

Airport Noise Zone Update Stakeholder Advisory Committee

Meeting #1

Baltimore/Washington International Thurgood Marshall Airport (BWI Marshall)

April 3, 2025

6:00 PM – 8:00 PM

Welcome to BWI Marshall

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 – Hallway by restrooms
- Nearest fire extinguisher – Hallway by restrooms
- Accountability Site: Parking lot outside of front door of Building 991
- Always report any hazards in the meeting room



Source: MDOT MAA, Office of Planning, 2019

Agenda

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

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

Introductions

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

Expected Meeting Takeaways

- What is an Airport Noise Zone (ANZ)
- What is a Noise Abatement Plan (NAP)
- Why MAA is undertaking this process
- Role of the Stakeholders Advisory Committee (SAC)
- How noise is evaluated, especially with the Day-Night Noise Level (DNL or Ldn) metric
- What inputs go into the noise model
- What the end results of the study will be

Airport Noise Zone (ANZ) Regulations

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
 - Maryland Statutes, Article Transportation, Section 5-805
- The certified ANZ consists of Day-Night Average Sound Level (DNL) contours at 65, 70, and 75 decibels
 - Printed on Airport Noise Zone Map

State Law and Regulations

Transportation Code	COMAR (Code of Maryland Regulations)
<u>Noise Zone Regulations Part I</u> 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. <u>Noise Zone Regulations Part II</u> • 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	<u>Chapter 11.03.03</u> • 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. <u>Section 11.03.03.05</u> Provides a process for permits for construction within the Noise Zone Surrounding a State-Owned Airport

ANZ Study Update

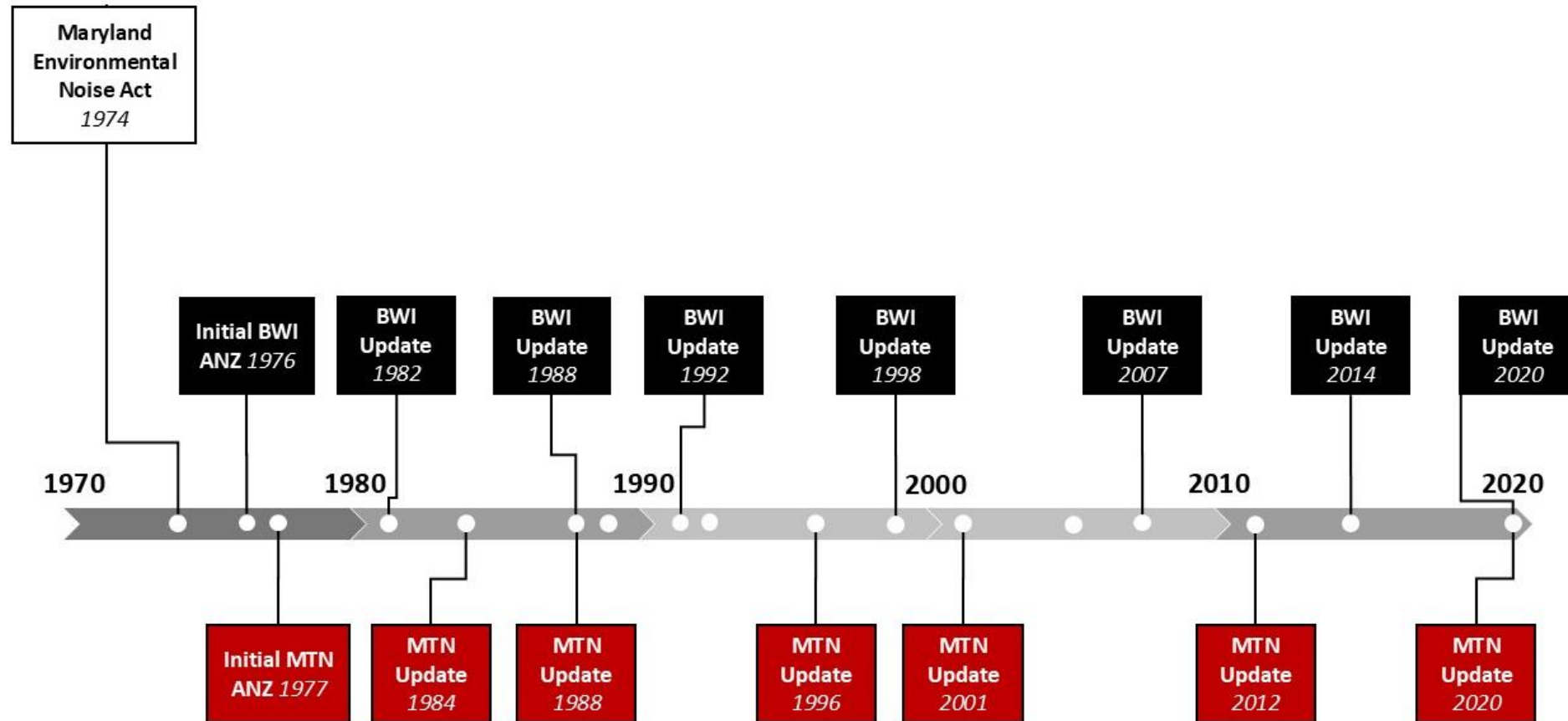
The ANZ update process includes status review of the NAP.

Airport Noise Zone (ANZ)	Noise Abatement Plan (NAP)
Provides the means to identify and control incompatible land development around BWI Marshall Is a composite of the farthest extents of the annual Day-Night Average (DNL or Ldn) 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

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

BWI's History of ANZ



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

Expectations for the ANZ

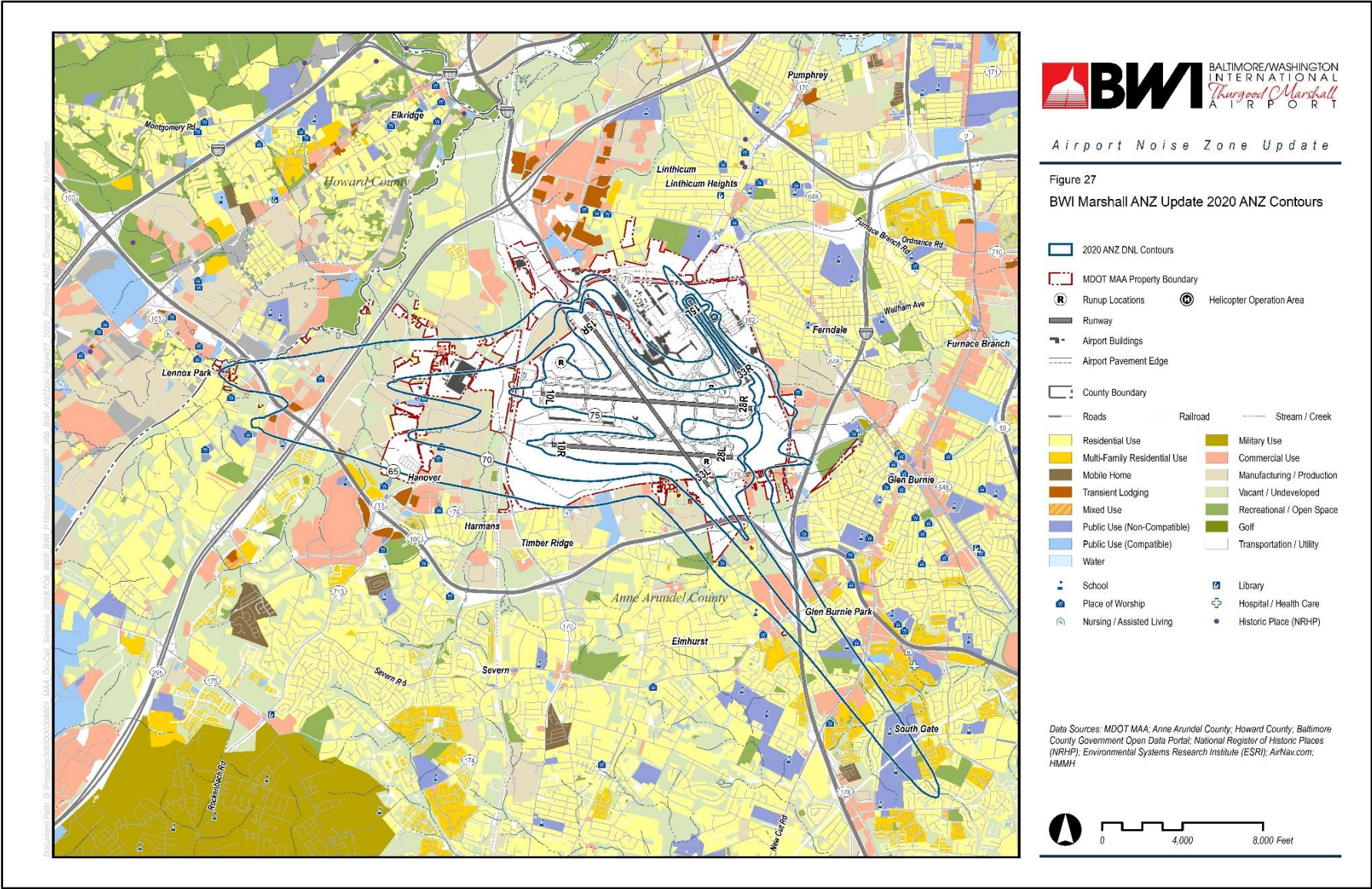
The ANZ provides a means to:

- Understand existing and future noise exposure around BWI Marshall
- 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

BWI Marshall Airport Noise Zone (2020)



Noise Abatement Plan (NAP) Overview

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
 - Measures may be updated later as part of the 14 CFR Part 150 process.

