APPENDIX F

Aircraft Noise Analysis

- **Appendix F-1** – Aircraft Noise Technical Report
- **Appendix F-2** – Area Equivalent Method (AEM) Results

Appendix F-1
Aircraft Noise Technical Report

APPENDIX F
Noise Technical Appendix

F.1 Introduction

This technical appendix includes a summary of the information necessary to compute the annual average day noise exposure associated with aircraft operations at Snohomish County Airport/ Paine Field (Paine Field) in 2017 (representing Existing Conditions), as well as the aircraft noise exposure associated with future years 2019 and 2024. For the future years, noise exposure contours were developed for two operational scenarios: Proposed Action and No Action Alternative.

For this aircraft noise analysis, the patterns of aircraft-related noise are described using noise contours prepared with the FAA's Aviation Environmental Design Tool (AEDT), Version 2d. AEDT 2d was the most current version of the AEDT at the time the noise contour development for this study were prepared.

F.2 Noise Metrics and General Approach

In order to understand results from a noise analysis, a foundation in the basics of sound and metrics used to measure it should be established first. The following sections describe the physics of sound and the methods used to measure and estimate sound level and impact.

F.2.1 General Characteristics of Aircraft Noise

Sound, when transmitted through the air and upon reaching our ears, may be perceived as desirable or unwanted. People normally refer to noise as unwanted sound. Because the response to sound is subjective, individuals have different perceptions, sensitivities, and reactions to noise. Loud sounds may bother some people, while others may be bothered by certain rhythms or frequencies of sound. Sounds that occur during sleeping hours are usually considered to be more objectionable than those that occur during waking hours and hours of activity (typically daytime).

Aircraft noise originates from both the engines and the airframe of an aircraft, but the engines are, by far, the more significant source of noise. Meteorological conditions affect the transmission of sound through the air. Wind speed and direction, and the temperature immediately above ground level, cause diffraction and displacement of sound waves. Humidity and temperature materially affect the transmission of air-to-ground sound through absorption associated with the instability and viscosity of the air.

F.2.2 Noise Descriptors

Noise levels are measured using a variety of scientific metrics. As a result of extensive research into the characteristics of aircraft noise and human response to that noise, standard noise descriptors have been developed for aircraft noise exposure analyses. The descriptors used in this noise analysis are described below.

A-Weighted Sound Pressure Level (dBA): The decibel (dB) is a unit used to describe sound pressure level. When expressed in dBA, the sound has been filtered to reduce the effect of very low and very high frequency sounds, much as the human ear filters sound frequencies. Without this filtering, calculated and measured sound levels would include events that the human ear cannot hear (e.g., dog whistles and low frequency sounds, such as the groaning sounds emanating from large buildings with changes in temperature and wind). With A-weighting, calculations and sound monitoring equipment approximate the sensitivity of the human ear to sounds of different frequencies.

Some common sounds on the dBA scale are listed in **Table F-1**. As shown in Table F-1, the relative perceived loudness of a sound doubles for each increase of 10 dBA, although a 10-dBA change in the sound level corresponds to a factor of 10 change in relative sound energy. Generally, sounds with differences of 2 dBA or less are not perceived to be noticeably different by most listeners.

Maximum Noise Level (Lmax): Lmax is the maximum or peak sound level during a noise event. The metric only accounts for the instantaneous peak intensity of the sound, and not for the duration of the event. As an aircraft passes by an observer, the sound level increases to a maximum level and then decreases. Some sound level meters measure and record the maximum or Lmax level.

Sound Exposure Level (SEL): SEL, expressed in dBA, is a time integrated measure, expressed in decibels, of the sound energy of a single noise event at a reference duration of one second. The sound level is integrated over the period that the level exceeds a threshold. Therefore, SEL accounts for both the maximum sound level and the duration of the sound. The standardization of discrete noise events into a one-second duration allows calculation of the cumulative noise exposure of a series of noise events that occur over a period of time. Because of this compression of sound energy, the SEL of an aircraft noise event is typically 7 to 12 dBA greater than the Lmax of the event. SELs for aircraft noise events depend on the location of the aircraft relative to the noise receptor, the type of operation (landing, takeoff, or overflight), and the type of aircraft. The SEL concept is depicted on page F-4.

TABLE F-1
COMMON SOUNDS ON THE A-WEIGHTED DECIBEL SCALE

Sound	Sound level (dBA)	Relative loudness (approximate)	Relative sound energy
Rock music, with amplifier	120	64	1,000,000
Thunder, snowmobile (operator)	110	32	100,000
Boiler shop, power mower	100	16	10,000
Orchestral crescendo at 25 feet, noisy kitchen	90	8	1,000
Busy street	80	4	100
Interior of department store	70	2	10
Ordinary conversation, 3 feet away	60	1	1
Quiet automobiles at low speed	50	1/2	.1
Average office	40	1/4	.01
City residence	30	1/8	.001
Quiet country residence	20	1/16	.0001
Rustle of leaves	10	1/32	.00001
Threshold of hearing	0	1/64	.000001

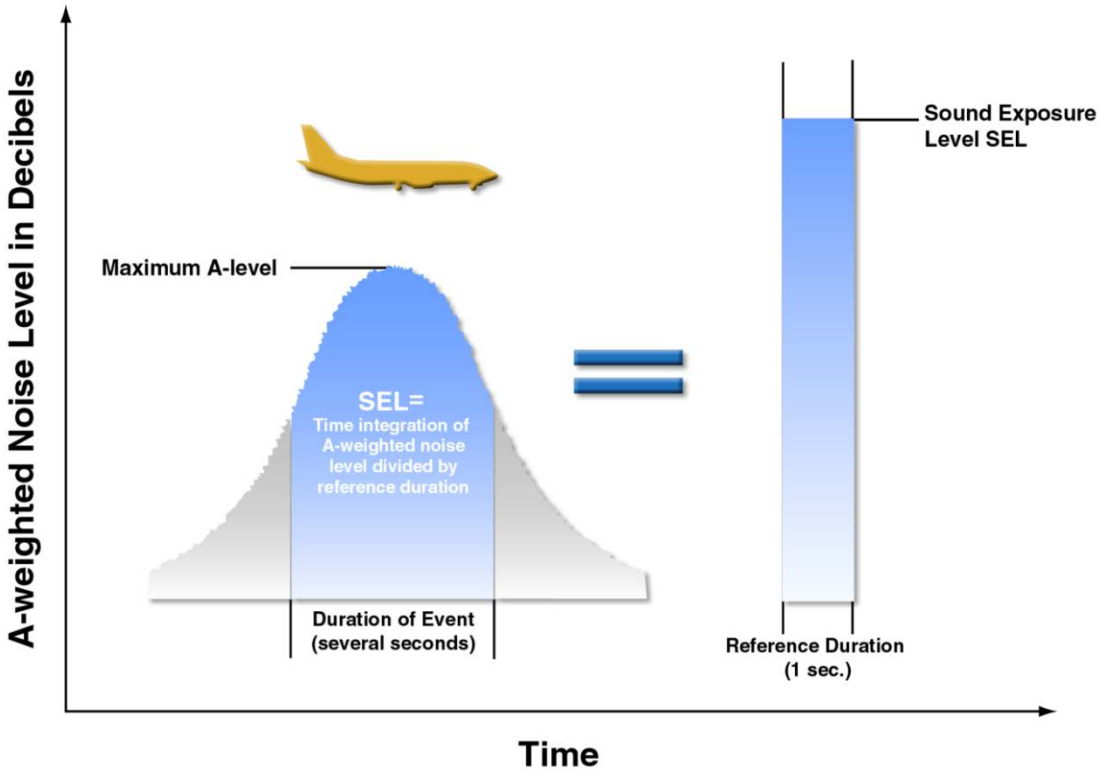
SOURCE: U.S. Department of Housing and Urban Development, Aircraft Noise Impact—Planning Guidelines for Local Agencies,1972.

Day-Night Average Sound Level (DNL): DNL, formerly referred to as Ldn, is expressed in dBA and represents the noise level over a 24-hour period. DNL includes the cumulative effects of a number of sound events rather than a single event. It also accounts for increased sensitivity to noise during relaxation and sleeping hours. DNLs are used to estimate the effects of specific noise levels on land uses. The U.S. Environmental Protection Agency (USEPA) introduced the metric in 1976 as a single number measurement of community noise exposure. The FAA adopted DNL as the noise metric for measuring cumulative aircraft noise under the 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*. The Department of Housing and Urban Development, the Veterans Administration, the Department of Defense, the United States Coast Guard, and the Federal Transit Administration have also adopted DNL for measuring cumulative noise exposure.

In the calculation of DNL, for each hour during the nighttime period (10:00 p.m. to 6:59 a.m.), the sound levels are increased by a 10 decibel-weighting penalty (equivalent to a 10-fold increase in aircraft operations) before the 24-hour value is computed. The weighting penalty accounts for the more intrusive nature of noise during the nighttime hours.

DNL is expressed as an average noise level on the basis of annual aircraft operations for a calendar year. To calculate the DNL at a specific location, the SELs at that location associated with each individual aircraft operation (landing or takeoff) are determined. Using the SEL for each noise event and applying the 10-decibel penalty for nighttime operations as appropriate, a partial DNL is then calculated for each aircraft operation. The partial DNLs for each aircraft operation are added logarithmically to determine the total DNL.

Sound Exposure Level Concept



SOURCE: Brown-Buntin Associates, Inc., November 2004.

Adding the noise from a relatively quiet event (60 dBA) to a relatively noisy event (70 dBA) results in a value of 70 dBA because the quieter event has only 1/10 the sound energy of the noisier event. As a result, the quieter noise event is "masked" by the noisier one, and there is no increase in the overall noise level as perceived by the human ear.

The logarithmic addition process, whereby the partial DNLs are combined, can be approximated by the following guidelines:

When two DNLs differ by	Add the following amount to the higher value
0 or 1 dBA	3 dBA
2 or 3 dBA	2 dBA
4 to 9 dBA	1 dBA
10 dBA or more	0 dBA

For example:

70 dBA + 70 dBA (difference: 0 dBA)	= 73 dBA
60 dBA + 70 dBA (difference: 10 dBA)	= 70 dBA

DNL is used to describe existing and predicted noise exposure in communities in an airport environs based on the average-daily operations over the year and the average-annual operational conditions at the airport. Therefore, at a specific location near an airport, the noise exposure on a particular day is likely to be higher or lower than the annual-average noise exposure, depending on the specific operations at the airport on that day. DNL is widely accepted as the best available method to describe cumulative aircraft noise exposure and is the noise descriptor required for aircraft noise exposure analyses and land use compatibility planning under the 14 CFR Part 150 and for environmental assessments for airport improvement projects.

Equivalent Continuous Noise Level (Leq): Leq is the sound level, expressed in dBA, of a steady sound which has the same A-weighted sound energy as the time-varying sound over the averaging period. Unlike SEL, Leq is the average sound level for a specified time period (e.g., 24 hours, 8 hours, 1 hour, etc.). Leq is calculated by integrating the sound energy from all noise events over a given time period and applying a factor for the number of events.

F.2.3 Noise Modeling Methodology Overview

The methodology for analyzing noise from most transportation or community noise sources, including aircraft, follows a generally accepted process that includes the application of a computer model to estimate noise levels and compare them to those for baseline conditions and future alternatives. The aircraft noise modeling analysis methodology outlined in the 14 CFR Part 150, *Airport Noise Compatibility Planning* and the FAA's *Environmental Desk Reference for Airport Actions* (Chapter 17, Sections 6(c) and 6(f)) were followed, where applicable.

There are two means of evaluating aircraft noise: noise modeling and noise measurements. At first glance, the ideal solution would seem to be the deployment of a vast array of microphones across the communities surrounding an airport to measure noise. However, a large noise measurement system like this has two significant limitations: cost and complexity. In addition, it does not allow planners and engineers the ability to evaluate future growth and "what-if" scenarios at an airport. Analytical noise models such as the AEDT overcome these limitations and provide mathematical predictions of aircraft noise levels within the community. AEDT is the FAA-approved method for quantifying aircraft noise exposure from future planning efforts.

Aircraft noise is analyzed using one or more computer models. To ensure a consistent approach to aircraft noise analyses, the FAA developed the AEDT, which is regularly updated for both aircraft noise characteristics and computational algorithms. The discussion below provides an overview of the AEDT, which is a planning tool designed to compare the relative effect of one set of theoretical conditions against those of another. Although differences between measured and modeled noise levels can be expected, the relative variances between the two are expected to remain consistent over a series of modeled scenarios, regardless of the inconsistencies between measured and modeled data. Therefore, the FAA requires noise exposure based on modeled via AEDT rather than measured data for its evaluations of changes in aircraft operating conditions or

operating scenarios at an airport (FAA Order 1050.1F, Appendix A, Section 14, Paragraph 14.2b).

AEDT Model Overview

The AEDT is the FAA-approved, industry-accepted, state-of-the-art tool for determining the total effect of aircraft noise exposure at and around airports. The following sections describe the model and the inputs required for analyzing aircraft noise. The AEDT is the FAA's standard tool for determining the predicted noise impact in the vicinity of airports since May 2015. Statutory requirements for AEDT use are defined in FAA Order 1050.1F, *Policies and Procedures for Considering Environmental Impacts*; and 14 CFR Part 150, *Airport Noise Compatibility Planning*.

The AEDT uses runway and flight track information, operation levels distributed by time of day, aircraft fleet mix, and aircraft profiles as inputs. The AEDT calculates noise exposure levels at a series of "noise grids", and produces noise exposure contours based on the grid results, including DNL, Lmax, Leq, SEL, and time above (TA).[1] In addition, the AEDT can compute noise at specific points on the ground (e.g., homes, schools, religious facilities, and other noise-sensitive facilities).

The AEDT was used to model noise exposure levels of flight operations arriving and departing from the airport. Within the AEDT program, there are three elements which process the input data in the following order:

- **Flight Module:** Definition of three-dimensional (3D) flight trajectories with associated aircraft performance characteristics. (use of user defined routes and the AEDT-provided aircraft performance flight profile database, which defines the three-dimensional trajectory of an aircraft based on the distance, altitude, speed, and thrust settings defined at many locations along a profile).

- **NPD Database:** Noise-Power-Distance values and curves based on 14 CFR Part 36 measured certification flights and based on Society of Automotive Engineers (SAE) methodology standards. The curves indicate the level of single-event noise based on the level of thrust used and how far the aircraft is along a given flight path from a receiver on the ground.

- **Acoustic Module:** Sound propagation algorithms approved for use by the scientific community (e.g., SAE) to account for reduction in noise levels based the distance traveled, atmospheric conditions, and source-to-receiver geometry.

Aircraft are modeled on 3D flight trajectories that approximate how they fly in the real world, with the appropriate altitude, flight speed and thrust setting at defined points and the flight segments that connect those defined points along the flight route. This is important, because at the core of the AEDT is the NPD database, which contains the source sound levels for all aircraft as a

[1] The AEDT computes noise exposure contours on a rectangular grid of irregularly spaced points. The number of analyzed points within a defined grid is based on the distance between each point in nautical miles. The smaller the distance between points, the greater the number of points within a grid. Smaller values of distance between points with a large grid size would result in longer run time.

function of aircraft thrust and distance along the flight path. As a result, modeling requires not only placing aircraft at the correct three-dimensional location in the air, but also requires that the aircraft speed and thrust values be matched appropriately in order to extract the correct sound level value from the NPD database. Finally, once the appropriate aircraft sound level is selected from the NPD, the AEDT estimates the sound level at receiver points on the ground using the sound propagation algorithms in the acoustic module.

The most current version of AEDT when this analysis was initiated was Version 2d. The FAA has made available detailed information related to the updates to AEDT 2d via release notes located on its website: http://aedt.faa.gov

AEDT Input Data and Assumptions

In order for the AEDT to generate DNL aircraft noise exposure contours, the following inputs to the model are required:

- A basic description of the airfield, including altitude, average annual temperature, and runway layout.
- Aircraft activity input, including the annual average day number of aircraft operations by time of day and aircraft type.
- Flight pattern input, including use of the runways, location and use of flight tracks, departure and arrival profiles, and existing noise abatement procedures.

The last two categories of data are discussed in more detail below.

Aircraft Activity Input

The AEDT requires the following input data regarding the character and timing of operations at an airport:

- The average daily number of flights by aircraft type, such as Boeing 757 (757PW), Gulfstream IV corporate jet (GIV), or Cessna 172 single-engine propeller aircraft (CNA172);
- Time of day the flights occurred; and
- Distance the aircraft is traveling to its destination ("stage length" to determine aircraft weight).

