# AURORA STATE AIRPORT

## DRAFT AIRPORT MASTER PLAN

Aurora, OR
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Working Paper No. 1

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Runway 17 Looking South – Source: Century West Engineering

Chapter 1

# *Introduction*

The Oregon Department of Aviation (ODAV) is preparing an Airport Master Plan (AMP) for Aurora State Airport (Airport) in cooperation with the Federal Aviation Administration (FAA) to define the Airport's needs for the next 20 years. The Airport Master Plan will provide specific guidance to maintain a safe and efficient airport that is economically, environmentally, and socially sustainable.

A glossary of common aviation terminology and list of acronyms is provided in **Appendix 1**.

## Project Purpose and Need

The purpose of the Airport Master Plan is to define the current, short-term, and long-term needs of the Airport through a comprehensive evaluation of facilities, conditions, and FAA airport planning and design standards. The study will also address elements of local planning (land use, transportation, environmental, economic development, etc.) that have the potential of affecting the planning, development, and operation of the Airport. The FAA requires airports to maintain current planning as conditions change. This Airport Master Plan will address changing local conditions, current FAA standards, and trends within the aviation industry.

## Project Funding

Funding for the Airport Master Plan is being provided through an FAA Airport Improvement Program (AIP) grant (AIP grant 3-41-004-022; $994,764). The AIP is a dedicated fund administered by FAA with the specific purpose of maintaining and improving the nation's public-use airports. The AIP is funded exclusively through fees paid by users of general aviation and commercial aviation. This project received 100% funding from the FAA, which includes COVID recovery funds. No local match was required.

**100% FAA Funded Project**

**Total: $994,764**

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# Goals of the Airport Master Plan

The primary goal of the master plan is to provide the framework and vision needed to define future facility needs at Aurora State Airport. The FAA sets out goals and objectives each master plan should meet to ensure future development will cost-effectively satisfy aviation demand and consider potential environmental and socioeconomic impacts.

***Goal 1:*** Define the vision for the Airport to effectively serve airport users and the region. Assess known issues including air traffic control, runway length, ability to accommodate development, auto parking, fencing, and land use to develop a realistic, sustainable plan to improve the Airport.

***Goal 2:*** Document existing activity, condition of airfield facilities, and policies that impact airport operations and development opportunities.

***Goal 3:*** Forecast future activity based on accepted methodology.

***Goal 4:*** Evaluate facilities and conformance with applicable local, state, and FAA standards.

**Goal 5:** Identify facility improvements to address design conformance issues and accommodate demand.

***Goal 6:*** Identify potential environmental and land use requirements that may impact development.

***Goal 7:*** Explore alternatives to address facility needs. Work collaboratively with all stakeholders to develop workable solutions to address needs.

***Goal 8:*** Develop an Airport Layout Plan to graphically depict proposed improvements consistent with FAA standards as a road map to future development. Prepare a supporting Capital Improvement Plan to summarize costs and priorities.

***Goal 9:*** Provide recommendations to improve land use and zoning oversight of the Airport to remove barriers to appropriate growth at the Airport.

***Goal 10:*** Summarize the vision and plan for the Airport in the Airport Master Plan report.

Source: FAA with Century West airport-specific content.

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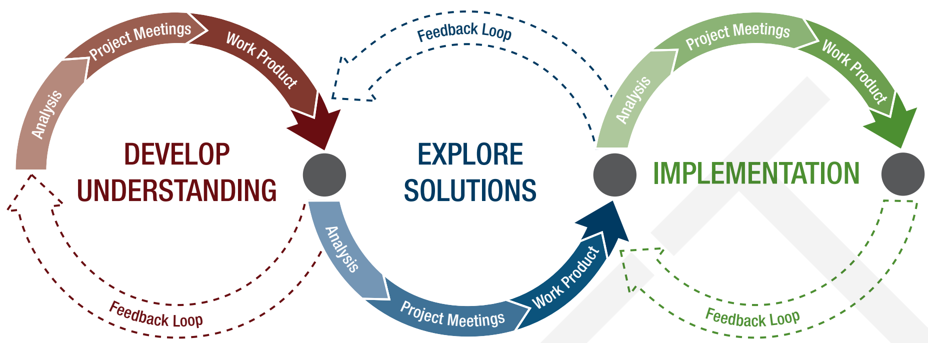
## THE FAA ROLE IN THE AIRPORT MASTER PLAN

FAA *Advisory Circular (AC) 150/5070-6B Airport Master Plans* defines the specific requirements and evaluation methods established by FAA for the study. The guidance in this AC covers planning requirements for all airports, regardless of size, complexity, or role. However, each master plan study must focus on the specific needs of the airport for which a plan is being prepared.

The recommendations contained in an airport master plan represent the views, policies and development plans of the airport sponsor and do not necessarily represent the views of the FAA. Acceptance of the master plan by the FAA does not constitute a commitment on the part of the United States to participate in any development depicted in the plan, nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public law. The FAA reviews all elements of the master plan to ensure that sound planning techniques have been applied. However, the FAA only approves the Aviation Activity Forecasts and Airport Layout Plan.

# Planning Process

The three-phase planning process is designed to provide multiple feedback loops intended to maintain the flow of information and ideas among the community and project stakeholders and ultimately maximize public involvement.




# Framework of the Airport Master Plan

The framework of the Airport Master Plan provides a clear structure to inform and steer future planning decisions and serve as a tool to guide a process that allows the plan to take shape through flexibility, iteration, and adaptation. The framework is based upon an airport-urban interface model intended to analyze the regional setting of the Airport, its landside elements and airside elements, as well as the management and administration functions associated with the Airport. The framework provides guidance while being flexible enough to adapt to changing conditions to maximize opportunities to develop understanding, explore solutions, and implement the preferred development alternatives for the Airport and adjacent urban and rural environments.

| | Regional Setting | Airside Elements | Landside Elements | Airport Administration |
|---|---|---|---|---|
| **Develop Understanding**<br>**Explore Solutions**<br>**Implementation** | Location & Vicinity<br>Socio-Economic Data<br>Airport Role<br>Airport History<br>Area Airports Context<br>Airport Operations<br>Applicable Planning Studies<br>Environmental Data<br>Local Surface Transportation<br>Land Use/Zoning | Area Airspace<br>Approach Procedures<br>FAA ATCT<br>Runway/Helipad<br>Taxiways/Taxilanes<br>Aprons/Tiedowns<br>Pavement Condition<br>FAA Design Standards<br>Support Facilities | General Aviation (GA) Terminal Areas<br>Through-the-fence (TTF) Agreements<br>Hangars<br>Airport Surface Roads<br>Vehicle Parking<br>Airport Fencing<br>Utilities | Airport Ownership & Management<br>Airport Financials<br>Airport Rates and Charges<br>Local Codes and Regulations<br>Oregon Aviation Laws<br>FAA Compliance Overview |

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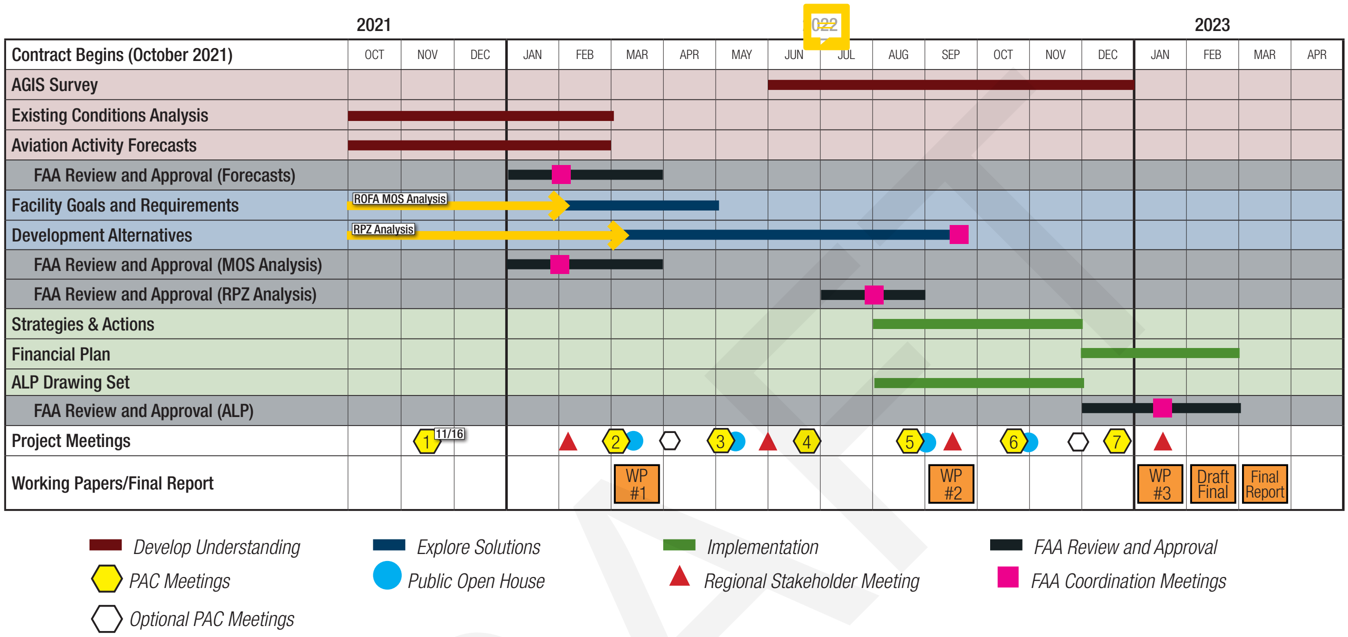
# Project Schedule

The Aurora State Airport Master Plan schedule is expected to occur over 18 months, Phase 1 – Develop Understanding will take approximately five months; Phase 2 – Explore Solutions will take approximately eight months; and Phase 3 – Implementation will take approximately five months including three months for FAA approvals, which can take from three to six months after delivery of the final draft narrative reports and drawings.




# Public Involvement Process

A comprehensive and engaging public involvement process is a key element to a successful Airport Master Plan. Therefore, numerous opportunities for public input are built into the process. ODAV is completing the Aurora Airport Master Plan in accordance with the Department of Land Conservation and Development's (DLCD) State Agency Coordination (SAC) Program. Accordingly, ODAV established a Planning Advisory Committee (PAC) that includes members from all affected Federal, State, Local Special Districts, and Interested Parties. The PAC will meet nine times throughout the 18-month Aurora State AMP project timeline. All PAC meetings are open to the public.

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# Planning Advisory Committee Meetings

The PAC was assembled to provide input and allow for public dissemination of data. Airport tenants, pilots, local & regional economic development interests, neighbors of the airport, and staff/representatives of ODAV serve as members of the PAC. In addition to the membership composition noted above, representatives from the FAA Seattle Airports District Office (ADO) serve as ex officio members of the PAC.

**TABLE 1-1: PLANNING ADVISORY COMMITTEE MEMBERS**

| Organization | Name | Alternate |
|---|---|---|
| 1000 Friends of Oregon | Roger Kaye | |
| AABC/TLM Holdings | Ted Millar | |
| Atlantic Aviation (formerly Lynx Aviation) | Bob Hala | |
| Aurora Air Traffic Control | Raul Suarez | |
| Aurora Airport Improvement Association | Bruce Bennett | |
| Aurora Butteville Barlow Community Planning Organization | Ken Ivey | |
| Aurora CTE, Inc | Bill Graupp | |
| Charbonneau Country Club | Steven P. Switzer | |
| City of Aurora | Brian Asher | |
| City of Canby | Scott Archer | |
| City of Wilsonville | Charlotte Lehan | Chris Neamtzu |
| Clackamas County | Commissioner Tootie Smith | |
| Columbia Helicopters | Rob Roedts | Bob Buchanan |
| Confederated Tribes of Siltez Indians | Robert Kentta | |
| Confederated Tribes of the Grand Ronde Community of Oregon | Cheryl Pouley | |
| Confederated Tribes of Warm Springs Reservation of Oregon | Christian Nauer | |
| Deer Creek Estates HOA | Matt Williams | |
| Friends of French Prairie | Ben Williams | Wayne Richards |
| Helicopter Transport Service | Robert Fournier | |
| Life Flight Network | Ben Clayton | |
| Marion County | Commissioner Danielle Bethell | |
| Marion County Planning Department | Austin Barnes | Brandon Reich |
| Oregon Dept of Aviation | Tony Beach | |
| Oregon Dept of Aviation Board | Cathryn Stephens | |
| Oregon Dept of Land Conservation and Development | Matt Crall | Nicole Mardell |
| Oregon Dept of Transportation | Naomi Zwerdling | |
| Oregon Farm Bureau | Mary Anne Cooper | |
| Oregon Office of Emergency Management | Bill Martin | Sarah Puls |
| Positive Aurora Airport Management | Tony Helbling | |
| Regional Solutions | Jody Christensen | |
| Vans Aircraft | Rian Johnson | Greg Hughes |
| Willamette Aviation | David Waggoner | |
| Wilsonville Chamber of Commerce | Patrick Donaldson | Kevin O'Malley |

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Air Traffic Control Tower from Hubbard Highway – Source: Century West Engineering

Chapter 2

# Existing Conditions Analysis

The existing conditions analysis documents the existing airfield assets and conditions that affect the operation and development of Oregon Department of Aviation (ODAV)-owned facilities with emphasis on the Airport's regional setting, and its airside, landside, and administrative functions. The existing conditions analysis utilizes site visits, FAA and Sponsor documentation and records, and other publicly available information to support the effort. The findings documented in this chapter will be referenced to support subsequent studies and recommendations throughout the master planning process. A survey of airport stakeholders is being conducted to acquire additional information to help guide the planning process. This information will be summarized and added to the airport master plan documentation.

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## Regional Setting

The Regional Setting section is comprised primarily of features that provide the "big-picture" context of the Airport within its local community and region. This section describes the location and vicinity of the Aurora State Airport and provides a range of information related to the operation and function of the Airport: socio-economic data, airport history, airport role, area airports context, airport activity data, environmental data, local surface transportation systems, land use on and around the Airport, and other relevant data.

### LOCATION AND VICINITY

The community of Aurora, Oregon is located in the Willamette Valley in Marion County. Aurora is located about three miles east of the U.S. Interstate 5 (I-5) corridor, 23 miles south of Portland. Aurora is located within 15 miles of three other adjacent counties (Washington, Yamhill, and Multnomah).

Aurora State Airport is located approximately one mile northwest of the City of Aurora, in Northwest Marion County. The north end of the Airport is located immediately adjacent to the Clackamas County western boundary (at Arndt Road).

Marion County has a land area of approximately 1,193 square miles. The county extends east from the Willamette Valley into the Cascade Range, including Mount Jefferson. Incorporated cities include Salem, Keizer, Woodburn, Silverton, and Aurora. Salem is the county seat.

Clackamas County has a land area of approximately 1,883 square miles. The county extends east from the Willamette Valley into the Cascade Range, including Mount Hood. Incorporated cities include Barlow, Canby, Gladstone, Happy Valley, Lake Oswego, Milwaukie, Oregon City, West Linn, and Wilsonville. Oregon City is the county seat.

**FIGURE 2-1: LOCATION AND VICINITY MAP**


Source: Google Maps

## COMMUNITY SOCIO-ECONOMIC DATA

Data from the Population Research Center (PRC) at Portland State University was reviewed to gauge recent changes in population within the Airport's service area. PRC data confirms that the areas within 30 to 60 minutes of Aurora State Airport have experienced steady growth over the past 10 years, often outpacing statewide growth rates. Sustained population growth within an airport's service area is often a general indication of broader economic conditions required increase airport activity. Historical PRC population estimates and average annual growth rates (AAGR) for these areas are presented in **Table 2-1**.

### TABLE 2-1: HISTORIC POPULATION ESTIMATES

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| Oregon | 3,883,735 | 3,919,020 | 3,962,710 | 4,013,845 | 4,076,350 | 4,141,100 | 4,195,300 | 4,236,400 | 4,243,791 | 4,266,560 |
| AAGR: | - | 0.91% | 1.11% | 1.29% | 1.56% | 1.59% | 1.31% | 0.98% | 0.17% | 0.54% |
| Marion County | 320,495 | 322,880 | 326,150 | 329,770 | 333,950 | 339,200 | 344,035 | 347,760 | 349,120 | 347,182 |
| AAGR: | - | 0.74% | 1.01% | 1.11% | 1.27% | 1.57% | 1.43% | 1.08% | 0.39% | -0.56% |
| Clackamas County | 381,680 | 386,080 | 391,525 | 397,385 | 404,980 | 413,000 | 419,425 | 423,420 | 426,515 | 425,316 |
| AAGR: | - | 1.15% | 1.41% | 1.50% | 1.91% | 1.98% | 1.56% | 0.95% | 0.73% | -0.28% |
| Portland | 601,510 | 592,120 | 587,865 | 613,355 | 627,395 | 639,100 | 648,740 | 657,100 | 664,675 | 658,773 |
| AAGR: | - | -1.56% | -0.72% | 4.34% | 2.29% | 1.87% | 1.51% | 1.29% | 1.15% | -0.89% |
| Salem | 156,455 | 157,770 | 159,265 | 160,690 | 162,060 | 163,480 | 165,265 | 167,400 | 168,970 | 177,694 |
| AAGR: | - | 0.84% | 0.95% | 0.89% | 0.85% | 0.88% | 1.09% | 1.29% | 0.94% | 5.16% |
| Wilsonville | 20,515 | 21,550 | 21,980 | 22,870 | 23,740 | 24,v315 | 25,250 | 25,635 | 25,915 | 27,186 |
| AAGR: | - | 5.05% | 2.00% | 4.05% | 3.80% | 2.42% | 3.85% | 1.52% | 1.09% | 4.90% |
| Aurora | 930 | 935 | 950 | 950 | 970 | 980 | 985 | 985 | 985 | 1,133 |
| AAGR: | - | 0.54% | 1.60% | 0.00% | 2.11% | 1.03% | 0.51% | 0.00% | 0.00% | 15.03% |

Source: PSU Population Research Center (PRC), 2021

A review of economic data also indicates broad growth in the region over the last decade. According to Woods & Poole Economics[1] data, the gross regional products (GRP) of Marion and Clackamas counties have both experienced steady growth over the last 10 years (average annual growth of 4.28% and 3.59%, respectively).

It should be noted that the economic effects of the COVID-19 pandemic are evident in the 2020 data when GRP for both counties decreased -3.77% (Marion) and -3.19% (Clackamas). These declines are attributed to state and local restrictions put in place to slow the spread of the virus, and the corresponding economic contraction. However, data for 2021 highlights economic recovery fueled in part by federal stimulus and steps toward economic recovery.

A summary of Marion and Clackamas County GRPs over the past decade is presented in **Table 2-2**.

### TABLE 2-2: HISTORIC GROSS REGIONAL PRODUCT (2012 DOLLARS)

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| Marion County (millions) | $11,546 | $11,865 | $12,287 | $13,311 | $14,0921 | $14,6971 | $15,532 | $16,132 | $15,523 | $16,761 |
| Percent Change | - | 2.76% | 3.56% | 8.33% | 5.87% | 4.29% | 5.68% | 3.86% | -3.77% | 7.97% |
| | | | | | | | | | | AAGR 4.28% |
| Clackamas County (millions) | $15,497 | $15,520 | $15,505 | $16,734 | $17,606 | $18,569 | $19,613 | $20,237 | $19,592 | $21,172 |
| Percent Change | - | 0.15% | -0.10% | 7.93% | 5.21% | 5.47% | 5.62% | 3.19% | -3.19% | 8.07% |
| | | | | | | | | | | AAGR 3.59% |

Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2021. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of Century West Engineering, Inc.

1 2021 State Profile - Woods & Poole Economics, Inc. Copyright 2021

## AIRPORT HISTORY

Aurora State Airport was built by the United States Army Air Forces in 1943 and was known as the Aurora Flight Strip. From the time of construction until 1953 it was managed by the United States Bureau of Public Roads, when it was transferred to the State of Oregon's Highway Division. In 1973, the Highway Division transferred ownership to the State Aeronautics Division, which would later become ODAV. ODAV remains the owner and operator of Aurora State Airport today.

Although the general configuration of the single-runway airfield has remained largely unchanged, several notable airport facility improvements have been made during the nearly 50 years of State of Oregon ownership:

- **1976** – runway reconstructed and parallel taxiway constructed;
- **1979 and 1986** – property acquisition (22 acres, 10 acres) increased ODAV-owned property to the current 140 acres;
- **1995** – runway length increased to 5,004 feet;
- **2004** – runway reconstructed;
- **2009** – parallel taxiway shifted east, to its current location; and
- **2015** – Air Traffic Control Tower (ATCT) constructed.

During this period, aeronautical use facilities such as aircraft hangars were developed both on ODAV property and on privately-owned land parcels adjacent to the east side of the Airport. These off-airport developments have agreements with ODAV (referred to as "Through-The-Fence", or "TTF" agreements) to access the Aurora State Airport at designated points. Development of two privately-owned heliports adjacent to the east side of Airport has also occurred. However, these facilities do not have TTF access agreements and their operations are fully independent of the Aurora State Airport.

Several planning studies have been completed through the Airport's history, including FAA-funded master plans in 1976, 1988, and 2012. A Constrained Operations – Runway Justification Study was completed in 2019 to review the recommended runway improvements defined in the 2012 Airport Master Plan Update. A list of recent FAA AIP funded projects is presented below in **Table 2-3**.

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**TABLE 2-3: PROJECT HISTORY**

| Fiscal Year | Federal Grant Sequence Number | Project Description | Federal Grants/Funds | State of Oregon Grants/Funds |
|---|---|---|---|---|
| 2005 | 11 | Rehabilitate Runway - 17/35 | $1,100,000 | $0 |
| 2007 | 12 | Construct Taxiway, Install Miscellaneous NAVAIDS, Install Taxiway Lighting | $1,959,856 | $0 |
| 2007 | 13 | Construct Taxiway, Install Miscellaneous NAVAIDS, Install Taxiway Lighting | $2,293,993 | $0 |
| 2009 | 14 | Remove Obstructions | $100,000 | $0 |
| 2009 | 15 | Conduct Miscellaneous Study (Airport Master Plan Update) | $534,431 | $0 |
| 2010 | 16 | Continued Study - Airport Master Plan Update | $64,600 | $0 |
| 2013 | 17 | Rehabilitate Apron, Rehabilitate Taxiway | $139,393 | $0 |
| 2015 | 18 | Construct Taxiway, Rehabilitate Apron, Rehabilitate Taxiway, Rehabilitate Taxiway | $1,289,561 | $0 |
| 2015 | — | 2015 IGA/Proj Number 26906 Aurora Air Traffic Control Tower | $2,695,000 | $141,852 |
| 2016 | 19 | Rehabilitate Taxiway | $639,502 | $0 |
| 2017 | 20 | Conduct Environmental Study (Phase 1) | $189,635 | $0 |
| 2017 | – | SOAR-2017-ODA-S-00016, Constrained Operations Study | $0 | $70,000 |
| 2017 | – | SOAR-2017-SO PROJ 3, Ramp Light Repairs | $0 | $13,000 |
| 2020 | – | SOAR-2020-ODA-S-00002, Taxiway Repair, Obstruction Easement Survey, Obstruction Removal | $0 | $ 330,000 |
| 2021 | 21 | Environmental Assessment for Obstruction Removal (Phase 2) | $ 140,294 | $0 |
| 2021 | 22 | Airport Master Plan Study and AGIS Survey | $994,764 | $0 |

Source: FAA AIP Grant Look Up Tool (Accessed 12/10/2021) and ODAV provided state grant information.

## AIRPORT ROLE

The role of an airport may vary within the context of the National, State, or Local perspective. Understanding the existing roles of the Airport is vital to establish the long-term vision and development of the facility.

### National Role

The federal airport system, referred to as the National Plan of Integrated Airport Systems (NPIAS), includes 3,304 public-use airports in all 50 states.[2] Fifty-seven of Oregon's 97 public-use airports are included in the NPIAS. Like federal highways, NPIAS airports represent a critical element of the national transportation system.

NPIAS reports are submitted every two years to Congress in accordance with title 49 United States Code (U.S.C.), section 47103. As required by the statute, the Federal Aviation Administration (FAA) *"…shall maintain the plan for developing public-use airports in the United States." The statute also requires that: "The plan shall include the kind and estimated cost of eligible airport development the Secretary of Transportation considers necessary to provide a safe, efficient, and integrated system of public-use airports adequate to anticipate and meet the needs of civil aeronautics, to meet the national defense requirements of the Secretary of Defense, and to meet identified needs of the United States Postal Service."*

NPIAS airports are grouped into two major categories: primary (commercial service) and non-primary (general aviation and limited passenger service). The majority of NPIAS airports are non-primary general aviation airports. Within the broad definition of general aviation airports, four functional categories are defined: National, Regional, Local, and Basic.

Aurora State Airport is designated a **"National" Nonprimary General Aviation** airport. The role of National airports in the NPIAS is defined as follows:

> *"National airports (84) are located in metropolitan areas near major business centers and support flying throughout the nation and the world. National airports are currently located within 31 states. They account for 13 percent of total flying at the studied general aviation airports and 35 percent of all flights that filed flight plans at the airports in the four new categories. These 84 airports support operations by the most sophisticated aircraft in the general aviation fleet. Many flights are by jet aircraft, including corporate and fractional ownership operations and air taxi services. These airports also provide pilots with an alternative to busy primary commercial service airports. There are no heliports or seaplane bases in this category.*
>
> *Criteria Used to Define the New National Category (all numbers are annualized):*
>
> *1. 5,000+ instrument operations, 11+ based jets, 20+ international flights, or 500+ interstate departures; or*
>
> *2. 10,000+ enplanements and at least one charter enplanement by a large certificated air carrier; or*
>
> *3. 500+ million pounds of landed cargo weight."*

Available data indicate that Aurora State Airport has consistently met or exceeded the FAA's "11+ based jet" and "5,000+ instrument operations" criteria established for National airports since the early 2000s. Aurora State Airport, and nearby Portland-Hillsboro Airport (19 miles northwest) are the only FAA-designated National Airports located in Oregon.

NPIAS airports are deemed significant to the air transportation in the United States, and thus are eligible for federal funding though the Airports Improvement Program (AIP), which currently covers 90% of eligible costs of planning and development projects.

### State Role

The Oregon Department of Aviation has developed and periodically updates the Oregon Aviation Plan (OAP) to provide guidance on preserving the State's system of airports. The OAP presents a framework for improving the system to enhance support of local communities and regional economic development. The current OAP (OAP v6.0), completed in 2019, classified Aurora State Airport as **Category II – Urban General Aviation Airport**. The definition for Category II airports is:

2 2021-2025 NPIAS Report, Federal Aviation Administration (9/30/2020)

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> *"These airports support all general aviation aircraft and accommodates corporate aviation activity, including piston and turbine engine aircraft, business jets, helicopters, gliders, and other general aviation activity. The most demanding user requirements are business-related. These airports service a large/multi-state geographic region or experience high levels of general aviation activity. The minimum runway length objective for Category II airports is 5,000 feet."*

The most demanding user requirements for Category II airports are typically related to business class aircraft since the airports do not support commercial airline service. Category II airports serve large/multi-state geographic regions and generally experience higher levels of general aviation activity.

The distribution of Category II airports throughout Oregon is a reflection of the state's physical geography, population centers, and the underlying market conditions required to support the full range of general aviation activity common to this type of airport. As documented in OAP v6.0, Oregon has a total 11 Category II airports, which includes one public-use heliport (Portland Downtown Heliport). More than half (6 of 11) of Oregon's Category II airports are located within 30 nautical miles of Aurora State Airport. The concentration of Category II airports in the Portland Metro area is consistent with the region's overall population and economic characteristics. Four of Oregon's Category II airports currently have an air traffic control tower (ATCT); three of these, including Aurora State Airport, are located in the Portland Metro area.

OAP-defined characteristics for Category II airports correspond to the business jet aircraft segment of general aviation. These airports accommodate a wide range of locally-based and transient aircraft that are designed to operate in all-weather conditions. These aircraft require increased facility capabilities for runways, taxiways, instrument approaches/departures, and airfield lighting systems.

### Local Role

Aurora State Airport serves the local community in several ways. Based on data reviewed in late 2021, the Airport is currently home to 281 aircraft stored both on ODAV-owned property, and on adjacent privately-owned property with authorized airport access. A review of 2016-2021 Aurora ATCT operations data shows mostly consistent year-over-year increases during the six-year period, ranging from roughly 48,000 to 70,000 annual operations. Additional aircraft flight activity occurs outside the ATCT hours of operation between 0700 and 2000 local time (7:00 am to 8:00 pm in standard time terms). Detailed breakdowns of airport activity are provided later in this chapter and in Chapter 3 – Aviation Activity Forecasts.

The (2019) OAP v6.0[3] states that Aurora State Airport supported 2,672 direct, indirect, and induced jobs, contributing over $125 million in payroll benefits to the local economy (2014 data). The Airport accommodates several businesses including two Fixed Base Operators (FBOs), three flight schools, several aircraft manufacturing and service providers, and a restaurant. OAP v6.0 estimates a total of nearly $510 million in sales revenue/output is generated from airport businesses annually. Two examples of the numerous businesses based at Aurora State Airport include the Life Flight Network administrative office, which supports life-saving medevac services across the Pacific Northwest Region, and Vans Aircraft, a leading kit aircraft manufacturer.

## AREA AIRPORT CONTEXTUAL ANALYSIS

Contextual analysis of the airport service area examines the impact that the airport has on its immediate geographic area. For general aviation airports, the majority of aviation activity can be directly linked to their service area boundaries defined by 30- and 60-minute driving times surrounding the Airport. The airports and aviation activity within a defined service area may directly affect activity at any individual airport in the service area. This ranges from locally-based aircraft to transient aircraft where operators choose airports based in part on proximity to their place of business or travel destination.

**Figure 2-2** (and **Table 2-4** at the end of this section) provide an overview of the public-use airports located in the service area for Aurora State Airport. These airports include both publicly-owned and privately-owned facilities. The most recent FAA Airport Master Record Form (5010) data available is presented for these airports to provide common reporting of activity. It is noted that the FAA 5010 data listed for Aurora State Airport is obsolete, but will be revised to reflect the 2021 baseline data developed in the airport master plan. Current based aircraft and aircraft operations data for Aurora State Airport are provided later in this chapter and will be used to develop the aviation activity forecasts (Chapter 3).

