division of State Lands or Army Corps of Engineers regulatory authority. This determination is based on information available from published sources and an onsite inspection conducted on March 26, 1996 and May 15, 1996.

Information relied on for this determination included the following sources:

1. Soils mapping described in the Soil Survey of Marion County, Oregon (enclosed)
2. The Salem NE National Wetlands Inventory Map (enclosed)
3. An aerial photograph of the AASF taken in January, 1996 (scale of 1" = 200')
4. Personal communications with the airport manager, OMD staff, and Annette Lalka of your staff.
5. A site inspection using the routine onsite determination methods as outlined in the Federal Manual For Identifying and Delineating Jurisdictional Wetlands (data form and sheets enclosed)

RESULTS

The site is essentially open space around the existing developments at the AASF. It is vegetated by various grasses and broadleaf plants. Although there are some slightly higher and lower areas with slight differences in vegetation, the site basically has one plant community which is dominated by blue fescue. At some plots the vegetation was inconclusive; certain plants could not be identified to species at this time of year. The plots indicate that the area has hydric soils, even though the series (Clackamas) is not classified as hydric.

The entire AASF area was ditched in the 1950s; thus, the grasslands have been effectively drained at least since then. Although water has been observed ponding in several areas at various times during the winter and spring, the soil was not saturated, and no water percolated into the

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16-inch pits that were dug, on March 26, 1996. The ponding is thought to be due to heavy clay soils and a pile of fill blocking drainage into a ditch. In addition, precipitation was above average in February and April, which probably made the site much wetter than in more normal years.

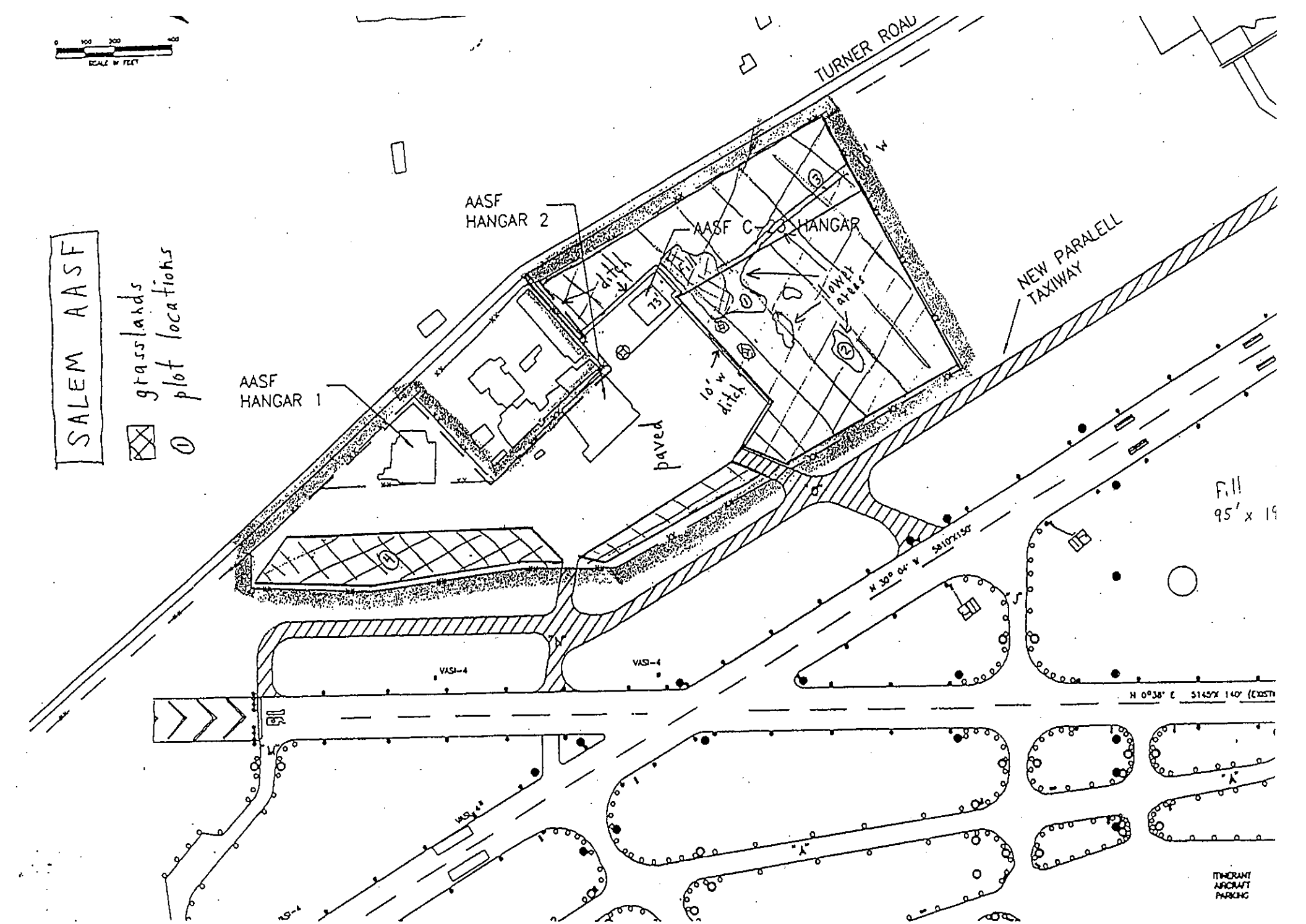
Based on our research and onsite observations of the existing hydrology and vegetation, we believe that no areas on the AASF are jurisdictional wetlands. We reached this conclusion because the hydrology criterion was not met at any of the plots, and the vegetation either failed to meet the criterion, or was marginal. The AASF area was probably once wet prairie, but the drainage ditches have effectively altered the site to a drier, upland condition.

