

Chapter Five

Airport Master Plan Update

AIRPORT DEVELOPMENT ALTERNATIVES *Mulino Airport*

The preceding chapter identified deficiencies of the Mulino Airport with respect to existing and anticipated aeronautical demand, which are consistent with current Federal Aviation Administration (FAA) design standards and State of Oregon development guidelines. This chapter presents several development alternatives that focus on meeting the Airport's facility needs for the long-term future (2027 and beyond).

The Port of Portland (Port), Oregon Department of Aviation (ODA), Project Advisory Committee (PAC), FAA, and members of the public reviewed each development alternative presented in this chapter. The alternatives were assessed on several factors including functionality, ease of implementation, development cost, and potential environmental concerns. After review by all interested parties, the Port (in cooperation with ODA) selected a preferred alternative for future development of the Airport. The preferred alternative is a composite of features from more than one alternative. The preferred alternative is developed in more detail in the Airport Layout Plan and the Capital Improvement Plan (Chapters Six and Seven).

While the development alternatives focus on meeting aeronautical demand projected for 2027, it is prudent to consider the ultimate potential of Airport property. By doing so, the planning documents remain flexible and functional, considering the possibility that unforeseen events or increases in user demand occur. Consequently, the alternatives highlight possible airfield and landside uses that could meet facility needs projected to occur after 2027.

SUMMARY OF FACILITY REQUIREMENTS

The preceding chapter, *Facility Requirements*, identified development needs to accommodate forecasted aeronautical activity. These are summarized below.

Airfield Requirements

- The current Runway Protection Zone (RPZ) dimensions meet FAA design standards. However, if an instrument approach with visibility minimums between $\frac{3}{4}$ mile and 1 mile is implemented, the recommended RPZ size is 1,000 feet by 1,510 feet by 1,700 feet. An instrument approach with visibility minimums lower than $\frac{3}{4}$ mile requires a larger RPZ. The larger the RPZ, the more land that will need to be acquired by fee simple or easement to ensure land use compatibility.
- The existing runway length is adequate for the planning period. A 1,600-foot extension was recommended in the 1993 Master Plan and the Port, and/or any future Airport owner, has reserved the right to extend the runway. Accordingly, one of the development alternatives shows this runway extension on the Runway 14 end.
- The berm of land located within the runway object free area should be removed and the area graded to meet object free area standards.
- The Airport's paved taxiway system meets or exceeds FAA design standards. It is recommended that access to the Airport Café, via grass taxiway, be maintained.
- Runway End Identifier Lights (REILs) should be installed at both runway ends.
- If an instrument approach is implemented, an instrument approach lighting system is recommended or required by the FAA, depending upon the type of approach.
- Installation of taxiway edge lights is recommended to enhance ground movement of aircraft.
- The Port has been planning for a GPS-assisted instrument approach to Runway 32 for several years. To assess the impact of different approach visibility minimums on facilities and land, the alternatives reflect a range of instrument approach visibility minimums.
- The location of the current helicopter landing area may interfere with aircraft ground maneuvering and should be relocated.
- If an instrument approach were implemented, it would become necessary to install an Automated Weather Observation System (AWOS).

Landside Requirements

- To meet 2027 demand, 31 additional T-hangars will be needed. This equates to approximately 76,800 square feet of building area, including taxiway construction around the T-hangar area.

- Five conventional hangars will also be needed to meet 2027 demand, which is an addition of 18,000 square feet of building area.
- It is recommended the tiedown apron be expanded and reconfigured to include three to four tiedowns sized for larger transient aircraft (Airplane Design Group II with wingspans up to 79 feet). Currently, there are 16 tiedowns on the apron and two usable grass tiedowns.
- Additional vehicular parking areas should be added to accommodate use.
- At least one acre should be reserved for locating a Fixed-Based Operator (FBO) facility.
- Current security and wildlife fencing should be upgraded to six or eight-foot secure chain link fencing with three-strand barbed wire.
- Install a self-service card-lock fueling system.
- Access road improvements are needed.

DEVELOPMENT ALTERNATIVES

Four alternatives for the long-term future development of the Mulino Airport are presented in this chapter:

- No-Build Alternative, which assumes maintenance of existing facilities and no expansion of airfield or landside facilities (except for facilities the Port has committed to building in 2007 as part of the management agreement with ODA).
- Alternative 1, which reflects many of the improvements in the current Airport Layout Plan and the 1993 Master Plan (including a runway extension).
- Alternative 2, which fulfills the minimum facilities projected to be needed by 2027.
- Alternative 3, plans for roads, taxiways, and hangars beyond those needed to accommodate growth forecasted for 2027. This alternative also shows the potential location of an off airport residential airpark. As stated earlier in this document, interest in a residential airpark at the Airport was expressed by several Airport users throughout the master planning process. The Airport Layout Plan and the Capital Improvement Plan that have been completed as part of this master plan, do not identify a residential airpark as part of the preferred alternative for future development. However, consideration of a residential airpark was discussed by the Master Plan Planning Advisory Committee and was an integral part of the master planning process. This planning element has been included in the master plan document to reflect that discussion.

