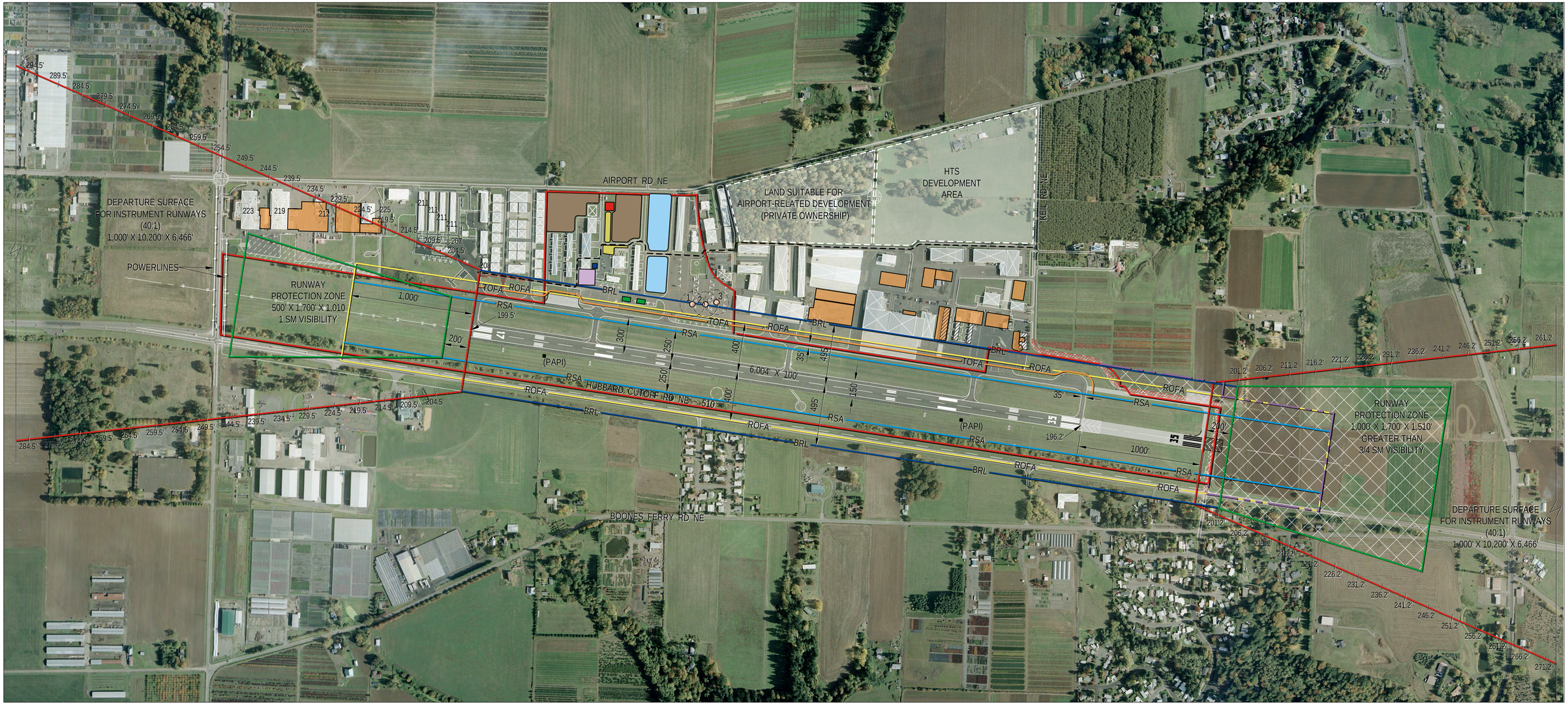

June 7, 2011

SCALE
400 0 200 400
(FEET)
1 INCH = 400 FT.

Legend

- Property Line
- Future Property Line
- BRL — 35' Building Restriction Line
- RSA — Runway Safety Area
- ROFA — Runway Object Free Area
- TOFA — Taxiway Object Free Area
- Service Road
- Existing Buildings
- Future Buildings
- Future Paved
- Air Traffic Control Tower (ATCT)
- Aurora Rural Fire Protection District
- Future Apron Area
- Cargo Apron
- Vehicular Parking
- Hangar Development
- Fuel Station
- Helicopter Parking
- Precision Approach Path Indicator (PAPI)
- Existing Building Removal
- Existing Building Hts
- Septic Drain Field
- (White) Future Property Aquisition
- (White) Future Avigation Easement

General Notes

Airport Reference Code (ARC) - C-II
Runway strengthened to 60,000 lbs dual wheel gear

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Aurora, OR

Exhibit 5J
Preferred Alternative
Revised 06/27/11

03417-AIRP-EX5J_MC.DWG

May 11, 2011

SCALE
400 0 200 400
(FEET)
1 INCH = 400 FT.

Legend

- Property Line
- Future Property Line
- BRL — 35' Building Restriction Line
- RSA — Runway Safety Area
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- Fuel Station
- Helicopter Parking
- Precision Approach Path Indicator (PAPI)
- Existing Building Removal
- 212 Existing Building Hts
- Septic Drain Field
- (White) Future Property Aquisition
- (White) Future Avigation Easement

General Notes

Airport Reference Code (ARC) - C-II
Runway strengthened to 60,000 lbs dual wheel gear
Tower location per FAA / ODA meeting in April

Scenario #1

Add 600-feet displaced threshold to Runway 35 and 200-feet displaced threshold to Runway 17 to acquire the following declared distances:

Scenario #1 Declared Distances

	R35	R17
Takeoff Run Available (TORA)	5,604'	5,204'
Takeoff Distance Available (TODA)	5,604'	5,204'
Accelerate-Stop Distance Available (ASDA)	5,804'	5,804'
Landing Distance Available (LDA)	5,004'	5,004'

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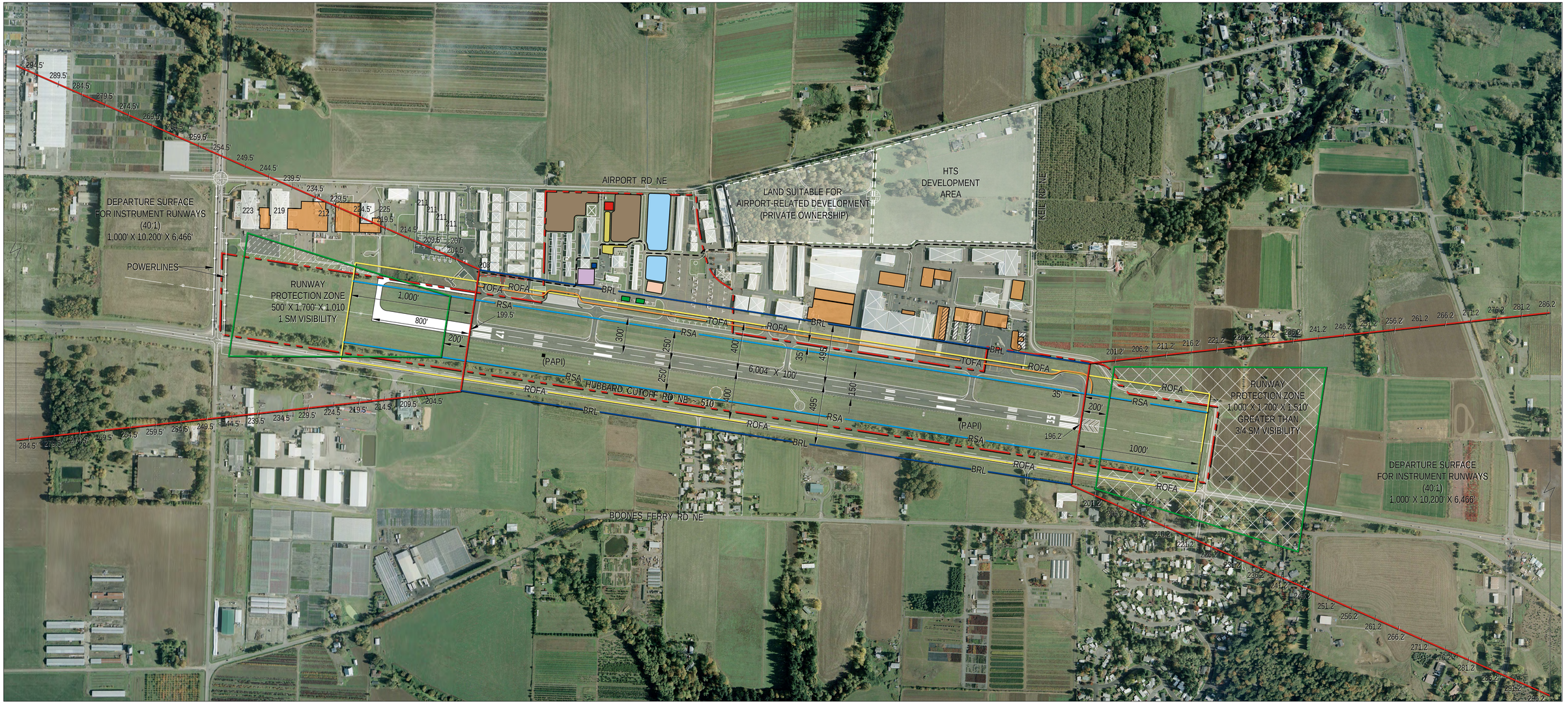
Exhibit 5J
Preferred Alternative
Scenario #1

034317-AIRP-EX5J_SCENARIOS_MC.DWG



May 11, 2011

SCALE
400 0 200 400
(FEET)
1 INCH = 400 FT.

