Appendix C – Noise Modeling

This appendix includes:

- Appendix C.1 – Flight Profile Analysis Memorandum supporting the choice of available flight profiles in the Aviation Environmental Design Tool (AEDT).
- Appendix C.2 – Noise Modeling Input Memorandum reviewed by GIAA.

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C.1 Flight Profile Analysis Memorandum

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TECHNICAL MEMORANDUM

To:	Audie Artero, Engineering Supervisor, A.B. Won Pat Guam Intl Airport
From:	Robert Mentzer, Project Manager, Principal Consultant Kevin Parker, Assistant Project Manager, Staff Consultant Gene Reindel, Principal in Charge
Date:	1/18/2024
Subject:	A.B. Won Pat International Airport Part 150 Update Flight Profile Analysis Memorandum
Reference:	HMMH Project Number 22-0212A

As part of the AECOM team, Harris Miller Miller & Hanson Inc. (HMMH) is assisting Guam International Airport Authority (GIAA) with the aircraft noise modeling element of the A.B. Won Pat Guam International Airport Part 150 Airport Noise Compatibility Program (Part 150) update. The purpose of this technical memorandum is to summarize the flight profile analysis to support the noise modeling input for the Noise Exposure Map (NEM) existing (2024) and forecast (2029) conditions. HMMH will use the Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT), Version 3f[1], to generate aircraft noise exposure contours for the NEM existing and forecast conditions. Therefore, the radar data profile evaluation compares to profile data developed from the AEDT 3f database for A.B. Won Pat Guam International Airport.

HMMH evaluated four of the main AEDT aircraft types in use at the Airport and determined that all U.S. based carriers typically use STANDARD profiles, and all international carriers typically use International Civil Aviation Organization (ICAO)-A profiles. Therefore, the noise modeling for the Airport includes ICAO-A flight profiles for all international airline operations for types with that profile available. Further details of this analysis are presented below.

1.0 Aircraft Selection

HMMH obtained flight track and aircraft identification data from FlightAware for the 12-month period from July 2022 to June 2023 that represented civilian (AC, AT, GA) operations. This data was used to develop the existing fleet mix and stage length data. The radar operations data were compared to the FAA tower counts for the same period. The fleet mix in the same categories were then scaled to the FAA approved Master Plan forecasts for 2024 and 2029.[2] Additional details on this process can be found in the "Aircraft Noise Modeling Input Memorandum."

The study team selected AEDT types with available radar data that represented the highest operations expected at the Airport within the five-year timeframe and types that represented both passenger and cargo jet operations. **Table 1** presents the four selected AEDT types and their modeled level of operations for 2024 and 2029.

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[1] Released December 15, 2023. https://aedt.faa.gov/3f_information.aspx

[2] FAA approved the use of the Master Plan forecast for the Part 150 Update.

The four AEDT types selected were:

- Boeing 737-800 – Passenger - United and International airline operations
- Boeing 747-400 – Cargo - U.S. and International airline operations
- Boeing 777-300ER – Passenger - United and International airline operations
- Airbus 321-232 – Passenger - International airline operations

Table 1. Selected AEDT Type Modeled Average Annual Day Operations
Source: GIAA Master Plan 2023

Year	Engine Type	AEDT Type	Arrivals		Departures		Local		Total
			Day	Night	Day	Night	Day	Night	
2024	Jet	737800	14.4	6.9	16.8	4.5	1.2	--	43.9
		747400	0.2	<0.1	0.2	<0.1	--	--	0.3
		7773ER	2.5	0.3	2.3	0.6	--	--	5.8
		A321-232	0.6	1.9	0.7	1.8	--	--	5.1
2029	Jet	737800	17.3	8.3	20.2	5.4	1.9	--	53.0
		747400	0.2	<0.1	0.2	<0.1	--	--	0.4
		7773ER	3.1	0.4	2.8	0.7	--	--	6.9
		A321-232	0.8	2.3	0.9	2.2	--	--	6.1

2.0 AEDT Flight Profiles

AEDT requires the use of specific flight performance data for each aircraft type operating at the Airport. Performance data include thrust, speed, and altitude profiles for takeoff, landing, and flight pattern operations. For departures, AEDT has STANDARD and ICAO aircraft flight profiles for many aircraft types, and each aircraft type may have multiple departure flight profiles representing specific ranges of takeoff weights.

AEDT uses departure "stage length" (the flight distance between the departure and arrival airport) as a surrogate for aircraft departure weight, since fuel load is the largest factor affecting variation in aircraft weight and therefore climb performance. AEDT includes performance profiles for most commercial aircraft types for a range of stage length values. **Table *2*** provides the stage length classifications in AEDT by their associated trip distances.

Table 2. AEDT Stage Length Categories
Source: AEDT 3f User Guide, December 2023

Category	Stage 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
Note: Stage Length is defined as the distance an aircraft travels from takeoff to landing	

The stage lengths determined for the Airport operations were based on the city-pair analysis of the 12-month radar data sample. **Table *3*** indicates the proportion of the operations that fell within each of the stage length categories split by airline for day and night periods. Typically, widebody aircraft which operate on long haul routes have higher stage lengths.

Table 3. Departure Stage Length Usage for Selected Aircraft

Source: FlightAware

Time of Day	Airline	AEDT Type	Stage Length								Total
			1	2	3	4	5	6	7	8	
Day	United Airlines	737800	18%	15%	66%	1%	0%	0%	0%	0%	100%
		7773ER	0%	0%	0%	29%	64%	0%	6%	<1%	100%
	Jeju Air	737800	0%	0%	28%	72%	0%	0%	0%	0%	100%
	Jin Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Korean Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
		7773ER	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Philippine Airlines	A321-232	0%	0%	100%	0%	0%	0%	0%	0%	100%
	T'way Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Air Seoul	A321-232	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Japan Airlines	737800	0%	0%	100%	0%	0%	0%	0%	0%	100%
		747400	0%	0%	0%	46%	46%	0%	7%	0%	100%
Night	United Airlines	737800	6%	32%	58%	3%	<1%	0%	0%	0%	100%
		7773ER	0%	0%	0%	12%	85%	0%	3%	0%	100%
	Jeju Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Jin Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Korean Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Philippine Airlines	A321-232	0%	0%	100%	0%	0%	0%	0%	0%	100%
	T'way Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Other	747400	49%	0%	0%	51%	0%	0%	0%	0%	100%
Note: Not all airlines and types have day and night operations.											

It is important to note that AEDT has a database of representative flight profiles that represent average stage length weight and flight conditions. These profiles are adjusted in the model based on runway gradient and weather conditions for the Airport in the model. Whereas the radar data profiles represent the conditions flown on that day, the weight of the aircraft, and pilot operating procedures. The goal of this analysis is to select the most representative flight profile for each set of operations.

3.0 Boeing 737-800 Analysis

The Boeing 737-800 has the highest operations, representing 71 percent of all Air Carrier passenger operations at the Airport. The aircraft type is flown by United mostly on shorter Stage length 1-3 flights and by international airlines operating Stage length 3-4 flights. Stage length 4 operations represent the highest level of operations by the 737-800 at the Airport, and these operations are mainly flown by International airlines as shown in **Figure 1**. The AEDT ICAO-A flight profile is the best match to the radar data flight profiles, especially below 3,000 feet in altitude.

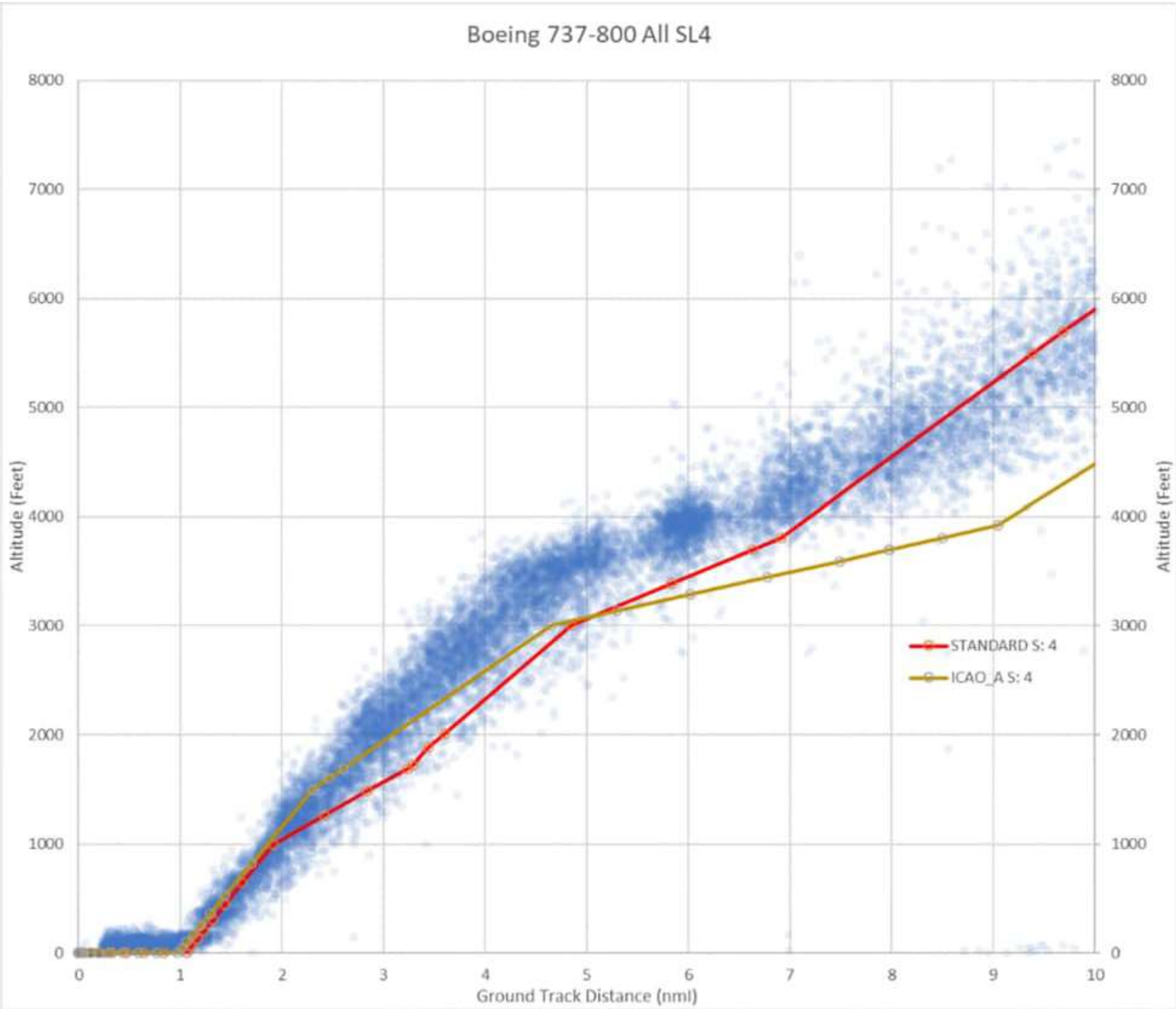

Figure 1. Boeing 737-800 Stage Length 4 Departures

Figure *2* displays the Stage length 3 737-800 departure flight profiles, which are a mixture of United and International airlines; however, United operations are the bulk of these departures, and the Standard profile best represents the United departures.

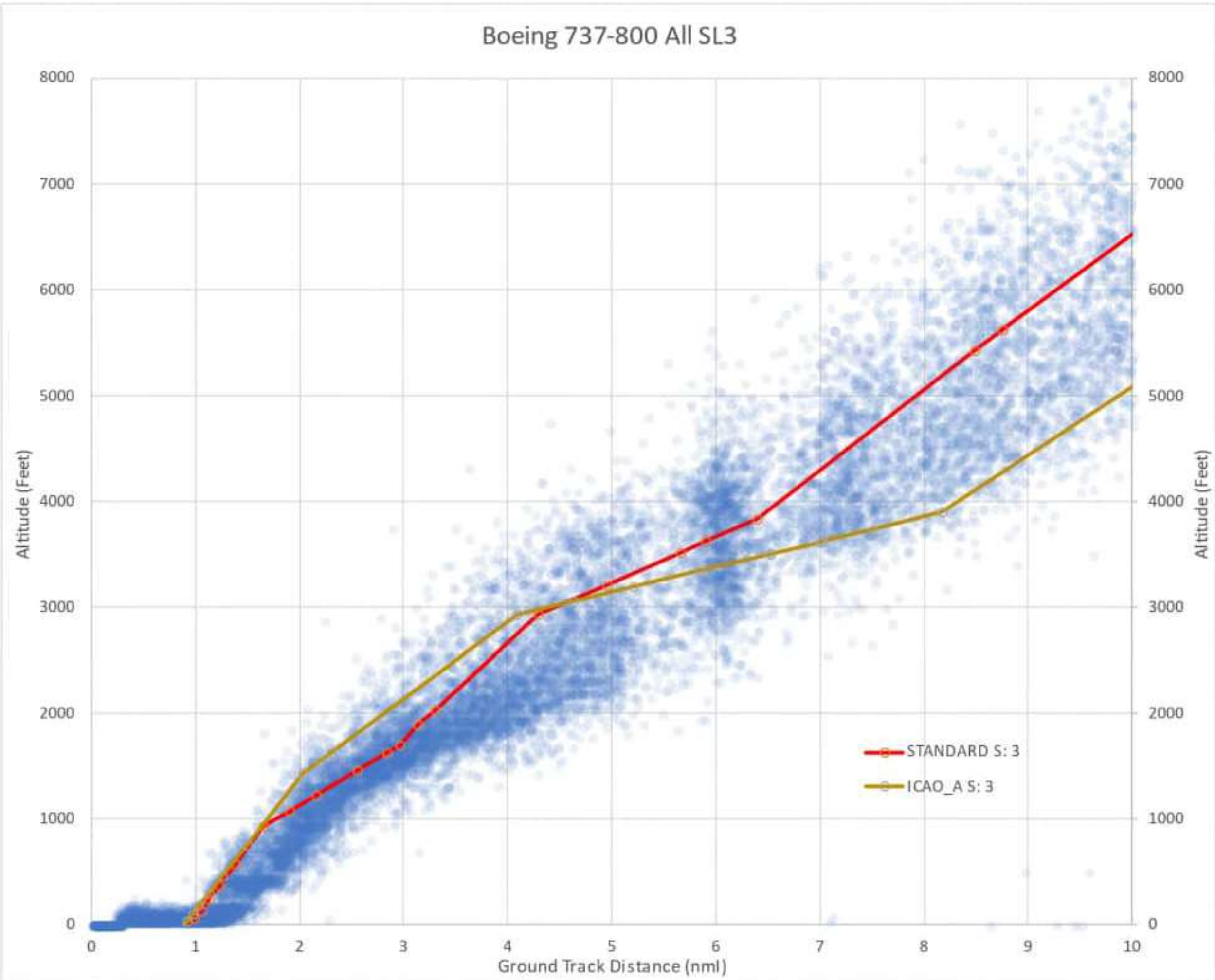

Figure 2. Boeing 737-800 Stage Length 3 Departures

4.0 Boeing 747-400 Analysis

The Boeing 747-400 is flown by U.S. and International cargo operators at the Airport. The aircraft type is flown by UPS and Atlas Air mostly on Stage length 4 and 5 flights.

Figure 3 displays the Stage length 4 747-400 departure flight profiles, and as shown, the Standard profile best represents the U.S. airline operations. It is mainly international cargo airlines that match the ICAO-A profile shown in the figure.

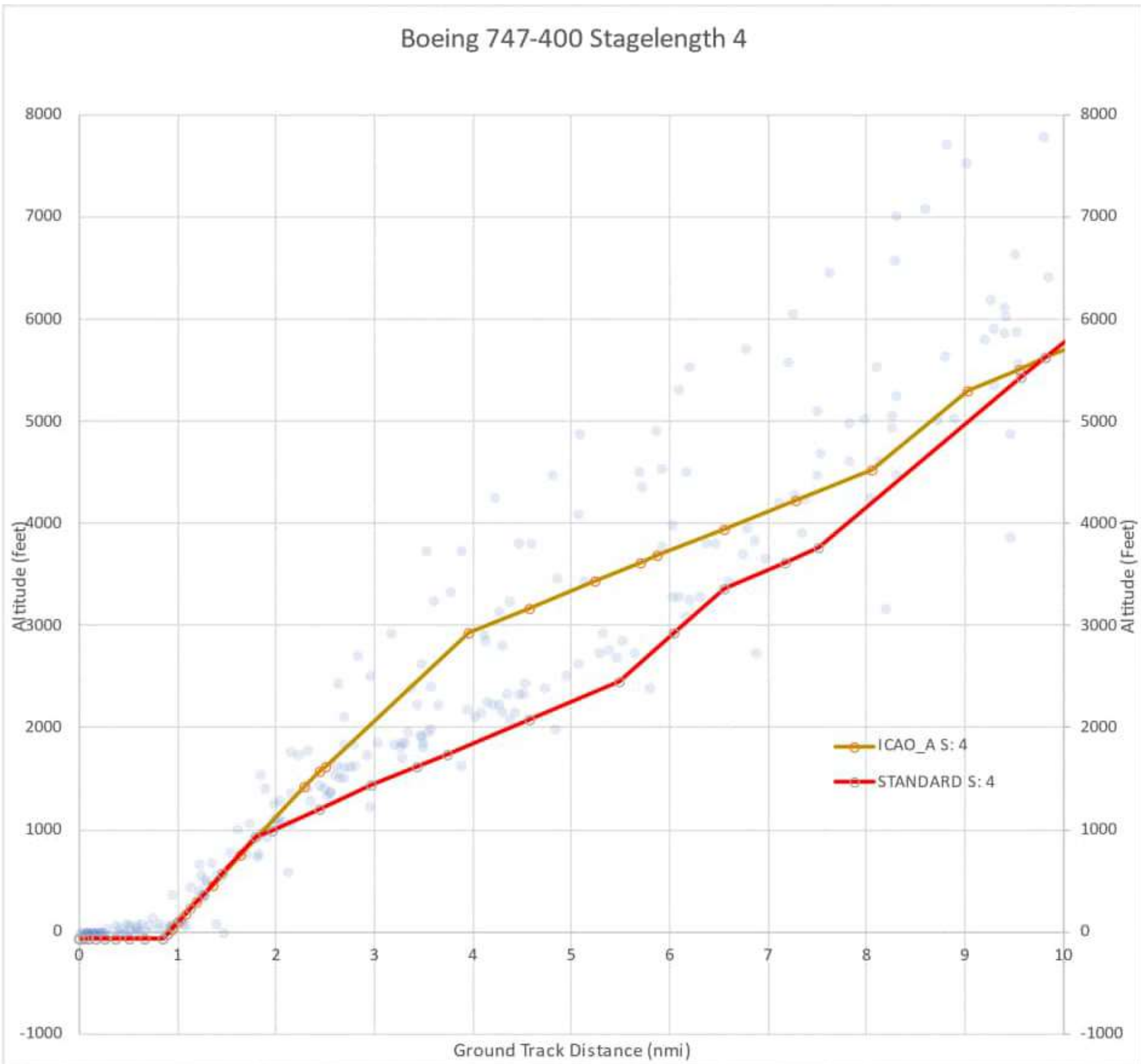

Figure 3. Boeing 747-400 Stage Length 4 Departures

Figure 4 displays the Stage length 5 747-400 departure flight profiles, and similar to the Stage length 4 profiles, the Standard profile matches the majority of departures.