3 OAP v6.0 Chapter 8: Economic Impact

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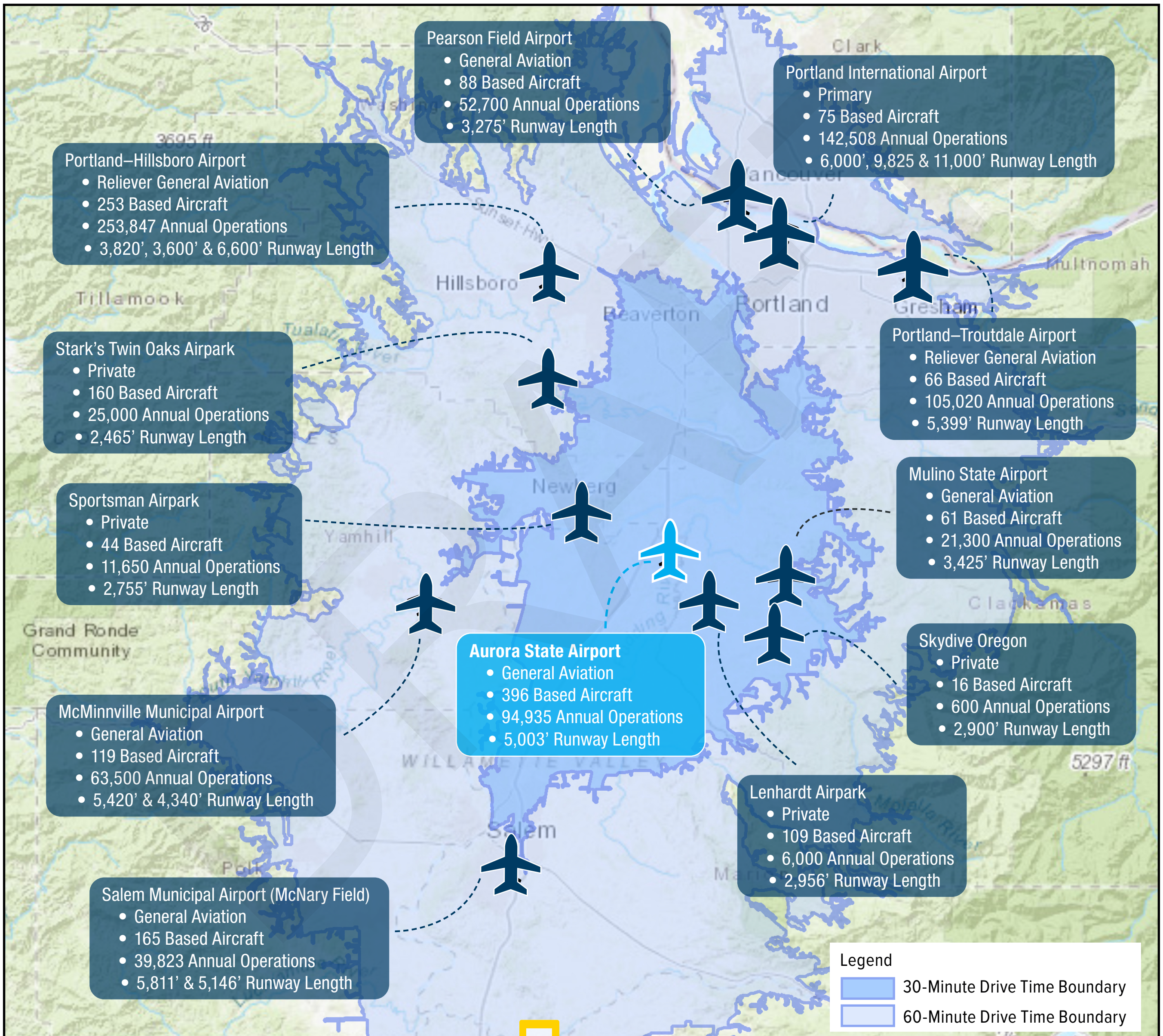
As noted in the state airport classification system, an airport's functional role is determined primarily by facility capabilities and factors such as the size of the population it serves. The airports in the local area accommodate a wide range of general aviation activity. Aurora State Airport, Portland-Hillsboro Airport, and Portland International Airport accommodate the majority of business aviation activity in the Portland Metro area, while the smaller airports accommodate predominately smaller aircraft. Portland International Airport (PDX) is the primary commercial service airport serving the local area and region. PDX also accommodates a limited amount of general aviation activity. With the exception of PDX, the other public-use airports located within the service area for Aurora State Airport do not accommodate scheduled airline service.

**FIGURE 2-2: AREA AIRPORTS**




Source: AirportIQ 5010, Esri, USGS, NOAA

## Portland International Airport

Portland International Airport (PDX) is located in northeast Portland, in Multnomah County on the south bank of the Columbia River. The Airport is owned and operated by the Port of Portland and is the largest commercial service airport in Oregon. It has three lighted runways with instrument approach capabilities and full range of aircraft services. The Airport is primarily focused on commercial airline service, but also supports a limited amount of general aviation (GA) activity, 75 GA based aircraft and 10,391 annual GA operations, according to the most recent 5010 data. The Port of Portland also owns Hillsboro and Troutdale Airports, which serve as GA reliever airports to Portland International.

### Portland – Hillsboro Airport

Portland-Hillsboro Airport, owned by the Port of Portland, is located in Hillsboro, 10 miles west of Portland. The Airport is a designated reliever GA airport for PDX and serves the Portland Metro Area. The Airport has three lighted runways with instrument approach capabilities, an ATCT, and weather reporting. Available services include aviation fuel, hangars and parking, aircraft repair and maintenance, flight training, aircraft rental, and air taxi (charter) services. Current FAA 5010 data lists 253 based aircraft and 253,847 annual operations.

### Portland – Troutdale Airport

Portland-Troutdale Airport, also owned by Port of Portland, is in Troutdale in northern Multnomah County between Interstate 84 (I-84) and the Columbia River. The Airport is a designated GA reliever airport for Portland International. The Airport has a single lighted runway, instrument approach capabilities, an ATCT, and weather reporting. Available services include aviation fuel, hangars and parking, parking, aircraft repair and maintenance, flight training, and aircraft rental. Current FAA 5010 data lists 66 based aircraft and 105,020 annual operations.

### Pearson Field Airport

Pearson Field Airport is owned by the City of Vancouver and located on the south side of the city in Clark County, Washington. The Airport is located north of the Columbia River and State Highway 14, approximately two miles northwest of Portland International Airport. The Airport has a single lighted runway with instrument approach capabilities, and weather reporting. Available services include aviation fuel, hangars and parking, aircraft repair and maintenance, flight training, and aircraft rental. Current FAA 5010 data lists 88 based aircraft and 52,700 annual operations.

### McMinnville Municipal Airport

McMinnville Municipal Airport is in the City of McMinnville in Yamhill County, on the southeast side of the city. The Airport is owned and operated by the City of McMinnville. The Airport has two runways (one lighted), instrument approach capabilities, and weather reporting. Available services include aviation fuel, hangars and parking, aircraft repair and maintenance, flight training, and aircraft rental. Current FAA 5010 data lists 199 based aircraft and 63,500 annual operations.

### Salem Municipal Airport (McNary Field)

Salem McNary Field is owned and operated by the City of Salem and located within the city limits two miles southeast of downtown. The Airport previously had scheduled commercial airline service, but the service ended in 2011 and current activity is limited to GA and military operations (Oregon Army National Guard). McNary Field is also the home of the ODAV offices. It has two lighted runways and a helipad, instrument approach capabilities, an ATCT, and weather reporting. Available services include aviation fuel, hangars and parking, aircraft repair and maintenance, flight training, and aircraft rental. Current FAA 5010 data list 165 based aircraft and 39,823 annual operations.

### Mulino State Airport

Mulino State Airport is ODAV-owned and operated, and is located in the Hamlet of Mulino, along State Highway 213, approximately five miles north of the City of Molalla. The Airport has a single lighted runway with visual approach capabilities. Available services include aviation fuel, hangars and parking, and aircraft repair and maintenance. Current FAA 5010 data lists 61 based aircraft and 21,300 annual operations.

### Stark's Twin Oaks Airpark

Stark's Twin Oaks Airpark is a privately-owned, public-use airport located south of Hillsboro, approximately 13 miles northwest of Aurora State Airport. The Airport has a single lighted runway with visual approach capabilities. Available services include aviation fuel, aircraft parking, hangars and parking, flight training, and aircraft rental. Current FAA 5010 data lists 160 based aircraft and 25,000 annual operations.

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## Lenhardt Airpark

Lenhardt Airpark is a privately-owned, public-use airport located east of Hubbard, approximately three and a half miles south of Aurora State Airport. The Airport has a paved lighted runway and a parallel grass strip on the west side of the runway, both with visual approach capabilities. Available services include aviation fuel, hangars and parking, aircraft maintenance, flight training, and aircraft rental. Current FAA 5010 data lists 109 based aircraft and 6,000 annual operations.

## Sportsman Airpark

Sportsman Airpark is a privately-owned, public-use airport located within the city limits of Newberg, approximately eight miles northwest of Aurora State Airport. The Airport has a single lighted runway with visual approach capabilities. Available services include aviation fuel, hangars and parking, aircraft maintenance, flight training, and aircraft rental. The airpark also serves as a launching point for hot air balloon operations. Current FAA 5010 data lists 44 based aircraft and 11,650 annual operations.

## Skydive Oregon

Skydive Oregon Airport is a privately-owned, private use airport located on the west side of Molalla, approximately eight miles southeast of Aurora State Airport. The Airport has a single lighted runway with visual approach capabilities. Skydive Oregon Airport facilitates skydiving operations and instruction services offered by a resident provider also called Skydive Oregon. While the airport has fuel and hangars on site, these services support the skydiving operations and are not available to the public. Current FAA 5010 data lists 16 based aircraft and 600 annual operations.

A summary of the most recent FAA 5010 data for theses airports is presented in **Table 2-4**. As note earlier, the 5010 data is provided for general reference only as a broad indication of activity. Relevant data to be updated in the aviation activity forecasts (Chapter 3).

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**TABLE 2-4: FAA 5010 DATA**

| | Aurora State | Lenhardt | Sportsman | Mulino State | Skydive Oregon | Stark's Twin Oaks | McMinnville | Hillsboro | Salem | Portland Int. | Pearson Field | Troutdale | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Air Carrier | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113,737 | 0 | 0 | 113,737 |
| Air Taxi | 7,909 | 0 | 100 | 0 | 0 | 0 | 0 | 9,561 | 3,776 | 16,168 | 100 | 4,000 | 41,614 |
| GA Local | 32,177 | 1,250 | 3,875 | 13,000 | 400 | 7,000 | 22,000 | 160,261 | 12,043 | 3,517 | 18,375 | 70,000 | 343,898 |
| GA Itinerant | 54,569 | 4,750 | 7,675 | 8,300 | 200 | 18,000 | 40,000 | 83,381 | 20,330 | 6,874 | 34,125 | 29,520 | 307,724 |
| Military | 280 | 0 | 0 | 0 | 0 | 0 | 1,500 | 644 | 3,674 | 2,212 | 100 | 1,500 | 9,910 |
| **TOTAL OPERATIONS** | **94,935** | **6000** | **11,650** | **21,300** | **600** | **25,000** | **63,500** | **253,847** | **39,823** | **142,508** | **52,700** | **105,020** | **816,883** |
| **TOTAL BASED AIRCRAFT** | **396** | **109** | **44** | **61** | **16** | **160** | **119** | **253** | **165** | **75** | **88** | **66** | **1,552** |
| Single Engine | 287 | 108 | 31 | 59 | 15 | 159 | 94 | 163 | 141 | 16 | 83 | 56 | 1212 |
| Multi Engine | 26 | 1 | 2 | 2 | 1 | 1 | 7 | 26 | 10 | 39 | 4 | 3 | 122 |
| Jet | 34 | 0 | 0 | 0 | 0 | 0 | 3 | 41 | 6 | 19 | 0 | 0 | 103 |
| Helicopters | 49 | 0 | 11 | 0 | 0 | 0 | 15 | 23 | 8 | 1 | 1 | 7 | 115 |
| Glider | 3 | 0 | 0 | 2 | 0 | 0 | 4 | 5 | 2 | 0 | 1 | 0 | 17 |
| Military | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 21 | 0 | 0 | 40 |
| Ultra-Light | 1 | 4 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| OPBA[1] | 239 | 55 | 265 | 349 | 38 | 568 | 521 | 1001 | 219 | 354 | 598 | 1569 | 447 |

Source: AirportIQ 5010 Airport Master Records and Reports (AirportIQ5010.com, Accessed 12/6/2021)
1. OPBA ratio includes general aviation and air taxi operations only. This is a ratio of total aircraft takeoffs and landings divided by the number of aircraft based at the airport.

## AIRPORT OPERATIONS SUMMARY

Aurora State Airport accommodates a wide variety of aeronautical activity, including small single- and multi-engine aircraft, business class turbine aircraft (business jets and turboprops), helicopters, and gliders.

### Based Aircraft

In late 2021, the ODAV State Airport Manager reviewed the based aircraft count for Aurora State Airport in the FAA based aircraft registry database. The count was previously updated in 2018 (349 based aircraft). The review was completed in consultation with the FAA Seattle Airports District Office in December 2021, and resulted in a new validated count of 281 based aircraft. The reduction in the Airport's based aircraft total reflects a more precise verification of aircraft and removal of previously-counted aircraft (helicopters) located at two private heliports adjacent to the Airport. Please see Chapter 3 - Aviation Activity Forecasts, for a full description of the current based aircraft count.

Aurora State Airport is unique compared to many other airports in that the majority of its based aircraft are stored off airport property on privately-owned land parcels. These aircraft access the Airport via a TTF agreement with ODAV. The flight operations for these aircraft rely on the Airport's runway-taxiway system, lighting, and navigational aids to access area airspace in the same manner as on-airport based aircraft. As noted above, the current based aircraft count does not include helicopters located at two privately owned heliports located adjacent to the Airport. A summary of all based aircraft by type and storage location is presented in **Table 2-5**.

**TABLE 2-5: BASED AIRCRAFT AND FLEET MIX**

| BA Type | On-Airport | TTF | Total |
|---|---|---|---|
| Single Engine | 45 | 175 | 220 |
| Multi Engine | 1 | 14 | 15 |
| Jet | 3 | 33 | 36 |
| Helicopter | 1 | 9 | 10 |
| **Total** | **50** | **231** | **281** |

Source: National Based Aircraft Inventory – January 2022

### Aircraft Operations

The ATCT at Aurora State Airport has been in service daily since October 2015. Controllers in the ATCT log aircraft contacts in the airport airspace, including arriving and departing aircraft, as well as aircraft transiting the airspace (without originating or terminating at the Airport). The resulting counts are available to the public through FAA's Operations Network (OPSNET) Traffic Counts datasets. To serve as a base for the Aurora State Airport operations estimate, the OPSNET Airport Traffic Counts dataset was downloaded for the period of 2016 through 2021, representing the six full years that the ATCT has been in service.

The Airport Traffic Counts dataset includes departure and arrival counts for itinerant aircraft (in both visual and instrument flight rules conditions)[4], local GA, and local military aircraft. The OPSNET Airport Traffic Counts for 2016-2021 are summarized in **Table 2-6**. These counts are unadjusted and provide the basis for a more detailed evaluation of aircraft operations at Aurora State Airport.

**TABLE 2-6: OPSNET AIRPORT TRAFFIC COUNTS**

| Calendar Year | Itinerant Total | Local Total | Total Operations |
|---|---|---|---|
| 2016 | 33,195 | 15,182 | 48,377 |
| 2017 | 34,641 | 23,511 | 58,152 |
| 2018 | 36,629 | 26,374 | 63,003 |
| 2019 | 34,252 | 28,598 | 62,850 |
| 2020 | 31,777 | 34,172 | 65,949 |
| 2021 | 35,566 | 34,176 | 69,742 |
| Total: | 206,060 | 162,013 | 368,073 |

Source: National Based Aircraft Inventory – January 2022

Aurora ATCT is in service daily between 0700 and 2000 local time. It should also be noted that in 2021 the ATCT was out of service outside of the normal schedule for portions of seven days. On February 13th, 2021 the ATCT opened 18 minutes late due to winter storm conditions, and due to a staffing shortage ATCT went to reduced hours (0800 to 1745 local time) Oct 29th - 31st, and Nov 3rd, 6th, and 10th. Total down time was 19 hours and 48 minutes, accounting for less than 0.5% of the scheduled service time scheduled for the year. These closures and their impact on the aggregated Airport Traffic Counts are not significant.

4 Visual Flight Rules (VFR) apply to aircraft operating with minimum visibility and cloud clearance requirements to maintain safe flight operations in visual meteorological conditions. Instrument Flight Rules (IFR) apply to aircraft operated under instrument flight plans, capable of meeting aircraft equipment and pilot requirements to operate exclusively with electronic guidance from ground or satellite navigational aids.

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Also of note, the OPSNET traffic counts presented in **Table 2-6** include itinerant helicopter operations for two private helipads located immediately east of the Airport. These aircraft movements are captured by the ATCT since they require the same clearance to operate in the controlled airspace that surrounds the Airport. However, ATCT does not log the flight activity differently than runway-related operations. As a result, the presence of these operations in the OPSNET source data have an inflating effect on the unadjusted data presented above.

For airport master planning purposes, the evaluation of aircraft activity will be limited to aircraft physically operating on the Airport's runway-taxiway system. Since the remote facility operations do not require any physical contact with the Airport's runway-taxiway system, the flight activity (and based aircraft) will be removed from datasets.

ATCT personnel indicate that the adjacent facility helicopter operations typically account for less than 3% of itinerant traffic recorded by Aurora ATCT. Based on this guidance, the historical itinerant operation counts from the OPSNET dataset were decreased by 3% in order to remove the helicopter operations. This traffic mix assumption will also be applied to forecast aircraft operations.

## After-Hour Operations Estimates

Outside of the scheduled service times, the Aurora ATCT is not staffed and aircraft operations at Aurora State Airport are not counted. After-hours operations are known to exist (see below) and they need to be estimated, and added to the Airport Traffic Counts to develop an accurate baseline operations total.

The *2019 Constrained Operations Runway Justification Study* for Aurora State Airport addressed after-hours operations hours by assuming that 95% of all airport operations occur during ATCT service hours, and inversely 5% occur outside of those hours. This is a standard method that has been employed at other airports in similar situations, and the resultant baseline counts were approved by FAA for use in the study's forecasts. However, the availability of additional flight data supports a more precise approach.

### Instrument Aircraft Flight Activity

FAA Traffic Flow Management System (TFMS) records were obtained through a Freedom of Information Act (FOIA) request. These records provide Instrument Flight Rules (IFR) flight plan arrivals and departures for all airports nationwide and include information on each aircraft, departure and arrival airports, and departure and arrival dates and times, among other data. Nearly 10 years of Aurora State Airport records were available for analysis—January 1, 2012 through August 16, 2021. Consultants have requested the remaining 2021 data through the FOIA process and will incorporate the data when available to complete the 2021 counts.

Flight records where Aurora State Airport was listed as either the departing or arrival airport were queried from the TFMS dataset, resulting in 79,885 IFR operations over the 10-year period. This time period predates the period that ATCT began service. However, arrival and departure times of IFR operations are likely minimally dependent on the presence of an ATCT, and the additional data increased the sample size provides a higher level of confidence in the resultant ratios. Although the TFMS data is based on actual flight plans that are not affected by the operating hours of the ATCT, the data distributions provide a reliable record of after-hours activity at the Airport.

Each of the TFMS operations was classified as occurring either during or outside of ATCT service hours based on arrival or departure timestamps. The timestamps are provided in the 24-hour format used in Coordinated Universal Time (UTC), which does not reflect local time change due to daylight savings time. This was then accounted for in the queries based on departure and arrival dates included in each record.

The queries showed that 86.1% (68,778) of IFR operations during the period occurred during the scheduled ATCT service time, and 13.9% (11,107) occurred outside of the scheduled service hours. To simplify calculations, the splits for IFR operations were rounded (86/14) for in-service and out-of-service operations ratios.

A breakdown of annual TFMS operations data based on the on- and off-hours schedule of the ATCT is presented in **Table 2-7**. The "ATCT open/closed" periods listed in the table are intended to provide time of day consistency when comparing TFMS data, and does not reflect actual period of ATCT operation, which began in late 2015.

**TABLE 2-7: TFMS OPERATIONS DATA (ORGANIZED BY ATCT HOURS)**

| | ATCT Open Ops | ATCT Closed Ops | Total Ops | % Closed |
|---|---|---|---|---|
| 2012* | 6,110 | 703 | 6,813 | 10.32% |
| 2013* | 6,417 | 645 | 7,062 | 9.13% |
| 2014* | 6,450 | 1,014 | 7,464 | 13.59% |
| 2015* | 6,838 | 1,242 | 8,080 | 15.37% |
| 2016 | 7,882 | 1,436 | 9,318 | 15.41% |
| 2017 | 7,771 | 1,406 | 9,177 | 15.32% |
| 2018 | 8,265 | 1,476 | 9,741 | 15.15% |
| 2019 | 7,676 | 1,238 | 8,914 | 13.89% |
| 2020 | 6,649 | 1,071 | 7,720 | 13.87% |
| 2021 | 4,720 | 876 | 5,596 | 15.65% |
| **Total** | **68,778** | **11,107** | **79,885** | **13.90%** |

Source: Century West Engineering developed using FAA TFMSC Data
* Data prior to October 2015 ATCT opening

As the ratio was derived using only IFR flight plan data, it is valid for estimating only IFR operations, but does not capture activity conducted outside of IFR flight plans. This would include aircraft operating visually, with or without visual flight rules (VFR) flight plans. While the OPSNET Traffic Counts provide hard counts of VFR traffic during ATCT service hours, off-hours traffic is not represented in the OPSNET or other available datasets. However, as previously mentioned, other studies have employed a general 5% (of total operations) estimate to approximate all traffic outside of ATCT service hours. Inversely, 95% of VFR operations were assumed to occur during ATCT service hours. It is reasonable to apply that same method to account for after-hours VFR activity at Aurora State Airport. While not as precise as the above IFR method, it is the best option available evaluating available data.

The above discussed ratios were applied to OPSNET Airport Traffic Counts (ATCT in-service) to approximate IFR and VFR operations occurring when the ATCT was closed. A summary of IFR and VFR operations by ATCT status, as well as the resulting total annual operations estimates are presented in **Table 2-8**.

**TABLE 2-8: ANNUAL OPERATIONS (ATCT ADJUSTED)**

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| ATCT Open (86%) - IFR | 9,880 | 10,018 | 10,522 | 7,515 | 6,576 | 7,596 |
| ATCT Closed (14%) - IFR | 1,608 | 1,631 | 1,713 | 1,223 | 1,071 | 1,237 |
| **Total IFR** | **11,488** | **11,649** | **12,235** | **8,738** | **7,647** | **8,833** |
| ATCT Open (95%)- VFR | 37,501 | 47,095 | 51,381 | 54,306 | 58,418 | 63,835 |
| ATCT Closed (5%) - VFR | 1,974 | 2,479 | 2,704 | 2,858 | 3,075 | 3,360 |
| **Total VFR** | **39,475** | **49,574** | **54,085** | **57,164** | **61,493** | **67,195** |
| ATCT Open - Total | 47,381 | 57,113 | 61,903 | 61,821 | 64,994 | 71,431 |
| ATCT Closed - Total | 3,582 | 4,110 | 4,417 | 4,081 | 4,146 | 4,597 |
| **Total Ops** | **50,963** | **61,223** | **66,320** | **65,902** | **69,140** | **76,028** |
| % ATCT Closed Ops | 7.56% | 7.20% | 7.14% | 6.60% | 6.38% | 6.44% |

Source: Century West Engineering developed using FAA TFMSC Data

The adjusted operations estimates align well with the previous approved forecast developed in the 2019 *Constrained Operations Runway Justification Study*. Using a 5% after-hours estimate across the board, that study approximated 66,153 operations for the 2018 base year. Using the updated methodology, the adjusted 2018 operations count is 67,478, an increase of 0.25%. Considering the heavier weight that was placed on IFR operations occurring outside of ATCT service hours, coupled with the removal of the erroneous itinerant helicopter operations, the slight increase is reasonable.

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## Operations Fleet Mix

To better understand the operational demand that the Airport's fleet composition has on the facility, an operations mix analysis was completed. The OPSNET Airport Traffic Counts attribute the airport operations to individual itinerant and local aircraft classifications. These classifications include:

- Itinerant
  - Air Taxi
  - General Aviation
  - Military
- Local
  - Civil (General Aviation)
  - Military

The percentage of operations that each classification composes of the annual totals was calculated for each year that the ATCT has been in service to create ratios for each classification for each year. The ratios for each classification were assumed to apply to all operations regardless of ATCT status. The resultant ratios were applied to the historical operations estimates described above. The results of the exercise are summarized in **Table 2-9**.

**TABLE 2-9: ANNUAL OPERATIONS FLEET MIX (HISTORICAL)**

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| Itinerant | | | | | | |
| Air Taxi | 2,194 | 2,319 | 2,121 | 1,670 | 1,129 | 2,006 |
| General Aviation | 32,174 | 33,502 | 35,665 | 33,638 | 31,621 | 36,390 |
| Military | 265 | 199 | 277 | 107 | 38 | 79 |
| **Subtotal** | **34,633** | **36,020** | **38,063** | **35,415** | **32,788** | **38,475** |
| Local | | | | | | |
| General Aviation | 16,191 | 25,075 | 28,011 | 30,453 | 36,333 | 37,488 |
| Military | 139 | 129 | 245 | 34 | 19 | 65 |
| **Subtotal** | **16,330** | **25,204** | **28,256** | **30,487** | **36,352** | **37,553** |
| **Total** | **50,963** | **61,223** | **66,320** | **65,902** | **69,140** | **76,028** |

Source: Century West Engineering developed using FAA TFMSC Data

The OPSNET Airport Traffic Count data only differentiate local and itinerant traffic for GA aircraft. Understanding the demand placed on the Airport by different sizes and types of aircraft is also important. A review of Traffic Flow Management System Counts (TFMSC) data illustrates an evolving fleet mix at the airport over the previous six-year period. Aircraft activity is primarily categorized by aircraft size (wingspan and tail height) and approach speed (during landing). The two characteristics are combined to create an "Airport Reference Code" (ARC). **Table 2-10** depicts aircraft ranging from small single-engine piston aircraft to large transport category jets. In general, larger and faster aircraft require larger operating surfaces and protected areas. The current and future ARC for Aurora State Airport will be determined following FAA approval of the aviation activity forecasts, specifically approval of the design aircraft is completed. The design aircraft represents the most demanding aircraft type that generates at least 500 annual operations.

**TABLE 2-10: AIRPORT REFERENCE CODE (ARC)**

| Aircraft Approach Category | Aircraft Approach Speed knots | Airplane Design Group | Aircraft Wingspan |
|---|---|---|---|
| A | less than or equal to 91 | I | less than or equal to 49’ |
| B | 92 to 121 | II | 50’ to 79’ |
| C | 122 to 141 | III | 80’ to 118’ |
| D | 142 to 166 | IV | 119’ to 171’ |

A-I (small)
12,500 lbs. or less


Beech Baron 55
Beech Bonanza
**Cessna 182**
Piper Archer

B-I (small)
12,500 lbs. or less

**Beech Baron 58**
Beech King Air C90
Cessna 402
Cessna 421

A-II, B-II (small)
12,500 lbs. or less

Super King Air 200
**Pilatus PC-12**
DCH Twin Otter
Cessna Caravan

ARC - B-II
Greater than 12,500 lbs.

Super King Air 300, 350
Beech 1900
**Cessna Citation**
Falcon 20, 50

A-III, B-III
Greater than 12,500 lbs.


DHC Dash 7, Dash 8
**Q-200, Q-300**
DC-3
Convair 580

C-I, D-I


**Lear 25, 35, 55, 60**
Israeli Westwind
HS 125-700

C-II, D-II

Gulfstream II, III, IV
**Canadair 600**
Canadair Regional Jet
Lockheed JetStar

C-III, D-III

Boeing Business Jet
**Gulfstream 650**
B 737-300 Series
MD-80, DC-9

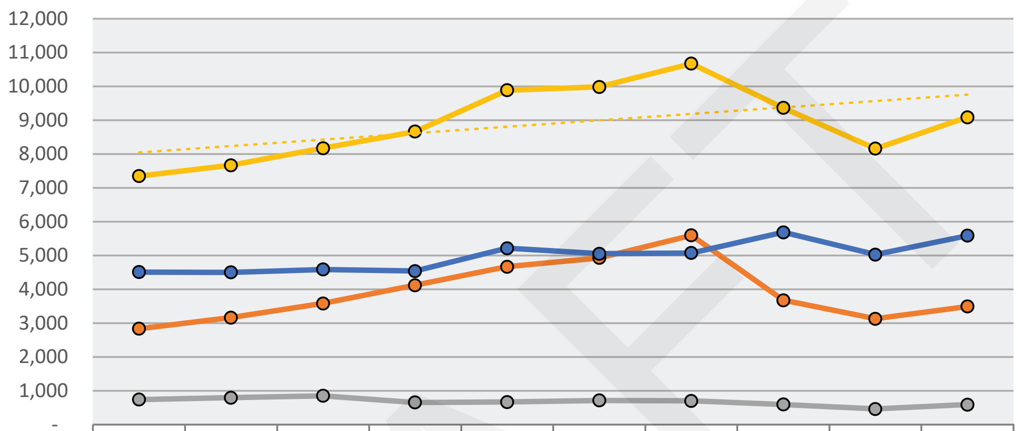
C-IV, D-IV

**B - 757**
B - 767
DC - 8-70
DC - 10

Source: Century West Engineering

As shown in **Figure 2-3**, while total operations are trending upward, operations by aircraft smaller than ARC B-I have declined significantly over the past three years, causing a decrease in total operations over the same period. At the same time operations by ARC B-I and larger aircraft have remained steady or increased slightly. This may indicate that the activity at the Airport, previously driven by single-engine piston aircraft, is evolving toward an environment driven increasingly by larger aircraft such as multi-engine piston, turboprops, and jets. This observation is further supported by fuel flowage data presented in **Table 2-11** below. Over the six years of available data, and accounting for decreased activity in 2020 due to the impacts of COVID-19, aviation gasoline (AVGAS) flowage has shown a decreasing trend while jet fuel flowage has increased.

**FIGURE 2-3: TFMSC IFR OPERATIONS DATA**




| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| Total | 7,350 | 7,670 | 8,178 | 8,666 | 9,890 | 9,990 | 10,678 | 9370 | 8164 | 9090 |
| Smaller than B-I Aircraft | 2,838 | 3,166 | 3,588 | 4,124 | 4,672 | 4,934 | 5,598 | 3,680 | 3,132 | 3,498 |
| B-I and Larger Aircraft | 4,512 | 4,504 | 4,590 | 4,542 | 5,218 | 5,056 | 5,080 | 5,690 | 5,032 | 5,592 |
| Total C and D Aircraft | 744 | 802 | 854 | 658 | 674 | 718 | 706 | 600 | 466 | 594 |

Source: Century West Engineering developed using FAA TFMSC Data

**TABLE 2-11: AURORA STATE AIRPORT FUEL FLOWAGE**

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|---|---|---|---|---|---|---|---|
| Jet Fuel gallons | 933,527 | 896,058 | 1,050,306 | 929,453 | 893,989 | 1,055,344 | 3,769,806 |
| AVGAS gallons | 107,900 | 134,397 | 150,515 | 117,445 | 79,196 | 92,808 | 481,553 |

Source: Oregon Department of Aviation

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## APPLICABLE PLANNING STUDIES/DOCUMENTS

This section summarizes existing planning documents, federal advisory documents and background information directly related to the Aurora State Airport and the Aurora State Airport Master Plan. The documents in this section were utilized by Century West Engineering and the ODAV to support the production of the Aurora State Airport Master Plan. The documents included in this section represent the most comprehensive information related to the Aurora State Airport Master Plan that were available to the ODAV at the time of publication.

### FAA Advisory Circulars

The FAA publishes a series of documents known as Advisory Circulars (AC) aimed at providing guidance to airports, airport users, and consultants for compliance with Code of Federal Regulations (CFR) pertaining to a variety of operational, engineering, and planning issues. While not an exhaustive list, the following ACs are commonly referenced during the airport master planning process. Additional ACs may be introduced and referenced as the plan develops.

