MIAMI INTERNATIONAL AIRPORT

Calendar Year 2023 Noise Contours Technical Noise Report

April 2024

ESA

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1 Introduction

This report provides the analysis and overview of the noise modeling data preparation and resulting contours for the calendar year 2023 at Miami International Airport (MIA). The Federal Aviation Administration's (FAA's) Aviation Environmental Design Tool version 3f (AEDT) was used to develop the Day-Night Average Sound Level (DNL) contours for the calendar year 2023. These contours were compared to the MIA 2019 noise contours that were previously modeled using the AEDT 3c.

The MIA 2023 noise contours were prepared using aircraft activity information from calendar year 2023. Information was gathered from Miami-Dade Aviation Department's (MDAD's) Airport Noise and Operations Monitoring System (ANOMS) and the FAA's Operations Network (OPSNET). A detailed discussion of the model inputs used to develop these contours is included in the following sections.

2 Aircraft Operations and Fleet Mix

ANOMS data provided information for noise contour development including the date, time of day, operation type (departure or arrival), runway used, flight and/or tail number, aircraft type, airline, and destination/origin for operations occurring at MIA. The ANOMS system recorded a total of 457,140 airport operations in 2023 while the FAA's OPSNET data, which reflect operations counts collected by MIA air traffic controllers, reported 461,792 airport operations at MIA during the same timeframe.[1]

While the ANOMS recorded approximately 4,650 operations less than OPSNET, the OPSNET numbers were used for the total operational count in the development of the 2023 noise contours. As a result, the ANOMS fleet data was scaled to the operations reflected in OPSNET. This equates to an average of approximately 1,265 daily operations (defined as either an arrival or departure) at MIA during the calendar year 2023.

Fleet mix defines the various types of aircraft and allows the development of very specific input data, such as engine, airframe, gross weight, and departure stage length for each aircraft. The AEDT aircraft database contains noise and performance data for 300 different types of aircraft and helicopters. The AEDT also has the functionality to allow the modeler to select different airframes and engine types, resulting in a database of over 3,600 unique aircraft. As described above, ANOMS data provided a comprehensive list of aircraft that utilized MIA for the calendar year 2023. The AEDT aircraft database was used to build a fleet mix representative of aircraft in operation at MIA during calendar year 2023. AEDT fleet mix is presented in **Appendix A-1** and **Appendix A-3** for various airport operational parameters, described below.

3 Stage Length

Departure destination information provided by the ANOMS was analyzed to determine departure stage lengths. An aircraft's stage length (or trip length) refers to the distance an aircraft flies from its origin airport (MIA) to its intended destination. Stage length is important in noise modeling since the longer the distance an aircraft will fly to its destination, the greater the fuel load required and overall weight and, as a result, the lower its departure profile will be. **Table 1** provides the trip

[1] https://aspm.faa.gov/opsnet/sys/airport.asp, accessed February 16, 2023.

distance to its associated stage length. The stage length information used to develop the MIA 2023 noise contours is included in **Appendix A-1**.

Table 1. Stage Length

Stage Length	Trip Length (nmi)
1	0 – 500
2	500 – 1,000
3	1,000 – 1,500
4	1,500 – 2,500
5	2,500 – 3,500
6	3,500 – 4,500
7	4,500 – 5,500
8	5,500 – 6,500
9	6,500 – 11,000
M	Maximum Range at Maximum Takeoff Weight

SOURCE: FAA, 2023.

4 Time of Day

Day-night use percentages are also included in the development of DNL contours. For the DNL metric, noise events occurring between the hours of 10:00:00 p.m. and 6:59:59 a.m. receive a 10 dB "penalty". A 10 dB penalty means each nighttime noise event is weighted equivalent to 10 daytime events. This penalty attempts to account for the higher sensitivity to noise in the nighttime and the expected decrease in background noise levels at night in comparison with background noise levels during the day.

MIA has a day and night percentage split of approximately 84.5 percent and 15.5 percent, respectively, for both arrival and departure aircraft, as shown in **Table 2**. A detailed breakdown of time-of-day percentages by AEDT aircraft type are shown in **Appendix A-2** and **Appendix A-3.**

Table 2. Day-Night Arrival and Departure Percentages

	Arrival			Departure		
	Day	Night	Total	Day	Night	Total
Total	192,890	35,252	228,142	193,551	35,447	228,998
Percentage	84.5%	15.5%	100.0%	84.5%	15.5%	100.0%

SOURCE: MDAD ANOMS, 2023; ESA, 2024.

5 Runway Use

The primary factor affecting runway use at airports is weather, in particular the wind direction and wind speed. Additional factors that may affect runway use include the position of the facility or ramp relative to the runways. Some airports have a preferred or preferential runway system that

balances noise concerns with the safest and most efficient use of the airport. If a certain runway is used predominantly for departures while another runway is used for arrivals, the noise contours will differ to reflect this type of activity. **Table 3** shows the runway use percentages by day-night departures and arrivals. The data shows that MIA most commonly operates day and night in an east flow condition utilizing Runways 08L, 08R, 09, and 12 a total of 74.4 percent of the time. This is a result of the strong ocean breezes and the performance needs of aircraft to depart into the wind. Runway 08R has the highest percentage of runway operations at approximately 31.5 percent and is primarily used for departures and nighttime arrivals.

Table 3. 2023 Runway Use

Runway	Arrival		Departure		Overall Runway Use
	Day	Night	Day	Night	
09	38.9%	34.0%	4.9%	12.2%	22.1%
27	1.9%	2.2%	11.4%	11.7%	6.7%
12	18.8%	2.1%	2.9%	1.6%	9.5%
30	10.8%	2.5%	0.1%	0.7%	4.8%
08L	15.2%	10.2%	8.8%	5.8%	11.4%
26R	10.8%	6.1%	2.9%	1.5%	6.4%
08R	1.9%	26.0%	58.2%	52.8%	31.5%
26L	1.5%	16.8%	10.8%	13.6%	7.6%
H1	0.1%	0.0%	0.1%	0.0%	0.1%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

SOURCE: MDAD ANOMS, 2023; ESA, 2024.