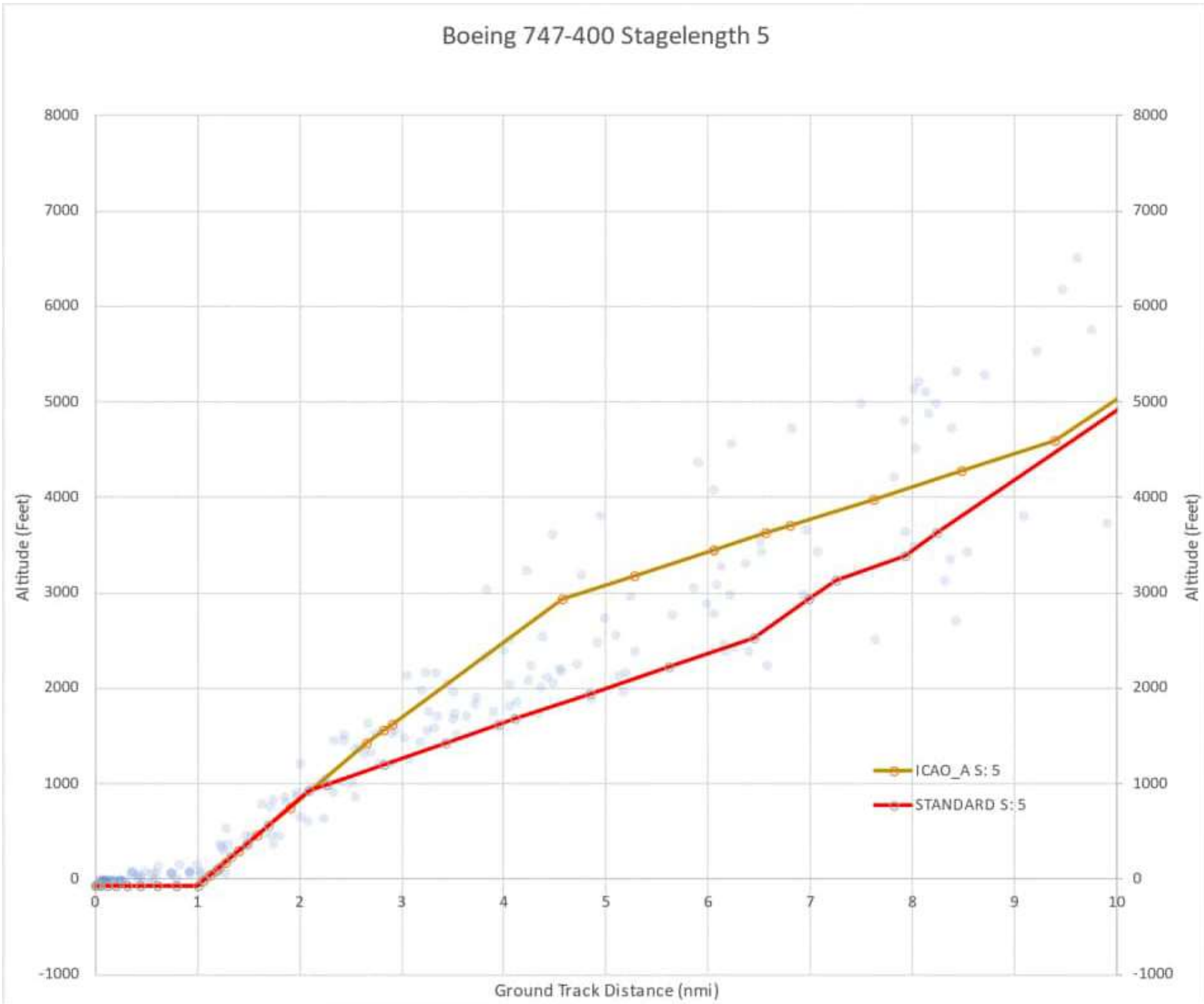

Figure 4. Boeing 747-400 Stage Length 5 Departures

5.0 Boeing 777-300ER Analysis

The Boeing 777-300ER is flown by United and Korean Air at the Airport mostly on Stage length 4, 5 and 7 flights.

Figure 5 displays the Stage length 4 777-300ER departure flight profiles which is a mixture of United and Korean Air flight, and as shown, the Standard profile best represents the United operations and ICAO-A for Korean Air.

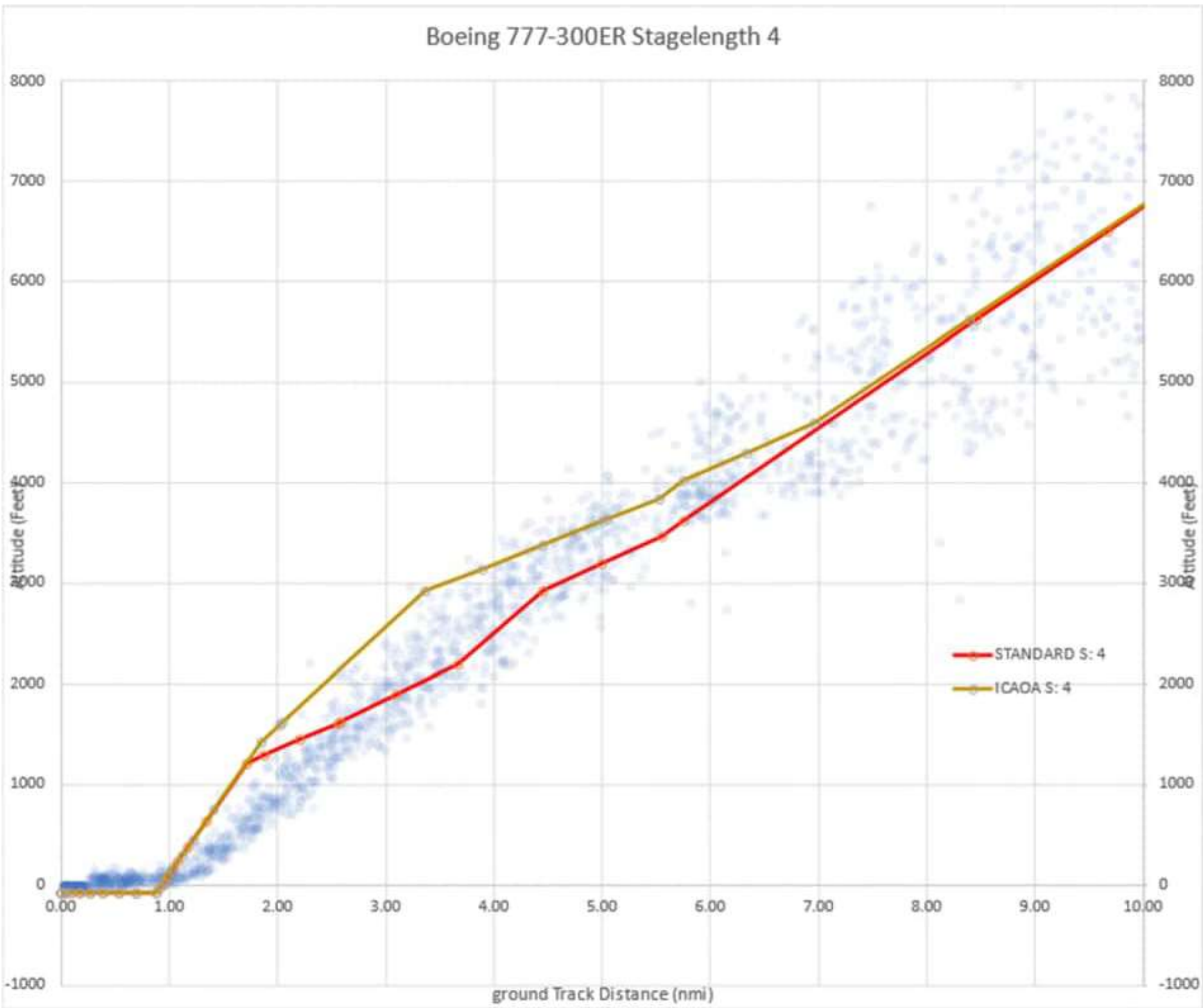

Figure 5. Boeing 777-300ER Stage Length 4 Departures

Figure 6 displays the Stage length 5 777-300ER departure flight profiles which are all United operations, and the Standard profile matches the majority of departures. Stage length 7 operations are also United and are not shown here but follow the same trend matching the Standard profile.

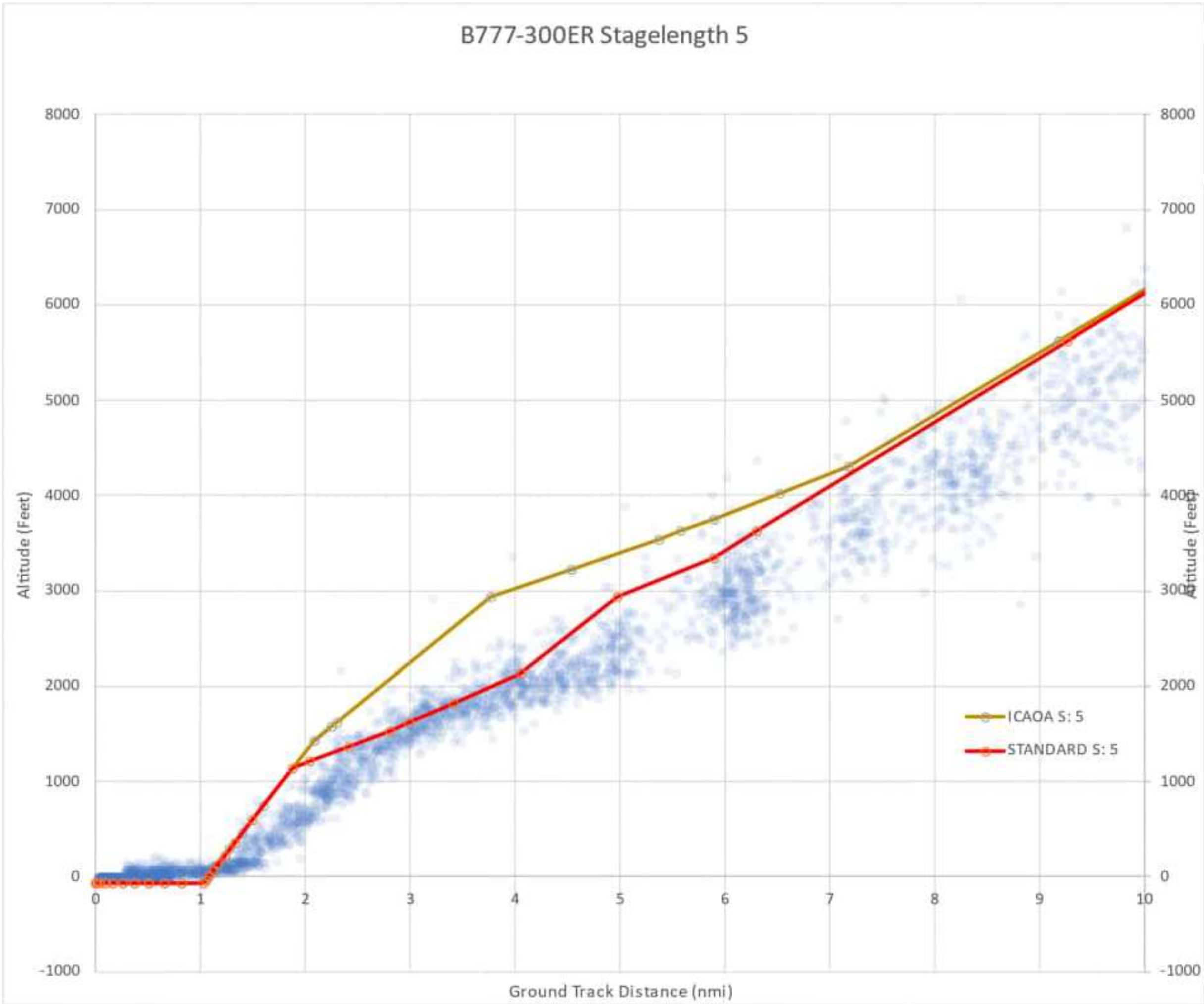

Figure 6. Boeing 777-300ER Stage Length 5 Departures

6.0 Airbus A321-232 Analysis

The Airbus A321-232 is flown by International airlines at the Airport, primarily Philippines Airlines, mostly on Stage length 3 and 4 flights.

Figure 7 displays the Stage length 3 A321-232 departure flight profiles which is a mixture of Philippine Airlines A321 and A321-Neo aircraft types. They are both modeled as the A321-232 in AEDT and the ICAO-A profile is the best representation of the data.

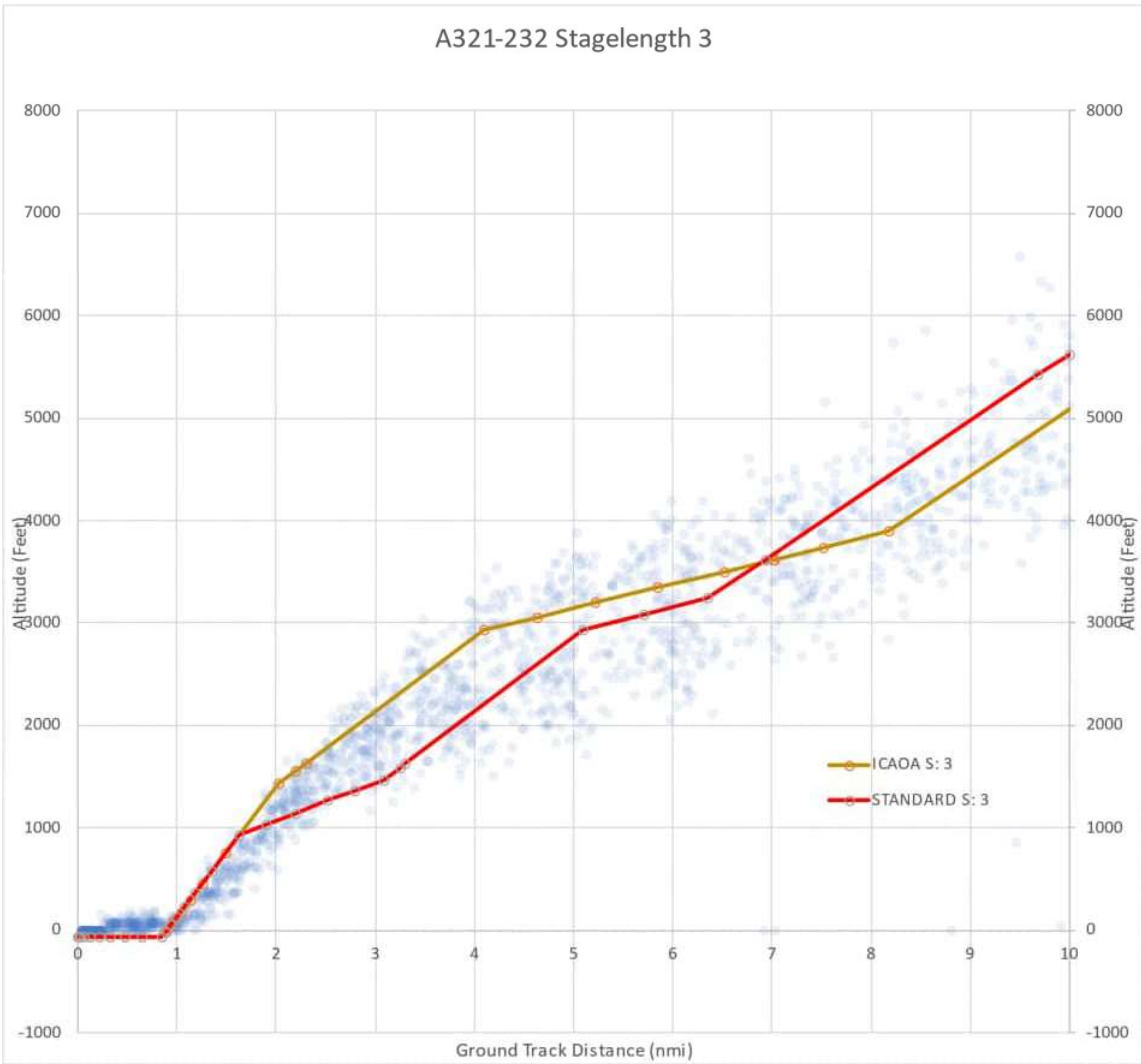

Figure 7. Airbus A321-232 Stage Length 3 Departures

Figure 8 displays the Stage length 4 A321-232 departure flight profiles which are all Philippines Airlines A321 operations, and the ICAO-A profile matches the majority of departures.

