Noise Exposure Map Update and Noise Compatibility Program Amendments

Piedmont Triad International Airport

HMMH Report No. 310081
November 2020

Prepared for:

PIEDMONT TRIAD AIRPORT AUTHORITY

Piedmont Triad Airport Authority
1000A Ted Johnson Parkway
Greensboro, NC 27409

Draft – Subject to Change

Noise Exposure Map Update and Noise Compatibility Program Amendments

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

Piedmont Triad International Airport

HMMH Report No. 310081

November 2020

Prepared for:

Piedmont Triad Airport Authority
1000A Ted Johnson Parkway
Greensboro, NC 27409

Prepared by:

Gene Reindel, Robert Mentzer, and Kate Larson

HMMH
700 District Avenue, Suite 800
Burlington, MA 01803
T 781.229.0707
F 781.229.7939

Executive Summary

The Piedmont Triad Airport Authority (PTAA) is committed to being a good neighbor and a responsible operator of the Piedmont Triad International Airport (PTI). The most comprehensive way an airport addresses noise is through the Airport Noise Compatibility Program under Title 14 of the Code of Federal Regulations Part 150 ("Part 150"). A Part 150 Study is a voluntary, federally-funded and federally-supervised program that helps airports find ways to reduce noncompatible land uses by analyzing current and future airport use.

A Part 150 Study includes 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 situation. 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 proposes to undertake to minimize existing and future noise and land use incompatibilities.

PTAA completed the original Part 150 Study for PTI in 2007 (including NEMs for 2006 and 2014 and a full NCP), which was submitted to the Federal Aviation Administration (FAA) in 2007. In response, the FAA provided a Record of Approval (ROA) for the 20 PTAA-recommended NCP measures, which approved, in whole or in part, all 20 PTAA-recommended NCP measures.

This document presents the results of the Part 150 Update PTAA conducted at PTI to quantify noise exposure from aircraft operations, assess compatibility of land uses around the airport, and evaluate the current NCP measures to determine their continued effectiveness in reducing noncompatible land uses. This Part 150 Update assesses noise exposure resulting from the existing condition (2020) and a five-year forecast condition (2025) and recommends amending the FAA-approved NCP measures. The Part 150 Update is part of the broader effort to address noise exposure resulting from PTI aircraft operations; it covers a study area that includes PTI and surrounding communities in Forsyth and Guilford Counties.

Noise Exposure Map Update

The fundamental elements of a Noise Exposure Map are the noise exposure contours for existing and five-year forecast conditions, presented over base 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. The 2020 and 2025 noise exposure contours are presented below in Figure ES-1-1 and Figure ES-1-2 and in Chapter 7 of this document.[1] As shown on the figures and documented in Chapter 7, all land uses are compatible for both the existing and the forecast conditions.

[1] Large-scale versions of these figures showing the Official Noise Exposure Maps, Figures 7-1 and 7-2, can be found in Attachment C to this document in the electronic version or in the back pocket of this document in print.

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: ES-1

Existing Conditions (2020) Noise Exposure Map

- 2020 DNL 65-75 Contours
- 2020 DNL 60 Contour (Informational Only)
- Airport Boundary
- Airport Buildings
- Runway
- Taxiway / Apron
- Helicopter Pad
- Run-Up Location
- Permanent Monitor Sites
- Municipal Boundary
- Highways
- Major Roads
- Local Roads
- Railroad
- Stream / Creek
- School
- Library
- Place of Worship
- Hospital / Health Care
- Residential Use
- Commercial Use
- Multi-Family Residential Use
- Manufacturing / Production
- Mobile Home
- Golf Course
- Transient Lodging
- Recreational / Open Space
- Mixed Use
- Transportation / Utility
- Public Use 1
- Vacant / Undeveloped
- Public Use 2
- Water

Note: Entire area depicted on the figure is within Guilford County and the City of Greensboro and High Point, The City of Greensboro and High Point have jurisdictional and land use control.

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

0 2,000 4,000 Feet

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_FigureES-1_2020_Noise_Contour.mxd Author: MJHamilton

This page intentionally left blank.

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: ES-2

Forecast Conditions (2025) Noise Exposure Map

- 2025 DNL 65-75 Contours
- 2025 DNL 60 Contour (Informational Only)
- Airport Boundary
- Runway
- Helicopter Pad
- Permanent Monitor Sites
- Municipal Boundary
- Airport Buildings
- Taxiway / Apron
- Run-Up Location
- Highways
- Major Roads
- Local Roads
- Railroad
- Stream / Creek
- School
- Library
- Place of Worship
- Hospital / Health Care
- Residential Use
- Multi-Family Residential Use
- Mobile Home
- Transient Lodging
- Mixed Use
- Public Use 1
- Public Use 2
- Commercial Use
- Manufacturing / Production
- Golf Course
- Recreational / Open Space
- Transportation / Utility
- Vacant / Undeveloped
- Water

Note: Entire area depicted on the figure is within Guilford County and the City of Greensboro and High Point, The City of Greensboro and High Point have jurisdictional and land use control.

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

0 2,000 4,000 Feet

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_FigureES-2_2025_Noise_Contour.mxd Author: MJHamilton

This page intentionally left blank.

Noise Compatibility Program Amendments

In accordance with Part 150 regulations, PTAA developed an NCP in 2007 to improve the aircraft noise and land use compatibility around PTI.[2] The PTI NCP includes three categories of measures: (1) noise abatement measures intended to reduce aircraft noise at the source, (2) land use measures intended to mitigate existing non-compatible land uses and to discourage the introduction of new non-compatible land uses and (3) program measures intended to implement and monitor compliance with the PTI NCP.

As part of the 2020 Part 150 Update, the implementation status and compliance with each of the 20 PTAA-recommended and FAA-approved NCP measures was determined and is provided in Chapter 4. PTAA is not intending, at this time, to do a full NCP update, but rather to amend the existing NCP measures where necessary. The PTAA-recommended NCP amendments are provided in Chapter 8 and summarized in the following sections. The complete set of existing NCP measures is shown in the diagram below.

Noise Abatement Measures	Land Use Measures	Programmatic Measures
1. Evaluate Noise Barriers * 2. Preferred Night Runway Use ** 3. Night Runway Use Assignments ** 4. Night Southbound Departure Corridor from Runway 23L ** 5. Night Departure Procedures from Runway 23R ** 6. Night Northbound Departure Corridor from Runway 23L ** 8. Departures from Runway 05L ** 9. Departures from Runway 05R ** 10. Restrictions on Use of APUs 11. Noise Abatement Departure Profiles ** 12. Noise Abatement Approach Procedure ** 13. Altitude for Downwind Legs **	1. Acquire Noise-Sensitive Properties where DNL Exceeds 70 dB 2. Sound Insulation of Noise-Sensitive Structures where DNL Exceeds 65 dB 3. Optional Acquisition of Avigation Easements for Noise-Sensitive Structures where DNL Exceeds 65 dB 4. Other Assistance for Owners of Residential Property where DNL Exceeds 65 dB * 5. Pursue Compatible Use Zoning where DNL Exceeds 65 dB	1. Establish a Noise Monitoring Function at PTI 2. Publish DNL Contours at 60 dB and Above 3. Install and Operate an Aircraft Noise and Operations Monitoring System

Note: There is no Noise Abatement Measure number 7 since it was included in Noise Abatement Measure number 5 during the course of the original study.
** - Approved for further study.*
*** - Approved as voluntary measures subject to traffic, weather, and airspace safety and efficiency.*

Noise Abatement Measures

PTAA recommended and the FAA approved 12 noise abatement measures in the 2007 PTI NCP. For the 2020 amended NCP, PTAA recommends that six (6) remain as written, three (3) be amended, and three (3) be eliminated, resulting in a remaining set of nine (9) recommended noise abatement measures. Table ES-1 provides a summary of the original and amended noise abatement (NA) measures.

[2] The FAA Record of Approval (ROA) for the NCP is provided in Appendix B

Table ES-1 Existing Noise Abatement Measures and Recommended Amendments
Source: PTAA and HMMH, 2020

Original Number	Noise Abatement Measure	Amended Number	Recommended Amendment
NA-1	Evaluate Noise Barriers	NA-1	No change
NA-2	Preferred Night Runway Use	NA-2	Clarify description
NA-3	Night Runway Use Assignments	--	Eliminate
NA-4	Night Southbound Departure Corridor from Runway 23L	NA-3	Include northeast destinations and initiate development of an RNAV procedure
NA-5	Night Departure Procedures from Runway 23R	NA-4	Incorporate NA-3, Item 5
NA-6	Night Northbound Departure Corridor from Runway 23L	--	Eliminate
NA-7	Not Applicable	--	--
NA-8	Departures from Runway 5L	NA-5	No change
NA-9	Departures from Runway 5R	NA-6	No change
NA-10	Restrictions on Use of APUs	NA-7	No change
NA-11	Noise Abatement Departure Profiles	--	Eliminate
NA-12	Noise Abatement Approach Procedures	NA-8	No change
NA-13	Altitude for Downwind Legs	NA-9	No change

Land Use Measures

PTAA recommended and the FAA approved five (5) land use measures in the 2007 PTI NCP. Table ES 2 summarizes those original land use measures and provides the PTAA recommendations for amendments. Two of the measures (LU-1 and LU-2) were implemented for eligible properties within the 65 DNL contour from the FAA's 2001 Record of Decision (ROD) for the Environmental Impact Statement for Proposed Runway 5L/23R. PTAA has acquired all the parcels intended under LU-1 and is in the final phase of the residential sound insulation program as required by the FAA's ROD. PTAA preferred to acquire land and sound insulate residential properties over acquiring avigation easements (LU-3) or providing sales/purchase assistance (LU-4). With the expected pending completion of the residential sound insulation program and the results of the NEM update resulting in no non-compatible land uses associated with PTI aircraft operations, PTAA recommends that only LU-5 remain as provided in the 2007 PTI NCP and that the other four land use measures be eliminated.

Table ES-2 Existing Land Use Measures and Recommended Amendments
Source: PTAA and HMMH, 2020

Original Number	Land Use Measure	Amended Number	Recommended Amendment
LU-1	Acquire Noise-Sensitive Properties where DNL Exceeds 70 dB	--	Eliminate as this measure is complete
LU-2	Sound Insulation of Noise-Sensitive Structures where DNL Exceeds 65 dB	--	Eliminate as this measure is nearly complete
LU-3	Optional Acquisition of Avigation Easements for Noise-Sensitive Structures where DNL Exceeds 65 dB	--	Eliminate as this measured was not required to eliminate noncompatible land
LU-4	Other Assistance for Owners of Residential Property where DNL Exceeds 65 dB	--	Eliminate as this measured was not required to eliminate noncompatible land
LU-5	Pursue Compatible Use Zoning where DNL Exceeds 65 dB	LU-1	No change

Program Management Measures

PTAA recommended and the FAA approved three (3) program management measures in the 2007 PTI NCP. Of the three program management measures, PTAA recommends that all three (3) remain as provided in the 2007 PTI NCP. Table ES-3 provides a summary of the original and amended program management (PM) measures.

Table ES-3 Existing Program Management Measures and Recommended Amendments
Source: PTAA and HMMH, 2020

Original Number	Program Management Measure Name	Amended Number	Recommended Amendment
PM-1	Maintain a Noise Monitoring Function at PTI	PM-1	No change
PM-2	Publish DNL Contours for 60 DNL and Above	PM-2	No change
PM-3	Operate and Maintain an Aircraft Noise and Operations Monitoring System	PM-3	No change

Stakeholder Engagement

A key element of this Part 150 Update is broad stakeholder engagement. The process employed by the PTAA provided opportunities for all interested parties to both follow the study's progress and be directly involved when key decisions were taken. Specific engagement strategies of the Part 150 Update included:

- Developing a working Technical Advisory Committee (TAC) in May of 2019, which held four meetings during the study.
- Developing a working Citizen Advisory Committee (CAC) in May of 2019, which held five meetings during the study.
- Consulting with agencies that have jurisdiction and responsibility within the study area for this update.
- Affording opportunities for public review and comment during the development of the NEM update and NCP amendment Report.
- Making project-specific materials available on the Piedmont Triad Airport Authority's Part 150 website: https://ptipart150update.com/.
- Hosting one public workshop to introduce the Part 150 Update and a second workshop presenting the NEM update and NCP amendments and a public hearing on the proposed amendments.
- Publishing two informational newsletters (1) at the onset of the Study, and (2) prior to the second workshop to announce the draft document was available for public review and comment.

Sponsor's Certification

The Piedmont Triad Airport Authority has completed a comprehensive Update in accordance with Title 14 of the Code of Federal Regulations Part 150 for Piedmont Triad International Airport. ***This is to certify the following:***

1. The 2020 and 2025 Noise Exposure Maps for the Piedmont Triad International Airport and the associated documentation the Piedmont Triad Airport Authority 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 "2020 Existing Condition Noise Exposure Map" (Figure 7-1 from Chapter 7, located in Attachment C to the Noise Exposure Map document) accurately represents conditions for calendar year 2020 as predicted prior to the COVID-19 pandemic and resulting travel restrictions.
3. The "2025 Five-Year Forecast Condition Noise Exposure Map" (Figure 7-2 from Chapter 7, located in Attachment C to the Noise Exposure Map document) accurately represents forecast conditions for calendar year 2025 as forecast prior to the COVID-19 pandemic and resulting travel restrictions.
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.
5. The NCP amendments were prepared in consultation with local public and planning agencies whose area of jurisdiction is partially within the 65 Day-Night Average Sound Level (DNL) contour depicted on the NEM and might be affected by any PTAA-recommended measures. The consultation also included federal and local officials having oversight responsibility and regular aeronautic users of the airport. The proposed NCP amendments are recommended by the PTAA and not by a consultant or other third party.

The operations at Piedmont Triad International Airport are hereby certified to be consistent with the fleet mix, forecast operational levels, and flight procedures depicted for 2020 within this document. Further information regarding development of the fleet mix, forecast, and procedures can be found in Chapter 6, "Development of Noise Exposure Maps," and Appendix D, "Documentation of Noise Modeling Process."

PIEDMONT TRIAD
AIRPORT AUTHORITY

By: Kevin Baker

Title: Executive Director, Pied

Date:

This section will be filled in upon final submission to the FAA.

Airport Name: Piedmont Triad International Airport

Airport Owner/Operator: Piedmont Triad Airport Authority

Address: 1000A Ted Johnson Parkway
Greensboro, NC 27409

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. Since the PTAA is recommending amendments to the existing NCP rather than an update that includes new measures, the NCP checklist is not applicable to this document and is not included.

Table ES-4: 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 and NCP Amendment
2. NEM and NCP together?	X		NEM Update and NCP Amendment. Sponsor Certification, page xv. Section 7, page 7-1 and Section 8, page 8-1
3. Revision to NEMs FAA previously determined to be in compliance with Part 150	X		Cover Letter, Section 7 and Appendix B.1
B. Airport and Airport Operator's name are identified?	X		Sponsor Certification, page xiii and Section 1.3, page 1-5
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		Section 9, page 9-1, Appendix E– Advisory Committees, Appendix F – Public Outreach, and Appendix G- Public Comments
B. Identification of consulted parties:			
1. Are the consulted parties identified?	X		Section 1.3.2, Section 9.1, Appendix E – Advisory Committees, Appendix F – Public Outreach, and Appendix G- Public Comments
2. Do they include all those required by 150.21(b) and A150.105(a)?	X		Section 1.3.2, Section 9.1, and Appendix E – Advisory Committees
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 9.1
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 xiii. Information on the consultation process is provided in Chapter 9 and Appendix E - Advisory Committees, Appendix F- Public Outreach and Appendix G - Public Comments

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		Two Public Workshops were held and one public hearing for the amended NCP. Section 9.3 lists the parties submitting comments. Appendix G provides copies of the comments, which by submission of this document are 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 7-1 in the back pocket of the print version of this document and in Attachment C to the electronic version presents the 2020 Map with existing conditions. Figure 7-2 in the back pocket of the print version of this document and in Attachment C to the electronic version presents the 2025 Map with 5-year conditions. 2020 Existing Condition Noise Exposure Map (Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
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 7-1 and 7-2 in the back pocket of this document in print and as Attachment C to the electronic version of this document, The official submittal to the FAA will be made under a cover letter that meets Part 150 requirements. 2020 Existing Condition Noise Exposure Map (Figure 7-1, page 7-1)
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 xiii. 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3) and Appendix D.1
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?	NA		
C. If the NEM and NCP are submitted together:	NA		
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 Section 7
2. If the forecast year map is based on program implementation:	NA		Prior Program Measures as currently implemented have been included
a. Are the specific program measures that are reflected on the map identified?	NA		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?	NA		
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	NA		The 2025 Forecast map includes the NCP as currently implemented. See Section 7.

would not change by plus/minus 1.5 DNL? (150.21(d))			
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 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*)	X		The "2020 Existing Condition Noise Exposure Map" (Figure 7-1) and "2025 Five-Year Forecast Condition Noise Exposure Map" (Figure 7-2) are presented at 1" to 2,000'. Unbound NEM and flight track figures at the full study area extent are provided at the scale of 1" to 2,000' in pockets at the rear of this document and included as an attachment (Attachment C) to the electronic version, as permitted by FAA.
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 "2020 Existing Condition Noise Exposure Map" (Figure 7-1) and "2025 Five-Year Forecast Condition Noise Exposure Map" (Figure 7-2) are presented at 1" to 2,000'. Unbound NEM and flight track figures at the full study area extent are provided at the scale of 1" to 2,000' in pockets at the rear of this document and included as an attachment (Attachment C) to the electronic version, 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		2020 Existing Condition Noise Exposure Map ((Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
b. Runway configurations with runway end numbers	X		2020 Existing Condition Noise Exposure Map ((Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
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. 2020 Existing Condition Noise Exposure Map ((Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
b. The area within the DNL 65 dB (or beyond, at local discretion)	X		2020 Existing Condition Noise Exposure Map ((Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
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 Guilford County, the City of Greensboro and High Point. 2020 Existing Condition Noise Exposure Map ((Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
D. 1. Continuous contours for at least the DNL 65, 70, and 75 dB?	X		2020 Existing Condition Noise Exposure Map ((Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)