Existing Noise Abatement Plan Measures

Noise Abatement Measures

Departure Procedures:

Jet aircraft fly specific distances before commencing turns to maximize flights over compatible land uses

Arrival Procedures:

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

Preferential Runway Use System:

Identifies preferred runways to minimize noise exposure

Control of Ground Based Noise Sources:

Efforts to minimize ground-based noise propagation

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

BWI Marshall NAP Caveats

Noise abatement procedures are voluntary:

- The FAA has primary responsibility for implementing flight procedures and the preferential runway use system at BWI Marshall.
- Aircraft may not follow noise abatement procedures if deemed necessary by air traffic control (ATC) or flight crews to maintain operational safety.
- The FAA has introduced new navigation technology and procedures that in some cases deviate from historic noise abatement procedures.

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)



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/CEO certifies ANZ
- BWI ANZ COMAR
 - <https://marylandaviation.com/environmental/airport-noise/bwi-marshall-airport-noise-zone/>
 - <https://dsd.maryland.gov/regulations/Pages/11.03.01.12.aspx>
 - <https://dsd.maryland.gov/regulations/Pages/11.03.01.01-1.aspx>

Stakeholder Advisory Committee

SAC Roles and Responsibilities

- The SAC serves in an advisory role to the MAA solely for purposes of the BWI Marshall ANZ update process.
 - Review of study inputs, assumptions, analyses, documentation, etc.
 - Provide 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 BWI Marshall ANZ update.

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

SAC Makeup

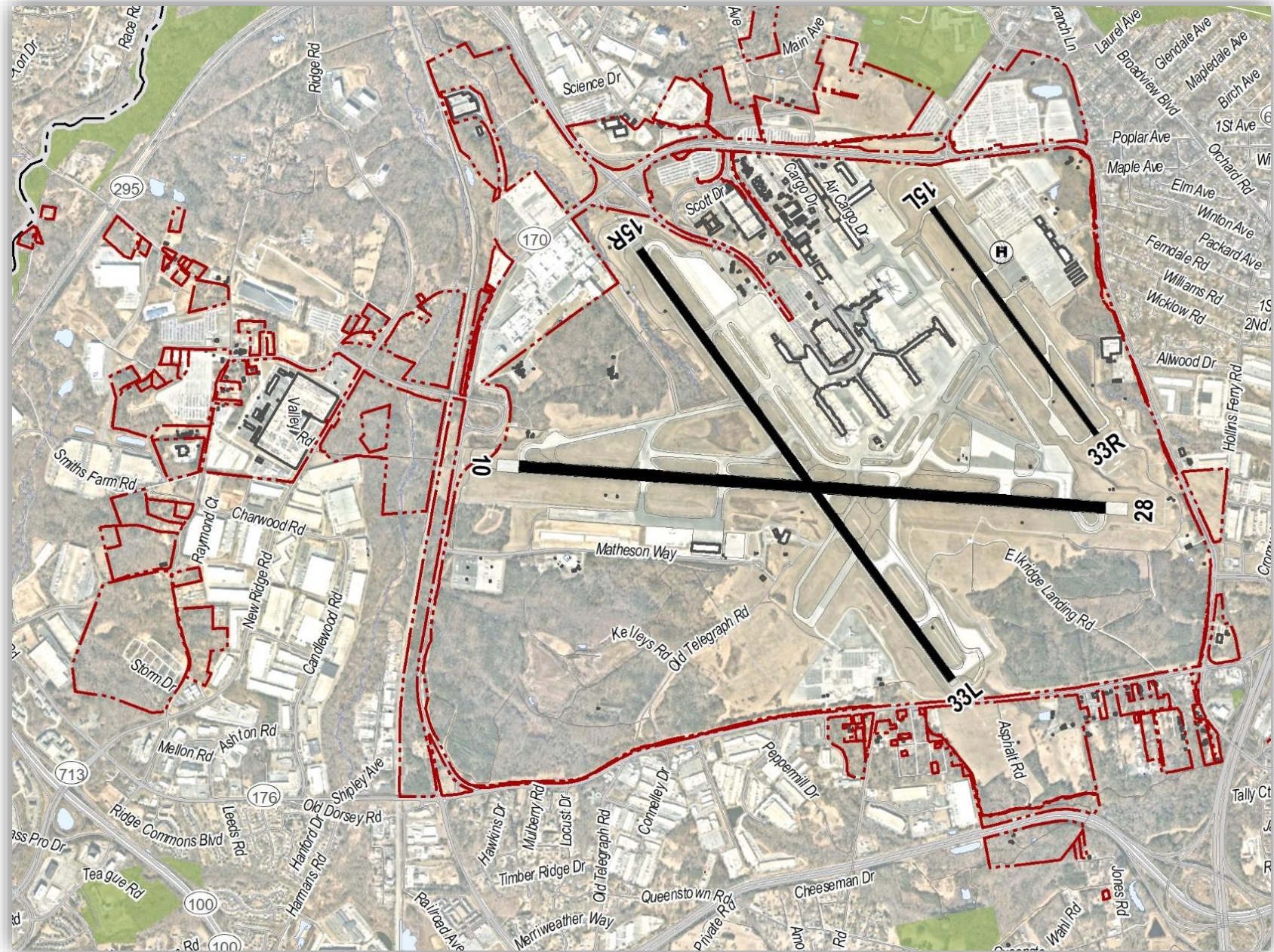
- The SAC is composed of stakeholders representing a wide range of interests at BWI Marshall:
 - State and local agencies
 - Community organizations
 - Airport tenants and users
 - Aviation trade associations
- Members serve on a voluntary basis without compensation.

We need you!

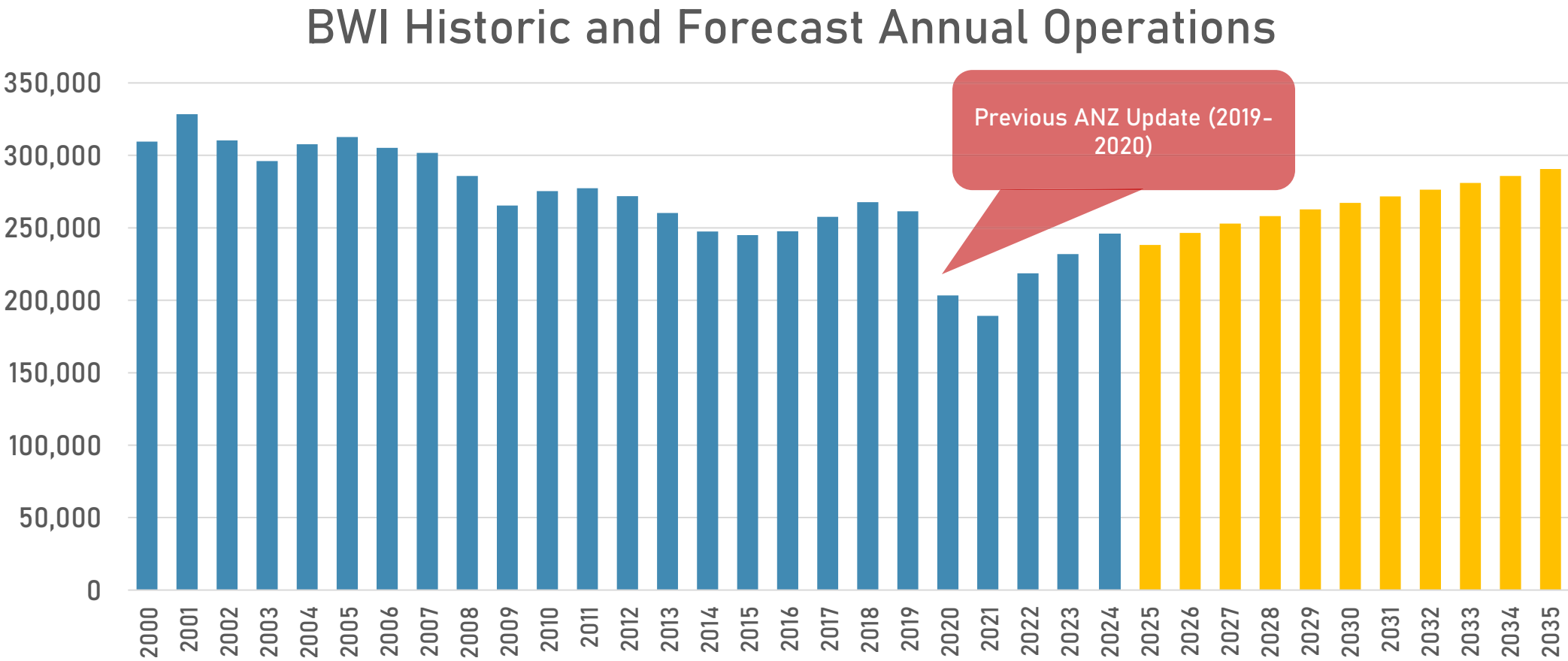
- To understand ANZ effects on stakeholders
- To review land use inventory and planning considerations
- To share information with your neighbors and organizations
- To review Noise Abatement Plan and provide insight
- To spread the word about future opportunities for public feedback