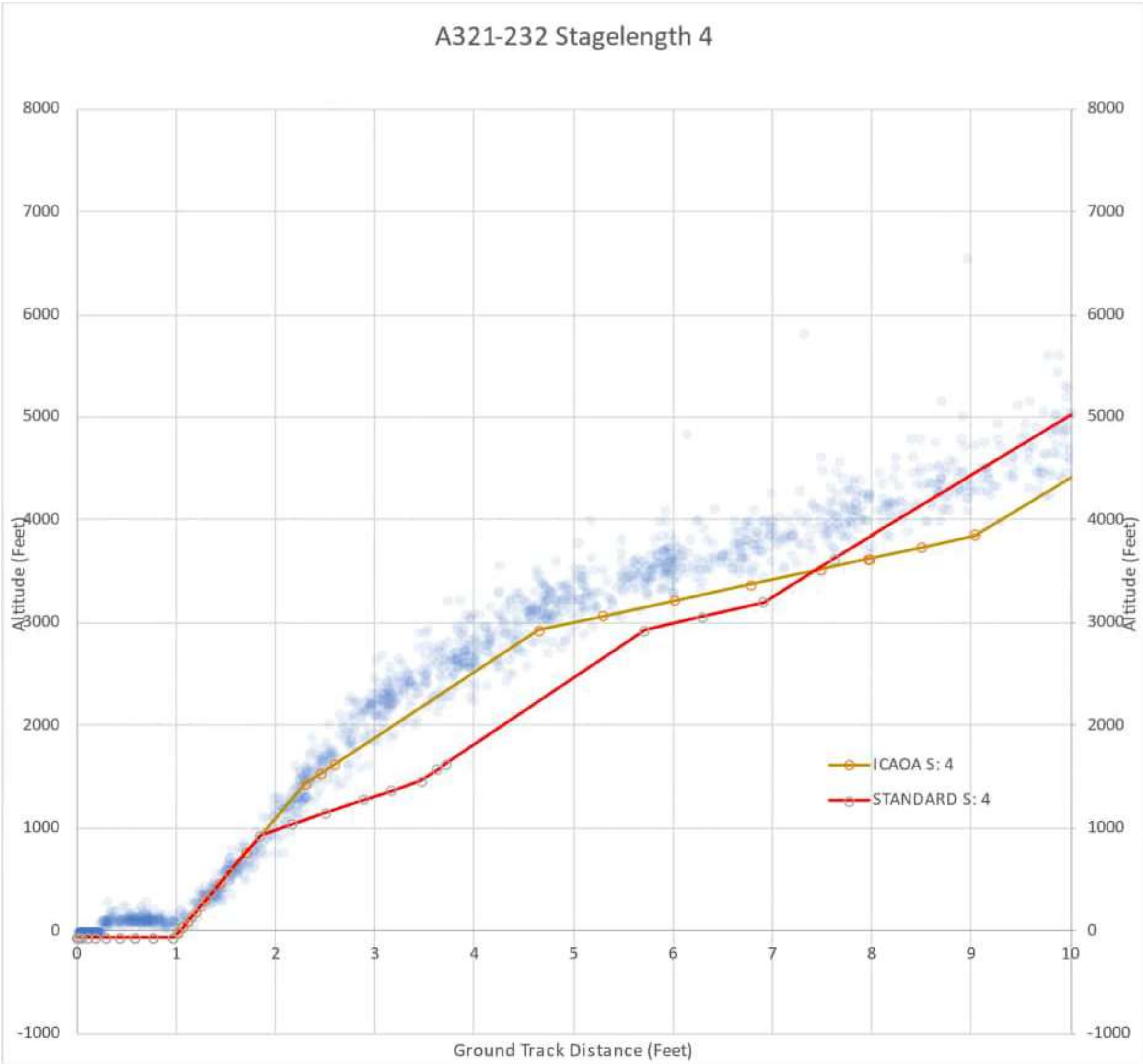

Figure 8. Airbus A321-232 Stage Length 4 Departures

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C.2 Noise Modeling Input Memorandum

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TECHNICAL MEMORANDUM

To:	Audie Artero, Engineering Supervisor, A.B. Won Pat Guam Intl Airport
From:	Gene Reindel, Principal in Charge Robert Mentzer, Project Manager, Principal Consultant Kevin Parker, Assistant Project Manager, Staff Consultant
Date:	1/5/2024
Subject:	A.B. Won Pat International Airport Part 150 Update Aircraft Noise Modeling Input Memorandum
Reference:	HMMH Project Number 22-0212A

As part of the AECOM team, Harris Miller Miller & Hanson Inc. (HMMH) is assisting Guam International Airport Authority (GIAA) with the aircraft noise modeling element of the A.B. Won Pat Guam International Airport Part 150 Airport Noise Compatibility Program (Part 150) update. The purpose of this technical memorandum is to summarize the baseline (12-month period from July 2022 to June 2023 and ***to seek concurrence from GIAA*** with the noise modeling input for the Noise Exposure Map (NEM) existing (2024) and forecast (2029) conditions as provided and described herein.

GIAA reviewed the technical memorandum and provided agreement on December 19, 2023. Since then, the memorandum has been updated to reflect the use of AEDT 3f and additional documentation is provided on the use of AEDT STANDARD and ICAO_A profiles in the model.

HMMH will use the Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT), Version 3f[1], to generate aircraft noise exposure contours for the NEM existing and forecast conditions. The subsequent sections describe the AEDT required noise modeling inputs for each condition, which include:

- Physical description of the airport layout
- Aircraft operations
- Aircraft noise and performance characteristics
- Runway utilization
- Flight track geometry and use
- Meteorological conditions
- Terrain data

1.0 Physical Description of the Airport Layout

The Airport is located approximately three miles east of the capital city of Hagåtña (formerly Agana) in the United States territory of Guam. The airport layout is comprised of two runways, Runway 6L/24R and Runway 6R/24L. **Figure 1** shows the current airport diagram and **Table 1** provides the runway specifications used in modeling aircraft noise exposure.

The number used to designate each runway end reflects, with the addition of a trailing “0”, the magnetic heading of the runway to the nearest 10 degrees from the perspective of the pilot. Runway 6L/24R is oriented along approximate magnetic headings of 64° and 244° and is 12,014 feet long by 150 feet wide. Runway 6R/24L is oriented along approximate magnetic headings of 64° and 244° and is 10,014 feet long by 150 feet wide.

[1] Released December 15, 2023. https://aedt.faa.gov/3f_information.aspx

Runway length, runway width, instrumentation, and declared distances affect which runway an aircraft will use and under what conditions, and therefore, will determine the rate of utilization of a runway relative to the other runways at the airport.

Table 1. Runway Specifications

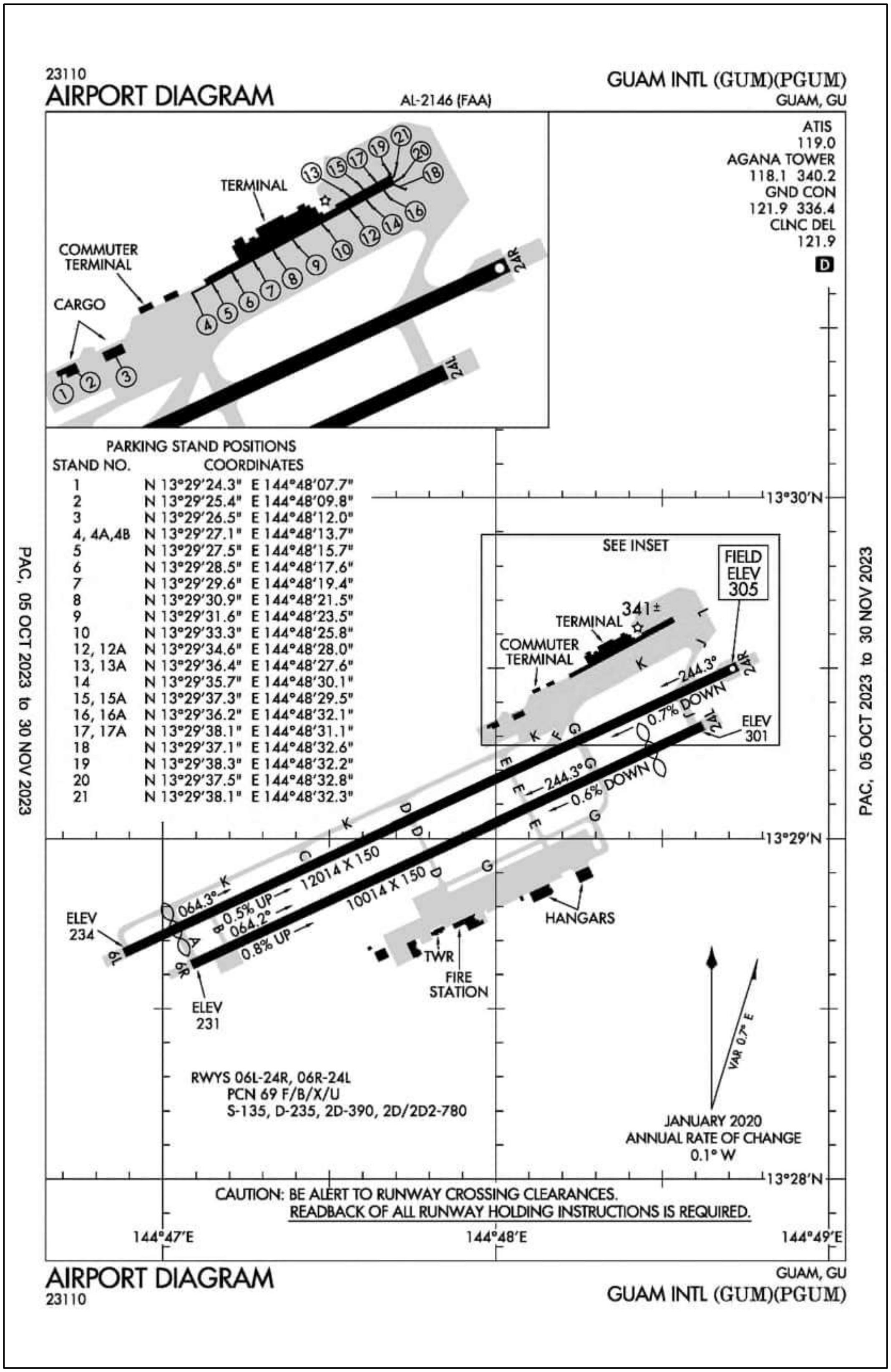
Source: GIAA Master Plan 2023, FAA 5010 Data. Accessed on Oct. 13th, 2023

Runway End	Latitude	Longitude	Elevation (ft MSL)	Length (ft)	Approach Angle (degrees)	Threshold Crossing Height (ft)	Displaced Thresholds (ft)
6L	13-28.6643N	144-46.8853E	233.7	12,014	3.0	55	1,000
24R	13-29.5051N	144-48.7242E	305.0	12,014	3.0	75	N/A
6R	13-28.6295N	144-47.0888E	231.0	10,014	3.0	57	N/A
24L	13-29.3303N	144-48.6213E	301.0	10,014	3.0	55	1,004
Note: 6L, 6R Threshold Crossing Height (TCH) from ILS and 24L, 24R TCH from RNAV Y Approach							

We have discussed the existing layout with the Master Plan consultant (AECOM) and GIAA and do not expect any changes to the runway layout within the five-year Part 150 update time period. Therefore, the same runway specifications will be used for the existing and forecast condition modeling used for the preparation of the Noise Exposure Maps.

Figure 1. Airport Diagram

Source: FAA. Accessed on October 13th, 2023



2.0 Airport Operations

FAA organizes aircraft operations into categories per FAA Order 7210.3 "Facility Operation and Administration"; namely Air Carrier (AC), Air Taxi (AT), General Aviation (GA), and Military (ML). AC and AT are commercial categories distinguished by aircraft capacity, while GA includes all non-commercial, non-military operations. FAA personnel at the airports ATCT provide counts of operations that are reported by FAA's OPSNET (tower counts) and then used in preparation of the FAA's Terminal Area Forecast (TAF).

HMMH obtained flight track and aircraft identification data from FlightAware for the 12-month period from July 2022 to June 2023 that represented civilian (AC, AT, GA) operations. This data was used to develop the existing fleet mix, day/night split, stage lengths, runway use and modeled flight tracks. The radar operations data were compared to the FAA tower counts for the same period. The fleet mix in the same categories were then scaled to the FAA approved Master Plan forecasts for 2024 and 2029[2]. Most military operations were not available in the radar data sample, therefore FAA Traffic Flow Management System Counts (TFMSC) for the same 12-month period were obtained and used to develop the military fleet mix operating at the airport.

Table 2 presents the total annual operations for 2022, the data collection period (7/22-06/23), and 2024 and 2029 in accordance with the 2023 Master Plan[3].

Table 2. Operation Counts by Tower Category

Sources: FlightAware, FAA OPSNET, GIAA Master Plan 2023

Year	ITINERANT					LOCAL			Total Operations
	Air Carrier	Air Taxi	General Aviation	Military	Total	Civil	Military	Total	
2022	10,501	968	7,830	930	**20,229**	14,123	643	14,766	**34,995**
07/22 – 06/23	13,790	1,489	8,806	992	**25,077**	17,045	688	17,733	**42,810**
MP 2024	22,062	3,842	16,538	927	**43,369**	15,592	1,000	16,592	**59,960**
MP 2029	26,512	4,331	26,951	927	**58,721**	23,933	1,000	24,933	**83,655**

Note: Totals may not match exactly due to rounding.
MP – Master Plan 2023

The derivation of the fleet mix utilized existing aircraft operations at the Airport and included air carrier, air taxi, general aviation, and itinerant military operations. The operations described below comprise the existing and forecast conditions for submittal of the Part 150 update. The aircraft operations data entered into AEDT includes the number of day and night arrivals, departures, and pattern (circuit) operations.

Pattern (circuit) operations are local pattern operations modeled on closed-circuit flight paths, which are flight tracks that depart and turn into a downwind pattern before landing back on the same runway. It should be noted that a "local" operation departs and lands at the Airport rather than going to or arriving from another airport, but a local operation is not necessarily a closed-circuit flight path. Any aircraft that arrives and departs from the same airport but uses a different runway end or flies a different path than a unidirectional turn would be considered a "local" operation, but not a closed-circuit flight path. The Airport has skydive operations which are considered local flights but due to the altitudes obtained will be modeled as departures and arrivals for this analysis. Japan Airlines also conducts training at the Airport

[2] FAA approved the use of the Master Plan forecast for the Part 150 Update.
[3] Antonio B. Won Pat International Airport Master Plan Update, October 2023

and those local operations and circuit tracks have been included. For the purposes of this analysis, all other local operations are modeled as circuits.

Table 3 provides the average daily operations, by aircraft type, that were developed for the baseline. The average daily number of aircraft arrivals, departures and circuits for the baseline are calculated by determining the total annual operations and dividing by 365 (days in a year). The baseline average annual day (AAD) operations included 117 total operations, 11.4 percent of which occurred during the nighttime hours of 10:00 p.m. to 6:59 a.m. per the definition of the FAA-required noise compatibility metric of DNL or the Day-Night Average Sound Level.

The operations for the existing condition and forecast condition were scaled based on the future operational levels in the Master Plan forecast. The fleet mix was adjusted based on future trends for 2024 and 2029 (e.g. United 777-200 operations were shifted to 777-300ER types for both years). **Table 4** and **Table 5** list the same operations information for the existing (2024) and forecast condition (2029) operations.