- *AC 150/5070-6B, Airport Master Plans* – Provides guidance for the preparation of airport master plans that range in size and function from small general aviation to large commercial service facilities
- *AC 150/5300-13A, Airport Design* – Contains the Federal Aviation Administration's (FAA) standards and recommendations for the geometric layout and engineering design of runways, taxiways, aprons, and other facilities at civil airports
- *AC 150/5060-5, Airport Capacity and Delay* – Explains how to compute airport capacity and aircraft delay for airport planning and design
- *AC 150/5325-4B, Runway Length Requirements for Airport Design* – Provides guidelines for airport designers and planners to determine recommended runway lengths for new runways or extensions to existing runways

### Marion County Comprehensive Plan

The Marion County Comprehensive Plan was developed for the purpose of providing a guide to development and conservation of Marion County's land resources. It is a long-range policy and land use guide that provides the basis for decisions on the physical, social, and economic development of Marion County. The Marion County Comprehensive Plan incorporates elements and policies of other Marion County planning documents through a formal process.

The following policies were identified in the Goals and Policies section of the Marion County Comprehensive Plan to address airports in the County[5]:

- *"Airports and airstrips shall be located in areas that are safe for air operations and should be compatible with surrounding uses."*
- *"The County should review and take appropriate actions to adopt State master plans for public airports in Marion County."*
- *"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."*
- *"The County will discourage noise-sensitive uses from locating in close proximity to public airports."*

### Marion County Rural Transportation System Plan

Marion County completed the *Rural Transportation System Plan* (RTSP) in 2005 with the intent of "providing framework for developing an efficient, well-balanced, and cost-effective transportation system for the next 20 years".[6] The RTSP addresses rural transportation facilities managed by Marion County outside of Urban Growth Boundaries (UGB). Transportation planning topics for areas within UGBs are addressed in individual city transportation system plans (E.g. City of Aurora Transportation System Plan). The RTSP has been formally adopted into the Marion County Comprehensive Plan.

5 Marion County Comprehensive Plan, pg. 58
6 Marion County RTSP Page 2-1



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The RTSP lists Aurora State Airport among the County's 25 airports and heliports (as of 2005), and references the projects outlined in the 1999 Aurora State Master Plan, most of which have been completed since the plan was developed. The RTSP states that the County intended to adopt the 2005 update to the Aurora State Airport Master Plan after review to ensure compatibility with County land use and zoning requirements.[7]

### City of Aurora Transportation System Plan

The City of Aurora developed its 2009 Transportation System Plan *(*TSP) to establish the City's goals, policies, and strategies to improve the transportation system within its UGB. The primary objective of the TSP is to "… enhance the general mobility throughout the City and offer guidance on multi-modal transportation decisions over the coming decades".[8]

While Aurora State Airport is not located within the Aurora UGB, its proximity to the city and its impact on residents warranted its inclusion in the plan. The following excerpt from the plan lays out the recommendations concerning the Airport.

> *"…For planning purposes, the City needs to continue to work with the Aurora State Airport and ODAV to help maintain and improve roadway access to and from the airport, as well as understand and address the effects of increased traffic flow on Airport and Ehlen Roads caused by airport growth. The increased growth will likely impact operations at intersections under the jurisdiction of the City, County, and ODOT. Mitigation for these impacts may be required in the future to ensure safety and efficient traffic operations."*[9]

### Oregon Aviation Plan

In 2019, ODAV completed an update to the *Oregon Aviation Plan* (OAP v6.0) for the state airport system which includes 95 airports, one heliport, and one seaplane base. The study area was statewide and considered both commercial service and general aviation airports.

Each airport's level generally reflects the type of aircraft and customers the airport serves as well as the characteristics of the airport's service area. In the OAP update, Aurora State Airport is classified as Category II – Urban General Aviation Airport.

As a Category II airport, the OAP has identified certain facilities and services that should ideally be in place. These objectives are considered the "minimums" to which the airport should be developed. At this time Aurora State Airport meets all of the listed requirements with the exception of a precision instrument approach.

As part of the OAP update, annual economic impacts for 97 statewide airports were also estimated. General aviation operations at Aurora State Airport accounted for an estimated 2,672 direct, indirect, and induced jobs, which contribute over $125 million in payroll. Airport businesses are estimated to generate nearly $510 million in sales revenue/output annually.[10]

### Oregon Resilience Plan

*The Oregon Resilience Plan* was completed in 2013, and provides analysis of key challenges, including the potential impact on Oregon's infrastructure and outlines a basic strategy for post disaster response coordination following a significant Cascadia seismic event. The overall expectation is that critical infrastructure components in coastal and western areas of the affected states will suffer complete loss or significant damage during a major event. The ability to respond will require coordinated use of assets outside the areas of damage. The plan identifies 29 airports throughout the state arranged into a three-tier system to indicate the priorities for making future investments:

- Tier 1 (T1) is comprised of the essential airports that will allow access to major population centers and areas considered vital for both rescue operations and economic restoration;
- Tier 2 (T2) is a larger network of airports that provide access to most rural areas and will be needed to restore major commercial operations; and
- Tier 3 (T3) airports will provide economic and commercial restoration to the entire region after a Cascadia subduction zone event.

7 Marion County RTSP, pg. 2-7
8 Aurora Transportation System Plan, pg. 1-1
9 City of Aurora Transportation System Plan, pg. 3-21
10 OAP v6.0, Chapter 8, Tables 8-3, 8-4, 8-5

Aurora State Airport is classified as a T3 airport. As a T3 airport the plan sets goals for reaching recovery milestones after an event. For Aurora, those goals are:

- To restore a Minimal level of recovery within 1-3 days: Restore essential services primarily for use of first responders, repair crews, and vehicles transporting critical supplies;
- To restore a Functional level of recovery within 1-3 months: Although service is not yet restored to full capacity, it is sufficient to get the economy moving again—e.g. some truck/freight traffic can be accommodated. There may be fewer lanes in use, some weight restrictions, and lower speed limits; and
- To restore an Operational level of recovery within 6-12 months: Restoration is up to 90% of capacity: A full level of service has been restored and is sufficient to allow people to commute to school and to work.

The study also modeled the potential impacts of a Cascadia magnitude 9.0 earthquake on the region using models from the United States Geological Survey (USGS) to simulate strong shaking that is likely to occur in such an event. The resulting simulated shaking map was then used to estimate the amount of ground failure due to liquefaction and landsliding that would occur. Liquefaction susceptibility values were assigned and then categorized into Low, Moderate, and High susceptibility categories. The results of the model scenario are publicly available via the Oregon Department of Geology and Mineral Industries (DOGAMI) Oregon HazVu: Statewide Geohazards Viewer website (https://gis.dogami.oregon.gov/maps/hazvu/). The HazVu viewer shows that the southern half of the airfield is classified as a Moderate hazard area and the north half is classified as a High hazard area.

## 2019 Constrained Operations Runway Justification Study

In 2019, the ODAV completed a study to review the runway length requirements and activity at Aurora State Airport to consider if the eligibility threshold for a runway extension has been met. A constrained operations Airport user survey was distributed as part of this study. The survey identified 645 constrained annual operations from a variety of aircraft and aircraft operators. Additional analysis of TFMSC data and the airport user surveys indicated in excess of 500 annual operations by aircraft to/from destinations beyond 1,000 nm of Aurora State Airport. The study concluded that a runway length of 7,888' was justified by FAA methodologies (AC 150/5325-4B). However, consultants recommended a future runway length of 6,002' as it was identified in the 2012 Airport Master Plan and depicted on the ALP.

## ENVIRONMENTAL DATA

Aurora has a warm-summer Mediterranean climate as classified by the Köppen climate classification system. The climate is characterized by cool, rainy winters, and warm, dry summers. The fall, winter, and spring seasons often have overcast, wet, and changing conditions, while the summers are warm and dry.

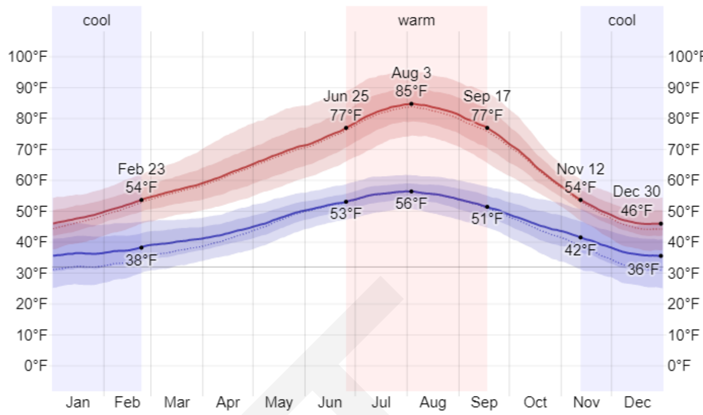
Average daily temperatures in Aurora range from a low of 40 degrees in December to a high of 68 degrees in July and August. The maximum average high temperature of the hottest month is 83 degrees in August, and the minimum average low temperature of the coldest month is 36 degrees in January and December. Annual temperature data are presented in **Figure 2-4**.

Precipitation at the Airport varies significantly throughout the year, as shown in **Figure 2-5**. The wet season lasts approximately seven months from mid-October to early-May. Inversely the dry season last approximately five months from early-May to mid-October. The airport receives an average of 52.3 inches of rainfall annually. The wettest month is December with an average of 8.7 inches; the driest month is July with an average of 0.5 inches of precipitation.

Sky conditions at the Airport, shown in **Figure 2-6**, vary significantly by season and are consistent with precipitation distributions. In general, the Airport experiences more instrument meteorological conditions (IMC) during the wetter months. The wetter, cloudy season generally begins in October and runs into early summer. The summer months are predominately partly cloudy, mostly clear, or clear—conditions that correspond to visual meteorological conditions (VMC).

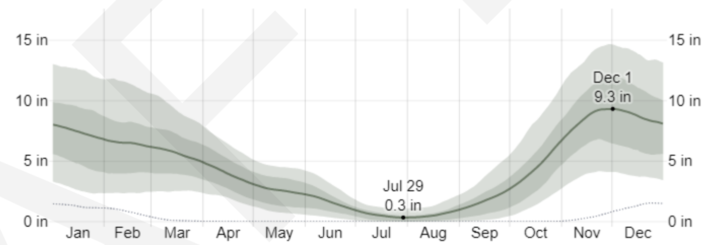
Wind data for the Airport indicates that prevailing wind directions vary by season. Spring and summer are characterized by north and west winds, while the fall and winter months observe winds from the south and east. See **Figure 2-7**. The FAA wind analysis computer program (Airport Data and Information Portal - Windrose Generator) confirms that the existing orientation of Runway 17/35 satisfies the FAA's minimum threshold of 95% crosswind coverage for all categories of aircraft.

#### FIGURE 2-4: ANNUAL TEMPERATURES



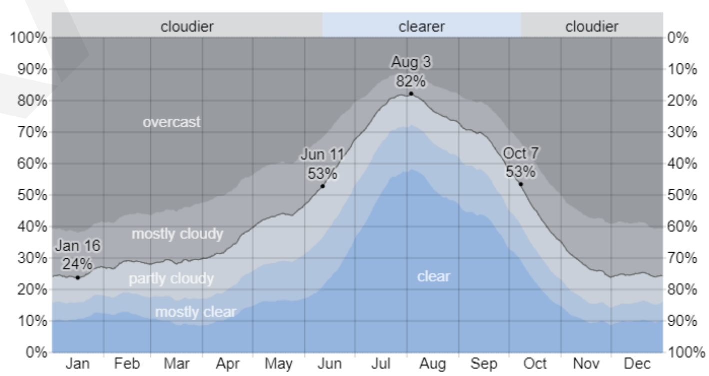

Source: www.weatherspark.com

#### FIGURE 2-5: ANNUAL RAINFALL



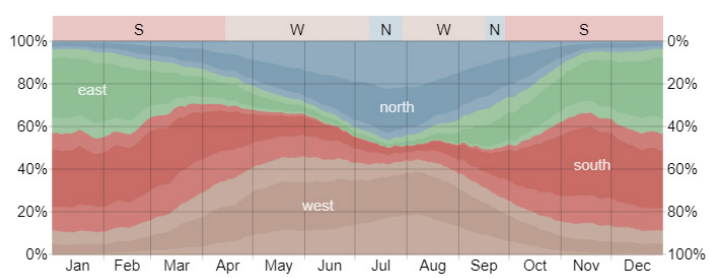

Source: www.weatherspark.com

#### FIGURE 2-6: ANNUAL CLOUD COVER




Source: www.weatherspark.com

#### FIGURE 2-7: ANNUAL WIND DATA




Source: www.weatherspark.com

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## ENVIRONMENTAL SCREENING/NEPA CATEGORIES

An environmental screening for the following environmental impact categories were included as part of the Master Plan.

- Air Quality;
- Biological Resources (including fish, wildlife, and plants);
- Department of Transportation Act, Section 4(f);
- Hazardous Materials, Solid Waste, and Pollution Prevention;
- Natural Resources and Energy Supply;
- Visual Effects; and
- Water Resources (including wetlands, floodplains, surface waters, water quality, stormwater, groundwater, and wild and scenic rivers).

A summary of significant findings is below. The full environmental screening report is provided in **Appendix 2.**

### Air Quality

The Aurora State Airport property falls within a census block where all air quality-related environmental hazard indexes are between the 24th and 73rd percentile nationwide. The Airport property scores within the 51st percentile for diesel particulate matter, the 73rd percentile for PM2.5 levels, the 24th percentile for ozone summer seasonal average of daily maximum eight-hour concentrations in the air, the 51st percentile for cancer risk from the inhalation of air toxics, and the 69th percentile nationwide for other respiratory hazards exposure.

### Biological Resources

A review of available data yielded no records of species observed on the Airport listed by state, or federally as endangered or threatened, nor were any species listed as candidates for listing reported. However, the Molalla River (three miles northeast of the Airport), the Pudding River (0.85 mile east of the Airport), and Mill Creek (0.75 mile southeast of the Airport) are designated as habitat for Chinook salmon (federally threatened; state classified sensitive critical), Pacific lamprey (federal species of concern; state classified sensitive vulnerable), and steelhead (federally threatened; state classified sensitive vulnerable) based on records of historic sightings.

There are no designated critical habitats on the Airport property. However, sub-watersheds surrounding the Airport are considered Essential Fish Habitat (EFH) for Chinook and coho salmon. Federal agencies are required to consult with the National Oceanic and Atmospheric Administration (NOAA) Fisheries regarding any action authorized, funded, or undertaken that may adversely affect EFH. Stormwater runoff from the Airport property flows into the Chinook and steelhead critical habitat areas as well as the Chinook and coho EFH areas.

### Hazardous Materials, Solid Waste and Pollution Prevention

An EPA hazardous waste treatment, storage, and disposal facility (TSDF) was reported at Columbia Helicopters Inc., adjacent to the Airport's northeast property boundary. This TSDF is recorded as addressing the handling and prevention of releases of hazardous materials into the environment from wastes generated on site at the property, as well as wastes received from off-site facilities. In addition to this TSDF, Columbia Helicopters Inc. also holds a National Pollutant Discharge Elimination System (NPDES) permit for water discharges and is identified by the EPA Cleanups in My Community Map as having been a Resource Conservation and Recovery Act (RCRA) corrective action site. Aurora State Airport also holds an NPDES permit (also referred to in Oregon as a 1200-Z Stormwater Discharge General Permit), as do 12 other properties within 12 miles of the Airport.

There is one aboveground storage tank fueling facility and one recently decommissioned fueling facility with underground storage tanks located on ODAV-owned property that are planned to be removed. There are also other privately-owned facilities surrounding the Airport property that have their own fueling facilities.

### Natural Resources and Energy Supply

A Water Control District has been formed at the Airport to provide water for fire protection for properties at the Airport. Two wells are located on Airport property, in addition to a pumphouse and underground water storage tanks that provide water to fire hydrants across the Airport property.

Water testing has revealed the presence of arsenic above the maximum contamination level set by the EPA in wells located on and surrounding the Airport property. Mitigation measures in the form of pump and filtration systems were recommended to be implemented to provide adequate flow and water quality.

### Water Resources

#### Wetlands

Several non-jurisdictional wetlands have been identified on Airport property. These wetlands were products of man-made drainage swales that are located in historic uplands with non-hydric soils. According to Oregon Department of State Lands Rule 141-085-0515 Removal-Fill Jurisdiction by Type of Water, these swales with wetland hydrology, vegetation, and soils are not considered waters of the state because they are artificially created for the purposes of stormwater detention and/or treatment.

#### Floodplains

The Airport property lies in a FEMA Zone X, which is considered an area of minimal flood hazard. The Airport is located outside of the 500-year floodplain. The closest 100-year floodplain is located approximately 0.55 miles east of the Airport and is associated with the Pudding River.

#### Water Quality

Many of the surface waters in the vicinity of the Aurora State Airport property are contaminated and listed on the DEQ 303(d) list. Contaminated surface waters in the vicinity of the Airport include:

- A segment of the Pudding River east of the Airport is on the 303(d) list of impaired waterways for guthion, water temperatures, and dieldrin. It is impaired for fish and aquatic life, fishing, and public and private domestic water supplies.
- The entire Mill Creek-Pudding River sub-watershed (1st–4th order streams) is listed on the 303(d) list for benthic macroinvertebrates bioassessments and inorganic arsenic. It is considered impaired habitat for fish and aquatic life, fishing, public and private domestic water supplies, and recreational contact with the water.
- A segment of the Molalla River that intersects the Pudding River east of the Airport is not a 303(d)-listed waterway but is listed by the EPA's "How's My Waterway" tool as impaired for fishing due to flow regime modification.
- The segment of the Willamette River that the Molalla River flows into north of the Airport is also a 303(d)-listed waterway. It is listed for the following factors: noxious aquatic plants, aldrin, benthic macroinvertebrates bioassessments, temperatures, 4,4'-DDE, 4,4'DDT, dieldrin, and PCBs. It is considered impaired for aesthetic quality, boating, fish and aquatic life, fishing, and public and private domestic water supply.

Compromised waters in the vicinity of the Airport property include critical habitat for federally threatened Upper Willamette River Chinook and steelhead populations. These waters also flow downstream to additional critical habitat areas for other species of federally listed fish species in the Columbia River.

## LOCAL SURFACE TRANSPORTATION

The Airport is located between Interstate 5 and State Highway 99E. Interstate 5, which is an essential north-south commerce link for the western United States, runs west of the Airport providing access to the Portland metro area. Access to the Airport is also provided by Highway 551 (Canby-Hubbard Highway) from the north and south, Arndt Road from the east and west, and Airport Road from Aurora. Keil Road is located south of the Airport and provides additional airport business access from Highway 551 and Airport Road. State Highway 99E, accessible to the Airport via Ehlen Road off of Highway 551 and Airport Road, provides access to the nearby communities of Canby, and Oregon City.

## AREA LAND USE/ZONING

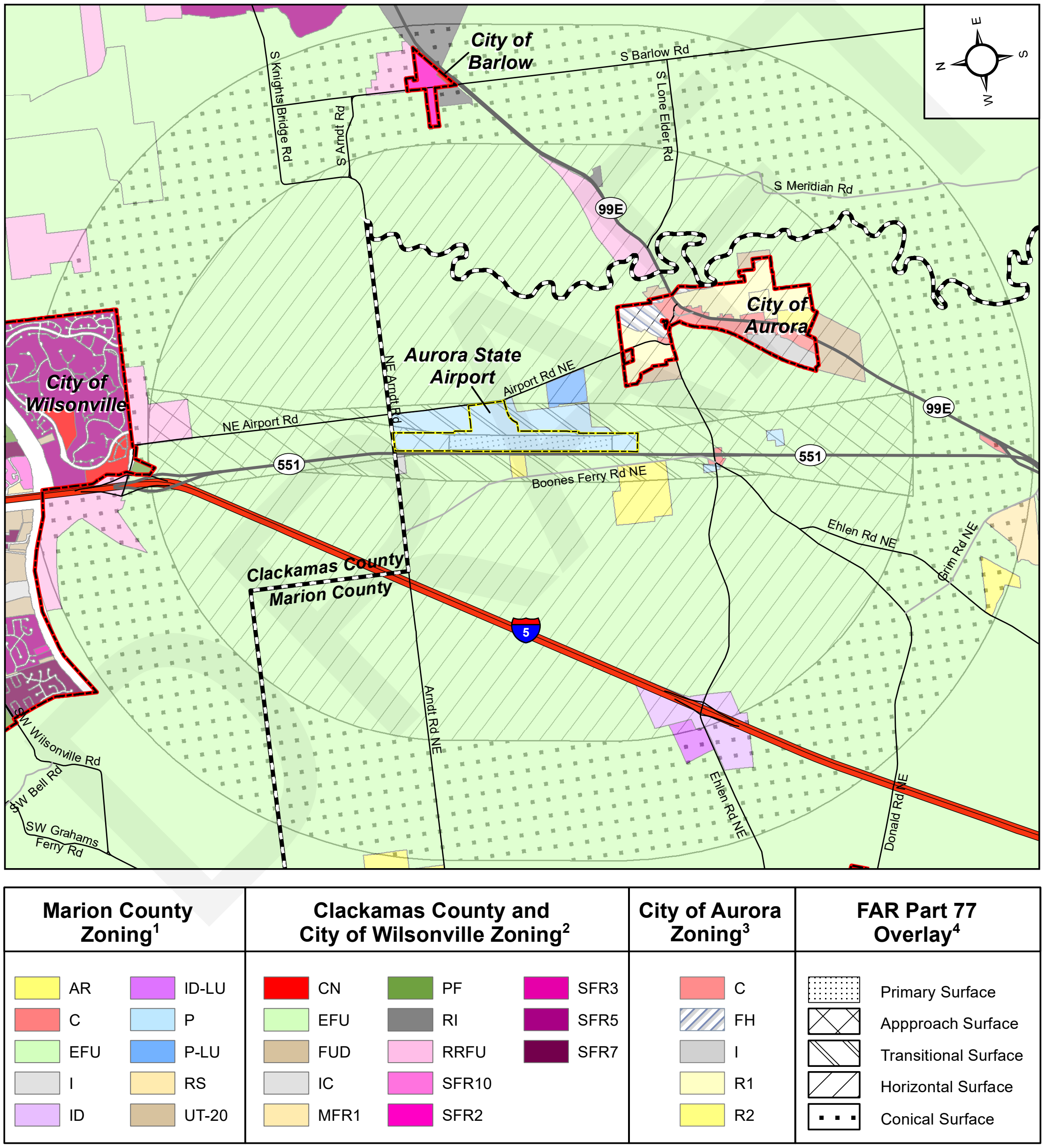
Aurora State Airport is located outside of the Aurora UGB. Land use actions related to the airport property and its immediate surroundings are under the exclusive jurisdiction of Marion County. The applicable zoning ordinance articles associated with the Airport are summarized below and provided in full in **Appendix 3**.

The Airport's FAR Part 77 airspace extends over areas of Marion and Clackamas County, and the City of Aurora. Each of these jurisdictions is responsible for protecting the areas of airport airspace that fall within their boundaries, and each employs overlay zoning districts as a mechanism to do so. The overlay districts are discussed in more detail below. The zoning around the airport property is shown in **Figure 2-8**.

## Existing Airport Base Zone

The existing airport property is zoned as **Public (P)** as defined in Marion County Code 17.171. The intent of the P zone is "to provide regulations governing the development of lands appropriate for specific public and semi-public uses and to ensure their compatibility with adjacent uses." Airports are regulated by Chapter 17.171, Section 030 - Conditional Uses, which states that "Airport and airport related commercial and industrial uses" are authorized under the procedure provided for conditional uses and are permitted in the P zone.

**FIGURE 2-8: ZONING MAP**




Note: The Cities of Wilsonville and Barlow have not adopted overlay zoning districts to protect FAR Part 77 airspace surfaces. The conical surface over these jurisdictions has been excluded.

Compiled by Century West Engineering from the following data sources:

1 Marion County GIS Open Data (https://marioncounty.maps.arcgis.com)
2 Metro RLIS Discovery (https://rlisdiscovery.oregonmetro.gov)
3 City of Aurora Planning (https://www.ci.aurora.or.us/planning/page/zoning-maps)

## Airport Vicinity Zoning/Land Use

The Airport is generally surrounded by Marion County **Exclusive Farm Use (EFU**) districts, and a few parcels of **Acreage Residential (AR)** and **Industrial (I)** located in the immediate vicinity of the property.

The intent of the EFU zone (Marion County Code 17.136) is to provide and preserve the continued practice of commercial agriculture. It is intended to be applied in areas composed of tracts that are predominantly high-value farm soils. EFU zone generally prohibits the construction, use, or design of buildings and structures except for facilities used in agricultural or forestry operations, replacing or restoring a lawfully established dwellings, supporting exploration of geothermal or mineral resources, or supporting agri-tourism destinations and events. EFU zone also permits the construction of public roads, establishment or enhancement of wetlands, and the operation of composting facilities.

The AR zone (Marion County Code 17.128) facilitates the division and development of property suitable for development of acreage homesites. Allowed uses include single-family dwellings, agricultural development, planned developments, public parks and recreation facilities, religious organization use (less than 20,000 square feet in area), or replacement of an existing lawfully established dwelling.

The I zone (Marion County Code 17.165) is intended to provide for the location of needed industrial uses which are not dependent upon urban services. The I zone encourages orderly and compatible development of industrial uses, including agricultural related industry, on rural lands. Permitted uses include agricultural services and forestry; contracting and service facilities; the processing and manufacture of various commercial products; coal and wood fuel dealers; fire stations, utility facilities, and dwellings intended for facility caretakers.

The closest City of Aurora zoning district to the airport is an area of **Low Density Residential (R-1)** located approximately one-third of a mile southeast of the property.

The LDR zone (Aurora Municipal Code 16.10) is intended to provide a minimum standard for residential uses in areas of low population density. The municipal code allows LDR zoned areas to be used for single-family dwellings, public support facilities, childcare facilities, residential home care, public parks and recreation areas, two-family dwellings, city-owned structures, accessory buildings including accessory dwelling units (ADU), and some agricultural buildings.

Marion County, Clackamas County, and the City of Aurora have adopted airport overlay zoning districts intended to enhance the protection of airport airspace, and compatible land use planning. The City of Wilsonville has not adopted an overlay zoning district.

The airport overlay zones based on FAR Part 77 imaginary surfaces, applicable within each jurisdictional boundary, are included in the following codes:

- Marion County Code (Chapter 17.177)
- Clackamas County Code (Chapter 713)
- City of Aurora Municipal Code (Chapter 16.24)

The language contained in the zoning codes addresses permitted and conditional uses within each of the designated overlay zones to address land use compatibilities and height restrictions intended to protect aircraft operating in the airspace, as well as persons and property on the ground. **Figure 2-8**, presented earlier, depicts the overlay zones based on FAR Part 77 imaginary surfaces established for Aurora State Airport.

The Oregon Department of Aviation Land Use Compatibility Guidebook recommends guidance for determining land use compatibility with overlaying FAR Part 77 surfaces. The guidance suggests that areas of residential land use should not be located under primary, approach, or transitional surfaces. At Aurora State Airport, two areas of residential property are located beneath the west transitional surface and another area of residential use is located south of the Willamette River near the end of the Runway 17 approach surface. Additionally, while the above discussed Public zone lists airports as a conditional use for the zone, the Land Use Compatibility Guidebook recommends establishing an airport-specific zone for airport properties.

# Airside Elements

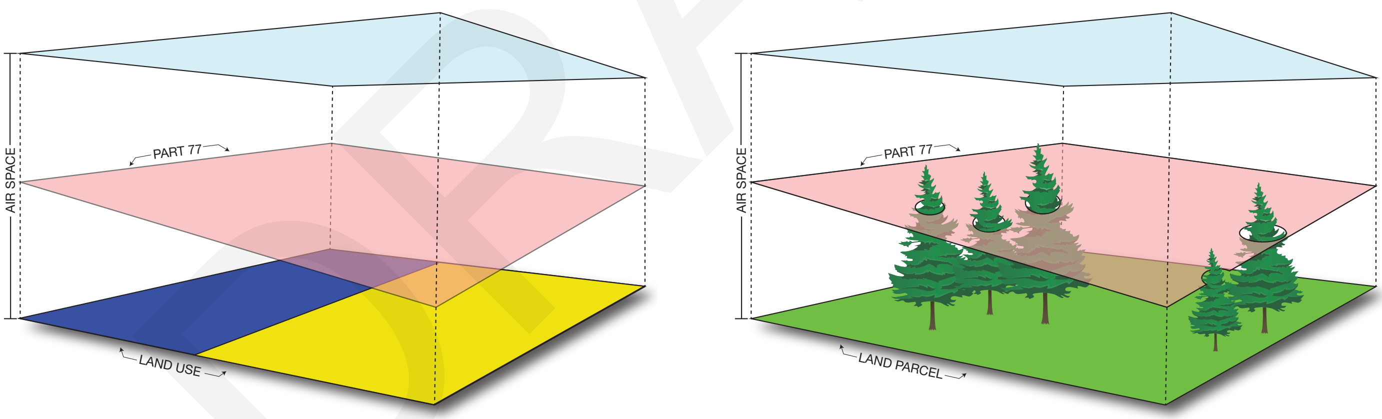
The Airside Elements (depicted in the existing conditions **Figure 2-12**) section is comprised of the facilities that facilitate the movement and operation of aircraft on the ground and in the air around Aurora State Airport. This section of the existing conditions analysis includes a discussion of the area airspace, instrument flight procedures, runways, taxiways/taxilanes, aprons/tiedowns/aircraft parking, airfield pavement condition, and airside support facilities.

## AIRSPACE – FAR PART 77, TERPS, AND RUNWAY END SITING SURFACES

In addition to the airspace classifications and operating environment with which pilots are more familiar with there are a variety of rules, regulations, design standards, and policies associated with the protection of airspace, evaluation of proposed objects on and near airports, and their effects on navigable airspace. Airport Cooperative Research Program (ACRP) Report 38 - *Understanding Airspace, Objects, and Their Effects on Airports* provides a comprehensive description of the regulations, standards, evaluation criteria, and processes designed to protect the airspace environments surrounding airports and is summarized below for additional context of airspace evaluation and design to serve Aurora State Airport.

### FAR Part 77 – Object Affecting Navigable Airspace

Federal Air Regulation (FAR) Part 77.19 defines airspace surfaces for civil airports and establishes the central regulation governing airspace protection, with cross-references to many other criteria documents. It sets forth the requirements for notifying the FAA of proposed construction; defines obstruction criteria; and describes aeronautical studies required to assess hazard status. The FAR Part 77 surfaces associated with Aurora State Airport have been codified by the local jurisdictions through airport overlay zones discussed above. **Figure 2-9** depicts the existing FAR Part 77 airspace defined for Runway 17/35 at Aurora State Airport. The graphics below illustrate the relationship between an invisible airspace surface (these surfaces are also referred to as “imaginary” surfaces) defined in Part 77 and the underlying land use and objects.




Source: Century West Engineering

### FAA Order 8260.3E – United States Standard for Terminal Instrument Procedures (TERPS)

This FAA Order, along with several derivative orders in the 8260 series and other related orders, define criteria that FAA flight procedure designers utilize when designing instrument flight procedures. Airspace protection requirements for instrument flight procedures are similar to those defined in FAR Part 77, although they also define protected airspace requirements for instrument approach and departure routes connecting the terminal and enroute airspace. Obstruction mitigation (obstacles to protected airspace) defined in FAA aeronautical studies may be required for TERPS surfaces, in addition FAR Part 77 surfaces.