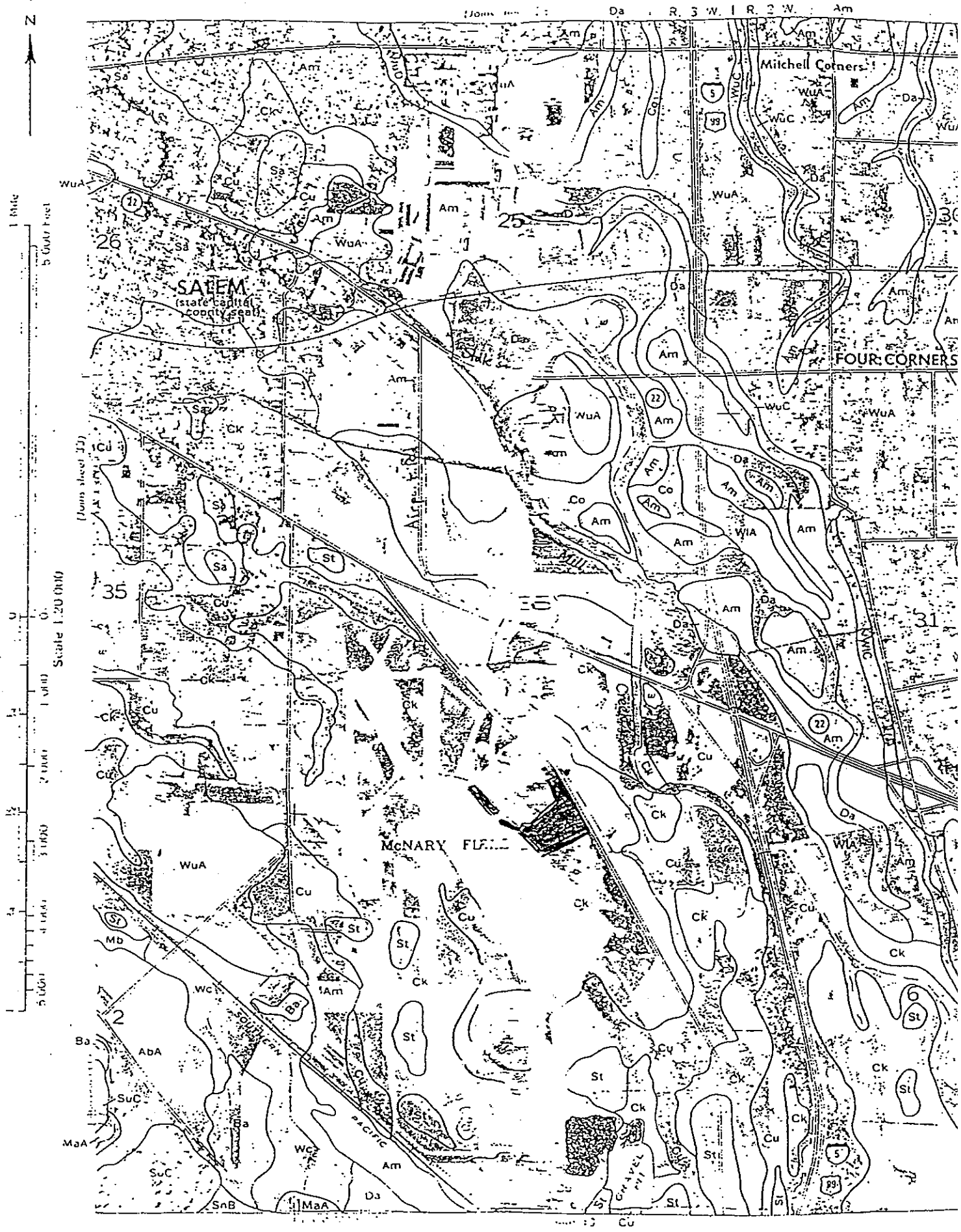
We request that you formally respond to this determination after you have reviewed the enclosed materials. If you have any questions or need additional information, please call Mr. Greg Mitchell at (503) 945-3851.

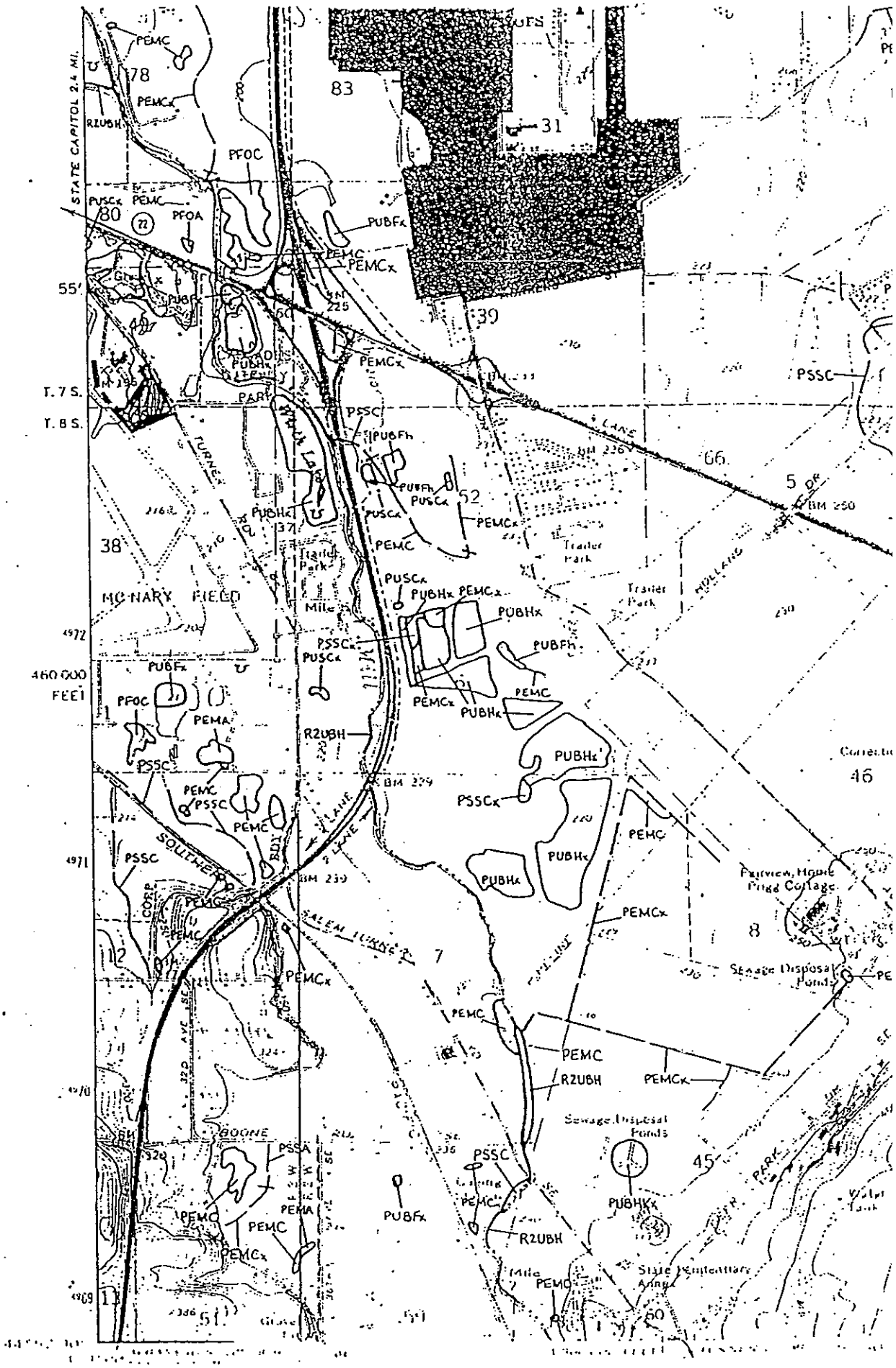
Sincerely,

GERALD E. ELLIOTT
Sergeant Major
Environmental Program Manager

Enclosures


SALEM AASF
grasslands
plot locations
TURNER ROAD
AASF HANGAR 2
AASF C-23 HANGAR
AASF HANGAR 1
NEW PARALELL TAXIWAY
ditch
paved
10' w ditch
lowpt areas
VASI-4
VASI-4
VASI-4
N 30° 04' W
N 0°38' E
ITINERANT AIRCRAFT PARKING
Fill
95' x 19


R. 3 W.
R. 2 W.
Mitchell Corners
SALEM
(state capital, county seat)
FOUR CORNERS
McNARY FIELD
Scale 1:20 000
1 Mile
5 000 Feet
WuA
WuC
Am
Da
Co
Ck
Cu
St
Sa
WlA
Ba
AbA
SuC
MaA
SnB
Mb
Wc
25
26
35
36
31
6
2
1
22
5
99
SOUTHERN PACIFIC
GRAVEL PIT