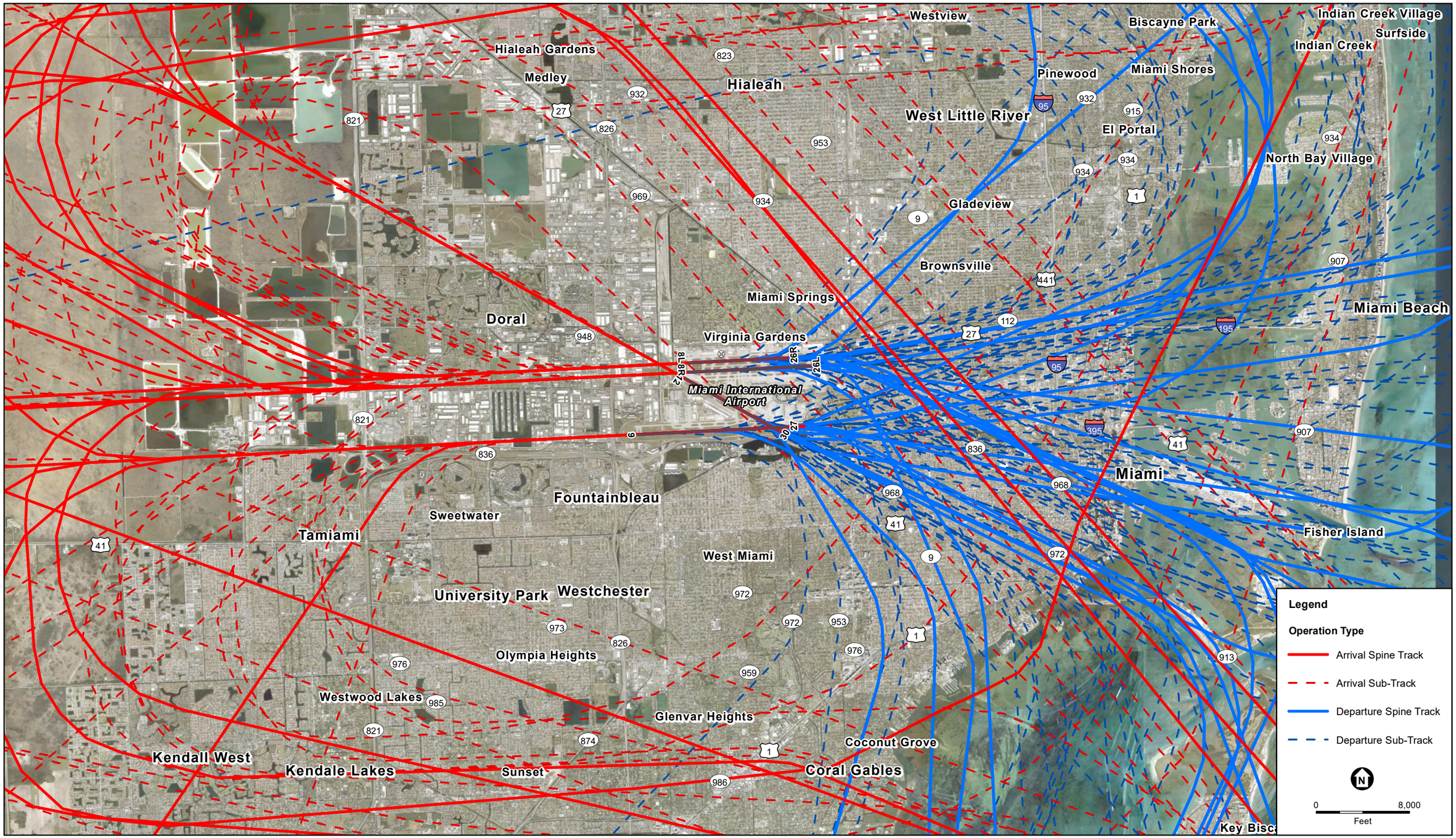
It should be noted that runway use percentages are also influenced by the relationship of where aircraft park on the airport relative to the runway location. MIA has a high number of cargo and general aviation operations in addition to air carrier operations. Most of the general aviation aircraft park on the north side of the airport and are more likely to use Runways 08L-26R and 08R-26L. Cargo aircraft are based at multiple locations on the airport and may use a broader range of runways. This is an important consideration as larger/heavier aircraft are often louder than general aviation aircraft and will have more of an effect on the shape of the noise contours. For this reason, runway use percentages by aircraft category (e.g. narrow-body, wide-body, regional, business jet, etc.) were also determined and used to develop the noise contours. A detailed breakdown of runway use by aircraft category is included in **Appendix A-4**.

Helicopter takeoff and landing locations were consolidated to one location immediately north of Runway 08L-26R because the ANOMS radar tracks indicated the majority of helicopters depart from and arrive to this area. All helicopter takeoff and landing activity was assigned to this location, labeled as H1 throughout Appendix A.

6 Flight Tracks

Flight track and flight track use percentages are a key element in the development of the DNL contours. Radar flight tracks obtained from ANOMS were compared to the 2019 modeled flight tracks and modified as necessary. The flight track use percentages were updated from the 2019 modeling as the metroplex had changed the overall use of the airspace around MIA. Dispersion of

aircraft operations across sub-tracks is presented in **Appendix A-5**. The flight track locations are depicted in **Figure 1** through **Figure 3**.



SOURCE: AEDT 3f; ESA, 2024.
AEDT = Aviation Environmental Design Tool.

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Figure 1
Fixed-Wing Model Flight Tracks - East Flow

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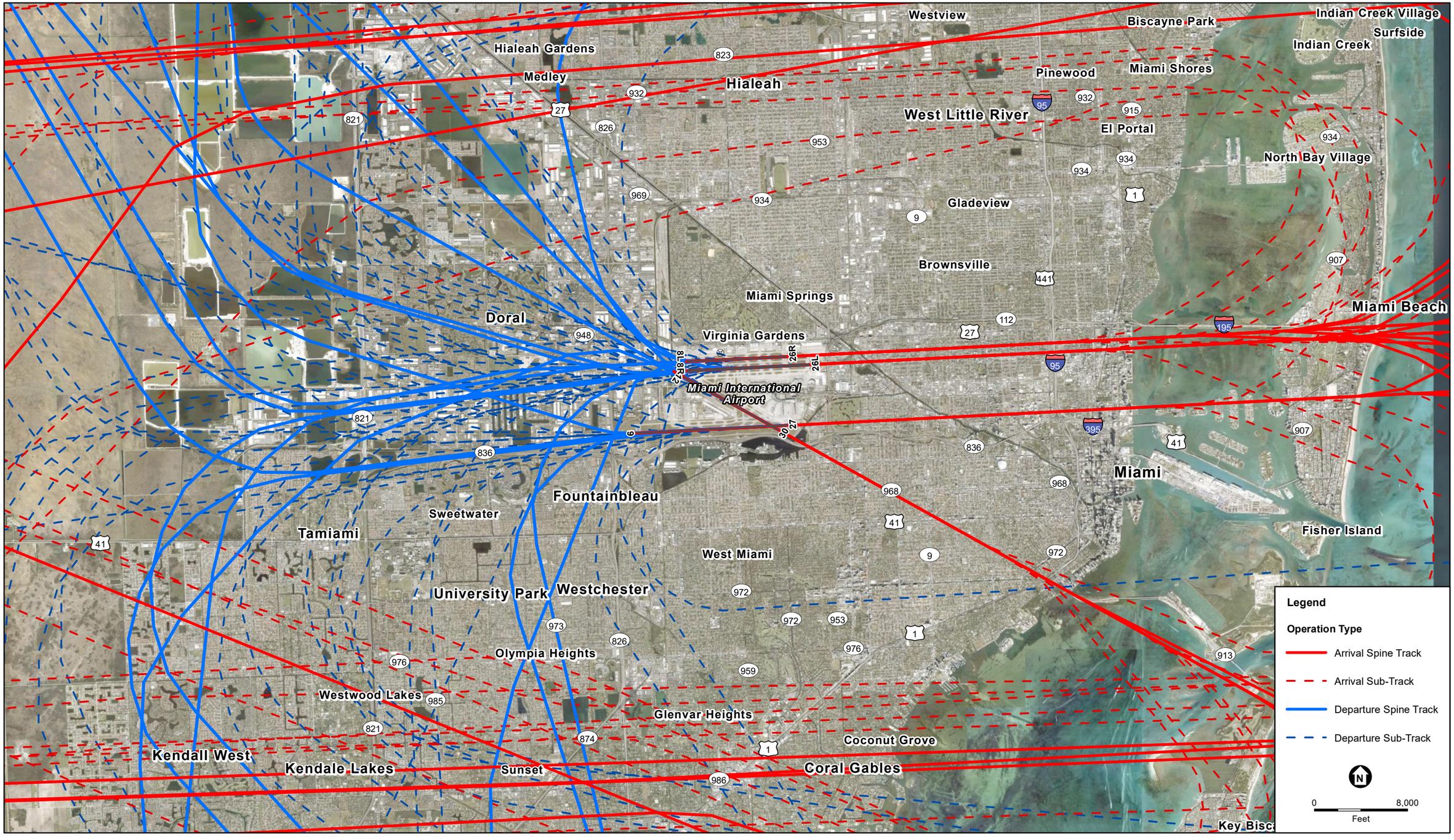

SOURCE: AEDT 3f; ESA, 2024.
AEDT = Aviation Environmental Design Tool.