Each of these input factors is discussed below, along with the concept of the Annual Average Day (AAD).

Annual Average Day Activity Levels

For DNL aircraft noise exposure calculations, aircraft operations associated with the annual-average day are used in the AEDT. The number of annual operations by each AEDT aircraft type

is divided by 365 to arrive at the annual-average day level. This representation of airport activity does not reflect any particular day, but gives an accurate picture of the character of operations throughout the year. Use of AAD is required by the FAA for aircraft noise modeling.

Operations by Aircraft Type

Different aircraft types vary dramatically in the amount of noise they generate. The noise level estimates are documented in FAA Advisory Circular 36-3H, *Estimated Airplane Noise Levels in A-Weighted Decibels* (March 1986 as amended), and are based on certificated aircraft noise levels measured at three points: 21,326 feet (6,500 meters) from the start of the takeoff roll (departure); 6,562 feet (2,000 meters) from the threshold on an extended centerline of the runway (arrival); and a point on a line parallel to and 1,476 feet (450 meters) from the extended centerline of the runway. Aircraft noise characteristics can be classified according to Federal noise level standards specified in 14 CFR Part 36, *Noise Standards, Aircraft Type and Airworthiness Certification*, as meeting Stage 1 (being noisiest) through Stage 4 (being quietest) standards. 14 CFR Part 91, *General Operating and Flight Rules*, specifies that after December 31, 1999, no person may operate a Stage 2 aircraft over 75,000 pounds in the contiguous United States. As a result of this ruling, all aircraft over 75,000 pounds that operated at an airport must meet 14 CFR Part 36 Stage 3 standards. 14 CFR 91 also specifies that after December 31, 2015, no person may operate a jet airplane weighing 75,000 pounds or less that does not comply with Stage 3 noise levels.

The AEDT aircraft database includes information for most, but not all, aircraft types. Therefore, substitutions are often necessary as a means to identify equivalent aircraft for those aircraft that are not included in the database. The FAA has developed a list of pre-approved aircraft substitutions for use in the AEDT. In this aircraft noise analysis, the FAA pre-approved list of substitutions was used for all aircraft.

Time of Day of Flight Activity

As noted in Section F.2.2, the DNL metric applies different weighting penalties to aircraft operations during the daytime or nighttime hours. Therefore, the average daily numbers of operations by aircraft type during the daytime and nighttime periods are required inputs to the AEDT. Due to the DNL weighting scheme, daytime and nighttime operations have a greater potential effect on the shape and size of the noise exposure area than their number might suggest. In the calculation of DNL, one operation during the nighttime hours is equivalent to 10 daytime operations.

Stage Length and Gross Aircraft Weight

Stage length (unrelated to “stage” classifications of aircraft for noise characteristics) refers to the non-stop distance an aircraft travels after departing from an airport. The stage length determines the gross takeoff weight assigned to each aircraft type. The aircraft weight serves as the basis for determining the appropriate departure climb altitude and thrust profiles used for modeling purposes. Aircraft noise characteristics vary depending on altitude and thrust. For example, a fully loaded aircraft departing on a long flight would probably weigh more than the same aircraft departing on a shorter flight due to a higher fuel load. The heavier aircraft climbs at a slower rate than the lighter aircraft. The heavier aircraft may also require use of higher takeoff thrust levels

for a longer period of time. Thrust levels and distances from the ground are two important factors related to noise levels heard by residents. The more power applied to the engines, the louder the noise is from the source. The closer the aircraft is to the ground, the shorter distance there is for attenuation. AEDT provides multiple stage lengths for larger aircraft departures. Most small aircraft only have one departure stage length profile included in the AEDT. All arrivals, regardless of aircraft type, have one single approach stage length, because of similarities expected in the final approach profile (e.g., all aircraft should be following a three-degree glide slope).

Flight Pattern Input

The existing and predicted future use of the runways and flight tracks to and from an airport directly influence where aircraft noise is experienced on the ground. The following sections describe how both variables are accounted for in AEDT.

Runway Use

In the AEDT, runways are defined by runway end in terms of latitude and longitude coordinates. A runway may include a displaced take-off or landing threshold. This portion of the runway is defined to be unavailable for that type of operation for safety or noise reasons (e.g., obstruction clearance). Displaced thresholds are identified in the AEDT, which uses the input to determine actual start-of-take-off or touchdown points along the runway.

Runway use for departures or arrivals is typically a function of prevailing wind and weather; lengths and widths of the runways; runway instrumentation; and effects of other airports or air traffic facilities in the area. Runway use may also be influenced by the direction of flight of an arriving or departing aircraft; the aircraft parking position; and/or periodic closures of runways and taxiways. Finally, noise abatement procedures may also influence runway use at an airport.

Aircraft Flight Tracks and Flight Track Use

Once aircraft leave a runway on departure or while approaching a runway on arrival, their location and altitude over surrounding communities becomes a determining factor in how much noise is experienced on the ground. For this reason, flight track information is an important input to the AEDT. Most pilots fly their aircraft in predictable patterns as they follow instructions from FAA Air Traffic Control handling their movements into or away from an airport.

Flight tracks are defined to represent the typical paths of the large majority of aircraft located throughout the study area. When using AEDT, these flight tracks are specified to capture the complexity of the actual flight patterns by representing the center of a specific flow of traffic, and dispersed tracks linked to the center track to account for the width. Flight tracks are defined in AEDT before aircraft operations can be entered. The number of operations is entered for each aircraft type, runway, and flight track for an AAD condition.

F.3 2017 Existing Conditions Noise Analysis

The following sections describe the noise modeling inputs for the 2017 Existing Conditions scenario.

F.3.1 Flight Operations

Annual operations by aircraft category for the 2017 Existing Conditions scenario are summarized in **Table F-2**. The annual operations figures were derived from the FAA's Air Traffic Activity Data System (ATADS) database with the assumption of aircraft operations during non-tower operation hours. The number of AAD operations was derived by dividing the number of annual operations by 365 days.

TABLE F-2
2017 EXISTING CONDITIONS
NUMBERS OF OPERATIONS BY AIRCRAFT CATEGORY

Aircraft Category	Numbers of Operations
Air Carrier	4,222
Air Taxi	1,231
General Aviation	106,368
Military	605
Annual Total	112,426
Annual Average Day (AAD) Operations	**308.02**

SOURCES: Federal Aviation Administration Air Traffic Activity Data System. 2018; ESA, 2018.

F.3.2 Aircraft Fleet Mix

Table F-3 presents AAD operations by operation type and AEDT aircraft type for the 2017 Existing Conditions scenario. The AEDT aircraft fleet mix is based on a review of calendar year 2017 flight data obtained from FlightAware, Inc.[2] and information contained in *Final Environmental Assessment for Amendment to the Operations Specifications for Air Carrier Operations, Amendment to the FAR Part 139 Certificate, and Modification of a Terminal Building: Snohomish County Airport – Paine Field* (2012 Final EA)[3].

A touch-and-go maneuver consists of two operations, with the approach portion of the touch-and-go maneuver counted as one operation and that the departure portion of the touch-and-go maneuver counted as another operation. To arrive at the AAD operations figure presented in

2 Flight data for Snohomish County Airport - Paine Field (January 1, 2017 through December 31, 2017), FlightAware, Inc.

3 Barnard Dunkelberg Company. *Final Environmental Assessment for Amendment to the Operations Specifications for Air Carrier Operations, Amendment to the FAR Part 139 Certificate, and Modification of a Terminal Building: Snohomish County Airport – Paine Field*. September 2012.

Table F-2, the number of touch-and-go maneuvers must be multiplied by two before it is added to the sum of the arrivals and departures.

TABLE F-3
AIRCRAFT FLEET MIX – 2017 EXISTING CONDITIONS

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
7478	0.21	0.21	0.00
737300	0.05	0.05	0.00
737400	0.07	0.07	0.00
737700	0.47	0.47	0.00
737800	1.28	1.28	0.00
747400	1.15	1.20	0.00
767300	0.15	0.15	0.00
777200	0.14	0.14	0.00
777300	0.28	0.28	0.00
7378MAX	0.00	0.00	0.00
74720B	0.08	0.08	0.00
757RR	0.01	0.01	0.00
767JT9	0.08	0.08	0.00
7773ER	0.70	0.70	0.00
7878R	0.97	0.97	0.00
A109	0.01	0.01	0.00
A319-131	0.01	0.01	0.00
A320-211	0.06	0.06	0.00
A321-232	0.00	0.00	0.00
A330-343	0.06	0.06	0.00
B206B3	0.02	0.02	0.00
B407	0.01	0.01	0.00
BD-700-1A10	0.21	0.21	0.00
BD-700-1A11	0.02	0.02	0.00
BEC58P	2.94	2.94	4.98
C9A	0.55	0.55	0.00
CIT3	0.41	0.41	0.00
CL600	0.75	0.75	0.00
CL601	0.71	0.71	0.00
CNA172	34.61	34.61	0.00
CNA182	5.36	5.36	0.00
CNA206	1.11	1.11	0.63
CNA208	7.61	7.61	0.00
CNA20T	0.17	0.17	0.00
CNA441	0.33	0.33	3.18
CNA500	1.25	1.25	0.00
CNA510	0.68	0.68	0.00
CNA525C	0.11	0.11	0.00
CNA55B	0.69	0.69	0.00
CNA560E	0.06	0.06	0.00
CNA560U	0.24	0.24	0.00
CNA560XL	0.54	0.54	0.00
CNA680	0.32	0.32	0.00
CNA750	1.41	1.41	0.00
COMJET	0.30	0.30	0.00
COMSEP	1.69	1.69	0.00
DC3	0.15	0.15	0.00
DC93LW	0.00	0.00	0.00
DHC6	2.00	2.00	0.00
DHC8	0.31	0.31	0.00
DHC830	0.01	0.01	0.00
E3A	0.03	0.03	0.00
EC130	0.00	0.00	0.00
ECLIPSE500	0.15	0.15	0.00
EMB120	0.02	0.02	0.00
EMB145	0.01	0.01	0.00
EMB175	0.05	0.05	0.00
F-18	0.11	0.11	0.09
FAL20	0.01	0.01	0.00
GASEPF	23.36	23.36	54.72
GASEPV	5.10	5.10	13.27

GIV	0.68	0.68	0.00
GV	0.22	0.22	0.00
H500D	0.01	0.01	0.00
IA1125	0.18	0.18	0.00
LEAR25	0.03	0.03	0.00
LEAR35	2.03	2.03	0.00
MU3001	0.11	0.11	0.00
P3A	0.09	0.09	0.00
PA28	9.90	9.90	0.00
PA30	1.95	1.95	0.00
PA42	1.11	1.11	0.00
R44	0.01	0.01	0.00
T34	0.03	0.03	0.00
Total	**115.55**	**115.60**	**76.87**

NOTE: Values may not sum to totals shown due to rounding.

SOURCES: Federal Aviation Administration Air Traffic Activity Data System, 2018; Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

F.3.3 Time of Day

To model aircraft noise exposure in terms of DNL, aircraft operations are grouped into two time periods over the day: daytime (7:00 am to 9:59 pm) and nighttime (10:00 pm to 6:59 am). The numbers of operations by time of day and operation type are shown in **Table F-4**. The day/night split of aircraft operations for the 2017 Existing Conditions scenario were derived from the FlightAware, Inc. datasets and the 2012 Final EA.

TABLE F-4
AIRCRAFT OPERATIONS BY TIME OF DAY – 2017 EXISTING CONDITIONS

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
7478	99.65%	0.35%	100.00%	99.65%	0.35%	100.00%	0.00%	0.00%	0.00%
737300	98.53%	1.47%	100.00%	98.53%	1.47%	100.00%	0.00%	0.00%	0.00%
737400	96.10%	3.90%	100.00%	96.10%	3.90%	100.00%	0.00%	0.00%	0.00%
737700	76.25%	23.75%	100.00%	76.25%	23.75%	100.00%	0.00%	0.00%	0.00%
737800	95.91%	4.09%	100.00%	95.91%	4.09%	100.00%	0.00%	0.00%	0.00%
747400	61.43%	38.57%	100.00%	62.10%	37.90%	100.00%	0.00%	0.00%	0.00%
767300	98.55%	1.45%	100.00%	98.55%	1.45%	100.00%	0.00%	0.00%	0.00%
777200	98.96%	1.04%	100.00%	98.96%	1.04%	100.00%	0.00%	0.00%	0.00%
777300	99.48%	0.52%	100.00%	99.48%	0.52%	100.00%	0.00%	0.00%	0.00%
7378MAX	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
74720B	95.53%	4.47%	100.00%	95.53%	4.47%	100.00%	0.00%	0.00%	0.00%
757RR	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
767JT9	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
7773ER	99.58%	0.42%	100.00%	99.58%	0.42%	100.00%	0.00%	0.00%	0.00%
7878R	99.55%	0.45%	100.00%	99.55%	0.45%	100.00%	0.00%	0.00%	0.00%
A109	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A319-131	67.69%	32.31%	100.00%	67.69%	32.31%	100.00%	0.00%	0.00%	0.00%
A320-211	90.81%	9.19%	100.00%	90.81%	9.19%	100.00%	0.00%	0.00%	0.00%
A321-232	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A330-343	66.83%	33.17%	100.00%	66.83%	33.17%	100.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BD-700-1A10	95.92%	4.08%	100.00%	95.92%	4.08%	100.00%	0.00%	0.00%	0.00%
BD-700-1A11	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BEC58P	98.82%	1.18%	100.00%	98.82%	1.18%	100.00%	97.71%	2.29%	100.00%

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
C9A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CIT3	97.92%	2.08%	100.00%	97.92%	2.08%	100.00%	0.00%	0.00%	0.00%
CL600	97.73%	2.27%	100.00%	97.73%	2.27%	100.00%	0.00%	0.00%	0.00%
CL601	98.21%	1.79%	100.00%	98.21%	1.79%	100.00%	0.00%	0.00%	0.00%
CNA172	98.06%	1.94%	100.00%	98.06%	1.94%	100.00%	0.00%	0.00%	0.00%
CNA182	97.85%	2.15%	100.00%	97.85%	2.15%	100.00%	0.00%	0.00%	0.00%
CNA206	95.27%	4.73%	100.00%	95.27%	4.73%	100.00%	93.05%	6.95%	100.00%
CNA208	96.40%	3.60%	100.00%	96.40%	3.60%	100.00%	0.00%	0.00%	0.00%
CNA20T	93.77%	6.23%	100.00%	93.77%	6.23%	100.00%	0.00%	0.00%	0.00%
CNA441	95.96%	4.04%	100.00%	95.96%	4.04%	100.00%	97.71%	2.29%	100.00%
CNA500	98.98%	1.02%	100.00%	98.98%	1.02%	100.00%	0.00%	0.00%	0.00%
CNA510	98.74%	1.26%	100.00%	98.74%	1.26%	100.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA55B	96.29%	3.71%	100.00%	96.29%	3.71%	100.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560XL	97.63%	2.37%	100.00%	97.63%	2.37%	100.00%	0.00%	0.00%	0.00%
CNA680	98.68%	1.32%	100.00%	98.68%	1.32%	100.00%	0.00%	0.00%	0.00%
CNA750	95.79%	4.21%	100.00%	95.79%	4.21%	100.00%	0.00%	0.00%	0.00%
COMJET	97.19%	2.81%	100.00%	97.19%	2.81%	100.00%	0.00%	0.00%	0.00%
COMSEP	98.14%	1.86%	100.00%	98.14%	1.86%	100.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DC93LW	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC6	96.38%	3.62%	100.00%	96.38%	3.62%	100.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EC130	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%
ECLIPSE500	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB120	80.76%	19.24%	100.00%	80.76%	19.24%	100.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB175	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%
FAL20	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
GASEPF	96.36%	3.64%	100.00%	96.36%	3.64%	100.00%	97.71%	2.29%	100.00%
GASEPV	96.62%	3.38%	100.00%	96.62%	3.38%	100.00%	97.71%	2.29%	100.00%
GIV	94.98%	5.02%	100.00%	94.98%	5.02%	100.00%	0.00%	0.00%	0.00%
GV	92.38%	7.62%	100.00%	92.38%	7.62%	100.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
IA1125	97.63%	2.37%	100.00%	97.63%	2.37%	100.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
LEAR35	94.35%	5.65%	100.00%	94.35%	5.65%	100.00%	0.00%	0.00%	0.00%
MU3001	92.59%	7.41%	100.00%	92.59%	7.41%	100.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
PA28	97.77%	2.23%	100.00%	97.77%	2.23%	100.00%	0.00%	0.00%	0.00%
PA30	94.67%	5.33%	100.00%	94.67%	5.33%	100.00%	0.00%	0.00%	0.00%
PA42	98.39%	1.61%	100.00%	98.39%	1.61%	100.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
All Aircraft	**96.83%**	**3.17%**	**100.00%**	**96.83%**	**3.17%**	**100.00%**	**97.68%**	**2.32%**	**100.00%**

NOTE: Values may not sum to 100% due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

F.3.4 Departure Stage Length

Departure stage lengths are used to further refine the noise exposure calculations. All departures at Paine Field fall within the following stage length categories:

Stage Length 1:	0 to 500 miles
Stage Length 2:	500 to 1,000 miles
Stage Length 3:	1,001 to 1,500 miles
Stage Length 4:	1,501 to 2,500 miles
Stage Length 5:	2,501 to 3,500 miles
Stage Length 6:	3,501 to 4,500 miles
Stage Length 7:	4,501 to 5,500 miles
Stage Length 8:	5,501 to 6,500 miles
Stage Length 9:	6,500+ miles

Departure stage length information for 2017 is presented in **Table F-5** and is derived from the FlightAware, Inc. datasets and the 2012 Final EA.

