Noise Exposure Map Update

Pursuant to Title 14 of the Code of Federal Regulations Part 150

Dane County Regional Airport

HMMH Report No. 312360

November 2022

Prepared for:

Dane County Regional Airport
4000 International Lane
Madison, WI 53704

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Executive Summary

Dane County is committed to being a good neighbor and a responsible operator of the Dane County Regional Airport (MSN). As the Airport proprietor, Dane County is updating the Noise Compatibility Plan in accordance with the Federal Aviation Administration's (FAA's) process codified under Title 14 of the Code of Federal Regulations Part 150 (14 CFR Part 150 or Part 150). Dane County has participated in the Part 150 program at MSN since the early 1990s.

A Part 150 Study is a voluntary, federally funded and federally supervised formal process for airport operators to address aircraft noise in terms of land use compatibility. A Part 150 Study includes the following two principal elements:

- The **Noise Exposure Map** (NEM) element describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs, and the resulting noise/land use compatibility. Part 150 requires that the documentation address aircraft operations during two time periods: the year of submission and a forecast year at least five years following the year of submission.
- The **Noise Compatibility Program** (NCP) element describes the actions the airport proprietor recommends to address existing and future land use incompatibilities with aircraft operations.

The Part 150 Study is similarly divided into two phases:

- **Phase 1** focuses on the development and submittal of the NEM to the FAA for acceptance as being completed in accordance with 14 CFR Part 150, and

- **Phase 2** determines the Airport-recommended measures to minimize incompatible land uses from aircraft operations with the development and submittal of the NCP.

This document includes all Phase 1 NEM documentation required for acceptance by the FAA. Dane County completed the original Part 150 Study for MSN in 1991. The FAA accepted the NEM in 1992 and provided a Record of Approval for the airport-recommended NCP measures in 1993.

This document presents the results of the NEM element of the ongoing Part 150 Study update including quantifying noise exposure from aircraft operations, assessing compatibility of land uses near the Airport, and evaluating the existing NCP measures to determine their continued effectiveness in reducing noncompatible land uses. This NEM assesses aircraft noise exposure resulting from the existing condition (2022) and a five-year forecast condition (2027). The Part 150 Study is part of the broader effort to address noise exposure resulting from MSN aircraft operations; it covers a study area that includes MSN and adjacent communities in Dane County.

Noise Exposure Maps

The 2022 and 2027 noise exposure contours are presented below in Figure ES-1 and Figure ES-2 and in Chapter 6 of this document.[1] The resulting land use compatibility analysis is summarized in Table ES-1 through Table ES-4, including the population and housing units within the 65 decibel (dB) contour and

[1] Large-scale versions of these figures showing the Official Noise Exposure Maps can be found in the back pocket of this document in print.

noise sensitive parcels. The land use analysis shows that 1,250 residential units and three noise-sensitive parcels (one education, one day care, and one place of worship) are potentially incompatible with noise from MSN aircraft operations in the 2027 forecast condition.[2] The FAA considers all land uses compatible with aircraft noise less than 65 dB in terms of the Day-Night Average Sound Level (DNL) metric.

Table ES-1. Baseline 2022 Land Use Compatibility

Source: HMMH, 2022

Contour Interval	Population Census 2020	Housing Units	Area (Acres)
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**

Table ES-2. Forecast 2027 Land Use Compatibility

Source: HMMH, 2022

Contour Interval	Population Census 2020	Housing Units	Area (Acres)
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**

Table ES-3. Baseline 2022 Noise Sensitive Sites

Source: HMMH, 2022

Contour Interval	Schools	Place of Worship	Library	Day Care	Hospital/ Medical Center	College/ University	Historic
65-70 DNL	0	0	0	0	0	0	0
70-75 DNL	0	0	0	0	0	1	0
>75 DNL	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**1**	**0**

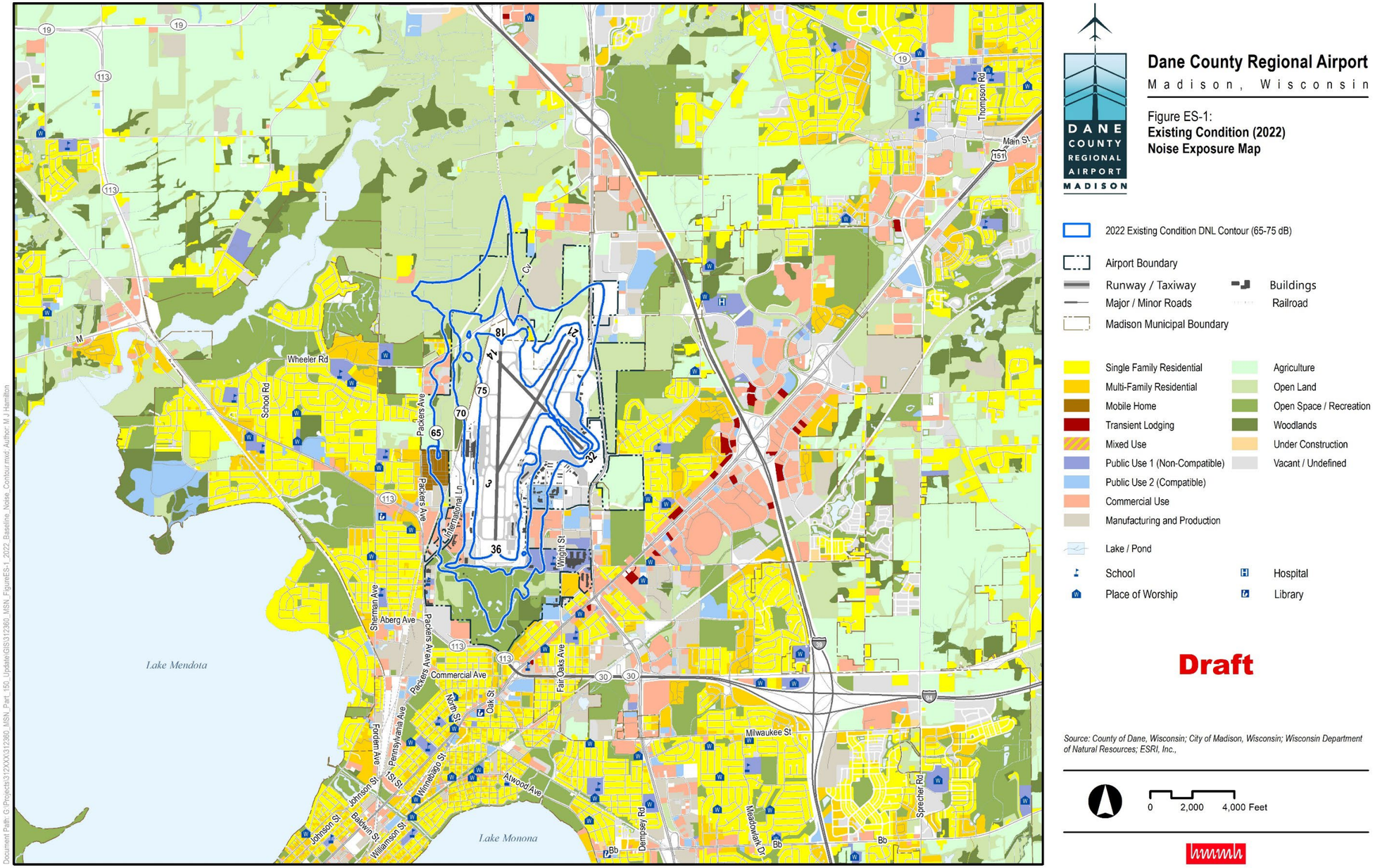
Table ES-4. Forecast 2027 Noise Sensitive Sites

Source: HMMH, 2022

Contour Interval	Schools	Place of Worship	Library	Day Care	Hospital/ Medical Center	College/ University	Historic
65-70 DNL	0	1	0	1	0	0	0
70-75 DNL	0	0	0	0	0	1	0
>75 DNL	0	0	0	0	0	0	0
Total	**0**	**1**	**0**	**1**	**0**	**1**	**0**

[2] Noise sensitive parcels identified in the 2027 NEM include Claudi's Kids Inc-Day Care Center, Ridgeway Church, and Madison Area Technical College.

Figure ES-1. Existing Condition (2022) Noise Exposure Map



Dane County Regional Airport
Madison, Wisconsin

Figure ES-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
Place of Worship
Hospital
Library

Draft

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

0 2,000 4,000 Feet

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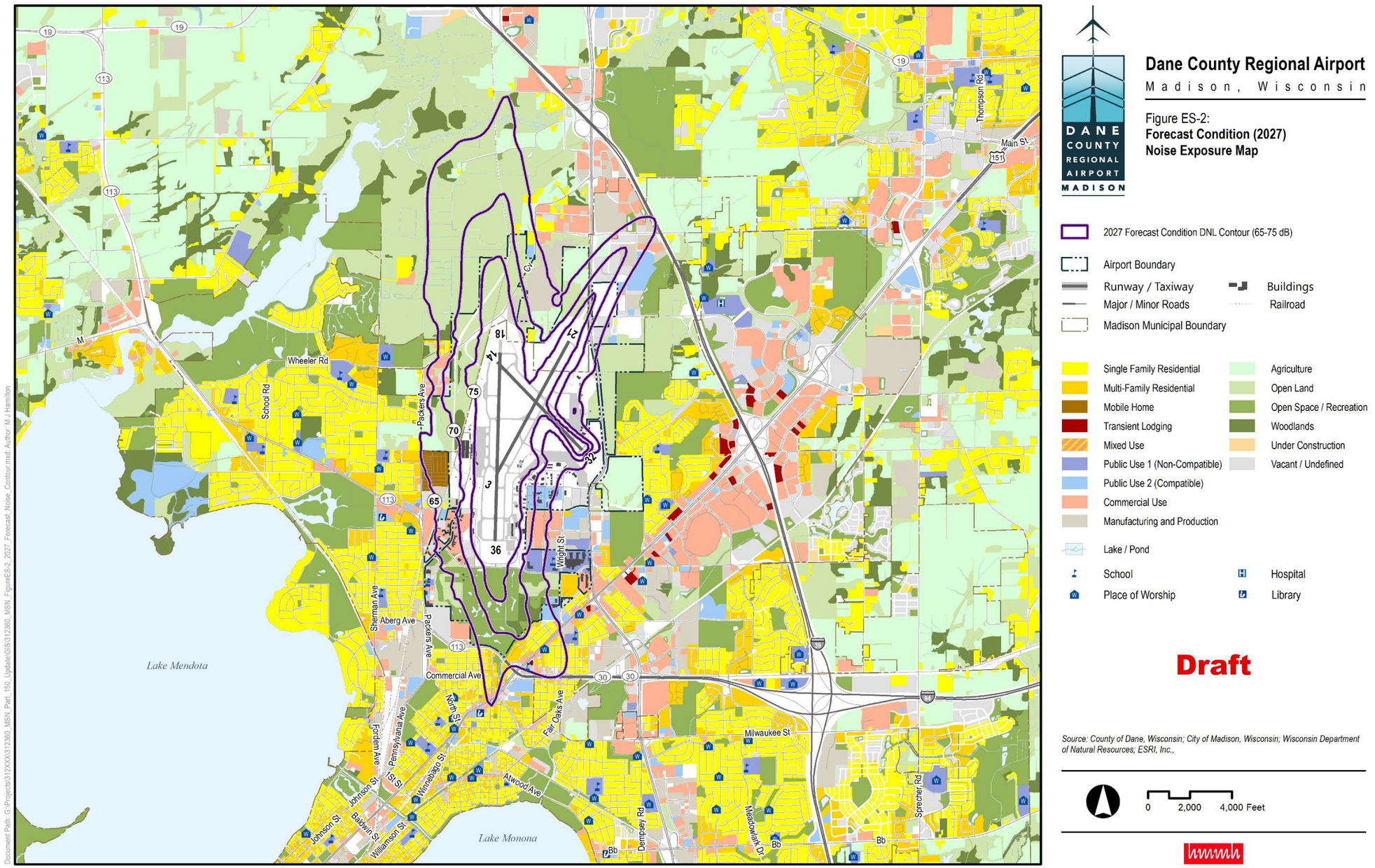
Figure ES-2. Future Conditions (2027) Noise Exposure Map



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Sponsor's Certification

Dane County has completed a comprehensive *Noise Exposure Map Update* in accordance with Title 14 of the Code of Federal Regulations Part 150 for Dane County Regional Airport. ***This is to certify the following:***

1. The 2022 and 2027 Noise Exposure Maps for the Dane County Regional Airport and the associated documentation that Dane County submitted in this volume to the Federal Aviation Administration under Title 14 CFR Part 150, Subpart B, Section 150.21, are true and complete, under penalty of 18 U.S.C. 1001.
2. The "Existing Condition (2022) Noise Exposure Map" (Figure 6-1 from Chapter 6) accurately represents conditions for calendar year 2022.
3. The "Future Condition (2027) Noise Exposure Map" (Figure 6-2 from Chapter 6) accurately represents forecast conditions for calendar year 2027 in conformance with the Federal Aviation Administration Terminal Area Forecast.
4. Pursuant to Title 14 CFR Part 150, Subpart B, Section 150.21(b), all interested parties have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft noise exposure maps, the descriptions of forecast aircraft operations, and the proposed NCP amendments.

The operations at Dane County Regional Airport are hereby certified to be consistent with the fleet mix, forecast operational levels, and flight procedures depicted for 2022 and 2027 within this document. Further information regarding development of the fleet mix, forecast, and procedures can be found in Chapter 5, "Development of Noise Exposure Contours," and Appendix C.

DANE COUNTY REGIONAL AIRPORT

_____

By:	Kimberly Jones
Title:	Airport Director
Date:	TBD
Airport Name:	Dane County Regional Airport
Airport Owner/Operator:	Dane County, Wisconsin
Address:	4000 International Lane, Madison, WI 53704

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FAA Checklist

The FAA produced Advisory Circular 150/5020, "Airport Noise and Land Use Compatibility Planning," that includes a checklist for FAA's use in reviewing NEM submissions. The FAA prefers that the Part 150 documentation include a copy of the checklist with appropriate page numbers or other references and pertinent notes and comments to assist in the document's review, as presented in the table below.

Table ES-5. Part 150 Noise Exposure Map Checklist

Source: FAA/APP, Washington, DC, March 1989; revised June 2005; reviewed for currency 12/2007

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
I. Submitting and Identifying The NEM:			
A. Submission is properly identified:			
1. 14 C.F.R. Part 150 NEM?	X		NEM Update
2. NEM and NCP together?		X	This document is the NEM Update. An NCP update will be prepared and submitted as a separate document, after acceptance of the NEM by the FAA. Sponsor Certification, page xi.
3. Revision to NEMs FAA previously determined to be in compliance with Part 150	X		Cover Letter, Chapter 6, page 6-1.
B. Airport and Airport Operator's name are identified?	X		Sponsor Certification, page xi.
C. NCP is transmitted by airport operator's dated cover letter, describing it as a Part 150 submittal and requesting appropriate FAA determination?	X		Cover letter will be included as part of the official FAA submittal.
II. Consultation: [150.21(b), A150.105(a)]			
A. Is there a narrative description of the consultation accomplished, including opportunities for public review and comment during map development?	X		Chapter 7, page 7-1, Appendix D– Stakeholder Engagement.
B. Identification of consulted parties:			
1. Are the consulted parties identified?	X		Chapter 7, Section 1.3, Section 7.1, Appendix D – Stakeholder Engagement.
2. Do they include all those required by 150.21(b) and A150.105(a)?	X		Chapter 7, Section 1.3.3, Section 7.1, and Appendix D – Stakeholder Engagement.
3. Agencies in 2., above, correspond to those indicated on the NEM?	X		Agencies identified on the NEM participated as part of the Technical Advisory Committee (TAC), Section 7.1.
C. Does the documentation include the airport operator's certification, and evidence to support it, that interested persons have been afforded adequate opportunity to submit their views, data, and comments during map development and in accordance with 150.21(b)?	X		Certification language is provided on page xi. Information on the consultation process is provided in Chapter 7 and Appendix D – Stakeholder Engagement.
D. Does the document indicate whether written comments were received during consultation and, if there were comments, that they are on file with the FAA regional airports division manager?	X		One Public Open House and three TAC presentations were held. Chapter 7.2 lists the public meetings. The Final NEM will provide copies of the comments, which by submission of this

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
			document we be on file with the FAA's Regional Airports Division Manager.
III. General Requirements: [150.21]			
A. Are there two maps, each clearly labeled on the face with year (existing condition year and one that is at least 5 years into the future)?	X		Figure 6-1 (page 6-3) presents the 2022 Map with existing conditions. Figure 6-2 (page 6-5) presents the 2027 Map with 5-year conditions. Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
B. Map currency:			
1. Does the year on the face of the existing condition map graphic match the year on the airport operator's NEM submittal letter?	X		See cover letter and Figures 6-1 (page 6-3) and 6-2 (page 6-5) in the back pocket of this document in print. The official submittal to the FAA will be made under a cover letter that meets Part 150 requirements. Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3).
2. Is the forecast year map based on reasonable forecasts and other planning assumptions and is it for at least the fifth calendar year after the year of submission?	X		See cover letter and certification language on page xi. Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
3. If the answer to 1 and 2 above is no, the airport operator must verify in writing that data in the documentation are representative of existing condition and at least 5 years' forecast conditions as of the date of submission?	N/A		
C. If the NEM and NCP are submitted together:	N/A		
1. Has the airport operator indicated whether the forecast year map is based on either forecast conditions without the program or forecast conditions if the program is implemented?	X		The existing and forecast year NEMs include the current implementation of the NCP. See Chapter 4
2. If the forecast year map is based on program implementation:	N/A		Prior Program Measures as currently implemented have been included.
a. Are the specific program measures that are reflected on the map identified?	N/A		Prior Program Measures as currently implemented have been included.
b. Does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?	N/A		
3. If the forecast year NEM does not model program implementation, the airport operator must either submit a revised forecast NEM showing program implementation conditions [B150.3(b), 150.35(f)] or the sponsor must demonstrate the adopted forecast year NEM with approved NCP measures would not change by plus/minus 1.5 DNL? (150.21(d))	N/A		The 2027 Forecast map includes the NCP as currently implemented. See Chapter 4.
IV. Map Scale, Graphics, And Data Requirements: [A150.101, A150.103, A150.105, 150.21(a)]			
A. Are the maps of sufficient scale to be clear and readable (they must not be less than 1" to 2,000'), and is the scale indicated on the maps? (*Note (1) if the submittal uses separate graphics to depict flight tracks and/or noise monitoring sites, these must be of the same scale, because they are part of the documentation*	X		The "Existing Condition (2022) Noise Exposure Map" (Figure 6-1) and " Future Condition (2027) Noise Exposure Map" (Figure 6-2) are provided at the scale of 1" to 2,000' in pockets near the rear of this document, as permitted by FAA.

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
required for NEMs.) (*Note (2) supplemental graphics that are not required by the regulation do not need to be at the 1" to 2,000' scale*)			
B. Is the quality of the graphics such that required information is clear and readable? (Refer to C. through G., below, for specific graphic depictions that must be clear and readable)	X		The "Existing Condition (2022) Noise Exposure Map" (Figure 6-1) and "Future Condition (2027) Noise Exposure Map" (Figure 6-2) are presented at 1" to 2,000' in pockets near the rear of this document, as permitted by FAA.
C. Depiction of the airport and its environs:			
1. Is the following graphically depicted to scale on both the existing condition and forecast year maps?			
a. Airport boundaries	X		Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
b. Runway configurations with runway end numbers	X		Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
2. Does the depiction of the off-airport data include?			
a. A land use base map depicting streets and other identifiable geographic features	X		Land uses on the NEMs, streets and other features are shown over the entire mapped area. Land use coverage is shown in Figure 3-1. Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
b. The area within the DNL 65 dB (or beyond, at local discretion)	X		Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
c. Clear delineation of geographic boundaries and the names of all jurisdictions with planning and land use control authority within the DNL 65 dB (or beyond, at local discretion)	X		As noted directly on the map portion of the NEM figures (which extends in both cases well beyond 65 dB DNL contour), the mapped area is within the jurisdictional boundaries of the Dane County, the City of Madison, and the Township of Burke. Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
D. 1. Continuous contours for at least the DNL 65, 70, and 75 dB?	X		Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
2. Has the local land use jurisdiction(s) adopted a lower local standard and if so, has the sponsor depicted this on the NEMs?		X	
3. Based on current airport and operational data for the existing condition year NEM, and forecast data representative of the selected year for the forecast NEM?	X		Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
E. Flight tracks for the existing condition and forecast year timeframes (these may be on supplemental graphics which must use the same land use base map and scale as the existing condition and forecast year NEM), which are numbered to correspond to accompanying narrative?	X		Section 5.6 (page 5-12), and see Figure 5-2 (page 5-21, Figure 5-3 (page 5-23, and Figure 5-4 (page 5-25).

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
F. Locations of any noise monitoring sites (these may be on supplemental graphics which must use the same land use base map and scale as the official NEMs)		X	There are no noise monitoring sites at MSN.
G. Noncompatible land use identification:			
1. Are noncompatible land uses within at least the DNL 65 dB noise contour depicted on the map graphics?	X		No noncompatible land use is located within the DNL 65 dB contour. Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
2. Are noise sensitive public buildings and historic properties identified? (Note: If none are within the depicted NEM noise contours, this should be stated in the accompanying narrative text.)	X		No noncompatible noise sensitive sites are located within the DNL 65 dB contour. Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5).
3. Are the noncompatible uses and noise sensitive public buildings readily identifiable and explained on the map legend?	X		Existing Condition (2022) Noise Exposure Map (Figure 6-1, page 6-3), Future Condition (2027) Noise Exposure Map (Figure 6-2, page 6-5)
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	N/A		There is no noncompatible land use within the DNL 65 dB contour that would normally be considered noncompatible.
V. Narrative Support Of Map Data: [150.21(a), A150.1, A150.101, A150.103]			
A. 1. Are the technical data and data sources on which the NEMs are based adequately described in the narrative?	X		See Chapter 5, page 4-4.
2. Are the underlying technical data and planning assumptions reasonable?	X		The Technical Advisory Committee (including FAA) carefully vetted all assumptions. Section 7.1, page 7-1, and Appendix D.
B. Calculation of Noise Contours:			
1. Is the methodology indicated?	X		As discussed in Chapter 5, the DNL contours contained in these NEMs were prepared using the most recent release of the FAA's AEDT available at the time the NEMs were prepared, i.e., "Version 3b."
a. Is it FAA approved?	X		
b. Was the same model used for both maps? (Note: The same model also must be used for NCP submittals associated with NEM determinations already issued by FAA where the NCP is submitted later, unless the airport sponsor submits a combined NEM/NCP submittal as a replacement, in which case the model used must be the most recent version at the time the update was started.)	X		
c. Has AEE approval been obtained for use of a model other than those that have previous blanket FAA approval?	X		Non-Standard Modeling request was submitted to the FAA, approvals are pending their review.
2. Correct use of noise models:			
a. Does the documentation indicate, or is there evidence, the airport operator (or its consultant) has adjusted or calibrated FAA-approved noise models or substituted one aircraft type for another that was not included on the FAA's pre-approved list of aircraft substitutions?	X		Appendix C

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
b. If so, does this have written approval from AEE, and is that written approval included in the submitted document?	X		Appendix C
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?		X	
4. For noise contours below DNL 65 dB, does the supporting documentation include an explanation of local reasons? (Note: A narrative explanation, including evidence the local jurisdiction(s) have adopted a noise level less than DNL 65 dB as sensitive for the local community(ies), and including a table or other depiction of the differences from the Federal table, is highly desirable but not specifically required by the rule. However, if the airport sponsor submits NCP measures within the locally significant noise contour, an explanation must be included if it wants the FAA to consider the measure(s) for approval for purposes of eligibility for Federal aid.)		X	
C. Noncompatible Land Use Information:			
1. Does the narrative (or map graphics) give estimates of the number of people residing in each of the contours (DNL 65, 70 and 75, at a minimum) for both the existing condition and forecast year maps?	X		Table 6-1 (page 6-9) and Table 6-2 (page 6-10).
2. Does the documentation indicate whether the airport operator used Table 1 of Part 150?	X		Chapter 1, page 3-1.
a. If a local variation to table 1 was used:			
(1) Does the narrative clearly indicate which adjustments were made and the local reasons for doing so?		X	Not applicable; no local variation was used.
(2) Does the narrative include the airport operator's complete substitution for table 1?		X	Not applicable; no local variation was used.
3. Does the narrative include information on self- generated or ambient noise where compatible or noncompatible land use identifications consider non-airport and non-aircraft noise sources?		X	There is no noncompatible land use within the DNL 65 dB contour.
4. Where normally noncompatible land uses are not depicted as such on the NEMs, does the narrative satisfactorily explain why, with reference to the specific geographic areas?		X	Not Applicable
5. Does the narrative describe how forecast aircraft operations, forecast airport layout changes, and forecast land use changes will affect land use compatibility in the future?	X		Section 5.1, page 5-1.
VI. Map Certifications: [150.21(b), 150.21(e)][3]			
A. Has the operator certified in writing that interested persons have been afforded adequate opportunity to submit views, data, and comments concerning the correctness and adequacy of the draft maps and forecasts?	X		Sponsor Certification, page xi.

