MARYLAND DEPARTMENT OF TRANSPORTATION

MARYLAND AVIATION ADMINISTRATION

2025 Airport Noise Zone Update

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2025 Airport Noise Zone Update

Martin State Airport

December 2025

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Executive Summary

Introduction

Martin State Airport (MTN), located in Middle River, Maryland, is owned by the State of Maryland and operated by the Maryland Department of Transportation Maryland Aviation Administration (MAA). Maryland law (the Maryland Environmental Noise Act of 1974) requires the protection of citizens from the impact of transportation-related noise. MAA is required to develop and certify an Airport Noise Zone (ANZ), assess the noise environment, and assist in preventing incompatible development around the airport.

Maryland law also requires the MAA to regularly update the ANZ for MTN, in order to ensure it remains an accurate representation of noise conditions at the airport. Updating the ANZ is necessary because factors such as the number of aircraft, operations, aircraft types, and flight paths may change over time, potentially altering overall noise exposure. Updating the ANZ involves studying airport noise and developing noise contours for both existing and future conditions at MTN, which are necessary for local land use planning.

This ANZ update also includes a review of the MTN Noise Abatement Plan (NAP). If an incompatible land use area falls within the ANZ, MTN is required to implement an NAP. While no incompatible land uses currently exist within MTN's noise zone, the airport has adopted an NAP in the past and will continue to review and update the plan as needed. The NAP prescribes measures to monitor and reduce or eliminate incompatible land use to the extent feasible, while maintaining efficient airport operations.

This ANZ update provides the MAA and MTN stakeholders including Baltimore County and surrounding communities with improved understanding of current and future noise conditions at the airport. The ANZ provides a means for the MAA to identify, control, and prevent incompatible land development around the airport.

Public Engagement

The ANZ update process includes multiple public consultation efforts to ensure that MTN stakeholder input and review is reflected in the resulting ANZ contour and NAP documentation. This public involvement component included two major initiatives: (1) voluntarily forming and convening a Stakeholder Advisory Committee (SAC) and (2) conducting a public workshop and hearing.

The SAC convened representatives of stakeholder groups affected by airport activities to ensure that these groups were informed of the 2025 MTN ANZ update process and methodology. Members were invited to participate throughout the process by reviewing study inputs, assumptions, analyses, and documentation, and by providing input and guidance related to the NAP. They were also encouraged to share relevant information with the groups or individuals they represent. The SAC was composed of stakeholders representing all significant interests at MTN:

- Local government planning staff
- Community organizations
- MTN tenants and users
- Aviation trade associations

The SAC convened three times during the ANZ update process and served in an advisory role to the MAA solely for the duration of the MTN ANZ update process.

As required by Maryland law, a public workshop and hearing will be held concerning the 2025 MTN ANZ on March 18, 2026. The public workshop and hearing will afford all interested persons with an opportunity to comment on the proposed update to the MTN ANZ and NAP.

Airport Noise Zone

The ANZ is an area specified by noise level contours in terms of the Day-Night Average Sound Levels, abbreviated DNL or L_{dn}. The study process considered existing conditions in 2025 (also referred to as the base year) and forecast conditions in 2030 and 2035.

This 2025 MTN ANZ document includes the DNL noise contours for the following three conditions:

1. Base year 2025 conditions utilizing the current runway layout
2. Forecast conditions for year 2030, five years post certification, reflecting the updated runway layout as outlined in the MTN Airport Layout Plan (ALP)[1]
3. Forecast conditions for year 2035, ten years post certification, reflecting the updated runway layout as outlined in the MTN ALP

The ANZ, as shown in **Figure ES-1**, is a composite of the three contours described above. The 2025 ANZ represents the largest extent of the annual DNL contours for each of the three study years (2025, 2030 and 2035) and is defined to provide the largest area of the existing or future noise exposure contours for planning purposes. The noise contours are presented in 5-decibel increments, from 65 dB to 75 dB.

The 65 dB DNL contour for the 2025 ANZ is 286 acres in size and remains almost entirely on airport property (approximately 98 percent). This represents a 30 percent decrease from the 411 acres contained within the previous 2020 ANZ. This decrease is attributed in part to reduced military operations as well as refined and updated military procedures. The 2025 ANZ does not include any noise-sensitive land uses (such as residential or educational). The 2025 ANZ noise contour extends beyond airport property over compatible land uses in four areas:

- An area on the northeast side of the airport off of Runway 15 due to military maintenance run-ups of A-10C aircraft on the Maryland Air National Guard (MDANG) ramp area.
- An area on the southwest side of the airport off of Runway 15 due to helicopter activity at the Baltimore City Police helipad.
- An area on the northeast side of the airport off of Runway 33 due to military pre-flight run-ups of A-10C aircraft.
- An area to the southwest side of the airport off of Runway 33 due to fixed wing arrival operations but dominated by helicopter activity at the Maryland State Police helipad.

[1] Maryland Aviation Administration. (2022). *Notice of Availability of Final Environmental Assessment (EA) and Finding of No Significant Impact / Record of Decision (FONSI/ROD) for Phase I Improvements at Martin State Airport*. https://marylandaviation.com/environmental/environmental-planning/

The base year contour largely defines the extent of the 2025 ANZ contour due to the A-10C operational levels. However, since the MDANG will divest the A-10C aircraft in 2025, no A-10C operations are expected under future conditions.

Noise Abatement Plan

The MAA has a long history of noise abatement at MTN. The NAP is designed to minimize the noise of aircraft operations within the constraints of the Federal Air Traffic Control System and ensure aircraft safety. The NAP was developed with the cooperation of MDANG, airport users, the aviation industry, and local governments.[2]

The NAP is formulated to minimize noise disturbance to neighboring communities while maintaining safe and efficient MTN Airport operations. The NAP is comprised of two parts: (1) the efforts the MAA is taking to mitigate noise in the areas surrounding MTN, and (2) aircraft operating procedures.

The MAA Division of MTN Airport Operations is responsible for the overall administration of the MTN NAP. Per COMAR Section 11.03.02.10C(3)(b), the MDANG, the Maryland State Police, and local law enforcement agencies are exempt from the provisions of this regulation when operational necessity dictates noncompliance, or in the event of a State or national emergency. As part of this study, the NAP was reviewed to determine the continued applicability of existing measures. No new measures were added.

[2] The MTN NAP is established pursuant to the Maryland Environmental Noise Act of 1974 (Transportation Article, §§ 5-805, 5-806, and 5-819, Annotated Code of Maryland) and COMAR Section 11.03.02.10. http://mdrules.elaws.us/comar/11.03.02.10

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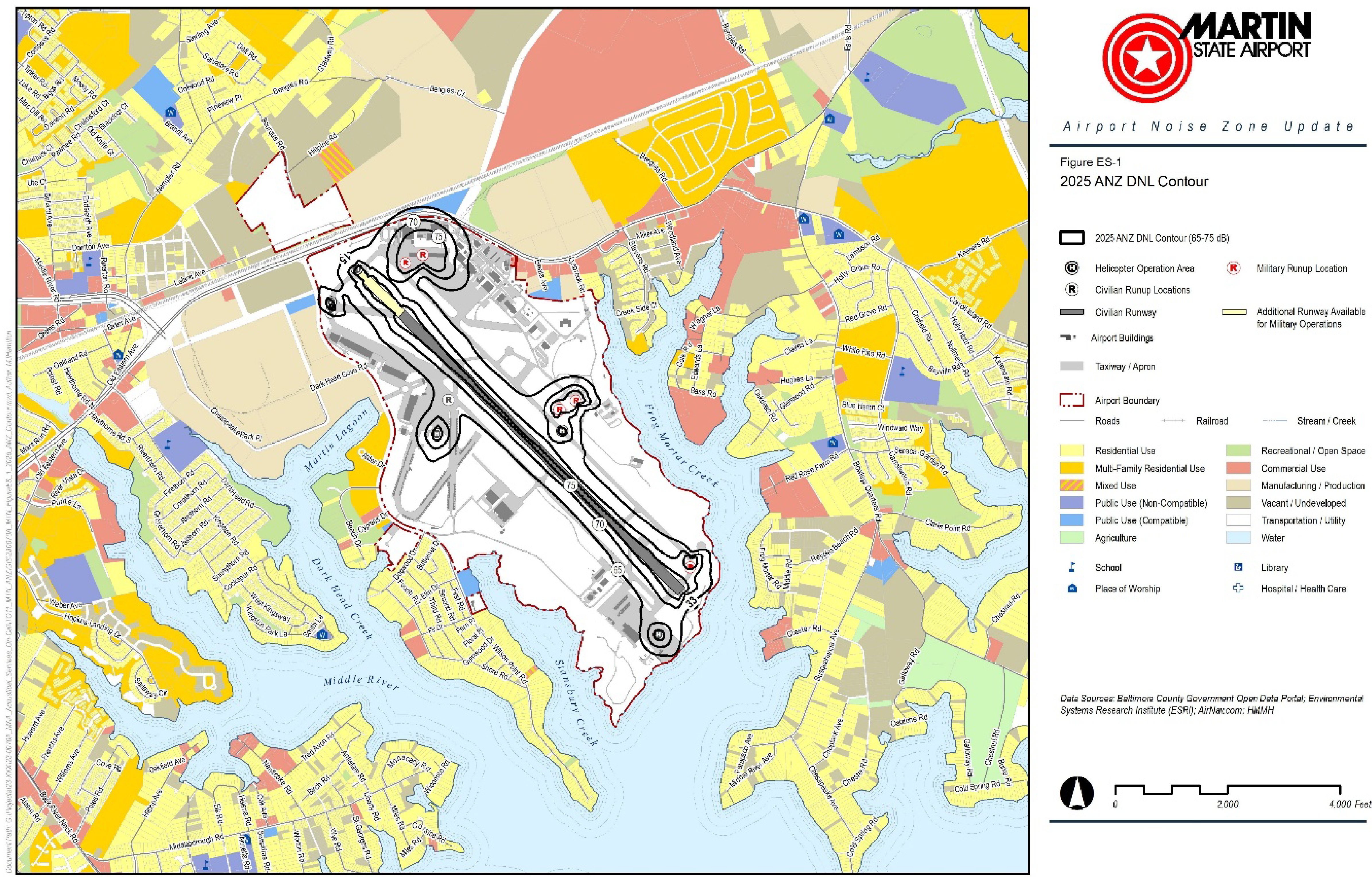
Figure ES-1. 2025 ANZ DNL Contour



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Acronyms

AAD	Average Annual Day
AEDT	Aviation Environmental Design Tool
AGL	Above Ground Level
ALP	Airport Layout Plan
ANOMS	Airport Noise and Operations Monitoring System
ANZ	Airport Noise Zone
ATADS	Air Traffic Activity Data System
ATC	Air Traffic Control
BAZA	Board of Airport Zoning Appeals
COMAR	Code of Maryland Regulations
dB	Decibel
dBA	A-Weighted Decibel
DNL/L_{dn}	Day-Night Average Sound Level
FAA	Federal Aviation Administration
GIS	Geographic Information System
HMMH	Harris Miller Miller & Hanson Inc.
IFR	Instrument Flight Rules
LOA	Letter of Agreement
MAA	Maryland Department of Transportation Maryland Aviation Administration
MDANG	Maryland Air National Guard
MTN	Martin State Airport
MSL	Mean Sea Level
NAD 83	North American Datum 1983
NAP	Noise Abatement Plan
nmi	Nautical Miles
SAC	Stakeholder Advisory Committee
SEL	Sound Exposure Level
TAF	Terminal Area Forecast
USGS	United States Geological Survey
VFR	Visual Flight Rules

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1. Introduction and Background

Maryland law requires the protection of citizens from the impact of transportation-related noise. To meet this requirement, the Maryland Department of Transportation Maryland Aviation Administration (MAA) must adopt an Airport Noise Zone (ANZ) that both minimizes the impact of aircraft noise on residents near Martin State Airport (MTN) and prevents incompatible land development around the airport.

The noise analysis conducted for the ANZ study provides the MAA, MTN stakeholders, and surrounding communities with a better understanding of current and future noise conditions at the airport. The ANZ serves as a tool for the MAA to identify, control, and prevent incompatible land development around the airport. It also guides the Noise Abatement Plan (NAP), which prescribes measures to monitor and reduce or eliminate impacted land use areas to the extent feasible, while maintaining efficient airport operations.

The State of Maryland uses the Day-Night Average Sound Level, abbreviated DNL or L_{dn}, as the measure of cumulative noise exposure required to develop an ANZ.[3] The ANZ, as defined by Maryland regulation, represents a composite of the 65, 70, and 75 DNL noise level contours for three study years: the base year, five-year, and ten-year forecast contours. The 2025 ANZ, as presented in this document, represents the largest extent of the annual DNL contours for all three years included in this study (2025, 2030, and 2035).

The resulting ANZ designates the greatest extent of the existing and/or future noise exposure contours overprinted on county tax maps, to be utilized for land-use planning purposes. Maryland law requires the MAA to regularly update the ANZ for MTN, in order to ensure it remains an accurate representation of noise conditions at the airport. The ANZ was last updated in 2020 and certified in 2021. Once certified, the ANZ represents composite noise contours at specified levels of exposure intended to control incompatible land development around MTN. Maryland law dictates that an applicant be denied approval if a proposed development is found to be incompatible with the ANZ. An applicant may petition the Board of Airport Zoning Appeals (BAZA) for a variance from the regulations. BAZA may issue conditions such as the addition of sound insulation components to buildings within the certified ANZ.

The MAA retained Harris Miller Miller & Hanson Inc. (HMMH) to support the Office of Environmental Compliance and Sustainability in preparing the 2025 MTN ANZ document. In coordination and collaboration with the MAA, HMMH designed and conducted the public participation program, developed the noise contours, compiled the composite ANZ contour, conducted a land-use inventory, reviewed and updated the NAP, and prepared ANZ documentation.

Section 2 of this report describes the methodology used in modeling the noise contours. Section 3 describes the inputs to the noise model in detail for the base year and forecast years. Section 4 presents DNL contours for the base year and forecast years, and finally the composite 2025 MTN ANZ contour and land use inventory. Section 5 presents the MTN NAP. Section 6 presents the public consultation efforts that the

[3] For the purposes of this document, Day-Night Average Sound Level is referred to as DNL. DNL describes 24-hour exposure, noise from 10 p.m. to 7 a.m. is considered nighttime, and is factored up by 10 dB, this "penalty" is equal to counting each nighttime event 10 times.

MAA took for this ANZ update to ensure that stakeholder input is reflected in the ANZ contour and NAP documentation.

The appendices of this document provide supplemental information. Appendix A includes an overview of aircraft noise terminology. Appendix B includes the ANZ overlaid on Baltimore County tax maps. Appendix C includes the MTN Stakeholder Advisory Committee (SAC) roster and materials from the April 2, 2025, June 26, 2025 and September 25, 2025 SAC Meetings, including the invitations, sign-in sheets, meeting minutes, and presentations. Appendix D includes Maryland Aviation Commission materials. Appendix E will include information related to the public workshop and hearing, including the invitations, documentation of public notices, attendance information, presentation materials, and hearing transcript. Appendix F will include documentation of public comments following the public hearing.

2. Noise Modeling Methodology

The State of Maryland uses DNL as the measure of cumulative noise exposure required to develop an ANZ. The DNL metric describes the total noise exposure produced by aircraft operations during a 24-hour period. The aircraft operations used to calculate DNL are those of an average day during a particular year. To account for the increased human sensitivity to nighttime noise, a 10-decibel (dB) penalty is applied to all aircraft operations between 10:00 p.m. and 7:00 a.m. when calculating DNL. In other words, DNL accounts for noise exposure in a 24-hour period, with the exception that it treats each aircraft operation occurring in the nighttime (between 10 p.m. and 7 a.m.) as equivalent to 10 operations during the daytime. Appendix A includes an overview of aircraft noise terminology.

The noise environment around an airport is described by contours of equal noise exposure, representing the noise that occurs during an average 24-hour day. The MTN ANZ is depicted by a series of lines (noise contours) surrounding the airport. These lines connect points of equal noise exposure and represent DNL 65 dB, 70 dB, and 75 dB noise contours. The ANZ contours represent the boundaries for determining incompatible activities or land uses with airport operations. The State uses the noise contours adopted in the ANZ to limit new development that would be incompatible with the cumulative noise exposure level acceptable for an area. The cumulative noise exposure limits are shown in **Table 2-1** below.

Table 2-1. State of Maryland Limits for Cumulative Noise Exposure

Land Use	Area of Compatibility (Noise Levels)
Residences, schools, hospitals, libraries, churches, auditoriums, rest homes, nursing homes, concert halls	Up to 65 dB DNL
Transient lodging, hotels, motels, sports arenas, outdoor spectator sports, playgrounds, neighborhood parks, noise sensitive manufacturing and communications	Up to 70 dB DNL
Golf courses, riding stables, water recreation, cemeteries, office buildings, retail and wholesale establishments, movie theaters, restaurants, industry, manufacturing, utilities, livestock farming, animal breeding	Up to 75 dB DNL
Agriculture (except livestock), mining, fishing, aviation related uses	All
Source: COMAR. 11.03.03.03, Limits for Cumulative Noise Exposure, http://mdrules.elaws.us/comar/11.03.03.03	

Maryland regulations require noise modeling as a prediction method to create ANZ noise contours.[4] As described above, noise modeling software creates computer-generated DNL estimates depicted as equal-exposure noise contours (much like topographic maps that indicate contours of equal elevation). DNL contours reflect average annual daily operating conditions, also referred to as an Average Annual Day (AAD) of operations, taking into account the type of aircraft, average number of flights each day, time of day, how often each runway is used throughout the year, and where, over the surrounding communities, the aircraft normally fly.

[4] COMAR 11.03.03.02, *Methods for Calculation and Measurement of Levels of Cumulative Noise Exposure,* http://mdrules.elaws.us/comar/11.03.03.02

This 2025 MTN ANZ document presents DNL noise contours for the following three conditions:

1. Base year conditions with the current runway layout
2. Five-year forecast 2030 conditions, with the updated runway layout as identified in the MTN Airport Layout Plan (ALP)[5]
3. Ten-year forecast 2035 conditions, with the updated runway layout as identified in the MTN ALP

[5] Maryland Aviation Administration. (2022). *Notice of Availability of Final Environmental Assessment (EA) and Finding of No Significant Impact / Record of Decision (FONSI/ROD) for Phase I Improvements at Martin State Airport*. https://marylandaviation.com/environmental/environmental-planning/

3. Noise Model Inputs

The 2025, 2030, and 2035 DNL contours were developed using the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) version 3g and HMMH's AEDT Preprocessor software for AEDT™ in a manner consistent with Section 11.03.03 of COMAR.

AEDT requires noise model input data in three categories:

1. Airport physical inputs
   - Runway layout (including displaced landing or takeoff thresholds)
   - Flight track geometry and use
   - Terrain data
   - Meteorological conditions
2. Aircraft noise and performance data
   - Aircraft performance profiles
   - Noise level vs. distance curves
3. Aircraft operational inputs
   - Number of aircraft operations
   - Aircraft fleet mix
   - Day-night split of operations
   - Runway utilization
   - Flight track geometry and utilization

The AEDT inputs used in developing the base year and future year noise contours are presented in subsections 3.1 through 3.7.

3.1 Physical Description of the Airport Layout

There is one runway at MTN, Runway 15/33. **Figure 3-1** presents the existing MTN runway layout and notations for the airport property line, helicopter operational areas, as well as civilian and military aircraft run-up locations. Currently, civil aircraft are permitted to use 6,997 feet of the runway for arrival and departure operations; military aircraft are permitted to use 8,100 feet or the full extent of the runway, for all departures and for Runway 33 arrivals; Runway 15 military arrivals have a displaced landing threshold of 1,113 feet.

MTN has five helicopter operational areas at the airport, which serve corporate, law enforcement, and flight training organizations:

- The Baltimore City Police operate at Taxiway A adjacent to Runway 15.
- The Baltimore County Police and the majority of corporate helicopters operate from a helipad west of the midpoint of Runway 15.

- The Maryland State Police operate in an area south of the end of Runway 33.
- Transient military helicopters operate at the end of Runway 15 near the Maryland Air National Guard (MDANG) ramp.
- Flight training helicopters operate on the northeast side of the airport on the taxiway north of the midpoint of Runway 33.

MTN has five maintenance run-up locations and two military pre-flight locations at the airport, which serve MTN-based military and civilian aircraft maintenance operations:

- The MDANG conducts pre-flight checks for A-10C aircraft at:
  - Adjacent to the end of Runway 15.
  - Adjacent to the end of Runway 33.
- The MDANG conducts maintenance run-ups for A-10C aircraft at:
  - The MDANG ramp near the end of Runway 15.
  - A trim pad and test cell located northeast of Runway 15/33.
- MTN based civilian operators conduct maintenance run-ups at:
  - The apron adjacent to the abandoned runway near the end of Runway 15.
  - The main apron area south of Runway 15/33.

Table 3-1 presents the latitude and longitude inputs and configurations for each runway, helicopter operational area, and run-up location used for modeling in AEDT.

Figure 3-1. Base Year (2025) Airport Layout

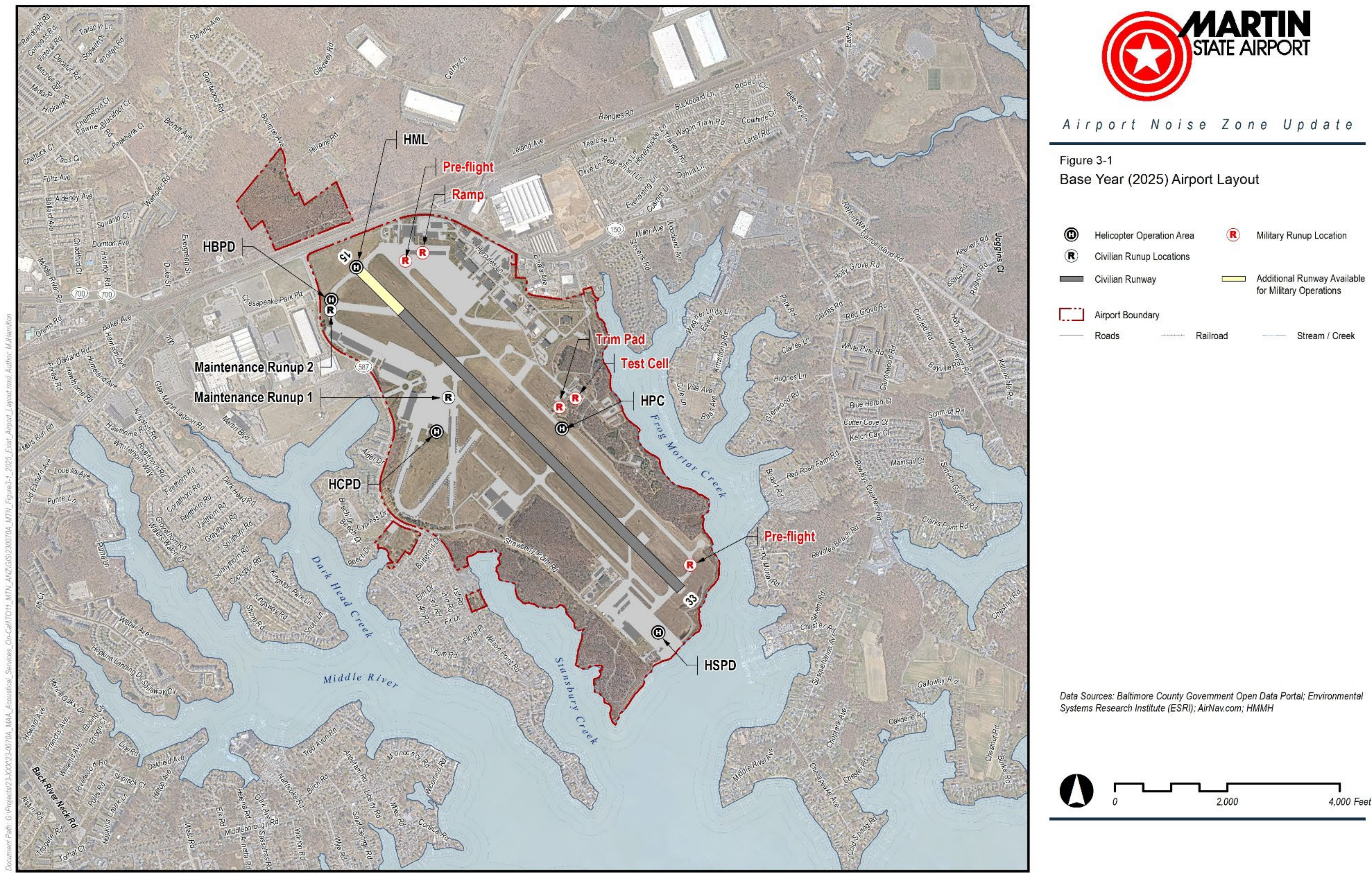

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Table 3-1. Base Year (2025) MTN Runway and Helipad Data

Runway	Latitude (deg)	Longitude (deg)	Length (feet)	Modeled Elevation (feet)	Displaced Landing Threshold (feet)	Approach Slope (degrees)	Threshold Crossing Height (feet)
Fixed-Wing Runways							
15	39.332474	-76.422483	6,997	21.3	0	4.01	37
33	39.318849	-76.405047	6,997	9.2	0	2.91	48
15 (Military)	39.334642	-76.425272	8,100	23.5	1,113	3.1	55
33 (Military)	39.318849	-76.405047	8,100	9.2	0	2.91	48
Helicopter Operations Areas							
Baltimore City Police (HBPD)	39.332839	-76.426898	N/A	21.5	N/A	N/A	N/A
Baltimore County Police (HCPD)	39.326586	-76.420273	N/A	21.5	N/A	N/A	N/A
Maryland State Police (HSPD)	39.316714	-76.406410	N/A	21.5	N/A	N/A	N/A
Practice Pad (HPC)	39.326683	-76.412404	N/A	21.5	N/A	N/A	N/A
Military Helipad (HML)	39.334642	-76.425272	N/A	23.5	N/A	N/A	N/A
Run-up Locations							
Ramp	39.335324	-76.421102	N/A	21.5	N/A	N/A	N/A
Trim pad	39.327734	-76.412556	N/A	21.5	N/A	N/A	N/A
Test cell	39.328166	-76.411542	N/A	21.5	N/A	N/A	N/A
Maintenance Run-up 1	39.328256	-76.419532	N/A	21.5	N/A	N/A	N/A
Maintenance Run-up 2	39.332839	-76.426898	N/A	21.5	N/A	N/A	N/A
Pre-flight (Runway 15)	39.334944	-76.422169	N/A	21.5	N/A	N/A	N/A
Pre-flight (Runway 33)	39.320333	-76.404389	N/A	9.2	N/A	N/A	N/A

Notes:
Latitude and Longitude coordinates reference to North American Datum 1983 (NAD 83)
Elevations referenced to Mean Sea Level (MSL)
Sources:
Runway coordinates: FAA, MAA, 2025
Helicopter Operations Areas: MTN staff and HMMH
Run-up Areas: MTN staff, MDANG, HMMH, and MTN Operators

The five-year and ten-year forecast airport layout configurations include proposed improvements to the airfield as identified in the MTN ALP. The MTN ALP identifies Phase I improvements that include changes needed to meet FAA standards and to accommodate anticipated general aviation demand. In the MTN ALP, the Runway 15 end for civilian aircraft would be relocated approximately 291 feet from the existing runway end with a displaced threshold of 225 feet. The Runway 33 end would be relocated approximately 380 feet from the existing runway end with a displaced threshold of 390 feet. Military aircraft would be able to utilize the full 8,100 feet of runway, which is the same as used for the base year configuration. **Table 3-2** presents the latitude and longitude inputs and configurations for each runway for the five-year and ten-year forecast configurations. Helicopter operational areas and run-up locations are the same as for the base year as detailed above.

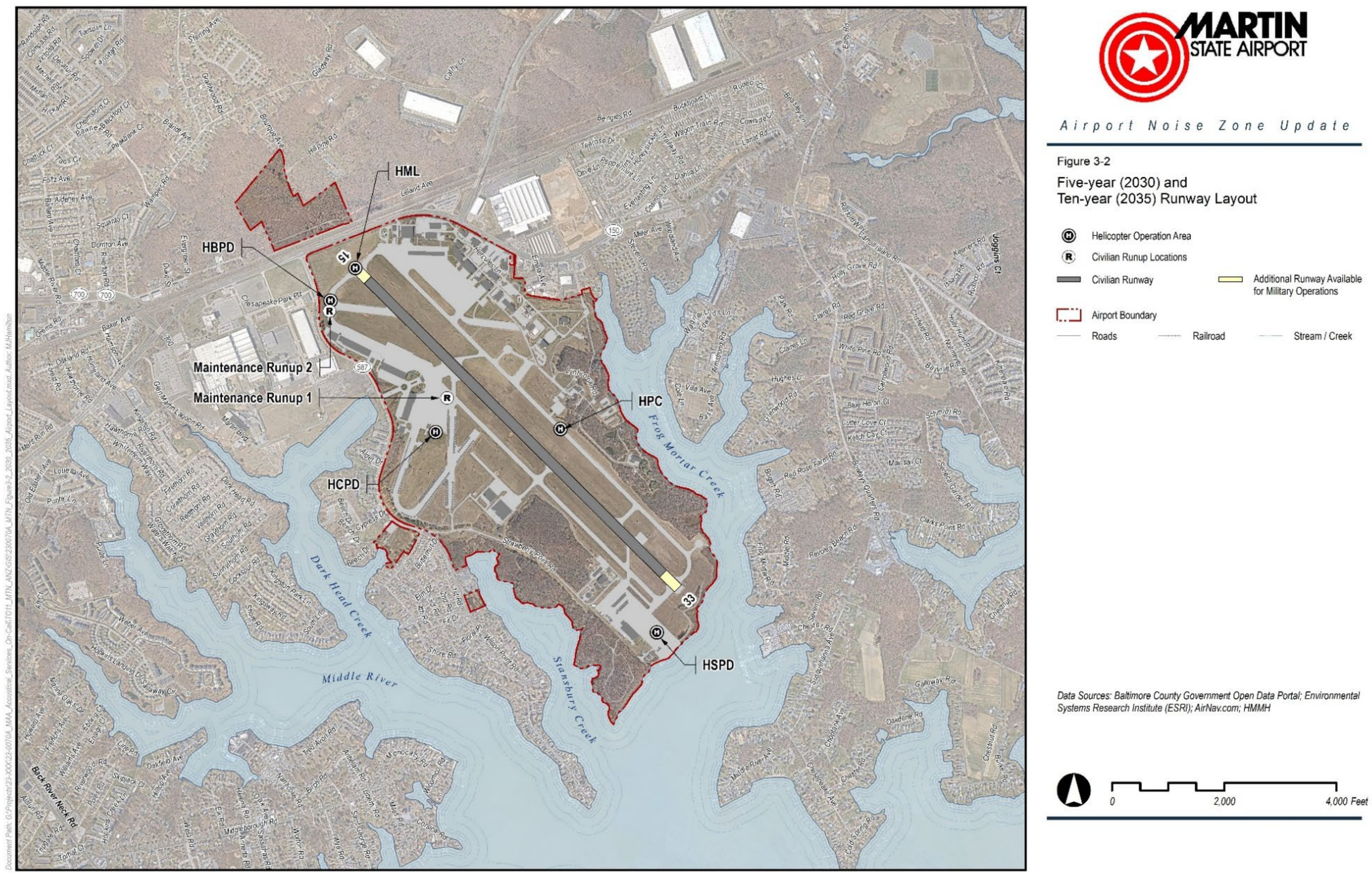
Figure 3-2 depicts the MTN runway layout that was used to develop the five-year and ten-year forecast contours. It includes notations for the airport property line, helicopter operational areas, as well as civilian and military aircraft run-up locations.

Table 3-2. Five-Year (2030) and Ten-Year (2035) Forecast Condition Runway, Helipad, and Run-up Inputs

Runway	Latitude (deg)	Longitude (deg)	Length (feet)	Modeled Elevation (feet)	Displaced Landing Threshold (feet)	Approach Slope (degrees)	Threshold Crossing Height (feet)
Fixed-Wing Runways							
15	39.334050	-76.424500	7,430	22.8	225	4.01	37
33	39.319583	-76.405986	7,430	9.2	390	2.91	48
15 (Military)	39.334642	-76.425272	8,100	23.5	516	3.1	55
33 (Military)	39.318849	-76.405047	8,100	9.2	770	2.91	48

Notes:
Latitude and Longitude coordinates reference to North American Datum 1983 (NAD 83).
Elevations referenced to Mean Sea Level (MSL).
Source: MAA, 2025

Figure 3-2. Five-Year (2030) and Ten-Year (2035) Forecast Condition Airport Layout



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3.2 Aircraft Operations and Run-ups

To create the noise contours, AEDT requires details related to AAD operations as well as aircraft maintenance run-ups be included as inputs. AAD operations and run-up estimates were developed for the base year and future years.

Operations for 2025 were determined using 12 months of 2024 flight data and the 2024 edition of the FAA's Terminal Area Forecast (TAF), issued in January 2025. The FAA TAF reports operations in terms of the federal fiscal year, which runs from October 1 to September 30, whereas the calendar year runs from January 1 to December 31. HMMH analyzed historical monthly data from the FAA Air Traffic Activity Data System (ATADS) for calendar year 2024, and this analysis indicated that adjusting the TAF federal fiscal year to a 2025 calendar year estimate would result in an overall decrease of about 1.4 percent of the total operations. Therefore, the TAF issued in 2025 was used without adjustment.

The detailed breakdown of operations by aircraft type for fixed-wing and helicopter civil aircraft at MTN was determined using the 12 months of 2024 flight data obtained from the MAA Airport Noise and Operations Management System (ANOMS). The flight data provided the primary aircraft fleet mix distributions for civilian aircraft, along with distributions over daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.). Calendar year 2024 FAA Traffic Flow Management System Counts were downloaded and used to check the aircraft types within the flight data and to provide the fleet mix for military aircraft. The data collected for 2024 were scaled to the 2025 operational totals shown in **Table 3-3**.

For the 2030 forecast, total overall operations increased by 4 percent over the base year. Air carrier passenger operations remain the same from the base year. Air taxi operations increased by 16 percent and general aviation operations increased by 6 percent. Military operations are reduced from the base year due to the A-10C aircraft being divested in 2025.

In 2035, total overall operations increased by 7 percent from the base year. Military operations are reduced from the base year due to the A-10C aircraft being divested in 2025. Air carrier passenger operations will remain the same from the base year. Air taxi operations increased 31 percent and general aviation operations increased 8 percent compared to the base year.

Table 3-3. Anticipated 2025, 2030 and 2035 Forecast Operations Levels

Case	Itinerant Operations				Local Operations		Total
	Air Carrier	Air Taxi	General Aviation	Military	General Aviation	Military	
2025	5	2,772	40,005	1,283	44,934	490	89,489
2030	5	3,202	42,505	459	46,617	0	92,788
2035	5	3,632	43,242	459	48,362	0	95,700
Source: FAA TAF issued January 2025; MAA ANOMS; HMMH 2025							

The modeled AAD operations are reported in **Table 3-4** through **Table 3-6**, for the base year, 2030 five-year, and 2035 ten-year forecasts, respectively. The fleet mix distributions are reported by aircraft category and their associated arrivals and departures separated by both day and night activity.

Table 3-4. Base Year (2025) Modeled Average Daily Aircraft Operations

Aircraft Category	Engine	AEDT Type	Arrivals		Departures		Circuits[1]		Total
			Day	Night	Day	Night	Day	Night	
Air Carrier	Jet	EMB175	<0.01	0.00	<0.01	0.00	0.00	0.00	0.01
Air Carrier Total			**<0.01**	**0.00**	**<0.01**	**0.00**	**0.00**	**0.00**	**0.01**
Air Taxi	Jet	CNA55B	0.59	0.04	0.57	0.06	0.00	0.00	1.25
		CNA560XL	0.54	<0.01	0.55	0.00	0.00	0.00	1.10
		CNA680	0.66	0.00	0.66	0.00	0.00	0.00	1.32
		LEAR35	0.60	0.00	0.60	0.00	0.00	0.00	1.20
	Turbo Prop	CNA208	0.40	<0.01	0.39	0.02	0.00	0.00	0.82
	Piston Prop	GASEPV	0.18	0.00	0.18	0.00	0.00	0.00	0.37
	Helicopter	SA330J	0.69	0.08	0.69	0.09	0.00	0.00	1.55
Air Taxi Total			**3.67**	**0.13**	**3.63**	**0.17**	**0.00**	**0.00**	**7.59**
General Aviation	Jet	CL601	0.87	0.08	0.85	0.11	0.00	0.00	1.91
		CNA525C	0.78	0.00	0.77	0.01	0.00	0.00	1.56
		CNA55B	3.28	0.16	3.27	0.17	0.00	0.00	6.88
		CNA560XL	0.29	<0.01	0.30	0.00	0.00	0.00	0.59
		CNA680	0.68	0.03	0.67	0.05	0.00	0.00	1.43
	Turbo Prop	CNA208	0.58	<0.01	0.56	0.03	0.00	0.00	1.17
		DHC6	1.14	0.03	1.16	0.00	0.00	0.00	2.32
	Piston Prop	BEC58P	0.69	0.00	0.69	0.00	0.23	0.00	1.91
		CNA172	20.29	0.19	20.37	0.11	74.75	0.42	116.14
		CNA182	1.13	0.09	1.21	0.01	0.38	0.00	4.51
		COMSEP	3.27	0.04	3.29	0.01	0.75	0.00	11.12
		GASEPF	7.00	0.09	6.79	0.31	6.29	0.44	42.53
		GASEPV	1.50	0.02	1.50	0.02	0.15	0.03	4.09
		PA30	0.35	0.00	0.35	0.00	0.11	0.00	1.36
	Helicopter	EC130	1.42	0.50	1.55	0.37	0.00	0.00	3.84
		R22	0.00	0.00	0.00	0.00	1.99	0.00	3.63
		SA330J	1.28	0.28	1.36	0.20	0.80	0.07	5.50
		SA350D	6.72	2.01	7.53	1.20	2.09	0.32	22.22
General Aviation Total			**51.27**	**3.53**	**52.21**	**2.59**	**120.61**	**2.5**	**232.71**
Military	Jet	A10A[2]	1.71	0.00	1.71	0.00	0.18	0.00	3.60
		C17	0.19	0.00	0.19	0.00	0.00	0.00	0.38
	Turbo Prop	DHC6	0.13	0.00	0.13	0.00	0.00	0.00	0.26
	Helicopter	S70	0.31	0.00	0.31	0.00	0.00	0.00	0.62
Military Total			**2.34**	**0.00**	**2.34**	**0.00**	**0.18**	**0.00**	**4.86**
Grand Total			**57.28**	**3.66**	**58.18**	**2.77**	**120.78**	**2.50**	**245.18**

Notes:
Totals may not match exactly due to rounding.
[1] Circuits are counted as two operations.
[2] A10A is the aircraft designated in AEDT, used as a surrogate for the A-10C.

Table 3-5. Five-Year (2030) Forecast Modeled Average Daily Aircraft Operations

Aircraft Category	Engine	AEDT Type	Arrivals		Departures		Circuits		Total
			Day	Night	Day	Night	Day	Night	
Air Carrier	**Jet**	EMB175	<0.01	0.00	<0.01	0.00	0.00	0.00	0.01
Air Carrier Total			**<0.01**	**0.00**	**<0.01**	**0.00**	**0.00**	**0.00**	**0.01**
Air Taxi	**Jet**	CNA55B	0.80	0.05	0.77	0.09	0.00	0.00	1.72
		CNA560XL	0.74	0.01	0.75	0.00	0.00	0.00	1.50
		CNA680	0.90	0.00	0.90	0.00	0.00	0.00	1.81
		LEAR35	0.35	0.00	0.35	0.00	0.00	0.00	0.71
	Turbo Prop	CNA208	0.55	0.01	0.53	0.03	0.00	0.00	1.12
	Piston Prop	GASEPV	0.18	0.00	0.18	0.00	0.00	0.00	0.37
	Helicopter	SA330J	0.69	0.08	0.68	0.09	0.00	0.00	1.55
Air Taxi Total			**4.23**	**0.16**	**4.17**	**0.21**	**0.00**	**0.00**	**8.77**
General Aviation	**Jet**	CL601	0.90	0.09	0.87	0.11	0.00	0.00	1.97
		CNA525C	0.46	0.00	0.45	<0.01	0.00	0.00	0.92
		CNA55B	3.38	0.18	3.37	0.18	0.00	0.00	7.10
		CNA560XL	0.30	<0.01	0.31	0.00	0.00	0.00	0.61
		CNA680	0.53	0.03	0.52	0.04	0.00	0.00	1.11
	Turbo Prop	CNA208	0.60	<0.01	0.58	0.03	0.00	0.00	1.21
		DHC6	1.14	0.03	1.16	0.00	0.00	0.00	2.32
	Piston Prop	BEC58P	0.69	0.00	0.69	0.00	0.54	0.00	1.91
		CNA172	23.96	0.23	24.06	0.14	80.05	0.52	128.95
		CNA182	1.32	0.11	1.41	0.01	2.01	0.03	4.89
		COMSEP	4.51	0.05	4.54	0.01	7.88	0.00	16.99
		GASEPF	6.05	0.09	5.85	0.29	23.12	1.13	36.53
		GASEPV	0.95	0.02	0.95	0.02	0.92	0.13	2.99
		PA30	0.42	0.00	0.42	0.00	0.64	0.00	1.47
	Helicopter	EC130	1.39	0.53	1.53	0.39	0.00	0.00	3.84
		R22	0.00	0.00	0.00	0.00	3.63	0.00	3.63
		SA330J	1.27	0.30	1.35	0.21	2.03	0.34	5.50
		SA350D	6.62	2.12	7.47	1.26	4.25	0.50	22.22
General Aviation Total			**54.47**	**3.76**	**55.53**	**2.7**	**125.07**	**2.65**	**244.17**
Military	**Jet**	C17	0.19	0.00	0.19	0.00	0.00	0.00	0.38
	Turbo Prop	DHC6	0.13	0.00	0.13	0.00	0.00	0.00	0.26
	Helicopter	S70	0.31	0.00	0.31	0.00	0.00	0.00	0.62
Military Total			**0.63**	**0.00**	**0.63**	**0.00**	**0.00**	**0.00**	**1.26**
Grand Total			**59.33**	**3.92**	**60.34**	**2.91**	**125.07**	**2.65**	**254.21**

Notes:
Totals may not match exactly due to rounding.
Circuits are counted as two operations.

Table 3-6. Ten-Year (2035) Forecast Modeled Average Daily Aircraft Operations

Aircraft Category	Engine	AEDT Type	Arrivals		Departures		Circuits		Total
			Day	Night	Day	Night	Day	Night	
Air Carrier	**Jet**	EMB175	<0.01	0.00	<0.01	0.00	0.00	0.00	0.01
Air Carrier Total			**<0.01**	**0.00**	**<0.01**	**0.00**	**0.00**	**0.00**	**0.01**
Air Taxi	**Jet**	CNA55B	1.05	0.07	1.01	0.12	0.00	0.00	2.24
		CNA560XL	0.97	0.01	0.98	0.00	0.00	0.00	1.97
		CNA680	1.18	0.00	1.18	0.00	0.00	0.00	2.36
		LEAR35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Turbo Prop	CNA208	0.72	0.02	0.69	0.05	0.00	0.00	1.47
	Piston Prop	GASEPV	0.18	0.00	0.18	0.00	0.00	0.00	0.37
	Helicopter	SA330J	0.69	0.09	0.68	0.1	0.00	0.00	1.55
Air Taxi Total			**4.78**	**0.19**	**4.71**	**0.26**	**0.00**	**0.00**	**9.95**
General Aviation	**Jet**	CL601	0.97	0.10	0.93	0.13	0.00	0.00	2.13
		CNA525C	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		CNA55B	3.64	0.20	3.63	0.20	0.00	0.00	7.67
		CNA560XL	0.32	<0.01	0.33	0.00	0.00	0.00	0.66
		CNA680	0.41	0.02	0.40	0.03	0.00	0.00	0.86
	Turbo Prop	CNA208	0.64	0.01	0.62	0.03	0.00	0.00	1.31
		DHC6	1.13	0.03	1.16	0.00	0.00	0.00	2.32
	Piston Prop	BEC58P	0.69	0.00	0.69	0.00	0.54	0.00	1.91
		CNA172	24.42	0.25	24.52	0.15	81.99	0.58	131.91
		CNA182	1.44	0.12	1.55	0.01	2.27	0.03	5.43
		COMSEP	5.25	0.06	5.29	0.01	9.72	0.00	20.32
		GASEPF	6.21	0.09	5.99	0.31	23.56	1.27	37.43
		GASEPV	0.55	0.02	0.56	<0.01	0.91	0.15	2.19
		PA30	0.46	0.00	0.46	0.00	0.72	0.00	1.64
	Helicopter	EC130	1.37	0.55	1.51	0.41	0.00	0.00	3.84
		R22	0.00	0.00	0.00	0.00	3.63	0.00	3.63
		SA330J	1.25	0.31	1.34	0.22	1.99	0.38	5.50
		SA350D	6.51	2.22	7.41	1.32	4.20	0.55	22.22
General Aviation Total			**55.25**	**3.98**	**56.39**	**2.84**	**129.54**	**2.96**	**250.97**
Military	**Jet**	C17	0.19	0.00	0.19	0.00	0.00	0.00	0.38
	Turbo Prop	DHC6	0.13	0.00	0.13	0.00	0.00	0.00	0.26
	Helicopter	S70	0.31	0.00	0.31	0.00	0.00	0.00	0.62
Military Total			**0.63**	**0.00**	**0.63**	**0.00**	**0.00**	**0.00**	**1.26**
Grand Total			**60.67**	**4.18**	**61.74**	**3.10**	**129.54**	**2.96**	**262.19**

Notes:
Totals may not match exactly due to rounding.
Circuits are counted as two operations.

In addition to aircraft flight operations, aircraft maintenance and pre-flight run-ups occur at MTN. To calculate DNL, AEDT requires details related to aircraft maintenance run-ups to be included as inputs. Required run-up information includes the location, direction, aircraft type, power settings, and frequency of maintenance run-ups. As shown in **Table 3-7**, the detailed breakdown of maintenance run-ups for civilian operators at MTN was determined based on input from MTN operators. Military run-up estimates are based on data recently validated by the MDANG. Modeled MTN civilian and military run-up activity is projected for 2025 and future forecast years. However, A-10C run-ups are excluded from the 2030 and 2035 models due to the aircraft's divestment in 2025.

Table 3-7. Base Five-Year (2030) and Ten-Year (2035) Modeled Average Daily Aircraft Run-ups

AEDT Aircraft Type	Site Name	Latitude (degrees)	Longitude (degrees)	Magnetic Heading (degrees)	Number of Run-ups	Duration per Run-up (sec.)	Approximate Power Setting (% of Takeoff Thrust/RPM)
A10A[1,2]	Ramp	39.335324	-76.421102	360º	2.90	150	85%
	Trim pad	39.327734	-76.412556	330º	0.05	300	94%
	Test cell	39.328166	-76.411542	330º	0.02	900	100%
	Pre-flight (Runway 15)	39.334944	-76.422169	315º	0.75	30	64%
	Pre-flight (Runway 33)	39.320333	-76.404389	190º	0.96	30	64%
CNA172	Maintenance Run-up 1	39.328256	-76.419532	015º	0.14	60	80%
CNA172	Maintenance Run-up 2	39.328256	-76.426898	205º	0.14	60	80%

Notes:
64% is the idle power within the military modeling noise data.
[1] A10A is the aircraft designated in AEDT, used as a surrogate for the A-10C.
[2] A10A will be excluded in the modeled future years due to their divestment in 2025.
Sources: MDANG and MTN Operators

3.3 Aircraft Noise and Performance Characteristics

AEDT includes a database of specific noise and performance data for most aircraft types operating at MTN. Aircraft not included in the database are assigned an FAA-approved representative aircraft type. Noise data are included 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 specific thrust level. SEL is a measure of the total "noisiness" of an event, that takes duration of the event into account. Performance data includes thrust, speed, and altitude data for takeoff and landing operations often referred to as aircraft profiles. The AEDT database contains standard noise and performance data for over 300 different aircraft types, which includes both civilian and military aircraft. AEDT automatically accesses the noise and performance data for takeoff, landing, and touch-and-go or circuit operations by aircraft included in the database. For the MTN ANZ update, the standard aircraft noise and performance data contained within the AEDT database were utilized.

Within the AEDT database, aircraft takeoff or departure profiles are usually defined by a range of trip distances identified as "stage lengths." A longer trip distance or higher stage length is associated with a heavier aircraft due to the increase in fuel requirements for the flight. For example, a departure aircraft with a trip distance less than 500 nautical miles (nmi) would be assigned a stage length value of one, where a departure aircraft with a trip distance of 3,000 nmi would be assigned a stage length value of five. For civilian aircraft, stage length determinations were obtained from aircraft departure data obtained from the MAA ANOMS. Military aircraft were assigned a stage length value of one, as there was insufficient data to determine trip distances for military operations. Those operations were not included in data obtained from the MAA NOMS. **Table 3-8** provides the stage length classifications by their associated trip distances.

Table 3-8. Stage Lengths by Trip Distance

Stage Length	Trip Distance (nmi)
1	0-500
2	501-1,000
3	1,001-1,500
4	1,501-2,500
5	2,501-3,500
6	3,501-4,500
7	4,501-5,500
8	5,501-6,500
9	6,501+

Table 3-9 presents the anticipated modeled stage length use percentages for departures for the base year as well as the five-year (2030) and ten-year (2035) scenarios.

Table 3-9. Modeled Departure Stage Length Usage by Aircraft Type

AEDT Type	Stage Length									
	Day					Night				
	1	2	3	4	5	1	2	3	4	5
A10C	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BEC58P	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CL601	66.7%	27.1%	6.2%	0.0%	0.0%	83.2%	16.8%	0.0%	0.0%	0.0%
CNA172	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
CNA182	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
CNA208	84.0%	16.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
CNA525C	66.7%	19.8%	0.0%	0.0%	13.5%	100.0%	0.0%	0.0%	0.0%	0.0%
CNA55B	74.3%	25.4%	0.3%	0.0%	0.0%	80.8%	19.2%	0.0%	0.0%	0.0%
CNA560XL	69.1%	30.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CNA680	57.3%	24.3%	10.9%	7.5%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
COMSEP	98.4%	1.6%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
DHC6	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
EMB175	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GASEPF	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
GASEPV	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
LEAR35	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PA30	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Source: HMMH 2025										

3.4 Runway Utilization

Runway usage at MTN is categorized by operation types; arrival, departure, or circuit; and by time of day, day or night. The primary factor affecting runway use at airports is weather, specifically wind direction and wind speed. **Table 3-10** and **Table 3-11** present the runway utilization rates used to model the DNL contours for base year operations. These rates reflect ongoing military operations tracked by the MDANG and civilian operations monitored through the MAA ANOMS system.

Table 3-10. Fixed-Wing Overall Runway Utilization Percentages for All Years

Aircraft Category	Operation Mode	Runway	
		15	33
Air Carrier and Air Taxi	Arrivals	44.3%	55.7%
	Departures	42.3%	57.7%
General Aviation	Arrivals	45.8%	54.2%
	Departures	43.7%	56.3%
	Circuits	48.4%	51.6%
Military	Arrivals	45.7%	54.3%
	Departures	43.6%	56.4%
	Circuits	48.4%	51.6%

Table 3-11. Helipad Utilization Percentages for All Years

Aircraft Category	Operation Mode	Helipad				
		HBPD	HCPD	HSPD	HPC	HML
Air Taxi and General Aviation	Arrivals	22.8%	59.3%	17.9%	0.0%	0.0%
	Departures	22.8%	59.3%	17.9%	0.0%	0.0%
	Circuits	0.0%	0.0%	0.0%	100.0%	0.0%
Military	All	0.0%	0.0%	0.0%	0.0%	100.0%

3.5 Flight Track Geometry and Use

Flight tracks were developed using multiple methods based on the data available for various aircraft types and the entity operating the aircraft. This section summarizes the methodology for developing flight track geometry and use.