All four alternatives show the two rows of T-hangars and fueling facility that the Port will build as part of the agreement with ODA. All four alternatives also show a residential area southeast of the Airport where the Port is pursuing an aviation easement.

The three development alternatives depict additional hangar expansion, a new place for helicopter parking, an instrument approach to Runway 32, an AWOS, and the acquisition of land within the building restriction lines and RPZs. Each alternative also depicts land reserved for a future FBO, but no FBO-specific apron has been designated. All the alternatives have excess apron area available that could accommodate FBO apron needs.

No-Build Alternative

One alternative to be considered is the No-Build alternative. By showing the consequences of not developing the Airport, the Airport Sponsor has a method for assessing advantages and disadvantages of development alternatives.

As shown in Chapter 3, Aeronautical Activity Forecast, the Mulino Airport is expected to experience increased demand. If no development were to occur, the Airport would not be able to support forecasted aeronautical uses and demands. The No-Build alternative would not optimize the Airport's potential. A safety deficiency would remain, namely the object free area that does not comply with FAA design standards. The helicopter landing location would continue to place fixed and rotor wing aircraft close to each other, increasing the risk of rotorwash damage to fixed wing aircraft. **Exhibit 5A** illustrates the No-Build alternative.

While the No-Build alternative is essentially a do-nothing option, it does not mean that there would be no financial impact to the Airport. Most prominently, there would still be a cost associated with maintaining the current pavements and facilities. Without additional sources of revenue, the Mulino Airport would continue to need financial subsidy, since income from leases and other sources falls short of covering operating expenses. In accordance with the Port and ODA management agreement, the Port will fund the construction of a retail card-lock fueling system, two rows of T-hangars (32 units total), and make drainage improvements on airport property. Since these improvements are part of the management contract and separate from the Airport Master Plan, they are included as a component of the No-Build alternative. **Table 5A** illustrates the total cost associated with this alternative over the 20-year planning period.

Table 5A. No-Build Alternative Cost Summary

Project Description	Time Period	Total Cost¹
Fuel Facility Upgrade		\$ 86,000
Avigation Easements		\$ 103,000
T-Hangars		\$ 2,400,000
Pavement Maintenance	1 - 5 Years	\$ 143,000
	5 - 10 Years	\$ 230,000
	10 - 15 Years	\$ 1,924,000
	15 - 20 Years	\$ 265,000
Total No-Build Alternative		\$ 5,151,000

¹ All cost sources from Port of Portland and statewide construction bid tabs. Costs in 2006 dollars.

Development Alternative 1

Development Alternative 1 (Alternative 1) maintains similar characteristics as the 1993 Mulino Airport Layout Plan (ALP). **Exhibit 5B** illustrates this alternative. Alternative 1 encompasses the facility requirements previously outlined. Many of the features are remnants of the 1993 plan, which reflected a more aggressive aeronautical activity forecast. Consequently, Alternative 1 incorporates development well beyond the projected 20-year need.

Airfield. Airfield developments for Alternative 1 are outlined below.

- Runway and parallel taxiway extension of 1,600 feet to the north-northwest, which requires the relocation of Mulino Road.
- Installation of a precision approach to Runway 32 with minimums lower than $\frac{3}{4}$ mile, which requires land acquisition and some residential relocation, due to the larger imaginary surfaces needing clearance and the larger RPZ required. New RPZ dimensions 1,000 feet by 1,750 feet by 2,500 feet.
- Realigned taxiway access to the Airport Café.
- Land cleared and available for a partial second parallel taxiway / taxilane on the east side of the runway.
- Installation of REILs, instrument approach lighting system, and taxilane edge lights.
- Relocation of helicopter landing facility.
- Installation of AWOS.

The runway extension was recommended in the 1993 Airport Master Plan and has been shown on the ALP since then. In order to accomplish the extension, land would need to be acquired, as well as the relocation of Mulino Road. As Chapter Four indicated, to accommodate 100% of all airplanes with 12,500 pound maximum takeoff weights, a runway extension of 715 feet would be needed. Consequently, an extension of 1,600 feet would allow for a much larger diversity of aircraft types that could use the runway, including aircraft with gross takeoff weights greater than 12,500 pounds, when the pavement strength is increased accordingly.

A significant feature of Alternative 1 is the precision approach to Runway 32. In order to meet specific standards outlined in FAA Advisory Circular 150/5300-13, *Airport Design*, many changes would occur. First, the RPZ area would need to be increased to 1,000' x 1,750' x 2,500', which would require additional property acquisition or avigation easements on the Runway 32 approach. Second, Part 77 Imaginary Surfaces would be affected considerably. A detailed discussion of Part 77 surfaces will be presented in Chapter Six, *Airport Layout Plan*. The primary surface, which is a horizontal surface centered on the runway centerline that should be kept free of obstructions, would need to be widened from 500 feet to 1,000 feet². Additionally, restrictions from the transitional surface would place the building restriction line³ 750 feet from the runway centerline. Consequent to these changes, property acquisition and

² Proposed Part 77 changes would make 1,000-foot wide primary surfaces applicable for all runways with nonprecision and precision instrument approaches, regardless of approach minima. Alternative 1 shows compliance with a 1,000-foot primary surface.

