4.0 DEVELOPMENT ALTERNATIVES

4.1 Introduction and Purpose

This chapter identifies and evaluates development alternatives for ORS. The alternatives were guided by master plan goals and objectives defined in Chapter 1 and they address facility requirements identified in Chapter 3. The alternatives were also guided by the issues, needs and ideas presented by stakeholders in the master plan survey and public meetings, and by the Advisory Committee. Stakeholder views varied from those who wanted major expansion to those who mostly just wanted to maintain existing facilities. The master plan evaluated the alternatives using input from the Advisory Committee, other stakeholder meetings, the FAA, and airport staff through various methods, including individual meetings, email communications, and public open house meetings. The Draft Development Plan, made up of projects from each of the alternatives was similarly reviewed by these groups. The alternatives, evaluation process, and Draft and Final Development Plan are further described below.

Some alternatives were considered but were soon dismissed without extensive evaluation. Moving the airport to another location on the island was briefly discussed but was thought to be prohibitively expensive. Most of Orcas Island is characterized by heavily wooded, steep terrain. Very little of the topography is suitable for airport operations, and much of the flatter terrain is developed or covered by wetlands. Also, closing the airport was not considered to be a viable option. The remote location of the island and inclement weather conditions for much of the year make land-based aircraft operations a critical part of the transportation network for the island and the region.

As noted in Chapter 3 Facility Requirements, the Runway Design Code (RDC) for ORS is expected to become B-II-1A-5000. This RDC accounts for the approach speed, runway and taxiway dimensions, and visibility minimums of the mix of airplanes which account for most of the critical operations that have been going on at ORS for the past several years. Many of the dimensional requirements for the runway and taxiway safety areas of a B-II airport are larger than those for a B-I airport, the current RDC for Orcas Island. These safety requirements were a priority in the consideration of development alternatives for the airport and include widening the runway from 60 feet to 75 feet, increasing the separation distance between the runway and the parallel taxiway, increasing the dimensions of the Runway Safety Area (RSA) and Runway Object Free Area (ROFA) on each end of the runway, and evaluating runway length. Considerable attention was also given to ways in which the conflicts between the Runway Protection Zones (RPZs) and the roads within them could be reduced or eliminated. Mount Baker Road crosses the RPZ for Runway 34, and Brandt’s Landing Lane crosses the RPZ for Runway 16. Competing interests such as the presence of wetlands and private property ownership adjacent to the airport were also considered.
4.2 Alternatives Overview & Identification

Runway/Taxiway Alternatives 1 – 4 were developed to show a range in the level of effort and cost of development for modifications to the runway, parallel taxiway, connector taxiways, and affected airport facilities. Alternative 1 has the least development and cost, and Alternative 4 has the most. The alternatives are described below and shown in Figures 4.1 to 4.4. Projects addressing the issues, needs, and facility requirements were included in each of the alternatives based on which alternative best matched the type of project.

Where major improvements have been suggested in an alternative, all the components of those improvements were proposed to meet safety standards for existing aircraft and current operations at the airport. For example, clearing obstacles from the Runway Safety Area requires relocating the airport terminal and some hangar facilities. Most of the planned improvements would be made on existing airport property to improve the safety of operations that have been going on for several years. No plans for development to increase the number of operations or the size of aircraft conducting them are anticipated. Table 4.1 includes a comparison of the components of the alternatives.

The alternatives included:

- **Alternative 1: No-Build** – Minor maintenance and management of the existing runway and taxiways with minor use of capital projects.
- **Alternative 2: Runway Widening and 156-foot Runway/Taxiway Separation** – Widen the runway from 60 feet to 75 feet, relocate the parallel taxiway to increase separation from the runway to 156 feet.
- **Alternative 3: Runway Widening, Displaced Thresholds, and 240-foot Runway/Taxiway Separation** – Widen the runway from 60 feet to 75 feet, add displaced thresholds to increase runway length to 3,400 feet, and relocate the parallel taxiway to increase separation from the runway to 240 feet.
- **Alternative 4: Runway Realignment, Displaced Thresholds, and 240-foot Runway/Taxiway Separation** – Widen and rotate the runway slightly, add displaced thresholds to increase runway length to 3,400 feet, and relocate the parallel taxiway to increase separation from the runway to 240 feet.

