Introduction

The purpose of this chapter is to present the Development Plan for Paine Field, in terms of both its concept and reasoning. This chapter provides a description of the various factors and influences, which will form the basis for the ultimate plan and program.

In concert with the status of the airport, some basic assumptions have been established which are intended to direct the development of the airport in the future. These assumptions are supported by the aviation activity forecasts and the various considerations on which the forecasts have been based. The assumptions also focus on continued airport development that centers upon facility enhancement, supports community needs, and generates economic growth.

Assumption One. The airport will be developed and operated in a manner that is consistent with the Snohomish County Code, federal and state statutes, federal grant assurances, and Federal Aviation Administration regulations.

Assumption Two. This assumption recognizes that this Master Plan Update for the airport is only the most recent effort in an on-going, long-term planning effort for Paine Field. In particular, the provisions and recommendations made in the 1978/79 Mediated Role Determination shall be considered in the formulation of development recommendations.

Assumption Three. This assumption relates to the size and type of aircraft that will utilize Paine Field and the resulting setback and safety criteria used as the basis for the layout of airport facilities. Because various areas on the airport are intended for use by aircraft with widely varying physical and operational characteristics, they can be designed with different criteria. For Runway 16R/34L and its supporting taxiway/ramp system, the design aircraft is the B-747-400. These portions of the airport should be designed using Airport Reference Code (ARC) D-V criteria. For Runway 16L/34R and Runway
Assumption Four. Because of the importance of the general aviation and industrial aviation activity at the airport, the fourth assumption relates to the need for the airport to accommodate aircraft operations with great reliability. This indicates that the airport's runway system should be developed with adequate runway lengths and approach guidance facilities to accommodate the forecast operations under almost all weather conditions. In addition, the airport's runway and taxiway system should be designed to maximize operational flexibility and facilitate large aircraft industrial operations.

Assumption Five. Because landside development area at the airport is at a premium, the fifth assumption is that the plan for future airport development should strive to maximize the area available for aviation related activities. Aviation and non-aviation areas should be developed to be compatible with surrounding areas, as well as provide the maximum amount of revenues to help support airport operating and maintenance expenses.

Assumption Six. The sixth assumption focuses on the relationship of the airport to off-airport land uses and the compatible and complimentary development of each. This is inherent in the design considerations and placement of facilities so as to complement, to the maximum extent possible, off-airport development, and to enhance the compatibility of the airport environs with the operation of the airport.

Assumption Seven. This assumption states that, in consideration of the congested airspace surrounding Paine Field and in the Seattle Metropolitan Area, recreational activities such as parachuting, ballooning, and ultra-light activity will be discouraged from occurring near the airport.

Goals for Development

Accompanying these assumptions are several goals that have been established for purposes of directing the plan and establishing continuity in the future for airport development. These goals take into account several categorical considerations relating to the needs of the airport both in the short-term and the long-term, including safety, noise, capital improvements, land use compatibility, financial and economic conditions, public interest and investment, and community recognition and awareness. While most are project oriented, some obviously represent more tangible activities than others; however, all are deemed important and appropriate to the future of the airport.
It should be noted that *A Strategic Vision for Economic Strength* plan was completed in September 1993 and developed for Snohomish County. This economic and investment plan recognizes the need for Snohomish County to, "stabilize and expand its manufacturing base, educate the citizens, provide for safe neighborhoods, and build the infrastructure that allows the community to become a more diverse place with all the amenities needed and desired." The Snohomish County General Policy Plan, as updated in 1999, sets an objective to “maximize the growth potential of local Port and Airport resources through continued commitment of public financial resources, improved transportation access to the physical sites, and aggressive marketing”.

As reflected in the following goals, which are intended to guide the preparation of this Master Plan Update and future development at Paine Field, the airport plays a vital role in this strategic vision both as a transportation facility and an industrial/commercial economic center.

Master planning and airport development goals:

• Provide effective direction for the future development of Paine Field through the preparation of a rational plan, followed by periodic updates and adherence to the adopted development program.

• As stated in the 1978/79 Mediated Role Determination adopted by the County as a policy statement, the airport has a "General Aviation" role. Activities that would be encouraged to continue and expand include: general aviation, aircraft related industries, business and corporate aviation, public service aviation, and air taxi/commuter service.

• Mitigate negative airport impacts on surrounding residential development.

• Because of the operational requirements of the existing and projected aircraft fleet, the existing runway lengths at Paine Field should be retained.

• The instrument approach capabilities of Runway 16R/34L should be maximized.

• Maximize the aviation development area at Paine Field. This includes planning for the best use of the airport's undeveloped areas, planning for the redevelopment of several areas on the airport, and utilizing building designs that make efficient use of the limited amount of aviation-use land available (e.g., connected hangars vs. individual hangars).
• Enhance the self-sustaining capability of the airport by ensuring the highest and best use of airport land that maximizes revenue to offset the airport’s operation and maintenance expenses.

• Plan and develop the airport to be environmentally compatible with the community and minimize environmental impacts on both airport property and property adjacent to the airport. Specifically, this has included development of high quality wetland compensation banks, storm water detention areas, and noise berms/walls. In addition, adverse noise intrusion should be minimized through aircraft operations planning and land use compatibility planning.

• Encourage the protection of the significant County and Federal investment in the airport’s land and facilities, by striving to minimize existing and potential land use conflicts.

• Plan and develop the airport to be capable of accommodating the future needs and requirements of the county and surrounding communities, thus continuing to serve as a regional general aviation/industrial aviation facility.