³ Building restriction line shown would prevent structures 35 feet higher than the runway's established elevation from penetrating the Part 77 transitional surface.

residential relocation would be necessary to ensure safety. Other facility upgrades needed with the instrument approach are an approach lighting system and AWOS.

Landside. The landside development features proposed in Alternative 1 include:

- In addition to the two rows of T-hangars that will be built in 2007, nine additional T-hangar buildings, with the potential to accommodate approximately 100 individual T-hangar units.
- Two large conventional hangars, with a combined area large enough to accommodate 14 aircraft.
- A terminal building.
- An air traffic control tower.
- Apron expansion of 12,500 square yards to accommodate larger transient aircraft tiedowns.
- Additional vehicle parking spaces.
- An FBO reserve of 2.7 acres.
- Upgraded security and wildlife fencing.
- A new entrance road connecting to the Airport Access Road and Mulino Road.

Based on the 1993 ALP and the building restriction line, consistent with a 1,000-foot wide primary surface, several existing buildings would penetrate the primary or transitional surfaces. These buildings could remain under an anticipated “grandfather” clause associated with the proposed Part 77 changes. They could also be removed and replaced when they reach their useful lives. These buildings are shown on Exhibit 5B. Once the buildings are removed, direct access from the parallel taxiway to the apron and taxilanes would be achieved by a new taxiway. The buildings would then be replaced with facilities, located according to Alternative 1. The demolition of these existing hangars will result in the loss of 20 T-hangar units. Consequently, the construction of 100 T-hangar units will yield a net increase of 80 T-hangar units.

A reserve of 2.7 acres is set aside for the development of a FBO facility. In addition, the two large conventional hangars flanking the terminal building would be large enough for competing FBOs to lease.

Alternative 1 shows much more aircraft storage and parking than the projected need in 2027. A future air traffic control tower is also shown, which would not be justified by the number of aircraft operations forecast for 2027, but may be needed in the future, when justified by annual operations.

Development cost estimates for Alternative 1 appear in **Table 5B**.

Table 5B. Development Alternative 1 Cost Summary

Project Description	Total Cost
Airfield	
Obstruction Removal (including 8 residential relocations)	\$ 3,435,000
Runway Extension and Strengthening (30,000 SWG)	\$ 10,496,000
Helicopter Landing Facility	\$ 169,000
T-Hangar Aprons/Taxilanes	\$ 10,969,000
Approach Lighting	\$ 1,454,000
Taxilane Edge Lighting	\$ 364,000
Automated Weather Observation Station	\$ 171,000
<i>Airside Subtotal</i>	\$ 27,058,000
Landside	
Structural Obstruction Clearance	\$ 3,060,000
Property Acquisition	\$ 17,131,000
Terminal Building	\$ 965,000
Air Traffic Control Tower	\$ 2,143,000
Conventional Hangars (14)	\$ 1,418,000
T-Hangars (100)	\$ 6,750,000
Terminal Parking/Aprons	\$ 7,086,000
Maintenance Building	\$ 375,000
Mulino Road Relocation	\$ 1,790,000
Access Road	\$ 2,476,000
Security Fencing	\$ 1,000,000
<i>Landside Subtotal</i>	\$ 44,194,000
Total Alternative 1	\$ 71,252,000

Development Alternative 2

Development Alternative 2 (Alternative 2) is the most conservative development alternative of the three plans. It focuses primarily on meeting the development demands presented in Chapter Four, *Facility Requirements* (see **Exhibit 5C**).

Airfield. Airfield development elements in Alternative 2 include:

- An instrument approach with 1-mile visibility minimums.
- Taxilane extensions for new hangars.
- Continued access to Airport Café via the grass taxiway.
- Installation of approach lighting system, REILs and taxilane edge lights.
- Relocation of helicopter landing facility.

The proposed instrument approach associated with Alternative 2 would require minimal changes to airfield design standards. The alternative shows the acquisition of some agricultural and undeveloped land so the Airport Sponsor can control all areas within the building restriction lines and RPZs.

Landside. Alternative 2 consists of the following landside developments:

- The two rows of T-hangars that the Port is committed to build in 2007, providing a total of 32 new T-hangar units.
- Development area of 64,000 square feet to accommodate the construction of 18 conventional hangars.
- Apron expansion of 12,500 square yards to accommodate larger transient aircraft tiedowns and taxilanes for better circulation.
- A new access point from Mulino Road.
- New interior airport roads to facilitate the separation of vehicles, taxiing aircraft, and to provide access to new development areas.
- Additional vehicle parking area.
- Aviation reserve of approximately 27 acres, which can be used for hangar development, tiedowns, etc.
- A reserve for an FBO facility consisting of approximately 1.5 acres.
- Upgraded security and wildlife fencing.