The methodology includes the use of proprietary AEDT Preprocessor software for AEDT. This software converts flight tracks to AEDT tracks and has been used for a variety of FAA-funded and reviewed projects including Noise Exposure Map projects at a number of airports**. Figure 3-4** and **Figure 3-5** depict the flight tracks and operations to be used to develop the 2025 ANZ contours by providing density plots of all anticipated modeled fixed-wing arrival and departure flight tracks.

AEDT Preprocessor software for AEDT is a preprocessor developed by HMMH that models each and every operation as an AEDT flight track. These tracks are then input into the model to produce results using the DNL noise metric. AEDT Preprocessor software for AEDT uses individual flight tracks taken directly from radar systems rather than relying on consolidated, representative flight track data. This provides the advantage of modeling each aircraft operation on the specific runway it used and at the actual time of day of the arrival or departure. AEDT Preprocessor software for AEDT then sets up an AEDT study using the AEDT standard data. These operations are then modeled in AEDT to produce an AAD DNL contour. The AEDT Preprocessor software for AEDT approach essentially eliminates the approximation associated with the use of a limited set of prototypical modeling tracks by applying the AEDT's modeling capabilities on a flight-by-flight basis. This level of detail is especially important at MTN due to the nature of the airport as a busy general aviation facility, where operations are highly variable in terms of aircraft type, flight path use, and time of day. The use of actual flight tracks ensures that this operational variability is accurately captured in the noise modeling.

Flight track density plots provided in **Figure 3-3** and **Figure 3-4** illustrate where the majority of aircraft typically fly when arriving or departing MTN. Flight track density plots permit presentation of comparative information for longer time frames using thousands of actual aircraft flight tracks. Rather than presenting every individual track, the plots use color gradations to depict the frequency of aircraft operations over an extended time period. The figures summarize the flight track geometry, dispersion, and the frequency of aircraft operations by using a uniform color gradient scheme based on the relative density of the traffic. The "warmer" red colors indicate areas where the most aircraft operations occurred, and the "cooler" blue colors indicate the areas where the fewest aircraft operations occurred given the sets of flight track data described above.

For all helicopter and fixed-wing circuit operations at MTN, model tracks were developed using a standard method which entailed analyzing all calendar year 2024 flight data from the MAA ANOMS for MTN and splitting the flight tracks into similar and manageable groups. This was done due to inconsistency in the track data close to the airport at low altitudes. Model tracks were first created by separating flight tracks by phase of flight (e.g., arrival or departure) and then by runway end. Following this, the flights were separated by destination direction, such as northeast, south, or west. Finally, flight tracks were analyzed and split into groups according to their degree of similar geometry. Model tracks were developed for each geometrically similar group. For example, Baltimore City Police helipad departures with a west destination were split into three geometrically similar groups, and backbone tracks were developed.

For military operations at MTN, model tracks are being estimated using information validated by the MDANG, based on data referenced in prior ANZ updates and confirmed as part of the current review**.** **Figure 3-3** through **Figure 3-11** show the developed model tracks layered over the airport base map for fixed-wing low approach, all helicopter, and all military operations, respectively. Additionally, **Figure 3-9** also presents the model tracks developed to represent military A-10C overhead break arrival operations.

Table 3-12 and **Table 3-13** present the utilization rates for each of the developed model tracks. The relative ratio of flight track usage was preserved according to those ratios in the entire flight track dataset for fixed-wing circuit and helicopter operations. For military operations, track utilization is derived from data validated in coordination with the MDANG as part of the current ANZ update.

Figure 3-3. Modeled Fixed-Wing Arrival Flight Track Density

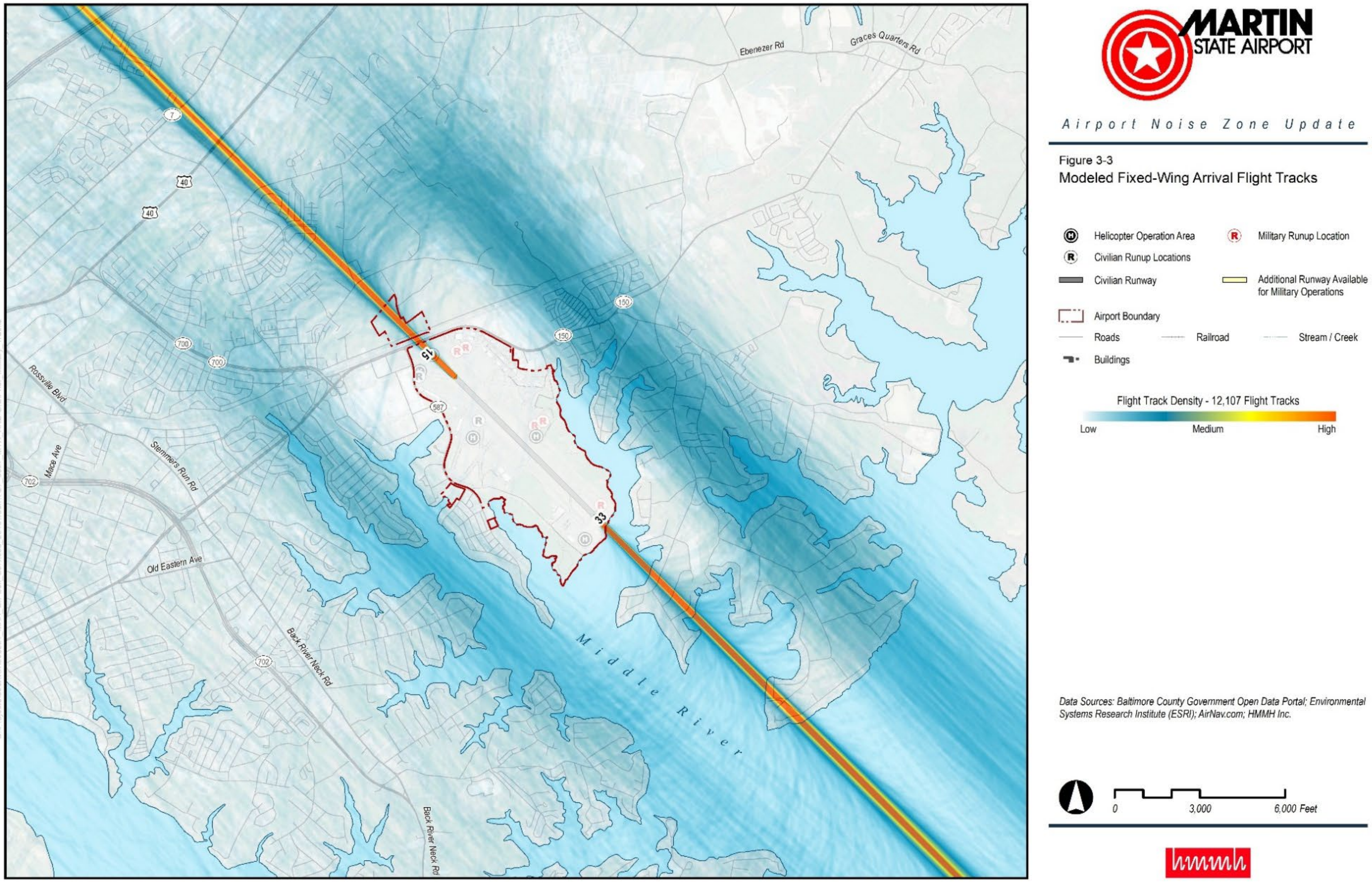

Figure 3-4. Modeled Fixed-Wing Departure Flight Track Density

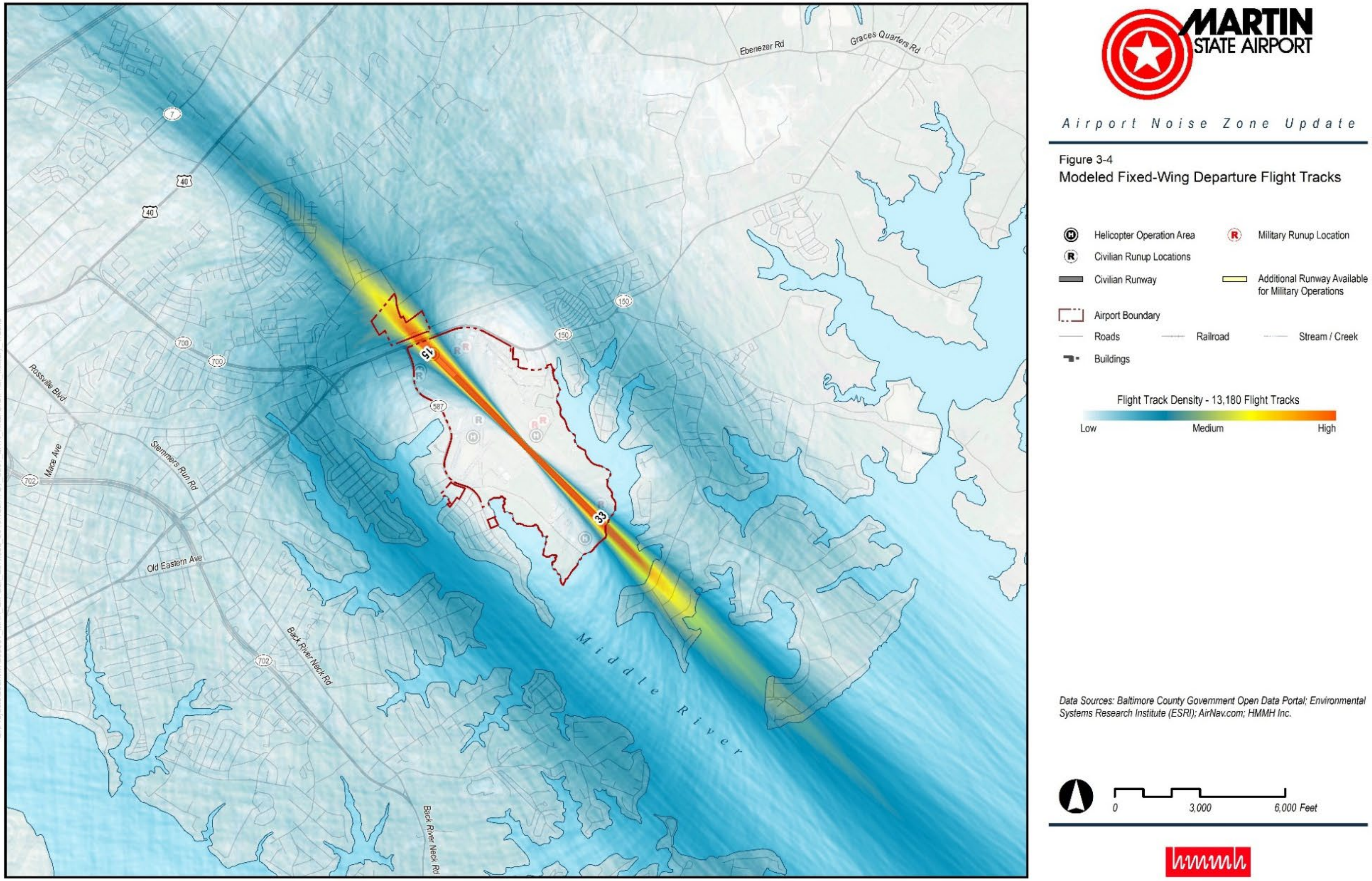

Figure 3-5. Fixed-Wing Circuit/Touch-and-Go Model Flight Tracks

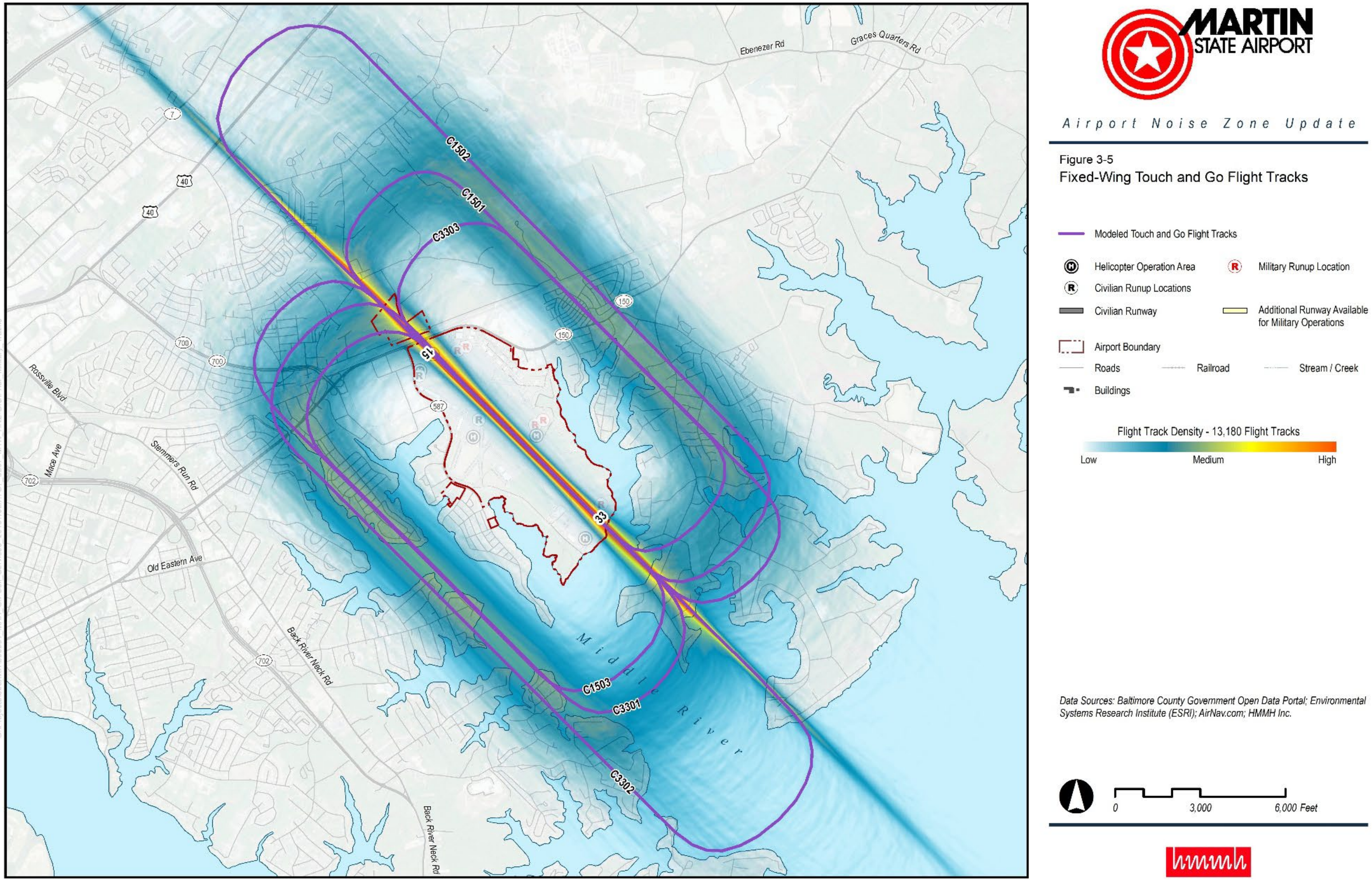

Figure 3-6. Helicopter Arrival Model Flight Tracks

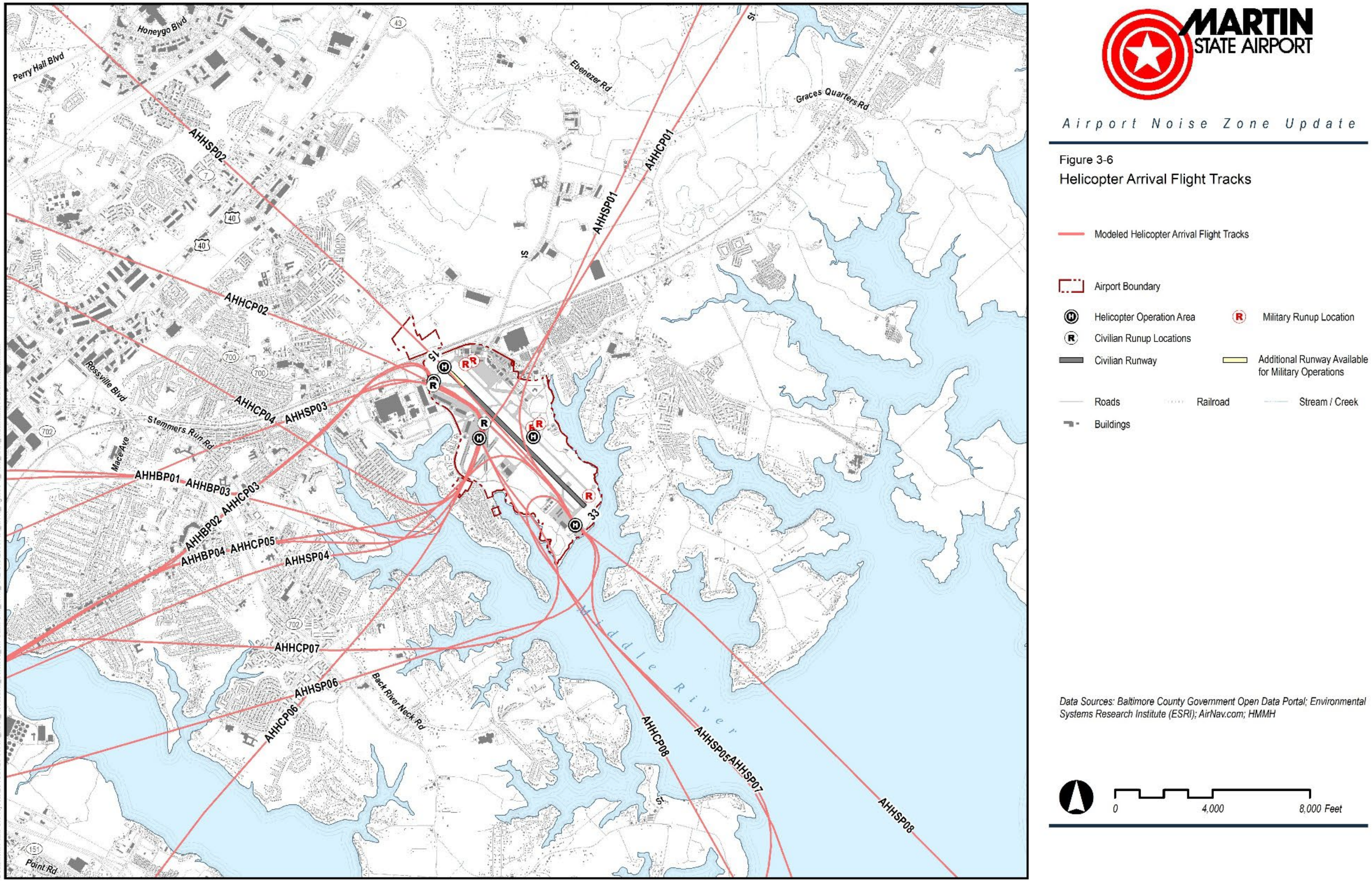

Figure 3-7. Helicopter Departure Model Flight Tracks

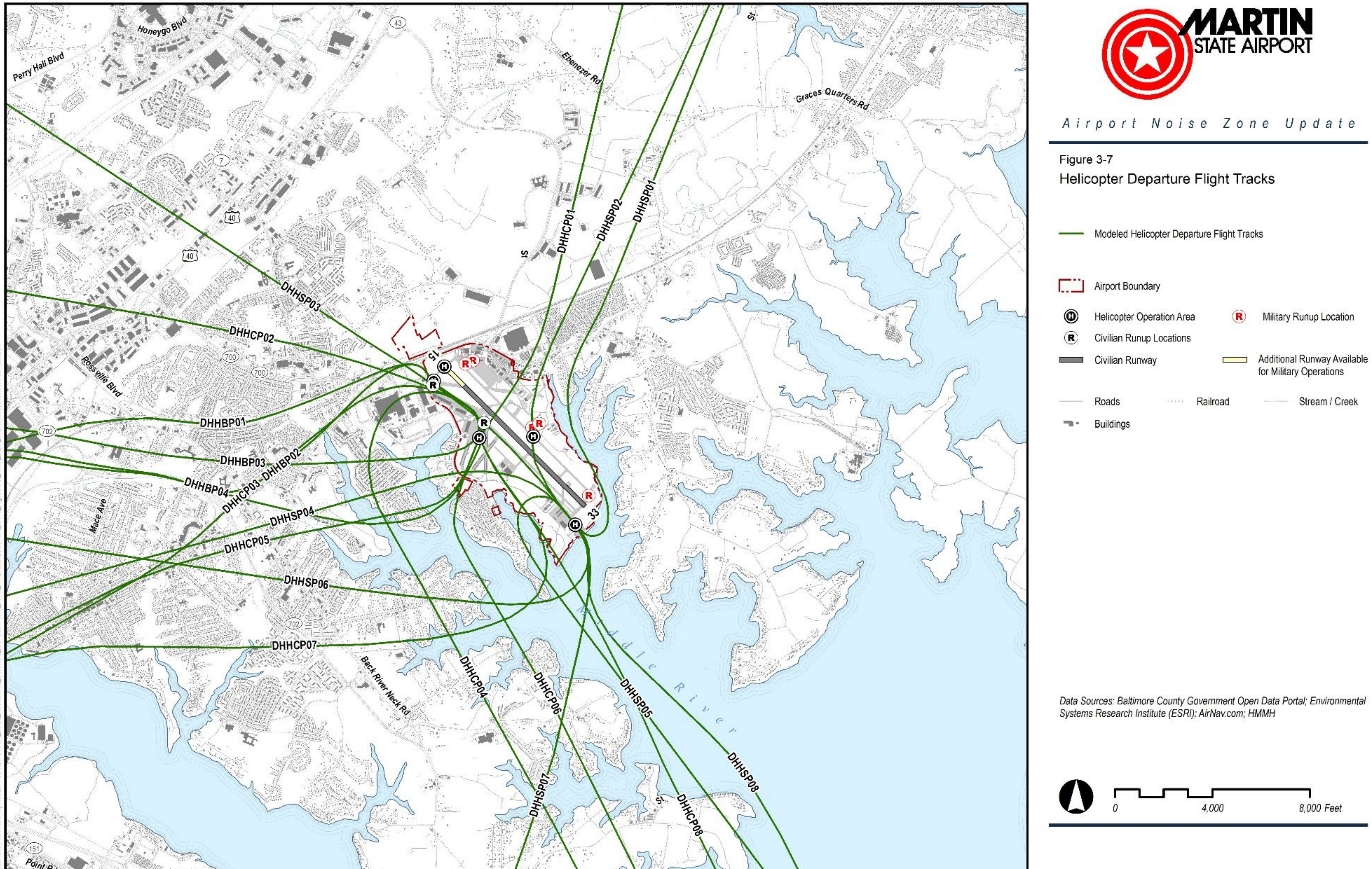

Figure 3-8. Helicopter Circuit/Touch-and-Go Model Flight Tracks

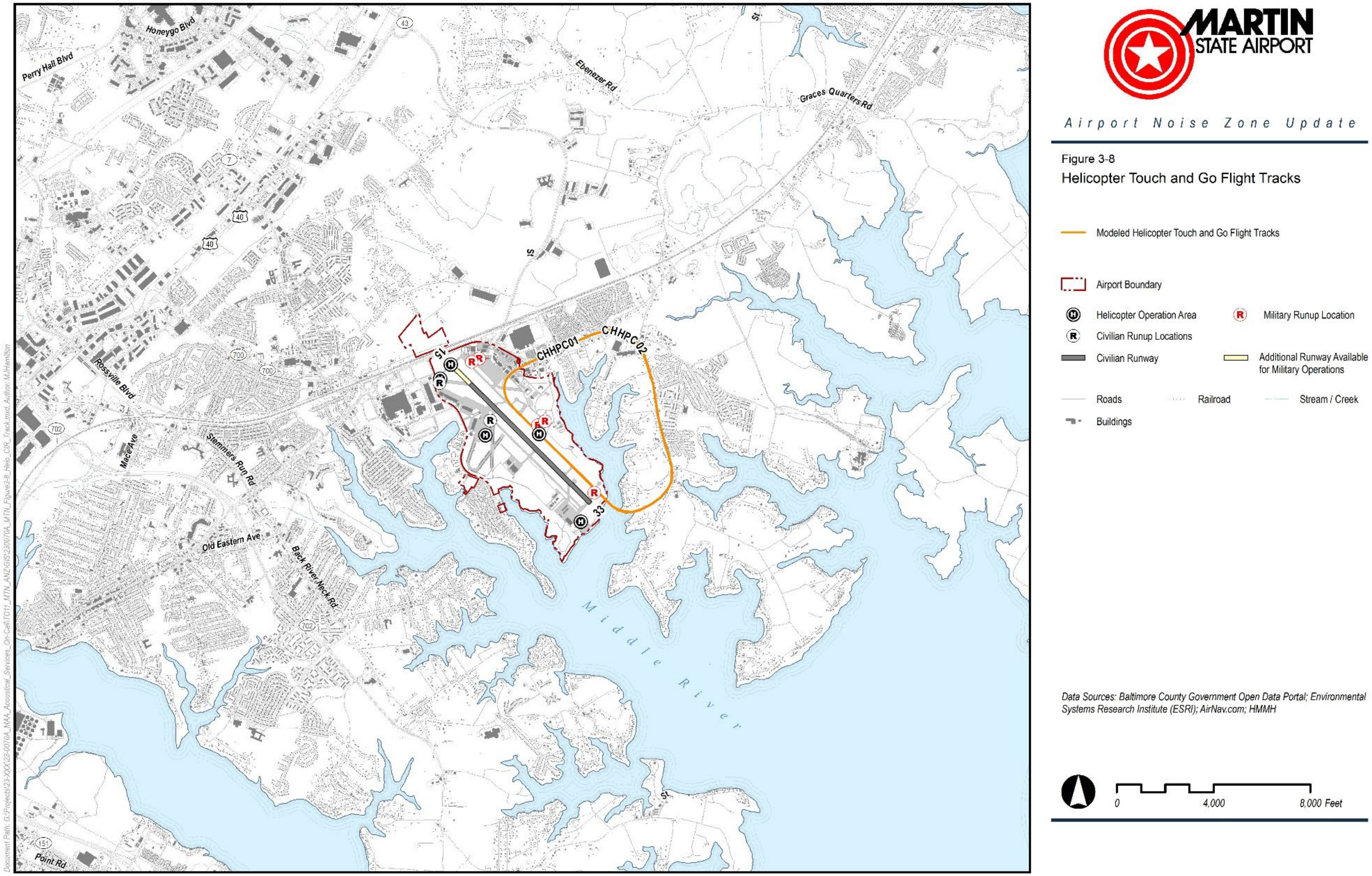

Figure 3-9. Military Arrival Model Flight Tracks

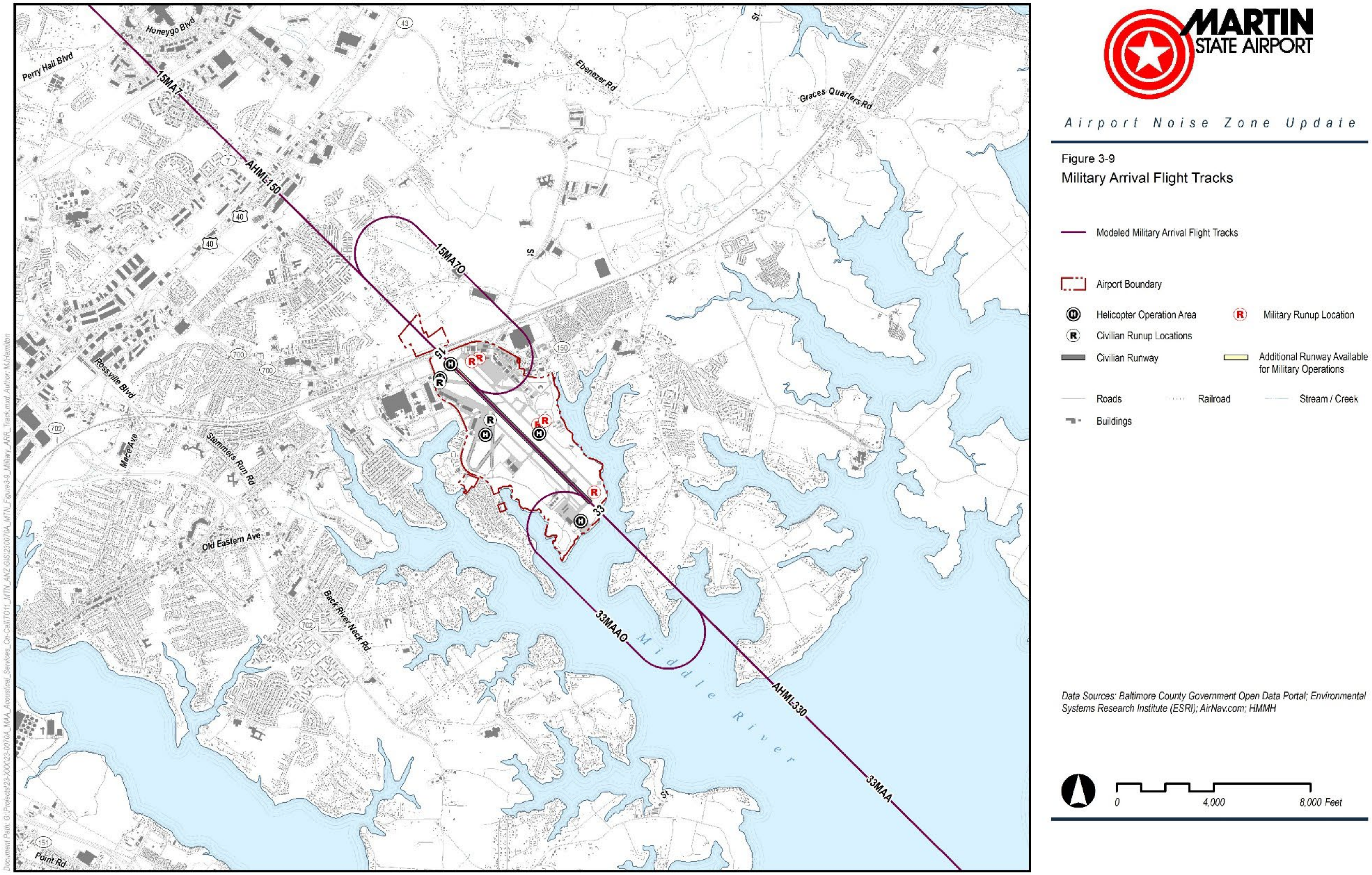

Figure 3-10. Military Departure Model Flight Tracks

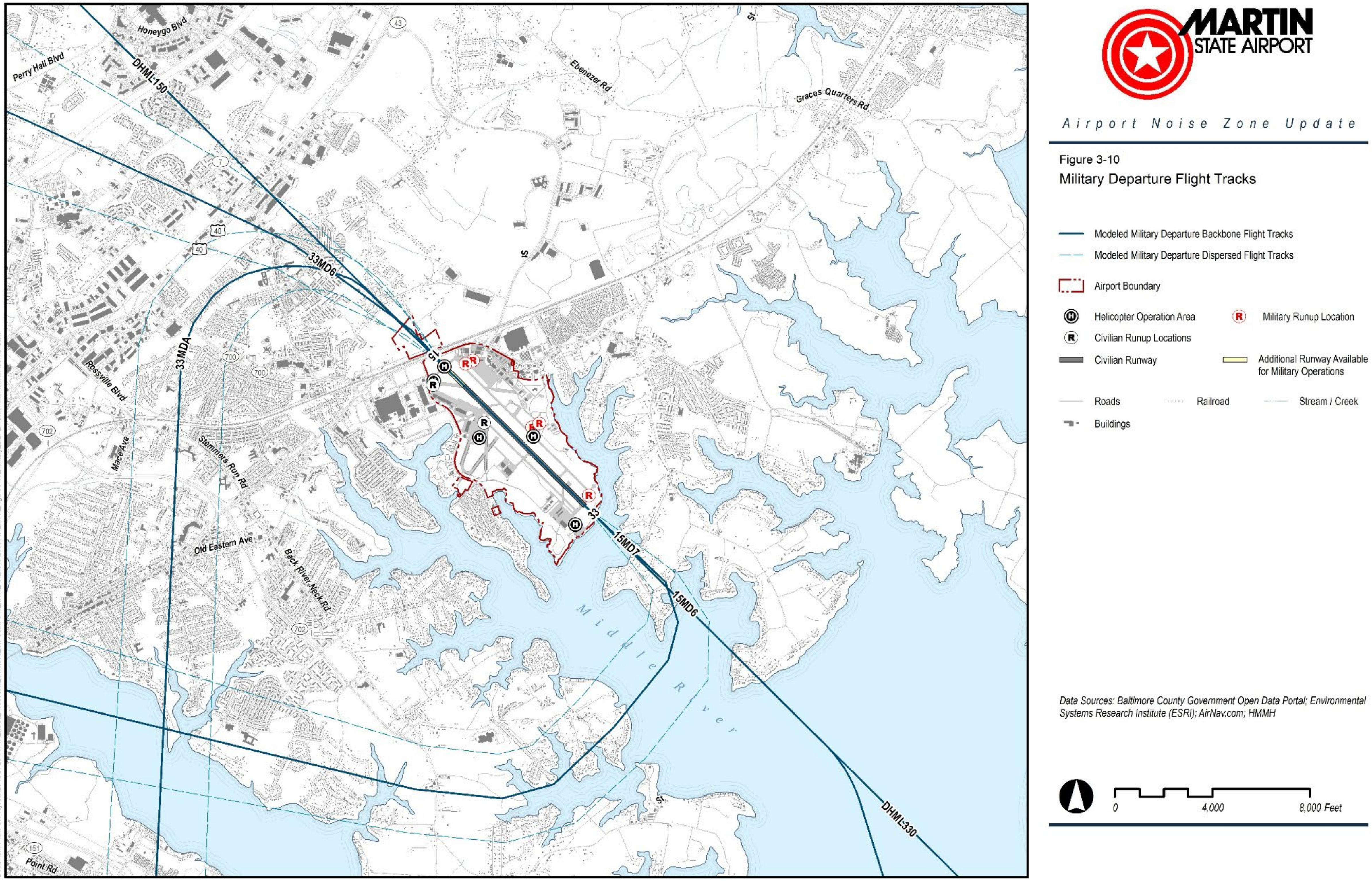

Figure 3-11. Military Low Approach Model Flight Track

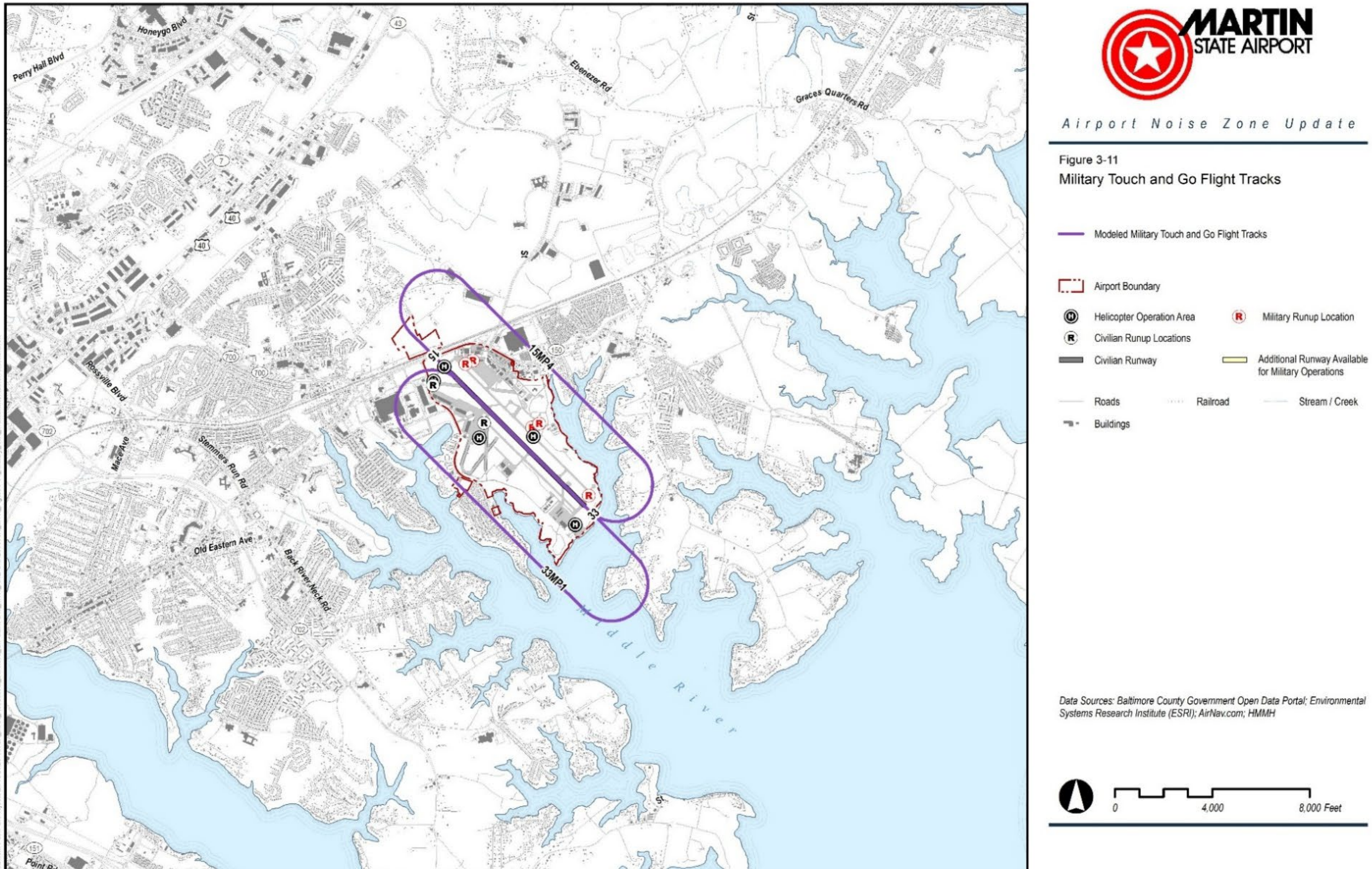

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Table 3-12. Fixed-Wing Model Track Utilization Percentages for All Years

Aircraft Category	Runway	Arrivals		Departures		Circuits	
		Track ID	Percent	Track ID	Percent	Track ID	Percent
General Aviation	15					C1501	80.1%
						C1502	12.8%
						C1503	7.1%
						Total	**100.0%**
	33					C3301	76.0%
						C3302	16.8%
						C3303	7.2%
						Total	**100.0%**
Military	15	15MA7	100.0%	15MD6	90.9%	15MP4	100.0%
				15MD7	9.1%		
		Total	**100.0%**	**Total**	**100.0%**	**Total**	**100.0%**
	33	33MAA	100.0%	33MD6	65.0%	33MP1	100.0%
				33MDA	35.0%		
		Total	**100.0%**	**Total**	**100.0%**	**Total**	**100.0%**

Table 3-13. Base Year (2025) and Five-Year Forecast (2030) Helicopter Model Track Utilization Percentages

Aircraft Category	Helipad	Arrivals		Departures		Circuits	
		Track ID	Percent	Track ID	Percent	Track ID	Percent
Air Taxi and General Aviation	HBP	AHHBP01	43.7%	DHHBP01	17.8%		
		AHHBP02	30.8%	DHHBP02	37.6%		
		AHHBP03	15.3%	DHHBP03	13.3%		
		AHHBP04	10.2%	DHHBP04	31.3%		
		Total	**100.0%**	**Total**	**100.0%**		
	HCP	AHHCP01	3.3%	DHHCP01	6.4%		
		AHHCP02	10.9%	DHHCP02	25.0%		
		AHHCP03	33.4%	DHHCP03	17.4%		
		AHHCP04	7.0%	DHHCP04	3.4%		
		AHHCP05	33.0%	DHHCP05	31.8%		
		AHHCP06	5.6%	DHHCP06	7.0%		
		AHHCP07	3.5%	DHHCP07	2.9%		
		AHHCP08	3.5%	DHHCP08	6.1%		
		Total	**100.0%**	**Total**	**100.0%**		
	HSP	AHHSP01	6.4%	DHHSP01	9.9%		
		AHHSP02	5.2%	DHHSP02	11.9%		
		AHHSP03	7.1%	DHHSP03	6.7%		
		AHHSP04	16.1%	DHHSP04	7.2%		
		AHHSP05	7.3%	DHHSP05	12.6%		
		AHHSP06	28.5%	DHHSP06	14.6%		
		AHHSP07	19.8%	DHHSP07	10.2%		
		AHHSP08	9.7%	DHHSP08	26.9%		
		Total	**100.0%**	**Total**	**100.0%**		
	HPC					CHHPC01	51.8%
						CHHPC02	48.2%
						Total	**100.0%**
Military	HML	AHML330	50.0%	DHML150	50.0%		
		AHML150	50.0%	DHML330	50.0%		
		Total	**100.0%**	**Total**	**100.0%**		

3.6 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 utilizes the following values for annual average weather conditions at MTN which are based on a 10-year average from 2014-2023:

- Temperature: 55.47° F
- Pressure: 1017.21 millibars
- Relative Humidity 75.08%
- Dew Point: 47.7° F
- Wind Speed: 4.4 knots

The AEDT annual average weather condition values detailed above were used in AEDT for generating the base year and 2030 and 2035 forecast noise contours for the MTN ANZ update.

3.7 Terrain Data

Terrain data describes the elevation of the ground surrounding the airport and on airport property. AEDT uses terrain data to set the ground level under the flight paths. The terrain data does not affect the aircraft's performance or noise levels, but it does affect the vertical distance between the aircraft and a noise "receiver" on the ground. This in turn affects noise propagation assumptions about how noise propagates over ground. The terrain data were obtained from the United States Geological Survey (USGS) National Map Data Download Application on May 8, 2025. Elevation Dataset with one-third arc second (approximately 33 feet) resolution was selected. Terrain data was utilized in conjunction with the terrain feature of AEDT to generate the base, five-year, and ten-year noise contours for the MTN ANZ update.

4. Study Results

4.1 2025 Base Year Contours

Figure 4-1 presents the MTN 65, 70, and 75 dB DNL contours for the base year.

The 65 dB DNL contour remains mostly on airport property with four exceptions:

- An area on the northeast side of the airport off of Runway 15 due to military maintenance run-ups of A-10C aircraft on the MDANG ramp area.
- An area on the southwest side of the airport off of Runway 15 due to helicopter activity at the Baltimore City Police helipad.
- An area on the northeast side of the airport off of Runway 33 due to military pre-flight run-ups of A-10C aircraft.
- An area to the southwest side of the airport off of Runway 33 due to fixed-wing arrival operations but dominated by helicopter activity at the Maryland State Police helipad.

The base year contour exposes approximately 283 acres, 278 (98 percent) of which are on airport property, as presented in **Table 4-1**.

Table 4-1. Households, Population, and Acreage within the 2025 Base Year Contour

DNL Contour Interval	Estimated Residential Population	Estimated Residential Housing Units	Area (acres)	On Airport (acres)	On Airport (%)	Off Airport (acres)	Off Airport (%)
65-70 dB	0	0	159	154	97%	5	3%
70-75 dB	0	0	80	80	100%	0	0%
>75 dB	0	0	44	44	100%	0	0%
Total	**0**	**0**	283	278	98%	**5**	2%
Sources: HMMH 2025; 2020 US Census							

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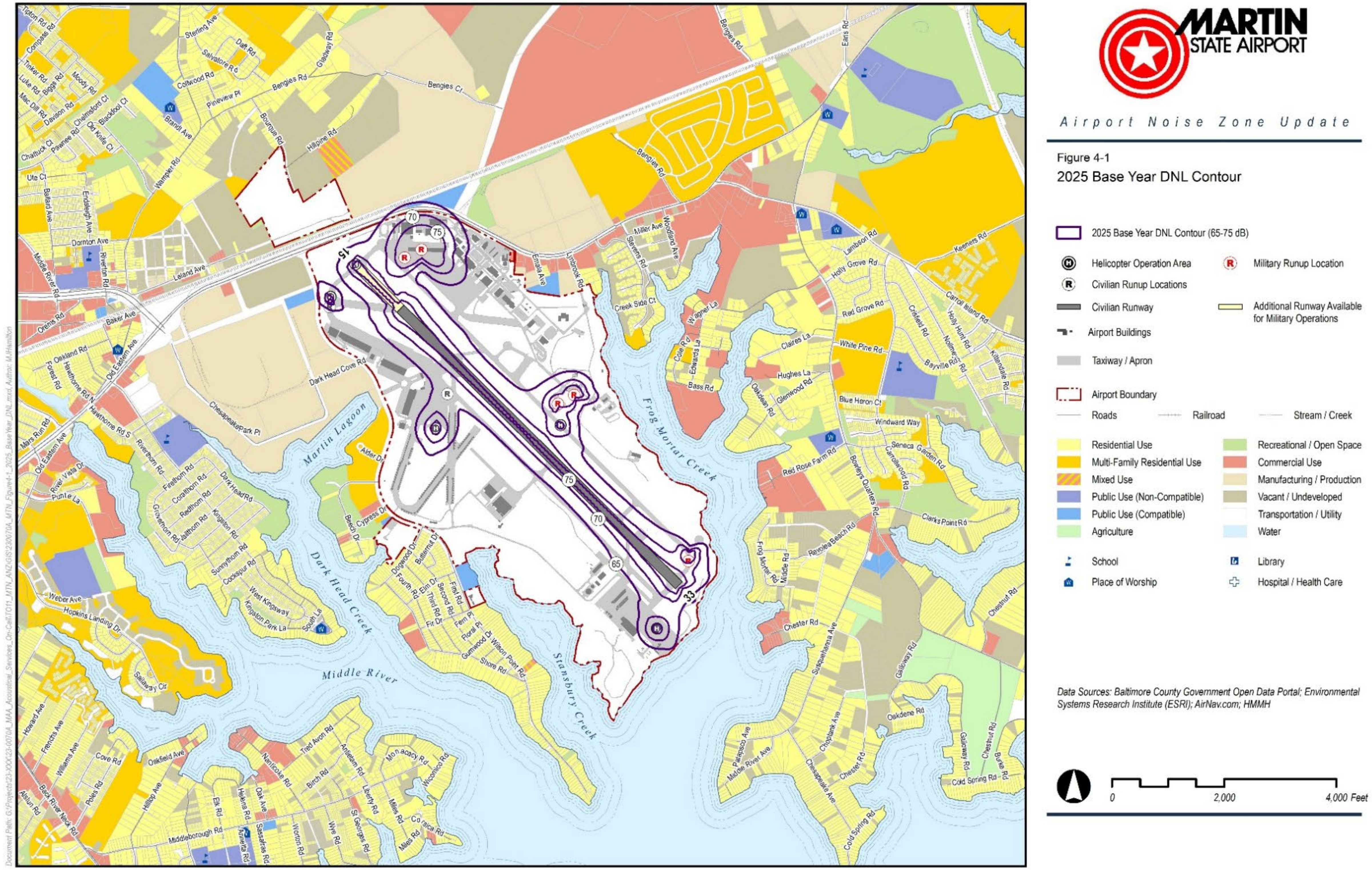
Figure 4-1. 2025 Base Year DNL Contours



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4.2 2030 Five-Year Forecast Contours

Figure 4-2 displays the 2030 five-year 65, 70, and 75 dB DNL contours for MTN. The land use data used to create the base map was derived from various sources, including aerial photography, airport layout and property boundaries, and information on undeveloped land acquired by the MAA.

The 2030 five-year forecast contours are noticeably smaller than those for the base year. The primary reason for this reduction is the MDANG's divestment of A-10C aircraft in 2025. As a result, the 2030 65 dB DNL contour is largely contained within airport property, with the exception of a northwest area off Runway 15, which is related to Baltimore City Police helicopter operations.

Overall, the 2030 five-year forecast contours are approximately 39 percent smaller in area compared to the base year, reflecting the anticipated changes in fleet mix during the 2030 forecast period. These contours cover approximately 172 acres, with 99 percent of that area located on airport property, as presented in **Table 4-2**.

Table 4-2. Households, Population, and Acreage within 2030 Five-Year Forecast DNL Contours

DNL Contour Interval	Estimated Residential Population	Estimated Residential Housing Units	Area (acres)	On Airport (acres)	On Airport (%)	Off Airport (acres)	Off Airport (%)
65-70 dB	0	0	113	113	99%	>1	>1%
70-75 dB	0	0	41	41	100%	0	0%
>75 dB	0	0	18	18	100%	0	0%
Total	**0**	**0**	**172**	**172**	**99%**	**>1**	**>1%**
Sources: HMMH 2025; 2020 US Census							

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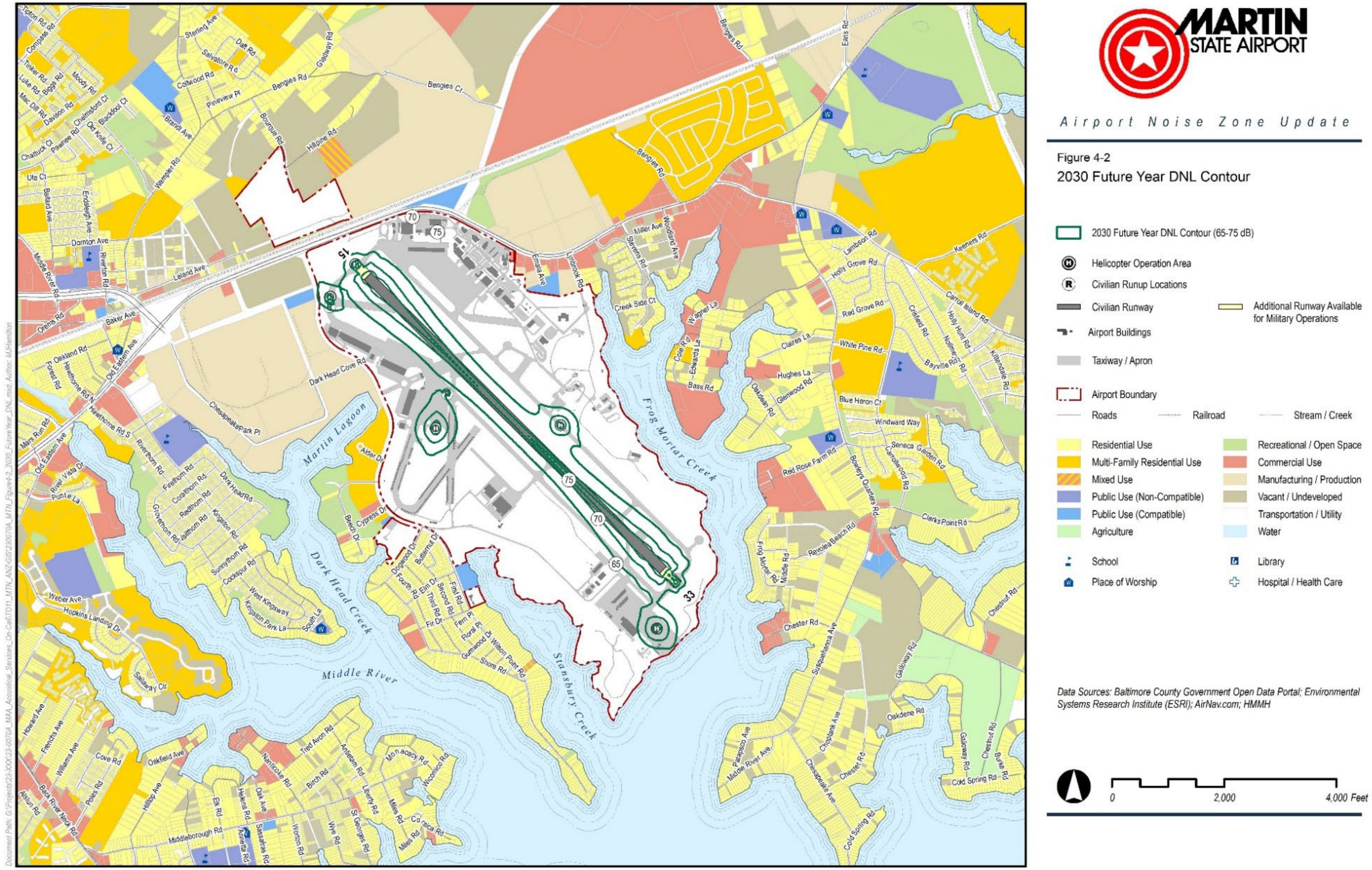
Figure 4-2. 2030 Five-Year Forecast DNL Contours



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4.3 2035 Ten-Year Forecast Contours

Figure 4-3 displays the 2035 ten-year 65, 70, and 75 dB DNL contours for MTN. The land use data used to create the base map was derived from various sources, including aerial photography, airport layout and property boundaries, and information on undeveloped land acquired by the MAA.