Legend

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- Helicopter Parking
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- Existing Building Removal
- Existing Building Hts
- Septic Drain Field
- (White) Future Property Aquisition
- (White) Future Avigation Easement

General Notes

Airport Reference Code (ARC) - C-II
Runway strengthened to 60,000 lbs dual wheel gear
Tower location per FAA / ODA meeting in April

Scenario #2

Add 800-feet displaced threshold to Runway 17 to achieve the following declared distances:

Scenario #2 Declared Distances

	R35	R17
Takeoff Run Available (TORA)	5,004'	5,804'
Takeoff Distance Available (TODA)	5,004'	5,804'
Accelerate-Stop Distance Available (ASDA)	5,804'	5,804'
Landing Distance Available (LDA)	5,004'	5,004'

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Exhibit 5J
Preferred Alternative
Scenario #2

03437-AIRP-EXSJ_SCENARIOS_MC.DWG

Scenario 1 Declared Distances		
	Runway 35	Runway 17
Takeoff Run Available (TORA)	5,604’	5,204’
Takeoff Distance Available (TODA)	5,604’	5,204’
Accelerate-Stop Distance Available (ASDA)	5,804’	5,804’
Landing Distance Available (LDA)	5,004’	5,004’

Add-On Scenario 2

In Scenario 2, an 800-feet displaced threshold would be added to Runway 17 (**Exhibit 5J Scenario #2**). All development would be on State property for the runway. If a parallel taxiway is constructed, property acquisition from Willamette Aviation would be required. Traffic departing to the south (Runway 17) would be against the calm wind traffic on Runway 35.

Scenario 2 Declared Distances		
	R35	R17
Takeoff Run Available (TORA)	5,004’	5,804’
Takeoff Distance Available (TODA)	5,004’	5,804’
Accelerate-Stop Distance Available (ASDA)	5,004’	5,804’
Landing Distance Available (LDA)	5,004’	5,004’

Add-On Scenario 3

The FAA has been approached regarding the use of displaced thresholds at Aurora State. At this time, an official response has yet to be received. However, preliminary discussions with the FAA have indicated they are not in favor of using displaced thresholds since doing so would only be a partial utilization of the runway (*i.e.*, not all pavement would be available for takeoff and landing). Additionally, a runway extension was justified in previous sections of the Master Plan, so the FAA would favor pursuing a runway extension to meet the demand. In response, Scenario 3 was developed to incorporate a 1,000-feet extension to the south (**Exhibit 5J Preferred Alternative**). The runway extension would accommodate nearly all business jets with ARC C-II and below that could potentially operate at the Airport. Keil Road would be dead-ended, with no access to Highway 551.

Runway/Pavement Strength

The analysis relating to pavement strength in Chapter Four tied runway strength to runway length. Although the runway length will remain the same in the Preferred Alternative, strengthening of the runway's pavement is proposed. The parallel taxiway currently has 60,000 pounds dual wheel gear strength and it is recommended the runway be overlaid to provide the same pavement strength as the taxiway. Currently there are airplanes based at the Airport with maximum takeoff weights that exceed the runway's strength rating.

Instrument Approach Procedures

The need for better instrument approach capability was identified by several Airport users at the beginning of this planning process, and the business aviation industry recommends better approach capability than the Airport has. When visibility is reduced by fog, rain, or snow to a distance below the minima set for an airport's instrument approaches, airplanes cannot land, resulting in costly trip delay or re-routing.

The Preferred Alternative proposes no changes to the Runway 17 approach minima, 1 statute mile. For Runway 35 (the calm wind runway), the Preferred Alternative improves the instrument approach to visibility minima greater than ¾ statute mile. The improved approach procedure would use GPS and not require additional navigational aids on the Airport, except for an approach lighting system similar to the system at the north end of the runway. Based on ten years of historical weather data, the improved instrumentation will increase annual Airport usability by 1.3% (nearly five days). In November, the increased use of the Airport will be 3.4% of the time.

In addition to reducing the time the Airport is "closed" due to weather, the instrument approach improvement will enhance aviation safety by increasing regional capability for instrument landings, increasing the margin of safety for VFR traffic, and making it easier for Airport users to adapt to sudden weather changes.

As mentioned previously, the change in ARC to C-II lengthens the RPZ at the north end of the runway, even though there is no change to Runway 17's minima. Most of the RPZ extension will remain on Airport property and where it extends off-airport avigation easements will be sought. With the instrument approach improvement to Runway 35, the RPZ at the south end of the runway becomes much larger, extending beyond current Airport property. ODA will pursue control of the additional land in the Runway 35 RPZ through fee acquisition.

Air Traffic Control Tower

The ATCT location was further analyzed through the FAA's tower siting study on March 3-5. The final location will be west of the Columbia Aviation Association Clubhouse, in the vicinity of the State's existing aircraft parking apron, as shown on the alternative exhibits.

Cargo Apron

The Oregon Aviation Plan (2007) identified the need for a cargo apron at the Airport. This apron would be used for aircraft parking while unloading/loading freight onto ground vehicles; it would not include a

sorting facility. The Preferred Alternative places the cargo apron north of Aurora Aviation because of good accessibility to the Airport's current access road.

North Run-up Area

There is no run-up area to Runway 17, which poses a safety hazard. Current restrictions do not allow construction of a run-up area near the Runway 17 end. As a compromise, a run-up area is proposed approximately 500 feet south of the north end of the parallel taxiway. In order for the run-up area to be constructed, the Aurora Aviation fuel tanks must be relocated.

Relocation of Fuel Tanks

As stated in prior chapters, the Aurora Aviation fuel tanks are located in an undesirable area due to their close proximity to Airport taxiways. Additionally, the north run-up area is proposed where the fuel tanks are located. ODA will negotiate relocating these fuel tanks northeast of the Aurora Aviation FBO building.

Aurora Rural Fire Protection District

While an Airport Rescue and Fire Fighting (ARFF) facility is not required for the Airport, the Aurora Rural Fire Protection District has indicated interest in locating a facility on the Airport where they could house their firefighting apparatus. The most desirable location, based on the District's input, is adjacent to the existing fire suppression system centrally located on the Airport near Airport Road.

Helicopter Parking

The helicopter parking area on state-owned property is proposed in an area currently used for fixed-wing tiedowns, approximately 500 feet south of the proposed run-up area. This area separates helicopter and fixed-wing aircraft parking to minimize possible damage to small fixed-wing aircraft by rotor wash.

Internal Service Road

An internal service road is included to help separate vehicular traffic from taxiing aircraft, which will enhance safety. It is intended to be used exclusively by approved operators (ODA and others who must use it for specific purposes, like fuel trucks, etc.).

Precision Approach Path Indicators (PAPIs)

PAPIs should be installed to replace the less precise visual glide slope indicators at the Airport.

Demand-Based Improvements

The Preferred Alternative shows additional hangar and tiedown areas on state-owned property. It is expected that not all of the demand-based needs will be met by development on state-owned land, and development/reconfiguration of private property will likely occur. Accordingly, the adjacent 16-acre church camp property is identified as suitable for airport-related development. Within the 20-year planning period, the projected need for additional land that is not currently zoned Public is only 5 acres. However, demand may exceed the forecast or development density may be lower than projected. The

church camp property east of the Airport is a logical area for excess demand to be met because it is adjacent to the Airport and on the Airport side of Airport Road.

Although previous discussions identified the adjacent church camp property as a potential location to meet this forecasted need, through the public involvement process, it was determined that it would not be identified on the Airport Layout Plan as future airport-related development.

Appendix to Chapter Five: ADDITIONAL RUNWAY LENGTH SCENARIOS

Airport Master Plan Update

Aurora State Airport

January 11, 2011

The Final Draft Airport Layout Plan (ALP) Drawing Set was submitted to the FAA's Seattle Airports District Office for review and comment in November 2011. The Final Draft ALP reflected two runway length scenarios. One scenario was an 800-foot displaced threshold to Runway 17, with modification to standards request to allow the existing Runway 17 threshold to be used in calculating FAA design surfaces. The other scenario was a 1,000-foot extension to Runway 35. The Oregon Aviation Board's preference was to pursue the displaced threshold, with the full extension as a back-up plan if the FAA would not approve the modifications to standards.