### FAA AC 150/5300-13A – Airport Design

This Advisory Circular (AC) is the principal document utilized by the FAA, airport sponsors, and consultants when planning and designing new airports or modifications to airports. Airspace clearances for key runway end features are defined in the AC’s discussion of Runway End Siting Surfaces.

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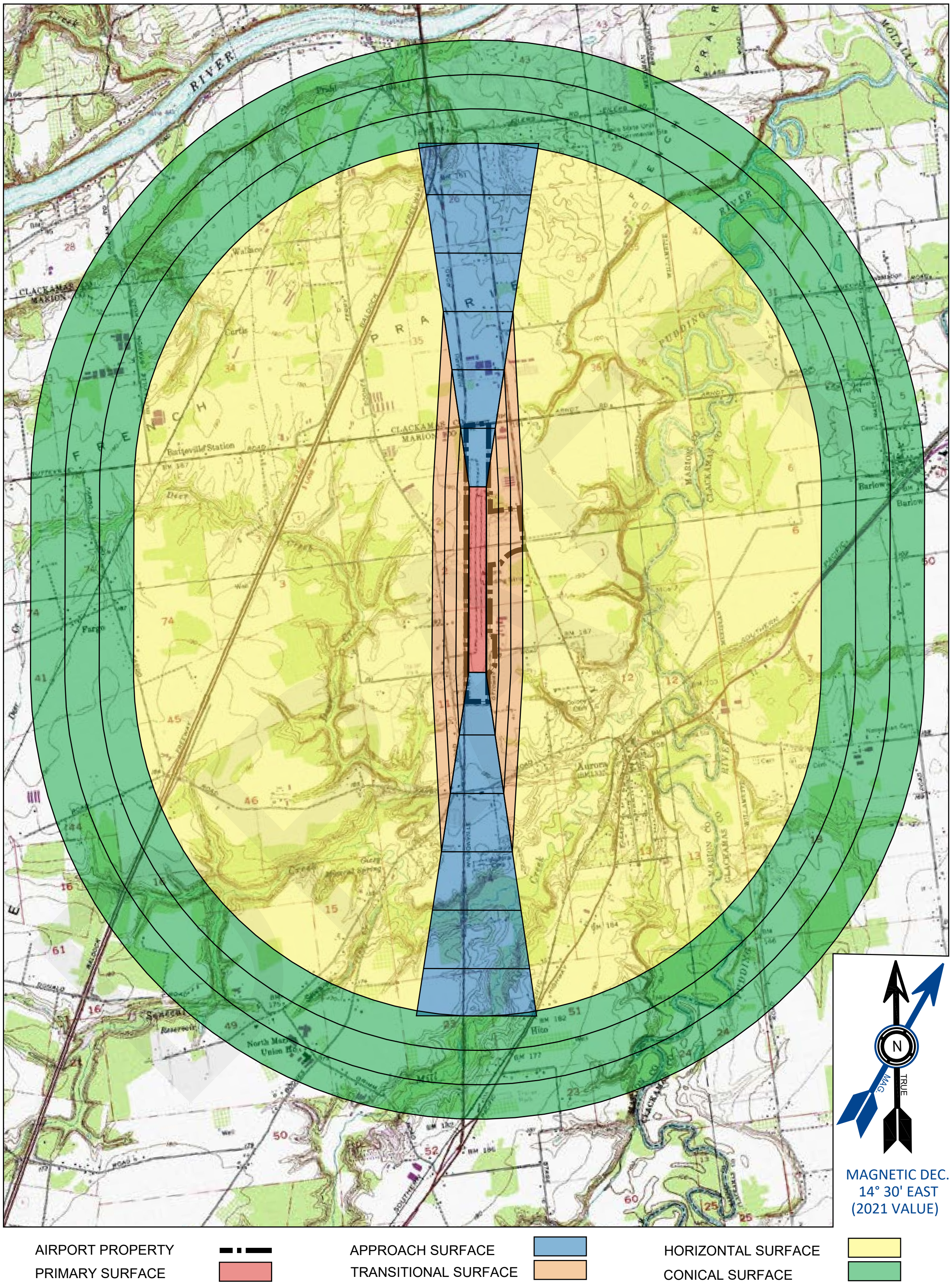
**FIGURE 2-9: FAR PART 77 AIRSPACE**




For Aurora State Airport, the approach surfaces for the runway extend 10,000 feet beyond each runway (beginning 200 beyond the runway end).

Source: Century West Engineering

## AIRSPACE CLASSIFICATIONS (Figure 2-10)

Airspace within the United States is classified by the FAA as "controlled" or "uncontrolled" with altitudes extending from the surface upward to 60,000 feet above mean sea level (MSL). Controlled airspace classifications include Class A, B, C, D, and E. Class G airspace is uncontrolled. Aircraft operating within controlled airspace are subject to varying levels of positive air traffic control that are unique to each airspace classification. Requirements to operate within controlled airspace vary, with the most stringent requirements associated with very large commercial airports in high traffic areas. Uncontrolled airspace is typically found in remote areas or is limited to a 700 or 1,200-foot AGL layer above the surface and below controlled airspace.

## LOCAL AREA AIRSPACE STRUCTURE (Figure 2-11)

The Seattle Sectional Aeronautical Chart depicts nearby airports, notable obstructions, and special airspace designations in the vicinity of Aurora State Airport. Low-altitude instrument airways are also depicted for general reference because pilots use them for both visual and instrument flight planning. The blue airways are identified as "Victor" or Area Navigation ("T routes") airways.

Additional definition of the low altitude airways is provided on FAA IFR Enroute Low Altitude – U.S. Chart L-1.[11] The chart is used exclusively for instrument flight planning and provides additional detail for pilots. As is common in busy air traffic areas, Aurora State Airport is surrounded by low altitude instrument airways in all directions. However, the minimum flight altitudes assigned to the nearby airway segments are well above the traffic pattern altitude (1,200 feet above mean sea level; 1,000 feet above ground level) for the Airport, which avoids operational conflicts between local and enroute air traffic. The proximity of several instrument airways, combined with VFR activity generated by nearby airports causes overflights from aircraft not departing or arriving at Aurora State Airport.

The nearest low altitude enroute airways to Aurora State Airport pass along the west and south sides of the Airport. These airways connect to ground-based electronic navigational aids (very high frequency (VHF) transmitters) located in Newberg, Bend, Eugene, and Battleground, Washington.

The airspace designation surrounding Aurora State Airport is dependent on the operational status of the ATCT. When the ATCT is operating, the surrounding airspace is Class D from the surface up to 2,500 feet AGL and extends outward in a four-mile radius. Aircraft operating in Class D airspace are required to establish contact with the ATCT before entering Class D airspace. When the ATCT is not operating, Class E airspace is in effect, extending from the surface upward and pilots are responsible for monitoring the assigned Common Traffic Advisory Frequency (CTAF).

### Special Use Airspace

Special Use Airspace (SUA) is airspace where activities are confined due to their nature or where limitations are placed on aircraft operations that are not part of those activities. SUAs also include warning areas, military operations areas (MOA), alert areas, controlled firing areas (CFA), and national security areas (NSA).

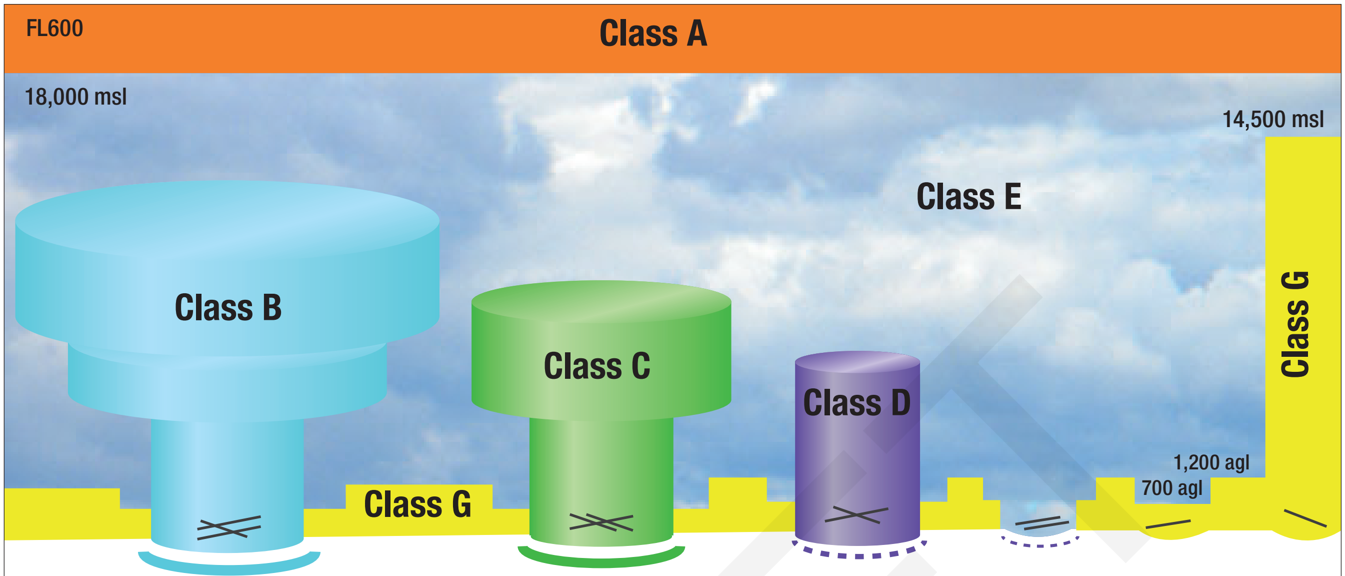
There are no SUAs in the immediate area of Aurora State Airport, with the closest example being the EEL C and EEL D MOAs located on the Oregon and Washington Coast.

### Controlled and Uncontrolled Airspace

As mentioned previously, Aurora State Airport operates in controlled Class D airspace during the hours of ATCT operations. During these times pilots contact Aurora ATCT upon arrivals and departures. Outside of the hours of ATCT operations, the Airport operates as Class E airspace, at which times pilots use the CTAF for communications with ground facilities and other aircraft operating in the vicinity of the airport.

11 United States Government Flight Information Publication

**FIGURE 2-10: AIRSPACE CLASSIFICATIONS**




**COMMUNICATION REQUIREMENTS AND WEATHER MINIMUMS**

| | Class A | Class B | Class C | Class D | Class E | Class G |
|---|---|---|---|---|---|---|
| Airspace Class Definition | Generally airspace above 18,000 feet MSL up to and including FL 600. | Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports | Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control | Generally airspace from the surface to 2,500 feet AGL surrounding towered airports | Generally controlled airspace that is not Class A, Class B, Class C, or Class D | Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E |
| Minimum Pilot Qualifications | Instrument Rating | Student* | Student* | Student* | Student* | Student* |
| Entry Requirements | IFR: ATC Clearance VFR: Operations Prohibited | ATC Clearance | IFR: ATC Clearance VFR: Two-Way Communication w/ ATC | IFR: ATC Clearance VFR: Two-Way Communication w/ ATC | IFR: ATC Clearance VFR: None | None |
| VFR Visibility Below 10,000 msl** | N/A | 3 Statute Miles | 3 Statute Miles | 3 Statute Miles | 3 Statute Miles | Day: 1 Statute Mile Night: 3 Statute Miles |
| VFR Cloud Clearance Below 10,000 msl*** | N/A | Clear of Clouds | 500 Below 1,000 Above 2,000 Horizontal | 500 Below 1,000 Above 2,000 Horizontal | 500 Below 1,000 Above 2,000 Horizontal | 500 Below 1,000 Above 2,000 Horizontal*** |
| VFR Visibility 10,000 msl and Above** | N/A | 3 Statute Miles | 3 Statute Miles | 3 Statute Miles | 5 Statute Miles | 5 Statute Miles |
| VFR Cloud Clearance 10,000 msl and Above | N/A | Clear of Clouds | 500 Below 1,000 Above 2,000 Horizontal | 500 Below 1,000 Above 2,000 Horizontal | 1,000 Below 1,000 Above 1 Statute Mile Horizontal | 1,000 Below 1,000 Above 1 Statute Mile Horizontal |

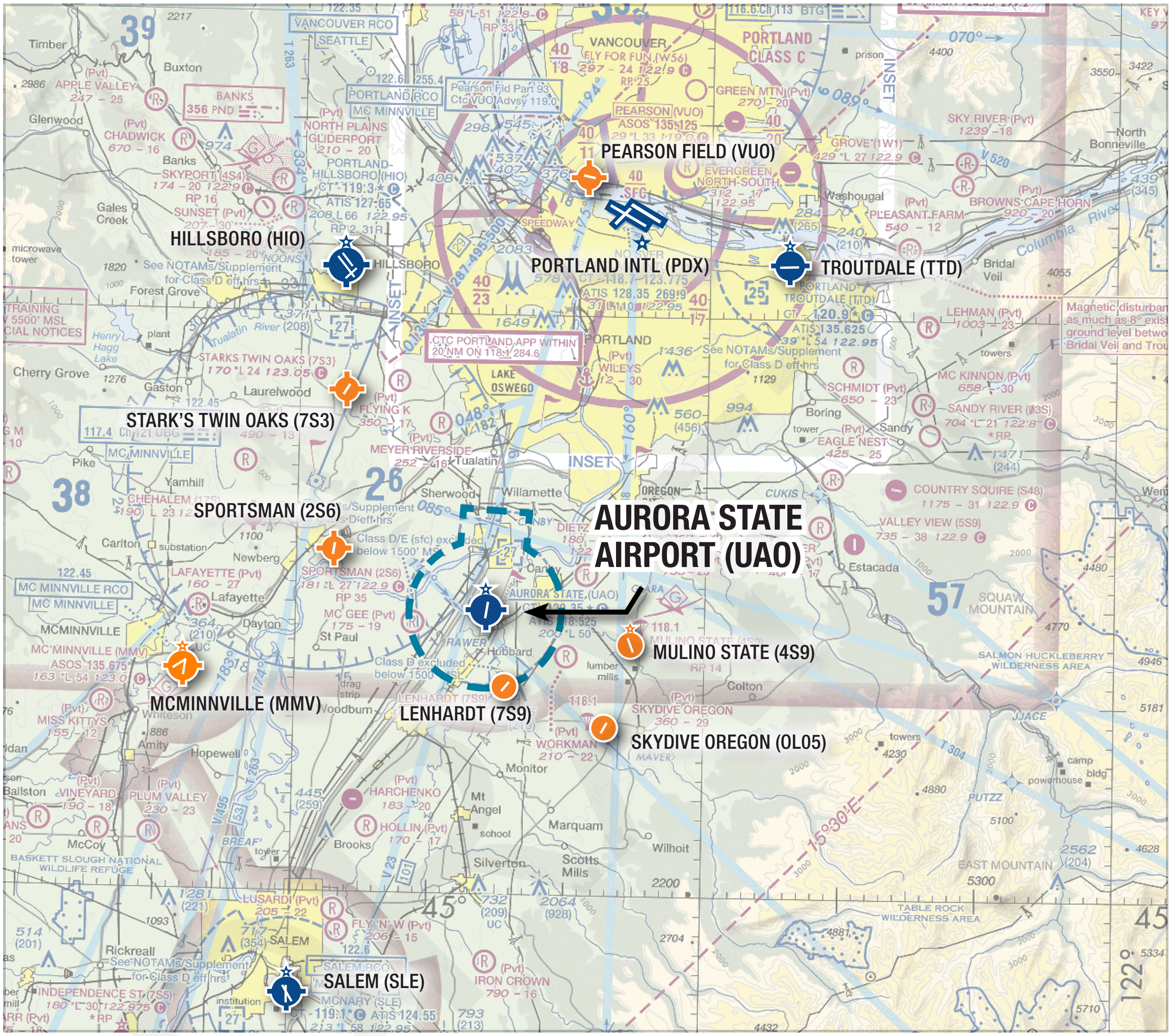
* Prior to operating within Class B, C, or D airspace (or Class E airspace with an operating control tower), student, sport, and recreational pilots must meet the applicable FAR Part 61 training and endorsement requirements. Solo student, sport, and recreational pilot operations are prohibited at those airports listed in FAR Part 91, appendix D, section 4.

** Student pilot operations require at least 3 statute miles visibility during the day and 5 statute miles visibility at night.

*** Class G VFR cloud clearance at 1,200 agl and below (day); clear of clouds.

Source: Century West Engineering

**FIGURE 2-11: AREA AIRSPACE – SEATTLE SECTIONAL CHART**




| LEGEND | | | |
|---|---|---|---|
| | Airports with other than hard-surface runways | | Compass Rose (VOR/DME or VORTAC) |
| | Airports with hard-surfaced runways 1,500 ft. to 8,069 ft. | | VOR or RNAV Airways |
| | Airports with hard-surfaced runways greater than 8,069 ft. or some multiple runways less than 8069 ft. | | Class D Airspace (surface) |
| | | | Class E Airspace with floor 700' above surface |
| | VOR/ VORTAC | | National Wilderness Area |

Source: SkyVector.com

## INSTRUMENT FLIGHT PROCEDURES

Instrument approach and departure procedures are developed by the FAA using electronic navigational aids and satellite navigation (SATNAV) to guide aircraft through a series of prescribed maneuvers in and out of an airport's terminal airspace. The procedures are designed to enable continued airport operation during instrument meteorological conditions (IMC), but are also used during visual conditions, particularly in conjunction with an instrument flight plan. The capabilities of each instrument approach are defined by the technical performance of the procedure platform (ground based navigational aids or satellite navigational aids) and the presence of nearby obstructions, which may affect the cloud ceiling and visibility minimums for the approach, and the routing for both the approach and missed approach procedure segments. The aircraft approach speed and corresponding descent rate may also affect approach minimums for different types of aircraft.

Aurora State Airport currently has three instrument approaches, two global positioning system (GPS) approaches to Runways 17 and 35, and a single localizer (LOC) approach to Runway 17. LOC RWY 17 approach presents separate minimums for approaching aircraft that are equipped to obtain a fix on FIDOV intersection. The GPS approaches provide vertical guidance to approaching aircraft. All published approach procedures provide electronic course guidance to either runway end and are authorized for category A-D aircraft (varying aircraft approach speeds) with approach minimums for both straight-in and circling procedures. Approach minimums are for each procedure are summarized in **Table 2-12** and the approach plates are provided in **Appendix 4**.

**TABLE 2-12: INSTRUMENT APPROACH PROCEDURES – AURORA STATE AIRPORT**

| | MINIMUM ALTITUDE (MSL) | MINIMUM VISIBILITY (SM) | AIRCRAFT CATEGORY |
|---|---|---|---|
| RNAV (GPS) RWY 17 | | | |
| LPV DA | 511 | 7/8 | A,B,C,D |
| LNAV/VNAV MDA | 661 | 1 1/4 | A,B,C,D |
| LNAV MDA | 660 | 1 | A,B |
| | 660 | 1 1/8 | C,D |
| Circling | 700 | 1 | A,B |
| | 700 | 1 1/2 | C |
| | 940 | 2 1/4 | D |
| RNAV (GPS) RWY 35 | | | |
| LPV DA | 453 | 7/8 | A,B,C,D |
| LNAV/VNAV MDA | 515 | 1 | A,B,C,D |
| LNAV MDA | 620 | 1 | A,B |
| | 620 | 1 1/4 | C,D |
| Circling | 700 | 1 | A,B |
| | 700 | 1 1/2 | C |
| | 940 | 2 1/4 | D |
| LOC RWY 17 | | | |
| S-17 | 1000 | 3/4* | A |
| | 1000 | 1 | B |
| | 1000 | 2 | C,D |
| Circling | 1000 | 1 | A |
| | 1000 | 1 1/4 | B |
| | 1000 | 2 1/2 | C,D |
| LOC RWY 17 (FIDOV FIX) | | | |
| S-17 | 580 | 3/4* | A,B |
| | 580 | 1 | C,D |
| Circling | 700 | 1 | A,B |
| | 700 | 1 1/2 | C |
| | 940 | 2 1/4 | D |

Source: Federal Aviation Administration
* Visibility minimums increased to 7/8-mile via NOTAM 1/5229

There are three departure procedures published for the Airport. GLARA TWO instructs aircraft departing from Runway 17 to climb to 1,000 feet then make a climbing left turn direct to GLARA, crossing at 4,000 feet, and aircraft departing Runway 35 to climb to 700 feet then make a climbing right turn to GLARA, also crossing at 4000 feet. GNNET TWO instructs aircraft departing from Runway 17 to climb to 1,000 feet then make a climbing right turn direct to GNNET, crossing at 5,000 feet, and aircraft departing Runway 35 to climb to 700 feet then make a climbing left turn to GLARA, crossing at 5,000 feet. NEWBERG TWO directs aircraft departing from Runway 17 to climb to 1000 feet then make a climbing right turn direct to the URG VOR/ DME and aircraft departing Runway 35 to climb to 700 feet then make a climbing left turn to URG VOR/DME, then traffic from either runway should continue climb in URG VOR/DME holding pattern to cross the waypoint at or above 4,000 feet before proceeding on course. Copies of the departure procedure plates are available in **Appendix 4**.

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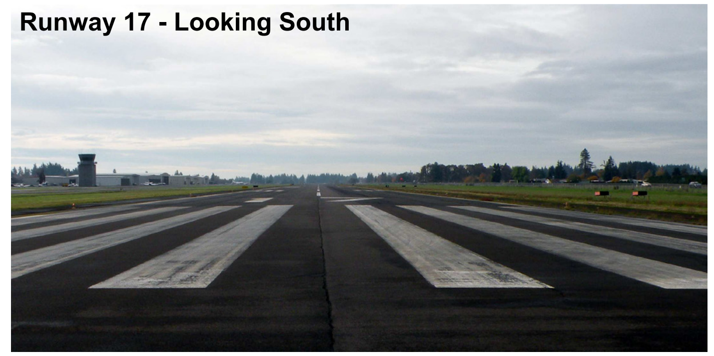
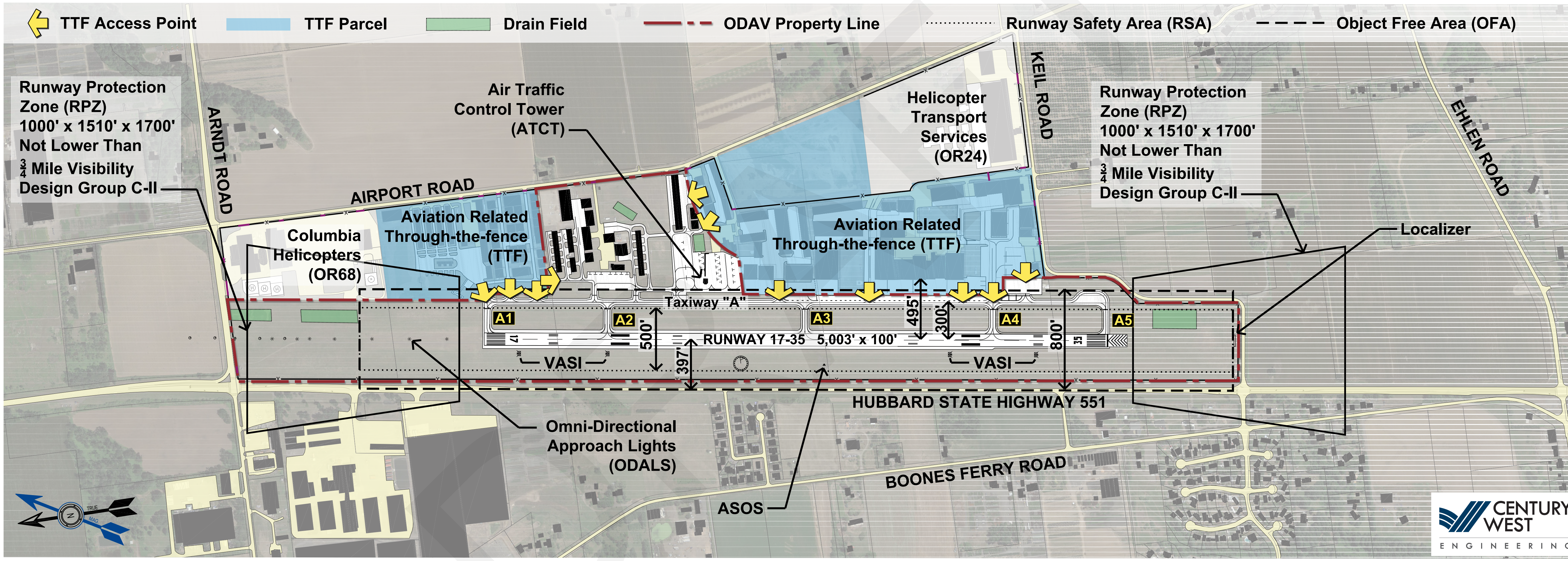
Taxiway "A"


Runway 17 - Looking South


Air Traffic Control Tower (ATCT)


Atlantic Aviation Fuel Tanks - Leased ODAV Property





Hangars on ODAV Property

Hubbard Highway at Arndt Road

Piper Road at Hubbard Highway


Runway Distance Markers and VASI

## RUNWAY

Runway 17/35 is 5,003 feet long and 100 feet wide and is oriented in a north-south direction (187°/007° true bearing). Both runway ends employ left-hand traffic patterns with a traffic pattern altitude of 1,200 feet MSL. The runway is lighted and has a full-length parallel taxiway. The runway slopes downward from the 17 end (elevation 199.7 feet MSL) to the 35 end (elevation 196.3 feet MSL) resulting in an effective runway gradient of 0.06%.

The current runway pavement is comprised of two main sections. The largest being the 4,100-foot northern portion which was originally constructed in 1943. The southern 900 feet of the runway was constructed as an extension in 1993. The most recent runway paving work was a 2- to 3-inch asphalt overlay for the entire runway length, completed in 2005. The runway surface is grooved asphalt with a published single-wheel gear strength rating of 30,000 pounds and a dual-wheel gear strength rating of 45,000 pounds.

The runway has precision markings on each end to accommodate vertical guidance associated with the LPV[12] minimums. Precision markings include threshold bars, edge and centerline striping, aiming point markings, and touchdown zone markings, and runway designation markings. The markings were observed in good condition during a recent field visit to the facility. All markings are consistent with FAA standards.

Runway 35 Looking North – Source: Century West Engineering

## TAXIWAYS AND TAXILANES

Runway 17/35 has a full length, 35-foot wide parallel taxiway (Taxiway A) that is offset 300 feet east of the runway (centerline to centerline). Taxiway A has five 90-degree connector taxiways accessing the runway (A1 – A5). The numbered taxiway connectors begin at the Runway 17 end (A1) and end at the Runway 35 end (A5). There are also 10 taxilanes branching off Taxiway A to provide access to apron and hangar areas, as well as the three defined GA development areas with landside aviation facilities at the Airport. These include:

- Northern TTF Development Area;
- ODAV Terminal Development Area near the center of the airfield; and
- Southern TTF Development Area.

Additional taxilanes are located in and around hangar areas. Taxiway A and connector taxiways are equipped with blue medium intensity edge lights and yellow markings. Taxiway pavement conditions range from "Good" to "Poor" according to the ODAV's 2018 Pavement Evaluation Program (PEP) report (**Appendix 5**). Pavement condition is discussed in more detail in the Pavement Condition section below.

## APRONS AND TIEDOWNS

Within the ODAV-owned property, there is a total of 316,434 square feet of apron space available, primarily on two apron areas. The largest terminal apron area is located at the center of the property east of Taxiway A, adjacent to the ATCT and measures 143,546 square feet. A smaller aircraft parking apron is located near the northern end of ODAV landside property at Taxiway A and Taxiway A2. This apron space is used primarily by Aurora Flight Training. The remaining apron area is on the south end of the airport adjacent to Atlantic Aviation.

12 LPV = "Localizer Performance with Vertical guidance." Satellite-based instrument approach procedure

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The ODAV-owned airport property has a total of 34 tiedown locations. Of the 34 tiedowns, 27 are located near the ATCT, including two configured as pull-through parking intended for large business aircraft. The remaining 25 tiedowns on the main apron are configured for small aircraft. The smaller north apron has seven tiedown locations for small aircraft. Neighboring tenants with airport TTF agreements also provide additional apron space and aircraft parking on their privately-owned land parcels.


Taxiway A Looking South – Source: Century West Engineering


Apron Looking East – Source: Century West Engineering

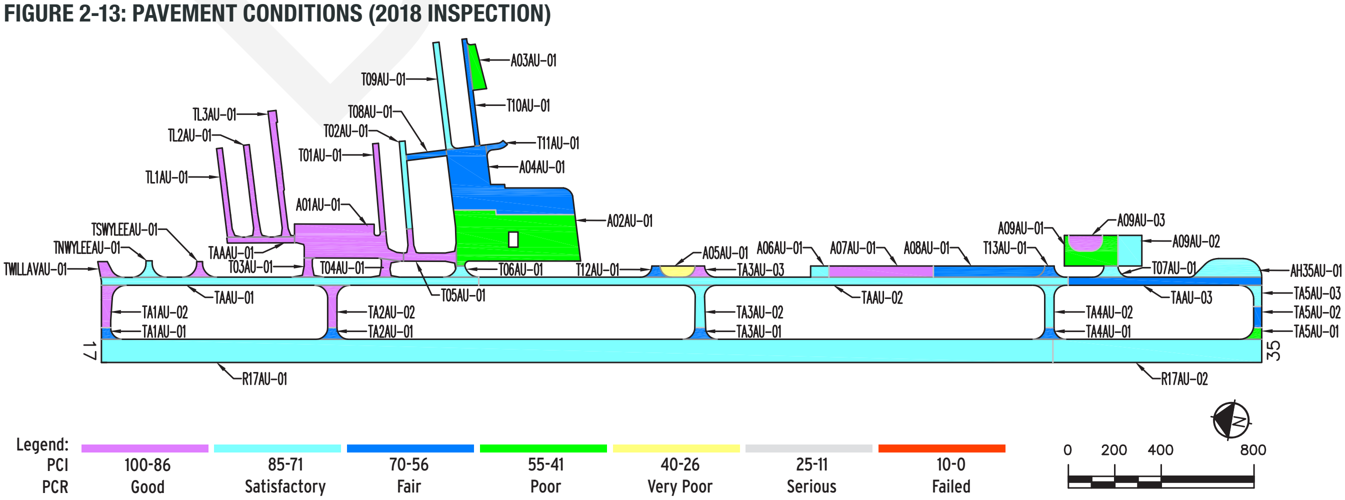
## AIRFIELD PAVEMENT CONDITION

The ODAV PEP systematically evaluates surface conditions, and identifies maintenance, repair, and rehabilitation projects needed to sustain functional pavements at Oregon airports. The PEP provides each paved, public-use airport in Oregon a thorough “snapshot in time” evaluation of surface conditions and provides projections of future surface condition for all eligible pavements in terms of pavement condition index (PCI). For NPIAS airports like Aurora State Airport that receive federal funding, the PEP report is a critical tool for prioritizing airfield pavement needs and meeting FAA grant assurances.