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		2020 Existing Condition Noise Exposure Map ((Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)Section 6.4, page 6-19
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 6.3, page 6-10, and see Figure 6-6, Figure 6-7and Figure 6-8. Unbound flight track figures at the full study area extent are provided at the scale of 1" to 2,000' in pockets at the rear of this document and included as an attachment (Attachment C) to the electronic version, as permitted by FAA. Appendix D contains detailed track and track use data.
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		Section 5 and Figure 5-1, page 5-2
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. 2020 Existing Condition Noise Exposure Map (Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
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. 2020 Existing Condition Noise Exposure Map (Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
3. Are the noncompatible uses and noise sensitive public buildings readily identifiable and explained on the map legend?	X		2020 Existing Condition Noise Exposure Map (Figure 7-1, page 7-1), 2025 Future Condition Noise Exposure Map (Figure 7-2, page 7-3)
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	NA		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 Section 6 page 6-1, and Appendix D
2. Are the underlying technical data and planning assumptions reasonable?	X		The Technical Advisory Committee (including FAA) carefully vetted all assumptions. Section 6 page 6-1, and Appendix D
B. Calculation of Noise Contours:			
1. Is the methodology indicated?	X		As discussed in Section 6, 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	X		

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.)			
c. Has AEE approval been obtained for use of a model other than those that have previous blanket FAA approval?	NA		Not Applicable
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?	NA		No nonstandard data was used in the AEDT.
b. If so, does this have written approval from AEE, and is that written approval included in the submitted document?	NA		No nonstandard data was used in the AEDT.
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?	X		Noise monitoring was conducted for this study; however, monitored noise levels were not used to adjust or calibrate the model. The measured levels are compared with annual average modeled DNL values (Section 7.1 on page 7-7)
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		The 2007 PTI NCP has an approved measure to provide the DNL 60 dB contour for informational purposes. The DNL 60 dB contour was included on the Noise Exposure Map for each year but it is clearly marked for informational purposes only.
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		There are zero dwelling units or people within the DNL 65 dB contour. Table 7-1: Land Use Compatibility Analysis Results
2. Does the documentation indicate whether the airport operator used Table 1 of Part 150?			Section 3.1, 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?	NA		Not applicable; no local variation was used.
(2) Does the narrative include the airport operator's complete substitution for table 1?	NA		Not applicable; no local variation was used.
3. Does the narrative include information on self-generated or ambient noise where compatible or	NA		There is no noncompatible land use within the DNL 65 dB contour.

noncompatible land use identifications consider non-airport and non-aircraft noise sources?			
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?	NA		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 6 page 6-1
VI. Map Certifications: [150.21(b), 150.21(e)]			
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
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

Glossary

Acronym	Full Definition
ADO	[Federal Aviation Administration] Airports District Office
AEDT	Aviation Environmental Design Tool
APU	Auxiliary Power Unit
ARO	Airport Overlay
ATCT	[Federal Aviation Administration] Airport Traffic Control Tower
CAC	Citizens Advisory Committee
CFR	Code of Federal Regulations
dB	Decibel
DNL	Day-Night Average Sound Level
EIS	Environmental Impact Study
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
GA	General Aviation
GPU	Ground Power Unit
HMMH	Harris Miller Miller & Hanson Inc.
IFR	Instrument Flight Rules
ILS	Instrument Landing System
L_{EQ}	Hourly equivalent noise level
L_{MAX}	Maximum sound level
MSL	Mean Sea Level
NA	Number of Events Above
NADP	Noise Abatement Departure Profile
NASR	National Airspace System Resources
NCP	Noise Compatibility Program
NEM	Noise Exposure Map
nmi	Nautical mile
NOIARS	Noise and Operations Integration, Analysis and Reporting System
Part 150	Title 14 of the Code of Federal Regulations Part 150 “Airport Noise Compatibility Planning”
PTAA	Piedmont Triad Airport Authority
PTI	Piedmont Triad International Airport
ROA	Record of Approval
RSIP	Residential Sound Insulation Program
SEL	Sound Exposure Level
SID	Standard Instrument Departure
TAC	Technical Advisory Committee
TAF	Terminal Area Forecast

Contents

Figures

Tables

1 Introduction to Noise Compatibility Planning

Title 14 of the Code of Federal Regulations Part 150 "Airport Noise Compatibility Planning" (Part 150) Study is a voluntary, federally-funded and federally-supervised program that helps airports find ways to reduce noncompatible land uses by analyzing current and future airport use. Piedmont Triad Airport Authority (PTAA) completed Piedmont Triad International Airport's (PTI)[3] first Part 150 Study in 2007[4]. The FAA accepted that Study as complying with Part 150 and approved each of the 20 PTAA-recommended Noise Compatibility Program measures in 2008[5].

1.1 Part 150 Process

The Federal Aviation Administration's (FAA) emphasis on the relationship between aircraft noise and land use compatibility planning started with the passage of the Aviation Safety and Noise Abatement Act of 1979. This act gives the FAA the authority to issue regulations on noise compatibility planning and provides a means for federal funding for projects to improve the noise environment around an airport.

Part 150 regulations set forth standards for airport operators to use when documenting noise exposure around airports and for establishing programs to minimize noise-related land use incompatibilities. Participation in this program by an airport is voluntary.[6] A Part 150 Study includes two principal elements:

1. Noise Exposure Map
2. Noise Compatibility Program

Acceptance of a Noise Exposure Map by the FAA is a pre-requisite to their subsequent approval of measures proposed in a Noise Compatibility Program. Figure 1-1 provides an overview of the FAA Part 150 process. Further descriptions of the Noise Exposure Map and Noise Compatibility Program follow along with the steps PTAA has taken for this Part 150 Update.

[3] The official FAA code for Piedmont Triad International Airport is GSO or KGSO

[4] FAR Part 150 Study for Piedmont Triad International Airport, Final Report, November 2007.

[5] Piedmont Triad International Airport, (GSO), Greensboro, NC Noise Compatibility Program Record of Approval, November 12, 2008.

[6] A part of the 2001 EIS mitigation, following the issuance of the Record of Decision, PTAA committed to conducting a Part 150 Study at the airport to evaluate both existing and future noise conditions.

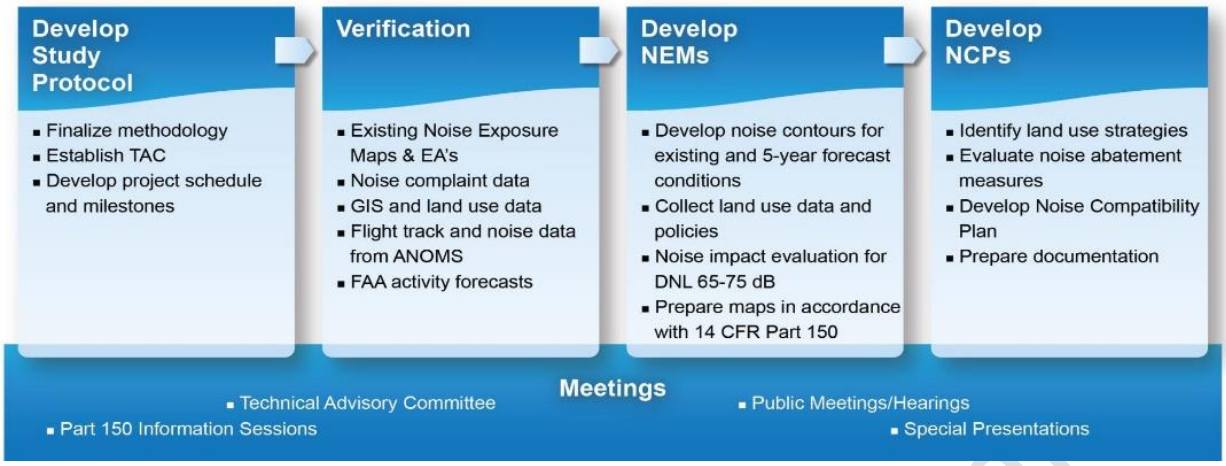


Figure 1-1 Overview of the FAA Part 150 Process
Source: HMMH

1.1.1 Noise Exposure Map

The Noise Exposure Map (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 situation. Part 150 requires that NEM documentation address aircraft operations during two time periods: (1) an existing year and (2) a forecast year that is at least five years following the year of submission (the "forecast conditions").

1.1.2 Noise Compatibility Program

The Noise Compatibility Program (NCP) is a description of the actions the airport proprietor proposes to undertake to minimize existing and future noise and noncompatible land use.

The NCP documentation includes:

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

1.1.3 PTAA Part 150 Update

For this Part 150 Update, PTAA plans to submit the document to FAA in 2020. Chapter 7 provides the official Noise Exposure Maps for the existing conditions in 2020 and the five-year forecast conditions in 2025. PTAA did not conduct a full NCP study and is only recommending amendments to the 2007 PTI NCP. The NCP amendments in this document will include elimination of measures which are no longer recommended by PTAA and slight modifications to some of the existing measures. The PTAA is not recommending new or vastly different NCP measures with this Study.

1.2 History of Noise Compatibility Planning at Piedmont Triad International Airport

Noise abatement began at PTI with the development of a joint planning group consisting of the Cities of Greensboro and High Point, Guilford County, and PTAA. This group met and developed the 1986 Airport Area Land Use Plan which guided compatible land use planning in areas near PTI affected by airport operations.

In 1998, FedEx announced plans to develop its Mid-Atlantic Hub at PTI. The FAA developed an Environmental Impact Statement (EIS) for the proposed project which was designed to support the FedEx Hub and bring over $600 Million in new assets to the airport, including the construction of a new parallel runway, associated taxiways and Navigational Aids, and the Hub facility itself. The EIS identified the ability for FedEx to conduct efficient head-to-head operations as part of the Purpose and Need for the project.

> Section Four of the FAA Record of Decision (ROD), "Project Purpose and Need" reads *"FedEx stated that PTIA was its choice because PTIA outranked the other airports in what was most important to FedEx: airport operations (e.g., potential for parallel runway airfield configuration with head-to-head operational capability, lack of competitive air carrier traffic during peak runway use periods)…." As a result, one of the explicit elements of the purpose and need for the project was to "Provide the Ability to Conduct Dual Simultaneous Independent Operations and Efficient Head-to-Head Operations to Meet Operational Requirements in Instrument Flight Rules (IFR) or Instrument Meteorological Conditions (IMC)."*

The EIS analysis of noise and other environmental impact categories was predicated on certain operational assumptions and criteria:

- An ultimate total of 63 FedEx aircraft arriving and departing each operational night. In general, those flights would arrive between 10 pm and 1 am, the packages would then be offloaded, sorted and reloaded onto the aircraft, which would then depart between 3 am and 4 am.
- When wind direction and speed permit, FedEx hub aircraft would arrive from the southwest, landing on Runways 5L or 5R, and after the completion of the sort, the departing aircraft would depart back to the southwest, using Runways 23L and 23R. This pattern was referred to as "Head-to-Head" in the EIS.
- A wind analysis conducted as part of the EIS effort concluded that with FedEx's agreement to accept a 10-knot tailwind component
- FedEx arrivals could be conducted from the southwest 95% of the time and FedEx departures could be conducted to the southwest 95% of the time.
- All EIS analyses assumed these runway directions for 95% of FedEx operations.

The effort concluded with the ROD on December 31, 2001[7]. The EIS and ROD provided for mitigation measures tied to the DNL noise contours for the project, based on the head-to-head operations, which

[7] RECORD OF DECISION FOR Proposed Runway 5L/23R, Proposed New Overnight Express Air Cargo Sorting and Distribution Facility, and Associated Development PIEDMONT TRIAD INTERNATIONAL AIRPORT GREENSBORO, NORTH CAROLINA - December 31, 2001 (https://www.faa.gov/airports/environmental/records_decision/media/rod_greensboro.pdf)

established PTI's first noise mitigation program. These measures included development of a Part 150 Study, installation of a noise and operations monitoring system, land acquisition for approximately 53 residential properties and sound insulation program for approximately 209 residential properties.

In 1999, during the final development of the EIS, a citizens committee and the planners from Cities of Greensboro and High Point, Kernersville, Guilford County, and PTAA began an update to the 1986 Airport Area Land Use Plan to incorporate the proposed FedEx Hub and the associated noise impacts and contours. This process was completed in 2002 and resulted in the City of Greensboro implementing the EIS Proposed Action DNL 60 noise contour as the boundary of the airport area plan.

In 2004, as a requirement of the ROD, PTAA began a Part 150 Study and developed a Noise Compatibility Program which was completed at the end of 2007. The Part 150 analysis was based on the same operating scenario as the EIS. The Part 150 Study confirmed the important role that the head-to-head operations would have in minimizing the exposure of sensitive land uses to noise levels greater than DNL 65. The NCP consisted of 20 recommended measures (12 Noise Abatement Measures, five Land Use Measures and three Program Management Measures). The FAA provided a Record of Approval (ROA) for the 20 PTAA-recommended NCP measures, which approved, in whole or in part, all 20 PTAA-recommended measures. The diagram below lists the 20 PTAA NCP measures.

Noise Abatement Measures	Land Use Measures	Programmatic Measures
1. Evaluate Noise Barriers *	1. Acquire Noise-Sensitive Properties where DNL Exceeds 70 dB	1. Establish a Noise Monitoring Function at PTI
2. Preferred Night Runway Use **	2. Sound Insulation of Noise-Sensitive Structures where DNL Exceeds 65 dB	2. Publish DNL Contours at 60 dB and Above
3. Night Runway Use Assignments **	3. Optional Acquisition of Avigation Easements for Noise-Sensitive Structures where DNL Exceeds 65 dB	3. Install and Operate an Aircraft Noise and Operations Monitoring System
4. Night Southbound Departure Corridor from Runway 23L **	4. Other Assistance for Owners of Residential Property where DNL Exceeds 65 dB *	
5. Night Departure Procedures from Runway 23R **	5. Pursue Compatible Use Zoning where DNL Exceeds 65 dB	
6. Night Northbound Departure Corridor from Runway 23L **		
8. Departures from Runway 05L **		
9. Departures from Runway 05R **		
10. Restrictions on Use of APUs		
11. Noise Abatement Departure Profiles **		
12. Noise Abatement Approach Procedure **		
13. Altitude for Downwind Legs **		

Note: There is no Noise Abatement Measure number 7 since it was included in Noise Abatement Measure number 5 during the course of the original study.
** - Approved for further study.*
*** - Approved as voluntary measures subject to traffic, weather, and airspace safety and efficiency.*

In accordance with the findings of both the EIS and the Part 150, PTAA has undertaken noise mitigation including land acquisition and a sound insulation program in the areas with noncompatible land use (primarily southwest of the Airport), based on forecast DNL contours with the proposed head-to-head operation. The EIS identified 53 residential properties within the DNL 70 contour; most of these properties were acquired for construction of the new parallel runway. As of August 2019, the airport's on-going noise mitigation program had acquired 13 remaining properties that were located within the EIS DNL 70 contours and had sound-insulated 123 homes (through Phase 7 of 8 planned phases of its sound insulation program). In August 2020, PTAA received an additional FAA grant to sound-insulate the remaining homes in the program. Many of the other NCP measures have also been implemented.

The Airport Area Land Use Plan was updated in 2008 after the completion of the 2007 Part 150 Study.

1.3 Roles and Responsibilities

Several groups are involved in the preparation of the PTI Part 150 Update. The three primary groups involved are:

1. Piedmont Triad Airport Authority, including its staff and consultant team
2. Technical Advisory Committee and Citizens Advisory Committee
3. Federal Aviation Administration

1.3.1 Piedmont Triad Airport Authority

As the "airport operator", PTAA is responsible for preparing the NEM, recommending NCP measures, pursuing implementation of the adopted NCP measures and managing the consultant team. PTAA may apply for grant funding for the implementation of FAA-approved Airport Improvement Program (AIP) eligible measures. A PTAA-recommended and FAA-approved measure does not require the implementation of the measure, but merely demonstrates that the measure is in compliance with Part 150 and allows PTAA to apply for federal Airport Improvement Program (AIP) grants for measures that are eligible. Additionally, if a measure requires subsequent FAA action, its implementation may require environmental study under the National Environmental Policy Act (NEPA).

The PTAA has 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 HMMH Study Team, including CHA Consulting, Inc. (CHA) and Ron Miller & Associates Inc. (RMA), working in close consultation with PTAA, has conducted the NEM update analysis, reviewed the existing NCP, prepared the NCP amendment, developed the Part 150 Update documentation and assisted with stakeholder engagement.

1.3.2 Advisory Committees

To assist with the Part 150 Update and in an effort to engage key technical stakeholders and the public, PTAA formed and convened two advisory committees. The Technical Advisory Committee (TAC) was made up of local planning jurisdictions, FAA, aeronautical users of the Airport and other interested persons, and served several important functions, such as:

- Representing a broad range of stakeholder groups,
- Receiving information about the Study and sharing it with their constituencies,
- Reviewing information and providing timely input to the Study, and
- In some cases, providing technical advice to the Study Team.

The Citizens Advisory Committee (CAC) was made up of residents within the nine surrounding cities, towns and counties. The residents were recommended by the elected officials' offices to represent their neighborhoods, and served several important functions, such as:

- Representing a broad range of communities,
- Receiving information about the Study and sharing it with their constituencies, and
- Reviewing information and providing timely input to the Study.