In response to this submittal, the FAA directed ODA to revisit the alternative of a northern extension to Runway 17 and stated they would not support a displaced threshold (FAA letter dated November 18, 2011 is included as reference). The FAA's position is that the benefit from a limited use displaced threshold to Runway 17 is not commensurate with the cost – particularly they did not agree that minimizing impacts to private property justified the use of the displaced threshold. Rather, an actual extension to Runway 17 on property already owned by the State is more preferable to the FAA. Furthermore, the option to extend Runway 35 south would not be supported by the FAA since adequate land to the north remains to accommodate a runway extension in that direction.

This appendix to the alternatives chapter is intended to explore the scenarios suggested by the FAA, and to examine additional issues caused by extending the runway northward beyond those posed to private property. It will identify the issues associated with extending the runway north versus south to assist the ODA, Oregon Aviation Board and FAA in determining the appropriate action to reduce constrained operations at the Aurora State Airport.

Northern Extension Option

The FAA's letter cites that a 1,000-foot runway safety area (RSA) can be achieved north of Runway 17 on land owned by the state, in which case an 800-foot extension could be feasible. However, potential obstructions posed by Arndt Road, two power lines, and other facilities that would be infeasible to relocate, render a northern extension limited to 400 feet. Referencing data from Chapter Four Table 4E (also included as reference), there are no operational impacts with a 400-foot extension. To begin reducing known constrained operations at the Airport, a minimum extension of approximately 500 feet would be required. Information presented in Chapter Four shows that a runway extension of approximately 1,000 feet would have a significant impact on reducing constrained operations at the Airport. Further discussions with the FAA regarding this limitation have clarified the need to extend Runway 17/35 beyond what is possible for Runway 17. Therefore, since a 1,000-foot extension north would not be achievable due to facilities penetrating various design surfaces, this option includes a 600-foot extension to the south to gain the more ideal runway length (see **Exhibit 5K**).

Key Features

The following discussion outlines key features of the northern extension option for comparison with the other alternative.

Runway Length

The ultimate runway length would be 6,004' – to be achieved by a north extension to Runway 17 of 400 feet and a south extension to Runway 35 of 600 feet.

An extension to Runway 17 assumes that Arndt Road would not be relocated and the power lines adjacent to Arndt Road would not be relocated or buried; both would remain located in the runway protection zone (RPZ). Arndt Road is a major arterial that was recently reconstructed and widened and would be very costly relocate and any relocation would have a large impact to surface transportation. Similarly, the high voltage power lines would be very costly to relocate. **FAA Advisory Circular 150/5300-13, *Airport Design*, allows for certain facilities to exist within the RPZ; however, when practical the FAA strongly discourages roads and power lines as they pose a safety risk to people on the ground and in aircraft.**

Using the assumption that Arndt Road and the power lines will not be relocated, Runway 17 can only be extended by 400 feet to retain consistency with FAA design standards. As stated above, there are no operational gains or reductions to constrained operations with a 400-foot extension, based on data gathered in Chapter Four.

Runway 35 would be extended by 600 feet to reach to optimal runway length of 6,004 feet, which would require a relocation of Keil Road in order to clear the RSA.

Property Acquisition

Implementation of this option would require the acquisition of real property and avigation easements to secure land use control within the RPZs. Avigation easements would be sought for approximately two

Legend

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- (White) Future Property Aquisition
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SCALE
400 0 200 400
(FEET)
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General Notes

Airport Reference Code (ARC) - C-II
Runway strengthened to 60,000 lbs dual wheel gear

01/05/12

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Aurora State Airport
Aurora, OR

Exhibit 5K
Runway Extension Alternative
Runway 17 - 400' & Runway 35 - 600'

034317-AIRP-EX5K_MC_2007.DWG

acres of land from Columbia Helicopters, which would limit their planned development. To the north of Arndt Road, approximately 5.5 acres would be acquired, along with approximately 37 acres to the south of Runway 35 that would include six residential properties. Property would also be acquired from Willamette Aviation for the Runway 17 parallel taxiway and run-up apron.

Departure / Approach Surface

As shown in Exhibit 5K, relocation of the Runway 17 threshold impacts the departure and approach surface. The departure surface extends upward and outward at a slope of 40:1 from the threshold. As the threshold moves north, the departure surface is lower over structures at **Columbia Helicopters**; thereby making them obstructions to navigation. Existing structures would likely be required to have obstruction lights; however, **future development may be restricted to prohibit penetrations to the departure surface.** Similarly, the approach surface, which begins 200 feet beyond the runway threshold, would be lowered over Arndt Road and the power lines. Although the power lines would remain below the approach surface, the safety margin between approaching aircraft would be reduced and that may result in an increase to the Airport's approach minimums, which are typically 1 ½ statute mile (sm) visibility for Category C and D aircraft (depending on the approach, Category C minimums are as low as 1 ¼ sm). Weather data shows that weather is below 1 sm visibility 5% of the time. The Airport would be below Approach Category C and D minimums a higher percentage of the time. Low visibility weather is not spread evenly throughout the year. In the months of May through August, visibility is below 1 sm less than 1% of the time on average, but in the months of November through January the weather is below approach minimums more than 10% of the time. Given this information, it would be imprudent to raise the existing minimums, which would virtually close the Airport in low visibility conditions.

Land Use

The majority of land identified for acquisition is currently zoned exclusive farm use. A portion of the land associated with home sites is zoned acreage residential. Land north of Arndt Road falls within the jurisdiction of Clackamas County; whereas everything to the south is within the Marion County boundary. Private property – Columbia Helicopters and Willamette Aviation – would be impacted by land acquisition and land use zoning restrictions on building height.

To maintain compatibility with FAA guidance, the acquired property should be rezoned to maintain airport compatibility.

Environmental

The anticipated environmental impact with this runway length option is minimal. Areas where potential impacts are expected include: water quality, farmland, noise, and temporary construction impacts. There would be increased stormwater runoff due to the increased impervious surface, which can be mitigated with adjustments to the existing stormwater drainage system. Farmlands would be minimally impacted; even though there is acquisition of farmland, farm-related activities could remain on the subject property consistent with FAA guidance. Noise is expected to increase over the planning period, as detailed in Chapter Five; however, the Airport's runway configuration has an insignificant impact on

noise according to FAA National Environmental Policy Act regulations. Temporary construction impacts will be offset by implementation of best management practices and impact avoidance.

Noise Abatement

New instrument departures, along with publish noise mitigation procedures and the use of the calm wind runway (Runway 35) are consistent with the northern runway length option. However, noise would be shifted slightly closer to the Charbonneau community.

Air Traffic Control Tower (ATCT)

Design of the ATCT included simulations at the FAA's Airway Facilities Tower Integration Laboratory (AFTIL). During that simulation no runway extension to the north was modeled. If a northern extension were pursued, the AFTIL work may need to be redone to ensure line of sight visibility from the ATCT to the extended runway end. The cost of the additional simulation could cost upwards of $200,000.

Construction

An extension to both ends of Runway 17/35 will require a two-phased construction approach. Temporary displaced thresholds will be utilized during construction, adding duplicate efforts for the contractor, adding time to construction and reducing operational efficiency of the airport.

Cost Estimate

The northern extension option is estimated to cost $9,606,000, as shown in the following table. Detailed cost estimates are attached for reference. A more detailed discussion regarding the cost estimating is included later in this analysis.

Northern Extension Option

#	Year	Description	Total Cost	ODA share	FAA Share
Runways 17 (400') and 35 (600') Extension					
14A	2018	Avigation Easement Acquisition (R17 RPZ)	$ 36,000.00	$ 1,800.00	$ 34,200.00
19A	2018	Property Acquisition (R17 and R35 RPZ)	$ 3,963,000.00	$ 198,150.00	$ 3,764,850.00
20A	2019	Keil Road Relocation	$ 1,427,000.00	$ 71,350.00	$ 1,355,650.00
21A	2020	Runway Extension (R17 - 400' Ext, R35 - 600' Ext)	$ 4,180,000.00	$ 209,000.00	$ 3,971,000.00
Runways 17 (400') and 35 (600') Extension Capital Costs			*$ 9,606,000.00*	*$ 480,300.00*	*$ 9,125,700.00*

Southern Extension Option

In an effort to make a valid comparison for the previous extension scenario, a 1,000-foot extension to the south will be compared against the Northern Extension Option. **Exhibit 5J** reflects the southern extension option, which is the State Aviation Board's Preferred Alternative presented in Chapter Five.

June 7, 2011

SCALE
400 0 200 400
(FEET)
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Legend

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Preferred Alternative
Revised 06/27/11

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Key Features

The following discussion details the southern runway extension option to provide a comparison against the northern extension option.