Alternatives were also developed for the southeast area of the airfield. Southeast Development Alternatives 1 and 2 show different configurations for the terminal building, cargo hangar, based-aircraft hangars, parking areas, etc. These layouts are shown in Figures 4.5 and 4.6. In these alternatives, storage facilities for maintenance equipment will be provided either as part of the terminal building or in a stand-alone maintenance building.

The airport owns a considerable amount of property on the west side of the runway which is currently not in use. A potential layout for the construction of new hangars in this West Development Area is shown in Figure 4.7. In the winter aircraft that remain outside overnight can be subject to the accumulation of ice, snow, and frost. In the summer aircraft interiors can become hot enough to
damage sensitive avionics and can become very uncomfortable for passengers. A structure that can be used as a deice facility in the winter and a shade structure in the summer is planned. Potential locations for it are the Southeast Development Area and the West Development Area, and these locations are shown in the figures.

At the north end of the runway Brandts Landing Lane encroaches into the Runway Protection Zone (RPZ) for Runway 16. Roads are considered an incompatible land use for the property within an RPZ, and Figure 4.8 shows the dimensions and location of the Runway 16 RPZ if the road were removed. It also shows a possible aircraft holding area at Taxiway A4 near the north end of the runway. All alternatives with the exception of Alternative 1: No-Build include the acquisition of land on the north end of the runway and closure of Brandt’s Landing Lane to eliminate the incompatible land use within the RPZ.

Just off the south end of the runway Mount Baker Road encroaches into the RPZ for Runway 34. Figure 4.9 illustrates different options for relocating Mount Baker Road to eliminate the conflict.

### 4.3 Alternatives Evaluation

Airport stakeholders and the project team evaluated alternatives and projects using several methods. All project ratings by stakeholders were completed without consideration of funding limitations, per FAA guidance. Detailed results of these ratings can be found in Appendix X.

- **Advisory Committee** - Committee members rated projects within each alternative high-, medium- or low-priority using colored dots.
- **Public Open House Meetings** – A public open house meeting was held on June 5, 2018 to present the draft alternatives. Those in attendance at this meeting were given opportunity to rate the priority of the alternative projects. Another public open house meeting was held on September 19, 2018 to present the draft preferred development plan. The master planning team answered questions and solicited comments from participants regarding the merits and challenges of the alternatives.
- **Email Comments** – Approximately 300 email comments were submitted as of October 8, 2018 by residents, members of area pilot associations, and many other people with an interest in Orcas Island.

#### 4.3.1 Alternative 1: No-Build

Alternative 1, shown in Figure 4.1, continues management and minor maintenance of existing facilities with existing staff and operating funds, but with minimal investment in capital projects. It is very likely that federal funding would no longer be available with this alternative, since ORS would not be meeting grant assurances. An overwhelming number of stakeholders prefer this option, believing that any improvements would be synonymous with airport expansion and enlargement, more noise, increased traffic, and more people placing greater demands on overstressed island resources.
The obvious benefit of the No-Build option is the savings in capital investment. Conditions are never static, however, and regular maintenance of facilities is required to sustain a satisfactory level of serviceability. Regardless of how diligent maintenance efforts are, the infrastructure will eventually degrade to the point at which continued maintenance is no longer cost-effective, and capital replacement is required, or facilities will become unusable.

As the demand for the air transportation of passengers and cargo increased, aircraft operators increased the number of their flights to meet those demands. They also began using aircraft that could more economically meet the new mission requirements. Notable among the new aircraft put into service was the Cessna 208 Caravan—a single-engine turboprop—which replaced piston-engine twins previously in use. The Cessna Caravan is an Aircraft Design Group II (ADG-II) airplane. The numerous operations of Cessna Caravans at ORS are the primary reason for change of the Runway Design Code to B-II.