The advisory committees offered opinions, advice and guidance to the Part 150 Update process, but PTAA has the sole discretion to accept or reject advisory committee recommendations in accordance with Part 150 regulations.

1.3.3 Federal Aviation Administration

FAA responsibility includes approval of the operational forecast, any non-standard noise modeling requests, review of the Part 150 submission to determine whether the technical work, consultation and documentation comply with Part 150 requirements, and acceptance of the NEM. In addition, the FAA is responsible for reviewing the details of the technical documentation as well as for broader issues of safety and consistency of recommended noise abatement measures with applicable federal law. The final role of the FAA is to approve or disapprove each PTAA-recommended NCP amendment measure. The FAA will evaluate recommended amendment measures individually with respect to a criteria framework and determine whether each amendment measure merits approval, disapproval, or further review for the purposes of Part 150. Following this determination, the FAA will issue the ROA as they provided to the PTAA in 2008 for the first Part 150 submittal. For this Study, PTAA is recommending amendments to existing and previously approved measures by the FAA.

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** (at FAA headquarters - AEE) reviews complex technical, regulatory, and legal matters of national environmental policy significance.

The **Air Traffic Organization** (ATO) includes the Air Traffic Controllers and support staff. PTI's Airport Traffic Control Tower (ATCT) provides significant input in several areas, including input on operational data, judgment regarding safety and capacity effects of alternative noise abatement measures, and input on implementation requirements.

Three groups in the **Office of Airports** are involved: (1) the Memphis Airports District Office (ADO) is the main point of contact for reviews, compliance, and direction as the Part 150 Update study progresses, including the approval of the aviation forecast, (2) the Southern 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, and (3) Headquarters ensures consistency with Part 150 regulations and reviews of national importance.

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

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 that can be difficult to understand. 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 daily 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 DNL.

DNL[8] 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. 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.

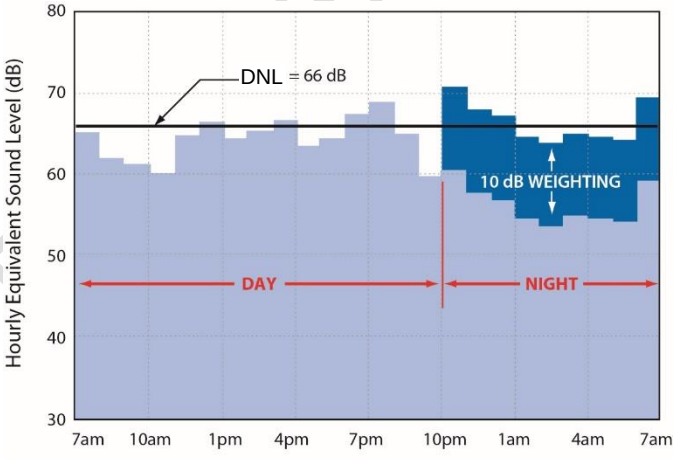


Figure 1-2 Example of a Day-Night Average Sound Level Calculation
Source: HMMH

[8] 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 Update it represents were undertaken in accordance with the requirements of the Part 150 regulation. A checklist is provided on page xvi 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 the Part 150 Study process and the history of noise compatibility planning at PTI
- Chapter 2 gives background information regarding the Airport
- Chapter 3 describes land use compatibility and specific land uses in the PTI Part 150 Update area
- Chapter 4 describes the existing PTI Noise Compatibility Program and reports the implementation status and current compliance, as applicable, with each measure
- Chapter 5 presents the results of the noise measurement program
- Chapter 6 describes the development of the aircraft noise exposure contours, including the noise modeling methodology and inputs
- Chapter 7 presents the official 2020 and 2025 Noise Exposure Maps
- Chapter 8 provides the PTAA-recommended amendments to the PTI Noise Compatibility Program
- Chapter 9 reports stakeholder engagement efforts undertaken during the Part 150 process

2 Airport Background

Located in Guilford County, NC, and operated by PTAA, PTI serves the Piedmont Triad region, providing passenger, cargo, and general aviation service to Greensboro, Winston-Salem, and High Point, NC, and their surrounding areas. Several aerospace companies, aircraft manufacturers, and other aviation service businesses are located on PTI's campus, providing significant economic impact to the area.

In 1927, the current site of PTI was selected as a stop along the New York-New Orleans airmail route authorized by Congress, and in 1928, regular mail service began. Dixie Flying Service began passenger service at PTI in 1930, providing a single route to Washington DC; Eastern Airlines later took over this route.

Though the airport closed briefly during the Great Depression, it reopened in 1937. During World War II, the Army Air Corps requisitioned the airport for war use, discontinuing airmail and passenger service. Despite this, the Army built a new passenger terminal and lengthened the two existing runways; commercial passenger service resumed following the end of the war.

The current terminal building was opened in 1982. In the early 1990's Cessna/Textron constructed a maintenance, repair, and overhaul facility at the Airport. In addition, Triad International Maintenance Company (TIMCO) was founded at PTI. TIMCO would subsequently be acquired by HAECO.

During the early 2000s, FedEx opened a regional hub at PTI, Honda Aircraft Company moved its global headquarters and built its research and development in addition to an aircraft production facility there, and Allegiant Air started serving the airport alongside Delta, United, and other airlines. In 2010, PTI completed the parallel Runway 5L/23R and began another renovation to the terminal in 2011. A new airport traffic control tower is under construction and is scheduled to be commissioned in 2022.

2.1 Airport Location

PTI covers approximately 4,000 acres within Guilford County, NC and serves the Piedmont Triad region in North Carolina. The Triad region includes 12 counties and the cities of Greensboro, Winston-Salem, and High Point. The region has a population of approximately 1.6 million people. PTI is approximately ten miles west of the City of Greensboro's Central Business District, 17 miles east of Winston-Salem, and ten miles north of High Point.

2.2 Airport Facilities

PTI's passenger terminal is located between parallel Runways 5R/23L and 5L/23R and has a linear two-concourse design. Additional details on the airport layout and runways can be found in Section 6.1. The terminal includes a parking structure, a public arrivals level, a public departures level, and a service level.

The lower arrivals level includes transportation, welcome areas, baggage services and screening, airport operations, security, and law enforcement. The upper departure level provides ticketing services, airport and airline offices, security screening, 26 boarding gates, and concessions space. American Airlines, Allegiant Airlines, and Spirit Airlines operate out of PTI's South concourse and Delta and United operate out of the North concourse. These five airlines provided nonstop service to 16 destinations as of May 2019.

PTI is served by two Fixed Base Operators (FBOs)—Koury Aviation and Signature Flight Services—that provide a range of services for business and general aviation aircraft. FBOs are airport service centers that provide aircraft services such as passenger handling, aircraft fueling, parking, maintenance, charters, rentals, flight training, and de-icing. FBOs also provide ground handling services like towing and baggage handling, and other services such as car rentals, hotel reservations, and pilot lounges.

The major cargo operators serving PTI are FedEx, UPS, and DHL. FedEx operates a regional hub out of PTI and in September 2018 increased its number of operations at the airport. PTI provides significant aviation manufacturing, parts supply, and maintenance and repair services to the region. The major contributors to these industries include Honda Aircraft Company, Cessna/Textron, and HAECO Americas.

Honda Aircraft Company's global headquarters are located at PTI. The company's light business jet, the HondaJet, is manufactured at PTI. Additionally, research and development, repair and maintenance, and other aircraft manufacturing facilities for the company are located on the airport's campus, employing approximately 1,500 people. In 2019, Honda Aircraft announced a $15.5 million expansion that will add 83,000 square feet to its facilities at PTI.

Cessna/Textron's Greensboro Citation Service Center is one of the busiest of the service centers within the Cessna/Textron. The Service Center has been operating out of PTI since 1994. Its 137,000 square-foot facility provides a full range of aircraft maintenance and repair services, including inspections, avionics and equipment installations and upgrades, customizations, and other specialized needs.

HAECO Americas, headquartered at PTI, provides aircraft engineering, maintenance, and overhaul services to commercial air carriers around the world. They also provide custom aircraft cabin interior design and engineering through their Cabin Solutions facilities. In 2018, HAECO Americas opened a fifth hangar at PTI; this hangar added 250,000 square feet of maintenance space and at capacity will add 500 additional employees.

In addition, charter airline iAero Airways (formerly Swift Air) has a base at PTI. Samaritan's Purse, an international relief organization, also bases their DC-8 aircraft at PTI. Airside support facilities at PTI include the FAA Airport Traffic Control building, the FAA's Flight Standards District Office, airport firefighting facilities, and airport maintenance facilities.

2.3 Contribution to Local Economy

PTI is one of North Carolina's most unique airports. In addition to being North Carolina's third largest passenger airport, it is the state's largest cargo airport. PTI provides passenger connections to hubs for American, United, and Delta Airlines; it also provides connections to additional airports via Allegiant Air

and Spirit Airlines. DHL Aviation, FedEx, UPS, Quest Diagnostics and Aloha Air Cargo provide cargo services. FedEx's regional hub at PTI helps relieve operations at its primary hub in Memphis, TN; the company recently increased the number of jobs and operations at PTI.

Overall, PTI contributes approximately $6 billion annually to the local economy and approximately 5,700 employees work at. more than 50 companies located on the airport campus. The airport continues to target airport manufacturers, logistics companies, and maintenance operators to further develop the regional economy.

2.4 Aircraft Operations

Table 2-1 depicts historic and forecast operations at PTI. Aircraft operations grew between 2009 and 2010, then remained relatively constant until 2013, when they fell slightly. Operations returned to 2009 levels in 2017, grew substantially in in 2019, and are forecast to continue growing through the forecast year 2025.[9] Figure 2-1 shows the trend in total operations at PTI between 2009 and 2019 with the additional NEM forecast years added.

Table 2-1 Historic and Forecast Trends in Aircraft Operations
Source: FAA Air Traffic Activity System and Terminal Area Forecast

Year	Itinerant Operations						Local Operations			Total Operations
	Commercial	Air Taxi	Cargo	GA	Military	Total	Civil	Military	Total	
2009	40,835	6,483	5,218	26,986	667	80,189	2,269	87	2,356	82,545
2010	38,848	6,195	5,442	28,898	1,170	80,553	9,062	406	9,468	90,021
2011	37,050	6,447	5,428	30,921	919	80,765	8,778	304	9,082	89,847
2012	36,762	6,182	5,356	27,786	2,107	78,193	9,518	446	9,964	88,157
2013	32,553	8,575	5,368	25,134	2,173	73,803	7,931	653	8,584	82,387
2014	31,774	8,974	4,860	24,084	1,558	71,250	6,254	518	6,772	78,022
2015	31,532	9,845	4,992	23,652	1,491	71,512	4,235	468	4,703	76,215
2016	31,120	10,040	4,794	24,035	1,482	71,471	6,694	458	7,152	78,623
2017	31,056	10,597	6,280	24,891	1,929	74,753	7,135	823	7,958	82,711
2018	32,774	10,034	6,458	24,596	1,453	75,315	5,816	383	6,199	81,514
2019	36,012	10,043	7,756	26,878	1,453	82,143	6,635	383	7,018	89,160
2020	36,359	10,053	8,204	26,964	1,453	83,033	6,656	383	7,039	90,072
2021	36,614	10,062	8,653	27,052	1,453	83,833	6,677	383	7,060	90,894
2022	36,806	10,071	9,102	27,140	1,453	84,573	6,699	383	7,082	91,656
2023	36,987	10,080	9,553	27,230	1,453	85,304	6,722	383	7,105	92,408
2024	37,124	10,090	10,004	27,321	1,453	85,992	6,744	383	7,127	93,119

[9] The forecasts were developed and approved prior to the downturn in operations due to COVID-19.

2025	37,265	10,099	10,456	27,413	1,453	86,686	6,767	383	7,150	93,836

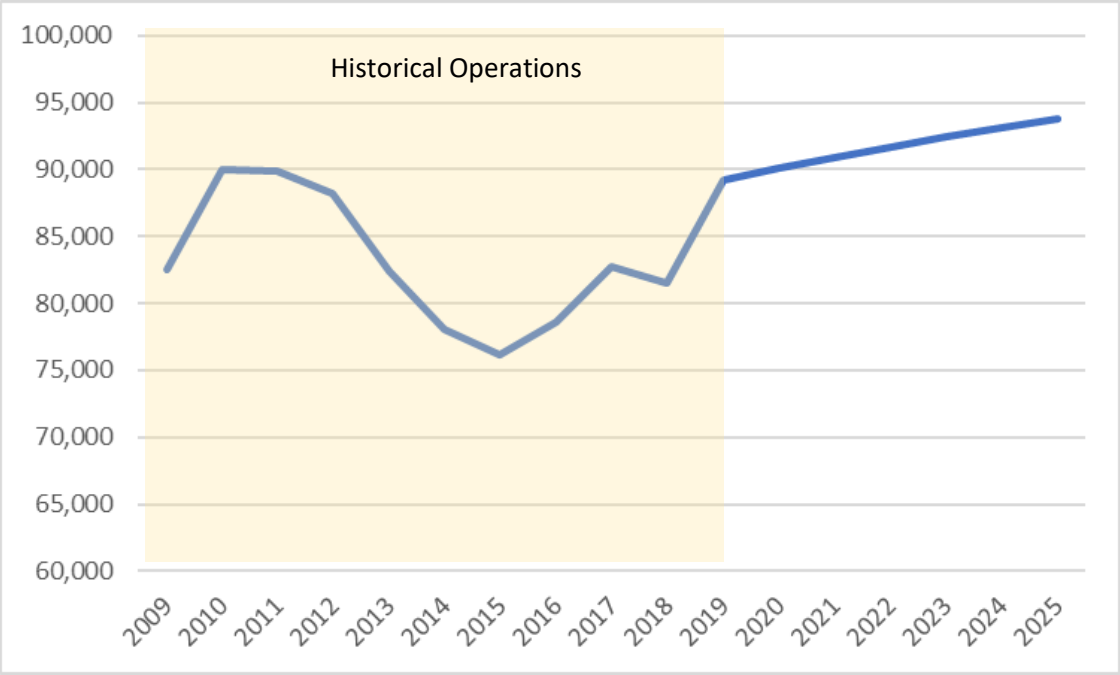


Figure 2-1 Trend in Total Operations at PTI
Source: FAA Air Traffic Activity System and Terminal Area Forecast

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 with arriving and departing aircraft. This includes delineation of land uses within the 65 DNL and higher aircraft noise exposure contours on the NEMs and identification of noise sensitive uses that may be noncompatible with that level of noise exposure. 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 is generally considered noncompatible but requires further investigation. Factors that influence compatibility and/or eligibility may include but are not limited to previous sound reduction treatments, current interior noise levels, structure condition, ambient and self-generated noise levels, whether a given use is considered temporary or permanent, and the timeframe within which a given structure was constructed.[10]

This chapter provides an overview of the municipal jurisdictions with authority to regulate land use in the vicinity of PTI, 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 and zoning 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 the table indicates, the FAA generally considers all land uses to be compatible with aircraft-related DNL below 65 dB, including residential, hotels, retirement homes, intermediate care facilities, hospitals, nursing homes, schools, preschools, and libraries. These categories will be referenced throughout the Part 150 process.

[10] On March 27, 1998, FAA issued a policy on 14 CFR Part 150 airport noise compatibility programs that limits approval of remedial mitigation measures, e.g., soundproofing, property acquisitions, and relocation, etc., to land uses that were in place as of October 1, 1998 unless an airport can demonstrate that DNL contours were not published prior to that date. New non-compatible uses resulting from airport expansion may be eligible for consideration.

Table 3-1 Part 150 Land Use Compatibility with Yearly Day-Night Average Sound Levels
Source: Part 150, Appendix A, Table 1, 2007

Land Use	Yearly Day-Night Average Sound Level [DNL] in Decibels (Key and notes on following page)					
	<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 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 stated 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 Land Use Data Collection and Verification

PTI is in Guilford County, NC, approximately five statute miles from the eastern border of Forsyth County and eight statute miles northeast of Davidson County, and serves the Piedmont Triad region of North Carolina. This region is a significant manufacturing, trade, transportation, and financial center for both North Carolina and the southeastern United States.

PTAA and the Study Team established a study area that meets the regulatory requirements[11] and collected detailed land use information from municipalities throughout the study area. Land use data collection and verification focused on the area within the 60 DNL contour for two reasons; because the current NCP recommends development of a 60 DNL contour and the PTAA wanted to ensure collecting sufficient land use information within and just beyond the 65 DNL contour. Guilford County and the Cities of Greensboro and High Point, the jurisdictions determined to potentially have land uses within the PTI 60 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 obtained from the Cities of Greensboro and High Point were summarized according to the Part 150 land use categories. HMMH staff drove all streets within the 60 DNL contour area in November of 2019 and manually updated the land use category for parcels where the observed use differed from the collected data. Land uses outside the 60 DNL areas were reviewed and verified by the Cities of Greensboro and High Point. Figure 3-1 shows the results of the land use data collection and verification process.

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

This page intentionally left blank.

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 3-1

Land Use Data Collection and Study Area

Forsyth County

Guilford County

Davidson County

Site A

Site B

Site C

Site D

- Study Area Boundary
- Airport Boundary
- Runway
- Airport Buildings
- Taxiway / Apron
- Permanent Monitor Sites
- Municipal Boundary
- County Boundary
- Highways
- Major Roads
- Local Roads
- Railroad
- Stream / Creek
- School
- Library
- Place of Worship
- Hospital / Health Care

- Residential Use
- Multi-Family Residential Use
- Mobile Home
- Transient Lodging
- Mixed Use
- Public Use 1
- Public Use 2
- Commercial Use
- Manufacturing / Production
- Golf Course
- Recreational / Open Space
- Transportation / Utility
- Vacant / Undeveloped
- Water

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

0 1.5 3 NMi

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure3.1_Existing_LandUse_Study_Area.mxd Author: MJHamilton

This page intentionally left blank.