F.3.5 Runway Use

Runway use is a primary factor that determines both the size and shape of a noise exposure area, and refers to the percentages of the AAD operations that arrive on or depart from each of the various runway ends based on annual average conditions. The annual average conditions account for varying weather patterns and FAA ATCT procedures that ultimately dictate runway assignments. Runway use patterns at Paine Field in 2017 were generally unchanged from runway use patterns documented in the 2012 Final EA with the exception of Runway 11/29 closed.

Table F-6 shows the resulting runway use percentages for 2017 Existing Conditions by type of operation and time of day. Runway use distributions were calculated separately for each AEDT aircraft type. Separate analyses were performed to assign helicopter operations to helipads.

TABLE F-5
DEPARTURE STAGE LENGTH BREAKDOWN – 2017 EXISTING CONDITIONS

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
7478	78.19%	5.45%	0.00%	4.09%	0.00%	4.09%	5.45%	2.73%	0.00%
737300	6.57%	86.86%	0.00%	6.57%	0.00%	0.00%	0.00%	0.00%	0.00%
737400	43.94%	20.02%	12.01%	24.02%	0.00%	0.00%	0.00%	0.00%	0.00%
737700	57.50%	35.36%	2.00%	5.15%	0.00%	0.00%	0.00%	0.00%	0.00%
737800	83.11%	16.27%	0.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
747400	0.18%	0.00%	21.42%	30.71%	3.55%	44.15%	0.00%	0.00%	0.00%
767300	77.69%	0.00%	0.00%	22.31%	0.00%	0.00%	0.00%	0.00%	0.00%
777200	27.19%	4.28%	66.39%	2.14%	0.00%	0.00%	0.00%	0.00%	0.00%
777300	93.44%	0.00%	0.00%	2.46%	0.00%	0.00%	4.10%	0.00%	0.00%
7378MAX	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
74720B	13.06%	15.92%	1.12%	65.92%	0.00%	3.98%	0.00%	0.00%	0.00%
757RR	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
767JT9	87.50%	8.33%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
7773ER	77.28%	1.92%	1.15%	0.00%	0.00%	1.47%	6.26%	9.61%	2.31%
7878R	76.12%	1.99%	2.54%	1.24%	0.58%	5.72%	2.28%	6.97%	2.56%
A109	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A319-131	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A320-211	4.60%	95.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A321-232	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A330-343	43.74%	0.00%	0.00%	56.26%	0.00%	0.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BD-700-1A10	42.45%	19.18%	6.39%	25.58%	0.00%	6.39%	0.00%	0.00%	0.00%
BD-700-1A11	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BEC58P	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
C9A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CIT3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL600	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL601	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA172	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA182	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA206	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA208	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA20T	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA441	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA500	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA510	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA55B	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560XL	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA680	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA750	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMJET	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMSEP	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC93LW	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC6	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EC130	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ECLIPSE500	33.33%	50.00%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB120	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB175	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FAL20	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
GASEPF	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GASEPV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GIV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
IA1125	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR35	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
MU3001	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA28	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA30	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA42	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
All Aircraft	**97.65%**	**0.60%**	**0.39%**	**0.55%**	**0.04%**	**0.54%**	**0.08%**	**0.12%**	**0.04%**

NOTE: Values may not sum to 100% due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-6
RUNWAY USE BY TYPE OF OPERATION AND TIME OF DAY – 2017 EXISTING CONDITIONS

Runway	Arrivals		Departures		Touch and Go	
	Day	Night	Day	Night	Day	Night
16L	19.79%	0.00%	19.78%	0.00%	10.53%	0.00%
34R	17.02%	0.00%	17.02%	0.00%	8.62%	0.00%
16R	34.45%	61.09%	34.46%	48.70%	44.47%	35.00%
34L	28.69%	38.84%	28.69%	51.22%	36.38%	65.00%
HPE	0.03%	0.04%	0.03%	0.04%	0.00%	0.00%
HPW	0.03%	0.04%	0.03%	0.04%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

NOTES:
Values may not sum to 100% due to rounding.
HPE = helipad east; HPW = helipad west.

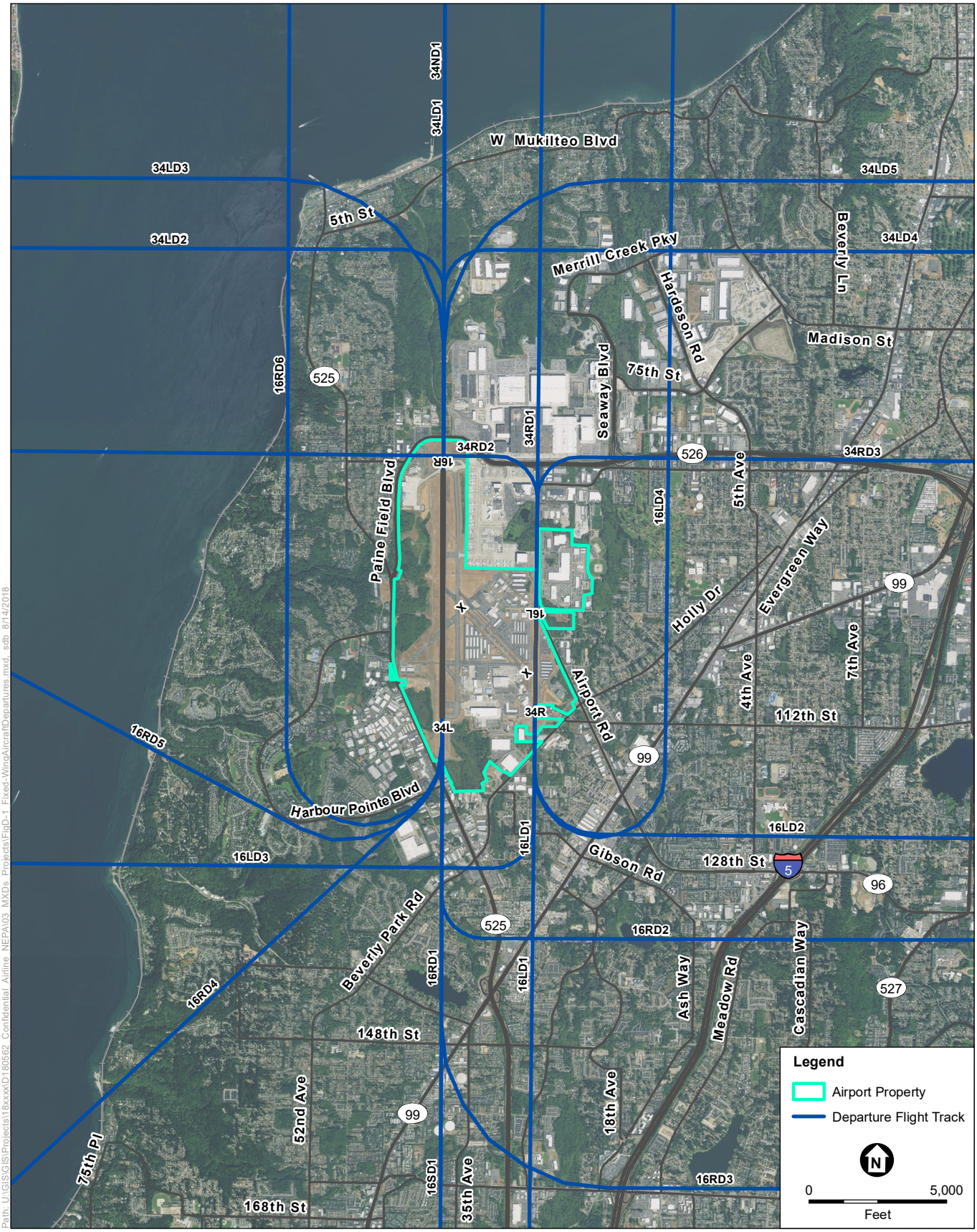
SOURCES: Barnard Dunkelberg Company, Sept. 2012; FlightAware, Inc., 2018; ESA, 2018.

F.3.6 Flight Track Location and Utilization

Flight tracks were developed using information contained in the 2012 Final EA and calendar year 2016 radar flight track information provided by the FAA. Radar flight track data from March 2016 was used to update the flight tracks and flight track utilization data contained in the 2012 Final EA. Flight track utilization percentages within each corridor were calculated for each AEDT aircraft type for arrivals, departures, and touch-and-go operations for the daytime and nighttime hours by dividing the number of operations on each flight track by the total number of operations within the flight corridor in which the flight track was located.

Figures F-1 through **F-3** depict the 2017 Existing Conditions flight tracks, as modeled in the AEDT, for departures, arrivals, helicopter, and touch-and-go operations. **Table F-7** provides

flight tracks utilization percentages for the 2017 Existing Conditions scenario. Flight track utilization percentages were calculated for each AEDT aircraft type by time of day, type of operation, and runway.



Path: U:\GIS\GIS\Projects\18xxxx\D180562_Confidential_Airline_NEPA\03_MXDs_Projects\FigD-1_Fixed-WingAircraftDepartures.mxd sdb 8/14/2018

SOURCE: USDA NAIP (Aerial Imagery); AEDT 2d; ESA, 2018
NOTE: Runway 11-29 closed indefinitely.

Figure F-1
Fixed-Wing Aircraft Departures
Snohomish County Airport (Paine Field)

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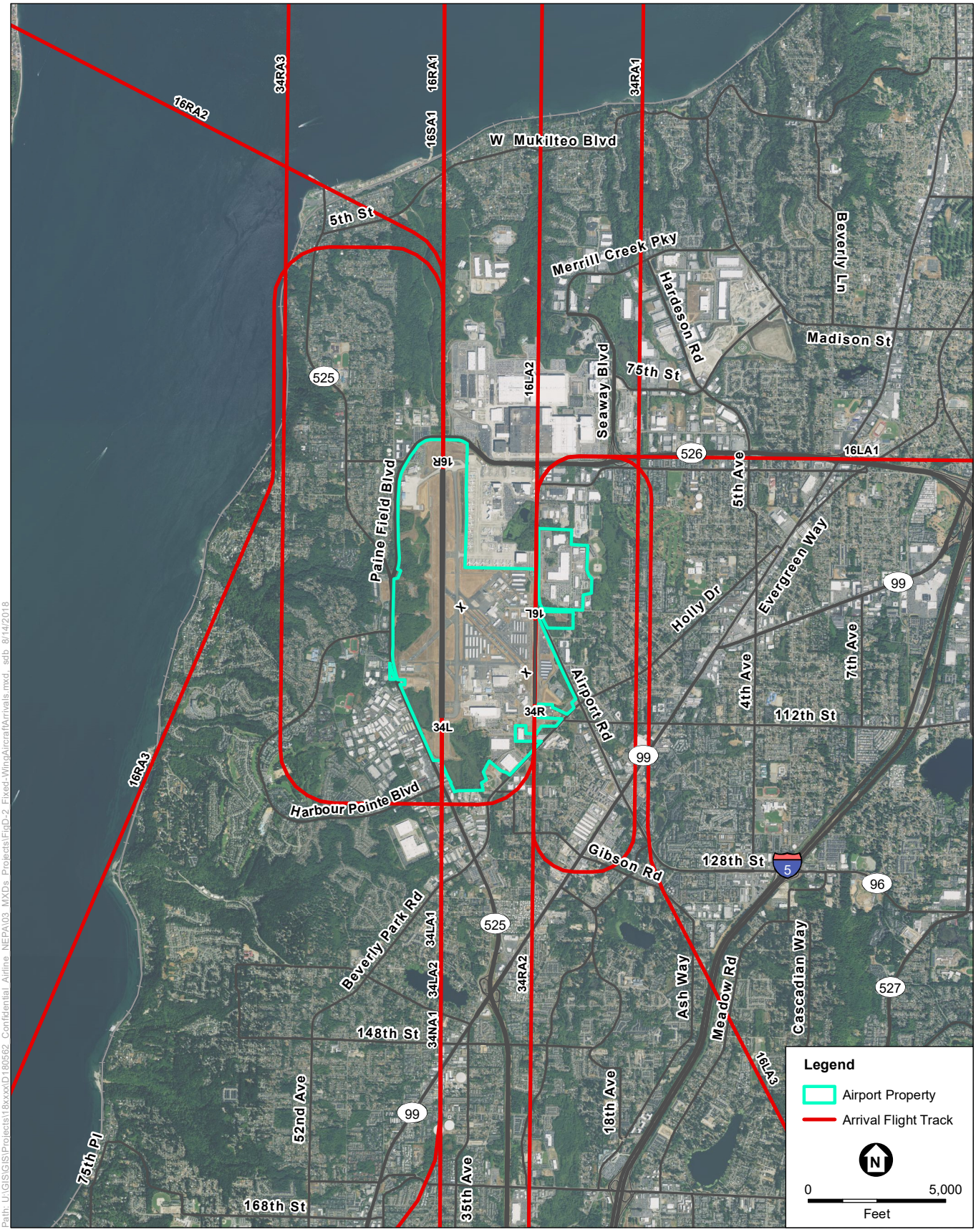

Path: U:\GIS\GIS\Projects\18xxxx\D180562_Confidential_Airline_NEPA\03_MXDs_Projects\FigD-2_Fixed-WingAircraftArrivals.mxd sdb 8/14/2018

SOURCE: USDA NAIP (Aerial Imagery); AEDT 2d; ESA, 2018
NOTE: Runway 11-29 closed indefinitely.