The safety area dimensions of ADG-II are larger than for ADG-I, and major improvements at ORS would be needed to meet the requirements of the new standards. The FAA places a significant emphasis on operational safety at airports, and continued FAA funding for ORS is contingent on efforts to meet the safety requirements for the standards that apply to the way the airport is being used. As an interim measure some safety issues may be temporarily mitigated by implementing Modifications of Airport Design Standards (MOS) (Ref. FAA Order 5300.1G Modifications to Agency Airport Design, Construction, and Equipment Standards). An MOS can be requested based on an analysis of operations at a specific airport. However, The FAA will not grant an MOS for some conditions such as non-standard RSA dimensions, non-standard Obstacle Free Zone (OFZ) surfaces, or impermissible land uses within RPZ limits. Also, the airport must certify that modifications to standards will provide an acceptable level of safety. Several modifications to standards would be required to address the numerous non-standard conditions at ORS (runway-to-parallel taxiway separation distance, taxiway safety area width, taxiway object free area width, to name a few). Requests for MOS for these non-standard conditions are not likely to receive FAA approval because the more safety-critical items (non-standard RSA and ROFA dimensions) would remain unaddressed.
4.3.2 Alternative 2: Runway Widening and 156-foot Runway/Taxiway Separation

This alternative (Figure 4.2) includes widening the runway from 60 feet to 75 feet and relocating the parallel taxiway to increase its separation from the runway to 156 feet. It would include acquisition of land on the north end of the runway and closure of Brandt’s Landing Lane to eliminate the incompatible land use within the RPZ.

One of the most common ADG-II airplanes operating at ORS is the Cessna Caravan, with a wingspan of 52'-1". A runway-taxiway separation distance of 156 feet provides the same wingtip clearance for most of the largest ADG-II aircraft currently operating at ORS as they would have if they were ADG-I airplanes. Implementing this alternative, however, would require the acquisition of land from Brandt’s Landing Marina along the east side of the north end of the runway. It would also require an MOS from the FAA, because the runway-taxiway separation distance would still be less than what the standards require. Approval of an MOS is not guaranteed and is not permanent. If granted, the MOS is subject to FAA review and renewal at least every five years, and the FAA will expect continued progress toward full compliance with safety standards as a condition of subsequent approval.

New lease lots, additional hangar space, tiedowns, and ground access will be provided at the Southeast and West Development Areas on existing airport property. The Southeast Development Area will also
provide space for cargo facilities, parking, and a new terminal building. The current facilities are insufficient for existing needs. The new terminal will accommodate air passenger requirements, pilot’s facilities, and other facilities which are currently inadequate. Utility service (water, waste water, electric power, telecommunications, etc.) will need to be extended to these development areas.

Figure 4.2

4.3.3 Alternative 3: Runway Widening, Displaced Thresholds, and 240-foot Runway/Taxiway Separation

This alternative (Figure 4.3) includes widening the runway from 60 feet to 75 feet, adding displaced thresholds to each end of the runway to increase the runway length to 3,400 feet, and relocating the parallel taxiway to increase its separation from the runway to 240 feet. It would also include acquisition of land on the north end of the runway and closure of Brandt’s Landing Lane to eliminate the incompatible land use within the RPZ. This option meets all safety standards and provides a runway length that serves 100 percent of the fleet mix, which is justified by the remote location of Orcas Island.

A runway-taxiway separation distance of 240 feet provides the required wingtip clearance for all ADG-II aircraft. However, it would require the acquisition of land from the Brandt’s Landing Marina parcel, a portion of the Parnell parcel, and a portion of the Larson parcel along the east side of the north end of
the runway. It would also conflict with the terminal building, two hangars, the fuel area, and numerous aircraft tie-downs on the apron. These facilities would be relocated to the Southeast Development Area with sufficient space to accommodate them. (See Section 4.3.5 for further discussion.) Additional turf tie-downs and hangars would be provided in the West Development Area. As with Alternative 2 utility service (water, waste water, electric power, telecommunications, etc.) will need to be extended to these development areas. This alternative would not require an MOS.