BWI Marshall Overview

Existing Airport Layout



Historic and Forecast Annual Operations



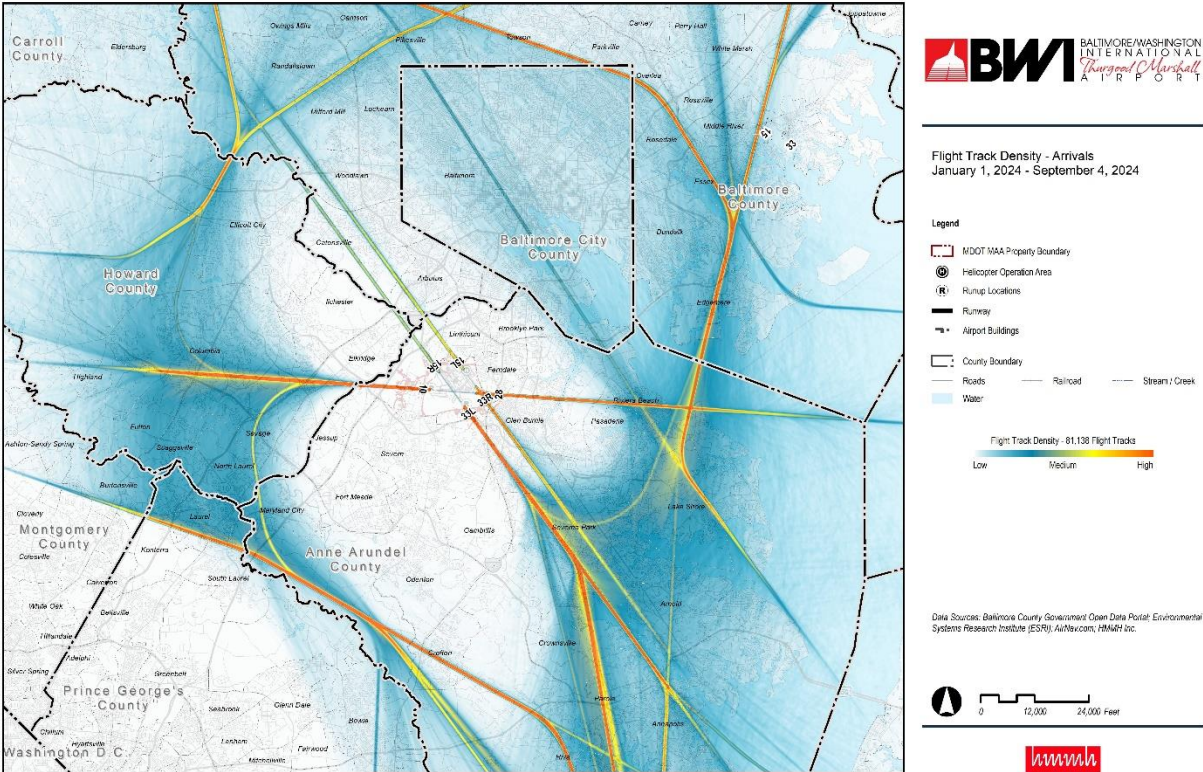
Source: FAA Terminal Area Forecast, Issued January 2025

Changes Since the Last ANZ Update

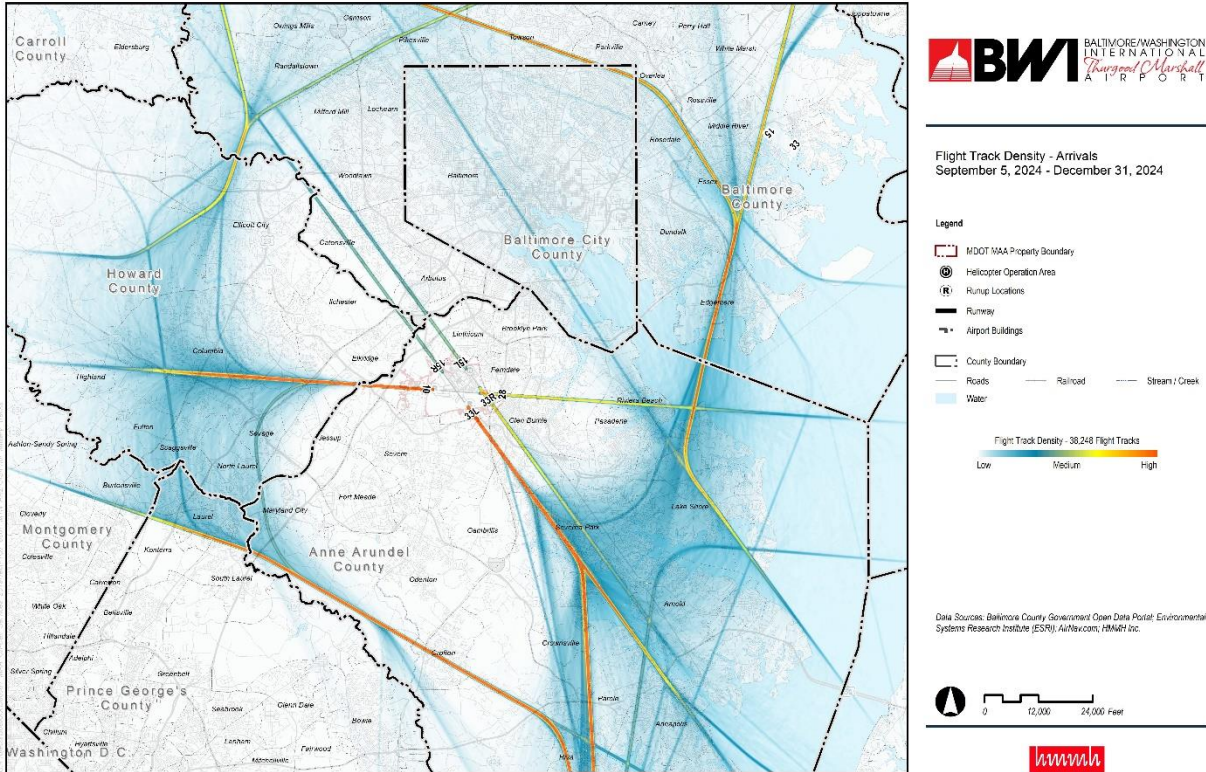
- Aircraft fleet changes
- COVID recovery
- Aircraft arrival/departure procedure changes
 - <https://marylandaviation.com/environmental/airport-noise/have-the-procedures-to-and-from-bwi-marshall-changed/>
- Residential Sound Insulation Program (RSIP)

