

Noise Compatibility Planning Study

Dane County Regional Airport

Public Open House



Airport Facility Overview

MSN

- Covers 3,500 acres and serves over 2.2 million commercial passengers each year
- Fixed-Base Operator Wisconsin Aviation is located on the east side of the airport

115th Fighter Wing of the Wisconsin Air National Guard (ANG)

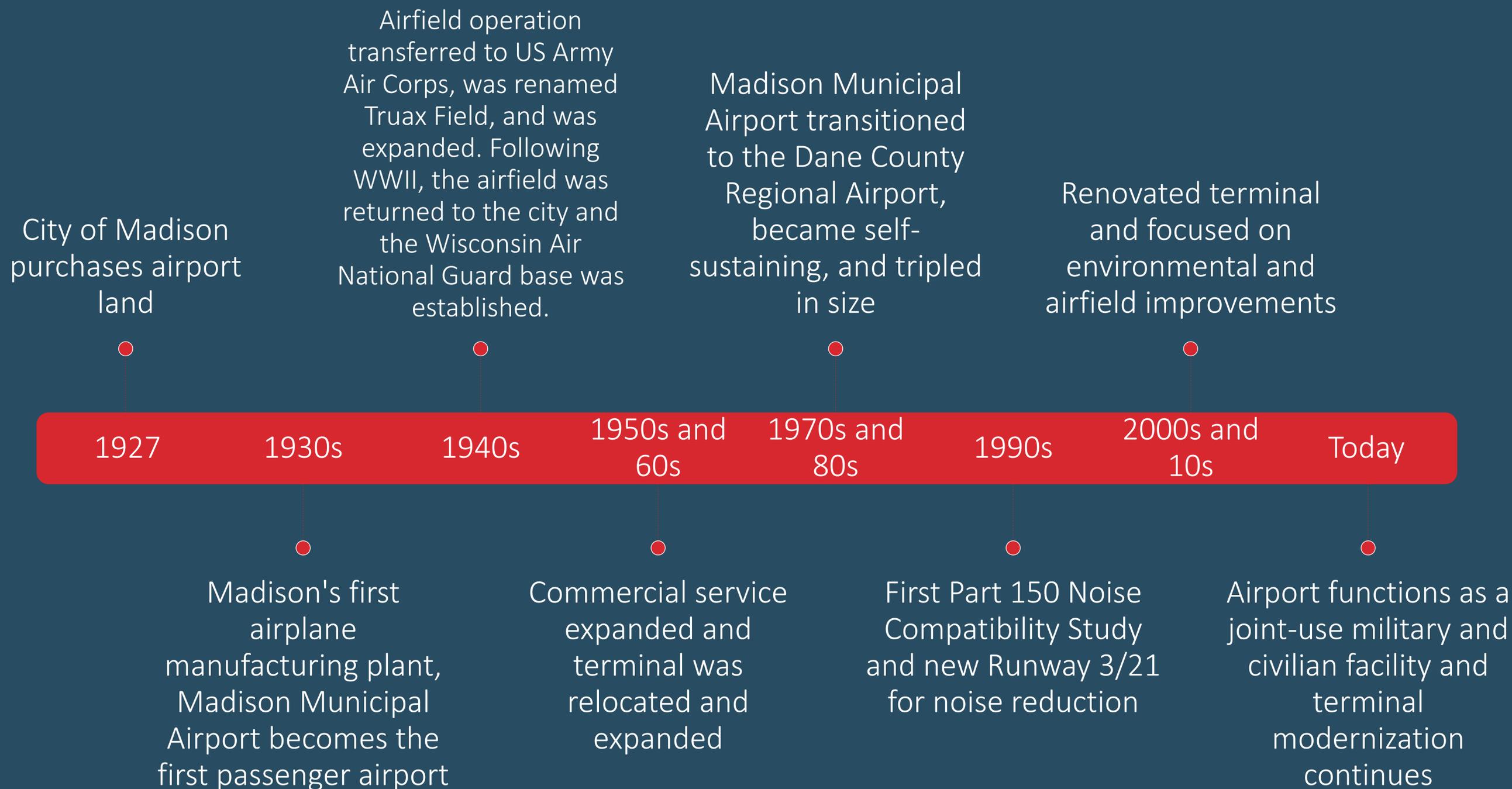
- Chosen to host the F-35A mission and receive a new fleet of F-35A Lightning II aircraft beginning in Spring of 2023

Wisconsin Army National Guard (ARNG) 64th Troop Command

- Operates UH-60 Black Hawk helicopters at Truax Field



Airport History



Source: https://www.msnaairport.com/about/facilities_maps/history



Roles and Responsibilities

Part 150 Study

Airport

- Project sponsor
- Certification that documentation is true and accurate
- Recommend measures to address incompatible land use

Consultant Team

- Overall project management, documentation, and outreach
- Aircraft noise analysis and abatement planning
- Noise compatibility analysis and planning
- Aviation forecast and airfield analysis

FAA

- Certification that the documentation meets federal regulations and guidelines
- Approval of Airport-recommended measures

Technical Advisory Committee

- Review study inputs, assumptions, analyses, documentation, etc.
- Input, advice, and guidance related to NEM and NCP development

Public

- Provide input on study during comment period
- Review public draft documents

Part 150 Overview: Major Elements

- FAA created in response to Federal Aviation Safety and Noise Abatement Act of 1979 (ASNA)
- Codified under Title 14 of the Code of Federal Regulations Part 150
 - Formal *citation* is “14 CFR Part 150,” informal is “Part 150”
- Two primary elements
 - Noise Exposure Map (NEM)
 - Noise Compatibility Program (NCP)
 - Detailed FAA guidance available at www.faa.gov/airports/environmental/airport_noise/
- Consultation required with:
 - All local, state, and federal entities with control over land use within DNL 65+ dB
 - FAA regional officials, regular aeronautical users of the airport
 - All parties interested in review of and comment on the draft
- Opportunity must be offered for a final public hearing on the NCP
- MSN will exceed all consultation requirements
 - Improved stakeholder relations is typically one of the most valuable study results

Part 150 Overview: Study Process

Develop Study Protocol

- Finalize methodology
- Establish Technical Advisory Committee
- Develop project schedule and milestones

Verification

- Existing Noise Exposure Maps, planning, and environmental documents
- Noise complaint data
- GIS and land use data
- Flight track, operations, and noise data
- FAA activity forecasts

Develop NEMs

- Develop noise contours for existing and 5-year forecast conditions
- Review land use data & policies
- Noise impact evaluation for DNL 65-75 dBa
- Identify incompatible land uses and review existing NCP
- Prepare maps in accordance with 14 CFR Part 150

Develop NCP

- Consider noise abatement strategies
- Consider land use strategies
- Consider programmatic strategies
- Update NCP in accordance with 14 CFR Part 150

Stakeholder Engagement and Public Outreach

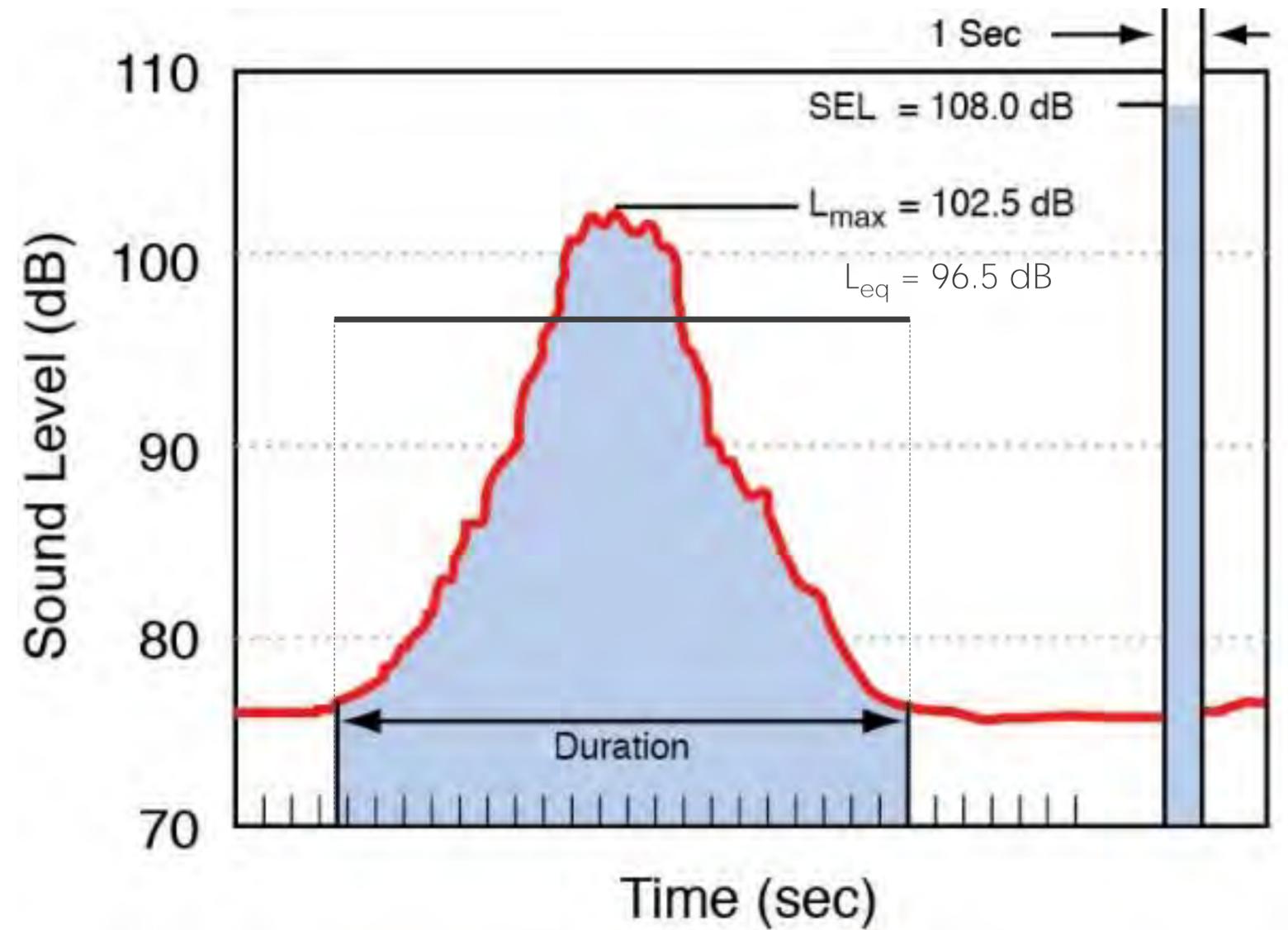
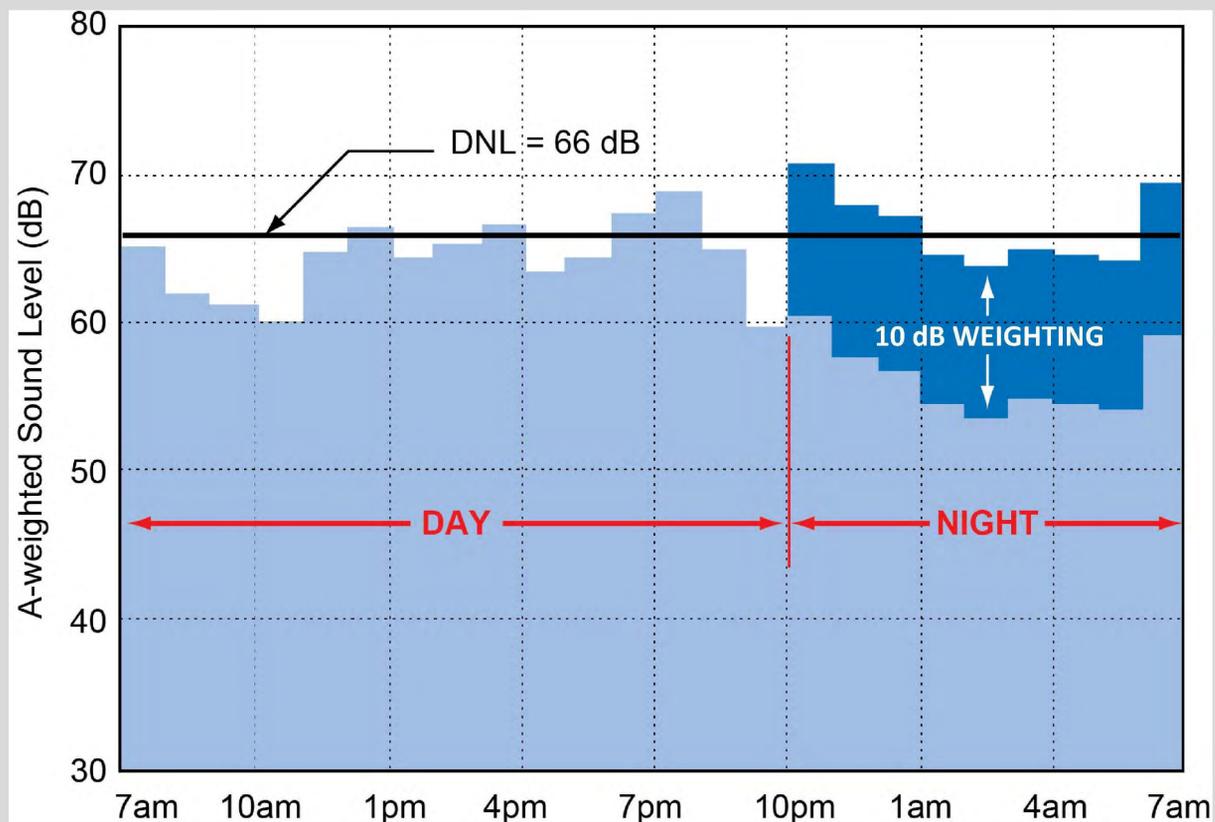
Technical Advisory Committee • Public Meetings/Hearings • Public Website Materials and Newsletters