Alternative 2 meets the facility requirements outlined in Chapter Four. This alternative has land available for development in the event demand exceeds the aeronautical activity forecast. The aviation reserve area could be developed for aircraft parking and storage and/or for aviation related businesses as demand occurs.

Development cost estimates for Alternative B are shown in **Table 5C**.

Table 5C. Development Alternative 2 Cost Summary

Project Description	Total Cost
Airfield	
Obstruction Removal	\$ 150,000
Helicopter Landing Facility	\$ 169,000
Hangar Taxiways/Aprons	\$ 716,000
Taxilane Edge Lighting	\$ 364,000
Approach Lighting	\$ 570,000
<i>Airside Subtotal</i>	\$ 1,969,000
Landside	
Property Acquisition	\$ 2,480,000
Conventional Hangars (18)	\$ 1,823,000
Access Road	\$ 732,000
Security Fencing	\$ 887,000
<i>Landside Subtotal</i>	\$ 5,922,000
Total Alternative 2	\$ 7,891,000

Development Alternative 3

Compared to Alternatives 1 and 2, Development Alternative 3 (Alternative 3) is a moderate development option that addresses the 2027 facility requirements, but also outlines development concepts beyond the planning period. Alternative 3 is illustrated by **Exhibit 5D**.

Airfield. Alternative 3 has the following airfield features:

- Installation of a non-precision approach to Runway 32 with minimums not lower than $\frac{3}{4}$ mile. New RPZ dimensions would be 1,000' x 1,510' x 1,700'.
- Taxilane extensions to serve new hangars and hangar development areas.
- Maintenance of taxiway access to the Airport Café.
- Installation of REILs, instrument approach lighting system, and taxilane edge lights.
- Relocation of helicopter landing facility.
- Installation of AWOS.

Alternative 3 incorporates the installation of a nonprecision approach to Runway 32. The approach minima for the approach would be not lower than $\frac{3}{4}$ mile. Due to the approach minima, the RPZ dimensions would need to increase to 1,000 feet by 1,510 feet by 1,700 feet. However, the primary surface and building restriction lines would be the same as in Alternative 2. Some land acquisition is recommended so that land within the building restriction lines and RPZs are controlled by the Port. As a component of the nonprecision instrument approach, an approach lighting system and AWOS will be needed.

Landside. Significant landside developments within Alternative 3 are:

- In addition to the two rows of hangars the Port will build in 2007, three additional T-hangar buildings are shown with the potential for 24 additional T-hangar units.
- Twelve acres for the development of attached or detached conventional hangars. This land is estimated to accommodate up to 145 conventional hangars, depending on hangar size and spacing.
- Apron expansion of 12,500 square yards to accommodate larger transient aircraft tiedowns and taxilanes for better circulation.
- Aviation reserve of approximately 37 acres, which can be used for hangar development, tiedowns, etc.
- A new access road connecting on airport development with Mulino Road and Highway 213.
- Additional vehicle parking area.
- FBO reserve of approximately 2.1 acres.
- Recommended fencing upgrade.
- Off-airport residential airpark.

Like the other development alternatives, Alternative 3 incorporates all of the recommendations from the Facility Requirements chapter. In addition, it allows more hangar development options (*i.e.*, T-hangars, conventional hangars, or large hangar lots). The variety of accommodations, with road/taxiway access and close proximity to services like fueling, could make the Airport more appealing to people looking to base their aircraft. Alternative 3 has an aviation reserve on the southeast side of the Airport that encompasses approximately 37 acres. Such an area could be used for the development of hangars, aprons, and aviation businesses once the northeast area has been built out.

An off-airport residential airpark site is shown in Alternative 3. Interest in a residential airpark at the Airport was expressed by several Airport users throughout the master planning process. The Airport Layout Plan and the Capital Improvement Plan that have been completed as part of this master plan, do not identify a residential airpark as part of the preferred alternative for future development. However, consideration of a residential airpark was discussed by the Master Plan Planning Advisory Committee and was an integral part of the master planning process. This planning element has been included in the master plan document to reflect that discussion.

Currently, the area is zoned as Exclusive Farm Use (EFU)⁴; consequently, a zoning change would be necessary to a land use compatible with residential housing⁵. Development density would depend on many factors, including sewage / septic treatment. In Clackamas County, allowed density also depends on the type of soils, depth to groundwater, depth to hardpan and other elements that require onsite testing. These are unknown at the present time. An assumed density of three dwelling units per acre⁶ yields approximately 72 airpark housing units, within the 24-acre reserve.

⁴ Refer to Chapter Two, *Inventory*, for details of these Clackamas County Zoning designations.

⁵ Clackamas County does not have a land use zoning designation that would permit a residential airpark outright. Most likely, a new zoning designation would have to be developed under the Special Use category.

⁶ Housing density maximum of three dwelling units per acre is taken from the City of Independence, Oregon Development Code Subchapter 48, *Residential Single Family Airpark Overlay Zone*, section 48.035.

Table 5D presents the development cost estimates for Alternative 3.