Runway Length

Runway 35 would be extended to the south by 1,000 feet for a total runway length of 6,004 feet, which is the ideal runway length to reduce a majority of the Airport's constrained operations. Keil Road would be relocated, as a result of the extension.

Property Acquisition

Extending Runway 35 would require the relocation of four residences and agricultural lands amounting to approximately 44.5 acres. Additionally, avigation easements would be sought from Columbia Helicopters to secure control of approximately 2.6 acres in the existing Runway 17 RPZ.

Departure / Approach Surface

A southern extension to Runway 35 would require the removal of obstructions, namely trees, to clear the approach and departure surfaces. No other buildings or facilities will be affected.

Land Use

All land use actions would be within Marion County's jurisdiction. Official action would be to designate the acquired land to "Public" to ensure compatibility with airport operations. Per FAA guidance, some agricultural uses are compatible with airport operations. No development would occur within the areas to be acquired, beyond relocation of Keil Road.

Environmental

The environmental considerations for the southern extension option are similar to those stated above. Noise would shift slightly farther south as a result of the longer extension to Runway 35.

Noise Abatement

New instrument departures, along with published noise mitigation procedures and the use of the calm wind runway (Runway 35) are consistent with the northern runway length option. The new instrument departures, along with the noise abatement techniques, are a culmination of ODA's public involvement that included coordination with the Positive Aurora Airport Management group and local communities.

Air Traffic Control Tower

The AFTIL simulation included modeling of a 1,000-foot southern extension. Extending Runway 35 would not require any additional AFTIL modeling.

Construction

Extension of Runway 35 would require the use of a single temporary displaced threshold. Keil Road would be relocated prior to runway construction.

Cost Estimating

The cost associated with the southern runway extension option is $7,169,000, see details in the following table.

Southern Extension Alternative					
#	Year	Description	Total Cost	ODA share	FAA Share
Runway 35 (1000') Extension					
14	2018	Avigation Easement Acquisition (R17 RPZ)	$ 44,000.00	$ 2,200.00	$ 41,800.00
19	2018	Property Acquisition (R35 RPZ)	$ 2,561,000.00	$ 128,050.00	$ 2,432,950.00
20	2019	Keil Road Relocation	$ 1,427,000.00	$ 71,350.00	$ 1,355,650.00
21	2020	Runway Extension (R35 - 1000')	$ 3,116,000.00	$ 155,800.00	$ 2,960,200.00
22	2020	Install Runway 17 PAPIs	$ 65,000.00	$ 3,250.00	$ 61,750.00
Runway 35 (1000') Extension Capital Costs			*$ 7,169,000.00*	*$ 358,450.00*	*$ 6,810,550.00*

Comparison of the Two Options

Key differences between the northern and southern runway extension options are presented below.

Runway Length

A runway length of 6,004 feet would be achieved in both options.

Property Acquisition

Total property acquisition is greater for the southern runway extension option by a margin of approximately 13 acres. However, the northern extension option requires the acquisition of two additional homes, because the shorter extension of Runway 35 places the RPZ over more residences. The avigation easement with Columbia Helicopters is also greater in the northern extension option by 1.1acres. Also 0.8 acres would be purchased from Willamette Aviation for the Parallel Taxiway extension and the run-up apron.

Departure / Approach Surface

Both options require removal of trees to clear the departure and approach surfaces. However, an extension to the north will also require obstruction lighting for existing Columbia Helicopter buildings and will likely limit the businesses' future development opportunities or raise the Airport's approach minimums and impact the departure surfaces.

The northern extension option would allow Arndt Road and the adjacent power lines to exist within the RPZ, which the FAA allows and at the same time discourages. Since the approach surface would be closer to the road and power lines, it is likely the approach minimums will be raised – which is an undesirable consequence as it would make the Airport inaccessible during some low visibility conditions.

The southern extension option would create clear RPZs.

Land Use

Both alternatives will require the rezoning of exclusive farm use property to public, in order to ensure compatibility with airport operations. However, as stated above, farm-related activity can occur within the areas according to FAA guidance.

The northern extension option will require coordination with both Clackamas and Marion Counties. Statements given at the Master Plan's public meetings have lead the planning team and ODA to believe Marion County is a willing partner with the Airport. It is unclear at this time what Clackamas County's position would be during any potential rezoning actions.

Environmental

Noise exposure would shift slightly farther south in the southern runway extension option. However, the difference is minimal and more consistent with the calm wind runway and published noise abatement procedures.

Noise Abatement

There is no appreciable difference between the two options; however, the southern extension option would likely move noise farther from Charbonneau and closer to housing communities around Aurora.

Air Traffic Control Tower

Remodeling of the AFTIL simulation would likely be required under the northern extension option, which could cost up to $200,000. The southern extension is compatible with the current AFTIL modeling and no additional work would be necessary.

Construction

The construction phasing for the northern extension option – by use of two temporary displaced thresholds – creates duplicity of efforts, which is reflected in the cost estimating.

Cost Estimating

The northern extension option is $2,437,000 more than that of the southern extension option, an increase of roughly 35%. The primary causes for this increase is:

- Additional avigation easement acquisition from Columbia Helicopters
- Property acquisition of RPZ property north of Arndt Road (considered to have more value than land south of the Airport)
- Acquisition of property from Willamette Aviation
- Purchase of two additional residences, as a result of the shorter extension to Runway 35
- Additional pavement required for the Runway 17 run-up apron and connector taxiway, with corresponding lighting improvements
- Relocation of the Runway 17 omnidirectional approach lighting system (ODALS)
- Increased unit prices for temporary flagging, marking, signage, staging and mobilization, as well as project coordination, as a result of the two temporary displaced thresholds required to extend both runway ends in the northern extension option.

Summary

In terms of benefits to the Airport and reducing constrained operations, the northern and southern runway extension options are similar as they increase Runway 17/35 to the desired length of 6,004 feet. The greatest difference between the options is cost. **The northern extension would require an additional $2.4 million to construct** and yield no benefit above and beyond the southern extension. Intangible costs for the northern extension are also greater. **For instance, while FAA guidance would allow Arndt Road and the power lines within the Runway 17 RPZ, the agency recommends keeping them out of the RPZ when practical to increase safety, and the Airport's approach minimums would likely be impacted. Additionally, constraints to Columbia Helicopters are not desirable as they are a prominent employer within Marion County that creates over 400 family wage jobs.** Additionally, working with one county for land use actions is more desirable than creating a situation of going through land use revisions in two counties.

Although the FAA has directed ODA to consider extending the runway north on land already owned by the State, this supplemental information clearly shows that an extension on State-owned land does not alleviate the existing and forecasted constrained operations at the Airport. An extension of 1,000 feet, however, would allow for unconstrained operations by aircraft currently using the Airport. The cost of extending the runway via the northern extension option far exceeds the cost of the southern extension option and does not gain any appreciable benefit. **Therefore, the southern extension option – reflected by the Preferred Alternative – remains the recommended course of action.**

SUPPLEMENTAL DATA:

FAA Letter

U.S. Department
of Transportation
**Federal Aviation
Administration**

Northwest Mountain Region
Seattle Airports District Office
1601 Lind Avenue S.W., Suite 250
Renton, Washington 98057-3356

November 18, 2011

Mr. Mitch Swecker
Director, Oregon Department of Aviation
3040 25th Street, SE
Salem, OR 97302-1125

Dear Mr. Swecker,

This letter is in response to your recent submission of a Modification to Design Standards for the addition of a displaced threshold north of Runway 17 at the Aurora State Airport.

Although we realize it is the preference of the Aurora State Airport Board to pursue the 800 foot displaced threshold in order to minimize the impact to private property, the FAA's position is that this is not adequate justification for funding an extension of limited use. Since a 1000 foot Runway Safety Area can be achieved at the north end of the proposed 800 foot surface and the land is already located on airport property, we would support a full runway extension – not a displaced threshold.

In addition, we understand that once you receive this disapproval of the displaced threshold, a 1000 foot extension to the south end of the runway will be pursued. Since an extension to the south includes land that is not located on airport property, we would not fund this land acquisition as long as sufficient airport-owned property lies undeveloped to the north.

If you have any questions, you may contact Bruce Fisher at 425.227.2649 or me at 2657.

Sincerely,

Stanley C. Allison
Acting Manager, Seattle Airports District Office

cc: Mr. Rainse Anderson, WH Pacific, Inc.

Supplemental Data:

Excerpt from Chapter Four, Runway Length Calculation

Runway Length Justification Process

FAA guidance states that to justify funding a runway extension, at least 500 annual itinerant aircraft operations must exhibit a need for an extension now or within the next five years. Determining the particular aircraft model(s) critical for runway length is much easier at a commercial service airport than at a general aviation airport because at a commercial service airport individual airlines mostly use the same type of airplanes and they publish flight schedules that facilitate quantifying numbers of operations and stage lengths. Gathering such data for a general aviation airport is more difficult. In addition, the FAA requires rigorous justification for extending runways at general aviation airports, including documentation from the operators of airplanes needing a longer runway with the individual N numbers of their airplanes and number of constrained operations. A constrained operation is one that must reduce payload for takeoff, or stop en route for fuel, for example.