4.3.4 Alternative 4: Runway Realignment, Displaced Thresholds, and 240-foot Runway/Taxiway Separation

This alternative (Figure 4.4) involves widening and rotating the runway slightly and adding displaced thresholds to each end of it to increase the runway length to 3,400 feet. The parallel taxiway would also be relocated to increase its separation from the runway to 240 feet. It would also include acquisition of land on the north end of the runway and closure of Brandt’s Landing Lane to eliminate the incompatible land use within the RPZ. This option meets all safety standards and provides a runway length that serves 100 percent of the fleet mix. It lessens the impact of airport improvements on Brand’s Landing Marina by moving the north runway end away from the marina at the expense of moving it farther into the wetlands to the west. On the south end, it moves the runway farther away from the structures on
the west side but aligns approach and departure operations over the community. It would still require
the acquisition of land from the Brandt’s Landing Marina parcel, the Parnell parcel, and the Larson
parcel along the east side of the north end of the runway. As with Alternative 3, it would also require
the relocation of the terminal building, two hangars, the fuel area, and aircraft tie-downs on the apron.
New lease lots, hangar space, tiedowns, and ground access are provided on the Southeast and West
Development Areas on existing airport property with sufficient space to accommodate their needs. As
with the other alternatives, utility service (water, waste water, electric power, telecommunications, etc.)
will need to be extended to these development areas. This alternative would not require an MOS.

4.3.5 Southeast Development Area

Relocating the parallel taxiway to the east would conflict with airport facilities on the east side of the
airfield because they would come within the new Taxiway Object Free Area (TOFA). The terminal
building, two hangars, the fuel facility, the helicopter landing area, and aircraft tie-downs in the turf and
paved areas of the airfield would all be impacted. These facilities would be relocated to the Southeast
Development Area on land currently owned by the airport. Figures 4.5 and 4.6 show two possible
configurations for the facilities in this area. The new fuel area will be an above-ground system with
capacity for 100LL and a second tank for non-ethanol unleaded fuel.
One of the impacted hangars is currently used by Aeronautical Services, Inc. for cargo handling. Relocating this facility to the Southeast Development Area has the benefit of putting it closer to customers, who sometimes have short deadlines for package delivery, and who would benefit by having easier access from their locations in the community to the shipping center. The current facilities for cargo handling are inadequate, and the new facilities will accommodate existing and expected needs.

A new terminal building, with improvements to accommodate passenger facilities, airport management operations, and pilot services would be located closer to Mt. Baker Road for better access from the land side and the air side of the building. Parking conveniently near the terminal would be provided. As previously mentioned, utility services such as water, waste water, gas, electric power, and telecommunications will need to be extended to this area.

The Southeast Development Area would also include a deicing facility/sunshade structure, a helipad, and tie-downs for transient aircraft. Taxilanes would allow for simultaneous operations of passenger aircraft at the terminal building and cargo aircraft moving through the area. A long-term parking area, sufficient to address the inadequacy of current parking facilities, would be located on the east side of the Southeast Development Area with a large landscaping buffer between it and North Beach Road. These facilities will be connected to the existing trail system providing easy access to the community of Eastsound.
After review by the public and the Port it is understood that the SE Development Alternative 2 would be significantly opposed and is currently not accommodated on the eastern portion by the current zoning standards for the intended proposed development.

### 4.3.6 West Development Area

New lease lots, hangar space, turf tiedowns, and ground access would be provided on existing airport property west of the runway. The deicing facility/sunshade structure could possibly be located in this area, but the Southeast Development Area is the preferred location for it. Utility service would need to be extended to this area. Coordination with San Juan County would be required to improve Seaview Street for improved vehicle and pedestrian access. In addition, the functional classification of Seaview Street may need to be upgraded in accordance with the WSDOT Guidelines for Amending Functional Classification in Washington State. Figure 4.7 shows a possible configuration for this area.
4.3.7 Brandt’s Landing Lane and Nina Lane

The purpose of a Runway Protection Zone (RPZ) is to protect people and property on the ground. The presence of Brandt’s Landing Lane and Nina Lane in the RPZ for Runway 16 is considered an incompatible land use as it presents a conflict between vehicles on the ground and arriving and departing aircraft. As shown in Figure 4.8 land on the north end of the runway would be acquired and these two roads would be closed to eliminate the safety hazard presented by the conflict. Figure 4.8 also shows a B-II runway pad.
4.3.8 Mt. Baker Road

As with Brandt’s Landing Lane and Nina Lane in the Runway 16 RPZ, the presence of Mt. Baker Road in the RPZ for Runway 34 is considered an incompatible land use as it presents a conflict between aircraft and ground vehicles that compromises safety standards. FAA guidance requires a continual effort to remove or mitigate the risk of existing incompatible land uses in an RPZ to the extent practical.