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Figure 2
Fixed-Wing Model Flight Tracks - West Flow

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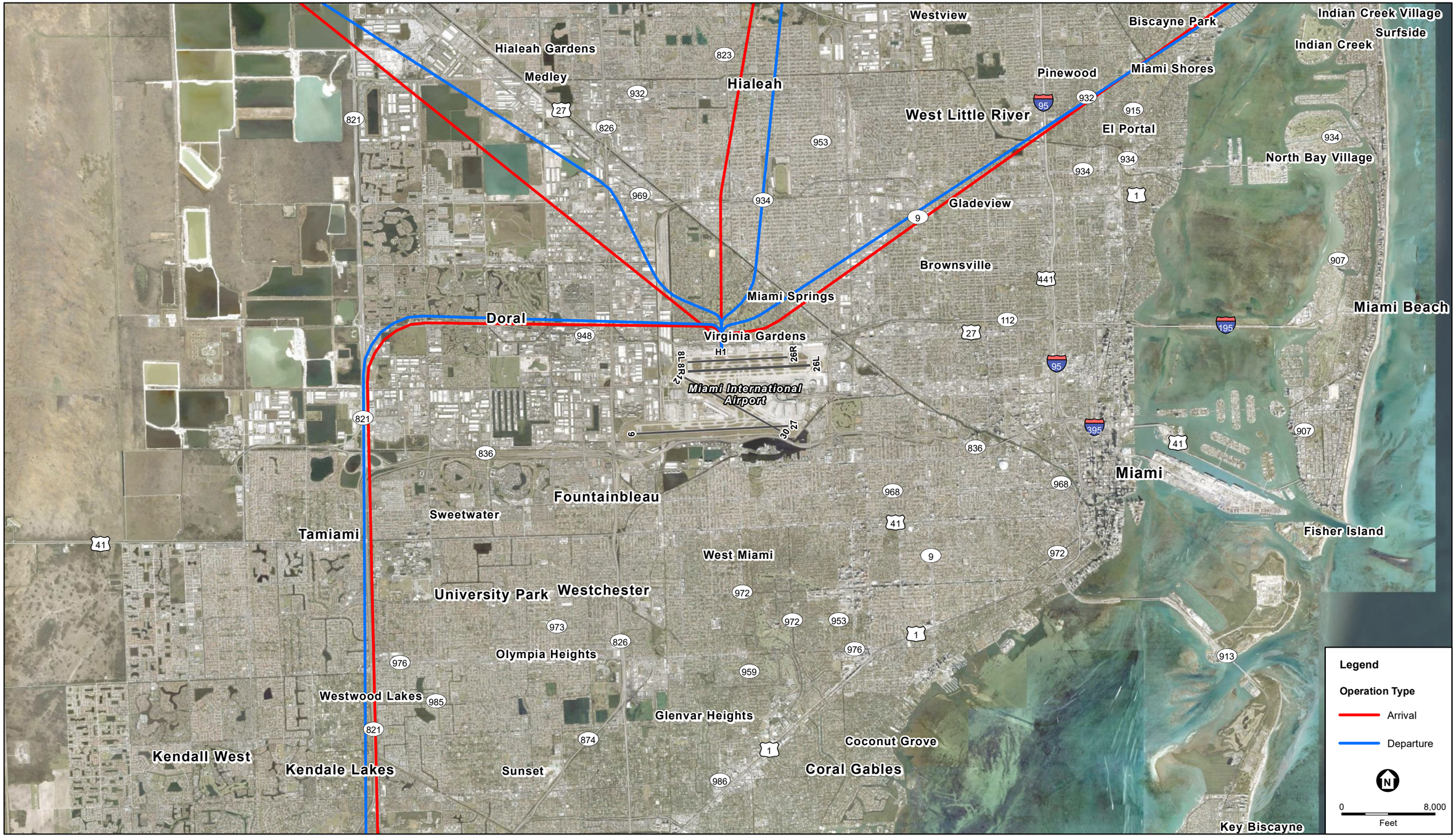

SOURCE: AEDT 3f; ESA, 2024.
AEDT = Aviation Environmental Design Tool.

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Figure 3
Helicopter Model Flight Tracks

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7 Meteorological Conditions

AEDT has several settings that affect aircraft performance profiles and sound propagation based on meteorological data. Meteorological settings include 10-year average temperature, barometric pressure, and relative humidity at the airport. AEDT includes the following values for annual average weather conditions at MIA:

- Temperature: 77.98° F
- Pressure: 1016.13 millibars
- Sea-level Pressure: 1017.25 millibars
- Relative Humidity 72.26%
- Dew Point: 68.31° F
- Wind Speed: 6.85 Knots