• Continue to minimize and mitigate activities and development at the airport that might encourage aviation wildlife hazards.

Airside Development Concepts and Alternatives

Introduction

To best accommodate the projected operational demand at Paine Field through the year 2021, it is important to first analyze any alternatives related to future runway and/or instrument approach development. As defined in FAA planning terminology, airside facilities are those that are used during the active movement of aircraft; i.e., instrument approach facilities/equipment, runways, and taxiways.

In the formulation of alternatives, the forecast operations and goals of Snohomish County relative to aviation development and economic enhancement were considered. These generalized alternatives are discussed in the following narrative. Following a review of these airside development alternatives, the purpose of which is to fulfill major facility requirements (basic runway configuration), recommendations for landside development are presented. For purposes of this Master Plan Update, landside facilities consist of aircraft parking aprons, hangar development areas, terminal area development, industrial aviation development areas, associated use areas, and airport access. The conclusion of this chapter will be the presentation of a generalized conceptual airport
development plan that will include recommendations for runway and taxiway improvements along with an on-airport land use plan. Details related to the exact alignment and configuration of the runway/taxiway system and the layout of landside development areas will be presented in a following chapter, entitled AIRPORT PLANS.

Because all other airport functions relate to and revolve around the basic runway/taxiway layout, airside development alternatives must first be carefully examined and evaluated. Specific considerations include taxiway layout, runway length, as well as runway orientation and instrument approach capabilities needed to support forecast use through the planning period. The main objective of the alternatives analysis presented herein is to analyze those alternatives that will result in a runway/instrument approach system capable of accommodating the forecast aircraft operations.

Alternatives

As stated previously, the basic runway system existing at the airport will remain in place for the foreseeable future. The need for additional runways or any major modification (extensions, approach threshold relocation, etc.) to the runway system has not been identified in this Master Plan Update.

There is, however, the need to examine the feasibility of implementing improved instrument approach capabilities at the airport. The north end of the main runway (Runway 16R) currently has precision instrument approach capabilities, while the south end of the main runway (Runway 34L) has a non-precision instrument approach. The secondary parallel runway (Runway 16L/34R), and the crosswind runway (Runway 11/29) are currently visual approach runways.

The single precision approach at Paine Field [Category I Instrument Landing System (ILS) approach from the north to Runway 16R] currently has precision instrument approach capabilities, while the south end of the main runway (Runway 34L) has a non-precision instrument approach. The secondary parallel runway (Runway 16L/34R), and the crosswind runway (Runway 11/29) are currently visual approach runways.

The single precision approach at Paine Field [Category I Instrument Landing System (ILS) approach from the north to Runway 16R] has some limitations with regard to full compliance with the airport’s published Noise Abatement Program (NAP). To minimize low level flight over populated areas, the NAP for jet, turboprop, and large propeller aircraft discourages circling approaches, and requests pilots avoid turns before reaching the shoreline when departing on Runway 34L. When winds require landing from the south (Runway 34L), the single precision approach from the north makes a circling approach a necessity in instrument weather conditions. When winds require departures on Runway 34L, departing aircraft are often placed in a “head to head” conflict with aircraft on the Runway 16R instrument approach. Under these conditions, air traffic controllers require the departing aircraft to turn as soon as possible after departure to maintain a safe separation between the converging aircraft. The amount of instrument approach training activity at Paine Field is significant and is projected to increase in the future; thus, the frequency of the operational conditions described above is likely to increase in the future.
The options for improving this situation have been reviewed, including the potential for a second precision instrument approach to one of the other runway ends. The 1995 Paine Field Master Plan indicated that Runway 34L will have precision instrument approach capabilities with visibility minimums less than ¾ mile in the future. Appropriately, this provision was made in the 1995 Master Plan simply to protect the ability to implement a Runway 34L precision approach if feasible at some point in the future.

As described previously in the *CAPACITY AND FACILITY REQUIREMENTS* chapter, providing the best instrument approach capabilities that are feasible at Paine Field are very important from an airport utilization and safety standpoint. The better the instrument approach capabilities, the less time the airport might be non-operational due to poor weather conditions. The airport experiences weather conditions with cloud ceilings and/or visibility conditions less than VFR minimums, but greater than the precision approach weather minimums (200-foot cloud ceiling and/or visibility of ½ mile) approximately 8.9% of the time annually. Weather conditions with cloud ceilings and/or visibility conditions less than VFR minimums, but greater than the non-precision approach weather minimums associated with Runway 34L (421-foot cloud ceiling and/or visibility of ¾-mile) occur approximately 7.7% of the time annually.

With regard to the previously stated goals, alternative examination is intended to maximize the instrument approach capabilities at the airport. The airspace around Paine Field and in the Seattle Metropolitan area is complex with many interrelated issues. In addition, facility and technological improvements (e.g., radar and GPS) are in the process of being implemented, which will change how air traffic and approach procedures are controlled in the vicinity of Paine Field.