Table 3. Baseline (July 2022- June 2023) Average Annual Day Operations

Source: FlightAware

Category	Engine Type	AEDT Type	Arrivals		Departures		Local		Total
			Day	Night	Day	Night	Day	Night	
Air Carrier	**Jet**	737800	8.8	4.2	10.2	2.7	1.3	--	27.3
		7378MAX	<0.1	--	<0.1	--	--	--	<0.1
		747400	0.1	<0.1	0.1	<0.1	--	--	0.3
		7478	0.1	--	<0.1	<0.1	--	--	0.1
		757PW	0.8	<0.1	0.7	0.2	--	--	1.6
		7673ER	0.1	--	0.1	--	--	--	0.3
		777200	0.4	<0.1	0.3	<0.1	--	--	0.7
		7773ER	1.4	0.2	1.3	0.3	--	--	3.1
		A321-232	0.4	1.2	0.4	1.1	--	--	3.1
		A330-301	0.8	<0.1	0.8	<0.1	--	--	1.6
		MD11GE	0.1	--	<0.1	0.1	--	--	0.2
		MD11PW	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
	Turboprop	C130	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
	Subtotal		**13.1**	**5.8**	**14.3**	**4.6**	**1.3**	**--**	**39.1**
Air Taxi	**Jet**	FAL900EX	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		GIIB	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
	Turboprop	CNA208	0.6	--	0.6	<0.1	--	--	1.3
	Piston	BEC58P	1.3	<0.1	1.3	<0.1	--	--	2.6
	Subtotal		**2.0**	**<0.1**	**2.0**	**<0.1**	**--**	**--**	**4.0**
General Aviation	**Jet**	CNA55B	<0.1	--	<0.1	<0.1	--	--	<0.1
		CNA680	<0.1	--	<0.1	--	--	--	<0.1
		GV	0.2	<0.1	0.2	<0.1	--	--	0.3
		LEAR35	0.2	<0.1	0.2	<0.1	--	--	0.4
	Turboprop	CNA208	5.7	--	5.4	0.3	15.9	0.3	27.6
	Piston	BEC58P	3.4	<0.1	3.5	<0.1	--	--	6.9
		CNA172	1.3	<0.1	1.3	<0.1	15.4	<0.1	18.0
		GASEPF	0.1	--	0.1	<0.1	13.7	<0.1	13.9
		GASEPV	1.0	--	1.0	--	--	--	2.0
	Subtotal		**12.0**	**0.1**	**11.6**	**0.4**	**45.0**	**0.4**	**69.5**
Military	**Jet**	767300	<0.1	<0.1	<0.1	--	--	--	<0.1
		767CF6	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		777200	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		F16PW0	0.9	--	0.9	--	1.7	--	3.6
		F-18	0.1	--	0.1	--	0.1	--	0.4
	Turboprop	C130AD	0.2	--	0.2	--	--	--	0.3
	Subtotal		**1.3**	**<0.1**	**1.3**	**<0.1**	**1.9**	**--**	**4.5**
Total			**28.4**	**6.0**	**29.2**	**5.1**	**48.2**	**0.4**	**117.3**

Table 4. Modeled 2024 Average Annual Day Operations

Source: GIAA Master Plan 2023

Category	Engine Type	AEDT Type	Arrivals		Departures		Local		Total
			Day	Night	Day	Night	Day	Night	
Air Carrier	Jet	737800	14.4	6.9	16.8	4.5	1.2	--	43.9
		7378MAX	<0.1	--	<0.1	--	--	--	<0.1
		747400	0.2	<0.1	0.2	<0.1	--	--	0.3
		7478	0.1	--	<0.1	<0.1	--	--	0.1
		757PW	0.8	0.1	0.7	0.2	--	--	1.8
		7673ER	0.2	--	0.2	--	--	--	0.4
		777200	0.3	<0.1	0.4	<0.1	--	--	0.7
		7773ER	2.5	0.3	2.3	0.6	--	--	5.8
		A321-232	0.6	1.9	0.7	1.8	--	--	5.1
		A330-301	1.4	<0.1	1.3	<0.1	--	--	2.7
		MD11GE	0.1	--	<0.1	0.1	--	--	0.2
		MD11PW	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
	Turboprop	C130	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
	Subtotal		**20.8**	**9.4**	**22.8**	**7.4**	**1.2**	**--**	**61.7**
Air Taxi	Jet	FAL900EX	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		GIIB	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
	Turboprop	CNA208	0.1	--	0.1	<0.1	--	--	0.2
	Piston	BEC58P	0.2	<0.1	0.2	<0.1	--	--	0.5
	Subtotal		**0.4**	**<0.1**	**0.4**	**<0.1**	**--**	**--**	**0.7**
General Aviation	Jet	CNA55B	<0.1	--	<0.1	<0.1	--	--	<0.1
		CNA680	<0.1	--	<0.1	--	--	--	<0.1
		GV	0.5	0.1	0.5	0.2	--	--	1.3
		LEAR35	0.6	<0.1	0.6	<0.1	--	--	1.2
	Turboprop	CNA208**	22.0	0.1	22.0	1.0	--	--	44.3
	Piston	BEC58P	5.8	<0.1	5.8	<0.1	--	--	11.7
		CNA172	4.0	<0.1	4.1	<0.1	14.1	<0.1	22.2
		GASEPF	0.3	--	0.3	<0.1	12.5	<0.1	13.2
		GASEPV	1.0	--	1.0	--	--	--	2.1
	Subtotal		**34.5**	**0.5**	**33.7**	**1.2**	**26.2**	**<0.1**	**96.6**
Military	Jet	767300	<0.1	<0.1	<0.1	--	--	--	<0.1
		767CF6	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		777200	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		F16PW0**	2.2	--	2.2	--	--	--	4.3
		F-18**	0.2	--	0.2	--	--	--	0.5
	Turboprop	C130AD	0.1	--	0.1	--	--	--	0.3
	Subtotal		**1.2**	**<0.1**	**1.2**	**<0.1**	**2.7**	**--**	**5.2**
Total			**58.3**	**9.9**	**59.5**	**8.6**	**27.8**	**<0.1**	**164.3**

** Local operations flown by Skydive Guam and military fighter aircraft are modeled as local arrival and departure operations

Table 5. Modeled 2029 Average Annual Day Operations

Source: GIAA Master Plan 2023

Category	Engine Type	AEDT Type	Arrivals		Departures		Local		Total
			Day	Night	Day	Night	Day	Night	
Air Carrier	Jet	737800	17.3	8.3	20.2	5.4	1.9	--	53.0
		7378MAX	<0.1	--	<0.1	--	--	--	<0.1
		747400	0.2	<0.1	0.2	<0.1	--	--	0.4
		7478	0.1	--	<0.1	<0.1	--	--	0.1
		757PW	1.0	0.1	0.9	0.2	--	--	2.2
		7673ER	0.3	--	0.3	--	--	--	0.5
		777200	0.4	<0.1	0.4	<0.1	--	--	0.8
		7773ER	3.1	0.4	2.8	0.7	--	--	6.9
		A321-232	0.8	2.3	0.9	2.2	--	--	6.1
		A330-301	1.6	<0.1	1.6	<0.1	--	--	3.2
		MD11GE	0.2	--	<0.1	0.1	--	--	0.3
		MD11PW	0.1	<0.1	<0.1	<0.1	--	--	0.1
	Turboprop	C130	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
	Subtotal		**25.1**	**11.3**	**27.4**	**8.9**	**1.9**	**--**	**74.5**
Air Taxi	Jet	FAL900EX	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		GIIB	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
	Turboprop	CNA208	0.2	--	0.2	<0.1	--	--	0.4
	Piston	BEC58P	0.4	<0.1	0.4	<0.1	--	--	0.7
	Subtotal		**0.6**	**<0.1**	**0.6**	**<0.1**	**--**	**--**	**1.1**
General Aviation	Jet	CNA55B	<0.1	--	<0.1	<0.1	--	--	<0.1
		CNA680	<0.1	--	<0.1	--	--	--	<0.1
		GV	0.9	0.2	0.8	0.3	--	--	2.1
		LEAR35	1.0	0.1	1.0	0.1	--	--	2.3
	Turboprop	CNA208**	34.5	0.2	33.3	1.4	--	--	69.3
	Piston	BEC58P	8.2	<0.1	8.2	<0.1	--	--	16.4
		CNA172	6.6	0.2	6.7	<0.1	21.6	<0.1	35.0
		GASEPF	0.5	--	0.5	<0.1	19.3	<0.1	20.3
		GASEPV	1.1	--	1.1	--	--	--	2.3
	Subtotal		**52.9**	**0.7**	**51.7**	**1.9**	**40.9**	**0.1**	**148.3**
Military	Jet	767300	<0.1	<0.1	<0.1	--	--	--	<0.1
		767CF6	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		777200	<0.1	<0.1	<0.1	<0.1	--	--	<0.1
		F16PW0**	2.2	--	2.2	--	--	--	4.3
		F-18**	0.2	--	0.2	--	--	--	0.5
	Turboprop	C130AD	0.1	--	0.1	--	--	--	0.3
	Subtotal		**2.6**	**<0.1**	**2.6**	**<0.1**	**--**	**--**	**5.2**
Total			**81.1**	**12.1**	**82.3**	**10.8**	**42.7**	**0.1**	**229.2**

** Local operations flown by Skydive Guam and military fighter aircraft are modeled as local arrival and departure operations

3.0 Aircraft Noise and Performance Characteristics

AEDT requires the use of specific noise and performance data for each aircraft type operating at the airport. Noise data is in the form of Sound Exposure Level (SEL) at a range of distances (from 200 feet to 25,000 feet) from a particular aircraft with engines at a range of thrust levels. Performance data include thrust, speed and altitude profiles for takeoff and landing operations. The AEDT database contains standard noise and performance data for over 300 fixed-wing aircraft types, most of which are civilian aircraft.

Aside from identifying the aircraft type in the database, AEDT has STANDARD and International Civil Aviation Organization (ICAO) aircraft flight profiles for takeoffs, landings, and flight patterns or touch-and-go operations. HMMH evaluated four of the main ANP types in use at the Airport and determined that all U.S. based carriers typically use STANDARD profiles and all international carriers typically use ICAO-A profiles. Therefore, the departure profiles in AEDT were assigned to each aircraft type based on use by U.S. based (STANDARD) or international carriers (ICAO-A if available) in AEDT for all civilian aircraft types in the existing and forecast conditions. In the database, each aircraft type may have multiple departure flight profiles representing specific ranges of takeoff weights.

AEDT uses departure "stage length" (the flight distance between the departure and arrival airport) as a surrogate for aircraft departure weight, since fuel load is the largest factor affecting variation in aircraft weight and therefore climb performance. AEDT includes performance profiles for most commercial aircraft types for a range of stage length values; however, smaller aircraft types have only a single representative weight used for all operations, identified as stage length 1.

The stage lengths determined for the Airport operations are based on the city-pair analysis of the 12-month radar data sample. **Table 6** indicates the proportion of the operations that fell within each of the stage length categories for existing conditions. Typically, widebody aircraft which operate on long haul routes have higher stage lengths.

Table 6. Existing and Future Conditions Departure Stage Length Usage

Source: FlightAware

Time of Day	Airline	AEDT Type	Stage Length								Total
			1	2	3	4	5	6	7	8	
Day	United Airlines	737800	18%	15%	66%	1%	0%	0%	0%	0%	100%
		7773ER	0%	0%	0%	29%	64%	0%	6%	<1%	100%
	Jeju Air	737800	0%	0%	28%	72%	0%	0%	0%	0%	100%
	Jin Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
		777200	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Korean Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
		7773ER	0%	0%	0%	100%	0%	0%	0%	0%	100%
		A330-301	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Philippine Airlines	A321-232	0%	0%	100%	0%	0%	0%	0%	0%	100%
	T'way Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Air Seoul	A321-232	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Japan Airlines	737800	0%	0%	100%	0%	0%	0%	0%	0%	100%
		7673ER	0%	0%	100%	0%	0%	0%	0%	0%	100%

Time of Day	Airline	AEDT Type	Stage Length 1	2	3	4	5	6	7	8	Total
	Asia Pacific Airlines	757PW	<1%	23%	12%	29%	35%	0%	0%	0%	100%
	Other	7378MAX	0%	0%	0%	0%	100%	0%	0%	0%	100%
		747400	0%	0%	0%	46%	46%	0%	7%	0%	100%
		7478	0%	0%	0%	77%	0%	23%	0%	0%	100%
		767300	0%	0%	0%	100%	0%	0%	0%	0%	100%
		767CF6	100%	0%	0%	0%	0%	0%	0%	0%	100%
		777200	0%	0%	0%	100%	0%	0%	0%	0%	100%
		BEC58P*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		C130	0%	100%	0%	0%	0%	0%	0%	0%	100%
		C130AD*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		CNA172*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		CNA208*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		CNA55B*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		CNA680*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		F16PW0*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		F-18*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		FAL900EX	0%	0%	0%	71%	29%	0%	0%	0%	100%
		GASEPF*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		GASEPV*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		GIIB*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		GV*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		LEAR35*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		MD11GE	0%	0%	0%	100%	0%	0%	0%	0%	100%
		MD11PW	0%	0%	0%	2%	98%	0%	0%	0%	100%
Time of Day	**Airline**	**AEDT Type**	**Stage Length 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Night	**United Airlines**	737800	6%	32%	58%	3%	<1%	0%	0%	0%	100%
		7773ER	0%	0%	0%	12%	85%	0%	3%	0%	100%
	Jeju Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Jin Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
		777200	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Korean Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
		A330-301	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Philippine Airlines	A321-232	0%	0%	100%	0%	0%	0%	0%	0%	100%
	T'way Air	737800	0%	0%	0%	100%	0%	0%	0%	0%	100%
	Asia Pacific Airlines	757PW	0%	9%	30%	32%	28%	0%	0%	0%	100%
	Other	747400	49%	0%	0%	51%	0%	0%	0%	0%	100%
		7478	0%	0%	0%	100%	0%	0%	0%	0%	100%
		767CF6	100%	0%	0%	0%	0%	0%	0%	0%	100%
		777200	0%	0%	0%	100%	0%	0%	0%	0%	100%
		BEC58P*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		C130	0%	100%	0%	0%	0%	0%	0%	0%	100%

Time of Day	Airline	AEDT Type	Stage Length								Total
			1	2	3	4	5	6	7	8	
		CNA172*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		CNA208*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		CNA55B*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		FAL900EX	0%	0%	0%	75%	25%	0%	0%	0%	100%
		GASEPF*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		GIIB*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		GV*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		LEAR35*	100%	0%	0%	0%	0%	0%	0%	0%	100%
		MD11GE	0%	0%	0%	100%	0%	0%	0%	0%	100%
		MD11PW	0%	0%	0%	89%	11%	0%	0%	0%	100%
*AEDT types that have only one stage length in AEDT											

4.0 Runway Utilization

The primary factor affecting runway use at airports is weather; specifically, the wind direction and wind speed. Trade winds are dominant in Guam throughout the year, which usually blow from an easterly direction. An additional factor that may affect runway use includes the position of the facility or ramp relative to the runway.

HMMH utilized data obtained from FlightAware from July 2022 to June 2023 to compile runway use tables. Due to the ongoing runway rehabilitation project on Runway 6L/24R, we used the 12-month period to develop the annual average flow of the airport (northeast or southwest) and then used the split between the parallels from the four months both runways were open and applied it to the whole year to develop an average annual condition.

HMMH categorized this information by arrival, departure, or circuits (pattern training flights), as well as day and night. HMMH separated the data by category as well as engine type (i.e. jet, non-jet) since these categories of aircraft types may use the runways differently. **Table 7** presents the runway utilization rates developed for the existing conditions. The runway utilization rates in **Table 7** will be used for the development of both 2024 and 2029 aircraft noise exposure contours in the NEM.

Table 7. Runway Utilization for Fixed-Wing Aircraft
Source: FlightAware

Category	Propulsion Class	Operation Type	Time of Day	Runway				Total
				6L	6R	24L	24R	
Air Carrier	Jet	Arrivals	Day	90.3%	3.0%	0.2%	6.4%	**100.0%**
			Night	96.5%	2.5%	<0.1%	0.9%	**100.0%**
		Departures	Day	87.1%	2.5%	0.3%	10.1%	**100.0%**
			Night	89.0%	1.9%	0.2%	8.9%	**100.0%**
		Circuits	Day	89.4%	--	--	10.6%	**100.0%**
			Night	--	--	--	--	**--**
	Non-jet	Arrivals	Day	90.3%	3.0%	0.2%	6.4%	**100.0%**
			Night	96.5%	2.5%	<0.1%	0.9%	**100.0%**
		Departures	Day	87.1%	2.5%	0.3%	10.1%	**100.0%**
			Night	89.0%	1.9%	0.2%	8.9%	**100.0%**
Air Taxi	Jet	Arrivals	Day	85.3%	7.8%	0.6%	6.4%	**100.0%**
			Night	68.3%	27.3%	1.2%	3.1%	**100.0%**
		Departures	Day	69.7%	21.8%	2.0%	6.5%	**100.0%**
			Night	86.9%	9.7%	0.3%	3.1%	**100.0%**
	Non-jet	Arrivals	Day	79.1%	12.1%	1.2%	7.7%	**100.0%**
			Night	86.8%	13.2%	--	--	**100.0%**
		Departures	Day	81.8%	11.7%	0.8%	5.7%	**100.0%**
			Night	87.5%	12.5%	--	--	**100.0%**
General Aviation	Jet	Arrivals	Day	85.3%	7.8%	0.6%	6.4%	**100.0%**
			Night	68.3%	27.3%	1.2%	3.1%	**100.0%**
		Departures	Day	69.7%	21.8%	2.0%	6.5%	**100.0%**
			Night	86.9%	9.7%	0.3%	3.1%	**100.0%**
	Non-jet	Arrivals	Day	86.8%	6.7%	0.5%	6.0%	**100.0%**
			Night	92.8%	7.2%	--	--	**100.0%**
		Departures	Day	75.2%	18.6%	1.2%	5.0%	**100.0%**
			Night	82.1%	13.7%	0.6%	3.6%	**100.0%**
		Circuits	Day	56.5%	39.2%	4.4%	--	**100.0%**
			Night	53.6%	42.8%	3.6%	--	**100.0%**
Military	Jet	Arrivals	Day	90.3%	3.0%	0.2%	6.4%	**100.0%**
			Night	96.5%	2.5%	<0.1%	0.9%	**100.0%**
		Departures	Day	87.1%	2.5%	0.3%	10.1%	**100.0%**
			Night	89.0%	1.9%	0.2%	8.9%	**100.0%**
	Non-jet	Arrivals	Day	90.3%	3.0%	0.2%	6.4%	**100.0%**
			Night	96.5%	2.5%	<0.1%	0.9%	**100.0%**
		Departures	Day	87.1%	2.5%	0.3%	10.1%	**100.0%**
			Night	89.0%	1.9%	0.2%	8.9%	**100.0%**

Note: Totals may not match exactly due to rounding

5.0 Flight Track Geometry and Use

The flight tracks for 2024 and 2029 used in the noise modeling were developed from the FlightAware data for the year of data from July 2022 to June 2023. No change in flight tracks or their usage is expected within the five-year forecast period of this project.