Table 5D. Development Alternative 3 Cost Summary

Project Description	Total Cost
Airfield	
Obstruction Removal	\$ 300,000
Hangar Taxiways/Aprons	\$ 1,315,000
Taxilane Edge Lighting	\$ 364,000
Helicopter Landing Facility	\$ 169,000
Approach Lighting	\$ 570,000
Automated Weather Observation Station	\$ 171,000
<i>Airside Subtotal</i>	\$ 2,889,000
Landside	
Property Acquisition	\$ 4,377,000
T-Hangars (24)	\$ 1,620,000
Conventional Hangars (145)	\$ 14,682,000
Access Road	\$ 2,365,000
Security Fencing	\$ 879,000
<i>Landside Subtotal</i>	\$ 23,923,000
Total Alternative 3*	\$ 26,812,000

* Costs do not reflect the development of a possible residential airpark.

COMPARATIVE SUMMARY OF ALTERNATIVES

Table 5E presents the key elements of the four airport development alternatives. The preferred alternative may be a composite of features from more than one alternative, as long as those features are not mutually exclusive. For example, whatever instrument approach is selected, the design standards, clearances, and lighting requirements for that approach must be included.

Table 5E. Comparative Summary of Alternatives and Facility Requirements

	No-Build	Alternative 1	Alternative 2	Alternative 3	
Airfield Requirements	<i>Instrument Approach – Runway 32</i>	No	Yes, lower than ¾ mile	Yes, 1 mile	Yes, not lower than ¾ mile
	<i>RPZ Size</i>	Both ends – 500’ x 700’ x 1,000’	Runway 14-500’ x 700’ x 1,000’. Runway 32-1,000’ x 1,750’ x 2,500’	Both ends – 500’ x 700’ x 1,000’	Runway 14-500’ x 700’ x 1,000’. Runway 32-1,000’ x 1,510’ x 1,700’
	<i>Runway Length</i>	No change	1,600’ Extension	No change	No change
	<i>Runway Strength</i>	No change	Strengthen	No change	No change
	<i>Maintain Airport Café Access</i>	Yes	Yes	Yes	Yes
	<i>Install REILs</i>	No	Yes	Yes	Yes
	<i>Instrument Approach Lighting</i>	No	Yes	Yes	Yes
	<i>Taxilane Edge Lights</i>	No	Yes	Yes	Yes
	<i>Helicopter Landing Facility</i>	No change	Relocated	Relocated	Relocated
	<i>Install AWOS</i>	No	Yes	Yes	Yes
Landside Requirements	<i>T-Hangars⁷ (31 more required by 2027)</i>	32	112	32	56
	<i>Conventional Hangars⁸ (5 more required by 2027)</i>	0	14	18	145
	<i>Reconfigured Tiedowns</i>	No Change	Expansion capable of 30 tiedown units	Expansion capable of 30 tiedown units	Expansion capable of 30 tiedown units
	<i>Vehicular Parking</i>	No	Yes	Yes	Yes
	<i>FBO Reserve</i>	No	Yes	Yes	Yes

⁷ Based on assumptions of 1,750 square feet needed for one T-hangar unit. Hangar units for Alternatives 1, 2, and 3 include the hangar development associated with the No-Build Alternative.

⁸ Based on assumptions of 3,600 square feet per conventional hangar unit.

Table 5E. Comparative Summary of Alternatives and Facility Requirements, Cont.

		No-Build	Alternative 1	Alternative 2	Alternative 3
Landside Requirements	<i>Upgrade Fencing</i>	No	Yes	Yes	Yes
	<i>Fuel Facility</i>	Yes	Yes	Yes	Yes
	<i>Residential Airpark</i>	No	No	No	Off-airport
Development Costs⁹	--	\$ 5,151,000	\$ 76,403,000	\$ 13,042,000	\$ 31,963,000
Land Acquisition	--	0 acres	151.6 acres	19.0 acres	33.6 acres
Easement Acquisition	--	24.5 acres	9.4 acres	24.5 acres	20.7 acres

ENVIRONMENTAL SCREENING OF ALTERNATIVES

Each alternative was analyzed to assess its relative environmental impact, as well as identify any environmental constraints that may prohibit development. The results of this analysis is presented in **Table 5F**.

⁹ No-Build development costs have been added to the development costs for Alternatives 1, 2, and 3 to reflect the maintenance needs throughout the planning period.