There are two sets of characteristics that are analyzed in considering the implementation of improved instrument approach capabilities. The first is physical; i.e., on-site facilities, lighting, and property ownership. The second is land use within the Runway Protection Zone (RPZ). The RPZ’s function is to enhance the protection of people and property on the ground. FAA policy standards indicate that certain land uses are to be prohibited within an RPZ; e.g., fuel storage facilities, residences, and places of public assembly. The FAA strongly recommends that an airport owner have control of the entire RPZ area through acquisition of sufficient property interest to control the height of objects and land use. If the airport has ownership control of the RPZ area, the land use policy standards with regard to prohibited activities are enforced as requirements. Where it is impracticable for the airport sponsor to acquire full control of the RPZ area, the RPZ land use standards have recommendation status for the portion of the RPZ not controlled by the airport owner.
**Recommendation.** Following additional discussion with several FAA divisions, it is recommended that the airport should continue to protect for a lower-than ¾ mile visibility minimum precision approach to Runway 34L. A detail of the physical layout of existing and future RPZs, approach lighting systems, and instrument approach facilities is provided in the following illustrations. The first illustration is entitled **RUNWAY 34L INSTRUMENT APPROACH DETAIL NOT LOWER THAN ¾-MILE VISIBILITY MINIMUM.** The second illustration is entitled **RUNWAY 34L INSTRUMENT APPROACH DETAIL LOWER THAN ¾-MILE VISIBILITY MINIMUM.** As can be noted, the existing approach visibility minimum can be accomplished with a relatively simple Medium Intensity Approach Light System with Sequenced Flashing Light (MALSF). To support a lower than ¾-mile visibility minimum approach, a more sophisticated Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALS) is needed.

This is a long-term recommendation. The demand for a low minimum precision instrument approach to Runway 34L is presently not sufficient to justify its implementation; however, at some point in the future this improvement may become more important. Even if a lower minimum approach is programmed in the future, it remains a priority that a straight-in VOR approach (and/or a better more usable non-precision GPS approach) be established to serve Runway 34L.

**Taxiway Improvements**

The existing taxiway system at the airport is arranged to be an efficient and safe system to facilitate the movement of aircraft to and from the runway system. As additional aviation facilities are developed, (e.g., on the west side of the airport), new access taxiways will be constructed as needed.

**Recommendation.** From a general airport-use standpoint, several taxiway improvements have been identified. First, a 90° exit taxiway from the main runway to Taxiway A between existing Taxiways A-2 and A-3 would be well utilized by many large (e.g., Boeing 767/777) aircraft landing on Runway 34L. The second is to ensure that proper object setback standards are met to allow large aircraft (B-747-400) unimpeded use of the south end of Taxiway A. This will require limiting access to the west side of an older hangar structure (#221), along with the ARFF/maintenance building, and some relocation of fencing.

To support the substantial concentration of small aircraft storage hangars on the west ramp, a new taxiway connecting Taxilane E and Taxilane H should be constructed west of and parallel to Runway 11/29. Also, a run-up area should be constructed adjacent to Taxiway A-4. In addition to maintaining Taxiways K-5 and K-6, the west side of the main runway should be provided with new access taxiways opposite A-1 and opposite the above mentioned new 90°exit between Taxiways A-2 and A-3.
Figure D1 Runway 34L
Instrument Approach Detail
Not Lower Than 3/4-mile Visibility Minimum
Figure D2 Runway 34L
Instrument Approach Detail
Lower Than 3/4-mile Visibility Minimum
Recommended Airside Development Plan

The airside development discussion provided above is intended to present Snohomish County with potential options to facilitate the formulation of an ultimate layout of facilities at the airport. Because no major changes in the runway/taxiway system at the airport are envisioned, the alternative considerations are limited. The development options were discussed with the Study Advisory Committee, Airport Staff, and the FAA before a decision was made on the preferred long-term layout of future airside facilities. The following illustration, entitled AIRSIDE DEVELOPMENT PLAN, provides a graphic illustration of existing and proposed airside facilities, along with the areas encompassed by runway safety areas, runway object free areas, critical taxiway object free areas, building restriction lines, and runway protection zones. It also indicates those areas on airport property that are outside of all the runway safety and object clearing zones, and are available for future development of landside facilities.

Landside Development Concepts

Introduction

With the framework of the airport's ultimate airside development identified, alternatives involving the placement of needed landside facilities can now be analyzed. The overall objective of the landside development at the airport is the provision of facilities that are conveniently located and accessible to the community, which accommodate the specific requirements of airport users. For purposes of this Master Plan Update, landside facilities consist of aircraft parking aprons, hangar development areas, terminal area development, industrial aviation development areas, associated use areas, and airport access.

Definitions

Several terms are used in the following paragraphs to identify development areas that require definitions:

Runway, Taxiway, and Approach System. These areas are reserved for aircraft movement and approach protection. They include all areas that are contained in FAA defined Runway Safety Areas, Object Free Areas, and all the area inside the established Building Restriction Line. The distance that a building restriction line is located away from a runway varies, depending on the largest aircraft designated to use a particular runway, the instrument approach capabilities provided to the runway, and the height of buildings (above the runway surface) expected in a certain area.
Runway Protection Zones. These areas include all existing and future Runway Protection Zones (RPZs). As stated above, the RPZ's function is to enhance the protection of people and property on the ground. The FAA recommends that an airport owner have control of the entire RPZ area through acquisition of sufficient property interest to control the height of objects and land use; however, where it is impracticable for the airport sponsor to acquire full control of the RPZ area, the requirements for land use control are considered to be recommendations.

Aviation Use Development With Taxiway Access. These areas are outside of the Building Restriction Lines (BRL) associated with the runway system and possess physical characteristics indicating the potential for taxiway access at some point in the future. The ability to provide these areas with taxiway access indicates that they should be reserved for aviation use.

Airport Compatible Development Without Taxiway Access. All future development within the bounds of the airport will be compatible with the primary purpose and function of the airport and will bring in lease revenue to support the operation of the airport. Some areas of the airport are not likely to be provided with taxiway access and are not identified for aviation use (although they can be utilized for an aviation support activity that does not require runway/taxiway access). The revenue generation potential of these areas will vary based on local traffic and road access. The development proposal for each specific site must be customized in consideration of these locational characteristics. County code should be modified to allow hotel development that supports airport activity.