To quantify constrained operations at Aurora State Airport, questionnaires were distributed to the operators of larger aircraft that use the Airport frequently. Transient aircraft operators were identified from IFR flight plan records. The questionnaires received are in **Appendix I** and the operators who identified constrained operations are listed in **Table 4E**.

Table 4E contains a list of business jets that have operated at the Airport in recent years, as documented by IFR flight plans. The table also indicates which airplane models are based at the Airport and gives the number of constrained operations reported by based and transient users of the Airport. The table lists airplane models in the order of runway length required at maximum takeoff weight, from shortest to longest. Many models listed in the table need a longer runway at maximum takeoff weight than Aurora State Airport's 5,004 feet; these airplanes can use the Airport because they are operating at less than their maximum takeoff weights and/or the temperature is lower than 84 degrees. Usually, airplanes are constrained for takeoff due to high summer temperatures; however, for some airplanes operating under air taxi or fractional jet regulations, the constrained operation is landing on a wet or slippery runway. In addition, the lengths in Table 4E are based solely on aircraft performance requirements. Some operators may have additional requirements based on company operations specifications or insurance.

Table 4E. Business Jet Runway Length Requirements at Aurora State Airport

TYPE	ARC	Max. Takeoff Weight (lbs)	Takeoff Distance (MTOW)	Based at UAO	Constrained Operations Reported
CESSNA 551 CITATION II/SP	B-II	12,500	3,042	No	
CESSNA 501 CITATION I/SP	B-I	11,850	3,249	Yes	
CESSNA 500 CITATION	B-I	11,850	3,364	No	
CESSNA 550 CITATION II	B-II	13,300	3,433	No	
CESSNA 525 CITATION (CJ-1)	B-I	10,400	3,536	Yes	
CESSNA 525B CITATIONJET III (CJ-3)	B-II	13,870	3,651	Yes	JHRD Investment
CESSNA 560 CITATION V ULTRA	B-II	16,300	3,651	Yes	
LEARJET 31	C-I	16,500	3,915	No	
CESSNA 525A CITATIONJET II (CJ-2)	B-II	12,500	3,926	Yes	
CESSNA 560 CITATION ENCORE	B-II	16,830	4,087	Yes	
CESSNA 560 CITATION EXCEL	B-II	20,000	4,121	Yes	Management West
CESSNA 550 CITATION BRAVO	B-II	14,800	4,133	No	
RAYTHEON 390 PREMIER	B-1	12,500	4,353	No	
BEECHJET 400A/T/ T-1A JAYHAWK	C-I	16,100	4,786	No	
LEARJET 45	C-I	20,200	4,845	Yes	Premier Air
MITSUBISHI MU-300	B-I	14,630	4,936	No	
DASSAULT FALCON 900	B-II	45,500	5,373	No	
DASSAULT FALCON 50	B-II	37,480	5,413	No	
CESSNA 650 CITATION VII	C-II	23,000	5,568	Yes	
DASSAULT FALCON 7X	B-II	69,000	5,586	Yes	
DASSAULT FALCON 900 EX	C-II	48,300	5,723	Yes	CSIM
LEARJET 35/36	C-I	18,300	5,740	No	
CESSNA 750 CITATION X	C-II	36,100	5,901	No*	RJ2/DB Aviation
CESSNA 650 CITATION III/VI	C-II	21,000	5,912	Yes*	RJ2/DB Aviation
DASSAULT FALCON 2000	B-II	35,800	6,016	No	
RAYTHEON/HAWKER 125-1000 HORIZON	C-II	36,000	6,027	Yes	

**RJ2/DB Aviation plans to replace the Cessna 650 Citation III/VI with the Cessna 750 Citation X in the near future.*

Table 4E. Business Jet Runway Length Requirements at Aurora State Airport (cont.)

TYPE	ARC	Max. Takeoff Weight (lbs)	Takeoff Distance (MTOW)	Based at UAO	Constrained Operations Reported
IAI - ASTRA 1125	C-II	23,500	6,084	Yes	Novellus, American Medical Concepts, Transcendent Investments
LEARJET 55	C-I	21,500	6,096	No	
LEARJET 60	D-I	23,500	6,153	No	
RAYTHEON/HAWKER 125-800	B-I	28,000	6,176	Yes	WAC Charter
EMBRAER 135	C-II	41,887	6,177	No	Aero Air
GULFSTREAM IV	D-II	71,780	6,257	No	
IAI - GALAXY 1126/Gulfstream G200	C-II	34,850	6,314	No	Anonymous
BOMBARDIER CL-601	C-II	41,250	6,544	No	Anonymous, Aero Air
BOMBARDIER CL-604	C-II	47,600	6,544	No	Anonymous
GULFSTREAM V	D-III	89,000	6,877	No	Vulcan Flight
BOMBARDIER BD-700 GLOBAL EXPRESS	C-III	93,500	7,232	No	Vulcan Flight, Y2K Aviation

Source: WHPacific, 2010, using business jet characteristics published by the Central Region FAA in 2001, manufacturers' specifications, based aircraft from Oregon Department of Aviation aircraft registration records, constrained operators from runway length survey conducted in 2009 and 2010. List includes only business jet models that have documented operations at the Airport according to IFR flight plan records or an operator who wants to use the Airport. Takeoff distances are based only on aircraft performance; federal aviation regulations, company policies, or insurance requirements may require more length. Takeoff distances for standard conditions were adjusted (+14.8%) to account for design conditions at Aurora state Airport.

The runway lengths listed in Table 4E use the manufacturers' takeoff distance for standard conditions (sea level and 59 degrees F). These lengths were increased 14.8% to account for the higher elevation (200 feet MSL), higher design temperature (84 degrees), and runway gradient (2 feet of difference between runway high and low points). The formula for determining the amount of increase is:

Altitude Correction
(7% per 1,000' above sea level)

L = Takeoff length @ sea level
L1 = Length corrected for altitude
L1 = (.07 * E / 1000) * L + L

Temperature Correction
(0.5% per degree above standard temperature in hottest month)

T1 = Adjusted Standard Temperature
T = Mean Max High Temperature
L2 = Length corrected for altitude & temperature

(Std Temp adjusted to Sea Level)

T1 = 59 - (3.566 * E / 1000)
L2 = (.005*(T - T1)) * L1 + L1

Effective Gradient Correction (takeoff only)	
(10' for each 1' difference between High / Low Point)	G = Difference between high / low point in feet L3 = RW length corrected for altitude, temperature & gradient L3 = G * 10 + L2

For three aircraft models, operators report constrained operations although the takeoff distance listed in Table 4E is less than the length of Runway 17/35. Two mentioned constraints on hot summer days, which are likely days when the temperature exceeds 84 degrees.

The runway length survey (Appendix I) identified the number of aircraft operations constrained at the Airport annually total 473, using only existing aircraft with N numbers and operators' names identified and using the average number of constrained operations if the operator identified a range of operations. Operators who wished to remain anonymous identified 12 more annual constrained operations. One operator based at the Airport, RJ2/DB Aviation, plans to replace its 650 Citation III/VI with a 750 Citation X, which would be constrained by runway length more often (an estimated 40 times per year compared to 30 for the existing aircraft).

To justify funding a runway extension, the FAA will not accept information for which the operator or the aircraft is not specifically identified. The identified number of constrained operations, 473, does not meet the 500 operations threshold at present time. Applying to 473 an annual growth rate of 3.6%[1], the number of annual constrained operations would reach 500 in 2012.

The 500 annual constrained operations threshold is projected to occur within five years. Even if jet traffic does not grow as fast as projected, it is likely the number of constrained operations will exceed 500 within the 20-year planning period. Consequently, ODA may want to consider planning for a runway extension now, in order to protect the airspace needed, among other things. To justify FAA funding for a planned extension, operators may need to be surveyed again in the future to identify operations that may be constrained.

Table 4E indicates the longest runway required for ARC C-II aircraft (Bombardier CL-601 and CL-604) that use the Airport is 6,544 feet, at maximum takeoff weight. This is 1,540 feet longer than the existing Runway 17/35. The longest runway required for an Aircraft Approach Category B aircraft (Raytheon/Hawker 125-800) is 6,176 feet, at maximum takeoff weight. This is 1,172 feet longer than the existing Runway 17/35. Most takeoffs are at weights under the certified maximum, so that the runway length needed is less. On the other hand, temperatures in the summer can exceed the 84 degrees used to determine runway length in Table 4E.

In the formulation of development alternatives, one or more alternatives might consider a runway extension, in order to evaluate relevant consequences.