Changes Since the Last ANZ Update

Implementation of New Arrival Procedures



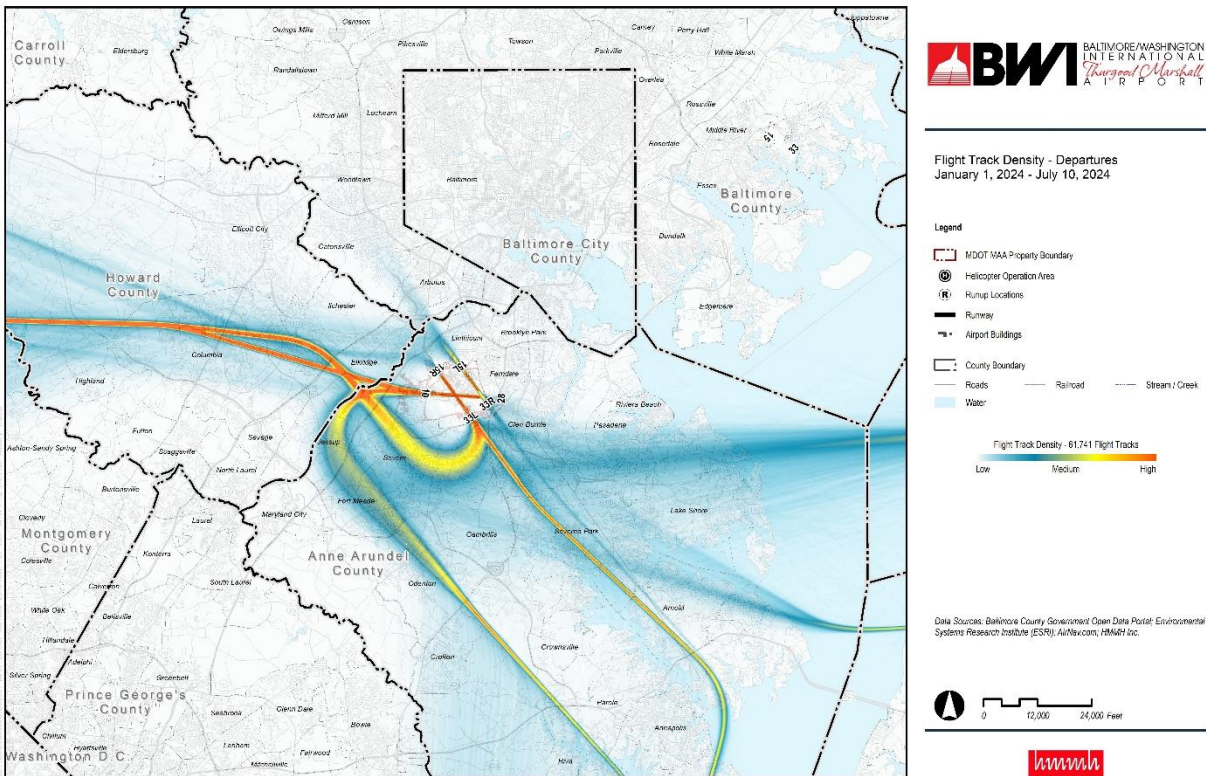
Jan – Sept 4, 2024



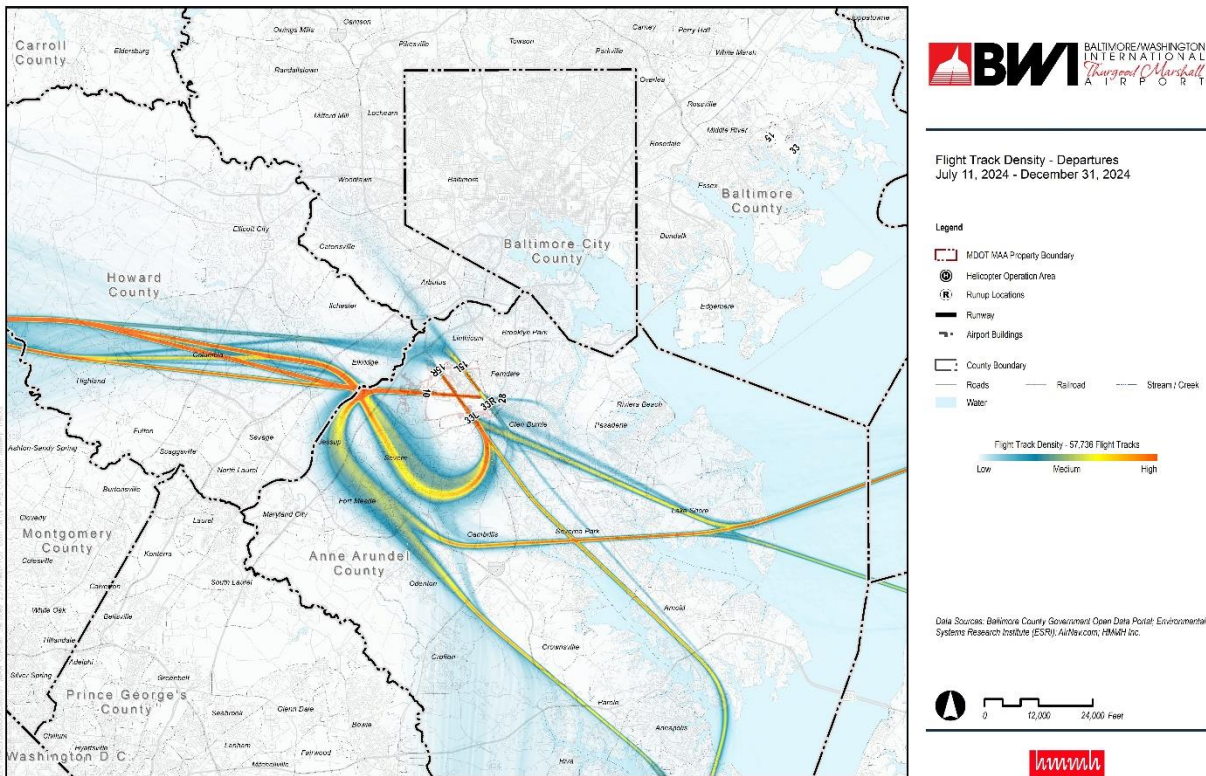
Sept 5 – Dec 2024

Changes Since the Last ANZ Update

Implementation of New Departure Procedures



Jan – July 10, 2024



July 11 – Dec 2024

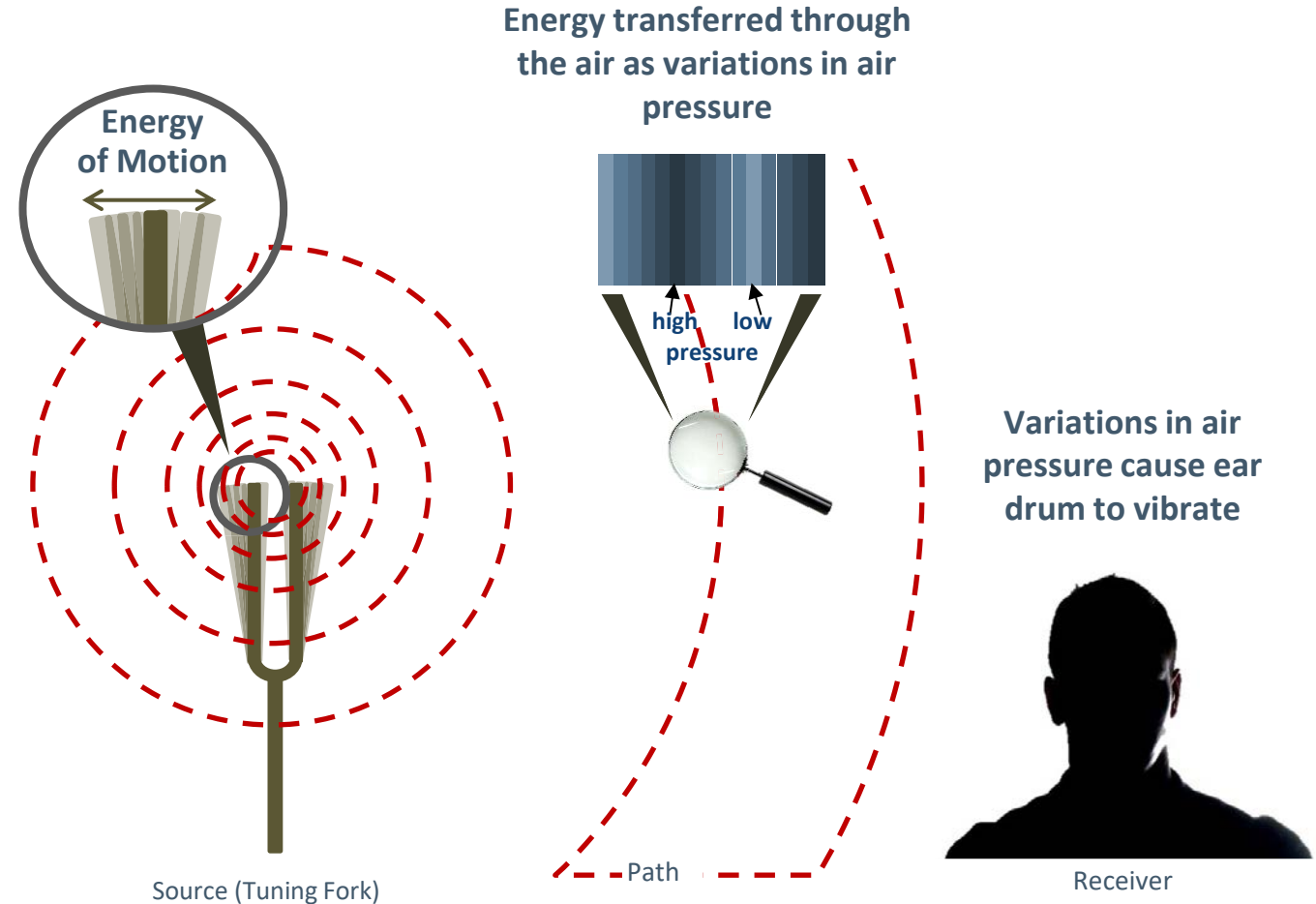
Fundamentals of Noise

Fundamentals of Noise

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