The 2035 ten-year forecast contours are noticeably smaller than those for the base year. The primary reason for this reduction is the MDANG's divestment of A-10C aircraft in 2025. As a result, the 2035 65 dB DNL contour is largely contained within airport property, with the exception of a northwest area off Runway 15, which is related to Baltimore City Police helicopter operations.

Overall, the 2035 ten-year forecast contours are approximately 38 percent smaller in area compared to the base year, reflecting the anticipated changes in fleet mix during the 2035 forecast period. These contours cover approximately 174 acres, with 99 percent of that area located on airport property, as presented in **Table 4-3**.

Table 4-3. Households, Population, and Acreage within 2035 Ten-Year Forecast DNL Contours

DNL Contour Interval	Estimated Residential Population	Estimated Residential Housing Units	Area (acres)	On Airport (acres)	On Airport (%)	Off Airport (acres)	Off Airport (%)
65-70 dB	0	0	116	116	99%	>1	>1%
70-75 dB	0	0	41	41	100%	0	0%
>75 dB	0	0	17	17	100%	0	0%
Total	**0**	**0**	**174**	**174**	**99%**	**>1**	**>1%**
Sources: HMMH 2025; 2020 US Census							

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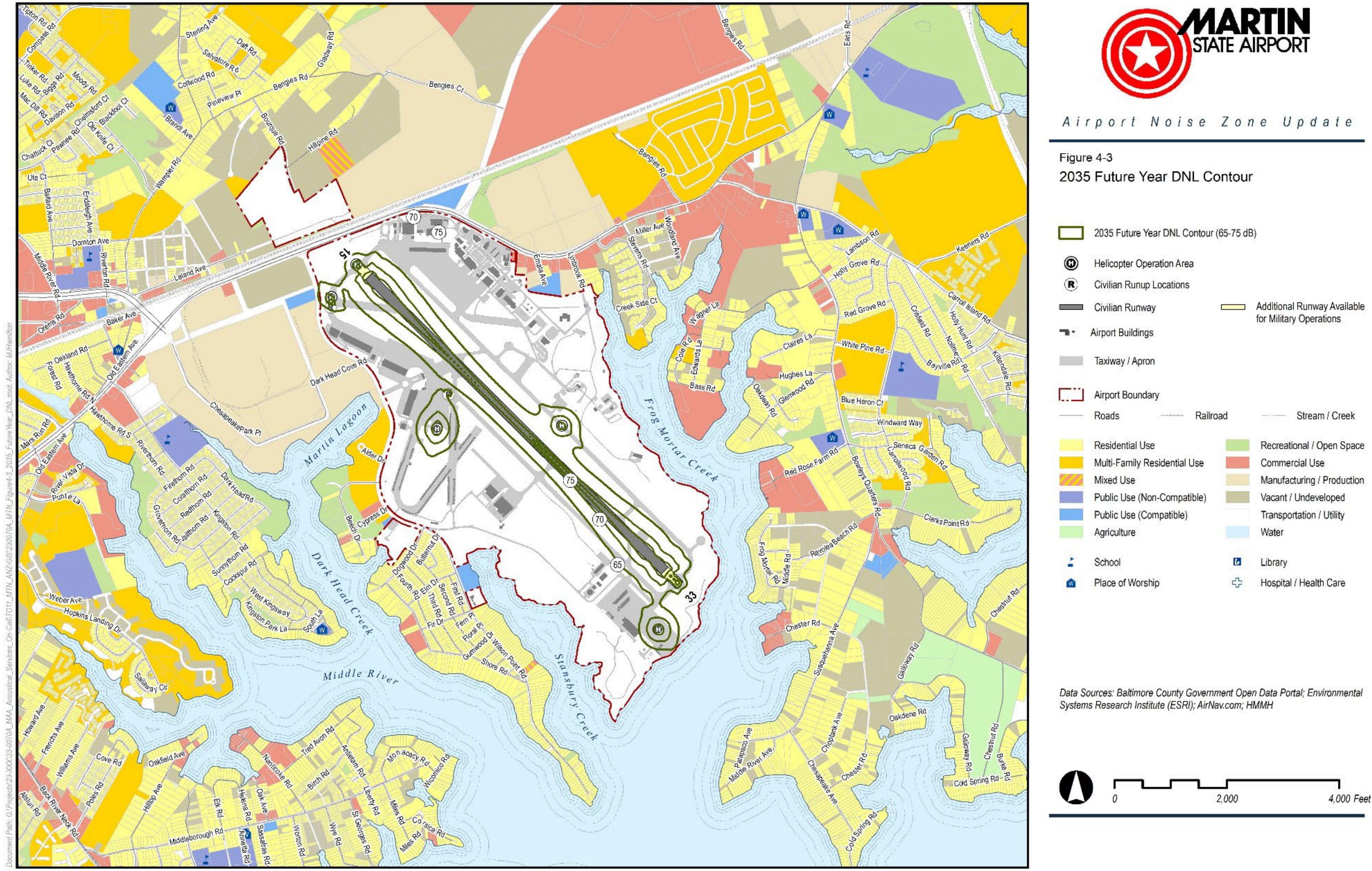
Figure 4-3. 2035 Ten-Year Forecast DNL Contours



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4.4 2025 ANZ Contours and Land Use Inventory

The 2025 MTN ANZ represents a composite of the 65, 70, and 75 dB DNL noise contours for three study years: the base year (2025) and two forecast years (2030 and 2035). The ANZ represents the outermost extent of the annual DNL contours for each of the three study years. As described in Section 1, the ANZ defines the largest area of the existing or future noise exposure contours for planning purposes.

The 2025 ANZ update process included an inventory of the latest land use within the ANZ DNL contour boundary as well as in the vicinity of MTN. An inventory of the land use within the contour boundary and in the vicinity of MTN was conducted in July 2025 and included in the development of the 2025 ANZ DNL contour.

Figure 4-4 presents the 65, 70, and 75 dB DNL contours for the 2025 ANZ in relation to land use surrounding MTN. The shape of the 2025 ANZ composite contours is primarily driven by the 2025 Base Year contours, which include MDANG A-10C operations. The 2030 and 2035 Forecast Year contours reflect forecasted fleet mix changes between 2025 and 2035, including the divestment of A-10C aircraft in 2025. The 2025 ANZ exposes approximately 286 acres to noise levels greater than 65 dB DNL, as presented in **Table 4-4**.

Table 4-4. Households, Population, and Acreage within the 2025 Full Build ANZ

DNL Contour Interval	Estimated Residential Population	Estimated Residential Housing Units	Area (acres)	On Airport (acres)	On Airport (%)	Off Airport (acres)	Off Airport (%)
65-70 dB	0	0	157	152	97%	5	3%
70-75 dB	0	0	82	82	100%	0	0%
>75 dB	0	0	47	47	100%	0	0%
Total	**0**	**0**	**286**	**281**	**98%**	**5**	**2%**
Sources: HMMH 2025; 2020 US Census							

Figure 4-5 presents the 2025 ANZ contours compared to the 2020 ANZ. The 2020 ANZ included a base year of 2020 and forecast years of 2025 and 2030. **Table 4-5** presents a comparison of acreage, estimated population, and estimated housing unit counts for the 2025 ANZ and the previous 2020 ANZ.

Table 4-5. Households, Population, and Acreage within the 2025 Full Build ANZ Compared to the 2020 ANZ

ANZ	Estimated Residential Population	Estimated Residential Housing Units	Area (acres)	On Airport (acres)	On Airport (%)	Off Airport (acres)	Off Airport (%)
2025 ANZ	0	0	286	281	98%	5	2%
2020 ANZ	0	0	411	392	95%	19	5%
Sources: HMMH 2025; 2020 US Census							

As shown in **Figure 4-5**, the 2025 ANZ covers a smaller area than the 2020 ANZ—286 acres compared to 411 acres—representing a 30 percent reduction in land exposed to noise levels above 65 dB DNL. This change reflects differences in the noise exposure patterns displayed in **Figures 4-4** and **4-5**. The reduction in ANZ size is primarily driven by change in military operations between the two analyses, including:

- Fewer A-10C operations conducted by the MDANG in the 2025 Base Year scenario.
- Updated A-10C arrival procedures implemented for 2025, which resulted in lower noise exposure.
- Reduced A-10C activity in future years of the 2025 ANZ compared to the busier 2030 Future Year scenario that influenced the 2020 ANZ.
- Increases in non-military operations in both analyses that were not large enough to offset the noise reduction from decreased A-10C activity.

Together these factors resulted in a more compact 2025 ANZ contour compared to the broader 2020 ANZ.

Figure 4-4. MTN 2025 ANZ Contours

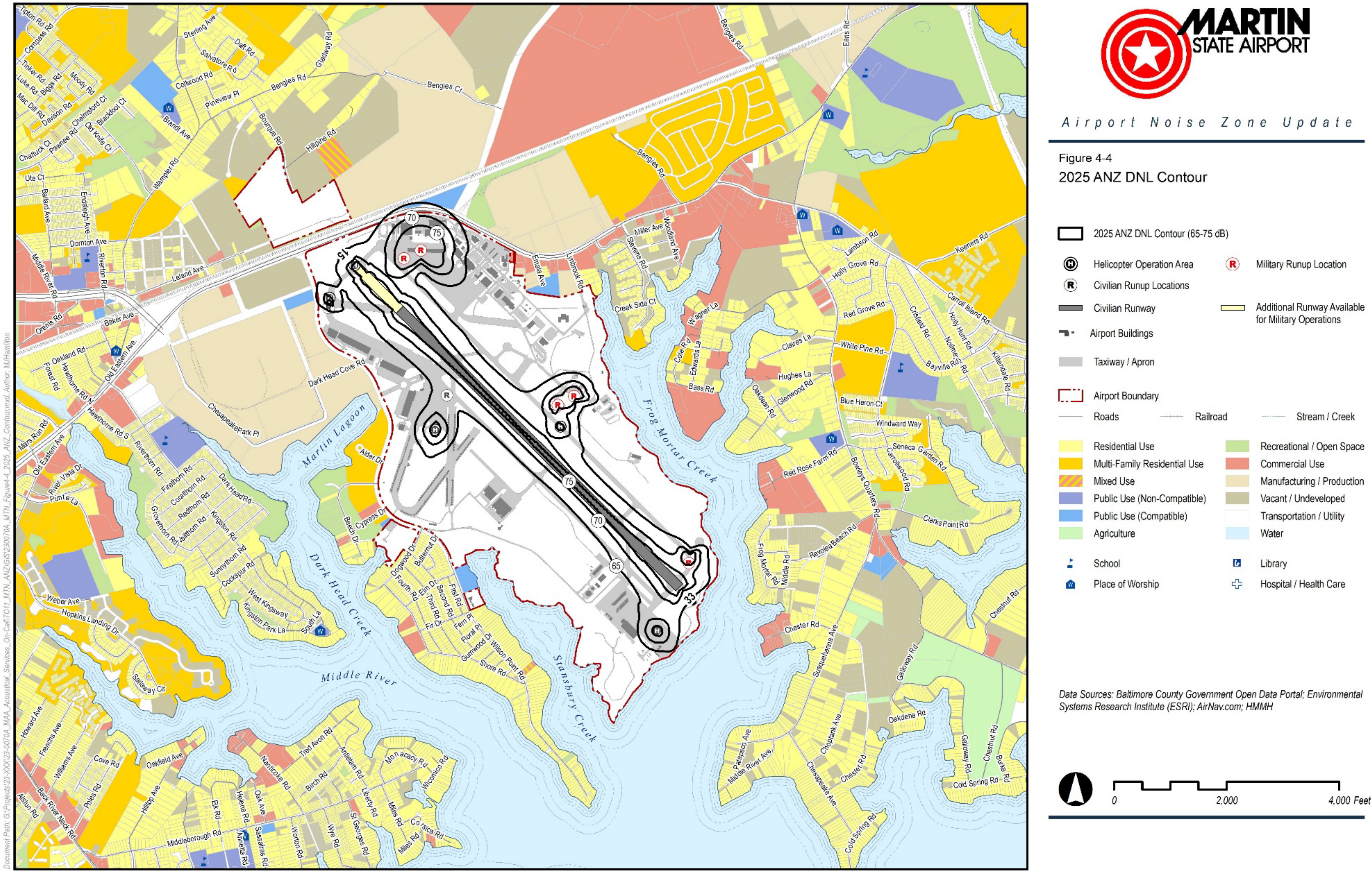
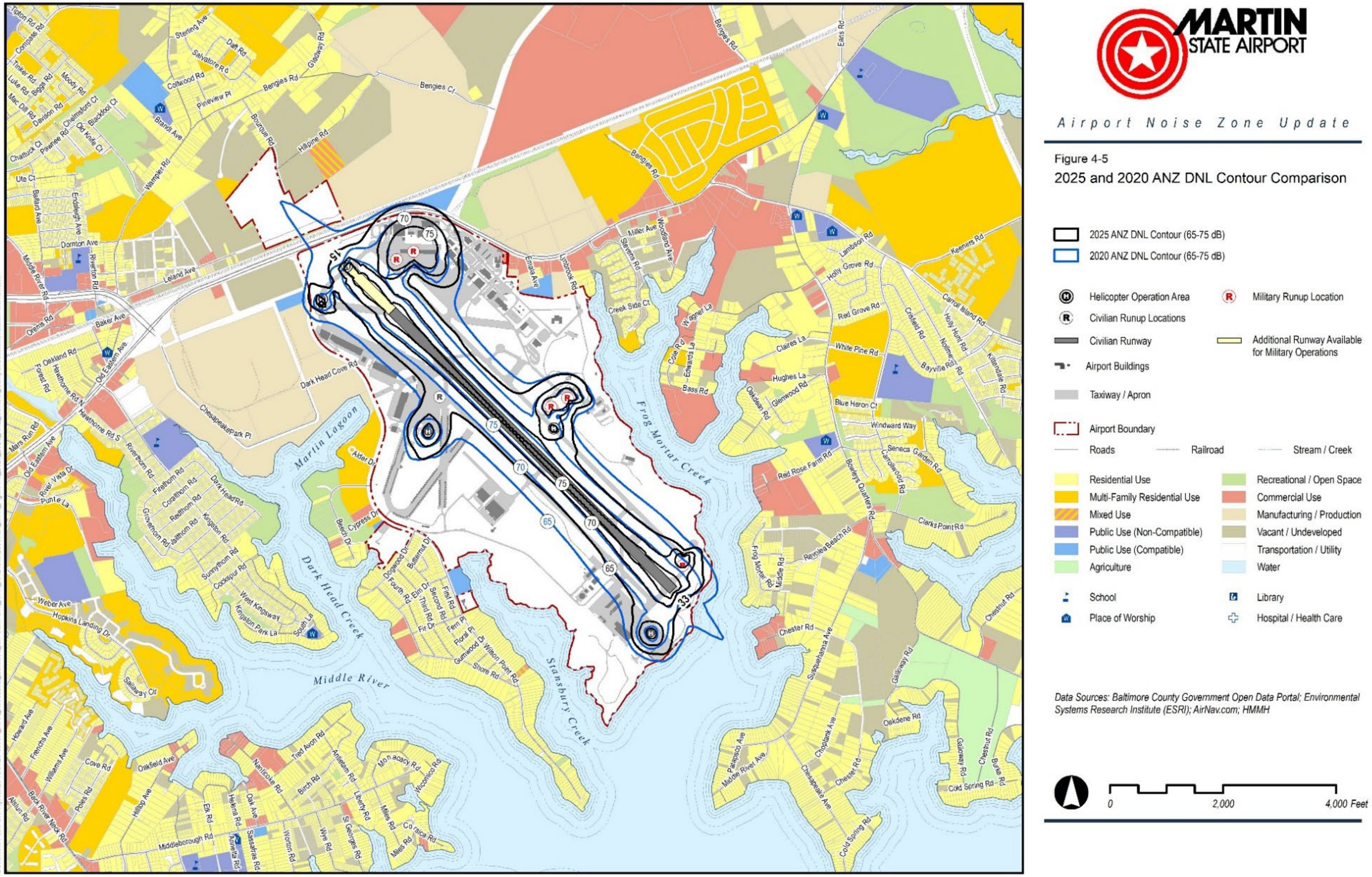


Figure 4-5. 2025 ANZ Compared to 2020 ANZ



5. Noise Abatement Plan

Martin State Airport (MTN) is owned by the State of Maryland and operated by the Maryland Department of Transportation Maryland Aviation Administration (MAA). Regulations regarding the Airport Noise Zone (ANZ) process indicate that if a noncompatible land use area exists within a noise zone, the airport operator shall develop a noise abatement plan (NAP) to reduce the size of or eliminate the impacted land use area by altering the coverage of the noise zone through the application of the best available technology, at a reasonable cost and without impairing safety of flight.[6] The MTN NAP is established pursuant to the Maryland Environmental Noise Act of 1974 (Transportation Article, §§ 5-805, 5-806, and 5-819, Annotated Code of Maryland) and COMAR Section 11.03.02.10.

In 1984, MTN adopted an NAP designed to minimize the noise of aircraft operations within the constraints of the Federal Air Traffic Control System and aircraft safety. The NAP was developed with the cooperation of the MDANG, airport users, the aviation industry, and local governments. It was updated in 2020 to reflect operating conditions at MTN. It was reviewed with no recommended changes as part of the 2025 MTN ANZ update

The NAP is formulated to minimize noise disturbance to neighboring communities while maintaining safe and efficient MTN airport operations. The MAA Division of MTN Airport Operations is responsible for the overall administration of the MTN NAP, and the noise abatement procedures are reproduced on the Martin State Airport Noise Abatement webpage[7] and in Martin State Airport Tenant Directive 501.1, which is distributed to all MTN tenants.[8]

Per COMAR Section 11.03.02.10C(3)(b), the MDANG, the Maryland State Police, and local law enforcement agencies are exempt from the provisions of this regulation when operational necessity dictates noncompliance, or in the event of a State or national emergency.

The NAP is comprised of two parts; (1) the efforts the MAA is taking to mitigate noise in the areas surrounding MTN, and (2) aircraft operating procedures.

5.1 Noise Mitigation Efforts

A. Airport Noise Zone (ANZ)

Maryland law requires the protection of citizens from the impact of transportation related noise. The MAA is required to adopt an ANZ that minimizes the impact of aircraft noise on people living near MTN and prevents incompatible land development around the airport.

[6] Code of Maryland Regulations (COMAR) Title 11 Sections 03.03.04 and 03.01.10 and Sections 5-805, 5-806, and 5¬819 of the Transportation Article, Annotated Code of Maryland.
[7] MAA, *Noise Abatement*, https://martinstateairport.com/noise-abatement/
[8] MAA, *Tenant Information and Directives*, https://martinstateairport.com/tenant-information-directives/

The MTN ANZ is depicted by noise contours surrounding MTN. These lines connect points of equal noise exposure and represent DNL 65 dB, 70 dB, and 75 dB noise contours. These contours represent the boundaries for determining incompatible activities or land uses under Maryland law. The State uses the noise contours adopted in the MTN ANZ to restrict new development that would be incompatible with the cumulative noise exposure level acceptable for an area.

B. Control of Incompatible Development

The State of Maryland regulates land use within the MTN ANZ. Anyone desiring to construct or modify a structure or land use is required to obtain an Airport Zoning Permit. An application can be obtained from the Baltimore County Office of Planning and Zoning or the MAA Office of Planning.[9] The MAA is required by law to approve or deny zoning permits based on the location relative to the MTN ANZ and the compatibility standards listed in the chart below.

NOISE COMPATIBILITY STANDARDS	
Land Use	**Areas of Compatibility (Noise Levels)**
Residences, schools, hospitals, libraries, churches, auditoriums, rest homes, nursing homes, concert halls.	Up to 65 DNL
Transient lodging, hotels, motels, sports arenas, outdoor spectator sports, playgrounds, neighborhood parks, noise sensitive manufacturing.	Up to 70 DNL
Golf courses, riding stables, water recreation, cemeteries, office buildings, retail and wholesale establishments, movie theaters, restaurants, industry, manufacturing, utilities, livestock farming, animal breeding.	Up to 75 DNL
Agriculture (except livestock), mining, fishing, aviation related uses.	All
Source: COMAR 11.03.03.03, *Limits for Cumulative Noise Exposure,* http://mdrules.elaws.us/comar/11.03.03.03	

For example, a person may wish to build a new housing development within the DNL 65 dB noise contour (i.e. within the ANZ). As the maximum limit for new residential land use is DNL 65 dB, the applicant would be denied a permit by the MAA. In the event a permit application is denied by the MAA, the applicant may appeal to the Board of Airport Zoning Appeals (BAZA) for a variance. The BAZA may deny an appeal or grant a variance requiring construction standards designed to reduce noise exposure to future occupants. The BAZA was created in 1974 by the Maryland General Assembly and is composed of 10 citizen members appointed by the Governor.

Under the current procedures, a house built within the ANZ would require a variance from BAZA. If the Board approves a variance, the applicant is typically required to meet the following conditions:

- Provide a report from an acoustical engineer demonstrating that the proposed construction will provide adequate sound insulation and achieve an interior noise level of 45 dB.
- Agree to complete a post construction noise test to demonstrate that the house meets the required interior noise level of 45 dB.

[9] MAA, *Permits & Forms*, https://www.marylandaviation.com/content/permitsandforms/constructionzoning/index.html

- Agree not to apply for a Use and Occupancy Permit until BAZA approves the results of the post construction test.
- Agree to grant an avigation easement to the MAA that includes a provision relinquishing any right to receive remuneration or any other compensation or benefit under any program designed to allay, abate, or compensate for the effects of aircraft noise and emissions in connection with the operation of MTN Airport.

C. Noise Concerns

MTN maintains telephone service to enable citizens to register noise-related complaints at any time 24 hours per day, 7 days a week. The telephone number is 410-682-8802. Complaints are investigated if appropriate and the complainant is provided with any relevant information.

Additionally, citizens can monitor MTN aircraft operations and register complaints utilizing MAA's WebTrak system (https://webtrak.emsbk.com/bwi3). WebTrak provides an interactive portal for the viewing of aircraft in the vicinity of MTN as well as BWI Marshall and provides the opportunity to file noise complaints directly to the MAA. WebTrak users can geolocate a place of interest (home, work, etc.) and view either current (20-minute delayed) or historical aircraft overflights. WebTrak includes an aircraft's type, altitude, origin and destination airports, and flight identification. Inquiries and complaints about aircraft flights at MTN submitted through WebTrak are passed to MTN Operations and Maintenance staff for review and follow-up. Note: WebTrak does not include data on military aircraft flights or operations due to reasons of national security.

D. Maryland Air National Guard (MDANG) Noise Barriers:

In 1989, MDANG erected noise barriers to provide reductions in noise impacts from engine maintenance activity for areas east and northeast of MTN.

E. Aircraft Maintenance Engine Run-up Areas

Aircraft maintenance engine run-ups are to be accomplished only in areas designated by the Chief, MTN Operations & Maintenance in accordance with MTN Tenant Directive 200.2.

5.2 MTN Noise Abatement Procedures

A. Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) Departures

1. VFR Piston-engine Aircraft:
   Runway 15/33 – Unless otherwise instructed by Air Traffic Control (ATC), aircraft fly runway heading to 1,000 feet Mean Sea Level (MSL) prior to turning to the ATC approved on-course heading or crosswind leg of the traffic pattern.
2. VFR Turbine Powered Aircraft:
   Runway 15/33 – Unless otherwise instructed by ATC, aircraft shall fly runway heading to 1,500 feet MSL prior to turning to the ATC approved, on-course heading or crosswind leg of the traffic pattern.

3. VFR Helicopter Departures:
   Unless operating under a Letter of Agreement (LOA) with MTN ATC specifying otherwise, helicopters shall climb to 500 feet above ground level (AGL) on initial departure heading before turning on-course.
4. All IFR Departures:
   IFR departures shall be accomplished in accordance with ATC direction or clearance.

B. VFR and IFR Arrivals and Traffic Patterns

VFR and IFR aircraft approach should, to the maximum extent feasible, maintain the highest practical altitude, commensurate with flight and ATC procedures in order to minimize aircraft noise exposure to communities underlying the final approach courses.

C. Closed Traffic Patterns

A left-hand traffic pattern shall be used at MTN unless otherwise directed by ATC. Piston fixed-wing aircraft should fly runway heading until reaching 1,000 feet MSL prior to turning to the crosswind leg of the traffic pattern. Turbine aircraft should fly runway heading until reaching 1,500 feet MSL prior to turning to the crosswind leg of the traffic pattern.

Traffic pattern altitudes are:

Fixed Wing	Piston engine	1,000’ MSL
	Civil turbine and military turboprop	1,500’ MSL
	Military Jet	2,000’ MSL
Rotary Wing		500’ MSL

D. Touch-and-Go or Practice Approaches

1. No touch-and-go and/or practice approaches or practice landings are permitted between 10:00 p.m. to 6:00 a.m. daily unless approved by MTN Operations and Maintenance staff.
2. Between 6:00 a.m. – 10:00 p.m. daily:

FAA Weight Class	Description	Weight	Limitation
Small	Small Single Engine/Twin Engine Aircraft, Helicopters, and Transient Military (e.g. Cessna 172, Piper Cherokee)	12,500 lbs. or less	No restrictions
Medium	Medium Aircraft and Transient Military* (e.g. military fighter jets, Learjet 35, Bombardier CRJ-200LR)	Between 12,500 and 41,000 lbs.	Limit of two practice approaches
Large	Large Jet/Large Commuter/757/Heavy Aircraft	More than 41,000 lbs.	Practice approaches and landings are not authorized without prior permission from MTN Operations and Maintenance staff.

* Military aircraft shall be limited to two practice landings/take-offs or approaches unless additional operations are approved by MTN Operations and Maintenance staff.
Source: FAA, https://aspmhelp.faa.gov/index.php/Weight_Class

6. Public Consultation

The ANZ update process included multiple public consultation efforts to ensure that MTN stakeholder input is reflected in the resulting ANZ contour and NAP documentation. This public involvement component included two major initiatives: (1) voluntarily forming and convening a Stakeholder Advisory Committee (SAC) and (2) conducting a public workshop and hearing.

6.1 Stakeholder Advisory Committee (SAC)

The SAC was formed to include representatives of community and industry stakeholder groups with an interest in airport activities, ensuring they remained informed of the 2025 MTN ANZ update process and methodology. SAC members were invited to participate throughout the MTN ANZ update process by attending meetings and providing input on the process. SAC members were expected to share pertinent MTN ANZ update information with the groups or any interested citizens that they represent.

The SAC served in an advisory role to the MAA solely for purposes of the MTN ANZ update process. The SAC is composed of stakeholders representing all significant interests at MTN, including representatives from:

- Local government planning staff
- Community organizations
- MTN tenants and users
- Aviation trade associations

The MAA encouraged SAC members to review study inputs, assumptions, analyses, and documentation. They were also encouraged to provide input, advice, and guidance related to the ANZ and NAP. SAC members were asked to review the land use inventory and planning considerations.

The SAC was convened three times during the ANZ update process. All meetings were held in Hangar 4 at MTN. The first meeting was held on April 2, 2025. During the first meeting the MAA presented the purpose and objectives of the update process, along with preliminary planning parameters. At the second meeting, held on June 26, 2025, noise modeling inputs and additional background information was presented to the SAC. At the third meeting, held on September 25, 2025, the presentation covered the resulting contours and land use inventory, as well as a review of the NAP. Prior to the third meeting, ANZ noise contours and the related land-use inventory, along with the NAP, were shared with all SAC members for review. All meeting materials, including the SAC committee roster, meeting invitations, sign-in sheets, meeting minutes, and presentations are included in Appendix C.

6.2 Public Workshop and Hearing

As required by Maryland law, a public workshop and hearing will be held concerning the 2025 MTN ANZ, which will offer all interested persons an opportunity to comment on proposed revisions to the MTN ANZ and NAP.

The public workshop and hearing will be held on March 18, 2026 from 6:00 p.m. to 8:00 p.m. at Hangar 4, 701 Wilson Point Road, Middle River, Maryland. During the workshop, MAA and HMMH staff will be available to discuss the MTN ANZ update process and outcomes. Public comments on the MAA's 2025 MTN ANZ and NAP will be accepted during the hearing via a court reporter. Additional public comments will be accepted via email or postal mail throughout the comment period. Information concerning the public workshop and hearing are available at the MAA's Aviation Noise website: https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/.

Public Hearing and Workshop Information		
Date: March 18, 2026	Time: 6:00 p.m. – 8:00 p.m. EDT	Location: 701 Wilson Point Rd, Middle River, MD 21220

The MAA will consider all oral and written comments received during the public comment period. Notification in the Maryland Register formally adopts the 2025 ANZ and NAP into Maryland law. The MAA will then certify and submit the adopted ANZ to the Baltimore County Land Record Officer for use in land-use planning and development. The public workshop materials will be provided in Appendix E, including invitations, documentation of public notices, attendance information, presentation materials, and the hearing transcript. Appendix F will contain documentation of public comments.

MARYLAND DEPARTMENT OF TRANSPORTATION

MARYLAND AVIATION ADMINISTRATION

2025 Airport Noise Zone Update

Appendices

MARTIN STATE AIRPORT

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Appendix A. Aircraft Noise Terminology

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Noise is a complex physical quantity. The properties, measurement, and presentation of noise involve specialized terminology that can be difficult to understand. To provide a basic reference on these technical issues, this section introduces fundamentals of noise terminology, the effects of noise on human activity, and noise propagation.

A.1 Introduction to Noise Terminology

Analyses of potential impacts from changes in aircraft noise levels rely largely on a measure of cumulative noise exposure over an entire calendar year, expressed in terms of a metric called the Day-Night Average Sound Level (DNL/L_{dn}). However, DNL is not the only metric for measuring noise. A variety of metrics, which are further described in subsequent subsections, are used to describe noise, including:

- Sound Pressure Level, SPL, and the decibel, dB
- A-Weighted Decibel, dBA
- Maximum A-Weighted Sound Level, L_{max}
- Time Above, TA
- Sound Exposure Level, SEL
- Equivalent A-Weighted Sound Level, L_{eq}
- Day-Night Average Sound Level, DNL/L_{dn}

A.2 Sound Pressure Level, SPL, and the Decibel, dB

All sounds come from a sound source—a musical instrument, a voice speaking, an airplane passing overhead. It takes energy to produce sound. The sound energy produced by any sound source travels through the air in sound waves—tiny, quick oscillations of pressure just above and just below atmospheric pressure. The ear senses these pressure variations and, with much processing in our brain, translates them into “sound.”

Our ears are sensitive to a wide range of sound pressures. The loudest sounds that we can hear without pain contain about one million times more energy than the quietest sounds we can detect. To allow us to perceive sound over this very wide range, our ear/brain “auditory system” compresses our response in a complex manner, represented by a term called sound pressure level (SPL), which is expressed in units called decibels (dB).

Mathematically, SPL is a logarithmic quantity based on the ratio of two sound pressures: the numerator being the pressure of the sound source of interest (P_{source}) and the denominator being a reference pressure ($P_{reference}$).[1]

$$\text{Sound Pressure Level (SPL)} = 20 * Log\left(\frac{P_{source}}{P_{reference}}\right) dB$$

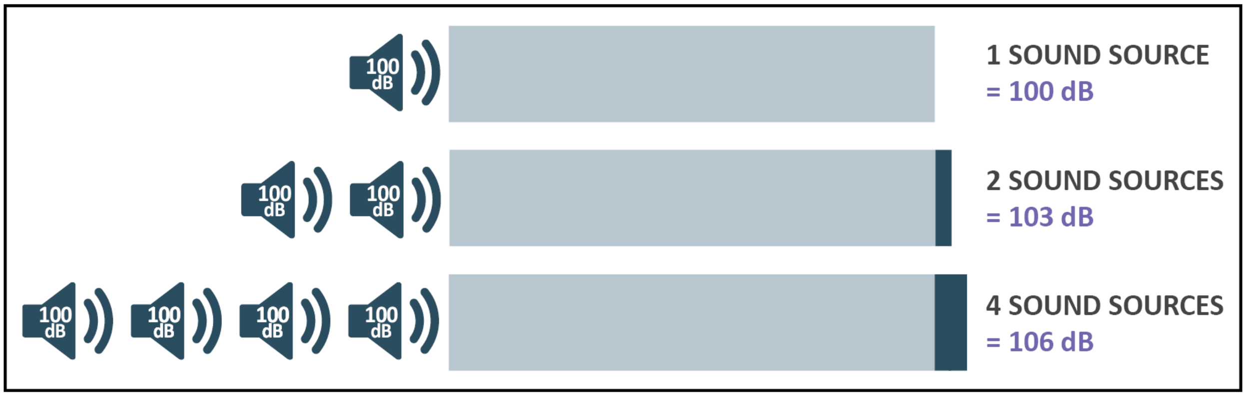
The logarithmic conversion of sound pressure to SPL means that the quietest sound that we can hear (the reference pressure) has a sound pressure level of about 0 dB, while the loudest sounds that we hear

[1] The reference pressure is approximately the quietest sound that a healthy young adult can hear.

without pain have sound pressure levels of about 120 dB. Most sounds in our day-to-day environment have sound pressure levels from about 40 to 100 dB.[2]

Because decibels are logarithmic quantities, we cannot use common arithmetic to combine them. For example, if two sound sources each produce 100 dB operating individually, when they operate simultaneously, they produce 103 dB, not the 200 dB we might expect. Increasing to four equal sources operating simultaneously will add another 3 dB of noise, resulting in a total SPL of 106 dB. For every doubling of the number of equal sources, the SPL increases by another 3 dB. This is illustrated in **Figure A-1**.

Figure A-1. Combined Sound Levels for Equal Sources



If one noise source is much louder than another is, the louder source "masks" the quieter one and the two sources together produce virtually the same SPL as the louder source alone. For example, a 100 dB and an 80 dB source produce approximately 100 dB of noise when operating together.

Two useful “rules of thumb” related to SPL are worth noting: (1) humans generally perceive a 6 to 10 dB increase in SPL to be about a doubling of loudness,[3] and (2) changes in SPL of less than about 3 dB for a particular sound are not readily detectable outside of a laboratory environment.

A.3 A-Weighted Decibel

An important characteristic of sound is its frequency, or "pitch.” This is the per-second oscillation rate of the sound pressure variation at our ear, expressed in units known as Hertz (Hz).

When analyzing the total noise of any source, acousticians often break the noise into frequency components (or bands) to consider the “low,” “medium,” and “high” frequency components. This breakdown is important for two reasons:

- Our ear is better equipped to hear middle and high frequencies and is least sensitive to lower frequencies. Thus, we find mid- and high-frequency noise more annoying.
- Engineering solutions to noise problems differ with frequency content. Low-frequency noise is generally harder to control.

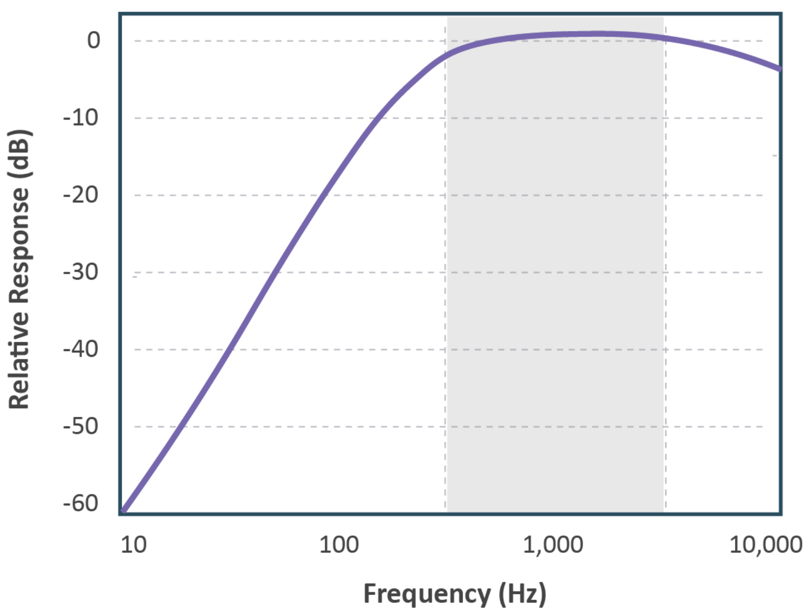
[2] The logarithmic ratio used in its calculation means that SPL changes relatively quickly at low sound pressures and more slowly at high pressures. This relationship matches human detection of changes in pressure. We are much more sensitive to changes in level when the SPL is low (for example, hearing a baby crying in a distant bedroom), than we are to changes in level when the SPL is high (for example, when listening to highly amplified music).

[3] A “10 dB per doubling” rule of thumb is the most often used approximation.

The normal frequency range of hearing for most people extends from a low of about 20 Hz to a high of about 10,000 to 15,000 Hz. Most people respond to sound most readily when the predominant frequency is in the range of normal conversation, typically around 1,000 to 2,000 Hz. The acoustical community has defined several “filters,” which approximate this sensitivity of our ear and thus, help us to judge the relative loudness of various sounds made up of many different frequencies.

The so-called "A" filter (“A weighting”) generally does the best job of matching human response to most environmental noise sources, including natural sounds and sound from common transportation sources. “A-weighted decibels” are abbreviated “dBA.” Because of the correlation with our hearing, the U. S. Environmental Protection Agency (EPA) and nearly every other federal and state agency have adopted A-weighted decibels as the metric for use in describing environmental and transportation noise. **Figure A-2** depicts A-weighting adjustments to sound from approximately 20 Hz to 10,000 Hz.

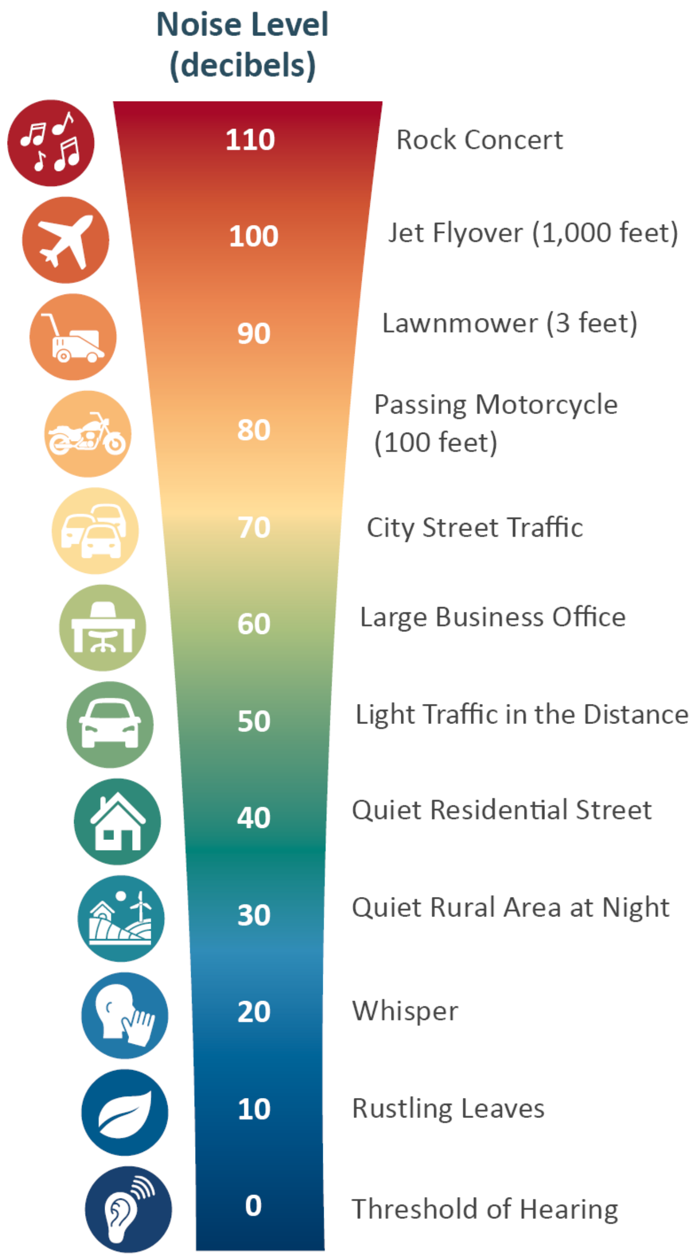
Figure A-2. A-Weighting Frequency Response



As the figure shows, A-weighting significantly de-emphasizes noise content at lower and higher frequencies where we do not hear as well, and has little effect, or is nearly "flat,” for mid-range frequencies between 1,000 and 5,000 Hz. All sound pressure levels presented in this document are A-weighted unless otherwise specified.

Figure A-3 depicts representative A-weighted sound levels for a variety of common sounds.

Figure A-3. A-Weighted Sound Levels for Common Sounds

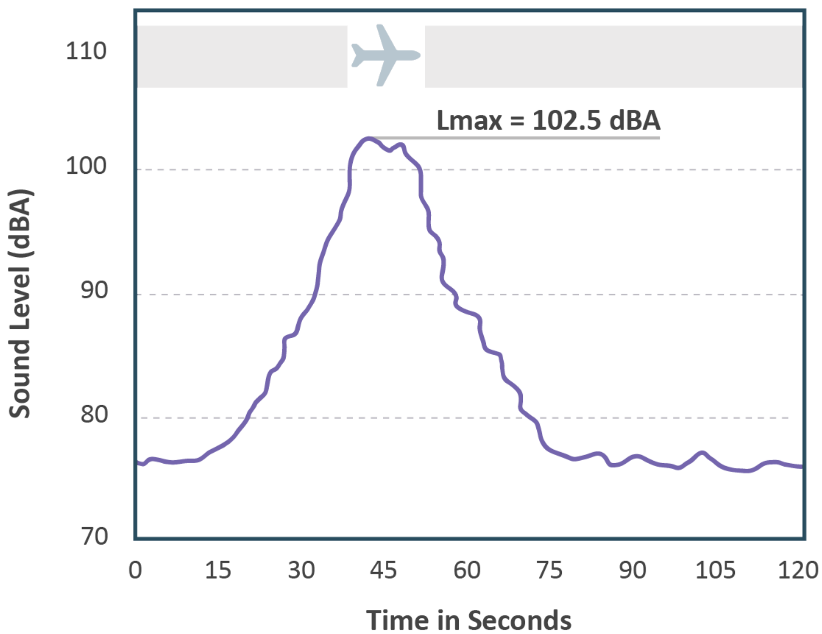


A.4 Maximum A-Weighted Sound Level, L_{max}

An additional dimension to environmental noise is that A-weighted levels vary with time. For example, the sound level increases as a car or aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance. The background or "ambient" level continues to vary in the absence of a distinctive source, for example, due to birds chirping, insects buzzing, or leaves rustling. It is often convenient to describe a particular noise "event" (such as a vehicle passing by, a dog barking, etc.) by its maximum sound level, abbreviated as L_{max}.

Figure A-4 depicts this general concept, for a hypothetical noise event with an L_{max} of approximately 102 dB.

Figure A-4. Variation in A-Weighted Sound Level over Time and Maximum Noise Level



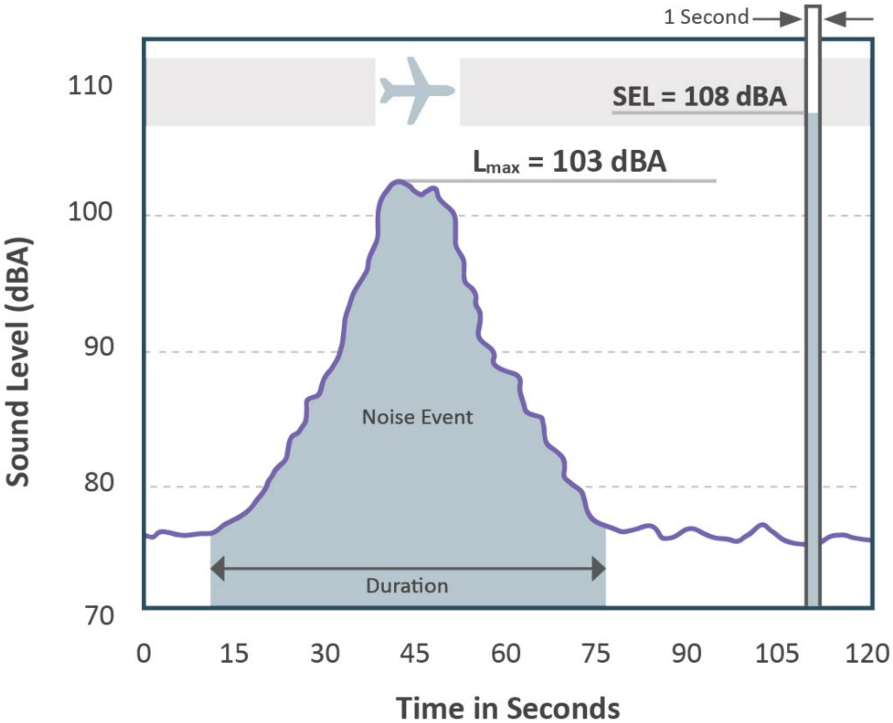
While the maximum level is easy to understand, it suffers from a serious drawback when used to describe the relative “noisiness” of an event such as an aircraft flyover, i.e., it describes only one dimension of the event and provides no information on the event’s overall, or cumulative, noise exposure. In fact, two events with identical maximum levels may produce very different total exposures. One may be of very short duration, while the other may continue for an extended period and be judged to be much more annoying. The next section introduces a measure that accounts for this concept of a noise "dose," or the cumulative exposure associated with an individual “noise event” such as an aircraft flyover.

A.5 Sound Exposure Level, SEL

The most commonly used measure of cumulative noise exposure for an individual noise event, such as an aircraft flyover, is the Sound Exposure Level, or SEL. SEL is a summation of the A-weighted sound energy over the entire duration of a noise event. SEL expresses the accumulated energy in terms of the one-second-long steady-state sound level that would contain the same amount of energy as the actual time-varying level.

SEL provides a basis for comparing noise events that generally match our impression of their overall “noisiness,” including the effects of both duration and level. The higher the SEL, the more annoying a noise event is likely to be. In simple terms, SEL “compresses” the energy for the noise event into a single second. **Figure A-5** depicts this compression. Note that the SEL is higher than the L_{max}.

Figure A-5. Graphical Depiction of Sound Exposure Level



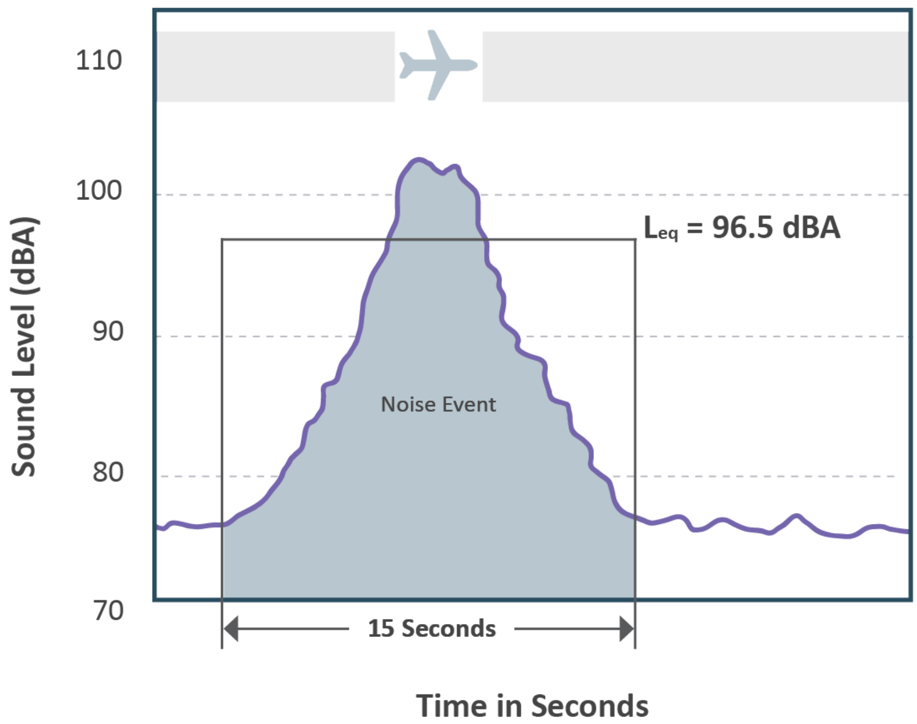
The "compression" of energy into 1 second means that a given noise event's SEL will almost always will be a higher value than its L_{max}. For most aircraft flyovers, SEL is roughly 5 to 12 dB higher than L_{max}. Adjustment for duration means that relatively slow and quiet propeller aircraft can have the same or higher SEL than faster, louder jets, which produce shorter duration events.

A.6 Equivalent A-Weighted Sound Level, L_{eq}

The Equivalent Sound Level, abbreviated L_{eq}, is a measure of the exposure resulting from the accumulation of sound levels over a particular period of interest, e.g., 1 hour, an 8-hour school day, nighttime, or a full 24-hour day. L_{eq} plots for consecutive hours can help illustrate how the noise dose rises and falls over a day or how a few loud aircraft significantly affect some hours.

L_{eq} may be thought of as the constant sound level over the period of interest that would contain as much sound energy as the actual varying level. It is a way of assigning a single number to a time-varying sound level. **Figure A-6** illustrates this concept for the same hypothetical event shown in **Figure A-4** and **A-5**. Note that the L_{eq} is lower than either the L_{max} or SEL.

Figure A-6. Example of a 15-Second Equivalent Sound Level



A.7 Day-Night Average Sound Level, DNL or L_{dn}

The FAA requires that airports use a measure of noise exposure that is slightly more complicated than L_{eq} to describe cumulative noise exposure—the Day-Night Average Sound Level or DNL.

The EPA identified DNL as the most appropriate means of evaluating airport noise based on the following considerations.[4]

- The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods.
- The measure should correlate well with known effects of the noise environment and on individuals and the public.
- The measure should be simple, practical, and accurate. In principle, it should be useful for planning as well as for enforcement or monitoring purposes.
- The required measurement equipment, with standard characteristics, should be commercially available.
- The measure should be closely related to existing methods currently in use.
- The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.
- The measure should lend itself to small, simple monitors, which can be left unattended in public areas for long periods.

[4] EPA, 1974, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, EPA Report No. 550/9-74-004, March.