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[1] *Table 3M in Chapter Three shows the jet operations forecast, from 10,909 annual operations in 2010 to 22,389 annual operations in 2030, which equates to a 3.6% average annual growth rate.*

SUPPLEMENTAL DATA:

Cost Estimates

Aurora State Airport CIP Comparison Between Alternatives

#	Year	Description	Total Cost	ODA share	FAA Share	Private Share	Other Funding
Runway 35 (1000') Extension							
14	2018	Avigation Easement Acquisition (R17 RPZ)	$ 44,000.00	$ 2,200.00	$ 41,800.00	$ -	$ -
19	2018	Property Acquisition (R35 RPZ)	$ 2,561,000.00	$ 128,050.00	$ 2,432,950.00	$ -	$ -
20	2019	Keil Road Relocation	$ 1,427,000.00	$ 71,350.00	$ 1,355,650.00	$ -	$ -
21	2020	Runway Extension (R35 - 1000')	$ 3,116,000.00	$ 155,800.00	$ 2,960,200.00	$ -	$ -
22	2020	Install Runway 17 PAPIs	$ 65,000.00	$ 3,250.00	$ 61,750.00	$ -	$ -
Runways 17 (400') and 35 (600') Extension							
14A	2018	Avigation Easement Acquisition (R17 RPZ)	$ 36,000.00	$ 1,800.00	$ 34,200.00	$ -	$ -
19A	2018	Property Acquisition (R17 and R35 RPZ)	$ 3,963,000.00	$ 198,150.00	$ 3,764,850.00	$ -	$ -
20A	2019	Keil Road Relocation	$ 1,427,000.00	$ 71,350.00	$ 1,355,650.00	$ -	$ -
21A	2020	Runway Extension (R17 - 400' Ext, R35 - 600' Ext)	$ 4,180,000.00	$ 209,000.00	$ 3,971,000.00	$ -	$ -
Runway 35 (1000') Extension Capital Costs			*$ 7,169,000.00*	*$ 358,450.00*	*$ 6,810,550.00*	$ -	$ -
Runways 17 (400') and 35 (600') Extension Capital Costs			*$ 9,606,000.00*	*$ 480,300.00*	*$ 9,125,700.00*	$ -	$ -
Cost difference between the Alternatives			*$ 2,437,000.00*	*$ 121,850.00*	*$ 2,315,150.00*	$ -	$ -

Chapter Six: AIRPORT LAYOUT PLAN

Airport Master Plan Update

Aurora State Airport

The Airport Layout Plan (ALP) drawings are a pictorial culmination of the master planning process. A major purpose of the ALP drawing set is to establish funding eligibility for the FAA's Airport Improvement Program (AIP), as capital projects must appear on an FAA-approved ALP to receive AIP grant funding.

The ALP has been developed with input from the Planning Advisory Committee (PAC), as well as from the public. The Draft Preferred Alternative was available for public comment from March 31 through April 21, 2011. Based on direction from the Oregon Aviation Board on April 28, 2011, declared distances – through the means of displaced thresholds[1] – were analyzed and presented to the PAC and public on June 7, 2011 to gather input relative to runway length. Comments were taken on the declared distances until June 21, 2011. On June 23, 2011 the Oregon Aviation Board recommended the ALP include an 800-foot northward extension of runway pavement and 800-foot displaced threshold to Runway 17. The Board determined additional runway length is justified at the Aurora State Airport and the use of declared distances is the most advantageous and neighborly method of increasing the runway's usable length. However, if the FAA's National Office does not approve the displaced threshold, the Board recommends pursuing an extension to Runway 35. As a result, both the northern displaced threshold and southern extension are shown on the ALP drawing set. Only one of these projects will be pursued, as is reflected in the capital improvement plan in Chapter Seven. It is emphasized the preferred action, based on the Board's recommendation, is to pursue the displaced threshold to mitigate the runway length deficiency at the Airport.

AIRPORT LAYOUT PLAN DRAWINGS

The following paragraphs describe the specific elements found on each sheet within the ALP drawing set.

[1] Please refer to Chapter 5 for an explanation of displaced thresholds, their application to airport design, and the use of declared distances.

Cover Sheet (CS)

The cover sheet is an index to the airport layout plan drawing set. It also provides pertinent information such as the airport sponsor, airport name, grant number the project is funded through, location and vicinity maps, and date the plan was completed. Also included is the Airport wind rose, which depicts the wind data discussed in Chapter Four.

Airport Layout Plan (Sheet 1)

The ALP depicts the current airport layout and proposed improvements to the Airport for the 20-year planning period. Detailed descriptions of the improvements and expected capital costs over the next 20 years are included in Chapter Seven*, Capital Improvement Plan*. The Preferred Alternative was the basis for determining the proposed improvements at the Airport. The ALP is a development guide; the timing of development depends upon when it is needed and can be funded.

As recommended by the Oregon Aviation Board at their June 23, 2011 meeting, the ALP retains two alternatives relating to runway length. The ALP depicts an 800-foot displaced threshold to Runway 17 and a 1,000-foot extension to Runway 35. These projects are mutually exclusive and it is the preference of the Board to pursue the displaced threshold option. However, if the FAA does not approve the displaced threshold, the extension to Runway 35 will be pursued. When the FAA decides, the ALP will be updated to identify only the FAA-approved alternative.

Other items reflected on the ALP include, but are not limited to:

- Runway protection zone, runway object free area, runway safety area and other standard airport dimensions
- Runway approach visibility minimums
    - Runway 17 – Visibility of 1 statute mile (sm) or greater
    - Runway 35 – Existing visibility of 1 sm or greater; ultimate approach minima of greater than ¾ sm.
- Data tables for the Airport, as well as data relating to the runway and facilities at the Airport
- A table identifying the modifications to standards requested
    - Modification to the runway object free area is requested, as Highway 551 encroaches into the area slightly.
    - Modification of the application of a displaced threshold to reduce off-airport impact from Part 77 and airport design surfaces.
- Land identified for avigation easement acquisition and fee acquisition
- Capital projects recommended in Chapter Five

Airport Airspace (Sheet 2)

This drawing shows the Part 77 Imaginary Surfaces for the future layout of the Airport with a USGS topographic map as the background. The Part 77 surfaces are the basis for protecting airspace around an airport; therefore, it is ideal to keep these surfaces clear of obstructions whenever possible. The FAA decides if any of the obstructions to Part 77 surfaces are hazardous to aviation. Recent obstruction removal projects at and near the Airport have cleared these surfaces of any known obstructions.

Part 77 defines five distinct surfaces, each with a different size and shape. The dimensions of these surfaces are based on the type of runway and the type of approach ultimately planned for the Airport. The imaginary surfaces are defined below.

Primary Surface. The primary surface is rectangular, is centered on the runway, extends 200 feet beyond each end of the runway, and has a width that varies according to airport-specific criteria. The elevation of the primary surface corresponds to the elevation of the nearest point of the runway centerline. The width of the primary surface of Runway 17/35 is 500 feet.

Approach Surface. Each runway end has an approach surface. The approach surface is centered on the extended runway centerline, starts at the end of the primary surface (200 feet beyond each end of the runway), and has a width equal to that of the primary surface. Approach surfaces slope upward and outward from the runway ends.

The ultimately planned approach surfaces at the Airport reflect nonprecision instrument approaches to Runways 17 and 35. The approach surface has an inner width of 500 feet, extends outward 10,000 feet to an outer width of 3,500 feet, and rises up at a slope of 34:1.

Runway Protection Zones (RPZs) are not Part 77 surfaces, but mirror the inner portions of approach surfaces on the ground. The existing and ultimate Runway 17 RPZ dimensions are 500 feet (inner width) by 1,700 feet (length) by 1,010 feet (outer width). The existing Runway 35 RPZ dimensions mirror the Runway 17 dimensions. However, the ultimate Runway 35 RPZ dimensions are 1,000 feet (inner width) by 1,700 feet (length) by 1,510 feet (outer width), to accommodate the approach with minimums greater than ¾ sm.

Transitional Surface. The transitional surface is a sloping 7:1 surface that extends outward and upward at right angles to the runway centerline from the sides of the primary surface and from the sides of the approach surfaces.

Horizontal Surface. The horizontal surface is a flat, elliptical surface at an elevation 150 feet above the established airport elevation. The extent of the horizontal surface is determined by swinging arcs of a 10,000-foot radius from the center of each end of the primary surface.

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

Airport Approach Surfaces (Sheet 3)

This drawing presents a larger scale plan and profile view of the approach surfaces shown in the Airport Airspace Drawing. The existing and ultimate runway ends are shown on the plan sheet. The highest composite terrain, along with known features, is shown in the profile view. There are no known obstructions within the Airport's approach surface.

Inner Portion of the Runway 17/35 Approach Surfaces (Sheet 4)

This drawing provides plan and profile views of the portions of approach surfaces that are closest to the runway, encompassing the existing and ultimate RPZs.