Figure F-2
Fixed-Wing Aircraft Arrivals
Snohomish County Airport (Paine Field)

ESA

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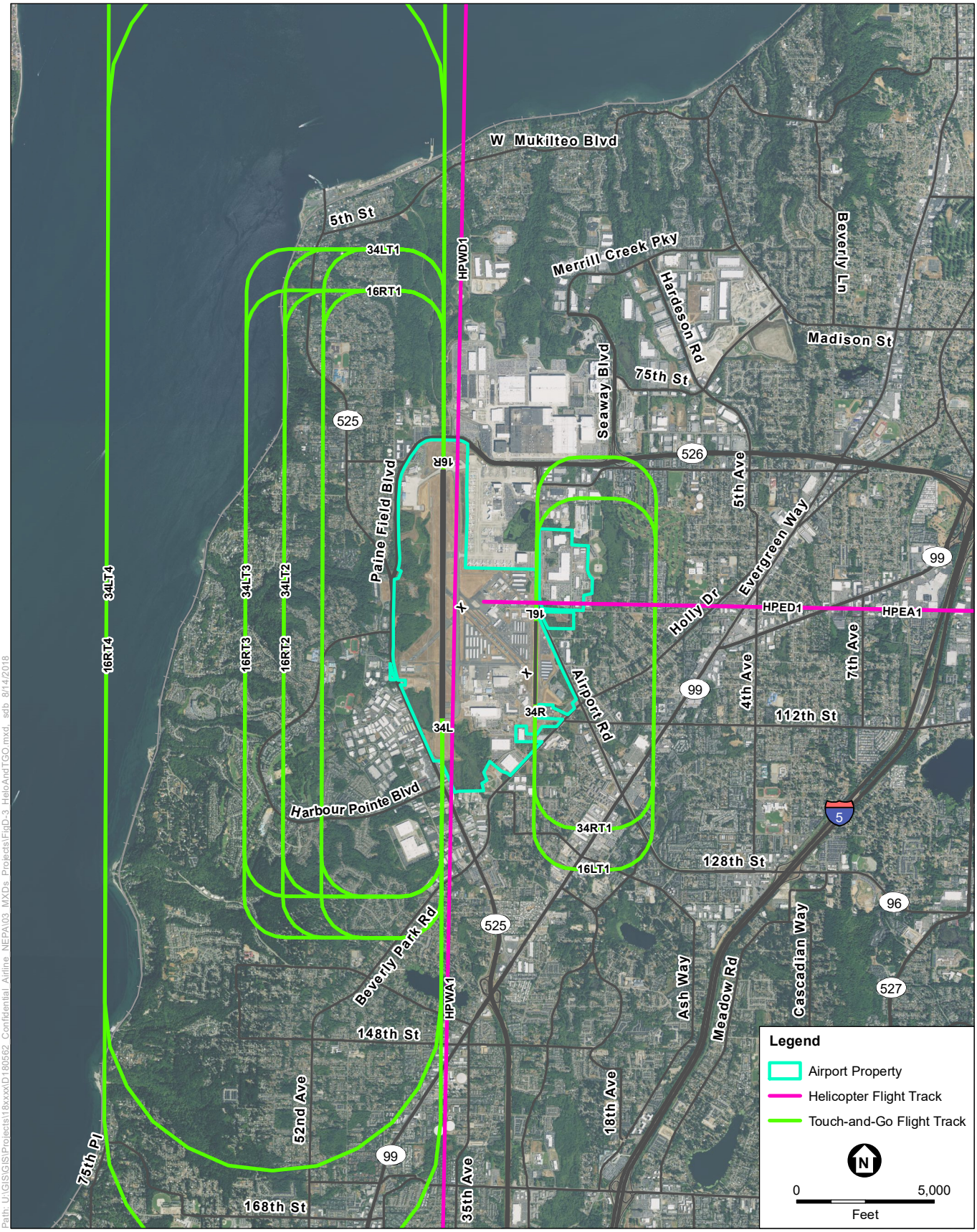

SOURCE: USDA NAIP (Aerial Imagery); AEDT 2d; ESA, 2018

Figure F-3
Helicopter and Touch-and-Go Flight Tracks
Snohomish County Airport (Paine Field)

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F.4 Noise Analysis for Proposed Action

The following sections describe the noise modeling inputs for the 2019 and 2024 Proposed Action scenarios.

F.4.1 Flight Operations

Annual operations by aircraft category in 2019 and 2024 under the Proposed Action are summarized in **Tables F-8** and **F-9**. The annual operations forecast for the Proposed Action was developed by ESA and is documented in **Appendix B**. The number of AAD operations was derived by dividing the number of annual operations by 365 days.

TABLE F-8
2019 PROPOSED ACTION
NUMBERS OF OPERATIONS BY AIRCRAFT CATEGORY

Aircraft Category	Numbers of Operations
Air Carrier	22,109
Air Taxi	1,197
General Aviation	100,436
Military	630
Annual Total	124,372
Annual Average Day (AAD) Operations	**340.75**

SOURCES: Alaska Airlines, United Airlines, and Southwest Airlines, 2018; ESA, 2018.

TABLE F-9
2024 PROPOSED ACTION
NUMBERS OF OPERATIONS BY AIRCRAFT CATEGORY

Aircraft Category	Numbers of Operations
Air Carrier	22,174
Air Taxi	1,197
General Aviation	101,472
Military	630
Annual Total	125,473
Annual Average Day (AAD) Operations	**343.76**

SOURCES: Alaska Airlines, United Airlines, and Southwest Airlines, 2018; ESA, 2018.

F.4.2 Aircraft Fleet Mix

Tables F-10 and **F-11** presents AAD operations by operation type and AEDT aircraft type in 2019 and 2024 under the Proposed Action. The AEDT aircraft fleet mix is based on information contained in the 2012 Final EA, the FlightAware, Inc. datasets and information provided by Alaska Airlines, United Airlines, and Southwest Airlines.

TABLE F-10
AIRCRAFT FLEET MIX – 2019 PROPOSED ACTION

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
7478	0.21	0.21	0.00
737300	0.05	0.05	0.00
737400	0.08	0.08	0.00
737700	5.49	5.49	0.00
737800	1.44	1.44	0.00
747400	1.18	1.23	0.00
767300	0.36	0.36	0.00
777200	0.14	0.14	0.00
777300	0.28	0.28	0.00
7378MAX	0.06	0.06	0.00
74720B	0.08	0.08	0.00
757RR	0.01	0.01	0.00
767JT9	0.08	0.08	0.00
7773ER	0.71	0.71	0.00
7878R	0.98	0.98	0.00
A109	0.01	0.01	0.00
A319-131	0.01	0.01	0.00
A320-211	0.06	0.06	0.00
A321-232	0.00	0.00	0.00
A330-343	0.06	0.06	0.00
B206B3	0.02	0.02	0.00
B407	0.01	0.01	0.00
BD-700-1A10	0.19	0.19	0.00
BD-700-1A11	0.02	0.02	0.00
BEC58P	2.72	2.72	4.98
C9A	0.56	0.56	0.00
CIT3	0.38	0.38	0.00
CL600	0.69	0.69	0.00
CL601	0.66	0.66	0.00
CNA172	32.01	32.01	0.00
CNA182	4.96	4.96	0.00
CNA206	1.03	1.03	0.63
CNA208	7.04	7.04	0.00
CNA20T	0.16	0.16	0.00
CNA441	0.31	0.31	3.18
CNA500	1.15	1.15	0.00
CNA510	0.62	0.62	0.00
CNA525C	0.10	0.10	0.00
CNA55B	0.64	0.64	0.00
CNA560E	0.06	0.06	0.00
CNA560U	0.22	0.22	0.00
CNA560XL	0.50	0.50	0.00
CNA680	0.30	0.30	0.00
CNA750	1.31	1.31	0.00
COMJET	0.28	0.28	0.00
COMSEP	1.56	1.56	0.00
DC3	0.14	0.14	0.00
DC93LW	0.00	0.00	0.00
DHC6	1.85	1.85	0.00
DHC8	0.29	0.29	0.00
DHC830	0.01	0.01	0.00
E3A	0.03	0.03	0.00
EC130	0.00	0.00	0.00
ECLIPSE500	0.14	0.14	0.00
EMB120	0.02	0.02	0.00
EMB145	0.01	0.01	0.00
EMB175	19.05	19.05	0.00
F-18	0.11	0.11	0.09
FAL20	0.01	0.01	0.00
GASEPF	21.62	21.62	54.72
GASEPV	4.71	4.71	13.27

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
GIV	0.63	0.63	0.00
GV	0.21	0.21	0.00
H500D	0.01	0.01	0.00
IA1125	0.17	0.17	0.00
LEAR25	0.03	0.03	0.00
LEAR35	1.88	1.88	0.00
MU3001	0.11	0.11	0.00
P3A	0.09	0.09	0.00
PA28	9.16	9.16	0.00
PA30	1.80	1.80	0.00
PA42	1.03	1.03	0.00
R44	0.01	0.01	0.00
T34	0.03	0.03	0.00
Total	**131.91**	**131.96**	**76.87**

NOTE: Values may not sum to totals shown due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; Alaska Airlines, United Airlines, and Southwest Airlines, 2018; ESA, 2018.

TABLE F-11
AIRCRAFT FLEET MIX – 2024 PROPOSED ACTION

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
7478	0.21	0.21	0.00
737300	0.05	0.05	0.00
737400	0.08	0.08	0.00
737700	5.50	5.50	0.00
737800	4.45	4.45	0.00
747400	1.18	1.23	0.00
767300	0.44	0.44	0.00
777200	0.14	0.14	0.00
777300	0.28	0.28	0.00
7378MAX	0.06	0.06	0.00
74720B	0.08	0.08	0.00
757RR	0.01	0.01	0.00
767JT9	0.08	0.08	0.00
7773ER	0.71	0.71	0.00
7878R	0.98	0.98	0.00
A109	0.01	0.01	0.00
A319-131	0.01	0.01	0.00
A320-211	0.06	0.06	0.00
A321-232	0.00	0.00	0.00
A330-343	0.06	0.06	0.00
B206B3	0.02	0.02	0.00
B407	0.01	0.01	0.00
BD-700-1A10	0.20	0.20	0.00
BD-700-1A11	0.02	0.02	0.00
BEC58P	2.75	2.75	4.98
C9A	0.56	0.56	0.00
CIT3	0.38	0.38	0.00
CL600	0.70	0.70	0.00
CL601	0.67	0.67	0.00
CNA172	32.46	32.46	0.00
CNA182	5.03	5.03	0.00
CNA206	1.04	1.04	0.63
CNA208	7.14	7.14	0.00
CNA20T	0.16	0.16	0.00
CNA441	0.31	0.31	3.18
CNA500	1.17	1.17	0.00

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
CNA510	0.63	0.63	0.00
CNA525C	0.11	0.11	0.00
CNA55B	0.64	0.64	0.00
CNA560E	0.06	0.06	0.00
CNA560U	0.22	0.22	0.00
CNA560XL	0.50	0.50	0.00
CNA680	0.30	0.30	0.00
CNA750	1.33	1.33	0.00
COMJET	0.28	0.28	0.00
COMSEP	1.59	1.59	0.00
DC3	0.15	0.15	0.00
DC93LW	0.00	0.00	0.00
DHC6	1.88	1.88	0.00
DHC8	0.29	0.29	0.00
DHC830	0.01	0.01	0.00
E3A	0.03	0.03	0.00
EC130	0.00	0.00	0.00
ECLIPSE500	0.14	0.14	0.00
EMB120	0.02	0.02	0.00
EMB145	0.01	0.01	0.00
EMB175	16.05	16.05	0.00
F-18	0.11	0.11	0.09
FAL20	0.01	0.01	0.00
GASEPF	21.92	21.92	54.72
GASEPV	4.78	4.78	13.27
GIV	0.63	0.63	0.00
GV	0.21	0.21	0.00
H500D	0.01	0.01	0.00
IA1125	0.17	0.17	0.00
LEAR25	0.03	0.03	0.00
LEAR35	1.90	1.90	0.00
MU3001	0.11	0.11	0.00
P3A	0.09	0.09	0.00
PA28	9.29	9.29	0.00
PA30	1.83	1.83	0.00
PA42	1.04	1.04	0.00
R44	0.01	0.01	0.00
T34	0.03	0.03	0.00
Total	**133.42**	**133.47**	**76.87**

NOTE: Values may not sum to totals shown due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; Alaska Airlines, United Airlines, and Southwest Airlines, 2018; ESA, 2018.

F.4.3 Time of Day

Time of day information for 2019 and 2024 under the Proposed Action is presented in **F12** and **D-13.** Day/night splits are not anticipated to change substantially between 2017 and 2019 or between 2019 and 2024. Changes in the aircraft fleet mix at Paine Field in the future are expected to have a minor effect on the overall day/night split.

F.4.4 Departure Stage Length

Tables F-14 and **F-15** present departure stage length information for 2019 and 2024 under the Proposed Action. The overall breakdown in departure stage lengths at Paine Field under the

Proposed Action would be slightly different than the departure stage length breakdown in 2017 as a result of the proposed airline service.

F.4.5 Runway Use

Table F-16 presents runway use by type of operation and time of day in 2019 under the Proposed Action. **Table F-17** presents runway use by type of operation and time of day in 2024 under the Proposed Action.

F.4.6 Flight Track Location and Utilization

Arrival, departure, and touch-and-go flight tracks in 2019 and 2024 under the Proposed Action are anticipated to be the same as in 2016. See Figures F-1 through F-5 for information regarding the arrival, departure, and touch-and-go flight tracks that were modeled in the AEDT.

Table F-18 presented at the end of this technical report lists flight track utilization percentages for 2019 under the Proposed Action. **Table F-19** presented at the end of this technical report lists flight track utilization percentages for 2024 under the Proposed Action. Flight track use in 2019 and 2024 is anticipated to be similar to flight track use in 2017 with minor variations due to anticipated changes in the aircraft fleet mix at Paine Field in the future.

TABLE F-12
AIRCRAFT OPERATIONS BY TIME OF DAY – 2019 PROPOSED ACTION

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
7478	99.59%	0.41%	100.00%	99.59%	0.41%	100.00%	0.00%	0.00%	0.00%
737300	98.32%	1.68%	100.00%	98.32%	1.68%	100.00%	0.00%	0.00%	0.00%
737400	95.55%	4.45%	100.00%	95.55%	4.45%	100.00%	0.00%	0.00%	0.00%
737700	79.43%	20.57%	100.00%	79.43%	20.57%	100.00%	0.00%	0.00%	0.00%
737800	95.79%	4.21%	100.00%	95.79%	4.21%	100.00%	0.00%	0.00%	0.00%
747400	60.44%	39.56%	100.00%	61.14%	38.86%	100.00%	0.00%	0.00%	0.00%
767300	99.30%	0.70%	100.00%	99.30%	0.70%	100.00%	0.00%	0.00%	0.00%
777200	98.81%	1.19%	100.00%	98.81%	1.19%	100.00%	0.00%	0.00%	0.00%
777300	99.40%	0.60%	100.00%	99.40%	0.60%	100.00%	0.00%	0.00%	0.00%
7378MAX	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
74720B	94.91%	5.09%	100.00%	94.91%	5.09%	100.00%	0.00%	0.00%	0.00%
757RR	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
767JT9	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
7773ER	99.52%	0.48%	100.00%	99.52%	0.48%	100.00%	0.00%	0.00%	0.00%
7878R	99.48%	0.52%	100.00%	99.48%	0.52%	100.00%	0.00%	0.00%	0.00%
A109	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A319-131	64.63%	35.37%	100.00%	64.63%	35.37%	100.00%	0.00%	0.00%	0.00%
A320-211	89.60%	10.40%	100.00%	89.60%	10.40%	100.00%	0.00%	0.00%	0.00%
A321-232	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A330-343	63.73%	36.27%	100.00%	63.73%	36.27%	100.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BD-700-1A10	95.83%	4.17%	100.00%	95.83%	4.17%	100.00%	0.00%	0.00%	0.00%
BD-700-1A11	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BEC58P	98.80%	1.20%	100.00%	98.80%	1.20%	100.00%	97.71%	2.29%	100.00%
C9A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CIT3	97.87%	2.13%	100.00%	97.87%	2.13%	100.00%	0.00%	0.00%	0.00%