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



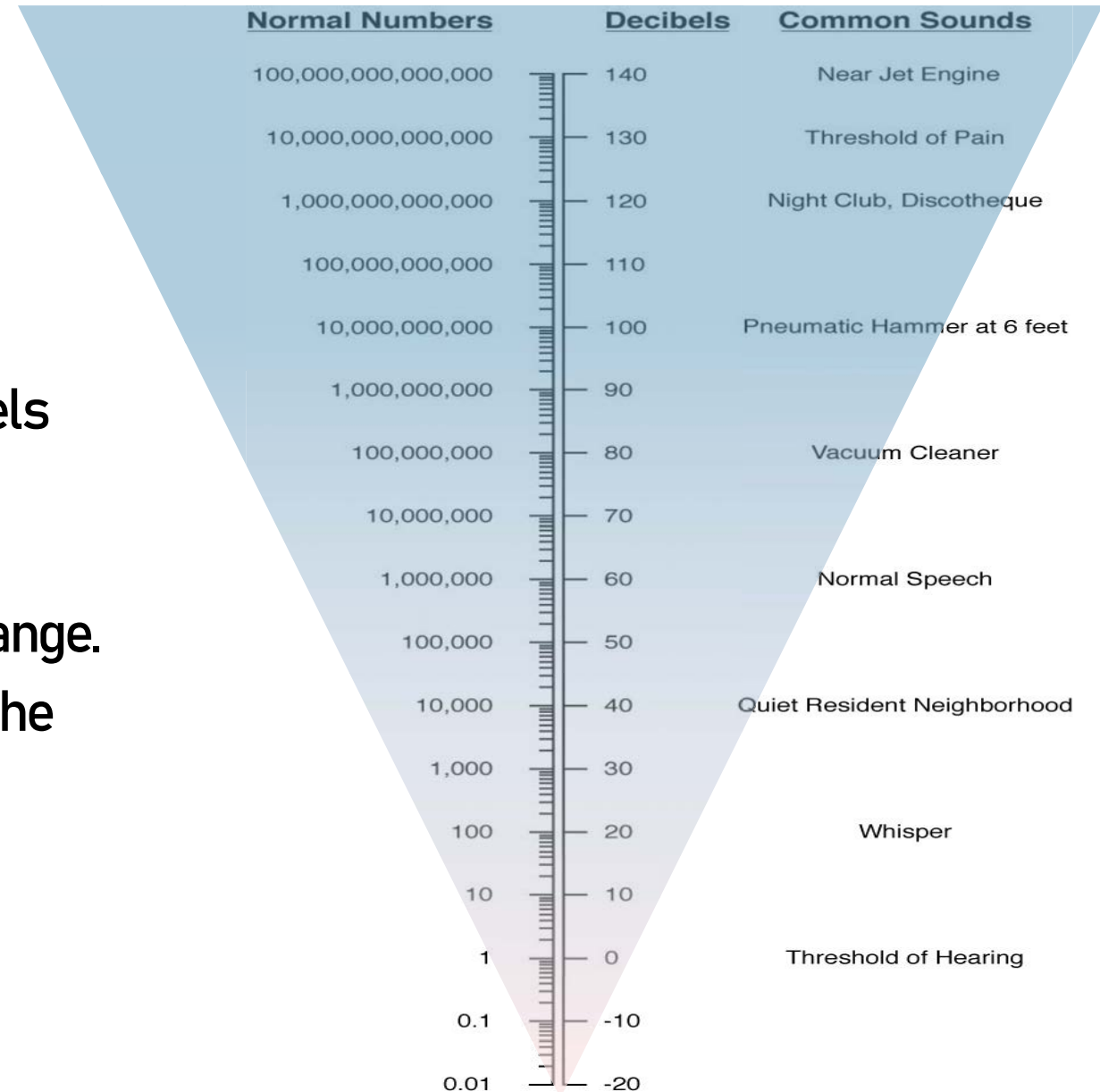
The Decibel Scale

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.



Real-Time Decibel Change “Rules of Thumb”

- In a laboratory test, a 1 dB change is generally detectable.
- 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.

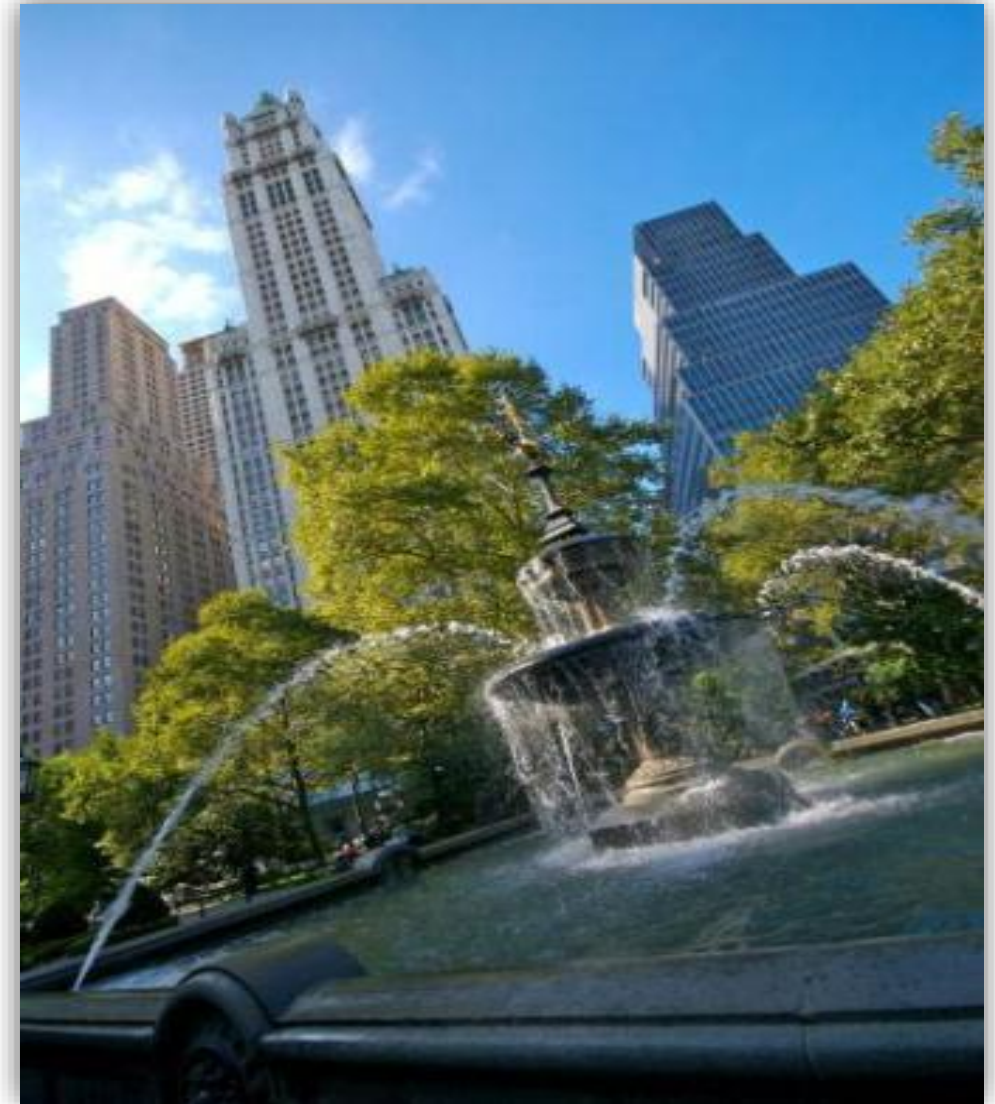
Caution: Decibel addition isn't ordinary math!