Part 150 Overview: Noise Exposure Map

- FAA “accepts” NEM as compliant with Part 150 standards
- NEM must include detailed description of
 - Airport layout, aircraft operations, and other inputs to noise model
 - Aircraft noise exposure in terms of Day-Night Average Sound Level (DNL)
 - Land uses within DNL 65+ decibel (dB) contours
 - Noise / land use compatibility statistics within DNL 65+ dB contours
- NEM must address two calendar years
 - Year of submission (2022)
 - Forecast (at least five years from year of submission; 2027)
 - FAA reviews forecasts for consistency with Terminal Area Forecast (TAF)

Noise Terminology

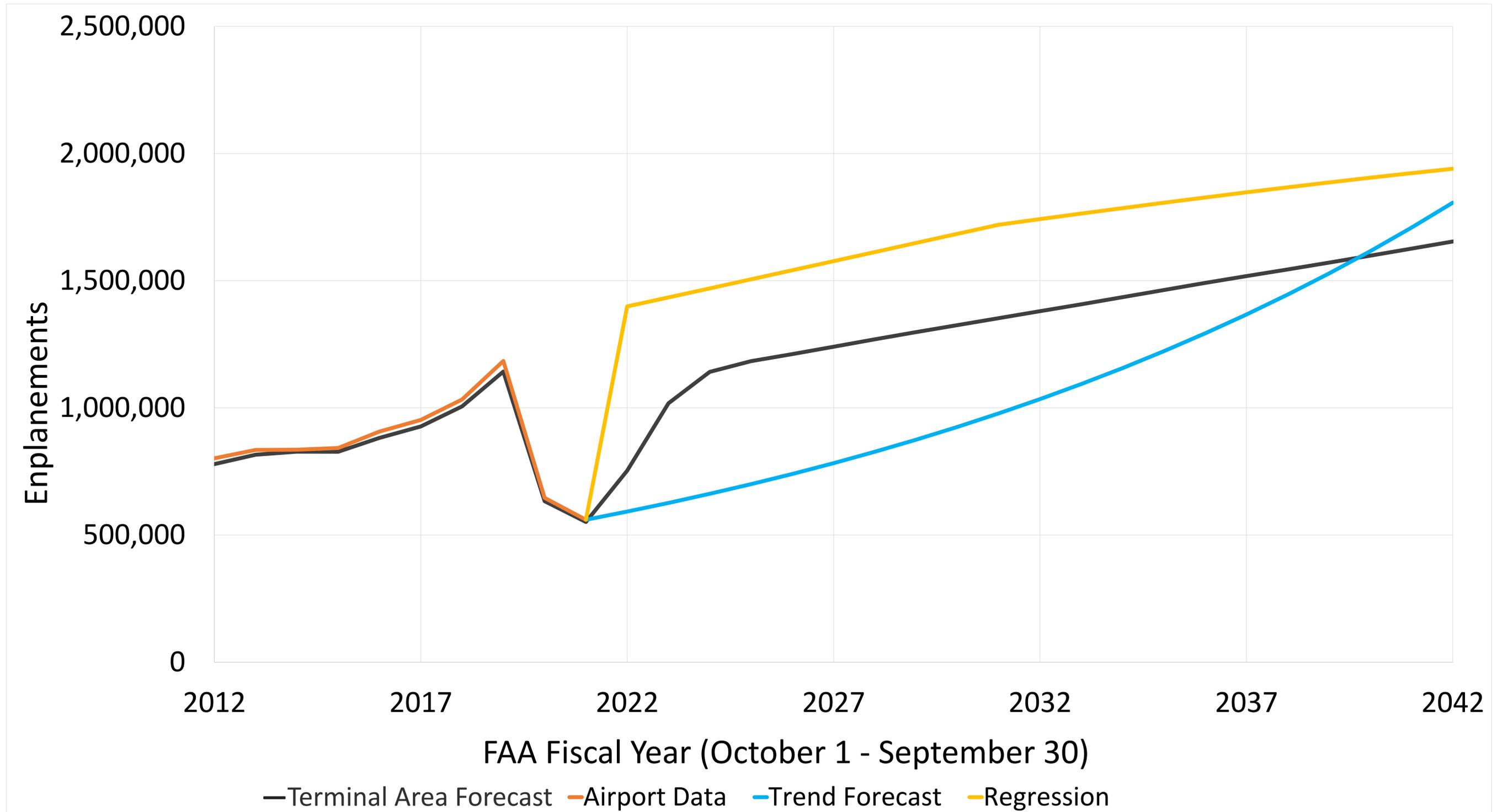
- Maximum Noise Level (L_{max})
- Sound Exposure Level (SEL)
- Equivalent Sound Level (L_{eq})
- Day-Night Average Sound Level (DNL)



Noise Terminology

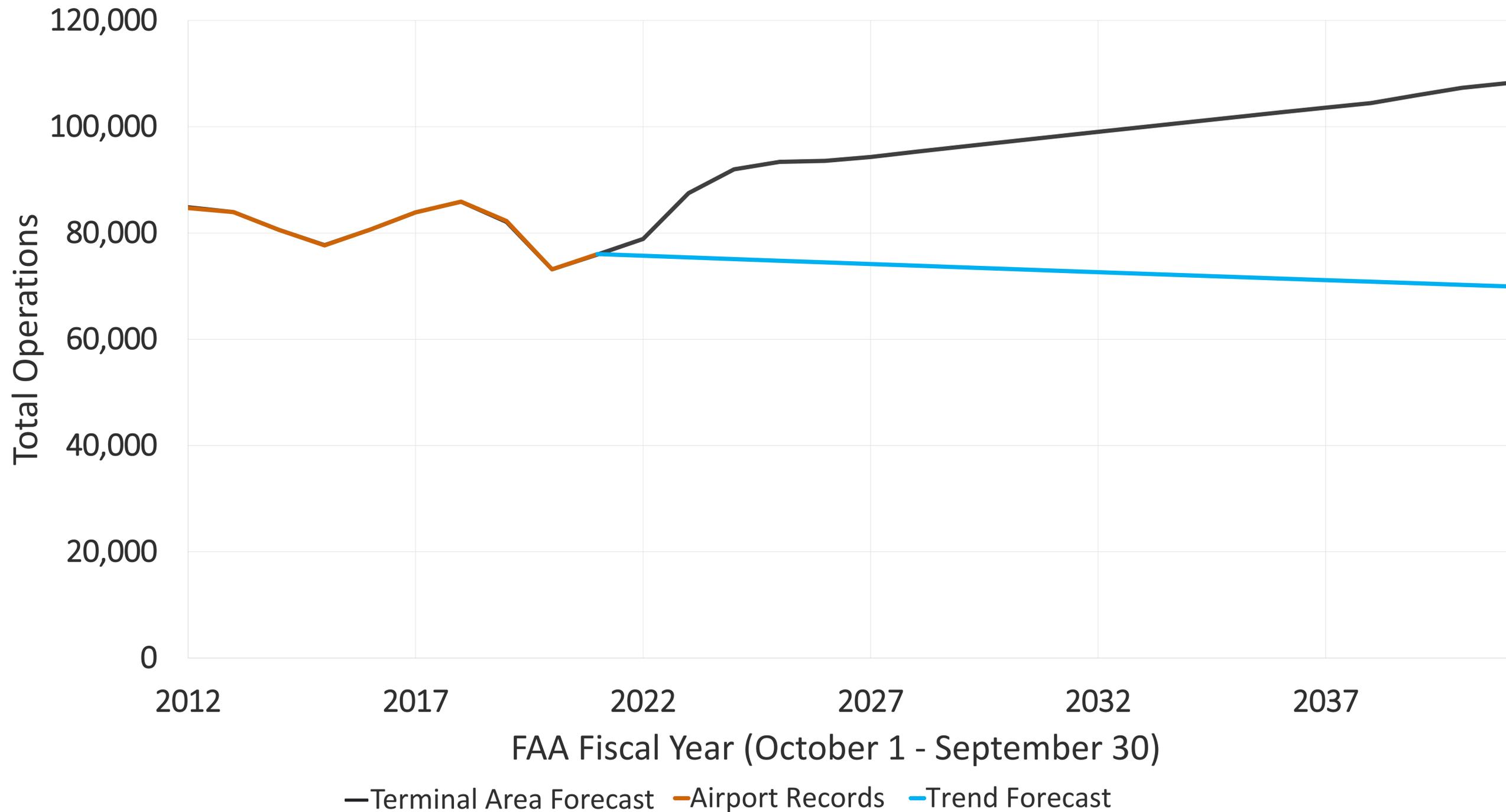
- The decibel is a complex logarithmic quantity based on sound pressure
- A-weighted decibels correlate well with how we hear
- Noise levels can be expressed many ways depending on their purpose, including but not limited to:
 - Instantaneous maximum noise levels (Lmax)
 - Single event dose (SEL)
 - Long-duration exposure (DNL)
- FAA requires use of DNL in a Part 150 study
- FAA Part 150 land use compatibility guidelines:
 - All land use is compatible with aircraft noise less than DNL 65 dB
 - Land use compatibility assessments use 5-dB contour bands
 - 65 to 70 dB
 - 70 to 75 dB
 - Greater than 75 dB