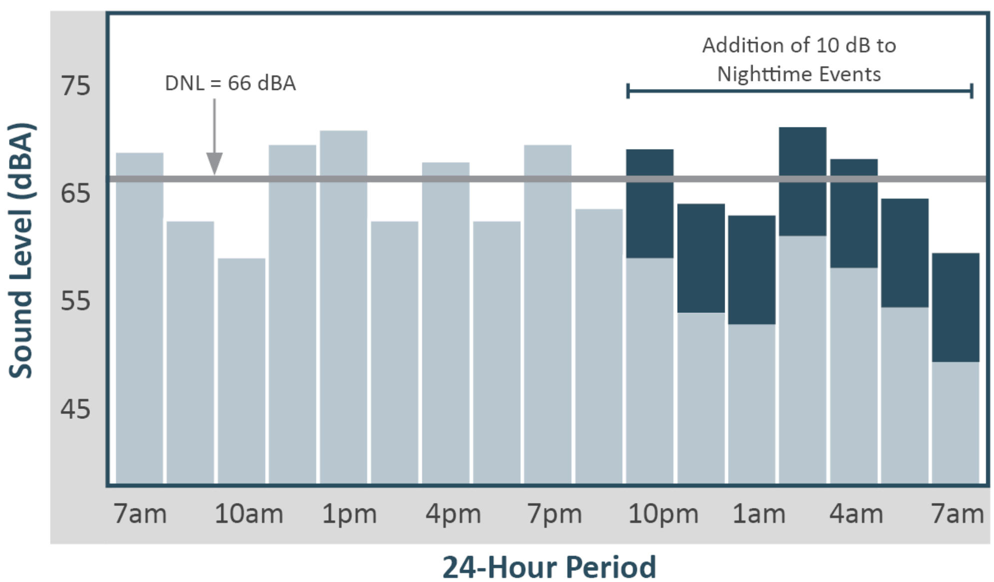
Most federal agencies dealing with noise have formally adopted DNL. The Federal Interagency Committee on Noise (FICON) reaffirmed the appropriateness of DNL in 1992. The FICON summary report stated, "There are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric."[5] This determination was reaffirmed in 2018 in a report from the Federal Interagency Committee on Aviation Noise (FICAN), the successor to FICON. Additionally, in response to a requirement in the FAA Reauthorization Act of 2018 stating that the FAA "evaluate alternative noise metrics to current average day-night level standard, such as the use of actual noise sampling to address community airplane noise concerns",[6] in 2020 the FAA published a report that recommended the continued use of DNL for its decision-making regarding noise compatibility.

In simple terms, DNL is the 24-hour L_{eq} with one adjustment: all noises occurring at night (defined as 10 p.m. through 7 a.m.) are increased by 10 dB to reflect the added intrusiveness of nighttime noise events when background noise levels decrease. In calculating aircraft exposure, this 10 dB increase is mathematically identical to counting each nighttime aircraft noise event 10 times.

DNL can be measured or estimated. Measurements are practical only for obtaining DNL values for limited numbers of points, and, in the absence of a permanently installed monitoring system, only for relatively short periods. Most airport noise studies use computer-generated DNL estimates depicted as equal-exposure noise contours (much as topographic maps have contours of equal elevation).

The annual DNL is mathematically identical to the DNL for the average annual day, i.e., a day on which the number of operations is equal to the annual total divided by 365 (366 in a leap year). **Figure A-7** graphically depicts the manner in which the nighttime adjustment applies in calculating DNL.

Figure A-7. Example of a Day-Night Average Sound Level Calculation



[5] FICON, 1992, Federal Agency Review of Selected Airport Noise Analysis Issues, August, https://www.faa.gov/fican/about_ficon_findings_1992.pdf
[6] FAA Reauthorization Act of 2018, Pub. L. 115254, § 188, 132 Stat. 3186, https://www.congress.gov/115/plaws/publ254/PLAW-115publ254.pdf

A.8 Aircraft Noise Effects on Human Activity

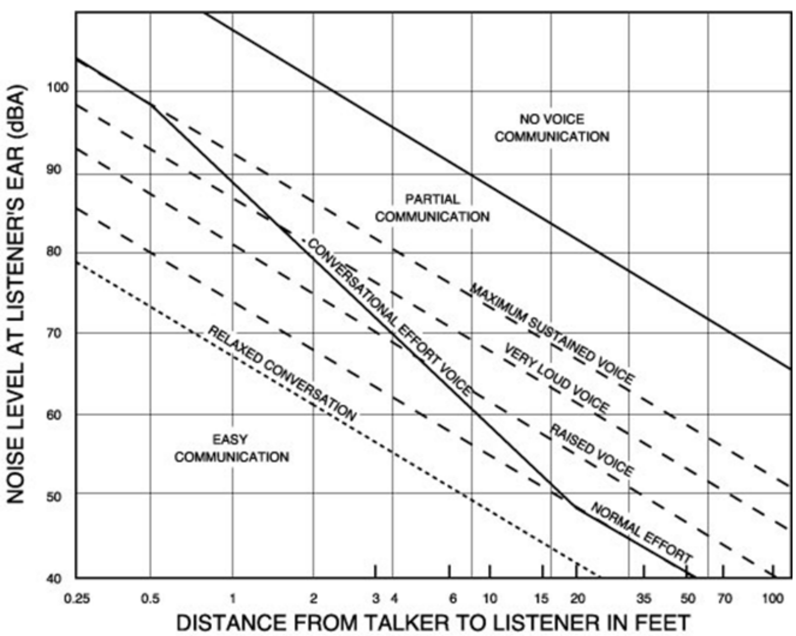
Aircraft noise can be an annoyance and a nuisance. It can interfere with conversation and listening to television, disrupt classroom activities in schools, and disrupt sleep. Relating these effects to specific noise metrics helps in the understanding of how and why people react to their environment.

Speech Interference

One potential effect of aircraft noise is its tendency to "mask" speech, making it difficult to carry on a normal conversation. The sound level of speech decreases as the distance between a talker and listener increases. As the background sound level increases, it becomes harder to hear speech.

Figure A-8 presents typical distances between talker and listener for satisfactory outdoor conversations, in the presence of different steady A-weighted background noise levels for raised, normal, and relaxed voice effort. As the background level increases, the talker must raise their voice, or the individuals must get closer together to continue talking.

Figure A-8. Outdoor Speech Intelligibility



Source: EPA, 1974, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March, p.D-5.

Satisfactory conversation does not always require hearing every word; 95 percent intelligibility is acceptable for many conversations. In relaxed conversation, however, we have higher expectations of hearing speech and generally require closer to 100 percent intelligibility. Any combination of talker-listener distances and background noise that falls below the bottom line in the figure (which roughly represents the upper boundary of 100 percent intelligibility) represents an ideal environment for outdoor speech communication. Indoor communication is generally acceptable in this region as well.

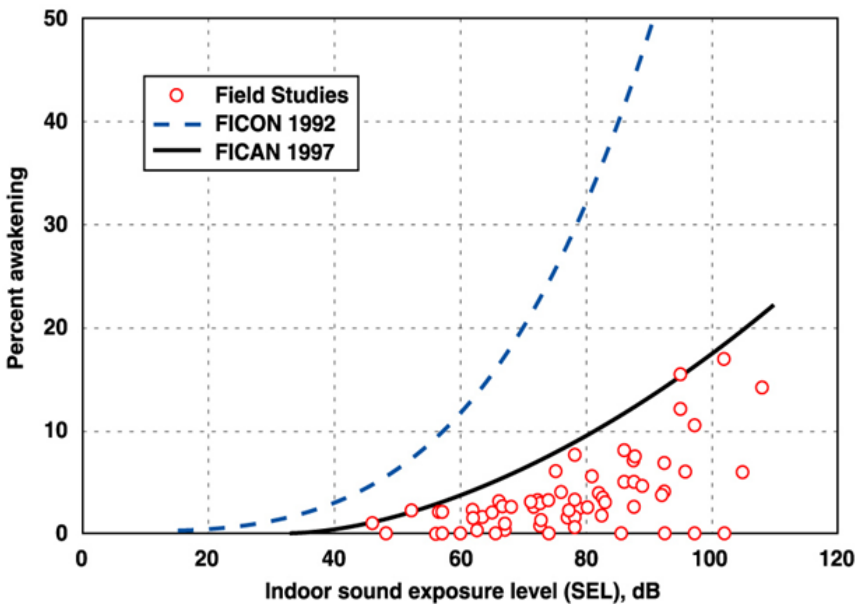
One implication of the relationships in **Figure A-8** is that for typical communication distances of 3 or 4 feet, acceptable outdoor conversations can be carried on in a normal voice as long as the background noise outdoors is less than about 65 dB. If the noise exceeds this level, as might occur when an aircraft passes overhead, intelligibility would be lost unless vocal effort were increased or communication distance were decreased.

Indoors, typical distances, voice levels, and intelligibility expectations generally require a background level less than 45 dB. With windows partly open, housing generally provides about 10 to 15 dB of interior-to-exterior noise level reduction. Thus, if the outdoor sound level is 60 dB or less, there is a reasonable chance that the resulting indoor sound level will afford acceptable interior conversation. With windows closed, 24 dB of attenuation is typical.

Sleep Interference

Research on sleep disruption from noise has led to widely varying observations. In part, this is because (1) sleep can be disturbed without awakening, (2) the deeper the sleep the more noise it takes to cause arousal, and (3) the tendency to awaken increases with age and other factors. **Figure A-9** shows a summary of findings on the topic.

Figure A-9. Sleep Interference



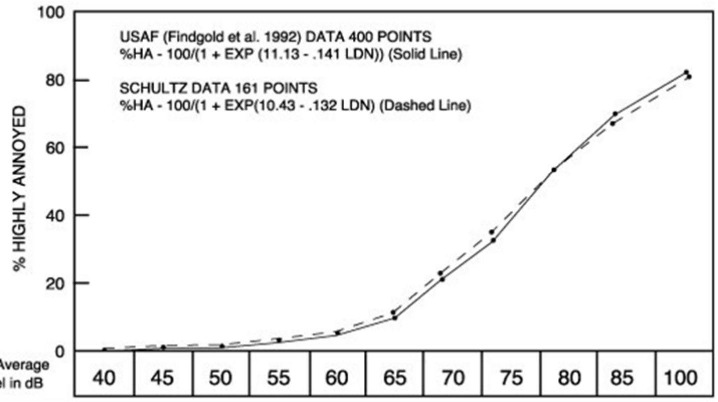
Source: FICAN, 1997, *Effects of Aviation Noise on Awakenings from Sleep*, June, p. 6

Figure A-9 uses indoor SEL as the measure of noise exposure; current research supports the use of this metric in assessing sleep disruption. An indoor SEL of 80 dBA results in a maximum of 10 percent awakening.

Community Annoyance

Numerous psychoacoustic surveys provide substantial evidence that individual reactions to noise vary widely with noise exposure level. Since the early 1970s, researchers have determined (and subsequently confirmed) that aggregate community response is generally predictable and relates reasonably well to cumulative noise exposure such as DNL. COMAR provides methods for the calculation of noise exposure including metrics and measurement methods.[7] **Figure A-10** depicts the widely recognized relationship between environmental noise and the percentage of people "highly annoyed," with annoyance being the key indicator of community response usually cited in this body of research. This relationship is commonly referred to as the Schultz curve and has formed the basis for the significance threshold of DNL 65 dB.

Figure A-10. Percentage of People Highly Annoyed

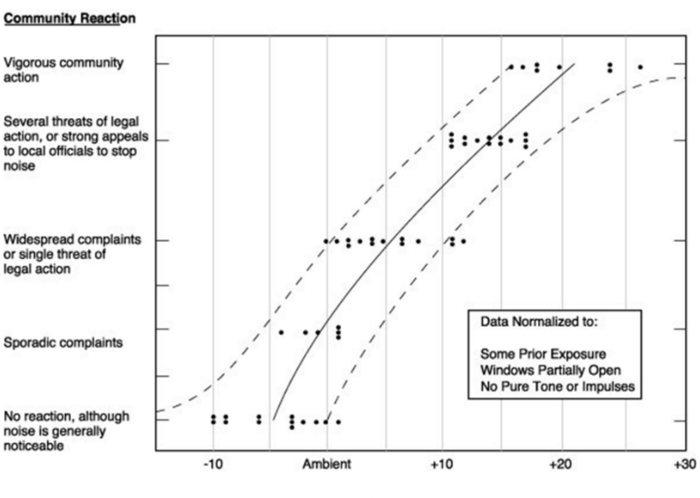


Day - Night Average Sound Level in dB		40	45	50	55	60	65	70	75	80	85	100
Calculated %HA Points	USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
	SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Source: FICON, 1992, *Federal Agency Review of Selected Airport Noise Analysis Issues*, September

Separate work by the EPA has shown that overall community reaction to a noise environment also depends on DNL. **Figure A-11** depicts this relationship. Data summarized in the figure suggest that little reaction would be expected for intrusive noise levels five decibels below the ambient level, while widespread complaints can be expected as intruding noise exceeds background levels by about five decibels. Vigorous action is likely when levels exceed the background by 20 dB.

Figure A-11. Community Reaction as a Function of Outdoor DNL



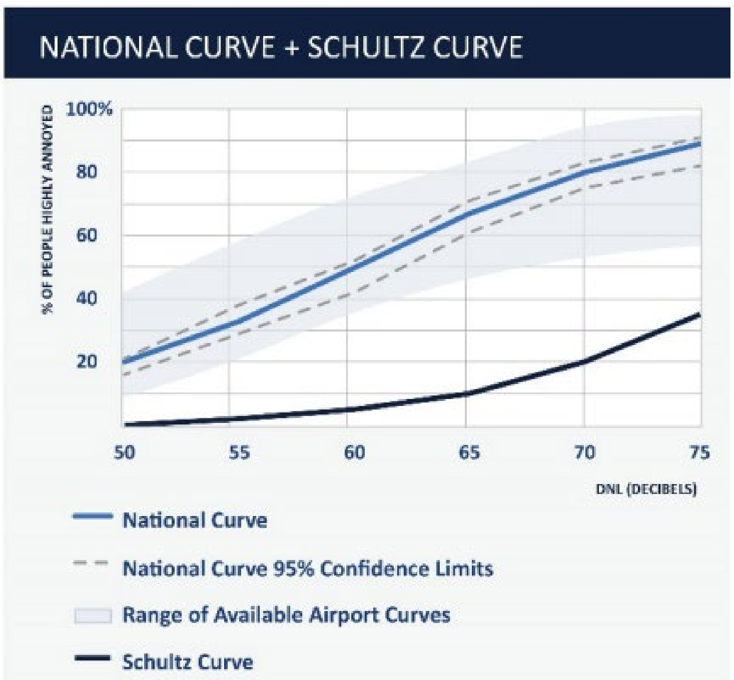
Source: Wyle Laboratories, 1971, *Community Noise*, prepared for the U.S. Environmental Protection Agency, Office of Noise Abatement and Control, Washington, D.C., December, p. 63

[7] COMAR. 11.03.03.02. Methods for Calculation and Measurement of Levels of Cumulative Noise Exposure. http://mdrules.elaws.us/comar/11.03.03.02

In 2017, the FAA initiated the Neighborhood Environmental Survey (NES), a multi-year research program to update scientific evidence on the relationship between aircraft noise exposure and its effects on communities around airports. The NES resulted in an updated dose-response curve for the percentage of people highly annoyed by environmental noise at varying levels of DNL. This updated curve shows a marked increase in the number of people highly annoyed by environmental noise at a given DNL compared to the Schultz curve, as shown in **Figure A-12**. The analysis of the NES data, published in 2021, notes that the Schultz curve is over 40 years old and aircraft operational environment at the time of Schultz's work was very different from today, with louder and less frequent operations.[8]

In 2023, the FAA initiated a review of its policies regarding civil aviation noise in response to public and stakeholder input on the FAA's ongoing research. This National Policy Review (NPR) includes a review of research on the effects of exposure to aviation noise and review and possible revision of the noise metrics used to describe exposure to aircraft and vehicle noise, the defined thresholds for significant noise exposure, and thresholds for land uses compatible with airport operations.[9] Specifically, the FAA is reviewing the use of DNL as the primary noise metric for cumulative aircraft noise exposure, as well as the threshold of DNL 65 dB for significant noise effects and land use compatibility.

Figure A-12. Comparison of Dose-Response Curves for Annoyance at a Given DNL



Source: FAA, 2023, Noise Policy Review, *The Foundational Elements of the FAA Civil Aviation Noise Policy: The Noise Measurement System, its Component Noise Metrics, and Noise Thresholds*, FAA Office of Environment and Energy, April 28

[8] FAA, 2021, *Analysis of the Neighborhood Environmental Survey*, April

[9] FAA, 2023, FAA Noise Policy Review, *The Foundational Elements of the FAA Civil Aviation Noise Policy: The Noise Measurement System, its Component Noise Metrics, and Noise Thresholds*, FAA Office of Environment and Energy, April 28

A.9 Noise Propagation

This section presents information on sound-propagation effect due to weather, source-to-listener distance, and vegetation.

A.10 Weather-Related Effects

Weather (or atmospheric) conditions that can influence the propagation of sound include humidity, precipitation, temperature, wind, and turbulence (or gustiness). The effect of wind—turbulence in particular—is generally more important than the effects of other factors. Under calm wind conditions, the importance of temperature (in particular vertical "gradients") can increase, sometimes to very significant levels. Humidity generally has little significance relative to the other effects.

Influence of Humidity and Precipitation

Humidity and precipitation rarely affect sound propagation in a significant manner. Humidity can reduce propagation of high-frequency noise under calm-wind conditions. This is called "atmospheric absorption." In very cold conditions, listeners often observe that aircraft sound "tinny" because the dry air increases the propagation of high-frequency sound. Rain, snow, and fog also have little, if any noticeable effect on sound propagation. A substantial body of empirical data supports these conclusions.[10]

Influence of Temperature

The velocity of sound in the atmosphere is dependent on the air temperature.[11] As a result, if the temperature varies at different heights above the ground, sound will travel in curved paths rather than straight lines. During the day, temperature normally decreases with increasing height. Under such "temperature lapse" conditions, the atmosphere refracts ("bends") sound waves upwards and an acoustical shadow zone may exist at some distance from the noise source.

Under some weather conditions, an upper level of warmer air may trap a lower layer of cool air. Such a "temperature inversion" is most common in the evening, at night, and early in the morning when heat absorbed by the ground during the day radiates into the atmosphere.[12] The effect of an inversion is just the opposite of lapse conditions. It causes sound propagating through the atmosphere to refract downward.

The downward refraction caused by temperature inversions often allows sound rays with originally upward-sloping paths to bypass obstructions and ground effects, increasing noise levels at greater distances. This type of effect is most prevalent at night, when temperature inversions are most common and when wind levels often are very low, limiting any confounding factors.[13] Under extreme conditions, one study found that noise from ground-borne aircraft might be amplified 15 to 20 dB by a temperature inversion. In a

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[10] Ingard, Uno, 1953, "A Review of the Influence of Meteorological Conditions on Sound Propagation," *Journal of the Acoustical Society of America*, Vol. 25, No. 3, May, p. 407.

[11] In dry air, the approximate velocity of sound can be obtained from the relationship:
$c = 331 + 0.6T_c$ (c in meters per second, T_c in degrees Celsius). Pierce, Allan D., *Acoustics: An Introduction to its Physical Principles and Applications.* McGraw-Hill. 1981. p. 29.

[12] Embleton, T.F.W., G.J. Thiessen, and J.E. Piercy, 1976, "Propagation in an inversion and reflections at the ground," *Journal of the Acoustical Society of America*, Vol. 59, No. 2, February, p. 278.

[13] Ingard, Uno, 1953, "A Review of the Influence of Meteorological Conditions on Sound Propagation," *Journal of the Acoustical Society of America*, Vol. 25, No. 3, May, p. 407.

similar study, noise caused by an aircraft on the ground registered a higher level at an observer location 1.8 miles away than at a second observer location only 0.2 miles from the aircraft.[14]

Influence of Wind

Wind has a strong directional component that can lead to significant variation in propagation. In general, receivers that are downwind of a source will experience higher sound levels, and those that are upwind will experience lower sound levels. Wind perpendicular to the source-to-receiver path has no significant effect.

The refraction caused by wind direction and temperature gradients is additive.[15] One study suggests that for frequencies greater than 500 Hz, the combined effects of these two factors tend towards two extreme values: approximately 0 dB in conditions of downward refraction (temperature inversion or downwind propagation) and -20 dB in upward refraction conditions (temperature lapse or upwind propagation). At lower frequencies, the effects of refraction due to wind and temperature gradients are less pronounced.[16]

Wind turbulence (or "gustiness") can also affect sound propagation. Sound levels heard at remote receiver locations will fluctuate with gustiness. In addition, gustiness can cause considerable attenuation of sound due to effects of eddies traveling with the wind. Attenuation due to eddies is essentially the same in all directions, with or against the flow of the wind, and can mask the refractive effects discussed above.[17]

A.11 Distance-Related Effects

People often ask how distance from an aircraft to a listener affects sound levels. Changes in distance may be associated with varying terrain, offsets to the side of a flight path, or aircraft altitude. The answer is a bit complex, because distance affects the propagation of sound in several ways.

The principal effect results from the fact that any emitted sound expands in a spherical fashion—like a balloon—as the distance from the source increases, resulting in the sound energy being spread out over a larger volume. With each doubling of distance, spherical spreading reduces instantaneous or maximum level by approximately 6 dB and SEL by approximately 3 dB.

A.12 Vegetation-Related Effects

Sound can be scattered and absorbed as it travels through vegetation. This results in a decrease in sound levels. The literature on the effect of vegetation on sound propagation contains several approaches to calculating its effect. Though these approaches differ in some aspects, they agree on the following:

- The vegetation must be dense and deep enough to block the line of sight.
- The noise reduction is greatest at high frequencies and least at low frequencies.

[14]Dickinson, P.J., 1976, "Temperature Inversion Effects on Aircraft Noise Propagation," (Letters to the Editor) *Journal of Sound and Vibration.* Vol. 47, No. 3, p. 442.
[15] Piercy JE and Embleton, TF. 1977. "Review of noise propagation in the atmosphere." *J Acoust Soc Am*. Jun;61(6):1403-18, p. 1412. Note, in addition, that as a result of the scalar nature of temperature and the vector nature of wind, the following is true: under lapse conditions, the refractive effects of wind and temperature add in the upwind direction and cancel each other in the downwind direction. Under inversion conditions, the opposite is true.
[16] Piercy JE and Embleton, TF. 1977. "Review of noise propagation in the atmosphere." *J Acoust Soc Am*. Jun;61(6):1403-18, p. 1413.
[17] Ingard, Uno, 1953, "A Review of the Influence of Meteorological Conditions on Sound Propagation," *Journal of the Acoustical Society of America*, Vol. 25, No. 3, May, pp. 409-410.

The International Standard ISO 9613-2[18] provides a useful example of the types of calculations employed in these methods. Originally developed for industrial noise sources, ISO 9613-2 is well-suited for the evaluation of ground-based aircraft noise sources under favorable meteorological conditions for sound propagation. ISO 9613-2's methodology for calculating sound propagation includes geometric dispersion from acoustical point sources, atmospheric absorption, the effects of areas of hard and soft ground, screening due to barriers, and reflections. The attenuation provided by dense foliage varies by octave band and by distance as shown in **Table A-1**.

For propagation through less than 10 m of dense foliage, no attenuation is assumed. For propagation through 10 m to 20 m of dense foliage, the total attenuation is shown in the first row of Table A-1.

For distances between 20 m and 200 m, the total attenuation is computed by multiplying the distance of propagation through dense foliage by the dB/m values shown in the second row of Table A-1.

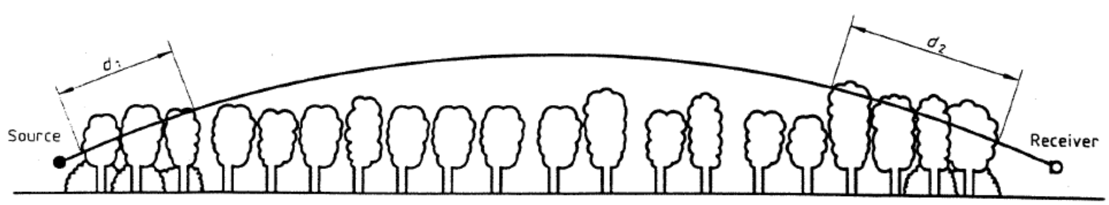
Table A-1. Dense Foliage Noise Attenuation

Propagation Distance	Nominal Midband Frequency (Hz)							
	63	125	250	500	1,000	2,000	4,000	8,000
10 m to 20 m (dB Attenuation)	0	0	1	1	1	1	2	3
20 m to 200 m (dB/m Attenuation)	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.12

Source: ISO 9613-2, Table A.1

ISO 9613-2 assumes a moderate downwind condition. The equations in the ISO Standard also hold, equivalently, for average propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights. In either case, the sound is refracted downward. The radius of this curved path is assumed to be 5 km. With this curved sound path, only portions of the sound path may travel through the dense foliage, as illustrated by **Figure A-13**. Thus, the relative locations of the source and receiver, the dimensions of the volume of dense foliage, and the contours of the intervening terrain are essential to the estimation of the noise attenuation.

Figure A-13. Downward Refracting Sound Path (source: ISO 9613-2)



As illustrated in **Figure A-13**, the foliage only provides attenuation if the sound path passes through the foliage. For aircraft in the air, the sound will pass through little, if any foliage. Additionally, either the noise source or receiver must be near the foliage for it to have an effect.

[18] International Organization for Standardization, 1996, *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General Method of calculation*, International Standard ISO9613-2, Geneva, Switzerland, December.

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Appendix B. MTN 2025 Airport Noise Zone Overlaid on County Tax Maps

These are reduced scale versions of the MTN ANZ. The official versions have six sheets plotted at 1 inch=2,000 feet and six sheets plotted at 1 inch = 600 feet.

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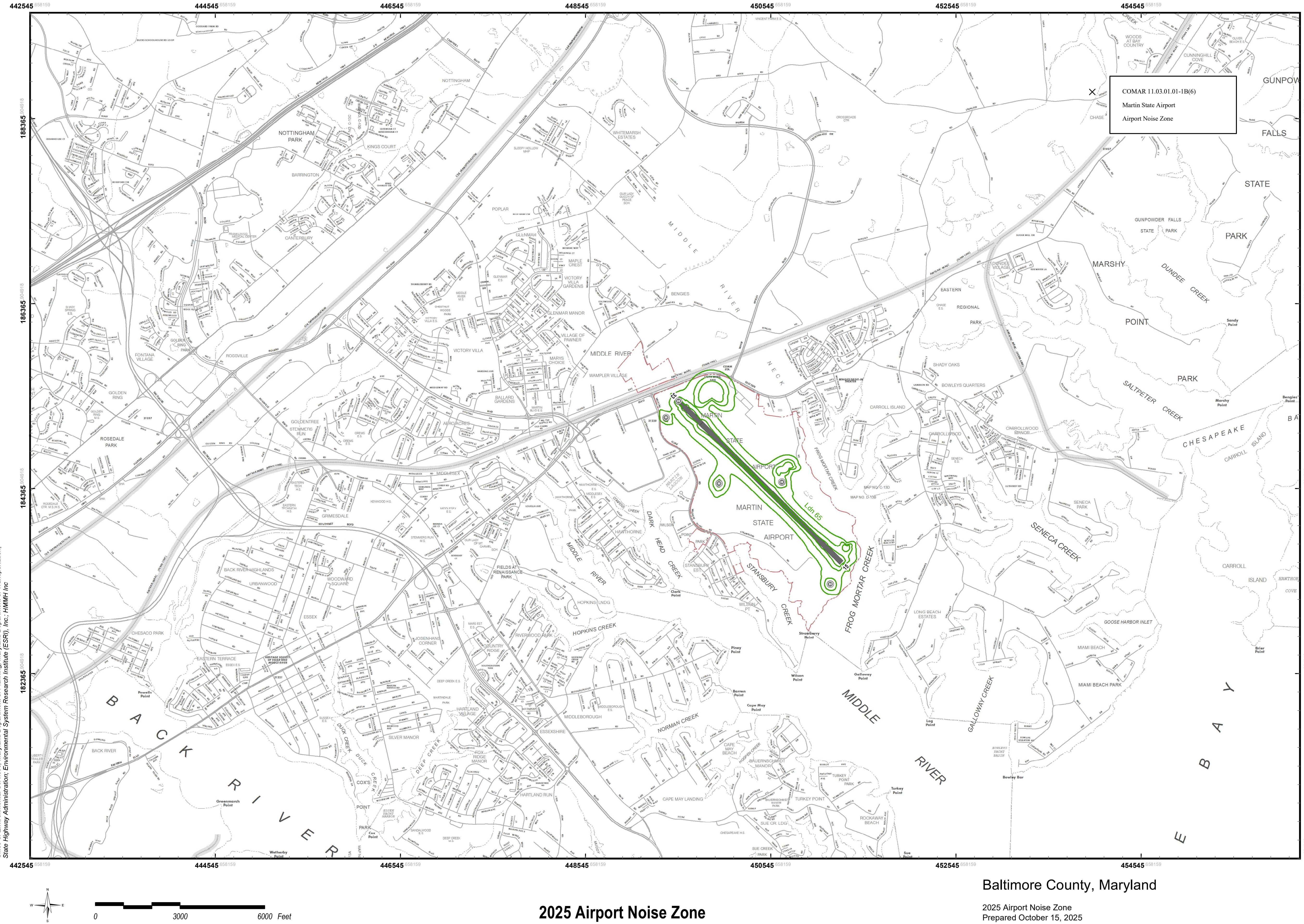
COMAR 11.03.01.01-1B(6)
Martin State Airport
Airport Noise Zone

MARTIN STATE AIRPORT
AIRPORT NOISE ZONE

Prepared by:
Maryland Department of Transportation
Maryland Aviation Administration

Assisted by:
Harris Miller Miller & Hanson Inc.

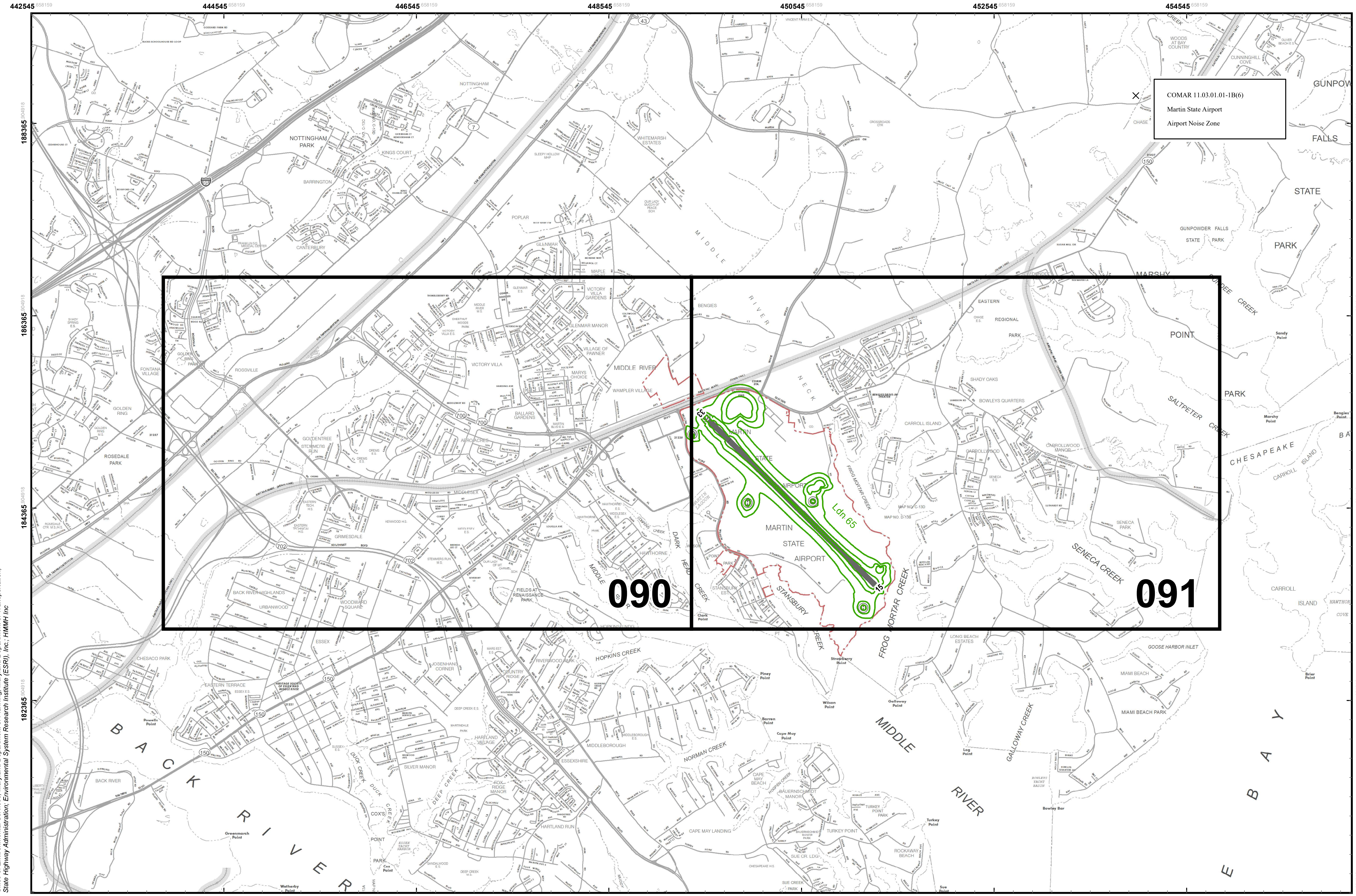


Data Sources: Maryland Department of Transportation, Maryland Aviation Administration, Office of Environmental Services; Maryland Department of Planning; Maryland Department of Transportation, State Highway Administration; Environmental System Research Institute (ESRI), Inc.; HMMH Inc

2025 Airport Noise Zone

Baltimore County, Maryland

2025 Airport Noise Zone
Prepared October 15, 2025



Data Sources: Maryland Department of Transportation, Maryland Aviation Administration, Office of Environmental Services; Maryland Department of Planning; Maryland Department of Transportation, State Highway Administration; Environmental System Research Institute (ESRI), Inc.; HMMH Inc

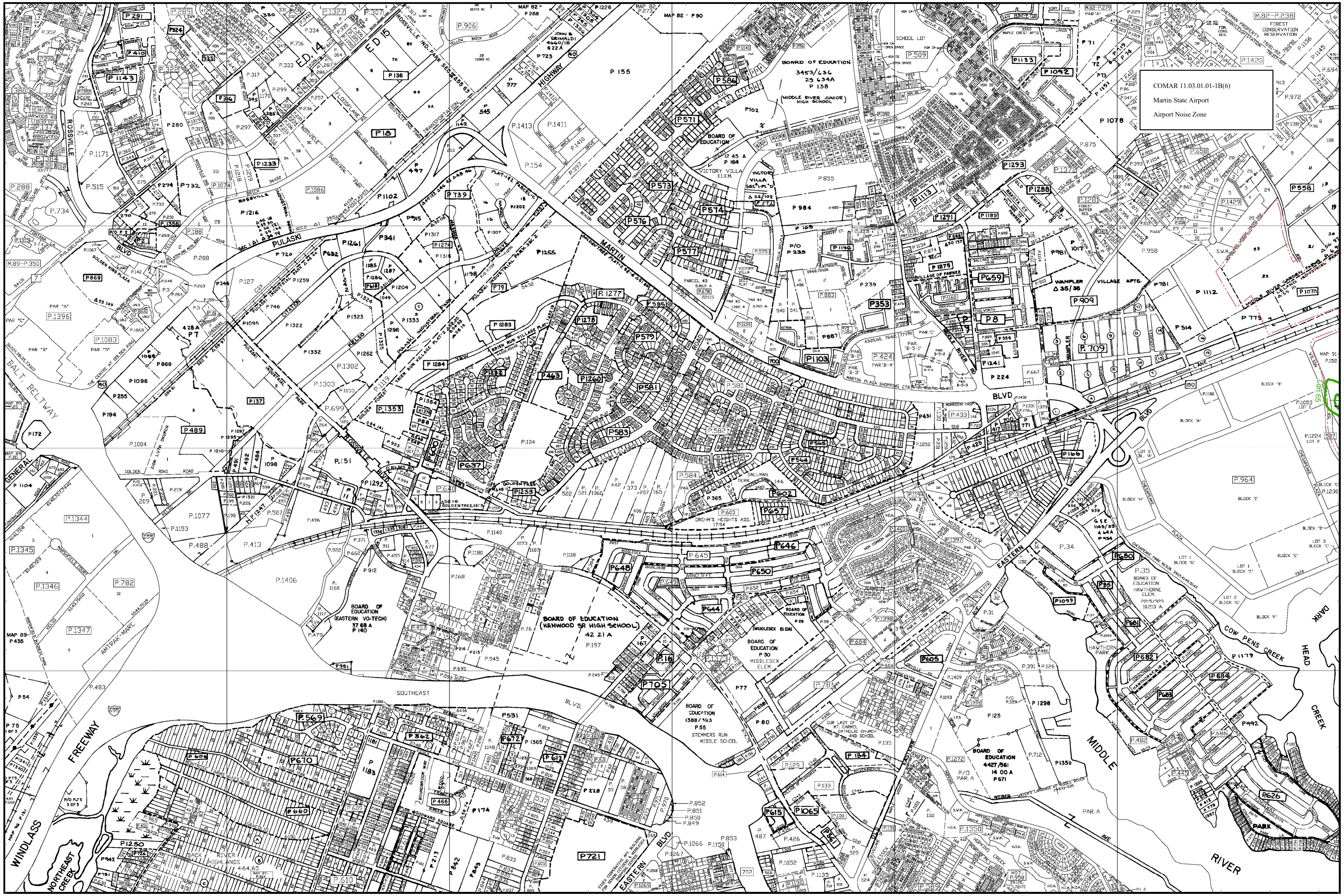
0 3000 6000 Feet

2025 Airport Noise Zone

Baltimore County, Maryland

Tax Map Grid
Prepared October 15, 2025

443917 445917 447917



185109

443917 445917 447917 183109

Data Sources: Maryland Department of Transportation, Maryland Aviation Administration, Office of Environmental Services; Maryland Department of Planning, Tax Map - March, 2016; Maryland Department of Transportation, State Highway Administration; Environmental System Research Institute (ESRI), Inc.; HMMH Inc

0 1200 2400 3600 Feet

2025 Airport Noise Zone

Baltimore County, Maryland

Tax Map

Prepared October 15, 2025

MAP NO. 090

Data Sources: Maryland Department of Transportation, Maryland Aviation Administration, Office of Environmental Services; Maryland Department of Planning, Tax Map - March, 2016; Maryland Department of Transportation, State Highway Administration; Environmental Systems Research Institute (ESRI), Inc.; HMMH Inc

N
W E
S

0 1200 2400 3600 Feet

2025 Airport Noise Zone

Baltimore County, Maryland

Tax Map
Prepared October 15, 2025

MAP NO.
091

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Appendix C MTN Stakeholder Advisory Committee (SAC) Meeting Materials

Appendix C includes the MTN SAC roster, along with materials from the three SAC meetings held in April 2025, June 2025, and September 2025. Related materials include invitations, sign-in sheets, presentations, and meeting minutes.

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Organization	Contact Name	SAC 1 Attendee(s)	SAC 2 Attendee(s)	SAC 3 Attendee(s)
Advanced Aviation Group, LLC	Melissa Torres			
ATP Flight School	n/a			
Baltimore City Police Department – Helicopter Unit	Lt. George Hauf; Matthew Cloud			
Baltimore County Department of Planning	Steve Lafferty			
Baltimore County Police Department - Aviation Unit	Sgt. Brandon Branham	X	X	X
Bowley's Quarters Community Association	Allen Robertson			
Bowley's Quarters Community Association	Jim Merritt	X	X	X
Bowley's Quarters Improvement Association	Jim Hock	X	X	
Bowley's Quarters Improvement Association	Kim Fry	X	X	
Bowley's Quarters Improvement Association	Marsha Ayres	X	X	
Bowley's Quarters Improvement Association	Mary Muth	X		
Brett Aviation	Helen Frado; James Hardwick			
Civil Air Patrol	John Henderson			
Essex Middle River Civic Council, Inc.	Josh Sines			
First Class Flight Academy, LLC	Jonathan Stitzinger			
Greenleigh Homeowners' Association	Ashley Zayas			
Greenleigh Homeowners' Association	Matthew Algiers		X	X
Maryland Air National Guard	Andrew Dewitt			X
Maryland Air National Guard	Brig. Gen. Richard Hunt			
Maryland Air National Guard	Colonel Chris Palmer		X	
Maryland State Police Aviation Command	W. Ernie Jenkins			
Maryland State Police Aviation Command	Joseph Ireton	X	X	X
Midwest Air Traffic Control	Nikolaus Wagenfeiler	X		
Nottingham Improvement Association, Inc.	Judith Davies			
Oliver Beach Improvement Association	Carol Sue Hart			
The Hawthorne Civic Association, Inc.	Pat Hook	X	X	
The Hawthorne Civic Association, Inc.	Sharon Pinkerton			
Trident Jet Aviation	Napoleon Martinez			
Wilson Point Civic Improvement Association	David Abassi			
Wilson Point Civic Improvement Association	Jeff Kyger	X	X	X
Wilson Point Civic Improvement Association	Robert Bendler			
Windlass Run Improvement Association, Inc.	William Kammer			
Total		**10**	**10**	**6**

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

Wes Moore
Governor
Aruna Miller
Lieutenant Governor
Paul J. Wiedefeld
Secretary
Ricky D. Smith, Sr.
Executive Director/CEO

March 26, 2025

[STAKEHOLDER]
[ORGANIZATION]
[ADDRESS]
[CITY], [STATE] [ZIP CODE]

Dear [STAKEHOLDER],

The Maryland Department of Transportation Maryland Aviation Administration (MAA) has begun the process of updating the **2025 Airport Noise Zone (ANZ)** for **Martin State Airport (MTN)**. Updating the ANZ is required under the Code of Maryland Regulations (COMAR) and involves studying airport noise and developing noise contours for existing and future conditions at MTN, as well as a review of the existing MTN Noise Abatement Plan. The most recent ANZ study for MTN was completed in 2020 and can be reviewed at the following link: https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/ Community stakeholders' involvement is critical to the success of the MTN ANZ update. Therefore, we seek input from affected stakeholders.

This letter invites you or another organization representative to join the MTN ANZ Stakeholder Advisory Committee (SAC). The purpose of the SAC is to convene stakeholders affected by airport activities and to present the preliminary ANZ contour planning parameters as we prepare for this MTN ANZ update. Members of the SAC will collaborate with MAA during the MTN ANZ update process and be asked to share pertinent information with the groups or impacted citizens they represent. The SAC will include state and local government representatives, the Maryland Air National Guard and Civil Air Patrol, local community organizations, tenants of MTN, industry organizations, and MAA staff. Your participation in the SAC is vital to the success of the MTN ANZ update process.

The first meeting of **MTN ANZ SAC** is scheduled for **Wednesday, April 2nd, 2025,** from **6:00 p.m. to 8:00 pm**. It will be held in Room 416, located at the lower level of Hanger 4 at **701 Wilson Point Rd Ste 1**, **Baltimore, MD 21220**. We appreciate your interest in airport issues and look forward to working with you to update the MTN ANZ.

If you have any questions or comments about this process, please contact me at 410-859-7813 or via email at brineer@bwiairport.com. To RSVP or register online to attend the MTN SAC meeting, please follow bit.ly/4imvJaI.

Sincerely,

Bruce Rineer, Manager
Noise Program Section
Office of Environmental Compliance and Sustainability
Maryland Aviation Administration

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

Wes Moore
Governor
Aruna Miller
Lieutenant Governor
Paul J. Wiedefeld
Secretary
Ricky D. Smith, Sr.
Executive Director/CEO

Martin State Airport
Airport Noise Zone Update
Stakeholder Advisory Committee (SAC) Meeting #1

AGENDA

Wednesday, April 2, 2025, 6:00 PM – 8:00 PM
701 Wilson Point Rd Ste
Hanger 4, Room 416
Baltimore, MD 21220

- Welcome, Introductions, Opening Remarks
- Airport Noise Zone (ANZ)
- Noise Abatement Plan (NAP) Overview
- Stakeholder Advisory Committee (SAC)
- Martin State Overview
- Fundamentals of Noise
- Noise Modeling Overview
- Schedule and Additional Resources

PO Box 8766, BWI Airport, Maryland 21240-0766 | 410.859.7100 | 800.435.9294 | Maryland Relay TTY 410.859.7727 | marylandaviation.com

Maryland Aviation Administration

Please Sign In

Martin State Airport (MTN)
Airport Noise Zone Update
Stakeholder Advisory Committee (SAC)
April 2, 2025

	NAME/TITLE	ORGANIZATION	PHONE	EMAIL	INITIALS
1.	Marsha L. Ayres	BQIA			MA
2.	Jim Hock	BQIA	410-977-5698	James.N.Hock@Gmail.com	JNH
3.	Nikolaus Wagenfeiler	Martin State Tower	410-682-8807	mtnfet@midwestates.com	[illegible]
4.	Kevin Clarke	MAA		Kclarke@bwiairport.com	[illegible]
5.	Jeff Kyger	WPCIA	(443) 904-5467	~~[illegible]~~ @gmail.com jlKygsr62	
6.	Jim Merritt	BQIA	4436763555	Jamerritt@comcast.net	[illegible]
7.	Joe Ireton	MSPAC	410 238 5800	joseph.ireton@maryland.gov	[illegible]
8.	Kim Fry	BQIA	(215) 490-2048	Kimberly.Fry1@Verizon.net	[illegible]
9.	Emily Martishius	MTN	910 746 7307	emartishius@ ~~martishius~~ martinstateairport.com	[illegible]
10.	Jerome Fernandez	MTN | MAA	410-508-1931	JFernandez@MartinStateAirport.com	[illegible]

* Stakeholder Advisory Committee Member

Maryland Aviation Administration

Please Sign In

Martin State Airport (MTN)
Airport Noise Zone Update
Stakeholder Advisory Committee (SAC)
April 2, 2025

	NAME/TITLE	ORGANIZATION	PHONE	EMAIL	INITIALS
1.	Brandon Branham	Balto Co Police	443 992 0542	BBranham@BaltimoreCountyMD.gov	BB
2.	Patrick Hook	Essex Middle River Civic Council Hawthorne Civic Assoc	443-240-7991	pjhook11@aol.com	P.H.
3.	Harold A. Fowler	MAA	410-508-8563	hfowler2@martinstateairport.com	HF
4.					
5.					
6.					
7.					
8.					
9.					
10.					

* Stakeholder Advisory Committee Member

MARTIN STATE AIRPORT

Airport Noise Zone Update Stakeholder Advisory Committee

Meeting #1

Martin State Airport

April 2, 2025
6:00 PM – 8:00 PM

1

1

Welcome to Martin State

Safety Briefing

- Follow emergency exits
- Call 911
- Assist those who need assistance
- Be sure to take a head count during the emergency event
- Nearest AED –#4 (Hangar 5)
- Nearest Fire Extinguisher – Room 527 (Hangar 5)
- Accountability Site: Parking lot outside of Hangar 4
- Always report any hazards in the meeting room

Source: MTN State Airport Photo Gallery

MARTIN STATE AIRPORT

2

2

Agenda

» Welcome and Introductions
» Airport Noise Zone (ANZ)
» Noise Abatement Plan (NAP) Overview
» Stakeholder Advisory Committee (SAC)
» Martin State Overview
» Fundamentals of Noise
» Noise Modeling Overview
» Schedule and Additional Resources

3

3

Meeting Facilitation

The meeting facilitator is responsible for ensuring SAC meetings:

- Run efficiently, respectfully, and effectively
- Focus on the published agenda
- Provide appropriate opportunities for all members to participate
- Result in consensus conclusions to the maximum extent feasible
- Are documented through preparation of accurate meeting notes

Welcome and Introductions 4

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Introductions

- Maryland Aviation Administration (MAA) representatives
- Stakeholder Advisory Committee (SAC) members
- Consultant team

5

Expected Meeting Takeaways

- What an Airport Noise Zone (ANZ) is
- What a Noise Abatement Plan (NAP) is
- Why MAA is undertaking this process
- Why you are needed as a member of the SAC
- How noise is evaluated, especially with the DNL metric
- What inputs go into the noise model
- What the end results of the study will be

6

Airport Noise Zone (ANZ) Regulations

7

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Maryland Airport Noise Zone (ANZ) Regulations

- Maryland Environmental Noise Act of 1974
  - *"Provide a positive basis for abatement of existing noise problems in communities near airports and to prevent new noise problems."*
- Maryland law requires MAA to complete an ANZ update approximately every 5 years
- The certified ANZ consists of Day-Night Average Sound Level (DNL) contours at 65, 70, and 75 decibels printed on:
  - Airport Noise Zone Map

Airport Noise Zone 8

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State Law and Regulations

Transportation Code	Code of Maryland Regulations (COMAR)
Noise Zone Regulations; Part I The purpose of this subtitle is to: (1) Provide a positive basis for abatement of existing noise problems in communities near airports and to prevent new noise problems; and (2) Protect the health and general welfare of the occupants of land near airports.	**Chapter 11.03.03** Defines the prediction method to be used to develop 'noise contours of equal noise exposure' (subject to the approval of the Executive Director) Provides direction for development of contours, including 5 and 10 year, plus cumulative condition, provides methods for determination of impacted land use areas, and direction on noise abatement plans.
Noise Zone Regulations; Part II Requires assessment of the noise environment, existing projected future use, following procedures the Executive Director establishes, delineates a "noise zone", requires development of a noise abatement plan - every five years	**Section 11.03.03.05** Provides a process for permits for construction within the Noise Zone Surrounding a State-Owned Airport

MARTIN STATE AIRPORT

Airport Noise Zone 9

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ANZ Study Update

The ANZ update process includes status review of the NAP.