- Decibels are a logarithmic quantity, so...
 - Two equal sources:
 - $70 + 70 \text{ dB} =$ ~~140 dB~~ **73 dB**
 - Four equal sources:
 - $70 + 70 + 70 + 70 \text{ dB} =$ **76 dB**
 - Ten equal sources:
 - $70 + 70 + 70 + 70 + 70 + 70 + 70 + 70 + 70 + 70 \text{ dB} =$ **80 dB**

Judging Noisiness

Sound *quality* matters

- Sources with the same overall dB level may “sound” different



Judging Noisiness

Duration matters

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



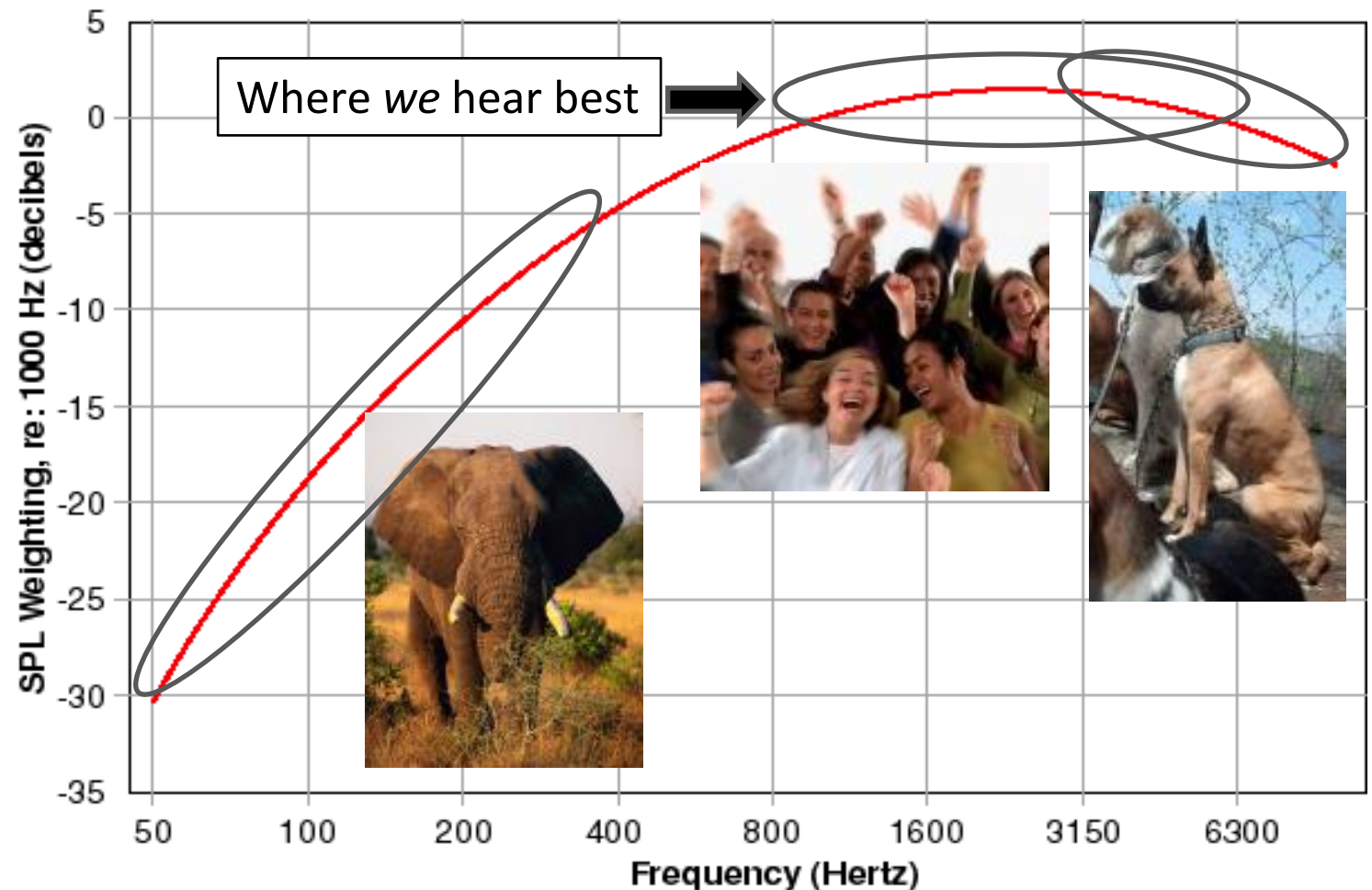
Judging Noisiness

Time of day matters



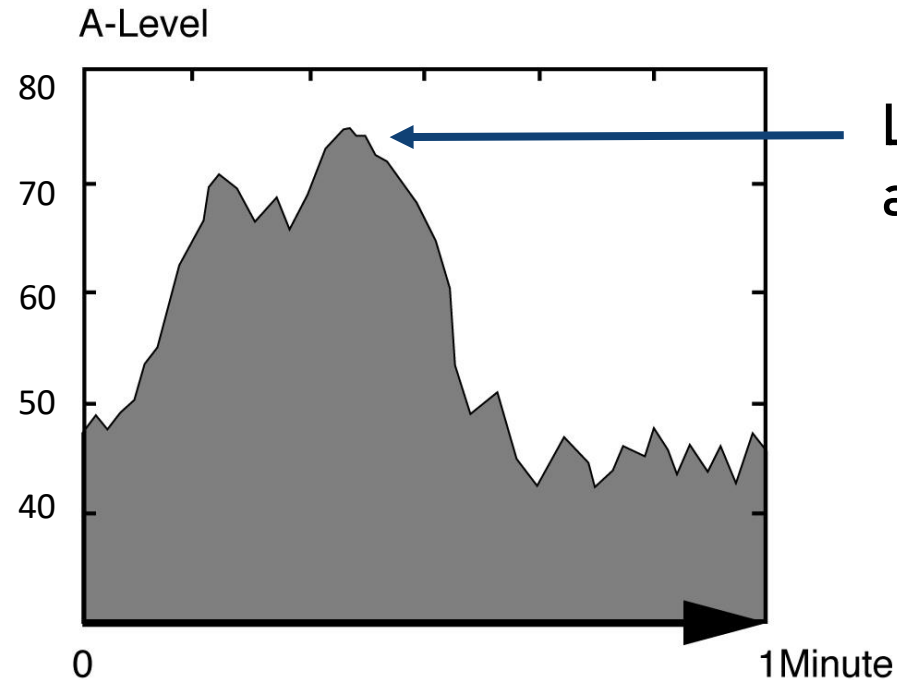
COMAR Requires use of A-Weighted Sound Level

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



Maximum Sound Level (L_{max})

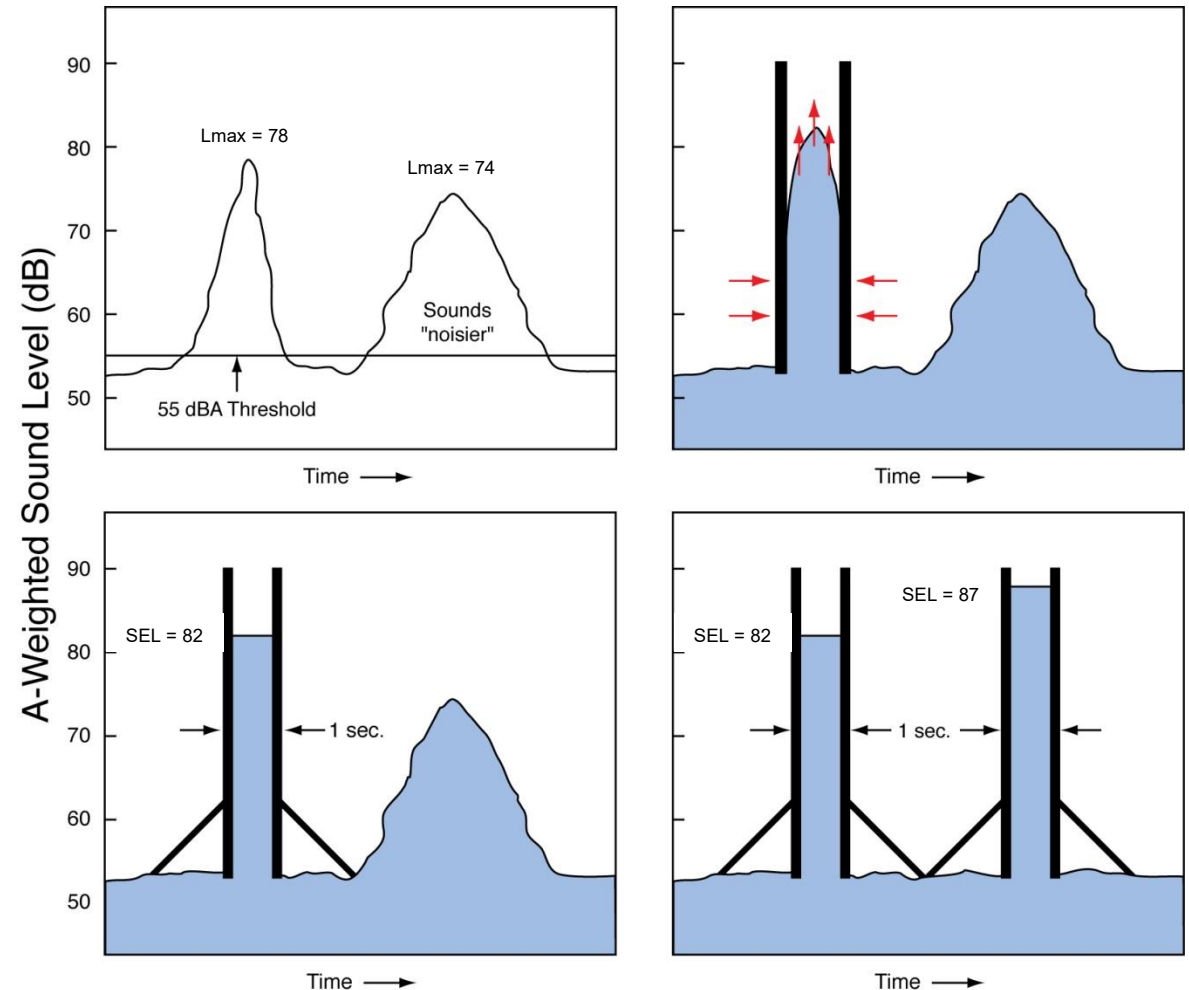
The simplest way to describe a discrete noise “event” is its maximum sound level (L_{max})