[3] Sponsor Certification occurs after the Public Comment Period and upon submittal of the Final NEM to the FAA.

PROGRAM REQUIREMENT	YES	NO	SUPPORTING PAGES/REVIEW COMMENTS
B. Has the operator certified in writing that each map and description of consultation and opportunity for public comment are true and complete under penalty of 18 U.S.C. § 1001?	X		Sponsor Certification, page xi.

Acronyms

Acronym	Definition
AC	Air Carrier
ADA	Americans with Disabilities Act
ADO	Airports District Office
AEDT	Aviation Environmental Design Tool
AEE	Office of Environment and Energy
ANP	Aircraft Noise and Performance
ASNA	Aviation Safety and Noise Abatement Act of 1979
AT	Air Taxi
ATCT	Airport Traffic Control Tower
CFR	Code of Federal Regulations
dB	Decibel
dBA	A-Weighted Decibel
DNL	Day-Night Average Sound Level
EIS	Environmental Impact Study
FAA	Federal Aviation Administration
FTZ	Foreign Trade Zone
GA	General Aviation
HMMH	Harris Miller Miller & Hanson Inc.
ICAO	International Civil Aviation Organization
ML	Military
MSL	Mean Sea Level
MSN	Dane County Regional Airport
NA	Noise Abatement
NCP	Noise Compatibility Program
NEM	Noise Exposure Map
NEPA	National Environmental Policy Act of 1969
NLR	Noise Level Reduction
NOP	National Offload Program
NPIAS	National Plan of Integrated Airport Systems
OPSNET	Operations Network
Part 150	Title 14 of the Code of Federal Regulations Part 150 “Airport Noise Compatibility Planning”
PM	Program Management
ROA	Record of Approval
SEL	Sound Exposure Level
SLUCM	Standard Land Use Coding Manual
SWIM	System Wide Information Management
TAC	Technical Advisory Committee
TAF	Terminal Area Forecast
USAF	United States Air Force
USGS	United States Geological Survey
WBOA	Wisconsin Bureau of Aeronautics
WIANG	Wisconsin Air National Guard
WIARNG	Wisconsin Army National Guard

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Contents

Appendices

Figures

Tables

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1 Introduction to Noise Compatibility Planning

Dane County Regional Airport (MSN) is undertaking a Noise Compatibility Planning Study in accordance with Title 14 of the Code of Federal Regulation Part 150 (14 CFR Part 150, or Part 150; herein referred to as "this Study" or "Part 150 Study"). The purpose of this Study is to develop an accurate Noise Exposure Map (NEM) that reflects current and future airport operations, including the Wisconsin Air National Guard (WIANG) replacement of F-16 aircraft with the F-35A Lightning II aircraft within the timeframe evaluated in this Study; to communicate noise exposure levels and land use compatibility associated with MSN aircraft operations to the surrounding communities; and to collaboratively develop recommendations aimed at addressing noncompatible land use using potential noise abatement, noise mitigation, and/or program management measures through a Noise Compatibility Program (NCP). The NEM and NCP prepared under this Study will be subject to Federal Aviation Administration (FAA) acceptance and ultimate approval of the airport-recommended NCP measures.

Part 150 describes a formal process for airport operators to address airport noise in terms of land use compatibility. The regulation establishes thresholds for aircraft noise exposure for specific land use categories. Part 150 studies are voluntary and allow airports to apply for federal funds to implement FAA-approved measures recommended by the County to reduce or eliminate incompatible land use.

Dane County is committed to reducing the effects of aircraft noise in nearby communities and has a long history of addressing community noise concerns associated with MSN aircraft operations. Dane County completed its first Part 150 Study for MSN in 1991. The NEM was accepted by the FAA in 1992, and NCP measures were approved by the FAA in 1993. Many of the noise abatement recommendations from the prior study have been successfully implemented by the County and were reviewed as a component of this Study. The current Study is expected to be completed in 2024.

MSN is well-known as a joint-use airport,[4] serving both civilian and military operations since the late 1940s. The military refers to the Airport as Truax Field which is home to the WIANG 115th Fighter Wing Installation and the 64th Troop Command of the Wisconsin Army National Guard (WIARNG). The 115th Fighter Wing currently operates F-16 aircraft at Truax Field. In 2020, the United States Air Force (USAF) selected the 115th Fighter Wing to receive the latest technology fleet of F-35A Lightning II to replace the aging F-16 jets.[5] This decision was based on public and agency consultation and analysis presented in the *USAF F-35A Operational Beddown Air National Guard Final Environmental Impact Statement* (USAF F-35 EIS)[6] and finalized by the USAF in the associated Record of Decision.[7] The 115th Fighter Wing is anticipated to begin flying the F-35A Lightning II within the next five years. The Airport is undertaking the Part 150 Study to ensure that the NEM reflects existing and future aircraft operations, including the

[4] https://crp.trb.org/acrpwebresource6/home/chapter-resources/chapter-4-operations-running-a-safe-and-efficient-airport/4-18-joint-use-airports/

[5] https://www.115fw.ang.af.mil/News/Article-Display/Article/2151068/truax-field-selected-to-receive-f-35-joint-strike-fighter/

[6] US Department of Defense. United States Air Force. "United States Air Force F-35A Operational Beddown Air National Guard Environmental Impact Statement", on file with US Environmental Protection Agency as EIS No. 20200051. Published February 28, 2020. Available at https://cdxapps.epa.gov/cdx-enepa-II/public/action/eis/details?eisId=290711.

[7] US Department of Defense. United States Air Force. "Record of Decisions for the Environmental Impact Statement United States Air Force F-35A Operational Beddown Air National Guard." Published April 23, 2020. Available at https://www.federalregister.gov/documents/2020/04/23/2020-08597/record-of-decisions-for-the-environmental-impact-statement-united-states-air-force-f-35a-operational.

F-35 mission, and that the NCP addresses any noncompatible land uses resulting from MSN aircraft operations, including the introduction of the F-35A Lightning II aircraft.

1.1 Part 150 Process

In 1968, Congress responded to widespread community concern with aircraft noise resulting from the dawn of the jet age by passing the Aircraft Noise and Sonic Boom Act, which set standards for measurement of aircraft noise and established noise abatement regulations associated with the certification of aircraft. The FAA's emphasis on the relationship between aircraft noise and land use compatibility planning began with the passage of the Aviation Safety and Noise Abatement Act of 1979 (ASNA). This act gives the FAA the authority to issue regulations on noise compatibility planning. The Airport and Airway Improvement Act of 1982 provides a means for federal funding of projects to improve land use compatibility around airports. In response to ASNA, the FAA developed implementing regulations as currently codified in Title 14 of the Code of Federal Regulations (14 CFR Part 150), "Airport Noise Compatibility Planning."[8]

These voluntary Part 150 regulations set forth standards for airport operators to use when documenting noise exposure around airports and for establishing programs to minimize aircraft noise-related land use incompatibilities. By regulation, a Part 150 Study includes the following two principal elements (described in Sections 1.1.1 and 1.1.2):

1. Noise Exposure Map (NEM)
2. Noise Compatibility Program (NCP)

Acceptance of an NEM by the FAA is a prerequisite to their subsequent review and approval of measures recommended in an NCP. Figure 1-1 provides an overview of the FAA Part 150 process.

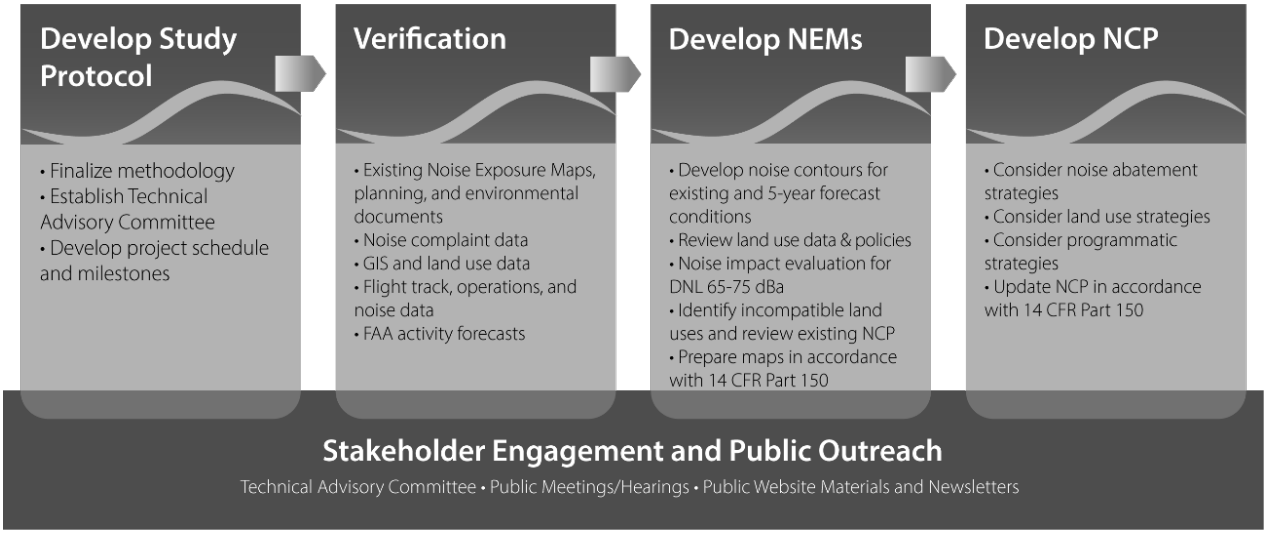

Figure 1-1. Overview of the FAA Part 150 Process
Source: HMMH

[8] U.S. Government Publishing Office. Electronic Code of Federal Regulations, Title 14 CFR Part 150 – Airport Noise Compatibility Planning. Accessed at https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title14/14cfr150_main_02.tpl

1.1.1 Noise Exposure Map

The NEM document describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs, and the resulting noise and land-use compatibility. Part 150 requires that NEM documentation address aircraft operations during two time periods:

1. The year of submission (the "existing conditions") and
2. A forecast year that is at least five years following the year of submission (the "forecast conditions").

The main elements in the NEM document are the two maps representing aircraft noise exposure and land use compatibility. The FAA maintains an NEM document checklist to ensure the documents include all the requirements contained in the Part 150 regulation, including tabulated data and results, and clear descriptions of the data collection and analysis undertaken in the development of the NEM.

1.1.2 Noise Compatibility Program

An NCP is a list of actions an airport proprietor recommends to address existing and future land use incompatibilities resulting from the noise of aircraft operations.

In addition to the NEM checklist, the FAA maintains an NCP checklist to ensure the documents include all the requirements of Part 150, such as:

- The development of the program
- Each measure the airport sponsor considered
- The reasons the airport sponsor elected to recommend or exclude each measure
- The entities responsible for implementing each recommended measure
- Implementation and funding mechanisms
- The predicted effectiveness of both the individual measures and the overall program

The FAA reviews and approves specific measures based on information contained in the NCP. Dane County may apply for grant funding for implementation of FAA-approved measures. A Dane County-recommended and FAA-approved measure does not require implementation of the measure but merely demonstrates that the measure is in compliance with Part 150. Additionally, if a measure requires subsequent FAA action, its implementation may require environmental study under the National Environmental Policy Act of 1969 (NEPA).

1.2 Dane County Regional Airport Part 150 Study

The Part 150 Study is divided into two phases: Phase 1 covers the development and submittal of the NEM, and Phase 2 is focused on the development and submittal of the NCP. This document is the final report for Phase 1 and includes all required elements for FAA acceptance of the 2022 NEM.

Dane County began the Part 150 Update in late 2021 and expects to submit the final NEM report to FAA in December 2022 for their acceptance of the document to be in accordance with 14 CFR Part 150 requirements. An open house was held in April 2022 to introduce the project to the community, to answer questions from the public, and to begin to understand the communities' concerns with noise resulting from MSN aircraft operations. Section 6 provides the official Noise Exposure Maps for the

existing conditions in 2022 and the five-year forecast conditions in 2027, with the predominant change being the replacement of the F-16 fleet with the F-35A fleet by the WIANG. Dane County will hold a thirty-day public comment period and a second public open house in the last quarter of 2022to answer questions related to the NEM.

After completion of Phase 1, Phase 2 of the Study is expected to begin in early 2023, with a focus on updating the MSN NCP to address the noncompatible land uses documented in the NEM. Once complete, there will be a thirty-day public comment period on the NCP, a third public open house to answer questions related to the NCP, and a public hearing for the community to comment on the airport-recommended measures aimed at addressing noncompatible land uses resulting from the noise of MSN aircraft operations. Dane County expects to submit the updated NCP with their recommendations to address the noncompatible land uses to the FAA in 2024.

1.2.1 History of Noise Compatibility Planning at Dane County Regional Airport

MSN is committed to reducing the effects of aircraft noise and has a long history of addressing noncompatible land use at the Airport. Dane County completed its first Part 150 Study for MSN in 1991. The NEM was accepted by the FAA in 1992 as adhering to the requirements of Part 150, and the FAA issued their Record of Decision in 1993 for the airport-recommended NCP measures. A review of the current NCP is described in detail in Section 4, along with implementation status of each recommended measure.

MSN works closely with airport partners to reduce noise in the surrounding community by encouraging the use of noise abatement procedures and other takeoff/landing methods that reduce aircraft noise over noise sensitive areas. The success of noise abatement strategy depends largely on the cooperation of pilots, air traffic controllers, and airport officials. MSN has implemented several strategies to assist in noise abatement, including:

- Construction of Runway 3/21 for noise reduction purposes
- Creation of a Preferential Runway Use Program and preferred runway take-off procedures for military and commercial aircraft
- Installation of signage at ramp exit points that detail airport noise abatement procedures
- Construction of a “Hush House” that deflects noise skyward when testing military aircraft engines as part of regular maintenance[9]

Historically, the Airport has successfully implemented land use measures related to land use compatibility planning. MSN completed a Home Sales Assistance Program and purchased property surrounding the Airport to prevent incompatible land uses. The Airport worked with local jurisdictions to define an “airport affected area” to limit incompatible development in noise sensitive areas.[10]

Additionally, MSN continues to work with communities surrounding the Airport to address their noise concerns and devotes resources to monitoring and responding to noise complaints. Prior to the COVID-19 pandemic, which temporarily halted many in-person meetings, the Airport regularly held a semi-annual noise meeting with the community and stakeholders.[11]

[9] https://www.msnairport.com/about/ecomentality/Noise-Abatement

[10] https://www.msnairport.com/about/ecomentality/noise_faq

[11] https://www.msnairport.com/about/ecomentality/Noise-Abatement

In terms of military noise abatement operations, the 115th Fighter Wing typically arrives from and departs to the north of Truax Field as a noise abatement procedure to avoid overflight of Madison. However, use of this abatement procedure is not always possible due to weather conditions or other air traffic management constraints.

1.3 Roles and Responsibilities

Several groups are involved in the preparation of the MSN Part 150 Study and have provided important information to the Study Team that has been incorporated into this NEM document, including:

- The Wisconsin Bureau of Aeronautics (WBOA)
- Dane County, including its staff and consultant team
- The 115th Fighter Wing of the WIANG
- The 64th Troop Command of the WIARNG
- The MSN Part 150 Technical Advisory Committee (TAC)
- The FAA, and
- The public

1.3.1 Wisconsin Bureau of Aeronautics

In the state of Wisconsin, the WBOA administers all state and federal aid for airport improvements. The WBOA retained a team of consultants led by Harris Miller Miller & Hanson Inc. (HMMH) to assist with the technical tasks required to fulfill Part 150 analysis and documentation requirements. The consultant team also includes Mead & Hunt and the Jones Payne Group.

1.3.2 Dane County

As the airport operator, Dane County submits the NEM, recommends NCP measures, pursues implementation of the adopted NCP measures, and manages the consultant team. Dane County also leads public engagement efforts related to the Part 150 Study.

1.3.3 115th Fighter Wing of the Wisconsin Air National Guard (WIANG)

The WIANG has three main bases in the state of Wisconsin. The 115th Fighter Wing Installation of the WIANG is located at Truax Field within MSN. The 115th Fighter Wing has both a state and federal mission to carry out. As of 2022, the installation operates 23 F-16C Block 30 fighter aircraft and one RC-26B Metroliner. The USAF selected the 115th Fighter Wing to host the F-35A mission and receive a new fleet of F-35A Lightning II aircraft beginning in Spring of 2023. The 115th Fighter Wing is planning a phased replacement of the F-16C fleet with F-35A aircraft. The Study Team consulted with the 115th Fighter Wing to understand their plans for operation of F-35A aircraft during the forecast year timeframe and obtain military operational activity. The Study Team obtained concurrence from the 115th Fighter Wing for military noise model inputs.

1.3.4 64th Troop Command of the Wisconsin Army National Guard (WIARNG)

The WIARNG is made up of approximately 7,700 soldiers including a headquarters staff in Madison and four major commands located throughout 67 Wisconsin communities. The 64th Troop Command (one of the four major commands) is located at Truax Field in MSN. Administered by the National Guard Bureau (a joint bureau of the departments of the Army and Air Force), the ARNG has both a federal and state mission. The dual mission, a provision of the U.S. Constitution and the U.S. Code of Laws, results in each Soldier holding membership in both the National Guard of their state and in the U.S. Army. The WIARNG operates UH-60 Black Hawk helicopters at Truax Field within MSN. The Study Team obtained concurrence from the 64th Troop Command for military noise model inputs.

1.3.5 Technical Advisory Committee

Part 150 studies benefit from the creation and participation of a TAC. Representatives invited to serve on the TAC represent their respective groups and/or constituencies. The purpose of the TAC is to bring a broad range of stakeholder perspectives to the Study. TAC members participate in regular meetings, distribute information about the Study to their constituencies/ organizations, and review technical components of the Study. The TAC's role is advisory in nature; members do not have decision-making authority over elements of the Study. That is, the TAC may offer opinions, advice, and guidance to the Study, but Dane County as the operator of MSN has the sole discretion to accept or reject the TAC recommendations in accordance with Part 150 regulations.

TAC membership includes:

- MSN staff
- WBOA staff
- FAA Airport District Office (ADO)
- FAA air traffic control tower (ATCT)
- 115th Fighter Wing of the WIANG
- 64th Troop Command of the WIARNG
- Airport tenants, users, and operators
- Local land use jurisdictions

1.3.6 Federal Aviation Administration

The FAA reviews the operational forecast for consistency with their Terminal Area Forecast (TAF) and any non-standard noise modeling requests. The FAA reviews the Part 150 submission to determine whether the technical work, consultation, and documentation comply with Part 150 requirements. The FAA provides acceptance of the NEM.

The FAA evaluates recommended NCP measures individually with respect to a criteria framework and determines whether each measure merits approval, disapproval, or further review for the purposes of Part 150. In addition, the FAA reviews the details of the technical documentation for broader issues of safety and ensures consistency of recommended noise abatement measures with applicable federal law. Finally, the FAA issues the Record of Approval (ROA) for the recommended measures in the NCP.

FAA involvement includes participation by staff from at least three parts of the agency:

- The Office of Environment and Energy
- The Air Traffic Organization
- The Office of Airports

The **Office of Environment and Energy** (AEE), located in FAA headquarters, reviews complex technical, regulatory, and legal matters of national environmental policy significance.

The **Air Traffic Organization** includes the Air Traffic Controllers and support staff. MSN's ATCT provides input on operational data, judgment regarding safety and capacity effects of alternative noise abatement measures, and shares input on implementation requirements.

Three groups in the **Office of Airports** are involved:

1. The Chicago ADO is the main point of contact for reviews, compliance, and direction as the Part 150 Update study progresses.

2. The Great Lakes Region Office is responsible for determining if the documentation satisfies all Part 150 requirements and has final review of the NCP for adequacy in satisfying technical and legal requirements.

3. Headquarters ensures consistency with Part 150 regulations and reviews of national importance.

Prior to acceptance of the NEM/NCP documentation and approval of the airport-recommended NCP measures, the FAA conducts a Lines-of-Business review, which includes Air Traffic, Flight Standards, Legal, Special Programs, Planning and Requirements, Flight Procedures, and Regional Review.

1.3.7 Public

Members of the public were given opportunities to follow the Study's progress and provide input. The public was encouraged to stay abreast of progress by visiting the Study website, reviewing the project newsletters, participating in the public open houses, and submitting comments on the draft documents.

1.4 Introduction to Noise Terminology

Information presented in this NEM document relies upon a reader's understanding of the characteristics of noise (unwanted sound), the effects noise has on persons and communities, and the metrics or descriptors commonly used to quantify noise. The properties, measurement, and presentation of noise involve specialized terminology. This section presents an overview and **Appendix A** contains more information on noise metrics.

Sound is a physical phenomenon consisting of minute vibrations (waveforms) that travel through a medium such as air or water. **Noise** is sound that is unwelcome because of its undesirable effects on persons (e.g., speech interference, sleep disturbance) or on entire communities (annoyance).

Noise metrics may be thought of as measures of noise 'dose'. There are two main types, describing (1) single noise events (single-event noise metrics) and (2) total noise experienced over longer time periods (cumulative noise metrics). Single-event metrics indicate the intrusiveness, loudness, or noisiness of individual aircraft noises. Cumulative metrics, used to measure long-term noise, indicate community

annoyance. Unless otherwise noted, all noise metrics presented in Part 150 documentation are reported in terms of the A-weighted decibel or dB.

Annoyance is greater when an intrusive sound occurs at night. As is implied in its name, the Day-Night Average Sound Level (DNL) represents the noise energy present during a 24-hour period. However, for purposes of Part 150, it normally is calculated through use of aircraft operations data from a longer period, such as a year, to smooth out fluctuations occurring in day-to-day operations. The DNL reported in Part 150 documentation is often referred to as the annual average daily DNL.

DNL represents noise as it occurs over a 24-hour period, treating noise events occurring at night (10 p.m. to 7 a.m.) with a 10 dB weighting.[12] This 10 dB weighting is applied to account for greater sensitivity to nighttime noise and the fact that events at night are often perceived to be more intrusive than daytime (see Figure 1-2). An alternative way of describing this adjustment is that each event occurring during the nighttime period is calculated is as if it were equivalent to ten daytime events.

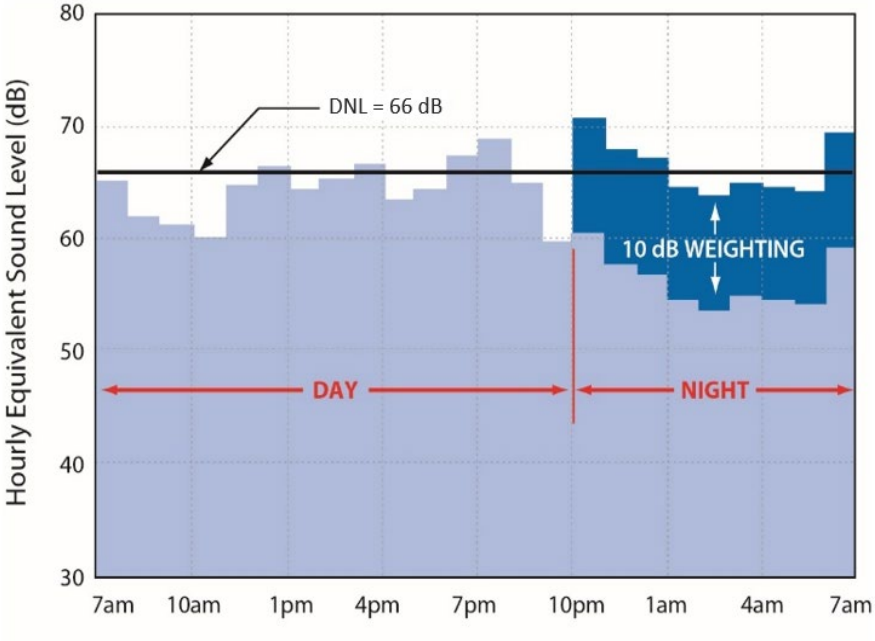

Figure 1-2. Example of a Day-Night Average Sound Level Calculation
Source: HMMH

[12] For the regulatory definition of DNL see 14CFR Part 150 §150.7 Definitions. http://www.ecfr.gov/cgi-bin/text-idx?SID=f8e6df268e3dad2edb848f61b9a0fb51&mc=true&node=pt14.3.150&rgn=div5

1.5 How to Use This Document

This document and the Part 150 Study it represents were undertaken in accordance with the requirements of the Part 150 regulation in Title 14 of the Code of Federal Regulations. The FAA-maintained NEM checklist is provided on page xiii that enumerates specific FAA requirements and identifies the associated location of the supporting text in this document and its appendices.