Enplanement Forecast Methods Comparison



Total Aircraft Operations Forecast Comparison

Total Operations



2021 FAA Terminal Area Forecast (TAF) for MSN

Fiscal Year	Enplanements	ITINERANT					LOCAL			Total Operations
		Air Carrier	Air Taxi	General Aviation	Military	Total	Civil	Military	Total	
2019	1,142,812	24,284	11,655	28,689	4,713	69,341	12,468	276	12,744	82,085
2021	551,317	17,728	6,747	29,916	4,855	59,246	16,541	170	16,711	75,957
2027	1,211,674	33,841	6,935	31,797	4,855	77,428	15,977	170	16,147	93,575
2032	1,352,756	37,150	6,941	32,773	4,855	81,719	16,219	170	16,389	98,108
2037	1,491,362	40,079	7,362	33,778	4,855	86,074	16,464	170	16,634	102,708
2042	1,626,176	43,877	7,781	34,814	4,855	91,327	16,713	170	16,883	108,210
Compound Annual Growth Rate (CAGR)										
'21-'41	5.56%	4.64%	0.72%	0.76%	0.00%	2.19%	0.05%	0.00%	0.05%	1.79%

Source: 2021 FAA Terminal Area Forecast (TAF)



Detailed Forecast Data

- Base fleet mix developed from flight track and aircraft identification data
- Fleet mix then assigned to Air Carrier, Air Taxi, General Aviation and Military
- Base fleet mix then scaled to the 2022 and 2027 Forecast levels for each category
- Military operations augmented with information from 115th Fighter Wing and Army Guard

Aircraft Operations Forecast by Aircraft Category

Aircraft Operation Category	2019	2022	2027
Air Carrier	24,284	20,306	35,714
Air Taxi	11,655	7,395	6,757
General Aviation	41,157	47,735	48,825
Military (Total)	4,989	6,047	7,418
ANG F-16C	-	3,081	-
ANG F-35A	-	-	4,252
Total Operations	82,085	81,483	98,741

2019 Source: Dane County Regional Airport

2021 Source: FAA OpsNet

2027 Sources: FAA Terminal Area Forecast (TAF)

Note: Calendar year operations were used for 2021 as they are the most recent 12 months of available data.



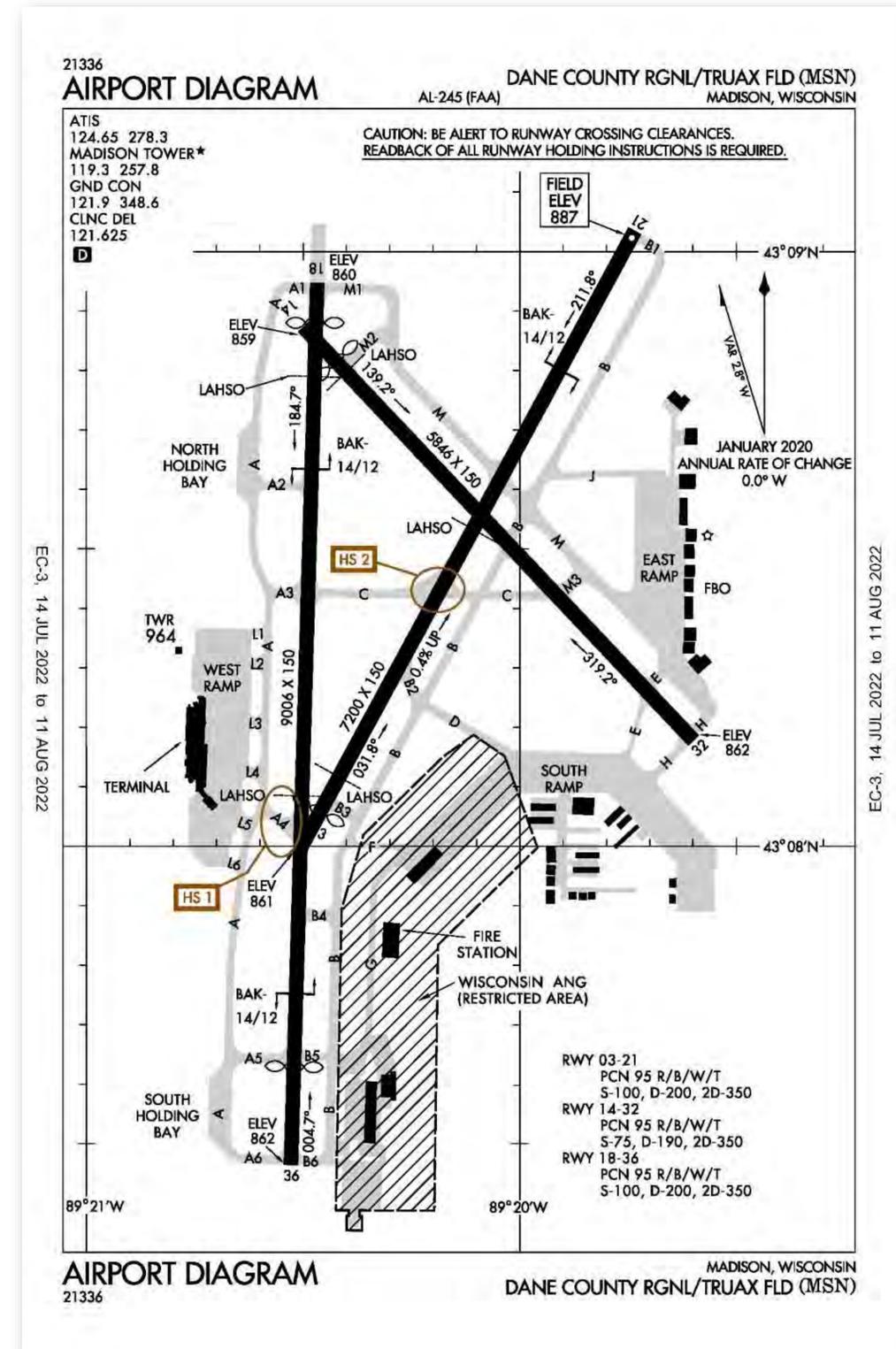
Noise Modeling Process

For Commercial and General Aviation Operations

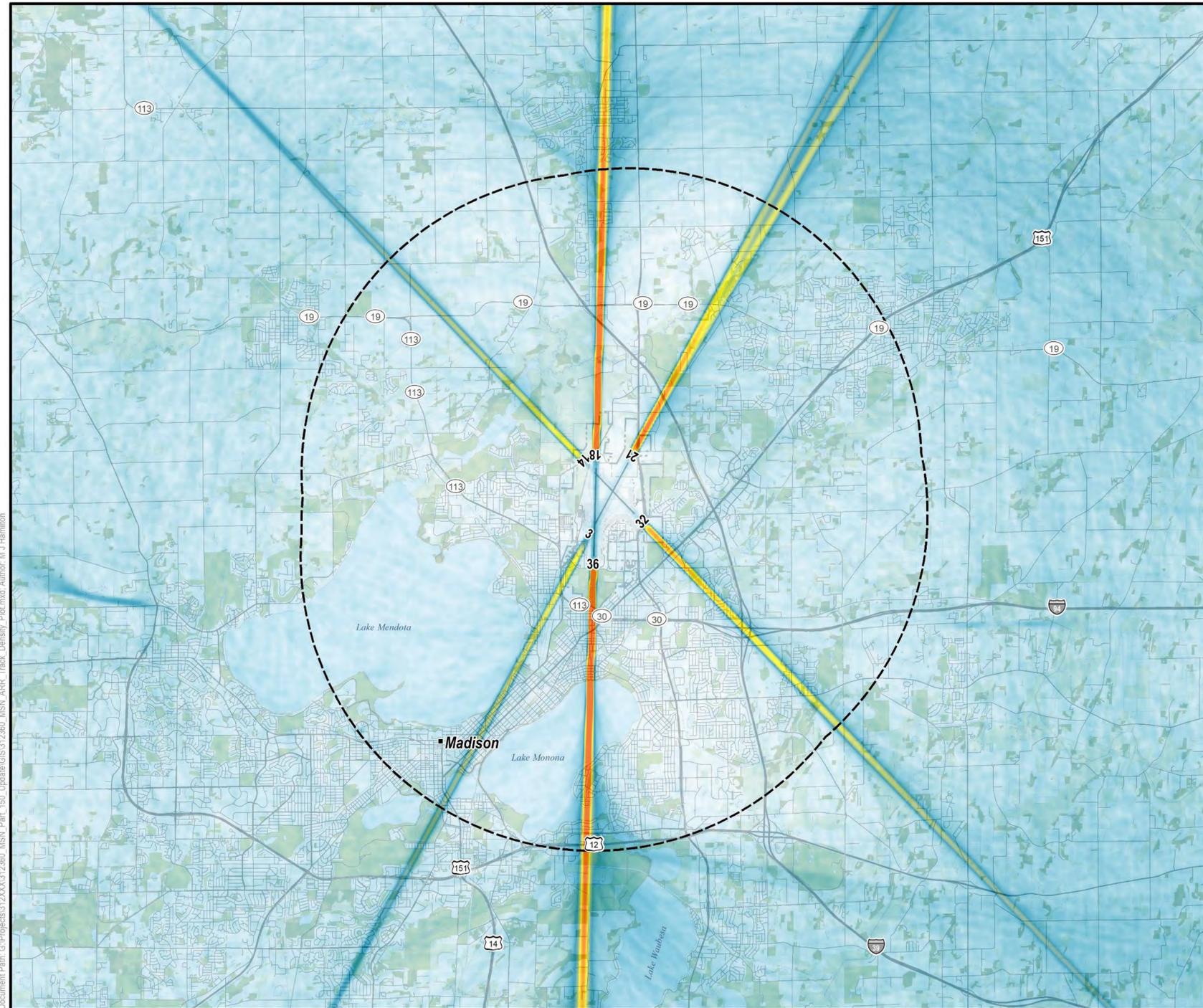
- Base Year – 2021
 - Obtained, processed and analyzed 12 months of flight track and aircraft identification data
 - Developed modeled flight tracks
 - Determined day-night aircraft operations, fleet mix and runway use
- Existing and Forecast Conditions – 2022 & 2027
 - Confirmation of the FAA's Terminal Area Forecast (TAF)
 - Scaled base year operations and updated aircraft fleet to 2022 and 2027 TAF
 - No changes to flight tracks, runway use

Noise Model Physical Input Requirements

- Airport layout
 - Runway configuration (including displaced landing or takeoff thresholds)
- Flight tracks
- Airport elevation
 - Terrain data were obtained from the United States Geological Survey National Elevation Dataset
- Airport weather (30-year average)
 - Temperature
 - Station pressure
 - Relative humidity
 - Dew point
 - Wind speed
- Aircraft operations data
 - Runway use rates
 - Flight track use rates
 - Numbers flight operations for each aircraft type by day and night