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
CL600	97.68%	2.32%	100.00%	97.68%	2.32%	100.00%	0.00%	0.00%	0.00%
CL601	98.17%	1.83%	100.00%	98.17%	1.83%	100.00%	0.00%	0.00%	0.00%
CNA172	98.02%	1.98%	100.00%	98.02%	1.98%	100.00%	0.00%	0.00%	0.00%
CNA182	97.80%	2.20%	100.00%	97.80%	2.20%	100.00%	0.00%	0.00%	0.00%
CNA206	95.18%	4.82%	100.00%	95.18%	4.82%	100.00%	93.05%	6.95%	100.00%
CNA208	96.32%	3.68%	100.00%	96.32%	3.68%	100.00%	0.00%	0.00%	0.00%
CNA20T	93.65%	6.35%	100.00%	93.65%	6.35%	100.00%	0.00%	0.00%	0.00%
CNA441	95.88%	4.12%	100.00%	95.88%	4.12%	100.00%	97.71%	2.29%	100.00%
CNA500	98.96%	1.04%	100.00%	98.96%	1.04%	100.00%	0.00%	0.00%	0.00%
CNA510	98.72%	1.28%	100.00%	98.72%	1.28%	100.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA55B	96.21%	3.79%	100.00%	96.21%	3.79%	100.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560XL	97.58%	2.42%	100.00%	97.58%	2.42%	100.00%	0.00%	0.00%	0.00%
CNA680	98.65%	1.35%	100.00%	98.65%	1.35%	100.00%	0.00%	0.00%	0.00%
CNA750	95.71%	4.29%	100.00%	95.71%	4.29%	100.00%	0.00%	0.00%	0.00%
COMJET	97.13%	2.87%	100.00%	97.13%	2.87%	100.00%	0.00%	0.00%	0.00%
COMSEP	98.10%	1.90%	100.00%	98.10%	1.90%	100.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DC93LW	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC6	96.31%	3.69%	100.00%	96.31%	3.69%	100.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EC130	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%
ECLIPSE500	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB120	80.42%	19.58%	100.00%	80.42%	19.58%	100.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB175	81.62%	18.38%	100.00%	81.62%	18.38%	100.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%
FAL20	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
GASEPF	96.29%	3.71%	100.00%	96.29%	3.71%	100.00%	97.71%	2.29%	100.00%
GASEPV	96.55%	3.45%	100.00%	96.55%	3.45%	100.00%	97.71%	2.29%	100.00%
GIV	94.87%	5.13%	100.00%	94.87%	5.13%	100.00%	0.00%	0.00%	0.00%
GV	92.22%	7.78%	100.00%	92.22%	7.78%	100.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
IA1125	97.58%	2.42%	100.00%	97.58%	2.42%	100.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
LEAR35	94.24%	5.76%	100.00%	94.24%	5.76%	100.00%	0.00%	0.00%	0.00%
MU3001	92.44%	7.56%	100.00%	92.44%	7.56%	100.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
PA28	97.73%	2.27%	100.00%	97.73%	2.27%	100.00%	0.00%	0.00%	0.00%
PA30	94.56%	5.44%	100.00%	94.56%	5.44%	100.00%	0.00%	0.00%	0.00%
PA42	98.36%	1.64%	100.00%	98.36%	1.64%	100.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
All Aircraft	**93.90%**	**6.10%**	**100.00%**	**93.89%**	**6.11%**	**100.00%**	**97.68%**	**2.32%**	**100.00%**

NOTE: Values may not sum to 100% due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-13
AIRCRAFT OPERATIONS BY TIME OF DAY – 2024 PROPOSED ACTION

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
7478	99.58%	0.42%	100.00%	99.58%	0.42%	100.00%	0.00%	0.00%	0.00%
737300	98.28%	1.72%	100.00%	98.28%	1.72%	100.00%	0.00%	0.00%	0.00%
737400	95.45%	4.55%	100.00%	95.45%	4.55%	100.00%	0.00%	0.00%	0.00%
737700	79.39%	20.61%	100.00%	79.39%	20.61%	100.00%	0.00%	0.00%	0.00%
737800	87.35%	12.65%	100.00%	87.35%	12.65%	100.00%	0.00%	0.00%	0.00%
747400	60.24%	39.76%	100.00%	60.94%	39.06%	100.00%	0.00%	0.00%	0.00%
767300	99.41%	0.59%	100.00%	99.41%	0.59%	100.00%	0.00%	0.00%	0.00%
777200	98.78%	1.22%	100.00%	98.78%	1.22%	100.00%	0.00%	0.00%	0.00%
777300	99.39%	0.61%	100.00%	99.39%	0.61%	100.00%	0.00%	0.00%	0.00%
7378MAX	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
74720B	94.80%	5.20%	100.00%	94.80%	5.20%	100.00%	0.00%	0.00%	0.00%
757RR	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
767JT9	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
7773ER	99.51%	0.49%	100.00%	99.51%	0.49%	100.00%	0.00%	0.00%	0.00%
7878R	99.47%	0.53%	100.00%	99.47%	0.53%	100.00%	0.00%	0.00%	0.00%
A109	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A319-131	64.10%	35.90%	100.00%	64.10%	35.90%	100.00%	0.00%	0.00%	0.00%
A320-211	89.38%	10.62%	100.00%	89.38%	10.62%	100.00%	0.00%	0.00%	0.00%
A321-232	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A330-343	63.20%	36.80%	100.00%	63.20%	36.80%	100.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BD-700-1A10	95.85%	4.15%	100.00%	95.85%	4.15%	100.00%	0.00%	0.00%	0.00%
BD-700-1A11	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BEC58P	98.80%	1.20%	100.00%	98.80%	1.20%	100.00%	97.71%	2.29%	100.00%
C9A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CIT3	97.88%	2.12%	100.00%	97.88%	2.12%	100.00%	0.00%	0.00%	0.00%
CL600	97.69%	2.31%	100.00%	97.69%	2.31%	100.00%	0.00%	0.00%	0.00%
CL601	98.18%	1.82%	100.00%	98.18%	1.82%	100.00%	0.00%	0.00%	0.00%
CNA172	98.03%	1.97%	100.00%	98.03%	1.97%	100.00%	0.00%	0.00%	0.00%
CNA182	97.81%	2.19%	100.00%	97.81%	2.19%	100.00%	0.00%	0.00%	0.00%
CNA206	95.19%	4.81%	100.00%	95.19%	4.81%	100.00%	93.05%	6.95%	100.00%
CNA208	96.33%	3.67%	100.00%	96.33%	3.67%	100.00%	0.00%	0.00%	0.00%
CNA20T	93.67%	6.33%	100.00%	93.67%	6.33%	100.00%	0.00%	0.00%	0.00%
CNA441	95.90%	4.10%	100.00%	95.90%	4.10%	100.00%	97.71%	2.29%	100.00%
CNA500	98.96%	1.04%	100.00%	98.96%	1.04%	100.00%	0.00%	0.00%	0.00%
CNA510	98.72%	1.28%	100.00%	98.72%	1.28%	100.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA55B	96.23%	3.77%	100.00%	96.23%	3.77%	100.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560XL	97.59%	2.41%	100.00%	97.59%	2.41%	100.00%	0.00%	0.00%	0.00%
CNA680	98.66%	1.34%	100.00%	98.66%	1.34%	100.00%	0.00%	0.00%	0.00%
CNA750	95.72%	4.28%	100.00%	95.72%	4.28%	100.00%	0.00%	0.00%	0.00%
COMJET	97.14%	2.86%	100.00%	97.14%	2.86%	100.00%	0.00%	0.00%	0.00%
COMSEP	98.11%	1.89%	100.00%	98.11%	1.89%	100.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DC93LW	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC6	96.32%	3.68%	100.00%	96.32%	3.68%	100.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EC130	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%
ECLIPSE500	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB120	80.48%	19.52%	100.00%	80.48%	19.52%	100.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB175	81.30%	18.70%	100.00%	81.30%	18.70%	100.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
FAL20	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
GASEPF	96.30%	3.70%	100.00%	96.30%	3.70%	100.00%	97.71%	2.29%	100.00%
GASEPV	96.56%	3.44%	100.00%	96.56%	3.44%	100.00%	97.71%	2.29%	100.00%
GIV	94.89%	5.11%	100.00%	94.89%	5.11%	100.00%	0.00%	0.00%	0.00%
GV	92.25%	7.75%	100.00%	92.25%	7.75%	100.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
IA1125	97.59%	2.41%	100.00%	97.59%	2.41%	100.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
LEAR35	94.26%	5.74%	100.00%	94.26%	5.74%	100.00%	0.00%	0.00%	0.00%
MU3001	92.46%	7.54%	100.00%	92.46%	7.54%	100.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
PA28	97.74%	2.26%	100.00%	97.74%	2.26%	100.00%	0.00%	0.00%	0.00%
PA30	94.58%	5.42%	100.00%	94.58%	5.42%	100.00%	0.00%	0.00%	0.00%
PA42	98.36%	1.64%	100.00%	98.36%	1.64%	100.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
All Aircraft	**93.94%**	**6.06%**	**100.00%**	**93.93%**	**6.07%**	**100.00%**	**97.68%**	**2.32%**	**100.00%**

NOTE: Values may not sum to 100% due to rounding.
SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-14
DEPARTURE STAGE LENGTH BREAKDOWN – 2019 PROPOSED ACTION

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
7478	78.20%	5.45%	0.00%	4.09%	0.00%	4.09%	5.45%	2.73%	0.00%
737300	6.55%	86.89%	0.00%	6.55%	0.00%	0.00%	0.00%	0.00%	0.00%
737400	44.26%	19.91%	11.94%	23.89%	0.00%	0.00%	0.00%	0.00%	0.00%
737700	5.23%	94.15%	0.17%	0.45%	0.00%	0.00%	0.00%	0.00%	0.00%
737800	84.72%	14.73%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
747400	0.18%	0.00%	21.50%	30.95%	4.01%	43.36%	0.00%	0.00%	0.00%
767300	84.49%	0.00%	6.09%	9.42%	0.00%	0.00%	0.00%	0.00%	0.00%
777200	27.15%	4.29%	66.43%	2.14%	0.00%	0.00%	0.00%	0.00%	0.00%
777300	93.45%	0.00%	0.00%	2.46%	0.00%	0.00%	4.10%	0.00%	0.00%
7378MAX	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
74720B	13.14%	15.82%	1.27%	65.82%	0.00%	3.95%	0.00%	0.00%	0.00%
757RR	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
767JT9	87.50%	8.33%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
7773ER	77.23%	1.92%	1.15%	0.00%	0.00%	1.51%	6.27%	9.61%	2.31%
7878R	76.09%	1.99%	2.54%	1.24%	0.57%	5.73%	2.28%	7.00%	2.55%
A109	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A319-131	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A320-211	5.20%	94.80%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A321-232	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A330-343	45.28%	0.00%	0.00%	54.72%	0.00%	0.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BD-700-1A10	42.50%	19.17%	6.39%	25.56%	0.00%	6.39%	0.00%	0.00%	0.00%
BD-700-1A11	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BEC58P	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
C9A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CIT3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL600	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL601	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA172	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA182	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA206	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA208	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA20T	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA441	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA500	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA510	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA55B	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560XL	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA680	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA750	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMJET	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMSEP	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC93LW	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC6	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EC130	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ECLIPSE500	33.33%	50.00%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB120	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB175	15.99%	84.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
FAL20	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GASEPF	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GASEPV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GIV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
IA1125	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR35	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
MU3001	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA28	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA30	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA42	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
All Aircraft	**81.98%**	**16.44%**	**0.37%**	**0.49%**	**0.04%**	**0.47%**	**0.07%**	**0.11%**	**0.03%**

NOTE: Values may not sum to 100% due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-15
DEPARTURE STAGE LENGTH BREAKDOWN – 2024 PROPOSED ACTION

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
7478	78.20%	5.45%	0.00%	4.09%	0.00%	4.09%	5.45%	2.72%	0.00%
737300	6.55%	86.90%	0.00%	6.55%	0.00%	0.00%	0.00%	0.00%	0.00%
737400	44.32%	19.89%	11.93%	23.86%	0.00%	0.00%	0.00%	0.00%	0.00%
737700	5.26%	94.11%	0.17%	0.45%	0.00%	0.00%	0.00%	0.00%	0.00%
737800	27.54%	72.28%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
747400	0.18%	0.00%	21.52%	30.99%	4.09%	43.22%	0.00%	0.00%	0.00%
767300	87.26%	0.00%	5.00%	7.74%	0.00%	0.00%	0.00%	0.00%	0.00%
777200	27.14%	4.29%	66.43%	2.14%	0.00%	0.00%	0.00%	0.00%	0.00%
777300	93.45%	0.00%	0.00%	2.46%	0.00%	0.00%	4.10%	0.00%	0.00%
7378MAX	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
74720B	13.15%	15.80%	1.30%	65.80%	0.00%	3.95%	0.00%	0.00%	0.00%
757RR	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
767JT9	87.50%	8.33%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
7773ER	77.23%	1.92%	1.15%	0.00%	0.00%	1.52%	6.27%	9.61%	2.31%
7878R	76.09%	1.99%	2.54%	1.24%	0.57%	5.73%	2.28%	7.00%	2.55%
A109	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A319-131	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A320-211	5.31%	94.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A321-232	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A330-343	45.55%	0.00%	0.00%	54.45%	0.00%	0.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BD-700-1A10	42.49%	19.17%	6.39%	25.56%	0.00%	6.39%	0.00%	0.00%	0.00%
BD-700-1A11	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BEC58P	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
C9A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CIT3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL600	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL601	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA172	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA182	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA206	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA208	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA20T	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA441	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA500	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA510	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA55B	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560XL	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA680	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA750	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMJET	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMSEP	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC93LW	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC6	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EC130	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ECLIPSE500	33.33%	50.00%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB120	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB175	18.99%	81.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FAL20	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
GASEPF	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GASEPV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GIV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
IA1125	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR35	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
MU3001	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA28	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA30	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA42	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
All Aircraft	**82.18%**	**16.26%**	**0.36%**	**0.48%**	**0.04%**	**0.47%**	**0.07%**	**0.11%**	**0.03%**

NOTE: Values may not sum to 100% due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-16
RUNWAY USE BY TYPE OF OPERATION AND TIME OF DAY – 2019 PROPOSED ACTION

Runway	Arrivals		Departures		Touch and Go	
	Day	Night	Day	Night	Day	Night
16L	16.53%	0.00%	16.52%	0.00%	10.53%	0.00%
34R	14.22%	0.00%	14.21%	0.00%	8.62%	0.00%
16R	37.84%	68.90%	37.84%	40.90%	44.47%	35.00%
34L	31.37%	31.07%	31.38%	59.07%	36.38%	65.00%
HPE	0.02%	0.02%	0.02%	0.02%	0.00%	0.00%
HPW	0.02%	0.02%	0.02%	0.02%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

NOTES:
Values may not sum to 100% due to rounding.
HPE = helipad east; HPW = helipad west.

SOURCES: Barnard Dunkelberg Company, September 2012; ESA, 2018.

TABLE F-17
RUNWAY USE BY TYPE OF OPERATION AND TIME OF DAY – 2024 PROPOSED ACTION

Runway	Arrivals		Departures		Touch and Go	
	Day	Night	Day	Night	Day	Night
16L	16.56%	0.00%	16.56%	0.00%	10.53%	0.00%
34R	14.25%	0.00%	14.24%	0.00%	8.62%	0.00%
16R	37.80%	68.87%	37.80%	40.93%	44.47%	35.00%
34L	31.34%	31.10%	31.35%	59.04%	36.38%	65.00%
HPE	0.02%	0.02%	0.02%	0.02%	0.00%	0.00%
HPW	0.02%	0.02%	0.02%	0.02%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

NOTES:
Values may not sum to 100% due to rounding.
HPE = helipad east; HPW = helipad west.

SOURCES: Barnard Dunkelberg Company, September 2012; ESA, 2018.

F.5 Noise Analysis for the No Action Alternative

The following sections describe the noise modeling inputs for the 2019 and 2024 No Action Alternative scenarios.

F.5.1 Flight Operations

Annual operations by aircraft category in 2019 and 2024 under the No Action Alternative are summarized in **Tables F-20** and **F-21**. The annual operations forecast was developed by ESA and is documented in **Appendix B**. The number of AAD operations was derived by dividing the number of annual operations by 365 days.

TABLE F-20
2019 NO ACTION ALTERNATIVE
NUMBERS OF OPERATIONS BY AIRCRAFT CATEGORY

Aircraft Category	Numbers of Operations
Air Carrier	4,589
Air Taxi	1,197
General Aviation	100,436
Military	630
Annual Total	106,852
Annual Average Day (AAD) Operations	**292.75**

SOURCE: ESA, 2018.

TABLE F-21
2024 NO ACTION ALTERNATIVE
NUMBERS OF OPERATIONS BY AIRCRAFT CATEGORY

Aircraft Category	Numbers of Operations
Air Carrier	4,654
Air Taxi	1,197
General Aviation	101,472
Military	630
Annual Total	107,953
Annual Average Day (AAD) Operations	**295.76**

SOURCES: ESA, 2018.

F.5.2 Aircraft Fleet Mix

Tables F-22 and **F-23** presents AAD operations by operation type and AEDT aircraft type in 2019 and 2024 under the No Action Alternative. The AEDT aircraft fleet mix is based on information contained in the 2012 Final EA and the FlightAware, Inc. datasets.