For civilian operations, HMMH used an industry-standard method to develop model flight tracks that entails analyzing all radar data for the Airport by splitting the flight tracks into similar and manageable groups. The standard procedure separates tracks by operation type, (i.e. arrival, departure, circuit) and runway end, aircraft type (i.e. jet, piston prop, turboprop, helicopter) and destination/direction. HMMH analyzed flight tracks with the same operation type, runway end, and destination direction for similar geometry and this resulted in the final radar track bundles used to create model tracks. Geometrically similar groups with wide dispersion have a 'backbone' track and one, two, or three 'dispersion' sub tracks on either side of the backbone, for three, five, or seven total tracks (e.g. one backbone and two, four, or six sub tracks).

Appendix A includes all model tracks in **Figure 2** through **Figure 24**. The figures include a Flight Track Analysis boundary that depicts the 30,000-ft minimum flight track depiction distance required by Part 150.[4] All model track bundles developed as part of this process and the assigned model percent usage are shown in **Table 8** through **Table 11**. The backbone and dispersion tracks are listed as one master bundle name below.

Table 8 presents the flight track use for air carrier passenger jet arrivals and departures separated by airline regions. **Table 9** presents the flight track use for air carrier cargo jet, air taxi, general aviation, and military transient jet arrivals and departures. The jet arrival flight tracks identified in **Table 8** and **Table 9** are depicted in **Figure 2** through **Figure 5**. The jet departure flight tracks identified in **Table 8** and **Table 9** are depicted in **Figure 6** through **Figure 9**.

Table 8. AEDT Modeled Itinerant Air Carrier Passenger Jet Model Flight Track Utilization

Source: FlightAware

Operation Type	Runway	Figure Number	Track Group	Air Carrier Passenger							
				United Airlines		Northeast Asia Airlines		Southeast Asia Airlines		Other Airlines	
				Day	Night	Day	Night	Day	Night	Day	Night
Arrivals	6L	Figure 2	AJ06L01	<1%	--	--	--	--	--	4%	--
			AJ06L02	82%	98%	100%	100%	100%	100%	96%	100%
			AJ06L03	3%	--	<1%	--	--	--	--	--
			AJ06L04	7%	<1%	--	--	--	--	--	--
			AJ06L05	7%	1%	--	--	--	--	--	--
	6R	Figure 3	AJ06R01	<1%	--	--	--	--	--	--	--
			AJ06R02	<1%	--	--	--	--	--	--	--
			AJ06R03	<1%	--	--	--	--	--	--	--
			AJ06R04	84%	98%	100%	100%	100%	100%	100%	100%
			AJ06R05	2%	<1%	<1%	--	--	--	--	--
			AJ06R06	4%	--	--	--	--	--	--	--
			AJ06R07	7%	2%	<1%	--	--	--	--	--

[4] 14 CFR Part 150 Section A150.103(b)(1)

Operation Type	Runway	Figure Number	Track Group	Air Carrier Passenger							
				United Airlines		Northeast Asia Airlines		Southeast Asia Airlines		Other Airlines	
				Day	Night	Day	Night	Day	Night	Day	Night
	24L	Figure 4	AJ24L01	100%	100%	100%	100%	100%	100%	100%	100%
	24R	Figure 5	AJ24R01	100%	100%	100%	100%	100%	100%	100%	100%
Departures	6L	Figure 6	DJ06L01	1%	3%	3%	12%	--	--	--	--
			DJ06L02	6%	1%	<1%	<1%	29%	70%	23%	19%
			DJ06L03	<1%	--	--	--	14%	4%	--	--
			DJ06L04	1%	<1%	<1%	<1%	36%	4%	--	--
			DJ06L05	3%	22%	<1%	<1%	--	3%	--	--
			DJ06L06	<1%	2%	<1%	--	--	7%	9%	--
			DJ06L07	3%	--	--	--	--	--	5%	6%
			DJ06L08	11%	5%	<1%	--	--	1%	18%	13%
			DJ06L09	2%	5%	2%	1%	--	--	5%	6%
			DJ06L10	6%	14%	<1%	1%	--	--	9%	13%
			DJ06L11	13%	5%	9%	8%	--	--	--	13%
			DJ06L12	6%	3%	8%	1%	--	1%	--	--
			DJ06L13	37%	36%	64%	55%	21%	9%	27%	13%
			DJ06L14	8%	5%	12%	19%	--	1%	5%	19%
	6R	Figure 7	DJ06R01	2%	3%	8%	13%	--	--	--	--
			DJ06R02	3%	1%	<1%	<1%	--	<1%	7%	--
			DJ06R03	6%	<1%	<1%	--	30%	33%	--	20%
			DJ06R04	<1%	--	<1%	1%	--	--	--	--
			DJ06R05	1%	1%	<1%	--	--	6%	7%	40%
			DJ06R06	2%	15%	<1%	<1%	30%	20%	--	--
			DJ06R07	2%	4%	<1%	--	--	18%	13%	--
			DJ06R08	9%	4%	1%	--	--	<1%	--	20%
			DJ06R09	1%	2%	<1%	--	--	--	7%	--
			DJ06R10	5%	3%	7%	2%	--	<1%	--	--
			DJ06R11	8%	9%	<1%	2%	--	<1%	27%	--
			DJ06R12	47%	40%	60%	70%	20%	12%	20%	20%
			DJ06R13	2%	3%	8%	--	--	<1%	--	--
			DJ06R14	2%	1%	<1%	--	10%	6%	--	--
			DJ06R15	<1%	2%	<1%	--	10%	2%	7%	--
			DJ06R16	10%	10%	10%	11%	--	--	13%	--
	24L	Figure 8	DJ24L01	5%	12%	1%	--	--	--	33%	50%
			DJ24L02	5%	6%	--	--	--	--	--	--
			DJ24L03	5%	1%	<1%	--	--	7%	33%	--
			DJ24L04	17%	52%	4%	--	100%	47%	33%	--
			DJ24L05	19%	10%	7%	17%	--	43%	--	50%
			DJ24L06	5%	1%	5%	8%	--	3%	--	--
			DJ24L07	16%	9%	76%	75%	--	--	--	--

Operation Type	Runway	Figure Number	Track Group	Air Carrier Passenger							
				United Airlines		Northeast Asia Airlines		Southeast Asia Airlines		Other Airlines	
				Day	Night	Day	Night	Day	Night	Day	Night
			DJ24L08	25%	4%	6%	--	--	--	--	--
			DJ24L09	3%	4%	--	--	--	--	--	--
	24R	Figure 9	DJ24R01	34%	50%	--	--	100%	93%	33%	--
			DJ24R02	17%	5%	30%	8%	--	--	--	--
			DJ24R03	17%	--	10%	17%	--	--	--	50%
			DJ24R04	17%	27%	59%	75%	--	--	--	--
			DJ24R05	5%	12%	1%	--	--	--	33%	50%
			DJ24R06	5%	6%	--	--	--	--	--	--
			DJ24R07	5%	1%	<1%	--	--	7%	33%	--

Note: Totals may not match exactly due to rounding

Table 9. AEDT modeled Itinerant Jet Model Flight Track Utilization

Source: FlightAware

Operation Type	Runway	Figure Number	Track Group	Air Carrier Cargo & Military				Air Taxi & General Aviation	
				Asia Pacific Airlines		Other Airlines & Military			
				Day	Night	Day	Night	Day	Night
Arrivals	6L	Figure 2	AJ06L01	11%	--	--	--	--	--
			AJ06L02	89%	100%	100%	100%	100%	100%
			AJ06L03	--	--	--	--	--	--
			AJ06L04	--	--	--	--	--	--
			AJ06L05	--	--	--	--	--	--
	6R	Figure 3	AJ06R01	--	--	--	--	1%	--
			AJ06R02	6%	--	--	--	--	--
			AJ06R03	6%	--	--	--	1%	--
			AJ06R04	88%	100%	100%	100%	97%	100%
			AJ06R05	<1%	--	--	--	--	--
			AJ06R06	--	--	--	--	--	--
			AJ06R07	--	--	--	--	--	--
	24L	Figure 4	AJ24L01	100%	100%	100%	100%	100%	100%
	24R	Figure 5	AJ24R01	100%	100%	100%	100%	100%	100%
Departures	6L	Figure 6	DJ06L01	--	--	4%	26%	--	--
			DJ06L02	--	--	7%	5%	13%	--
			DJ06L03	--	--	--	--	7%	--
			DJ06L04	--	--	4%	--	--	--
			DJ06L05	16%	--	2%	--	20%	--
			DJ06L06	3%	--	4%	--	7%	--
			DJ06L07	3%	50%	--	--	--	11%

Operation Type	Runway	Figure Number	Track Group	Air Carrier Cargo & Military				Air Taxi & General Aviation	
				Asia Pacific Airlines		Other Airlines & Military			
				Day	Night	Day	Night	Day	Night
			DJ06L08	31%	13%	--	5%	20%	22%
			DJ06L09	25%	38%	11%	11%	--	11%
			DJ06L10	13%	--	25%	--	27%	22%
			DJ06L11	--	--	11%	11%	--	11%
			DJ06L12	--	--	2%	--	--	--
			DJ06L13	6%	--	16%	26%	--	22%
			DJ06L14	3%	--	15%	16%	7%	--
	6R	Figure 7	DJ06R01	--	--	6%	2%	--	--
			DJ06R02	--	2%	3%	4%	--	--
			DJ06R03	<1%	2%	13%	4%	6%	--
			DJ06R04	--	--	--	--	--	5%
			DJ06R05	3%	--	--	--	--	11%
			DJ06R06	4%	--	--	--	11%	16%
			DJ06R07	7%	5%	6%	--	7%	11%
			DJ06R08	34%	19%	3%	--	26%	--
			DJ06R09	17%	14%	--	--	6%	5%
			DJ06R10	3%	--	6%	--	--	--
			DJ06R11	17%	12%	3%	--	20%	16%
			DJ06R12	3%	24%	31%	60%	17%	32%
			DJ06R13	--	--	3%	13%	--	--
			DJ06R14	<1%	5%	--	2%	1%	--
			DJ06R15	--	--	--	--	1%	--
			DJ06R16	11%	17%	25%	15%	4%	5%
	24L	Figure 8	DJ24L01	40%	67%	--	--	13%	--
			DJ24L02	32%	--	--	--	--	--
			DJ24L03	4%	--	--	--	38%	--
			DJ24L04	24%	--	--	50%	13%	100%
			DJ24L05	--	33%	67%	--	25%	--
			DJ24L06	--	--	--	--	--	--
			DJ24L07	--	--	--	50%	13%	--
			DJ24L08	--	--	33%	--	--	--
			DJ24L09	--	--	--	--	--	--
	24R	Figure 9	DJ24R01	24%	--	--	50%	13%	100%
			DJ24R02	--	--	--	--	--	--
			DJ24R03	--	33%	67%	--	25%	--
			DJ24R04	--	--	33%	50%	13%	--
			DJ24R05	40%	67%	--	--	13%	--
			DJ24R06	32%	--	--	--	--	--
			DJ24R07	4%	--	--	--	38%	--

Operation Type	Runway	Figure Number	Track Group	Air Carrier Cargo & Military				Air Taxi & General Aviation	
				Asia Pacific Airlines		Other Airlines & Military			
				Day	Night	Day	Night	Day	Night
Note: Totals may not match exactly due to rounding									

Table 10 presents the flight track use for all civilian propeller and military non-jet arrivals and departures. The arrivals flight tracks identified in **Table 10** are depicted in **Figure 10** through **Figure 13**. The departure flight tracks identified in **Table 10** are depicted in **Figure 14** through **Figure 17**.

Table 10. AEDT modeled Itinerant Non-Jet Fixed Wing Model Flight Track Utilization

Source: FlightAware

Operation Type	Runway	Figure Number	Track Group	Air Taxi		General Aviation		General Aviation Skydive Local	
				Day	Night	Day	Night	Day	Night
Arrivals	6L	Figure 10	AN06L01	--	--	1%	--	--	--
			AN06L02	6%	--	3%	50%	--	--
			AN06L03	7%	--	2%	--	--	--
			AN06L04	74%	100%	87%	50%	--	--
			AN06L05	6%	--	4%	--	--	--
			AN06L06	--	--	1%	--	--	--
			AN06L07	7%	--	<1%	--	--	--
			AN06L08	--	--	--	--	100%	100%
	6R	Figure 11	AN06R01	3%	--	2%	--	--	--
			AN06R02	11%	--	6%	50%	--	--
			AN06R03	7%	--	3%	--	--	--
			AN06R04	72%	100%	86%	50%	--	--
			AN06R05	2%	--	1%	--	--	--
			AN06R06	1%	--	2%	--	--	--
			AN06R07	2%	--	2%	--	--	--
			AN06R08	--	--	--	--	100%	100%
	24L	Figure 12	AN24L01	--	--	7%	--	--	--
			AN24L02	5%	--	4%	--	--	--
			AN24L03	27%	--	26%	--	--	--
			AN24L04	55%	--	60%	--	--	--
			AN24L05	14%	--	4%	--	--	--
			AN24L06	--	--	--	--	100%	100%
	24R	Figure 13	AN24R01	--	--	32%	--	--	--
			AN24R02	--	--	16%	--	--	--
			AN24R03	43%	--	16%	--	--	--
			AN24R04	43%	--	32%	--	--	--
			AN24R05	14%	--	4%	--	--	--
Departures	06L	Figure 14	DN06L01	2%	--	2%	--	--	--

Operation Type	Runway	Figure Number	Track Group	Air Taxi		General Aviation		General Aviation Skydive Local	
				Day	Night	Day	Night	Day	Night
			DN06L02	16%	--	9%	--	--	--
			DN06L03	7%	--	3%	--	--	--
			DN06L04	74%	100%	45%	100%	--	--
			DN06L05	2%	--	42%	--	--	--
			DN06L06	--	--	--	--	69%	82%
			DN06L07	--	--	--	--	31%	18%
	06R	Figure 15	DN06R01	--	--	<1%	--	--	--
			DN06R02	--	--	<1%	--	--	--
			DN06R03	5%	50%	3%	2%	--	--
			DN06R04	7%	--	5%	2%	--	--
			DN06R05	20%	--	11%	3%	--	--
			DN06R06	64%	50%	53%	24%	--	--
			DN06R07	<1%	--	<1%	--	--	--
			DN06R08	4%	--	19%	55%	--	--
			DN06R09	--	--	8%	15%	--	--
			DN06R10	--	--	--	--	67%	88%
			DN06R11	--	--	--	--	33%	12%
	24L	Figure 16	DN24L01	11%	--	11%	33%	--	--
			DN24L02	11%	--	3%	--	--	--
			DN24L03	6%	--	9%	33%	--	--
			DN24L04	39%	--	25%	--	--	--
			DN24L05	33%	--	49%	33%	50%	67%
			DN24L06	--	--	3%	--	--	--
			DN24L07	--	--	--	--	50%	33%
	24R	Figure 17	DN24R01	89%	--	--	33%	--	--
			DN24R02	--	--	86%	33%	--	--
			DN24R03	11%	--	11%	33%	--	--
			DN24R04	--	--	3%	--	--	--

Note: Totals may not match exactly due to rounding

Table 11 presents the flight track use for all civilian local circuits which were modeled in AEDT. The Japan Airlines circuit tracks are shown in **Figure 18** and **Figure 19**. The remaining non-jet circuit tracks identified in **Table 11** are depicted in **Figure 20** through **Figure 22**.

Table 11. AEDT Modeled Local Fixed-Wing Model Flight Track Utilization

Source: FlightAware

Operation Type	Runway	Figure Number	Track Group	Air Carrier Japan Airlines		General Aviation	
				Day	Night	Day	Night
Circuits	6L	Figure 18	CJ06L01	100%	--	--	--
		Figure 20	CN06L01	--	--	100%	100%
	6R	Figure 21	CN06R01	--	--	55%	85%
			CN06R02	--	--	45%	15%
	24L	Figure 22	CN24L01	--	--	35%	--
			CN24L02	--	--	43%	--
			CN24L03	--	--	22%	100%
	24R	Figure 19	CJ24R01	100%	--	--	--
Note: Totals may not match exactly due to rounding							

6.0 Meteorological Conditions

AEDT has several settings that affect aircraft performance profiles and sound propagation based on meteorological data. Meteorological settings include average annual temperature, barometric pressure, and relative humidity at the airport. AEDT holds the following default values for annual average weather conditions at the Airport and these values will be used for all noise modeling:

- Temperature: 81.82° F
- Sea-level Pressure: 1010.43 millibars
- Relative Humidity 80.92%
- Dew Point: 75.36° F
- Wind Speed: 8.84 Knots

7.0 Terrain Data

Terrain data describes the elevation of the ground surrounding the airport and on airport property. AEDT uses terrain data to adjust the ground level under the flight paths. The terrain data does not change the aircraft's performance or noise levels but alters the vertical distance between the aircraft and a "receiver" on the ground. This affects assumptions about how noise propagates over ground. HMMH obtained the terrain data from the United States Geological Survey (USGS) National Elevation Dataset with one-third arc second (approximately 33 feet) resolution. Terrain data was utilized in conjunction with the terrain features of the AEDT to generate the noise contours for the existing condition.