Arrival Track Density

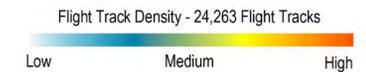


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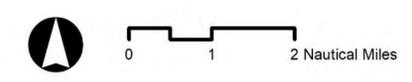
Dane County Regional Airport
Madison, Wisconsin

Figure:
Arrival Track Density Plot

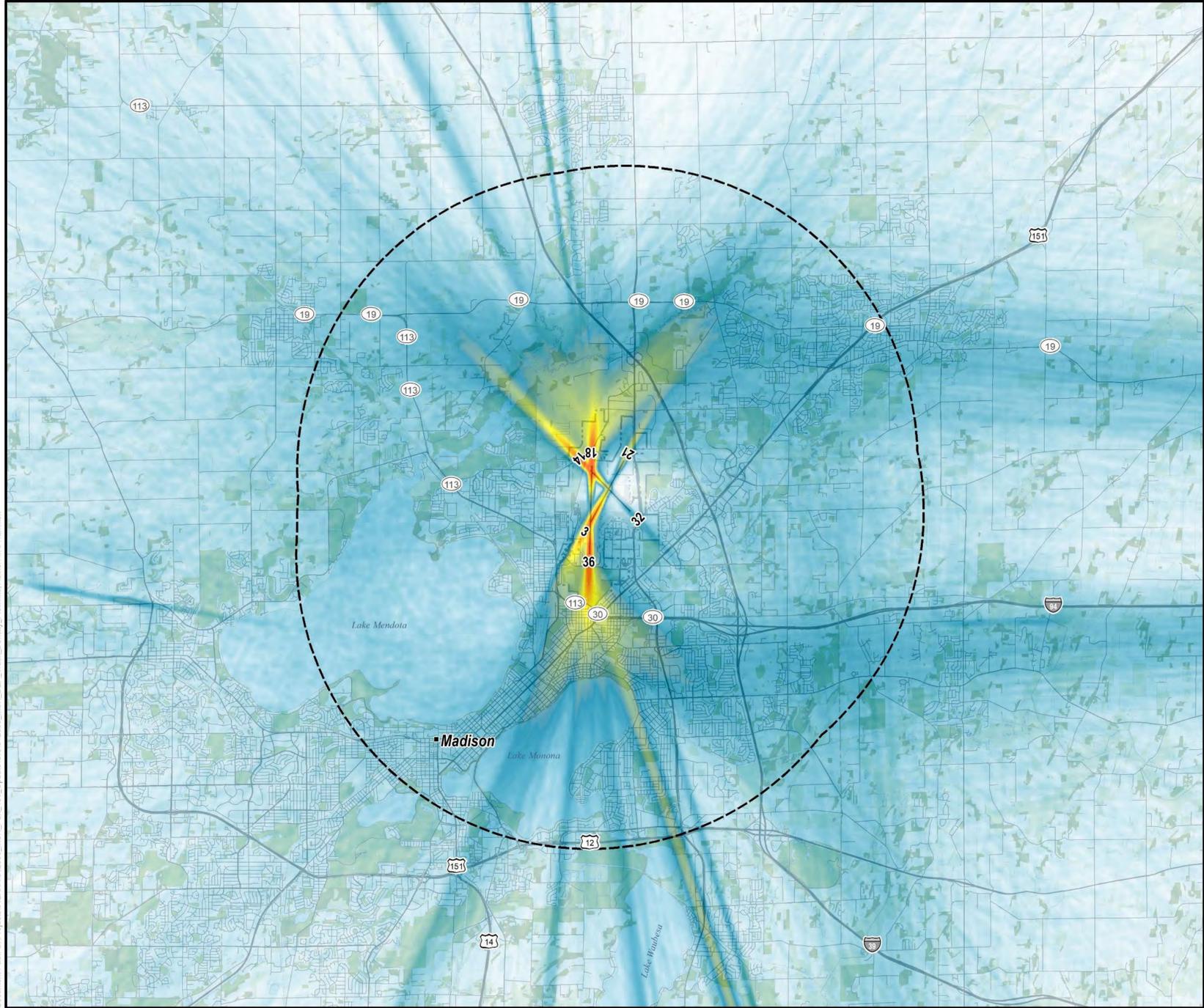
- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Major / Minor Roads
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond
- Buildings
- Railroad



Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.



Departure Track Density



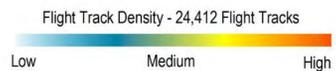
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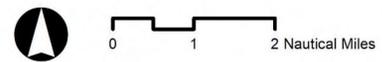

Dane County Regional Airport
Madison, Wisconsin

Figure:
Departure Track Density Plot

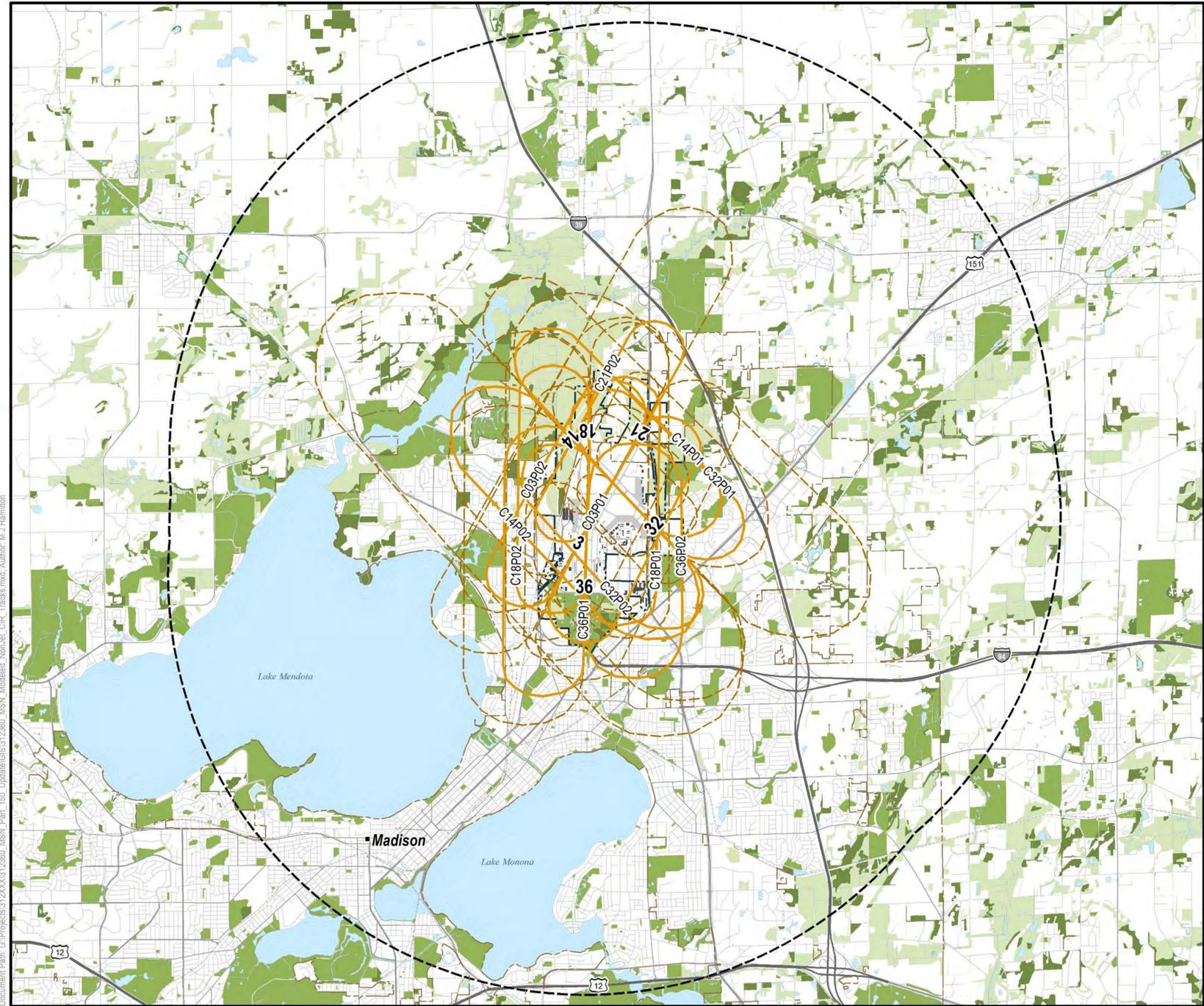
-  Airport Boundary
-  FlightTrack Analysis Boundary
-  Runway / Taxiway
-  Major / Minor Roads
-  Madison Municipal Boundary
-  Open Land
-  Recreation / Open Space
-  Woodlands
-  Lake / Pond
-  Buildings
-  Railroad



Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.,



Non-Jet Circuit Tracks



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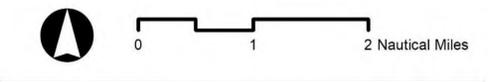
Dane County Regional Airport
Madison, Wisconsin