This document is organized as follows:

- Chapter 1 introduces Part 150 and the history of noise compatibility planning at MSN.
- Chapter 2 provides background information regarding the Airport.
- Chapter 3 describes land use in the MSN Part 150 Study area.
- Chapter 4 describes the existing MSN Noise Compatibility Program and reports the implementation status for each measure.
- Chapter 5 describes the development of the aircraft noise exposure contours, including the noise modeling methodology and inputs.
- Chapter 6 presents the official 2022 and 2027 Noise Exposure Maps and resulting land use compatibility.
- Chapter 7 reports stakeholder engagement efforts undertaken during the Part 150 process to date.

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2 Airport Background

Dane County Regional Airport is located in south central Wisconsin approximately four miles northeast of downtown Madison and five miles from the University of Wisconsin campus. It is owned and operated by Dane County. The small hub Airport provides commercial and general aviation service to the Madison Metropolitan Area. The Airport is a joint-use military and civilian facility.

Madison Municipal Airport, as it was originally named, opened in 1939 and included four 3,500-foot paved runways, a small terminal building, and a stone hangar. In 1942, the City of Madison leased the Airport to the U.S. Army Air Corps for use as a radio technical training school during World War II. During the time the U.S. Army Corps occupied the Airport, the airfield was expanded to 2,140 acres and the runways were rebuilt. The airfield was renamed Truax Field in honor of Lt. Thomas Leroy Truax, the first person from Madison, Wisconsin to lose his life in an air crash while serving his country during World War II.

After World War II ended, the Federal Government deactivated Truax Field and returned control to the City of Madison. In 1948, the WIANG was established and stationed in Madison. In 1951, following the start of the Korean War, the USAF took control of the airfield and the WIANG was activated. During that time, the north/south runway (Runway 18/36) was extended 2,000 feet south, making it the primary runway, totaling 7,600 feet. Truax Field was among several facilities the Department of Defense closed in 1964 and the USAF phased out its presence at the airfield by 1968.

The City of Madison completed a long-range master plan in 1962, designing a new terminal and taxiway system. The city also completed an airport improvement study in 1967 which kickstarted several construction projects after its approval. Airport ownership transferred from the City of Madison to Dane County in 1974 and upon transfer, the Airport was renamed Dane County Regional/Truax Field. Throughout the 1970s and 1980s, the runways were reconstructed and expanded and the terminal tripled in size, with an extensive expansion.

In 1990, the Airport served over 1 million passengers and in 1991 the terminal was expanded again to over 125,000 square feet. The first Part 150 study began in 1990 and the NCP led to the construction of Runway 3/21 to reduce the effects of aircraft noise on surrounding communities. The 7,200-foot runway opened in 1998 and it was the first new runway built on the airfield since 1942.

In the 2000s, the Airport continued to modernize with runway reconstruction, parking expansion, and a terminal modernization that doubled it in size to 274,000 square feet. In the 2010s, the Airport completed several projects intended to protect environmental resources and improve the safety of the airfield, such as installing a glycol management system, improving snow removal infrastructure, and constructing Taxiway M. In 2020, a two-phase terminal modernization program began to improve passenger facilities and work continues.[13,14]

[13] https://www.msnairport.com/about/facilities_maps/history

[14] Dane County Regional Airport. Airport Master Plan and FAR Part 150 Noise Compatibility Study. September 1991.

2.1 Airport Facilities

Airside facilities at MSN currently include three runways, an extensive taxiway system, and four ramp areas that support general aviation, air carrier, military, and air cargo services. Landside facilities include an air traffic control tower, a fixed base operator that operates the south and east ramps, a terminal building located on the west ramp, air cargo support buildings located on the south ramp, and WIANG and WIARNG facilities located on the southeast side of the Airport. MSN has an extensive road network around the airfield with surface parking lots and a multi-story parking structure that is connected to the terminal on the ground floor and via a skywalk on the second level.

The terminal building contains two levels, one ticketing level, and one concourse level. The ticketing level contains ticket counters, baggage claim, meeting rooms, the Robert B. Skuldt Conference Room, an art display area, and car rental counters, along with access to ground transportation. The secure concourse level encompasses 13 gates, administrative offices, concessions, and two security checkpoints, along with passenger amenities such as a business center, mother's lounge, and restrooms.

2.2 Truax Field

The military refers to their portion of MSN (located on the southern part of the airfield) as Truax Field. The WIANG 115th Fighter Wing is equipped with F-16C as their primary aircraft and the RC-26B Metroliner as a secondary aircraft. The WIARNG 64th Troup Command operates the UH-60 helicopter out of Truax Field. The WIANG is tasked to carry out both federal and state missions. The federal mission is to ensure the security of America's skies. As part of the total force WIANG provides operationally ready combat units and personnel to fulfill wartime, peacetime and contingency commitments when called to action. The unit's state mission includes providing protection of life and property, and preserving peace, order and public safety. The 115 FW staffs and trains flying units to provide disaster relief in times of earthquakes, hurricanes, floods and forest fires, search and rescue, protection of vital public services, and defense support to civil authorities. The 64th Troup Command provides administrative, training, and logistical support to specialized units within the WIARNG.

2.3 Contribution to Local Economy

Based on 2012 data, MSN contributes approximately $500 million to the regional economy annually and directly and indirectly supports 10,000 jobs. Nearly 6,500 workers are employed in Dane County as a direct result of airport operations and facilities use, ranking the Airport as the third largest full-time employer in the County. This generates over $140 million in wages to airport-related workers in Dane County, with over $82 million in secondary wages paid to workers throughout the County.[15]

The Airport receives no local tax revenue and airport funds are derived from airport operations. The primary tenants of the Airport are the commercial airlines, which currently include American Airlines, Delta Air Lines, Frontier Airlines, Sun Country Airlines, and United Airlines, along with FedEx that provides air cargo services.

Other revenue sources include parking revenues, terminal building tenants such as rental car agencies and restaurants, and multiple airport property tenants. MSN owns land along the International Lane

[15] Dane County Regional Airport. Sustainability Plan Highlights. 2014. https://www.msnairport.com/documents/pdf/Highlights.pdF

corridor to the west and along US Highway 51 to the east. Referred to as the AirPark, it covers approximately 300 acres and major tenants include the Madison Area Technical College, Wisconsin Aviation, and Great Lakes Higher Education Corp.[16] Fixed base operator, Wisconsin Aviation, provides general aviation services at MSN.

The Airport contains two Foreign Trade Zone (FTZ) sites, totaling 123 acres, that provide another source of revenue for Dane County. FTZ sites are established through the U.S. Department of Commerce and refer to areas located in or near a port of entry where certain merchandise can be imported without going through formal customs entry procedures or paying import duties. Companies value these zones as they are typically not charged tariffs on their inventory until it is sold, saving money and improving cash flow.[17] FTZs enhance business development and air cargo demand in the greater Madison and Dane County area.

[16] https://www.msnairport.com/about/news/economic_impact

[17] https://www.msnairport.com/about/facilities_maps/Foreign-Trade-Zone

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3 Land Use

Part 150 requires the review of land uses located in the airport environs to understand the relationship between those land uses and the noise exposure associated aircraft operations. This includes delineation of land uses within the 65 DNL and higher aircraft noise exposure contours and identification of noise sensitive uses. Identification of a noise sensitive use within the 65 DNL contour does not necessarily mean that the use is either considered noncompatible or that it is eligible for mitigation. Rather, identification merely indicates that the use may be considered noncompatible and requires further investigation.

This chapter provides an overview of the municipal jurisdictions with authority to regulate land use in the vicinity of MSN, a description of recommended land uses that are deemed generally compatible under Appendix A of Part 150, the land use data collection and verification process, and an overview of existing land uses classifications in the vicinity of the Airport.

3.1 Land Use Compatibility Guidelines

The objective of airport noise compatibility planning is to promote compatible land use in communities surrounding airports. Part 150 requires the review of existing land uses surrounding an airport to determine land use compatibility associated with aircraft activity at the Airport.

The FAA has published land use compatibility designations, as set forth in Part 150, Appendix A, Table 1 (reproduced here as Table 3-1). As Table 3-1 indicates, the FAA generally considers all land uses to be compatible with aircraft-related noise exposure in terms of DNL below 65 dB, including residential parcels, hotels, retirement homes, intermediate care facilities, hospitals, nursing homes, schools, preschools, and libraries. These categories will be referenced throughout the Part 150 process.

Table 3-1: Part 150 Airport Noise / Land Use Compatibility Guidelines

Source: Part 150, Appendix A, Table 1, 2007

Land Use	Yearly Day-Night Average Sound Level [DNL] in Decibels					
	<65	65-70	70-75	75-80	80-85	>85
Residential Use						
Residential other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Key to Table 3-1

SLUCM: Standard Land Use Coding Manual
Y(Yes): Land use and related structures compatible without restrictions.
N(No): Land use and related structures are not compatible and should be prohibited.
NLR: Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35: Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 A-weighted decibels (dBA) must be incorporated into design and construction of structure.

Notes for Table 3-1

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dBA and 30 dBA should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dBA, thus, the reduction requirements are often started as 5, 10, or 15 dBA over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
2) Measures to achieve NLR of 25 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
3) Measures to achieve NLR of 30 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
4) Measures to achieve NLR of 35 dBA must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
5) Land use compatible provided special sound reinforcement systems are installed.
6) Residential buildings require an NLR of 25.
7) Residential buildings require an NLR of 30.
8) Residential buildings not permitted.

3.2 Local Land Use

MSN is located in Dane County, Wisconsin, approximately four miles northeast of the city of Madison. Local municipalities have primary authority over land use decisions in the vicinity of the Airport.

Dane County

Dane County has adopted land use ordinances designed to protect and maintain compatible land use around the Airport. This includes the creation of an "Airport Affected Area" and notification on the plat or survey map of subdivided properties located within an area subject to heightened noise levels due to aircraft.

City of Madison

The City of Madison follows the Dane County airport noise compatibility zoning requirements. There are a number of land uses within the city of Madison which are located within the existing and future NEM contours, including residential and mobile home communities, commercial, mixed use, public use, and recreational/open space.

Town of Burke

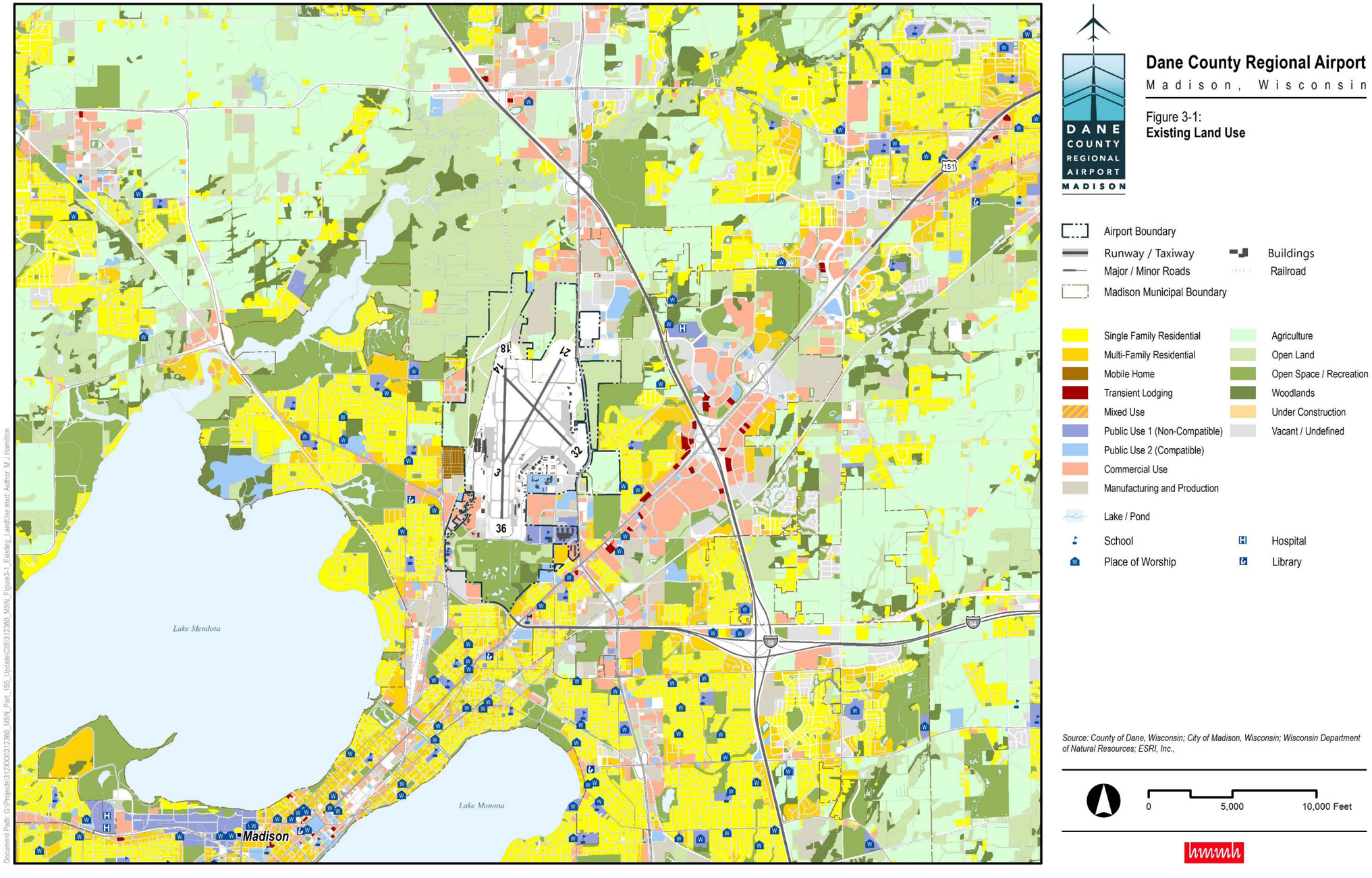
The Town of Burke follows the Dane County airport noise compatibility zoning requirements. The town of Burke is located north and east of the Airport. Land use located within the existing and future noise contour is primarily open land with a limited area of residential land use.

3.3 Land Use Data Collection and Verification

The Study Team defined a study area that meets the regulatory requirements[18] of Part 150 and collected detailed land use information from municipalities throughout the study area. Land use data collection and verification focused on the area expected to be within the 65 DNL contour. This data collection area is based on prior experiences collecting land use survey data and was based on the potential extent of the contours for this Part 150 Study. The jurisdictions determined to potentially have land uses within the 65 DNL or higher aircraft noise exposure areas were consulted to obtain and document existing land uses, and to discuss local land use controls and/or policies. The collected land use and zoning information were summarized according to the Part 150 land use categories and parcels were verified with number of noncompatible land uses based on type (residential, school, etc.). The Study Team conducted a field visit to perform a "windshield survey" to verify land uses within the study area. Figure 3-1 presents the existing land use.

[18] The land use data collection area covered the area to at least beyond 30,000' (approximately 5 nautical miles) from each runway end.

Figure 3-1. Existing Land Use



DANE COUNTY REGIONAL AIRPORT MADISON

Dane County Regional Airport

Madison, Wisconsin

Figure 3-1:
Existing Land Use

- 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
- Place of Worship
- Hospital
- Library

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

0 5,000 10,000 Feet

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4 Existing Noise Compatibility Program

As a result of the 1991 Part 150 Study, Dane County implemented a Noise Compatibility Program at MSN with the approval of all 23 Dane County-recommended measures as provided in the FAA's ROA. A copy of the ROA is included in **Appendix B**. The 1991 Part 150 documentation includes detailed description of the recommended measures and analyses of the potential benefits of each measured considered. The MSN NCP measures focus on the following three strategies to reduce or prevent noncompatible land use:

1. Noise abatement (NA)
2. Land use (LU), including noise mitigation
3. Program management (PM)

This chapter summarizes the measures in the 1991 Study and evaluates their current implementation status and compliance as applicable. A full review of the measures and analysis related to their implementation status, as determined by the Study Team is included in **Appendix B**.

4.1 Noise Abatement Measures

Noise abatement measures are those that control noise at the source; such measures include airport layout modifications, noise barriers, flight path changes, preferential runway use, and arrival and departure procedures. The intention of noise abatement measures in the NCP is to reduce the number of people and noise-sensitive properties exposed to aircraft noise of 65 DNL or greater.

For this Part 150 Study, the Dane County recommended noise abatement measures contained in the FAA's ROA were reviewed to assess implementation status and compliance. Flight track and aircraft identification data covering calendar year 2021 was obtained from Envirosuite, which includes data from the FAA's National Offload Program (NOP) that is a component of the FAA's System Wide Information Management (SWIM) data feed. This aircraft operational data provided the primary basis for evaluating the extent to which the approved noise abatement measures from the original 1991 MSN NCP are implemented and in compliance with the intent of each of the measures.

Table 4-1 lists the Dane County-recommended noise abatement measures approved by the FAA and summarizes the implementation status of each measure as described in the 1991 NCP and 1993 ROA.

Table 4-1. Status of 1991 Noise Abatement Measures
Source: HMMH, 2022

Measure Number	Flight Procedures Addressed	Implementation Status
NA-1	Continue the existing runway use program	Superseded by NA-7
NA-2	Continue requiring aircraft departing on Runway 31 to pass through 2,500 feet mean sea level (MSL; 1,600 feet above ground level) before turning left	Implemented
NA-3	Establish visual approach and departure corridors for helicopters	Implemented
NA-4	Encourage use of noise abatement departure procedures by operators of jet aircraft	Implemented
NA-5	Encourage Air National Guard to construct a hush house for F-16 engine maintenance runups prior to converting its fleet	Implemented
NA-6	Build new 6,500-foot Runway 3-21	Implemented

Measure Number	Flight Procedures Addressed	Implementation Status
NA-7	Adopt runway use system preferring departures on Runways 3, 31, and 36 and arrivals on Runways 13, 18, and 21	Implemented
NA-8	Require east and southbound aircraft exceeding 12,500 pounds and departing on Runway 3 to climb on runway heading through 2,500 feet MSL before turning right	Implemented
NA-9	Require all aircraft exceeding 12,500 pounds and departing Runway 21 to turn left 10 degrees as soon as safe and practicable	Implemented

4.2 Land Use Measures

Land use measures address aircraft noise in areas of high noise exposure that cannot be eliminated through the implementation of noise abatement measures. Corrective land use measures, which are typically implemented by an airport operator, include land acquisition and sound insulation treatments of structures. In contrast, preventive measures prohibit the introduction of new noncompatible land uses and/or notifying potential buyers of properties affected by aircraft noise; such measures are typically implemented by the local planning and zoning jurisdictions. Neither the FAA nor Dane County has regulatory authority to control land uses around airports. Dane County recognizes that state and local governments are responsible for land use planning, zoning, and regulation.

Table 4-2 lists the Dane County-recommended land use measures approved by the FAA and summarizes the implementation status of each measure.

Table 4-2. Status of 1991 Land Use Measures
Source: HMMH, 2022

Measure Number	Land Use Measures Addressed	Implementation Status
LU-1	Maintain existing compatible zoning in the airport vicinity	Implemented
LU-2	Define "airport affected area" for purposes of implementing Wisconsin Act 1936	Implemented
LU-3	Adopt airport noise overlay zoning	Not implemented
LU-4	Amend subdivision regulations to require dedication of noise and avigation easements of plat notes on final plat	Implemented
LU-5	Consider amending County subdivision regulations to prevent subdivision of land zoned A-1 Agriculture	Not implemented
LU-6	Amend building codes to provide soundproofing standards for noise-sensitive development in airport noise overlay zones	Not implemented
LU-7	Amend local land use plans to reflect noise compatibility plan recommendations and establish airport compatibility criteria for project review	Not implemented
LU-8	Follow through with planned land acquisition in Cherokee Marsh and Token Creek Park areas	Not implemented
LU-9	Consider expanding land acquisition boundaries in Cherokee Marsh and Token Creek areas	Not implemented
LU-10	Establish sales assistance or purchase assurance program for homes impacted by noise above 70 Ldn[19]	Implemented
LU-11	Install sound insulation for schools impacted by noise above 65 Ldn	Not implemented

[19] Ldn is the same as DNL for the purposes of this report; Ldn was more commonly used when the 1991 NCP was developed, while DNL is used more often in the present day.

4.3 Program Management Measures

Program management measures enable Dane County to monitor the implementation and compliance of the recommended noise abatement and land use management measures, as well as enhance stakeholders' understanding of aircraft noise. Program management measures are critical to the success of the NCP implementation. Table 4-3 lists the Dane County recommended program management measures approved by the FAA and summarizes the implementation status of each measure.

Table 4-3. Status of 1991 Program Management Measures

Source: HMMH, 2022

Measure Number	Program Measures Addressed	Implementation Status
PM-1	Program monitoring and noise contour updating	Implemented
PM-2	Evaluation and update of the plan	Implemented
PM-3	Noise complaint response	Implemented

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5 Development of Noise Exposure Contours

Consistent with Part 150 requirements, the aircraft noise exposure contours for this Study were prepared using the most recent release of the FAA's Aviation Environmental Design Tool (AEDT) that was available at the outset of the study, Version 3d SP2. AEDT is a software system developed by the FAA that models aircraft performance in space and time to estimate fuel consumption, emissions, noise and air quality consequences.[20] AEDT is the FAA-approved tool for determining the cumulative effect of aircraft noise exposure around airports. Statutory requirements for AEDT use are defined in Part 150, "Airport Noise Compatibility Planning."

The WIANG and WIARNG's aircraft operations were evaluated with the Department of Defense's NOISEMAP (NMAP) software, Version 7.3. The operations of all based military aircraft were modeled in NMAP. Data for the NMAP modeling was based on the modeling from the USAF F-35 EIS, including updates based on data provided by the Air and Army National Guard. Transient military aircraft were identified and characterized using data collected from the MSN Operations Team.

Several transient military aircraft with civilian airframe and engine counterparts were modeled in AEDT, and the remaining were modeled in NMAP. The noise grid output of the NMAP model was combined with the AEDT output to generate contours for the average annual daily DNL contours. In accordance with the definition of the DNL metric, daytime is between 7 AM and 10 PM and nighttime is between 10 PM and 7 AM. These day and night definitions are used through this NEM unless specified otherwise.

Sections 5.2 through 5.8 describe the required AEDT and NMAP inputs, which include:

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

5.1 Terminal Area Forecast (TAF) Validation

The FAA annually releases a forecast of operations for airports in the National Plan of Integrated Airport Systems (NPIAS) known as the Terminal Area Forecast (TAF).[21] The most recent FAA publication at the outset of this Study is the 2021 TAF. As part of this Part 150 Study, the FAA TAF was analyzed against standard aviation forecasting methodologies. This analysis of the TAF confirmed that the 2021 TAF is the

[20] https://aedt.faa.gov/

[21] FAA defines the TAF: "The Terminal Area Forecast (TAF) is the official FAA forecast of aviation activity for U.S. airports. It contains active airports in the National Plan of Integrated Airport Systems (NPIAS) including FAA-towered airports, Federal contract-towered airports, non-federal towered airports, and non-towered airports. Forecasts are prepared for major users of the National Airspace System including air carrier, air taxi/commuter, general aviation, and military. The forecasts are prepared to meet the budget and planning needs of the FAA and provide information for use by state and local authorities, the aviation industry, and the public." Source: https://www.faa.gov/data_research/aviation/taf

preferred forecast for this Part 150 Study, as it most accurately accounts for COVID-19 impacts and likely recovery scenarios.

The TAF does not contain detailed military operations statistics. To make sure that military operations are modeled with the best possible data, one recommended adjustment to the 2021 FAA TAF is to include military operations as projected by the local Air National Guard and the Army National Guard units at MSN/Truax Field. Both units provided current and detailed operations statistics and aircraft fleet management information to the MSN Part 150 Study Team for their respective military operations during the Part 150 forecast period. Additional information related to the TAF Validation can be found in **Appendix C.**

5.2 Physical Description of the Airport Layout

MSN is located approximately 5.5 miles northeast of downtown Madison in Dane County, Wisconsin. The airport layout is comprised of three runways, Runway 18/36, Runway 3/21, and Runway 14/32. Figure 5-1 shows the current airport diagram and Table 5-1 provides the runway specifications used in modeling the existing condition.