SALEM NE.
NORTH SANTIAM RIVER

SITE DATA FOR SALEM AASF

10 May 1996

Applicant:	Oregon Military Department 1776 Militia Way Salem, OR 97309-5047
Owner:	City of Salem
Zoning/land use:	light industrial/airport
Proposed use:	aviation operations (paved helicopter parking)
Location:	1921 Turner Rd. SE (next to Salem Airport), Salem, OR Township 7S, Range 3W, Section 36
Size:	AASF is 25 acres; 11.3 acres is undeveloped grassland
Elevation:	195 - 205 feet
Vegetation type:	grassland (11.3 acres)
Topography:	flat/gently sloping to north; drains northeast through site ditches to roadside ditches
Floodway:	not in floodway; AASF in 100-year floodplain of Mill Creek (4 Sept 1986 FEMA map)
Wetlands:	no NWI mapped wetlands
Present use:	aviation operations since the 1970s
Past use:	unused part of Salem Airport since at least the 1950s
Adjacent areas:	parks/open space and industrial to north and east; industrial to south; airport to west

Form completed by: Greg Mitchell, Natural Resources Specialist, Oregon Military Dept.

DATA FORM 1

WETLAND DETERMINATION

Applicant Name: Oregon Military Dept. Application Number: _____ Project Name: AASF Helicopter Parking Expansion

State: OR County: Marion Legal Description: Township: 7S Range: 3W

Date: 3/26/96 Plot No.: 1 Section: 36

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Species	Indicator Status	% cover
Trees		Herbs		
1. NA		7. Festuca arundinacea	FAC- (only dominant)	25%
2.		8.		
3.		9.		
Saplings/shrubs		Woody vines		60% bareground
4. NA		10. NA		
5.		11.		
6.		12.		

% of species that are OBL, FACW, and/or FAC: 0. Other indicators: _____.

Hydrophytic vegetation: Yes ____ No ✓. Basis: _____.

Soil

Series and phase: Clackamas On hydric soils list? Yes ____; No ✓.

Mottled: Yes ✓; No ____. Mottle color: 7.5YR 5/8; Matrix color: 10YR 4/1. 40%

Gleyed: Yes ____ No ✓ Other indicators: _____.

Hydric soils: Yes ✓ No ____; Basis: Matrix chroma < 2

Hydrology

Inundated: Yes ____; No ✓. Depth of standing water: _____.

Saturated soils: Yes ____; No ✓. Depth to saturated soil: _____.

Other indicators: wet surface, drowned veg., encrusted detritus.

Wetland hydrology: Yes ____; No ✓. Basis: no saturation or water in pit after 2 1

Atypical situation: Yes ____; No ✓.

Normal Circumstances? Yes ____ No ✓. site has been ditched

Wetland Determination: Wetland _____; Nonwetland ✓. Hydr lack

Comments:

Ponded water recently dried up
Very little veg. around plot
Heavy clay soils
Site is ditched
Fill blocking drainage to ditch

Determined by: Greg Mitchell

B2

DATA FORM 1

WETLAND DETERMINATION

Applicant Name: OMD Application Number: _____ Project Name: AASF Parking

State: OR County: Marion Legal Description: Township: 7S Range: 3W

Date: 3/26/96 Plot No.: 2 Section: 36

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Dominant Species	Indicator Status	% cover
Trees		**Herbs**		
1. NA		7. Fescue arundinacea	FAC-	35
2.		8. Plantago lanceolata	FAC	10
3.		9. Grass spp.	?	35
Saplings/shrubs		**Woody vines**		
4. NA		10. NA		
5.		11.		
6.		12.		

% of species that are OBL, FACW, and/or FAC: ___. Other indicators: _____.

Hydrophytic vegetation: Yes ___ No ___. Basis: undetermined.

Soil

Series and phase: Clackamas On hydric soils list? Yes ___; No ✓.

Mottled: Yes ✓; No ___. Mottle color: 7.5YR 5/8; Matrix color: 10YR 3/2. 40% mott

Gleyed: Yes ___ No ___ Other indicators: concretions.

Hydric soils: Yes ✓ No ___; Basis: matrix chroma 2.

Hydrology

Inundated: Yes ___; No ✓. Depth of standing water: _____.

Saturated soils: Yes ___; No ✓. Depth to saturated soil: _____.

Other indicators: _____.

Wetland hydrology: Yes ___; No ✓. Basis: no saturation or water in pit.

Atypical situation: Yes ___; No ✓.

Normal Circumstances? Yes ✓ No ___. site ditched

Wetland Determination: Wetland _____; Nonwetland ✓ Hydrology lacking

Comments:

Little veg. around plot

Determined by: Greg Mitchell

DATA FORM 1

WETLAND DETERMINATION

Applicant Name: OMD Application Number: _____ Project Name: AASF parking

State: OR County: Marion Legal Description: Township: 7S Range: 3W

Date: 3/26/96 Plot No.: 4 Section: 36

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Species	Indicator Status	% cover
Trees		Herbs		
1. NA		7. Fescue arundinacea	FAC-	85
2.		8. Plantago lanceolata	FAC	10
3.		9.		
Saplings/shrubs		Woody vines		
4. NA		10. NA		
5.		11.		
6.		12.		

% of species that are OBL, FACW, and/or FAC: 0%. Other indicators: _____.

Hydrophytic vegetation: Yes ____ No X. Basis: _____.

Soil

Series and phase: Clackamas On hydric soils list? Yes ____; No ✓.

Mottled: Yes ✓; No ____. Mottle color: 7.5 YR 5/8; Matrix color: 10 YR 3/2.

Gleyed: Yes ____ No ✓ Other indicators: _____.

Hydric soils: Yes ✓ No ____; Basis: matrix chroma 2

Hydrology

Inundated: Yes ____; No ✓. Depth of standing water: _____.

Saturated soils: Yes ____; No ✓. Depth to saturated soil: _____.

Other indicators: _____.

Wetland hydrology: Yes ____; No ✓. Basis: no saturation or water in pit

Atypical situation: Yes ____; No ____.

Normal Circumstances? Yes ____ No ✓. site ditched

Wetland Determination: Wetland _____; Nonwetland ✓

Comments:

Hydrol
vege
1

Determined by: Greg Mitchell

DATA FORM 1

WETLAND DETERMINATION

Applicant Name: OMD Application Number: _____ Project Name: AASF Parking

State: OR County: Marion Legal Description: Township: 7S Range: 3W

Date: 3/26/96 Plot No.: 3 Section: 36

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

Species	Indicator Status	Species	Indicator Status	% cover
Trees		Herbs		
1. NA		7. Fescue arundinacea	FAC-	50
2.		8. Trifolium pratense	FACU	20
3.		9.		
Saplings/shrubs		Woody vines		
4. NA		10. NA		
5.		11.		
6.		12.		

↖ dominants

% of species that are OBL, FACW, and/or FAC: 0% Other indicators: _____.

Hydrophytic vegetation: Yes ____ No ✓. Basis: _____.