Figure:
Modeled Non-Jet Circuit Tracks

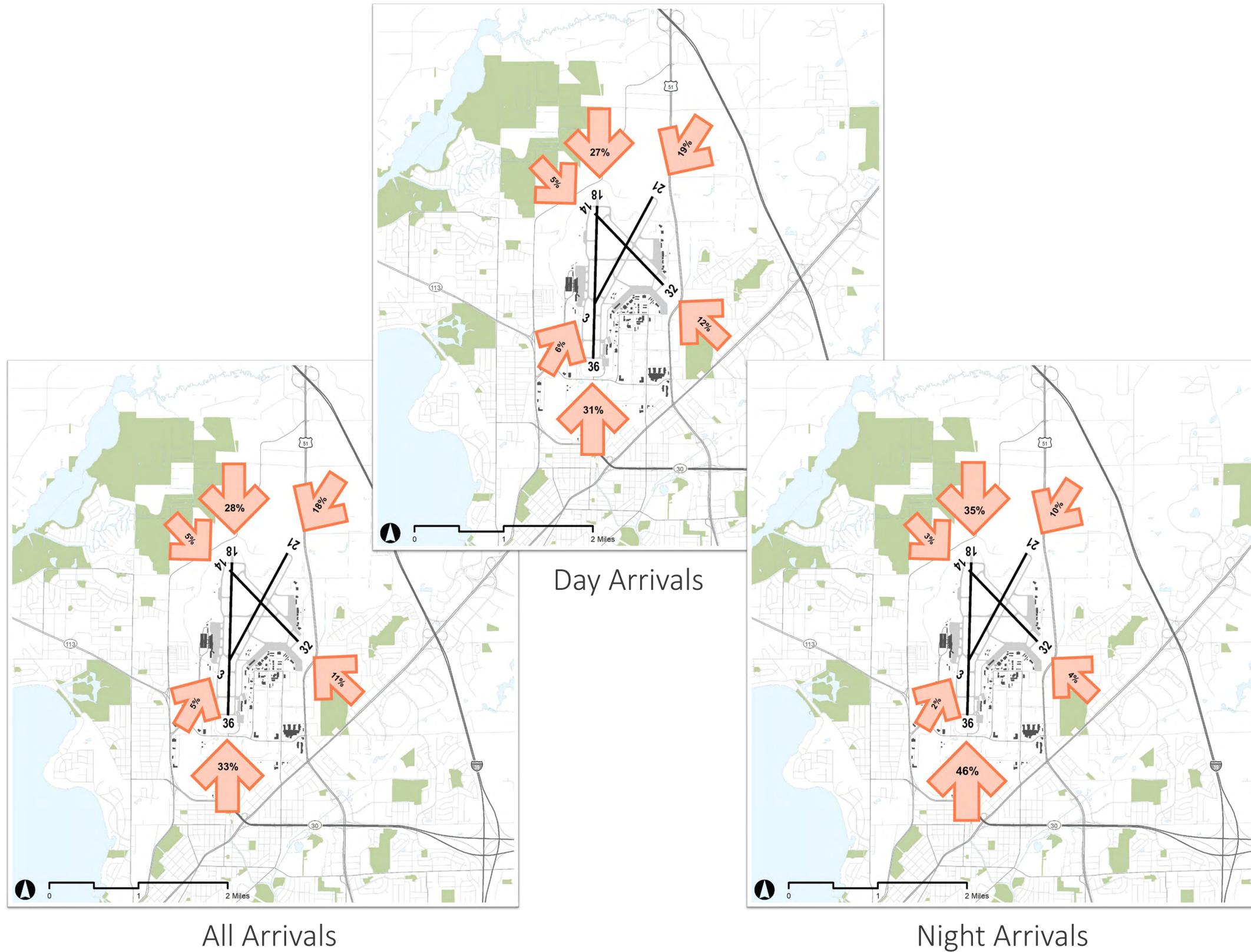


-  Modeled Circuit Backbone Track
-  Modeled Circuit Dispersed Track
-  Airport Boundary
-  Study Area
-  FlightTrack Analysis Boundary
-  Runway / Taxiway
-  Major / Minor Roads
-  Madison Municipal Boundary
-  Open Land
-  Recreation / Open Space
-  Woodlands
-  Lake / Pond
-  Buildings
-  Railroad

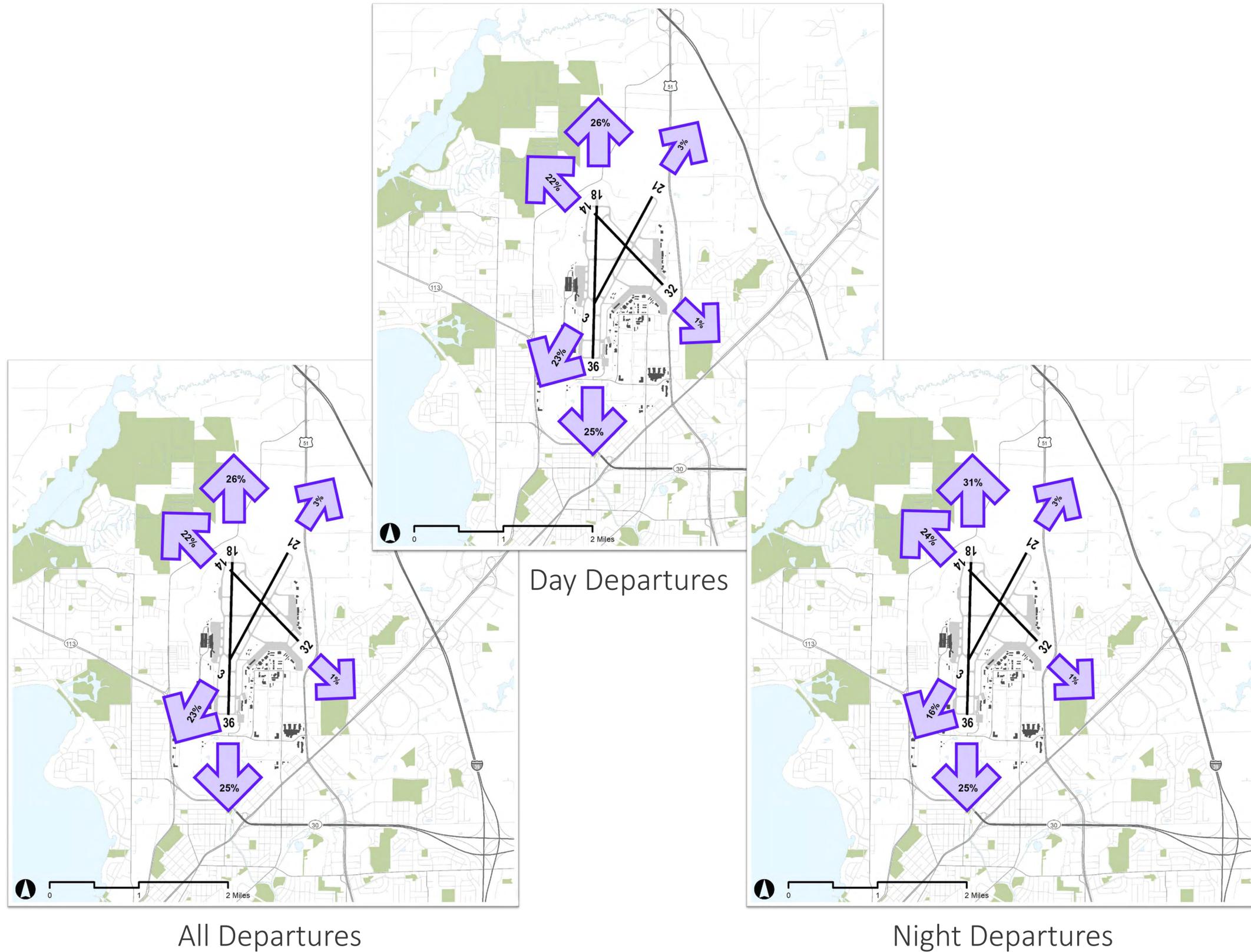
Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.,



Arrival Runway Use



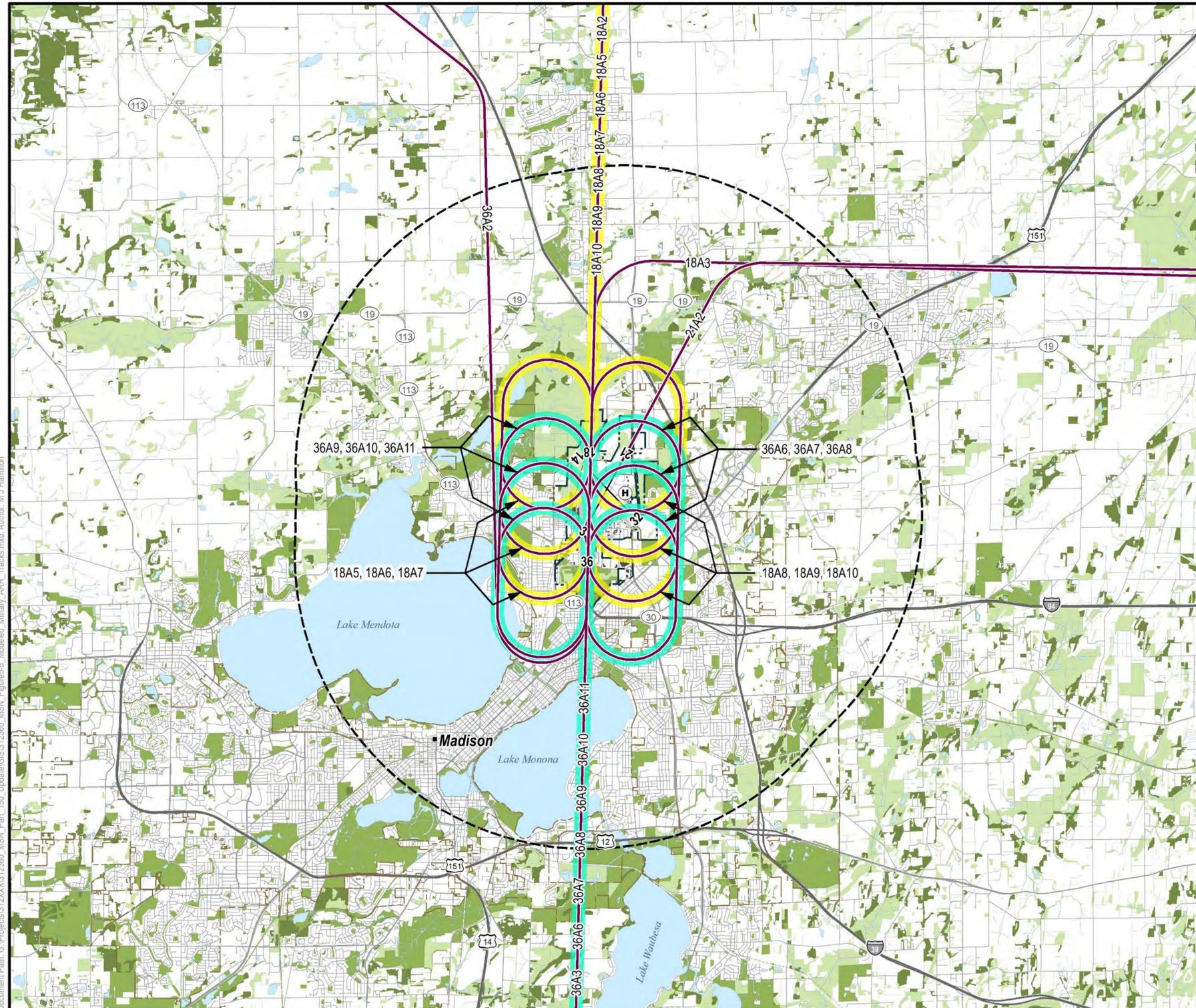
Departure Runway Use



Noise Modeling Process For Military Aviation Operations

- Base Year for Air National Guard (ANG) – 2021
 - ANG provided numbers of annual flight F-16C operations
 - ANG reviewed and updated F-16C model input data from the F-35A EIS for use in the Existing NEM
- Existing and Forecast Conditions – 2022 & 2027
 - Army National Guard reviewed and updated UH-60 model input data from the EIS for use in the Existing and Forecast NEMs
 - ANG F-16C 2021 pre-drawdown operations data used for Existing NEM
 - ANG forecast 2027 annual operations for the F-35A are based on historical average annual operations for the F-16C
 - ANG reviewed and updated F-35A model input data from the EIS for use in the Forecast NEM
 - No changes to flight tracks runway use between Existing and Forecast

Model Tracks: NOISEMAP Inputs

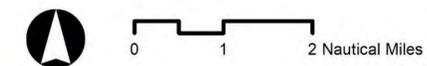


Dane County Regional Airport
Madison, Wisconsin

Figure 5-5:
NMAP Modeled Fixed-wing Arrival
Flight Tracks

- Modeled Military Arrival Tracks (17)
- Overhead Arrival Pattern (Runway 18)
- Overhead Arrival Pattern (Runway 36)
- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Buildings
- Major / Minor Roads
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond
- H Helicopter Pad
- Railroad

Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.,

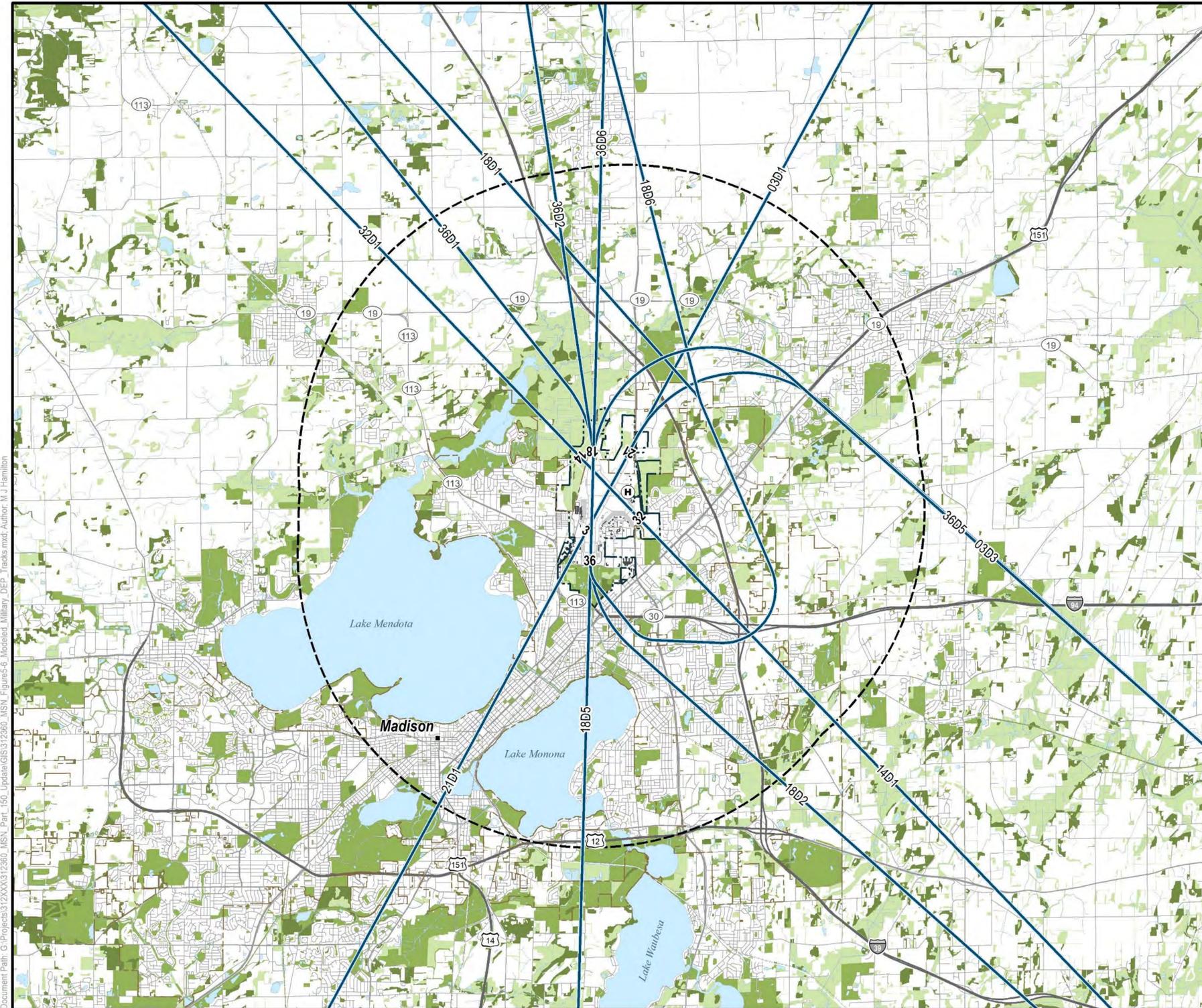


Military Fixed-wing Arrivals



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Model Tracks: NOISEMAP Inputs



Dane County Regional Airport
Madison, Wisconsin

Figure 5-6:
NMAP Modeled Fixed-wing Departure Flight Tracks

- Modeled Military Departure Tracks (13)
- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Buildings
- Major / Minor Roads
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond
- Helicopter Pad
- Railroad

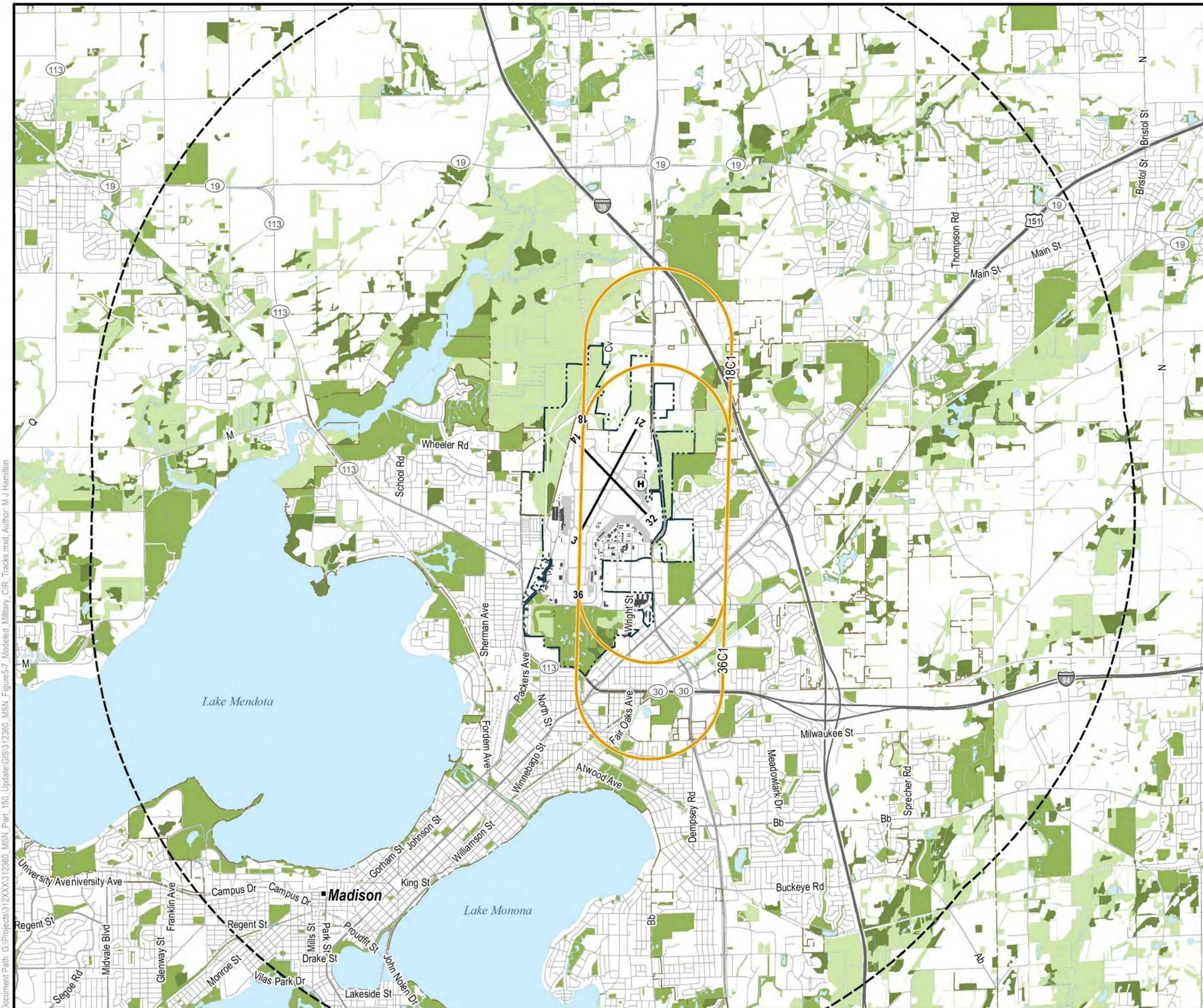
Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.,

Military Fixed-wing Departures



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Model Tracks: NOISEMAP Inputs

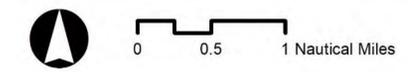



Dane County Regional Airport
 Madison, Wisconsin


Figure 5-7:
NMAP Modeled Fixed-wing Circuit Flight Tracks

-  Modeled Military Circuit Tracks (2)
-  Airport Boundary
-  FlightTrack Analysis Boundary
-  Runway / Taxiway
-  Buildings
-  Major / Minor Roads
-  Madison Municipal Boundary
-  Open Land
-  Recreation / Open Space
-  Woodlands
-  Lake / Pond
-  Helicopter Pad
-  Railroad

Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.,



Military Fixed-wing Circuits

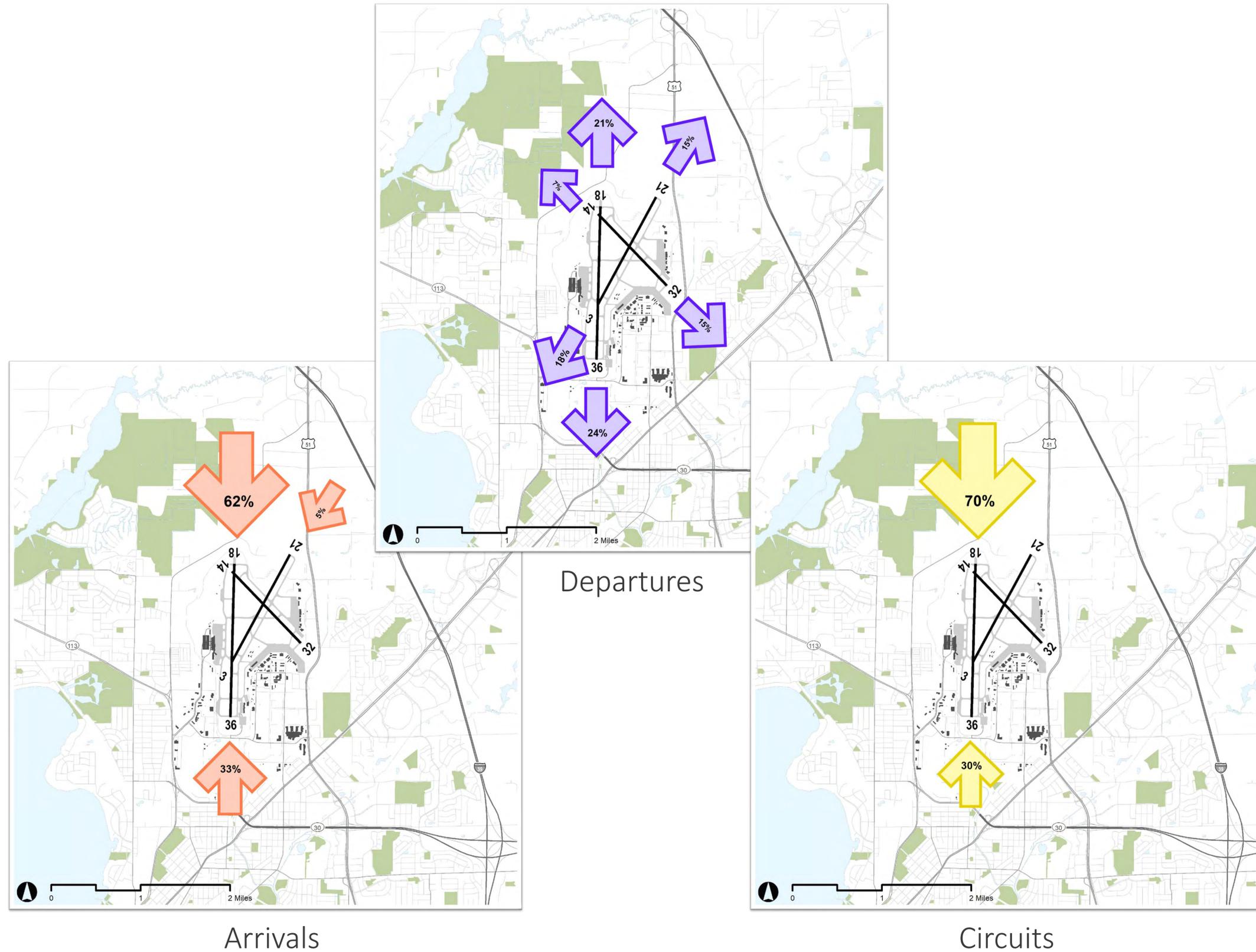


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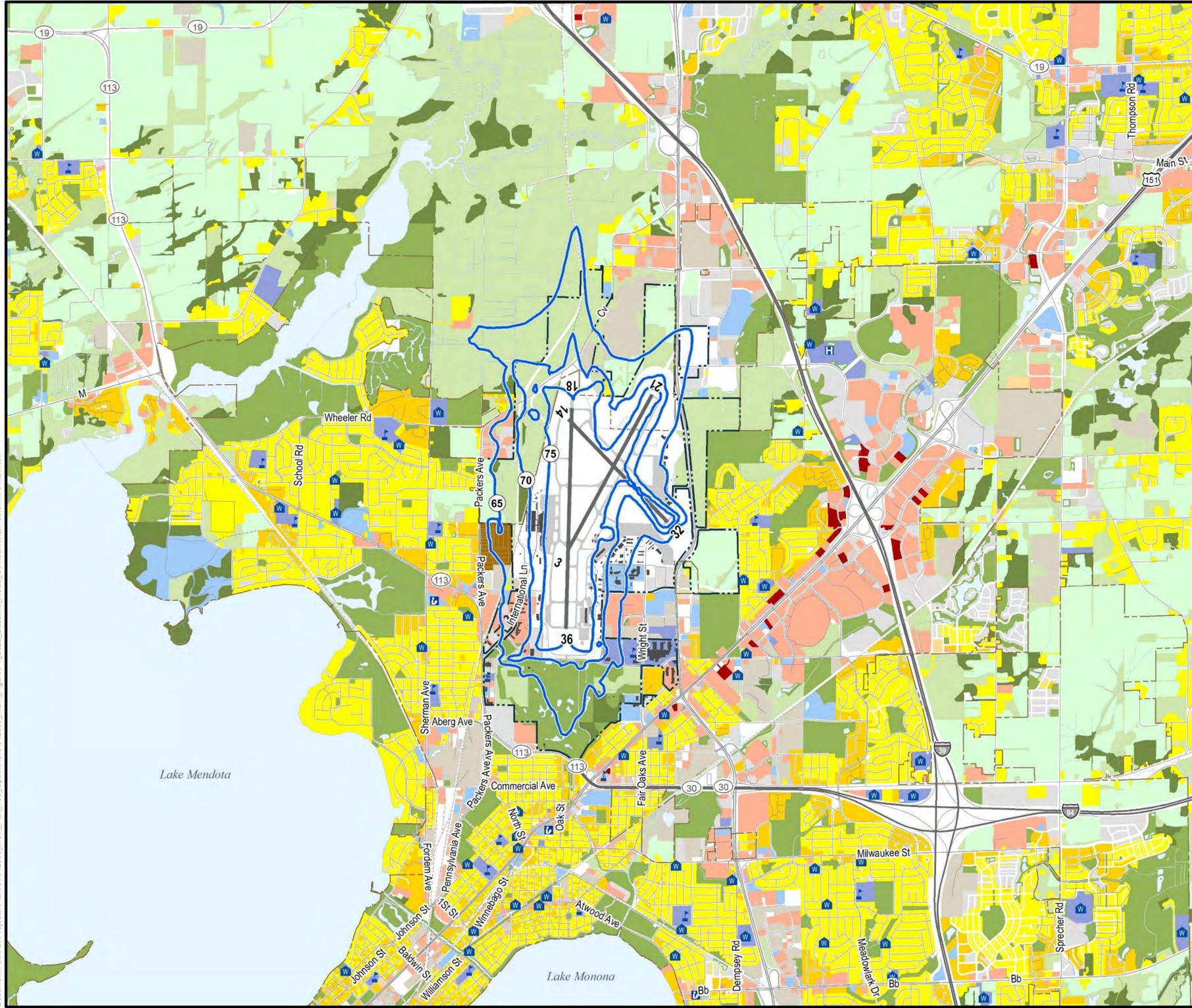
Military Jet Runway Use



Military Turboprop Runway Use



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Dane County Regional Airport Madison, Wisconsin

Figure 6-1:
Existing Condition (2022)
Noise Exposure Map

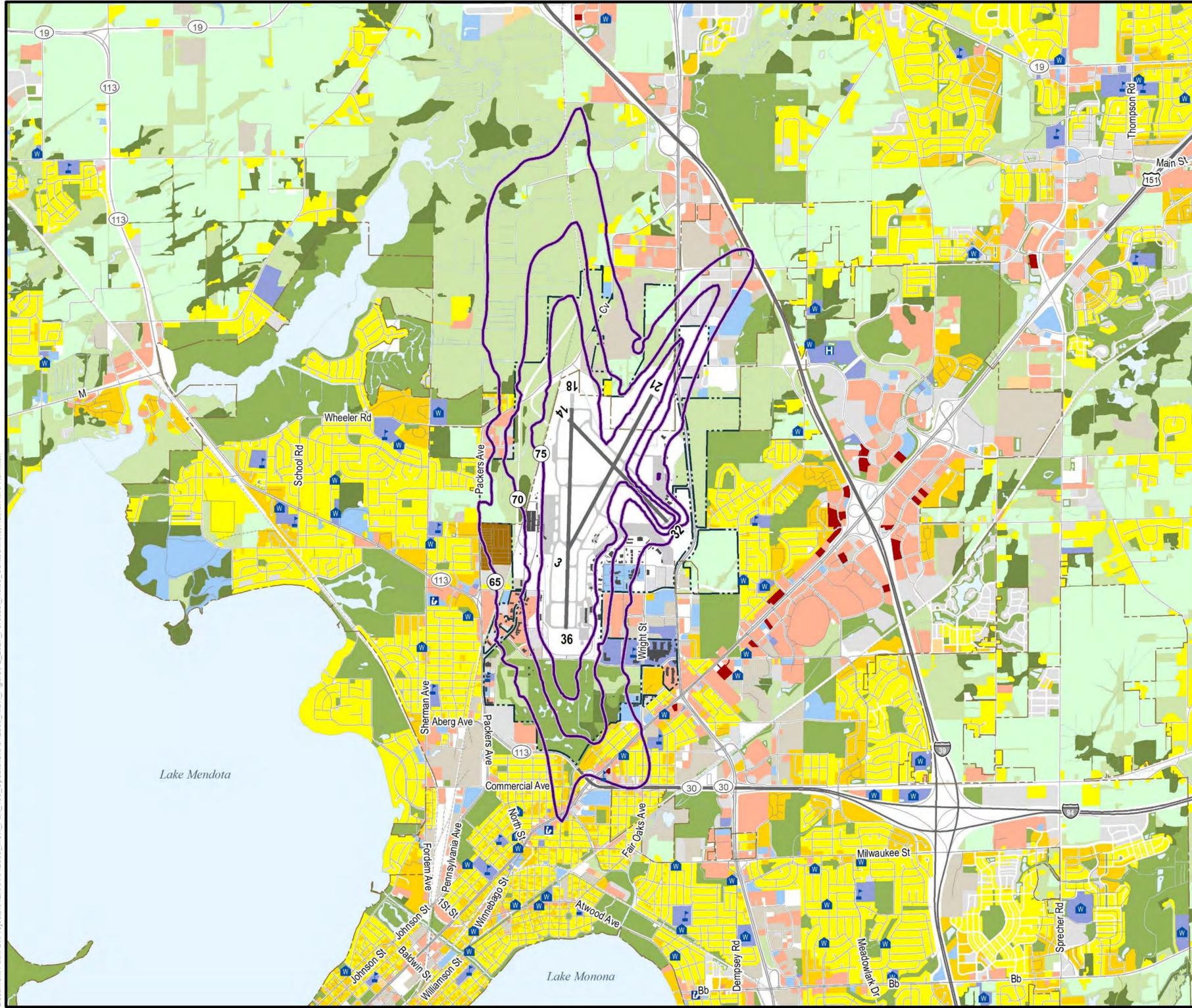
- 2022 Existing Condition DNL Contour (65-75 dB)
- Airport Boundary
- Runway / Taxiway
- Major / Minor Roads
- Madison Municipal Boundary
- Buildings
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- Mixed Use
- Public Use 1 (Non-Compatible)
- Public Use 2 (Compatible)
- Commercial Use
- Manufacturing and Production
- Agriculture
- Open Land
- Open Space / Recreation
- Woodlands
- Under Construction
- Vacant / Undefined
- Lake / Pond
- School
- Hospital
- Place of Worship
- Library

Draft

Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.,



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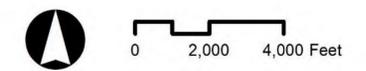
Dane County Regional Airport Madison, Wisconsin