The number used to designate each runway end reflects, with the addition of a trailing "0", the magnetic heading of the runway to the nearest 10 degrees from the perspective of the pilot. Runway 18/36 is oriented along approximate magnetic headings of 180 degrees and 360 degrees and is 9,006 feet long by 150 feet wide. Runway 3/21 is oriented along approximate magnetic headings of 30 degrees and 210 degrees and is 7,200 feet long by 150 feet wide. Runway 14/32 is oriented along approximate magnetic headings of 140 degrees and 320 degrees and is 5,846 feet long by 150 feet wide. There is one helipad location on the East Ramp area of the Airport.

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

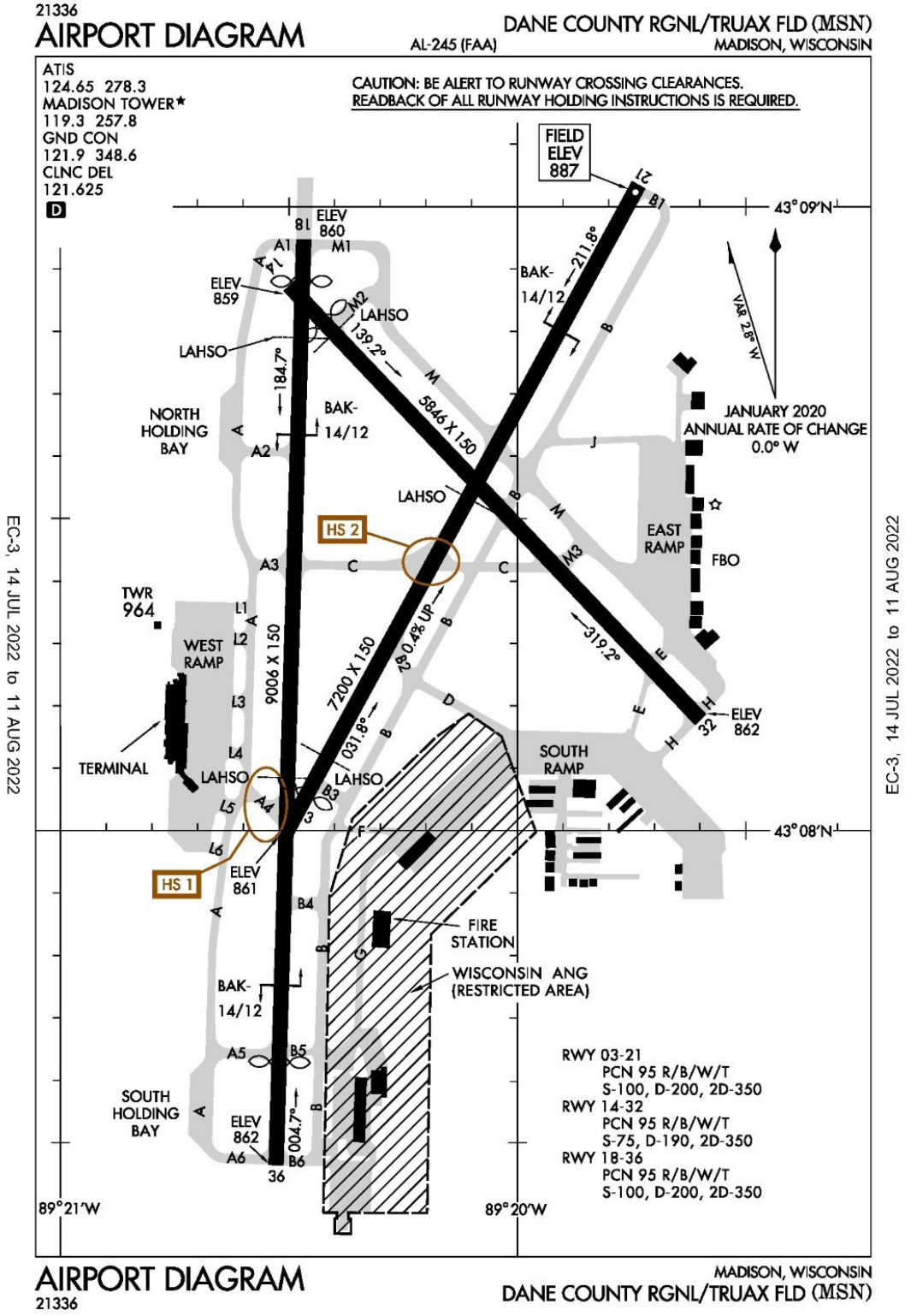
Table 5-1. Runway Specifications

Source: HMMH 2022, FAA 5010 Data. Accessed on August 10, 2022

Runway End	Latitude	Longitude	Elevation (ft. MSL)	Length (ft.)	Approach Angle (degrees)	Threshold Crossing Height (ft)	Displaced Thresholds (ft)
3	43.133302	-89.341758	860.8	7,199	3	49	431
14	43.147908	-89.341564	858.9	5,846	3	45	477
18	43.149136	-89.341025	860.3	9,005	3	57	400
21	43.150581	-89.328683	886.6	7,199	3	53	-
32	43.136286	-89.326469	861.5	5,846	3	56	-
36	43.124444	-89.342166	862.0	9,005	3	59	1,001
H1*	43.141342	-89.327650	859.0	N/A			
*-H1 denotes the location of the helipad							

Figure 5-1. Airport Diagram

Source: MSN and https://www.faa.gov/airports/runway_safety/diagrams/, obtained August 10, 2022



5.3 Aircraft Noise and Performance Characteristics

AEDT and NMAP require the use of specific noise and performance data for each aircraft type operating at the Airport. Noise data is in the form of Sound Exposure Level (SEL) at a range of distances (from 200 feet to 25,000 feet) from a particular aircraft with engines at a range of thrust levels. Performance data include thrust, speed and altitude profiles for takeoff and landing operations. The AEDT database contains standard noise and performance data for over 300 different fixed-wing aircraft types, most of which are civilian aircraft. NMAP includes noise data for various military aircraft types, though unlike AEDT, NMAP does not contain inbuilt aircraft performance data. Performance data for modeling of aircraft in NMAP is developed based on data obtained through interviews of aircraft operators. Collectively, the aircraft data in both models will be referred to as aircraft noise and performance (ANP) data.

Within the AEDT database, it is standard for aircraft takeoff or departure profiles to be defined by a range of trip distances identified as "stage lengths." Higher stage lengths (longer trip distances) are associated with a heavier aircraft due to the increase in fuel requirements for the flight. For this Part 150 study, stage lengths are defined using city pair distances, determined by the great-circle distance from the originating airport (MSN) to the planned arrival city.

Aside from identifying the aircraft type in the database, AEDT has STANDARD and International Civil Aviation Organization (ICAO) aircraft flight profiles for takeoffs, landings, and flight patterns or touch-and-go operations. HMMH used STANDARD profiles for all civilian aircraft types in the existing condition. For military aircraft types modeled in NMAP, HMMH used interviews with on-base pilots to develop locally accurate representative profiles that are indicative of how aircraft fly at MSN.

5.4 Annual Aircraft Operations

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

The study team obtained flight track and aircraft identification data Envirosuite for calendar year 2021 that represents civilian (AC, AT, GA) operations. This data was used to develop the existing fleet mix and day/night and modeled flight tracks. The FAA ATCT at MSN is not staffed 24/7. As such, the operations data between 6 AM and 11 PM were compared to the FAA tower counts for the same period. This provided scale factors to adjust the operations data to represent annual conditions.

Preparation of the 2027 civilian operations data are described in the TAF Validation which can be found in **Appendix C**.

Annual operations for all based military aircraft for the NEM 2022 Existing and 2027 Forecast years were provided by the WIANG and WIARNG. The WIANG is currently in the process of transitioning from a fleet of F-16C multi-role fighter aircraft to the F-35A Lightning II aircraft. As a result of the ongoing F-16C drawdown for transition to the F-35A, the WIANG is currently flying a reduced mission as compared to their standard mission. As this reduced mission is temporary, much like a runway closure for maintenance, the Existing NEM utilizes pre-drawdown F-16C annual aircraft activity based on calendar year 2021.

Once the WIANG reaches full operational capability with the F-35A, its total annual operations would be the same as those for F-16C. However, WIANG conducts a portion of their operations away from MSN each year. The number of at home operations for WIANG varies from year to year based on deployments and/or detachments to other locations. F-16C operations at MSN were lower than average in 2021 due aircraft deployments. As such, the existing NEM annual operations for F-16C are lower than typical. NEM forecast year activity for the F-35A was based on a historical 15-year annual average of at home operations for the WIANG flying the F-16C.

Table 5-2 presents the total annual operations for 2022 and 2027 in accordance with the FAA's four categories contained within the TAF, with the aforementioned adjustments.

Table 5-2. Operation Counts by Tower Category

Sources: envirosuite, FAA, HMMH, Mead & Hunt, Wisconsin Air and Army National Guard

Year	Air Carrier	Air Taxi	General Aviation	Military	Total
2022	20,306	7,395	47,735	6,047	**81,483**
2027	35,714	6,757	48,852	7,418	**98,741**
Note: Totals may not match exactly due to rounding.					

The derivation of the fleet mix utilized existing aircraft operations at MSN and included air carrier, air taxi, general aviation, and itinerant military operations. The operations described below comprise the existing and forecast conditions for submittal of the MSN 2022 NEM update. The aircraft operations data entered into AEDT includes the number of day and night arrivals, departures, and pattern (circuit) operations.

Pattern (circuit) operations are local pattern operations modeled on closed-circuit flight paths, which are flight tracks that depart and turn into a downwind pattern before landing back on the same runway. It should be noted that a "local" operation departs and lands at MSN rather than going to or arriving from another airport, but a local operation is not necessarily a closed-circuit flight path. Any aircraft that arrives and departs from the same airport but uses a different runway end or flies a different path than a unidirectional turn would be considered a "local" operation, but not a closed-circuit flight path. For the purposes of this analysis, all local operations are modeled as circuits. Table 5-3 and Table 5-3Table 5-4 list the modeled annual arrival, departure, circuit, and overall operations by category and aircraft type at MSN for the existing condition. Table 5-5 and Table 5-6 list the same operations information for the forecast condition.

Table 5-3. Modeled 2022 Annual Itinerant Operations

Source: HMMH

Category	Propulsion Class	ANP Aircraft Type	Arrivals			Departures			Total
			Day	Night	Total	Day	Night	Total	
Air Carrier	Jet	717200	611	126	737	539	197	737	1,473
		737800	330	110	440	376	63	439	879
		757PW	26	99	125	65	60	125	250
		757RR	20	100	120	59	61	120	240
		A300-622R	192	205	398	135	262	398	795
		A319-131	626	340	966	913	53	966	1,932
		A320-211	98	72	171	100	71	171	341
		A320-271N	170	1	171	168	3	171	343
		CRJ9-ER	4,758	546	5,305	4,850	455	5,304	10,609
		EMB170	336	26	362	331	32	363	725
		EMB175	1,126	233	1,360	1,264	95	1,359	2,719
	Subtotal		**8,294**	**1,859**	**10,153**	**8,801**	**1,352**	**10,153**	**20,306**
Air Taxi	**Helicopter**	EC130	6	3	9	6	3	9	17
	Jet	CL600	940	13	953	884	69	953	1,906
		CNA55B	454	25	480	447	33	479	959
		CNA680	442	27	469	453	16	469	938
		EMB14L	710	-	710	709	1	709	1,419
		FAL20	12	6	18	12	6	18	36
	Piston Prop	BEC58P	5	1	6	5	1	6	11
		CNA182	343	3	346	334	12	346	692
	Turboprop	CNA208	411	41	452	294	158	452	904
		SD330	250	6	256	2	254	256	513
	Subtotal		**3,573**	**125**	**3,698**	**3,146**	**552**	**3,698**	**7,395**
General Aviation	**Helicopter**	A109	118	118	237	102	134	237	473
	Jet	CL600	318	14	332	315	17	332	664
		CL601	192	20	212	204	8	212	424
		CNA525C	854	70	923	777	146	924	1,847
		CNA55B	291	23	314	282	32	314	628
		CNA560U	390	14	404	333	71	404	808
		CNA560XL	269	19	288	267	21	288	576
		CNA680	397	10	407	388	19	407	813
		CNA750	312	21	334	315	19	334	667
		EMB145	224	78	303	267	36	302	605
		FAL900EX	256	6	262	258	4	261	523
		GIV	258	21	279	263	16	279	557
		LEAR35	774	83	857	771	86	857	1,714
		MU3001	189	15	204	192	12	204	408
	Piston Prop	BEC58P	1,084	58	1,142	1,016	126	1,142	2,284
		CNA172	3,056	98	3,154	3,025	128	3,154	6,307
		CNA182	676	11	687	658	29	687	1,374
		COMSEP	508	7	515	508	7	515	1,030
		GASEPF	1,662	40	1,703	1,663	40	1,703	3,406
		GASEPV	2,137	61	2,199	2,144	55	2,199	4,398
		PA28	2,428	83	2,511	2,438	74	2,511	5,023
	Turboprop	CNA208	447	42	489	459	30	489	979
		CNA441	306	33	338	295	43	338	677
		DHC6	693	145	838	692	147	838	1,677
	Subtotal		**17,841**	**1,090**	**18,931**	**17,633**	**1,298**	**18,931**	**37,861**

Category	Propulsion Class	ANP Aircraft Type	Arrivals			Departures			Total
			Day	Night	Total	Day	Night	Total	
Transient Military	Jet	C17	8	-	8	8	-	8	16
		KC135R	11	-	11	11	-	11	22
		F-18*	71	-	71	71	-	71	142
		T-38*	59	-	59	59	-	59	118
	Turboprop	C130	35	2	37	37	-	37	74
	Subtotal		**184**	**2**	**186**	**186**	**0**	**186**	**372**
Based Military	Jet	F-16C*	1,443	42	1,485	1,489	7	1,496	2,981
	Turboprop	RC-26*	58	3	61	57	2	59	120
		C-26*	156	12	168	156	12	168	336
	Helicopter	UH60A *	1,040	-	1,040	780	260	1,040	2,080
	Subtotal		**2,697**	**57**	**2,754**	**2,482**	**281**	**2,763**	**5,517**
Grand Total			**32,591**	**3,135**	**35,726**	**32,243**	**3483**	**35,726**	**71,452**

Notes:
1. Totals may not match exactly due to rounding
2. Aircraft to be modeled in NMAP are marked with an asterisk (*).
3. Although the guard operates the UH60M variants, NMAP only has noise data for the UH60A.

Table 5-4. Modeled 2022 Annual Local Operations

Source: HMMH

Category	Propulsion Class	ANP Aircraft Type	Day	Night	Total
General Aviation	Piston Prop	BEC58P	355	17	373
		CNA172	3,208	59	3,267
		CNA182	261	0	261
		COMSEP	228	0	228
		GASEPF	2,154	106	2,260
		GASEPV	3,324	63	3,387
	Turboprop	CNA208	20	0	20
		CNA441	12	3	15
		DHC6	56	6	62
	Subtotal		**9,618**	**254**	**9,873**
Military	**Jet**	F-16C*	100	-	100
	Turboprop	C-26*	6	-	6
	Helicopter	UH60A*	52	-	52
	Subtotal		**158**	**-**	**158**
Grand Total			**9,776**	**254**	**10,031**

Notes:
1. Totals may not match exactly due to rounding
2. Aircraft to be modeled in NMAP are marked with an asterisk (*).
3. Although the guard operates the UH60M, NMAP only has noise data for the UH60A.

Table 5-5. Modeled 2027 Annual Itinerant Operations

Source: HMMH

Category	Propulsion Class	ANP Aircraft Type	Arrivals			Departures			Total
			Day	Night	Total	Day	Night	Total	
Air Carrier	Jet	737800	1,151	384	1,535	1,315	220	1,535	3,070
		757PW	47	180	227	118	108	226	453
		757RR	36	182	218	107	111	218	435
		A300-622R	349	372	720	246	475	721	1,441
		A319-131	2,187	1,187	3,374	3,189	185	3,374	6,748
		A320-211	343	253	596	348	248	595	1,191
		A320-271N	595	4	599	588	11	599	1,198
		CRJ9-ER	4,904	563	5,467	4,998	469	5,467	10,934
		EMB170	347	27	373	341	33	374	747
		EMB175	3,933	815	4,749	4,415	333	4,748	9,497
	Subtotal		**13,892**	**3,965**	**17,857**	**15,665**	**2,192**	**17,857**	**35,714**
Air Taxi	**Helicopter**	EC130	9	4	13	8	4	13	25
	Jet	CL600	407	5	412	383	30	412	825
		CNA55B	662	37	699	651	48	699	1,398
		CNA680	644	39	684	660	23	683	1,367
		FAL20	18	8	26	18	8	26	52
	Piston Prop	BEC58P	7	<1	8	7	1	8	16
		CNA182	500	5	505	487	18	504	1,009
	Turboprop	CNA208	598	60	659	429	230	659	1,317
		SD330	365	9	374	3	371	374	748
	Subtotal		**3,210**	**169**	**3,379**	**2,646**	**732**	**3,379**	**6,757**
General Aviation	**Helicopter**	A109	121	121	242	105	137	242	484
	Jet	CL600	326	14	340	322	18	340	680
		CL601	197	20	217	209	8	217	434
		CNA525C	874	71	945	795	150	945	1,890
		CNA55B	298	24	321	288	33	322	643
		CNA560U	400	14	413	341	73	413	827
		CNA560XL	275	19	295	273	22	294	589
		CNA680	406	10	416	397	19	416	832
		CNA750	320	22	341	322	19	342	683
		EMB145	229	80	310	273	37	310	619
		FAL900EX	261	6	267	264	4	268	535
		GIV	264	21	285	269	16	285	570
		LEAR35	792	85	877	789	88	877	1,754
		MU3001	193	16	209	197	12	209	418
	Piston Prop	BEC58P	1,110	59	1,169	1,040	129	1,169	2,338
		CNA172	3,127	100	3,227	3,096	131	3,227	6,455
		CNA182	692	11	703	673	29	703	1,406
		COMSEP	520	7	527	520	7	527	1,053
		GASEPF	1,702	41	1,743	1,702	41	1,743	3,486
		GASEPV	2,188	63	2,251	2,195	56	2,251	4,501
		PA28	2,485	85	2,570	2,495	76	2,570	5,140
	Turboprop	CNA208	458	43	501	469	31	501	1,001
		CNA441	313	33	346	302	44	346	693
		DHC6	710	149	858	708	150	858	1,716
	Subtotal		**18,259**	**1,114**	**19,374**	**18,045**	**1,328**	**19,374**	**38,747**

Category	Propulsion Class	ANP Aircraft Type	Arrivals			Departures			Total
			Day	Night	Total	Day	Night	Total	
Transient Military	Jet	F-18*	71	0	71	71	0	71	142
		T-38*	59	0	59	59	0	59	118
		C17	8	-	8	8	-	8	16
		KC135R	11	-	11	11	-	11	22
	Turboprop	C130	35	2	37	37	-	37	74
	Subtotal		184	2	186	186	-	186	372
Based Military	Jet	F-35A*	2,054	47	2,101	2,083	18	2,101	4,202
	Turboprop	C-26*	156	12	168	156	12	168	336
	Helicopter	UH60A*	900	300	1,200	1,190	10	1,200	2,400
	Subtotal		**3,110**	**359**	**3,469**	**3,429**	**40**	**3,469**	**6,938**
Grand Total			**38,655**	**5,609**	**44,265**	**39,971**	**4,292**	**44,265**	**88,529**

Notes:
1. Totals may not match exactly due to rounding
2. Aircraft to be modeled in NMAP are marked with an asterisk (*).
3. Although the guard operates the UH60M variants, NMAP only has noise data for the UH60A.

Table 5-6. Modeled 2027 Annual Local Operations

Source: HMMH

Category	Propulsion Class	ANP Aircraft Type	Day	Night	Total
General Aviation	Piston Prop	BEC58P	364	18	381
		CNA172	3,283	60	3,343
		CNA182	267	-	267
		COMSEP	234	-	234
		GASEPF	2,205	108	2,313
		GASEPV	3,402	64	3,466
	Turboprop	CNA208	21	-	21
		CNA441	12	3	15
		DHC6	58	6	64
Subtotal			**9,846**	**259**	**10,104**
Military	Jet	F-35A*	50	-	50
	Turboprop	C-26*	6	-	6
	Helicopter	UH60A*	52	-	52
Subtotal			**108**	**-**	**108**
Grand Total			**9,954**	**259**	**10,212**

Notes:
1. Totals may not match exactly due to rounding
2. Aircraft to be modeled in NMAP are marked with an asterisk (*).
3. Although the guard uses UH60M variants, NMAP only has noise information for the UH60A.

5.5 Runway Use

The primary factor affecting runway use at airports is weather; specifically, the wind direction and speed. An additional factor that may affect runway use includes the position of airport facilities, including passenger terminals, general aviation ramps, fixed based operators, and other unique factors related to an airport's configuration relative to the position and direction of the runways.

The 2021 aircraft operations data obtained as part of this Study was used to compile runway use tables for civilian operations. For military operations, HMMH verified runway use information from the USAF F-35 EIS with on-base subject matter experts to compile runway use tables. HMMH categorized this information by arrival, departure, or circuits, as well as day and night. HMMH separated the data by category as well as engine type (i.e., jet, piston prop, turboprop) since these categories of aircraft types may use the runways differently. Table 5-7 on the following page presents the runway utilization rates used to model the aircraft operations in the noise models. There are no known changes to the airport configuration or any known changes to aircraft flight procedures during the five-year forecast period of this Part 150 Study, and as such, the same runway utilization rates were used for both 2022 and 2027.

Table 5-7. Runway Utilization for Fixed-Wing Aircraft

Source: HMMH, envirosuite, Wisconsin Air National Guard

Category	Propulsion Class	Operation Type	Time of Day	Runway						Total
				3	14	18	21	32	36	
Air Carrier	Jet	Arrivals	Day	1%	0%	45%	5%	<1%	48%	100%
			Night	<1%	0%	42%	5%	<1%	53%	100%
		Departures	Day	2%	<1%	47%	3%	<1%	47%	100%
			Night	2%	<1%	41%	3%	7%	47%	100%
Air Taxi	Jet	Arrivals	Day	4%	6%	28%	16%	7%	39%	100%
			Night	7%	13%	16%	15%	10%	39%	100%
		Departures	Day	2%	<1%	27%	23%	20%	28%	100%
			Night	2%	1%	19%	22%	28%	27%	100%
	Piston Prop	Arrivals	Day	9%	8%	8%	33%	31%	10%	100%
			Night	15%	23%	8%	31%	0%	23%	100%
		Departures	Day	3%	3%	1%	42%	45%	5%	100%
			Night	0%	13%	0%	33%	47%	7%	100%
	Turboprop	Arrivals	Day	6%	19%	9%	29%	27%	9%	100%
			Night	7%	16%	12%	38%	10%	17%	100%
		Departures	Day	4%	1%	3%	31%	44%	17%	100%
			Night	3%	3%	3%	32%	46%	13%	100%
General Aviation	Jet	Arrivals	Day	8%	6%	19%	24%	12%	31%	100%
			Night	6%	6%	26%	18%	5%	40%	100%
		Departures	Day	5%	<1%	3%	45%	41%	6%	100%
			Night	4%	<1%	5%	38%	48%	5%	100%
	Piston Prop	Arrivals	Day	10%	8%	9%	34%	30%	8%	100%
			Night	7%	14%	9%	27%	33%	10%	100%
		Departures	Day	5%	3%	2%	44%	44%	3%	100%
			Night	4%	3%	3%	41%	44%	5%	100%
		Circuits	Day	4%	3%	2%	44%	45%	2%	100%
			Night	5%	0%	0%	35%	55%	5%	100%
	Turboprop	Arrivals	Day	10%	13%	9%	28%	25%	14%	100%
			Night	7%	18%	17%	35%	12%	12%	100%
		Departures	Day	7%	2%	2%	40%	46%	3%	100%
			Night	4%	0%	4%	25%	65%	3%	100%
		Circuits	Day	0%	43%	0%	14%	29%	14%	100%
			Night	0%	0%	0%	0%	50%	50%	100%
Military (Transient)	Jet	Arrivals	Day	0%	3%	68%	0%	0%	29%	100%
		Departures	Day	0%	0%	69%	0%	0%	31%	100%
	Turboprop	Arrivals	Day	0%	13%	30%	7%	0%	50%	100%
			Night	0%	0%	50%	0%	0%	50%	100%
		Departures	Day	5%	0%	20%	20%	20%	35%	100%
Military (Based)	Jet	Arrivals	Day	0%	0%	70%	0%	0%	30%	100%
			Night	0%	0%	70%	0%	0%	30%	100%
		Departures	Day	0%	0%	35%	0%	0%	65%	100%
			Night	0%	0%	35%	0%	0%	65%	100%
		Departures (Scrambles)	Day	90%	0%	4%	0%	0%	6%	100%
			Night	90%	0%	4%	0%	0%	6%	100%
		Circuits	Day	0%	0%	70%	0%	0%	30%	100%
			Night	0%	0%	70%	0%	0%	30%	100%
	Turboprop	Arrivals	Day	0%	0%	62%	5%	0%	33%	100%
			Night	0%	0%	62%	5%	0%	33%	100%
		Departures	Day	15%	15%	24%	18%	7%	21%	100%
			Night	15%	15%	24%	18%	7%	21%	100%
		Circuits	Day	0%	0%	70%	0%	0%	30%	100%
			Night	0%	0%	70%	0%	0%	30%	100%

Note: Totals may not match exactly due to rounding

5.6 Aircraft Flight Tracks

The model flight tracks for 2022 and 2027 were developed from the Envirosuite data for civilian operations and from the USAF F-35 EIS for military operations, including some minor updates based on data provided by the Air and Army National Guard. No change in flight tracks or flight track usage is expected within the five years of this Study timeline.