PCI evaluations were performed as part of the PEP at Aurora State Airport in July 2018. The PEP was performed using the PCI methodology developed by the U.S. Army Corps of Engineers and outlined in the current edition of ASTM D-5340, Standard Test Method for Airport Condition Index Surveys. The 2018 PEP report for the Aurora State Airport is included in **Appendix 5**.

The PEP results (**Figure 2-13**) show that the runway pavement surface was in “satisfactory” condition with a weighted average PCI of 81 at that time. The primary distresses present on the runway were low- to medium-severity longitudinal cracking, low-severity weathering, and isolated low-severity alligator cracking. The longitudinal cracking was located primarily at paving joints created during the 2005 overlay project and sealed most recently in August of 2020. The alligator cracking was located primarily in areas aligning with the gear paths for typical business jet aircraft using the airport.

**FIGURE 2-13: PAVEMENT CONDITIONS (2018 INSPECTION)**




Source: 2018 ODAV Pavement Evaluation/Maintenance Management Program

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Most of the taxiway pavements were rated "Satisfactory" or "Good." Notable exceptions being the south 900 feet of Taxiway A and west fillets of connector taxiways A1 – A4, which received ratings of "Fair," and the west fillet of connector taxiway A5 that was rated as "Poor." The Taxilanes accessing hangar areas were rated as "Good" to "Fair."

The apron pavements conditions were more varied. The west half of the main apron was rated as "Poor", the east half was rated as "Fair," and the north parking apron received a rating of "Good." Most of the remaining apron pavements were rated as "Fair" or better. However, there was a single small area of apron located north of A3 between two access taxilanes rated "Very Poor."

The 2018 PEP report recommended a variety of treatments to address the findings of the inspection, ranging from crack and slurry sealing to asphalt overlays and pavement reconstruction. The recommended treatment projects will be completed according to priority and funding availability, and ultimately included in the airport master plan's capital improvement program (CIP).

In August of 2019, the ODAV commissioned GRI to conducted a Runway 17/35 pavement evaluation (included in **Appendix 5**) to determine the existing Pavement Classification Number (PCN). PCN is an International Civil Aviation Organization (ICAO) standard used to indicate the strength of a runway, taxiway or apron. That assessment included review of ODAV historical pavement records, falling weight deflectometer testing, pavement cores, and related analysis. The guidance provided in FAA Advisory Circular 150/5335-5C, Standardized Method of Reporting Airport Pavement Strength – PCN, was used to calculate the final PCN.

The results of the evaluation suggested that based on calculated PCN, individual operations of up to 102,000 pounds for single-wheel and 143,000 pounds for dual-wheel could theoretically be accommodated. The evaluation hypothesized that a higher than expected PCN number for these isolated operations may have resulted from additional structural capacity added by the 2005 overlay. Conversely, the study also identified low-severity top-down alligator cracking and delamination of the top layer of pavement within the gear paths that would limit the ability of larger aircraft to use the runway. This type of cracking and delamination results from shear stresses at the pavement surface from aircraft wheel loading during landing and hard braking. These shear stresses are greater when larger aircraft with larger tire contact patches are in use, potentially resulting in catastrophic runway pavement damage if operations of larger aircraft were allowed.

Century West Engineering produced an additional memorandum for ODAV in September of 2020 that summarized the findings of the GRI pavement evaluation. The memorandum, entitled "Runway Pavement Considerations for Overweight Landings" (included in **Appendix 5**), also provided recommendations on evaluation of future requests by operators of aircraft exceeding the published Runway 17/35 weight limitations. The memorandum recommended that cumulative operations and their effects on pavement structural life be considered when operations exceeding weight limitations are requested. Since PCN is a measure only of whether individual operations may cause pavement failure, analysis that includes changes in overall fleet mix should be conducted for any reoccurring overweight operations. Also, the memorandum discussed pavement surface distresses and overlay delamination that were noted (and discussed above) that should be carefully considered as an indicator of increased chance of catastrophic pavement failure in the affected areas due to overweight landings and takeoffs. More frequent pavement inspections in areas of concern were also recommended. Finally, the memorandum provided recommendations on response planning should a pavement failure occur.

In May of 2021, GRI completed one additional evaluation for the ODAV that examined the remaining structural life of the Runway 17/35 pavement (included in **Appendix 5**). This evaluation calculated the remaining structural pavement life under a variety of fleet mix scenarios including the existing fleet mix and with the addition of varying numbers of overweight aircraft operations. The assessment concluded that repeated stresses put on the Runway by overweight aircraft would likely result in further damage, a shortened structural life of the pavement, and increased the likelihood of a catastrophic pavement failure. GRI also recommended a rehabilitation of the existing Runway pavement within the next 10 years due to the distresses noted previously.

## FAA DESIGN STANDARDS

The FAA defines several recommended standards for airport design in *AC 150/5300-13A, Airport Design*. Some of the most critical standards are those related to the design of runways and taxiways and will be described in more detail in subsequent chapters of this planning study. At this stage of the planning process, it is relevant to summarize existing non-standard conditions previously identified by the FAA for consideration throughout the planning process.

**Runway Safety Area (RSA)** – The RSA is a defined surface surrounding the runway that is prepared or suitable for reducing the risk of damage to airplanes in the event of an airplane undershoot, overshoot, or an excursion from the runway.

**Object Free Area (OFA)** –The OFA is an area on the ground centered on the runway, taxiway, or taxilane centerline that is provided to enhance the safety of aircraft operations. No above ground objects are allowed except for those that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

**Object Free Zone (OFZ)** – The OFZ is a volume of airspace that is required to be clear of obstacles, except for frangible items required for the navigation of aircraft. It is centered along the runway and extended runway centerline.

**Runway Protection Zone (RPZ)** – The Runway Protection Zone (RPZ) is a trapezoidal area off each runway end intended to enhance the protection of people and property on the ground. The dimensions of an RPZ are a function of the critical aircraft and approach visibility minimums. The FAA recommends that RPZs be clear of all residences and places of public assembly (churches, schools, hospitals, etc.) and that airports own the land within the RPZs.

At Aurora State Airport, there are several known existing non-standard conditions to be analyzed in detail in the Facility Goals and Requirements and Development Alternatives Chapters:

- RPZs are encroached by various public roadways and contain properties that are not directly controlled by the Airport. "Interim Guidance on Land Uses Within Runway Protection Zone (2012)" generally identifies a public roadway as an incompatible land use within the RPZ. It also states that it is preferred that all property within RPZs be held by the airport in fee simple so the Airport sponsor can completely control the land use within.
- The runway OFA along its entire length is obstructed by Hubbard State Highway 551.
- There are several taxiway/taxilane design standard issues that should also be addressed at the Airport. The FAA recommends that taxiways/taxilanes not lead directly from an apron to the runway without requiring a turn. There are two direct runway access points on the Airport at Taxiways A3 and A4.
- The intersection of Taxiway A at A4 has been designated as a hotspot by the FAA. A hot spot is defined as a location on an airport movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

## AIRPORT SUPPORT SERVICES

Support facilities generally include airside support facilities such as airfield lighting, signage, weather reporting equipment, ground-based navigational aids (NAVAIDS), and fueling facilities.

### Air Traffic Control Tower

Aurora State Airport has an FAA Contract Air Traffic Control Tower (ATCT) on the main apron. Contract towers are ATCTs that are staffed by employees of private companies rather than by FAA employees. The ATCT was constructed in 2015 and began operations in October of that year. The tower is in operation daily between 0700 and 2000 local time (7:00 am to 8:00 pm in standard time terms).

### Runway/Taxiway Lighting

Airfield edge lighting is classified as low, medium, or high intensity systems. Aurora State Airport's runway has a medium intensity runway lighting (MIRL) which are white in color. The parallel taxiway and connector taxiways have medium intensity taxiway lighting (MITL) which are blue in color. Both systems are pilot-activated by keying the microphone from their aircraft. Apron edges are marked by blue edge reflectors.



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## Airfield Lighting

The Airport accommodates day and night operations in visual and instrument meteorological conditions. The runway is equipped with lighting systems that meet the standards for the current instrument approach requirements and runway use.

Exterior building and pole-mounted overhead lighting is installed at various locations around the airfield in some parking lots and on airport buildings.

The airfield lighting was observed to be in good working condition and fully operational during recent site visits.

## Airfield Signage

The runway-taxiway system has lighted mandatory instruction signs (red background with white text) marking the aircraft holding positions at each of the taxiway connections with the runway [17-35, 17, 35, etc.]; the signs also include taxiway direction/designations [A1, A2, etc.] with yellow background and black numbers/letters. The signs are located to coincide with the painted aircraft hold lines on each taxiway that connects to the runway.

## Weather Reporting

Aurora State Airport has an Automated Surface Observation System (ASOS) that provides 24-hour weather information. The ASOS sensor array is located west of the runway, near midfield. The system reports the following readings:

- Sky conditions such as cloud height and cloud coverage up to 12,000 feet;
- Surface visibility up to at least 10 statute miles;
- Basic present weather information such as the type and intensity for rain, snow, and freezing rain;
- Obstructions to vision like fog, haze, and/or dust;
- Sea-level pressure and altimeter settings;
- Air and dew point temperatures;
- Wind direction, speed and character (gusts, squalls);
- Precipitation accumulation; and
- Selected significant remarks including variable cloud height, variable visibility, precipitation beginning/ending times, rapid pressure changes, pressure change tendency, wind shift, peak wind.

When the ATCT is operating, weather reports are broadcast via the Automated Terminal Information System (ATIS). ATIS reports weather conditions and other information relevant to the airport hourly at 55 minutes past the hour on frequency 118.525 MHz. When the ATCT is not in service, the system reverts to the default ASOS information broadcast on the same frequency. The ASOS weather information is also available by telephone (503) 678-3011.

Taxiway Light and Air Traffic Control Tower

Willamette Aviation Fuel Tanks

Medium Intensity Runway Lighting (MIRL)

VASI and Windsock

Source: Century West Engineering

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## NAVAIDs
Navigational Aids (NAVAIDS) provide navigational assistance to approaching aircraft. They are classified as either Visual or Electronic. Visual NAVAIDs provide visual cues to pilots, usually through lights. Electronic NAVAIDs aid the pilot on approach by interacting with electronic instruments onboard the aircraft.

### Visual NAVAIDs
Aurora State Airport has four types of visual NAVAIDs:

**Visual Approach Slope Indicators (VASI)**. Two-box VASIs are located at both runway ends. VASIs give pilots visual cues regarding their angle of final approach by displaying different colored lights based on where they are in relation to the published glide slope angle. The Runway 17 VASI has a 3.5-degree glide path; the Runway 35 VASI has a 3.0-degree glide path. VASIs allow a limited range of adjustment above the standard 3.0-degree glide path angle to increase clearance over close-in obstructions to the runway approach.

**Runway End Indicator Lights (REIL)**. Runway 17 is equipped with a REIL. REILs mark runway ends with sequenced strobe lights positioned on each corner of the runway end. REILS increase a pilot's ability to identify the runway end in darkness or poor visibility conditions.

**Omnidirectional Approach Lighting System (ODALS)**. Runway 17 is equipped with an ODALS. ODALSs are normally associated with runways with published instrument approach procedures. They consist of a series of lights extending out from the runway end flashing in sequence guiding the aircraft to the runway end.

**Airport Rotating Beacon (APBN)**. APBNs are used to indicate the location of an airport to pilots in darkness or during reduced visibility. For land airports, the APBN provides sequenced white and green flashing lights that rotate 360-degrees to allow pilots to identify the airport from all directions, from several miles. The beacon operates on a dusk-dawn photocell automatic switch and reportedly functions normally.

### Electronic NAVAIDs
**Localizer (LOC) with Distance Measuring Equipment (DME)**. The LOC and DME work in conjunction to provide lateral course guidance and distance information to aircraft on approach to Runway 17.

**Newberg (URG) Very High Frequency Omnidirectional Range with DME (VOR/DME)**. The NAVAID is located 10.8 miles northwest of the Airport and supports nearby enroute navigational routes and instrument procedures to several airports in the area. Nine separate instrument airways converge in the area surrounding Aurora State Airport. Air traffic on these airways includes aircraft from throughout the instrument enroute system, including aircraft operating at airports throughout the region and aircraft that are simply transiting the area enroute to more distant airports.

## FBO and Flight Training Services
There are two businesses offering fixed base operator (FBO) services at the Airport. Atlantic Aviation (formerly Lynx FBO) provides fueling and oxygen services, aircraft parking, hangar rentals, aircraft maintenance, and avionics sales and service. Willamette Aviation Services provides aircraft fuel, aircraft parking, hangar leasing and sales, and aircraft rental and maintenance services. Flight training service are offered by Willamette Aviation Services and Aurora Flight Training (formerly Aurora Aviation), which is a non-FBO business.

## Fuel Services
Fuel services are provided by Atlantic Aviation and Willamette Aviation. Atlantic Aviation provides both aviation gasoline (AVGAS/100LL) and JetA and Willamette Aviation provides only AVGAS. There are two privately-owned aboveground fuel tanks located near the south end of the Airport on ODAV property.

# Landside Facilities

The landside elements section includes the landside facilities (depicted in **Figure 2-12**) designed to support airport operations, including aircraft storage and maintenance. This section of the existing conditions analysis includes a discussion of General Aviation (GA) Terminal Areas and "Through-The-Fence" (TTF) development, hangars/airport buildings, airport surface roads, vehicle parking, airport fencing, and utilities.

## GENERAL AVIATION (GA) TERMINAL AREAS AND "THROUGH-THE-FENCE" (TTF) AGREEMENTS

As depicted in **Figure 2-14**, there are three discernible GA development areas with landside aviation facilities at the Airport. All of the existing landside facilities are located on the east side of the runway:

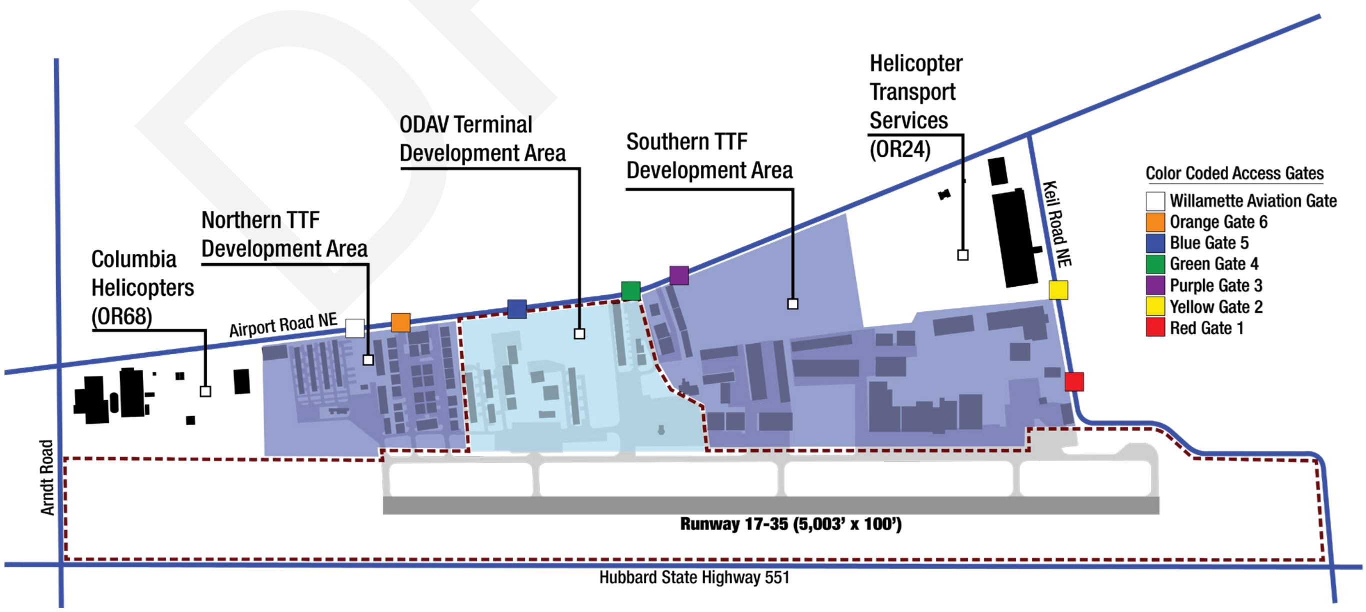
- **Terminal Development Area** – ODAV-owned property near the center of the airfield
- **North TTF Development Area** – privately-owned aeronautical use areas with ODAV-approved TTF access agreements
- **South TTF Development Area** – privately-owned aeronautical use areas with ODAV-approved TTF access agreements

The focus of the airport master plan are the public facilities located on ODAV property and the eleven designated TTF access points on the airport property line. As noted earlier, the nearby Columbia Helicopters and Helicopter Transport Services (HTS) facilities are privately-owned helipads that are fully independent from Aurora State Airport operations and facilities. These facilities will not be included in the master plan evaluations.

Therefore, from a landside development standpoint, attention will be given to the facilities within the ODAV Terminal Development Area. In certain instances, appurtenant facilities in the North and South TTF Development Areas may be included to provide necessary context.

The ODAV Terminal Development Area is comprised of numerous hangars for storing general aviation aircraft, airport businesses like Aurora Flight Training, Aurora Aviation; an apron for itinerant traffic, and the FAA Air Traffic Control Tower (ATCT). The specific airfield facilities within this area of the Airport have been discussed within the relevant sections of this existing conditions analysis.

**FIGURE 2-14: AURORA STATE AIRPORT DEVELOPMENT AREAS**




Source: Developed by Century West Engineering

## HANGARS/AIRPORT BUILDINGS

Within the ODAV Terminal Development Area there are six T-hangar buildings, eight conventional / multiple-aircraft hangars, and three other buildings (fixed base operator and fire suppression facility). On the remaining TTF and private development areas there are 76 buildings: seven T-hangar buildings, 54 conventional / multiple-aircraft hangars, and fifteen other buildings.

**Table 2-13** summarizes the existing buildings, ownership, and general usage.

**TABLE 2-13: HANGARS/AIRPORT BUILDINGS**

| | T-Hangar Buildings | T-Hangar Buildings SF | Conventional / Multiple-Aircraft | Conventional / Multiple-Aircraft SF | Other (business, office, etc) | Other (business, office, etc) SF | Total | Total SF |
|---|---|---|---|---|---|---|---|---|
| Northern TTF Development Area | 5 | 47,300 | 33 | 163,100 | 1 | 1,500 | 35 | 211,900 |
| ODAV Terminal Development Area | 5 | 64,400 | 10 | 73,300 | 3 | 6,000 | 17 | 143,700 |
| Southern TTF Development Area | - | - | 28 | 623,000 | 2 | 14,500 | 30 | 637,500 |
| **Total** | **10** | **111,700** | **71** | **859,400** | **6** | **22,000** | **82** | **993,100** |

Source: Century West Engineering - Aerial photo based analysis

The 2019 *Constrained Operations Runway Justification Study* included a hangar/building analysis to identify new construction:

> *"Since 2012, most of the new hangar construction at the Airport has occurred in the South TTF Development Area. Approximately 30,650 SF of T-hangars were removed to accommodate construction of new larger conventional and corporate aircraft storage hangars. Overall, in the South TTF Development Area, including the HTS building, new construction amounted to approximately 223,000 SF of new aviation commercial and corporate aircraft storage space. Further expansion in the South TTF Development Area is ongoing.*
>
> *Within the ODAV Terminal Development Area no hangars had been removed since 2012 and new construction included one hangar at approximately 6,200 SF. There is approximately 8.1 acres of developable land within the ODAV Terminal Development Area. In the north end Columbia Helicopters development area, new construction included approximately 3,500 SF of new storage buildings that appear to have been constructed to replace steel shipping/storage containers. No changes were identified in the Wiley or Willamette development areas within the North TTF Development Area."*

## AIRPORT SURFACE ROADS

There are multiple access points to the Airport that coincide with a colored gate system to clearly delineate Airport access and assist in emergency response and advertisement (see **Figure 2-14**). Stenbock Way NE access is located at the Purple Gate at Airport Road NE and is considered to be the major entry point to ODAV property due to the access provided to the ATCT. However, the Purple Gate entry on Stenbock Way NE provides access directly on to privately-owned land on the South TTF Development Area and provides access to numerous private hangars and buildings like the Columbia Aviation Association meeting facility.

Access to the ODAV Terminal Development Area is also provided at the unnamed access roads identified by the Green and Blue Gates on Airport Road, slightly north of the Purple Gate. The access road at the Blue Gate is the only public access point that is located entirely on public land. The road is approximately 700' long and provides vehicle access to Aurora Flight Training, a large vehicle parking lot, and most of the hangars located on public property.

## VEHICLE PARKING

On the public land within the ODAV Terminal Development Area, several joint use parking lots are available near the public tiedown area, air traffic control tower, adjacent hangars, and airport related businesses. The parking areas on state-owned land provides parking for approximately 60 vehicles. The majority of the vehicle parking positions are located adjacent to Aurora Flight Training and is accessible from the Blue Gate. Several more parking positions located next to the ATCT are typically reserved for FAA ATCT and ODAV maintenance staff.

On the adjacent privately held land, airport businesses offer parking for employees and customers based on Marion County zoning and development standards. Individual hangar tenants typically park adjacent to or in their hangars while flying; some parking lots are available for their use, as well.

## AIRPORT FENCING

Approximately four miles of security fencing and access gates surround the entire Airport inclusive of the public and private properties. The perimeter fencing was constructed in 1999 and funded with private funds on private land and FAA grant money on the publicly owned land. All access points are gated, although not all are automated.

The non-automated gates sometimes remain open during normal business hours. The Airport gate signage and color system (Red, Yellow, Purple, Blue, Orange, Green, and Yellow) was installed at access points along Canby-Hubbard Highway, Keil Road, Arndt Road, and Airport Road. The design, construction, and installation of the access gates was funded with private money. ODAV maintains the gates and pays for lighting and electricity.

## UTILITIES

The developed areas of Aurora State Airport have water, sewer, storm water drainage, natural gas, and electric. The following text describes the major utilities serving the Airport.

### Water

Water at the Airport is provided from a system of wells. In the early 2000s, with the assistance of Marion County, the Aurora Airport Water Control District was created to address major fire and life safety needs for privately-owned land adjacent to ODAV property at the Airport. The system included an underground tank system, a pump house, underground water pipes, fire hydrants, and numerous connections for fire sprinkler systems.

### Sewer

Sanitary sewer is provided by individual and shared drain field/septic tank systems. There are at least nine individual drain fields located on ODAV owned property that are shared for both aviation related uses on both private and publicly owned land.

### Stormwater

The Airport's stormwater system is made up of a network of edge drain, culverts and surface drainage features which generally flow to the east, west, and south sides of the Airport. Most of the stormwater runoff originating on ODAV-owned property and airfield facilities like the runway, taxiway, and apron flows to the west side of the Airport.

### Electric

Electric service is provided by Portland General Electric (PGE).

### Gas

Natural gas service is provided NW Natural.

# Airport Administration

The Airport Administration section provides a summary of Airport Ownership and Management, Airport Finance, Rates and Charges, and overview of FAA Grant Assurances and Compliance.

## AIRPORT OWNERSHIP AND MANAGEMENT

Aurora State Airport is owned and operated by the Oregon Department of Aviation. ODAV manages Aurora State Airport among a group of 28 state-owned or operated airports from its office in Salem. The department has approximately 15 ½ full-time employees with one State Airports Manager, who is responsible for the day-to-day management of the airports. Airport management staff oversees grant administration, construction management, airport finance and leasing, as well as operations and maintenance of the Aurora State Airport. Airport tenants are responsible for managing their facilities and leased areas to meet the requirements defined in their leases.

## AIRPORT FINANCE

ODAV operates Aurora State Airport within its group of state-owned airports as an enterprise fund. All revenue generated by the airports remains within the airport operating budget. This is a standard FAA requirement for all airports to prevent revenue diversion from airport operations to general services or non-airport operations.

The primary revenue generating sources for Aurora State Airport includes improved and unimproved ground lease rents, access fees from through-the-fence users, and fuel flowage fees. The primary expenditures for the Airport include airport legal fees, property taxes, maintenance and operation expenses, and personnel services. The Airport's capital improvement projects are typically funded through FAA grants with a local match that may be provided by ODAV grants. Based on a review of the airport's revenues and expenses for 2021, the airport's revenues exceed its expenses for normal operations and maintenance. A summary of the airports revenues and expenses are included in **Tables 2-14** and **2-15**.

**TABLE 2-14: AIRPORT REVENUE/EXPENSE SUMMARY (2021)**

| AIRPORT REVENUE | |
|---|---|
| Leases, Tiedowns, Property Tax, Utilities | $83,203.15 |
| Access Fees (Through-the-Fence) | $40,000.00 |
| Fuel Flowage Fees | $92,114.00 |
| **TOTAL AIRPORT REVENUES** | **$215,317.15** |
| **AIRPORT EXPENSES** | |
| Airport Personnel Services | $19,101.96 |
| Transit Tax | $63.28 |
| Utilities | $28,547.38 |
| Maintenance & Inspections | $30,359.68 |
| Supplies | $5,834.80 |
| Legal Fees | $83,166.70 |
| Reporting & Monitoring Charges | $14,050.00 |
| Property Taxes | $33,009.73 |
| **TOTAL AIRPORT OPERATING EXPENSES** | **$214,133.53** |
| **NET OPERATING INCOME** | **$1,183.62** |

Source: ODAV Budget FY2021 Actuals

**TABLE 2-15: AIRPORT RATES AND CHARGES DATA**

| RATES AND CHARGES | |
|---|---|
| FBO Tiedown Fees (Monthly) | $10.00 |
| Non-Commercial Tiedown Fees (By Category) (Per Month) | |
| Category II | $20.00 |
| Category III & IV | $17.50 |
| Category V | $15.00 |
| Access Fees (shall be the greater of the two (1) weight range or (2) minimum guarantee) | |
| (1) Weight Range (Per Month) | |
| Class 1 Aircraft (up to 5,000 lbs) | $15.00 |
| Class 2 Aircraft (5,001 to 10,000 lbs) | $24.00 |
| Class 3 Aircraft (10,001 to 20,000 lbs) | $44.00 |
| Class 4 Aircraft (20,001 to 30,000 lbs) | $66.00 |
| Class 5 Aircraft (30,001 to 40,000 lbs) | $88.00 |
| Class 6 Aircraft (40,001 lbs and over) | $120.00 |
| (2) Minimum Guarantee (Per Month) | |
| Category II | $275.00 |
| Category III & IV | $175.00 |
| Category V | $75.00 |
| Fuel Flowage Fee (Per Gallon) | $0.08 |
| Improved Ground Lease Rates (Sq/Ft) (Per Month) | $0.3256 |
| Unimproved Ground Lease Rates (Sq/Ft) (Per Month) | $0.05 |

Source: ODAV State Airport Rates 2021

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## FAA COMPLIANCE OVERVIEW

A management program based on the FAA's "Planning for Compliance" guidance and the adoption of additional airport management "Best Practices" is recommended to address FAA compliance requirements and avoid noncompliance, which could have significant consequences.

Airport management "Best Practices" are developed to provide timely information and guidance related to good management practices and safe airport operations for airport managers and sponsors. The practices outlined herein are designed for use by ODAV for evaluating and improving their current and future operation and management program.

Airport sponsors must comply with various federal obligations through agreements and/or property conveyances, outlined in *FAA Order 5190.6B, Airport Compliance Manual*. The contractual federal obligations a sponsor accepts when receiving federal grant funds or transfer of federal property can be found in a variety of documents including:

- Grant agreements issued under the Federal Airport Act of 1946, the Airport and Airway Development Act of 1970, and Airport Improvement Act of 1982. Included in these agreements are the requirement for airport sponsors to comply with:
    - Grant Assurances;
    - Advisory Circulars;
    - Application commitments;
    - FAR procedures and submittals; and
    - Special conditions.
- Surplus airport property instruments of transfer;
- Deeds of conveyance;
- Commitments in environmental documents prepared in accordance with FAA requirements; and
- Separate written requirements between a sponsor and the FAA.

### OREGON AVIATION LAWS

The Oregon Department of Aviation (ODAV) has created both the Oregon Administrative Rules (OAR) and Oregon Revised Statutes (ORS) to govern airports within the state.

#### Oregon Administrative Rules (OAR)

- OAR Chapter 660, Division 13 – Airport Planning
- OAR Chapter 660, Division 13 – Exhibits
- OAR Chapter 738 – ODAV
- Non-Commercial Leasing Policy
- Commercial Leasing Policy
- Category II Minimum Standards Policy
- Category IV Minimum Standards Policy
- Category V Minimum Standards Policy
- Insurance Requirements

#### Oregon Revised Statutes (ORS)

- ORS 197 – Land Use Planning I
- ORS 197A – Land Use Planning II
- ORS 319 – Aviation Fuel Tax
- ORS 835 – Aviation Administration
- ORS 836 – Airports and Landing Fields
- ORS 837 – Aircraft Operations
- ORS 838 – Airport Districts

## Airport Compliance with Grant Assurances

As a recipient of both federal and state airport improvement grant funds, the airport sponsor is contractually bound to various sponsor obligations referred to as "Grant Assurances", developed by FAA and the State of Oregon. These obligations, presented in detail in federal and state statute and administrative codes, document the commitments made by the airport sponsor to fulfill the intent of the grantor (FAA or state) required when accepting federal and/or state funding for airport improvements. Failure to comply with the grant assurances may result in a finding of noncompliance and/or forfeiture of future funding. Grant assurances and their associated requirements are intended to protect the significant investment made by the FAA or State of Oregon to preserve and maintain public-use airports as valuable transportation assets.

## FAA Grant Assurances

The FAA's Airport Compliance Program defines the interpretation, administration, and oversight of federal sponsor obligations contained in grant assurances. The Airport Compliance Manual defines policies and procedures for the Airport Compliance Program. Although it is not regulatory or controlling with regard to airport sponsor conduct, it establishes the policies and procedures for FAA personnel to follow in carrying out the FAA's responsibilities for ensuring compliance by the sponsor.

The *Airport Compliance Manual* states the FAA Airport Compliance Program is: "…designed to monitor and enforce obligations agreed to by airport sponsors in exchange for valuable benefits and rights granted by the United States in return for substantial direct grants of funds and for conveyances of federal property for airport purposes. The Airport Compliance Program is designed to protect the public interest in civil aviation. Grants and property conveyances are made in exchange for binding commitments (federal obligations) designed to ensure that the public interest in civil aviation will be served. The FAA bears the important responsibility of seeing that these commitments are met. This order addresses the types of commitments, how they apply to airports, and what FAA personnel are required to do to enforce them."

According to the FAA, cooperation between the FAA, state, and local agencies should result in an airport system with the following attributes:

- Airports should be safe and efficient, located at optimum sites, and be developed and maintained to appropriate standards;
- Airports should be operated efficiently both for aeronautical users and the government, relying primarily on user fees and placing minimal burden on the general revenues of the local, state, and federal governments;
- Airports should be flexible and expandable, able to meet increased demand and accommodate new aircraft types;
- Airports should be permanent, with assurance that they will remain open for aeronautical use over the long-term;
- Airports should be compatible with surrounding communities, maintaining a balance between the needs of aviation and the requirements of residents in neighboring areas;
- Airports should be developed in concert with improvements to the air traffic control system;
- The airport system should support national objectives for defense, emergency readiness, and postal delivery;
- The airport system should be extensive, providing as many people as possible with convenient access to air transportation, typically not more than 20 miles of travel to the nearest NPIAS airport; and
- The airport system should help air transportation contribute to a productive national economy and international competitiveness.