4 Existing Noise Compatibility Program

As a result of the 2007 Part 150 Study, PTAA implemented a Noise Compatibility Program at PTI with the approval of all 20 PTAA-recommended measures as provided in the FAA's Record of Approval. A copy of the ROA is included in Appendix B.2. The 2007 Part 150 documentation includes detailed description of the NCP and analyses of the benefits of each measured considered. The PTI NCP measures focus on the following three strategies to reduce or prevent noncompatible land use:

1. Noise abatement
2. Land use including noise mitigation
3. Program management

This chapter summarizes the measures in the 2007 PTI NCP and evaluates their current implementation status and compliance.

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 Update, the PTAA-recommended noise abatement measures contained in the FAA's ROA were reviewed to assess implementation status and compliance. Flight track and aircraft identification data between December 15, 2018 and March 31, 2019, obtained from the PTAA Noise and Operations Integration, Analysis and Reporting System (NOIARS) provided the primary basis for evaluating the extent to which the approved noise abatement measures from the original 2007 PTI NCP are implemented and in compliance with the intent of measures.

Table 4-1 lists the 12 PTAA recommended noise abatement measures approved by the FAA and summarizes the status of each measure in relation to its description in the 2007 NCP and 2008 ROA.

Table 4-1 Implementation Status of 2007 NCP Noise Abatement Measures
Source: PTAA and HMMH, 2020

Measure Number	Noise Abatement Measure	Implementation Status[12]
NA-1	Evaluate Noise Barriers	Not implemented
NA-2	Preferred Night Runway Use	Partially implemented
NA-3	Night Runway Use Assignments	Not applicable
NA-4	Night Southbound Departure Corridor from Runway 23L	Implemented
NA-5	Night Departure Procedures from Runway 23R	Implemented
NA-6	Night Northbound Departure Corridor from Runway 23L	Not implemented
NA-8	Departures from Runway 5L	Partially implemented
NA-9	Departures from Runway 5R	Partially implemented
NA-10	Restrictions on Use of APUs	Partially implemented
NA-11	Noise Abatement Departure Profiles	Not implemented
NA-12	Noise Abatement Approach Procedures	Partially implemented
NA-13	Altitude for Downwind Legs	Implemented

Note: There is no NA-7 as that proposed measure was incorporated into NA-5 during the development of the 2007 NCP.

Each of the existing noise abatement measures is described in full below. The implementation status and compliance with each measure is indicated (as compared to the intention of the measure as given in the 2007 NCP). The italicized text provides the 2007 NCP measure description. The PTAA recommendation is provided after the discussion of each measure.

4.1.1 NA-1: Evaluate Noise Barriers

Under this measure, the Piedmont Triad Airport Authority (PTAA) would adopt a policy to evaluate potential benefits of noise barriers to control off-airport noise levels from future airport facilities. The policy would commit the PTAA to work with tenants to have the tenant install noise barriers if the PTAA considers the use of a barrier appropriate.

Implementation Status: Not implemented
Compliance: N/A
PTAA has yet to evaluate potential benefits of noise barriers. To address one of the predominant ground noise sources for which barriers are effective at reducing noise beyond the airport boundaries, PTAA

[12] With respect to measures related to runway use or flight procedures, "implemented" means it has been adopted by the FAA within the Airport Traffic Control Tower Standard Operating Procedures or instrument flight procedures for the Airport. With respect to measures under the purview of PTAA, "implemented" means the Authority has taken formal action to put the measure into effect.

adopted a policy prohibiting tenants from performing engine runups between the hours of 11:00 pm and 5:00 am without advance notice and approval.

PTAA Recommendation: Maintain measure as is.

4.1.2 NA-2: Preferred Night Runway Use

When new runway 5L/23R is available for use during nighttime hub operations, designate runways 23L and 23R as the preferred departure runways and runways 5L and 5R as the preferred arrival runways. This head-to-head pattern of runway use will be used when permitted by weather and runway conditions. To the extent feasible, equal numbers of aircraft shall use the left and right runways for arrivals. Runway use assignments for departures shall be as established by Proposed Measure NA-3.

Implementation Status: Implemented head-to-head operations; Not implemented equal use of runways
Compliance: 92% departures and 75% arrivals on head-to-head operations; N/A on equal use of runways

The purpose of this measure is to avoid overflights of densely populated residential areas to the northeast of the airport when runways are available and weather permits. These areas are in closer proximity to the airport than residential neighborhoods to the southwest. The head-to-head runway use pattern has been implemented with the introduction of the FedEx hub operations. The current level of demand during the FedEx hub can be accommodated on a single runway, so there is no need to equalize use of the left and right runways for arrivals or departures. The counts for this analysis were restricted to December 15, 2018 through March 31, 2019, a period of time after the commencement of FedEx hub operations without any runway closures for maintenance/reconstruction.

Table 4-2 presents the runway use by aircraft participating in the nighttime hub operations specified in the measure. Currently, hub arrival operations generally occur between 11:00pm and 1:00am and hub departure operations between 3:00 am and 4:30 am, so only FedEx[13] flights occurring on hub nights (Monday through Thursday nights) within an hour or two of these time windows were counted as "Sort" operations. Any other aircraft operating during that time frame would also use the same active runways to not conflict with the hub operations. The table shows that 92 percent of hub departures and 75 percent of hub arrivals comply with NA-2 Preferred Night Runway Use.

Table 4-2 PTI Runway Use During FedEx Sort Operations
Source: PTAA NOIARS December 15, 2018 through March 31, 2019, HMMH 2020

Runway	Number of Departures	Departure Percentage	Number of Arrivals	Arrival Percentage
5L or 5R	38	8%	353	75%
23L or 23R	463	92%	114	24%
14 or 32	0	0%	2	0%
Total	501	100%	469	100%

[13] Any flight with airline listed as "FDX" or "MTN" were counted in this analysis

PTAA Recommendation: Modify the measure by rewording the description of the measure. The wording describing balanced use of the parallel runways will be removed to allow the tower to retain the flexibility to assign runways at night**.**

4.1.3 NA-3: Night Runway Use Assignments

When new runway 5L/23R is available for use during the nighttime hub operations, designate the following pattern of runway use:

1. *When departures are using runways 23L and 23R, designate runway 23R as the departure runway for Retrofitted Stage 3 aircraft*
2. *When departures are using runways 23L and 23R, the runways to be used by New Stage 3 aircraft are as follows:*
    a. *For all New Stage 3 aircraft departing to southern destinations, designate runway 23L as the departure runway*
    b. *For all New Stage 3 aircraft departing to south-western destinations, designate runway 23R as the departure runway*
    c. *For New Stage 3 aircraft departing to northern destinations, either runway 23L or runway 23R may be used as the departure runway.*
    d. *To the extent feasible, assign usage of runways 23L and 23R by New Stage 3 aircraft to northern destinations so that equal numbers of aircraft use runways 23L and 23R for night departures*
3. *When departures are using runways 5L and 5R, designate runway 5R as the departure runway for Retrofitted Stage 3 aircraft*

4. *When departures are using runways 5L and 5R, assign usage of departure runways by New Stage 3 aircraft so that approximately equal numbers of aircraft use runways 5L and 5R for departures to the extent feasible*

5. *Aircraft departing on runway 23R and needing to make a transition to a more southerly heading should delay the transition until they have reached an altitude of 4,000 MSL*

6. *It is anticipated that carriers operating during the nighttime will request runway assignments that are consistent with this measure*

Implementation Status: Parts 1, 2, 3, 4 and 6 not applicable or no longer preferred; Part 5 is addressed as part of NA-5
Compliance: N/A (see NA-5 for Part 5)

FAA had approved this voluntary measure for PTAA to implement through coordination and agreements with air carriers. No such coordination or agreements with air carriers has occurred to implement this measure. Of the six parts of NA-3, most specify how the choice between the parallel runways should be made once the direction (either 5L/5R or 23L/23R) has been established. The assignment decision

focuses on whether the aircraft is new Stage 3[14] or retrofitted Stage 3, a distinction which is no longer relevant[15] given retrofitted Stage 3 aircraft have been retired and no longer serve the Airport. Parts 1 and 3 no longer apply since there are no retrofitted Stage 3 aircraft in the current US commercial fleet and most passenger and cargo aircraft today are Stage 4 or 5 compliant. Two of the runway selection criteria, parts 2 and 4, may apply as they refer to "New Stage 3" aircraft. Since part 5 addresses flight path procedures for Runway 23R departures rather than runway assignments, the review of that part is included below in the discussion of NA-5.

Part 2 of measure NA-3 is predicated on having demand for a two-runway, simultaneous operation. The measure differentiates between jet departures from Runways 23L and 23R according to their destinations, but due to the relatively low demand, 98 percent of nighttime hub operations departing in south flow use Runway 23L. Night runway use is currently handled by the tower. PTAA and the tower prefer to retain this flexibility.

Part 4 of measure NA-3 addresses departures from Runways 5L and 5R (again predicated on the airport having demand for a two-runway, simultaneous operation) indicating an overall goal of equal numbers of night departures on each runway. The nighttime hub operations data indicate that 92 percent of north flow departures use Runway 5R. Night runway use is currently handled by the tower. PTAA and the tower prefer to retain this flexibility.

Part 6 of measure NA-3 anticipated that carriers operating at night would request assignments based on this measure, that is, in consideration of whether the aircraft is a retrofitted Stage 3 aircraft or a new Stage 3 aircraft when choosing a runway. However, the measure has never been implemented, agreements with air carriers as described in the FAA's ROA have never been developed and the tower provides runway assignments. PTAA and the tower prefer to retain this flexibility.

PTAA Recommendation: Eliminate this measure because this measure has never been implemented, there are no retrofitted Stage 3 aircraft in the current US commercial fleet, agreements with air carriers as described in the FAA's ROA have never been developed and the tower provides runway assignments. PTAA and the tower prefer to retain this flexibility.

4.1.4 NA-4: Night Southbound Departure Corridor from Runway 23L

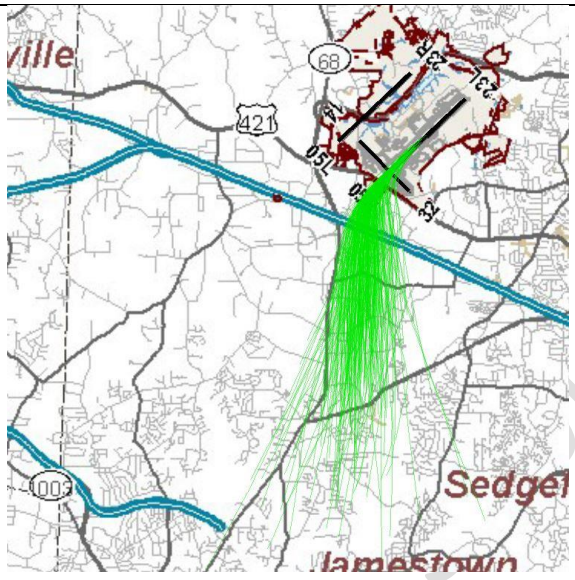
Promptly after FAA approval of this measure, establish a new nighttime departure procedure for aircraft departing runway 23L for southern destinations so that the initial flightpath is in a southerly direction, east of and parallel to NC Highway 68. Departing aircraft shall initiate the left departure turn onto this flight path as soon as practicable. Aircraft may make a transition to another heading after reaching 4,000 feet MSL.

[14] Aircraft that meet the Stage 3 requirements of FAR Part 36: if the aircraft met the Stage 3 requirements at the time of original manufacture, they were identified as "New Stage 3." If the aircraft met the requirements through retrofit or engine replacement, they were identified as "Retrofitted Stage 3."

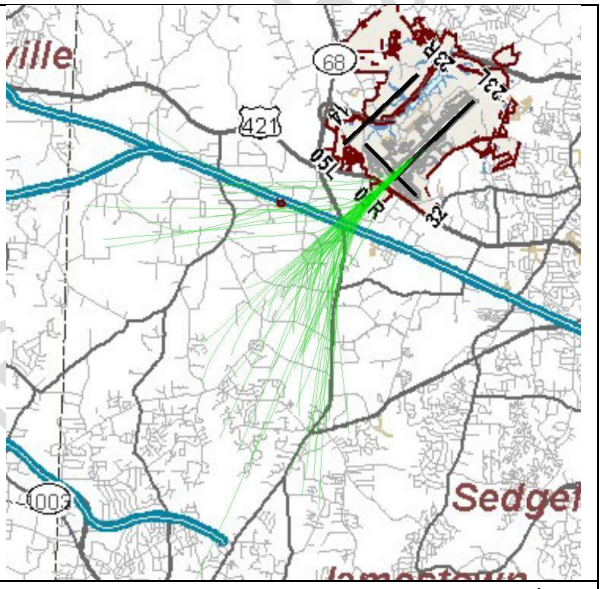
[15] Retrofitted Stage 3 aircraft have largely been phased out of service in the United States and the specific aircraft type of concern, Boeing 727s, are no longer in the fleet

Implementation Status: Implemented
Compliance: 79% of all Runway 23L nighttime southbound departures turn left to be east of and parallel to NC Highway 68. Of these, 93% reach 4,000 feet MSL before transitioning to another heading.

The southbound departure corridor as described in the measure is currently used in the daytime as well as at night. FAA has implemented this procedure as part of the TRIAD SID. The CLINE transition on the TRIAD SID turns aircraft departing from Runway 23L to a 190-degree heading. To analyze compliance with this noise abatement procedure, nighttime departures from Runway 23L with destinations to the south[16] were selected from the sample period flight track data. Figure 4-1 depicts these flights at altitudes up to 4,000 feet above Mean Sea Level (MSL) in two groups: the map on the left shows the flight paths that incorporated the left turn, while the map on the right shows those that did not. Close to 79 percent of the flights in the sample used the noise abatement procedure. Of those that did not, the majority remain on runway heading past Interstate 40 (then remaining close to runway heading or turning late to the south) and a small amount turning to the west.



RWY 23L southbound nighttime departures – 294/373 compliant (78.8%)



RWY 23L southbound nighttime departures – 79/373 NOT compliant (21.2%)

Figure 4-1 Night Southbound Departure Corridor from Runway 23L
Source: PTAA NOIARS December 15, 2018 through March 31, 2019

PTAA Recommendation: Modify the measure by rewording the description to include northeast destinations and development of an RNAV procedure. Adding northeast destinations will reflect how the measure was implemented by FAA. Adding an RNAV overlay procedure would potentially increase compliance with the measure.

[16] Destination Airport in flight track data listed as FLL, DFW, ATL, TPA, MCO, MEM, MIA, APF, FXE, ILM, CAE, CHS, OPF, PBI, SUA, JQF, FTY, PIE, SFB, BCT, or PDK

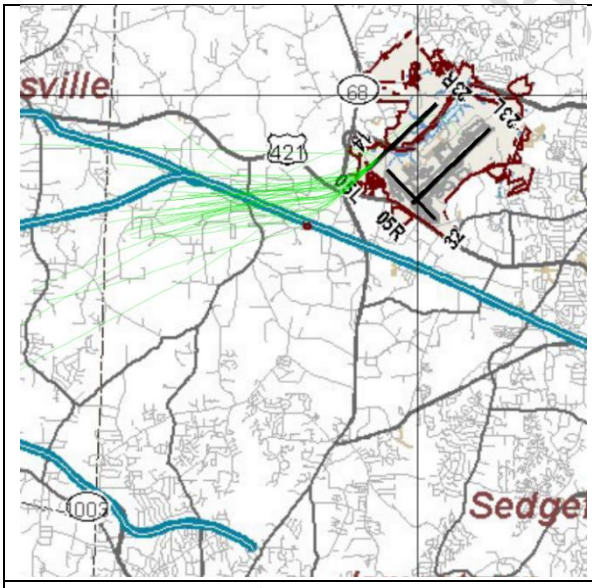
4.1.5 NA-5: Night Departure Procedures from Runway 23R

Aircraft departing runway 23R at night and turning right shall initiate the right departure turn as soon as practicable (NA-5). Aircraft departing on runway 23R and needing to make a transition to a more southerly heading should delay the transition until they have reached an altitude of 4,000 MSL (NA-3, Part 5).

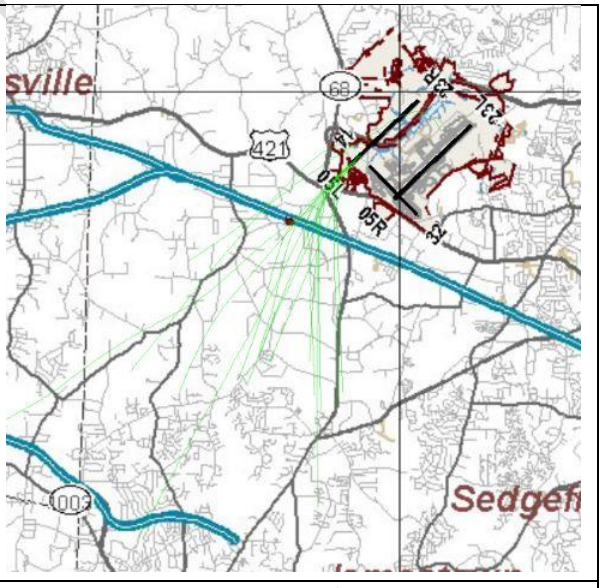
Implementation Status: Implemented NA-5; Not implemented NA-3 Part 5
Compliance: 100% NA-5; 0% NA-3 Part 5

FAA has implemented NA-5 as part of the TRIAD SID and TRSHA RNAV SID. The YADKI and BOTTM transitions on the TRIAD SID turns aircraft departing from Runway 23R to a 297 or 312-degree heading. The TRSHA RNAV SID turns aircraft to 270 degrees as soon as they reach 500' above ground level from Runway 23R.