Soil

Series and phase: Clackamas On hydric soils list? Yes ____; No ✓.

Mottled: Yes ✓; No ____. Mottle color: 7.5YR 5/8; Matrix color: 10YR 3/2.

Gleyed: Yes ____ No ____ Other indicators: _____.

Hydric soils: Yes ✓ No ____; Basis: matrix chroma 2

Hydrology

Inundated: Yes ____; No ✓. Depth of standing water: _____.

Saturated soils: Yes ____; No ✓. Depth to saturated soil: _____.

Other indicators: _____.

Wetland hydrology: Yes ____; No ✓. Basis: no soil saturation or water in pit

Atypical situation: Yes ____; No ____.

Normal Circumstances? Yes ____ No ____. site ditched

Wetland Determination: Wetland _____; Nonwetland ✓.

Hydrology & vegetation lacking

Comments:

Determined by: Greg Mitchell

Appendix D
Archaeological Reconnaissance Summary

Prepared by Archaeological Investigations Northwest
February 2011

Archaeological Investigations Northwest, Inc.

2632 S.E. 162nd Ave. • Portland, Oregon 97236
Phone (503) 761-6605 • Fax (503) 761-6620

Vancouver Phone (360) 696-7473
E-mail: ainw@ainw.com
Web: www.ainw.com

MEMO

Date: February 3, 2011

To: Kevin Mulcaster, AICP, Mead & Hunt, Inc.

From: Lucie Tisdale, M.A., R.P.A., Senior Archaeologist

Re: Salem McNary Field Airport
Salem, Marion County, Oregon
Archaeological Reconnaissance Summary

Archaeological Investigations Northwest, Inc. (AINW) conducted a preliminary background review and filed reconnaissance to provide information regarding archaeological and historic resources that may be found in the project area. The Salem McNary Field is currently conducting an analysis of alternatives as part of the Phase II and Runway Needs Assessment. Following close in time may be the EA for the NEPA and will need to be reviewed by the FAA. The review by the FAA for the NEPA study will mean that the project will need to meet Section 106 of the National Historic Preservation Act.

Salem McNary Field is located in Township 7 South, Range 3 West, Section 36 and Township 8 South, Range 3 West, Section 1 of the Willamette Meridian, in Marion County, Oregon (Figure 1). Reports, historical maps, and other information available to AINW in its library, at the State Historic Preservation office (SHPO), and online was consulted to determine the likelihood for the presence of archaeological and historic resources within the proposed project area.

Archaeological Resources

Based on information in the SHPO files, cultural resource surveys have been completed for projects around the airport but not within the airport. These surveys have been conducted for industrial park developments as well as Interstate 5 interchange improvements. One archaeological resource is located within the airport grounds. The site was recorded in the 1970s, during a time when exact location data were not used and therefore, site boundaries could not be determined. There are known archaeological sites located within 0.25 mile (0.40 kilometer) of the Salem McNary Field Airport. Mill Creek, located northeast of the airport is known historically for Native American village sites.

A field reconnaissance was completed on November 24, 2010, to address the current alternative analysis and to also determine current conditions and to provide information on possible evidence of the previously recorded site on the surface of the ground. A field reconnaissance was done by accessing the field by car and foot and spot checking for previous disturbance. An area located on the northwest end of the runway had evidence of a historic trash scatter (Photo 1). This trash scatter is located within the safety zone of the airport runway.

Surface inspection indicated soils to be very gravelly and rocky as possible remnants of an old alluvial terrace. The south end of the airport grounds has the small remnants of an old pond (Photo 2). Inspection of a 1980s aerial photograph showed the pond to be approximately 300 feet in diameter but the city of Salem has since been filling it. It is not known if the pond was man-made or if it was a natural pond formed and cut-off from Mill Creek. Archaeological sites are more often found near water and if the pond was natural, may be considered an area likely for encountering archaeological resources.

AINW staff spot-checked areas that were thought to contain the archaeological site, 35MA13. There was no surface indication of the previously recorded archaeological site within the airport grounds.

Portions of the runway were built or maintained by the US Navy during World War II. Old runway maps are held in the airport office for viewing. On line information about McNary Field indicate that a large expansion project took place during the war and that the airport received its official name in 1944. Salem McNary Field meets the age requirements for listing in the National Register of Historic Places (50 years of age or older).

Recommendations

Given that an archaeological site had previously been recorded and surface inspection did not locate the site, AINW recommends an intensive pedestrian survey and subsurface testing for areas of the airport that are likely intact and that will be impacted. Salem McNary Field is considered a historic resource and AINW recommends that documentation and determination of eligibility also be completed.