The airport sponsor should have a clear understanding of and comply with all assurances. The following sections describe the selected assurances in more detail.

## Project Planning, Design, and Contracting

### Sponsor Fund Availability (Assurance #3)

Once a grant is given to the airport sponsor, the sponsor commits to providing the funding to cover their portion of the total project cost. Currently this amount is 10% of the total eligible project cost, although it may be higher depending on the particular project components or makeup. Once the project has been completed, the receiving airport also commits to having adequate funds to maintain and operate the airport in the appropriate manner to protect the investment in accordance with the terms of the assurances attached to and made a part of the grant agreement. It is noted that this airport master plan project is 100% FAA funded due to the availability of grants associated with COVID-19 pandemic recovery.

#### Consistency with Local Plans (Assurance #6)

All projects must be consistent with city and county comprehensive plans, transportation plans, zoning ordinances, development codes, and hazard mitigation plans. The airport sponsor should familiarize themselves with local planning documents before a project is considered to ensure that all projects follow local plans and ordinances.

#### Accounting System Audit and Record Keeping (Assurance #13)

All project accounts and records must be made available at any time. Records should include documentation of cost, how monies were actually spent, funds paid by other sources, and any other financial records associated with the project at hand. Any books, records, documents, or papers that pertain to the project should be available at all times for an audit or examination.

### General Airport Assurances

#### Good title (Assurance #4)

The airport sponsor must have a Good Title to affected property when considering projects associated with land, building, or equipment. Good Title means the sponsor can show complete ownership of the property without any legal questions, or show it will soon be acquired.

#### Preserving Rights and Powers (Assurance #5)

No actions are allowed, which might take away any rights or powers from the sponsor, which are necessary for the sponsor to perform or fulfill any condition set forth by the assurance included as part of the grant agreement.

#### Airport Layout Plan (ALP) (Assurance #29)

The airport sponsor should maintain an up-to-date ALP, which should include current and future property boundaries, existing facilities/structures, locations of non-aviation areas, and existing and proposed improvements. FAA requires proposed improvements to be depicted on the ALP in order to be eligible for FAA funding. If changes are made to the airport without authorization from the FAA, the FAA may require the airport to change the alteration back to the original condition or jeopardize future grant funding.

#### Disposal of Land (Assurance #31)

Land purchased with the financial participation of an FAA Grant cannot be sold or disposed of by the airport sponsor at their sole discretion. Disposal of such lands are subject to FAA approval and a definitive process established by the FAA. If airport land is no longer considered necessary for airport purposes, and the sale is authorized by the FAA, the land must be sold at fair market value. Proceeds from the sale of the land must either be repaid to the FAA, or reinvested in another eligible airport improvement project.

### Airport Operations and Land Use

#### Pavement Preventative Maintenance (Assurance #11)

Since January 1995, the FAA has mandated that it will only give a grant for airport pavement replacement or reconstruction projects if an effective airport pavement maintenance-management program is in place. The Oregon Department of Aviation prepares and updates pavement reports for the airport. These reports identify the maintenance of all pavements funded with federal financial assistance and provides a pavement condition index (PCI) rating (0 to 100) for various sections of aprons, runways, and taxiways; including, a score for overall airport pavements.

#### Operations and Maintenance (Assurance #19)

All federally funded airport facilities must operate at all times in a safe and serviceable manner and in accordance with the minimum standards as may be required or prescribed by applicable Federal, State, and Local agencies for maintenance and operations.

### Compatible Land Use (Assurance #21)

Land uses around an airport should be planned and implemented in a manner that ensures surrounding development and activities are compatible with the airport. Aurora State Airport is located in unincorporated Marion County. The airport sponsor should work with the county and adjacent land use jurisdictions to ensure that zoning and land use controls are in place to protect the airport from incompatible land uses. Incompatible land uses around airports represents one of the greatest threats to the future viability of airports.

## Day-To-Day Airport Management

### Economic Non-Discrimination (Assurance #22)

Any reasonable aeronautical activity offering service to the public should be permitted to operate at the airport as long as the activity complies with airport established standards for that activity. Any contractor agreement made with the airport will have provisions making certain the person, firm, or corporation will not be discriminatory when it comes to services rendered including rates or prices charged to customers.

### Exclusive Rights (Assurance #23)

No exclusive right for the use of the airport by any person providing, or intending to provide, aeronautical services to the public. However, an exception may be made if the airport sponsor can prove that permitting a similar business would be unreasonably costly, impractical, or result in a safety concern, the sponsor may consider granting an exclusive right.

## Leases And Finances

### Fee and Rental Structure (Assurance #24)

An airport's fee and rental structure should be implemented with the goal of generating enough revenue from airport related fees and rents to become self-sufficient in funding the day-to-day operational needs. Airports should update their fees and rents on a regular basis to meet fair market value, often done through an appraisal or fee survey of nearby similar airports. Common fees charged by airports include fuel flowage fees, tiedown fees, landing fees, and hangar or ground lease rents.

### Airport Revenue (Assurance #25)

Revenue generated by airport activities must be used to support the continued operation and maintenance of the airport. Use of airport revenue to support or subsidize non-aviation activities or to fund other departments who are not using the funds for airport specific purposes is not allowed and is considered revenue diversion. Revenue diversion is a significant compliance issue for FAA.

For additional information on FAA Grant Assurances, please visit: https://www.faa.gov/airports/aip/grant_assurances/#current-assurances

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Taxiway A at A4 – Source: Century West Engineering

Chapter 3

# *Aviation Activity Forecasts*

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## COVID-19 STATEMENT (JANUARY 2022)

This forecast was prepared at the end of the second full year of the COVID-19 pandemic. The disruption of airport activity experienced throughout the U.S. airport system related to COVID-19 since 2020 is unprecedented and has led to significant declines in activity that are not consistent with recent historical trends. It is acknowledged that not all elements of general aviation activity have been affected equally. Some segments of personal air travel have demonstrated resilience, partly in response to the heavily impacted commercial airline industry.

Although the limits of the current industry-wide disruption have yet to be defined, it is believed that the underlying elements of demand within general aviation will remain largely intact until all public health constraints are fully addressed and economic conditions gradually return to normal.

Federal Aviation Administration (FAA) forecast approval will be based in reference to the data and methodologies used and the conclusions at the time the document was prepared. However, consideration must still be given to the significant impacts of COVID-19 on aviation activity. As a result, there is lower than normal confidence in future growth projections.

FAA approval of the forecast does not provide justification to begin airport development. Justification for future projects will be made based on activity levels at the time the project is requested for development, rather than this forecast approval. Further documentation of actual activity levels reaching the planning activity levels will be needed prior to FAA participation in funding for eligible projects.

# Introduction and Overview

This chapter provides a summary of historical aviation activity and new aviation activity forecasts for the 2021-2041 Aurora State Airport (Airport) - Airport Master Plan. The most recent aviation activity forecasts approved by the Federal Aviation Administration (FAA) for Aurora State Airport were developed in the 2012 Airport Master Plan and the 2019 Constrained Operations Runway Justification Study.

The aviation activity forecasts have a base year of 2021 (calendar year), the last year of complete data available when the forecasts were prepared. The forecast covers a 20-year period with reporting intervals at every five years. Multiple forecasting methodologies are used in this analysis and the models that provide the most valid outlooks are presented for comparison.

Aviation activity forecasts help determine if existing airport facilities are sufficient or will need to be modified to handle future demand (aircraft operations and based aircraft). The FAA Seattle Airports District Office (ADO) reviews the preliminary forecasts for rationality and comparison to the FAA Terminal Area Forecast (TAF). FAA forecast approval is a critical step in the airport master planning process since the projected activity will determine applicable design standards and other planning criteria.

The chapter is organized around the following sections:

- Introduction/Overview, FAA Forecasting Process;
- Key Activity Elements;
- Historical Data, Historical Forecasts, and Airport Events;
- Based Aircraft Forecasts;
- Aircraft Operations Forecasts;
- Peak Activity Forecasts;
- Design Aircraft; and
- Forecast Summary.

The overall goal is to prepare forecasts that accurately reflect current conditions, relevant historical trends, and provide reasonable projections of future activity, which can be translated into specific airport facility needs anticipated during the next 20 years and beyond. Aurora State Airport is currently capable of accommodating a full range of general aviation (GA) activity in both Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). Aircraft use includes business class jets and turboprops, a wide variety of piston-engine aircraft, and helicopters.

The forecast methodologies presented in this chapter are consistent with the Airport's role as an urban general aviation airport and they do not anticipate a change in the Airport's functional role, such as the initiation of commercial passenger or cargo service.

The forecasts are unconstrained and assume the Oregon Department of Aviation (ODAV) will be able to make the facility improvements necessary to accommodate the anticipated demand, unless specifically noted. ODAV will consider if any unconstrained demand will not or cannot be reasonably met through the evaluation of airport development alternatives later in the master plan.

The historical development of landside facilities at Aurora State Airport, including aircraft hangars, has occurred both on and off ODAV-owned property. These facilities and the based aircraft they accommodate are identified as "inside the fence" or "Through-The-Fence (TTF)." All off-airport facilities/users with direct access to the runway-taxiway system have TTF access agreements with ODAV.

This airport master plan will address needs for existing and future facilities that are, or would be under the direct ownership and management of ODAV. However, the activity generated by all aircraft that rely on TTF access to airfield facilities, are included in the Airport's based aircraft count and the aircraft operations data compiled by the air traffic control tower (ATCT). This activity will be included when evaluating runway-taxiway and related facility needs.

## FEDERAL AIRPORT SYSTEM

As described in Chapter 2, Aurora State Airport is included in the federal airport system, referred to as the National Plan of Integrated Airport Systems (NPIAS). The NPIAS currently includes 3,304 public-use airports in all 50 states. Fifty-seven of Oregon's 97 public-use airports are included in the NPIAS.

Aurora State Airport is designated a **"National" Nonprimary General Aviation** airport. The role of National airports in the NPIAS is defined as follows:[1]

> *"National airports (84) are located in metropolitan areas near major business centers and support flying throughout the nation and the world. National airports are currently located within 31 states. They account for 13 percent of total flying at the studied general aviation airports and 35 percent of all flights that filed flight plans at the airports in the four new categories. These 84 airports support operations by the most sophisticated aircraft in the general aviation fleet. Many flights are by jet aircraft, including corporate and fractional ownership operations and air taxi services. These airports also provide pilots with an alternative to busy primary commercial service airports. There are no heliports or seaplane bases in this category.*
>
> *Criteria Used to Define the New National Category (all numbers are annualized):*
>
> *1) 5,000+ instrument operations, 11+ based jets, 20+ international flights, or 500+ interstate departures; or*
> *2) 10,000+ enplanements and at least one charter enplanement by a large certificated air carrier; or*
> *3) 500+ million pounds of landed cargo weight."*

Available data indicate that Aurora State Airport has consistently met or exceeded the FAA's "11+ based jet" and around 5,000+ instrument operations criterion established for National airports since the early 2000s.

Aurora State Airport, and nearby Portland-Hillsboro Airport (19 miles northwest) are the only FAA-designated National Airports located in Oregon.

## STATE AIRPORT SYSTEM

As described in Chapter 2, Aurora State Airport is designated a **Category II – Urban General Aviation Airport** in the 2019 Oregon Aviation Plan (OAP v6.0). The definition for Category II airports is:

> *"These airports support all general aviation aircraft and accommodate corporate aviation activity, including piston and turbine engine aircraft, business jets, helicopters, gliders, and other general aviation activity. The most demanding user requirements are business-related. These airports service a large/ multi-state geographic region or experience high levels of general aviation activity. The minimum runway length objective for Category II airports is 5,000 feet."*

Oregon currently has a total of 11 Category II airports, which includes one public-use heliport (Portland Downtown Heliport). The distribution of Category II airports throughout Oregon is a reflection of the state's physical geography, population centers, and the underlying market conditions required to support the full range of GA activity common to this type of airport.

More than half (6 of 11) of Oregon's Category II airports are located within 30 nautical miles of Aurora State Airport. The concentration of Category II airports in the Portland Metro area is consistent with the region's overall population and economic characteristics.

1 2021-2025 NPIAS Report, Federal Aviation Administration (9/30/2020)

# FAA Forecasting Process

The FAA provides aviation activity forecasting guidance for airport master planning projects. *FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans*, outlines seven standard steps involved in the forecast process:

1. Identify Aviation Activity Measures: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.
2. Previous Airport Forecasts: May include the FAA Terminal Area Forecast (TAF), state or regional system plans, and previous master plans.
3. Gather Data: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.
4. Select Forecast Methods: There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.
5. Apply Forecast Methods and Evaluate Results: Prepare the actual forecasts and evaluate for reasonableness.
6. Summarize and Document Results: Provide supporting text and tables as necessary.
7. Compare Forecast Results with FAA's TAF: Follow guidance in FAA Order 5090.5, *Field Formulation of the National Plan of Integrated Airport Systems and Airport Capital Improvement Program*. In part, the Order indicates that forecasts should not vary significantly (more than 10%) from the TAF. When there is a greater than 10% variance, supporting documentation should be supplied to the FAA. The aviation demand forecasts are then submitted to the FAA for their approval.

# Key Activity Elements

As noted above, GA airport activity forecasting focuses on two key activity segments: based aircraft and aircraft operations (takeoffs & landings). Detailed breakdowns of these activity segments include:

- Aircraft fleet mix;
- Peak activity;
- Distribution of local and itinerant operations; and
- Determination of the design aircraft (also referred to as the critical aircraft).

The design aircraft represents the most demanding aircraft type or family of aircraft that uses an airport on a regular basis (a minimum of 500 annual takeoffs & landings per year). The design aircraft is used to establish a variety of FAA design categories, which then establish design standards for airfield facilities. FAA airport design standard groupings reflect the physical requirements of specific aircraft types and sizes. Design items, such as runway length evaluations, are determined by the requirements of current/future design aircraft. The activity forecasts also support the evaluation of several demand-based facility requirements including runway and taxiway capacity, aircraft parking, and hangar capacity.

**Table 3-1** describes the data sources used in this chapter.

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## FAA Forecast Terminology

**Aircraft Operation**
A count of a takeoff, landing, or touch-and-go. Each time an aircraft touches the runway to takeoff or land, it counts as an operation.

**Aircraft Approach Category (AAC)**
Classification of an aircraft by approach speed, with A being the slowest and E being the fastest.

**Airplane Design Group (ADG)**
Classification of an aircraft by its size (wingspan and tail height) with I being the smallest and VI being the largest.

**Airport Reference Code (ARC)**
Used to determine facility size and setback requirements. The ARC is a composite of the AAC and ADG of the critical aircraft.

**Based Aircraft**
Aircraft that are stored at the Airport,[1] either full-time or seasonally (more than half a calendar year).

**Design Aircraft**
The most demanding aircraft, or family of aircraft (in terms of size and/or speed) generating at least 500 annual operations at an airport. The design aircraft is used to establish the applicable ARC (for existing and forecast activity).

**General Aviation (GA)**
Aviation activities conducted by recreational, business, and charter users not operating as airlines under FAR Part 121, Part 135, or military regulations.

**Air Taxi**
Aviation activities conducted by on-demand or scheduled operators certified under FAR Part 135. The majority of air taxi activity is conducted with aircraft also operated by general aviation users.

**Itinerant Operation**
An operation that originates at one airport and terminates at a different airport. For example, an aircraft flying from the Airport to another airport.

**Local Operation**
An operation that originates and terminates at the same airport. For example, an aircraft takes off from the Airport, remains near the airport to practice flight maneuvers, and then lands at the Airport. Touch-and-go operations occur in the airport traffic pattern and they are categorized as local operations.

**Touch-and-Go**
A maneuver where an aircraft lands and takes off without leaving the runway. A touch-and-go is counted as two aircraft operations.

1 Includes aircraft located on ODAV-owned property and aircraft located on privately-owned property that have TTF access.
Source: Century West Engineering, FAA and industry terminology.

**TABLE 3-1: FORECASTING DATA SOURCES**

| Source | Description |
|---|---|
| Air Traffic Control Tower (ATCT)<br><br>Airport Operations Data | The FAA database provides aircraft operations counts for equipped airports. For Aurora State Airport, ATCT reports are available from late 2015 through 2021. The 6-year period (2016-2021) of full year data provides a reliable historical indication of basic activity, adjusted to reflect specific conditions, to provide a baseline for new aircraft operations forecasts at the Airport.<br><br>The FAA standard ATCT activity categories are not specific to aircraft types, but do break out local and itinerant operations. Itinerant operation counts are logged for air carrier, general aviation, air taxi, and military aircraft. Local operation counts are logged for civil and military aircraft.<br><br>The Aurora ATCT manager also provided additional first-hand observations about the mix of air traffic, and common operational factors not captured in ATCT data for the Airport. |
| FAA National Based Aircraft Inventory Program | The FAA National Based Aircraft Inventory Program database assigns all eligible active civilian aircraft to individual airports, as reported and verified by airport owners. Aircraft reported by more than one airport are researched by airport management, with the final resolution approved by FAA. Inactive and other aircraft that do not meet FAA criteria may be listed, but they are not included in the airport's current "validated count." The FAA requires airport owners to update their counts periodically to reflect changes in activity.<br><br>The accuracy of based aircraft counts at individual airports has improved significantly with more consistent airport verification and reporting. The current level of verification was not common in previous master plan data. |

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**(Continued)**

**TABLE 3-1: FORECASTING DATA SOURCES**

| Source | Description |
|---|---|
| FAA Terminal Area Forecast (TAF) | The current FAA TAF, published in May 2021, provides forecasts for operations and based aircraft at the Airport. The forecasts are based on overall growth rates assigned by FAA and do not necessarily correspond to the previous master plan, or other existing forecasts. The master plan's recommended based aircraft and operations forecasts will be compared to the TAF as part of the FAA forecast review/approval process. |
| FAA National Aerospace Forecast | The 2021-2041 Aerospace Forecast is a national-level forecast of aviation activity. The Aerospace Forecast helps guide local forecasts by serving as a point of comparison between local and national trends. |
| Traffic Flow Management System Counts (TFMSC) | The TFMSC includes data collected from FAA instrument flight rules (IFR) flight plan filings. This activity is categorized by aircraft type and it provides airport origin-destination and time of day information for all flights, including flights that occur when the Aurora State Airport control tower is closed. The advantage of the TFMSC data is its degree of detail and insights into the more demanding aircraft operating at the Airport, such as jets and turboprops, that regularly file IFR flight plans. TFMSC data is the most reliable indicator of business aviation activity at the Airport, which is critical in documenting activity required for design aircraft designation and the operations fleet mix. |
| Socioeconomic Data | Socioeconomic data is provided by data vendor Woods & Poole, Inc. (W&P). Population data are provided by the Portland State University - Population Research Center (PRC).<br><br>The PRC produces the annual population estimates and long term forecasts for Oregon and its counties and cities, as well as the estimates by age and sex for the state and its counties. These estimates are used by the state and local governments, various organizations, and agencies for revenue sharing, funds allocation, and planning purposes. The 2020-2065 PRC population forecast is the primary resource for evaluating changes in local area population during the master plan 20-year planning horizon.<br><br>The W&P datasets for Marion and Clackamas Counties were used for this analysis. The W&P data provides 124 data categories with historical records from 1970 to 2019 and forecasts through 2050. Data categories considered include population, employment, earnings and income, and gross regional product. |
| State Aviation System Plans | The Oregon Aviation Plan (OAP v6.0) is the current state aviation system plan for Oregon, adopted in 2019. OAP v6.0 includes facility data, activity forecasts, system-wide minimum standards and performance measures for Oregon's public-use airports. |
| Previous Airport Planning | The 2012 Aurora State Airport Master Plan Update provides is the most recent FAA-approved airport layout plan (ALP) drawing for the Airport. The 2019 Constrained Operations Runway Justification Study provided updated aviation activity forecasts and airside facility requirements assessments related to the critical aircraft. Both planning documents were prepared prior to the COVID-19 pandemic. |
| Fixed Base Operator (FBO) | Historical fuel flowage data provided to airport management by the Airport tenants providing aircraft services was reviewed. This information was consulted when developing aircraft operations forecasts. |

Source: Century West Engineering

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# National General Aviation Activity Trends

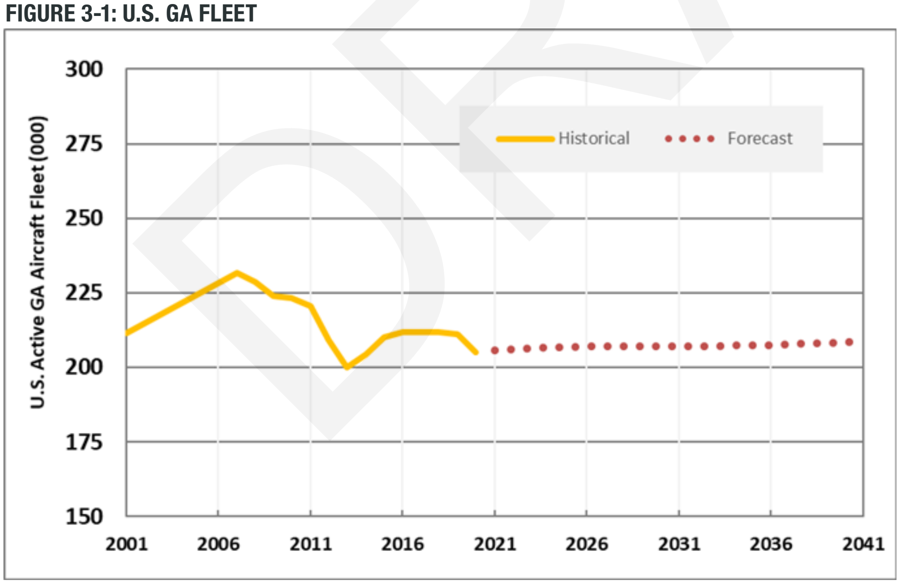
The first two decades of the 21st Century have presented numerous challenges for the GA industry. On a national level, most measures of GA activity declined sharply during the Great Recession, rebounded, then declined again at the outset of the COVID-19 pandemic.

Aircraft manufacturing, for example, hit a low point in 2010 after several years of growth, then rebounded and experienced relatively stable year-over-year growth through 2019. The COVID-19 pandemic abruptly slowed worldwide deliveries of GA aircraft in 2020 (-9.7%) compared to 2019. Deliveries of business jets, turboprops and helicopters in 2020 experienced double-digit declines, while piston airplanes declined by less than 1%. 2021 year-to-date deliveries (through the third quarter) are showing signs of recovery: year-to-date, third quarter deliveries are up 13% above 2020 totals for the same period.

The FAA performs an annual assessment of U.S. civil aviation through its FAA Aerospace Forecast. The 20-year forecasts are updated annually by evaluating recent events and established trends affecting a wide range of commercial and GA segments. Broad economic conditions and current forecasts are examined in order to provide reasonable expectations for aviation within the broader U.S. and global economy. The FAA forecasts examine in detail several key aviation industry indicators including fuel prices, production and supply; aircraft manufacturing trends; aircraft ownership trends; fleet and pilot attrition; flight training trends; advances in fuel, engine, avionics, and airspace technology (ADS-B NextGen, etc.); and on-demand air travel. This array of factors is reflected in the FAA's overall assessment of future U.S. aviation activity. The most recent forecast (released in 2021) has factored in the impacts of the COVID-19 pandemic in both historical data and forecasts.

As depicted in **Figure 3-1**, the active U.S. GA fleet has fluctuated within a slight overall decline since 2001. This trend coincides with other GA industry trends including annual aviation fuel consumption, hours flown, IFR enroute air traffic, operations at towered airports, active pilots, etc. The most recent downward trend, attributed to the pandemic, reflects a sharp decline in 2019 and 2020 data. The FAA 2021-2041 forecast predicts that the active GA aircraft fleet will grow at an average annual rate of approximately 0.1% between 2020 and 2041 (forecast assumptions summarized below).

**FIGURE 3-1: U.S. GA FLEET**




Source: FAA Long Range Aerospace Forecasts (FY 2021-2041)

Although the FAA maintains a modestly favorable long-term outlook for general aviation, many of the activity segments associated with piston engine aircraft and aviation gasoline (AVGAS) consumption are not projected to return to "pre-Great Recession" levels within the 20-year forecast.

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Key takeaways from the FAA 2021-2041 Aerospace Forecast Highlights are summarized below:

### Positive Activity Indicators

- Turbine aircraft (turboprop, turbojet, helicopter) fleet and hours flown will grow;
- Sport and Experimental aircraft fleet and hours flown will grow;
- Piston Rotorcraft fleet and hours flown will grow;
- Jet fuel consumption will grow;
- The number of active Sport, Airline Transport, Rotorcraft Only, and Instrument rated pilots will grow;
- GA Enroute IFR air traffic will grow; and
- GA Operations at towered airports will grow.

### Negative Activity Indicators

- Fixed-wing Piston aircraft fleet and hours flown will decline;
- AVGAS consumption will decline; and
- The number of active Private and Commercial pilots will decline.

### Neutral Activity Indicators

- Overall GA fleet net growth is nearly flat over the next 20 years.

The cited measures of national general aviation activity (positive, negative, neutral) are intended to reflect the broad expectations defined by FAA, which have varying relevancy to Aurora State Airport. For example, Van's Aircraft, a leading aircraft kit manufacturer located at the Airport, reports nearly 11,000 aircraft kits have been completed and flown, with thousands more kits currently under construction. It is apparent that this manufacturing activity has directly affected activity at Aurora State Airport. A significant, and growing percentage of the single-engine aircraft based at the Aurora State Airport are kit aircraft, certified by FAA in the experimental category.

It is recognized that trends experienced at individual airports often deviate from system wide trends, and generally reflect localized factors. In its current forecast, the FAA expects general aviation to experience modest growth overall. The FAA's annual growth assumptions for individual general aviation activity segments are summarized in **Table 3-2**.

**TABLE 3-2: FAA LONG RANGE FORECAST ASSUMPTIONS (U.S. GENERAL AVIATION)**

| ACTIVITY COMPONENT | FORECAST AVERAGE ANNUAL GROWTH RATE (2021-2041) |
|---|---|
| **Aircraft in U.S. Fleet** | |
| Single Engine Piston Aircraft in U.S. Fleet | -0.9% |
| Multi-Engine Piston Aircraft in U.S. Fleet | -0.4% |
| Turboprop Aircraft in U.S. Fleet | 0.6% |
| Turbojet Aircraft in U.S. Fleet | 2.3% |
| Experimental Aircraft in U.S. Fleet | 1.4% |
| Sport Aircraft in U.S. Fleet | 4.0% |
| Piston Helicopters in U.S. Fleet | 0.9% |
| Turbine Helicopters in U.S. Fleet | 1.6% |
| Active GA Fleet (# of Aircraft) | 0.1% |
| **Active Pilots in U.S.** | |
| Sport Pilots | 2.7% |
| Private Pilots | -0.4% |
| Commercial Pilots | -0.1% |
| Airline Transport Pilots | 0.7% |
| Instrument Rated Pilots | 0.4% |
| Student Pilots (Indicator of flight training activity) | -- (See note 1) |
| Active GA Pilots (All Ratings, Excluding Student Pilots) | 0.2% |
| **Hours Flown in U.S.** | |
| Fixed Wing Piston Aircraft | -0.7% |
| Fixed Wing Turbine Aircraft | 2.6% |
| Rotorcraft Piston Aircraft | 1.9% |
| Rotorcraft Turbine Aircraft | 2.1% |
| Experimental Aircraft | 2.7% |
| Light Sport Aircraft | 4.5% |
| Total GA Fleet Hours | 1.0% |
| **Fuel Consumption in U.S.** | |
| AVGAS (Gallons consumed - GA only) | -0.3% |
| Jet Fuel (Gallons consumed – GA only) | 2.4% |

Source: FAA Long Range Aerospace Forecasts (FY 2021-2041)
1. Change in FAA certificate expiration; now excluded from forecast

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# Recent Events Summary

This following section briefly summarizes several events that contribute to the current airport activity levels and the development of new forecasts.

## HANGAR CONSTRUCTION

Aurora State Airport has experienced significant growth in aircraft hangars and support facilities over the last 10 years. The majority of this activity has occurred off airport property with developments that have TTF access agreements with ODAV.

Historical aerial photography was reviewed to approximate the net increase in building square footage based on visible roof area. Most of the activity involved new construction, although removal of older hangars also occurred. The net increase in hangar square footage between 2012 and 2021 translates into a compound annual growth rate (CAGR) of 1.7%. This indicator verifies physical improvements that have contributed directly to airport activity since the last master plan. A summary of the hangar evaluation is provided in **Table 3-3**.

**TABLE 3-3: HANGAR DEVELOPMENT SUMMARY**

| Hangar Inventory | |
|---|---|
| (Square Feet)<br>Includes On-Airport and Off-Airport (TTF) Development | |
| 2012 | 833,000 |
| 2021 | 971,100 |
| Net Change | 138,100 (+17%) |
| CAGR | 1.72% |

Century West Engineering using Google Earth Imagery
CAGR: Compounded Annual Growth Rate

## AVIATION FUEL VOLUMES

Operator-reported fuel delivery data for aviation gasoline (AVGAS) and jet fuel flowage fees reported to ODAV, were reviewed for the 2016-2021 period. As indicated in **Table 3-4**, annual volumes for both fuel grades have fluctuated over the six-year period, which appears to be related to a combination of factors. As with other indicators influenced by COVID-19 and other transitional events, the fluctuations do not reveal a reliable trend that can be used to predict future activity. However, the recent historical fuel data does confirm the significant activity generated by (locally-based and transient) turbine aircraft at Aurora State Airport.

The data demonstrates a relatively consistent split between jet fuel and AVGAS volumes. During this period AVGAS, fluctuated between 8 and 13% of total fueling volume at Aurora State Airport. The Airport's recent proportional splits between fuel grades are consistent with current national aviation fuel consumption trends, which reflects typical piston and turbine aircraft utilization and common aircraft requirements (e.g., fuel consumption rates, varying aircraft fuel capacities, aircraft range, etc.).

**TABLE 3-4: FUEL FLOWAGE (GALLONS)**

| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|---|---|---|---|---|---|---|---|
| Jet Fuel | 933,527 | 896,058 | 1,050,306 | 929,453 | 893,989 | 1,055,344 | 3,769,806 |
| AVGAS | 107,900 | 134,397 | 150,515 | 117,445 | 79,196 | 92,808 | 481,553 |

Source: Oregon Department of Aviation

## FLIGHT TRAINING

Aurora State Airport currently accommodates two locally-based flight schools (Willamette Aviation and Aurora Flight Training Academy) with a combined fleet of 20 piston fixed-wing aircraft for training and rental.

The Aurora ATCT manager estimates that 40 to 45% of the total aircraft operations at Aurora State Airport are related to flight training, noting that "Aurora State is so dynamic in its day-to-day operations and highly dependent upon the weather. This percentage may be higher in the summer months." Flight training activity is recorded as either local and itinerant operations by the ATCT. The activity mix is consistent with historical ATCT operations counts and is reflected in the 2021 baseline operations total.

In addition to the locally-based flight training fleet, flight training operators from other airports, both in the Portland Metro region and beyond the local area, routinely operate at Aurora State Airport. A search of pilot schools on the FAA.gov webpage (https://av-info.faa.gov/PilotSchool.asp) identifies four flights schools at three nearby airports (Hillsboro, Troutdale, and Newberg).