Terminal Area Plan (Sheet 5)

The Terminal Area Plan drawing provides a large-scale view of the terminal area, so that features such as aprons, buildings, hangars, and parking lots are easier to discern.

Land Use and Noise Contours (Sheet 6 and 7)

A land use map has been developed for the Airport and the surrounding area. This map includes the land uses on and around the Airport according to Marion and Clackamas Counties, as applicable.

Land uses around airports should be compatible with airport operations. Land use compatibility issues that are of the greatest concern at airports include:

- Aircraft Noise
- Nearby Lighting
- Glare, Smoke and Dust Emissions
- Bird Attractions and Landfills
- Airspace Obstructions
- Electrical Interference
- Concentrations of People

Current zoning on Airport Property is listed as Public and is compatible with airport operations. However, not all property within the Airport Environs – the footprint of the land nearby the Airport within the boundaries of the four surrounding roads – is zoned in a manner suitable for airport-related development recommended in this Master Plan. Marion County has land use jurisdiction over the subject property and any private developer would have to work with the County to ensure proper zoning is in place prior to any development.

Noise contours were developed for the Airport, based on existing and forecasted aircraft operations, in accordance with FAA regulations using the Integrated Noise Model (INM) version 7.0. INM produces contours representative of average weighted sound exposure levels. According to FAA guidance, 65 dBA is the threshold for aircraft noise incompatibility with some land uses. [2] The three noise contour sets modeled for the Airport are:

- Existing Conditions (2010) - At present, the 65 dBA contour line extends off Airport Environs to the north, south and west. Some residential areas west of the Airport are within the 65 dBA and the 70 dBA lines.
- Displaced Threshold Option (2020) - The forecasted increase in operations and changes in aircraft fleet, cause the 65 dBA contour line to extend further off airport by 2020; however, the eastern 65 dBA noise contour line remains nearly all within the Airport Environs. More

[2] For more information about land use incompatibility with airport noise, see FAA Advisory Circular 150/5020-1, *Noise Control and Compatibility Planning for Airports.*

residential homes would be affected by noise exposures of 65 dBA. The displaced threshold to Runway 17 does not cause a significant shift northward of the contour lines.

- Runway Extension Option (2020) - As a result of the extension southward, the noise profile shifts to the south when compared to the previous profiles. Under this option, noise is shifted further away from Charbonneau, but closer to the City of Aurora and its surrounding communities.

Details of how the noise contours were developed are discussed in Chapter Five, *Airport Development Alternatives*.

Runway Departure Surfaces (Sheet 8)

The Runway Departure Surfaces Plan depicts the plan and profile views of the Runway 17/35 departure surfaces, which apply to runways with instrument departure procedures. Each departure surface at the Airport begins at the departure end of the runway at a width of 1,000 feet, extends outward 10,200 feet to an outer width of 6,466 feet, and slopes up at 40:1.

Airport Property Map (Sheet 9)

This drawing provides a history of the ODA's airport property acquisition by showing and listing all land transactions.

Marion County, OR

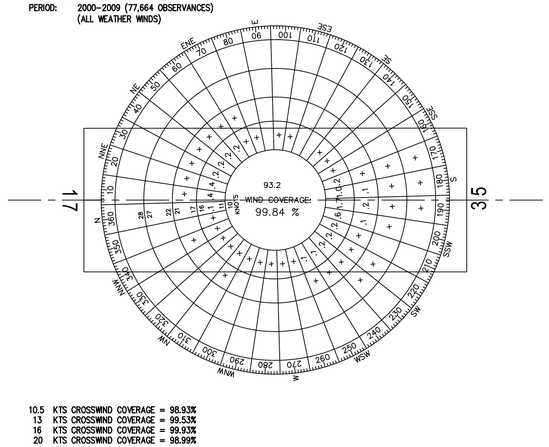
Aurora State Airport

Master Plan Update

A.I.P. #3-41-0004-015

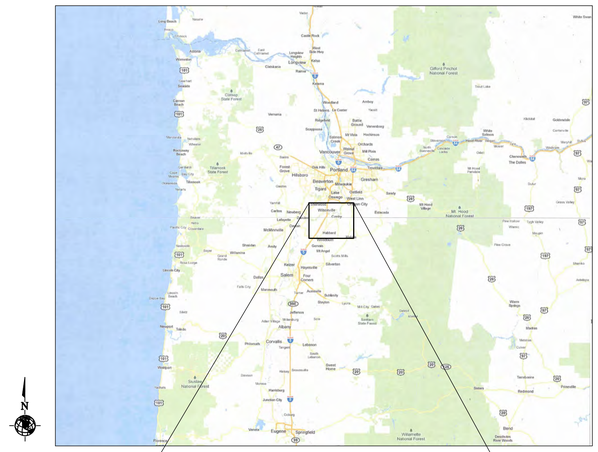
March 2012

SOURCE: NOAA NATIONAL CLIMATIC DATA CENTER
LOCATION: AURORA STATE AIRPORT
PERIOD: 2000-2009 (77,664 OBSERVANCES)
(ALL WEATHER WINDS)



10.5 KTS CROSSWIND COVERAGE = 98.93%
13 KTS CROSSWIND COVERAGE = 99.53%
16 KTS CROSSWIND COVERAGE = 99.93%
20 KTS CROSSWIND COVERAGE = 98.99%

WIND ROSE



LOCATION MAP

VICINITY MAP

SOURCE: GOOGLE MAPS

SHEET INDEX

WHPacific
9755 SW Barnes Rd, Suite 300
Portland, OR 97225
503-626-0455 Fax 503-526-0775
www.whpacific.com

OREGON DEPARTMENT OF AVIATION

THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM FINANCIAL ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION (PROJECT NUMBER 3-41-0004-015) AS PROVIDED UNDER TITLE 49, UNITED STATES CODE, SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS REPORT BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

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CHECKED	REA
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PLOT DATE	1/3/2013
SUBMITTAL	

REVISIONS			
NO.	BY	DATE	REMARKS

COVER SHEET

OREGON DEPARTMENT OF AVIATION
AURORA STATE AIRPORT ~ MASTER PLAN UPDATE

PROJECT NUMBER	DRAWING FILE NAME	SCALE
034317	034317-AIRP-MSTR-CS01	N.T.S.

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NOTE

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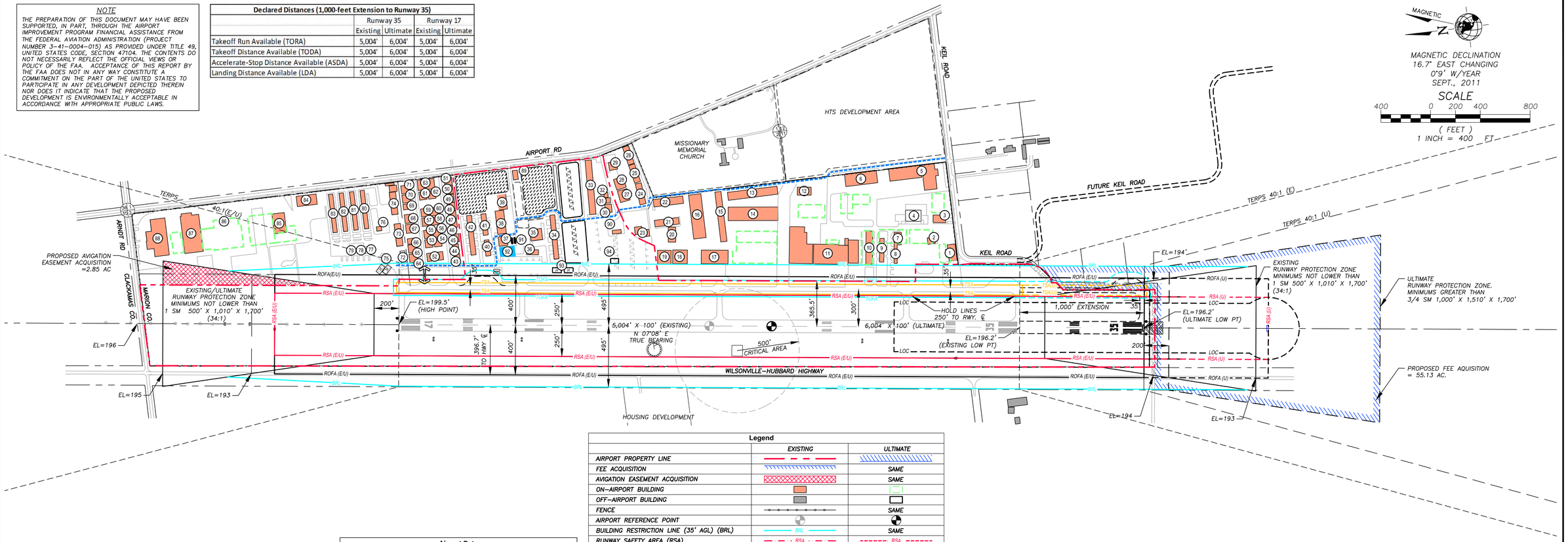
Declared Distances (1,000-feet Extension to Runway 35)