Specific proposals for non-aviation use will undergo additional review.

Future Airport Property Acquisition. Because of their strategic locations adjacent to existing airport property, three parcels of land in the southeast quadrant of the airport have been identified for potential acquisition. If acquired, these three parcels will remain in airport compatible, non-aviation use.

Using these definitions, the potential uses of airport property can be established using the overall guideline that all airport property, which can be reasonably provided with taxiway access, should be reserved for aviation use in the long-term. The land use concept for the airport is presented by geographic area in the following illustration, entitled ON-AIRPORT LAND USE PLAN. In addition to designation of land use, the size
of aircraft [by Airplane Design Group (ADG)] likely to use each area has also been identified. The wingspans associated with the various ADGs, along with example aircraft types are listed below.

- **ADG 1** – Wingspans up to 49 feet, including most of the small propeller driven general aviation aircraft.
- **ADG 2** – Wingspans of 49 feet up to 79 feet. This group includes all of the larger general aviation aircraft and a majority of the business jets, with the exception of the new very large business jets. The turboprop and regional jet commercial passenger aircraft are also included in this category.
- **ADG 3** – Wingspans of 79 feet up 118 feet. This group includes the new very large business jets (e.g., the Boeing Business Jet, the Gulfstream V, etc.) and most of the narrow body commercial passenger jet aircraft (i.e., the B-737, A-320, MD-80, etc.).
- **ADG 4** – Wingspans of 118 feet up to 171 feet. This group includes the largest narrow body commercial passenger aircraft (the B-757, etc.) and the smaller wide body commercial passenger aircraft (the B-767, MD-11, etc.).
- **ADG 5** – Wingspans of 171 feet up to 214 feet. The larger wide body commercial passenger aircraft (B-747, B-777, etc.) are included in this design group.
- **ADG 6** – Wingspans of 214 feet up to 262 feet. This group includes very large cargo aircraft (i.e., the AN-124 and the Lockheed C-5B).

**Conceptual Development Plan**

**Introduction**

The next step in the establishment of a long-term development plan for Paine Field is to, where possible, detail the shape of development areas and/or formulate a conceptual building layout for the land use areas presented in previous illustrations. These more detailed conceptual building area plans and structure locations can only be provided for parcels where a relatively good idea of demand can be established.

The focus of the Conceptual Development Plan proposal is on the various sites that are currently available for new development and those sites where redevelopment (removal of old facilities and replacement with new) is likely to occur. An illustration of the **CONCEPTUAL DEVELOPMENT PLAN** is provided on the following page.
Area A (Central, Terminal, and North Ramps)

This area is located between the parallel runways, north of Runway 11/29. Currently, it is one of the most intensely developed areas on the airport. The efficient use of the available development space in Area A is critical. It currently contains a variety of functions, such as airport administrative offices, general aviation terminal facilities, general aviation hangars, FBO facilities, corporate aviation facilities, and industrial aviation facilities, which front on the airport’s Central, Terminal, and North Ramps.

Because the area has excellent airside and landside access, including an adequate aircraft parking ramp, it is programmed to continue to accommodate many of the airport's general aviation, industrial aviation, and administrative facilities, along with the airport's passenger terminal facility. It is expected that, in the long-term, the industrial aviation uses in Area A will be shifted to other areas on the airport.

Following the events of September 11, 2001, increased security requirements have restricted automobile parking in close proximity to a passenger terminal building (±300 feet, depending on the structural design of the terminal building). It is expected that these increased security requirements will remain in place for the foreseeable future. Because of this, if commercial passenger service is initiated at Paine Field (even a limited regional service such as Horizon Airlines’ recent proposal for a Paine Field to Portland route), it will be extremely unlikely that the passenger terminal function could be accommodated in an existing structure within Area A. Therefore, a new terminal building/administration building located in the infield area northeast of the intersection of Runway 16R/34L and Runway 11/29 is being proposed. Security requirements of the Federal Aviation Administration and the Transportation Safety Administration are evolving and the further refinement of the proposed terminal location recommendation may be required. A site for a new Aircraft Rescue and Fire Fighting facility has also been identified in the northwest corner of Area A.

In addition to the passenger terminal facility development area described above, Area A has two other undeveloped tracts that are identified for aviation use development. The first is located on the northeast end of the inner terminal ramp, east of the new Air Traffic Control Tower (ATCT). This area, along with the Passenger Terminal Development area will be designed to accommodate the largest business jets and the small to medium size commercial passenger service aircraft (i.e., Gulfstream V, B-737, etc. - ADG 3). This area is programmed for the development of FBO/General Aviation Terminal facilities. The second is located in the northeast corner of Area A (the north ramp area). This area will continue to be developed for hangar facilities to accommodate medium to large general aviation aircraft (up to ADG 2 aircraft).
In addition, the north side of the Central Ramp area will likely be redeveloped for aviation use. This area currently contains the airport’s restaurant (Building C-57), along with Buildings C-5 and C-71. When redeveloped, this area will continue to support facilities for smaller general aviation aircraft (ADG 1).

**Area B (West Ramp and South Ramp)**

This area is located between the parallel runways south of Runway 11/29. Like Area A, Area B is also intensely developed. Existing facilities include the industrial aviation facilities (primarily related to Goodrich Inc.) and general aviation facilities.