## FIXED BASE OPERATORS (FBO)

Aurora State Airport currently has two full service fixed base operators (Atlantic Aviation and Willamette Aviation Services) offering fuel, aircraft hangar and parking space, and aircraft maintenance services for a full range of general aviation and business aviation users. The current level of service reflects the Airport's ability to support the local based aircraft fleet and attract transient aircraft, including business aviation users in a highly competitive market.

## CHANGES IN DATA SOURCES AND METHODOLOGY

Several improvements in data sources, verification and methodology have occurred since 2012. The changes provide a more accurate definition of airport activity than presented previously. These changes, described below and previously in Chapter 2, are incorporated into the 2021 airport activity data that is the baseline for new 20-year aviation activity forecasts.

The updated data provides a more accurate picture of current activity at Aurora State Airport, and therefore the ability to develop more reliable long-term aviation activity forecasts. However, it is important to recognize that the recent improvements in data accuracy reduces the ability to draw definitive conclusions when comparing to previously-reported estimates or forecasts. As a result, it is recommended that the new aviation activity forecasts be reviewed using consistent data sources and the assumptions defined in each forecast model, rather than a comparison to previous forecasts.

## BASED AIRCRAFT COUNTING METHODOLOGY

The FAA's method of monitoring an airport's based aircraft fleet has improved in recent years. Airport owners are now required by FAA to regularly update their locally-based aircraft totals through verification and submittal of validated counts through the FAA National Based Aircraft Inventory Program (www.basedaircraft.com). The coordinated reporting eliminates duplicated (aircraft counted at more than one airport) and inactive aircraft. The regular reporting also allows more opportunities to review and validate aircraft. Inactive aircraft can be added to an airport's validated count when reactivated in the FAA's system.

In late 2021, the ODAV State Airport Manager reviewed the based aircraft count for Aurora State Airport, previously updated in 2018. The evaluation was completed in consultation with the FAA Seattle Airports District Office in December 2021, and resulted in a new validated count of 281 based aircraft. The previous count was 349 based aircraft 2018. The reduction in the Airport's based aircraft total reflects a more precise verification of aircraft and removal of previously-counted aircraft located at two private heliports adjacent to Aurora State Airport.

The 2022 validated based aircraft count included the following adjustments to the previous inventory:

- Added new aircraft not previously entered (or assigned to the Airport) in the database;
- Removed aircraft that could not be physically verified on site;
- Removed aircraft that were also reported by other airports and could not be verified on site for 6+ months per year;
- Removed aircraft without current FAA registrations or airworthiness certificates; and
- Removed aircraft (21 helicopters) located at the nearby Columbia Helicopters Heliport (FAA Identifier: OR68) and the HTS Aurora Heliport (FAA Identifier: OR24).

Based on FAA facility criteria, it was determined that the two private heliports operate independently from Aurora State Airport since their aircraft do not require access to the runway-taxiway facilities. Historically, these aircraft have been included in previous master plan forecasts and data sets. Based on current FAA guidance, the off-airport aircraft at OR68 and OR24 will not be reflected in baseline data or new master plan forecasts for Aurora State Airport. In addition to the adjustment in based aircraft numbers, the Airport's ATCT aircraft operation counts were adjusted to reflect the separation of on- and off-airport activity. Additional information on ATCT operations adjustments is provided later in this chapter.

The current split between aircraft located on airport property and on adjacent privately-owned property with TTF access agreements was verified in the updated validated count. Both on-airport and TTF aircraft are included the Airport's FAA validated counts since they all rely on the runway-taxiway system for their flight operations.

The new validated based aircraft count for the Airport was approved and accepted by FAA in January 2022. The FAA requires the January 2022 validated count (281) to serve as the common baseline for all based aircraft forecast models in the master plan. Other existing FAA data sources reporting based aircraft (5010-1 Airport Record Form, Terminal Area Forecast, etc.) will be updated for consistency with the current validated count.

**TABLE 3-5: BASED AIRCRAFT AND FLEET MIX**

| Aircraft Type | On-Airport | TTF | Total |
|---|---|---|---|
| Single Engine | 45 | 175 | 220 |
| Multi Engine | 1 | 14 | 15 |
| Jet | 3 | 33 | 36 |
| Helicopter | 1 | 9 | 10 |
| **Total** | **50** | **231** | **281** |

Source: National Based Aircraft Inventory – January 2022

The January 2022 validated based aircraft count for Aurora State Airport is summarized in **Table 3-5**. The summary includes a breakdown of aircraft by types, consistent with FAA data reporting. Additional information on aircraft types and categories is provided on the following page. The FAA National Based Aircraft Inventory Program report (January 2022) for the Airport is provided in **Appendix 6**.

### Single-Engine Piston (SEP) and Turboprop (SETP)

SEP aircraft have one piston-powered engine. SETP aircraft have one turbine powered engine used to drive the aircraft's propeller. Both or these types of aircraft are generally smaller and often used for flight training and recreational flying but may be used for municipal business trips. Depending on weight and operator certification, these aircraft generally require only one pilot. Single-engine piston and turboprop aircraft are included in the "Single Engine" category on the FAA 5010-1 Airport Master Record Form and the FAA National Based Aircraft Inventory Program.

### Multi-Engine Piston (MEP) and Turboprop (METP)

MEP/METP aircraft have two or more engines and are typically larger than SEP/SETP aircraft. Multiple engines make the aircraft more capable and require additional flight instruction beyond what is needed to operate an SEP/SETP aircraft. MEP aircraft are primarily used for personal travel, flight training, and business aviation. METP aircraft are used extensively in business aviation. Most MEP/METP aircraft may be operated with one pilot, but some larger aircraft may require two pilots. MEP/METP aircraft are included in the "Multi Engine" category on the FAA 5010-1 Airport Master Record Form and the FAA National Based Aircraft Inventory Program.

### Jets

Jet aircraft have one or more turbofan/turbojet engines instead of a piston or turboprop engine. These aircraft range in size from small, four-passenger business jets to the largest airliners. They can generally fly faster and at higher altitudes than piston and turboprop aircraft, providing service capabilities (range, speed) comparable to commercial airliners. Some civilian jets are certified for single-pilot operation, although the majority of jet models require two pilots.

### Helicopter

Helicopters have one or more rotors mounted above the cabin for lift and propulsion. Helicopters are commonly used for aerial firefighting, law enforcement, emergency response, medical evacuation (MEDVAC), flight training, and aerial inspection (pipeline, forestry, aerial agriculture, etc.). Helicopters may be piston- or turbine-powered, and depending on the complexity of the model, can be operated by one pilot or two.

### Other

Some aircraft that are included in the categories noted above may further categorized by FAA based on their design category or type certificate.

- Experimental aircraft refer to kit airplanes built by users or third parties other than the original manufacturer. Experimental aircraft share many characteristics with SEP aircraft; the key differentiator is how and where the aircraft is assembled. These aircraft are commonly included in the "Single Engine" category in FAA airport records (5010, Based Aircraft Inventory), rather than "Other."
- Sport aircraft (also referred to as Light Sport Aircraft, or LSA) are airplanes that have a specific weight and maximum speed in level flight. Sport aircraft require less training and a less strict medical certificate to pilot the aircraft. These aircraft are listed in the "Single Engine" category in FAA 5010 airport records.
- Gliders are unpowered aircraft that are towed into flight and use thermal uplift to sustain altitude. Powered gliders are equipped with engines and are capable of takeoff without the aid of tow plane. These aircraft are listed in the "Gliders" category in FAA 5010 airport records.
- Ultralight aircraft weigh less than 155 pounds and do not require the pilot operating the aircraft to have a private pilot's license or medical certificate. These aircraft are listed in the "Ultralights" category in FAA 5010 airport records.

Source: Century West Engineering, FAA and industry terminology.

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## ANNUAL AIRCRAFT OPERATIONS

The addition of an ATCT at Aurora State Airport in October 2015 provides actual counts of aircraft takeoffs and landings during the 13 hours (0700 to 2000 hours) of daily operation. Overall aircraft operations data presented in the last master plan were estimated and supplemented with limited instrument flight plan data. The ability to accurately estimate aircraft operations is greatly improved with actual data accounting for the majority of flight activity.

As described in Chapter 2, the 2021 baseline aircraft operations total was developed using actual air traffic control tower counts, with two specific adjustments. First, an adjustment was made to account for aircraft activity occurring during non-ATCT operating hours (2000 to 0700). Based on methods described in Chapter 2, off-hours IFR activity was estimated to account for 14% of annual operations, and off-hours and supplemented with activity was estimated to be 5% of annual operations. Combined, total estimated off-hours operations accounted for 6.4% of 2021 activity.

A second adjustment was made to eliminate helicopter operations for the two adjacent private heliports. The movement of these aircraft in and out of the Airport's controlled airspace is captured in the operations counts for the Aurora State Airport, although they do not actually takeoff or land on the Airport. ATCT operations counts do not distinguish between fixed-wing aircraft and helicopters. However, based on ATCT manager estimates, the off-airport helicopter activity accounts for 2 to 3% of total ATCT-logged operations for the Airport. A reduction of 3% was applied to the ATCT operations counts to account for the helicopter flight activity associated with the two adjacent heliports.

Detailed breakdowns of VFR and IFR operational splits were developed from these data, for use in forecasting future activity.

**Table 3-6** summarizes adjusted annual aircraft operations for Aurora State Airport for the historical period (2016-2021). For consistency in data, the adjustments described above were applied retroactively to the historical years coinciding with the operation of the air traffic control tower.

**TABLE 3-6: AURORA STATE AIRPORT HISTORICAL ATCT DATA (ADJUSTED)**

| | Annual Aircraft Operations | | | | | |
|---|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| Itinerant | | | | | | |
| Air Taxi | 2,194 | 2,319 | 2,121 | 1,670 | 1,129 | 2,006 |
| General Aviation | 32,174 | 33,502 | 35,665 | 33,638 | 31,621 | 36,390 |
| Military | 265 | 199 | 277 | 107 | 38 | 79 |
| **Subtotal** | **34,633** | **36,020** | **38,063** | **35,415** | **32,788** | **38,475** |
| Local | | | | | | |
| General Aviation | 16,191 | 25,075 | 28,011 | 30,453 | 36,333 | 37,488 |
| Military | 139 | 129 | 245 | 34 | 19 | 65 |
| **Subtotal** | **16,330** | **25,204** | **28,256** | **30,487** | **36,352** | **37,553** |
| **Total** | **50,963** | **61,223** | **66,320** | **65,902** | **69,140** | **76,028** |

Source: Century West Engineering developed using FAA OPSNET Data

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## INSTRUMENT FLIGHT PLAN (TFMSC) DATA

A 10-year summary of instrument flight plan data at Aurora State Airport is provided in **Tables 3-7 and 3-8**. The FAA TFMSC provides detailed, aircraft-specific data for flight plan filings and aircraft movements. While air traffic control tower data is the best gauge of overall airport activity, the TFMSC data provides a reliable measure of flight activity needed to document the Airport's design aircraft operations. The 2012 airport master plan update identified the current and future design aircraft to be a high performance jet included in Airport Reference Code C-II (ARC-C-II). This finding was confirmed in the data review contained in the 2019 Constrained Operations Runway Justification Study, and it continues to be justified based on the review of current TFMSC aircraft operations data.

**TABLE 3-7: AURORA STATE AIRPORT INSTRUMENT FLIGHT OPERATIONS**

| Historical TFMSC IFR Operations by Aircraft Design Group (ADG) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARC | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Average |
| A-I | 2,402 | 2,656 | 2,436 | 2,502 | 2,764 | 2,780 | 3,456 | 2,492 | 2,162 | 2,180 | 2,583 |
| A-II | 422 | 504 | 1,150 | 1,618 | 1,904 | 2,144 | 2,136 | 1,186 | 970 | 1,314 | 1,335 |
| A-III | 14 | 6 | 2 | 4 | 4 | 10 | 6 | 2 | 0 | 4 | 5 |
| A-IV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B-I | 1,510 | 1,394 | 1,444 | 1,208 | 1,220 | 1,152 | 1,162 | 1,220 | 1,030 | 1,072 | 1,241 |
| B-II | 2,104 | 2,140 | 2,080 | 2,436 | 3,100 | 2,958 | 2,994 | 3,702 | 3,382 | 3,846 | 2,874 |
| B-III | 0 | 0 | 0 | 2 | 0 | 2 | 6 | 8 | 2 | 0 | 2 |
| B-IV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C-I | 366 | 384 | 520 | 438 | 342 | 310 | 276 | 294 | 172 | 256 | 336 |
| C-II | 502 | 558 | 514 | 448 | 544 | 596 | 576 | 400 | 404 | 318 | 486 |
| C-III | 18 | 10 | 6 | 8 | 0 | 14 | 50 | 54 | 10 | 0 | 17 |
| C-IV | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 |
| C-V | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| D-I | 2 | 8 | 18 | 0 | 4 | 10 | 8 | 4 | 2 | 12 | 7 |
| D-II | 4 | 0 | 4 | 0 | 2 | 6 | 2 | 8 | 26 | 80 | 13 |
| D-III | 6 | 10 | 4 | 2 | 6 | 8 | 4 | 0 | 4 | 6 | 5 |
| D-IV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| D-V | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Unknown | 458 | 394 | 382 | 396 | 512 | 382 | 376 | 472 | 448 | 568 | 439 |
| **Total** | **7,808** | **8,064** | **8,560** | **9,062** | **10,402** | **10,372** | **11,054** | **9,842** | **8,612** | **9,658** | **9,343** |
| **C & D Aircraft** | **898** | **970** | **1,066** | **896** | **898** | **944** | **918** | **760** | **618** | **674** | **864** |

Source: FAA TFMSC Report - 2/2/2022 (Aurora State Airport)

### TABLE 3-8: HISTORICAL TFMSC ACTIVITY BY ARC (SELECT JETS)

Jet Aircraft with Maximum Certificated Takeoff Weight of More than 12,500 Pounds and Select Jet Aircraft over 60,000 Pounds

| | ARC | Aircraft Based at Aurora State Airport | Aircraft Designator | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Average Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cessna 550 Citation | B-II | x | C550 | 212 | 134 | 164 | 226 | 262 | 158 | 212 | 174 | 138 | 146 | 183 |
| Cessna 560 Citation | B-II | x | C560 | 366 | 498 | 466 | 590 | 694 | 774 | 708 | 632 | 546 | 574 | 585 |
| Cessna 680 Citation | B-II | x | C680 | 64 | 56 | 68 | 72 | 66 | 90 | 140 | 150 | 140 | 240 | 109 |
| Falcon 20 | B-II | x | FA20 | 94 | 86 | 28 | 14 | 98 | 74 | 76 | 68 | 66 | 74 | 68 |
| Falcon 2000 | B-II | x | F2TH | 2 | 14 | 6 | 4 | 6 | 4 | 40 | 134 | 124 | 334 | 67 |
| Falcon 50 | B-II | x | FA50 | 16 | 32 | 108 | 228 | 320 | 332 | 276 | 286 | 216 | 270 | 208 |
| Falcon 900 | B-II | | F900 | 180 | 148 | 48 | 10 | 56 | 82 | 70 | 110 | 32 | 24 | 76 |
| Hawker Horizon | B-II | | HA4T | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 6 | 2 |
| Phenom 300 | B-II | x | E55P | 14 | 106 | 98 | 96 | 88 | 130 | 56 | 80 | 256 | 398 | 132 |
| Bombardier Global Express* | B-III | | GLEX | 18 | 10 | 4 | 8 | 0 | 14 | 50 | 52 | 10 | 0 | 17 |
| Hawker 800 | C-I | x | H25B | 224 | 212 | 316 | 118 | 42 | 28 | 34 | 22 | 8 | 30 | 103 |
| Lear 31 | C-I | | LJ31 | 4 | 2 | 0 | 0 | 6 | 54 | 92 | 110 | 32 | 22 | 32 |
| Lear 45 | C-I | x | LJ45 | 116 | 156 | 180 | 236 | 242 | 212 | 112 | 140 | 124 | 190 | 171 |
| Lear 55 | C-I | | LJ55 | 0 | 2 | 0 | 0 | 2 | 0 | 4 | 2 | 0 | 0 | 1 |
| Lear 60 | C-I | x | LJ60 | 2 | 4 | 10 | 82 | 36 | 14 | 30 | 16 | 6 | 10 | 21 |
| Astra 1125 | C-II | | ASTR | 178 | 152 | 164 | 114 | 160 | 162 | 96 | 14 | 0 | 4 | 104 |
| Cessna 650 Citation | C-II | x | C650 | 94 | 92 | 120 | 144 | 122 | 126 | 104 | 68 | 68 | 42 | 98 |
| Cessna 750 Citation | C-II | | C750 | 60 | 76 | 92 | 94 | 102 | 100 | 108 | 92 | 84 | 38 | 85 |
| Challenger 300 | C-II | x | CL30 | 32 | 102 | 72 | 74 | 78 | 104 | 88 | 80 | 62 | 52 | 74 |
| Challenger 600 | C-II | x | CL60 | 126 | 122 | 36 | 12 | 68 | 82 | 64 | 60 | 96 | 72 | 74 |
| Embraer ERJ 135 | C-II | | E135 | 0 | 4 | 6 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 1 |
| Galaxy 1126 | C-II | | GALX | 8 | 10 | 16 | 0 | 2 | 4 | 0 | 4 | 2 | 2 | 5 |
| Gulfstream 150 | C-II | | G150 | 2 | 0 | 0 | 2 | 2 | 6 | 80 | 24 | 4 | 2 | 12 |
| Lear 75 | C-II | | LJ75 | 0 | 0 | 0 | 0 | 4 | 10 | 12 | 0 | 2 | 6 | 3 |
| Lear 35 | D-I | | LJ35 | 2 | 8 | 18 | 0 | 4 | 6 | 8 | 4 | 0 | 10 | 6 |
| Gulfstream IV/G400* | D-II | | GLF4 | 4 | 0 | 4 | 0 | 2 | 6 | 2 | 8 | 26 | 80 | 13 |
| Gulfstream V/G500* | D-III | | GLF5 | 6 | 10 | 4 | 2 | 0 | 4 | 2 | 0 | 4 | 6 | 4 |
| Gulfstream VI/G600* | D-III | | GLF6 | 0 | 0 | 0 | 0 | 6 | 4 | 2 | 0 | 0 | 0 | 1 |
| **Total** | | | | **1826** | **2038** | **2030** | **2126** | **2470** | **2582** | **2466** | **2332** | **2048** | **2632** | **2255** |
| | B-II | | | 950 | 1076 | 988 | 1240 | 1590 | 1644 | 1578 | 1636 | 1520 | 2066 | 1429 |
| | B-III | | | 18 | 10 | 4 | 8 | 0 | 14 | 50 | 52 | 10 | 0 | 17 |
| | C-I | | | 346 | 376 | 506 | 436 | 328 | 308 | 272 | 290 | 170 | 252 | 328 |
| | C-II | | | 500 | 558 | 506 | 440 | 540 | 596 | 552 | 342 | 318 | 218 | 457 |
| | D-I | | | 2 | 8 | 18 | 0 | 4 | 6 | 8 | 4 | 0 | 10 | 6 |
| | D-II | | | 4 | 0 | 4 | 0 | 2 | 6 | 2 | 8 | 26 | 80 | 13 |
| | D-III | | | 6 | 10 | 4 | 2 | 6 | 8 | 4 | 0 | 4 | 6 | 5 |
| Operations by AAC C and D Jets | | | | 858 | 952 | 1038 | 878 | 880 | 924 | 838 | 644 | 518 | 566 | 810 |
| Operations by ADG II and III Jets | | | | 1478 | 1654 | 1506 | 1690 | 2138 | 2268 | 2186 | 2038 | 1878 | 2370 | 1921 |

Source: Century West Engineering developed using FAA TFMSC Data
Notes: 1. * Maximum Takeoff Weight (MTOW) exceeds 60,000 pounds

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## TERMINAL AREA FORECAST

The current FAA Terminal Area Forecast (TAF) for Aurora State Airport, published May 2021, provides historical and forecast data for the period 1990-2045. Current and historical TAF based aircraft and operations data for the Airport share many of the data collection issues described earlier. Accordingly, the historical TAF activity data for Aurora State Airport are not considered accurate enough to draw reliable conclusions related to current activity data. Historical (2000-2020) TAF based aircraft and annual aircraft operations data are presented in **Figures 3-2 and 3-3**. The 2021 baseline activity levels for based aircraft and operations are depicted for reference.

**FIGURE 3-2: HISTORICAL TAF – BASED AIRCRAFT**

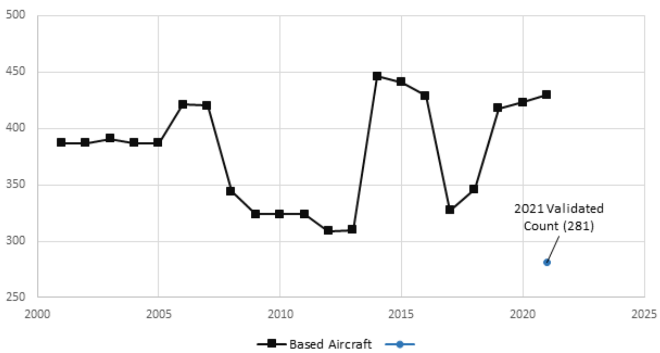
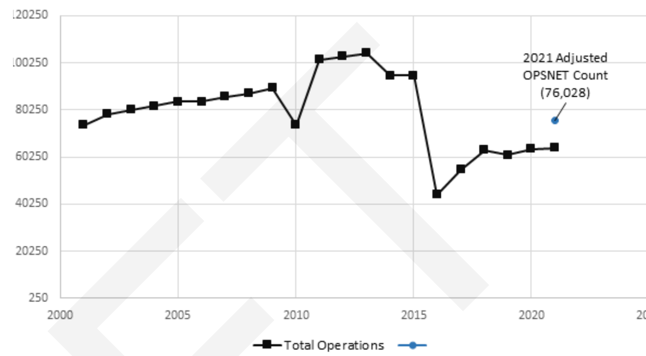



**FIGURE 3-3: HISTORICAL TAF – ANNUAL AIRCRAFT OPERATIONS**




Source: FAA TAF 2000-2045 (Aurora State Airport) www.taf.faa.gov

## SUMMARY OF RECENT ACTIVITY FORECASTS

The two most recent aviation activity forecasting efforts specific to Aurora State Airport were prepared in the 2012 Airport Master Plan Update and the 2019 Constrained Operations Runway Justification study. The 2012 master plan used a 2010 base year with forecasts extending to 2030. The 2019 runway study used a 2018 base year with forecasts extending to 2038. The 2019 forecast was designed to be a minor update of the master plan forecast with updated evaluations focused on the design aircraft and its associated runway length requirements. The 2019 forecast was also the first forecast supported by actual air traffic control tower operations counts. Both forecasts were prepared in the pre-COVID era. Understanding these previous forecasting efforts provides context for the forecasting efforts to be developed as part of this planning process.

### 2012 Aurora State Airport – Airport Master Plan Update

The preferred based aircraft forecast projected an increase from 354 to 464 aircraft over the 20-year planning period. This forecast translates into a 1.36% average annual growth rate and a net increase of 110 aircraft. The preferred aircraft operations forecast projected an increase from 90,909 to 124,386 annual operations over the 20-year planning period. This forecast translates into a 1.58% average annual growth rate for the forecast period. The forecast identified the existing and future design aircraft as high performance medium business jets (IAI Astra and Cessna Citation X), both of which have Airport Reference Code C-II (ARC C-II) designations.

### 2019 Aurora State Airport – Constrained Operations Runway Justification Study

The preferred based aircraft forecast projected an increase from 349 to 561 aircraft over the 20-year planning period. This forecast translates into a 2.4% average annual growth rate and a net increase of 212 aircraft. The preferred aircraft operations forecast projected an increase from 66,153 to 112,200 annual operations over the 20-year planning period. This forecast translates into a 2.68% average annual growth rate for the forecast period. The forecast identified the existing and future design aircraft as ARC C-II medium business jet.

### FAA Terminal Area Forecast

The 2020-2045 Terminal Area Forecast (TAF) of based aircraft and aircraft operations for the Airport was described earlier in the chapter. The TAF based aircraft forecast projects an increase from 346 to 554 aircraft over the 26-year forecast period (2019-2045). This forecast translates into a 1.09% average annual growth rate and a net increase of 208 aircraft. The TAF aircraft operations forecast projects an increase from 61,127 to 69,063 annual operations over the 26-year period. This forecast translates into a 0.47% average annual growth rate for the forecast period. The recommended master plan forecasts will be compared to the current TAF as part of the FAA review and approval process. Significant deviations from the TAF must be adequately documented for FAA forecast approval.

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## Oregon Aviation Plan V6.0 Model

The current Oregon Aviation Plan (OAP v6.0) was adopted in 2019 and provided long term aviation activity forecasts for all general aviation airports in the state. The OAP v6.0 relied on FAA TAF data for the 2015 baseline and its forecast horizon was 2015-2035.

The OAP v6.0 preferred based aircraft forecast annual growth rate was 1.1%. For Aurora State Airport, this model translated into increase from 346 to 421 based aircraft over the 20-year forecast period (+75 aircraft). The preferred aircraft operations forecast annual growth rate was 0.9%. For Aurora State Airport, this model translated into increase from 94,935 to 113,231 annual operations over the 20-year forecast period.

## COMMUNITY PROFILE

Historical population and economic data for the region was presented in Chapter Two. Long term population and economic forecasts are summarized in **Tables 3-9 and 3-10**. These data are used by local government to project future demand for services, housing, and to effectively manage growth as required by the State of Oregon land use planning law. The forecast population and economic growth within the service area for Aurora State Airport is expected to contribute to increased aviation demand the master planning horizon.

**Table 3-9** summarizes the 2021 Portland State University - Population Research Center (PRC) population forecast for the 2021-2041 period that corresponds to the Airport Master Plan. The county and statewide population forecasts for the local area generally project higher rates of annual growth over the next five years, followed by a slowing that accelerates near the end of the forecast horizon. The PRC forecast growth in Clackamas County and in Aurora exceed the projected statewide growth rate; the forecast growth in Marion County trails the forecast statewide growth rate. The Aurora urban growth boundary (UGB) population forecast projects annual growth averaging above 2% over the 20-year forecast.

**TABLE 3-9 : FORECAST POPULATION**

| | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|
| Oregon | 4,266,560 | 4,542,741 | 4,761,243 | 4,960,026 | 5,130,713 |
| CAGR: | - | 1.26% | 0.94% | 0.82% | 0.68% |
| Marion County | 347,182 | 373,010 | 387,806 | 399,722 | 409,506 |
| CAGR: | - | 1.45% | 0.78% | 0.61% | 0.48% |
| Clackamas County | 425,316 | 441,763 | 464,902 | 487,724 | 509,796 |
| CAGR: | - | 0.76% | 1.03% | 0.96% | 0.89% |
| Aurora UGB | 1,133 | 1,193 | 1,357 | 1,524 | 1,695 |
| CAGR: | - | 1.04% | 2.61% | 2.35% | 2.15% |

Source: PSU Population Research Center (PRC), 2021

**Table 3-10** summarizes the current Woods & Poole Economics forecast gross regional product (GRP) for Marion and Clackamas County for the 2021-2041 period that corresponds to the Airport Master Plan. GRP measures the market value of all goods and services produced in the defined region. As indicated in the data, strong GRP growth is forecast over the long term, with a similar slowing near the end of the forecast horizon.

**TABLE 3-10: FORECAST GROSS REGIONAL PRODUCT**

| | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|
| Marion County (millions) | $16,761 | $18,397 | $20,107 | $21,874 | $23,688 |
| Percent Change | - | 9.76% | 9.29% | 8.79% | 8.29% |
| | | | | | CAGR: 1.7% |
| Clackamas County (millions) | $21,172 | $23,348 | $25,652 | $28,067 | $30,590 |
| Percent Change | - | 10.28% | 9.87% | 9.42% | 8.99% |
| | | | | | AAGR 1.9% |

Source: Woods & Poole Economics, Inc. Washington, D.C. Copyright 2021. Woods & Poole does not guarantee the accuracy of this data. The use of this data and the conclusion drawn from it are solely the responsibility of Century West Engineering, Inc.



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# Current Aviation Activity

Current based aircraft and annual aircraft operations data for use in developing new aviation activity forecasts are presented in **Tables 3-11 and 3-12**. The 2021 baseline totals will be applied to all 2021-2041 master plan forecast models.

**TABLE 3-11: BASELINE BASED AIRCRAFT (JANUARY 2022)**

| Aircraft Type | On-Airport | TTF | Total |
|---|---|---|---|
| Single Engine | 45 | 175 | 220 |
| Multi Engine | 1 | 14 | 15 |
| Jet | 3 | 33 | 36 |
| Helicopter | 1 | 9 | 10 |
| **Total** | **50** | **231** | **281** |

Source: National Based Aircraft Inventory – January 2022

**TABLE 3-12: BASELINE AIRCRAFT OPERATIONS (2021)**

| | 2021 |
|---|---|
| Itinerant | |
| Air Taxi | 2,006 |
| General Aviation | 36,390 |
| Military | 79 |
| **Subtotal** | **38,475** |
| Local | |
| General Aviation | 37,488 |
| Military | 65 |
| **Subtotal** | **37,553** |
| **Total** | **76,028** |

Source: Century West Engineering developed using FAA TFMSC Data

# 2021-2041 Aviation Activity Forecasts

## BASED AIRCRAFT

Seven based aircraft forecasts were developed based on a variety of models. The average annual growth rates for the models ranged from 0.1% to 1.7%. Four of the models were discarded after review and additional analysis determined limited applicability. The remaining three models were determined appropriate for comparison. These models are presented in **Table 3-13** and depicted in **Figure 3-4**. These forecast models are applied to the 2021 based aircraft baseline data presented earlier in the chapter.

**Historical Hangar Development Trend Model** – This model was developed based on an assessment of the Airport's hangar development trend since the last master plan was completed. The evaluation was performed by measuring the total area of on-airport and TTF hangar building footprints in August 2012 and June 2021 as observed in Google Earth imagery. Hangars were measured as whole; non aircraft storage spaces (operations, aircraft maintenance, equipment storage, etc.) located within the structures have not been removed from the measurements. A linear rate (1.7% CAGR) of increase in hangar space was calculated for the nine-year period. Details of the net change in airport hangar area are described in Chapter 2. The rate was applied to baseline based aircraft total and projected out for the 20-year planning period. The model assumes that actual hangar development was demand driven, not speculative and that the buildings constructed as hangars are used for aircraft storage, not general storage. The model results in a CAGR of 1.7%.

**Federal Contract Tower (Oregon) TAF Model** – The FAA TAF forecast presented in the "Summary of Recent Activity Forecasts" section of the chapter was developed specifically for the Aurora State Airport facility. This model also uses the FAA TAF Query Data, but reflects the forecast for the larger group of Oregon airports with federal contract air traffic control towers. The operational similarities of this group of Oregon airports provides a broader assessment of activity.

This model applies the Oregon Federal Contract Tower TAF forecast annual growth rates for total based aircraft to the Airport's baseline based aircraft count, and projected out for the 20-year planning period. The model is non-linear and year-over-year growth rates vary. The model assumes that the Airport's based aircraft fleet growth will be in line with state growth for airports with FAA contract air traffic control towers. The model results in an average annual growth rate of 1.1%.