TABLE F-22
AIRCRAFT FLEET MIX – 2019 NO ACTION ALTERNATIVE

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
7478	0.21	0.21	0.00
737300	0.05	0.05	0.00
737400	0.08	0.08	0.00
737700	0.49	0.49	0.00
737800	1.44	1.44	0.00
747400	1.18	1.23	0.00
767300	0.36	0.36	0.00
777200	0.14	0.14	0.00
777300	0.28	0.28	0.00
7378MAX	0.06	0.06	0.00
74720B	0.08	0.08	0.00
757RR	0.01	0.01	0.00
767JT9	0.08	0.08	0.00
7773ER	0.71	0.71	0.00
7878R	0.98	0.98	0.00
A109	0.01	0.01	0.00
A319-131	0.01	0.01	0.00
A320-211	0.06	0.06	0.00
A321-232	0.00	0.00	0.00
A330-343	0.06	0.06	0.00
B206B3	0.02	0.02	0.00
B407	0.01	0.01	0.00
BD-700-1A10	0.19	0.19	0.00
BD-700-1A11	0.02	0.02	0.00
BEC58P	2.72	2.72	4.98
C9A	0.56	0.56	0.00
CIT3	0.38	0.38	0.00
CL600	0.69	0.69	0.00
CL601	0.66	0.66	0.00
CNA172	32.01	32.01	0.00
CNA182	4.96	4.96	0.00
CNA206	1.03	1.03	0.63
CNA208	7.04	7.04	0.00
CNA20T	0.16	0.16	0.00
CNA441	0.31	0.31	3.18
CNA500	1.15	1.15	0.00
CNA510	0.62	0.62	0.00
CNA525C	0.10	0.10	0.00
CNA55B	0.64	0.64	0.00
CNA560E	0.06	0.06	0.00
CNA560U	0.22	0.22	0.00
CNA560XL	0.50	0.50	0.00
CNA680	0.30	0.30	0.00
CNA750	1.31	1.31	0.00
COMJET	0.28	0.28	0.00
COMSEP	1.56	1.56	0.00
DC3	0.14	0.14	0.00
DC93LW	0.00	0.00	0.00
DHC6	1.85	1.85	0.00
DHC8	0.29	0.29	0.00
DHC830	0.01	0.01	0.00
E3A	0.03	0.03	0.00
EC130	0.00	0.00	0.00
ECLIPSE500	0.14	0.14	0.00
EMB120	0.02	0.02	0.00
EMB145	0.01	0.01	0.00
EMB175	0.05	0.05	0.00
F-18	0.11	0.11	0.09
FAL20	0.01	0.01	0.00
GASEPF	21.62	21.62	54.72
GASEPV	4.71	4.71	13.27

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
GIV	0.63	0.63	0.00
GV	0.21	0.21	0.00
H500D	0.01	0.01	0.00
IA1125	0.17	0.17	0.00
LEAR25	0.03	0.03	0.00
LEAR35	1.88	1.88	0.00
MU3001	0.11	0.11	0.00
P3A	0.09	0.09	0.00
PA28	9.16	9.16	0.00
PA30	1.80	1.80	0.00
PA42	1.03	1.03	0.00
R44	0.01	0.01	0.00
T34	0.03	0.03	0.00
Total	**107.91**	**107.96**	**76.87**

NOTE: Values may not sum to totals shown due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-23
AIRCRAFT FLEET MIX – 2024 NO ACTION ALTERNATIVE

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
7478	0.21	0.21	0.00
737300	0.05	0.05	0.00
737400	0.08	0.08	0.00
737700	0.50	0.50	0.00
737800	1.45	1.45	0.00
747400	1.18	1.23	0.00
767300	0.44	0.44	0.00
777200	0.14	0.14	0.00
777300	0.28	0.28	0.00
7378MAX	0.06	0.06	0.00
74720B	0.08	0.08	0.00
757RR	0.01	0.01	0.00
767JT9	0.08	0.08	0.00
7773ER	0.71	0.71	0.00
7878R	0.98	0.98	0.00
A109	0.01	0.01	0.00
A319-131	0.01	0.01	0.00
A320-211	0.06	0.06	0.00
A321-232	0.00	0.00	0.00
A330-343	0.06	0.06	0.00
B206B3	0.02	0.02	0.00
B407	0.01	0.01	0.00
BD-700-1A10	0.20	0.20	0.00
BD-700-1A11	0.02	0.02	0.00
BEC58P	2.75	2.75	4.98
C9A	0.56	0.56	0.00
CIT3	0.38	0.38	0.00
CL600	0.70	0.70	0.00
CL601	0.67	0.67	0.00
CNA172	32.46	32.46	0.00
CNA182	5.03	5.03	0.00
CNA206	1.04	1.04	0.63
CNA208	7.14	7.14	0.00
CNA20T	0.16	0.16	0.00
CNA441	0.31	0.31	3.18
CNA500	1.17	1.17	0.00

AEDT Aircraft	Arrivals	Departures	Touch-and-Go Operations
CNA510	0.63	0.63	0.00
CNA525C	0.11	0.11	0.00
CNA55B	0.64	0.64	0.00
CNA560E	0.06	0.06	0.00
CNA560U	0.22	0.22	0.00
CNA560XL	0.50	0.50	0.00
CNA680	0.30	0.30	0.00
CNA750	1.33	1.33	0.00
COMJET	0.28	0.28	0.00
COMSEP	1.59	1.59	0.00
DC3	0.15	0.15	0.00
DC93LW	0.00	0.00	0.00
DHC6	1.88	1.88	0.00
DHC8	0.29	0.29	0.00
DHC830	0.01	0.01	0.00
E3A	0.03	0.03	0.00
EC130	0.00	0.00	0.00
ECLIPSE500	0.14	0.14	0.00
EMB120	0.02	0.02	0.00
EMB145	0.01	0.01	0.00
EMB175	0.05	0.05	0.00
F-18	0.11	0.11	0.09
FAL20	0.01	0.01	0.00
GASEPF	21.92	21.92	54.72
GASEPV	4.78	4.78	13.27
GIV	0.63	0.63	0.00
GV	0.21	0.21	0.00
H500D	0.01	0.01	0.00
IA1125	0.17	0.17	0.00
LEAR25	0.03	0.03	0.00
LEAR35	1.90	1.90	0.00
MU3001	0.11	0.11	0.00
P3A	0.09	0.09	0.00
PA28	9.29	9.29	0.00
PA30	1.83	1.83	0.00
PA42	1.04	1.04	0.00
R44	0.01	0.01	0.00
T34	0.03	0.03	0.00
Total	**109.42**	**109.47**	**76.87**

NOTE: Values may not sum to totals shown due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

F.5.3 Time of Day

Time of day information for 2019 and 2024 under the No Action Alternative is presented in **Tables F-24** and **F-25.** Day/night splits are not anticipated to change substantially between 2017 and 2019 or between 2019 and 2024; however, changes in the aircraft fleet mix at Paine Field in the future will affect the overall day/night split at Paine Field.

F.5.4 Departure Stage Length

Tables F-26 and **F-27** present departure stage length information for 2019 and 2024 under the No Action Alternative. The overall breakdown in departure stage lengths at Paine Field under the No

Action Alternative would be slightly different than the departure stage length breakdown in 2017 as a result of anticipated changes in the aircraft fleet mix at Paine Field in the future.

F.5.5 Runway Use

Table F-28 presents runway use by type of operation and time of day in 2019 under the No Action Alternative. **Table F-29** presents runway use by type of operation and time of day in 2024 under the No Action Alternative.

F.5.6 Flight Track Location and Utilization

Arrival, departure, and touch-and-go flight tracks in 2019 and 2024 under the No Action Alternative are anticipated to be the same as in 2017. See Figures F-1 through F-3 for information regarding the arrival, departure, and touch-and-go flight tracks that were modeled in the AEDT. **Table F-30** presented at the end of this technical report lists flight track utilization percentages for 2019 under the No Action Alternative. **Table F-31** presented at the end of this technical report lists flight track utilization percentages for 2024 under the No Action Alternative. Flight track use in 2019 and 2024 is anticipated to be similar to flight track use in 2017 with minor variations due to anticipated changes in the aircraft fleet mix at Paine Field in the future.

TABLE F-24
AIRCRAFT OPERATIONS BY TIME OF DAY – 2019 NO ACTION ALTERNATIVE

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
7478	99.59%	0.41%	100.00%	99.59%	0.41%	100.00%	0.00%	0.00%	0.00%
737300	98.32%	1.68%	100.00%	98.32%	1.68%	100.00%	0.00%	0.00%	0.00%
737400	95.55%	4.45%	100.00%	95.55%	4.45%	100.00%	0.00%	0.00%	0.00%
737700	73.69%	26.31%	100.00%	73.69%	26.31%	100.00%	0.00%	0.00%	0.00%
737800	95.79%	4.21%	100.00%	95.79%	4.21%	100.00%	0.00%	0.00%	0.00%
747400	60.44%	39.56%	100.00%	61.14%	38.86%	100.00%	0.00%	0.00%	0.00%
767300	99.30%	0.70%	100.00%	99.30%	0.70%	100.00%	0.00%	0.00%	0.00%
777200	98.81%	1.19%	100.00%	98.81%	1.19%	100.00%	0.00%	0.00%	0.00%
777300	99.40%	0.60%	100.00%	99.40%	0.60%	100.00%	0.00%	0.00%	0.00%
7378MAX	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
74720B	94.91%	5.09%	100.00%	94.91%	5.09%	100.00%	0.00%	0.00%	0.00%
757RR	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
767JT9	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
7773ER	99.52%	0.48%	100.00%	99.52%	0.48%	100.00%	0.00%	0.00%	0.00%
7878R	99.48%	0.52%	100.00%	99.48%	0.52%	100.00%	0.00%	0.00%	0.00%
A109	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A319-131	64.63%	35.37%	100.00%	64.63%	35.37%	100.00%	0.00%	0.00%	0.00%
A320-211	89.60%	10.40%	100.00%	89.60%	10.40%	100.00%	0.00%	0.00%	0.00%
A321-232	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A330-343	63.73%	36.27%	100.00%	63.73%	36.27%	100.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BD-700-1A10	95.83%	4.17%	100.00%	95.83%	4.17%	100.00%	0.00%	0.00%	0.00%
BD-700-1A11	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BEC58P	98.80%	1.20%	100.00%	98.80%	1.20%	100.00%	97.71%	2.29%	100.00%
C9A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CIT3	97.87%	2.13%	100.00%	97.87%	2.13%	100.00%	0.00%	0.00%	0.00%
CL600	97.68%	2.32%	100.00%	97.68%	2.32%	100.00%	0.00%	0.00%	0.00%

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
CL601	98.17%	1.83%	100.00%	98.17%	1.83%	100.00%	0.00%	0.00%	0.00%
CNA172	98.02%	1.98%	100.00%	98.02%	1.98%	100.00%	0.00%	0.00%	0.00%
CNA182	97.80%	2.20%	100.00%	97.80%	2.20%	100.00%	0.00%	0.00%	0.00%
CNA206	95.18%	4.82%	100.00%	95.18%	4.82%	100.00%	93.05%	6.95%	100.00%
CNA208	96.32%	3.68%	100.00%	96.32%	3.68%	100.00%	0.00%	0.00%	0.00%
CNA20T	93.65%	6.35%	100.00%	93.65%	6.35%	100.00%	0.00%	0.00%	0.00%
CNA441	95.88%	4.12%	100.00%	95.88%	4.12%	100.00%	97.71%	2.29%	100.00%
CNA500	98.96%	1.04%	100.00%	98.96%	1.04%	100.00%	0.00%	0.00%	0.00%
CNA510	98.72%	1.28%	100.00%	98.72%	1.28%	100.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA55B	96.21%	3.79%	100.00%	96.21%	3.79%	100.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560XL	97.58%	2.42%	100.00%	97.58%	2.42%	100.00%	0.00%	0.00%	0.00%
CNA680	98.65%	1.35%	100.00%	98.65%	1.35%	100.00%	0.00%	0.00%	0.00%
CNA750	95.71%	4.29%	100.00%	95.71%	4.29%	100.00%	0.00%	0.00%	0.00%
COMJET	97.13%	2.87%	100.00%	97.13%	2.87%	100.00%	0.00%	0.00%	0.00%
COMSEP	98.10%	1.90%	100.00%	98.10%	1.90%	100.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DC93LW	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC6	96.31%	3.69%	100.00%	96.31%	3.69%	100.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EC130	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%
ECLIPSE500	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB120	80.42%	19.58%	100.00%	80.42%	19.58%	100.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB175	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%
FAL20	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
GASEPF	96.29%	3.71%	100.00%	96.29%	3.71%	100.00%	97.71%	2.29%	100.00%
GASEPV	96.55%	3.45%	100.00%	96.55%	3.45%	100.00%	97.71%	2.29%	100.00%
GIV	94.87%	5.13%	100.00%	94.87%	5.13%	100.00%	0.00%	0.00%	0.00%
GV	92.22%	7.78%	100.00%	92.22%	7.78%	100.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
IA1125	97.58%	2.42%	100.00%	97.58%	2.42%	100.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
LEAR35	94.24%	5.76%	100.00%	94.24%	5.76%	100.00%	0.00%	0.00%	0.00%
MU3001	92.44%	7.56%	100.00%	92.44%	7.56%	100.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
PA28	97.73%	2.27%	100.00%	97.73%	2.27%	100.00%	0.00%	0.00%	0.00%
PA30	94.56%	5.44%	100.00%	94.56%	5.44%	100.00%	0.00%	0.00%	0.00%
PA42	98.36%	1.64%	100.00%	98.36%	1.64%	100.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
All Aircraft	**96.71%**	**3.29%**	**100.00%**	**96.70%**	**3.30%**	**100.00%**	**97.68%**	**2.32%**	**100.00%**

NOTE: Values may not sum to 100% due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-25
AIRCRAFT OPERATIONS BY TIME OF DAY – 2024 NO ACTION ALTERNATIVE

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
7478	99.58%	0.42%	100.00%	99.58%	0.42%	100.00%	0.00%	0.00%	0.00%
737300	98.28%	1.72%	100.00%	98.28%	1.72%	100.00%	0.00%	0.00%	0.00%
737400	95.45%	4.55%	100.00%	95.45%	4.55%	100.00%	0.00%	0.00%	0.00%
737700	73.24%	26.76%	100.00%	73.24%	26.76%	100.00%	0.00%	0.00%	0.00%
737800	95.69%	4.31%	100.00%	95.69%	4.31%	100.00%	0.00%	0.00%	0.00%
747400	60.24%	39.76%	100.00%	60.94%	39.06%	100.00%	0.00%	0.00%	0.00%
767300	99.41%	0.59%	100.00%	99.41%	0.59%	100.00%	0.00%	0.00%	0.00%
777200	98.78%	1.22%	100.00%	98.78%	1.22%	100.00%	0.00%	0.00%	0.00%
777300	99.39%	0.61%	100.00%	99.39%	0.61%	100.00%	0.00%	0.00%	0.00%
7378MAX	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
74720B	94.80%	5.20%	100.00%	94.80%	5.20%	100.00%	0.00%	0.00%	0.00%
757RR	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
767JT9	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
7773ER	99.51%	0.49%	100.00%	99.51%	0.49%	100.00%	0.00%	0.00%	0.00%
7878R	99.47%	0.53%	100.00%	99.47%	0.53%	100.00%	0.00%	0.00%	0.00%
A109	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A319-131	64.10%	35.90%	100.00%	64.10%	35.90%	100.00%	0.00%	0.00%	0.00%
A320-211	89.38%	10.62%	100.00%	89.38%	10.62%	100.00%	0.00%	0.00%	0.00%
A321-232	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
A330-343	63.20%	36.80%	100.00%	63.20%	36.80%	100.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BD-700-1A10	95.85%	4.15%	100.00%	95.85%	4.15%	100.00%	0.00%	0.00%	0.00%
BD-700-1A11	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
BEC58P	98.80%	1.20%	100.00%	98.80%	1.20%	100.00%	97.71%	2.29%	100.00%
C9A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CIT3	97.88%	2.12%	100.00%	97.88%	2.12%	100.00%	0.00%	0.00%	0.00%
CL600	97.69%	2.31%	100.00%	97.69%	2.31%	100.00%	0.00%	0.00%	0.00%
CL601	98.18%	1.82%	100.00%	98.18%	1.82%	100.00%	0.00%	0.00%	0.00%
CNA172	98.03%	1.97%	100.00%	98.03%	1.97%	100.00%	0.00%	0.00%	0.00%
CNA182	97.81%	2.19%	100.00%	97.81%	2.19%	100.00%	0.00%	0.00%	0.00%
CNA206	95.19%	4.81%	100.00%	95.19%	4.81%	100.00%	93.05%	6.95%	100.00%
CNA208	96.33%	3.67%	100.00%	96.33%	3.67%	100.00%	0.00%	0.00%	0.00%
CNA20T	93.67%	6.33%	100.00%	93.67%	6.33%	100.00%	0.00%	0.00%	0.00%
CNA441	95.90%	4.10%	100.00%	95.90%	4.10%	100.00%	97.71%	2.29%	100.00%
CNA500	98.96%	1.04%	100.00%	98.96%	1.04%	100.00%	0.00%	0.00%	0.00%
CNA510	98.72%	1.28%	100.00%	98.72%	1.28%	100.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA55B	96.23%	3.77%	100.00%	96.23%	3.77%	100.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
CNA560XL	97.59%	2.41%	100.00%	97.59%	2.41%	100.00%	0.00%	0.00%	0.00%
CNA680	98.66%	1.34%	100.00%	98.66%	1.34%	100.00%	0.00%	0.00%	0.00%
CNA750	95.72%	4.28%	100.00%	95.72%	4.28%	100.00%	0.00%	0.00%	0.00%
COMJET	97.14%	2.86%	100.00%	97.14%	2.86%	100.00%	0.00%	0.00%	0.00%
COMSEP	98.11%	1.89%	100.00%	98.11%	1.89%	100.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DC93LW	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC6	96.32%	3.68%	100.00%	96.32%	3.68%	100.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EC130	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%
ECLIPSE500	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB120	80.48%	19.52%	100.00%	80.48%	19.52%	100.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
EMB175	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%