Airport Noise Zone (ANZ)	Noise Abatement Plan (NAP)
Provides the means to identify and control incompatible land development around Martin State Is a composite of the farthest extents of the annual Day-Night Average (DNL) contours for each of the study years (2025 base, 2030 and 2035 forecast)	Prescribes measures to monitor, reduce, and/or eliminate incompatible land use areas within the ANZ to the extent possible while maintaining efficient airport operations

MARTIN STATE AIRPORT

Airport Noise Zone 10

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Major Components

- Models noise through current year, 5-year, and 10-year contours
- Models noise exposure using FAA's AEDT and airport operational data
- Mitigates noise through Noise Abatement Plan
- Land Use
- Flight Procedures
- State Funded – not eligible for Federal funding

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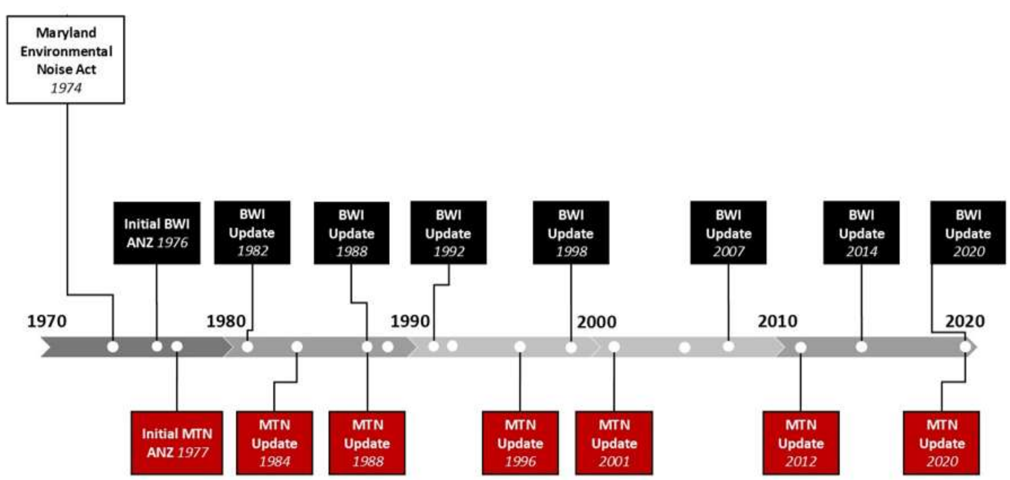
MTN ANZ History



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Expectations

The ANZ provides a means to:

- Understand existing and future noise exposure around Martin State
- Assist local land use jurisdictions in the control of potentially incompatible development
- Identifies potential strategies to mitigate noise, including voluntary noise abatement procedures

The ANZ cannot:

- Restrict the hours of operations
- Impose curfews or restrictions
- Require the FAA to change flight procedures
- Be used to limit demand or forecast growth

Airport Noise Zone 13

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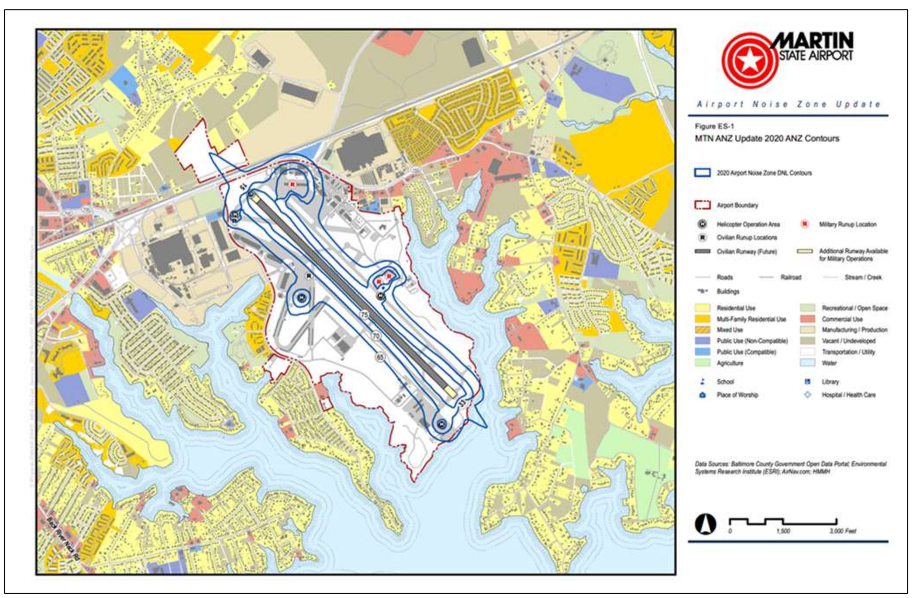
Martin State Noise Zone (2020)



Airport Noise Zone 14

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Land Use Planning Process

Airport Noise Zone (ANZ)
Certified ANZ is based on composite noise contours lines at specified noise levels (65, 70 and 75 DNL)
Land development within the ANZ is subject to Maryland law, which dictates that an applicant be denied approval if the proposed land use is found to be incompatible with the noise level
An applicant may petition the Board of Airport Zoning Appeals (BAZA) for a variance from the regulations. BAZA may issue conditions such as the addition of sound insulation components to buildings within the Certified ANZ

Airport Noise Zone 15

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Noise Abatement Plan (NAP) Overview

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Noise Abatement Plan (NAP)

NAP Goal: To the extent possible, reduce incompatible land use within ANZ while maintaining efficient airport operations.

- **General categories of NAP measures:**
  - Noise abatement elements
  - Land use elements
- NAP status review only at this time

Noise Abatement Plan Measures

Noise Abatement Measures

Departure Procedures:
VFR and IFR Flight Rules

Arrival Procedures:
Attempt to keep arriving aircraft as high as possible and to take advantage of compatible land uses

Closed Traffic Patterns:
A left-hand traffic pattern shall be used at MTN unless otherwise directed by ATC.

Touch-and-Go or Practice Approaches:
No touch-and-go and/or practice approaches or practice landings are permitted between 10:00 p.m. to 6:00 a.m. daily unless approved by MTN Operations and Maintenance staff.

Programmatic Measures

Continued Monitoring and Annual Review:
Efforts to monitor the overall noise abatement program

Land Use Measures

Control of Incompatible Development:
Includes the ANZ program, BAZA, and Noise Zone Notification in Real Estate transactions

Noise Assistance Programs:
For residents and schools in the ANZ, to reduce number of affected properties and noise impacts

Martin State NAP Caveats

Noise abatement procedures are voluntary:

- MTN NAP is formulated to minimize noise disturbance to neighboring communities while maintaining safe and efficient MTN Airport operations. MAA Division of MTN Airport Operations is responsible for the overall administration of MTN.
- Aircraft may not follow noise abatement procedures if deemed necessary by Air Traffic Control (ATC) or flight crews to maintain operational safety.

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ANZ Update Scope and Process

- **Form and engage with Stakeholder Advisory Committee (SAC)**
- Conduct public informational meeting
- Prepare base year, 5-year, 10-year forecast noise contours
- Compile ANZ (composite of the three contour sets)
- Conduct land use inventory within ANZ
- Review existing Noise Abatement Plan (NAP)
- Conduct public hearing/ workshop
- Update Code of Maryland Regulations (COMAR)

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Administrative Procedure – COMAR

- Amending COMAR requires a 'Notice of Proposed Action' to incorporate the updated ANZ by reference
  - Requires consideration and approval in a meeting of the Maryland Aviation Commission
  - Provides an opportunity for public comment and public hearing
  - Updated ANZ provided to counties
- Airport Executive Director certifies ANZ
- MTN ANZ COMAR
  - https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone
  - https://dsd.maryland.gov/regulations/Pages/11.03.01.01-1.aspx

Noise Abatement Plan 21

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Stakeholder Advisory Committee

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SAC Roles and Responsibilities

- The SAC serves in an advisory role to the MAA solely for purposes of the Martin State ANZ update process.
  - Review of study inputs, assumptions, analyses, documentation, etc.
  - Input, advice, and guidance related to Noise Abatement Plan
- SAC members are expected to provide two-way communication between the SAC and their organizations / constituents.
- MAA shall respect and consider SAC input but retains overall responsibility for the Martin State ANZ update.

Stakeholder Advisory Committee 23

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SAC Responsibilities

- Contribute to study inputs
  - Discussion and feedback at SAC meetings
- Review modeling assumptions
  - Base year and forecasts
- Review analysis results
  - Base, 5-year and 10-year contours
- Review documentation
  - NAP and Draft ANZ document

Stakeholder Advisory Committee 24

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SAC Makeup

- The SAC is composed of stakeholders representing a wide range of interests at Martin State:
  - State and local agencies
  - Community organizations
  - Airport tenants and users
  - Aviation trade associations
- Members serve on a voluntary basis without compensation.

Stakeholder Advisory Committee 25

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Invited SAC Participants

MDOT Maryland Department of Transportation — Maryland Aviation Administration

Bruce Rineer
Karen Harrell
Kevin Clarke
Shawn Ames
Harold Fowler
Darline Terrell-Tyson
Emily Martishius
Royce Bassarab
Jerome Fernandez
Paul Shank

hmmh

Tyler White
Rhea Hanrahan
Paul Krusell

ASSEDO Consulting

Odessa Phillip
Elsa Arias
Monica Watson
Kayla Woods

Baltimore City/County/State Police

Lt. George Hauf
Sgt. Matthew Cloud
Sgt. Brandon Branham
Lt. W. Ernie Jenkins

Associations

Mary Muth — Bowleys Quarters
Allen Robertson — Bowleys Quarters
Josh Sines — Essex Middle River
Pat Hook — Hawthorne Civic Assn
Carol Sue Hart — Oliver Beach
Ashley Zayas — Greenleigh
Robert Bendler — Wilson Point
William Kammer — Windlass Run
James Gates — Baltimore Mobile Home Assn
Judith Davies — Nottingham
Jim Merrit — Community Roundtable

Jeff Mayhew — Baltimore Dept of Planning
John Henderson — Civil Air Patrol
Brig. Gen. Richard Hunt — Maryland Air National Guard
Nikolaus Wagenfeiler — Midwest Air Traffic Control
Jonathan Stitzinger — First Class Flight Academy

Napoleon Martinez — Trident
Michael McCabe — PHI Air Medical Maryland
Melissa Torres — Advanced Aviation Group
Helen Frado — Brett Aviation
ATP Flight School

Stakeholder Advisory Committee 26

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We need you!

- To understand ANZ effects on stakeholders
- To review land use inventory and planning considerations
- To share information with your neighbors and organizations
- To review Noise Abatement Plan and provide insight
- To spread the word about future opportunities for public feedback

MARTIN STATE AIRPORT Stakeholder Advisory Committee 27

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MARTIN STATE AIRPORT

Martin State Overview

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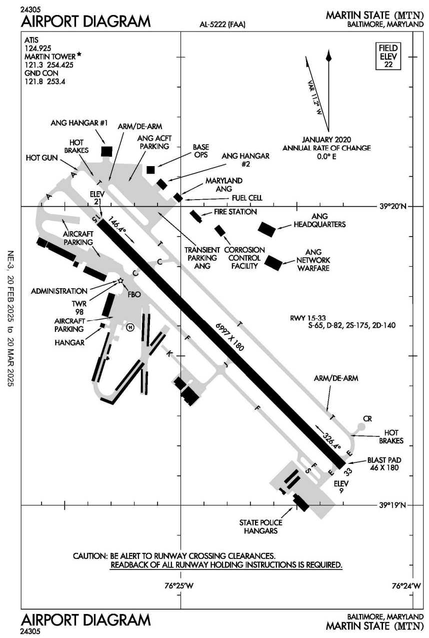
Existing Airport Layout



MARTIN STATE AIRPORT

Martin State Overview 29

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MARTIN STATE AIRPORT

Fundamentals of Noise

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Fundamentals of Noise

- Sound vs. noise
- Decibels (dB) and noisiness
- The A-weighted decibel (dBA)
- Single event noise metrics - Lmax and SEL
- Cumulative exposure metric - DNL
- Noise modeling vs. measurements: ANZ requirements

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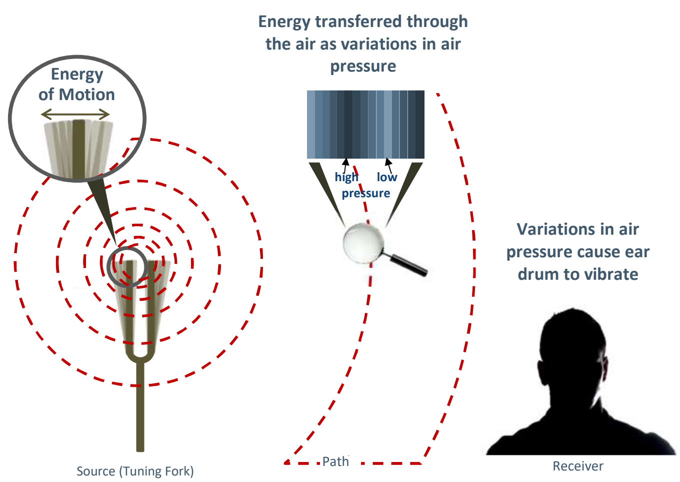
Sound vs Noise

- Sound is pressure variation our ears can detect
  - An objective quantity
- Noise is “unwanted sound”
  - A subjective quantity
- We relate sound and noise by considering effects
  - Annoyance
  - Speech interference
  - Sleep disruption



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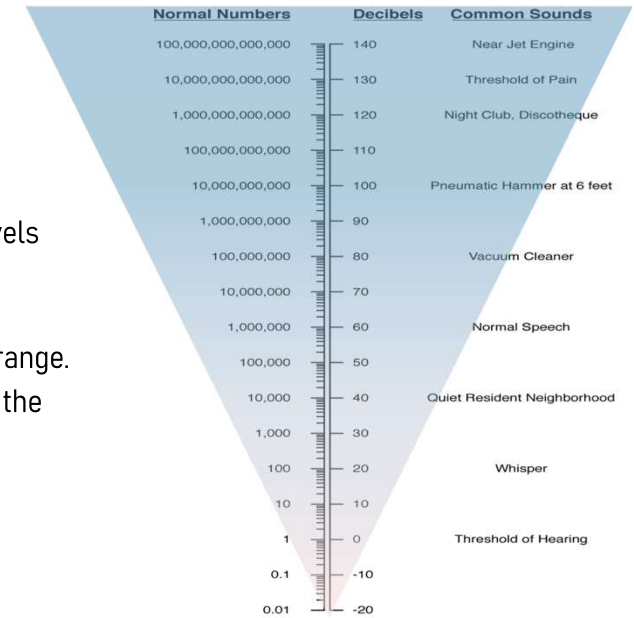
The Decibel Scale

Use a logarithmic scale

- Decibels (dB) used to express sound levels and noise levels

Why?

- We hear sound pressures over a HUGE range.
- Decibels compress this range to match the way we interpret sound pressures.
  - 0 to 140 dB
  - 0.000000003 to 0.003 lbs. per sq. inch (psi)
- We "hear" in decibels.



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Real-Time Decibel Change "Rules of Thumb"

- In a laboratory test, a 1 dB change is generally detectible.
- In a normal environment, a 3 dB change is generally the threshold of detectability for a careful listener.
  - Why? Distinct A:B comparisons are rare.
- A 6 dB change is clear in most day-to-day situations.
- In general, a 10 dB change seems twice as loud.
  - Ten times the sound energy
- Different rules of thumb apply to cumulative exposure.

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Caution: Decibel addition isn't ordinary math!

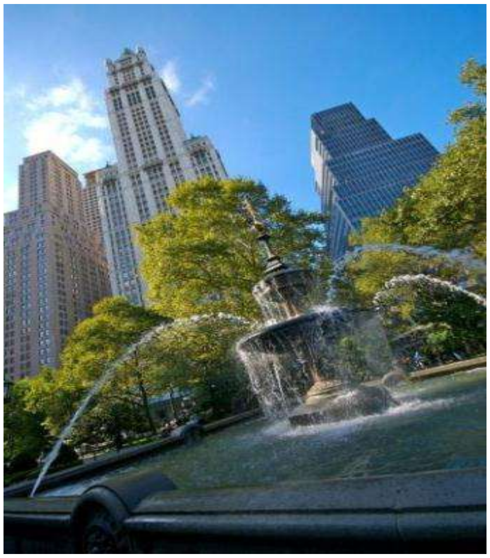
- Decibels are a logarithmic quantity, so…
  - Two equal sources:
    - 70 + 70 dB = ~~140 dB~~ **73 dB**
  - Four equal sources:
    - 70 + 70 + 70 + 70 dB = **76 dB**
  - Ten equal sources:
    - 70 + 70 + 70 + 70 + 70 + 70 + 70 + 70 + 70 + 70 dB = **80 dB**

35

Judging Noisiness

Sound *quality* matters

- Sources with the same overall dB level may "sound" different



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Judging Noisiness

Duration matters

- Longer durations increase exposure, even for sources with the same dB level

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Judging Noisiness

Time of day matters

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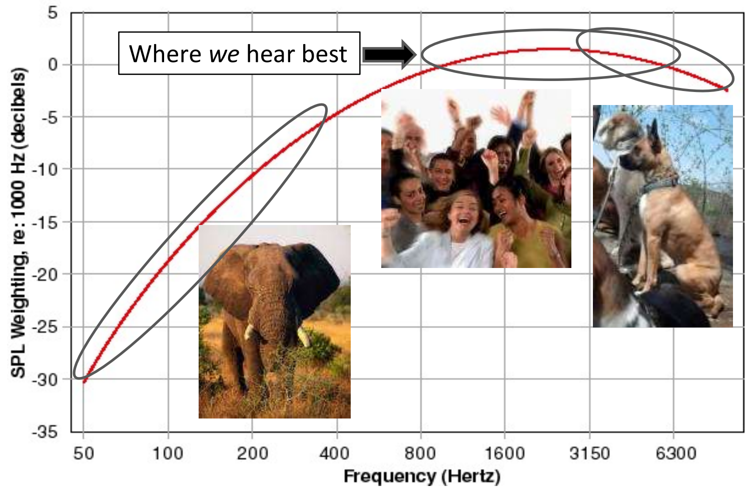
COMAR Requires use of A-Weighted Sound Level

- Our ear is not equally sensitive to all frequencies
- A-weighted decibels (dB) measure sound the way we "hear" it
- Consistent with worldwide practice



Fundamentals of Noise – A-weighted Decibel 39

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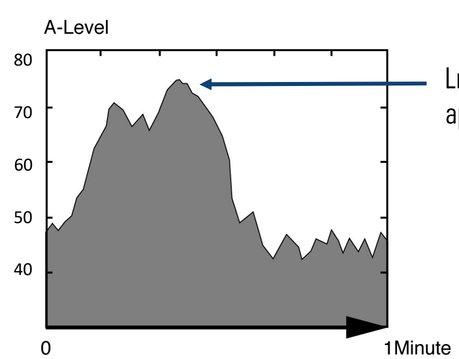
Maximum Sound Level (Lmax)

The simplest way to describe a discrete noise "event" is its maximum sound level (Lmax)



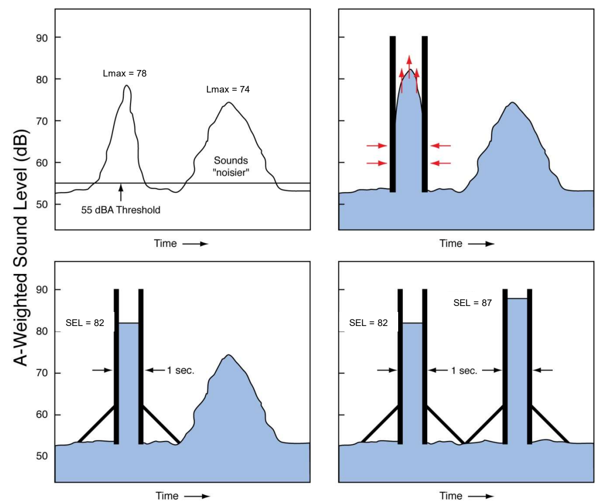
Lmax in this example is approximately 75 dBA

Fundamentals of Noise – Single Event Noise Metrics 40

40

Sound Exposure Level (SEL)

- Duration matters: A longer event may seem “noisier,” even if it has a lower or equal maximum level
- SEL measures the total “noisiness” of an event by taking duration into account



Fundamentals of Noise – Single Event Noise Metrics 41

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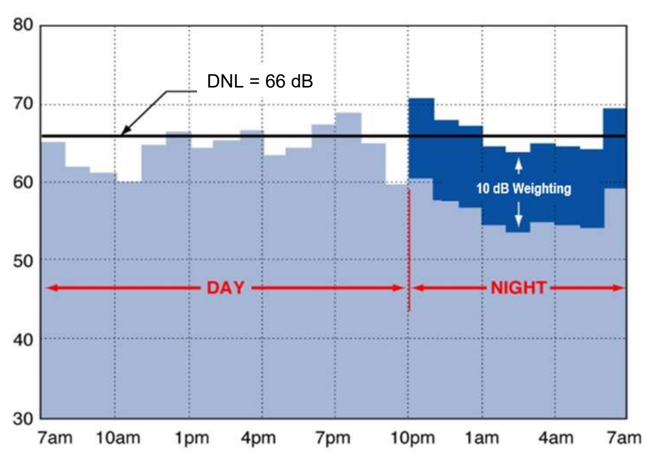
Day-Night Average Sound Level (DNL)

- Describes 24-hour exposure
- Noise from 10 pm to 7 am is factored up by 10 dB
  - “Weighting” is equal to counting each night aircraft 10 times
- Sometimes abbreviated Ldn (as in COMAR documents)
- DNL is the only metric that COMAR requires for ANZ



Fundamentals of Noise – Cumulative Exposure 42

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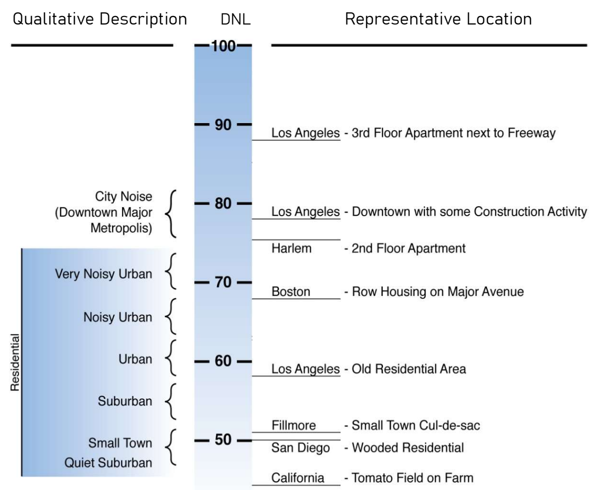
Typical Community DNL Examples



Source: United States Environmental Protection Agency, Information on Levels Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p. 14.

Fundamentals of Noise – Cumulative Exposure 43

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Interpreting Changes in DNL

1 - 2 dB change in level

- May be noticeable
- Abatement may be beneficial

2 - 5 dB change in level

- Generally noticeable
- Abatement should be beneficial

Over 5 dB change in level

- Community reaction is likely

These differ from previously cited "rules of thumb" for "real-time" change.

- 1 dB threshold of detectability in a laboratory test
- 3 dB threshold of detectability for a careful listener in a normal environment
- 6 dB in most day-to-day situations

Fundamentals of Noise 44

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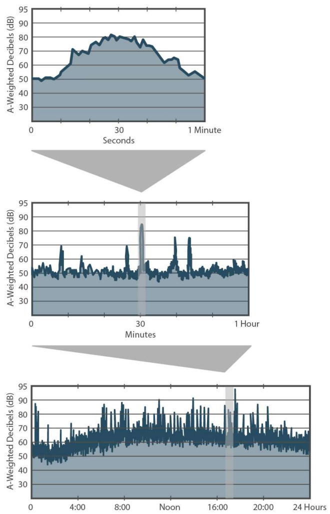
Why We Use DNL



DNL is a way to describe the noise dose for a 24-hour period.

DNL accounts for each event's "noisiness" (**intensity and duration**).

DNL accounts for number of noise events (**frequency of operations**).

DNL provides an additional weighting for nighttime operations (**time of occurrence**).

The Aviation Safety and Noise Abatement Act of 1979 ("ASNA")

Established a single, uniform, repeatable system for considering aviation noise around airport communities.

Established a single system for determining noise exposure from aircraft, which takes into account noise **intensity**, **duration of exposure**, **frequency of operations**, and **time of occurrence**.

Identified land uses which are normally compatible with various exposures of individuals to noise.

Noise Metric Summary

- The decibel is a complex logarithmic quantity based on sound pressure
- A-weighted decibels correlate well with how humans hear
- Noise levels can be expressed many ways, including but not limited to:
  - Instantaneous maximum (Lmax)
  - Single event dose (SEL)
  - Long-duration exposure (DNL)
- Best metric to use in a situation depends on purpose

COMAR considers all land uses compatible below DNL 65 dB.

COMAR Requires Noise Modeling

Allows Noise Measurements

Sec. 11.03.03.02.

§C. Development of noise contours of equal noise exposure are to be determined using a prediction method in accordance with the procedures of §D, below. Measurements, undertaken in accordance with the procedure of §E of this regulation, may be used to confirm the locations of contours of equal noise exposure.

Source: http://www.dsd.state.md.us/comar/comarhtml/11/11.03.03.02.htm

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Fundamentals of Noise 47

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Measured vs Modeled

- Most airport noise studies use computer-generated DNL estimates depicted as equal-exposure noise contours (much like topographic maps that indicate contours of equal elevation).
- Modeled DNL contours reflect average annual conditions, accounting for
  - Average number of flights each day/night,
  - Type of aircraft
  - How often each runway is used throughout the year,
  - Where, over the surrounding communities, the aircraft normally fly

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Fundamentals of Noise 48

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Measured vs Modeled

Measured noise data (permanent or portable noise monitors) cannot be used for creating airport DNL contours:

1. Measured noise levels can contain non-aircraft noise sources.
2. It is not possible to measure at enough locations to draw contours from the results.
   - Modeling calculates DNL for a full year's airport operations at every point in a precise grid.
3. Measured noise levels cannot be used to predict future noise levels. Measurements only document what has already occurred.

Airport Noise and Operations Monitoring System

MAA maintains a Noise and Operations Monitoring System (NOMS) that:

- Manages and analyzes aircraft flight track data and associated noise and complaint data
- Supports MAA's Noise Abatement Program

NOMS Purpose:

- Monitor flight operations at BWI, MTN and within the regional airspace
- Improve public understanding of MTN operations
- Assist in investigating and responding to noise complaints related to specific aircraft operations
- Objectively document aircraft operations and noise exposure for historical records

Noise Modeling Overview

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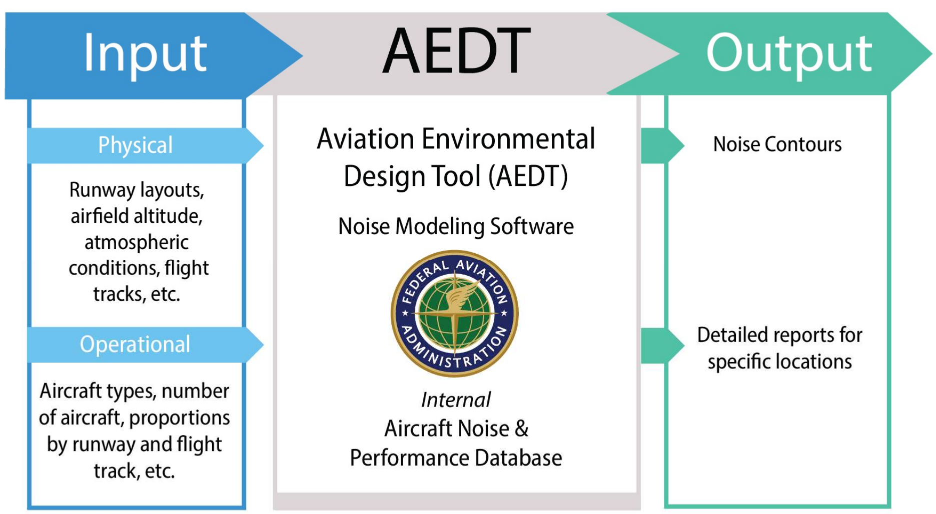

Noise Modeling Overview 52

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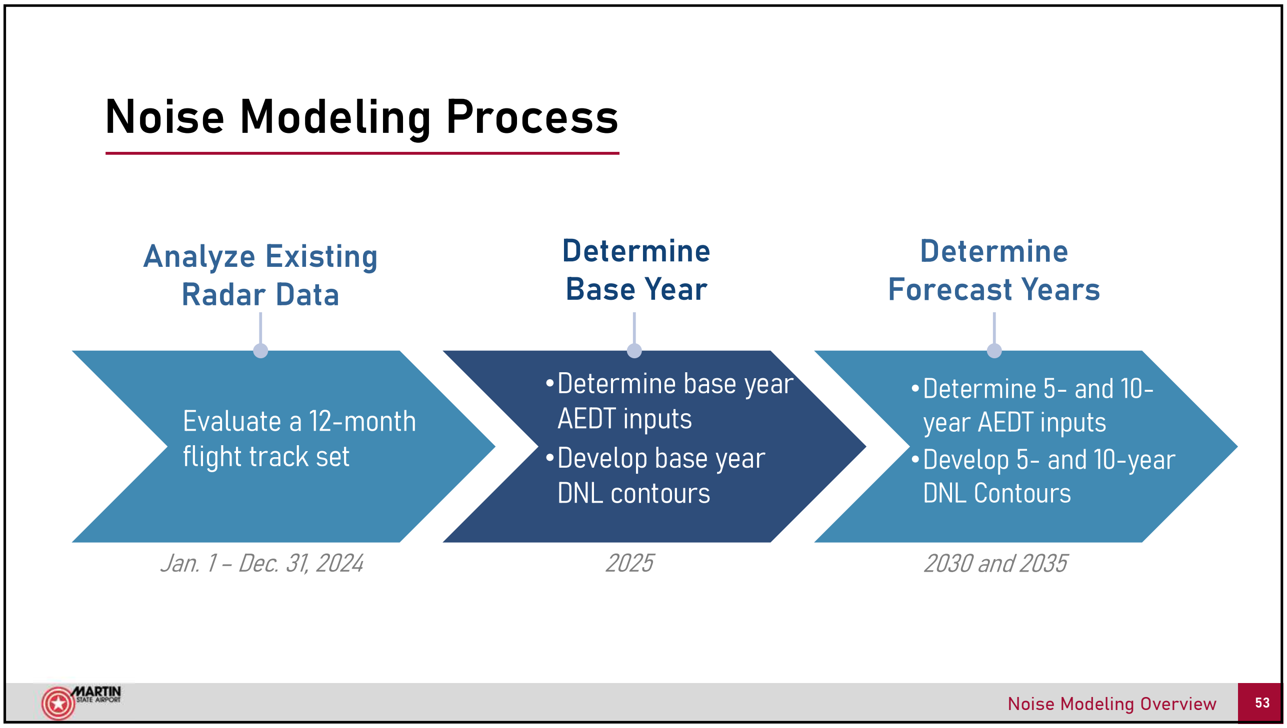
Noise Modeling Process
Analyze Existing Radar Data
Determine Base Year
Determine Forecast Years
Evaluate a 12-month flight track set
•Determine base year AEDT inputs
•Develop base year DNL contours
•Determine 5- and 10-year AEDT inputs
•Develop 5- and 10-year DNL Contours
Jan. 1 – Dec. 31, 2024
2025
2030 and 2035
MARTIN STATE AIRPORT
Noise Modeling Overview
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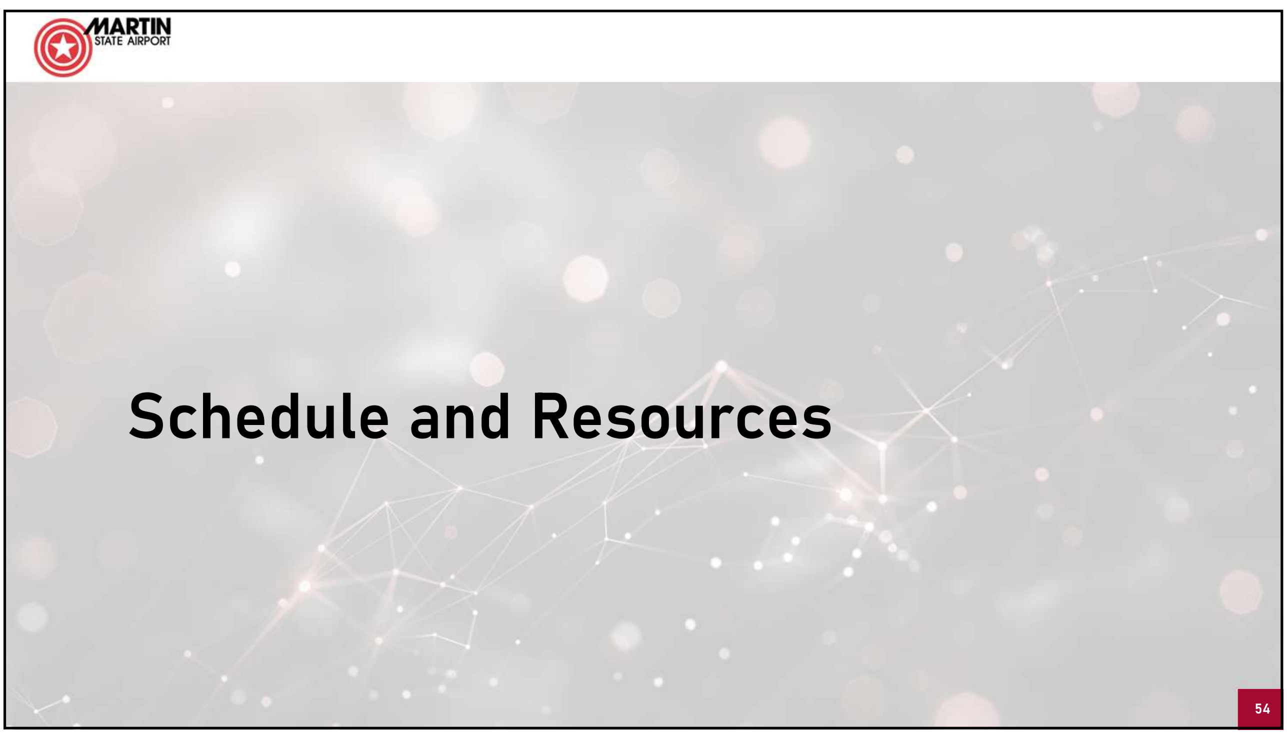
MARTIN STATE AIRPORT
Schedule and Resources
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Proposed Project Schedule

Jan 2025	April 2025	June 2025	Sept 2025	Nov 2025
Project Start	• **SAC Meeting #1**	• **SAC Meeting #2** • NAP Focus • Modeling Inputs	• **SAC Meeting #3** • Draft ANZ/NAP Publication • Public Workshop	• Comment Period Ends • Publish Final ANZ/NAP

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Project Contacts

Project Primary Contact

Email: MDOT-MAA-ANZ@assedollc.com

Phone: (240) 200-5176

MAA Project Manager

Bruce Rineer, Manager, Office of Environmental Compliance and Sustainability, Noise Section BRineer@bwiairport.com

ANZ Project Managers

Tyler White, Principal Consultant, twhite@hmmh.com

Rhea Hanrahan, Director, AES, rhanrahan@hmmh.com

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Additional Resources

2020 Martin State ANZ

https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/

WebTrak

https://webtrak.emsbk.com/bwi3

Schedule and Resources 57

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Wrap Up

- SAC member questions, comments, and discussion
- Public Comments
- Next SAC meeting:
  - June 2025 – Specific date TBD

Topics:

- Primary focus will be the NAP
- Review detailed land use
- Present model inputs and forecast

Schedule and Resources 58

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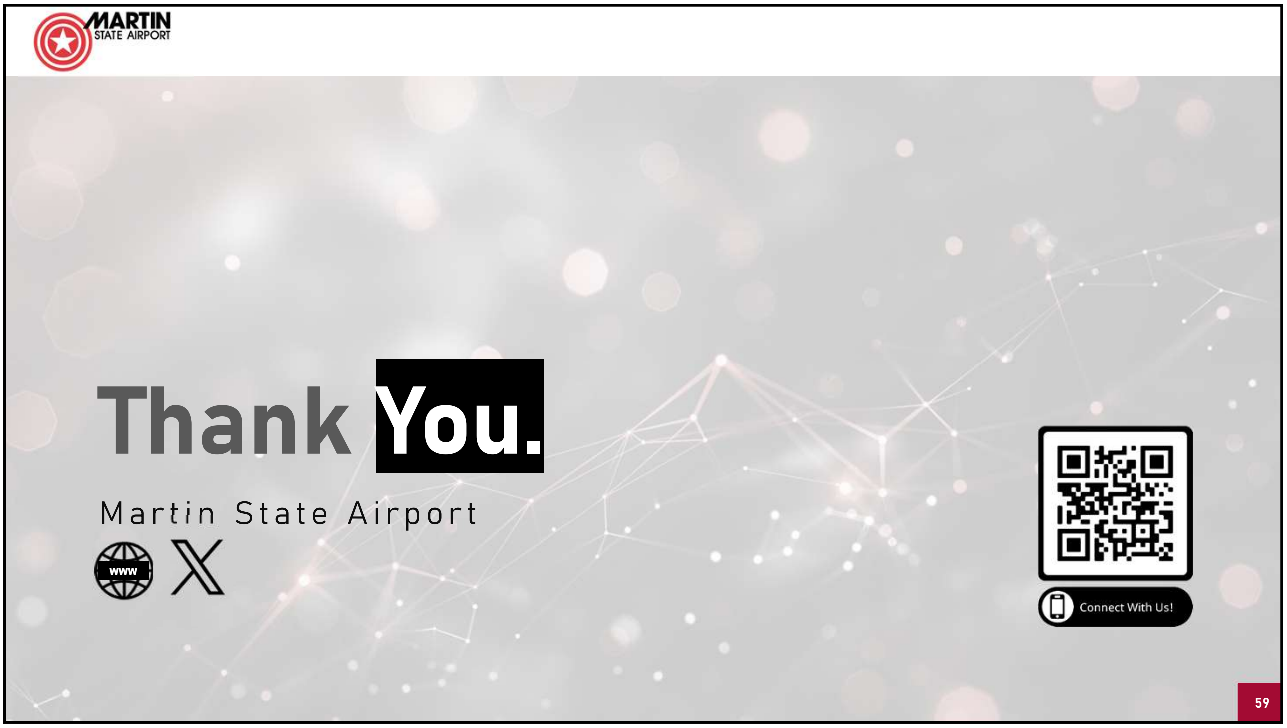
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Martin State Airport Noise Zone (ANZ) Update
Stakeholder Advisory Committee (SAC) Meeting 1

MEETING MINUTES

Wednesday, April 2, 2025, 6:00 PM – 8:00 PM

Martin State Airport
701 Wilson Point Road, Hanger 4
Baltimore, MD 21220

Discussion Item	Notes	Presenter
Welcome	Mr. Bruce Rineer welcomed attendees and conducted a safety briefing, identifying emergency exits, AED and fire extinguisher locations, and the accountability site outside Hangar 4. Attendees were reminded to report any hazards in the meeting room. He introduced the MAA and consultant team (HMMH), and each SAC member introduced themselves and the organizations they represent. Mr. Rineer emphasized that this process aims to update the existing Airport Noise Zone (ANZ) through stakeholder input and data collection. He noted that the last ANZ update for Martin State Airport occurred during the COVID pandemic and received little public feedback. This year, the process will include SAC meetings, a public hearing, and a workshop, offering multiple opportunities for engagement and feedback.	Bruce Rineer
Meeting Facilitation and Introductions	Ms. Rhea Hanrahan (HMMH) facilitated the meeting. Attendees, including members of the SAC, MAA, consultant teams (HMMH), and local stakeholders, introduced themselves and the organizations they represent.	Rhea Hanrahan
Expected Meeting Takeaways	Mr. Rineer outlined the key objectives of the meeting: • Provide an ANZ and Noise Abatement Plan (NAP) overview. • Explain the rationale for the ANZ update process. • Describe the regulatory background, including COMAR requirements. • Introduce the noise metrics used in the study, particularly DNL (Day-Night Average Sound Level). • Clarify the role of SAC members in shaping inputs and sharing information with their communities.	Bruce Rineer

	He also clarified that while the NAP includes voluntary procedures, the ANZ update is a regulatory requirement incorporating modeling, forecasting, and community input.	
Airport Noise Zone	Mr. Rineer began the discussion by providing an overview of the purpose and statutory basis of the ANZ. He explained that the ANZ is mandated by the Maryland Environmental Noise Act of 1974 and is used to identify noise contour boundaries, specifically at 65, 70, and 75 dB DNL, that help guide land use compatibility near state-owned airports. The objective is not to limit airport operations but to support local planning decisions that reduce the impact of aviation noise on surrounding communities. Ms. Hanrahan followed by clarifying the acoustic metrics used in the study. She explained that the Day-Night Average Sound Level (DNL) is the required metric under the Code of Maryland Regulations (COMAR) and is designed to reflect long-term noise exposure by accounting for both daytime and nighttime operations, with added weighting for nighttime noise. The presenter explained that the ANZ is updated on a five-year cycle and includes a base year, a five-year projection, and a ten-year forecast. For this ANZ update, these years will be 2025, 2030, and 2035. They emphasized that the modeling process is data-driven and does not include speculation about unknown or future changes. For example, introducing commercial airline services would require an environmental review and could trigger a new update.	Bruce Rineer
Noise Abatement Plan (NAP) Overview	Mr. Rineer introduced the Noise Abatement Plan (NAP), describing it as a set of voluntary operational procedures designed to reduce noise impacts on surrounding communities. While the NAP is not mandatory, it plays a key role in MAA's commitment to responsible airport operations. Mr. Nikolaus Wagenfeiler provided an example of an active noise abatement strategy at Martin State Airport. He explained that the airport only allows up to three aircrafts in the pattern to perform concurrent touch-and-go operations. Previously, having five or six aircraft performing these maneuvers at once could delay runway access and contribute to elevated noise levels. This change has improved both operational flow and community satisfaction. Mr. Rineer added that these initiatives were added to develop collaborations with local stakeholders, and that the airport has already seen positive effects. During this portion of the meeting, SAC members	Bruce Rineer

	raised concerns and asked questions. Jim Merritt noted that aircraft noise varies widely depending on the type of plane and expressed frustration that a few particularly noisy aircraft affect the community's perception of the airport. Mr. Jeff Kyger questioned how effective long-term planning can be when future changes, like tree removal or new aircraft types, are still uncertain. Mr. Rineer responded that the ANZ process relies on confirmed data and operational trends. If significant changes arise, such as the introduction of commercial carriers, those will require a separate environmental review and could trigger an ANZ revision. Mr. Harold Fowler asked whether the NAP language could be strengthened during this update. Mr. Rineer confirmed that the upcoming meetings and the broader process were intended to gather such input and potentially revise the NAP language to reflect better and respond to community concerns.	
Stakeholder Advisory Committee (SAC)	The next portion of the meeting centered on the purpose and expectations of the Stakeholder Advisory Committee (SAC). Mr. Rineer described the SAC as a vital part of the ANZ update process, composed of local representatives, community members, and aviation stakeholders. He emphasized that the SAC operates voluntarily, but its work is essential in creating a transparent and community-driven process. Mr. Rineer explained that the SAC's responsibilities include reviewing technical assumptions, evaluating noise modeling inputs, and helping MAA understand local concerns and conditions. Members are also encouraged to act as liaisons to the broader public, sharing information and collecting feedback to ensure a two-way flow of communication. Ms. Hanrahan added that SAC members bring invaluable local knowledge to the table. She emphasized that their participation builds the credibility and consensus needed for a successful update process. She encouraged members to stay engaged and continue contributing their perspectives as the project progresses.	Bruce Rineer
Martin State Overview	This section provided a foundational perspective on how Martin State Airport functions differently from larger commercial airports like BWI. Mr. Rineer began framing Martin State Airport as a unique facility that supports many users, including the military, flight schools, law enforcement, and medevac operations.	Bruce Rineer

	Mr. Rineer detailed recent technical upgrades to MAA's airport noise and operations modeling system (ANOMS), particularly the installation of an ADS-B antenna, that improves the capture and analysis of MTN. The discussion then transitioned into long-term infrastructure planning. Mr. Kevin Clarke addressed the committee with information about the Airport Layout Plan (ALP). He noted that if elements like lighting upgrades or tree removal are scheduled to occur within the 5- or 10-year planning window, they will be reflected in the noise modeling forecasts.	
Fundamentals of Noise	Ms. Hanrahan presented noise fundamentals to ensure all participants understood how noise is quantified and evaluated. She began by explaining the difference between sound and noise: sound is a physical phenomenon, while noise is subjective and varies by individual perception. Ms. Hanrahan walked attendees through the basics of the decibel scale, emphasizing that it is logarithmic. She noted that every 3 dB increase represents a doubling of sound energy, while a 10 dB increase is perceived as twice as loud to the human ear. This led to a discussion of several noise metrics that are used when describing airport noise: • **LMAX:** the peak level of noise during a single event. • **SEL:** Sound Exposure Level integrates a noise event's intensity and duration. • **DNL:** Day-Night Average Level, which applies a weighting to nighttime noise to reflect its increased potential for disturbance. Ms. Hanrahan explained that DNL is the FAA and COMAR-required standard because it captures a 24-hour average noise exposure, ensuring national consistency. She also noted that DNL allows noise to be analyzed in a way that accounts for frequency, intensity, and timing of events, providing a more complete picture. Ms. Hanrahan stated that communities begin to notice and react to increases in DNL of 5 dB, and many consider a 10 dB increase to be a doubling of noise. She also noted that use of DNL allows comparison of noise exposure across all airports nationwide.	Rhea Hanrahan
Noise Modeling Overview	The technical portion of the meeting focused on how aircraft noise is modeled to update the ANZ. Mr. Paul Krusell led this discussion, introducing the Aviation Environmental Design Tool (AEDT), a sophisticated modeling platform for simulating and forecasting noise exposure around airports.	Paul Krusell

Mr. Krusell described how the model integrates a wide range of data, including aircraft types, operational counts, flight paths, runway usage, and time-of-day information. "We use AEDT, the Aviation Environmental Design Tool. It factors in aircraft types, flight paths, operations, time of day, runway use, even weather and terrain," he said.

Mr. Rineer elaborated on how the data is categorized, noting that while military data is available only in aggregate due to security concerns, civilian aircraft are individually identifiable through the ADS-B system. "We don't get tail numbers, but we do get counts," he said. "Civilian aircraft are more transparent thanks to ADS-B."

Ms. Hanrahan reinforced that the goal of the modeling isn't just accuracy, it's about providing a foundation for community input and responsible land use decisions. The contours produced by AEDT for 2025, 2030, and 2035 will inform zoning and community planning for years to come.

"Community feedback is critical to validating our assumptions," Ms. Hanrahan noted. "While the system is highly technical, it's meant to translate complex data into something meaningful for decision-makers and community members alike."

Schedule and Additional Resources — Paul Krusell

To conclude the meeting, Mr. Krusell presented the overall project schedule, outlining each upcoming milestone in the ANZ update process. The SAC will reconvene for two additional sessions, one focused on reviewing model inputs and the NAP and another to preview the draft contours before the public workshop. After gathering public input, the finalized plan will be submitted for codification in COMAR.

"Here's the timeline we're working with," Mr. Krusell began:

- April 2025: SAC Meeting #1 (Completed)
- June 2025: SAC Meeting #2 (Review modeling inputs and the NAP)
- September 2025: SAC Meeting #3 (Preview ANZ Contours)
- Fall 2025: Public hearing, workshop, and comment period.
- Winter 2025: Codification in COMAR

Mr. Rineer followed up with a practical overview of Web Trak, the online tool for tracking aircraft and submitting noise complaints. He acknowledged its BWI-centered interface but noted that it can still provide useful insights for the Martin State community. "Use Web Trak to track aircraft and submit complaints," he encouraged. "It's a BWI-focused system, but it can still help. And we're always here to answer questions."

	Ms. Hanrahan closed the session by assuring attendees that future meeting materials would be distributed in advance. She emphasized flexibility in participation, stating, "You'll have options for how involved you want to be, and that's okay. Some people dig into the data; others just want the summary. We support both."	
Adjournment	The meeting concluded around 7:45 pm, with the project team appreciating all participants. Mr. Rineer thanked attendees for their input and emphasized MAA's commitment to transparency and community collaboration in the ANZ update process.	Bruce Rineer

Kayla Woods

From: MDOT-MAA-ANZ
Sent: Friday, April 11, 2025 2:15 PM
To: Hfowler2@martinstateairport.com
Subject: Thank you for your participation!
Attachments: 2025_04-10 MDOT_MTN-SAC-Thank You Letter Fowler.pdf

Regards,

BWI Marshall and Martin State Airport Noise Zone
Outreach Team
Phone: 240-200-5176
https://marylandaviation.com/environmental/airport-noise/bwi-marshall-airport-noise-zone/
https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/

June 18, 2025

Dear [STAKEHOLDER]
[*ORGANIZATION*]

Thank you again for your continued participation in the Martin State Airport Noise Zone (ANZ) Update Stakeholder Advisory Committee (SAC). Your engagement, feedback, and community insight are crucial to the success of this process, and we appreciate your ongoing commitment. We are pleased to continue working with you as we prepare for our second SAC meeting.

The Maryland Aviation Administration (MAA) is continuing its effort to update the 2025 ANZ for Martin State Airport. As required by the Code of Maryland Regulations (COMAR), this update includes modeling current and future aircraft noise conditions and reviewing the existing Martin State Noise Abatement Plan. Your participation as a member of the SAC ensures that the study is informed by local expertise and aligns with the community's priorities.

We are excited to invite you to the second SAC meeting, which will take place on:

Thursday, June 26, 2025
6:00 PM – 8:00 PM
Martin State Airport – Hanger 4
701 Wilson Point Road, Baltimore, MD 21220

At this meeting, the project team will present preliminary modeling inputs and assumptions that will inform the development of updated noise contours, providing a foundation for future discussions and decisions. We'll also continue discussions around the Noise Abatement Plan and provide space for questions, feedback, and collaborative discussion. In addition, we will continue to welcome new SAC members as the process progresses. If you were not able to attend the first meeting, we encourage you to join us for SAC Meeting 2 and participate in the ongoing discussions.

We kindly request that all attendees confirm their participation at https://MtnAnzSAC2.eventbrite.com. Those who RSVP will receive the meeting materials beforehand, including the agenda, presentation slides, and the SAC Meeting 1 minutes, to ensure a productive and informed discussion.

If you have any questions or would like to discuss the meeting in more detail, please contact me at 410-859-7813 or brineer@bwiairport.com. We look forward to seeing you.

Sincerely,

Bruce Rineer, Manager
MAA Noise Program Section
Office of Environmental Compliance and Sustainability

MAA MTN ANZ SAC 1 Reminder Emails:
(sent to full invitee list on 06/25/2025)

Good afternoon,

This is a friendly reminder about tomorrow's Stakeholder Advisory Committee (SAC) meeting to discuss the **Martin State Airport Noise Zone (ANZ) Update**.

Meeting Details:

Thursday, June 26, 2025, from 6:00 PM – 8:00 PM

at Martin State Airport, Hangar 4 – 701 Wilson Point Rd, Baltimore, MD 21220

Your participation is critical in shaping this update and ensuring it reflects the needs of the impacted communities.

The Agenda for this meeting is as follows:

- Welcome and Introductions
- SAC Meeting #1 Recap
- ANZ Noise Modeling Process
- Noise Model Inputs
- ANZ Land Use Inventory
- Noise Abatement Plan (NAP)
- Schedule and Resources

To **RSVP**, please register online here: **https://MtnAnzSAC2.eventbrite.com**. Thank you to those who have already done so.

If you have any questions, please contact our Outreach Team at 240-200-5176 or MDOT_MAA-ANZ@assedollc.com.

We look forward to working with you!

Regards,

Bruce Rineer,

Manager Noise Program Section
Office of Environmental Compliance and Sustainability

https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/

MARYLAND DEPARTMENT OF TRANSPORTATION

MARYLAND AVIATION ADMINISTRATION

Maryland Aviation Administration

Please Sign In

MARTIN STATE AIRPORT
Airport Noise Zone Update
Stakeholder Advisory Committee (SAC 2)
June 26 2025

	NAME/TITLE	ORGANIZATION	PHONE	EMAIL	INITIALS
1.	Brandon Branham SGT	B Co P.D.	410 887 0280 ~~410 [illegible]~~	BBRANHAM@BALTIMORECOUNTYMD.GOV	BB
2.	Jeff Kyger	WPCIA	(443) 904-5467	jlkyger62@gmail.com	J.K.
3.	CHRIS PALMER	175WG	662-549-7745	CHRISTOPHER.PALMER.29@US.AF.MIL	CAP
4.	PAT HOOK	EMRCC/HAWTHORNE	443-240-7991	pjhook11@aol.com	P.H.
5.	Kim Fry	BQIA	(215) 490-2048	Kimberly.Fry1@verizon.net	[illegible]
6.	JIM HOCK	BQIA	410-977-5698	James.N.Hock@Gmail.com	JNH
7.	JOE IRETON	MSPAC	410 238 5800	joseph.ireton@maryland.gov	[illegible]
8.	Jim Merritt	BQIA	443 676 3555	Jamerritt@comcast.net	[illegible]
9.	Matthew Algiers	Greenleigh HOA	443 787 5849	matt.algiers@gmail.com	MJA
10.	Marsha Ayres	BQIA	410 335 7973	mayres1027@gmail.com	MLA

* Stakeholder Advisory Committee Member

Airport Noise Zone Update Stakeholder Advisory Committee

Meeting #2

Martin State Airport

June 26, 2025
6:00 PM – 8:00 PM

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Welcome to Martin State

Safety Briefing

- Follow emergency exits
- Call 911
- Assist those who need assistance
- Be sure to take a head count during the emergency event
- Nearest AED –#4 (Hangar 5)
- Nearest Fire Extinguisher – Room 527 (Hangar 5)
- Accountability Site: Parking lot outside of Hangar 4
- Always report any hazards in the meeting room

Source: MTN State Airport Photo Gallery

2

2

Agenda

- Welcome and Introductions
- SAC Meeting #1 Recap
- ANZ Noise Modeling Process
- Noise Model Inputs
- ANZ Land Use Inventory
- Noise Abatement Plan (NAP)
- Schedule and Resources

3

3

Meeting Facilitation

The meeting facilitator is responsible for ensuring SAC meetings:

- Run efficiently, respectfully, and effectively
- Focus on the published agenda
- Provide appropriate opportunities for all members to participate
- Result in consensus conclusions to the maximum extent feasible
- Are documented through preparation of accurate meeting notes

Welcome and Introductions 4

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Introductions

- Maryland Aviation Administration (MAA) representatives
- Stakeholder Advisory Committee (SAC) members
- Consultant team

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Welcome and Introductions 5

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SAC Meeting #1 Recap

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ANZ Update Scope and Process

- Form and engage with Stakeholder Advisory Committee (SAC)
- **Prepare base year, 5-year, 10-year forecast noise contours**
- Compile ANZ (composite of the three contour sets)
- Conduct land use inventory within ANZ
- Review existing Noise Abatement Plan (NAP)
- Conduct public hearing/workshop
- Update Code of Maryland Regulations (COMAR)

SAC Meeting #1 Recap 7

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ANZ Study Update

The ANZ update process includes status review of the NAP.