Usage for Runway 23R at night is low as most night operations use Runway 5R/23L. There were 89 nighttime departures from Runway 23R in the 3.5-month analysis sample of data. Figure 4-2 presents plots of those flight tracks at altitudes up to 4,000 feet MSL. The left side of the figure shows the NA-5 measure displaying aircraft that made a right turn. The right-turning aircraft all initiated their turns close to the airport, most overflying non-residential areas to the north of and along Interstate 40 rather than residential areas further south. This shows agreement with measure NA-5 as all night departures from Runway 23R turning to the west seem to turn immediately and near the end of the Runway. As noted previously, one of the six parts of NA-3 (NA-3, part 5) also addressed Runway 23R departures. The right side of the figure shows the NA-3, part 5 measure displaying aircraft not turning right at night. In general, these aircraft do not remain on runway heading until 4,000 feet MSL but are turned to fly headings on the TRIAD SID, generally a 190 heading.



(NA-5) RWY 23R – 71/89 turn right, 100% compliant with making any right turns as soon as practicable.



(NA-3, part 5) RWY 23R – 18/89 NOT turning right, 0% compliant with delaying a transition to a more southerly heading until reaching 4,000 MSL

Figure 4-2 Night Departure Procedures from Runway 23R
Source: PTAA NOIARS December 15, 2018 through March 31, 2019

PTAA Recommendation: Modify the measure by incorporating NA-3, Part 5. This will combine all Runway 23R procedures as part of one measure.

4.1.6 NA-6: Night Northbound Departure Corridor from Runway 23L

Promptly after FAA approval of this measure, establish a new nighttime departure procedure for aircraft departing from runway 23L to northern destinations to initiate a left departure turn to a northeasterly heading as soon as practicable.

Implementation Status: Not implemented
Compliance: N/A

Similar to the analysis for NA-4 above, nighttime departures from Runway 23L with destinations to the north[17] were selected from the sample period flight track data. Figure 4-3 depicts these flight tracks. Approximately 84% of the northbound night departures turned left, a few remained on runway heading and the remainder turned right. The blue departure path shown in Figure 4-3 represents the modeled departure path from the 2007 NCP.

Of the operations that turned left, the majority appear to follow the initial flight path parallel to and east of NC Highway 68, as prescribed in NA-4, as opposed to executing an immediate turn to a northeasterly heading. Therefore, this measure has not been implemented. However, such routing may be preferable from both an air traffic control perspective and for purposes of reducing aircraft operations over densely populated residential areas compared with a more immediate turn to the northeast.

[17] Arrival Airport in flight track data listed as DCA, EWR, IAD, LGA, PHL, TEB, RIC, ACY, HPN, ORF or ROA

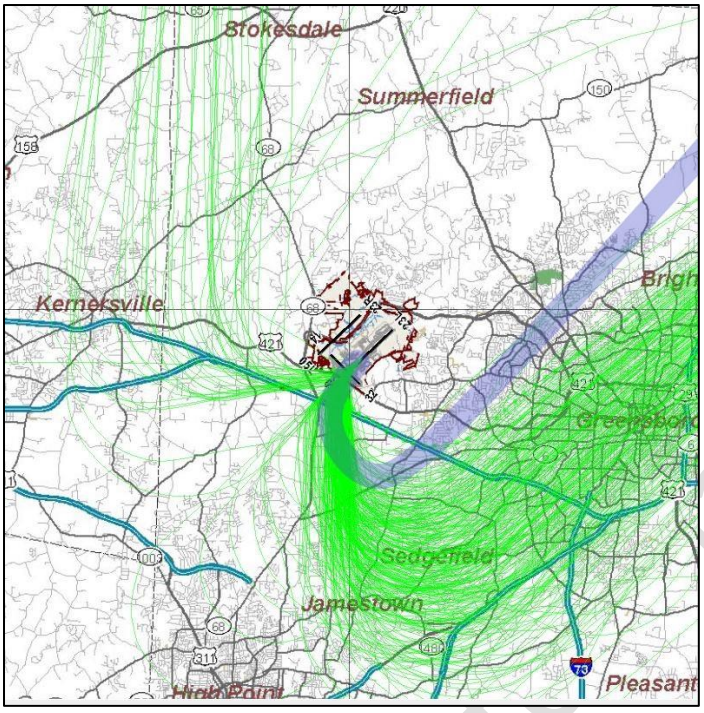


Figure 4-3 Night Northbound Departures from Runway 23L
Source: PTAA NOIARS December 15, 2018 through March 31, 2019

PTAA Recommendation: Eliminate this measure because this measure has never been implemented as written. FAA incorporated the northbound Runway 23L departures into the NA-4 measure.

4.1.7 NA-7: No Such Measure

The statement of measure **NA-8** in the original Part 150 documentation is: *In response to comments received from the FAA's Atlanta Airports District Office, Measure NA-5 was modified to address all aircraft that turn right from runway 23R. Measure NA-7 thus became redundant and was deleted.*

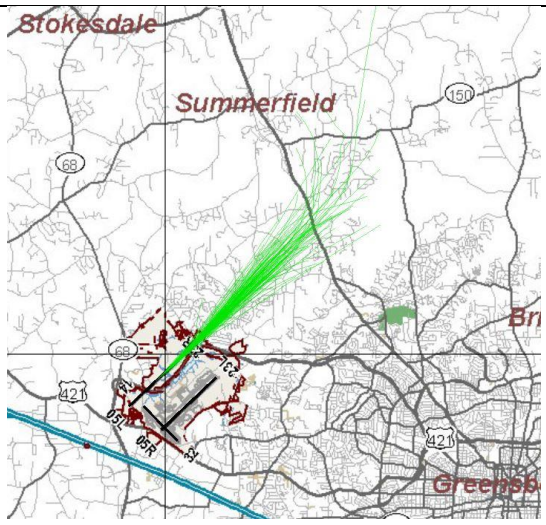
Implementation Status: N/A
Compliance: N/A

4.1.8 NA-8: Departures from Runway 5L

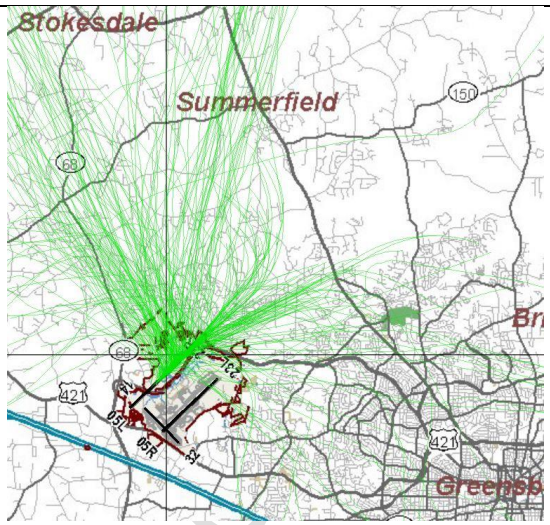
When runway 5L/23R is available for use, establish a procedure to delay initial turns from runway heading by aircraft departing on runway 5L until such aircraft reach an altitude of 4,000 MSL.

Implementation Status: Partially implemented
Compliance: 65%
To analyze compliance with this noise abatement procedure, departures from Runway 5L flights at altitudes up to 4,000 feet MSL were plotted and counted. Figure 4-4 depicts these departure flights in four groups: the map on the top left shows the flight paths that remain on runway heading until after reaching 4,000 feet while the map on the top right shows those that turned prior to reaching that altitude. Approximately 36 percent of Runway 5L departures in the sample used the noise abatement

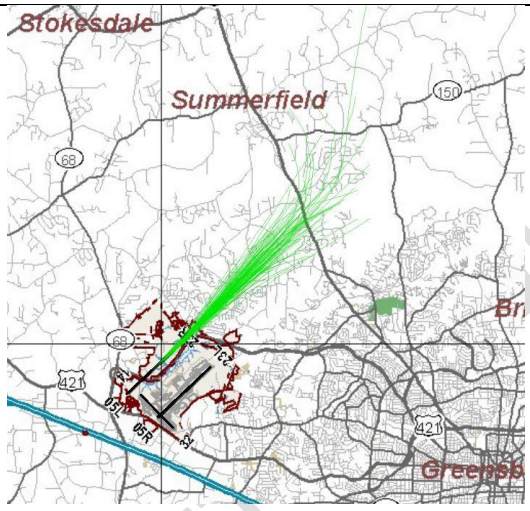
procedure. The bottom pair of maps show only jet aircraft from the same sample: approximately 65 percent of jet departures complied with the measure.



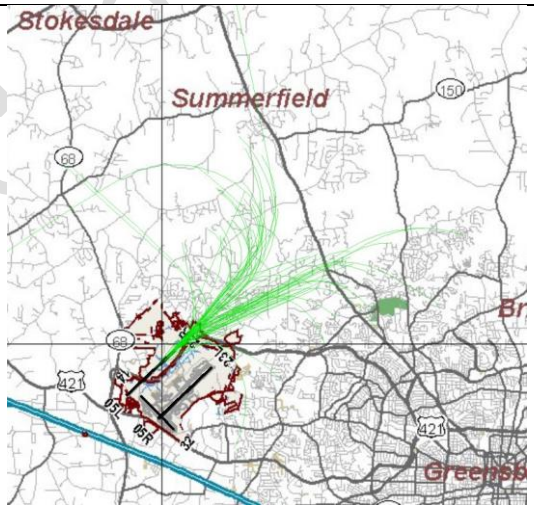
RWY 05L all departures – 147/406 compliant (36.2%)



RWY 05L all departures – 259/406 NOT compliant (63.8%)



RWY 05L jet departures – 138/211 compliant (65.4%)



RWY 05L jet departures – 73/211 NOT compliant (34.6%)

Figure 4-4 Runway 5L Departures
Source: PTAA NOIARS December 15, 2018 through March 31, 2019

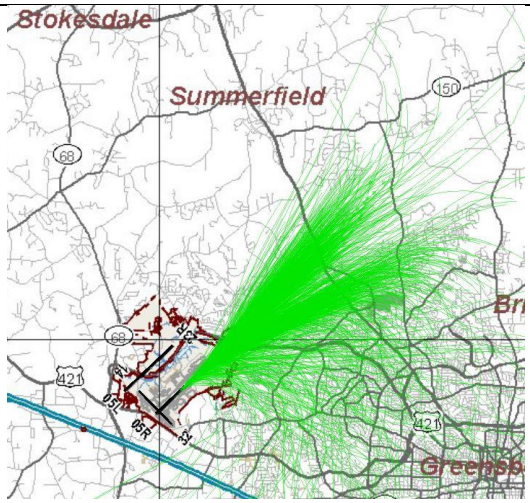
PTAA Recommendation: Maintain measure as is.

4.1.9 NA-9: Departures from Runway 5R

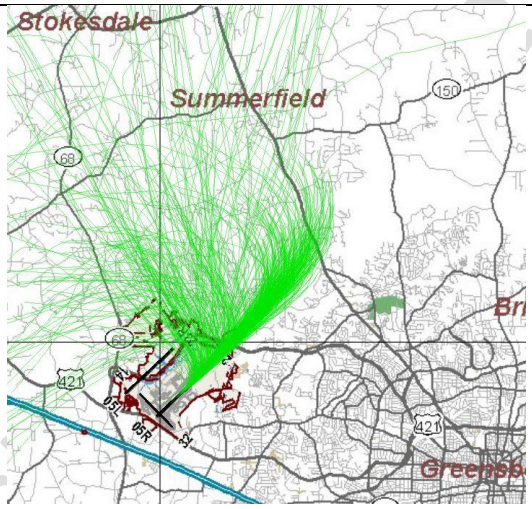
Revise the existing procedure to delay initial left turns from runway heading by aircraft using runway 5R until such aircraft reach an altitude of 4,000 MSL.

Implementation Status: Partially implemented
Compliance: 78%

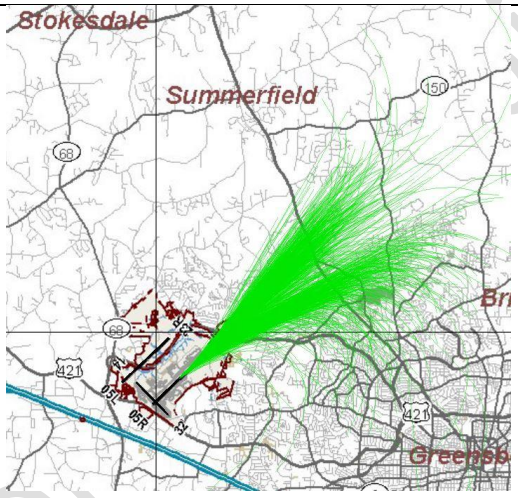
In the analysis of this noise abatement measure, departure flight paths for aircraft at or below 4,000 feet MSL aircraft were mapped. Aircraft maintaining runway heading or turning right were deemed compliant and are depicted in the top left panel of Figure 4-5. Aircraft that turned left prior to reaching the specified altitude were counted as non-compliant, as shown in the top right panel of the figure. Approximately 74 percent of the Runway 5R departures in the sample were compliant with this measure by not turning left or by reaching 4,000 feet MSL before initiating a left turn. As in the previous measure evaluation, the bottom pair of maps show only jet aircraft from the same sample: approximately 78 percent of jet departures complied with the measure.



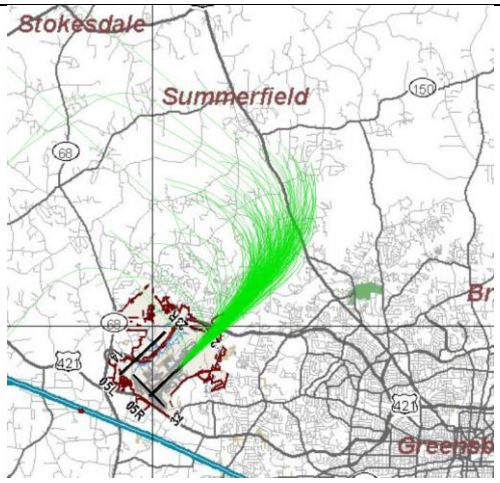
RWY 05R all departures – 1765/2255 compliant (74.3%)



RWY 05R all departures – 580/2255 NOT compliant (25.7%)



RWY 05R jet departures – 1374/1753 compliant (78.4%)



RWY 05R jet departures – 379/1753 NOT compliant (21.6%)

Figure 4-5 Runway 5R Departures
Source: PTAA NOIARS December 15, 2018 through March 31, 2019

PTAA Recommendation: Maintain measure as is.

4.1.10 NA-10: Restrictions on Use of APUs

Under this measure, the Piedmont Triad Airport Authority (PTAA) will adopt a policy for future airport facilities, and for new tenants after FAA approval of this measure, that would require that auxiliary

power units, either on-board units or ground units, except for units in use for engine starts, not produce night-time noise levels in off-airport residential neighborhoods that exceed the ambient noise level at those locations.

Implementation Status: Partially implemented – formal policy not adopted
Compliance: 16 of 20 jet bridges will employ ground power units (GPU) by the end of 2020

By the end of 2020, 16 of the 20 gates with jet bridge access to aircraft will incorporate GPUs to allow aircraft to shut down their auxiliary power units (APU) and switch to quieter GPUs. As jet bridges are replaced or added, PTAA intends to outfit them with GPUs. While equipment exists to allow for aircraft operators to shut down their APUs, PTAA has yet to adopt a formal policy to require future facilities and new tenants to use GPUs.

PTAA Recommendation: Maintain measure as is.

4.1.11 NA-11: Noise Abatement Departure Profiles

Under this measure, the Piedmont Triad Airport Authority (PTAA) designates the Close-in Noise Abatement Departure Profile (NADP) for jet departures on runways 5L and 5R beginning with the opening for use of new runway 5L/23R.

Implementation Status: Not implemented
Compliance: N/A

FAA Advisory Circular 91-53A provides acceptable criteria for two safe Noise Abatement Departure Profile (NADP) procedures for commercial jet aircraft: Close-in NADP (NADP 1) and Distant NADP (NADP 2). As the names of the procedures suggest, the Close-in NADP provides noise benefit to areas adjacent to the airport whereas the Distant NADP provides noise benefit slightly further out from the airport. Airport operators cannot mandate the use of NADP at an airport because airport operators do not have the authority to require specific operating procedures for aircraft in flight; implementation of NADP is voluntary and at the choice of aircraft operators. However, FAA Advisory Circular 91-53A encourages aircraft operators "*…to use the appropriate NADP when an airport operator requests its use to abate noise for either a close-in or distant community.*"

While through NA-11 PTAA designates the "Close-In" NADP-1 as the preferred jet departure procedure on Runways 5L and 5R, PTAA has not formally requested the jet operators to implement NADP-1 in their departure procedures at PTI. Therefore, it is likely that jet aircraft operators are using their standard departure procedures rather than NADP-1 procedure to depart PTI. NADP-1 is likely not as effective with the newer generation aircraft in operation at PTI today. Figure 4-6 shows a comparison of the two NADP procedures.