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**National Aerospace Forecast (Weighted Airport Fleet Mix) Model** – This model applies the National Aerospace forecast growth rates for each aircraft type to the Airport's existing fleet mix and projects out for the 20-year planning period. The linear projection assumes steady growth that does not change year-over-year during the 20-year forecast. The models accounts for growth differences between aircraft types by weighting rates with the Airport's fleet mix distribution. Aircraft types were summed to get total projected counts for each forecast year. The model assumes that the Airport's based aircraft fleet will grow in parallel to the national fleet. The model results in an average annual growth rate of 0.2%.

## RECOMMENDED BASED AIRCRAFT FORECAST SUMMARY

The recommended based aircraft forecast for the 2021-2041 Aurora State Airport Master Plan is the **Oregon Federal Contract Tower TAF Model**. The model provides a reasonable projection of growth that also aligns toward recent hangar construction trends at the Airport, while outpacing very modest national general aviation fleet growth expectations.

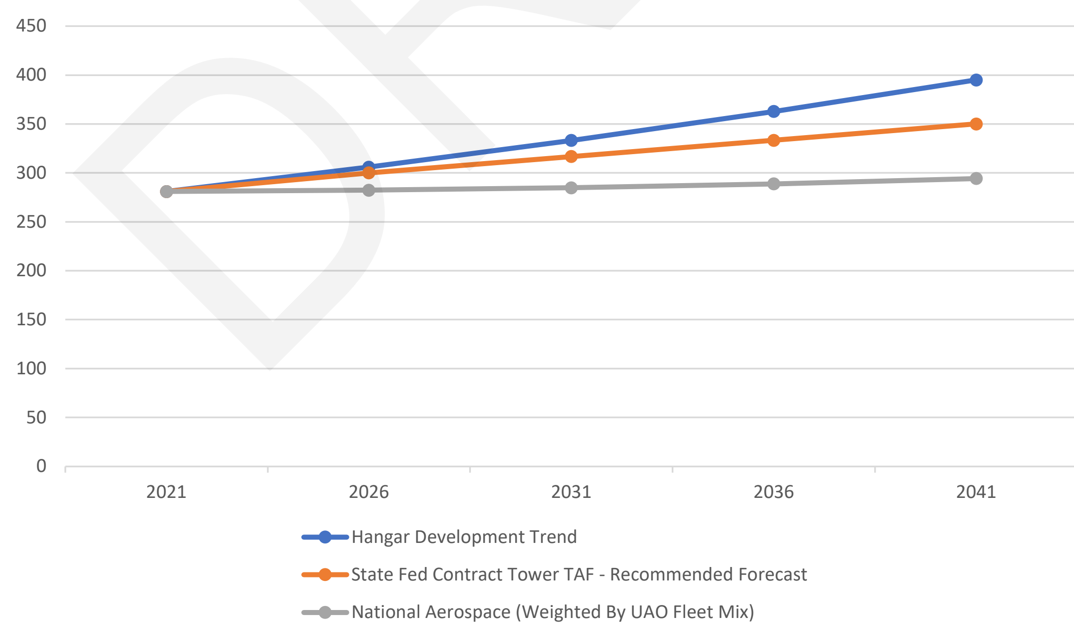
The recommended forecast results in a net increase of 69 based aircraft over the planning period, which reflects an average annual growth rate of **1.1%**. The forecast exceeds the FAA's most recent NPIAS forecast for the region (0.9% CAGR) and the OAP v6.0 long-term forecast rates for Oregon's based aircraft fleet (1.1% CAGR). The based aircraft forecast models presented for consideration, including the recommended model, are summarized in **Table 3-13** and depicted on **Figure 3-4**.

### TABLE 3-13: FORECASTS OF BASED AIRCRAFT

| Based Aircraft Forecast Models | CAGR | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|---|
| Historical Hangar Development Trend Model | 1.7% | 281 | 306 | 333 | 363 | 395 |
| **Federal Contract Tower (Oregon) TAF Model - Recommended Forecast** | **1.1%** | **281** | **300** | **317** | **333** | **350** |
| National Aerospace Forecast (Weighted By the Aurora State Airport Fleet Mix) Model | 0.2% | 281 | 282 | 285 | 289 | 294 |

Source: Century West Engineering

### FIGURE 3-4: BASED AIRCRAFT FORECASTS




Source: Century West Engineering developed using FAA TFMSC Data

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### Discarded Models

**National Aerospace Forecast (Combined Rate) Model** – This model applies the *National Aerospace Forecast FY 2021-2041* growth rate for entire fleet to the Airport's baseline based aircraft count, and projected out for the 20-year planning period. The linear projection assumes steady growth that does not change year-over-year during the 20-year forecast. The model projects fleet growth as a whole, not by individual aircraft type. The model results in an average annual growth rate of 0.1%. The model was discarded in favor of a weighted version of the National Aerospace forecast, as it does not account for aircraft fleet mix.

**Northwest Mountain Region Federal Contract Tower TAF Model** – This model also uses the FAA TAF Query Data subsets for federal contract air traffic control towers described earlier. The model is based on the TAF forecast for the group of airports located in the FAA's Northwest Mountain Region. As with the Oregon contract tower model, the operational similarities of this group of airports provides a broad assessment of activity. This model applies the FAA's Northwest Mountain Region Federal Contract Tower TAF forecast annual growth rates for aircraft classifications to the Airport's baseline based aircraft counts (using the same classifications) over the 20-year period. The model uses the same assumptions as State TAF contract tower models, but uses regional forecast rates. The model results in an average annual growth rate of 1.1%. This model was discarded in favor of the similar and more locally-based state TAF model.

**National Federal Contract Tower TAF Model** – This model also uses the FAA TAF Query Data subsets for federal contract air traffic control towers. The model is based on the TAF forecast for all similarly grouped airports in the federal contract tower system. As with the other FAA contract tower models, the operational similarities of this group of airports provides a broad assessment of activity. This model applies the FAA's National Federal Contract Tower TAF forecast annual growth rates for aircraft classifications to the Airport's baseline based aircraft counts (using the same classifications) over the 20-year period. The model uses the same assumptions as State TAF contract tower models but uses national TAF forecast rates. The model results in an average annual growth rate of 1.3%. This model was discarded in favor of the similar and more locally-based state TAF model.

**Oregon Aviation Plan v6.0 Model** – This model applies OAP v.6.0 operations growth rate to the Airport's baseline based aircraft count and projects out 20 years. The linear projection assumes steady growth that does not change year-over-year during the 20-year forecast. The model results in an average annual growth rate of 1.1%. This model was discarded based on its reliance on historical TAF data and pre-COVID activity assumptions in place when the forecast was created.

## Based Aircraft Fleet Mix

**Table 3-14** summarizes the current and forecast fleet mix for the planning period. The based aircraft fleet mix at Aurora State Airport is expected to become slightly more diverse as it is anticipated that as single-engine piston aircraft are retired over time, a portion are likely be replaced by LSA or experimental kit aircraft, following national trends. The addition of locally based turbine-engine aircraft (turboprop, jet, helicopter, etc.) is also anticipated based on the FAA's long term general aviation fleet forecast which reflects continued adoption of turbine engine technology.

**TABLE 3-14: FORECAST BASED AIRCRAFT FLEET MIX**

| | CAGR | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|---|
| Single Engine* | 0.9% | 216 | 229 | 240 | 250 | 259 |
| Multi Engine Piston | 0.0% | 6 | 6 | 6 | 6 | 6 |
| Turbo Prop | 1.1% | 13 | 14 | 15 | 15 | 16 |
| Jet | 2.3% | 36 | 40 | 45 | 50 | 56 |
| Helicopter | 1.4% | 10 | 11 | 11 | 12 | 13 |
| **Total Based Aircraft** | **1.1%** | **281** | **300** | **317** | **333** | **350** |

Source: Century West Engineering
*Includes Experimental/LSA

## AIRCRAFT OPERATIONS

Eleven aircraft operations forecasts were developed based on a variety of models. The average annual growth rates for the models ranged from 0.5% to 3.6%. Five of the models were discarded after review; the remaining models are presented in **Table 3-15** and depicted in **Figure 3-5**. These forecast models are applied to the 2021 aircraft operations baseline data presented earlier in the chapter.

**Historical Tower Counts Trend** – This model uses the full six years (2016-2021) of adjusted ATCT airport operations data available to establish a best-fit linear trend line for the period. The model assumes steady linear growth year-over-year. Itinerant and local splits were based on 2021 operations counts. The model is limited by the short period from which to develop meaningful trend and operational events experienced during the COVID-19 pandemic may be disproportionately reflected in the resulting trend projection. The model results in an average annual growth rate of 3.6%.

**TFMSC Historical Trend (20-year)** – This model uses 20 years (2001-2021) of TFMSC instrument flight plan data for the Airport to establish a trend line for the period. Itinerant and local splits were based on 2021 operations counts. Operational impacts experienced during the COVID-19 pandemic appear to dampen the overall trend. This model yields a reasonable correlation between the historical data to the derived trend line (R-squared = 0.72). The model results in an average annual growth rate of 2.3%.

**Marion County Population Correlation** – Socio-economic indicators (population, employment, and gross regional product) for several local defined areas were compared to the Airport's adjusted ATCT operations counts (2016-2021). Ultimately Marion County Population was chosen as the most representative model as the county showed good correlation across the three indicators (population being the highest at R-squared = 0.93) and is the most focused area in which the airport is located. Clackamas County Population was also 0.93, but the airport isn't located in the county and employment correlation was on the low end of the range, so it wasn't chosen over Marion County. PSU PRC population forecast annual growth rates were applied to baseline operation counts for the 20-year period. The model assumes that operations will continue to mirror population growth in Marion County. Itinerant and Local split based on 2021 operations counts. The model results in an average annual growth rate of 2.9%.

**National Aerospace Forecast Operations (Airports with ATCT)** – This model applies the *National Aerospace Forecast FY2021-2041* "Total Combined Aircraft Operations at Airports with FAA and Contract Traffic Control Service" forecast 2021-2041 growth rates for all aircraft categories to the Airport's baseline operation counts and projects out 20 years. Resulting operations by aircraft type were summed to get total operations for each year in the forecast. Aircraft categories were combined into Local and Itinerant totals based on the splits from baseline. The model assumes that the Airport operations will mirror national trends. The model results in an average annual growth rate of 0.8%.

**Federal Contract Tower TAF Non-Hub Models** – The FAA TAF for non-hub airports with federal contract air traffic control towers provides a reasonable model for projecting annual aircraft operations at Aurora State Airport based on the model's focus on airports with similar facilities and operational characteristics. The TAF models for general aviation operations are primarily based on time-series analysis. The FAA notes that the average decrease in 2020 general aviation operations was significantly less than commercial operations or commercial enplaned passengers. Three models were developed for varying geographic levels (national, regional, and state). Based on the review of each model, the projection for Oregon contract towers was determined to be most applicable for further consideration (see below). The national and regional federal contract tower models, although producing similar growth rates, were discarded in favor of the Oregon model. The TAF model based on Oregon contract tower airports is recommended for further consideration, and it is summarized below.

**Federal Contract Tower TAF State (Oregon) Model** – This model applies the Oregon Federal Contract Tower TAF forecast annual growth rates for aircraft classifications to Aurora State Airport's baseline operations counts (using the same classifications) over the 20-year period. The model is non-linear and year-over-year growth rates vary. The model assumes that the Airport's operations will mirror state trends. The model results in an average annual growth rate of 0.6%.

### Discarded Models

**National Aerospace Forecast (Hours Flown) Model** – This model applies the "Active General Aviation and Air Taxi Hours Flown" forecast 2021-2041 single growth rate to the Airport's baseline operation counts and projects out 20 years. Aircraft categories were combined into Local and Itinerant totals based on the splits from baseline. The model assumes that the Airport operations will mirror national trends. The model results in an average annual growth rate of 1.0%. This model was discarded since the individual aircraft categories presented in the FAA forecast are not detailed in ATCT activity counts used to develop the baseline aircraft operations total.

**Northwest Mountain Region Federal Contract Tower TAF Model** – This model applies the FAA's NW-Mountain Region Federal Contract Tower TAF forecast annual growth rates for aircraft classifications to the Airport's baseline operations counts (using the same classifications) over the 20-year period. The model uses the same assumptions as State TAF contract tower models but uses Northwest Mountain Region TAF forecast rates. The model results in an average annual growth rate of 0.5%. This model was discarded in favor of the similar and more locally based state TAF model.

**National Federal Contract Tower TAF Model** – This model applies the FAA's National Federal Contract Tower TAF forecast annual growth rates for aircraft classifications to the Airport's baseline operations counts (using the same classifications) over the 20-year period. The model uses the same assumptions as State TAF contract tower models but uses national TAF forecast rates. The model results in an average annual growth rate of 0.7%. This model was discarded in favor of the similar and more locally-based state TAF model.

**National Aerospace Forecast (Hours Flown) Model** – This model applies the "Active General Aviation and Air Taxi Hours Flown" forecast 2021-2041 single growth rate to the Airport's baseline operation counts and projects out 20 years. Aircraft categories were combined into Local and Itinerant totals based on the splits from baseline. The model assumes that the Airport operations will mirror national trends. The model results in an average annual growth rate of 1.0%. This model was discarded since the individual aircraft categories presented in the FAA forecast are not detailed in ATCT activity counts used to develop the baseline aircraft operations total.

**Oregon Aviation Plan v6.0 Model** – This model applies OAP v.6.0 operations growth rate to the Airport's baseline operations count and projects out 20 years. The linear projection assumes steady growth that does not change year-over-year during the 20-year forecast. The model results in an average annual growth rate of 0.9%. This model was discarded based on its reliance on historical TAF data and pre-COVID-19 activity assumptions in place when the forecast was created.

## RECOMMENDED AIRCRAFT OPERATIONS FORECASTS SUMMARY

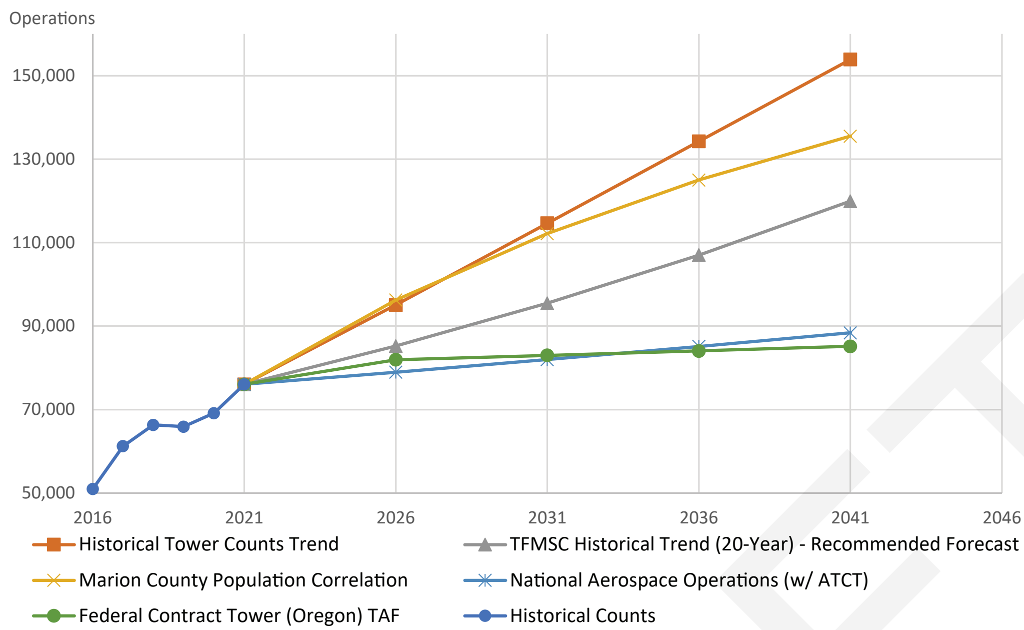
The FAA TFMSC Historical Trend Model is the recommended aircraft operations forecast for the 2021-2041 Aurora State Airport Master Plan. The extended period of TFMSC data provides a reliable indication of the Airport's growth in flight activity that is not exceedingly influenced by intermittent events. The TFMSC data also provides a stable measure of activity that is not affected by adjustments to baseline activity data. This model projects an average annual growth rate in operations of 2.3% over the planning period. The aircraft operations forecast models are included in **Table 3-15** and depicted in **Figure 3-5**.

**TABLE 3-15: AIRCRAFT OPERATIONS FORECAST MODELS**

| | CAGR | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|---|
| Historical Tower Counts Trend | 3.6% | 76,028 | 95,039 | 114,646 | 134,254 | 153,862 |
| **TFMSC Historical Trend (20-Year) - Recommended Forecast** | **2.3%** | **76,028** | **85,201** | **95,480** | **107,000** | **119,909** |
| Marion County Population Correlation | 2.9% | 76,028 | 96,244 | 112,162 | 124,981 | 135,506 |
| National Aerospace Forecast Operations (w/ ATCT) | 0.8% | 76,028 | 78,939 | 81,966 | 85,114 | 88,388 |
| Federal Contract Tower (Oregon) TAF | 0.6% | 76,028 | 81,924 | 82,972 | 84,046 | 85,151 |

Source: Century West Engineering developed using FAA TFMSC Data

**FIGURE 3-5: OPERATIONS FORECAST MODELS**




Source: Century West Engineering developed using FAA TFMSC Data

## AIRCRAFT OPERATIONS FLEET MIX AND SPLITS

Single-engine piston aircraft currently account for approximately 80% of airport operations, followed by helicopters, jets, turboprops, and multi-engine piston aircraft. It is expected that the mix of air traffic at Aurora State Airport will shift slightly during the 20-year planning period to include more turbine aircraft (jets, turboprops, and helicopters) based on current trends in aircraft manufacturing and the composition of airport users.

It is anticipated that the expected decline in older conventional single-engine piston aircraft will be partly offset by growth in experimental and sport aircraft. The aircraft operations fleet mix forecast is summarized in **Table 3-16**. Activity splits (local, itinerant, etc.) for forecast operations are summarized in **Table 3-17**.

**TABLE 3-16: OPERATIONS FLEET MIX**

| Aircraft Type | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|
| **Total Airport Operations** | **76,028** | **85,201** | **95,480** | **107,000** | **119,909** |
| Single Engine* | 60,823 | 67,650 | 75,143 | 83,674 | 92,929 |
| Multi Engine Piston | 760 | 767 | 764 | 642 | 600 |
| Turbo Prop | 3,041 | 3,578 | 4,297 | 5,029 | 5,995 |
| Jet | 5,322 | 6,390 | 7,638 | 9,095 | 10,792 |
| Helicopter | 6,082 | 6,816 | 7,638 | 8,560 | 9,593 |
| **Fleet Mix Percentages** | | | | | |
| Single Engine* | 80.0% | 79.4% | 78.7% | 78.2% | 77.5% |
| Multi Engine Piston | 1.0% | 0.9% | 0.8% | 0.6% | 0.5% |
| Turbo Prop | 4.0% | 4.2% | 4.5% | 4.7% | 5.0% |
| Jet | 7.0% | 7.5% | 8.0% | 8.5% | 9.0% |
| Helicopter | 8.0% | 8.0% | 8.0% | 8.0% | 8.0% |

Source: Century West Engineering
*Includes LSA/Experimental Operations Fleet Mix

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TABLE 3-17: LOCAL AND ITINERANT ACTIVITY

| Aircraft Operations | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|
| Itinerant | | | | | |
| Itinerant Air Taxi | 2,006 | 2,248 | 2,519 | 2,823 | 3,164 |
| Itinerant GA | 36,390 | 40,790 | 45,721 | 51,246 | 57,439 |
| Itinerant Military | 79 | 79 | 79 | 79 | 79 |
| **Itinerant Total** | **38,475** | **43,117** | **48,319** | **54,149** | **60,682** |
| Local | | | | | |
| Local GA | 37,488 | 42,019 | 47,096 | 52,786 | 59,162 |
| Local Military | 65 | 65 | 65 | 65 | 65 |
| **Local Total** | **37,553** | **42,084** | **47,161** | **52,851** | **59,227** |
| **Total Operations** | **76,028** | **85,201** | **95,480** | **107,000** | **119,909** |

Source: Century West Engineering developed using FAA ATCT Data

# Operational Peaks

Activity peaking is evaluated to identify potential capacity related issues that may need to be addressed through facility improvements or operational changes. The Peak Month represents the month of the year with the greatest number of aircraft operations (takeoffs and landings). The peak month for most general aviation airports occurs during the summer when weather conditions and daylight are optimal. This also coincides with the busiest time of year for flight training and recreational flying. This level of peaking is consistent with recent fuel delivery records for the Airport and the annual distribution of TFMSC data.

Peak Day operations are defined by the average day in the peak month (Design Day) and the busy day in the typical week during peak month (Busy Day). The Design Day is calculated by dividing peak month operations by 30.5. For planning purposes, the Busy Day is estimated to be 50% higher than the average day in the peak month (Design Day x 1.5), based on common activities generating significant surges in flight activity.

The peak activity period in the Design Day is the Design Hour. For planning purposes, the Design Hour operations are estimated to account for 20% of Design Day operations (Design Day x 0.20).

The operational peaks for each forecast year are summarized in **Table 3-18**. This level of peaking is consistent with the mix of airport traffic and is expected to remain relatively unchanged during the planning period. These measures of activity are considered in the facility requirements analyses when calculating runway/taxiway capacity and transient aircraft parking requirements.

TABLE 3-18: AIRCRAFT OPERATIONS PEAKING

| | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|
| **Total Based Aircraft** | **76,028** | **85,201** | **95,480** | **107,000** | **119,909** |
| Peak Month Operations (11%) | 8,363 | 9,372 | 10,503 | 11,770 | 13,190 |
| Design Day Operations (Average Day in Peak Month) | 274 | 307 | 344 | 386 | 432 |
| Busy Day Operations (Assumed 150% of design day) | 411 | 461 | 517 | 579 | 649 |
| Design Hour Operations (Assumed 20% of design day) | 55 | 61 | 69 | 77 | 86 |

Source: Century West Engineering

# Design Aircraft

The design aircraft (or critical aircraft) represents the most demanding aircraft, or family of aircraft, using an airport on a regular basis and determines the appropriate Airport Reference Code (ARC) and airport design standards for airport development.

**The existing and future design aircraft identified in the aviation activity forecasts corresponds to Airport Reference Code C-II (ARC C-II)**

- 2021 TFMSC data indicates that Approach Category C and D aircraft operations exceeded the minimum of 500 annual operations required for Design Aircraft designation. While neither approach category alone reached the operations threshold, collectively they exceed the threshold and represent the most demanding family of high performance jet aircraft.
- Airplane Design Group II or larger aircraft operations also exceeded the 500 operations threshold required for Design Aircraft designation.
- Each element of the ARC is independently justified through current activity levels, and the ARC C-II designation most accurately represents this segment of aircraft activity.
- Specific facility requirements, such as runway length requirements will be derived from the composite of Approach Category C and D jet aircraft reflected in FAA runway length planning tables.

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**Table 3-19** summarizes FAA technical criteria used to determine the applicable ARC for aircraft based on physical characteristics; representative aircraft are also depicted.

**TABLE 3-19: AIRPORT REFERENCE CODE (ARC)**

| Aircraft Approach Category | Aircraft Approach Speed knots | Airplane Design Group | Aircraft Wingspan |
|---|---|---|---|
| A | less than or equal to 91 | I | less than or equal to 49’ |
| B | 92 to 121 | II | 50’ to 79’ |
| C | 122 to 141 | III | 80’ to 118’ |
| D | 142 to 166 | IV | 119’ to 171’ |

A-I (small)
12,500 lbs. or less


Beech Baron 55
Beech Bonanza
**Cessna 182**
Piper Archer

B-I (small)
12,500 lbs. or less

**Beech Baron 58**
Beech King Air C90
Cessna 402
Cessna 421

A-II, B-II (small)
12,500 lbs. or less

Super King Air 200
**Pilatus PC-12**
DCH Twin Otter
Cessna Caravan

ARC - B-II
Greater than 12,500 lbs.

Super King Air 300, 350
Beech 1900
**Cessna Citation**
Falcon 20, 50

A-III, B-III
Greater than 12,500 lbs.


DHC Dash 7, Dash 8
**Q-200, Q-300**
DC-3
Convair 580

C-I, D-I

**Lear 25, 35, 55, 60**
Israeli Westwind
HS 125-700

C-II, D-II

Gulfstream II, III, IV
**Canadair 600**
Canadair Regional Jet
Lockheed JetStar

C-III, D-III

Boeing Business Jet
**Gulfstream 650**
B 737-300 Series
MD-80, DC-9

C-IV, D-IV

**B - 757**
B - 767
DC - 8-70
DC - 10

Source: Century West Engineering

# Military Activity

Air traffic control tower counts for the Airport average 248 annual military operations since 2016, although the volume has decreased to less than 150 annual operations over the last two years. Occasional military use with helicopters or small fixed-wing aircraft in support of emergency response, search and rescue, and flight training activities would be consistent with activity (Oregon Army National Guard, etc.) experienced at other Oregon general aviation airports. Military flight activity at the Airport is projected to remain at current levels, with a static projection of 144 annual operations during the planning period. Forecast military activity is included in **Table 3-20**.

# Air Taxi Activity

Air taxi activity includes for-hire charter flights, medevac flights, and some scheduled commercial air carriers operating under FAR Part 135. Air taxi activity at Aurora State Airport is forecast to increase at the same rate as itinerant general aviation operations. Forecast air taxi activity is included in **Table 3-20** (forecast summary).

# Forecast Summary

A summary of the based aircraft and annual aircraft operations is presented in **Table 3-20**. These forecasts project slight to modest growth over the 20-year planning period that is consistent with FAA's long-term expectations for general aviation in the region. Based aircraft are forecast to increase at an average annual rate of 1.1% between 2021 and 2041. Aircraft operations are forecast to increase at an average annual rate of 2.3% between 2021 and 2041. The forecasts reflect the Airport's ability to attract and accommodate both locally based and transient aeronautical activity from a diverse group of users, including flight training, recreational aviation, personal travel, and business aviation.

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TABLE 3-20: FORECAST SUMMARY

| Activity | CAGR | 2021 | 2026 | 2031 | 2036 | 2041 |
|---|---|---|---|---|---|---|
| **Based Aircraft** | | | | | | |
| Single Engine* | 0.9% | 216 | 229 | 240 | 250 | 259 |
| Multi Engine Piston | 0.0% | 6 | 6 | 6 | 6 | 6 |
| Turbo Prop | 1.1% | 13 | 14 | 15 | 15 | 16 |
| Jet | 2.3% | 36 | 40 | 45 | 50 | 56 |
| Helicopter | 1.4% | 10 | 11 | 11 | 12 | 13 |
| **Total Based Aircraft** | **1.1%** | **281** | **300** | **317** | **333** | **350** |
| | | | | | | |
| **Aircraft Operations** | | | | | | |
| Itinerant | | | | | | |
| Itinerant Air Taxi | 2.3% | 2,006 | 2,248 | 2,519 | 2,823 | 3,164 |
| Itinerant GA | 2.3% | 36,390 | 40,790 | 45,721 | 51,247 | 57,439 |
| Itinerant Military | 0.0% | 79 | 79 | 79 | 79 | 79 |
| **Itinerant Total** | **2.3%** | **38,475** | **43,117** | **48,319** | **54,149** | **60,682** |
| | | | | | | |
| Local | | | | | | |
| Local GA | 2.3% | 37,488 | 42,019 | 47,096 | 52,786 | 59,162 |
| Local Military | 0.0% | 65 | 65 | 65 | 65 | 65 |
| Local Total | 2.3% | 37,553 | 42,084 | 47,161 | 52,851 | 59,227 |
| **Total Operations** | **2.3%** | **76,028** | **85,201** | **95,480** | **107,000** | **119,909** |
| | | | | | | |
| **Aircraft Operations Fleet Mix** | | | | | | |
| Single Engine* | 2.1% | 60,823 | 67,650 | 75,143 | 83,674 | 92,929 |
| Multi Engine Piston | -1.2% | 760 | 767 | 764 | 642 | 600 |
| Turbo Prop | 3.5% | 3,041 | 3,578 | 4,297 | 5,029 | 5,995 |
| Jet | 3.6% | 5,322 | 6,390 | 7,638 | 9,095 | 10,792 |
| Helicopter | 2.3% | 6,082 | 6,816 | 7,638 | 8,560 | 9,593 |
| **Total Operations** | 2.3% | 76,028 | 85,201 | 95,480 | 107,000 | 119,909 |
| | | | | | | |
| Operations By C-II (Critical Aircraft) | 3.1% | 318 | 370 | 432 | 503 | 586 |
| Operations by AAC C & D | 3.1% | 672 | 659 | 768 | 895 | 1,042 |
| Operations by ADG II & III | 3.1% | 4,250 | 2,761 | 3,216 | 3,747 | 4,364 |
| | | | | | | |
| Instrument Operations | 2.3% | 9,658 | 10,823 | 12,129 | 13,592 | 15,232 |

Source: Century West Engineering
*Includes Experimental/LSA

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### TERMINAL AREA FORECAST (TAF) COMPARISON

The recommended based aircraft and aircraft operations forecasts are compared to the current TAF as required for FAA review in **Table 3-21**.

**TABLE 3-21: AIRPORT PLANNING AND TAF FORECAST COMPARISON**

| Activity | Year | Airport Forecast | TAF | "AF/TAF (% Difference)" |
|---|---|---|---|---|
| **Passenger Enplanements** | | | | |
| Base yr. | 2021 | 0 | 0 | 0.0% |
| Base yr. + 5yrs. | 2026 | 0 | 0 | 0.0% |
| Base yr. + 10yrs. | 2031 | 0 | 0 | 0.0% |
| Base yr. + 15yrs. | 2036 | 0 | 0 | 0.0% |
| | | | | |
| **Commercial Operations** | | | | |
| Base yr. | 2021 | 2,006 | 1,191 | 68.4% |
| Base yr. + 5yrs. | 2026 | 2,248 | 1,731 | 29.9% |
| Base yr. + 10yrs. | 2031 | 2,519 | 1,848 | 36.3% |
| Base yr. + 15yrs. | 2036 | 2,823 | 1,973 | 43.1% |
| | | | | |
| Total Operations | | | | |
| Base yr. | 2021 | 76,028 | 64,035 | 18.7% |
| Base yr. + 5yrs. | 2026 | 85,201 | 65,371 | 30.3% |
| Base yr. + 10yrs. | 2031 | 95,480 | 66,303 | 44.0% |
| Base yr. + 15yrs. | 2036 | 107,000 | 67,262 | 59.1% |

Source: Century West Engineering
Note: TAF data is on a U.S. government fiscal year basis (October through September).

# Next Steps

The draft aviation activity forecasts will be submitted to the FAA Seattle Airports District Office (ADO) for formal review following presentation and discussion of the chapter in Planning Advisory Committee (PAC) Meeting 2.

Upon FAA approval of the forecasts, the current and future design aircraft will be used in subsequent master plan technical evaluations and definition of airport design standards and airspace planning standards. These designations will include the appropriate design criteria, including Airport Reference Code (ARC) and Taxiway Design Group (TDG) to be used in the 2021-2041 Airport Master Plan.

The approved aviation activity forecasts will be used to evaluate the aeronautical facility requirements for the Airport in the following chapter (Chapter 4 – Facility Requirements). The facility requirements evaluation will quantify current and future facility needs in general terms and volume.

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