Mt. Baker Road is part of a major roadway that connects the east and west sides of Orcas Island and is a designated truck route around the community of Eastsound. The segment of Mt. Baker Road adjacent to the airport is one of the most heavily traveled sections of road on the island. In evaluating options to remove or mitigate the conflict between Mt. Baker Road and the RPZ, considerable thought was given to maintaining or increasing the traffic volume capacity and safety of the road while minimizing impacts to connections with existing streets, adjacent landowners, wetlands in the area, and other competing interests. Ideas briefly considered and discarded were: shortening the runway or moving it farther north to shift all of the RPZ to the north side of Mt. Baker Road, putting Mt. Baker Road in a tunnel under the RPZ, implementing Declared Distances to establish approach and departure RPZs, installation of an Engineered Materials Arresting System (EMAS) to shorten the required Runway Safety Area (RSA), and other methods of mitigating the conflict. Some options for relocating Mt. Baker Road are shown in Figure 4.9. Although multiple alignments for the road are shown as options, only one alignment will be constructed.
Figure 4.9: Runway 34 RPZ Alternatives

Table 4.1
4.4 Preferred Development Alternative

The preferred alternative for ORS is the result of a combination of formal comments received from the Orcas Island Airport Master Plan Advisory Committee, Port of Orcas Commission, Airport staff, other interested stakeholders, the public, and the FAA regarding the alternatives previously described. The preferred alternative has many elements that are the same or very similar to elements in those alternatives, as well as a few that are obviously different. The ultimate development for the airport in the preferred alternative is shown in Figure 4.10. It includes the acquisition of land on the north end of the runway and closure of Brandt’s Landing Lane to eliminate the incompatible land use within the RPZ.

4.4.1 Runway

In the preferred alternative the runway would be widened from its current 60 feet, the standard for B-I airports, to 75 feet, the B-II standard. To achieve this increase, the runway pavement would be reconstructed with an additional 7.5 feet on each side, while the runway centerline remains in its present position. New medium-intensity runway lights (MIRL) and Runway End Identifier Lights (REILs) will be installed to replace the existing lighting.

As stated previously, the runway length required to serve 100 percent of the fleet of aircraft currently operating at Orcas Island Airport is 3,400 feet. This length is justified by the remote location of the island and that options for access to it are limited. A 3,400-foot runway, however, would require that Mt. Baker Road be relocated south to merge with Enchanted Forest Road to remain out of the Runway 34 RPZ (see Figure 4.9). This alignment of Mt. Baker Road would greatly increase costs by requiring the acquisition of additional private property. Also, it would probably need a traffic signal at the intersection of Enchanted Forest Road with Lovers Lane, which would adversely affect the flow of traffic.

The runway length shown in the preferred alternative is 3,255 feet. This length is the maximum runway length that will allow for smooth roadway geometry in transitioning Mt. Baker Road into Lovers Lane. It also has the advantages of keeping most of the Mt. Baker Road realignment on land currently owned by the airport and of keeping the RSA within the airport boundary on the north side of Mt. Baker Road—a consideration for phased implementation of the plan.

In its ultimate configuration Runway 34 will not have a displaced threshold, but the threshold of Runway 16 will be displaced by approximately 191 feet to provide clearance over potential obstacles offshore and to maintain current instrument approach minimums. The runway length available for takeoff will be 3,255 feet, and for landing it will be 3,064 feet.
4.4.2 Taxiways

The parallel taxiway will be reconstructed east of its present location to achieve a runway-taxiway separation distance of 240 feet. This construction will require acquisition of a portion of the Brandt’s Landing Marina parcel, a portion of the Parnell parcel, and a portion of the Larson parcel along the east side of the north end of the runway. This project could be coordinated with improvements to the marina for ease of permitting and construction phasing.