For civilian operations, HMMH used an industry-standard method to develop model tracks that entails analyzing a full year of flight tracks and aircraft identification for MSN by splitting the flight tracks into similar and manageable groups. The standard procedure separates tracks by operation type, (i.e. arrival, departure, circuit) and runway end, aircraft type (i.e. jet, piston prop, turboprop, helicopter) and destination/direction. HMMH analyzed flight tracks with the same operation type, runway end, and destination direction for similar geometry and this resulted in the final radar track bundles used to create model tracks. Civilian aircraft departing MSN fly to destinations within the United States in all four compass directions. As such, aircraft departing on any of the six runways will turn to a given destination: south, west, north, or east. Depending on the final destination of aircraft, flight tracks will share similar geometry. Because of this consistency seen in the data, geometrically similar groups with similar destination dispersions are modeled using a 'backbone' track and one, two, or three 'dispersion' sub tracks on either side of the backbone, for three, five, or seven total tracks (e.g. one backbone and two, four, or six sub tracks).

To graphically depict the model flight track development, a series of figures were generated for this report. The figures were developed using the above-described methodology and follow industry best practices. Figure 5-2 through Figure 5-9 depict all model tracks for both civilian and military aircraft and helicopters. All figures include a Flight Track Analysis boundary that is created by generating points 30,000 feet from the end of reach Runway end, and then connecting them via the radius of a circle from point to point. For MSN, there are six runway ends, so there are six points that were used to generate the Flight Track Analysis Boundary. This methodology is required by Part 150.[22] All model track bundles developed as part of this process and the assigned model percent usage are shown in Table 5-8 through Table 5-14 and were used for both 2022 and 2027. In these tables a "Track Group" refers to a unique bundle that includes a backbone track and its corresponding dispersion tracks.

On the following pages, a series of data tables corresponds with the flight track figures. The purpose of these tables is to describe the modeled flight track usage inputs. Table 5-8 presents the flight track use for all civilian jet and transient military jet arrivals and departures modeled with AEDT. The arrivals tracks identified in Table 5-8 are depicted in Figure 5-2. The departure tracks identified in Table 5-8 are depicted in Figure 5-3. Table 5-9 presents the flight track use for all military jet arrivals and departures modeled with NMAP. The arrivals tracks identified in Table 5-9 are depicted in Figure 5-5. The departure tracks identified in Table 5-9 are depicted in Figure 5-6.

Table 5-10 presents the flight track use for all civilian propeller and military transient turboprop arrivals and departures modeled with AEDT. The arrivals tracks identified in Table 5-10 are depicted in Figure 5-2. The departure tracks identified in are depicted in Figure 5-3. Table 5-11 presents the flight track use for all civilian local circuits which were modeled in AEDT. The circuit tracks identified in Table 5-11 are depicted in Figure 5-4. Table 5-12 presents the flight track use for all military circuits which were modeled in NMAP. The circuit tracks identified in Table 5-12 are depicted in Figure 5-7 NMAP Modeled Circuit Flight Tracks and Figure 5-12. NMAP Modeled Helicopter Circuit Flight Tracks. Table 5-13 presents the flight

[22] 14 CFR Part 150 Section A150.103(b)(1)

track use for all civilian helicopters which were modeled in AEDT. Very few civilian helicopters operate annually at MSN, therefore the tracks used for the WIARNG were applied to the civilian helicopter pad. The arrival tracks identified in Table 5-13 are depicted Figure 5-8. The departure tracks identified in Table 5-13 are depicted in Figure 5-9. Table 5-14 presents the flight track use for all military helicopter arrivals and departures modeled with NMAP. The arrivals tracks identified in Table 5-14 are depicted in Figure 5-10. The departure tracks identified in Table 5-14 are depicted in Figure 5-11.

Table 5-8. AEDT Modeled Itinerant Jet Model Track Utilization

Source: HMMH, envirosuite

Operation Type	Runway	Track Group	Air Carrier	AirTaxi	General Aviation	Transient Military
Arrivals	3	A03J01	35%	35%	27%	0%
		A03J02	7%	27%	23%	0%
		A03J03	11%	21%	26%	0%
		A03J04	15%	13%	18%	0%
		A03J05	2%	4%	6%	0%
		Subtotal	**100%**	**100%**	**100%**	**0%**
	14	A14J01	0%	67%	65%	0%
		A14J02	0%	13%	15%	0%
		A14J03	0%	3%	2%	0%
		A14J04	0%	8%	7%	0%
		A14J05	0%	2%	5%	0%
		A14J06	0%	7%	5%	0%
		A14M01	0%	0%	0%	100%
		Subtotal	**0%**	**100%**	**100%**	**100%**
	18	A18J01	4%	2%	5%	0%
		A18J02	14%	4%	12%	0%
		A18J03	23%	16%	37%	0%
		A18J04	6%	4%	8%	0%
		A18J05	22%	7%	16%	0%
		A18J06	31%	67%	22%	0%
		A18M01	0%	0%	0%	100%
		Subtotal	**100%**	**100%**	**100%**	**100%**
	21	A21J01	2%	2%	2%	0%
		A21J02	8%	9%	6%	0%
		A21J03	4%	6%	5%	0%
		A21J04	7%	4%	8%	0%
		A21J05	4%	2%	5%	0%
		A21J06	20%	17%	35%	0%
		A21J07	48%	54%	29%	0%
		A21J08	7%	6%	10%	0%
		Subtotal	**100%**	**100%**	**100%**	**0%**
	32	A32J01	0%	4%	10%	0%
		A32J02	30%	13%	12%	0%
		A32J03	10%	15%	15%	0%
		A32J04	60%	68%	63%	0%
		Subtotal	**100%**	**100%**	**100%**	**0%**
	36	A36J01	2%	1%	4%	0%
		A36J02	12%	7%	16%	0%
		A36J03	2%	2%	6%	0%
		A36J04	26%	53%	19%	0%
		A36J05	28%	21%	31%	0%
		A36J06	27%	12%	18%	0%
		A36J07	4%	3%	6%	0%
		A36M01	0%	0%	0%	100%
		Subtotal	**100%**	**100%**	**100%**	**100%**

Operation Type	Runway	Track Group	Air Carrier	AirTaxi	General Aviation	Transient Military
Departures	3	D03J01	5%	2%	7%	0%
		D03J02	15%	20%	15%	0%
		D03J03	11%	12%	20%	0%
		D03J04	1%	4%	<1%	0%
		D03J05	40%	35%	42%	0%
		D03J06	29%	27%	14%	0%
		Subtotal	**100%**	**100%**	**100%**	**0%**
	14	D14J01	50%	62%	58%	0%
		D14J02	50%	19%	21%	0%
		D14J03	0%	19%	21%	0%
		Subtotal	**100%**	**100%**	**100%**	**0%**
	18	D18J01	1%	<1%	6%	0%
		D18J02	27%	21%	23%	0%
		D18J03	7%	6%	15%	0%
		D18J04	9%	<1%	3%	0%
		D18J05	9%	2%	13%	0%
		D18J06	7%	6%	6%	0%
		D18J07	4%	2%	9%	0%
		D18J08	3%	2%	3%	0%
		D18J09	6%	5%	3%	0%
		D18J10	<1%	<1%	1%	0%
		D18J11	<1%	<1%	0%	0%
		D18J12	4%	3%	<1%	0%
		D18J13	6%	3%	8%	0%
		D18J14	16%	50%	8%	0%
		D18M01	0%	0%	0%	100%
		Subtotal	**100%**	**100%**	**100%**	**100%**
	21	D21J01	<1%	<1%	<1%	0%
		D21J02	6%	4%	5%	0%
		D21J03	4%	6%	9%	0%
		D21J04	6%	9%	13%	0%
		D21J05	3%	13%	9%	0%
		D21J06	10%	7%	9%	0%
		D21J07	29%	17%	11%	0%
		D21J08	5%	3%	4%	0%
		D21J09	35%	33%	33%	0%
		D21J10	3%	10%	7%	0%
		Subtotal	**100%**	**100%**	**100%**	**0%**
	32	D32J01	1%	8%	6%	0%
		D32J02	15%	40%	33%	0%
		D32J03	48%	8%	10%	0%
		D32J04	1%	1%	2%	0%
		D32J05	1%	7%	5%	0%
		D32J06	0%	6%	11%	0%
		D32J07	2%	8%	11%	0%
		D32J08	5%	7%	5%	0%
		D32J09	<1%	6%	6%	0%
		D32J10	4%	4%	4%	0%
		D32J11	22%	7%	8%	0%
		Subtotal	**100%**	**100%**	**100%**	**0%**
	36	D36J01	10%	6%	4%	0%
		D36J02	5%	1%	5%	0%
		D36J03	11%	9%	25%	0%
		D36J04	6%	<1%	4%	0%
		D36J05	8%	<1%	6%	0%

Operation Type	Runway	Track Group	Air Carrier	AirTaxi	General Aviation	Transient Military
		D36J06	3%	5%	3%	0%
		D36J07	23%	48%	13%	0%
		D36J08	31%	26%	37%	0%
		D36J09	3%	3%	3%	0%
		D36M01	0%	0%	0%	100%
		Subtotal	**100%**	**100%**	**100%**	**100%**
Note: Totals may not match exactly due to rounding.						

Table 5-9. Military NMAP-modeled Itinerant Fixed Wing Model Track Utilization

Source: HMMH, USAF F-35 EIS, Wisconsin Air National Guard

Type	Operation Type	Runway/Pad	Track Group	Usage Percent
Jet	Arrival	18	18A10	3%
			18A2	56%
			18A5	12%
			18A6	12%
			18A7	12%
			18A8	3%
			18A9	3%
			Subtotal	**100%**
		36	36A10	11%
			36A11	11%
			36A2	29%
			36A3	29%
			36A4	0%
			36A6	3%
			36A7	3%
			36A8	3%
			36A9	11%
			Subtotal	**100%**
	Departure	03	03D3	100%
			Subtotal	**100%**
		18	18D1	40%
			18D2	1%
			18D5	5%
			18D6	55%
			Subtotal	**100%**
		36	36D1	50%
			36D2	46%
			36D5	1%
			36D6	3%
			Subtotal	**100%**
Turboprop	Arrival	18	18A2	60%
			18A3	40%
			Subtotal	**100%**
		21	21A2	100%
			Subtotal	**100%**
		36	36A3	100%
			Subtotal	**100%**
	Departure	03	03D1	100%
			Subtotal	**100%**
		14	14D1	100%
			Subtotal	**100%**
		18	18D1	19%
			18D2	19%

Type	Operation Type	Runway/Pad	Track Group	Usage Percent
			18D5	62%
			Subtotal	**100%**
		21	21D1	100%
			Subtotal	**100%**
		32	32D1	100%
			Subtotal	**100%**
		36	36D1	41%
			36D2	41%
			36D6	18%
			Subtotal	**100%**
Note: Totals may not match exactly due to rounding.				

Table 5-10. AEDT modeled Itinerant Non-Jet Fixed Wing Model Track Utilization

Source: HMMH, envirosuite

Operation Type	Runway	Track Group	Air Taxi		General Aviation		Military
			Piston Prop	Turbo prop	Piston Prop	Turboprop	Turboprop
Arrivals	3	A03P01	3%	0%	6%	3%	0%
		A03P02	6%	7%	8%	6%	0%
		A03P03	9%	13%	8%	8%	0%
		A03P04	32%	38%	29%	37%	0%
		A03P05	9%	2%	11%	21%	0%
		A03P06	12%	2%	7%	4%	0%
		A03P07	27%	4%	22%	10%	0%
		A03P08	3%	33%	8%	11%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**0%**
	14	A14M01	0%	0%	0%	0%	100%
		A14P01	8%	70%	9%	10%	0%
		A14P02	41%	23%	50%	69%	0%
		A14P03	13%	1%	14%	13%	0%
		A14P04	13%	<1%	7%	<1%	0%
		A14P05	7%	4%	6%	3%	0%
		A14P06	4%	0%	6%	<1%	0%
		A14P07	13%	<1%	8%	4%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**100%**
	18	A18M01	0%	0%	0%	0%	100%
		A18P01	45%	90%	44%	67%	0%
		A18P02	14%	3%	16%	11%	0%
		A18P03	14%	3%	8%	2%	0%
		A18P04	7%	0%	17%	5%	0%
		A18P05	14%	1%	8%	9%	0%
		A18P06	3%	0%	4%	2%	0%
		A18P07	3%	3%	3%	4%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**100%**
	21	A21M01	0%	0%	0%	0%	100%
		A21P01	15%	38%	13%	9%	0%
		A21P02	17%	15%	21%	40%	0%
		A21P03	2%	14%	4%	4%	0%
		A21P04	36%	6%	31%	21%	0%
		A21P05	1%	1%	3%	<1%	0%
		A21P06	12%	3%	7%	5%	0%
		A21P07	0%	1%	3%	<1%	0%
		A21P08	7%	16%	11%	14%	0%

Operation Type	Runway	Track Group	Air Taxi		General Aviation		Military
			Piston Prop	Turbo prop	Piston Prop	Turboprop	Turboprop
		A21P09	2%	3%	2%	<1%	0%
		A21P10	8%	4%	4%	5%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**100%**
	32	A32P01	39%	29%	36%	46%	0%
		A32P02	15%	10%	14%	8%	0%
		A32P03	11%	43%	13%	14%	0%
		A32P04	14%	3%	14%	10%	0%
		A32P05	3%	2%	4%	2%	0%
		A32P06	5%	1%	4%	6%	0%
		A32P07	5%	<1%	4%	2%	0%
		A32P08	3%	1%	5%	7%	0%
		A32P09	2%	8%	3%	2%	0%
		A32P10	5%	2%	3%	5%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**0%**
	36	A36M01	0%	0%	0%	0%	100%
		A36P01	49%	52%	44%	46%	0%
		A36P02	11%	3%	14%	8%	0%
		A36P03	5%	10%	8%	7%	0%
		A36P04	13%	1%	8%	4%	0%
		A36P05	5%	14%	8%	14%	0%
		A36P06	8%	3%	11%	13%	0%
		A36P07	3%	10%	2%	4%	0%
		A36P08	5%	7%	5%	4%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**100%**
Departures	**3**	D03M01	0%	0%	0%	0%	100%
		D03P01	18%	23%	3%	5%	0%
		D03P02	9%	24%	25%	36%	0%
		D03P03	0%	15%	15%	5%	0%
		D03P04	9%	10%	11%	2%	0%
		D03P05	9%	14%	16%	23%	0%
		D03P06	36%	0%	16%	18%	0%
		D03P07	9%	9%	8%	7%	0%
		D03P08	9%	4%	5%	4%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**100%**
	14	D14P01	24%	6%	27%	50%	0%
		D14P02	37%	42%	14%	0%	0%
		D14P03	8%	6%	23%	17%	0%
		D14P04	0%	35%	7%	8%	0%
		D14P05	16%	0%	10%	8%	0%
		D14P06	16%	12%	20%	17%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**0%**
	18	D18M01	0%	0%	0%	0%	100%
		D18P01	0%	53%	33%	5%	0%
		D18P02	50%	14%	17%	25%	0%
		D18P03	25%	0%	19%	30%	0%
		D18P04	0%	18%	1%	10%	0%
		D18P05	0%	5%	13%	25%	0%
		D18P06	25%	9%	17%	5%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**100%**
	21	D21M01	0%	0%	0%	0%	100%
		D21P01	6%	52%	10%	5%	0%
		D21P02	18%	5%	15%	7%	0%

Operation Type	Runway	Track Group	Air Taxi		General Aviation		Military
			Piston Prop	Turbo prop	Piston Prop	Turboprop	Turboprop
		D21P03	18%	13%	20%	28%	0%
		D21P04	13%	3%	11%	6%	0%
		D21P05	5%	4%	6%	11%	0%
		D21P06	7%	3%	6%	7%	0%
		D21P07	2%	3%	7%	7%	0%
		D21P08	10%	2%	8%	16%	0%
		D21P09	9%	3%	10%	7%	0%
		D21P10	8%	2%	4%	3%	0%
		D21P11	5%	10%	4%	4%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**100%**
	32	D32M01	0%	0%	0%	0%	100%
		D32P01	13%	22%	7%	7%	0%
		D32P02	9%	7%	11%	20%	0%
		D32P03	2%	<1%	5%	3%	0%
		D32P04	21%	10%	15%	19%	0%
		D32P05	10%	3%	11%	2%	0%
		D32P06	4%	12%	8%	2%	0%
		D32P07	8%	3%	8%	9%	0%
		D32P08	19%	6%	18%	24%	0%
		D32P09	6%	3%	8%	8%	0%
		D32P10	4%	3%	5%	5%	0%
		D32P11	3%	32%	4%	3%	0%
		Subtotal	100%	100%	100%	100%	100%
	36	D36M01	0%	0%	0%	0%	100%
		D36P01	11%	84%	6%	7%	0%
		D36P02	6%	0%	17%	18%	0%
		D36P03	24%	4%	25%	41%	0%
		D36P04	53%	9%	41%	19%	0%
		D36P05	6%	3%	11%	15%	0%
		Subtotal	**100%**	**100%**	**100%**	**100%**	**100%**
Note: Totals may not match exactly due to rounding							

Table 5-11. AEDT Modeled Local Fixed-Wing Model Track Utilization

Source: HMMH, envirosuite

Operation Type	Runway	Track Group	General Aviation	
			Piston Prop	Turboprop
Circuits	3	C03P01	32%	0%
		C03P02	68%	0%
		Subtotal	**100%**	**0%**
	14	C14P01	33%	33%
		C14P02	67%	67%
		Subtotal	**100%**	**100%**
	18	C18P01	33%	0%
		C18P02	67%	0%
		Subtotal	**100%**	**0%**
	21	C21P01	91%	100%
		C21P02	9%	0%
		Subtotal	**100%**	**100%**
	32	C32P01	87%	100%
		C32P02	13%	0%
		Subtotal	**100%**	**100%**
	36	C36P01	79%	100%
		C36P02	21%	0%
		Subtotal	**100%**	**100%**
Note: Totals may not match exactly due to rounding				

Table 5-12. NMAP modeled Local Military Model Track Utilization

Source: HMMH, USAF F-35 EIS, Wisconsin Air and Army National Guard

Type	Runway	Track Group	Usage Percentage
Helo	18	18C2	100%
		Subtotal	**100%**
	36	36C2	100%
		Subtotal	**100%**
Jet	18	18C1	100%
		Subtotal	**100%**
	36	36C1	100%
		Subtotal	**100%**
Turboprop	18	18C1	100%
		Subtotal	**100%**
	36	36C1	100%
		Subtotal	**100%**

Table 5-13. AEDT modeled Itinerant Civilian Helicopter Model Track Utilization

Source: HMMH, USAF F-35 EIS, Wisconsin Army National Guard

Operation Type	Runway	Track Group	Air Taxi	General Aviation
Arrivals	**H1**	AH1H01	25%	25%
		AH1H02	12%	12%
		AH1H03	12%	12%
		AH1H04	25%	25%
		AH1H05	25%	25%
		Subtotal	**100%**	**100%**
Departures	**H1**	DH1H01	13%	13%
		DH1H02	30%	30%
		DH1H03	13%	13%
		DH1H04	30%	30%
		DH1H05	13%	13%
		Subtotal	**100%**	**100%**
Note: Totals may not match exactly due to rounding				

Table 5-14. NMAP-Modeled Military Iterant Helicopter Model Track Utilization

Source: HMMH, USAF F-35 EIS, Wisconsin Army National Guard

Type	Operation Type	Runway/Pad	Track Group	Usage Percent
Helo	Arrival	H6018	18HA1	33%
			18HA2	67%
			Subtotal	**100%**
		H6018B	18BHA1	33%
			18BHA2	67%
			Subtotal	**100%**
		H6036	36HA1	20%
			36HA2	40%
			36HA3	40%
			Subtotal	**100%**
		H6036B	36BHA1	20%
			36BHA2	40%
			36BHA3	40%
			Subtotal	**100%**
	Departure	H6018	18HD1	24%
			18HD2	53%
			18HD3	24%
			Subtotal	**100%**
		H6018B	18BHD1	24%
			18BHD2	53%
			18BHD3	24%
			Subtotal	**100%**
		H6036	36HD1	31%
			36HD2	69%
			Subtotal	**100%**
		H6036B	36BHD1	31%
			36BHD2	69%
			Subtotal	**100%**
Note: Totals may not match exactly due to rounding				

Figure 5-2. AEDT Modeled Fixed-wing Arrival Flight Tracks

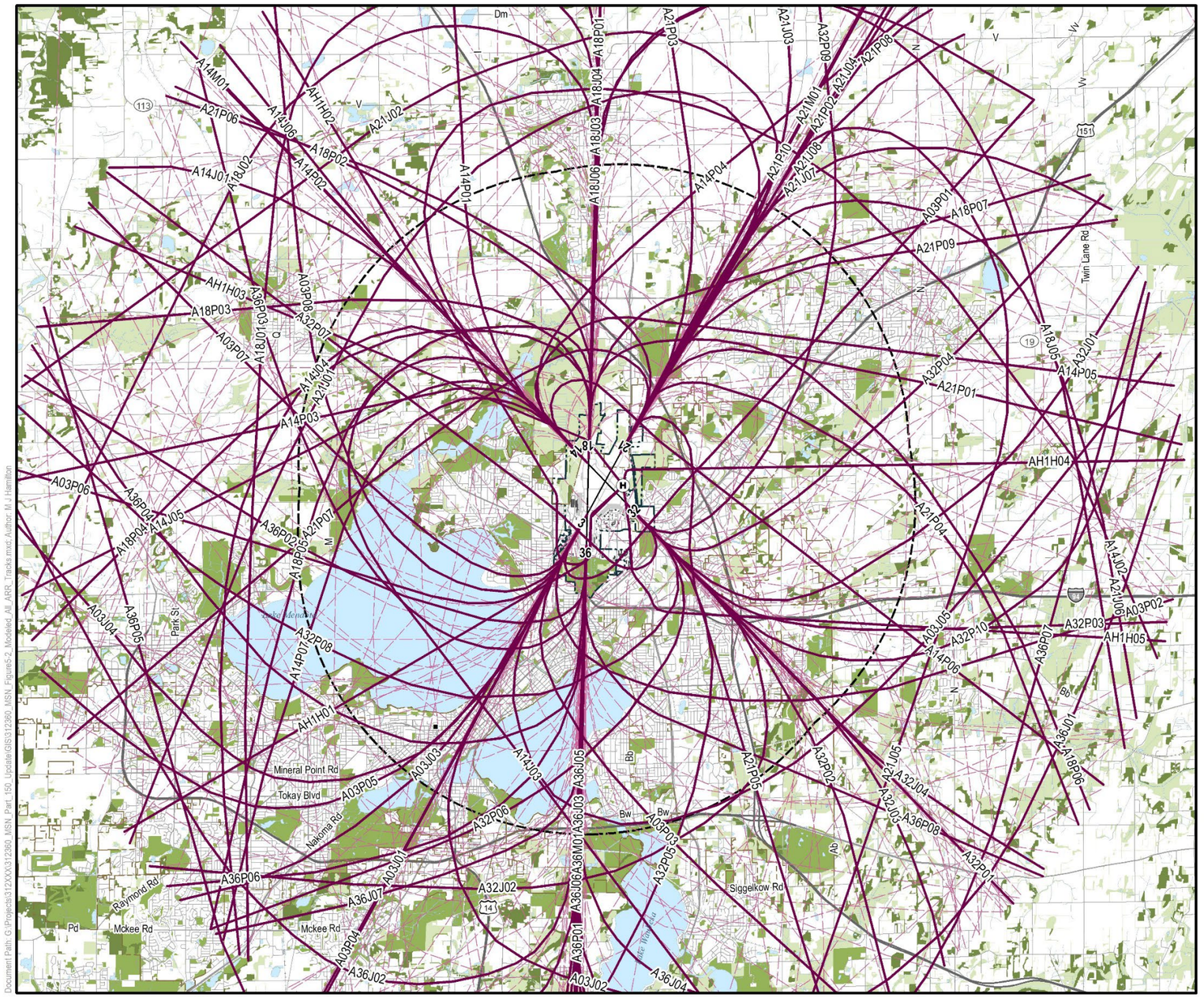


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Figure 5-3. AEDT Modeled Fixed-wing Departure Flight Tracks