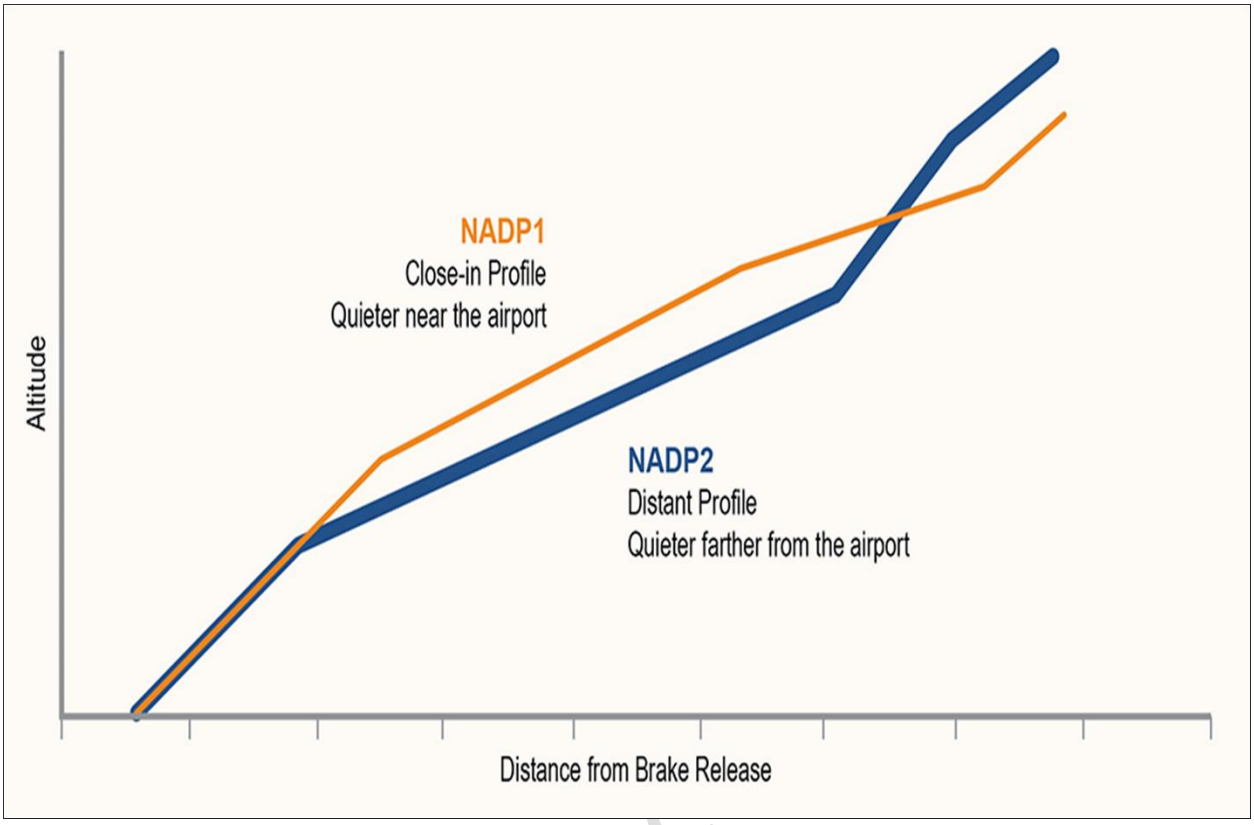


Figure 4-6 Overview of NADP-1 (Close-In) and NADP-2 (Distant) procedures
Source: Civil Air Navigation Services Organization and Airports Council International, "Managing the Impacts of Aviation Noise - A Guide for Airport Operators and Air Navigation Service Providers," September 2015

PTAA Recommendation: Eliminate this measure because it has not been implemented, jet aircraft operators are likely using their standard departure procedures rather than the NADP-1 procedure to depart PTI, and NADP-1 is likely not as effective with the newer generation aircraft in operation at PTI today.

4.1.12 NA-12: Noise Abatement Approach Procedures

Under this measure, the PTAA requests that FAA Air Traffic Control Tower personnel direct all jet aircraft arriving at the airport, whether on an IFR[18] or a visual approach, to intercept the final approach at least 5.5 nautical miles from the intended landing runway and to stay at or above the glideslope throughout the remainder of their approach. The PTAA requests that FAA Air Traffic Control Tower personnel direct all jet aircraft arriving at the airport and on the final approach within 12.5 nautical miles from the

[18] IFR stands for Instrument Flight Rules, which indicates that the aircraft has a flight plan and navigation is accomplished by reference to electronic signals and direction from Air Traffic Control, as opposed to VFR (Visual Flight Rules), in which the pilot relies primarily on visual cues for navigation

intended landing runway, whether on an IFR or a visual approach, to stay at or above the glideslope throughout the remainder of their approach.

Implementation Status: Partially implemented
Compliance: 82% intercepting final approach at or beyond 5.5 nautical miles; 6% at or above the glideslope at 12.5 nautical miles; 89% at or above the glideslope at 5.5 nautical miles; and 97% at or above the glideslope at 2.5 nautical miles (as a check to stay at or above the glideslope throughout the remainder of the approach).

Jet aircraft arrivals were analyzed separately for each of the six runways. To determine if an aircraft intercepted the final approach at least 5.5 nautical miles (nmi) from the runway end, a gate approximately a mile wide was drawn across the final approach path; if an aircraft passed through the gate it was counted as compliant with that specification. Collectively, 82.4 percent of the jet arrivals in the sample intercepted the final approach at least 5.5 nmi from the given runway end. Runway 5L, Runway 23R, and Runway 32 have Final Approach Fixes (FAF) set at less than 5.5 nmi, therefore compliance with this measure may be lower for those runways.

Table 4-3 indicates the number of jet arrivals to each runway during the analysis period and lists the number and percentage of operations on final approach at 12.5 nmi, 5.5 nmi, and 2.5 nmi from the runway end. The distances 12.5 nmi and 5.5 nmi are specified in the statement of the measure; the 2.5 nmi distance was chosen as a checkpoint to evaluate the "stay at or above glideslope throughout the remainder of their approach" directive.

Table 4-3 : Jet Arrivals on Final Approach
Source: PTAA NOIARS December 15, 2018 through March 31, 2019, HMMH 2020

Runway	Total arrival count	On final approach at 2.5 nmi		On final approach at 5.5 nmi		On final approach at 12.5 nmi	
		Count through gate	Percentage	Count through gate	Percentage	Count through gate	Percentage
05L	311	306	98.4%	255	82.0%	103	33.1%
05R	2275	2267	99.6%	2047	90.0%	761	33.5%
14	12	12	100.0%	9	75.0%	0	0.0%
23L	3457	3379	97.7%	2737	79.2%	750	21.7%
23R	272	271	99.6%	239	87.9%	84	30.9%
32	380	361	95.0%	241	63.4%	7	1.8%
Total	**6707**	**6596**	**98.3%**	**5528**	**82.4%**	**1705**	**25.4%**

Each of the airport's runways has a specified three-degree glideslope, but their threshold crossing heights vary slightly and the ground elevation of the runway ends differs by as much as 70 feet. In order to determine compliance with an aircraft being at or above glideslope at a given distance, the appropriate altitude in MSL was calculated for each runway at three different distances. Table 4-4 lists the calculated glideslope altitudes and the percentage of jets in the analysis period at or above that altitude for each of the distances. A 50-foot tolerance below the glideslope altitude was allowed due to the accuracy level of altitudes in radar data.

Table 4-4 Jet Arrivals At or Above Glideslope on Final Approach
Source: PTAA NOIARS December 15, 2018 through March 31, 2019, HMMH 2020

Runway	Runway end elevation	Threshold crossing height	At 2.5 nmi		At 5.5 nmi		At 12.5 nmi	
			Glideslope altitudes (MSL)	Percent at or above glideslope	Glideslope altitudes (MSL)	Percent at or above glideslope	Glideslope altitudes (MSL)	percent at or above glideslope
05L	916	55	1768	87.9%	2724	72.2%	4954	6.8%
05R	900	53	1750	96.4%	2706	93.7%	4936	4.6%
14	925	59	1781	100.0%	2737	100.0%	4967	--
23L	886	52	1735	99.0%	2691	89.7%	4921	6.5%
23R	855	55	1707	86.7%	2663	79.1%	4893	8.3%
32	900	53	1750	95.8%	2706	63.9%	4936	14.3%
Overall compliance				**96.9%**		**88.8%**		**5.8%**
Note: Percentages calculated based on flights being within 50' of the Glideslope or higher.								

Collectively, of the aircraft that passed through the gates on their final approach, 5.8 percent were at or above the glideslope when 12.5 nmi away from the runway end, 88.8 percent were at or above the glideslope at 5.5 nmi out, and 96.9 percent were at or above the glideslope by the 2.5 nmi analysis point.

The figures on the next several pages (Figure 4-7 through Figure 4-12) present the flight track plots of jet arrivals to each runway end. The analysis gates at 5.5 and 2.5 nmi from runway end are shown on each track plot. To the right of each plot, cross-section graphs depict the position of the aircraft passing through each of the gates. A horizontal line on each cross-section represents the altitude of the 3-degree glideslope. Dots below the horizontal line indicate aircraft that is lower than the glide slope (not in compliance) at that location.

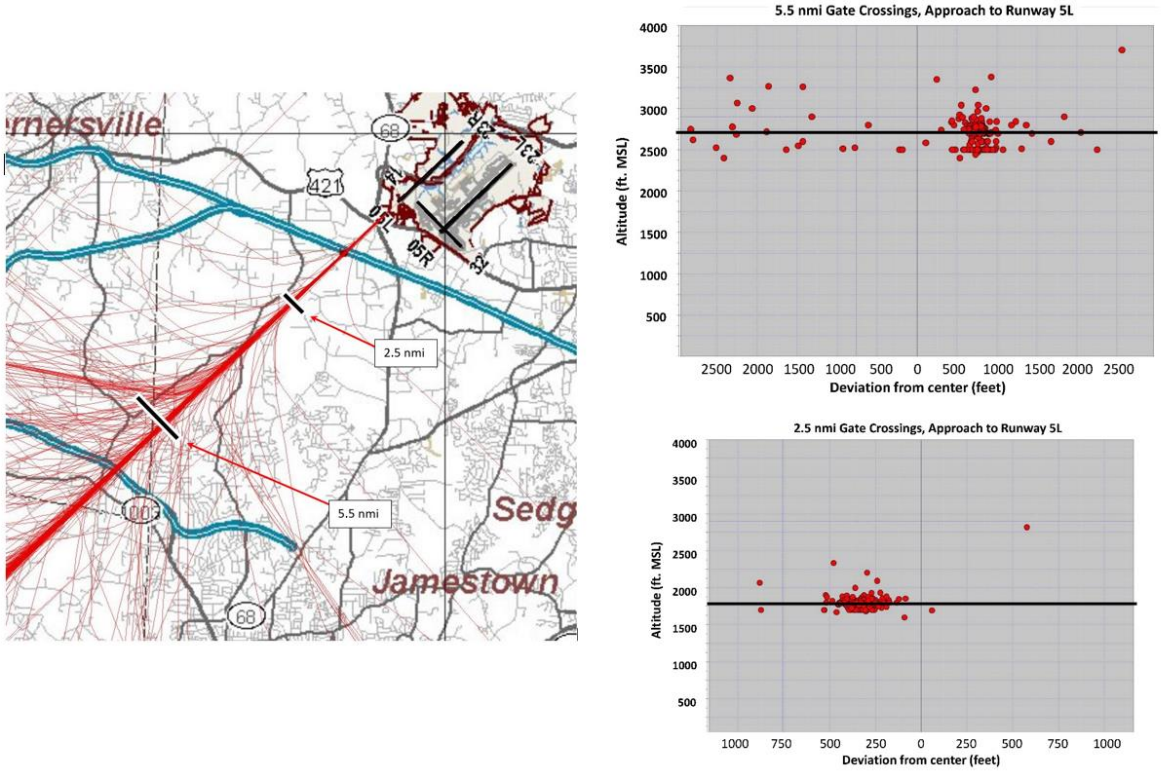


Figure 4-7 NA-12 Approach Procedure: Runway 5L
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

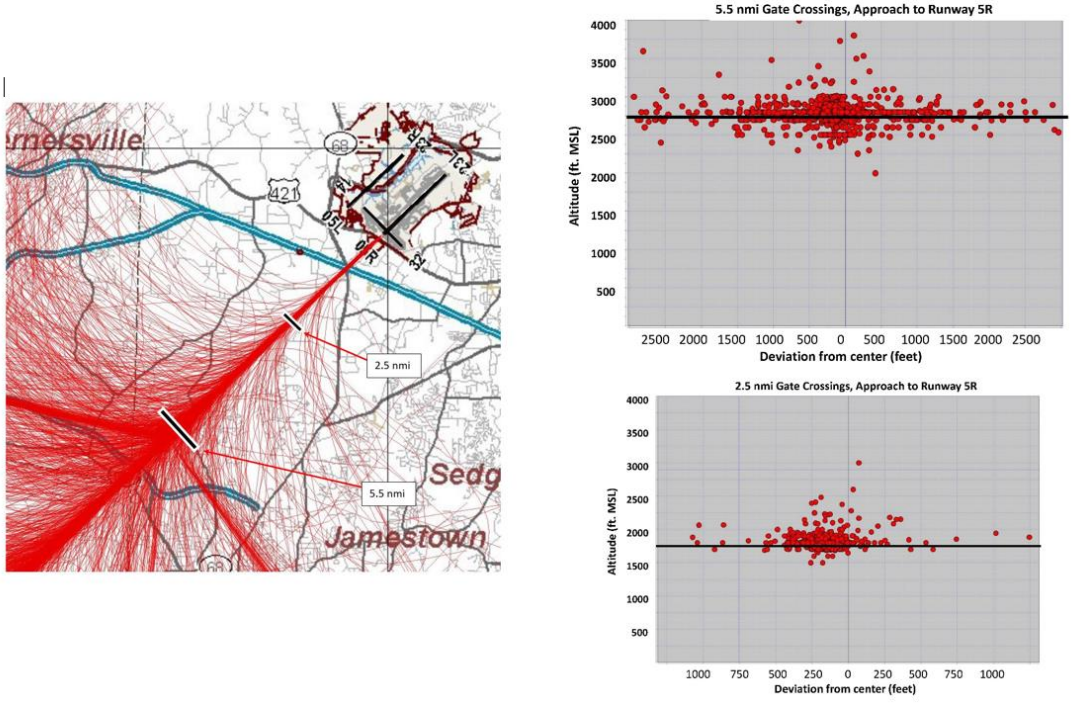


Figure 4-8 NA-12 Approach Procedure: Runway 5R
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

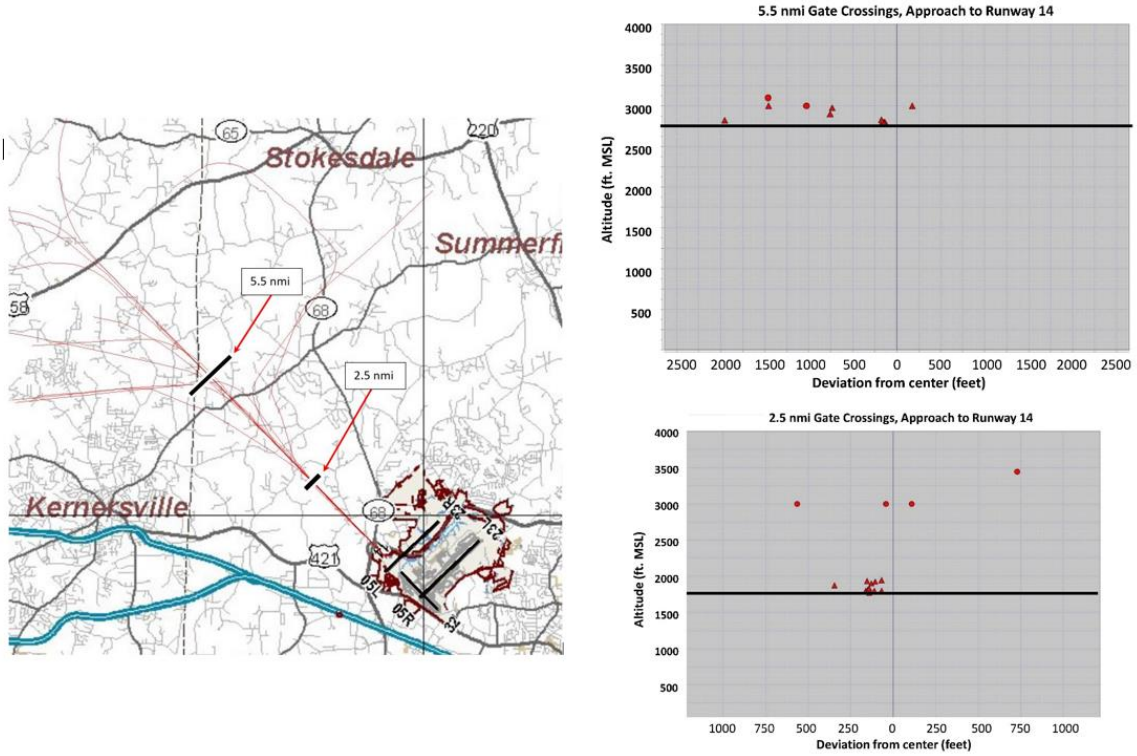


Figure 4-9 NA-12 Approach Procedure: Runway 14
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