Table 5F. Development Alternatives - Environmental Constraints and Impacts¹⁰

Impact Categories¹¹	No-Build Alternative	Alternative 1	Alternative 2	Alternative 3
Noise	Noise increases with growth in operations. <i>1</i>	Noise increases with growth in operations; runway extension may attract larger aircraft; instrument approach may bring landing aircraft in at a lower slope thus, closer to the ground. <i>3</i>	Noise increases with growth in operations, with development of hangars. <i>2</i>	Noise increases with growth in operations. Instrument approach may bring landing aircraft in at a lower slope <i>2</i>
Land Use Compatibility	No apparent issues. <i>1</i>	Runway extension/road relocation not consistent with EFU. Potential noise impacts. <i>4</i>	No apparent issues. <i>1</i>	Residential airpark not consistent with current zoning of EFU. <i>4</i>
Social Impact	No apparent issues. <i>1</i>	No apparent issues. <i>1</i>	No apparent issues. <i>1</i>	Airpark location in area of low density/agricultural residences. <i>3</i>
Induced Socio-Economic Impacts	Fuel could generate revenue for local business. <i>4</i>	Longer runway could attract industrial tenants, more tenants, and more revenue. <i>3</i>	Aviation Reserve could attract tenants. <i>2</i>	Aviation Reserve could attract tenants. Development of Airpark would have infrastructure costs. <i>1</i>
Environmental Justice	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>
Historic Properties & Cultural Resources	No apparent issues. <i>1</i>	RW extension may require a cultural resource study under FAA guidelines. <i>2</i>	If FAA funds are used for development of Aviation Reserve, cultural resource study may be needed. <i>2</i>	If FAA funds are used for development of Aviation Reserve, cultural resource study may be needed. <i>2</i>
Recreational Lands	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>
Farmland Preservation	No apparent issues. <i>1</i>	Relocation of Mulino Road and RW/TW extension conflict with EFU regulations. <i>4</i>	Reserve development in EFU and Rural Residential, Farm Forest-5 acre (RRFF-5) area. <i>2</i>	Reserve development in EFU area. <i>4</i>
Light and Glare	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>
Air Quality	No apparent issues. <i>2</i>	No apparent issues. Construction dust is covered under Construction Impacts. <i>2</i>	No apparent issues. Construction dust is covered under Construction Impacts. <i>2</i>	No apparent issues. Construction dust is covered under Construction Impacts. <i>2</i>

¹⁰ The small italic number in each cell represents the qualitative rank of each alternative for the specific category. Where all alternatives are approximately equal, a value of 2 was given. A value of 1 represents the least impacting alternative; a value of 4 represents the greatest impact. A summing of these values appears at the bottom of this table, which in turn provides a subjective ranking of the four alternatives.

¹¹ The analysis is divided into 18 impact categories and is examined per FAA Order 1050.1E and guidance from the Council on Environmental Quality.

Table 5F. Development Alternatives - Environmental Constraints and Impacts, Continued

Impact Categories	No-Build Alternative	Alternative 1	Alternative 2	Alternative 3
Water Quality	Fuel facility will need protection to keep potential spills out of the Airport’s runoff. Increased impervious surface from T-hangars and fuel area will need to be collected, treated, and conveyed. <i>1</i>	Fuel facility will need protection to keep potential spills out of the Airport’s runoff. Increased impervious surface from T-hangars and fuel area will need to be collected, treated, and conveyed. This alt. also has largest increase in impervious surface due to RW/TW extension. <i>2</i>	Fuel facility will need protection to keep potential spills out of the Airport’s runoff. Increased impervious surface from T-hangars and fuel area will need to be collected, treated, and conveyed. Drainage from Aviation reserve would need to be addressed as they are developed. <i>3</i>	Fuel facility will need protection to keep potential spills out of the Airport’s runoff. Increased impervious surface from T-hangars and fuel area will need to be collected, treated, and conveyed. Drainage from Airpark and Aviation reserves would need to be addressed as they are developed. <i>4</i>
Plants & Animals	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>
Wetlands & Floodplains	No apparent issues. <i>1</i>	May affect three linear wetlands to the east of the RW south end. <i>3</i>	May affect three linear wetlands to the east of the RW south end. <i>3</i>	May affect three linear wetlands to the east of the RW south end. <i>3</i>
Energy Supply & Natural Resources	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>
Solid Waste	No apparent issues. <i>2</i>	No apparent issues. <i>2</i>	Aviation Reserve developed uses could generate solid waste. <i>3</i>	Airpark and Aviation Reserve developed uses could generate solid waste. <i>4</i>
Hazardous Materials	Fuel site will need containment. May require review of previous fuel site that has been remediated. <i>2</i>	Fuel site will need containment. May require review of previous fuel site that has been remediated. <i>2</i>	Fuel site will need containment. May require review of previous fuel site that has been remediated. <i>2</i>	Fuel site will need containment. May require review of previous fuel site that has been remediated. <i>2</i>
Construction Impacts	Construction activities will require dust suppression and erosion protection. Possible short-term noise impacts. <i>1</i>	Construction activities will require dust suppression and erosion protection. Runway construction and road relocation would have transportation impacts and more significant earthwork than other alternatives. <i>2</i>	Construction activities will require dust suppression and erosion protection. Development of reserve areas could have significant earthwork, although they would likely be built in stages over time. <i>3</i>	Construction activities will require dust suppression and erosion protection. Development of reserve areas could have significant earthwork, although they would likely be built in stages over time. <i>4</i>
Controversy	No apparent issues. <i>1</i>	RW/TW extension could be controversial. <i>3</i>	Development of reserve could be controversial. <i>2</i>	Development of reserves could be controversial. <i>3</i>
Total ranking	29	43	38	48

Each alternative presents an array of environmental opportunities and constraints. The following discussion summarizes the potential environmental concerns associated with each alternative.