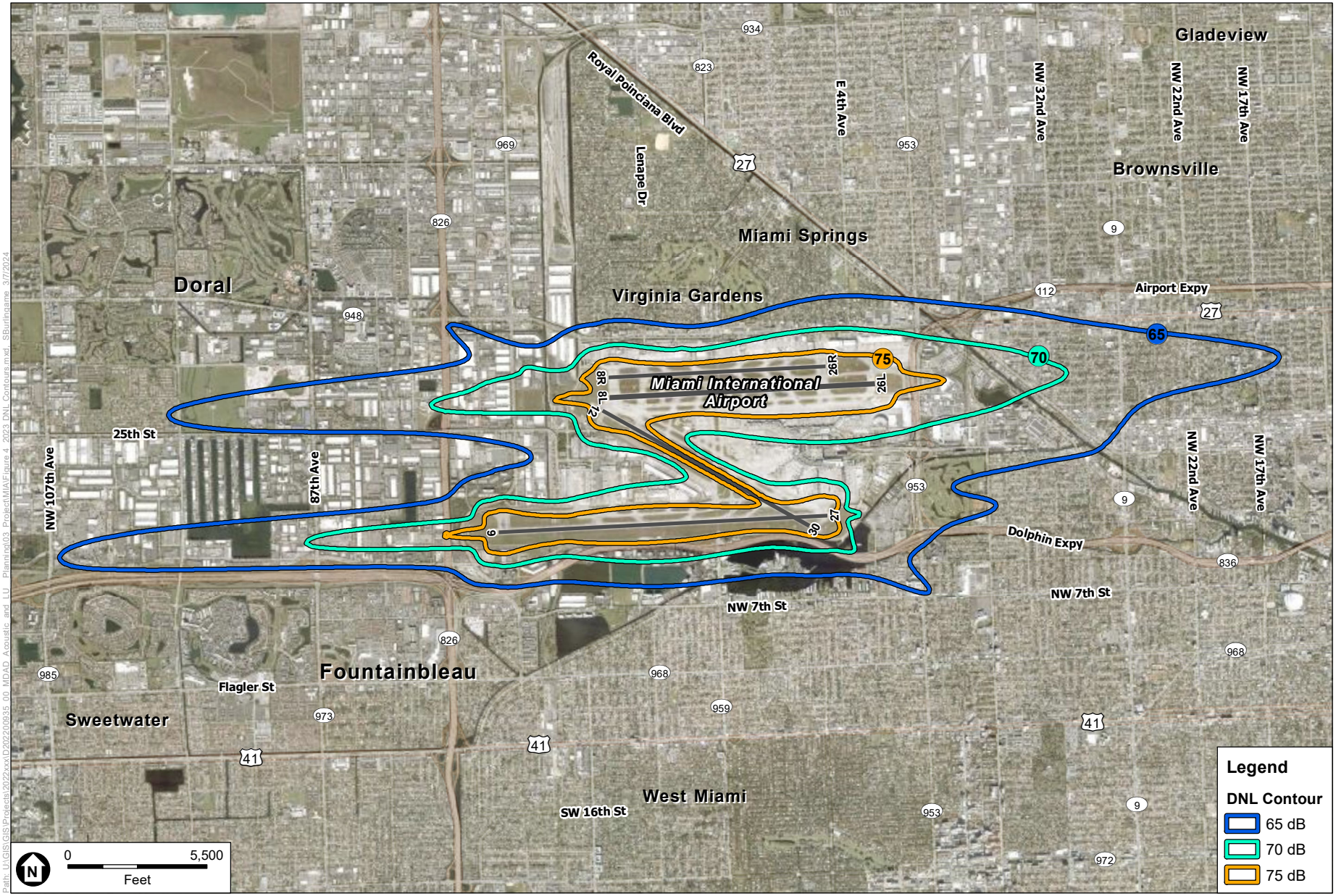
8 Terrain

Terrain data describes the elevation of the ground surrounding the airport and on airport property. If the AEDT user selects the use of terrain data, AEDT uses terrain data to adjust the ground level under the flight paths. The terrain data does not affect the aircraft's performance or noise levels, but does affect the vertical distance between the aircraft and a "receiver" on the ground. This in turn affects how noise propagates over ground. ESA obtained 1/3 arcsecond terrain data from the United States Geological Survey (USGS) National Map Viewer and it was used with the terrain feature of the AEDT in generating the noise contours.[2]

9 2023 DNL Contours

The information described above was compiled and incorporated into the AEDT. The AEDT calculates noise using a defined network of grid points at ground level around an airport. It computes the noise generated by each aircraft operation, by aircraft type and engine thrust level along each flight track. Corrections are applied for atmospheric acoustical attenuation, acoustical shielding of the aircraft engines by the aircraft itself, and aircraft speed variations. The noise exposure levels for each aircraft are then summed at each grid point. The cumulative noise exposure levels at all grid points are then used to develop noise exposure contours for selected values (e.g. DNL 65, 70 and 75 dB). Using the results of the grid point analysis, noise contours of equal noise exposure can then be plotted. The 2023 MIA noise contours for DNL 65, 70, and 75 dB are shown in **Figure 4**. These contours represent the noise exposure to areas surrounding MIA on an average annual day. The overall shape of the noise contours reflect the east and west orientation of the runways at MIA. The area of the contours in square miles is shown in **Table 4**. Each contour area is inclusive of the subsequent contour areas. Therefore, the cumulative footprint of all three contours is approximately 10.83 square miles.

[2] USGS terrain data obtained on February 12, 2024.



SOURCE: Esri; AEDT 3f; ESA, 2024.
AEDT = Aviation Environmental Design Tool.
DNL = Day-Night Average Sound Level.
dB = Decibel.

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Figure 4
2023 DNL Contours

Table 4. 2023 DNL Contour Areas

DNL	Contour Area (Sq. Mi.)
≥ 65	10.83
≥ 70	4.43
≥ 75	1.80

SOURCE: AEDT 3f; ESA 2024.

As stated previously, MIA typically operates in an east flow condition due to the predominant winds at the airport. The narrower more defined contour bands to the west of the airport reflect the influence of the high number of arriving aircraft from the west, while the wider bands of contours to the east reflect the higher number of aircraft departures to the east.

10 2019 and 2023 DNL Contour Comparison

In order to determine the changes in noise exposure that occur over time, it is helpful to compare previous contours to existing contours. With the understanding that the MIA 2023 DNL contours were produced with AEDT 3f and the 2019 DNL contours were produced with AEDT 3c, every effort was made to ensure that the differences in models did not unduly influence the contour shapes.

A comparison of the MIA 2019 and 2023 DNL contours is shown in **Figure 5**. Noise exposure areas of increase and decrease between the MIA DNL 2019 and DNL 2023 are depicted in **Figure 6**. **Table 5** compares the area coverage of 2019 and 2023 contours.

Table 5. DNL Contour Area Comparison

	DNL Contour Area (Sq. Mi.)		
DNL	2023	2019	Difference
≥ 65	10.83	10.72	0.11
≥ 70	4.43	4.33	0.10
≥ 75	1.80	1.80	0.00

SOURCE: AEDT 3f; AEDT 3c; ESA 2024.

As presented in **Table 5**, the 2023 DNL contours are slightly larger than the 2019 DNL contours. **Table 6** compares the aircraft operations during 2019 and 2023. The total number aircraft operations increased by 45,019 (approximately 10%) from 2019 to 2023, which resulted in the increase in area of the DNL 65 by 0.11 square miles.

Table 6. Aircraft Operations Comparison

	Arrival		Departure		
Year	Day	Night	Day	Night	Total
2019	178,007	30,380	175,410	32,976	416,773
2023	195,276	35,620	195,447	35,449	461,792
Difference	17,269	5,241	20,036	2,473	45,019