L_{max} in this example is approximately 75 dBA

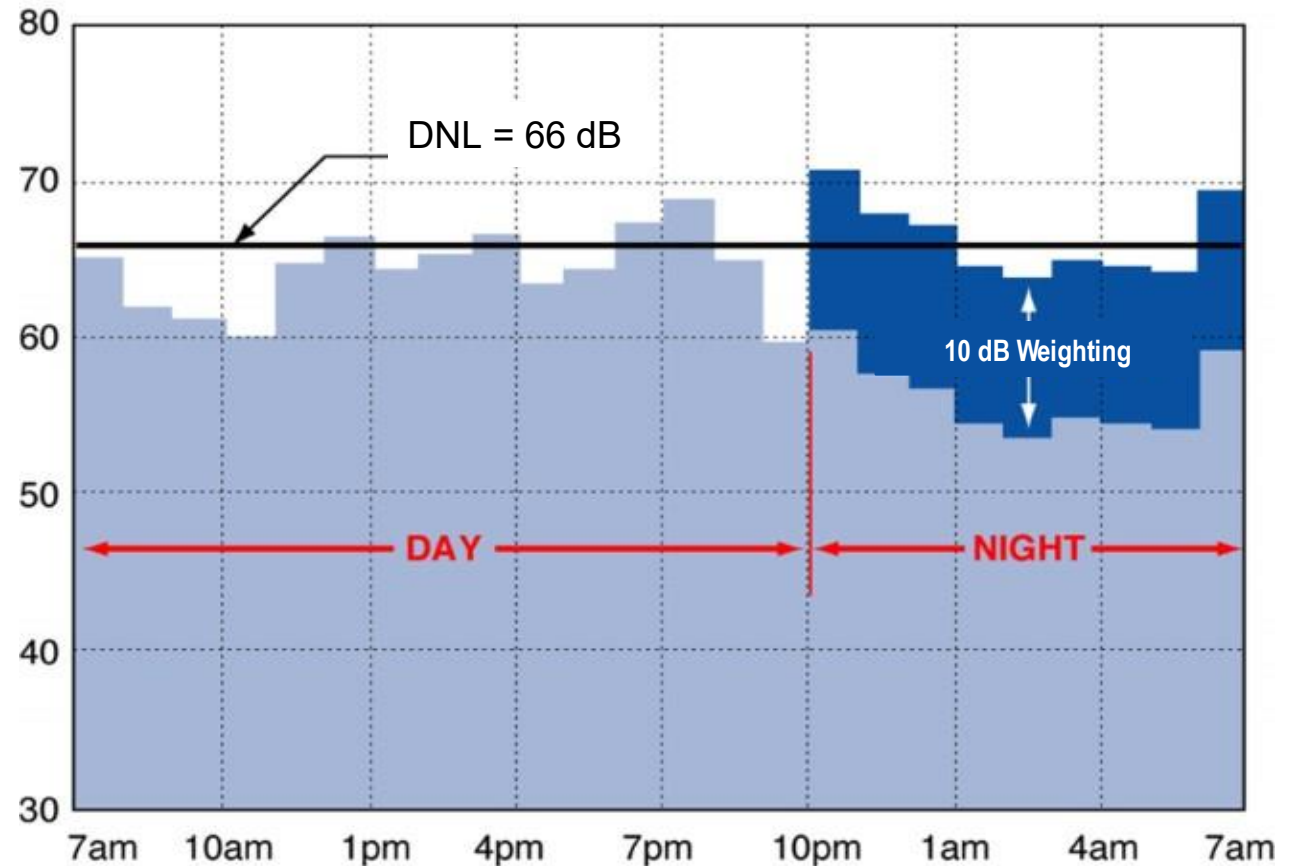
Sound Exposure Level (SEL)

- 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



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



Typical Community DNL Examples

Qualitative Description	DNL	Representative Location
	100	
	90	Los Angeles - 3rd Floor Apartment next to Freeway
City Noise (Downtown Major Metropolis)	80	Los Angeles - Downtown with some Construction Activity
		Harlem - 2nd Floor Apartment
Very Noisy Urban	70	Boston - Row Housing on Major Avenue
Noisy Urban		
Urban	60	Los Angeles - Old Residential Area
Suburban		
Small Town	50	Fillmore - Small Town Cul-de-sac
Quiet Suburban		San Diego - Wooded Residential
		California - Tomato Field on Farm

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.

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

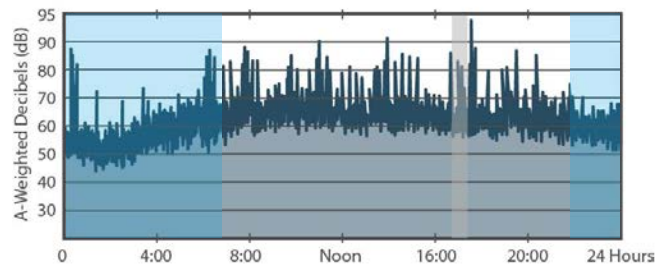
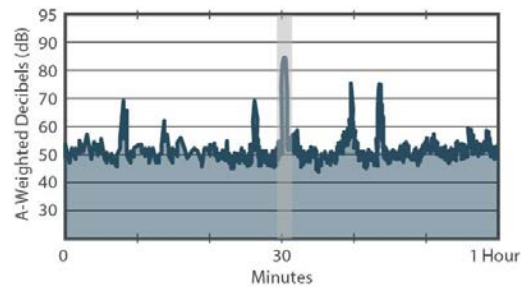
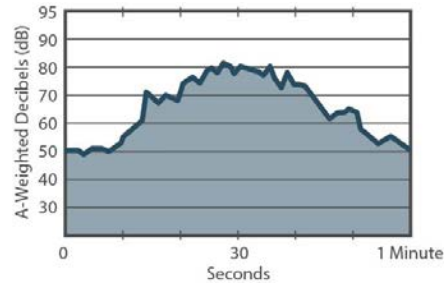
Over 5 dB change in level

- 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

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 (L_{max})
 - 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>

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 the aircraft normally fly over the surrounding communities