No-Build Alternative

The No-Build Alternative includes three actions: a fuel facility, two rows of T-hangars, and improvements to on-airport drainage. The alternative proposal does not present land use compatibility concerns, noise concerns, or direct threats to plant and animal communities. The fuel facility will need to include spill containment features and ways to keep any spilled fuel out of the airport drainage system. New T-hangars will increase impervious surface and will need to include stormwater treatment and drainage. In terms of overall impact, **this alternative has the least impact to the existing natural and built environments.**

Development Alternative 1

This alternative extends the runway and taxiway approximately 1,600 feet to the north-northwest. It includes nine rows of new T-hangars, a fuel facility, helipad, FBO site, terminal buildings, conventional hangars, and an air traffic control tower. This alternative changes the location of one runway end and has the potential of attracting larger and potentially noisier aircraft, thereby increasing, and reconfiguring the Airport's noise footprint. Alternative 1 would add a large amount of new impervious surface, primarily from the runway and taxiway extension. Extension into previously undisturbed areas would likely require a cultural resources review and consultation with the State Historic Preservation Office and local tribes. The proposed runway extension crosses a zoning boundary into land zoned as EFU. The relocation of Mulino Road and the runway/taxiway extension is not consistent with the allowed uses in EFU zones. A land use process, likely involving County Commission approval, will be required to allow the extension. The extension may also generate public controversy based on potential noise, farmland intrusion, and other land use issues.

In general, noteworthy impacts associated with this alternative include increased pavement and runoff, and extension of the noise footprint. It appears that the noise increases would occur over farmland and not sensitive noise receptors, such as residential areas. The extension would require a land use review process where the purpose and need is weighed against farmland preservation goals. **This alternative lies between Alternative 2 and Alternative 3 in potential environmental impact.**

Development Alternative 2

This alternative includes two rows of conventional hangars, an FBO site, a fuel facility, and a helipad. It also includes 25.8 acres in aviation reserve. Impervious surface increase would be minimal in the aircraft operation area. Development of the aviation reserve land could increase impervious surface significantly, and therefore increase stormwater runoff and risk for water quality issues. Development of these areas could require cultural resource reviews. Development in these reserves may impact three linear wetlands shown east of the southern end of the runway. The Reserve areas cross into zoning districts of EFU and RRFF-5. These uses are not consistent with the zoning and may require a zone change, and possible goal exception to

statewide planning goals. The principal focus of analysis for goal exceptions of transportation facilities is on the identified transportation need and on the reasons why that need cannot reasonably be accommodated through alternative methods or locations not requiring goal exceptions. Potential development density of the reserve areas may generate public controversy based on density, urbanization, and traffic issues. **This alternative has the second least overall impact of the alternatives.**

Development Alternative 3

This alternative includes three rows of T-hangars, two rows of conventional hangars, space for large hangars, an FBO site, a fuel facility, and a helipad. It also includes 35.6 acres in aviation reserve and approximately 20 acres in airpark reserve. Impervious surface increase would be moderate in the aircraft operation area with the addition of the largest area of hangar space. Development of the aviation reserve and airpark reserve land could increase impervious surface significantly, and therefore increase stormwater runoff and risk for water quality issues. The off-airport airpark would likely require additional drainage system development, as it may be too distant to take advantage of existing airport facilities. Development of these areas could require cultural resource reviews. Development in the aviation reserve may impact three linear wetlands shown east of the southern end of the runway. The reserve areas cross into EFU and RRFF-5 zoning districts. These uses are not consistent with the zoning and may require a zone change. The off-airport airpark may have increased traffic impacts on the roads west of the Airport. The reserve areas are larger and have the potential for a greater amount of development than Alternative 2. Potential development density of the reserve areas may generate public controversy based on density, urbanization, and traffic issues.

An important issue with this alternative is the inclusion of the airpark in areas that are zoned for EFU. The Airport is outside of the Urban Growth Boundary and it may be difficult for the County to support the necessary land use changes. In addition, development of the residential airpark would have secondary impacts to infrastructure, including drinking water, sanitary sewer/septic, stormwater resources, and off-airport surface transportation. **This alternative has the most impact.**

Stormwater Analysis

An analysis was performed to calculate each alternative's impact on stormwater runoff. The current stormwater system consists of piping that drains to two detention ponds located in the northwest and northeast quadrants of the Airport. This system was designed to retain runoff from existing impervious surfaces, as well as the areas to be developed as part of the ODA management agreement, for a 25-year flood. Calculations of each alternative's increase of impervious surface¹² and the resulting required maximum storage are included in **Table 5G**.

¹² The aviation reserves for Alternatives 2 and 3 and the airpark reserve in Alternative 3 are not included in the calculations. Since development in the aviation reserve is beyond the 2027 planning period, it is too speculative to determine what the amount of impervious surface would be. If development in the reserves occurs, future stormwater analyses would be needed.