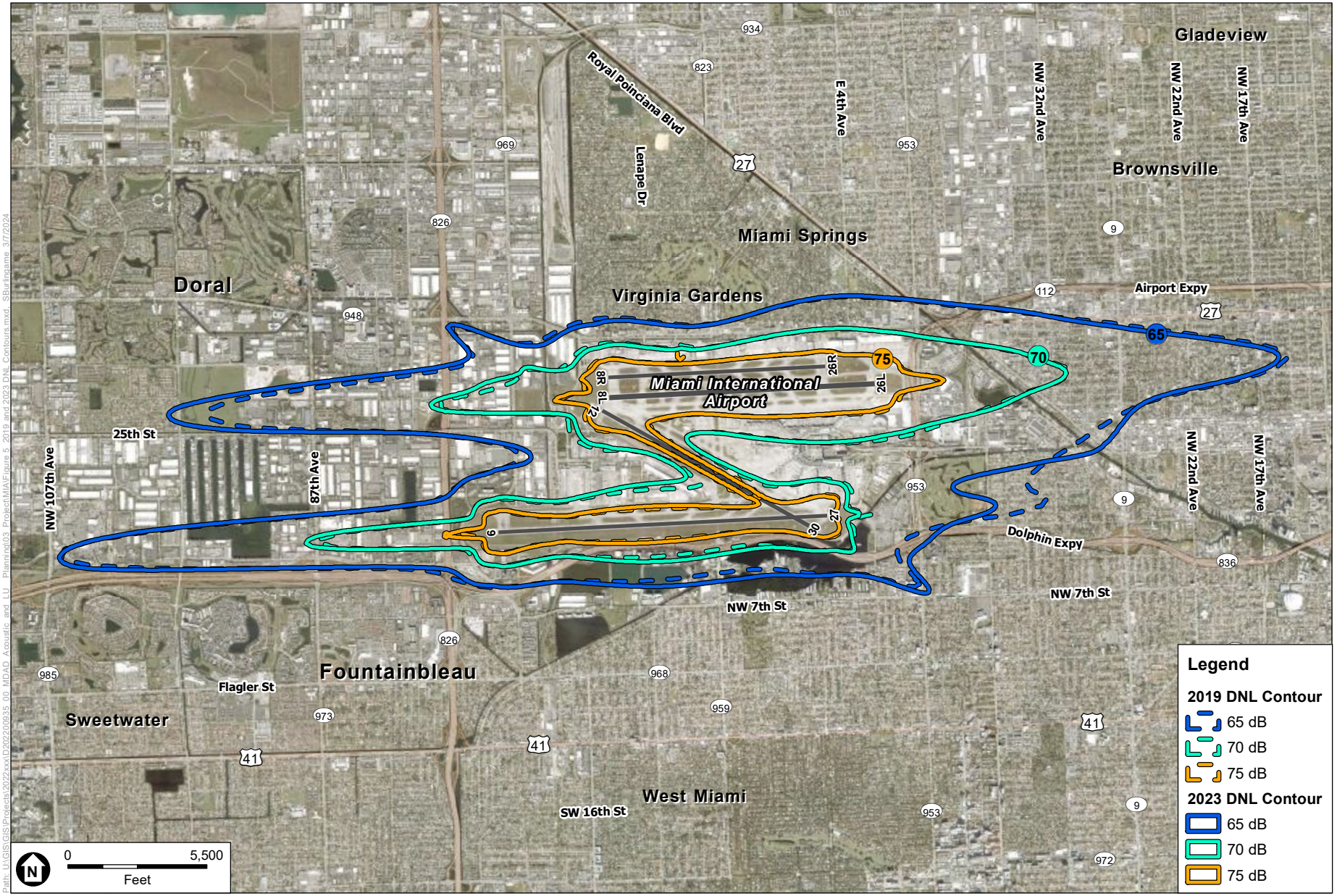
SOURCE: L&B, 2020; MDAD ANOMS, 2023; ESA, 2024.

Table 7 compares overall runway use between 2019 and 2023. As depicted in the table, the use of Runway 08L increased in 2023. This increase in most notable in the arrival lobe shown in **Figure 6**. The increase in Runway 09 arrivals compared to 2019 increased sideline noise south of the airport. The decrease to the east of Runway 27 is attributed to the decrease in nighttime, wide-body aircraft off Runway 9 and overall decrease in arrivals to Runway 27.

Table 7. Overall Runway Use Comparison

Runway	2019	2023	Difference
08L	9.08%	11.54%	2.46%
08R	32.06%	31.43%	-0.62%
9	20.32%	22.11%	1.79%
12	9.44%	9.43%	-0.01%
26L	8.84%	7.53%	-1.31%
26R	6.70%	6.42%	-0.29%
27	7.45%	6.70%	-0.74%
30	5.97%	4.81%	-1.16%
H1	0.15%	0.04%	-0.12%

SOURCE: AEDT 3f; ESA 2024; L&B, 2020.



SOURCE: Esri; AEDT 3c and 3f; L&B, 2020; ESA, 2024.
AEDT = Aviation Environmental Design Tool.
DNL = Day-Night Average Sound Level.
dB = Decibel.

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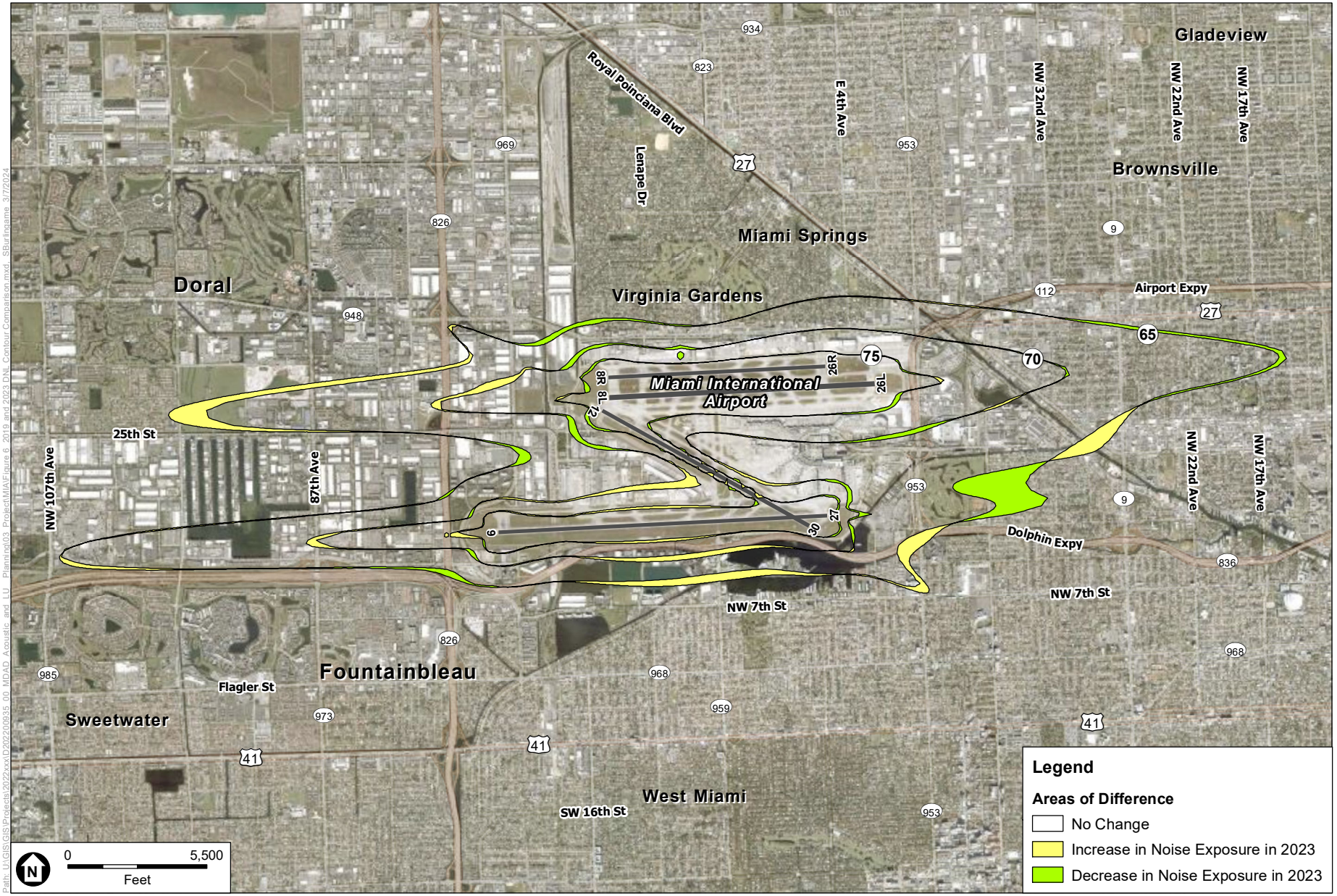
Figure 5
2019 and 2023 DNL Contours



SOURCE: Esri; AEDT 3c and 3f; L&B, 2020; ESA, 2024.
AEDT = Aviation Environmental Design Tool.