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

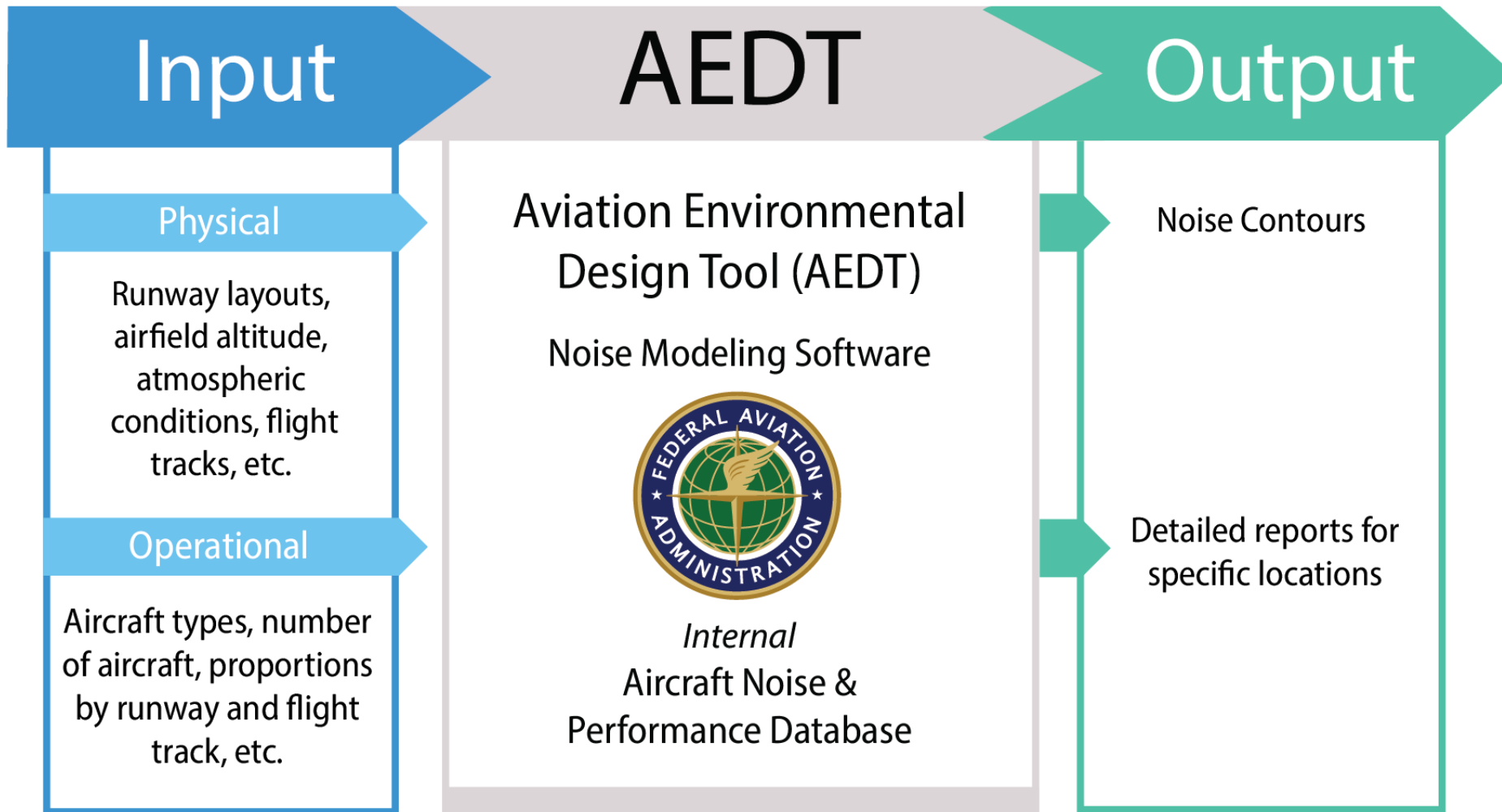
MAA maintains a Noise and Operations Monitoring System (NOMS) that:

- Manages and analyzes aircraft flight track data and associated noise and complaint data
- Supports MAA's BWI Noise Abatement Program
- Includes 24 noise monitor terminals

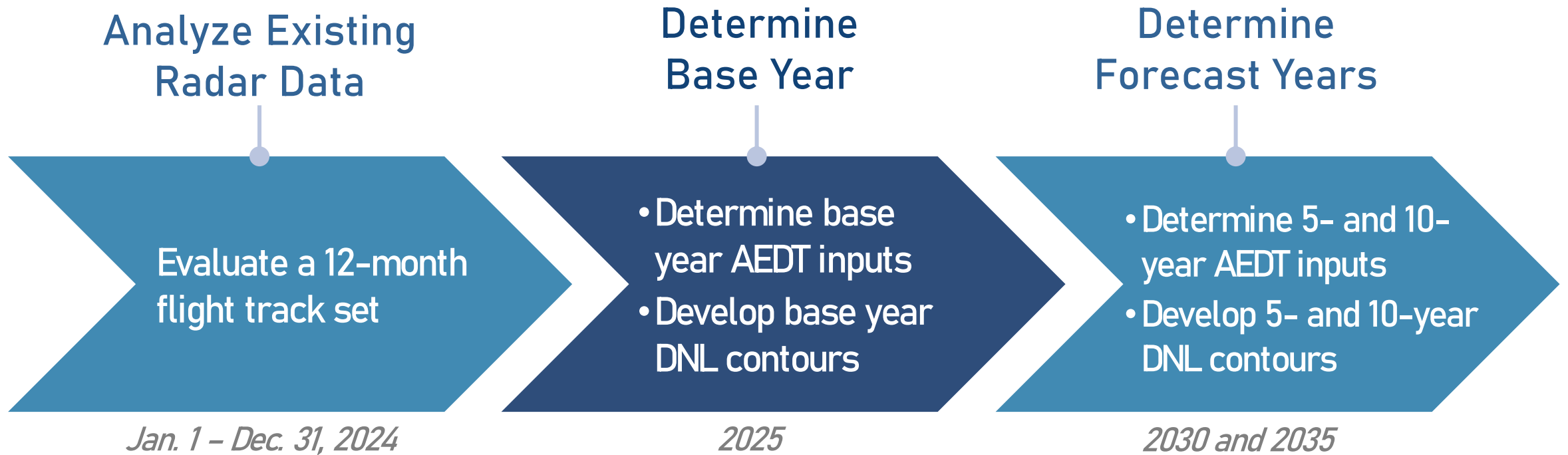
NOMS Purpose:

- Monitor flight operations at BWI and within the regional airspace
- Improve public understanding of BWI Marshall operations
- Assist in investigating and responding to noise complaints related to specific aircraft operations
- Monitor aircraft noise levels in local communities using both fixed and portable noise monitors
- Objectively document aircraft operations and noise exposure for historical records

Noise Modeling Overview

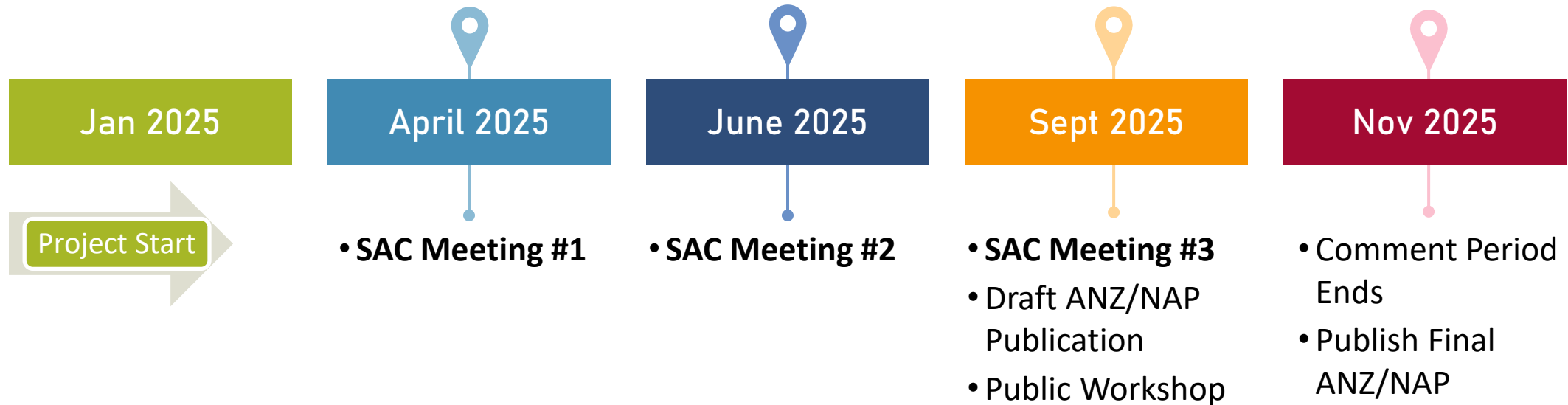


Noise Modeling Process



Schedule and Resources

Proposed Project Schedule



Project Contacts

Project Primary Contact

Email: MDOT-MAA-ANZ@assedollc.com

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MAA Project Manager

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ANZ Project Managers

Sarah Yenson, Principal Consultant
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Rhea Hanrahan, Director, AES
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Additional Resources

2020 BWI Marshall ANZ

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

BWI Marshall Roundtable

- <https://marylandaviation.com/environmental/airport-noise/dc-metroplex-bwi-community-roundtable/>

Quarterly Noise Reports

- <https://marylandaviation.com/environmental/airport-noise/quarterly-noise-reports/>

WebTrak

- <https://webtrak.emsbk.com/bwi3>

Wrap Up

- SAC member questions, comments, and discussion
- Next SAC meeting:
 - June 2025

Topics:

- Present model inputs and forecast
- Review detailed land use
- Review potential airport development

Thank You.

Baltimore/Washington International
Thurgood Marshall Airport