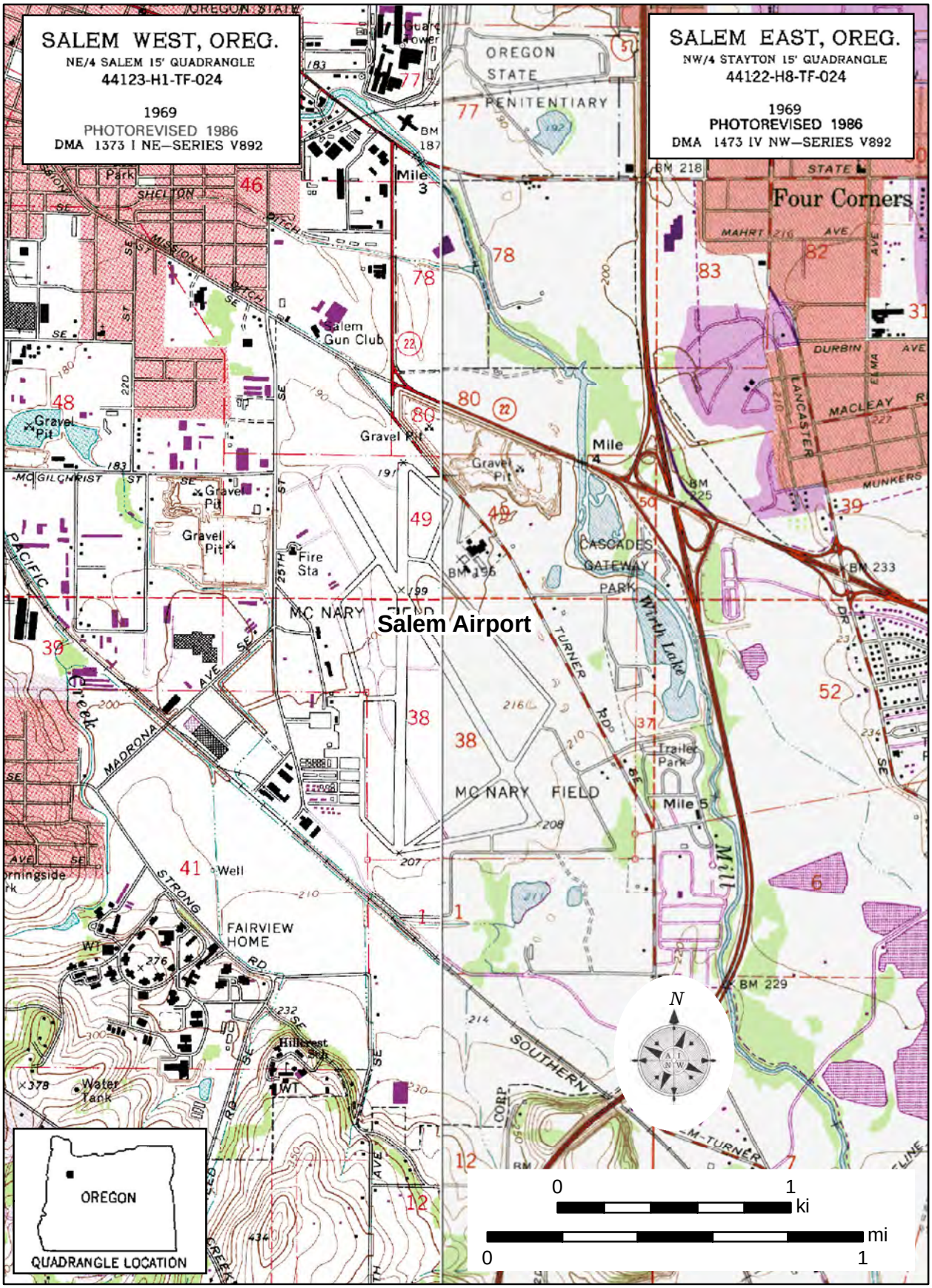


Figure 1. Salem Airport location.

Photo 1. Whiteware and glass fragments from trash scatter located northwest of runway.

Photo 2. Remaining 'pond' south of runway in Salem McNary Field.

Appendix E
FAA Forecasting

Prepared by Mead & Hunt, Inc.
August 2011

Comparing Airport Planning and TAF Forecasts

AIRPORT NAME: **Salem Municipal Airport**

	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base yr.	2008	14,834	14,834	0.00%
Base yr. + 5yrs.	2013	5,673	5,673	0.00%
Base yr. + 10yrs.	2018	5,673	5,673	0.00%
Base yr. + 15yrs.	2023	5,673	5,673	0.00%
Commercial Operations				
Base yr.	2008	1,722	3,005	-42.70%
Base yr. + 5yrs.	2013	1,902	1,892	0.53%
Base yr. + 10yrs.	2018	2,140	2,140	0.00%
Base yr. + 15yrs.	2023	2,418	2,418	0.00%
Total Operations				
Base yr.	2008	64,777	66,410	-2.46%
Base yr. + 5yrs.	2013	67,271	55,274	21.70%
Base yr. + 10yrs.	2018	71,519	59,626	19.95%
Base yr. + 15yrs.	2023	74,797	64,337	16.26%

NOTES: TAF data is on a U.S. Government fiscal year basis (October through September).

AF/TAF (% Difference) column has embedded formulas.

Salem Municipal Airport Planning Forecasts

A. Forecast Levels and Growth Rates

AIRPORT NAME: Salem Municipal Airport **Specify base year:** 2008

	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Average Annual Compound Growth Rates: Base yr. to +1	Base yr. to +5	Base yr. to +10	Base yr. to +15
Passenger Enplanements									
Air Carrier	0	0	0	0	0	N/A	N/A	N/A	N/A
Commuter	14,834	0	5,673	5,673	5,673	-100.0%	-17.5%	-9.2%	-6.2%
TOTAL	14,834	0	5,673	5,673	5,673	-100.0%	-17.5%	-9.2%	-6.2%
Operations									
Itinerant									
Air carrier	20	20	17	17	17	-1.1%	-3.2%	-1.6%	-1.1%
Commuter/air taxi/Cargo	1,702	1,735	1,875	2,123	2,401	2.0%	2.0%	2.2%	2.3%
Total Commercial Operations	1,722	1,755	1,892	2,140	2,418	9.6%	1.9%	1.9%	2.2%
General aviation	27,322	27,838	30,000	32,000	33,000	1.9%	1.9%	1.6%	1.3%
Military	3,404	1,773	1,773	1,773	1,773	-47.9%	-12.2%	-6.3%	-4.3%
Local									
General aviation	31,046	31,427	33,000	35,000	37,000	1.2%	1.2%	1.2%	1.2%
Military	1,633	606	606	606	606	-62.9%	-18.0%	-9.4%	-6.4%
TOTAL OPERATIONS	65,127	63,399	67,271	71,519	74,797	-2.7%	0.6%	0.9%	0.9%
Instrument Operations	18,366	17,879	18,970	20,168	21,093	-2.5%	0.9%	1.1%	1.1%
Peak Hour Operations	39	39	40	43	45	1.0%	1.0%	1.4%	1.4%
Cargo/mail (enplaned+deplaned tons)	199	203	214	237	264	2.4%	1.4%	1.8%	1.9%
Based Aircraft									
Single Engine (Nonjet)	153	156	170	177	184	2.1%	2.1%	1.5%	1.2%
Multi Engine (Nonjet)	21	21	23	24	25	1.8%	1.8%	1.3%	1.2%
Jet Engine	12	12	13	14	14	1.6%	1.6%	1.6%	1.0%
Helicopter	11	11	12	13	13	1.8%	1.8%	1.7%	1.1%
Other	19	19	21	22	23	2.0%	2.0%	1.5%	1.3%
TOTAL	216	220	239	250	259	2.0%	2.0%	1.5%	1.2%

B. Operational Factors

	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.
Average aircraft size (seats)					
Air carrier	0.0	0.0	0.0	0.0	0.0
Commuter	50.0	0.0	9.0	9.0	9.0
Average enplaning load factor					
Air carrier	0.0%	0.0%	0.0%	0.0%	0.0%
Commuter	61.6%	0.0%	75.0%	75.0%	75.0%
GA operations per based aircraft	270	269	264	268	270

Note: Show base plus one year if forecast was done. If planning effort did not include all forecast years shown interpolate years as needed, using average annual compound growth rates.

NOTE: Right hand side of worksheet has embedded formulas for average annual compound growth rate calculations.

U.S. Department
of Transportation

**Federal Aviation
Administration**

Seattle Airports District Office
1601 Lind Avenue, S. W., Ste 250
Renton, Washington 98055-4056

11 August, 2011

Mr. Robert Noble
Acting Airport Administrator
City of Salem
555 Liberty Street SE Rm 330
Salem, OR 97301-3503

Dear Mr. Noble:

Airport Improvement Program (AIP) Project Number 3-41-0055-016 & 017
Approval of Activity Forecasts – Airport Master Plan Update

I have reviewed the (revised) Aviation Activity Forecasts (Chapter 3) submitted by your Consultants. I find adequate justification exists for the figures cited and hereby approve the Forecast Summary.

If you have any questions, please feel free to contact me at: 425.227.2649 or by e-mail at: bruce.fisher@faa.gov.

Sincerely,

Bruce C. Fisher
Airport Planner, Oregon / Idaho

cc: Mr. Kevin Mulcaster, Mead & Hunt, Inc.