AEDT Aircraft Type	Arrivals			Departures			Touch-and-Go Operations		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
FAL20	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
GASEPF	96.30%	3.70%	100.00%	96.30%	3.70%	100.00%	97.71%	2.29%	100.00%
GASEPV	96.56%	3.44%	100.00%	96.56%	3.44%	100.00%	97.71%	2.29%	100.00%
GIV	94.89%	5.11%	100.00%	94.89%	5.11%	100.00%	0.00%	0.00%	0.00%
GV	92.25%	7.75%	100.00%	92.25%	7.75%	100.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
IA1125	97.59%	2.41%	100.00%	97.59%	2.41%	100.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
LEAR35	94.26%	5.74%	100.00%	94.26%	5.74%	100.00%	0.00%	0.00%	0.00%
MU3001	92.46%	7.54%	100.00%	92.46%	7.54%	100.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
PA28	97.74%	2.26%	100.00%	97.74%	2.26%	100.00%	0.00%	0.00%	0.00%
PA30	94.58%	5.42%	100.00%	94.58%	5.42%	100.00%	0.00%	0.00%	0.00%
PA42	98.36%	1.64%	100.00%	98.36%	1.64%	100.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	100.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%
All Aircraft	**96.72%**	**3.28%**	**100.00%**	**96.71%**	**3.29%**	**100.00%**	**97.68%**	**2.32%**	**100.00%**

NOTE: Values may not sum to 100% due to rounding.
SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-26
DEPARTURE STAGE LENGTH BREAKDOWN – 2019 NO ACTION ALTERNATIVE

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
7478	78.20%	5.45%	0.00%	4.09%	0.00%	4.09%	5.45%	2.73%	0.00%
737300	6.55%	86.89%	0.00%	6.55%	0.00%	0.00%	0.00%	0.00%	0.00%
737400	44.26%	19.91%	11.94%	23.89%	0.00%	0.00%	0.00%	0.00%	0.00%
737700	58.08%	35.02%	1.93%	4.97%	0.00%	0.00%	0.00%	0.00%	0.00%
737800	84.72%	14.73%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
747400	0.18%	0.00%	21.50%	30.95%	4.01%	43.36%	0.00%	0.00%	0.00%
767300	84.49%	0.00%	6.09%	9.42%	0.00%	0.00%	0.00%	0.00%	0.00%
777200	27.15%	4.29%	66.43%	2.14%	0.00%	0.00%	0.00%	0.00%	0.00%
777300	93.45%	0.00%	0.00%	2.46%	0.00%	0.00%	4.10%	0.00%	0.00%
7378MAX	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
74720B	13.14%	15.82%	1.27%	65.82%	0.00%	3.95%	0.00%	0.00%	0.00%
757RR	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
767JT9	87.50%	8.33%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
7773ER	77.23%	1.92%	1.15%	0.00%	0.00%	1.51%	6.27%	9.61%	2.31%
7878R	76.09%	1.99%	2.54%	1.24%	0.57%	5.73%	2.28%	7.00%	2.55%
A109	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A319-131	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A320-211	5.20%	94.80%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A321-232	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A330-343	45.28%	0.00%	0.00%	54.72%	0.00%	0.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BD-700-1A10	42.50%	19.17%	6.39%	25.56%	0.00%	6.39%	0.00%	0.00%	0.00%
BD-700-1A11	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BEC58P	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
C9A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CIT3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL600	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL601	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA172	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA182	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA206	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA208	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA20T	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA441	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA500	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA510	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA55B	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560XL	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA680	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA750	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMJET	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMSEP	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC93LW	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC6	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EC130	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ECLIPSE500	33.33%	50.00%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB120	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB175	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FAL20	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
GASEPF	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GASEPV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GIV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
IA1125	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR35	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
MU3001	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA28	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA30	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA42	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
All Aircraft	**97.43%**	**0.65%**	**0.45%**	**0.60%**	**0.05%**	**0.58%**	**0.08%**	**0.13%**	**0.04%**

NOTE: Values may not sum to 100% due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-27
DEPARTURE STAGE LENGTH BREAKDOWN – 2024 NO ACTION ALTERNATIVE

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
7478	78.20%	5.45%	0.00%	4.09%	0.00%	4.09%	5.45%	2.72%	0.00%
737300	6.55%	86.90%	0.00%	6.55%	0.00%	0.00%	0.00%	0.00%	0.00%
737400	44.32%	19.89%	11.93%	23.86%	0.00%	0.00%	0.00%	0.00%	0.00%
737700	58.18%	34.96%	1.92%	4.94%	0.00%	0.00%	0.00%	0.00%	0.00%
737800	84.71%	14.74%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
747400	0.18%	0.00%	21.52%	30.99%	4.09%	43.22%	0.00%	0.00%	0.00%
767300	87.26%	0.00%	5.00%	7.74%	0.00%	0.00%	0.00%	0.00%	0.00%
777200	27.14%	4.29%	66.43%	2.14%	0.00%	0.00%	0.00%	0.00%	0.00%
777300	93.45%	0.00%	0.00%	2.46%	0.00%	0.00%	4.10%	0.00%	0.00%
7378MAX	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
74720B	13.15%	15.80%	1.30%	65.80%	0.00%	3.95%	0.00%	0.00%	0.00%
757RR	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
767JT9	87.50%	8.33%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
7773ER	77.23%	1.92%	1.15%	0.00%	0.00%	1.52%	6.27%	9.61%	2.31%
7878R	76.09%	1.99%	2.54%	1.24%	0.57%	5.73%	2.28%	7.00%	2.55%
A109	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A319-131	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A320-211	5.31%	94.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A321-232	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A330-343	45.55%	0.00%	0.00%	54.45%	0.00%	0.00%	0.00%	0.00%	0.00%
B206B3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B407	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BD-700-1A10	42.49%	19.17%	6.39%	25.56%	0.00%	6.39%	0.00%	0.00%	0.00%
BD-700-1A11	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BEC58P	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
C9A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CIT3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL600	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CL601	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA172	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA182	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA206	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA208	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA20T	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA441	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA500	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA510	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA525C	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA55B	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560E	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560U	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA560XL	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA680	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CNA750	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMJET	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
COMSEP	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DC93LW	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC6	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC8	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
DHC830	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EC130	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ECLIPSE500	33.33%	50.00%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB120	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB145	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EMB175	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
F-18	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FAL20	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

AEDT Aircraft Type	Departures by Stage Length (%)								
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9
GASEPF	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GASEPV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GIV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GV	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H500D	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
IA1125	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR25	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LEAR35	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
MU3001	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
P3A	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA28	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA30	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PA42	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
R44	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
T34	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
All Aircraft	**97.45%**	**0.64%**	**0.44%**	**0.59%**	**0.05%**	**0.57%**	**0.08%**	**0.13%**	**0.04%**

NOTE: Values may not sum to 100% due to rounding.

SOURCES: Barnard Dunkelberg Company, September 2012; FlightAware, Inc., 2018; ESA, 2018.

TABLE F-28
RUNWAY USE BY TYPE OF OPERATION AND TIME OF DAY – 2019 NO ACTION ALTERNATIVE

Runway	Arrivals		Departures		Touch and Go	
	Day	Night	Day	Night	Day	Night
16L	19.61%	0.00%	19.61%	0.00%	10.53%	0.00%
34R	16.87%	0.00%	16.87%	0.00%	8.62%	0.00%
16R	34.63%	61.46%	34.64%	48.34%	44.47%	35.00%
34L	28.83%	38.47%	28.84%	51.59%	36.38%	65.00%
HPE	0.03%	0.04%	0.03%	0.04%	0.00%	0.00%
HPW	0.03%	0.04%	0.03%	0.04%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

NOTES:
Values may not sum to 100% due to rounding.
HPE = helipad east; HPW = helipad west.

SOURCES: Barnard Dunkelberg Company, September 2012; ESA, 2018.

TABLE F-29
RUNWAY USE BY TYPE OF OPERATION AND TIME OF DAY – 2024 NO ACTION ALTERNATIVE

Runway	Arrivals		Departures		Touch and Go	
	Day	Night	Day	Night	Day	Night
16L	19.62%	0.00%	19.61%	0.00%	10.53%	0.00%
34R	16.87%	0.00%	16.87%	0.00%	8.62%	0.00%
16R	34.63%	61.47%	34.64%	48.33%	44.47%	35.00%
34L	28.83%	38.46%	28.83%	51.60%	36.38%	65.00%
HPE	0.03%	0.04%	0.03%	0.04%	0.00%	0.00%
HPW	0.03%	0.04%	0.03%	0.04%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

NOTES:
Values may not sum to 100% due to rounding.
HPE = helipad east; HPW = helipad west.

SOURCES: Barnard Dunkelberg Company, September 2012; ESA, 2018.

Flight Track Utilization Tables

TABLE F-7
FLIGHT TRACK USE – 2017 EXISTING CONDITIONS

Runway/ Flight Track	Arrivals		Departures		Touch-and-Go Operations	
	Day	Night	Day	Night	Day	Night
16L						
16LA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA2	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA3	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LD1	0.00%	0.00%	49.35%	0.00%	0.00%	0.00%
16LD2	0.00%	0.00%	19.59%	0.00%	0.00%	0.00%
16LD3	0.00%	0.00%	8.59%	0.00%	0.00%	0.00%
16LD4	0.00%	0.00%	22.47%	0.00%	0.00%	0.00%
16LT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
34R						
34RA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA2	70.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA3	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RD1	0.00%	0.00%	21.06%	0.00%	0.00%	0.00%
34RD2	0.00%	0.00%	11.32%	0.00%	0.00%	0.00%
34RD3	0.00%	0.00%	67.62%	0.00%	0.00%	0.00%
34RT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
16R						
16RA1	71.20%	90.39%	0.00%	0.00%	0.00%	0.00%
16RA2	17.40%	9.04%	0.00%	0.00%	0.00%	0.00%
16RA3	11.40%	0.57%	0.00%	0.00%	0.00%	0.00%
16RD1	0.00%	0.00%	54.81%	100.00%	0.00%	0.00%
16RD2	0.00%	0.00%	18.23%	0.00%	0.00%	0.00%
16RD3	0.00%	0.00%	4.36%	0.00%	0.00%	0.00%
16RD4	0.00%	0.00%	7.40%	0.00%	0.00%	0.00%
16RD5	0.00%	0.00%	3.80%	0.00%	0.00%	0.00%
16RD6	0.00%	0.00%	11.40%	0.00%	0.00%	0.00%
16RT1	0.00%	0.00%	0.00%	0.00%	33.58%	33.51%
16RT2	0.00%	0.00%	0.00%	0.00%	40.05%	40.02%
16RT3	0.00%	0.00%	0.00%	0.00%	26.23%	26.47%
16RT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
34L						
34LA1	75.00%	95.04%	0.00%	0.00%	0.00%	0.00%
34LA2	25.00%	4.96%	0.00%	0.00%	0.00%	0.00%
34LD1	0.00%	0.00%	55.90%	100.00%	0.00%	0.00%
34LD2	0.00%	0.00%	17.62%	0.00%	0.00%	0.00%
34LD3	0.00%	0.00%	4.43%	0.00%	0.00%	0.00%
34LD4	0.00%	0.00%	17.62%	0.00%	0.00%	0.00%
34LD5	0.00%	0.00%	4.43%	0.00%	0.00%	0.00%
34LT1	0.00%	0.00%	0.00%	0.00%	33.08%	32.94%
34LT2	0.00%	0.00%	0.00%	0.00%	39.94%	40.01%
34LT3	0.00%	0.00%	0.00%	0.00%	26.83%	27.05%
34LT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
HPE						
HPEA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPED1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**
HPW						
HPWA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPWD1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**

SOURCES: Barnard Dunkelberg Company, September 2012; FAA, 2016; ESA, 2018.

TABLE F-18
FLIGHT TRACK USE – 2019 PROPOSED ACTION

Runway/ Flight Track	Arrivals		Departures		Touch-and-Go Operations	
	Day	Night	Day	Night	Day	Night
16L						
16LA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA2	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA3	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LD1	0.00%	0.00%	49.35%	0.00%	0.00%	0.00%
16LD2	0.00%	0.00%	19.59%	0.00%	0.00%	0.00%
16LD3	0.00%	0.00%	8.59%	0.00%	0.00%	0.00%
16LD4	0.00%	0.00%	22.47%	0.00%	0.00%	0.00%
16LT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
34R						
34RA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA2	70.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA3	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RD1	0.00%	0.00%	21.06%	0.00%	0.00%	0.00%
34RD2	0.00%	0.00%	11.32%	0.00%	0.00%	0.00%
34RD3	0.00%	0.00%	67.62%	0.00%	0.00%	0.00%
34RT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
16R						
16RA1	72.11%	80.86%	0.00%	0.00%	0.00%	0.00%
16RA2	19.23%	18.93%	0.00%	0.00%	0.00%	0.00%
16RA3	8.66%	0.22%	0.00%	0.00%	0.00%	0.00%
16RD1	0.00%	0.00%	58.46%	100.00%	0.00%	0.00%
16RD2	0.00%	0.00%	13.84%	0.00%	0.00%	0.00%
16RD3	0.00%	0.00%	6.93%	0.00%	0.00%	0.00%
16RD4	0.00%	0.00%	9.23%	0.00%	0.00%	0.00%
16RD5	0.00%	0.00%	2.88%	0.00%	0.00%	0.00%
16RD6	0.00%	0.00%	8.65%	0.00%	0.00%	0.00%
16RT1	0.00%	0.00%	0.00%	0.00%	33.57%	33.51%
16RT2	0.00%	0.00%	0.00%	0.00%	40.05%	40.02%
16RT3	0.00%	0.00%	0.00%	0.00%	26.23%	26.47%
16RT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
34L						
34LA1	75.00%	85.75%	0.00%	0.00%	0.00%	0.00%
34LA2	25.00%	14.25%	0.00%	0.00%	0.00%	0.00%
34LD1	0.00%	0.00%	59.29%	100.00%	0.00%	0.00%
34LD2	0.00%	0.00%	13.39%	0.00%	0.00%	0.00%
34LD3	0.00%	0.00%	6.97%	0.00%	0.00%	0.00%
34LD4	0.00%	0.00%	13.39%	0.00%	0.00%	0.00%
34LD5	0.00%	0.00%	6.97%	0.00%	0.00%	0.00%
34LT1	0.00%	0.00%	0.00%	0.00%	33.08%	32.94%
34LT2	0.00%	0.00%	0.00%	0.00%	39.94%	40.01%
34LT3	0.00%	0.00%	0.00%	0.00%	26.83%	27.05%
34LT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
HPE						
HPEA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPED1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**
HPW						
HPWA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPWD1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**

SOURCES: Barnard Dunkelberg Company, September 2012; FAA, 2016; ESA, 2018.