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Figure 6
2019 and 2023 DNL Contour Comparison

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Appendix A-1

Departure Operations and Stage Length Percentages

AEDT ANP	Total Operations	Departure Stage Length Percentage									
		1	2	3	4	5	6	7	8	9	M
737300	481.96	33%	65%	2%	1%	0%	0%	0%	0%	0%	0%
737400	1,619.95	87%	10%	3%	<1%	0%	0%	0%	0%	0%	0%
737700	4,509.70	13%	52%	35%	<1%	<1%	<1%	0%	0%	0%	0%
737800	54,689.92	18%	62%	18%	2%	<1%	<1%	0%	0%	0%	0%
7378MAX	27,150.77	11%	46%	27%	14%	1%	0%	0%	0%	0%	0%
747400	2,885.72	1%	10%	20%	18%	14%	37%	<1%	<1%	<1%	0%
7478	1,651.14	<1%	18%	7%	4%	19%	51%	0%	<1%	<1%	0%
757PW	5,570.21	3%	88%	7%	1%	<1%	<1%	0%	0%	0%	0%
767300	18,001.71	1%	42%	21%	18%	10%	8%	<1%	0%	0%	0%
777200	2,789.13	5%	39%	<1%	5%	0%	50%	0%	0%	0%	0%
777300	1,291.94	0%	13%	6%	11%	14%	38%	18%	0%	0%	0%
7773ER	3,101.05	<1%	4%	<1%	1%	<1%	66%	10%	<1%	19%	0%
7878R	3,604.14	<1%	13%	15%	9%	0%	55%	3%	4%	0%	0%
7879	2,588.90	3%	5%	4%	3%	3%	61%	13%	9%	0%	0%
A300-622R	489.00	14%	40%	46%	0%	0%	0%	0%	0%	0%	0%
A319-131	13,776.62	27%	42%	29%	2%	<1%	0%	0%	0%	0%	0%
A320-211	10,732.92	12%	51%	34%	3%	0%	0%	0%	0%	0%	0%
A320-270N	6,963.77	3%	54%	27%	17%	0%	0%	0%	0%	0%	0%
A321-232	21,805.94	12%	47%	10%	31%	<1%	0%	0%	0%	0%	0%
A330-301	4,444.30	<1%	10%	19%	11%	8%	46%	5%	0%	0%	0%
A330-343	622.83	0%	0%	0%	0%	0%	84%	16%	0%	0%	0%
A340-642	74.46	0%	0%	3%	1%	0%	95%	1%	0%	0%	0%
A350-941	664.08	0%	<1%	0%	0%	0%	63%	13%	0%	0%	23%
A380-841	423.60	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
BD-700-1A10	1,374.68	30%	33%	11%	9%	<1%	14%	1%	<1%	0%	0%
BD-700-1A11	393.47	33%	39%	14%	7%	<1%	6%	0%	0%	0%	0%
BEC58P	205.65	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
C12	20.99	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CIT3	44.29	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CL600	4,471.80	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CL601	208.98	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CNA172	65.18	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CNA208	341.70	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CNA510	432.19	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CNA525C	227.17	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%

AEDT ANP	Total Operations	Departure Stage Length Percentage									
		1	2	3	4	5	6	7	8	9	M
CNA55B	873.24	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CNA560U	129.09	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CNA560XL	417.64	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CNA680	1,307.33	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CNA750	419.54	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
COMSEP	144.91	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DHC6	1,178.77	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DHC8	1,102.03	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DHC830	1,128.15	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
ECLIPSE500	44.29	84%	16%	0%	0%	0%	0%	0%	0%	0%	0%
EMB145	679.17	8%	89%	2%	1%	0%	0%	0%	0%	0%	0%
EMB170	17,264.04	50%	41%	8%	0%	0%	0%	0%	0%	0%	0%
EMB175	367.26	20%	52%	29%	0%	0%	0%	0%	0%	0%	0%
EMB190	660.05	<1%	83%	16%	<1%	0%	0%	0%	0%	0%	0%
FAL900EX	318.36	38%	38%	18%	6%	0%	<1%	0%	0%	0%	0%
G650ER	234.13	29%	41%	10%	12%	0%	7%	1%	0%	<1%	0%
GASEPV	110.10	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GIV	446.75	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GV	382.89	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
IA1125	207.35	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LEAR35	811.23	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MD11GE	1,001.15	<1%	97%	2%	<1%	0%	0%	0%	0%	0%	0%
MD82	559.44	0%	100%	<1%	0%	0%	0%	0%	0%	0%	0%
MD83	563.46	85%	9%	4%	2%	0%	0%	0%	0%	0%	0%
MU3001	114.53	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PA30	57.58	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SD330	341.22	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SF340	2,230.19	79%	21%	0%	0%	0%	0%	0%	0%	0%	0%

SOURCE: MDAD ANOMS, 2023; ESA, 2024.

Appendix A-2

2023 Average Day-Night Percentages

2023 Average Day-Night Percentages

Aircraft Category	Arrival			Departure		
	Day	Night	Total	Day	Night	Total
Wide-Body	69.8%	30.2%	100.0%	66.2%	33.8%	100.0%
Narrow-Body	86.4%	13.6%	100.0%	88.3%	11.7%	100.0%
Regional Jet	96.3%	3.7%	100.0%	88.5%	11.5%	100.0%
Business Jet	90.2%	9.8%	100.0%	92.8%	7.2%	100.0%
Large Propeller	96.8%	3.2%	100.0%	99.2%	0.8%	100.0%
Small Propeller	92.4%	7.6%	100.0%	91.8%	8.2%	100.0%
Helicopter	96.7%	3.3%	100.0%	92.1%	7.9%	100.0%

SOURCE: MDAD ANOMS, 2023; ESA, 2024.