It is important that potential development areas within Area B be well utilized. New general aviation hangars are programmed for the eastern portion of the west ramp. In addition, the eastern portion of Area B (adjacent to Runway 16L/34L - containing buildings C-19, C-20 C-21, C-22, and C-23) is programmed for aviation redevelopment, which will be focused on general aviation use.

The potential to accommodate new industrial aviation development is identified in the area to the southwest of Goodrich Hangar 3. Industrial aviation redevelopment is identified for the South Ramp area (Buildings 201 and 207). The south ramp has also been identified as the location on the airport that could accommodate a temporary use by large air cargo aircraft.

Because potential development areas on the airport, or directly adjacent to the airport, are at a premium and to ensure land use compatibility, the former Navy Housing tract in Area B was acquired in 1996. The majority of this tract (the southern portion of Area B) is identified for Airport Commercial/Industrial Development.

**Area C (Bomarc)**

This area is located east of Runway 16L/34R and northeast of Airport Road. In addition to continued use of the area for the Bomarc Business Park and its related functions, the area south of 100th St S.W. (currently containing Snohomish County Public Works Department facilities) should be utilized for airport compatible commercial/industrial development. In addition, the plan identifies a parcel of land to be acquired on the east side of the county maintenance area.

**Area D (East Ramp)**

Area D is located East of Runway 16L/34R and currently contains several general aviation hangars. The portion of the area adjacent to the parallel taxiway on the east side of Runway 16L/34R, which is undeveloped, is designated for aviation use and should be
utilized for additional general aviation facilities (ADG 1). The tract in Area D, south of Minuteman Lane, is designated for airport compatible commercial/industrial development and currently contains the County’s Solid Waste Transfer Station. In addition, there is a small tract in Area D located directly east of the Runway 34R RPZ, along with an adjacent tract that is recommended for acquisition. These tracts are programmed for Airport Compatible Commercial/Industrial facilities.

**Area E (West Side-North)**

This area is located west of Runway 16R/34L north of the RPZ associated with the approach to Runway 11. This area is currently undeveloped; however, it has excellent potential for taxiway access and has been designated to be used primarily for aviation facilities. This area can accommodate large corporate-type general aviation facilities or industrial aviation functions (e.g., expansion area for the Boeing Company, which has leasing right-of-first-refusal on this property). The layout of Area E facilities can be designed to accommodate large aircraft (up to ADG 5). The northern most portion of this area has been identified for commercial aviation/airport-related facilities including tour center, hotel, restaurant, and museum development.

**Area F (West Side-South)**

Area F is located west of Runway 16R/34L, south of the Runway 11 RPZ. The site immediately south of the Runway 11 RPZ contains several wetlands and has a significant amount of topographic relief; therefore, development for aviation use facilities will be limited to only that area in close proximity (within 950’ of runway centerline) to the runway, where earth fill quantities will be minimized.

The portion of Area F that is adjacent to Taxiways K-5 and K-6 is programmed for aviation use. This site is likely to accommodate large corporate-type general aviation facilities. To minimize the amount of fill needed for the construction of hangars on the northern portion of Area F, it is anticipated that a partial parallel access taxiway will be constructed which slopes down from Taxiway K-5.

The area south of Taxiways K-5 and K-6, in Area F, is programmed for airport compatible development. Some of the area will remain open to accommodate existing wetlands. In the past, a park & ride facility has been proposed for the southern portion of this area.
Environmental Processing Requirements

A general explanation of the Federal [National Environmental Policy Act (NEPA)] and State [Washington State Environmental Policy Act (SEPA)] environmental documentation/clearance process is provided below.

Federal. In 1969, Congress passed the National Environmental Policy Act (NEPA) that required Federal agencies to consider the environmental impact of Federal actions. As a result of the NEPA, the FAA has developed detailed guidance documents titled FAA Order 1050.1D “Policies and Procedures for Considering Airport Environmental Impacts”, and for airport development actions, FAA Order 5050.4A “Airport Environmental Handbook”. In addition to describing the contents of environmental documents, these FAA orders describe the process by which Federal agencies are required to consider environmental issues as a part of their decision-making.

As is noted in FAA Order 5050.4A, not all development proposals require the preparation of environmental documents. This order specifically identifies the following categories for considering the environmental impact of Federal actions:

- **Categorical Exclusions** are projects excluded from the need to prepare environmental documents, as their impacts are presumed to not be significant;

- **Environmental Assessment (EA)** - if a project might result in environmental impacts, an EA is often prepared. If the action is found to result in a significant environmental impact that is not mitigated, an EIS is then prepared. If no significant unmitigated impacts are identified, the Federal agency then typically issues a Finding of No Significant Impact (FONSI).

- **Environmental Impact Statement (EIS)**: An EIS is a detailed assessment of the impacts of a proposed action and its alternatives.

The following table, entitled *ACTIONS UNDER NEPA REQUIRING VARIOUS TYPES OF ANALYSIS*, lists the actions that typically require one of the above types of actions.
**Table D1**