TABLE F-19
FLIGHT TRACK USE – 2024 PROPOSED ACTION

Runway/ Flight Track	Arrivals		Departures		Touch-and-Go Operations	
	Day	Night	Day	Night	Day	Night
16L						
16LA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA2	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA3	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LD1	0.00%	0.00%	49.35%	0.00%	0.00%	0.00%
16LD2	0.00%	0.00%	19.59%	0.00%	0.00%	0.00%
16LD3	0.00%	0.00%	8.59%	0.00%	0.00%	0.00%
16LD4	0.00%	0.00%	22.47%	0.00%	0.00%	0.00%
16LT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
34R						
34RA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA2	70.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA3	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RD1	0.00%	0.00%	21.06%	0.00%	0.00%	0.00%
34RD2	0.00%	0.00%	11.32%	0.00%	0.00%	0.00%
34RD3	0.00%	0.00%	67.62%	0.00%	0.00%	0.00%
34RT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
16R						
16RA1	72.11%	80.89%	0.00%	0.00%	0.00%	0.00%
16RA2	19.21%	18.89%	0.00%	0.00%	0.00%	0.00%
16RA3	8.68%	0.22%	0.00%	0.00%	0.00%	0.00%
16RD1	0.00%	0.00%	58.43%	100.00%	0.00%	0.00%
16RD2	0.00%	0.00%	13.89%	0.00%	0.00%	0.00%
16RD3	0.00%	0.00%	6.90%	0.00%	0.00%	0.00%
16RD4	0.00%	0.00%	9.21%	0.00%	0.00%	0.00%
16RD5	0.00%	0.00%	2.89%	0.00%	0.00%	0.00%
16RD6	0.00%	0.00%	8.68%	0.00%	0.00%	0.00%
16RT1	0.00%	0.00%	0.00%	0.00%	33.57%	33.51%
16RT2	0.00%	0.00%	0.00%	0.00%	40.05%	40.02%
16RT3	0.00%	0.00%	0.00%	0.00%	26.23%	26.47%
16RT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
34L						
34LA1	75.00%	85.80%	0.00%	0.00%	0.00%	0.00%
34LA2	25.00%	14.20%	0.00%	0.00%	0.00%	0.00%
34LD1	0.00%	0.00%	59.26%	100.00%	0.00%	0.00%
34LD2	0.00%	0.00%	13.43%	0.00%	0.00%	0.00%
34LD3	0.00%	0.00%	6.94%	0.00%	0.00%	0.00%
34LD4	0.00%	0.00%	13.43%	0.00%	0.00%	0.00%
34LD5	0.00%	0.00%	6.94%	0.00%	0.00%	0.00%
34LT1	0.00%	0.00%	0.00%	0.00%	33.08%	32.94%
34LT2	0.00%	0.00%	0.00%	0.00%	39.94%	40.01%
34LT3	0.00%	0.00%	0.00%	0.00%	26.83%	27.05%
34LT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
HPE						
HPEA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPED1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**
HPW						
HPWA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPWD1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**

SOURCES: Barnard Dunkelberg Company, September 2012; FAA, 2016; ESA, 2018.

TABLE F-30
FLIGHT TRACK USE – 2019 NO ACTION ALTERNATIVE

Runway/ Flight Track	Arrivals		Departures		Touch-and-Go Operations	
	Day	Night	Day	Night	Day	Night
16L						
16LA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA2	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA3	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LD1	0.00%	0.00%	49.35%	0.00%	0.00%	0.00%
16LD2	0.00%	0.00%	19.59%	0.00%	0.00%	0.00%
16LD3	0.00%	0.00%	8.59%	0.00%	0.00%	0.00%
16LD4	0.00%	0.00%	22.47%	0.00%	0.00%	0.00%
16LT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
34R						
34RA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA2	70.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA3	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RD1	0.00%	0.00%	21.06%	0.00%	0.00%	0.00%
34RD2	0.00%	0.00%	11.32%	0.00%	0.00%	0.00%
34RD3	0.00%	0.00%	67.62%	0.00%	0.00%	0.00%
34RT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
16R						
16RA1	71.25%	89.89%	0.00%	0.00%	0.00%	0.00%
16RA2	17.51%	9.56%	0.00%	0.00%	0.00%	0.00%
16RA3	11.24%	0.55%	0.00%	0.00%	0.00%	0.00%
16RD1	0.00%	0.00%	55.02%	100.00%	0.00%	0.00%
16RD2	0.00%	0.00%	17.97%	0.00%	0.00%	0.00%
16RD3	0.00%	0.00%	4.51%	0.00%	0.00%	0.00%
16RD4	0.00%	0.00%	7.51%	0.00%	0.00%	0.00%
16RD5	0.00%	0.00%	3.74%	0.00%	0.00%	0.00%
16RD6	0.00%	0.00%	11.23%	0.00%	0.00%	0.00%
16RT1	0.00%	0.00%	0.00%	0.00%	33.57%	33.51%
16RT2	0.00%	0.00%	0.00%	0.00%	40.05%	40.02%
16RT3	0.00%	0.00%	0.00%	0.00%	26.23%	26.47%
16RT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
34L						
34LA1	75.00%	94.69%	0.00%	0.00%	0.00%	0.00%
34LA2	25.00%	5.31%	0.00%	0.00%	0.00%	0.00%
34LD1	0.00%	0.00%	56.10%	100.00%	0.00%	0.00%
34LD2	0.00%	0.00%	17.37%	0.00%	0.00%	0.00%
34LD3	0.00%	0.00%	4.58%	0.00%	0.00%	0.00%
34LD4	0.00%	0.00%	17.37%	0.00%	0.00%	0.00%
34LD5	0.00%	0.00%	4.58%	0.00%	0.00%	0.00%
34LT1	0.00%	0.00%	0.00%	0.00%	33.08%	32.94%
34LT2	0.00%	0.00%	0.00%	0.00%	39.94%	40.01%
34LT3	0.00%	0.00%	0.00%	0.00%	26.83%	27.05%
34LT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
HPE						
HPEA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPED1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**
HPW						
HPWA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPWD1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**

SOURCES: Barnard Dunkelberg Company, September 2012; FAA, 2016; ESA, 2018.

TABLE F-31
FLIGHT TRACK USE – 2024 NO ACTION ALTERNATIVE

Runway/ Flight Track	Arrivals		Departures		Touch-and-Go Operations	
	Day	Night	Day	Night	Day	Night
16L						
16LA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA2	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LA3	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16LD1	0.00%	0.00%	49.35%	0.00%	0.00%	0.00%
16LD2	0.00%	0.00%	19.59%	0.00%	0.00%	0.00%
16LD3	0.00%	0.00%	8.59%	0.00%	0.00%	0.00%
16LD4	0.00%	0.00%	22.47%	0.00%	0.00%	0.00%
16LT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
34R						
34RA1	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA2	70.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RA3	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34RD1	0.00%	0.00%	21.06%	0.00%	0.00%	0.00%
34RD2	0.00%	0.00%	11.32%	0.00%	0.00%	0.00%
34RD3	0.00%	0.00%	67.62%	0.00%	0.00%	0.00%
34RT1	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Total	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
16R						
16RA1	71.25%	89.88%	0.00%	0.00%	0.00%	0.00%
16RA2	17.50%	9.57%	0.00%	0.00%	0.00%	0.00%
16RA3	11.24%	0.55%	0.00%	0.00%	0.00%	0.00%
16RD1	0.00%	0.00%	55.02%	100.00%	0.00%	0.00%
16RD2	0.00%	0.00%	17.98%	0.00%	0.00%	0.00%
16RD3	0.00%	0.00%	4.51%	0.00%	0.00%	0.00%
16RD4	0.00%	0.00%	7.51%	0.00%	0.00%	0.00%
16RD5	0.00%	0.00%	3.75%	0.00%	0.00%	0.00%
16RD6	0.00%	0.00%	11.24%	0.00%	0.00%	0.00%
16RT1	0.00%	0.00%	0.00%	0.00%	33.57%	33.51%
16RT2	0.00%	0.00%	0.00%	0.00%	40.05%	40.02%
16RT3	0.00%	0.00%	0.00%	0.00%	26.23%	26.47%
16RT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
34L						
34LA1	75.00%	94.68%	0.00%	0.00%	0.00%	0.00%
34LA2	25.00%	5.32%	0.00%	0.00%	0.00%	0.00%
34LD1	0.00%	0.00%	56.10%	100.00%	0.00%	0.00%
34LD2	0.00%	0.00%	17.37%	0.00%	0.00%	0.00%
34LD3	0.00%	0.00%	4.57%	0.00%	0.00%	0.00%
34LD4	0.00%	0.00%	17.37%	0.00%	0.00%	0.00%
34LD5	0.00%	0.00%	4.57%	0.00%	0.00%	0.00%
34LT1	0.00%	0.00%	0.00%	0.00%	33.08%	32.94%
34LT2	0.00%	0.00%	0.00%	0.00%	39.94%	40.01%
34LT3	0.00%	0.00%	0.00%	0.00%	26.83%	27.05%
34LT4	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
HPE						
HPEA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPED1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**
HPW						
HPWA1	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
HPWD1	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**0.00%**	**0.00%**

SOURCES: Barnard Dunkelberg Company, September 2012; FAA, 2016; ESA, 2018.

Appendix F-2

Area Equivalent Method (AEM) Results

Area Equivalent Method (AEM) Version 2c SP2

Airport Name/Code:	PAE: 2019

DNL (dBA)	Baseline Area (Sq. Mi.)	Alternative Area (Sq. Mi.)	Percent Change in Area
65	0.7	0.7	-2.9%

	BASE Case		ALTERNATIVE Case	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
707				
720				
737				
7478	0.21	0.00	0.21	0.00
707120				
707320				
717200				
727100				
727200				
737300	0.05	0.00	0.05	0.00
737400	0.07	0.00	0.07	0.00
737500				
737700	4.36	1.13	0.36	0.13
737800	1.45	0.06	1.45	0.06
747100				
747200				
747400	0.73	0.47	0.73	0.47
757300				
767300	0.36	0.00	0.36	0.00
767400				
777200	0.14	0.00	0.14	0.00
777300	0.28	0.00	0.28	0.00
1900D				
707QN				
720B				
727D15				
727D17				
727EM1				
727EM2				
727Q15				
727Q7				
727Q9				
727QF				
7373B2				
737D17				
737N17				
737N9				
737QN				
74710Q				
74720A				
74720B	0.08	0.00	0.08	0.00

	BASE Case		ALTERNATIVE Case	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
747SP				
757PW				
757RR	0.01		0.01	
767CF6				
767JT9	0.08		0.08	
7773ER	0.70	0.00	0.70	0.00
7878R	0.97	0.01	0.97	0.01
A10A				
A3				
A300-622R				
A300B4-203				
A310-304				
A319-131	0.00	0.00	0.00	0.00
A320-211	0.05	0.01	0.05	0.01
A320-232				
A321-232	0.00		0.00	
A330-301				
A330-343	0.04	0.02	0.04	0.02
A340-211				
A340-642				
A37				
A380-841				
A380-861				
A4C				
A6A				
A7D				
A7E				
B1				
B2A				
B52BDE				
B52G				
B52H				
B57E				
BAC111				
BAE146				
BAE300				
BEC58P	2.68	0.03	2.68	0.03
C118				
C12				
C130				
C130AD				
C130E				
C-130E				
C130HP				
C131B				
C135A				
C135B				
C137				
C140				
C141A				
C17				
C18A				
C-20				
C21A				
C22				
C23				

	BASE Case		ALTERNATIVE Case	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
C5A				
C7A				
C9A	0.56		0.56	
CIT3	0.37	0.01	0.37	0.01
CL600	0.67	0.02	0.67	0.02
CL601	0.65	0.01	0.65	0.01
CNA172	31.38	0.63	31.38	0.63
CNA182	4.85	0.11	4.85	0.11
CNA182FLT				
CNA206	0.98	0.05	0.98	0.05
CNA208	6.78	0.26	6.78	0.26
CNA20T	0.15	0.01	0.15	0.01
CNA441	0.29	0.01	0.29	0.01
CNA500	1.14	0.01	1.14	0.01
CNA510	0.62	0.01	0.62	0.01
CNA525C	0.10		0.10	
CNA55B	0.61	0.02	0.61	0.02
CNA560E	0.06		0.06	
CNA560U	0.22		0.22	
CNA560XL	0.48	0.01	0.48	0.01
CNA680	0.29	0.00	0.29	0.00
CNA750	1.25	0.06	1.25	0.06
COMJET	0.27	0.01	0.27	0.01
COMSEP	1.53	0.03	1.53	0.03
CONCRD				
CRJ9-ER				
CRJ9-LR				
CVR580				
DC1010				
DC1030				
DC1040				
DC3	0.14		0.14	
DC6				
DC820				
DC850				
DC860				
DC870				
DC8QN				
DC910				
DC930				
DC93LW	0.00		0.00	
DC950				
DC95HW				
DC9Q7				

Area Equivalent Method (AEM) Version 2c SP2

Airport Name/Code:	PAE: 2024

DNL (dBA)	Baseline Area (Sq. Mi.)	Alternative Area (Sq. Mi.)	Percent Change in Area
65	0.8	0.7	-2.3%

	BASE Case		ALTERNATIVE Case	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
707				
720				
737				
7478	0.21	0.00	0.21	0.00
707120				
707320				
717200				
727100				
727200				
737300	0.05	0.00	0.05	0.00
737400	0.07	0.00	0.07	0.00
737500				
737700	4.36	1.13	0.36	0.13
737800	3.95	0.56	3.95	0.56
747100				
747200				
747400	0.73	0.48	0.73	0.48
757300				
767300	0.44	0.00	0.44	0.00
767400				
777200	0.14	0.00	0.14	0.00
777300	0.28	0.00	0.28	0.00
1900D				
707QN				
720B				
727D15				
727D17				
727EM1				
727EM2				
727Q15				
727Q7				
727Q9				
727QF				

	BASE Case		ALTERNATIVE Case	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
7373B2				
737D17				
737N17				
737N9				
737QN				
74710Q				
74720A				
74720B	0.08	0.00	0.08	0.00
747SP				
757PW				
757RR	0.01		0.01	
767CF6				
767JT9	0.08		0.08	
7773ER	0.70	0.00	0.70	0.00
7878R	0.97	0.01	0.97	0.01
A10A				
A3				
A300-622R				
A300B4-203				
A310-304				
A319-131	0.00	0.00	0.00	0.00
A320-211	0.05	0.01	0.05	0.01
A320-232				
A321-232	0.00		0.00	
A330-301				
A330-343	0.04	0.02	0.04	0.02
A340-211				
A340-642				
A37				
A380-841				
A380-861				
A4C				
A6A				
A7D				
A7E				
B1				
B2A				
B52BDE				
B52G				
B52H				
B57E				
BAC111				
BAE146				
BAE300				
BEC58P	2.72	0.03	2.72	0.03
C118				
C12				
C130				

	BASE Case		ALTERNATIVE Case	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
C130AD				
C130E				
C-130E				
C130HP				
C131B				
C135A				
C135B				
C137				
C140				
C141A				
C17				
C18A				
C-20				
C21A				
C22				
C23				
C5A				
C7A				
C9A	0.56		0.56	
CIT3	0.37	0.01	0.37	0.01
CL600	0.68	0.02	0.68	0.02
CL601	0.65	0.01	0.65	0.01
CNA172	31.82	0.64	31.82	0.64
CNA182	4.92	0.11	4.92	0.11
CNA182FLT				
CNA206	0.99	0.05	0.99	0.05
CNA208	6.88	0.26	6.88	0.26
CNA20T	0.15	0.01	0.15	0.01
CNA441	0.30	0.01	0.30	0.01
CNA500	1.16	0.01	1.16	0.01
CNA510	0.63	0.01	0.63	0.01
CNA525C	0.11		0.11	
CNA55B	0.62	0.02	0.62	0.02
CNA560E	0.06		0.06	
CNA560U	0.22		0.22	
CNA560XL	0.49	0.01	0.49	0.01
CNA680	0.30	0.00	0.30	0.00
CNA750	1.27	0.06	1.27	0.06
COMJET	0.27	0.01	0.27	0.01
COMSEP	1.56	0.03	1.56	0.03
CONCRD				
CRJ9-ER				
CRJ9-LR				
CVR580				
DC1010				
DC1030				
DC1040				
DC3	0.15		0.15	

	BASE Case		ALTERNATIVE Case	
Aircraft Type	Daytime LTO Cycles	Nighttime LTO Cycles	Daytime LTO Cycles	Nighttime LTO Cycles
DC6				
DC820				
DC850				
DC860				
DC870				
DC8QN				
DC910				
DC930				
DC93LW	0.00		0.00	
DC950				
DC95HW				
DC9Q7				