Figure 6-2:
Forecast Condition (2027)
Noise Exposure Map

- 2027 Forecast Condition DNL Contour (65-75 dB)
- Airport Boundary
- Runway / Taxiway
- Major / Minor Roads
- Madison Municipal Boundary
- Buildings
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- Mixed Use
- Public Use 1 (Non-Compatible)
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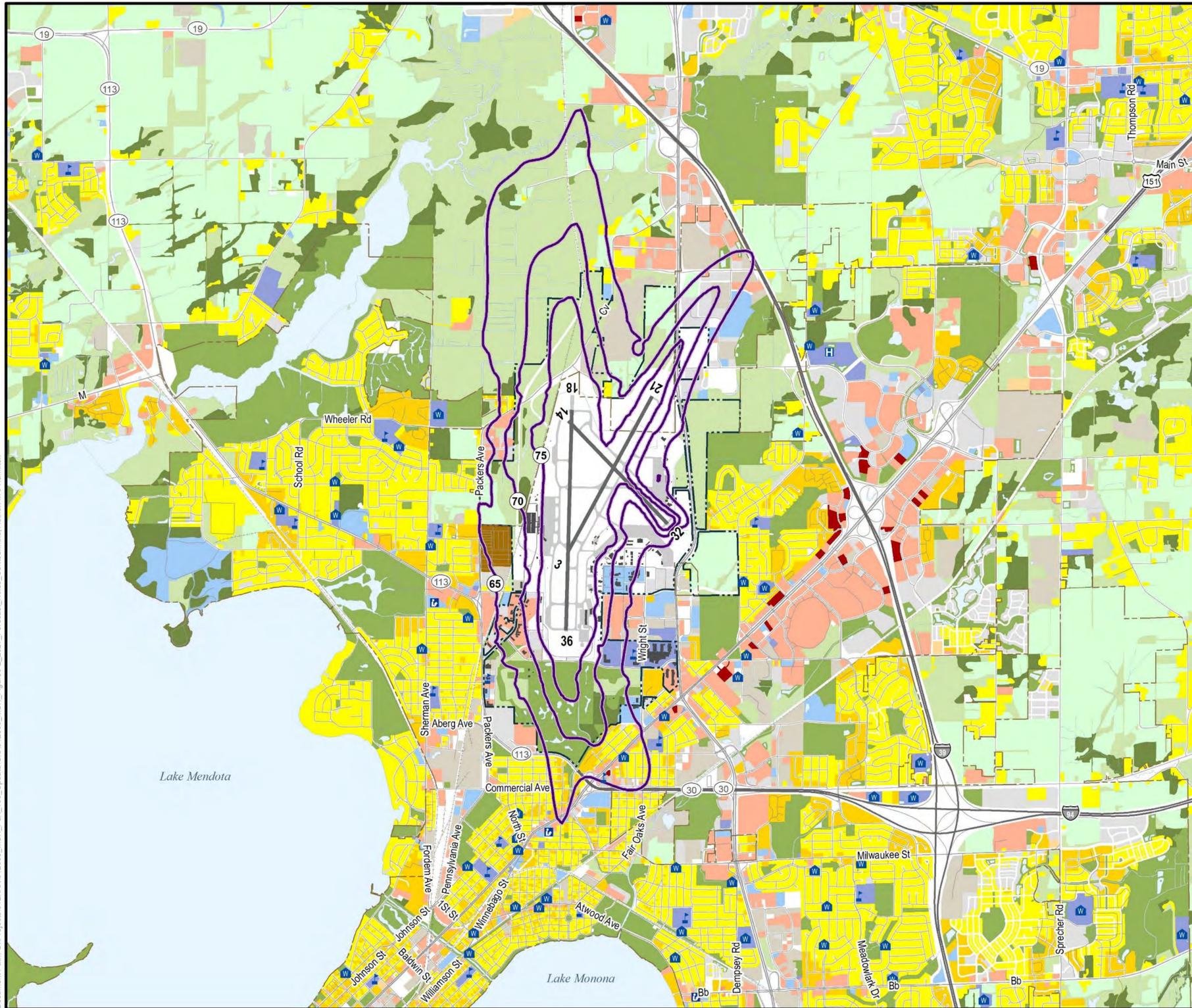
Land Use Assessment for Existing and Forecast Conditions

Baseline 2022 Combined 65 – 75 DNL Contours			
	<i>Population Census 2020</i>	<i>Housing Units</i>	<i>Area (Acres)</i>
65-70 DNL	503	225	1,070.54
70-75 DNL	12	3	534.13
>75 DNL	0	0	626.02
Total	515	228	2,230.69
Noise Sensitive Receptor	Madison Area Technical College		

Forecast 2027 Combined 65 – 75 DNL Contours			
	<i>Population Census 2020</i>	<i>Housing Units</i>	<i>Area (Acres)</i>
65-70 DNL	2,424	1227	1,823.31
70-75 DNL	57	23	935.53
>75 DNL	0	0	917.30
Total	2,481	1,250	3,676.14
Noise Sensitive Receptors	Madison Area Technical College, Claudi's Kids Inc Day Care Center, and Ridgeway Church		



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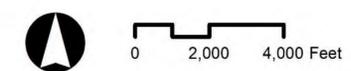
Dane County Regional Airport Madison, Wisconsin

Figure 6-2:
Forecast Condition (2027)
Noise Exposure Map

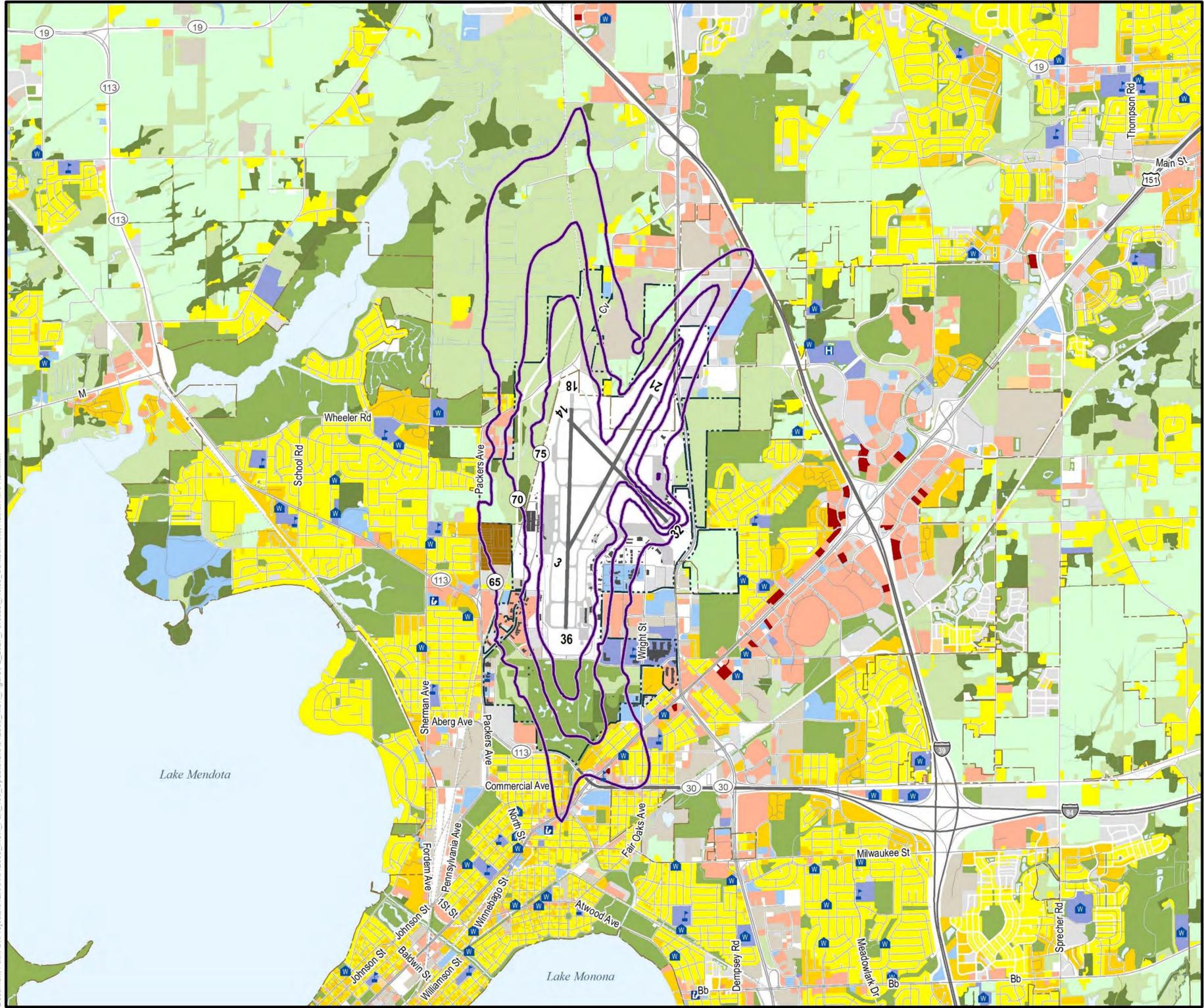
- 2027 Forecast Condition DNL Contour (65-75 dB)
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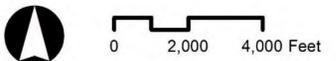
Dane County Regional Airport Madison, Wisconsin

Figure 6-2:
Forecast Condition (2027)
Noise Exposure Map

- 2027 Forecast Condition DNL Contour (65-75 dB)
- Airport Boundary
- Runway / Taxiway
- Major / Minor Roads
- Madison Municipal Boundary
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Proposed Schedule

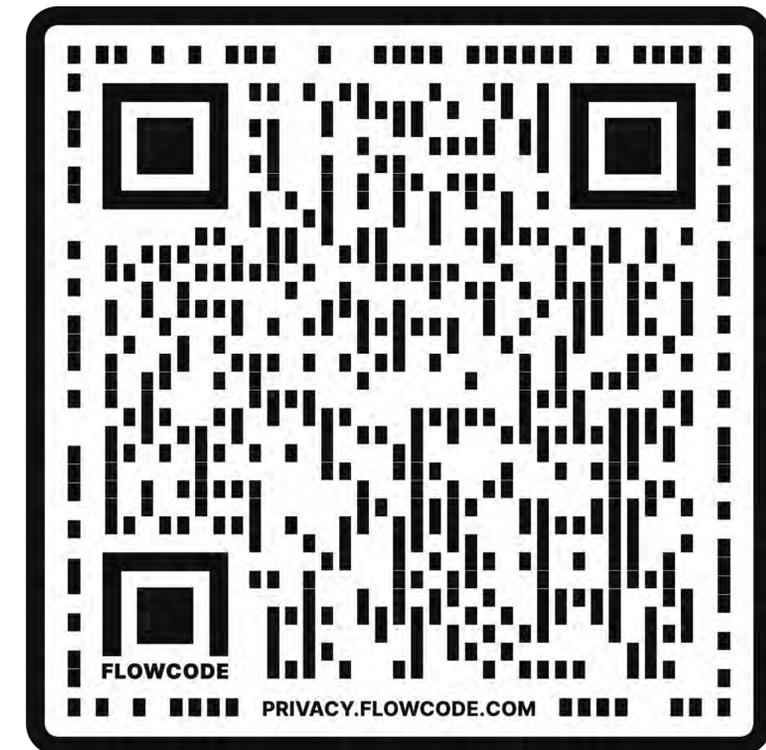
Meeting / Activity	Anticipated Purpose	Anticipated Time Frame
Kick-Off Meeting with MSN and the Part 150 Team	Define organizational and procedural matters and public outreach, review and refine scope and schedule details.	January 20, 2022
1 st Public Open House	Introduction to Part 150, set expectations, discuss stakeholder roles, identify issues of concern	April 26, 2022
NEM Public Comment Period, 2 nd Public Open House	NEM thirty-day public comment period and second Public Open House	November-December 2022
MSN to Submit Final NEM to FAA	MSN submits final updated NEM to FAA for review and approval. Respond to FAA questions as needed.	December 2022
NCP Public Comment Period, 3 rd Public Open House and NCP Hearing	NCP thirty-day public comment period and third Public Open House and NCP Hearing.	4 th Quarter 2023
MSN to Submit Final NCP to FAA	MSN submits final updated NCP to FAA for review and approval. Respond to FAA questions as needed.	1 st Quarter 2024

Note: Schedule is subject to change



MSN Part 150 Study Website and Project Contacts

- Website:
<https://www.msnairport.com/about/ecomentality/Part-150-Study>
- Project email address:
part150study@msnairport.com
- Tim Middleton – HMMH Project Manager, Contact:
tmiddleton@hmmh.com
- Michael Riechers – MSN Director of Marketing and Communications, Contact:
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Public Comment Opportunities

- Public comments can be submitted throughout the comment period (**November 14, 2022-December 10, 2022**)
 - In writing at the public open house
 - Through the project email address (part150study@msnairport.com)
- The draft NEM is available for public review at the following locations:
 - On the MSN website:
<https://www.msnairport.com/about/ecomentality/Part-150-Study>
 - At the MSN administrative office: 4000 International Lane, Madison, WI 53704, during normal business hours
 - At the Lakeview Branch of the Madison Public Library: 2845 N. Sherman Ave., Madison, WI 53704