Airport Noise Zone (ANZ)	Noise Abatement Plan (NAP)
Provides the means to identify and control incompatible land development around Martin State Is a composite of the farthest extents of the annual Day-Night Average (DNL) contours for each of the study years (2025 base, 2030 and 2035 forecast)	Prescribes measures to monitor, reduce, and/or eliminate incompatible land use areas within the ANZ to the extent possible while maintaining efficient airport operations

Airport Noise Zone 8

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Maryland Airport Noise Zone (ANZ) Regulations

- Maryland Environmental Noise Act of 1974
  - *"Provide a positive basis for abatement of existing noise problems in communities near airports and to prevent new noise problems."*
- Maryland law requires MAA to complete an ANZ update approximately every 5 years
- The certified ANZ consists of Day-Night Average Sound Level (DNL) contours at 65, 70, and 75 decibels printed on:
  - Airport Noise Zone Map

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State Law and Regulations

Transportation Code	Code of Maryland Regulations (COMAR)
Noise Zone Regulations; Part I The purpose of this subtitle is to: (1) Provide a positive basis for abatement of existing noise problems in communities near airports and to prevent new noise problems; and (2) Protect the health and general welfare of the occupants of land near airports.	**Chapter 11.03.03** Defines the prediction method to be used to develop 'noise contours of equal noise exposure' (subject to the approval of the Executive Director) Provides direction for development of contours, including 5 and 10 year, plus cumulative condition, provides methods for determination of impacted land use areas, and direction on noise abatement plans.
Noise Zone Regulations; Part II Requires assessment of the noise environment, existing projected future use, following procedures the Executive Director establishes, delineates a "noise zone", requires development of a noise abatement plan - every five years	**Section 11.03.03.05** Provides a process for permits for construction within the Noise Zone Surrounding a State-Owned Airport

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Expectations

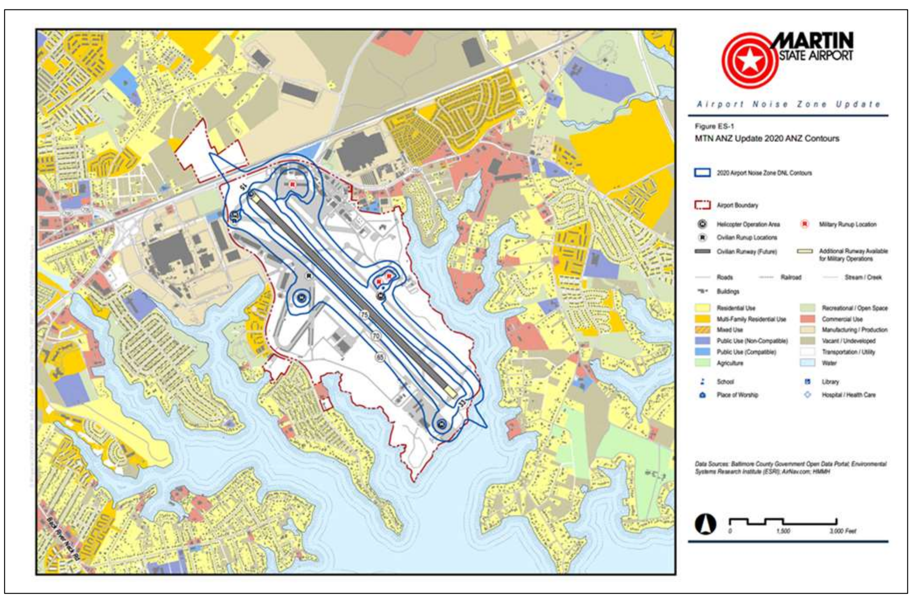
The ANZ provides a means to:

- Understand existing and future noise exposure around Martin State
- Assist local land use jurisdictions in the control of potentially incompatible development
- Identifies potential strategies to mitigate noise, including voluntary noise abatement procedures

The ANZ cannot:

- Restrict the hours of operations
- Impose curfews or restrictions
- Require the FAA to change flight procedures
- Be used to limit demand or forecast growth

Martin State Noise Zone (2020)



SAC Responsibilities

- Contribute to study inputs
  - Discussion and feedback at SAC meetings
  - Provide input, advice, and guidance related to Noise Abatement Plan
  - understand ANZ effects on stakeholders
- Review modeling assumptions
  - Base year and forecasts
- Review analysis results
  - Base, 5-year, and 10-year contours
- Review documentation
  - NAP and Draft ANZ document
- Provide two-way communication between the SAC and their organizations / constituents
  - Share information with your neighbors and organizations
  - Spread the word about future opportunities for public feedback

MAA will respect and consider SAC input but retains overall responsibility for the Martin State ANZ update.

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ANZ Noise Modeling Process

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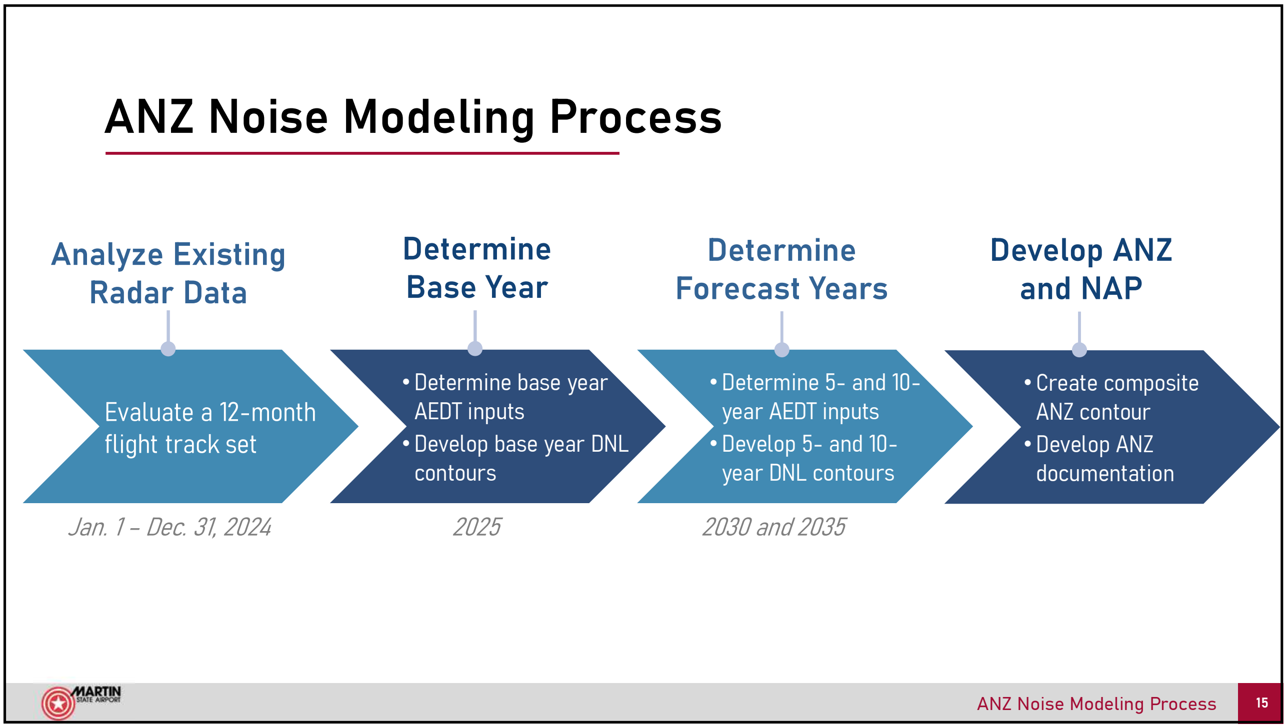
ANZ Noise Modeling Process
Analyze Existing Radar Data
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• Determine base year AEDT inputs
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2025
Determine Forecast Years
• Determine 5- and 10-year AEDT inputs
• Develop 5- and 10-year DNL contours
2030 and 2035
Develop ANZ and NAP
• Create composite ANZ contour
• Develop ANZ documentation
ANZ Noise Modeling Process
15

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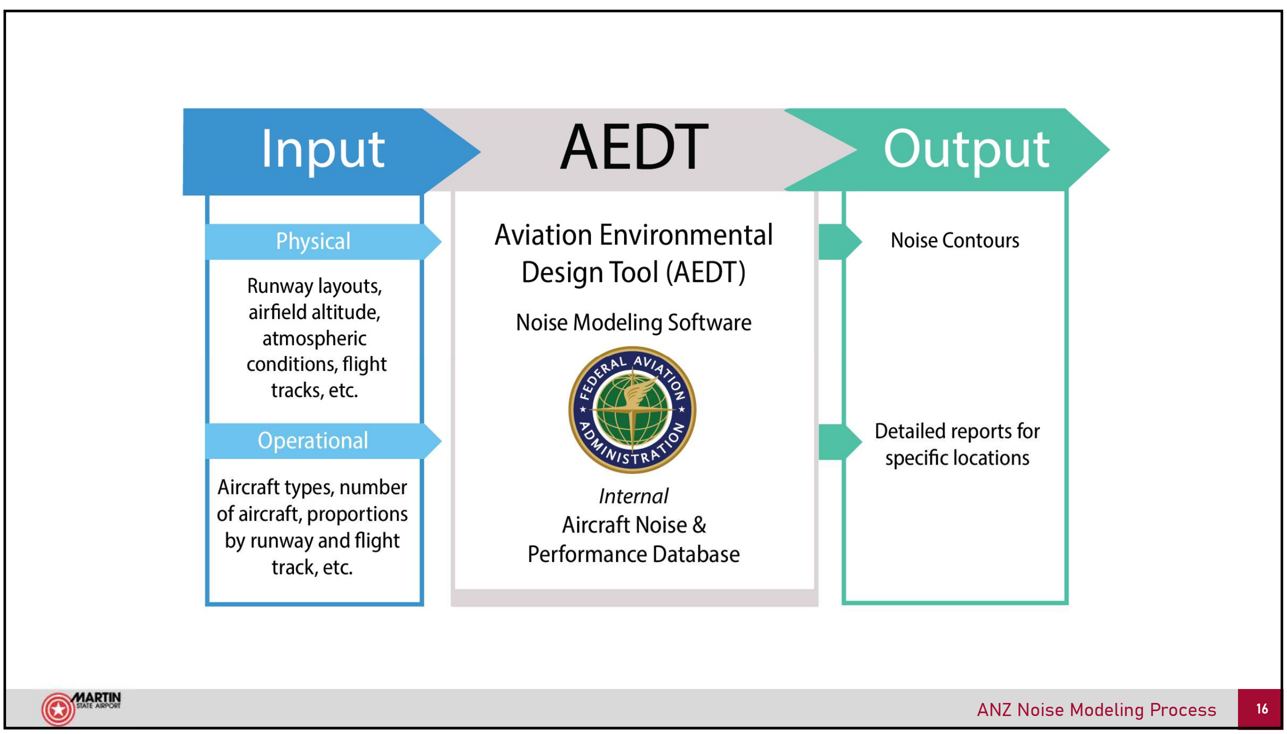
Input
AEDT
Output
Physical
Runway layouts, airfield altitude, atmospheric conditions, flight tracks, etc.
Operational
Aircraft types, number of aircraft, proportions by runway and flight track, etc.
Aviation Environmental Design Tool (AEDT)
Noise Modeling Software
Internal
Aircraft Noise & Performance Database
Noise Contours
Detailed reports for specific locations
ANZ Noise Modeling Process
16

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Noise Model Inputs

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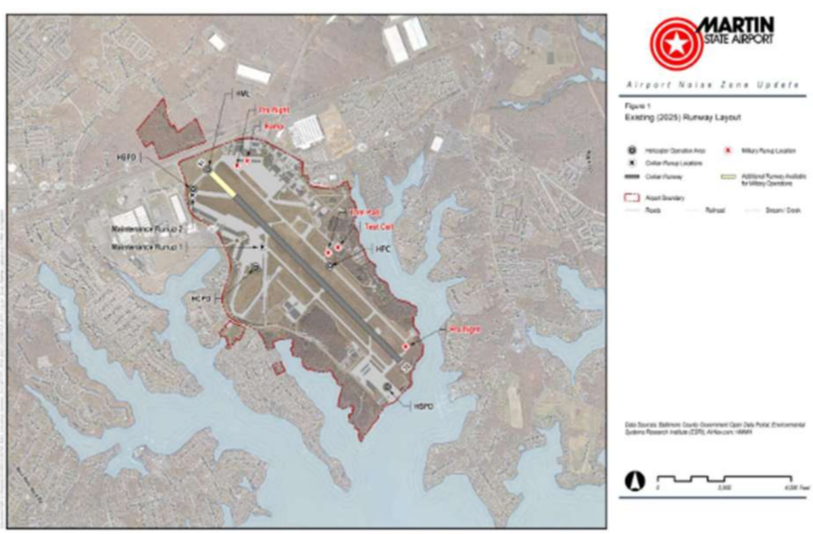
Airport Layou

Base Year (2025)



Runups

- Pre-flight run-ups and Maintenance run-ups will performed in designated areas

Noise Model Inputs 18

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Model Track Development

- HMMH AEDT Preprocessor
  - Models each and every operation as an AEDT Flight Track
  - Used for all Fixed Wing Arrivals and Departure operations
- Representative Model Tracks
  - Representative model tracks were use for helicopter operations and fixed-wing circuit operations
  - Military operations use model tracks based on prior ANZ updates and validated by MDANG

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Noise Model Inputs 19

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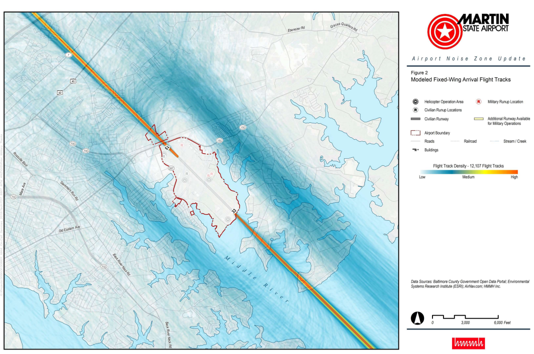
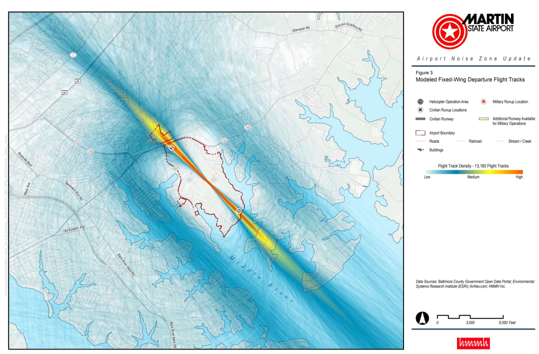
Fixed Wing Modeled Flight Track Density



Arrival tracks



Departures tracks

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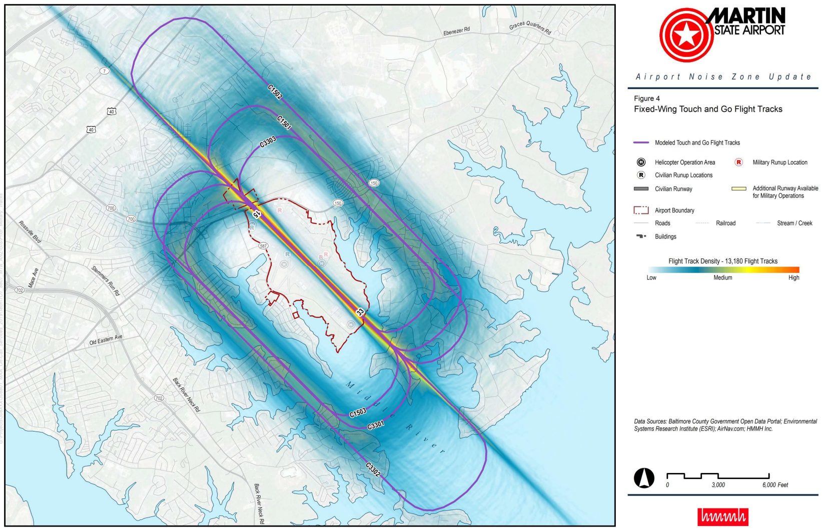
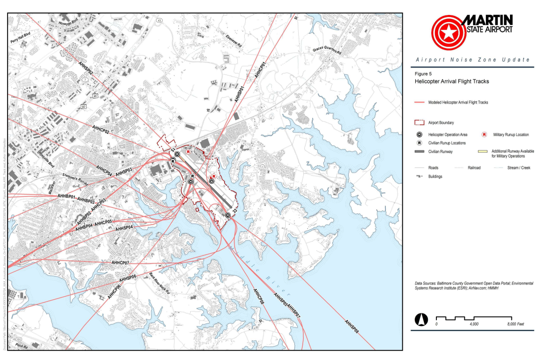
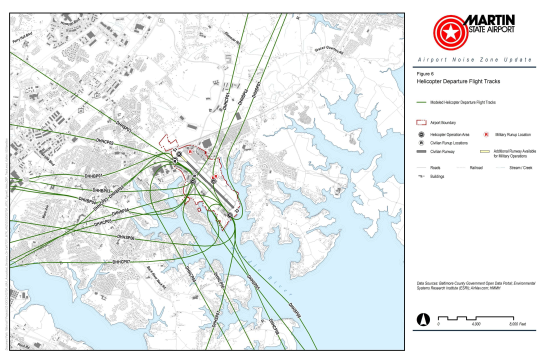
Fixed Wing Modeled Circuit/Touch and Go Tracks



All Helicopter Modeled Flight Tracks

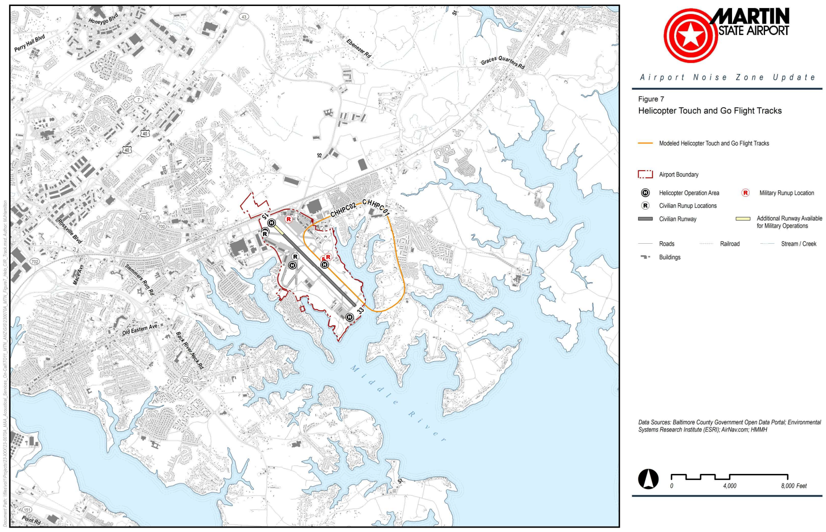


Arrival tracks



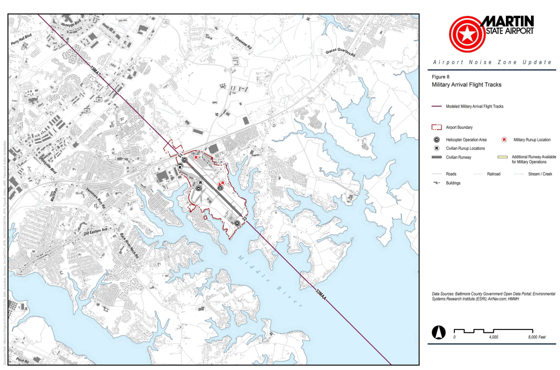
Departures tracks

Helicopter Modeled Circuit/Touch and Go Tracks

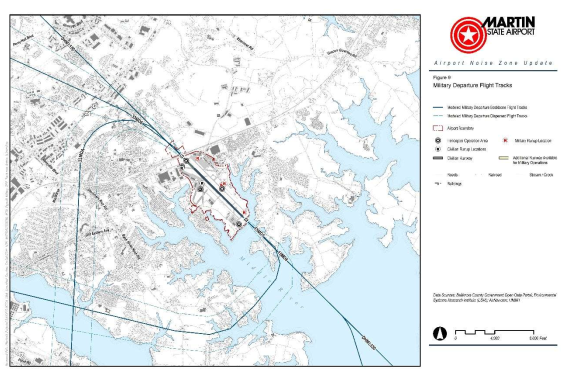


23

Military Modeled Flight Track



Arrival tracks



Departures tracks

24

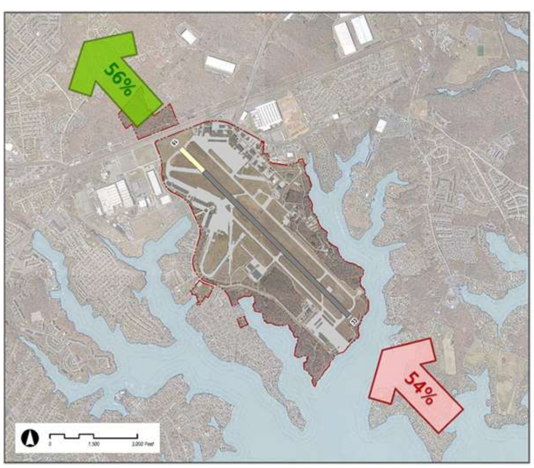
Base Year (2025) Operations

- Operations levels determined from 2024 edition of the FAA's Terminal Area Forecast (issued Jan 2025)
  - Calendar year 2024 data scaled to 2025 TAF
- Aircraft fleet mix, runway use, and flight tracks derived from ANOMS data
  - Model flight tracks were created using flight data from the 2024 calendar year.

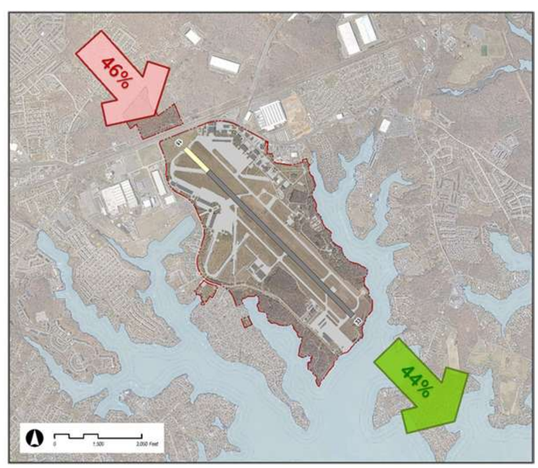
Operations Category	Operations Count	Operations Percentage
Air Carrier (AC)	5	<0.1%
Air Taxi (AT)	2,772	3.1%
General Aviation (GA)	84,939	94.9%
Military (ML)	1,773	2.0%
Total	89,489	
Average Annual Day (AAD)	245.18	

Runway Utilization

Base Year (2025)



West Flow 54%



East Flow 46%

Base Year (2025) Aircraft Fleet mix

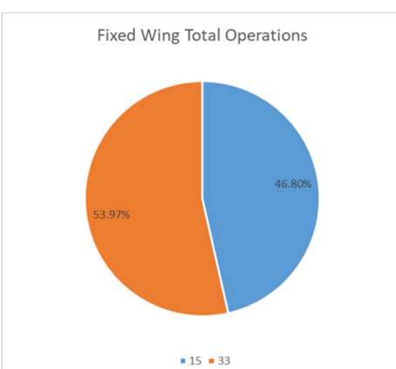
- Air Carrier
  - EMB175 (Embraer ERJ175)

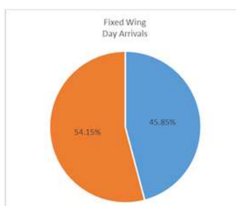
- Air Taxi
  - SA330J (Leonardo AW139)
  - CNA680 (Cessna 680-A Citation Latitude)
  - CNA55B (Embraer Phenom 300 (EMB-505)

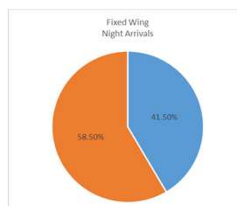
- General Aviation
  - CNA172 (Cessna 172 Skyhawk)
  - GASEPF (Piper PA-28 Cherokee Series and other single-engine fixed pitch propeller aircraft)
  - SA350D (Airbus Helicopters H125)

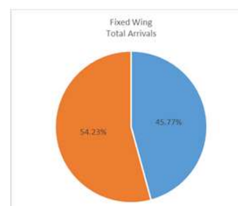
- Military
  - A10C (Fairchild A-10C Thunderbolt II)
  - S70 (Sikorsky UH-60 Black Hawk)
  - DHC6 (Raytheon Super King Air 200 and other military twin-engine turboprop aircraft)

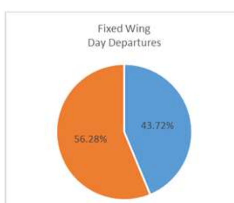
Total Fixed Wing Runway Utilization

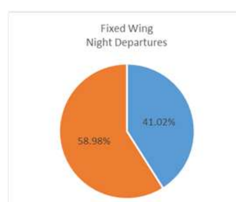


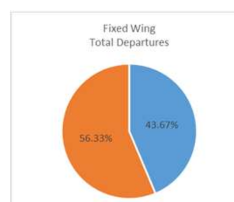


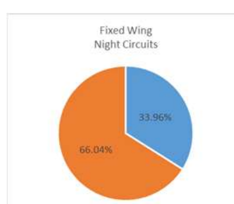


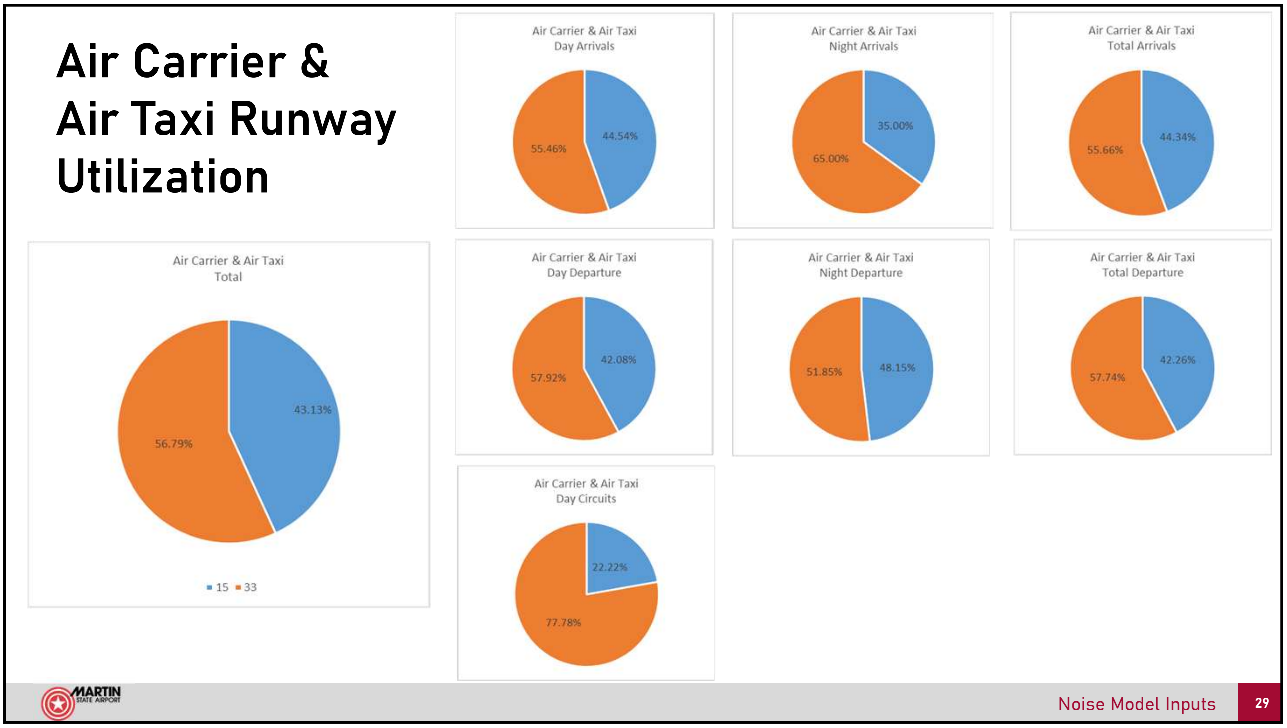











Air Carrier & Air Taxi Runway Utilization
Air Carrier & Air Taxi Total
43.13%
56.79%
15 33
Air Carrier & Air Taxi Day Arrivals
44.54%
55.46%
Air Carrier & Air Taxi Night Arrivals
35.00%
65.00%
Air Carrier & Air Taxi Total Arrivals
44.34%
55.66%
Air Carrier & Air Taxi Day Departure
42.08%
57.92%
Air Carrier & Air Taxi Night Departure
48.15%
51.85%
Air Carrier & Air Taxi Total Departure
42.26%
57.74%
Air Carrier & Air Taxi Day Circuits
22.22%
77.78%
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Noise Model Inputs
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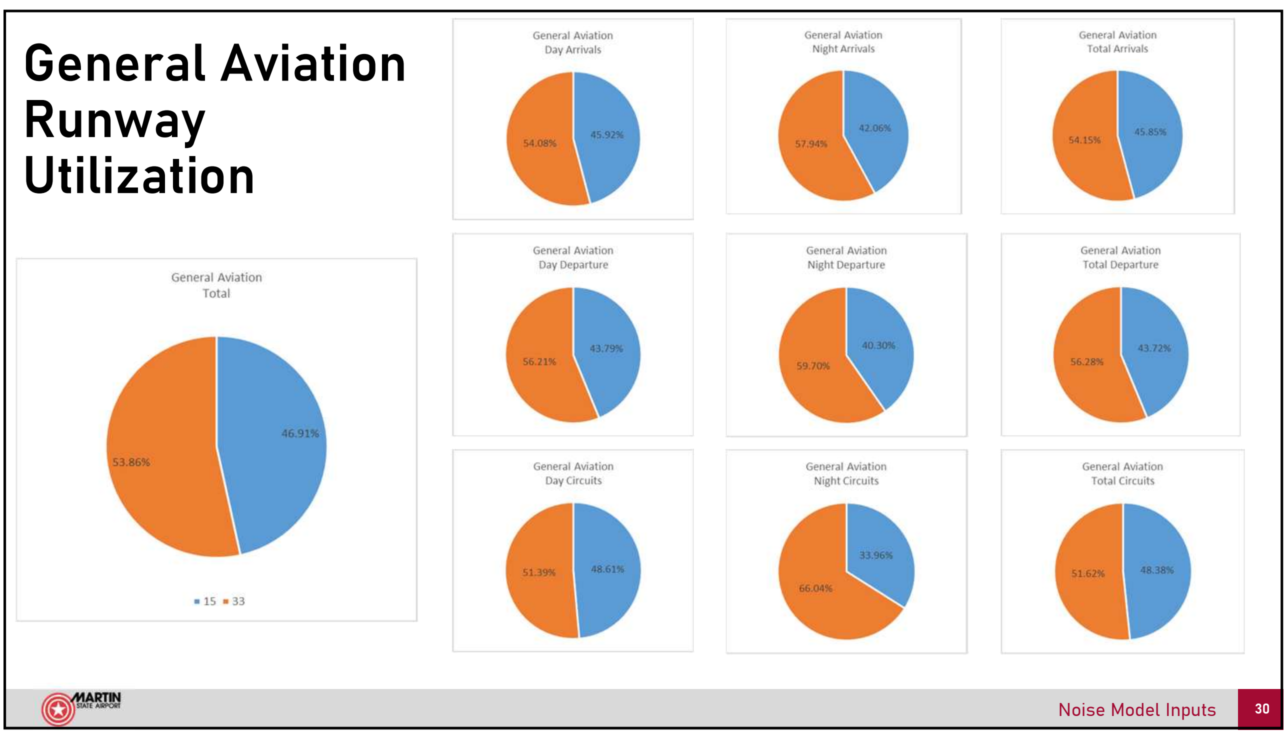
General Aviation Runway Utilization
General Aviation Total
46.91%
53.86%
15 33
General Aviation Day Arrivals
45.92%
54.08%
General Aviation Night Arrivals
42.06%
57.94%
General Aviation Total Arrivals
45.85%
54.15%
General Aviation Day Departure
43.79%
56.21%
General Aviation Night Departure
40.30%
59.70%
General Aviation Total Departure
43.72%
56.28%
General Aviation Day Circuits
48.61%
51.39%
General Aviation Night Circuits
33.96%
66.04%
General Aviation Total Circuits
48.38%
51.62%
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Noise Model Inputs
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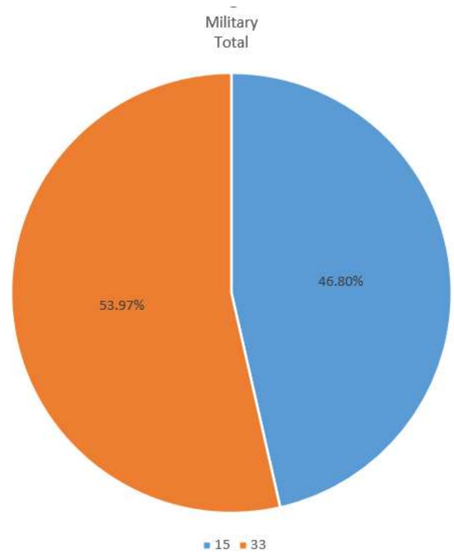
Military Runway Utilization



Meteorological and Terrain Data

AEDT's database includes 30-year average weather for each airport. For MTN:

- Temperature: 55.47°F
- Station pressure: 1017.21 millibars
- Dew point: 47.7°F
- Relative humidity: 75.08%
- Wind speed: 4.4 knots

Terrain Data

- Obtained from the United States Geological Survey (USGS) National Elevation Dataset with one-third arc second resolution.
- Terrain data will be utilized in conjunction with the terrain feature of AEDT to generate the base year noise contours for the MTN ANZ update.

Five-Year (2030) Operations

- Relocation of Runway 15/33 ends for civilian aircraft – from 6,997 to 7,430 ft
- Operations levels derived from 2024 TAF
- Runway use, and flight tracks are the same as the base year operations

Operations Category	Operations Count	Operations Percentage
Air Carrier (AC)	5	<0.1%
Air Taxi (AT)	3,202	3.5%
General Aviation (GA)	89,122	96.2%
Military (ML)	523	0.3%
Total	**92,852**	
Average Annual Day (AAD)	**254.39**	

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Noise Model Inputs 33

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Ten-Year (2035) Operations

- Relocation of Runway 15/33 ends for civilian aircraft – from 6,997 to 7,430 ft
- Operations levels derived from 2024 TAF
- Runway use, and flight tracks are the same as the base year operations

Operations Category	Operations Count	Operations Percentage
Air Carrier (AC)	5	<0.1%
Air Taxi (AT)	3,632	3.8%
General Aviation (GA)	91,604	95.9%
Military (ML)	523	0.3%
Total	**95,764**	
Average Annual Day (AAD)	**262.37**	

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Noise Model Inputs 34

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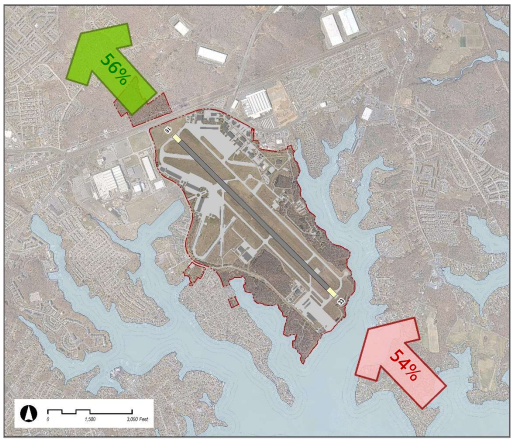
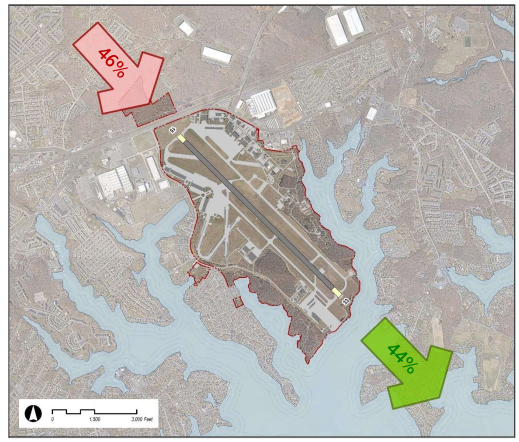
Runway Utilization

Five-Year (2030), Ten-Year (2035)



West Flow 54%



East Flow 46%

Aircraft Fleet Mix

Base Year (2025), Five-Year (2030), Ten-Year (2035)

- AEDT Type (Aircraft Types) with the Highest Growth
  - COMSEP (Cirrus SR20 and Cirrus SR22)
  - CNA560XL (Cessna 560 Citation XLS)
  - CNA208 (Pilatus PC-12)
- AEDT Type (Aircraft Types) with the Largest Decrease
  - CNA525C (Cessna CitationJet CJ/CJ1 (Cessna 525))
  - LEAR35 (Bombardier Learjet 35)
  - GASEPV (Piper PA-32 Cherokee Six and other Single Engine Variable-pitch Propeller Aircraft)

AEDT Type	Average Daily Ops (2025)	Changes (2030)	Changes (2035)
COMSEP	11.1	53%	83%
CNA560XL	1.7	25%	56%
CNA208	2.0	17%	39%
CNA525C	1.6	-41%	-100%
LEAR35	1.2	-41%	-100%
GASEPV	4.5	-25%	-43%

Noise Contours (Next Meeting)

- Base Year Noise Contour
- 2030 Forecast Noise Contour
- 2035 Forecast Noise Contour

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Noise Model Inputs 37

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Noise Abatement Plan (NAP) Overview

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Noise Abatement Plan (NAP)

Originally adopted in 1984, updated in 1987, reviewed and approved with no changes in 2012. The NAP was reviewed and updated as part of the 2020 MTN ANZ update process in order to accurately reflect current operating conditions at MTN.

NAP Goal: To the extent possible, reduce incompatible land use within ANZ while maintaining efficient airport operations.

General categories of NAP measures:

- **Noise abatement elements**
- **Land use elements**

Evaluate current NAP and allow for potential modifications or updates to be made.

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Noise Abatement Plan (NAP)

Noise abatement procedures are voluntary and designed to minimize exposure of residential areas to aircraft noise, while ensuring safety of flight operations.

- Visual Flight Rules (VFR) / Instrument Flight Rules (IFR)
- Departures
- Arrivals
- Closed traffic patterns
- Taxiing aircraft
- Touch and Go and/or Practice Approach Restrictions
- Aircraft Maintenance Engine Run-up Areas

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Noise Abatement Plan Measures

Noise Abatement Measures	Programmatic Measures
Departure Procedures	Review of operations and noise concerns
Arrival Procedures	
Closed Traffic Patterns	**Land Use Measures**
Touch-and-Go or Practice Approaches	Control of Incompatible Development

Martin State NAP Caveats

Noise abatement procedures are voluntary:

- MTN NAP is formulated to minimize noise disturbance to neighboring communities while maintaining safe and efficient MTN Airport operations. MAA Division of MTN Airport Operations is responsible for the overall administration of MTN.
- Aircraft may not follow noise abatement procedures if deemed necessary by Air Traffic Control (ATC) or flight crews to maintain operational safety.

Noise Abatement Plan (NAP):

- **VFR Piston-engine Aircraft:**
  - Runway 15/33 – Unless otherwise instructed by Air Traffic Control (ATC), aircraft fly runway heading to 1000' Mean Sea Level (MSL) prior to turning to the ATC approved on-course heading or crosswind leg of the traffic pattern.
- **VFR Turbine Powered Aircraft:**
  - Runway 15/33 – Unless otherwise instructed by ATC, aircraft shall fly runway heading to 1,500' MSL prior to turning to the ATC approved, on-course heading or crosswind leg of the traffic pattern.
- **VFR Helicopter Departures:**
  - Unless operating under a Letter of Agreement (LOA) with MTN ATC specifying otherwise, helicopters shall climb to 500' AGL on initial departure heading before turning on-course.
- **All IFR Departures:**
  - IFR departures shall be accomplished in accordance with ATC direction or clearance.

Note: IFR departures will be accomplished in accordance with Air Traffic Control (ATC) direction or clearance.

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Noise Abatement Plan (NAP):

VFR and IFR Arrivals and Traffic Patterns:

VFR and IFR aircraft approach should, to the maximum extent feasible, maintain the highest practical altitude, commensurate with flight and ATC procedures in order to minimize aircraft noise exposure to communities underlying the final approach courses.

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Noise Abatement Plan (NAP):

Closed Traffic Patterns

A left-hand traffic pattern shall be used at MTN unless otherwise directed by ATC. Piston fixed-wing aircraft should fly runway heading until reaching 1,000' MSL prior to turning to the crosswind leg of the traffic pattern. Turbine aircraft should fly runway heading until reaching 1,500' MSL prior to turning to the crosswind leg of the traffic pattern.

Traffic pattern altitudes are:

Fixed Wing	**Piston engine**	1,000' MSL
	Civil turbine and military turboprop	1,500' MSL
	Military Jet	2,000' MSL
Rotary Wing		500' MSL

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Noise Abatement Plan (NAP):

Touch-and-Go or Practice Approaches

No touch-and-go and/or practice approaches or practice landings are permitted between 10:00 p.m. to 6:00 a.m. daily unless approved by MTN Operations and Maintenance staff.

FAA Weight Class	Description	Weight	Limitation
Small	Small Single Engine/Twin Engine Aircraft, Helicopters, and Transient Military (e.g. Cessna 172, Piper Cherokee)	12,500 lbs. or less	**No restrictions**
Medium	Medium Aircraft and Transient Military* (e.g. military fighter jets, Learjet 35, Bombardier CRJ- 200LR)	Between 12,500 and 41,000 lbs	**Limit of two practice approaches**
Large	Large Jet/Large Commuter/757/Heavy Aircraft	More than 41,000 lbs.	**Practice approaches and landings are not authorized without prior permission from MTN Operations and Maintenance staff.**

*** Military aircraft shall be limited to two practice landings/take-offs or approaches unless additional operations are approved by MTN Operations and Maintenance staff.**
FAA Aircraft Weight Class - https://aspm.faa.gov/aspmhelp/index/Weight_Class.html

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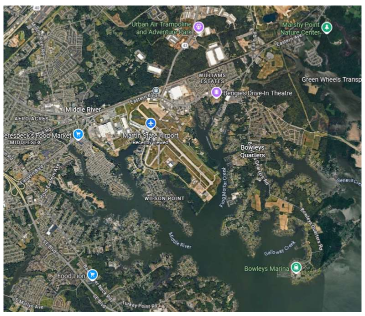
Noise Abatement Plan (NAP):

Aircraft Maintenance Engine Run-up Areas

Aircraft maintenance engine run-ups are to be accomplished only in areas designated by the Chief, MTN Operations & Maintenance in accordance with MTN Tenant Directive 200.2.



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Noise Abatement Plan (NAP)

Other Elements

Noise Concerns can be reported via telephone hotline

Zoning Permit and Appeal Procedure

- MAA regulates land use within the Airport Noise Zone.
- Anyone desiring to construct or modify a structure or land use is required to obtain an Airport Zoning Permit.

MDANG Noise Barriers

- MDANG erected two noise barriers, both located between the MDANG's engine maintenance area and the homes northeast of the Airport.

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Schedule and Resources

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Proposed Project Schedule

Jan 2025	April 2025	June 2025	Sept 2025	Nov 2025
Project Start	• **SAC Meeting #1**	• **SAC Meeting #2** • NAP Focus • Modeling Inputs	• **SAC Meeting #3** • Draft ANZ/NAP Publication • Public Workshop	• Comment Period Ends • Publish Final ANZ/NAP

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Schedule and Resources 50

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Project Contacts

Project Primary Contact

Email: MDOT-MAA-ANZ@assedollc.com

Phone: (240) 200-5176

MAA Project Manager

Bruce Rineer, Manager, Office of Environmental Compliance and Sustainability, Noise Section BRineer@bwiairport.com

ANZ Project Managers

Tyler White, Principal Consultant, twhite@hmmh.com

Rhea Hanrahan, Director, AES, rhanrahan@hmmh.com

Additional Resources

2020 Martin State ANZ

https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/

WebTrak

https://webtrak.emsbk.com/bwi3

Wrap Up

- SAC member questions, comments, and discussion
- Public Comments
- Next SAC meeting:
  - September 2025 – Specific date TBD

Topics:

- Draft noise modeling results, contours and land use inventory
- Updated Noise Abatement Plan

Schedule and Resources 53

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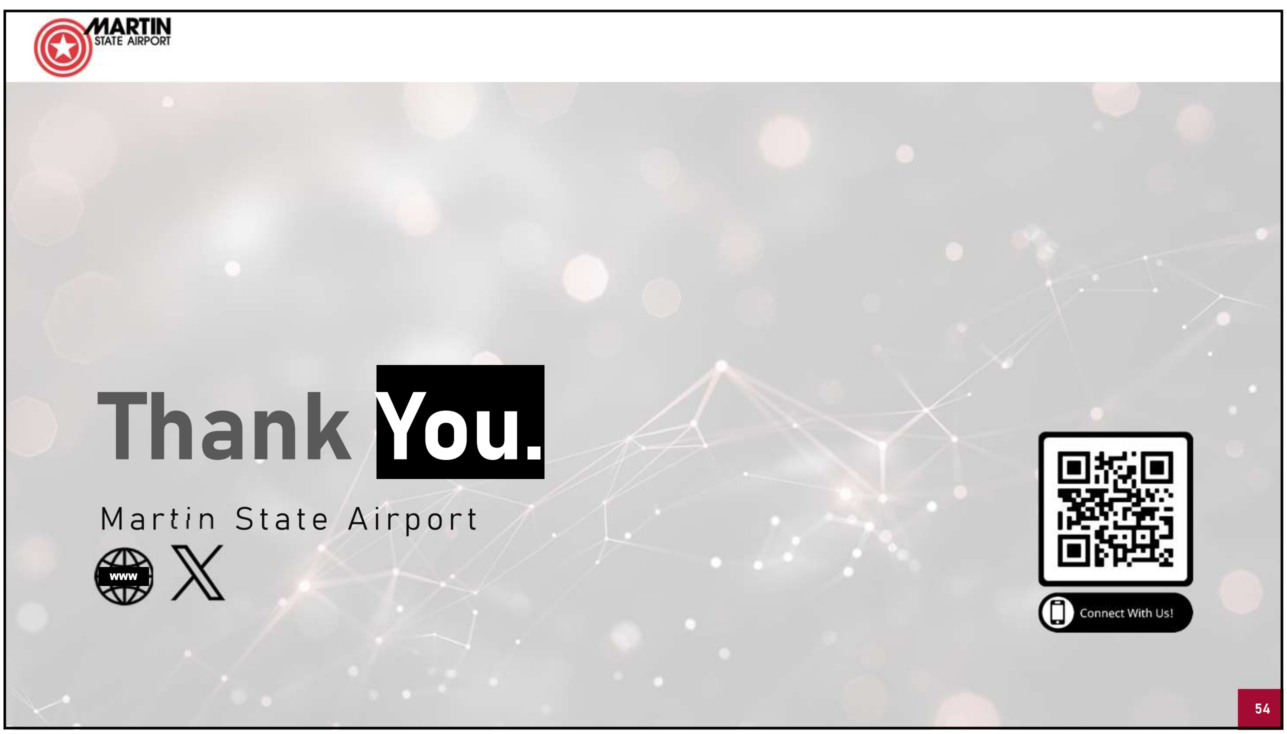

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Martin State Airport
Airport Noise Zone (ANZ) Update
Stakeholder Advisory Committee (SAC) Meeting #2

MEETING MINUTES

Thursday, June 26, 2025, 6:00 PM – 8:00 PM

Martin State Airport
701 Wilson Point Road, Hangar 4
Baltimore, MD 21220

Discussion Item	Notes	Presenter
Safety Briefing	Mr. Bruce Rineer opened the meeting with a brief safety overview specific to the Hangar 4 meeting space at Martin State Airport. He identified the location of the Automated External Defibrillator (AED), which was stationed down the hallway near Room 527, as well as a fire extinguisher located along the same corridor. In the event of an emergency, Mr. Rineer instructed attendees to exit the building promptly and proceed directly to the designated accountability area, located in front of the hangar. Mr. Rineer encouraged participants to remain alert to any safety concerns during the meeting and to report any issues they observed. He noted that the evening's meeting would not have a formal facilitator, but that Ms. Rhea Hanrahan from the project team would be available to step in and help guide the discussion if necessary.	Bruce Rineer
Welcome and Introductions	Following the safety briefing, Mr. Rineer welcomed everyone and thanked both returning and new SAC members for their time and continued participation in the Martin State Airport - Airport Noise Zone (ANZ) Update process. He provided a brief refresher on the project's purpose, explaining that the SAC plays a critical role in ensuring that noise modeling and policy recommendations are informed not only by technical data but also by the lived experiences of residents and stakeholders in the surrounding communities. Mr. Rineer emphasized that the update process involves reviewing current noise exposure levels, developing future-year forecasts, and aligning those findings with land use compatibility goals. He reiterated	Bruce Rineer

	that the SAC's feedback would directly inform the revised ANZ, the Noise Abatement Plan (NAP), and future regulatory documents. He noted that this work is required under Maryland State law and governed by the Code of Maryland Regulations (COMAR). Each SAC member and project team participant then introduced themselves by name and affiliation.	
SAC Meeting #1 Recap	Mr. Tyler White provided a recap of the first SAC meeting held in April. He began with the project timeline and pointing out where the process currently stood. He explained that the focus of SAC Meeting #2 would be on understanding the model inputs, but he first wanted to review the foundational context from the April session. Mr. White reminded the group that the ANZ update is required every five years and is designed to evaluate how aircraft noise impacts surrounding communities using the Day-Night Average Sound Level (DNL) thresholds of 65, 70, and 75 decibels. He noted that noise contours are not just lines on a map; they are used to guide compatible land use planning and to ensure that State and local policies are aligned with aviation noise exposure levels. The work is governed by COMAR, which provides a structured process for assessing existing noise impacts, projecting future impacts, and considering strategies for mitigation. However, Mr. White reminded everyone that the ANZ process cannot address all aviation concerns, it does not influence air traffic control decisions, cannot restrict federal airspace, and cannot change existing development. He also displayed the 2020 ANZ composite contour, showing how the majority of noise exposure remained within airport boundaries. Mr. White closed the recap by underscoring the role of the SAC moving forward, stating that future meetings would focus on draft contours and documentation, and that feedback from the committee would be essential to ensure the updated contours accurately reflect on-the-ground conditions.	Tyler White
ANZ Noise Modeling Process	Mr. White then led a detailed presentation on the ANZ noise modeling process. He explained that the team is using the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) to simulate how aircraft noise propagates from Martin State Airport under typical operating scenarios. The model is designed to integrate real-world radar data, flight paths, aircraft types, topography, and atmospheric conditions to calculate how noise travels over the surrounding communities. Mr. White emphasized that the AEDT model supports both current and forecast conditions. For the base year of 2025, the team used 2024 radar data and scaled it forward using FAA forecasts. For future years,	Tyler White

2030 and 2035, AEDT includes expected changes in operations and aircraft fleet mix. He explained that while the contours produced by the model reflect average daily noise exposure, they are still sensitive to several variables, including time of day, runway direction, and types of aircraft.