Connecting taxiways A1 and A4 will be relocated to the new runway ends, and the remaining pavement outside of those limits will be removed. An aircraft holding apron will be constructed at the north end of the parallel taxiway at A4. To minimize the impact to the adjacent marina property, the holding apron is sized for aircraft not larger than Runway Design Code B-I, and property acquisition has been reduced to include only that which is necessary for airfield safety areas.

Connecting taxiways A2, B2, and A3 will be reconstructed outside of the “high energy” middle third of the runway in accordance with current FAA design standards. Taxiway B2 will be opposite A2 and will be on existing airport property. Taxiway B2 will connect to a short section of parallel taxiway (Taxiway B) to provide access to the West Development Area. Taxiway B will be located at the required runway-taxiway separation distance of 240 feet. The existing Taxiway B pavement north and south of B1 will be removed after the necessary property acquisitions in that area. Taxiways A, A1, A2, A3, and A4 will include new medium-intensity taxiway lighting (MITL) to replace the existing lights.
4.4.3 Southeast Development Area

The terminal building, vehicle parking, two hangars, the fuel facility, the helicopter landing area, and aircraft tie-downs will be relocated to the Southeast Development Area as shown in Figure 4.11. Utility services will be extended to serve the new facilities. This development will also include a deicing facility/sunshade structure, and tie-downs for transient aircraft. A de-icing shelter/sunshade was selected as the most environmentally friendly way to accommodate de-icing needs to prevent the use of chemicals and requirements for stormwater controls. Taxilanes would allow for simultaneous operations of passenger aircraft at the terminal building and cargo aircraft moving through the area. A long-term parking area would be located on the east side of the area with a large landscaped buffer between it and North Beach Road. Pedestrian access will be provided to the community of Eastsound via connections to the existing trail system.

![Figure 4.11: SE Development](image)

4.4.4 Westside Development Area

New lease lots, hangar space, turf tiedowns, and ground access will be provided on existing airport property as shown in Figure 4.12. As previously mentioned, utility service would need to be extended to this area, and improvements to Seaview Street will need to be coordinated with San Juan County and in accordance with the WSDOT Guidelines for Amending Functional Classification in Washington State to provide better vehicle and pedestrian access.
4.4.5 Mt. Baker Road

The realignment of Mt. Baker Road outside of the RPZ for Runway 34 is a long-range plan which will be developed in conjunction with planning for the San Juan County transportation network on the island. Implementation is dependent on land acquisition, the availability of funding, environmental studies, and many other factors. Although the final configuration of the road will be the result of much detailed planning, a likely alignment for it is shown in Figure 4.10.

4.5 Environmental Considerations

The following is a screening-level evaluation of environmental impacts that would potentially result from the projects included in the preferred development alternative. The purpose of this evaluation is to evaluate the airport alternatives and to provide information that will help expedite subsequent environmental processes, including a National Environmental Policy Act (NEPA) evaluation. This evaluation addresses only those environmental impact categories outlined in FAA Order 5050.4, NEPA Implementing Instructions for Airport Projects, that are likely to be affected by the preferred development alternatives under consideration as part of the Airport Master Plan Update. A comparison of the environmental impacts associated with each Alternative described earlier in this chapter is presented in Table 4.2 (Appendix X).
4.5.1 Air Quality

The airport is located within an area designated as being “in attainment” for all criteria pollutants under the NAAQS. The proposals presented as a part of the recommended development plan are not anticipated to result in substantively different assessments related to Air Quality. Air quality, including construction emissions, would need to be considered for any future project during the environmental documentation process in compliance with FAA’s National Environmental Policy Act (NEPA) guidelines.