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2023 Annual Operations

2023 Annual Operations							
	Arrival			Departure			
AEDT ANP	Day	Night	Total	Day	Night	Total	Subtotal
Wide-Body							
747400	1,786.59	1,099.13	2,885.72	1,562.60	1,323.13	2,885.72	5,771.45
7478	1,228.78	422.36	1,651.14	1,184.27	466.87	1,651.14	3,302.28
767300	11,780.16	6,221.54	8,001.71	0,918.77	7,082.94	18,001.71	36,003.41
777200	2,064.16	724.97	2,789.13	1,893.63	895.5	2,789.13	5,578.26
777300	956.28	335.66	1,291.94	973.98	317.95	1,291.94	2,583.87
7773ER	2,359.34	741.71	3,101.05	2,616.07	484.98	3,101.05	6,202.09
7878R	2,453.60	1,150.54	3,604.14	2,521.49	1,082.65	3,604.14	7,208.27
7879	1,910.64	678.26	2,588.90	1,801.06	787.84	2,588.90	5,177.80
A300-622R	276.7	212.3	489	355.91	133.09	489	978.01
A330-301	3,262.72	1,181.57	4,444.30	3,051.74	1,392.55	4,444.30	8,888.60
A330-343	611.74	11.09	622.83	585.6	37.23	622.83	1,245.65
A340-642	72.44	2.01	74.46	71.44	3.02	74.46	148.91
A350-941	651.99	12.09	664.08	412.53	251.55	664.08	1,328.16
A380-841	418.57	5.03	423.6	359.21	64.4	423.6	847.2
MD11GE	608.34	392.81	1,001.15	559.44	441.71	1,001.15	2,002.30
Narrow-Body							
737300	431.44	50.52	481.96	459.82	22.14	481.96	963.92
737400	1,379.32	240.63	1,619.95	1,478.08	141.87	1,619.95	3,239.90
737700	3,315.36	1,194.34	4,509.70	3,851.36	658.34	4,509.70	9,019.40
737800	49,445.82	5,244.10	54,689.92	48,892.31	5,797.61	54,689.92	109,379.83
7378MAX	24,613.85	2,536.92	27,150.77	25,204.81	1,945.95	27,150.77	54,301.53
757PW	4,115.03	1,455.18	5,570.21	4,245.07	1,325.14	5,570.21	11,140.43
A319-131	12,296.13	1,480.49	13,776.62	12,149.63	1,626.99	13,776.62	27,553.24
A320-211	8,932.49	1,800.43	10,732.92	9,506.39	1,226.53	10,732.92	21,465.85
A320-270N	5,391.96	1,571.81	6,963.77	5,477.64	1,486.13	6,963.77	13,927.55
A321-232	17,292.35	4,513.59	21,805.94	18,721.99	3,083.94	21,805.94	43,611.87
MD82	534.15	25.29	559.44	558.43	1.01	559.44	1,118.87
MD83	480.95	82.51	563.46	453	110.46	563.46	1,126.92
Regional Jet							
EMB145	658.96	20.21	679.17	666.09	13.08	679.17	1,358.34
EMB170	16,669.04	595	17,264.04	15,153.07	2,110.97	17,264.04	34,528.08
EMB175	366.25	1.01	367.26	349.14	18.11	367.26	734.51

2023 Annual Operations							
	Arrival			Departure			
AEDT ANP	Day	Night	Total	Day	Night	Total	Subtotal
EMB190	580.44	79.61	660.05	616.79	43.27	660.05	1,320.11
EMB145	658.96	20.21	679.17	666.09	13.08	679.17	1,358.34
EMB170	16,669.04	595	17,264.04	15,153.07	2,110.97	17,264.04	34,528.08
EMB175	366.25	1.01	367.26	349.14	18.11	367.26	734.51
EMB190	580.44	79.61	660.05	616.79	43.27	660.05	1,320.11
Business Jet							
BD-700-1A10	1,139.30	235.38	1,374.68	1,172.24	202.45	1,374.68	2,749.37
BD-700-1A11	350.3	43.17	393.47	365.71	27.75	393.47	786.93
CIT3	42.28	2.01	44.29	42.4	1.9	44.29	88.59
CL600	4,170.18	301.62	4,471.80	4,302.01	169.79	4,471.80	8,943.60
CL601	197.55	11.43	208.98	199.18	9.8	208.98	417.96
CNA510	411.67	20.52	432.19	412.57	19.62	432.19	864.38
CNA525C	210.72	16.45	227.17	214.51	12.66	227.17	454.34
CNA55B	807	66.24	873.24	811.23	62.01	873.24	1,746.48
CNA560U	105.97	23.12	129.09	98.71	30.37	129.09	258.18
CNA560XL	387.26	30.37	417.64	394.01	23.63	417.64	835.27
CNA680	1,218.69	88.64	1,307.33	1,257.97	49.36	1,307.33	2,614.66
CNA750	380.12	39.41	419.54	403.08	16.45	419.54	839.07
ECLIPSE500	38.6	5.7	44.29	40.44	3.85	44.29	88.59
FAL900EX	286.86	31.5	318.36	293.88	24.49	318.36	636.73
G650ER	189.99	44.14	234.13	202.49	31.64	234.13	468.26
GIV	395.91	50.84	446.75	417.64	29.11	446.75	893.49
GV	334.52	48.37	382.89	346.32	36.57	382.89	765.78
IA1125	194.18	13.16	207.35	200.81	6.53	207.35	414.69
LEAR35	635.41	175.82	811.23	649.24	161.99	811.23	1,622.46
MU3001	101.88	12.66	114.53	108.21	6.33	114.53	229.07
Large Propeller							
DHC6	943.17	38.05	981.22	959.99	21.22	981.22	1,962.43
DHC8	1,085.63	16.4	1,102.03	1,092.24	9.8	1,102.03	2,204.06
DHC830	1,085.71	42.45	1,128.15	1,126.52	1.64	1,128.15	2,256.31
SD330	341.22	-	341.22	341.22	-	341.22	682.44
SF340	2,140.00	90.19	2,230.19	2,217.13	13.06	2,230.19	4,460.37
Small Propeller							

2023 Annual Operations							
	Arrival			Departure			
AEDT ANP	Day	Night	Total	Day	Night	Total	Subtotal
BEC58P	194.26	11.39	205.65	192.33	13.33	205.65	411.31
C12	17.73	3.25	20.99	17.74	3.25	20.99	41.97
CNA172	53.79	11.39	65.18	53.56	11.62	65.18	130.35
CNA208	328.29	13.41	341.7	327.15	14.55	341.7	683.41
COMSEP	142.38	2.53	144.91	134.74	10.17	144.91	289.81
DHC6	160	37.55	197.55	165.47	32.08	197.55	395.1
GASEPV	103.67	6.44	110.1	103.14	6.96	110.1	220.21
PA30	56.32	1.27	57.58	55.68	1.9	57.58	115.17
BEC58P	194.26	11.39	205.65	192.33	13.33	205.65	411.31
C12	17.73	3.25	20.99	17.74	3.25	20.99	41.97
CNA172	53.79	11.39	65.18	53.56	11.62	65.18	130.35
CNA208	328.29	13.41	341.7	327.15	14.55	341.7	683.41
COMSEP	142.38	2.53	144.91	134.74	10.17	144.91	289.81
DHC6	160	37.55	197.55	165.47	32.08	197.55	395.1
GASEPV	103.67	6.44	110.1	103.14	6.96	110.1	220.21
PA30	56.32	1.27	57.58	55.68	1.9	57.58	115.17
Helicopter							
B407	35.89	0.82	36.7	33.54	3.16	36.7	73.4
S76	43.66	1.9	45.56	42.26	3.3	45.56	91.12

SOURCE: MDAD ANOMS, 2023; ESA, 2024.