APPENDIX A. FLIGHT TRACK FIGURES

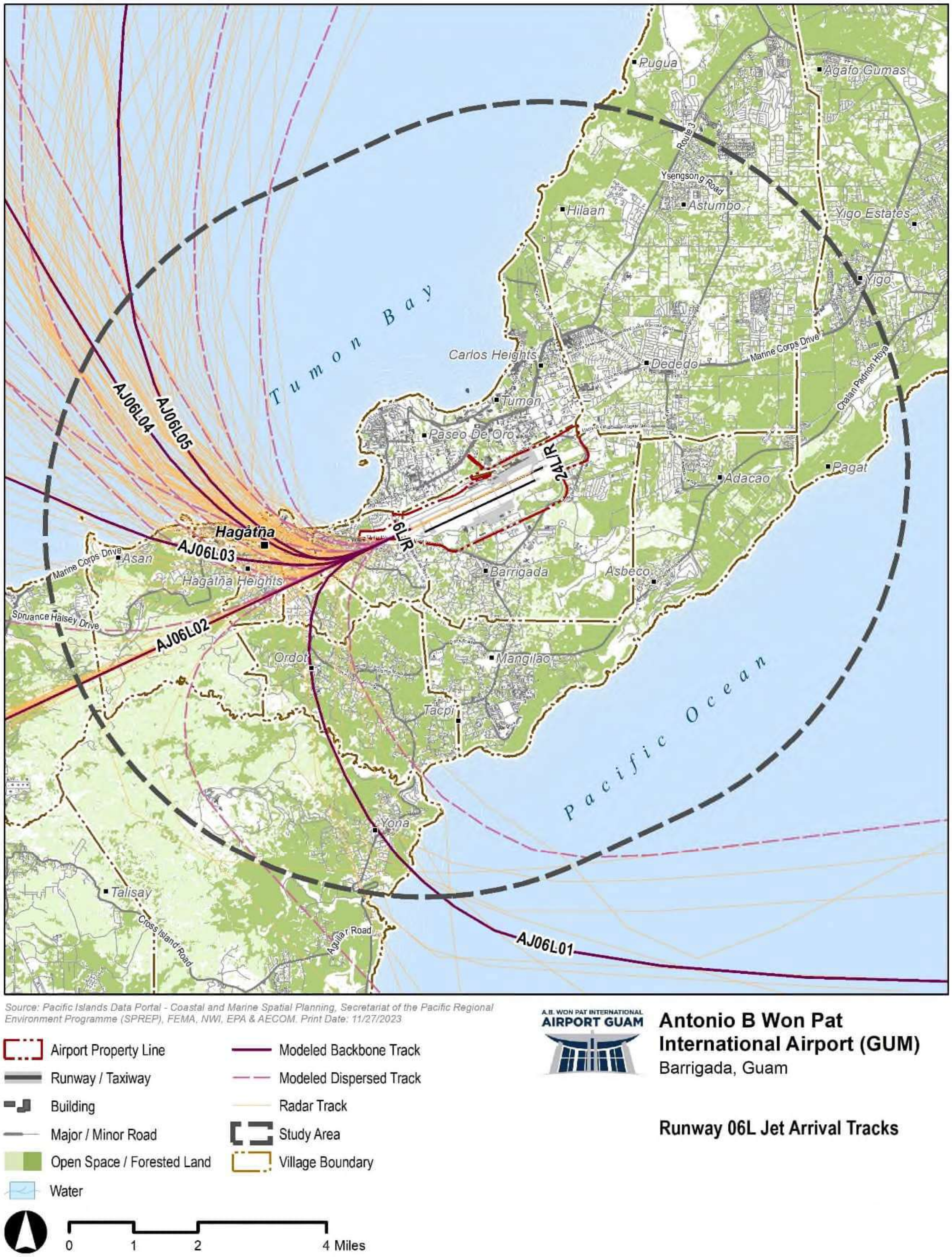


Figure 2. Runway 6L Jet Arrival Flight Tracks

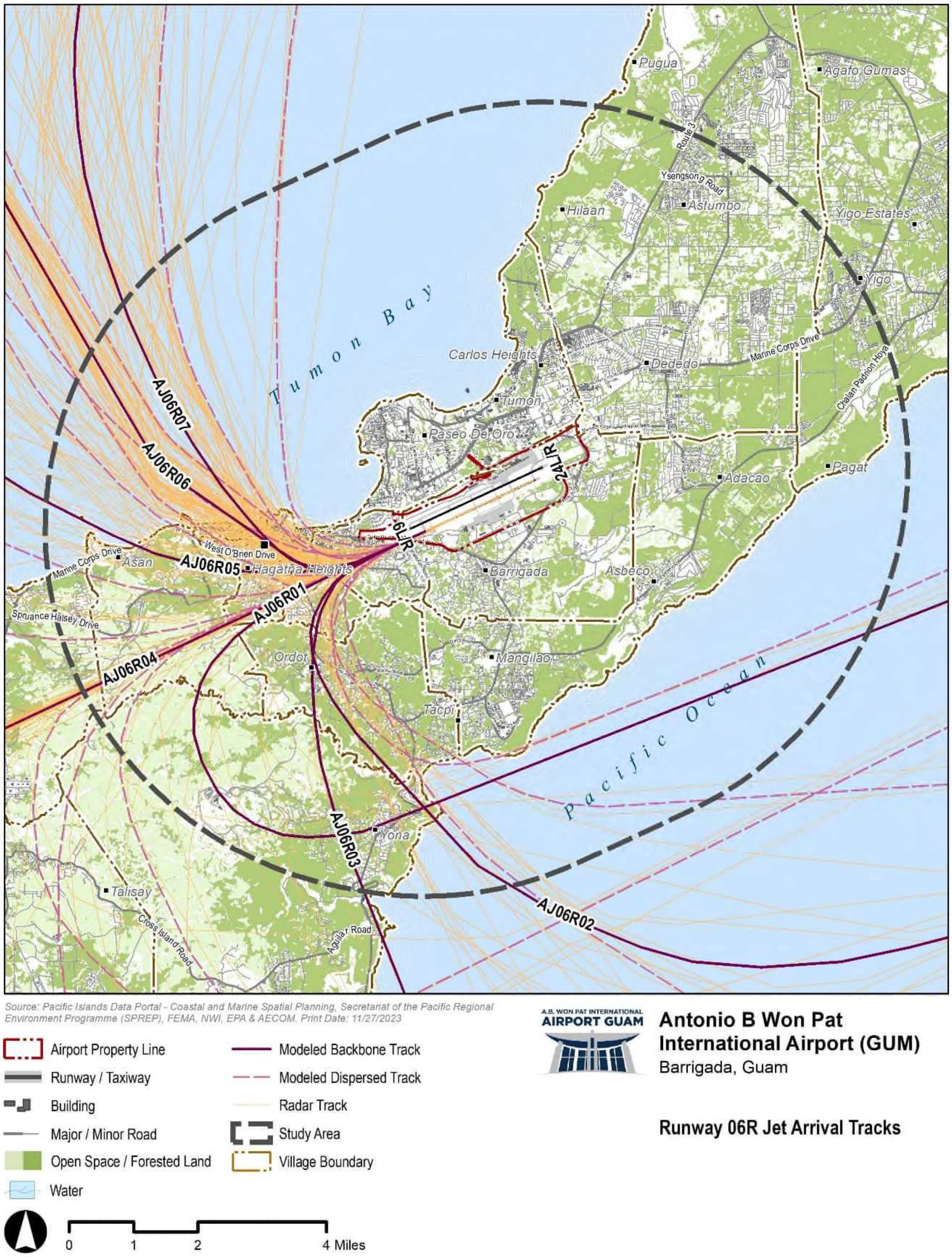


Figure 3. Runway 6R Jet Arrival Flight Tracks

Figure 4. Runway 24L Jet Arrival Flight Tracks

Figure 5. Runway 24R Jet Arrival Flight Tracks

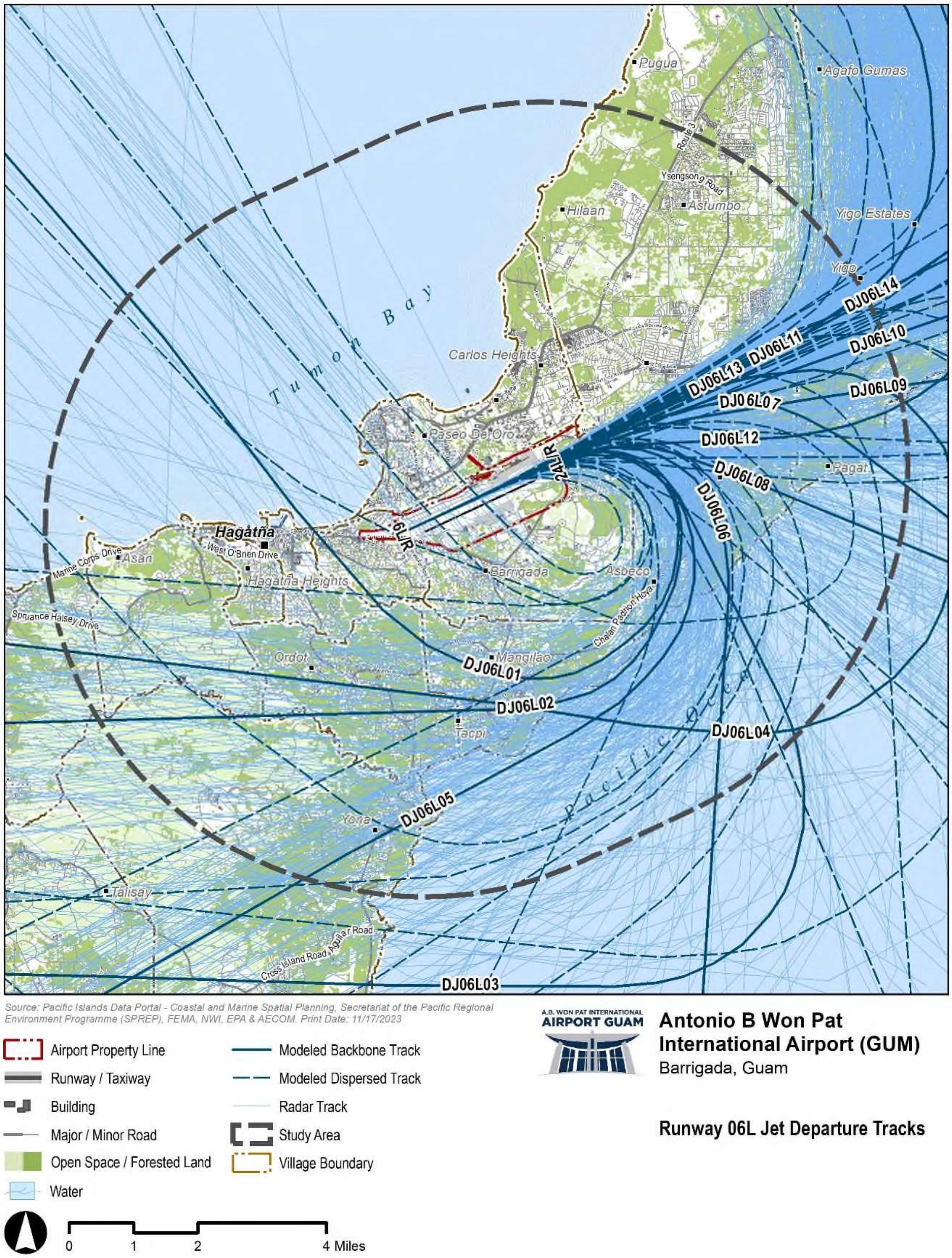


Figure 6. Runway 6L Jet Departure Flight Tracks

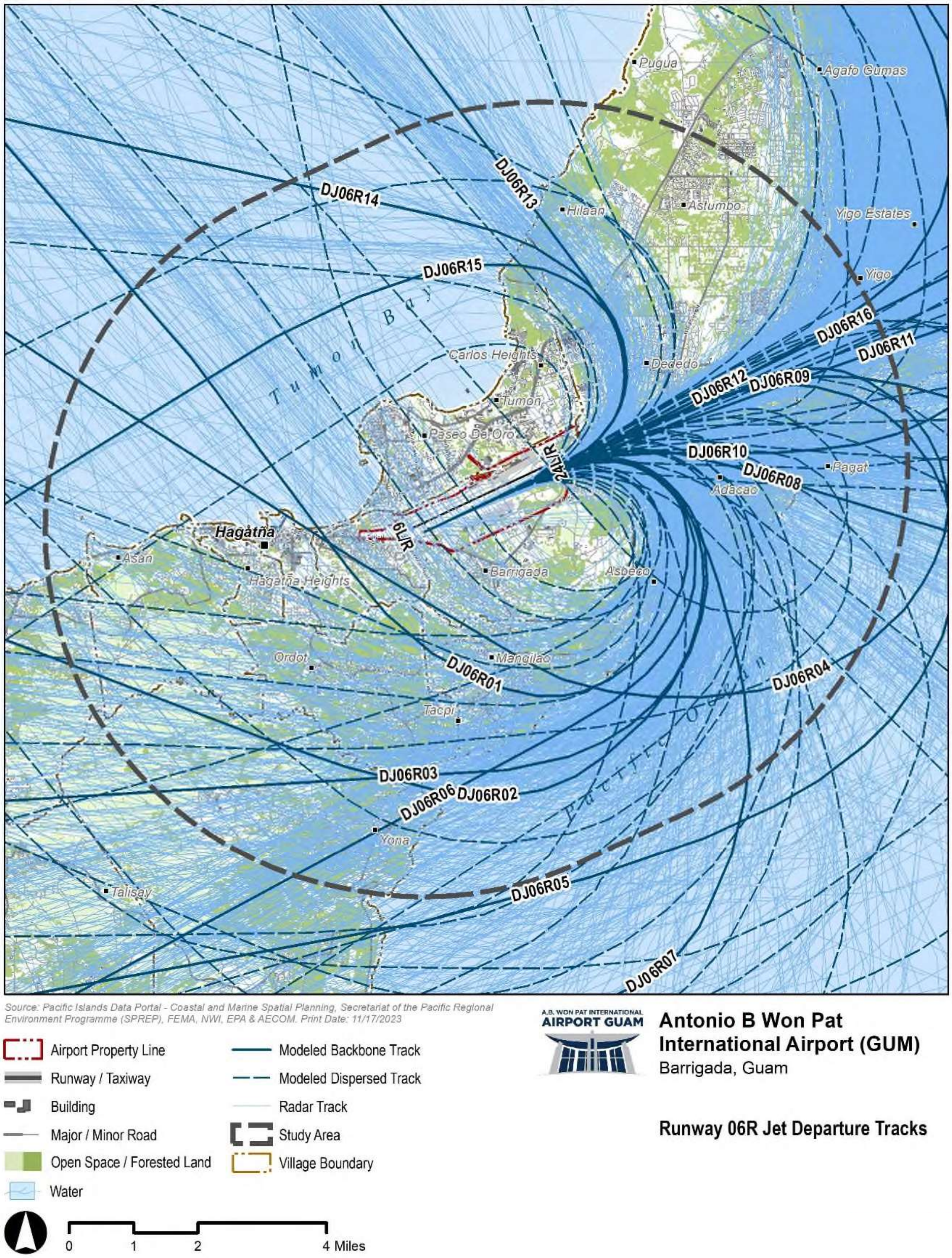


Figure 7. Runway 6R Jet Departure Flight Tracks

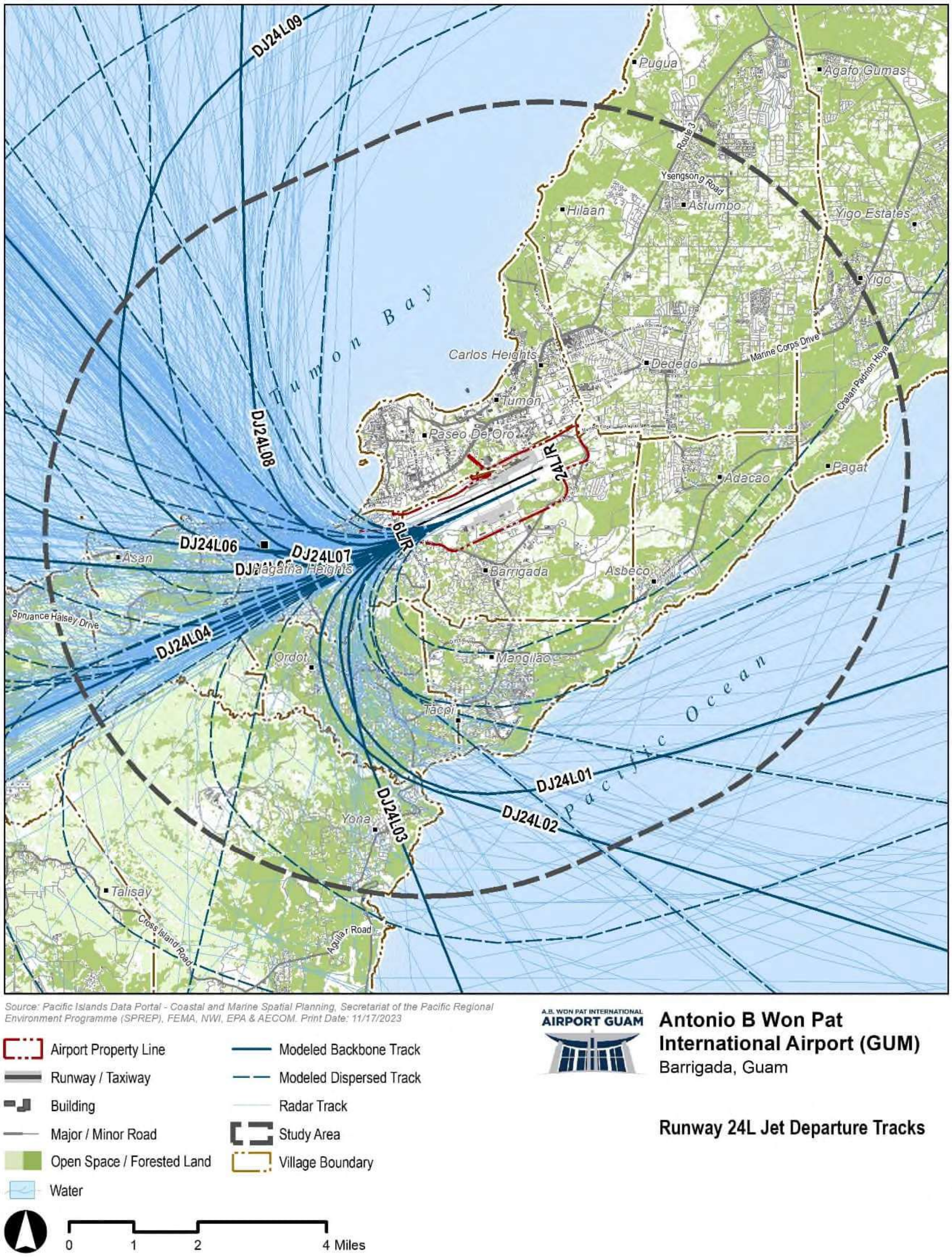


Figure 8. Runway 24L Jet Departure Flight Tracks