4.5.2 Biological Resources

**Threatened and Endangered Species.** As provided in the Inventory chapter, according to the USFWS’s Information for Planning and Conservation (IPAC) website, no candidate, threatened, or endangered species are likely to be present on the airport, nor is any critical habitat found within the airport property. Migratory birds are known to occur on and around the airport, but these species are not currently listed as federally threatened or endangered. Two threatened fish species are known to occur in San Juan County, Bull Trout (*Salvelinus confluentus*) and Dolly Varden (*Salvelinus malma*). Even though these species and their habitat are unlikely to be present on the airport, they could be negatively impacted by the increased areas of impervious surface associated with the proposed construction and operation of the Southeast Development Area, Westside Development Area, runway widening (including filling of the excavated boat slip channel at Brandt’s Landing marina), and taxiway relocation projects. Stormwater runoff from these impervious surfaces could contribute to increased turbidity and pollutant levels downstream of airport property, where these species reside. It is recommended that a storm water runoff analysis be included in the design of all projects that would result in increased impervious surface, and that development plans include measures to provide adequate pollutant removal for water leaving airport property and entering downstream waters.

**Essential Fish Habitat (EFH).** As presented in the Inventory chapter, the airport is in an area designated as EFH for Chinook, Coho, and Pink salmon. These species may occur in the waters to the north of the Airport property. Alteration of on-site wetlands or stream channels that drain to Puget Sound, filling of the excavated boat slip channel at Brandt’s Landing marina, and construction-generated erosion could have a negative impact on EFH. As described above for threatened and endangered species, it is recommended that a storm water runoff analysis be included in the design of all increased impervious surface projects, and measures to control erosion and treat runoff generated by Airport improvements should be incorporated in to final Airport improvement plans.

**Migratory Bird Treaty Act/Bald and Golden Eagle Protection Act**

As described in the inventory chapter, the project area is within the Pacific Flyway bird migration route, which encompasses all of Washington state. Many common migratory bird species nest and breed along this flyway route. There are no known bald eagle nests on airport
property, however a bald eagle nest survey should be conducted during the NEPA process that will be part of the master plan implementation. Proposed Airport development plans should include seasonal construction timing restrictions to minimize the possibility of harming migratory birds and bald eagles.

4.5.3 Climate

The amount of GHG emissions created at the Airport are unknown; however, due to the modest operations at this airport, emissions are likely minimal. Implementation of the proposals contained in the recommended development plan are unlikely to cause an appreciable increase in GHG emissions.

4.5.4 Coastal Resources

As described in the Inventory chapter, San Juan County is one of 15 counties within the state of Washington’s Coastal Zone. As such, the Airport must demonstrate that proposed projects will not result in adverse effects to coastal resources.

4.5.6 Department of Transportation Act, Section 4(f) Resources

As presented in the Inventory chapter, two publicly-owned areas that could be 4(f) resources are located approximately 0.75 mile from the Airport. One 4(f) resource, a non-motorized trail, is located on land owned by the Port of Orcas between Mt. Baker Road and Enchanted Forest Road. The trail runs along the east side of the Runway 34 RPZ.

All proposed realignments of the road would impact the trail. The NEPA analysis should evaluate direct impacts to the trail and consider whether any indirect impacts (i.e. noise) might occur to the other nearby 4(f) properties.

4.5.7 Historical, Architectural, Archaeological, & Cultural Resources

As described in the Inventory chapter the Michael and Myrna Donohue House, located at 1159 North Beach Road approximately 700 feet east of the airport terminal building was nominated for the National Register of Historic Places and is on the Washington Heritage Register. A cultural resources survey carried out for the Airport in 2015 (Reference) included extensive pedestrian and subsurface surveys and identified no cultural resources. Based on this analysis, it is not anticipated that any historic, architectural, tribal, or cultural resources will be affected by any proposals presented in the recommended development plan. However, it is advised that a cultural resources survey be conducted that analyzes the potential archaeological, tribal, or cultural resources and Section 106 of the National Historic Preservation Act (NHPA) and Government to Government consultation be completed prior to the earthwork conducted for proposed airport improvements on previously-undeveloped areas including the Southeast Development Area and the Westside Development Area.
4.5.8 Natural Resources and Energy

As described in the inventory chapter, FAA guidance asserts that Airport improvement projects will be examined to identify effects on local energy supplies or natural resources. If impacts are identified, energy producers and environmental stakeholders must coordinate activities. It is not anticipated that any of the proposed airport improvements will have an appreciable impact on energy supplies or natural resources.