Appendix F
Integrated Noise Model Input

Prepared by Mead & Hunt, Inc.
November 2011

Runway End 13	D-13	D-13	13 LT	13 LT	13 LOC/S	13 LOC/S	13 RT	13 RT	T&G-L	T&G-L-D	T&G-L-N	T&G-R	T&G-R-D	T&G-R-N
Code	Day	Night	Day	Night	Day	Night	Day	Night	Total	Day	Night	Total	Day	Night
Air Carrier/Cargo														
CLREGJ	1.38	0.07	0.00	0.00	1.38	0.07	0.00	0.00						
CNA208	0.57	0.03	0.00	0.00	0.57	0.03	0.00	0.00						
Military									0.98			0.98		
S70 - Blackhawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B206L-Kiowa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23- Sherpa	0.10	0.01	0.03	0.00	0.03	0.00	0.03	0.00	0.49	0.46	0.02	0.49	0.46	0.02
C-12-Huron	0.10	0.01	0.03	0.00	0.03	0.00	0.03	0.00	0.49	0.46	0.02	0.49	0.46	0.02
Corporate GA									0.00					
GIV	0.12	0.01	0.04	0.00	0.04	0.00	0.04	0.00						
Lear35+31	0.24	0.01	0.08	0.00	0.08	0.00	0.08	0.00						
Bec9F	0.12	0.01	0.04	0.00	0.04	0.00	0.04	0.00						
Citation I	0.12	0.01	0.04	0.00	0.04	0.00	0.04	0.00						
FAL20	0.12	0.01	0.04	0.00	0.04	0.00	0.04	0.00						
CNA55B	0.12	0.01	0.04	0.00	0.04	0.00	0.04	0.00						
CNA510	0.12	0.01	0.04	0.00	0.04	0.00	0.04	0.00						
Other GA									18.57			18.57		
CNA182	7.28	0.38	2.43	0.13	2.43	0.13	2.43	0.13	4.64	4.41	0.23	4.64	4.41	0.23
CNA206	7.28	0.38	2.43	0.13	2.43	0.13	2.43	0.13	4.64	4.41	0.23	4.64	4.41	0.23
GASEPF	7.28	0.38	2.43	0.13	2.43	0.13	2.43	0.13	4.64	4.41	0.23	4.64	4.41	0.23
GASEPV	7.28	0.38	2.43	0.13	2.43	0.13	2.43	0.13	4.64	4.41	0.23	4.64	4.41	0.23

Runway End 31	D-31	D-31	0	0	1	1	2	2	T&G-L	T&G-L-D	T&G-L-N	T&G-R	T&G-R-D	T&G-R-N
Code	Day	Night	Day	Night	Day	Night	Day	Night	Total	Day	Night	Total	Day	Night
Air Carrier/Cargo														
CLREGJ	1.38	0.07	0.00	0.00	1.38	0.07	0.00	0.00						
CNA208	0.57	0.03	0.00	0.00	0.57	0.03	0.00	0.00						
Military									1.46			1.46		
S70 - Blackhawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B206L-Kiowa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23- Sherpa	0.15	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.73	0.70	0.04	0.73	0.70	0.04
C-12-Huron	0.15	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.73	0.70	0.04	0.73	0.70	0.04
Corporate GA									0.00					
GIV	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00						
Lear35+31	0.36	0.02	0.12	0.01	0.12	0.01	0.12	0.01						
Bec9F	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00						
Citation I	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00						
FAL20	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00						
CNA55B	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00						
CNA510	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00						
Other GA									27.85			27.85		
CNA182	5.46	0.29	1.82	0.10	1.82	0.10	1.82	0.10	6.96	6.61	0.35	6.96	6.61	0.35
CNA206	5.46	0.29	1.82	0.10	1.82	0.10	1.82	0.10	6.96	6.61	0.35	6.96	6.61	0.35
GASEPF	5.46	0.29	1.82	0.10	1.82	0.10	1.82	0.10	6.96	6.61	0.35	6.96	6.61	0.35
GASEPV	5.46	0.29	1.82	0.10	1.82	0.10	1.82	0.10	6.96	6.61	0.35	6.96	6.61	0.35

Runway End 16	D-16	D-16	16 LT	16 LT	16 STRT	16 STRT	16 RT	16RT	T&G-L	T&G-L-D	T&G-L-N	T&G-R	T&G-R-D	T&G-R-N
Code	Day	Night	Day	Night	Day	Night	Day	Night	Total	Day	Night	Total	Day	Night
Air Carrier/Cargo														
CLREGJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
CNA208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Military									0.49					
S70 - Blackhawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B206L-Kiowa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23- Sherpa	0.05	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.24	0.23	0.01	0.24	0.23	0.01
C-12-Huron	0.05	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.24	0.23	0.01	0.24	0.23	0.01
Corporate GA									0.00					
GIV	0.06	0.00	0.02	0.00	0.02	0.00	0.02	0.00						
Lear35+31	0.12	0.01	0.04	0.00	0.04	0.00	0.04	0.00						
Bec9F	0.06	0.00	0.02	0.00	0.02	0.00	0.02	0.00						
Citation I	0.06	0.00	0.02	0.00	0.02	0.00	0.02	0.00						
FAL20	0.06	0.00	0.02	0.00	0.02	0.00	0.02	0.00						
CNA55B	0.06	0.00	0.02	0.00	0.02	0.00	0.02	0.00						
CNA510	0.06	0.00	0.02	0.00	0.02	0.00	0.02	0.00						
Other GA									9.28			9.28		
CNA182	1.82	0.10	0.61	0.03	0.61	0.03	0.61	0.03	2.32	2.20	0.12	2.32	2.20	0.12
CNA206	1.82	0.10	0.61	0.03	0.61	0.03	0.61	0.03	2.32	2.20	0.12	2.32	2.20	0.12
GASEPF	1.82	0.10	0.61	0.03	0.61	0.03	0.61	0.03	2.32	2.20	0.12	2.32	2.20	0.12
GASEPV	1.82	0.10	0.61	0.03	0.61	0.03	0.61	0.03	2.32	2.20	0.12	2.32	2.20	0.12

Runway End 34	D-34	D-34	34 LT	34 LT	34 STRT	34 STRT	34 RT	34 RT	T&G-L	T&G-L-D	T&G-L-N	T&G-R	T&G-R-D	T&G-R-N
Code	Day	Night	Day	Night	Day	Night	Day	Night	Total	Day	Night	Total	Day	Night
Air Carrier/Cargo														
CLREGJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
CNA208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
Military									1.95			1.95		
S70 - Blackhawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B206L-Kiowa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23- Sherpa	0.19	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.10	0.09	0.00	0.10	0.09	0.00
C-12-Huron	0.19	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.10	0.09	0.00	0.10	0.09	0.00
Corporate GA									0.00					
GIV	0.24	0.01	0.08	0.00	0.08	0.00	0.08	0.00						
Lear35+31	0.48	0.03	0.16	0.01	0.16	0.01	0.16	0.01						
Bec9F	0.24	0.01	0.08	0.00	0.08	0.00	0.08	0.00						
Citation I	0.24	0.01	0.08	0.00	0.08	0.00	0.08	0.00						
FAL20	0.24	0.01	0.08	0.00	0.08	0.00	0.08	0.00						
CNA55B	0.24	0.01	0.08	0.00	0.08	0.00	0.08	0.00						
CNA510	0.24	0.01	0.08	0.00	0.08	0.00	0.08	0.00						
Other GA									37.14			37.14		
CNA182	14.57	0.77	4.86	0.26	4.86	0.26	4.86	0.26	9.28	8.82	0.46	9.28	8.82	0.46
CNA206	14.57	0.77	4.86	0.26	4.86	0.26	4.86	0.26	9.28	8.82	0.46	9.28	8.82	0.46
GASEPF	14.57	0.77	4.86	0.26	4.86	0.26	4.86	0.26	9.28	8.82	0.46	9.28	8.82	0.46
GASEPV	14.57	0.77	4.86	0.26	4.86	0.26	4.86	0.26	9.28	8.82	0.46	9.28	8.82	0.46