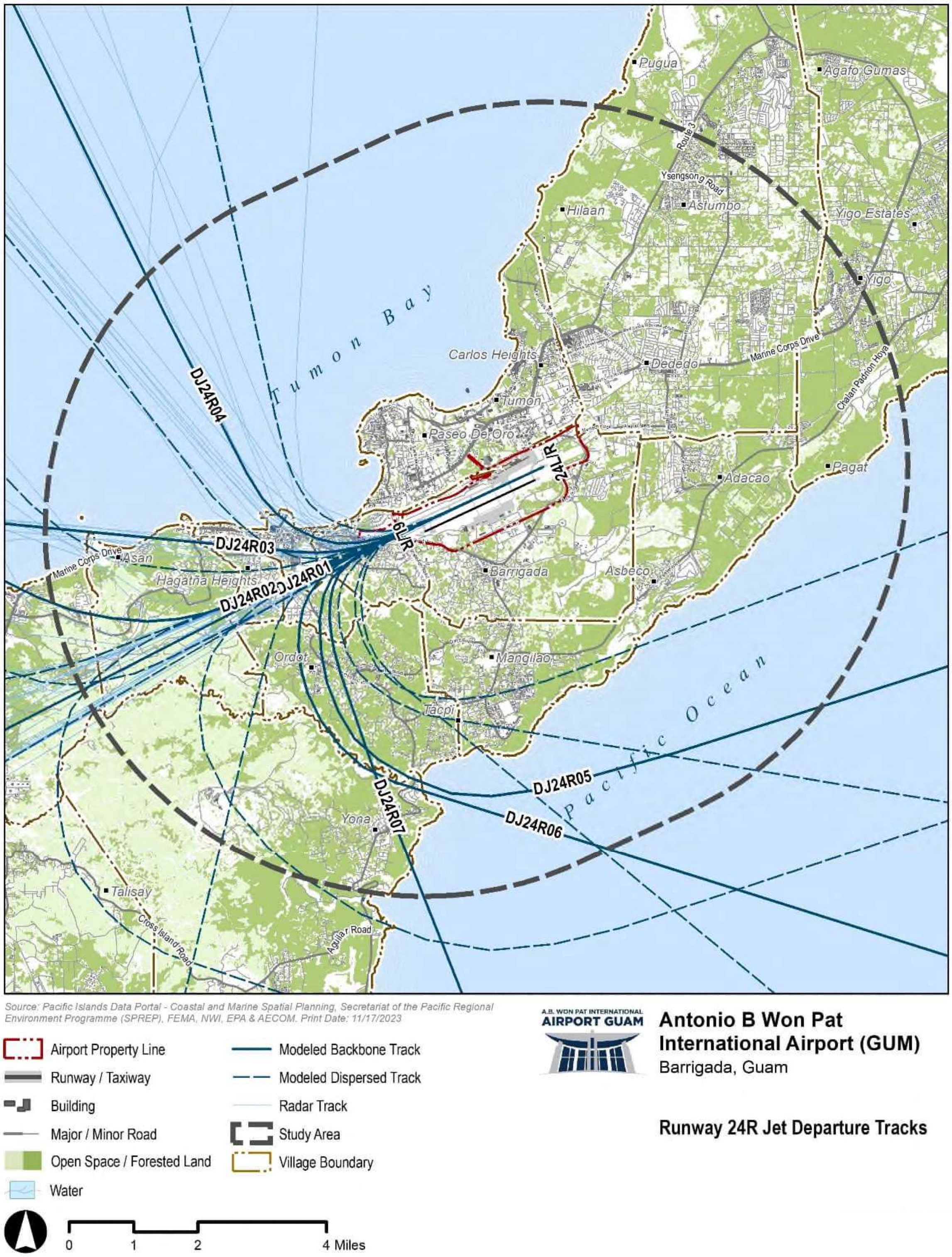


Figure 9. Runway 24R Jet Departure Flight Tracks

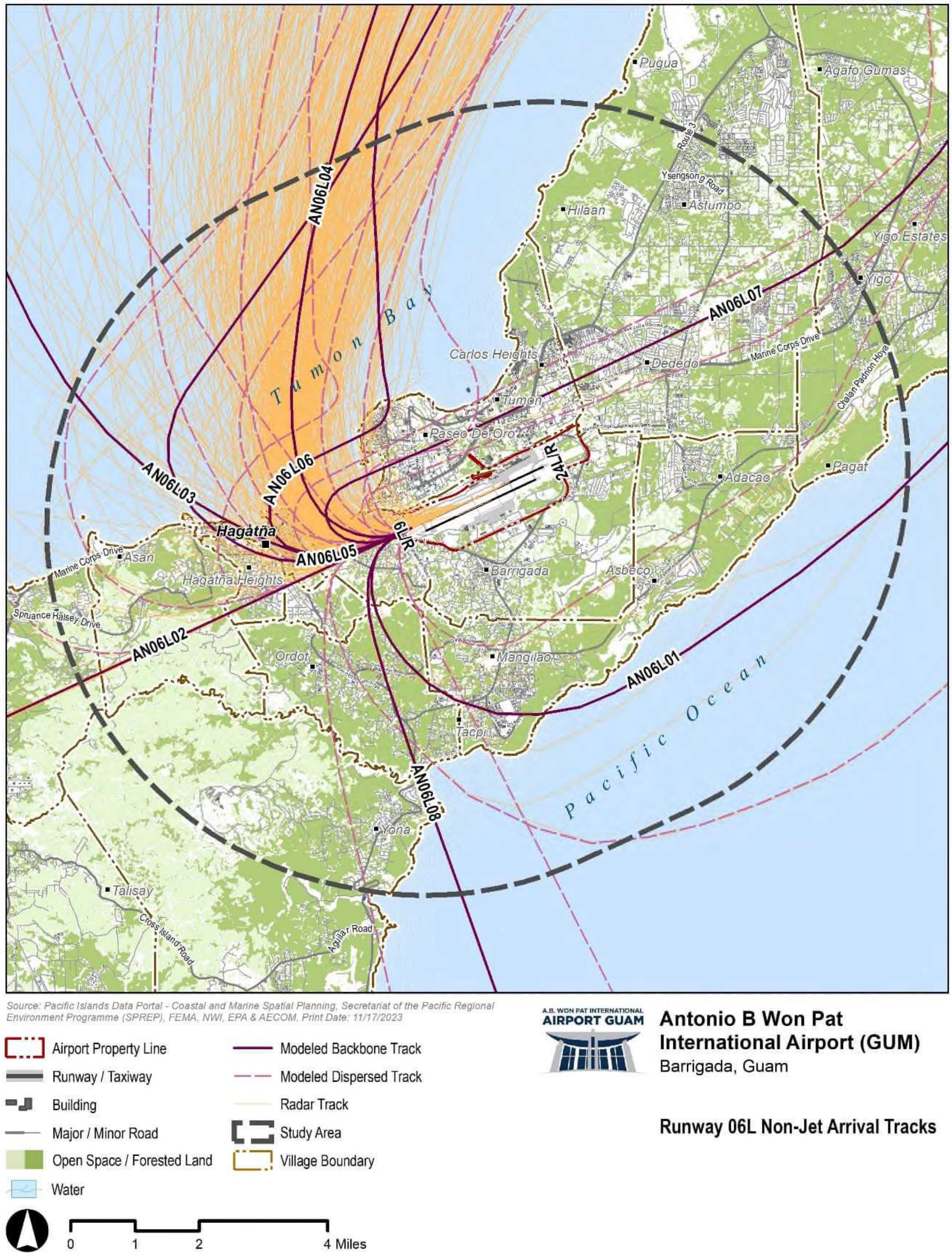


Figure 10. Runway 6L Non-Jet Arrival Flight Tracks

Figure 11. Runway 6R Non-Jet Arrival Flight Tracks

Figure 12. Runway 24L Non-Jet Arrival Flight Tracks

Figure 13. Runway 24R Non-Jet Arrival Flight Tracks

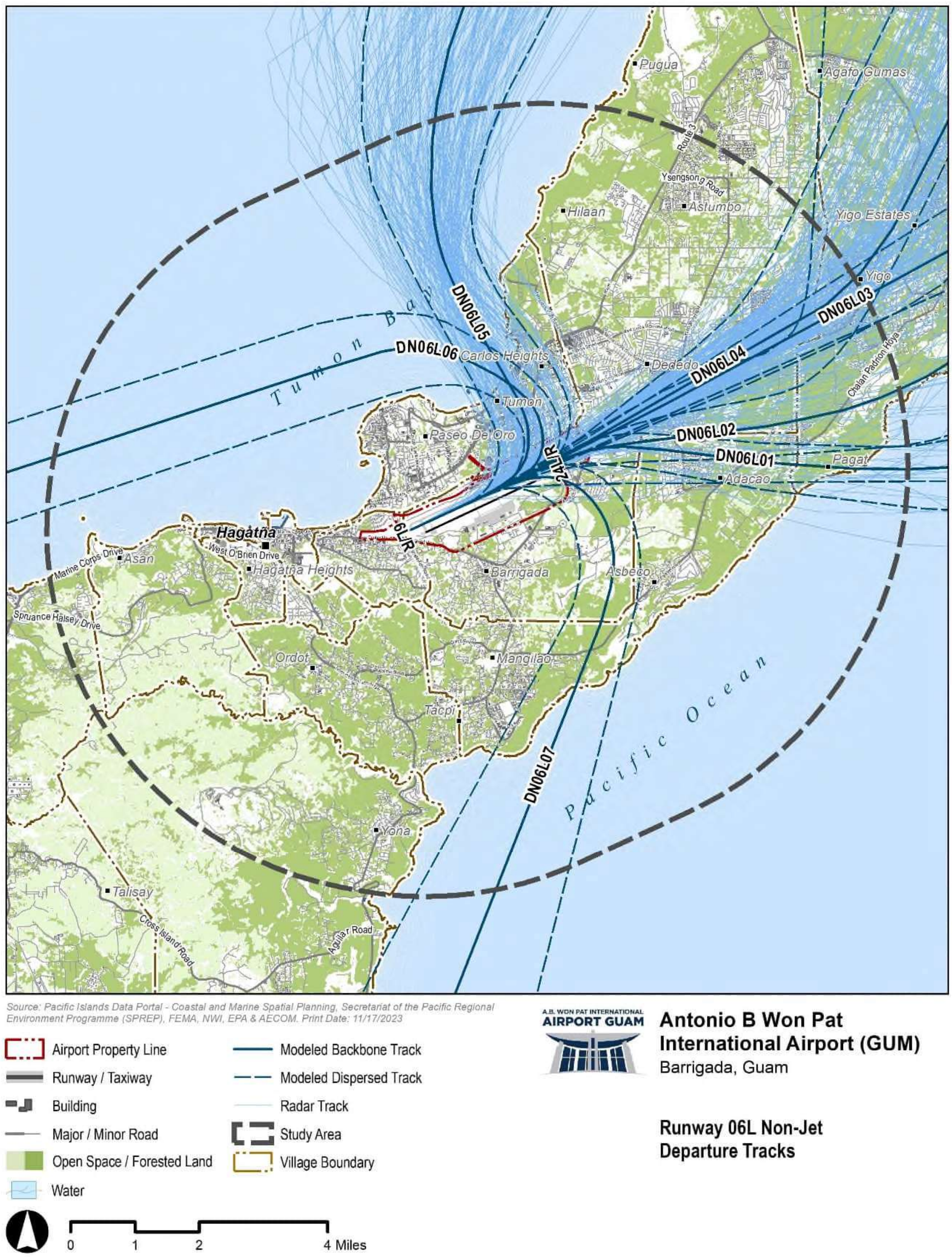


Figure 14. Runway 6L Non-Jet Departure Flight Tracks

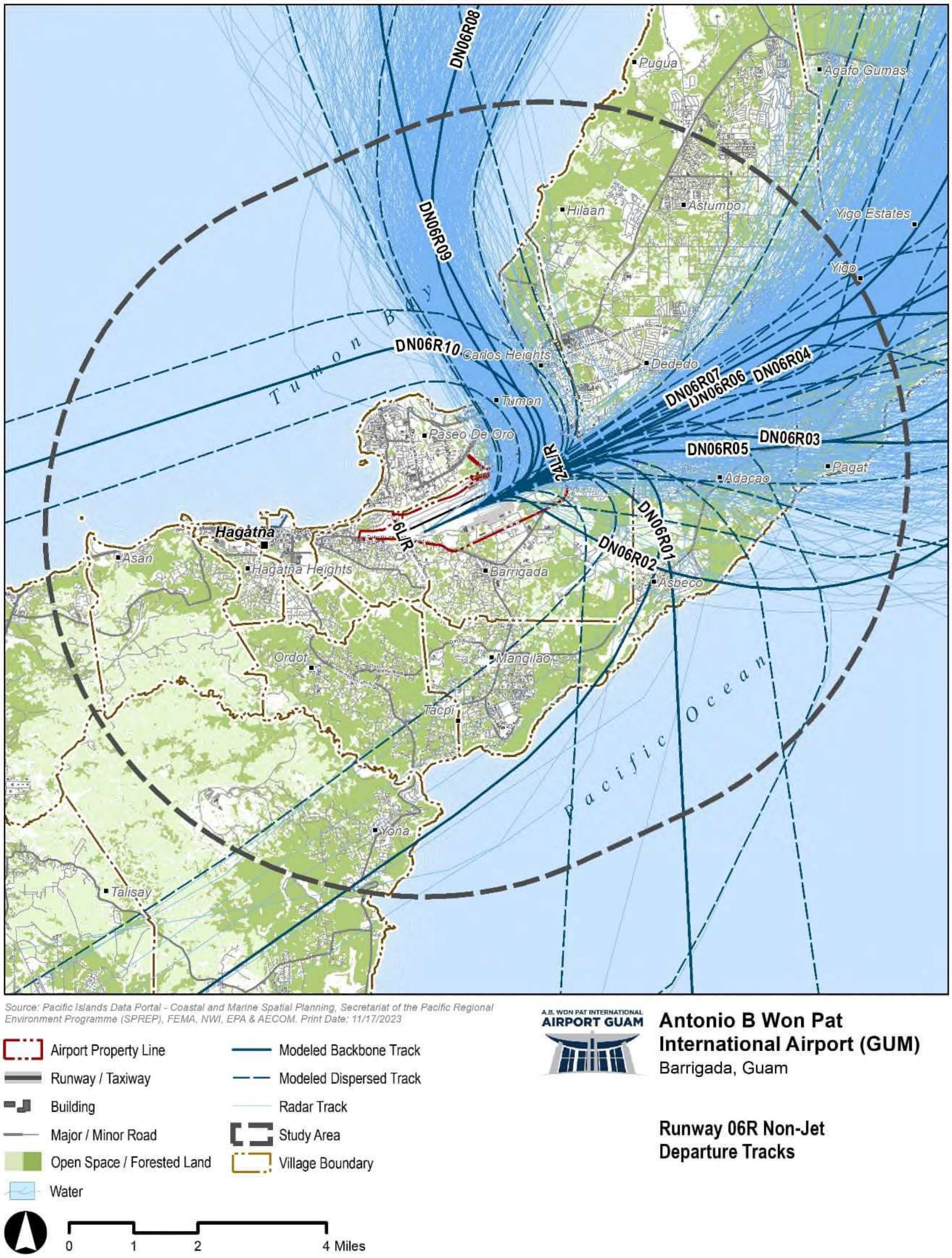


Figure 15. Runway 6R Non-Jet Departure Flight Tracks