Table 5G. Development Alternative Impacts on Stormwater

	Impervious Surface (Acres)	Required Maximum Storage (ft³) 25-yr flood
Existing and Planned Impervious Surface (No-Build)	21.72	131,809
Alternative 1	80.37	175,262
Alternative 2	25.05	132,870
Alternative 3	34.72	135,355

The analysis shows that there is little impact on the required maximum storage needed for Alternatives 2 and 3 compared to the No-Build alternative. Piping the areas of new development into the existing detention ponds would be sufficient to maintain stormwater runoff.

However, development associated with Alternative 1 would require capacity enhancement of the detention system. Approximately 43,500 cubic feet of additional storage capacity would need to be provided, as well as conveyance piping from areas of new development.

MASTER PLAN CONCEPT

The three development alternatives and No-Build were presented to the Port, ODA, PAC, and members of the public on February 13, 2007. Based on comments made at that meeting and during a six-week review period, the Port selected a preferred alternative (see **Exhibit 5E**). The preferred alternative, or Master Plan Concept, is based on various components of each of the alternatives presented in this chapter, as well as a few additional components not previously depicted. The Master Plan Concept is the basis for the Airport Layout Plan in Chapter Six. The proposed Master Plan Concept is summarized below:

Airfield.

- Installation of a nonprecision approach to Runway 32 with minimums not lower than ¾ mile. New RPZ dimensions would be 1,000 feet by 1,510 feet by 1,700 feet.
- Taxilane extensions to serve new hangars and hangar development areas.
- Additional taxilane access from the parallel taxiway to the aircraft storage area.
- Maintenance of taxiway access to the Airport Café, unless demand for non-aviation development occurs.
- Relocate access taxiway to Runway 32 threshold.
- Installation of REILs, instrument approach lighting system, and taxilane edge lights.
- Relocation of helicopter landing facility.
- Installation of AWOS.

Landside.

- In addition to the two rows of hangars the Port will build in 2007/08, three additional T-hangar buildings, with potential of 24 T-hangar units.
- Approximately six acres for the development of attached or detached conventional hangars. This land is estimated to accommodate up to 72 conventional hangars, depending on hangar size and spacing.

- Apron expansion of 12,500 square yards to accommodate larger transient aircraft tiedowns and taxilanes for better circulation.
- Aviation reserve area, which can be used for hangar development, tiedowns, etc., if demand necessitates.
- New access road connecting areas of development with both Mulino Road and Highway 213.
- Additional vehicle parking area.
- FBO reserve of approximately 2.1 acres.
- Recommended fencing upgrade.
- New maintenance building.
- Electrical vault.
- Installation of fueling facility.

Changes to the airfield improvements previously depicted are the location of a new access taxilane, relocation of the taxiway accessing Runway 32, the helicopter landing facility location, and the AWOS location:

- Stakeholders supported the need for two access points to the aircraft ramp, parking, and storage area, noting the one existing access point can become congested during summer operations. However, the location proposed in Alternative 3 was thought to be too close to the existing access taxilane. The proposed location of the new taxilane will require the aging hangar/maintenance building to be removed.
- The relocated threshold for Runway 32 requires the access taxiway to be relocated to the new threshold, in order to meet FAA design standards.
- The helicopter landing facility is shown in two locations. The initial location is on the FBO reserve. When the FBO reserve is developed and the ramp area is built out, the ultimate location will be farther north, near the future taxilane. To minimize the potential of vehicle and aircraft conflicts, a new Airport entrance road should be built before the new helicopter landing facility and access taxilane, since these facilities will put operating aircraft next to what is now the main gate to the Airport.
- Two AWOS locations are depicted on the exhibit. The preferred location is a collocation on the beacon tower. If FAA siting criteria are not met at this location, the alternative location is on the west side of the runway.

A nonprecision approach to Runway 32, with minimums not lower than $\frac{3}{4}$ mile, was selected as the preferred instrument approach. It was not felt that an approach with lower minimums was needed at the Airport, based on user comments and survey input. An approach with minimums not lower than $\frac{3}{4}$ mile should be achievable, although additional evaluation will need to be completed at a later date to confirm this.

New landside features not previously depicted are: enlarged aviation reserve area, and location for an electrical vault:

- The aviation reserve area was enlarged to maximize the land dedicated for aviation-related functions.
- The electrical vault will be necessary to accommodate the installation of approach lighting, taxilane edge lighting, and REILs.

An extension of Runway 14-32 is not a component of the master plan concept, since the projected demand throughout the planning period does not justify additional length. If the type of aircraft using the Airport changes substantially in the future from what is currently forecasted, it may be necessary to conduct another master plan update to determine the need for a runway extension.

The master plan concept allows considerable airport growth. However, ultimately it is demand for the facilities that will drive development. If demand grows at a moderate rate for the next 20 years, as forecasted in this planning process, it is likely not all of the development shown in the Master Plan Concept will occur. It is possible that growth may occur at a higher rate than expected and at that time it may be necessary to re-evaluate the Master Plan Concept.