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2023 Runway Utilization

2023 Runway Utilization										
	Runway End									
Aircraft Category	08L	08R	09	12	26L	26R	27	30	H1	Subtotal
Daytime Arrivals										
Wide-Body	8.1%	8.2%	48.4%	11.2%	6.2%	3.2%	8.1%	6.5%	0.0%	100.0%
Narrow-Body	9.4%	0.8%	42.4%	22.1%	0.7%	10.6%	0.9%	13.1%	0.0%	100.0%
Regional Jet	11.7%	0.4%	35.6%	26.2%	1.0%	13.1%	0.5%	11.5%	0.0%	100.0%
Business Jet	74.0%	1.2%	0.4%	0.2%	0.4%	23.6%	0.0%	0.1%	0.0%	100.0%
Large Propeller	71.4%	1.0%	4.8%	0.0%	0.4%	20.7%	0.1%	1.5%	0.0%	100.0%
Small Propeller	72.8%	0.9%	1.2%	1.5%	0.6%	22.3%	0.0%	0.6%	0.0%	100.0%
Helicopter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Nighttime Arrivals										
Wide-Body	5.8%	32.8%	32.4%	0.7%	19.8%	3.4%	3.1%	2.0%	0.0%	100.0%
Narrow-Body	11.0%	21.2%	37.5%	3.0%	15.4%	7.2%	1.8%	2.9%	0.0%	100.0%
Regional Jet	15.9%	9.3%	39.1%	7.3%	9.7%	11.6%	2.3%	4.7%	0.0%	100.0%
Business Jet	36.4%	35.1%	1.3%	0.6%	12.0%	13.9%	0.2%	0.5%	0.0%	100.0%
Large Propeller	39.3%	41.7%	3.6%	1.2%	7.1%	6.0%	1.2%	0.0%	0.0%	100.0%
Small Propeller	48.4%	24.2%	3.1%	0.0%	10.2%	11.7%	1.6%	0.8%	0.0%	100.0%
Helicopter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Daytime Departures										
Wide-Body	8.4%	33.4%	31.1%	2.2%	5.6%	2.9%	16.4%	0.0%	0.0%	100.0%
Narrow-Body	1.5%	69.3%	0.5%	3.4%	12.5%	0.4%	12.3%	0.1%	0.0%	100.0%
Regional Jet	3.4%	68.9%	0.0%	2.9%	16.0%	0.8%	7.9%	0.0%	0.0%	100.0%
Business Jet	69.5%	5.5%	0.2%	0.0%	1.4%	23.3%	0.2%	0.0%	0.0%	100.0%
Large Propeller	61.7%	11.1%	0.3%	1.0%	0.9%	23.5%	1.5%	0.0%	0.0%	100.0%
Small Propeller	69.7%	7.3%	0.1%	0.3%	1.5%	20.1%	0.3%	0.7%	0.0%	100.0%
Helicopter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Nighttime Departures										
Wide-Body	5.1%	40.3%	27.3%	0.8%	10.2%	1.6%	14.0%	0.6%	0.0%	100.0%
Narrow-Body	4.7%	62.9%	1.7%	2.3%	15.6%	0.8%	11.2%	0.8%	0.0%	100.0%
Regional Jet	1.0%	68.7%	0.2%	1.2%	22.3%	0.2%	6.3%	0.0%	0.0%	100.0%
Business Jet	37.9%	32.6%	1.3%	0.8%	11.9%	14.0%	1.3%	0.2%	0.0%	100.0%
Large Propeller	29.4%	35.3%	11.8%	0.0%	5.9%	5.9%	8.8%	2.9%	0.0%	100.0%
Small Propeller	34.2%	38.3%	0.7%	0.7%	12.8%	10.7%	0.7%	2.0%	0.0%	100.0%
Helicopter	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%

SOURCE: MDAD ANOMS, 2023; ESA, 2024.

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2023 Flight Track Utilization

2023 Departure Flight Track Utilization			
Runway	Track ID	Day	Night
08L	08LD1	4.9%	3.0%
	08LD2	46.6%	57.6%
	08LD3	10.5%	5.4%
	08LD4	4.1%	1.7%
	08LD5	8.4%	15.0%
	08LD6	11.0%	16.9%
	08LD7	14.5%	0.5%
Total		100.0%	100.0%
08R	08RD1	54.4%	61.4%
	08RD2	3.8%	2.1%
	08RD3	16.1%	12.9%
	08RD4	13.6%	16.9%
	08RD5	9.6%	4.8%
	08RD6	1.7%	1.6%
	08RD7	0.9%	0.3%
	08RD1	54.4%	61.4%
Total		100.0%	Total
09	09D1	17.3%	16.2%
	09D2	2.0%	1.8%
	09D3	16.9%	17.7%
	09D4	9.7%	11.9%
	09D5	43.2%	44.4%
	09D6	8.9%	6.8%
	09D7	2.0%	1.3%
Total		100.0%	Total
12	12D1	2.5%	2.6%
	12D2	37.4%	51.4%
	12D3	11.7%	11.9%
	12D4	15.9%	11.5%
	12D5	15.4%	11.4%
	12D6	12.3%	9.9%
	12D7	4.8%	1.3%
Total		100.0%	Total
26L	26LD1	1.1%	0.5%

2023 Arrival Flight Track Utilization			
Runway	Track ID	Day	Night
08L	08LA1	35.3%	34.6%
	08LA2	26.1%	42.0%
	08LA3	10.7%	13.8%
	08LA4	10.2%	0.7%
	08LA5	17.6%	8.9%
Total		100.0%	100.0%
08R	08RA1	32.6%	21.0%
	08RA2	6.3%	0.7%
	08RA3	23.5%	32.3%
	08RA4	19.2%	16.5%
	08RA5	18.4%	29.6%
Total		100.0%	100.0%
09	09A1	27.4%	34.7%
	09A2	26.8%	19.9%
	09A3	1.8%	13.3%
	09A4	4.6%	7.8%
	09A5	39.4%	24.3%
Total		100.0%	100.0%
12	12A1	77.1%	59.1%
	12A2	21.4%	33.9%
	12A3	1.2%	4.0%
	12A4	0.3%	2.9%
Total		100.0%	100.0%
26L	26LA1	64.6%	23.2%
	26LA2	15.9%	29.8%
	26LA3	3.7%	14.9%
	26LA4	3.3%	2.1%
	26LA5	12.4%	30.0%
Total		100.0%	100.0%
26R	26RA1	57.9%	34.9%
	26RA2	26RA2	23.0%
	26RA3	2.5%	9.1%

2023 Departure Flight Track Utilization				2023 Arrival Flight Track Utilization			
Runway	**Track ID**	**Day**	**Night**	**Runway**	**Track ID**	**Day**	**Night**
	26LD2	63.4%	65.4%		26RA4	4.9%	2.1%
					26RA5	11.7%	16.9%
	26LD3	1.4%	1.1%	Total		100.0%	100.0%
	26LD4	1.2%	0.5%	27	27A1	53.4%	34.3%
	26LD5	33.0%	32.4%		27A2	5.0%	10.1%
Total		100.0%	100.0%		27A3	41.6%	55.6%
26R	26RD1	48.4%	56.0%	Total		100.0%	100.0%
	26RD2	1.3%	2.2%	30	30A1	1.0%	5.8%
	26RD3	8.0%	5.0%		30A2	32.3%	47.8%
	26RD4	21.6%	36.0%		30A3	38.8%	27.8%
	26RD5	20.8%	0.7%		30A4	27.9%	18.6%
Total		100.0%	100.0%	Total		100.0%	100.0%
27	27D1	0.6%	0.4%	H1	H1A1	4.2%	0.0%
	27D2	43.2%	55.7%		H1A2	23.4%	50.0%
	27D3	53.9%	43.1%		H1A3	60.4%	50.0%
	27D4	2.3%	0.7%		H1A4	12.0%	0.0%
Total		100.0%	100.0%	Total		100.0%	100.0%
30	30D1	20.0%	5.2%				
	30D2	53.9%	49.9%				
	30D3	26.1%	44.9%				
Total		100.0%	100.0				
H1	H1D1	5.1%	0.0%				
	H1D2	28.7%	30.0%				
	H1D3	56.7%	70.0%				
	H1D4	9.6%	0.0%				
Total		100.0%	100.0				

SOURCE: MDAD ANOMS, 2023; ESA, 2024.