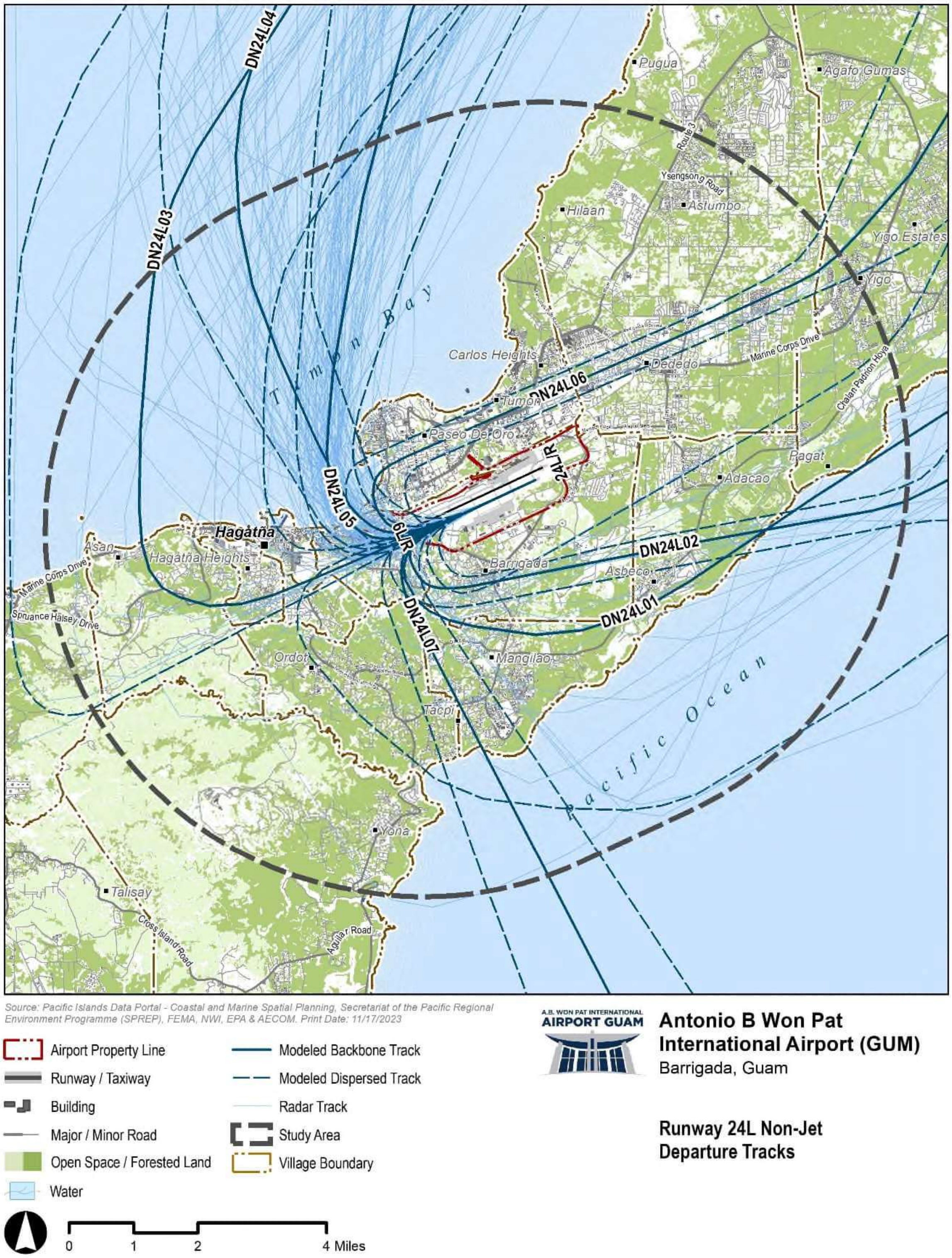


Figure 16. Runway 24L Non-Jet Departure Flight Tracks

Figure 17. Runway 24R Non-Jet Departure Flight Tracks

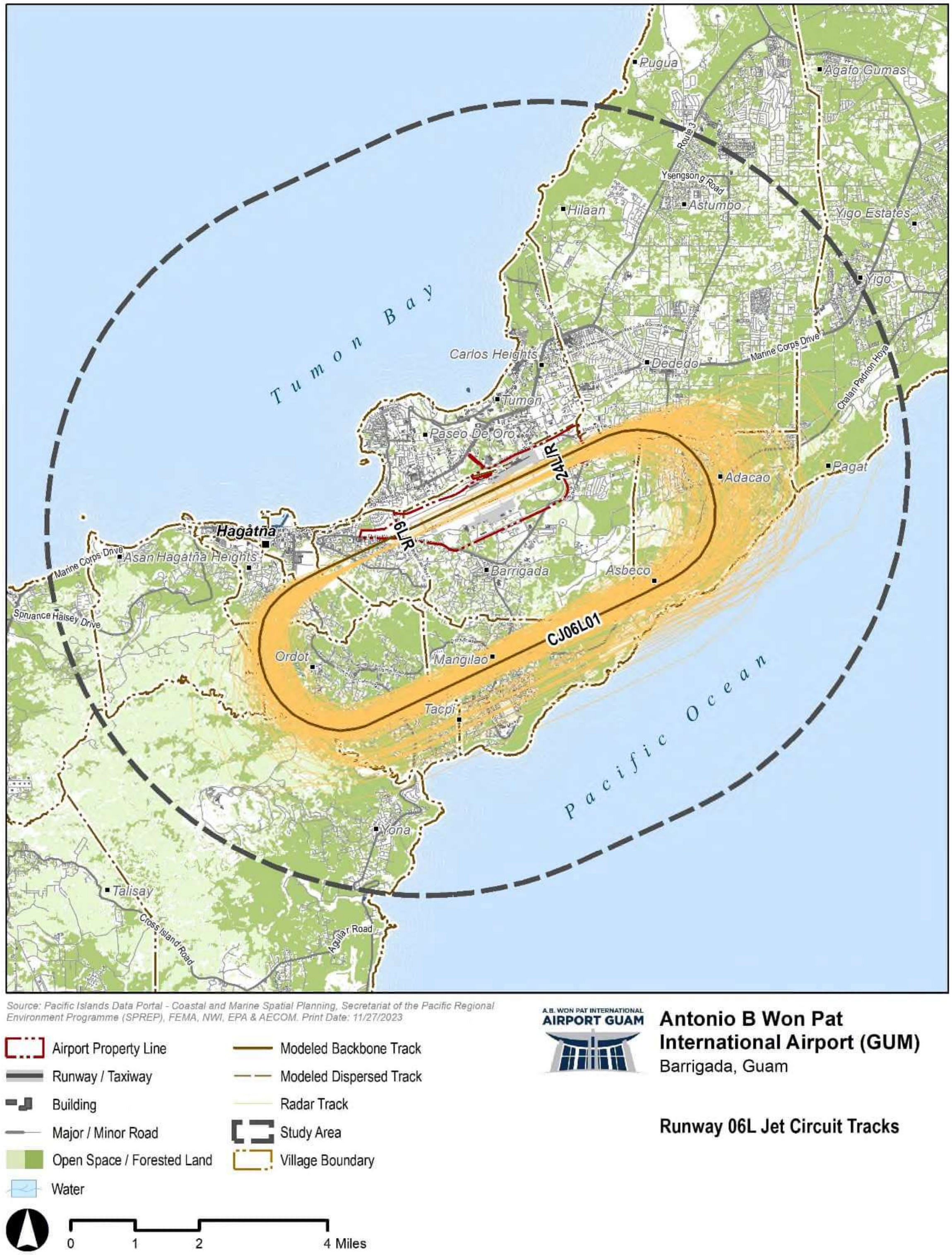


Figure 18. Runway 6L Jet Circuit Flight Tracks

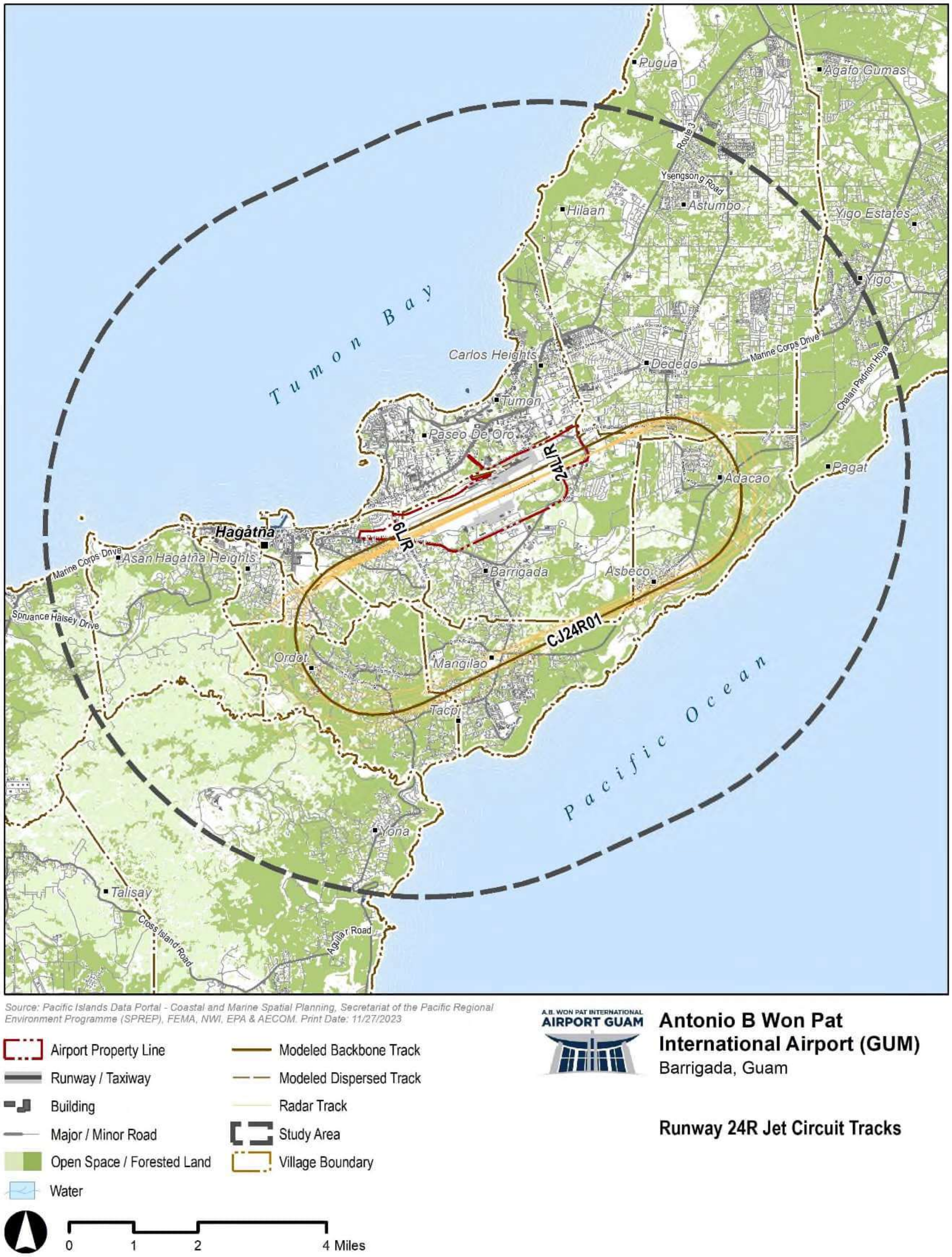


Figure 19. Runway 24R Jet Circuit Flight Tracks

Figure 20. Runway 6L Non-Jet Circuit Flight Tracks

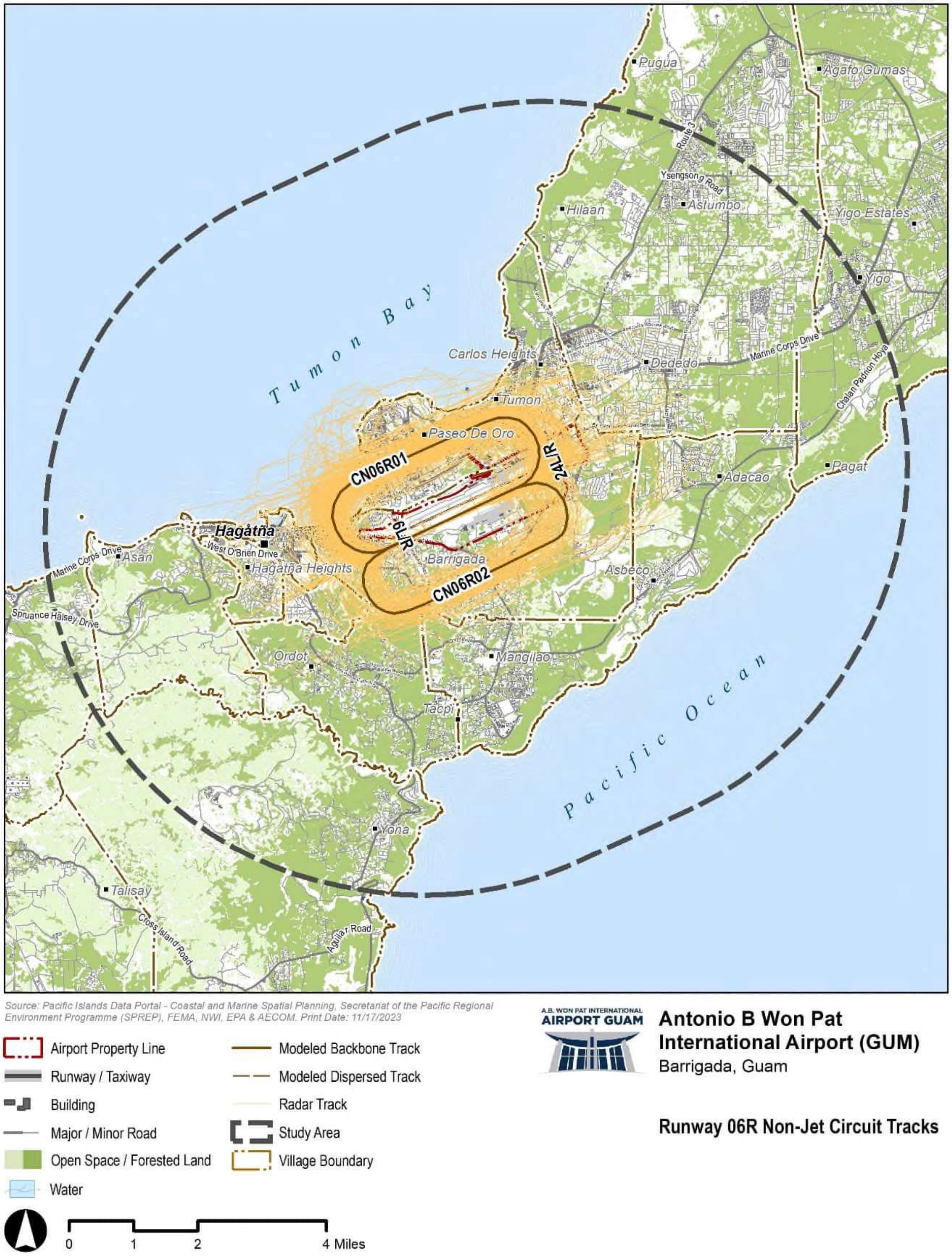


Figure 21. Runway 6R Non-Jet Circuit Flight Tracks

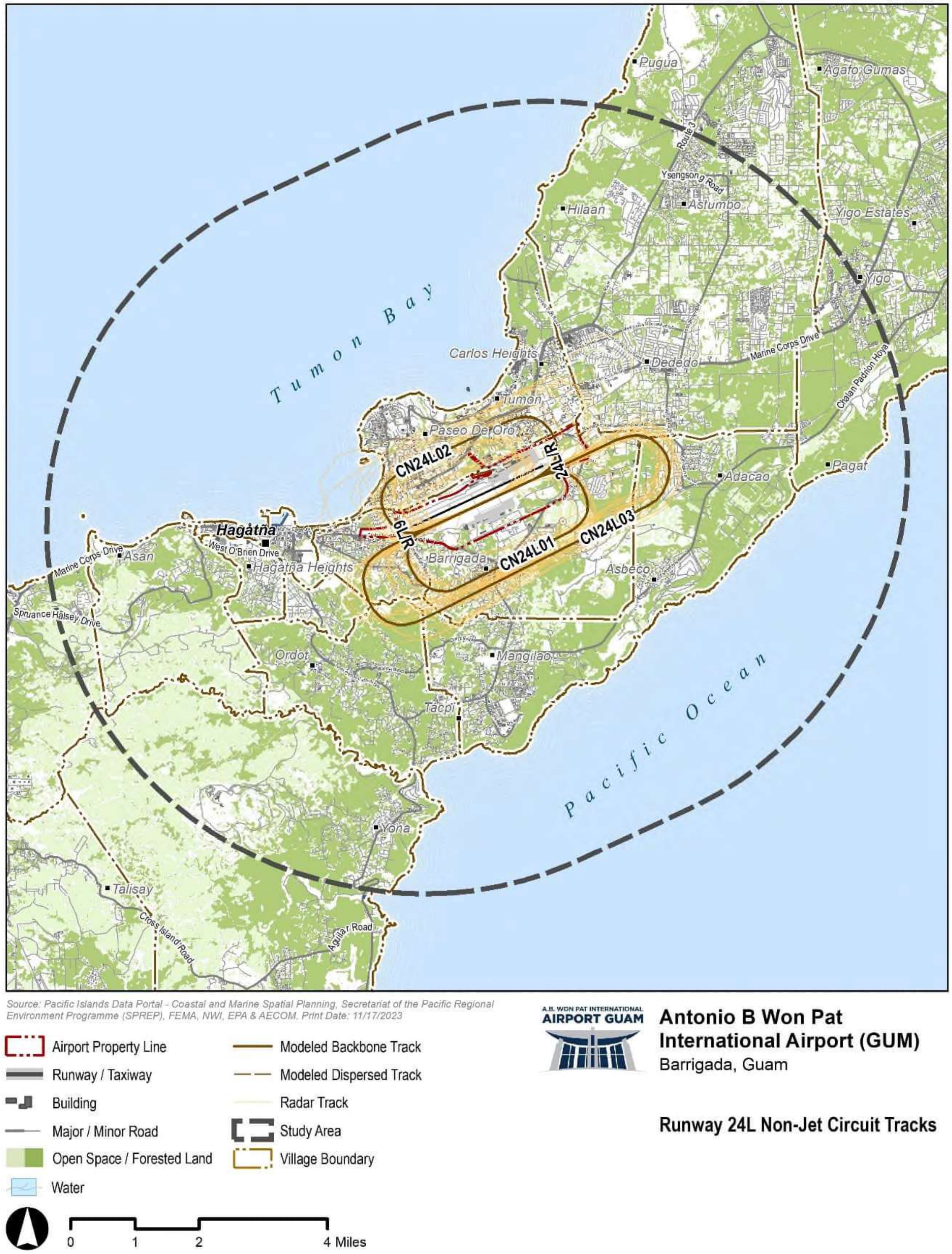


Figure 22. Runway 24L Non-Jet Circuit Flight Tracks