OANG	A-STNDRD	A-STNDRD	D-STNDRD	D-STNDRD	A-STNDRD	A-STNDRD	D-STNDRD	D-STNDRD
	Day	Night	Day	Night	Day	Night	Day	Night
Military								
S70 - Blackhawk	3.38	0.18	3.38	0.18	3.38	0.18	3.38	0.18
B206L-Kiowa	0.97	0.05	0.97	0.05	0.97	0.05	0.97	0.05

Runway End 13-2028	D-13	D-13	13 LT	13 LT	13 LOC/S	13 LOC/S	13 RT	13 RT	T&G-L-D	T&G-L-N	T&G-R-D	T&G-R-N
Code	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Air Carrier/Cargo												
B737	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00				
CNA208	1.93	0.10	0.00	0.00	1.93	0.10	0.00	0.00				
CNA441	1.93	0.10	0.00	0.00	1.93	0.10	0.00	0.00				
Military												
S70 - Blackhawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B206L-Kiowa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23- Sherpa	0.05	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.17	0.01	0.17	0.01
C-12-Huron	0.05	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.17	0.01	0.17	0.01
Corporate GA												
GIV	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00				
Lear35+31	0.36	0.02	0.12	0.01	0.12	0.01	0.12	0.01				
CNA441 Add to ComOps	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00				
CNA500	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00				
FAL20	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00				
CNA55B	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00				
CNA510	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00				
Other GA												
CNA182	9.22	0.49	3.07	0.16	3.07	0.16	3.07	0.16	5.54	0.29	5.54	0.29
CNA206	9.22	0.49	3.07	0.16	3.07	0.16	3.07	0.16	5.54	0.29	5.54	0.29
GASEPF	9.22	0.49	3.07	0.16	3.07	0.16	3.07	0.16	5.54	0.29	5.54	0.29
GASEPV	9.22	0.49	3.07	0.16	3.07	0.16	3.07	0.16	5.54	0.29	5.54	0.29

Runway End 31-2028	D-31	D-31	0	0	1	1	2	2	T&G-L-D	T&G-L-N	T&G-R-D	T&G-R-N
Code	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Air Carrier/Cargo												
B737	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00				
CNA208	3.86	0.20	0.00	0.00	1.93	0.10	0.00	0.00				
Military												
S70 - Blackhawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B206L-Kiowa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23- Sherpa	0.08	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.26	0.01	0.26	0.01
C-12-Huron	0.08	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.26	0.01	0.26	0.01
Corporate GA												
GIV	0.27	0.01	0.09	0.00	0.09	0.00	0.09	0.00				
Lear35+31	0.54	0.03	0.18	0.01	0.18	0.01	0.18	0.01				
CNA441 Add to ComOps	0.27	0.01	0.09	0.00	0.09	0.00	0.09	0.00				
CNA500	0.27	0.01	0.09	0.00	0.09	0.00	0.09	0.00				
FAL20	0.27	0.01	0.09	0.00	0.09	0.00	0.09	0.00				
CNA55B	0.27	0.01	0.09	0.00	0.09	0.00	0.09	0.00				
CNA510	0.27	0.01	0.09	0.00	0.09	0.00	0.09	0.00				
Other GA												
CNA182	6.92	0.36	2.31	0.12	2.31	0.12	2.31	0.12	8.31	0.44	8.31	0.44
CNA206	6.92	0.36	2.31	0.12	2.31	0.12	2.31	0.12	8.31	0.44	8.31	0.44
GASEPF	6.92	0.36	2.31	0.12	2.31	0.12	2.31	0.12	8.31	0.44	8.31	0.44
GASEPV	6.92	0.36	2.31	0.12	2.31	0.12	2.31	0.12	8.31	0.44	8.31	0.44

Track	D-16	D-16	16 LT	16 LT	16 STRT	16 STRT	16 RT	16RT	T&G-L-D	T&G-L-N	T&G-R-D	T&G-R-N
Code	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Air Carrier/Cargo												
B737	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
CNA208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Military												
S70 - Blackhawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B206L-Kiowa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23- Sherpa	0.03	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.09	0.00	0.09	0.00
C-12-Huron	0.03	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.09	0.00	0.09	0.00
Corporate GA												
GIV	0.09	0.00	0.03	0.00	0.03	0.00	0.03	0.00				
Lear35+31	0.18	0.01	0.06	0.00	0.06	0.00	0.06	0.00				
CNA441 Add to ComOps	0.09	0.00	0.03	0.00	0.03	0.00	0.03	0.00				
CNA500	0.09	0.00	0.03	0.00	0.03	0.00	0.03	0.00				
FAL20	0.09	0.00	0.03	0.00	0.03	0.00	0.03	0.00				
CNA55B	0.09	0.00	0.03	0.00	0.03	0.00	0.03	0.00				
CNA510	0.09	0.00	0.03	0.00	0.03	0.00	0.03	0.00				
Other GA												
CNA182	2.31	0.12	0.77	0.04	0.77	0.04	0.77	0.04	2.77	0.15	2.77	0.15
CNA206	2.31	0.12	0.77	0.04	0.77	0.04	0.77	0.04	2.77	0.15	2.77	0.15
GASEPF	2.31	0.12	0.77	0.04	0.77	0.04	0.77	0.04	2.77	0.15	2.77	0.15
GASEPV	2.31	0.12	0.77	0.04	0.77	0.04	0.77	0.04	2.77	0.15	2.77	0.15

Track	D-34	D-34	34 LT	34 LT	34 STRT	34 STRT	34 RT	34 RT	T&G-L-D	T&G-L-N	T&G-R-D	T&G-R-N
Code	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Air Carrier/Cargo												
B737	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
CNA208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Military												
S70 - Blackhawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B206L-Kiowa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C23- Sherpa	0.10	0.01	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00
C-12-Huron	0.10	0.01	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00
Corporate GA												
GIV	0.36	0.02	0.12	0.01	0.12	0.01	0.12	0.01				
Lear35+31	0.72	0.04	0.24	0.01	0.24	0.01	0.24	0.01				
CNA441 Add to ComOps	0.36	0.02	0.12	0.01	0.12	0.01	0.12	0.01				
CNA500	0.36	0.02	0.12	0.01	0.12	0.01	0.12	0.01				
FAL20	0.36	0.02	0.12	0.01	0.12	0.01	0.12	0.01				
CNA55B	0.36	0.02	0.12	0.01	0.12	0.01	0.12	0.01				
CNA510	0.36	0.02	0.12	0.01	0.12	0.01	0.12	0.01				
Other GA												
CNA182	9.22	0.49	3.07	0.16	3.07	0.16	3.07	0.16	11.08	0.58	11.08	0.58
CNA206	9.22	0.49	3.07	0.16	3.07	0.16	3.07	0.16	11.08	0.58	11.08	0.58
GASEPF	9.22	0.49	3.07	0.16	3.07	0.16	3.07	0.16	11.08	0.58	11.08	0.58
GASEPV	9.22	0.49	3.07	0.16	3.07	0.16	3.07	0.16	11.08	0.58	11.08	0.58