**ACTIONS UNDER NEPA REQUIRING VARIOUS TYPES OF ANALYSIS**

*Paine Field Master Plan Update*

<table>
<thead>
<tr>
<th>Categorical Exclusions **</th>
<th>Environmental Assessment /FONSI **</th>
<th>Environmental Impact Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway, taxiway, apron, or loading ramp or repair work except where project will create adverse off-airport impacts</td>
<td>Airport location</td>
<td>First time Airport Layout Plan Approval for a Particular Airport</td>
</tr>
<tr>
<td>Installation or upgrading of airfield lighting systems</td>
<td>New runway (except as noted for an EIS)</td>
<td>A new runway capable of accommodating air carrier aircraft in a major metropolitan area</td>
</tr>
<tr>
<td>Installation of miscellaneous items including segmented circles, wind or landing direction indicators, fencing, etc.</td>
<td>Major runway extension</td>
<td>Actions for which an EA has shown the need to prepare an EIS</td>
</tr>
<tr>
<td>Construction or expansion of passenger handling facilities</td>
<td>Change in runway strength that could result in a significant noise increase to noise sensitive uses inside 65 DNL</td>
<td></td>
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<tr>
<td>Construction, relocation or repair of entrance and service roadway</td>
<td>Construction or relocation of entrance or service road connections to public roads which adversely affect roadway capacity</td>
<td></td>
</tr>
<tr>
<td>Grading or removal of obstructions on airport property and erosion control actions with no off-airport impacts</td>
<td>Land acquisition associated with the above</td>
<td></td>
</tr>
<tr>
<td>Landscaping generally, and landscaping or construction of physical barriers to diminish impact of airport blast and noise</td>
<td>Establishment or relocation of instrument landing system or an approach lighting system</td>
<td></td>
</tr>
<tr>
<td>Projects to carry out noise compatibility projects</td>
<td>Any action that triggers: ✓ Use of DOT 4(f) land (such as a park or historic site) ✓ Effect on a site on or eligible for listing on the National register of Historic Places ✓ Conversion of valuable farmland ✓ Impacts to wetlands, coastal zones, or floodplains ✓ Impacts to endangered species</td>
<td></td>
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<tr>
<td>Land acquisition associated with any of the above</td>
<td>Conveyances of government land for airport purposes</td>
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<tr>
<td>Federal release of airport land</td>
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<tr>
<td>Removal of Displaced Thresholds</td>
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</table>

** ** Extraordinary Circumstances- Issues such as impacts to DOT 4(f) lands, wetlands, coastal zones, endangered species, historic sites, protected farmland may require a higher level of environmental impact analysis. In addition, “an action that is likely to be highly controversial on environmental grounds” may represent extraordinary circumstances if opposed on environmental grounds by a Federal, State or local governmental agency or is opposed by a substantial number of persons affected by the action.
State. First adopted in 1971, the State Environmental Policy Act (SEPA) provided Washington State’s basic environmental charter. Several years of committee work led to the 1974 legislative creation of the Council on Environmental Policy to write rules to interpret and implement SEPA. SEPA was modeled after the NEPA, and became effective in January 1976 (Washington Administrative Code 197-10). Within SEPA, the following types of environmental processing are required:

- **Environmental Checklist** – a formal screening analysis to identify if the impacts of the project are significant and require mitigation. If the impacts are determined to be non-significant, the responsible SEPA official can issue a notice or “Determination of Non-Significance” (DNS). If impacts are not significant after mitigation, the responsible SEPA official could also issue a “Mitigated Determination of Non-Significance” (MDNS).

- **Environmental Impact Statement** – if the impacts of the project are likely to be significant, the responsible SEPA official may require preparation of an EIS.

**Environmental Considerations**

Federal

In consultation with the Federal Aviation Administration, the critical environmental aspects for this Master Plan were identified as Aircraft Noise Exposure and Air Quality. From a federal perspective, no “project construction” environmental clearance is attributed to an Airport Master Plan. Therefore, no environmental impact documentation is required as an element of the preparation of an Airport Master Plan. It is also recognized that the implementation of the improvements specified in this Master Plan could have environmental consequences and that Snohomish County should be aware of environmental impact potentials for certain critical aspects. These aspects are discussed in more detail below.

**Aircraft Generated Noise.** Noise impacts are certainly significant ingredients in establishing a basis for valid land use planning practices within the full environs of the airport. In many cases, noise impacts encompass a greater area than those covered by other considerations; however, safety factors in the form of runway protection zones and approach surfaces [including height restrictions on manmade and natural objects to conform with FAR Part 77 – Objects Affecting Navigable Airspace (see AIRPORT AIRSPACE DRAWING in Airport Plans Chapter)] are additional ingredients on which to base land use decisions and implementation practices. These same land use planning practices and mechanisms are appropriate for both noise and safety concerns and should be employed in terms of establishing a proper and realistic set of land use recommendations for the airport environs.
Noise is generally defined as unwanted sound and, as such, the determination of acceptable levels is subjective. The day-night sound level (DNL) methodology is used to determine both the noise levels resulting from existing conditions and the potential noise levels that could be expected to occur at the end of the 20-year planning period. The basic unit in the computation of DNL is the Sound Exposure Level (SEL). An SEL is computed by adding the “A” weighted decibel level [dB(A)] for each second of a noise event above a certain threshold (“A” weighted refers to the sound scale pertaining to the human ear). For example, a noise monitor located in a quiet residential area [40 dB(A)] receives the sound impulses of an approaching aircraft and records the highest dB(A) reading for each second of the event as the aircraft approaches and departs the site. Each of these one-second readings is then added logarithmically to compute the SEL. The following table, entitled COMPARATIVE NOISE LEVELS, depicts the general dB(A) values of noise commonly experienced by people. This illustrates the relative impact of single event noise in “A” weighted level.
### Table D2