4.5.9 Noise and Noise-Compatible Land Use

As presented in the Inventory chapter, the existing and future levels of aircraft operations at the airport do not warrant a full noise modeling effort for this Master Plan Update. However, noise modeling may be conducted as part of the NEPA evaluation that will be conducted for the proposed Airport improvement projects.

4.5.10 Land Use

According to Title 18, Unified Development Code of the San Juan County Code, land use designations are applied as established by the 1998 San Juan County Comprehensive Plan. As presented in the Inventory chapter, the land use designations within the properties surrounding the airport are Service and Light Industrial, Marina, and areas designated as Eastsound Residential and Village Residential/Institutional which includes a mix of residential densities. The proposals contained in the recommended development plan will not change the fundamental nature of the airport nor will there be an overall increase in the size or numbers of aircraft currently operating at the airport. Therefore, the proposals are not expected to have a detrimental effect on surrounding land uses.

4.5.11 Socioeconomics, Environmental Justice, & Children’s Environmental Health/Safety Risks

As presented in the inventory chapter, there are no concentrations of minority or low-income populations within the immediate vicinity of the Airport. In addition, there are no places where children congregate (e.g., schools, recreation centers, or daycare centers) immediately adjacent to the Airport, although Buck Park, Orcas Island Skatepark, Orcas Island Middle School, Of People And Land (OPAL) Housing, Orcas Christian School, and Eastsound Village Green Park are located within a mile to the south/southeast of Airport property. It will be necessary to evaluate the impacts, in particular potential changes in noise, of future projects on these properties. A noise study may be warranted to document existing conditions at these locations.

4.5.12 Water Resources

Wetlands and Waterways
As provided in the Inventory chapter, according to the U.S. Fish and Wildlife Service National Wetlands Inventory (NWI), San Juan County wetlands mapping
http://sjcgis.org/arcgis/rest/services/CAO/Wetlands/MapServer, and a wetland study conducted for the airport in 2015 (WRI 2105), there are estuarine and marine deep-water and wetland habitats, freshwater emergent wetlands, freshwater forested/shrub wetlands, freshwater ponds, and streams on and in the vicinity of the Airport property. A list and descriptions of these aquatic resources is presented in Table 1.7 in the Inventory chapter. Table 4.2 provides a list of the projects included in the preferred development alternative, the baseline environmental conditions at the proposed project location, potential environmental impacts, and the anticipated environmental studies and permits required for each.

Prior to implementing any of the proposals contained in the recommended development alternative a qualified wetland biologist should confirm the presence or absence of jurisdictional wetlands, determine the extent of potential wetland impacts associated with the identified projects, and work with the Airport to propose appropriate mitigation measures.

**Floodplains**
As presented in the inventory chapter the airport is not located within or near a floodplain and therefore no floodplain impacts will occur as result of any of the proposed projects.

**Water Quality**
As presented in the Inventory chapter, there are no impaired streams, impaired waterbodies, or wild or scenic rivers near the airport. Surface water originating from the southern portion of the Airport flows south beneath Mt Baker Road, through wetlands and an un-named stream channel, ultimately draining to Fishing Bay. Surface water originating from the central and northern portions of the Airport flows north through a pipe located beneath the airport and then flows north through an open channel to the Strait of Georgia.

Widening of the runway and relocating the parallel taxiway to the east will directly impact streams and wetlands. Additional impervious surfaces associated with the runway-widening and the proposed Southeast and Westside Developments have the potential to negatively impact water quality both on the Airport and off-site. The Airport will conduct a drainage study to identify appropriate stormwater treatment measures to be implemented as part of the proposed improvements.

**Wild & Scenic Rivers**
There are no Wild & Scenic Rivers identified in San Juan County and therefore there will be no impacts to Wild & Scenic Rivers from any proposed Airport improvement projects.