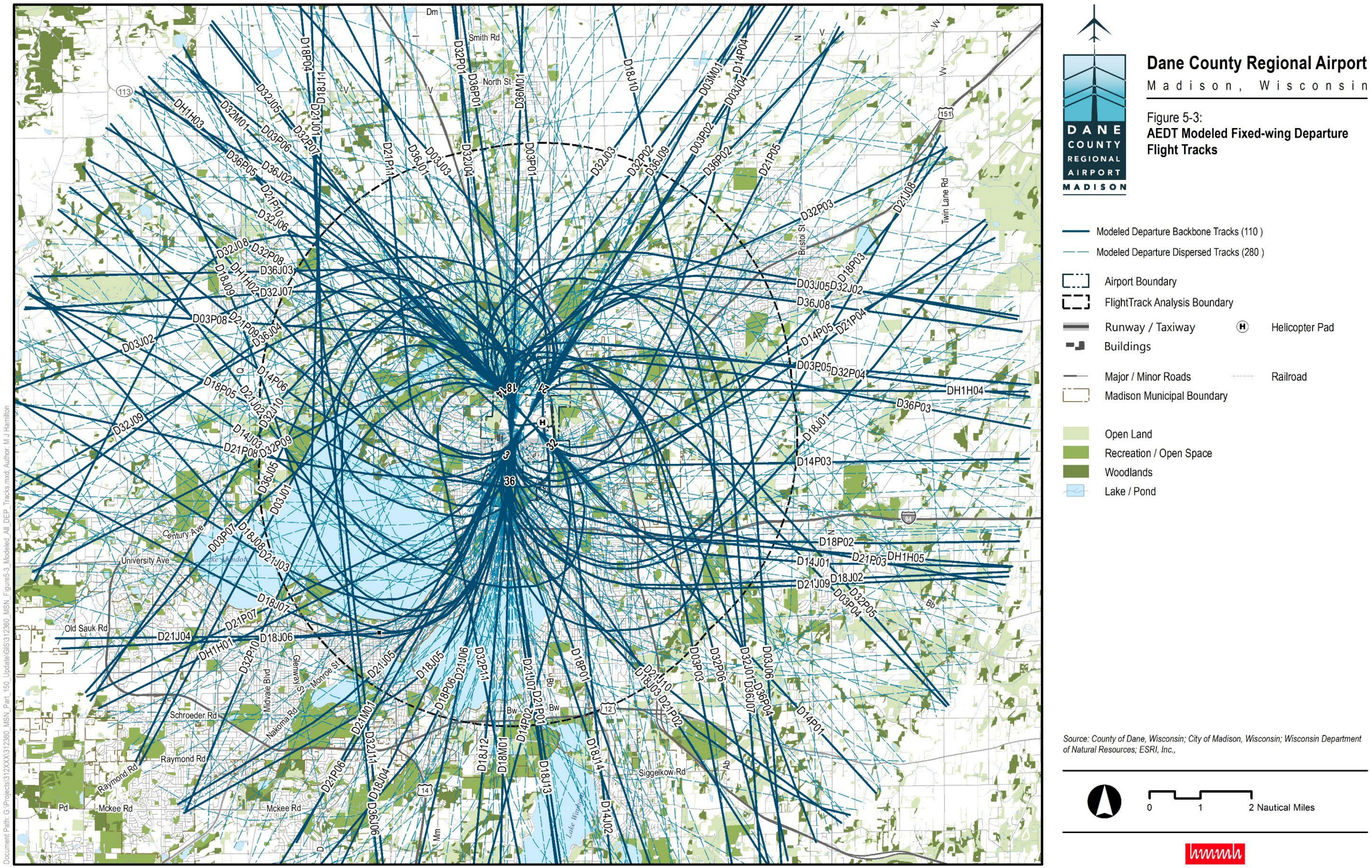

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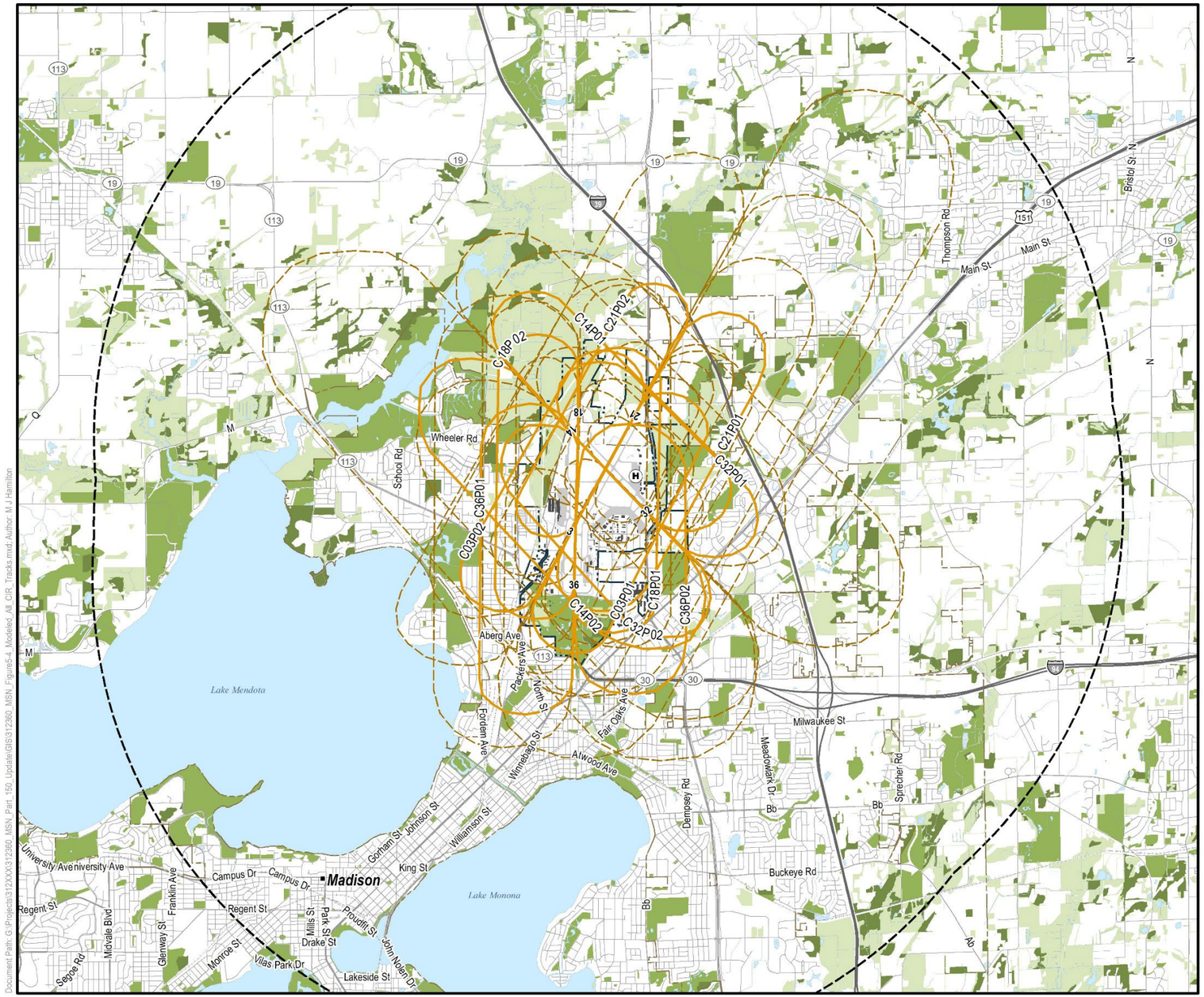
Figure 5-4. AEDT Modeled Fixed-wing Circuit Flight Tracks



Dane County Regional Airport
Madison, Wisconsin

Figure 5-4:
AEDT Modeled Fixed-wing Circuit Flight Tracks

- Modeled Circuit Backbone Tracks (12)
- Modeled Circuit Dispersed Tracks (26)
- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Helicopter Pad
- Buildings
- Major / Minor Roads
- Railroad
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond

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

0 0.5 1 Nautical Miles

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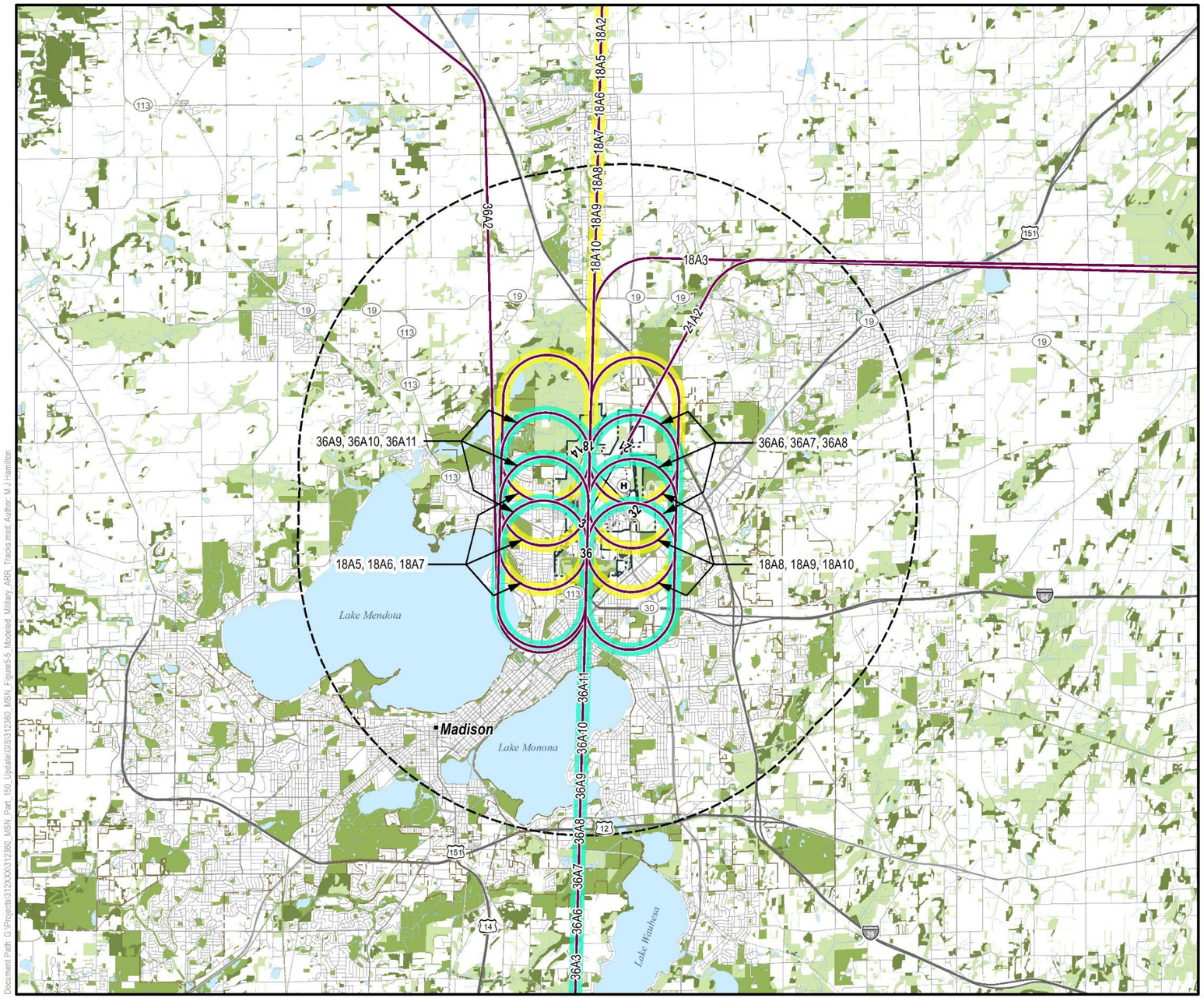
Figure 5-5. NMAP Modeled Fixed-wing Arrival Flight Tracks



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
- Helicopter Pad
- Buildings
- Major / Minor Roads
- Railroad
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond

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

0 1 2 Nautical Miles

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

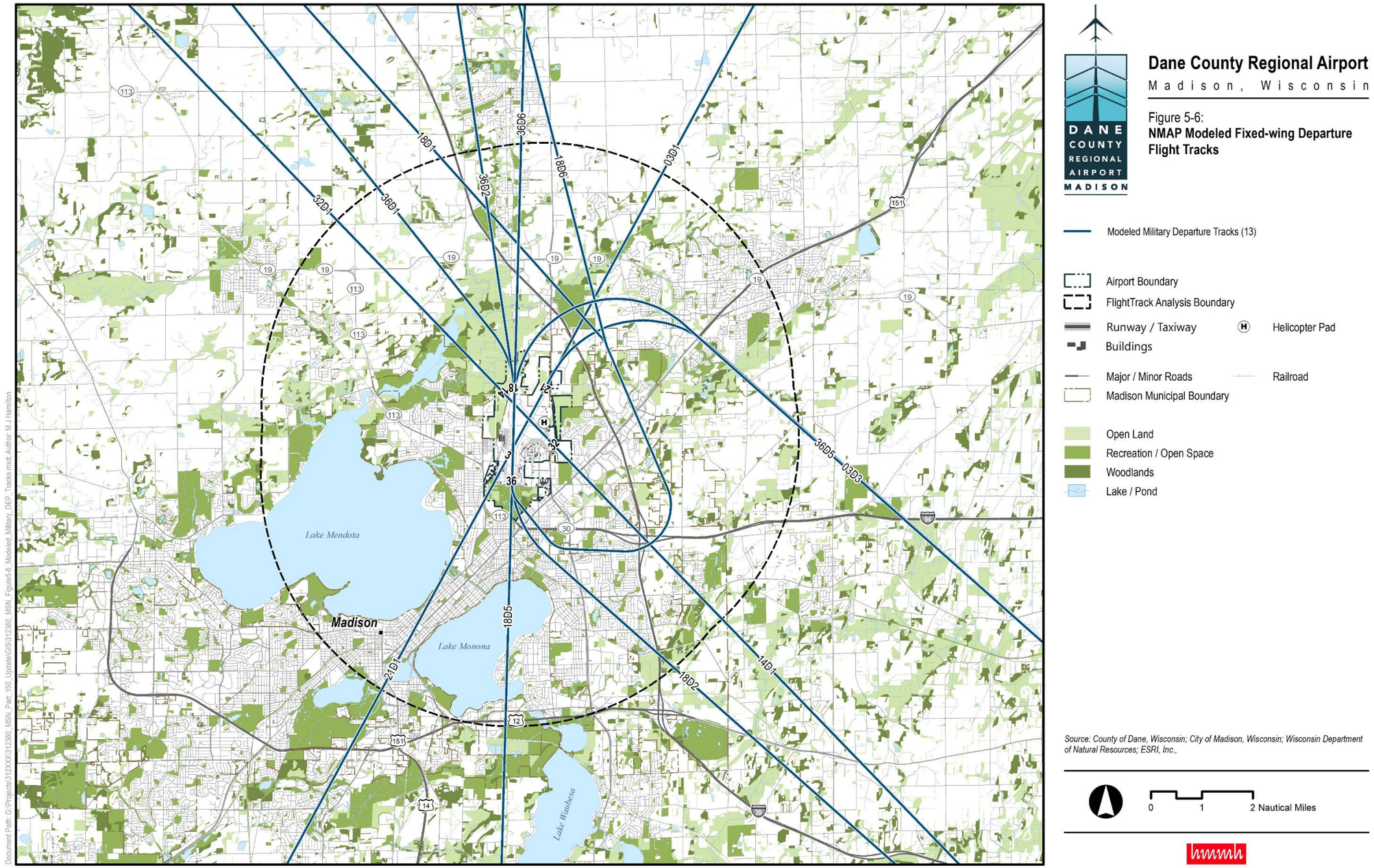

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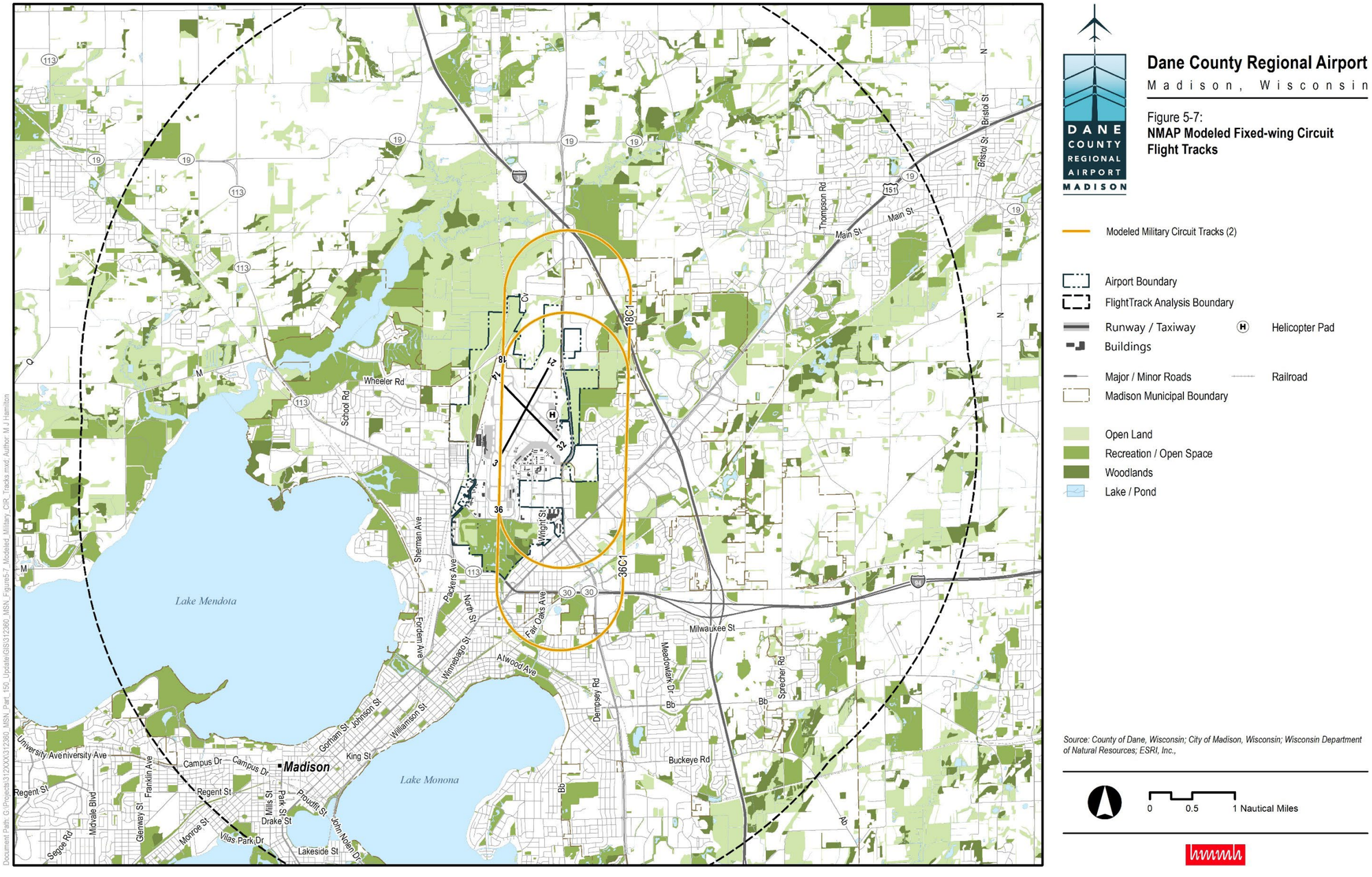
Figure 5-7. NMAP Modeled Fixed-wing Circuit Flight Tracks



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
- Helicopter Pad
- Buildings
- Major / Minor Roads
- Railroad
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond

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

0 0.5 1 Nautical Miles

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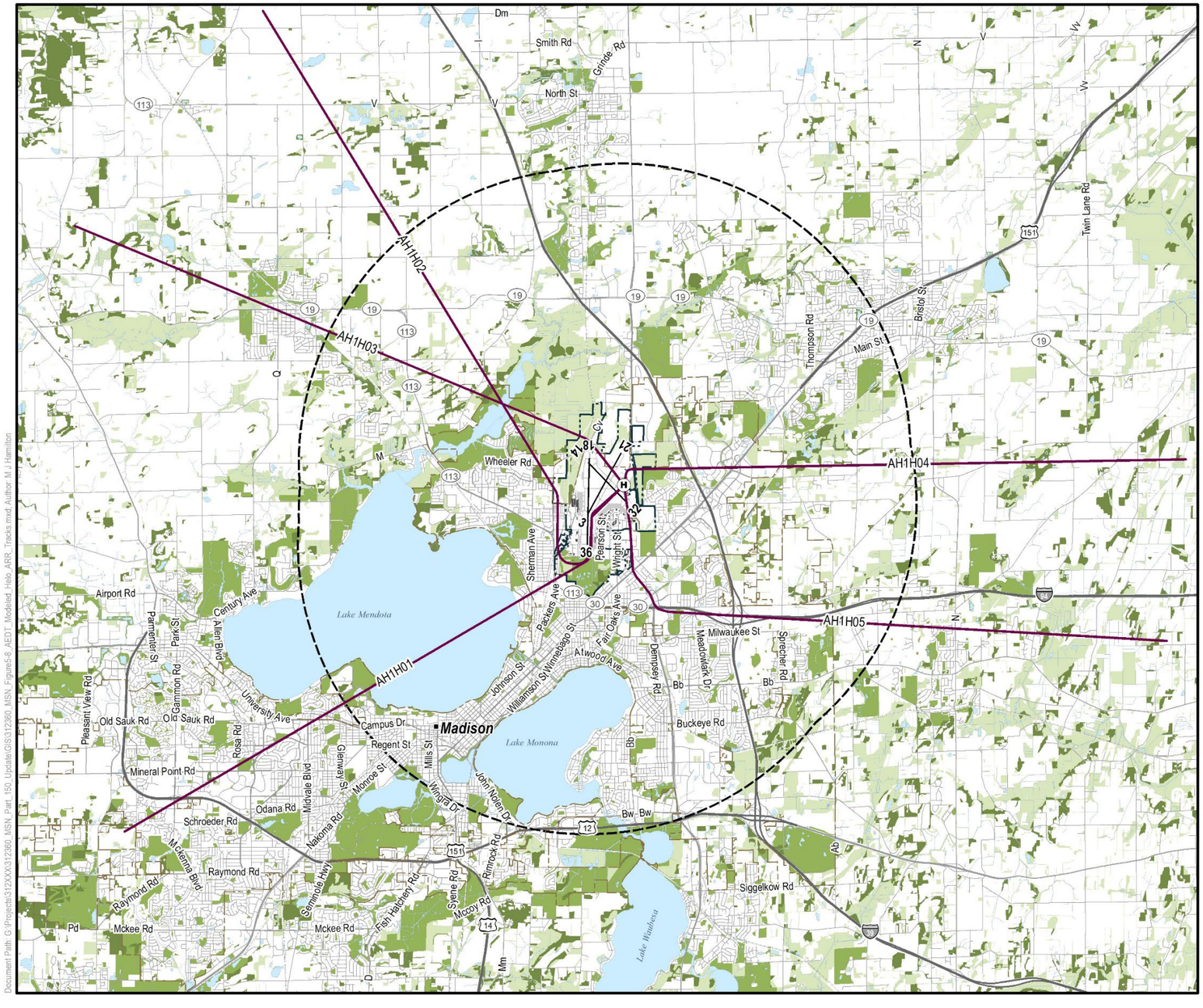
Figure 5-8. AEDT Modeled Helicopter Arrival Flight Tracks