The model includes all types of operations, fixed-wing aircraft, helicopters, and military flights, and although military operations are not available in the ANOMS data for security purposes, they are included in the study and the project team received detailed information from the MDANG. Mr. White displayed diagrams showing how different types of aircraft are assigned specific track types within the model, such as circuit patterns for training flights or straight-in approaches for larger aircraft.

Several SAC members asked clarifying questions throughout the presentation. Mr. White explained that fixed-wing general aviation and on-demand air taxi flights are categorized separately within the model and that while Martin State Airport does not host commercial airline service, charter flights are included when they occur. When asked about the impact of tree removal near the north end of the runway, Mr. White stated that while it might slightly shift takeoff or landing points, it would not significantly change aircraft routing or noise exposure. He reiterated that runway use is primarily driven by wind conditions, not obstacles or changes in runway length.

Mr. Matthew Algiers inquired about the frequency of charter flights, and Mr. White responded that there had been five in the past year. He explained that the model differentiates between daytime and nighttime operations, with nighttime modeled as a separate component to accurately assess DNL values during noise-sensitive hours.

Mr. White also addressed the challenge of modeling military aircraft, noting that security protocols prevent radar access for flights. In those cases, the team relied on best-available data and conservative estimates to fill in the gaps, including discussions with the Maryland Air National Guard. Terrain, elevation, and long-term weather patterns are also taken into account in the model to produce the most accurate results possible.

Mr. James Hock raised concerns about how noise might carry across Middle River, pointing out that water surfaces can reflect noise in ways that land does not. Mr. White acknowledged that difference and confirmed that the model accounts for those acoustic properties. Another SAC member asked why the noise of arrival aircraft appeared more concentrated on the north side. Mr. White said that aircraft like the A-10 historically followed arrival paths that produced more noise in that area, a pattern that would be accounted for in the 2025 modeling scenarios.

Noise Model Inputs

Tyler White

Mr. White continued into Noise Model Inputs, walking through the radar-based modeling approach being used for Martin State Airport. He explained that the team was using an in-house preprocessor tool to feed actual radar tracks into the model, rather than relying solely on representative tracks. This allowed them to more accurately capture how aircraft were flying, including the dispersion in flight paths and variations from one track to another. He pointed to a heat map on the screen, showing how fixed-wing arrival and departure paths appeared, noting areas of heavier density with warmer colors.

Mr. Hock asked for clarification on whether each radar track represented a single aircraft operation, particularly for touch-and-go activity. Mr. White confirmed that each track was counted individually, even for training circuits. He said the team would be modeling each occurrence and that the touch-and-go operations would be accounted for in the model accordingly. As he advanced to the next slide, he showed the tracks associated with touch-and-go operations and explained how these would be used to generate model input tracks, each associated with a specific number of aircraft operations.

He moved into helicopter traffic, explaining that model tracks for helicopters were developed by drawing centerlines through the densest radar returns. Each helipad had its own arrival and departure track, reflecting actual flows observed in the data. Mr. Hock commented that it seemed like most helicopter routes passed over Wilson Point and Hawthorne and asked whether the model would reflect that imbalance. Mr. White confirmed that the radar data supported the observation and said the model would include weighted allocations, meaning that routes experiencing more traffic, such as those over Wilson Point, would be modeled with proportionally more activity.

He then displayed the helicopter training circuit track, followed by the military tracks. The military flight paths included both straight-in and straight-out patterns, and an overhead break pattern was also being added, which would resemble a circuit track but with an extended leg. These paths would be used to model A-10s, C-130s, and other military aircraft based on historical data.

Mr. White then described how operational forecasts were derived. The model's baseline year was 2025, but since full 2025 data was not yet available, the team had used 2024 radar data and scaled it using the FAA's Terminal Area Forecast (TAF). This method allowed them to estimate total operations by category, air carrier, air taxi, general aviation, and military, and that breakdown would inform the fleet mix, runway utilization, and overall activity assumptions.

At this point, Mr. Rineer interjected to mention that engine run-up operations were performed during the monitoring period by Grandview Aviation, which has since ceased operations at the airport. He said those run-ups should be included in both the base and future-year models. Mr. White agreed and noted where the run-up locations were mapped. Mr. Rineer added that the team had originally planned to define a run-up area with Grandview's input, but the operator left before that could happen. He suggested modeling run-up activity in front of the hangar where those operations had previously taken place. Mr. White said he would make sure that was captured.

Mr. White continued, stating that for the base year 2025, the project team would model approximately 89,000 operations, or approximately 245 average daily operations. That number would increase in future years to approximately 95,000 by 2035. He displayed the modeled runway use data for both the base and future years. For arrivals and patterns, Runway 33 (west flow) would be used 54 percent of the time and Runway 15 (east flow) would be used 46 percent of the time. For departures, Runway 33 would account for 56 percent of departures and Runway 15 would account for the other 44 percent. These figures were derived directly from radar data and would be used for all future-year scenarios.

Mr. Jim Merritt mentioned a previous statement from Mr. Harold Fowler suggesting that when trees were cleared from the north end of the runway, the operation split would become more balanced, closer to 50/50, and asked if that was accurate. Mr. Kevin Clarke responded that he did not believe it would significantly affect operational patterns. He said that while removing the trees could increase the usable runway length from 7,000 to 8,000 feet, it would not alter air traffic control practices or pilot preferences, which were still largely dictated by wind and operational efficiency. The main change, Mr. Clarke said, would be that aircraft could take off or land slightly farther north, which could help them achieve greater altitude earlier, possibly benefiting areas like Long Beach Estates by reducing low-altitude overflights.

Returning to the presentation, Mr. White gave a more detailed look at the fleet mix, starting with the 2025 base year. He described the air carrier category as including larger commercial aircraft, such as 737s, but emphasized that these would only appear as charters at Martin State, not as regular service. Air taxis, he said, were small business jets flown on-demand. General aviation encompassed everything else that wasn't military or commercial, such as corporate jets, private pilots, and helicopters, among others.

Mr. Hock asked for clarification on what was included in the general aviation count, specifically whether it included general aviation jets or only small propeller planes. Mr. White said the 89,000 operations included all aircraft types. The team clarified that general aviation included both jets and propeller aircraft that weren't classified as air carriers or military. He said the air carrier category included aircraft like chartered Southwest or Delta flights, while air taxis were things like privately chartered Embraer jets. Ms. Hanrahan added that their modeling included every type of aircraft that flew in or out of Martin State Airport in 2024, with exact aircraft type data.

Ms. Kim Fry expressed concern upon hearing the mention of 737s, asking whether Martin State currently had contracts with any air carriers. Mr. Rineer responded that Martin State Airport is not a Part-139 airport like BWI and was therefore not certified for scheduled commercial service. Any commercial flights were charters and were extremely rare. Ms. Hanrahan confirmed there were five air carrier operations in 2024. A 737 had landed at Martin State recently, but it was a chartered flight, possibly for a sports team, which was an infrequent occurrence, and the airport is not designed to support commercial service. When someone asked for a charter count, Mr. Rineer confirmed again that there were five air carrier operations in 2024.

Mr. White transitioned into the runway utilization breakdown by aircraft category and time of day. He showed the data split into day and night operations, including circuits. Ms. Hanrahan noted that this section had been emailed out in advance due to the detailed data tables. Mr. Rineer pointed out that runway use is influenced by wind, not just runway length or nearby obstacles. Ms. Hanrahan emphasized that runway utilization was broken down not just overall, but by category, day arrivals, night circuits, and so on, to ensure that DNL values accurately reflected how and when aircraft were operating. She reminded the group that "night" in the model was defined as 10 PM to 7 AM.

Mr. White continued through additional charts for air taxis, general aviation, and military aircraft, stating that for military aircraft, radar data wasn't available due to safety restrictions, so modeling assumptions had to be applied. He then discussed other model inputs like long-term weather averages and terrain.

When he got to the 2030 model assumptions, Mr. White noted that operations were projected to increase slightly and that the only change to tracks would be the inclusion of a runway shift. Mr. Merritt asked why military aircraft were still included in 2030 modeling if A-10s had left and there were no future plans for fixed-wing military operations. Ms. Hanrahan explained that although the base wouldn't host fixed-wing units, military aircraft might still operate at the airport. Mr. White gave the number as 1,700 operations. Mr. Clarke added that although the A-10s had left, there was still some effort underway to bring new aircraft in, and that military presence at Martin State Airport wasn't necessarily over.

The discussion then shifted toward noise propagation over water and whether the model captured how sound might carry across Middle River. Mr. Hock raised the concern, arguing that trees and land absorb sound, but water reflects it, potentially increasing impacts on communities across the river. Ms. Hanrahan confirmed that the modeling software accounts for over-water reflection and said noise is still modeled over a wide geographical area. She emphasized, however, that 65 dB DNL contours, the focus of the regulatory analysis, typically do not extend far from the airport property at Martin State.

Mr. Hock requested that the model include points across the river so that actual noise levels could be compared now and in the future. Ms. Hanrahan agreed this was possible and said they could place model points wherever needed. Mr. Merritt said having those numbers would be useful in future SAC meetings to track change over time. He asked to pull up the map showing noise contours and pointed out that the northern lobe seemed to extend farther than the southern one, which seemed odd given the population on the south end. Ms. Hanrahan acknowledged that the contours would not be perfectly symmetrical and said that runway use and aircraft mix dictated the contour shape.

ANZ Land Use Inventory	Mr. Rineer introduced the topic of land use by explaining that the ANZ Land Use Inventory is a key element of the update process. The goal of this component, he said, is to assess how current land use and zoning aligns with projected noise exposure contours and to identify any instances of incompatible development. Mr. Rineer emphasized that this work is intended to inform future policy guidance and collaboration with Baltimore County to prevent land use conflicts near Martin State Airport.	Bruce Rineer

Mr. White elaborated that the modeling and analysis help determine whether current development patterns are consistent with the FAA's guidelines on land use compatibility in noise-impacted areas. He noted that Martin State is the second-busiest general aviation airport in Maryland, with a runway capable of handling more than 40 operations per hour. While the airport has not experienced significant development pressure to date, the land use inventory helps ensure that future growth is planned in a way that avoids placing sensitive uses, like residences or schools, too close to high-noise areas.

Mr. Rineer added that while the modeling data provides the technical foundation, the real aim of the land use inventory is to work with local partners to minimize future conflicts. He said that in past cases, coordination with planning agencies have helped prevent the introduction of incompatible new uses. He concluded that the inventory is not just a regulatory task, but a planning tool meant to benefit the long-term relationship between the airport and its surrounding communities.

Noise Abatement Plan (NAP)

Mr. Rineer then transitioned into a discussion of the NAP, noting that while the plan is voluntary, it plays a significant role in promoting noise-conscious flying behaviors. He explained that the current NAP, updated in 2020, includes recommended procedures for different types of aircraft. These include altitude minimums and turn restrictions aimed at minimizing overflight noise in nearby communities.

Bruce Rineer

He detailed several of the plan's key guidelines: fixed-wing aircraft are encouraged to reach 1,000 feet before initiating any turns; turbine-powered aircraft are asked to reach 1,500 feet; helicopters should maintain a minimum of 500 feet when departing or arriving; and aircraft on arrival should remain at the highest possible altitude until initiating final approach. Instrument Flight Rules (IFR) traffic, he noted, follows published procedures that are less flexible but still within the scope of the plan's recommendations.

During the discussion, several SAC members raised questions about the effectiveness and enforceability of these procedures. One participant asked whether Visual Flight Rules (VFR) arrivals could fly at higher altitudes to further reduce noise. Mr. Rineer responded that this is something they could evaluate further, especially by studying pilot behavior and approach starting points.

Mr. Merritt asked whether aircraft could be required to use the full runway length for takeoffs to avoid steep climbs over water. Mr. Clarke responded that this is already being addressed through the design of a new parallel taxiway, which will allow aircraft to stage from the very

	end of the runway. He noted that this change should help reduce the low-altitude noise footprint over communities like Long Beach Estates. Another participant inquired whether the runway extension would lead to increased traffic. Mr. Clarke clarified that the purpose of the extension was to improve operational efficiency and safety, not to increase airport capacity. He emphasized that any significant increase in operations would require separate planning and likely another round of environmental review. Further questions touched on aircraft noise characteristics. Mr. Merritt asked if twin-engine aircraft were louder than single-engine planes, to which the team acknowledged, noting they typically have more power and climb performance. Another member asked whether piston aircraft were louder than modern jets. Mr. Rineer said that in many cases, older piston aircraft can be louder due to outdated technology. Responding to questions about oversight, Mr. Rineer confirmed that all aircraft undergo routine FAA inspections and that any safety violations are flagged. He added that flight schools operating at Martin State are limited to three aircraft in the traffic pattern at a time and that touch-and-go landings are not permitted between 10:00 PM and 6:00 AM unless explicitly approved by airport operations. Mr. Merritt proposed adjusting the allowed start time for operations from 6:00 AM to 7:00 AM to reduce early-morning noise impacts. Ms. Fry followed up by asking when the control tower opens. Mr. Rineer responded that the tower opens at 6:00 AM. The conversation briefly turned to the new community college aviation maintenance program planned for the airport. While this program would bring more people into aviation-related training, it is unlikely to have a meaningful impact on flight operations or noise levels.	
Schedule and Resources	As the presentation concluded, Mr. Rineer turned the discussion to planning the next SAC meeting. He explained that the project team would be compiling and analyzing the modeling outputs in the coming months, with the goal of presenting draft contours and documentation for review in the fall. In preparation, Mr. Rineer asked attendees to begin thinking about their availability in September and October so the team could begin coordinating a date for SAC Meeting #3. Ms. Elsa Arias used the opportunity to ask SAC members to share any standing meeting dates or known conflicts that might interfere with scheduling. She emphasized the team's desire to avoid overlaps with regularly scheduled community meetings. Mr. Rineer clarified that the team was particularly looking at dates in September.	Bruce Rineer

Ms. Hanrahan added that members could send their availability or conflicts by email if they did not have that information on hand during the meeting. Mr. Hock responded that the second Thursday of each month was reserved for his association’s general meetings and would be the only time that would consistently conflict. He added that his group does not meet during July or August, which opened more scheduling flexibility in the summer months.

Mr. Rineer confirmed this, asking whether it was the first or second Thursday, and Mr. Hock reiterated it was the second. Another attendee added that the first Tuesday of the month would also pose a conflict for their group. Mr. Rineer repeated these two restrictions to the group, no meetings on the first Tuesday or the second Thursday of the month, to ensure the planning team would avoid those windows when proposing dates.

Ms. Hanrahan reminded the group that all SAC members would receive follow-up emails, including meeting materials and a summary of the discussion would be posted on the website, and encouraged anyone with additional scheduling notes to reach out directly. Mr. Rineer closed the topic by thanking everyone for their input and reaffirming the team’s commitment to maintaining open communication as they transitioned into the next phase of work.

Q&A and Open Discussion — Rhea Hanrahan

At the conclusion of the formal meeting, the floor was opened for additional questions.

- Mr. Merritt asked whether the public workshop would be separate from SAC Meeting #3. Bruce Rineer confirmed that the public workshop would be a separate event from the third SAC meeting. The SAC meeting would be held with committee members, while the public workshop would be open to the broader community for feedback.

- Ms. Fry and Mr. Merritt engaged in a discussion about identifying the most noise-sensitive areas in the community using the heat map from the presentation. Mr. Rineer encouraged members to use tools like Google Maps to define sensitive zones, which could help in developing preferred flight patterns that minimize impacts on areas like Bowley’s Quarters and Wilson Point.

- Mr. Merritt referenced Long Beach Estates as a particularly sensitive area based on the flight pattern screenshots he previously shared. Mr. Rineer acknowledged the point and used the heat map to help visually locate the area. Ms. Fry supported the identification and said the map was a helpful visual tool.

- Mr. Hock and Mr. Merritt commented on the use of flight paths over less populated areas like parks or waterways to reduce community impact. Mr. Rineer agreed that redirecting patterns over low-density areas could help reduce complaints and suggested that the team could work with flight schools to explore alternate routing. Mr. Merritt also pointed out the potential benefit of utilizing waterways to reduce overflight impacts.

- Mr. Hock raised concerns about helicopters flying over Wilson Point. Mr. Joseph Ireton responded that the community generally understands the presence of helicopters and accepts them as necessary. Mr. Jeff Kyger added that law enforcement helicopters prioritize emergency responses and do not tend to raise complaints, except for specific operations like mosquito spraying, which can fly low. Mr. Brandon Branham said that pilots are encouraged to avoid neighborhoods whenever possible, but emergency situations sometimes require direct and fast routes. Mr. Ireton agreed, adding that police and medical flights are necessary operations. Mr. Rineer mentioned that most complaints about police helicopters tend to relate to return flights rather than outbound emergency runs.

- Mr. Rineer clarified that there is no longer an active helicopter training school at Martin State, so helicopter pattern traffic is now limited. Ms. Hanrahan added that the modeling still includes some helicopter pattern activity to ensure the full range of operations is accounted for.

- Ms. Fry asked whether the “500 MSL” label for helicopters indicated a required departure altitude. Mr. Ireton responded that while helicopters aim to reach a pattern altitude, they are not designed to climb vertically and must depart forward. A 500-foot altitude is a general target, but it is not always feasible.

- Ms. Fry asked whether helicopters could fly lower than fixed-wing aircraft to maintain separation. Mr. Ireton replied that helicopters sometimes do fly patterns but not often, and that separation is maintained for safety reasons.

- Ms. Marsha Ayres asked if helicopter activity occurred on weekends and late at night. Mr. Ireton answered that training is required but rarely happens after 10 PM and is generally minimal. Ms. Ayres followed up by asking whether helicopters fly over the water and return that way. Mr. Ireton confirmed that the State Police generally avoid flying over Wilson Point, instead turning over the water after takeoff and following river paths.

- Mr. Merritt asked about the rare times helicopters do fly over neighborhoods like Bowley's Quarters. Mr. Ireton clarified that this only happens during bad weather when they must follow instrument approach paths.

- Mr. Hock asked why the flight school had not attended the meeting, despite prior commitments to engage with the community. Mr. Rineer said he wasn't sure of Mr. Fowler's current efforts to involve the schools. The team noted that flight schools had been invited several times, including for the previous meeting, and only one representative showed up in the past. He proposed setting up a separate conversation outside of SAC meetings to discuss concerns and feedback directly. Mr. Merritt supported this idea, noting that a respectful, collaborative approach would likely be more effective than confrontational complaints.

- Mr. Kyger said he had been sent to the meeting with a question from his community regarding a planned charging station at the airport for electric aircraft. Mr. Clarke confirmed that a company called Beta was establishing an electric aircraft charging network along the East Coast, and a station was planned for Martin State. It would be similar to a Tesla charging station and would be located far enough from neighborhoods to avoid disturbance.

- Mr. Kyger asked whether the charging station would generate noise due to cooling fans. Mr. Clarke said the charging station itself would be quiet and wouldn't involve loud cooling fans like those found in industrial battery storage systems.

- Mr. Hock asked where the electricity would come from and raised concerns about the noise produced by fans used to cool battery storage facilities. Mr. Clarke clarified that the airport's project did not include such large-scale battery storage. However, he acknowledged that companies were exploring nearby properties, including at Martin State, for potential battery storage projects, which would be governed by local permitting and not part of the current aviation study.

- Mr. Rineer added that if flight schools begin transitioning to electric aircraft, the airport would need the infrastructure to support that shift, which could reduce noise levels significantly.

- Mr. Hock expressed concern about lithium-ion battery fires, explaining that once ignited, they're difficult to extinguish and that local fire departments are monitoring these risks closely. Mr. Clarke acknowledged the concern and said it was an important data point for airport planning, though again unrelated to aircraft noise modeling.

Adjournment	With all scheduled topics covered and no further questions, Mr. Rineer thanked the SAC members for their continued involvement and thoughtful engagement. He reiterated that the SAC's feedback is a vital part of the process and expressed appreciation for the evening's discussion. Mr. Rineer confirmed that the next SAC meeting would be scheduled once the modeling results were compiled and encouraged attendees to keep an eye out for draft materials in the coming months. The meeting concluded shortly after 8:00 PM.	Rhea Hanrahan

Kayla Woods

From: MDOT-MAA-ANZ
Sent: Tuesday, July 29, 2025 1:14 PM
To: Bruce Rineer
Subject: Thank you for your participation!

Dear Stakeholder,

Thank you for attending the second **Stakeholder Advisory Committee (SAC) meeting for the 2025 Airport Noise Zone (ANZ) Update for Martin State Airport** on June 26, 2025. The Maryland Aviation Administration (MAA) appreciates your input and participation as a stakeholder on this important

committee. Materials from the first and second SAC meetings, including meeting presentations and meeting minutes, is available on the website: Martin State Airport Noise Zone - Maryland Aviation Administration. The most recent Noise Abatement Plan (NAP) can be viewed here: *Noise Abatement - Martin State Airport*.

Details concerning the Third SAC meeting and the Public Information Workshop, both anticipated to occur in the Fall of 2025, are forthcoming.

If you have questions about the ANZ process, please email Bruce Rineer at *BRineer@bwiairport.com*. If you have questions or concerns related to the logistics of the upcoming .meetings, contact the MAA Outreach Team at 240-200-5176 or *MDOT-MAA-ANZ@assedollc.com*.

Sincerely,

Bruce Rineer, Manager
Noise Program Section
Office of Environmental Compliance and Sustainability
Maryland Aviation Administration

MARYLAND DEPARTM
OF TRANSPORTATIO

Kayla Woods

From: MDOT-MAA-ANZ
Sent: Friday, September 5, 2025 3:55 PM
To: Bruce Rineer
Subject: Stakeholder Advisory Committee 3 Invitation - Airport Noise Zone (ANZ) Update for Martin State Airport
Attachments: 2025_09-05 MAA MTN ANZ SAC 3 email letter.pdf

Good afternoon,

The Maryland Aviation Administration (MAA) is in the process of updating the **2025 Airport Noise Zone (ANZ)** for **Martin State Airport**, and we are seeking input from key stakeholders like you!

Your participation is essential to this process, and we appreciate your engagement. Please find attached the invitation with details about the upcoming **Stakeholder Advisory Committee (SAC) Meeting 3**. You also received a formal invitation in the mail.

Date: **Thursday, September 25, 2025**

Time: **6:00 to 8:00 PM**

Location: **Martin State Airport, Hangar 4; 701 Wilson Point Rd, Baltimore, MD 21220**

To RSVP, register online here: MTN ANZ Eventbrite

If you have any questions, feel free to contact our Outreach Team.

Regards,

Bruce Rineer, Manager
Noise Program Section
Office of Environmental Compliance and Sustainability
Maryland Aviation Administration

MARYLAND DEPARTM
OF TRANSPORTATI

MAA MTN ANZ SAC 1 Reminder Emails:
(sent to all who RSVP'd on 09/19/2025 with readahead material included)

Good afternoon,

Thank you for registering for next week's Stakeholder Advisory Committee (SAC) meeting to discuss the **Martin State Airport Noise Zone (ANZ) Update**. Readahead material for this event is attached.

Meeting Details:

Thursday, September 25, 2025, from 6:00 PM – 8:00 PM

at Martin State Airport, Hangar 4 – 701 Wilson Point Rd, Baltimore, MD 21220

Thank you for your participation in shaping this update and ensuring it reflects the needs of the impacted communities.

If you have any questions, please contact our Outreach Team at 240-200-5176 or MDOT-MAA-ANZ@assedollc.com.

We look forward to working with you!

Regards,

Bruce Rineer,

Manager Noise Program Section
Office of Environmental Compliance and Sustainability

https://marylandaviation.com/environmental/airport-noise/bwi-marshall-airport-noise-zone/

https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/

MARYLAND DEPARTMENT OF TRANSPORTATION

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MARYLAND AVIATION ADMINISTRATION

SIGN IN SHEET

Martin State Airport (MTN)
Airport Noise Zone Update
Stakeholder Advisory Committee (SAC 3)
Date: September 25, 2025

MARTIN STATE AIRPORT

NAME	ORGANIZATION/NEIGHBORHOOD	EMAIL ADDRESS	ZIP CODE	HOW DID YOU HEAR ABOUT THIS MEETING?
Dewitt, Andrew	175th OSS Air Guard	~~andrew.dew~~ andrew.dewitt.3@us.af.mil		__ Web X Email __ Social Media __Family/Friend __ DPW Newsletter __Other:
Pat Hook	HAWTHORNE	pjhook71@aol.com		__ Web __ Email __ Social Media __Family/Friend __ DPW Newsletter __Other:
Jim Merritt	Long Beach	jmerritt@comcast.net	21220	__ Web __ Email __ Social Media __Family/Friend __ DPW Newsletter __Other:
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MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

SIGN IN SHEET

Martin State Airport (MTN)
Airport Noise Zone Update
Stakeholder Advisory Committee (SAC 3)
Date: September 25, 2025

MARTIN STATE AIRPORT

NAME	ORGANIZATION/NEIGHBORHOOD	EMAIL ADDRESS	ZIP CODE	HOW DID YOU HEAR ABOUT THIS MEETING?
Jeff Kyger	W.P.C.I.A.	jlkygsr62@gmail.com	21220	__ Web ✓ Email __ Social Media __Family/Friend __ DPW Newsletter __Other:
Harold A. Fowler	MAA	hfowler2@martinstateairport.com	21220	__ Web ✓ Email __ Social Media __Family/Friend __ DPW Newsletter __Other:
JOE IRETON	MSPAC			__ Web __ Email __ Social Media __Family/Friend __ DPW Newsletter __Other:
Brandon Branham	BCoPD			__ Web __ Email __ Social Media __Family/Friend __ DPW Newsletter __Other:
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Airport Noise Zone Update Stakeholder Advisory Committee

Meeting #3
Martin State Airport

September 25, 2025
6:00 PM – 8:00 PM

1

1

Welcome to Martin State

Safety Briefing

- Follow emergency exits
- Call 911
- Assist those who need assistance
- Be sure to take a head count during the emergency event
- Nearest AED –#4 (Hangar 5)
- Nearest Fire Extinguisher – Room 527 (Hangar 5)
- Accountability Site: Parking lot outside of Hangar 4
- Always report any hazards in the meeting room

Source: MTN State Airport Photo Gallery

2

2

Agenda

- Welcome and Introductions
- SAC Meeting #2 Recap
- Noise Contours and Land Use
- Noise Abatement Plan (NAP)
- Schedule and Resources

3

3

Meeting Facilitation

The meeting facilitator is responsible for ensuring SAC meetings:

- Run efficiently, respectfully, and effectively
- Focus on the published agenda
- Provide appropriate opportunities for all members to participate
- Result in consensus conclusions to the maximum extent feasible
- Are documented through preparation of accurate meeting notes

Welcome and Introductions 4

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Introductions

- Maryland Aviation Administration (MAA) representatives
- Stakeholder Advisory Committee (SAC) members
- Consultant team
- Opening remarks

Welcome and Introductions 5

5

SAC Meeting #2 Recap

6

6

ANZ Update Scope and Process

- Form and engage with Stakeholder Advisory Committee (SAC)
- Prepare base year, 5-year, 10-year forecast noise contours
- **Compile ANZ (composite of the three contour sets)**
- Conduct land use inventory within ANZ
- **Review existing Noise Abatement Plan (NAP)**
- Conduct public hearing/workshop
- Update Code of Maryland Regulations (COMAR)

7

ANZ Study Update

The ANZ update process includes status review of the NAP.

Airport Noise Zone (ANZ)	Noise Abatement Plan (NAP)
Provides the means to identify and control incompatible land development around Martin State Is a composite of the farthest extents of the annual Day-Night Average (DNL) contours for each of the study years (2025 base, 2030 and 2035 forecast)	Prescribes measures to monitor, reduce, and/or eliminate incompatible land use areas within the ANZ to the extent possible while maintaining efficient airport operations

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ANZ Noise Modeling Process

Analyze Existing Radar Data
- Evaluate a 12-month flight track set

Jan. 1 – Dec. 31, 2024

Determine Base Year
- Determine base year AEDT inputs
- Develop base year DNL contours

2025

Determine Forecast Years
- Determine 5- and 10-year AEDT inputs
- Develop 5- and 10-year DNL contours

2030 and 2035

Develop ANZ and NAP
- Create composite ANZ contour
- Develop ANZ documentation

State Law and Regulations

Transportation Code	Code of Maryland Regulations (COMAR)
Noise Zone Regulations; Part I The purpose of this subtitle is to: (1) Provide a positive basis for abatement of existing noise problems in communities near airports and to prevent new noise problems; and (2) Protect the health and general welfare of the occupants of land near airports.	**Chapter 11.03.03** Defines the prediction method to be used to develop 'noise contours of equal noise exposure' (subject to the approval of the Executive Director) Provides direction for development of contours, including 5 and 10 year, plus cumulative condition, provides methods for determination of impacted land use areas, and direction on noise abatement plans.
Noise Zone Regulations; Part II Requires assessment of the noise environment, existing projected future use, following procedures the Executive Director establishes, delineates a "noise zone", requires development of a noise abatement plan - every five years	**Section 11.03.03.05** Provides a process for permits for construction within the Noise Zone Surrounding a State-Owned Airport

Noise Model Inputs Summary

- Airport Layouts
  - 2025 (base year), 2030 (five-year), 2035 (ten-year)
- Operations
  - Counts, fleet mix, runway use, flight tracks, runups
- Weather and Terrain

11

SAC Responsibilities

- Contribute to study inputs
  - Discussion and feedback at SAC meetings
  - Provide input, advice, and guidance related to Noise Abatement Plan
  - understand ANZ effects on stakeholders
- Review modeling assumptions
  - Base year and forecasts
- Review analysis results
  - Base, 5-year, and 10-year contours
- Review documentation
  - NAP and Draft ANZ document
- Provide two-way communication between the SAC and their organizations / constituents
  - Share information with your neighbors and organizations
  - Spread the word about future opportunities for public feedback

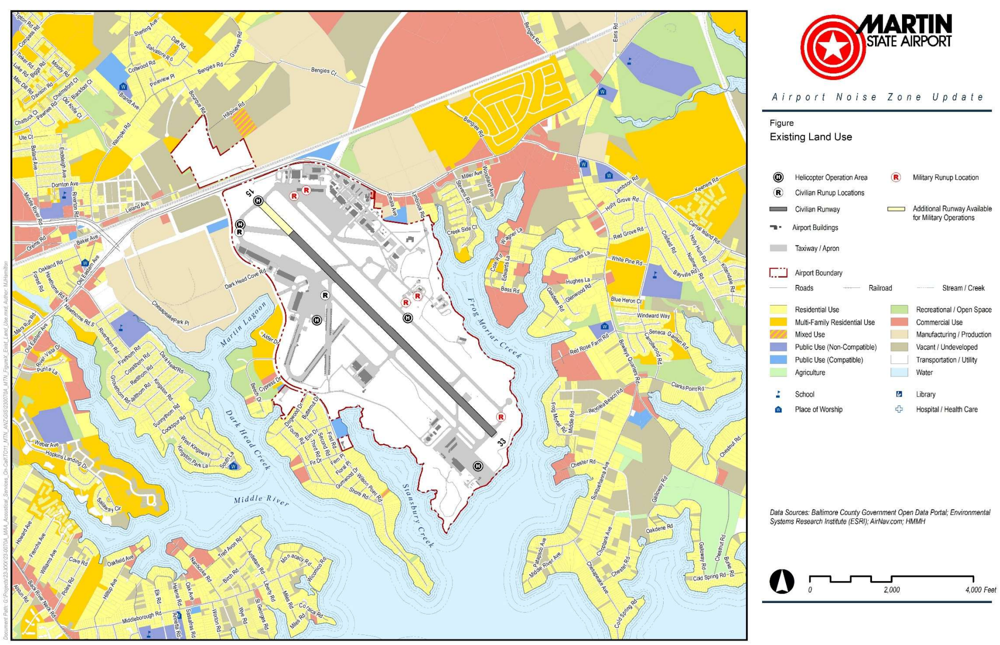
MAA will respect and consider SAC input but retains overall responsibility for the Martin State ANZ update.

12

Noise Contours and Land Use

13

Current Land Use



14

Land Use Compatibility

- Assemble and review land use, zoning, and population data
- Identify local land use policies referring to compatibility with airport operations
- Create existing land use maps
- Identify noise sensitive sites (churches, schools, etc.)
- Following contour development, survey and confirm use within the 65 DNL contour

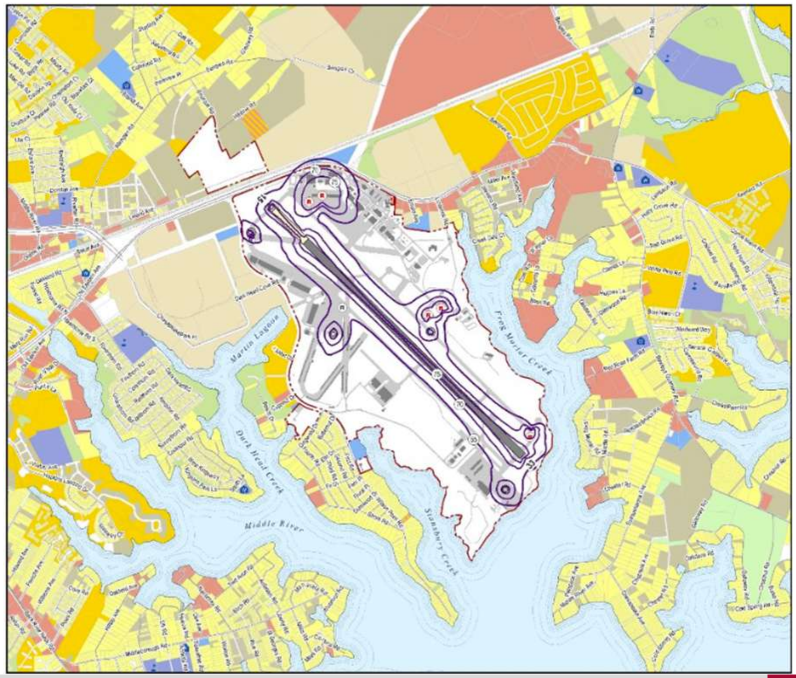
Per 11.03.03.03 in COMAR, all land uses are compatible with aircraft noise exposure for DNL less than 65 dB.

Noise Contours

- 2025 Base Year Noise Contour
- Forecast Contours
  - Five-Year 2030 Forecast Noise Contour
  - Ten-Year 2035 Forecast Noise Contour
- 2025 ANZ Noise Contour

Base Year (2025) Contours

- Total annual operations: 89,489
- Total area: 283 acres
  - Majority (97% / 278 acres) is on airport property
  - Only 5 acres (3%) off airport within the 65–70 dB range
  - Higher noise levels (70–75 dB and>75 dB) fall entirely on airport property
- No residential population or housing units are affected



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ANZ Contours and Land Use 17

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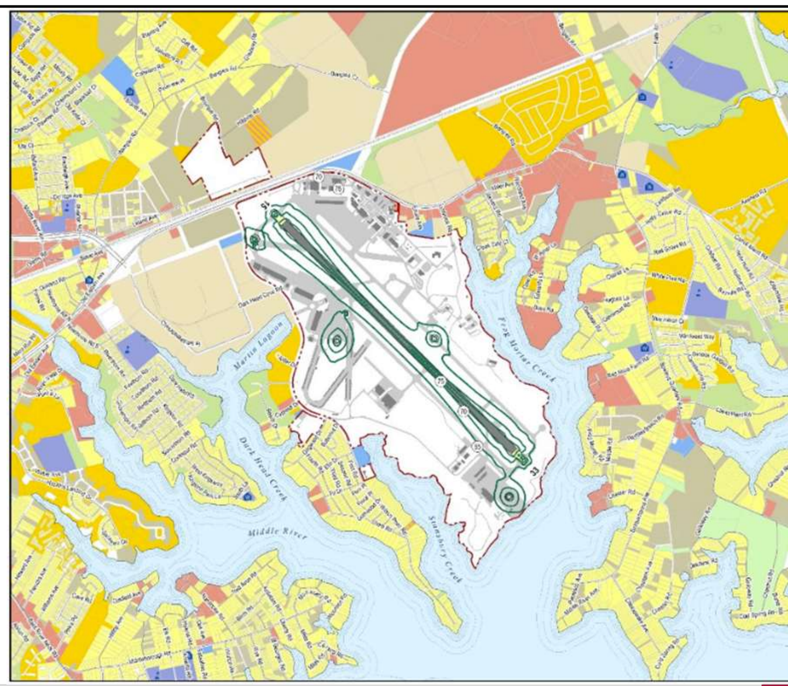
Five-Year (2030) Contours

- Total annual operations: 92,788
- Total area: 172 acres (down from 283 acres in 2025)
  - 99% of area on airport property (>1 acre off airport in 65–70 dB range)
  - Higher noise levels (70–75 dB and >75 dB) are fully contained on airport property
- No residential population or housing units affected



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ANZ Contours and Land Use 18

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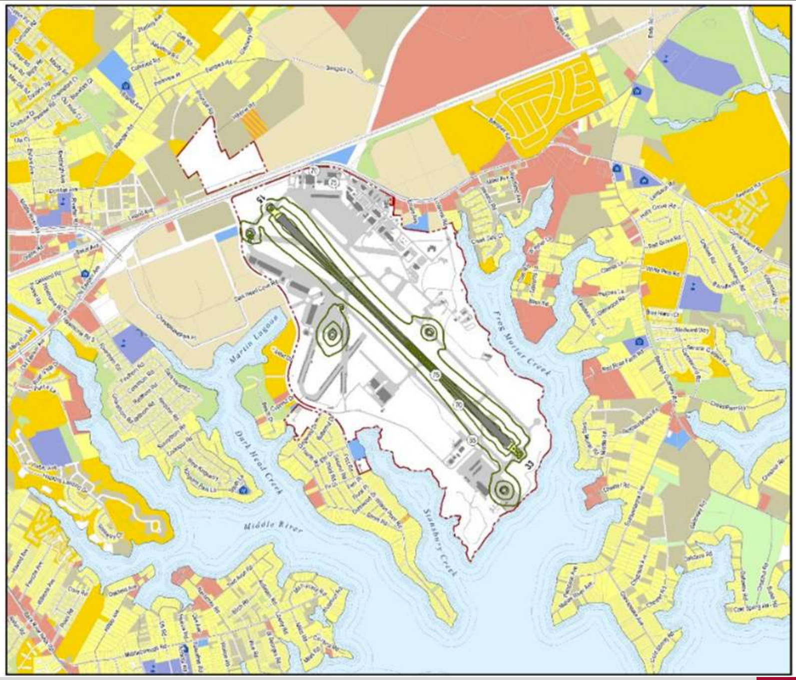
Ten-Year (2035) Contours

- Total annual operations: 95,700
- Total area: 174 acres (similar to 2030)
  - 99% of area on airport property (>1 acre off-airport in the 65–70 dB range)
  - Higher noise levels (70–75 dB and >75 dB) remain fully on airport property
- No residential population or housing units affected



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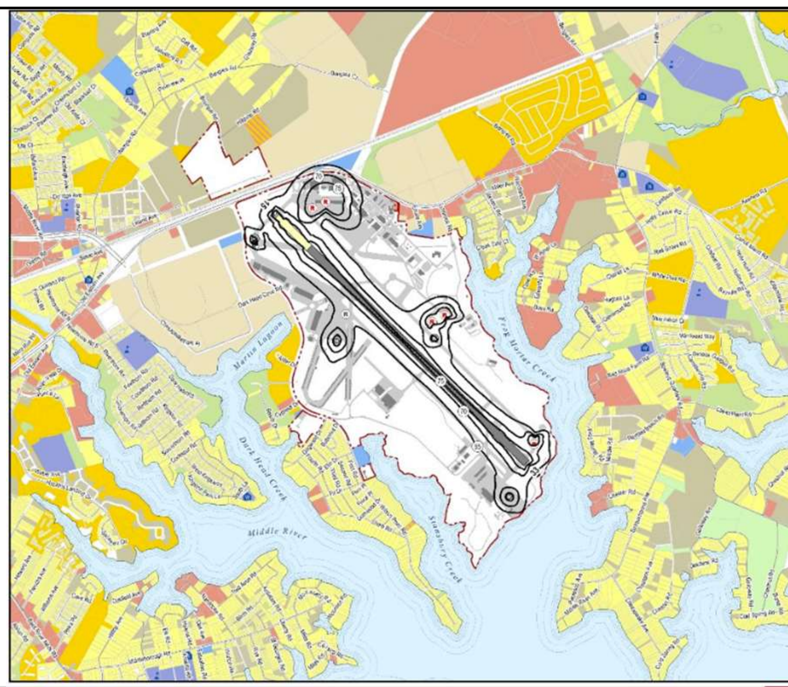
2025 ANZ Contours

- Total area: 286 acres
  - Only 5 acres (5%) off airport within the 65–70 dB range
  - Higher noise levels (70–75 dB and >75 dB) remain fully on airport property
- No residential population or housing units affected



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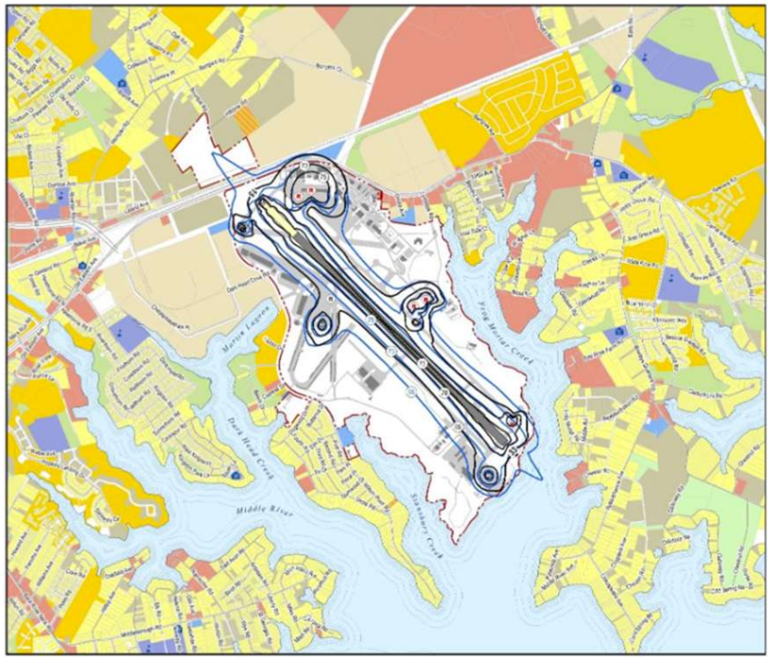
2025 ANZ and 2020 ANZ Contours Comparison

- Total area: Decrease of 31%
  - 76% decrease of off airport within the 65-70 dB range
  - Higher noise levels (70-75 dB and >75 dB) remain fully on airport property and decrease by 52%
- No residential population or housing units affected



ANZ Contours and Land Use 21

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Noise Abatement Plan (NAP) Overview

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Noise Abatement Plan (NAP)

Originally adopted in 1984, updated in 1987, reviewed and approved with no changes in 2012. The NAP was reviewed and updated as part of the 2020 MTN ANZ update process in order to accurately reflect current operating conditions at MTN.

NAP Goal: To the extent possible, reduce incompatible land use within ANZ while maintaining efficient airport operations.

General categories of NAP measures:

- **Noise abatement elements**
- **Land use elements**

Evaluate current NAP and allow for potential modifications or updates to be made.

Noise Abatement Plan (NAP)

Noise abatement procedures are voluntary and designed to minimize exposure of residential areas to aircraft noise, while ensuring safety of flight operations.

- Visual Flight Rules (VFR) / Instrument Flight Rules (IFR)
- Departures
- Arrivals
- Closed traffic patterns
- Taxiing aircraft
- Touch and Go and/or Practice Approach Restrictions
- Aircraft Maintenance Engine Run-up Areas

Noise Abatement Plan Measures

Noise Abatement Measures	Programmatic Measures
Departure Procedures	Review of operations and noise concerns
Arrival Procedures	
Closed Traffic Patterns	**Land Use Measures**
Touch-and-Go or Practice Approaches	Control of Incompatible Development

Martin State NAP Caveats

Noise abatement procedures are voluntary:

- MTN NAP is formulated to minimize noise disturbance to neighboring communities while maintaining safe and efficient MTN Airport operations. MAA Division of MTN Airport Operations is responsible for the overall administration of MTN.
- Aircraft may not follow noise abatement procedures if deemed necessary by Air Traffic Control (ATC) or flight crews to maintain operational safety.

Noise Abatement Plan (NAP)

VFR and IFR Departure Traffic Patterns

- **VFR Piston-engine Aircraft**
  - Runway 15/33 – Unless otherwise instructed by Air Traffic Control (ATC), aircraft fly runway heading to 1000' Mean Sea Level (MSL) prior to turning to the ATC approved on-course heading or crosswind leg of the traffic pattern.
- **VFR Turbine Powered Aircraft**
  - Runway 15/33 – Unless otherwise instructed by ATC, aircraft shall fly runway heading to 1,500' MSL prior to turning to the ATC approved, on-course heading or crosswind leg of the traffic pattern.
- **VFR Helicopter Departures**
  - Unless operating under a Letter of Agreement (LOA) with MTN ATC specifying otherwise, helicopters shall climb to 500' AGL on initial departure heading before turning on-course.
- **All IFR Departures**
  - IFR departures shall be accomplished in accordance with ATC direction or clearance.

Note: IFR departures will be accomplished in accordance with Air Traffic Control (ATC) direction or clearance.

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Noise Abatement Plan (NAP)

VFR and IFR Arrivals and Traffic Patterns

VFR and IFR aircraft approach should, to the maximum extent feasible, maintain the highest practical altitude, commensurate with flight and ATC procedures in order to minimize aircraft noise exposure to communities underlying the final approach courses.

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Noise Abatement Plan (NAP)

Closed Traffic Patterns

A left-hand traffic pattern shall be used at MTN unless otherwise directed by ATC. Piston fixed-wing aircraft should fly runway heading until reaching 1,000' MSL prior to turning to the crosswind leg of the traffic pattern. Turbine aircraft should fly runway heading until reaching 1,500' MSL prior to turning to the crosswind leg of the traffic pattern.

Traffic pattern altitudes are:

Fixed Wing	Piston engine	1,000 ft MSL
	Civil turbine and military turboprop	1,500 ft MSL
	Military Jet	2,000 ft MSL
Rotary Wing		500 ft MSL

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Noise Abatement Plan (NAP)

Touch-and-Go or Practice Approaches

No touch-and-go and/or practice approaches or practice landings are permitted between 10:00 p.m. to 6:00 a.m. daily unless approved by MTN Operations and Maintenance staff.

FAA Weight Class	Description	Weight	Limitation
Small	Small Single Engine/Twin Engine Aircraft, Helicopters, and Transient Military (e.g. Cessna 172, Piper Cherokee)	12,500 lbs. or less	No restrictions
Medium	Medium Aircraft and Transient Military* (e.g. military fighter jets, Learjet 35, Bombardier CRJ- 200LR)	Between 12,500 and 41,000 lbs	Limit of two practice approaches
Large	Large Jet/Large Commuter/757/Heavy Aircraft	More than 41,000 lbs.	Practice approaches and landings are not authorized without prior permission from MTN Operations and Maintenance staff.

* Military aircraft shall be limited to two practice landings/take-offs or approaches unless additional operations are approved by MTN Operations and Maintenance staff.
FAA Aircraft Weight Class - https://aspm.faa.gov/aspmhelp/index/Weight_Class.html

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Noise Abatement Plan (NAP)

Aircraft Maintenance Engine Run-Up Areas

Aircraft maintenance engine run-ups are to be accomplished only in areas designated by the Chief, MTN Operations & Maintenance in accordance with MTN Tenant Directive 200.2.

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Noise Abatement Plan (NAP)

Other Elements

- Noise Concerns can be reported via telephone hotline and WebTrak
- Zoning Permit and Appeal Procedure
  - MAA regulates land use within the Airport Noise Zone.
  - Anyone desiring to construct or modify a structure or land use is required to obtain an Airport Zoning Permit.
- MDANG Noise Barriers
  - MDANG erected two noise barriers, both located between the MDANG's engine maintenance area and the homes northeast of the Airport.

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Additional Initiatives

- Airfield signage
- Wall posters in Hangar 4 hallway
- Flyers and Posterboards Visuals
- Additional NAP training along with airfield driving training

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Noise Abatement Plan 33

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Schedule and Resources

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Proposed Project Schedule

Jan 2025	April 2025	June 2025	Sept 2025	Winter 2025/2026
Project Start	• SAC Meeting #1	• SAC Meeting #2 • NAP Focus • Modeling Inputs	• SAC Meeting #3	• Draft ANZ/NAP Publication • Public Workshop • Comment Period Ends • Publish Final ANZ/NAP

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Certifying the ANZ

- Current MTN ANZ
  - Certified in 2021
  - Referenced in COMAR Section 11.03.02.10
  - Incorporated by reference in COMAR Section 11.03.01.01-1(B)(5)
- Final 2025 MTN ANZ will be updated in COMAR
- Updating COMAR requires a regulatory process governed by the Maryland Administrative Procedure Act (APA)
- The Maryland Aviation Commission (MAC) is required to approve regulations prior to their adoption by the Executive Director of MAA.