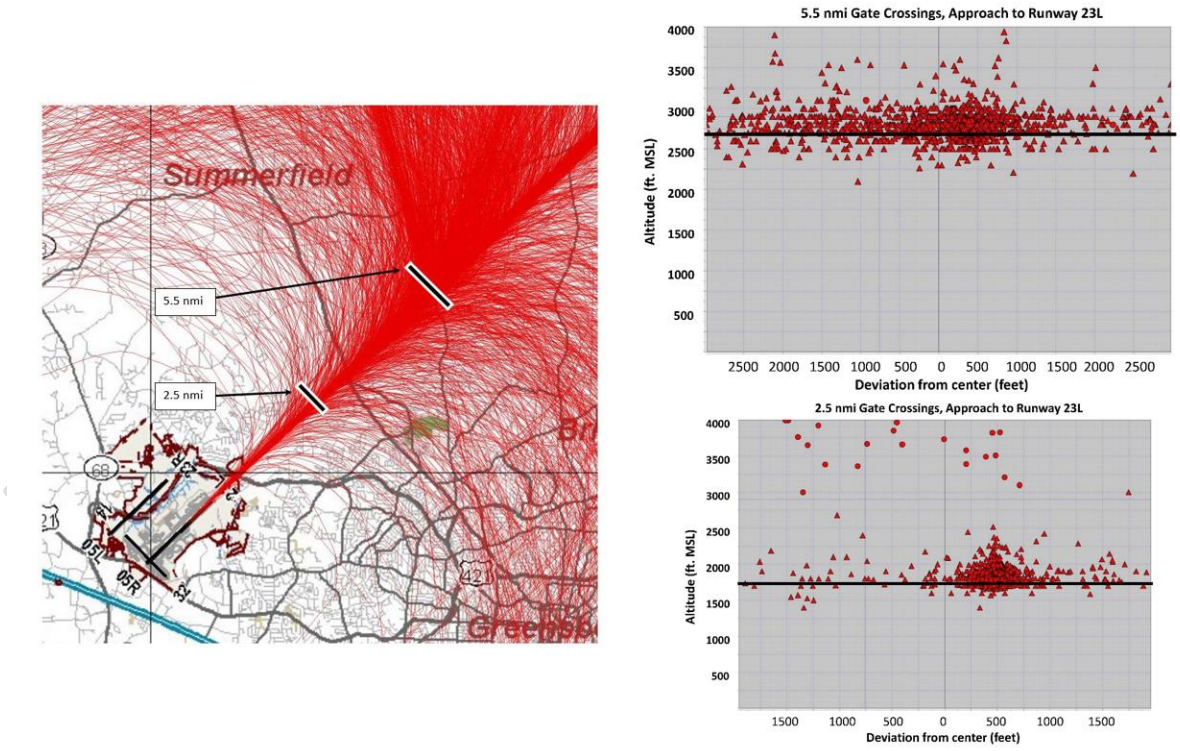


Figure 4-10 NA-12 Approach Procedure: Runway 23L
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

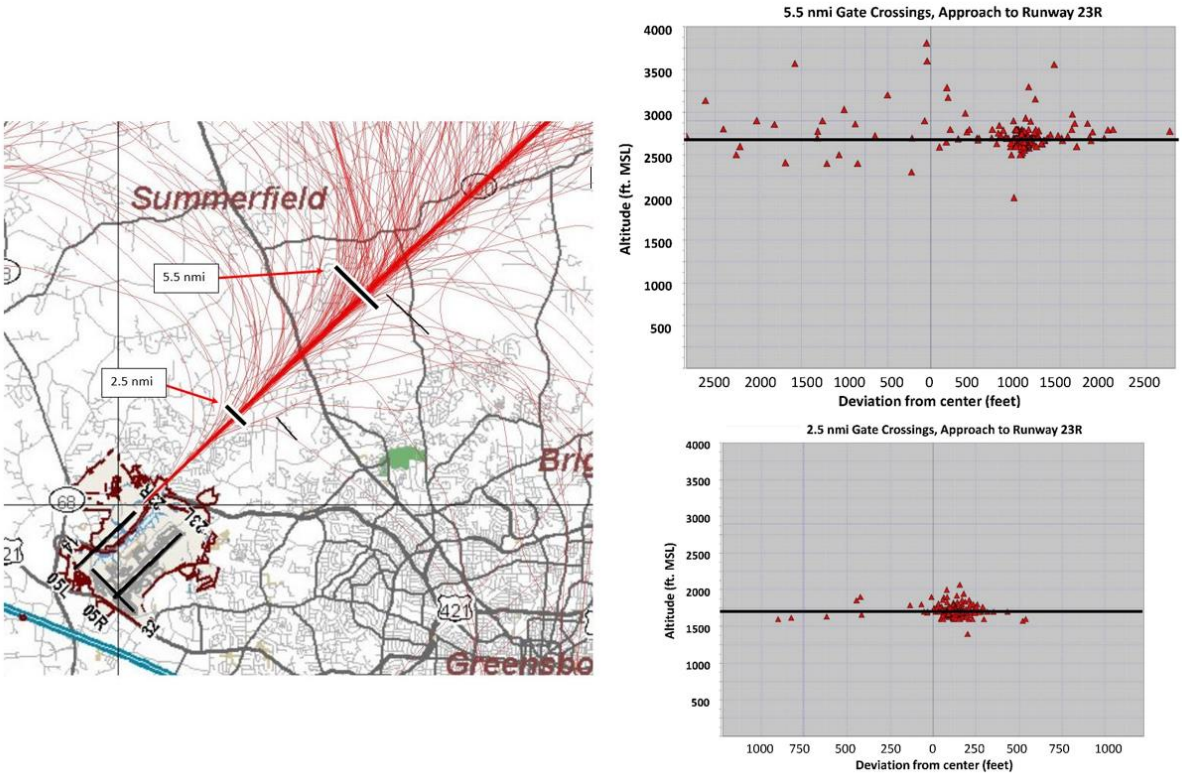


Figure 4-11 NA-12 Approach Procedure: Runway 23R
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

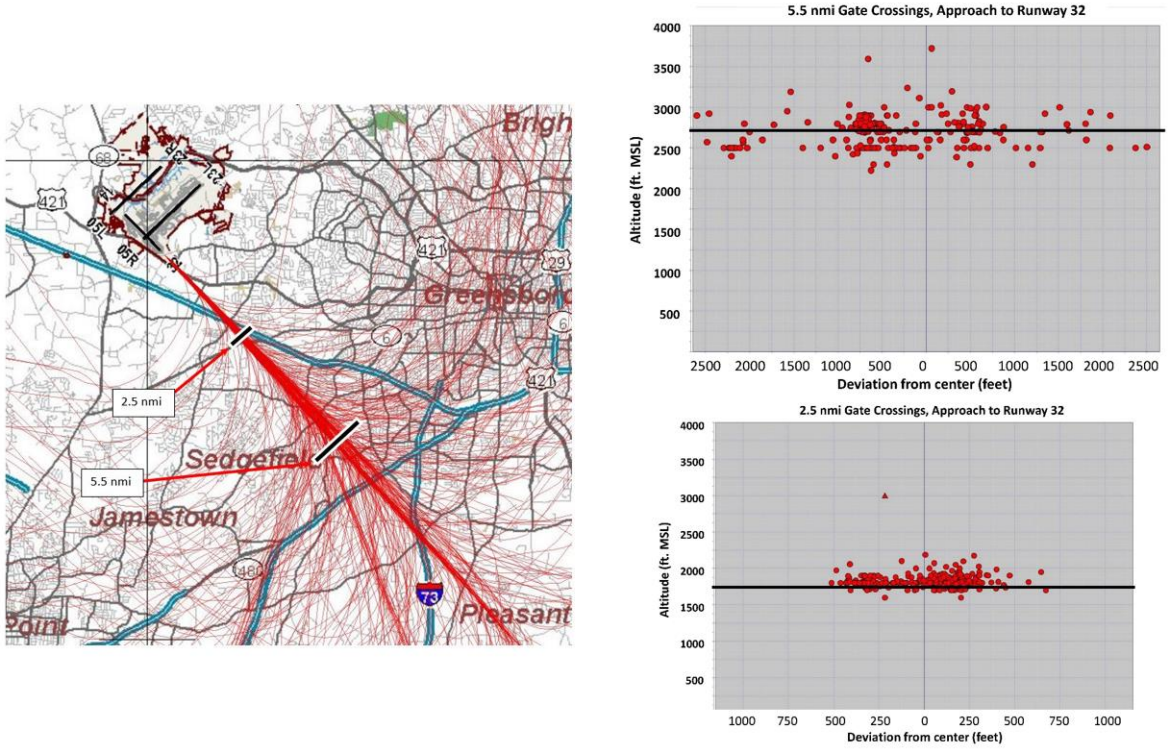


Figure 4-12 NA-12 Approach Procedure: Runway 32
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

Altitude profiles of the final approach corridor for all jet aircraft passing over the 12.5 nmi analysis location are shown in Figure 4-13. The straight dark line indicates the 3-degree glide slope, and the individual altitude profiles of the flight tracks are plotted in red. The majority of flights are not at or above the glide slope altitude that far from the airport, which is expected since aircraft typically do not intercept the final approach course until they reach the FAF.

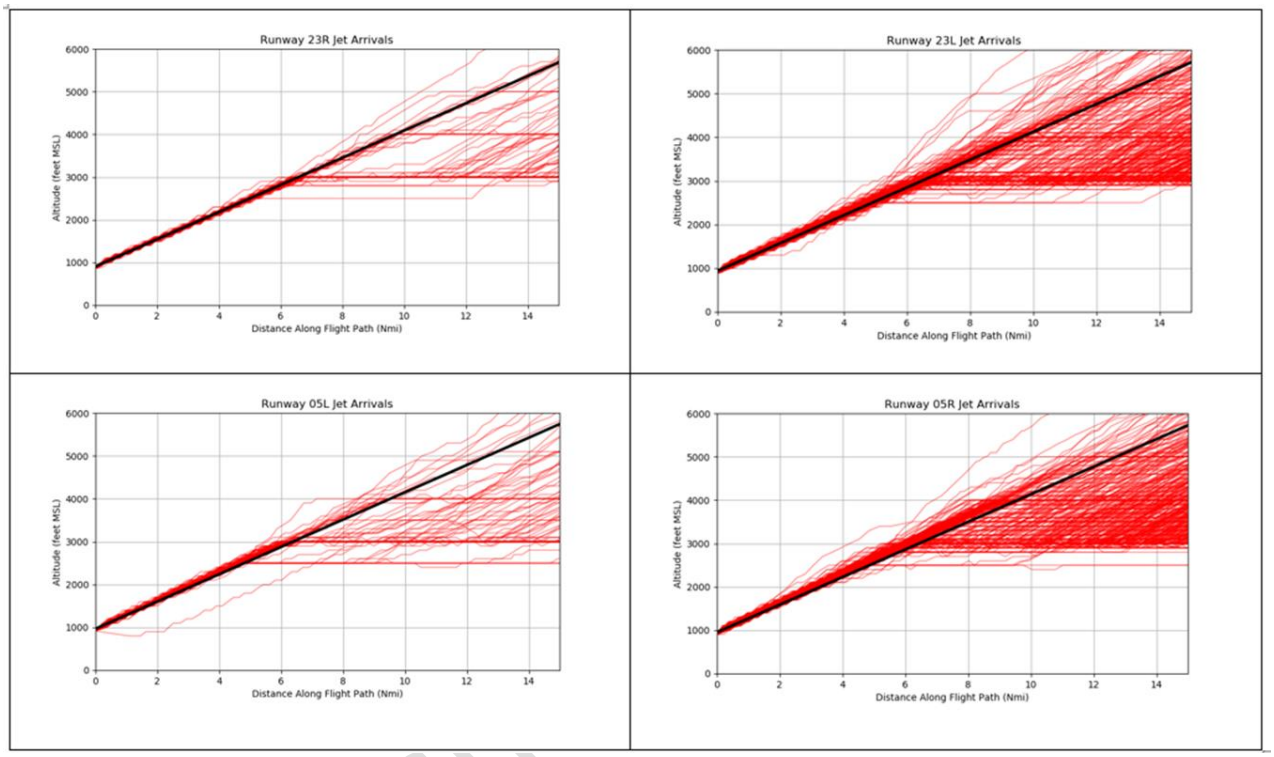


Figure 4-13 Altitude Plots of Jet Aircraft Arrivals on Final Approach
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

PTAA Recommendation: Maintain measure as is.

4.1.13 NA-13: Altitude for Downwind Legs

Under this measure, the PTAA requests that FAA Air Traffic Control Tower personnel direct IFR aircraft[19] on the downwind leg for arrival on runways 5L, 5R, 23L or 23R to remain at or above 4,000' MSL until crossing the extended centerline of runway 14/32 at the airport. When implementing this measure and there are simultaneous approaches to runways 5L and 5R, the PTAA requests that FAA Air Traffic Control

[19] IFR stands for Instrument Flight Rules, which indicates that the aircraft has a flight plan and navigation is accomplished by reference to electronic signals and direction from Air Traffic Control, as opposed to VFR (Visual Flight Rules), in which the pilot relies primarily on visual cues for navigation.

Tower personnel direct IFR aircraft on the downwind leg for runway 5R to remain at or above 5,000' MSL and aircraft on the downwind leg for runway 5L to remain at or above 4,000' MSL.

Implementation Status: Implemented
Compliance: 94% Runway 5L; ≥90% Runway 5R; ≥89% Runway 23L; and ≥85% Runway 23R

This measure specifically applies to IFR aircraft, which are not explicitly identified as such in the flight track and aircraft identification data. Since the vast majority of air carrier and air taxi operations at PTI are IFR flights, aircraft in those two categories, plus general aviation jet aircraft formed the sample for this measure's evaluation**.** Figure 4-14 is provided to illustrate the terms used in describing segments of aircraft approach paths. Flight track plots were produced for each of the four main runways (5L, 5R, 23L and 23R) depicting those arrival flights that flew a downwind leg parallel to the runways prior to turning 180 degrees on to the final approach. For Runway 5L, the downwind leg is flown on the west side of the airport, while for the other three runways (5R, 23L, and 23R) the downwind leg may be either on the west side or the east side of the airport. Analysis gates were drawn along the extended centerline of the crosswind runway to capture the aircraft altitudes as they pass over the extended centerline along the downwind leg.

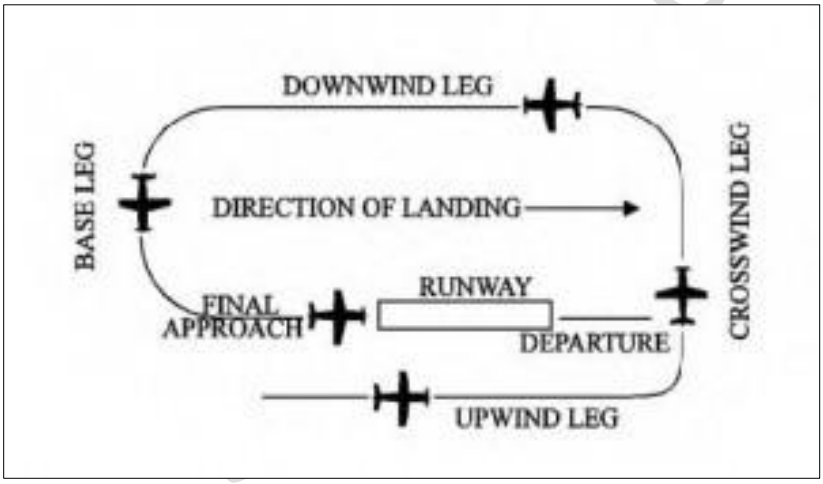
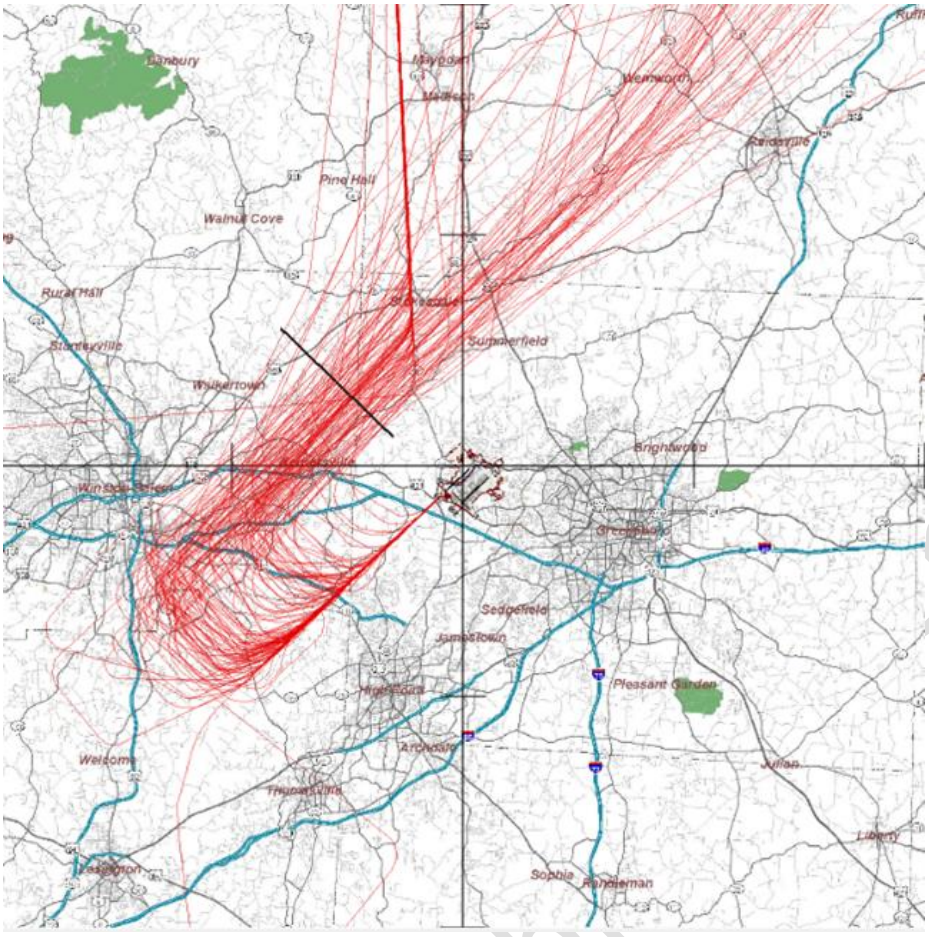
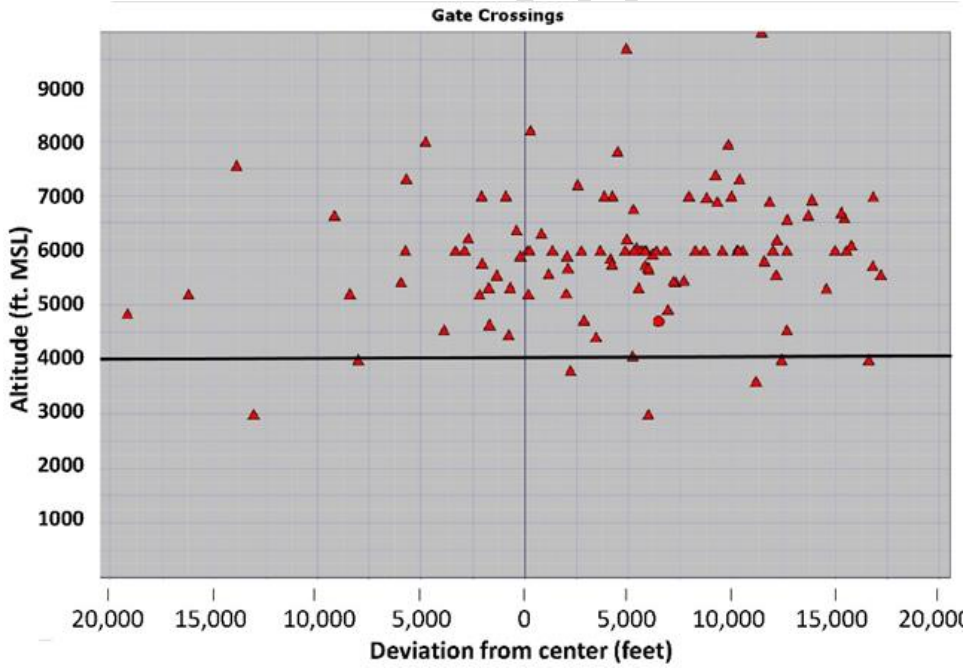


Figure 4-14 Aircraft Landing Diagram
Source: https://aviationglossary.com/downwind-leg/ January 30, 2020

Figure 4-15 through Figure 4-21 present the flight track plots for each of the approach corridors to the four main runways. A cross-section graph to the right of each plot depicts the aircraft altitude at that point along the route. A horizontal line on the graph at 4,000 feet MSL (and also at 5,000 feet MSL for Runway 5R) indicates the altitude specified by the noise abatement measure; counts of aircraft below and above, as well as calculation of percent compliance are noted below each graph. Overall, of the 2,721 observed flights that flew a downwind leg on approach to Runways 5L, 5R, 23L or 23R, 2,525 of them (92.7 percent) were at or above 4,000 feet MSL when crossing the extended centerline of Runway 14/32.