**COMPARATIVE NOISE LEVELS**

*Paine Field Master Plan Update*

<table>
<thead>
<tr>
<th>Activity</th>
<th>dB(A) Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rustling Leaves</td>
<td>20</td>
</tr>
<tr>
<td>Room in Quiet Dwelling at Midnight</td>
<td>32</td>
</tr>
<tr>
<td>Soft Whisper at 5 Feet</td>
<td>34</td>
</tr>
<tr>
<td>Men’s Clothing Department of Large Store</td>
<td>53</td>
</tr>
<tr>
<td>Window Air Conditioner</td>
<td>55</td>
</tr>
<tr>
<td>Conversational Speech</td>
<td>60</td>
</tr>
<tr>
<td>Household Department of Large Store</td>
<td>62</td>
</tr>
<tr>
<td>Busy Restaurant</td>
<td>65</td>
</tr>
<tr>
<td>Vacuum Cleaner in House (at 10 feet)</td>
<td>69</td>
</tr>
<tr>
<td>Ringing Alarm Clock (at 2 feet)</td>
<td>80</td>
</tr>
<tr>
<td>Loudly Reproduced Orchestral Music in Large Room</td>
<td>82</td>
</tr>
<tr>
<td>Printing Press Plant (medium size automatic)</td>
<td>86</td>
</tr>
<tr>
<td>Heavy City Traffic</td>
<td>92</td>
</tr>
<tr>
<td>Heavy Diesel-Propelled Vehicle (at 25 feet)</td>
<td>92</td>
</tr>
<tr>
<td>Air Grinder</td>
<td>95</td>
</tr>
<tr>
<td>Cut-off Saw</td>
<td>97</td>
</tr>
<tr>
<td>Home Lawn Mower</td>
<td>98</td>
</tr>
<tr>
<td>Turbine Condenser</td>
<td>98</td>
</tr>
<tr>
<td>150 Cubic Foot Air Conditioner</td>
<td>100</td>
</tr>
<tr>
<td>Banging of Steel Plate</td>
<td>104</td>
</tr>
<tr>
<td>Air Hammer</td>
<td>107</td>
</tr>
</tbody>
</table>

*Note: Prolonged levels over 85 dB(A) represent beginning of hearing damage.*

Adapted from *Impact of Noise on People*, Federal Aviation Administration.

The DNL index is a 24-hour, time-weighted energy average noise level based on the A-weighted decibel. It is a measure of the overall noise experienced during an entire day. Time-weighted refers to the fact that noise occurring during certain sensitive time periods is penalized. In the DNL scale, noise occurring between the hours of 10 p.m. to 7 a.m. is penalized by 10 dB. This penalty was selected to attempt to account for the higher sensitivity to noise in the nighttime and the expected further decrease in background noise levels that typically occur in the nighttime. DNL is specified by the FAA for airport noise assessment, and the Environmental Protection Agency (EPA) specifies DNL for community noise and airport noise assessment.
DNL levels are usually depicted as grid cells or noise contours. Grid cells are squares of land of a specific size that are entirely characterized by a noise level. Noise contours are interpolations of noise levels based on the center of a grid cell and drawn to connect all points of similar level. Noise contours appear similar to topographical contours and form concentric “footprints” about a noise source. These footprints of DNL noise contours drawn around an airport are used to predict community response to the noise from aircraft using that airport.

The main advantage of DNL is that it provides a common measure for a variety of differing noise environments. The same DNL level can describe both an area with very few high level noise events and an area with many low level events. DNL is thus constructed because it has been found that the total noise energy in an area best predicts community response. It must be remembered that the DNL noise contours do not delineate areas that are either free from excessive noise or areas that will be subjected to excessive noise. In other words, it cannot be expected that a person living on one side of a DNL noise contour will have a markedly different reaction than a person living nearby, but on the other side of the noise contour. What can be expected is that the general aggregate community response to noise within the 65 DNL noise contour, for example, will be less than the public response from the 70 DNL noise contour, and even less still than the response from within the 75 DNL noise contour.

In order to consider future noise impacts for the twenty-year Development Plan, as described in Master Plan Update, existing and future noise contour maps have been prepared, and are illustrated in the following figures, entitled **EXISTING (2000) NOISE CONTOURS & GENERALIZED EXISTING LAND USE** and **FUTURE (2021) NOISE CONTOURS & GENERALIZED EXISTING LAND USE**. The formulation of these noise contours takes into consideration existing and forecast operational assumptions, flight track utilization [FAA/airport data base – Aircraft Flight Tracking and Environmental Monitoring System (AFTEMS)], and aircraft runway use allocations. The future noise contours are based on the twenty-year Development Plan for the airport.

**Computer Modeling.** The DNL noise contours were generated using the Integrated Noise Model (INM) Version 6.0c, which is the most current computer program developed by the Federal Aviation Administration specifically for modeling the noise environment at airports. The INM program requires the input of the physical and operational characteristics of the airport. Physical characteristics include runway end coordinates, displaced thresholds, airport altitude, topography, and temperature. Operational characteristics include aircraft mix and flight tracks. Optional data that can be incorporated in the model includes approach and departure profiles, approach and departure procedures, and aircraft noise curves. Data from Paine Field’s Aircraft Flight Tracking and Environmental Monitoring System (AFTEMS) was used to calculate the INM flight tracks and noise levels. Refinements in INM version 6.0c enhance its ability to
accurately predict noise impacts from aircraft engine run-ups and noise attenuation provided by terrain.

*Federal Land Use Compatibility Guidelines.* Establishing land use compatibility within airport environs is the responsibility of local authorities, but should be based on a recognized standard. Federal Aviation Regulations (FAR) Part 150 guidelines are the acknowledged standards by the federal government regarding aircraft generated noise at airports. These guidelines indicate that the 65 DNL noise contour is the threshold noise level for defining incompatible land uses [some noise sensitive land uses (e.g., residential, schools, hospitals, etc.) may be incompatible if located within a 65 or higher DNL noise contour area]. Please reference the 1996 *Paine Field FAR Part 150 Noise Study* for a comprehensive discussion and analysis of noise and land use compatibility issues specifically related to Paine Field.