Complete Draft ANZ & NAP (i.e., Draft the Regulation)
↓
Draft Regulation (Maryland Aviation Commission)
↓
Publication in the Maryland Register
↓
Public Comment & Meeting
↓
Final Agency Action (Maryland Aviation Commission)
↓
Executive Director Certification
↓
Certification in COMAR

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Project Contacts

Project Primary Contact

Email: MDOT-MAA-ANZ@assedollc.com

Phone: (240) 200-5176

MAA Project Manager

Bruce Rineer, Manager, Office of Environmental Compliance and Sustainability, Noise Section BRineer@bwiairport.com

ANZ Project Managers

Tyler White, Principal Consultant, twhite@hmmh.com

Rhea Hanrahan, Director, AES, rhanrahan@hmmh.com

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Additional Resources

2020 Martin State ANZ

https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/

WebTrak

https://webtrak.emsbk.com/bwi3

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Wrap Up

- SAC member questions, comments, and discussion
- Public workshop
  - Winter 2025/2026

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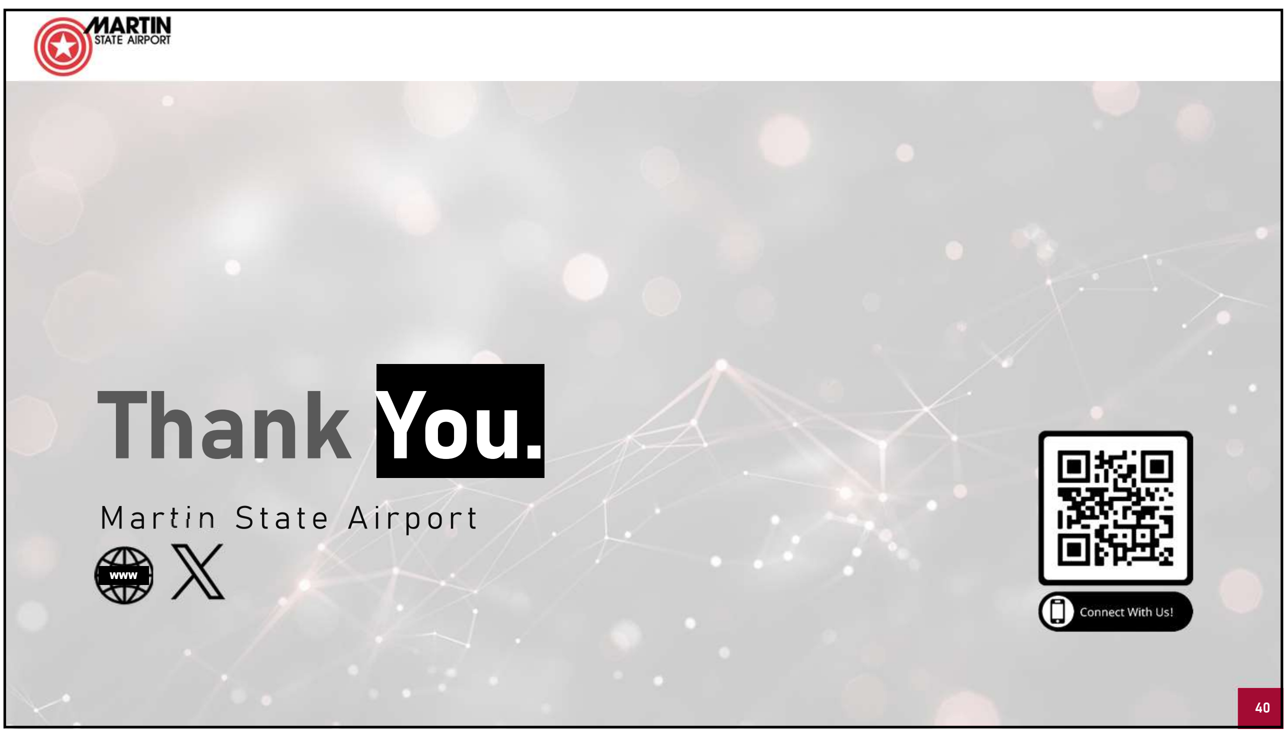

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Dear MTN SAC Member,

Thank you for attending the third **Stakeholder Advisory Committee (SAC) meeting for the 2025 Airport Noise Zone (ANZ) Update for Martin State Airport** on September 25, 2025.

The Maryland Aviation Administration (MAA) appreciates your input and participation as a stakeholder on this important committee. Materials from the SAC meetings are available on the website: Martin State Airport Noise Zone - Maryland Aviation Administration. The most recent Noise Abatement Plan (NAP) can be viewed here: *Noise Abatement - Martin State Airport*.

Details concerning the upcoming Public Information Workshop followed by the Open Comment Period anticipated to occur in early 2026, are forthcoming

If you have questions about the ANZ process, please email Bruce Rineer at *BRineer@bwiairport.com*. If you have questions or concerns related to the upcoming meetings, please contact the MAA Outreach Team at 240-200-5176 or *MDOT-MAA-ANZ@assedollc.com*.

Regards,

BWI Marshall and Martin State Airport Noise Zone Outreach Team
Phone: 240-200-5176
https://marylandaviation.com/environmental/airport-noise/bwi-marshall-airport-noise-zone/
https://marylandaviation.com/environmental/airport-noise/martin-state-airport-noise-zone/

MDOT
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

Wes Moore
Governor

Aruna Miller
Lieutenant Governor

Samantha Biddle
Acting Secretary

Shannetta R. Griffin, P.E.
Executive Director/CEO

Martin State Airport
Airport Noise Zone (ANZ) Update
Stakeholder Advisory Committee (SAC) Meeting #3

MEETING MINUTES

Thursday, September 25, 2025, 6:00 p.m. – 8:00 p.m.

Martin State Airport, Hangar 4
701 Wilson Point Rd
Baltimore, MD 21220

Discussion Item	Notes	Presenter
Safety Briefing	Mr. Bruce Rineer opened the meeting with a brief safety overview, specifically of Hangar 4 meeting space at Martin State Airport (MTN). He identified the location of the Automated External Defibrillator (AED), and the locations of fire extinguishers. Mr. Rineer instructed attendees to exit the building promptly and proceed directly to the designated accountability area, located in front of the hangar.	Bruce Rineer
Welcome and Introductions	Following the safety briefing, Mr. Rineer welcomed participants to the third Stakeholder Advisory Committee (SAC) meeting for MTN Airport Noise Zone (ANZ) Update. He briefly reviewed the evening's agenda, noting that the meeting would cover a short summary of the second SAC meeting, a presentation of the latest noise contour modeling and land use analysis, a discussion of the Noise Abatement Plan (NAP), and an overview of certification and next steps. He recognized Ms. Rhea Hanrahan with HMMH as the meeting facilitator. Mr. Rineer then invited introductions from attendees around the room. The SAC included representatives from MAA, including leadership and staff from the Noise Program, HMMH and Assedo Consulting members, airline industry representatives, MTN airport tenants, the Chief of Airport Operations and Maintenance for MTN, community association representatives, and more.	Bruce Rineer
SAC Meeting #2 Recap	Mr. Rineer provided a brief recap of SAC Meeting #2, emphasizing that the purpose of the ongoing update is to comply with the Code of Maryland Regulations (COMAR), requiring two parts: the development of updated the ANZ contours and the NAP. He reminded members that the modeling process tracks flights for 12 months and is processed	Bruce Rineer

through the FAA's Aviation Environmental Design Tool (AEDT) model, which generates the noise contours. These contours are developed for a base year (2025), a five-year forecast year (2030), and a 10-year forecast year (2035). The inputs that go into these calculations include operation counts, the fleet mix, runway use, flight tracks, run-ups, and weather and terrain conditions. He described this as a process required by state law, but also as something that MAA and MTN desire to complete.

With this context established, Mr. Rineer transitioned to the next agenda item, handing the discussion to Mr. Tyler White of HMMH to present the ANZ contours and land use analysis.

ANZ Contours and Land Use	Mr. White, Principal Consultant with HMMH, presented the updated ANZ contours and accompanying land-use analysis. He began by reminding the group that ANZ is defined in COMAR and serves as the regulatory framework for managing and preventing incompatible land use around the airport.	Tyler White

Mr. White displayed and described the 2025 base year contour. It represents approximately 89,000 annual operations and the 65-decibel (dB) DNL contour remains largely on airport property, with a small percentage extending off the property due to A-10 operations and maintenance run-ups. The portion of the contour that exceeds airport property covers a parking lot northeast of the airport, and no residential areas are within the contour.

Mr. Andrew Dewitt from Maryland Air National Guard (MDANG) added that the A-10 operations are no longer a factor, as they have stopped. Mr. White provided clarification that this knowledge is reflected in the future contours. The A-10 operations are modeled for the 2025 base year only.

Mr. White continued by displaying and describing the 2030 five-year contour. The 2030 65 dB contour would be smaller than the base year due to the absence of the A-10. Approximately 93,000 annual operations are represented, and no residential properties are anticipated to be impacted by noise levels at 65 DNL or higher.

Moving to the 2035 ten-year contour, Mr. White shared that the 2035 contour is slightly larger than the 2030 contour, with annual operations increasing to 96,000 and no residential properties affected.

When the outer boundaries of the three scenarios were combined, they form the 2025 ANZ composite contour, encompassing a total of 3,802 acres. No residential areas lie within the composite contour. This composite contour forms the official ANZ boundary that will be incorporated into COMAR.

He then compared the 2025 ANZ with the previous 2020 ANZ, highlighting a 31% decrease in the overall area of the contour, with the major changes happening at the end of the runway. The reduction is largely due to modeling fewer A-10 operations than were modeled in the 2020 ANZ update and modifying arrival procedures in collaboration with the MDANG.

Ms. Hanrahan paused to invite attendees to ask any questions before proceeding with a review of the NAP. There were no questions.

Noise Abatement Plan (NAP)	Mr. Rineer resumed the presentation to review the NAP, explaining that MTN has maintained a robust set of noise abatement measures since the 1980s. The NAP was originally adopted in 1984, updated in 1987, reviewed in 2012, and then updated again in 2020.	Bruce Rineer

He reminded the committee that the goal of the NAP is to reduce incompatible land use inside the noise zone to the greatest extent possible while maintaining safe and efficient airport operations. He shared that at MTN, a NAP is not required by COMAR because the ANZ contours do not extend far beyond the airport property, resulting in no incompatible development. MAA and MTN acknowledge the strategic importance of a NAP and have therefore continued to maintain one. He emphasized that the NAP guidelines are voluntary, but that it is good practice to follow them. He shared that the NAP includes procedures for Visual Flight Rules (VFR), Instrumental Flight Rules (IFR), departures, arrivals, closed traffic patterns, taxiing aircraft, touch-and-go's, and aircraft maintenance run-ups.

He then began describing the operational measures in detail.

VFR and IFR Departure Traffic Patterns guidelines are as follows:

- VFR Piston-engine aircraft shall fly runway heading 1000 feet mean sea level (MSL) before turning.
- VFR Turbine Powered Aircraft shall fly runway heading to 1,500 feet MSL before turning.
- VFR Helicopter Departures shall climb to 500 feet above ground level (AGL) on initial departure heading before turning on-course, unless operating under a Letter of Agreement (LOA).
- All IFR departures shall adhere to Air Traffic Control (ATC) clearance.

Mr. Jim Merritt requested an opportunity to review several of the shared operational guidelines. He reminded attendees that Mr. Nikolaus Wagenfeiler, representing ATC, had addressed airport operations during the first SAC meeting. Mr. Merritt reiterated the recommendation to direct all pilots to taxi to the end of Runway 15 prior to departing, thereby ensuring that aircraft reach an altitude of 1,000 feet before entering the Long Beach residential area.

He emphasized that community concerns are not solely driven by the volume of operations, but rather by the altitude of aircraft as they traverse the Long Beach neighborhood. Furthermore, he noted that Mr. Wagenfeiler had proposed a potential modification to existing flight paths—suggesting that, instead of maintaining a straight trajectory, aircraft could turn over the water and ascend to 1,000 feet above Frog Mortar Creek and Middle River, thereby minimizing overflight of residential zones.

Mr. Merritt inquired whether these considerations would be reflected in the forthcoming update to the NAP.

Mr. Rineer responded by noting that the determination is contingent upon both the type of aircraft and prevailing traffic patterns. He reiterated that the current guidelines emphasize that piston aircraft should climb to 1,000 feet AGL before initiating any turns. In contrast to previous procedures, which were often confusing, the updated guidelines included in the 2025 NAP are intended to provide greater clarity and ensure that aircraft consistently reach the prescribed altitude before maneuvering. He further explained that variations in aircraft performance, particularly differences in turn radius, will naturally result in some operational variability. Mr. Merritt responded by sharing that community members typically do not have issues with the jets.

Mr. Harold Fowler, Chief of Airport Operations and Maintenance, mentioned that there had been a discussion about changing the traffic pattern guidelines. He explained that the guidelines that Mr. Merritt is requesting are under the domain of ATC and therefore would not appear in the NAP. The NAP provides guidelines for pilots, which are separate from the guidelines and procedures of traffic and ATC.

In response, Mr. Merritt requested a dedicated meeting to review ATC guidelines in greater detail, emphasizing the importance of ensuring that community members are informed about what constitutes compliance versus deviation. He noted that without transparency and access to these guidelines, residents would be unable to distinguish between acceptable operations and those that fall outside established parameters. He shared that he expected to see guidelines related to traffic patterns reflected in the NAP guidelines. Mr. Fowler agreed to talk with Mr. Wagenfeiler to gather more details about the feasibility of Mr. Merritt's request changes.

Mr. Jim Hock inquired about an update regarding a proposed extension of Taxiway F (Foxtrot), noting that such a change would prevent aircraft from departing from a mid-runway position and instead require them to start from the full length of Runway 15.

Mr. Fowler stated that the extension of Taxiway F falls outside the scope of the NAP. However, he noted that if Taxiway F is extended, it will reach the edge of Runway 15. He clarified that, if directed by ATC, aircraft may still have the option to begin takeoff from a point other than the full runway length. The current airport configuration includes taxi lanes, which can offer a more practical route for smaller aircraft under certain conditions.

Mr. Merritt emphasized that the aircraft most associated with community concerns are smaller planes, which flight schools frequently operate. This dual association, where instructors work closely with new pilot trainees, takes longer to progress through higher training levels and results in a compounded impact on nearby residents. He noted that this dynamic is a significant source of frustration for the surrounding neighborhoods.

Mr. Fowler noted that the extension of the taxiway is not anticipated within the next three years.

Mr. Dewitt acknowledged that while not a major contributing factor, the departure of A-10 aircraft has reduced some noise activity. However, transient military aircraft, such as the C-17, are still expected to operate periodically, and they are known to generate significant noise.

Mr. Rineer reminded stakeholders that military operations were included in the modeling process. Mr. Merritt added that while residents often enjoy photographing unique or high-profile airplanes, their enthusiasm may wane if such visits become more frequent.

Mr. Fowler clarified that the frequency of these operations is approximately two to three times per month, with a modest increase during the summer season. Mr. Dewitt further noted that fewer than 100 such operations occurred over the past year.

Mr. Rineer concluded by acknowledging that military operations data can be challenging to gather but emphasized that coordination efforts were made to ensure its inclusion in the forecast. Mr. Rineer continued to share the operational measures of the NAP.

- VFR and IFR Arrival Traffic Patterns should maintain the highest practical altitude to minimize aircraft noise exposure.
- During Closed Traffic Patterns, a left-hand traffic pattern shall be used unless otherwise directed by ATC. Piston fixed-wing

aircraft should fly runway heading until reaching 1,000' MSL before turning to the crosswind leg of the traffic pattern. Turbine aircraft should fly runway heading until reaching 1,500' MSL before turning to the crosswind leg of the traffic pattern. He shared that these have not changed at MTN and are generally standard around the country.

- There are no restrictions for small aircraft touch-and-go’s. However, medium-sized aircraft are limited to two practice approaches and large jets require prior permission from Mr. Fowler before all practice approaches and landings.
- Aircraft maintenance run-ups are to be accomplished only in areas designated by Mr. Fowler, Chief of Airport Operations and Maintenance, in accordance with MTN’s Tenant Directive. Mr. Rineer mentioned that run-ups are rare at MTN. A previous tenant who is no longer at MTN often performed run-ups.

Mr. Rineer shared that noise concerns can be submitted to MAA or the Chief of Airport Operations and Maintenance at MTN. There is a zoning permit and appeal procedure that regulates land use within the ANZ, requiring an Airport Zoning Permit to be acquired by anyone wishing to construct or modify a structure or engage in new land use. MAA grants these permits. Mr. Rineer also shared that the MDANG has a noise barrier located between the MDANG's engine maintenance area and the homes northeast of the airport. He confirmed with Mr. Dewitt that these barriers are still there.

Mr. Rineer continued by sharing additional initiatives, outside of the NAP, that would aid in its implementation.

In addition to the formal NAP, several implementation strategies were discussed to enhance pilot awareness and compliance. Mr. Rineer introduced these ideas, beginning with the installation of airfield signage to alert pilots that NAP guidelines are in effect, and shared examples of potential designs.

Mr. Merritt confirmed that these initiatives are still in the proposal stage and have not yet been implemented but represent promising steps forward. Mr. Rineer confirmed that these initiatives are new, and the purpose is to remind pilots of the NAP.

Mr. Rineer further suggested placing wall posters in hangars outlining the NAP guidelines, as well as distributing informational flyers. He also recommended that Mr. Fowler incorporate the NAP training component into the airfield driving certification training.

Mr. Hock inquired whether these training schools follow a standardized set of regulations during training. Mr. Rineer confirmed that the FAA provides guidelines. Mr. Hock then asked whether a review of the NAP could be integrated into the beginning of the flight training curriculum. Mr. Rineer responded that while such inclusion cannot be mandated, efforts are underway to make it as accessible and straightforward as possible for schools to adopt.

Mr. Merritt asked whether flight school pilots are required to complete the airfield driver training. Mr. Fowler clarified that while pilots are not required to do so, any instructor operating a vehicle on the ramp must complete this training. He reiterated that there is consideration being given to requiring all airfield drivers to undergo this NAP training.

Mr. Dewitt noted that much of the enforcement of the NAP falls under the purview of ATC, rather than individual pilots or ground personnel. Mr. Rineer agreed but emphasized that pilots and instructors should still be familiar with key guidelines, such as the requirement to climb to 1,000 feet AGL before turning. He added that efforts are being made to provide Mr. Fowler with the compliance performance data through the MAA Noise and Operations Management System (NOMS) to help assess compliance with the NAP, noting that Mr. Royce Bassarab has recently compiled this information.

Mr. Bassarab reported that he had analyzed data from touch-and-go operations to the north (i.e. on Runway 33) during August and found that approximately 90% of aircraft reached or exceeded the 1,000-foot altitude threshold. However, a small number of flight patterns were observed at around 800 feet. Mr. Merritt confirmed that 800 feet falls outside the established guidelines, and Mr. Bassarab concurred.

Mr. Merritt reiterated that community frustration often stems from a small number of aircraft that fail to adhere to these procedures.

Mr. Rineer emphasized that the outreach strategy focuses on ensuring pilots are aware of the NAP guidelines and know where to access them, thereby embedding these procedures into routine operations. The previous NAP is currently available on MTN website, and the updated NAP will also be available on the website.

Mr. Merritt noted that flight schools are generally encouraged to begin operations at 6:00 a.m. During the winter months, they typically delay until 7 a.m. due to limited daylight, but in the summer, they resume the earlier start. He asked whether it would be possible to request a 6:30 a.m. start time instead, citing concerns about early morning noise. He inquired whether such a change would fall under ATC jurisdiction or be addressed within the NAP framework.

Mr. Fowler responded that if such a modification were deemed appropriate, it could be incorporated into the NAP. Mr. Merritt stated that flight patterns, which begin at 6 a.m. during summer months, occur while many residents are still asleep, contributing to community dissatisfaction.

Mr. Rineer reminded attendees that the NAP serves as a set of voluntary guidelines and cannot be enforced as a mandatory policy. Mr. Merritt acknowledged this but expressed interest in formally documenting the recommendation, noting that written guidelines enhance accountability and transparency. Mr. Rineer added that only a few early morning operations had been recorded.

Mr. Merritt responded that even a small number of disruptive flights can leave a lasting negative impression on the community. Mr. Fowler added that, in relation to proposed signage about the NAP, there are ongoing discussions about including key procedural details directly on the sign. He also noted that the NAP at MTN is in effect 24 hours a day. Mr. Merritt concluded by offering to personally fund the installation of the signs.

Mr. Merritt then asked whether MTN is unique in being surrounded by residential neighborhoods. Mr. Rineer responded that it is not, citing College Park and Montgomery County airports as examples of facilities located in similarly congested and densely populated areas. Mr. Fowler added that during his time at flight school in Salisbury, Maryland, he observed comparable NAP signage posted near the runways. Ms. Hanrahan further contributed that numerous airports in Florida are bordered entirely by residential communities, with no adjacent water bodies available for aircraft to turn over, highlighting that such conditions are common nationwide.

From a military perspective, Mr. Dewitt shared that efforts are ongoing to secure a new aircraft for future operations. He noted that the proposed aircraft would likely be a next-generation fighter jet, which is expected to produce significant noise. He anticipates continued advocacy for its deployment at the airport.

Mr. Rineer added that if such a development were to occur, it would trigger additional environmental assessments, including a noise impact analysis. He emphasized that the MAA would be required to conduct a comprehensive review that considers the introduction of the new aircraft.

Mr. Merritt revisited the point that 8,000 feet of runway is required for the safe operation of an F-35 aircraft. He noted, however, that the airport currently has only 7,000 feet of usable runway available for civilian use.

Mr. Dewitt clarified that the remaining 1,000 feet currently exist but are presently designated for military takeoff operations only. Mr.

Fowler added that while there is an approved plan to extend the usable runway length to 7,400 feet, efforts are underway to further increase that to 8,000 feet.

Mr. Merritt inquired whether there would be opportunities for community input during this process. In response, Mr. Dewitt explained that although the full 8,000 feet of runway physically exists, the portion available for civilian aircraft remains limited. Without additional real estate, that limitation is unlikely to change.

Mr. Bassarab outlined the two-step process required for major airport improvements of this nature. The first step involves updating the airport layout plan, which must be approved by the FAA. That approval may be either conditional or unconditional. A conditional approval would trigger an environmental assessment process, which includes public outreach and community engagement meetings.

Mr. Rineer emphasized that such a process typically spans several years and reminded attendees that no formal agreement had been made at this time. However, he noted that community members may begin to hear discussions about the proposal.

Schedule and Resources

Bruce Rineer

Mr. Rineer outlined the next steps in the process of updating the ANZ. This includes compiling all relevant information, drafting an initial version of the revised ANZ, and securing approval from the Executive Director of the MAA. Once approved, the draft will be submitted to the Maryland Aviation Commission (MAC). A public meeting will be scheduled for January to solicit additional feedback, after which the proposal will be returned to the MAC for final approval and will proceed through the certification process.

Mr. Merritt confirmed that, as of now, no substantive changes are anticipated. Mr. Rineer agreed, noting that only a few lines within COMAR would be updated, primarily to reflect the transition to the 2025 regulatory framework, including revised dates and numerical references.

Mr. Rineer then encouraged members of the SAC to reach out to him, Assedo Consulting, or Mr. Fowler with any questions or input they may have. He also noted that the current ANZ documentation is publicly available on both the MAA and MTN websites. Mr. Rineer added that they plan to attend two upcoming Commission meetings, with the first scheduled for November.

Mr. Bassarab clarified that any regulatory update must be presented to the MAC on two separate occasions. The initial presentation is scheduled for November, after which the proposed update must be published in the Maryland Register. This publication serves as the

	formal announcement, initiating the timeline for public outreach and engagement. Following this, the regulation will be returned to the MAC for final review, which is tentatively expected to occur in March 2026. Mr. Fowler noted that MAC meetings are open to the public. In response, Mr. Merritt requested that this information be communicated to members of the SAC. Mr. Bassarab confirmed that the first MAC meeting will take place on November 12, 2025, while the March 2026 meeting has not yet been scheduled. He reiterated that the timing of the public informational meeting will be determined by the date that the update is published in the Maryland Register. Ms. Hanrahan assured attendees that all individuals invited to participate in SAC meetings will receive updates regarding the publication of the draft, the public comment period, and other key milestones. Mr. Merritt requested that the presentation slides be shared with the group. Ms. Hanrahan confirmed that the presentation materials will be posted on the MTN website for public access.	
Q&A and Open Discussion	As the discussion concluded, Mr. Rineer then opened the floor for any final comments. Mr. Merritt reiterated his interest in further discussing the distinctions between NAP and ATC guidelines. He expressed a desire to explore the ATC guidelines in a separate setting, noting that many community members mistakenly believe that the NAP is the only set of operational rules. Mr. Fowler clarified that while the NAP exists and can be supported through materials posted on the website, ATC guidelines are entirely separate and governed by different protocols. Mr. Hock raised the topic of data collection related to NAP compliance, suggesting that individuals who consistently fail to follow the guidelines could be flagged or formally documented based on the available data. Mr. Rineer responded that this concept is still under consideration, acknowledging the significant administrative effort it would require. He noted that discussions are ongoing with Mr. Fowler to determine a practical approach. Mr. Hock remarked that this was his first time learning about the data report and expressed enthusiasm about its potential as a tool for accountability. Mr. Merritt added that many of the issues may stem from a single pilot trainee emphasizing that human factors play a role in guideline adherence. Mr. Fowler noted that most of the challenges arise from student pilots. He explained that when a student is struggling with basic flight control,	Bruce Rineer

	such as maintaining a straight path, the instructor's focus may not be on ensuring a rapid climb to 1,000 feet. Mr. Hock concluded by emphasizing that instructors still bear responsibility for enforcing the guidelines and should actively communicate them to student pilots.	
Adjournment	Mr. Rineer thanks the committee members for their attendance and participation. With no further questions or comments, the meeting was adjourned a little before 7:00 p.m.	Bruce Rineer

Appendix D. Maryland Aviation Commission Materials

MAA staff presented a Decision Paper to the Maryland Aviation Commission in November 2025. The November 2025 Decision Paper discussed the update of the ANZ and NAP. At that meeting, the Maryland Aviation Commission approved that the MAA could proceed with the update to the ANZ and NAP.

Materials presented at the Maryland Aviation Commission meetings are presented in this appendix.

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MARYLAND AVIATION ADMINISTRATION
Decision Paper

Airport Noise Zone and Noise Abatement Plan Update
Martin State Airport

1. SUBJECT/ISSUE

The Maryland Department of Transportation Maryland Aviation Administration (MAA) proposes to update the Code of Maryland Regulations (COMAR) to reflect an updated Airport Noise Zone (ANZ) and Noise Abatement Plan (NAP) for Martin State Airport (MTN). The MAA develops and certifies the MTN ANZ pursuant to the *Maryland Environmental Noise Act of 1974* (See Transportation Article, §§5-805, 5-806, and 5-819, Annotated Code of Maryland). The current ANZ for MTN, certified in 2021, is referenced in COMAR Section 11.03.02.10 - *Certified Martin State Airport (MTN) Noise Zone* and incorporated by reference in COMAR Section 11.03.01.01-1(B)(6).

In accordance with the Annotated Code of Maryland, Transportation §5-201 (b)(2), the Maryland Aviation Commission is required to approve MAA regulations prior to their adoption by the Executive Director.

2. DISCUSSION

Maryland law requires that an assessment of the noise environment created by the operation and projected future use of the airport be regularly undertaken, which includes the delineation of an ANZ and identification of any impacted land use area. An ANZ and NAP were first established for MTN in 1977 and was updated in 1984, 1988, 1996, 2001, 2012 and 2020. The ANZ represents the boundaries for determining incompatible activities or land uses under Maryland law and is used to restrict noise-sensitive development that would be incompatible with the cumulative noise exposure level acceptable for an area.

Airport Noise Zone

The ANZ contour is determined by a composite of three Day Night Average Sound Level (DNL) contours: a base year contour, a 5-year forecast contour (2030), and a 10-year forecast contour (2035). The largest of the three contours in any area around the Airport determines the ANZ. The MTN 2025 ANZ is shown on **Attachment 1**.

The 2025 ANZ encompasses 286 acres, a 30% decrease from the 411 acres contained within the previous ANZ. The 2025 ANZ remains over either the airport (95%) or other compatible land uses (5%), and there are no noise-sensitive land uses within the ANZ. The decrease in size is primarily associated with the deactivation of the Maryland Air National Guard A-10 aircraft. A comparison of the previous and proposed ANZ contours is shown on **Attachment 2**.

Review of NAP for MTN

MAA is required to implement a NAP at MTN if an impacted land use area exists within the ANZ. The MTN NAP prescribes measures to monitor and reduce or eliminate impacted land use areas around MTN to the extent feasible, while maintaining safe and efficient airport operations. The NAP is designed to minimize the noise of aircraft operations within the constraints of the Federal Air Traffic Control System and ensure aircraft safety.

Currently, there are no impacted land use areas within the ANZ for MTN, however, MAA has reviewed the status of the NAP to ensure the existing measures address potential noise concerns. While no changes were made to the NAP, MAA has identified a series of strategies to increase awareness of and compliance with the voluntary measures prescribed in the NAP.

Public Participation

The 2025 MTN ANZ Update includes opportunities for public involvement and participation. A Stakeholder Advisory Committee (SAC) was convened at the onset of the study, which included representatives of stakeholder groups such as tenants, local planning and zoning officials, and representation from communities most affected by airport noise. The SAC was convened three times during the ANZ update process, in April, June, and September 2025 to solicit input, review materials, and provide a means to disseminate study findings. A public meeting and hearing offering the opportunity to provide comment will be held prior to the certification of the 2025 ANZ by the Executive Director.

Review of Potential Need for Noise Assistance Programs

As indicated above, there are no incompatible land uses within the 2025 MTN ANZ. Therefore, a Federal Aviation Administration Part 150 Study is not warranted, as there is no need to pursue federal funding for noise assistance programs.

3. CONCLUSION

MAA has completed the technical work associated with updating the 2025 ANZ and NAP for MTN. The MAA proposes to proceed with the update of the ANZ and NAP for MTN in COMAR. MAA will publish both the proposed ANZ and NAP as a proposed action in the Maryland Register and will hold a public hearing on the proposed action. The public will be able to comment on the proposed action at the public hearing. Maryland Aviation Commission approval will be sought prior to the final adoption of regulations establishing the updated ANZ and NAP for MTN.

4. RECOMMENDATION

MAA recommends that the Maryland Aviation Commission approve the revised and proposed updated ANZ and NAP for MTN as to be provided for in amendments to COMAR 11.03.02.10 *Certified Martin State Airport (MTN) Noise Zone* and COMAR 11.03.01.01-1 *Incorporation by Reference*.

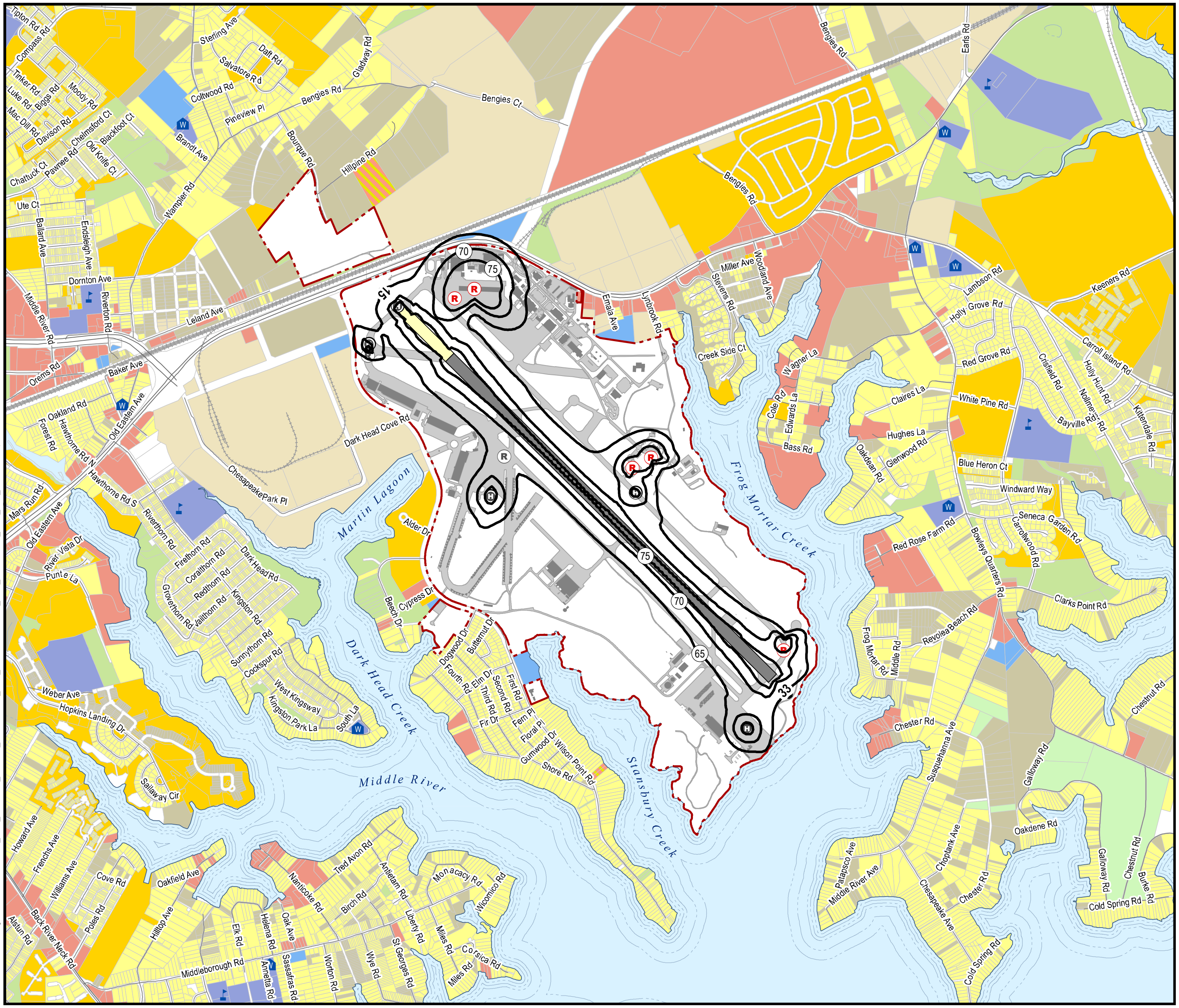
Approved__________ Disapproved__________ Date__________

MARTIN STATE AIRPORT

Airport Noise Zone Update

Attachment 1

2025 ANZ DNL Contour



2025 ANZ DNL Contour (65-75 dB)

Helicopter Operation Area

Civilian Runup Locations

Military Runup Location

Civilian Runway

Additional Runway Available for Military Operations

Airport Buildings

Taxiway / Apron

Airport Boundary

Roads

Railroad

Stream / Creek

Residential Use

Multi-Family Residential Use

Mixed Use

Public Use (Non-Compatible)

Public Use (Compatible)

Agriculture

Recreational / Open Space

Commercial Use

Manufacturing / Production

Vacant / Undeveloped

Transportation / Utility

Water

School

Place of Worship

Library

Hospital / Health Care

Data Sources: Baltimore County Government Open Data Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH

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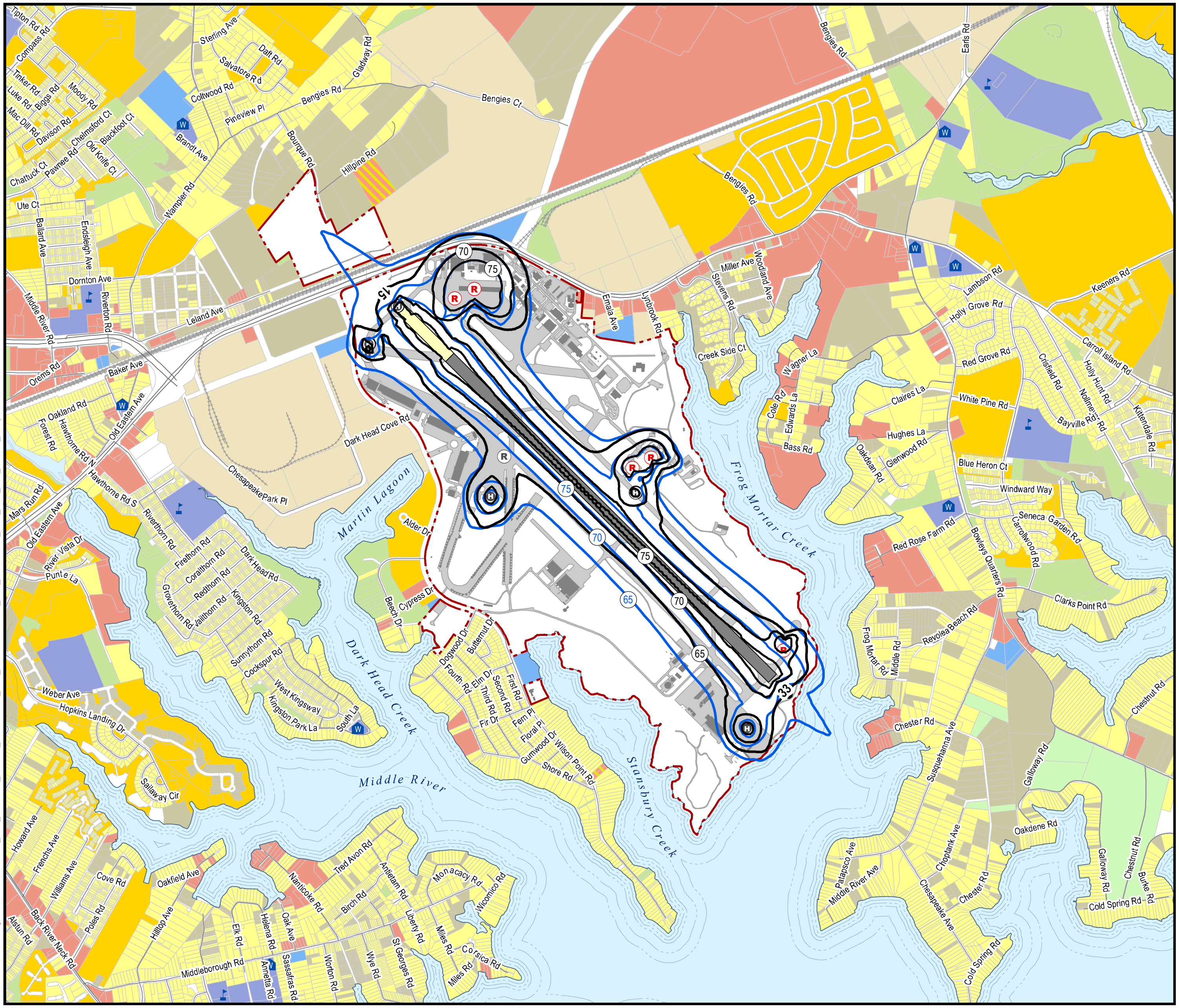
Document Path: G:\Projects\23-XXX\23-00704_MAA_Acoustical_Services_On-Call\TO11_MTN_ANZ\GIS\2300704_MTN_Attachment1_2025_ANZ_Contour.mxd Author: MJHamilton

MARTIN STATE AIRPORT

Airport Noise Zone Update

Attachment 2

2025 and 2020 ANZ DNL Contour Comparison



2025 ANZ DNL Contour (65-75 dB)

2020 ANZ DNL Contour (65-75 dB)

Helicopter Operation Area

Military Runup Location

Civilian Runup Locations

Civilian Runway

Additional Runway Available for Military Operations

Airport Buildings

Taxiway / Apron

Airport Boundary

Roads

Railroad

Stream / Creek

Residential Use

Recreational / Open Space

Multi-Family Residential Use

Commercial Use

Mixed Use

Manufacturing / Production

Public Use (Non-Compatible)

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Public Use (Compatible)

Transportation / Utility

Agriculture

Water

School

Library

Place of Worship

Hospital / Health Care

Data Sources: Baltimore County Government Open Data Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH

0 2,000 4,000 Feet

MDOT
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

Airport Noise Zone Update Martin State Proposed Action

Maryland Aviation Commission

November 12, 2025

Key Points/Overview

- The Maryland Environmental Noise Act of 1974 requires an “assessment of the noise environment”, delineation of a "noise zone“, and development of a noise abatement plan every five years*
- The Code of Maryland Regulations prescribes the noise metric, methodology, compatible land uses, consideration for noise abatement plan elements, and the permit process for construction within the Noise Zone
- The most recent Airport Noise Zone (ANZ) for MTN, certified in 2021, is referenced in COMAR Section 11.03.02.10 and incorporated by reference in COMAR Section 11.03.01.01-1(B)(6)
- MAA initiated an update to the ANZ at MTN in January 2025, and has completed the technical work
- MAA proposes to update the references in COMAR to reflect an updated ANZ for MTN
- The Maryland Aviation Commission is charged with the approval of regulations prior to their adoption by the MAA Executive Director

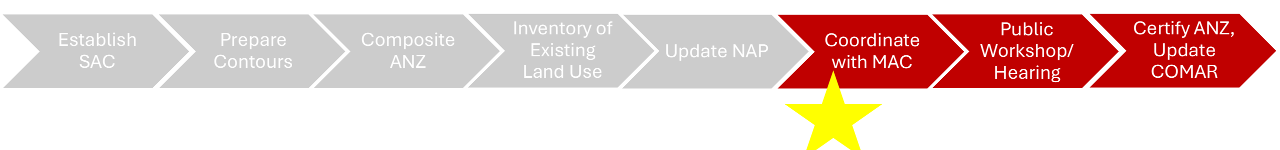
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

*Transportation Article, §§5-805, 5-806, and 5-819, Annotated Code of Maryland

ANZ Scope & Process

- Establish Stakeholder Advisory Committee (SAC)
- Prepare base year, 5-year, 10-year forecast contours
- Compile composite Airport Noise Zone (ANZ)
- Prepare inventory of existing land use
- Update the Noise Abatement Plan (NAP)
- **Obtain approval from MAC to circulate proposed ANZ Update**
- Conduct public workshop/hearing
- Obtain approval from MAC to submit Certified ANZ Update for incorporation into COMAR

Completed, January 2025 – September 2025



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MARTIN STATE AIRPORT

Schedule to Update COMAR

Complete Draft ANZ & NAP (i.e., Draft the Regulation)

January – September 2025

Draft Regulation (Maryland Aviation Commission)

November 12, 2025 MAC Meeting

Publication in the Maryland Register

30-day Public Comment Period & Meeting

Anticipating January 2026

Final Agency Action (Maryland Aviation Commission)

Anticipating March 2026 MAC Meeting

Executive Director Certification

Effective Date - Publication in COMAR

Project Conclusion, Anticipating April 2026

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Stakeholder Advisory Committee (SAC)

MTN Stakeholder Advisory Committee

- County Gov't (Baltimore County Office of Planning)
- Community Associations (Bowley's Quarters Improvement Assoc, Wilson Point Community Assoc, others)
- Airport Stakeholders (FAA, Maryland State Police, Maryland Air National Guard, Baltimore City Police Department, Trident Jet Aviation, Brett Aviation, others)

Jan 2025
Project Start

April 2025
- **SAC Meeting #1**

June 2025
- **SAC Meeting #2**

Sept 2025
- **SAC Meeting #3**

Invited SAC Membership

Name	Organization
Melissa Torres	Advanced Aviation Group, LLC
	ATP Flight School
Lt. George Hauf; Matthew Cloud	Baltimore City Police Department – Helicopter Unit
Steve Lafferty	Baltimore County Department of Planning
Sgt. Brandon Branham	Baltimore County Police Department -Aviation Unit
Allen Robertson	Bowley's Quarters Community Association
Mary Muth	Bowley's Quarters Improvement Association (BQIA)
Helen Frado; James Hardwick	Brett Aviation
John Henderson	Civil Air Patrol
Jim Merritt	Bowley's Quarters Community Association
Josh Sines	Essex Middle River Civic Council, Inc.
Jonathan Stitzinger	FIRST CLASS FLIGHT ACADEMY, LLC
Ashley Zayas	Greenleigh Community
Brig. Gen. Richard Hunt	Maryland Air National Guard

Name	Organization
W. Ernie Jenkins	Maryland State Police
Nikolaus Wagenfeiler	Midwest Air Traffic Control
Judith Davies	Nottingham Improvement Association, Inc.
President Carol Sue Hart	Oliver Beach Improvement Association
Sharon Pinkerton	The Hawthorne Civic Association, Inc.
Napoleon Martinez	Trident Jet Aviation
President Robert Bendler	Wilson Point Civic Improvement Association
President William Kammer	Windlass Run Improvement Association, Inc.
Jim Hock	Bowley's Quarters Improvement Association
Marsha Ayres	Bowley's Quarters Improvement Association
Kim Fry	Bowley's Quarters Improvement Association
Joseph Ireton	Maryland State Police Aviation Command
Jeff Kyger	Wilson Point Civic Improvement Association
Pat Hook; Emily Martishius	The Hawthorne Civic Association

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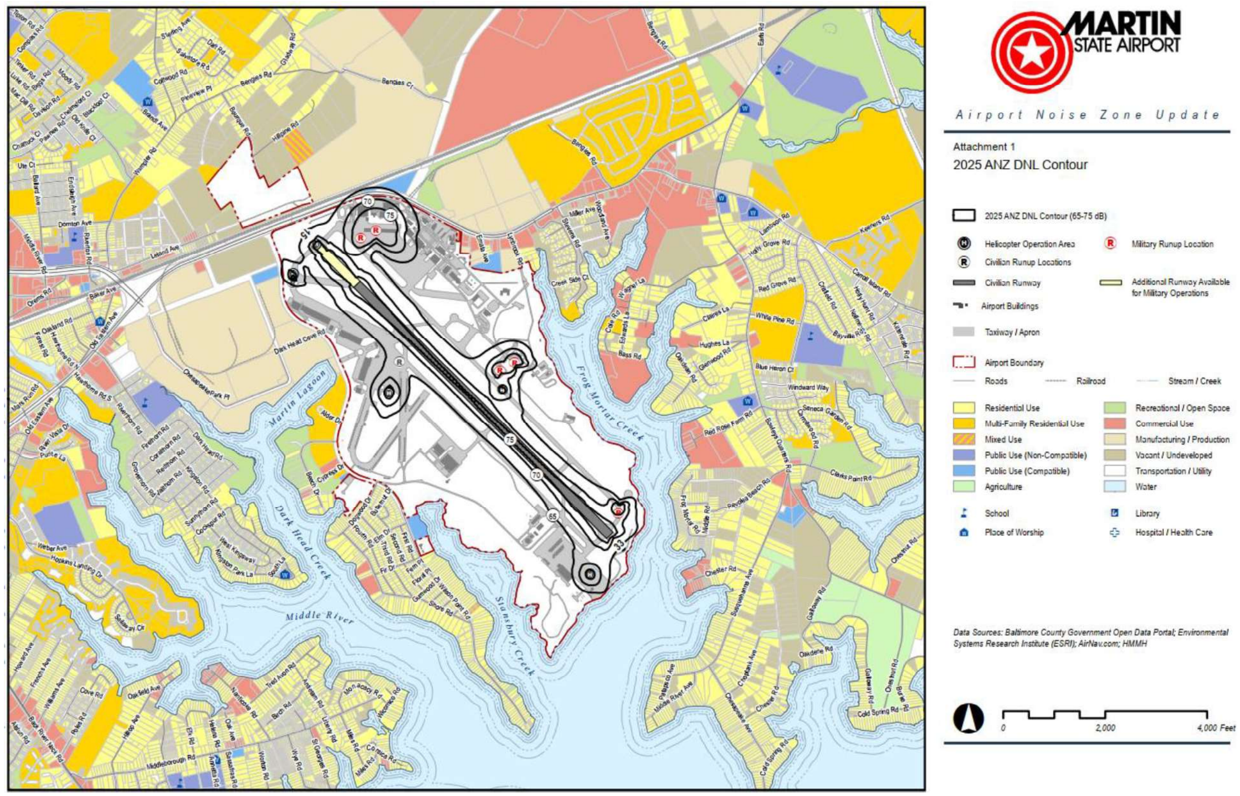
MTN ANZ Contours

- Noise contours are developed for existing (2025), a five-year forecast (2030) and a ten-year forecast (2035)
- Operations are based on the FAA's Terminal Area Forecast
- FAA's Aviation Environmental Design Tool (AEDT) is used to develop noise contours
- MTN Marshall Highlights
  - 245 average daily operations in 2025, increasing to 262 by 2035
  - Future forecast includes relocation of Runway 15/33 ends for civilian aircraft – from 6,997 to 7,430 ft.
  - Forecast removes A-10 operations, but retains some military aircraft activity

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

2025 ANZ – MTN

- Total area: 286 acres
- 95% remains on-airport; 5% off airport but over compatible land uses
- No residential population or housing units affected



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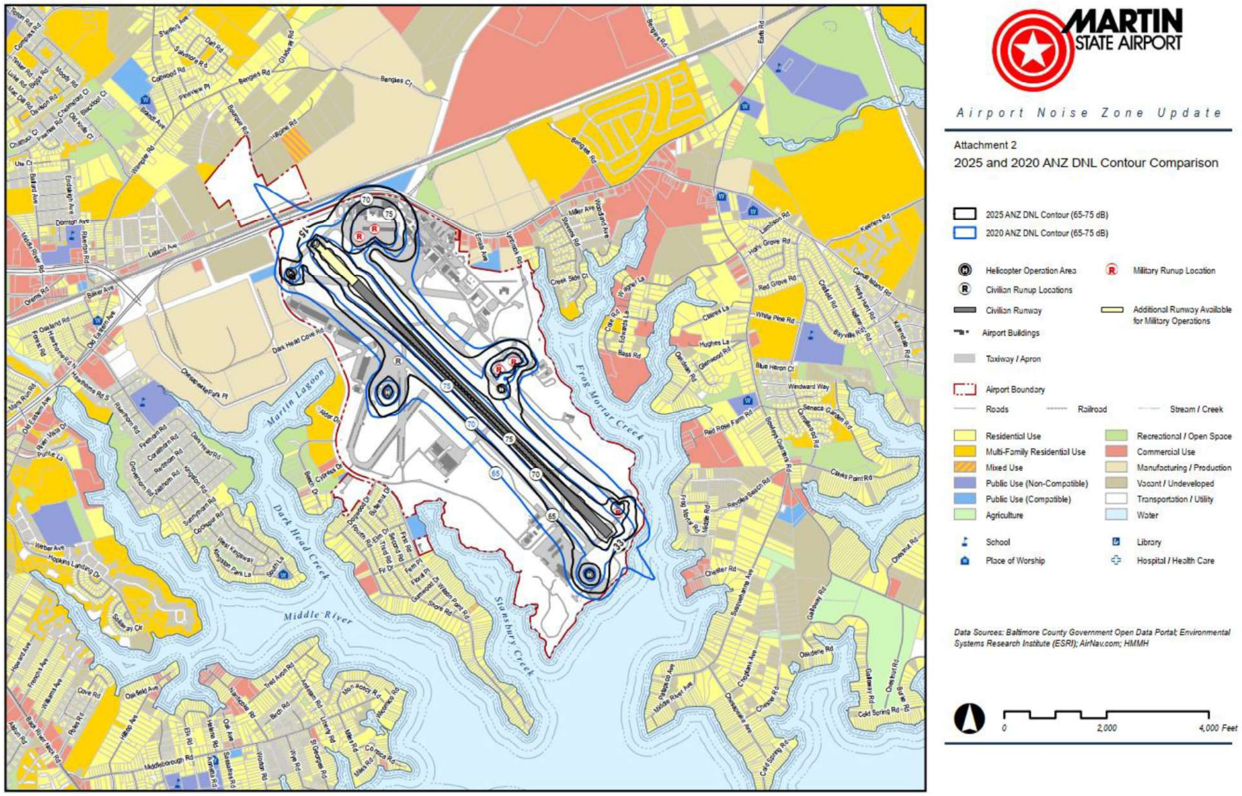
2025 ANZ vs 2020 ANZ – Martin State

- 2025 ANZ decreases in total area by 125 acres (30 percent)
- Smaller contours are a result of:
  - Changes in how A-10 operations are modeled; reduced level of A-10 activity in 2025 and no future Guard flying mission



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Noise Abatement Plan

- The NAP was developed with the cooperation of airport users, the aviation industry, FAA, communities, and local governments
- The NAP has two general categories:
  - Noise Abatement Elements – Industry, FAA, and MAA
    - Strategies intended to reduce noise impacts for communities around the airport
    - Voluntary operational procedures such as control of ground-based noise sources, arrival and departure flight procedures
  - Land Use Elements – MAA
    - Summarizes the means of controlling and mitigating noise-sensitive development within the ANZ (Airport Zoning Permit approval or denial, appeals process)
- Martin State Measures
  - No incompatible land uses within the ANZ, no changes to existing procedures
  - Identified additional strategies to increase awareness of Noise Abatement Plan

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION

MARTIN STATE AIRPORT

Public Notice & Review

- Proposed Action (updating COMAR) will be published in advance in the Maryland Register. Public notice will be provided via posting in:
  - Dundalk Eagle, East County Times, Baltimore Sun, The Avenue News
  - SAC members and Maryland State and Local elected officials will be notified directly

- Document will be available for public review at the following locations:
  - Electronically at MAA website
  - Baltimore County Library, 1110 Eastern Blvd
  - Baltimore County Library, 1716 Merritt Blvd

- Public Workshop and Hearing

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Appendix E. Public Workshop and Hearing Materials

Appendix E includes information related to the Public Workshop and Hearing, including invitations, documentation of public notices, attendance information, presentation materials, and the hearing transcript.

To be included in the final version of the ANZ document.

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Appendix F. Public Comments

To be included in the final version of the ANZ document.

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