	A-STNDRD	A-STNDRD	D-STNDRD	D-STNDRD	A-STNDRD	A-STNDRD	D-STNDRD	D-STNDRD
	Day	Night	Day	Night	Day	Night	Day	Night
Military								
S70 - Blackhawk	1.76	0.09	1.76	0.09	1.76	0.09	1.76	0.09
B206L-Kiowa	0.50	0.03	0.50	0.03	0.50	0.03	0.50	0.03

Appendix G
Public Involvement Summary

Prepared by Mead & Hunt, Inc.
August 2012

Appendix **G**

Public Involvement Summary

A Planning Advisory Committee (PAC) was formed by the City of Salem to assist with the development of the Airport Master Plan Phase II by assessing Airport and Community issues. PAC membership was determined by the City of Salem. Members include neighborhood groups, local businesses, airport users, airport businesses, and City of Salem staff. The PAC acted as a sounding board for proposed improvements, and a conduit for information between various interest groups throughout the community. Three PAC meetings were held to provide interaction between airport staff, PAC members, and the consultant team. These meetings were scheduled to coincide with milestones in the planning process, and used to solicit information and responses from airport staff and the PAC regarding information presented by the consultant team. PAC meetings were open to the public, and were advertised by the City of Salem.

In addition to the PAC, three public open houses were held to help educate the public on airport issues and airport planning. Information and documents were provided at the meetings, and on a project website. Two presentations were made to the Airport Advisory Commission (AAC), whose meetings are open to the public and occur monthly. One presentation was made during a City Council working session, which included a public question and answer session afterwards.

The following meetings and open houses occurred during as part of the Master Plan.

PAC Meeting #1	March 23, 2011
PAC Meeting #2	June 29, 2011
Public Open House #1	June 29,2011
Presentation to AAC #1	October 7, 2011
City Council Work Session	October 17, 2011
PAC Meeting #3	December 7, 2011
Presentation to AAC #2	February 1, 2012
PAC Meeting #3	February 1, 2012
Public Open House #2	February 16, 2012

In addition to meetings held specifically for the Airport, the Airport Manager attended various neighborhood meetings from September 2011 to August 2012. These included meetings with the Northeast Neighbors (NEN); Southeast Mill Creek (SEMCA); South East Salem (SESNA); and South Gateway neighborhood associations. The Airport Manager provided an overview of the contents and highlights of the Master Plan, and advised citizens on how they can become involved in the process.

Photos and meeting announcements from the public involvement process are included on the following page.

Exhibit E-1: Public Involvement Process

Public Open House, June 29, 2011

Public Open House, June 29, 2011

Public Open House, January 7, 2012

Public Open House, January 7, 2012

CITY OF Salem AT YOUR SERVICE

FOR IMMEDIATE RELEASE
DATE: Tuesday, February 7, 2012

CONTACT PERSON: John Paskell, Airport Administrator
City of Salem
503-588-6314
jpaskell@cityofsalem.net

Public Invited to Comment on Salem Airport Master Plan

Salem, OR – What does the future hold for the development of Salem Airport? The City of Salem has set a public meeting to seek feedback from the public on the draft Airport Master Plan. The meeting will be held on Thursday, February 16 starting at 5:30 p.m. at the Airport Terminal Building (2990 25th Street SE).

Last updated in 1997, the new Airport Master Plan provides a vision and roadmap for development of the site over the next 20 years. Salem City Council will consider the draft Master Plan at a public hearing on Monday, February 27 at their regularly scheduled meeting at City Hall (555 Liberty Street SE – Council Chambers). Council meetings begin at 6:30 p.m.

The 750-acre Salem Municipal Airport has been a landmark in the community since it was created by voters in 1928. Salem Airport is a hub for corporate, cargo, military and general aviation.

Copies of the draft Master Plan are available for public review at the Salem Library, or may be downloaded from the web (www.meadhunt.com/client/SLE/master-plan.html).

For more information, contact John Paskell, Airport Administrator (phone: 503-588-6314 email: jpaskell@cityofsalem.net).

Si necesita ayuda para comprender esta informacion, por favor llame 503-588-6178. Modifications or accommodations in order to participate in this meeting are available upon request (including sign language and interpreters). To request, email urbandev@cityofsalem.net or call 503-588-6314 at least two business prior to this meeting.

# # #

Public Open House Press Release, Feb. 16, 2012

Salem Airport Master Plan

Public Meeting – *You're Invited!*

The draft Master Plan is ready for review – share your views!

Thursday, February 16, 2012
Airport Terminal Building
2990 25th Street SE,
Salem, OR 97302

5:30 p.m. Doors Open
6:00 p.m. Presentation
Public Comment

If you can't attend, the draft Master Plan is also available at:

- Salem Public Library (585 Liberty St. SE)
- Website: www.meadhunt.com/client/SLE/master-plan.html

Comments are appreciated and may be directed to John Paskell, Airport Administrator by February 16:

Email: jpaskell@cityofsalem.net
Website: www.meadhunt.com/client/SLE/plan-comments.html
Address: Salem Municipal Airport
2990 25th St. SE, Salem OR 97302
Phone: 503-588-6314
Fax: 503-315-2550

Salem City Council will hold a public hearing on the Airport Master Plan February 27, 6:30 p.m. at City Hall (555 Liberty St. SE / Council Chambers / Room 240)

Si necesita ayuda para comprender esta información, por favor llame 503-588-6178. Modifications or accommodations in order to participate in this meeting are available upon request (including sign language and interpreters). To request, email urbandev@cityofsalem.net or call 503.588.6314 at least two business days before this meeting.

Public Open House Advertisement, Feb. 16, 2012

Appendix H
List of Preparers

Prepared by Mead & Hunt, Inc.
August 2012

Appendix **H**

List of Preparers

The Salem Municipal Airport Master Plan was prepared with assistance from the City of Salem, Mead & Hunt, Inc., Vigil-Agrimis, Inc., and Archaeological Investigation Northwest, Inc. The following individuals wrote, reviewed, and edited the document.

City of Salem

John Paskell	Airport Administrator
Robert Noble	Deputy Assistant Airport Administrator
Tom Franklin	Airport Operations Manager
John Wales	Urban Development Director
Courtney Knox	Urban Development Project Coordinator
Tory Banford	Urban Development Management Analyst

Mead & Hunt, Inc.

Damon Smith	Pacific Northwest Aviation Business Unit Leader
Kevin Mulcaster	Project Manager
Mitchell Hooper	Project Planner
Brad Musinski	Airport Layout Plan Coordinator
Jon Archibald	Hydrology Engineer
Kari Nichols	Environmental Engineer
Kerry Seifert	Project Engineer

Vigil-Agrimis, Inc.

Paul Agrimis	Vice President
Linda Mark	Project Manager
Mike Yun	Landscape Planner

Archaeological Investigations Northwest

Lucie Tisdale	Senior Archaeologist