*Noise Contour Evaluation.* Using the existing and forecast aircraft operation numbers presented earlier, noise contours have been generated and are presented in the proceeding illustrations. The 55, 60, 65, 70, and 75 DNL noise contours are illustrated on each map.

The existing 75 DNL noise contour contains approximately 144 acres, all within airport/Boeing Company property. The 70 DNL noise contour contains approximately 351 acres, all contained within airport/Boeing Company property. The 65 DNL encompasses roughly 604 acres, all of which is contained on airport/Boeing Company property. The 60 DNL noise contour contains approximately 1,163 acres, while the existing 55 DNL contour contains approximately 2,563 acres. The 60 DNL noise contour extends off of airport property to the south of both parallel runways and to the north of the main runway. The 55 DNL noise contour extends off of airport property in all directions.

The number of aircraft operations used as the 2000 base year in this Master Plan Update noise contour was 223,192 (based on 213,371 counted by the FAA Airport Traffic Control tower between 7:00am and 9:00pm, and 9,821 estimated between 9:00pm and 7:00am). The new noise contours generated by the INM Version 6.0c provide a more accurate depiction of airport related noise due to refined model inputs from the airport’s new Aircraft Flight Tracking Environmental Monitoring System (AFTEMS) and the upgraded capabilities of the newer INM model to present noise effects from engine run-ups at Goodrich and Boeing.

The future 75 DNL noise contour encompasses some 155 acres, while the 70 DNL contains approximately 378 acres, both of which are contained entirely within airport/Boeing Company property. The future 65 DNL noise contour contains approximately 682 acres, extending off of airport/Boeing company property only slightly
to the north of the main runway. The future 60 DNL noise contour contains approximately 1,465 acres and extends off of airport property to the south of both parallel runways, as well as to the north and slightly to the west of the main runway. The 55 DNL noise contour encompasses approximately 3,156 acres and extends off of airport property to the north, south, east, and west. The number of aircraft operations used as the 2021 future year in this Master Plan Update noise contour was 375,706 (based on projections of 359,176 when the FAA Airport Traffic Control tower is open between 7:00 am and 9:00pm, and 16,530 between 9:00pm and 7:00am).

With this information as background, Snohomish County will update the Existing and Future (five year) Noise Exposure Maps that were prepared as part of the 1996 FAR Part 150 Study. The Noise Exposure Maps are the “official” Federally recognized noise contour maps that local governments use when considering land use compatibility issues.

**Air Quality.** An air quality evaluation was performed to find out if a Clean Air Act general conformity determination would be required if the Master Plan Update’s proposed projects during the first five year period are approved for construction. An emissions inventory was prepared and contrasted with the de-minimis levels for a maintenance area (the designation applied to Snohomish County as air quality has met the national ambient air quality standards subsequent to the non-attainment designation of the early 1990s). The *Air Quality Conformity Analysis* document is contained in the Appendix of this document and shows that the emissions from the proposed development projects are below the Clean Air Act defined de-minimis thresholds, indicating that no further analysis is required.

**State**

Snohomish County Airport will prepare and issue a non-project SEPA Determination of Nonsignificance (DNS) on the adoption of the Airport Master Plan and FAR Part 150 Noise Exposure Maps. Environmental effects of individual projects identified in this Master Plan Update will be subject of project specific environmental review and determinations at the time of each project permitting. During the Master Plan Update’s draft report public review period comments were received suggesting that, even though the Master Plan does not provide specific drainage analysis or recommendations, it should identify the efforts the airport has undertaken to address surface water quality and quantity issues.

**Surface Water Programs.** Paine Field has an extensive system of water treatment, conveyance and detention facilities to deal with storm water. The airport sits on top of a plateau at 600’ Above Mean Seal Level (AMSL) with airport storm water flowing toward Puget Sound through a number of drainages. Paine Field is the headwaters for creeks in the Big Gulch, Smugglers Gulch, Japanese Gulch, Swamp Creek, and Lake Stickney.
basins. Nearly half of the airport’s 1,284 acres flow into the Big Gulch basin. Comprehensive storm water detention plans have been developed and constructed utilizing a system of biofiltration fields, bioswales, oil water separators, regional detention ponds, wetlands, dikes, and valve control structures to protect water quality and control peak storm water flows leaving the airport into these basins. New facilities constructed on the Airport are designed in compliance with the County’s drainage ordinance. In addition to multi-million dollar investments in these facilities, the airport provides funding for off-site surface water improvements through County Surface Water Management Program fees in excess of $100,000 per year. The airport is currently participating in studies with the City of Mukilteo and the Olympus Terrace Sewer District for the construction of a peak flow storm water bypass pipe down Big Gulch to address erosion issues in the creek.

Snohomish County Airport contains numerous wetlands ranging from very small (<100sf) “low” quality (category 3) to large (19 acre) “high” quality (category 1). The airport has undertaken an elaborate program to enhance and expand existing wetlands as advance mitigation for wetlands that will be impacted by future development on the airport. This Wetland Banking program includes on-site wetlands with “scrub-shrub” vegetation to minimize bird attraction for aircraft flight safety, and a large remote off-site wetland with “open water” elements providing a nature sanctuary for wildlife. The airport’s wetland banking program has received numerous national, state, regional and local awards for finding a balance between environmental protection, airport development and aircraft safety (for more information on the airports wetland compensation efforts please visit painefield.com).