Dane County Regional Airport
Madison, Wisconsin

Figure 5-8:
AEDT Modeled Helicopter Arrival Flight Tracks

- Modeled Arrival Backbone Tracks (5)
- Modeled Arrival Dispersed Tracks (0)
- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Helicopter Pad
- Buildings
- Major / Minor Roads
- Railroad
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond

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

0 1 2 Nautical Miles

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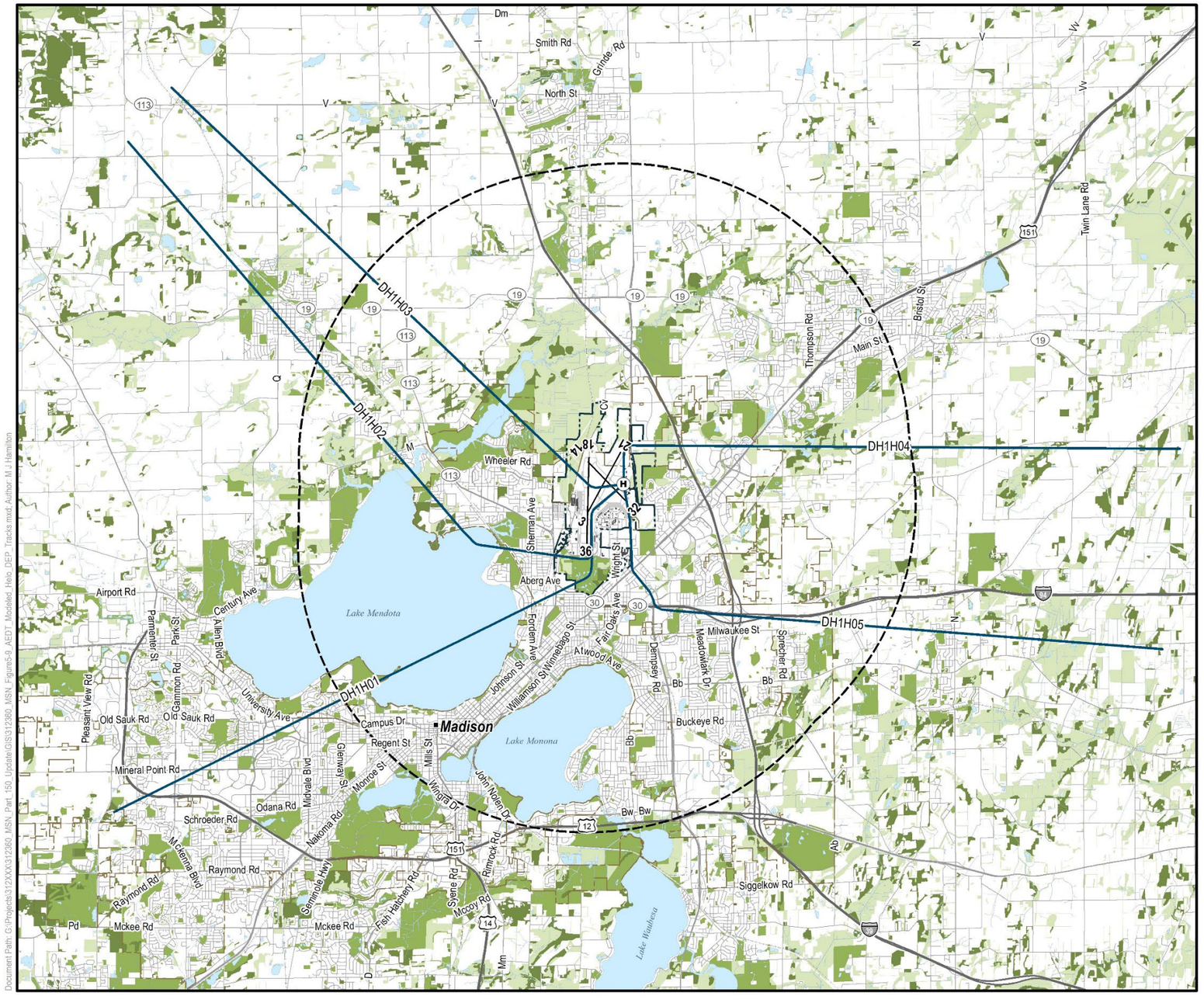
Figure 5-9. AEDT Modeled Helicopter Departure Flight Tracks



Dane County Regional Airport
Madison, Wisconsin

Figure 5-9:
AEDT Modeled Helicopter Departure Flight Tracks

- Modeled Departure Backbone Tracks (5)
- Modeled Departure Dispersed Tracks (0)
- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Helicopter Pad
- Buildings
- Major / Minor Roads
- Railroad
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond

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

0 1 2 Nautical Miles

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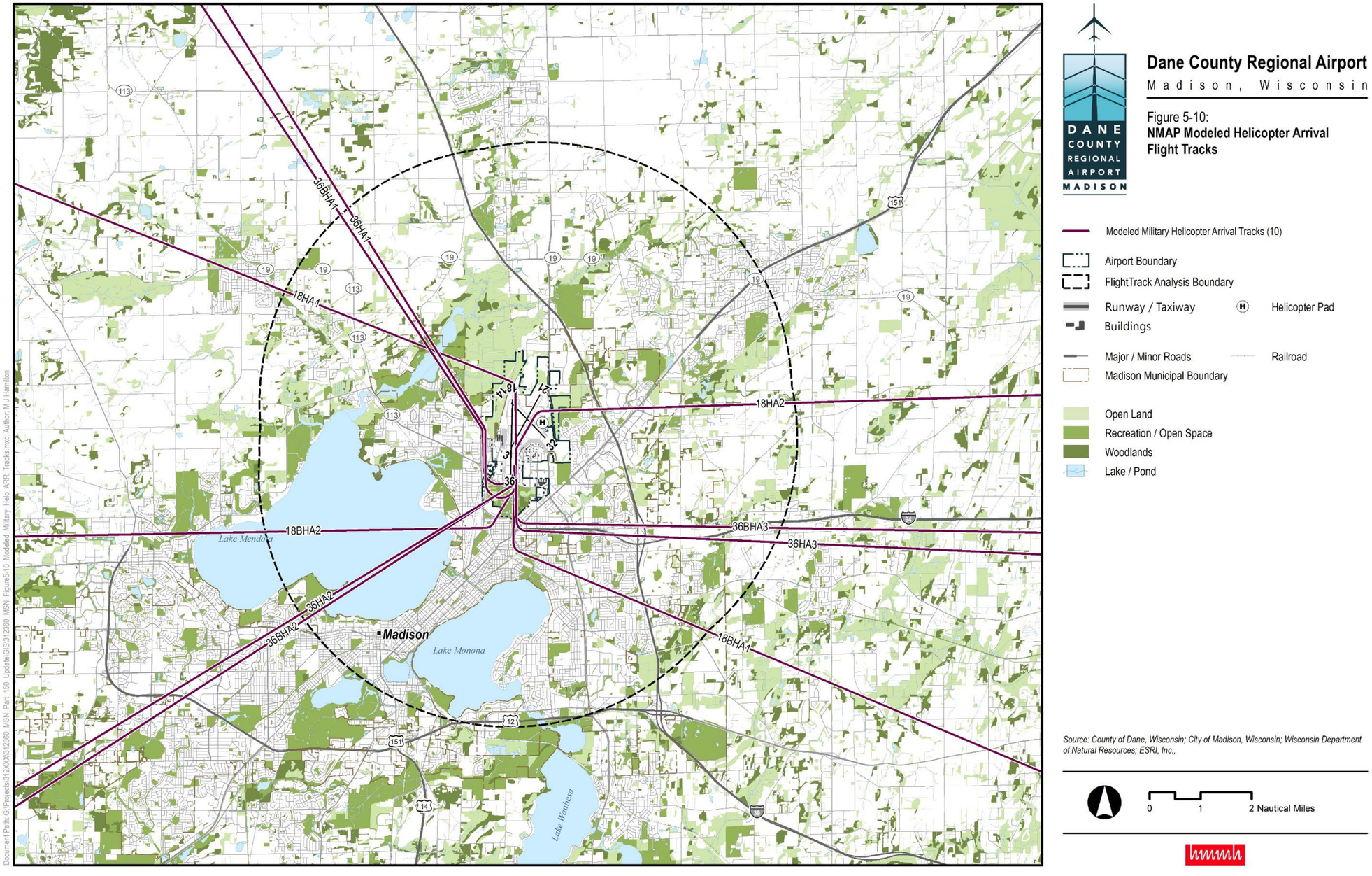
Figure 5-10. NMAP Modeled Helicopter Arrival Flight Tracks



Dane County Regional Airport
Madison, Wisconsin

Figure 5-10:
NMAP Modeled Helicopter Arrival Flight Tracks

- Modeled Military Helicopter Arrival Tracks (10)
- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Helicopter Pad
- Buildings
- Major / Minor Roads
- Railroad
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond

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

0 1 2 Nautical Miles

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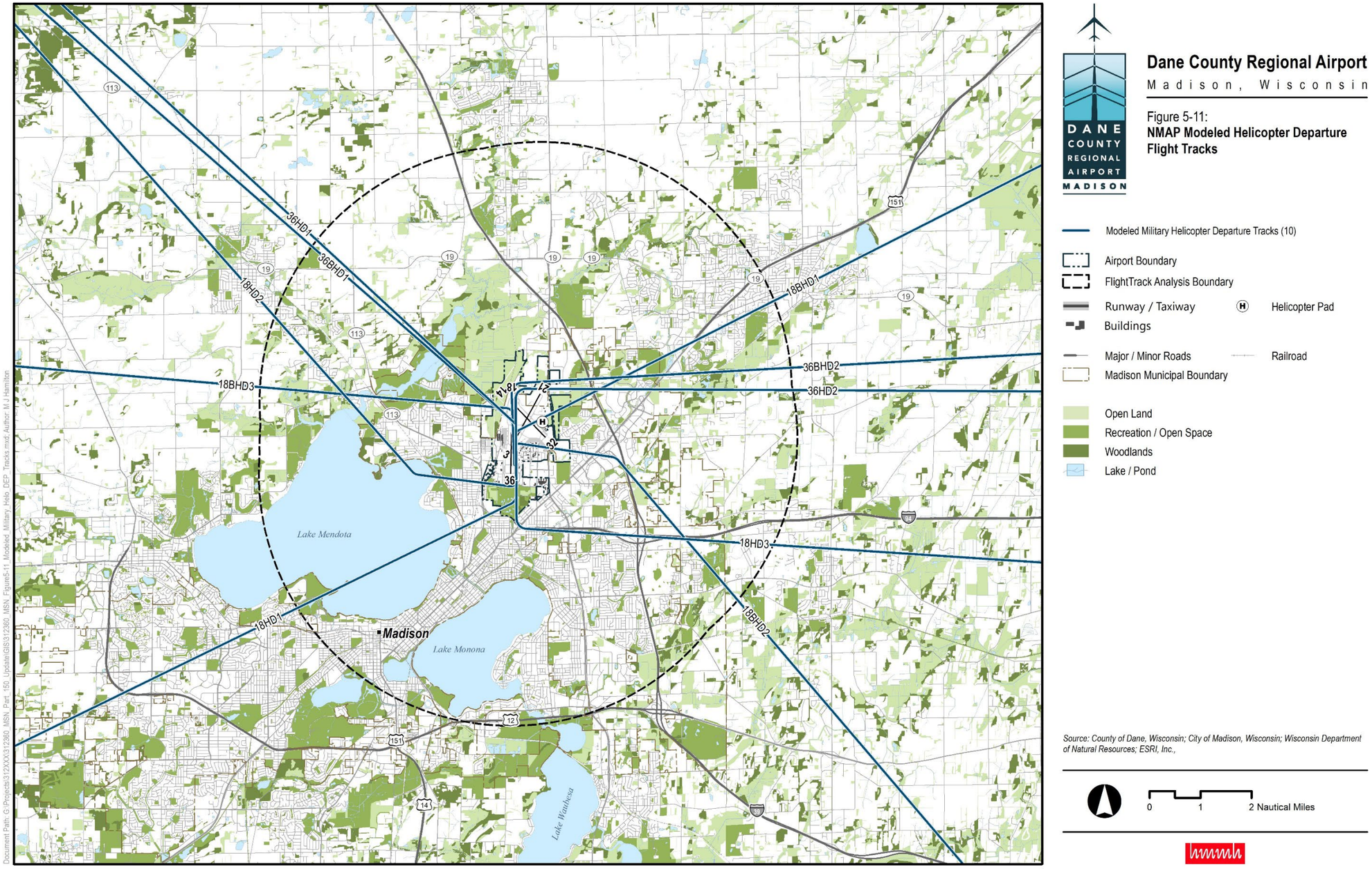
Figure 5-11. NMAP Modeled Helicopter Departure Flight Tracks



Dane County Regional Airport
Madison, Wisconsin

Figure 5-11:
NMAP Modeled Helicopter Departure Flight Tracks

- Modeled Military Helicopter Departure Tracks (10)
- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Helicopter Pad
- Buildings
- Major / Minor Roads
- Railroad
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond

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

0 1 2 Nautical Miles

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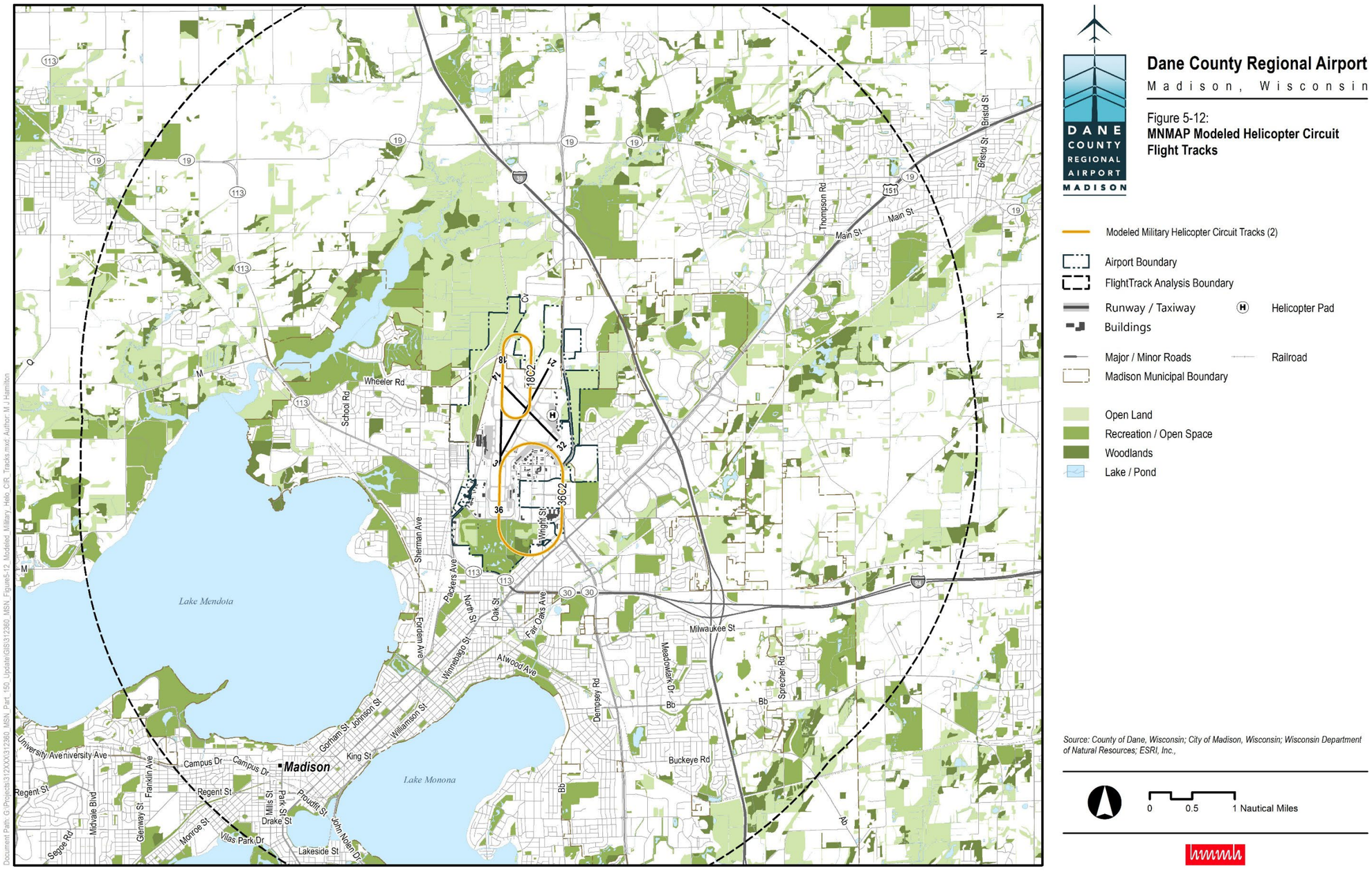
Figure 5-12. NMAP Modeled Helicopter Circuit Flight Tracks



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5.7 Aircraft Engine Runup Operations

Maintenance runups are rarely performed at MSN for civilian operations and were not included as an AEDT input as they would have no effect on the size and/or location of the aircraft noise exposure contours included on the Noise Exposure Maps.

For military aircraft, pre-flight, post-flight, arm/disarm, and engine maintenance runups are included in the modeling for the Air and Army National Guard. Data for the NMAP modeling was based on the modeling from the USAF F-35 EIS including updates based on data provided by the Air and Army National Guard.

Table 5-15 summarizes the annual aircraft engine runup activity modeled for 2022 and 2027, respectively. The data include the annual number of each runup type, as well as the locations, and magnetic headings of the aircraft where runups are conducted. The location and aircraft heading given in the table are depicted on Figure 5-13. Modeled Engine Runup Locations for the Wisconsin Air and Army National Guard.

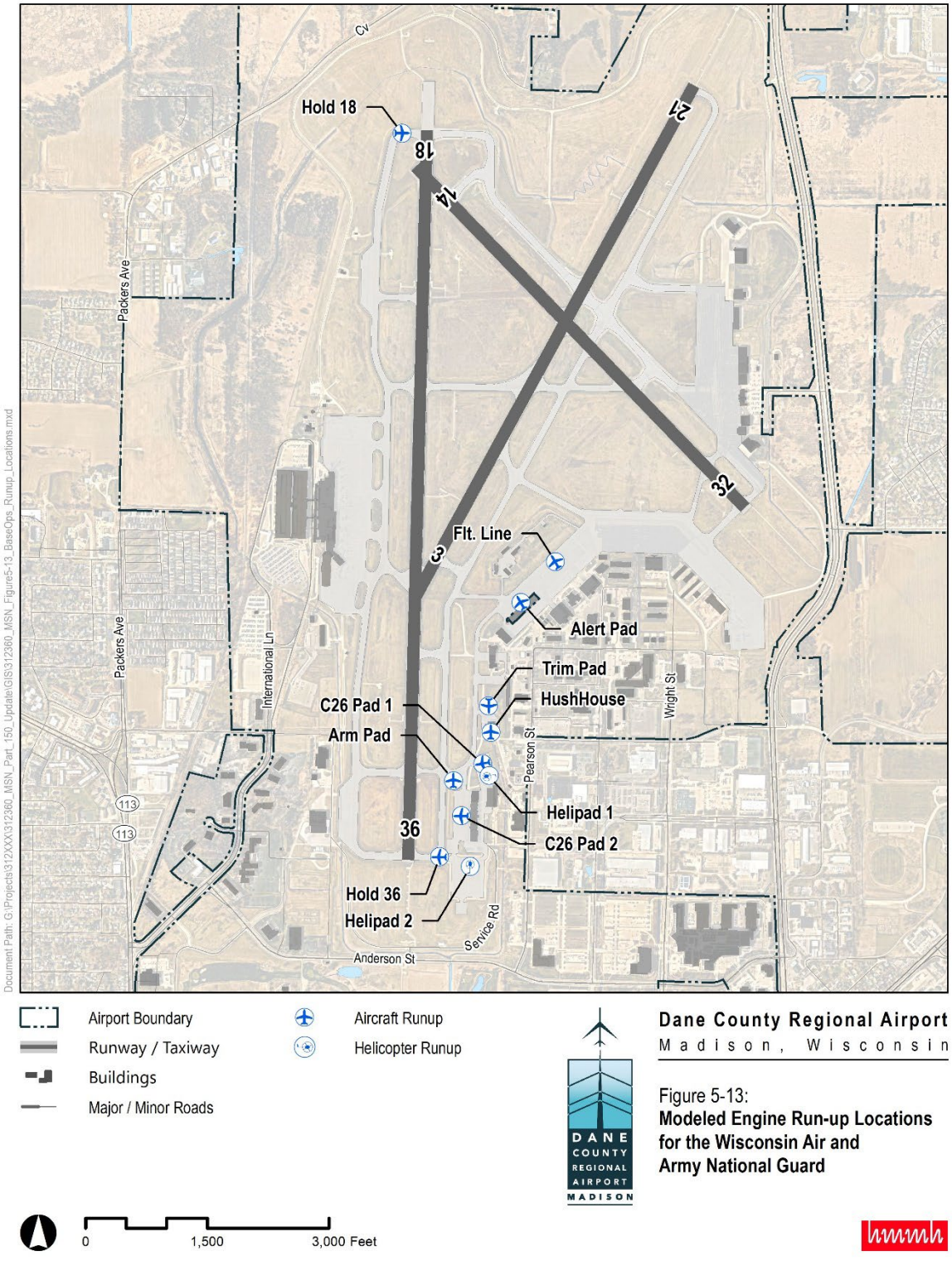
Except for the F-16C and F-35A, annual runup activity does not change between the existing and forecast years for military aircraft. With the F-16C aircraft, most maintenance runups are conducted in the hush house constructed as part of the current MSN Noise Compatibility Program. The hush house will not be used for the F-35A aircraft.

Table 5-15. Modeled Engine Runup Activity for the Wisconsin Air and Army National Guard

Source: Wisconsin Air and Army National Guard

Aircraft	Runup Description	Existing 2022		Forecast 2027		Location	Location %	Aircraft Heading (degree)
		Day (0700-2200)	Night (0700-2200)	Day (0700-2200)	Night (0700-2200)			
F-16C	Preflight I	1,443	42			Flt. Line	91%	330
						Alert Pad	9%	
	Preflight Arm	1,443	42			Arm Pad	100%	360
	Preflight II	1,443	42			Hold 18	35%	270
						Hold 36	65%	90
	Post Flight	1,443	42			Arm Pad	100%	360
	Interface Run	10	0			Flt. Line	30%	330
						Trim Pad	70%	180
	Interface Run - Engine Shop	7	0			Trim Pad	100%	180
	Interface Run II	3	0			Flt. Line	100%	330
	HH Interface Run I	15	0			Hush House	100%	360
	HH Interface Run II	144	0					
	High Power Run	17	0					
	Low Power Run	19	0					
	High Power Run - Engine Shop	29	0					
	Engine Shop, Leak Check	11	0					
	Interface Run - Engine Shop	25	0					
	Engine Shop	72	0					
F-35A	Preflight I			2,083	18	Flt. Line	91%	330
						Alert Pad	9%	330
	Preflight II			2,083	18	Hold 18	35%	270
						Hold 36	65%	90
	Post Flight			2,054	47	Alert Pad	100%	330
RC-26	Pre Flight	58	3	0	0	C26 Pad 1	10%	260
						C26 Pad 2	90%	270
C-26	Pre Flight	156	12	156	12	C26 Pad 1	10%	260
						C26 Pad 2	90%	270
UH-60	Pre Flight	1,030	10	1,190	10	Helipad 1	70%	260
						Helipad 2	30%	0

Figure 5-13. Modeled Engine Runup Locations for the Wisconsin Air and Army National Guard



5.8 Meteorological Data

The AEDT and NMAP have 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. NMAP used the AEDT default values for the study. The AEDT holds the following default values for annual average weather conditions at MSN and these values were used for all modeling:

- Temperature: 47.57° F
- Sea-level Pressure: 1016.43 millibars
- Relative Humidity: 71.59%
- Dew Point: 38.84° F
- Wind Speed: 6.34 Knots

5.9 Terrain Data

Terrain data describes the elevation of the ground surrounding the Airport and on airport property. The AEDT and NOISEMAP use terrain data to adjust the aircraft-to-ground path length, to take into account locations where terrain variation relative to the airfield makes the ground closer to or farther from the aircraft relative to flat-earth conditions. The terrain data does not change the aircraft's performance or noise levels but alters the vertical distance between the aircraft and a "receiver" on the ground. This affects assumptions about how noise propagates over ground. NOISEMAP, additionally uses terrain elevation data to account for hill and valley effects, and land cover data to account for ground impedance effects on sound propagation.