	Runway 35		Runway 17	
	Existing	Ultimate	Existing	Ultimate
Takeoff Run Available (TORA)	5,004'	6,004'	5,004'	6,004'
Takeoff Distance Available (TODA)	5,004'	6,004'	5,004'	6,004'
Accelerate-Stop Distance Available (ASDA)	5,004'	6,004'	5,004'	6,004'
Landing Distance Available (LDA)	5,004'	6,004'	5,004'	6,004'



Legend

	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
FEE ACQUISITION		SAME
AVIGATION EASEMENT ACQUISITION		SAME
ON-AIRPORT BUILDING		
OFF-AIRPORT BUILDING		
FENCE		SAME
AIRPORT REFERENCE POINT		
BUILDING RESTRICTION LINE (35' AGL) (BRL)	BRL	SAME
RUNWAY SAFETY AREA (RSA)	RSA	RSA
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)		
EXTENDED RUNWAY CENTERLINE		SAME
DISPLACED THRESHOLD	N/A	
RUNWAY HOLDLINE		SAME
TAXIWAY SAFETY AREA (TSA)	TSA	TSA
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	TOFA
SERVICE ROAD	N/A	
HANGAR DEVELOPMENT AREA		SAME
APRON / TIEDOWN AREA		
WINDCONE & SEGMENTED CIRCLE		SAME
VASI		SAME
PAPI	N/A	
REIL		SAME
ODAL		
LOCALIZER		
LOCALIZER CRITICAL AREA	LOC	SAME
CARGO APRON	N/A	
PAVEMENT		
PAVEMENT REMOVAL		SAME
FUEL TANKS		
HELICOPTER PARKING	H	H
RESIDENTIAL THROUGH THE FENCE ACCESS (RTTF)		SAME

Airport Data

	Existing	Ultimate
Airport Elevation (MSL)	199.5'	Same
Airport Reference Point (ARP)		
Latitude	45°14'54.085"N	45°14'44.758"N
Longitude	122°46'11.405"W	122°46'13.040"W
Mean Maximum Temperature	84°	Same
Airport Reference Code (ARC)	C-II	C-II
Airport Service Level	General Aviation	Same
Design Aircraft	IAI Astra 1125	Cessna Citation X

Runway 17/35 Data

	Existing	Ultimate
Percent Effective Gradient	0.06%	Same
Percent Wind Coverage (10.5 kts)	98.93%	Same
Maximum Elevation Above MSL	199.5'	Same
Runway Length	5,004'	6,004'
Runway Width	100'	Same
Runway Surface Type	Asphalt	Same
Runway Strength (Dual Wheel Gear)	45,000 lbs	60,000 lbs
FAR Part 77 Approach Category		
Runway 17	C (NP)	Same
Runway 35	C (NP)	D (NP)
Approach Type	Nonprecision	Same
Runway 17	Not lower than 1 sm	Same
Runway 35	Not lower than 1 sm	Not lower than 3/4 sm
Approach Slope (Required / Clear)	34:1 / 34:1	Same
Runway Lighting	MIRL	Same
Runway Marking	Precision	Same
Taxiway Lighting	MITL / Reflectors	Same
Taxiway Marking	Standard	Same
Navigation Aids	LOC/DME, NDB	Same
Visual Aids	ODALS, VASI, REIL	ODALS, PAPI, REIL
Runway Safety Area Dimension	500' x 1,000' beyond rwy end	Same
Runway Object Free Area Dimension	800' x 1,000' beyond rwy end	Same
Runway Obstacle Free Zone (OFZ)	No OFZ Penetrations	Same
Runway End Coordinates		
Runway 17 Latitude	45°15'14.166"N	Same
Longitude	122°46'07.828"W	Same
Runway 35 Latitude	45°14'25.148"N	45°14'15.350"N
Longitude	122°46'16.515"W	122°46'18.251"W

Notes

Horizontal datum is NAD 1983, vertical datum is NAVD88.
The Airport is flat. Elevations / ground contours vary by less than 5 feet and are not shown. Drainage features are typically 2-3 feet lower than adjacent land.
Building restriction line is based on a 35-foot building located 495 feet from the runway centerline not penetrating FAR Part 77 surfaces for the Airport.
A Residential Through The Fence (RTTF) access exists at hangar #64 at the Wylee Condominium Association. The tenant is the resident caretaker for the airport.

Modifications to Standards

	Standard Being Modified	Proposed Action
1	Advisory Circular (AC) 150/5300-13, para 307 (Runway Object Free Area)	The standard runway object free area (OFA) for Airport Reference Code C-II airports is 800 feet. Highway 551 runs north/south parallel to Runway 17/35; the approximate distance from the Runway 17/35 centerline to the Highway 551 centerline is 400 feet. As the airport geometry is not changing from the current condition, the Oregon Department of Aviation (ODA) requests a modification of the OFA design standard to allow the runway and highway to remain in their current positions.
2	AC 150/5300-13, Appendix 14 (Declared Distances)	The ODA requests the existing threshold for Runway 17 be referenced in determining FAR Part 77 surfaces and design standard surfaces referenced in AC 150/5300-13 (*i.e.*, RSA, RPZ, OFA, OFZ).

Airport Facilities and Buildings Legend

Building No. Existing	Building No. Ultimate	Name / Owner	Use	Estimated Top Elevation (AGL)
1		Leased by Aurora Jet Center	Maintenance, Aircraft Storage	27'
2		Aurora Jet Center	Fixed Base Operator	22'
3		Private Southend Hangar	Aircraft Storage	19'
4		BPS Associates	Aircraft Storage	23'
5		Van's Aircraft	Business	30'
6		Artex	Business	26'
7, 8		Foxtrot Hangars / Southend Airpark	Aircraft Storage	21'
9		Hangar Row G / Southend Airpark	Aircraft Storage	13'
10		Hangar Row H / Southend Airpark	Business, Aircraft Storage	21'
11		Hangar India, Juliet & Kilo / Southend Airpark	Business, Aircraft Storage	38'
12		Winco	Business	29'
13		Hangar November / Southend Airpark	Business, Aircraft Storage	29'
14		Hangar Mike / Southend Airpark	Business, Aircraft Storage	31'
15 – 17		Airport Aviation Condo Association	Aircraft Storage	32'
18		Airport Aviation Condo Association	Aircraft Storage	32'
19		Aurora Aviation	Maintenance	26'
20 – 22		Airport Aviation Condo Association	Aircraft Storage	25'
23		Columbia Aviation Association	Clubhouse	21'

Airport Facilities and Buildings Legend

Building No. Existing	Building No. Ultimate	Name / Owner	Use	Estimated Top Elevation (AGL)
24 – 26		Meridian Condos	Business	23'
27 – 29		Pacific Coast Aviation	Business	26'
30 – 33		Oregon Dept. of Aviation	Aircraft Storage	25'
34		Columbia Helicopters	Aircraft Storage	22'
35		Columbia Helicopters	Maintenance	28'
36		Aurora Aviation	Fixed Base Operator	16'
37		Pitts Hangar	Aircraft Storage	26'
38 – 42		Aurora Business Park	Aircraft Storage	25'
43 – 71		Wylee Condo Association	Aircraft Storage	27'
72		Civil Air Patrol Building	Aircraft Storage	26'
73		Sunset Helicopters	Business	26'
74		Aerometal	Business	27'
75		Willamette Aviation	Aircraft Fueling	7'
76		Willamette Aviation	Fixed Base Operator	12'
77 – 83		Willamette Aviation	Aircraft Storage	16'
84		Marlow Treit	Aircraft Storage	22'
85 – 88		Columbia Helicopters	Business	30'
89		Fire Suppression Tanks	Fire Suppression	12'
	90	Aurora Rural Fire Protection District	Emergency Response	TBD
	91	Aurora Aviation	Aircraft Fueling	16'
	92	Oregon Dept. of Aviation	Cargo Apron	N/A
	93	Oregon Dept. of Aviation	Helicopter Parking	N/A
	94	Oregon Dept. of Aviation	Air Traffic Control Tower	90'

WHPacific
9755 SW Barnes Rd, Suite 300
Portland, OR 97225
503-626-0455 Fax 503-526-0775
www.whpacific.com

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REVISIONS

NO.	BY	DATE	REMARKS

AIRPORT LAYOUT PLAN DRAWING

OREGON DEPARTMENT OF AVIATION
AURORA STATE AIRPORT ~ MASTER PLAN UPDATE

PROJECT NUMBER	DRAWING FILE NAME	SCALE
034317	034317-XREF-MSTR-ALP	1"=400'

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