The terrain data used in AEDT and NOISEMAP were obtained from the United States Geological Survey (USGS) National Elevation Dataset with 1/3 arc second (approximately 33 feet) resolution covering the study area. The land cover data used in NOISEMAP were obtained from the USGS National Land Cover Database (NLCD) 2019 data. Terrain data was utilized in conjunction with the terrain features of the AEDT and NMAP to generate the noise contours for the existing condition.

6 2022 and 2027 Noise Exposure Maps

The fundamental elements of an NEM are the noise exposure contours representing 5-decibel-increment contours using the DNL metric for existing and forecast conditions (2022 and 2027, respectively), presented over land use maps depicting the airport layout, local land-use control jurisdictions, major land-use categories, discrete noise-sensitive "receptors," and other information required by Part 150.

This chapter presents the Dane County Regional Airport modeled aircraft noise exposure contours for calendar years 2022 and 2027 and the associated land use compatibility.

6.1 Noise Exposure Map Figures

Figure 6-1 and Figure 6-2 represent the public draft NEMs that are part of the 30-day NEM Public Comment Period. Upon review of comments received from the public and the FAA, Dane County will make adjustments where deemed appropriate based on Part 150 regulations, and plans to submit a Final NEM document under Part 150 for appropriate FAA review and determination of compliance, pursuant to §150.21.[23] As noted in item IV.D of Part 150 Noise Exposure Maps Checklist (the checklist), Part 150 requires that Noise Exposure Maps depict the 65, 70, and 75 DNL noise contours. The scale on these figures is 1 inch to 2,000 feet, which is the minimum scale as required by §A150.103(b)(1) of Part 150. The two figures contain all graphical elements that Part 150 requires on NEMs, with the exception of flight tracks, which Part 150 permits airports to submit in supplemental graphics (see Chapter 5, Section 5.4).

Figure 6-1 and Figure 6-2 present the NEM for existing (2022) and five-year forecast conditions (2027). Figure 6-3 shows both sets of NEM contours for easy comparison between the existing and forecast contour sets.

[23] Large-scale versions of these figures showing the Official Noise Exposure Maps, Figures 6-1 and 6-2, and the full extent of the study area can be found in the back pocket of this document in print.

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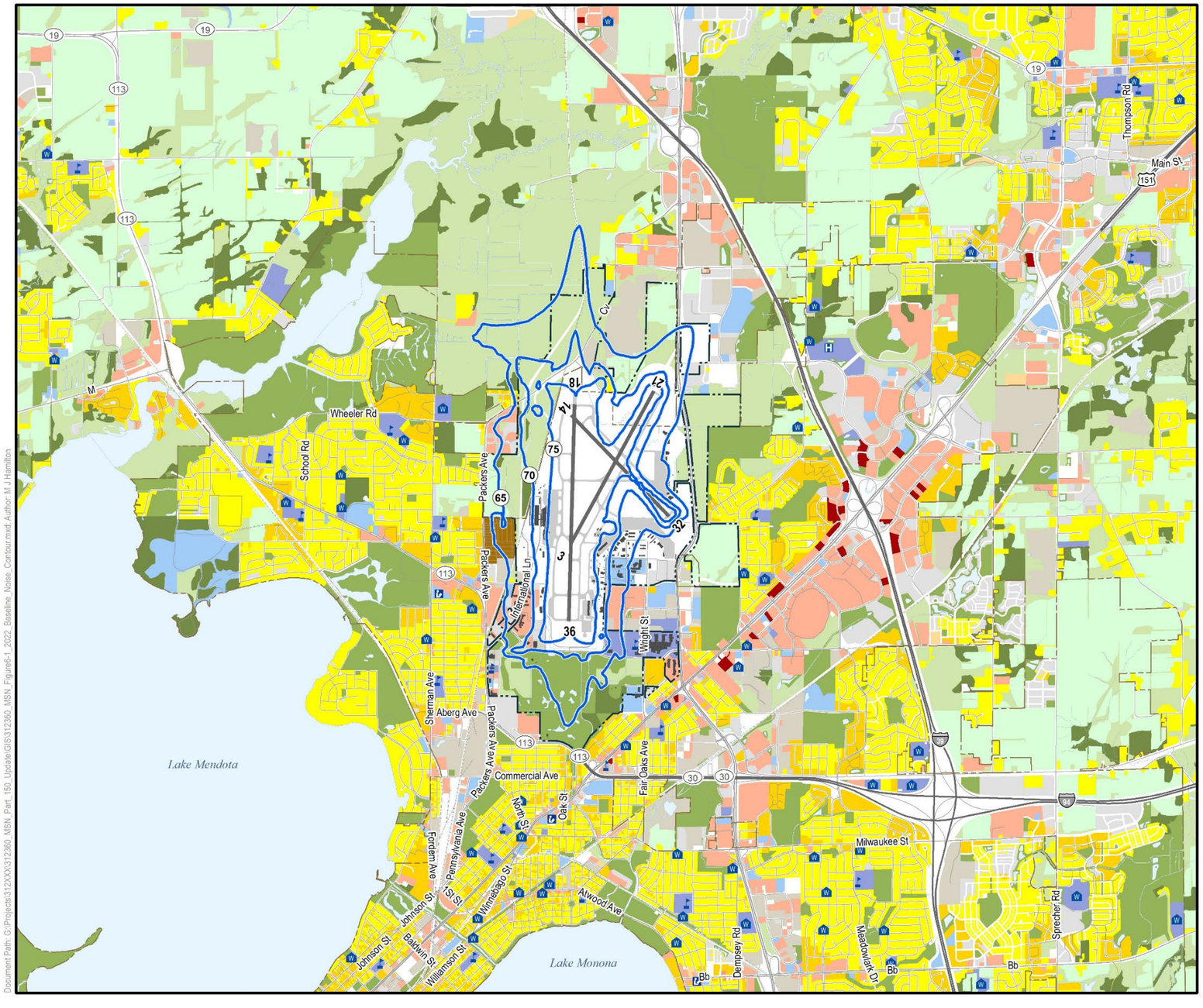
Figure 6-1. Existing Condition (2022) Noise Exposure Map



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
- Place of Worship
- Hospital
- Library

Draft

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

0 2,000 4,000 Feet

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Figure 6-2. Future Condition (2027) Noise Exposure Map

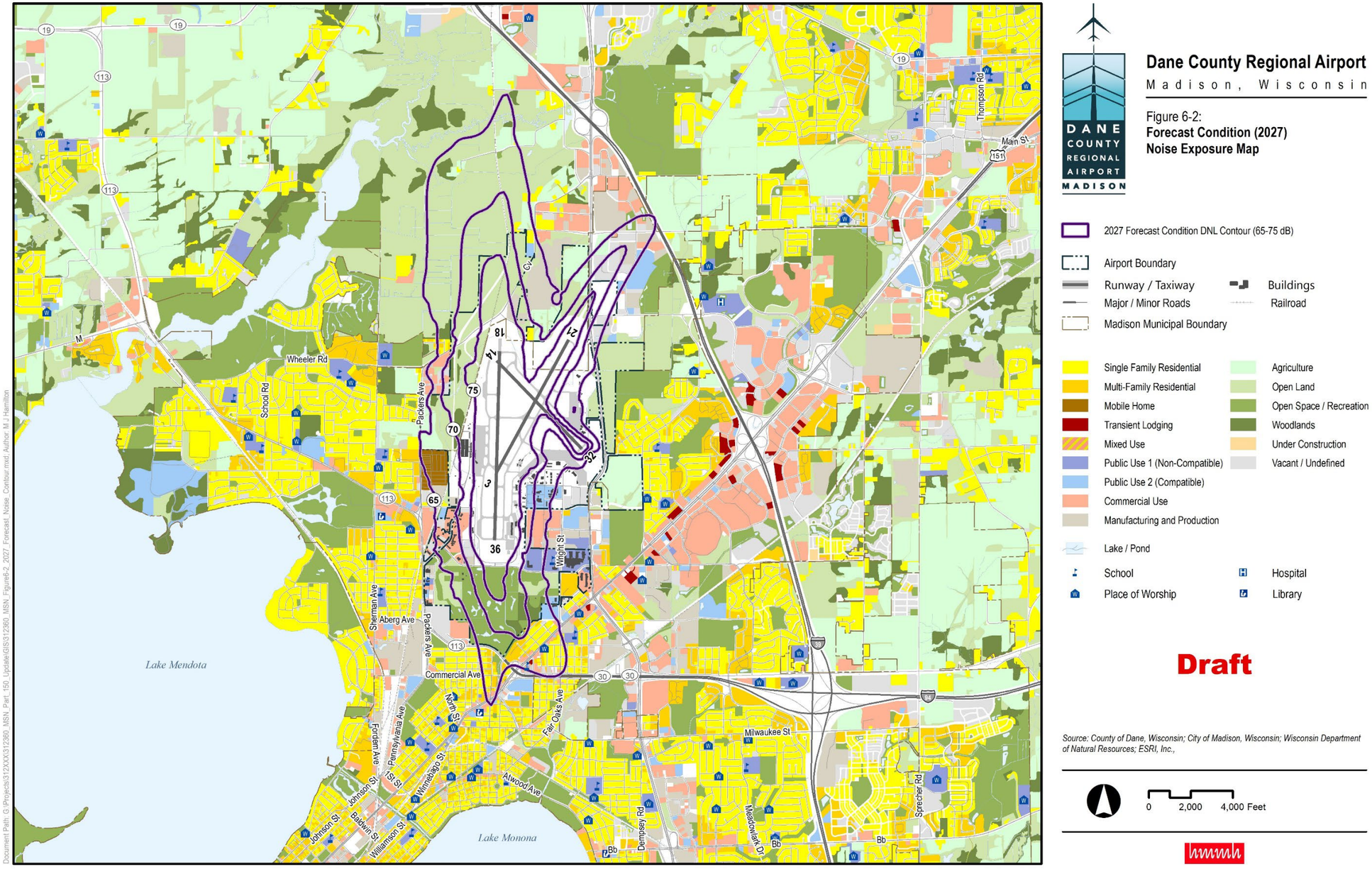

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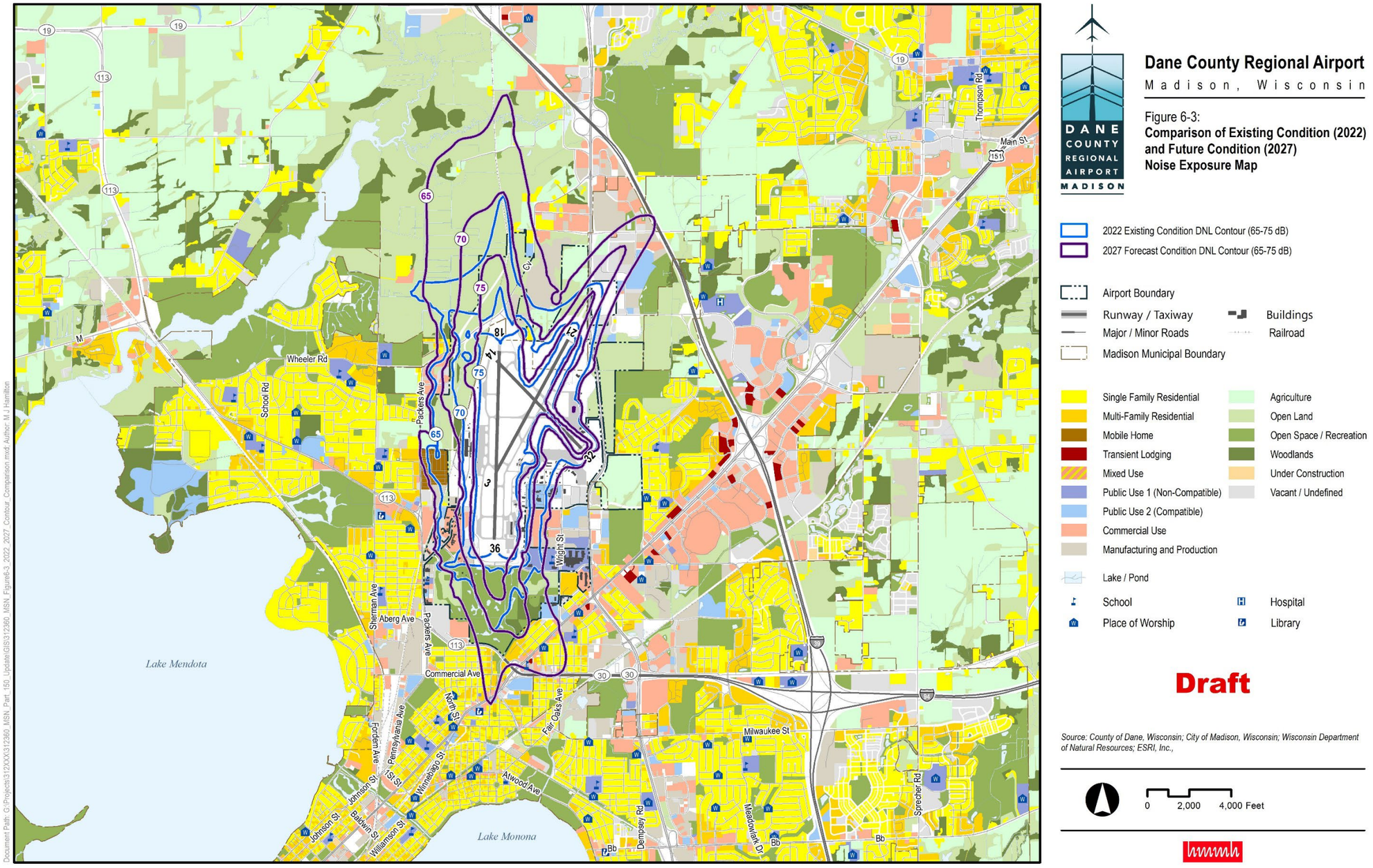
Figure 6-3. Comparison of Existing Condition (2022) and Future Condition (2027) Noise Exposure Map



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6.2 Land Use Compatibility within the 2022 and 2027 Noise Exposure Maps

As required under Part 150, land use compatibility analysis is summarized in Table 6-1 through 6-6, including the population and housing units within the 65 dB contour and noise sensitive parcels. The land use analysis shows that 1,250 residential units and three noise-sensitive parcels are potentially incompatible with noise from MSN aircraft operations in the 2027 forecast condition. The FAA considers all land uses compatible outside of the 65 DNL contour.

The 65 DNL contour is located completely within Dane County, WI. As shown in Figure 6-1 and Figure 6-2, the 65 DNL contours for both 2022 and 2027 extend off airport property in six areas

- North of Runway 18/36 is mostly open land and agricultural within both 65 DNL contours, but there are several single-family residential parcels within the 2027 65 DNL contour. There is also a single-family residential parcel on Messerschmidt Rd northeast of Runway 18/36 within both the 2022 and 2027 65 DNL contours.
- To the west of Runway 14/32 towards Packers Ave, there is a neighborhood of single and multi-family residential parcels north of County Highway C V that is partially within both 65 DNL contours. Compatible land uses within the contours are commercial, manufacturing, and vacant land.
- To the west of Runway 3/21, there is a mobile home neighborhood and a single-family residential parcel east of Packers Ave within both 65 DNL contours. A larger portion of the neighborhood is within the 2027 contour than the 2022 DNL contour. Other land uses in this area are compatible public use and manufacturing.
- The 65 DNL contour for 2022 does not extend off airport property to the south of Runway 18/36. The land use within the 65 DNL contour for 2027 is mostly single and multi-family residential parcels surrounding the Highway 30/US 151 interchange, including apartment complexes to the north of the interchange. Other incompatible land uses are a church, a day care center, and a motel, all along US 151. The few compatible land uses within the contour are commercial, manufacturing, and public use to the east of the interchange.
- To the east of Runway 18/36, the land use is commercial and manufacturing in the small area that extends from Pearson St. to Hoffman St. within both 65 DNL contours. A portion of Madison Area Technical College is also within the 65 DNL contours.
- To the northeast of Runway 3/21, all land within the 65 DNL contour for 2022 is vacant. The area within the 65 DNL contour for 2027 extends to I-39 and includes compatible land uses such as commercial, manufacturing, industrial, agricultural, public use, and vacant land.

Table 6-1. Baseline 2022 Land Use Compatibility

Source: HMMH, 2022

Contour Interval	Population Census 2020	Housing Units	Area (Acres)
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**

Table 6-2. Forecast 2027 Land Use Compatibility

Source: HMMH, 2022

Contour Interval	Population Census 2020	Housing Units	Area (Acres)
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**

Table 6-3. Baseline 2022 Noise Sensitive Sites

Source: HMMH, 2022

Contour Interval	Schools	Place of Worship	Library	Day Care	Hospital/ Medical Center	College/ University	Historic
65-70 DNL	0	0	0	0	0	0	0
70-75 DNL	0	0	0	0	0	1	0
>75 DNL	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Table 6-4. Forecast 2027 Noise Sensitive Sites

Source: HMMH, 2022

Contour Interval	Schools	Place of Worship	Library	Day Care	Hospital/ Medical Center	College/ University	Historic
65-70 DNL	0	1	0	1	0	0	0
70-75 DNL	0	0	0	0	0	1	0
>75 DNL	0	0	0	0	0	0	0
Total	**0**	**1**	**0**	**1**	**0**	**1**	**0**

Table 6-5. Noise Sensitive Sites within 2022 70 DNL Contour

Source: HMMH, 2022

Contour Interval	Noise Sensitive Site	Type	Address
70-75 DNL	Madison Area Technical College	School	1701 Wright St, Madison, WI 53704

Table 6-6. Noise Sensitive Sites within 2027 65-70 DNL Contour

Source: HMMH, 2022

Contour Interval	Noise Sensitive Site	Type	Address
65-70 DNL	Claudis Kids Inc-Day Care Center	Day Care	3131 E Washington Ave, Madison, WI 53704
65-70 DNL	Ridgeway Church	Place of Worship	3245 E Washington Ave, Madison, WI 53704
70-75 DNL	Madison Area Technical College	School	1701 Wright St, Madison, WI 53704

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7 Stakeholder Engagement

One of the opportunities afforded by an update to the MSN Part 150, including the NEM, is stakeholder engagement. This chapter describes outreach efforts conducted throughout the development of the NEM to engage airport stakeholders. Stakeholders and those interested in aircraft noise compatibility planning were afforded an ongoing opportunity to learn about the Study and provide comments. This occurred through various mechanisms, including a TAC, a project website, project newsletters, public draft documents, public open houses, and a 30-day public comment period. The County formed a TAC to ensure the key stakeholders remained engaged in the process and to efficiently keep them apprised of the progress and results.

7.1 Technical Advisory Committee

Part 150 studies benefit from the creation and participation of a TAC. Representatives invited to serve on the TAC represent their respective groups and/or constituencies. The TAC intends to bring a broad range of stakeholder perspectives to the Study. TAC members participate in regular meetings, distribute information about the Study to their constituencies/ organizations, and review technical components of the Study. The TAC's role is advisory in nature; members do not have decision-making authority over elements of the Study. That is, the TAC may offer opinions, advice, and guidance to the Study, but MSN retained the sole discretion to accept or reject the TAC recommendations in accordance with 14 CFR Part 150.

TAC membership includes:

- MSN staff
- WBOA staff
- FAA Airport District Office (ADO)
- FAA air traffic control tower (ATCT)
- 115th Fighter Wing of the WIANG
- 64th Troop Command of the WIARNG
- Airport tenants, users, and operators
- Local land use jurisdictions

Table 7-1 provides the list of member organizations that were invited to participate on the TAC. on the regulations governing the stakeholder consultation portions of the Part 150 process are found at 14 CFR 150.21 (b) and 14 CFR 150.105(a). While a TAC is not specifically described in Part 150, the Dane County Regional Airport and WBOA created a TAC as part of this Part 150 study in an effort to provide robust outreach and feedback related to all aspects of the study. Not all member organizations invited to the TAC chose to send a representative, but a broad range of representatives took part, and all members were invited to each meeting whether or not they attended previous meetings.

Table 7-1. Member Organizations on the Technical Advisory Committee
Source: HMMH

States, Public Agencies or Planning Agencies	FAA Regional Officials	Regular Aeronautical Users of the Airport
• Dane County Regional Airport • Dane County Department of Planning and Development • City of Madison Planning Division • Township of Burke*	• FAA Airport Traffic Control Tower (ATCT) • Great Lakes Regional Airports District Office (ADO)	• 115th Fighter Wing of the Wisconsin Air National Guard • Wisconsin Army National Guard • Delta Airlines • Wisconsin Aviation
* Invited but has not attended as of October 20, 2022		

MSN scheduled TAC meetings for which the Study Team served as meeting facilitators, presented information, and engaged the members in appropriate discussions to assist in the validation of the collected information. Major topics discussed at each of the TAC meetings are presented in Table 7-2. Slides from TAC meeting presentations and the meeting summaries are provided in **Appendix D**.

Table 7-2. Meeting Topics of the Technical Advisory Committee
Source: HMMH, 2022

TAC Meeting #	Date	Topics Covered
1	4/26/2022	Overview of the Part 150 process, the TAC, and roles and responsibilities
2	7/26/2022	Operations forecast development, noise model inputs, military noise modeling, land use, NCP review
3	10/18/2022	Final noise model inputs, preliminary draft noise exposure maps, existing NCP review, public workshop

7.2 Public Open Houses

Members of the public were given opportunities to follow the Study's progress and provide input. The public is encouraged to stay abreast of progress by visiting the Study website, reviewing the project newsletters, participating in the public open houses, and submitting comments on the Study.

The County posted public open house notices to the Study website and social media accounts. They informed TAC members and elected officials about the public open houses. The Study Team worked with the County to identify open house location, manage logistics, and ensure that the meeting space was Americans with Disabilities Act (ADA) compliant.

The Study Team members as well as MSN and Wisconsin Bureau of Aeronautics (WBOA) staff served as facilitators at various stations at the public open houses to discuss the project and answer questions from the public. The first public open house was held at the beginning of the study to introduce the Part 150 process and schedule. The second will occur during the public comment period for the NEM document and will present information on the aviation forecast, and the draft NEM document, with a focus on the resulting noise exposure contours and land use compatibility. The public open house events are summarized in Table 7-3. All open house materials are provided in **Appendix D**.

Table 7-3. Public Meetings
Source: HMMH, 2022

Meeting	Date	Topics Covered
Open House #1	4/26/2022	Open House provided overview of the Part 150 process, the TAC, noise metrics, and roles and responsibilities of all interested stakeholders
Open House #2 (NEM Results)	11/14/2022	Public workshop to present the results of the Part 150 Update and the draft NEM Report prior to submittal to the FAA

7.3 Public Review and Comment on the Draft NEM Report

MSN is providing the draft NEM document for public review and comment from November 11, 2022 through December 12, 2022. An electronic version of the full draft NEM document is posted on the Study website for the public review period. A hard copy (printed paper edition) of the draft NEM document can be viewed at the MSN offices in the Airport terminal building. The draft Part 150 document is available for public review at the following locations:

- On the MSN website, at https://www.msnairport.com/about/ecomentality/Part-150-Study
- At the MSN offices, 4000 International Lane, Madison, WI 53704, during normal business hours
- Madison Public Library – Lakeview, 2845 North Sherman Avenue, Madison, WI 53704

The draft NEM document is the primary topic of the second public open house, to be held on November 14, 2022. The open house and draft NEM document availability and comment period will be publicized through the Study website, a newsletter, airport social media accounts, and the TAC membership.

Public comments can be submitted in writing at the public open house or through the project email address (part150study@msnairport.com) anytime throughout the project duration. The final NEM will include all public comments received prior to the close of the public comment period for the NEM document.

7.4 Project Newsletters

The Study Team prepared two newsletters. The first newsletter introduced the study and summarized the first public open house. The second newsletter summarized the NEM results and publicized the second public open house. The newsletters were posted to the study website. Copies of the newsletters are provided in **Appendix D**.

7.5 Project Website

The MSN Part 150 Study website is found at https://www.msnairport.com/about/ecomentality/Part-150-Study. All Study-related information and resources are posted on this site.