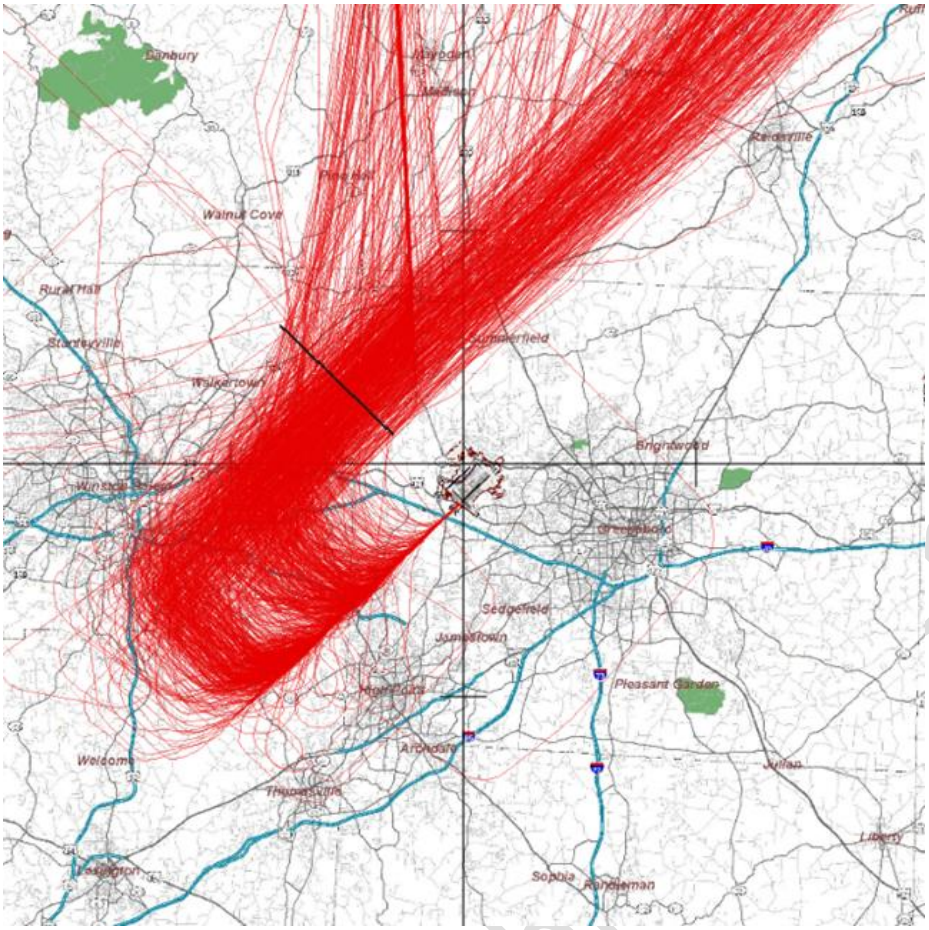


RWY 5L IFR arrivals with western downwind leg

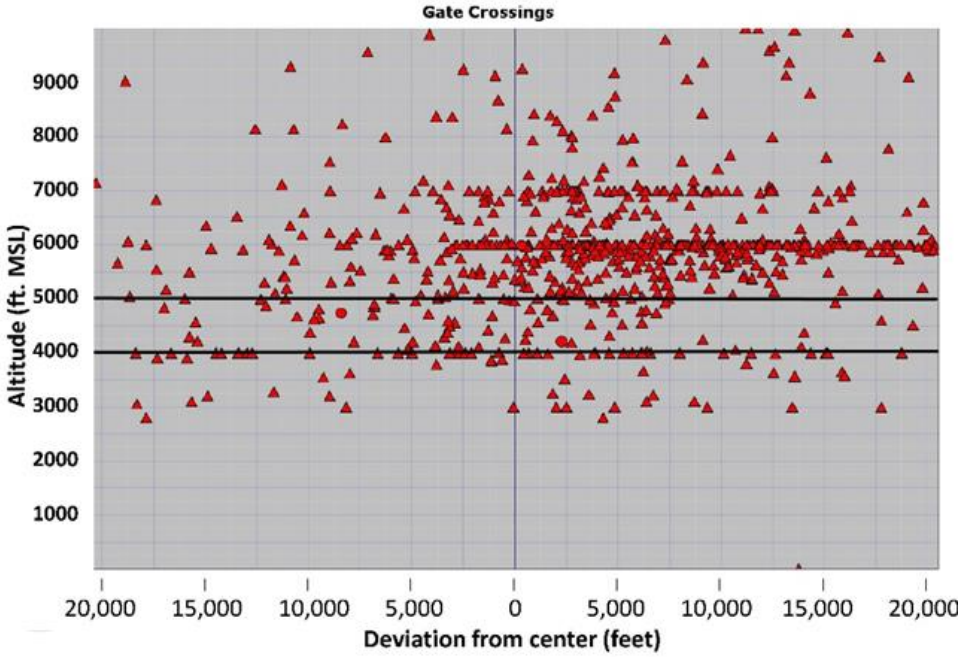


102/109 at or above 4,000 ft MSL (93.5%)

Figure 4-15 NA-13 Altitude for Downwind Legs: Runway 5L Arrivals
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

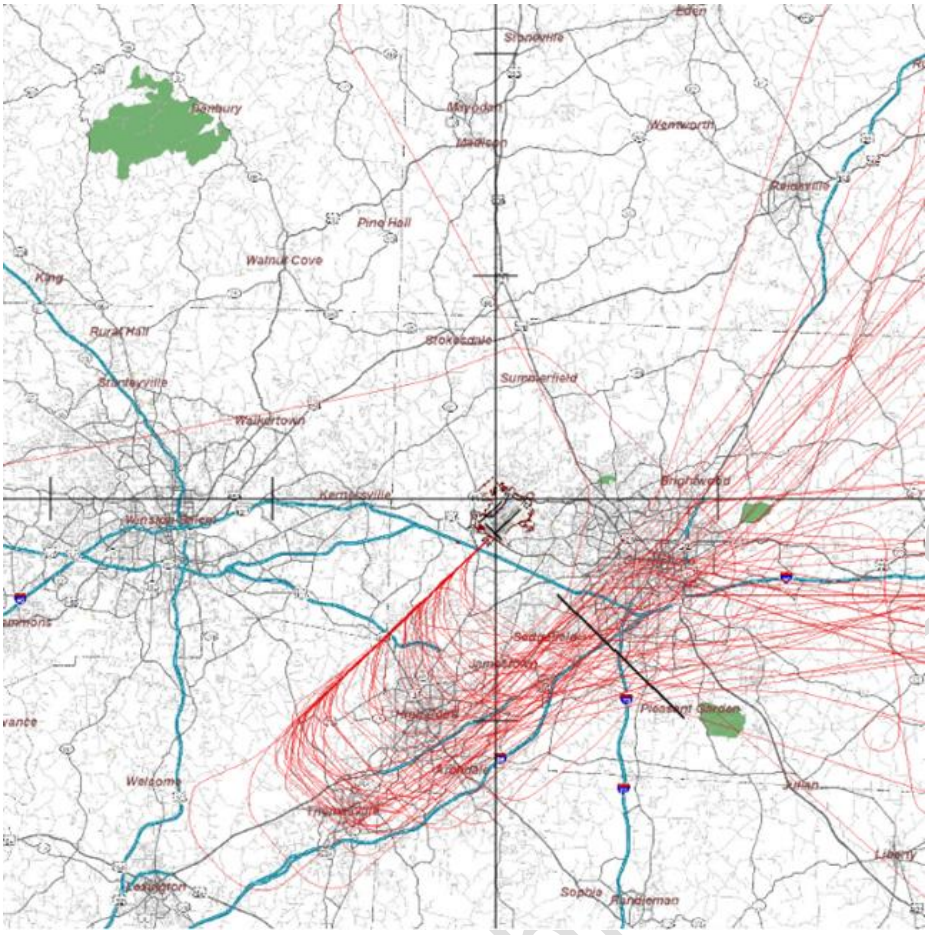


RWY 5R IFR arrivals with western downwind leg

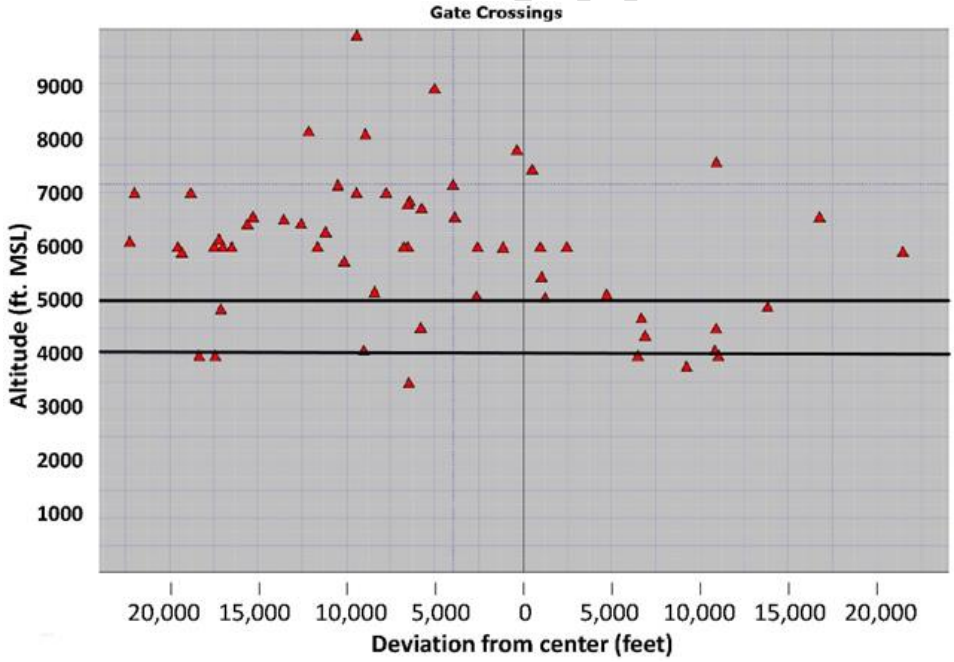


666/738 at or above 4,000 ft MSL (90.2%)

Figure 4-16 NA-13 Altitude for Downwind Legs: Runway 5R Arrivals on West Side
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

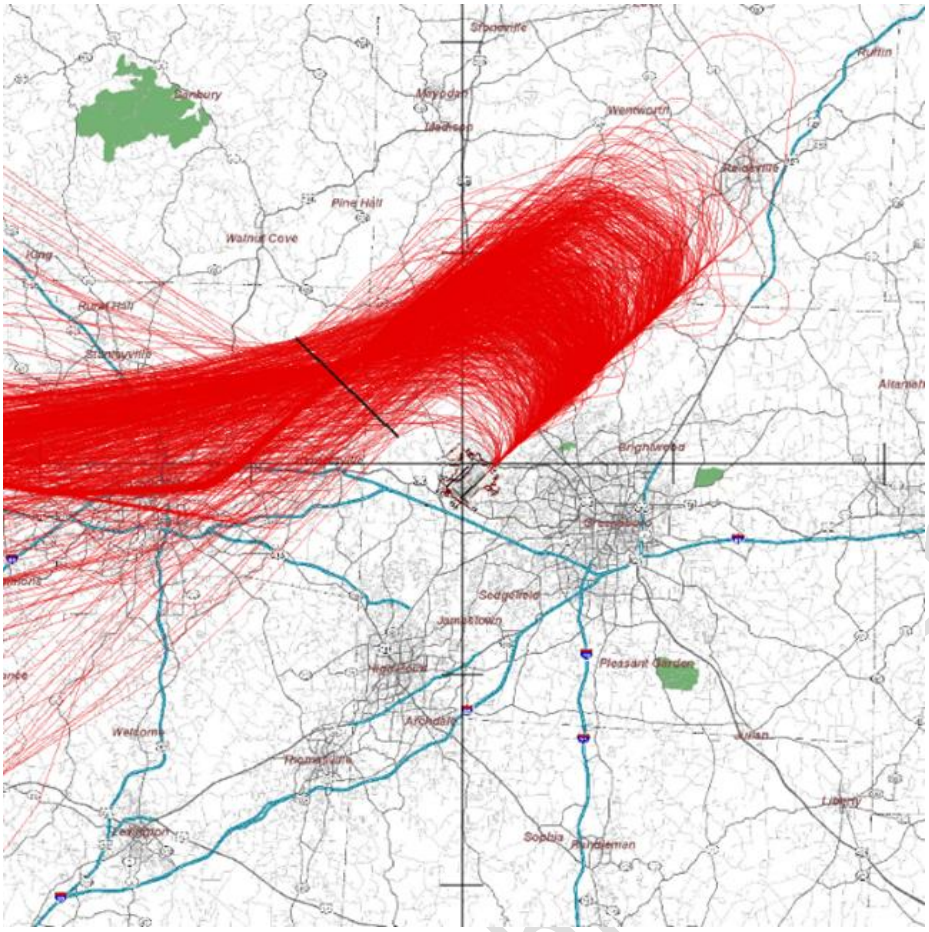


RWY 5L IFR arrivals with eastern downwind leg

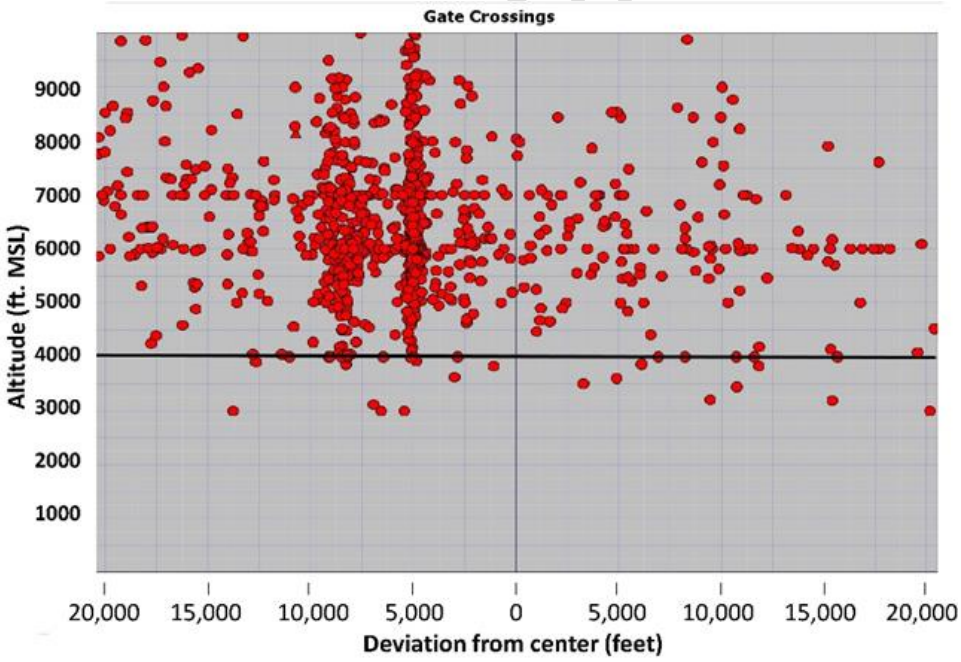


52/58 at or above 4,000 ft MSL (89.6%)

Figure 4-17 NA-13 Altitude for Downwind Legs: Runway 5R Arrivals on East Side
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

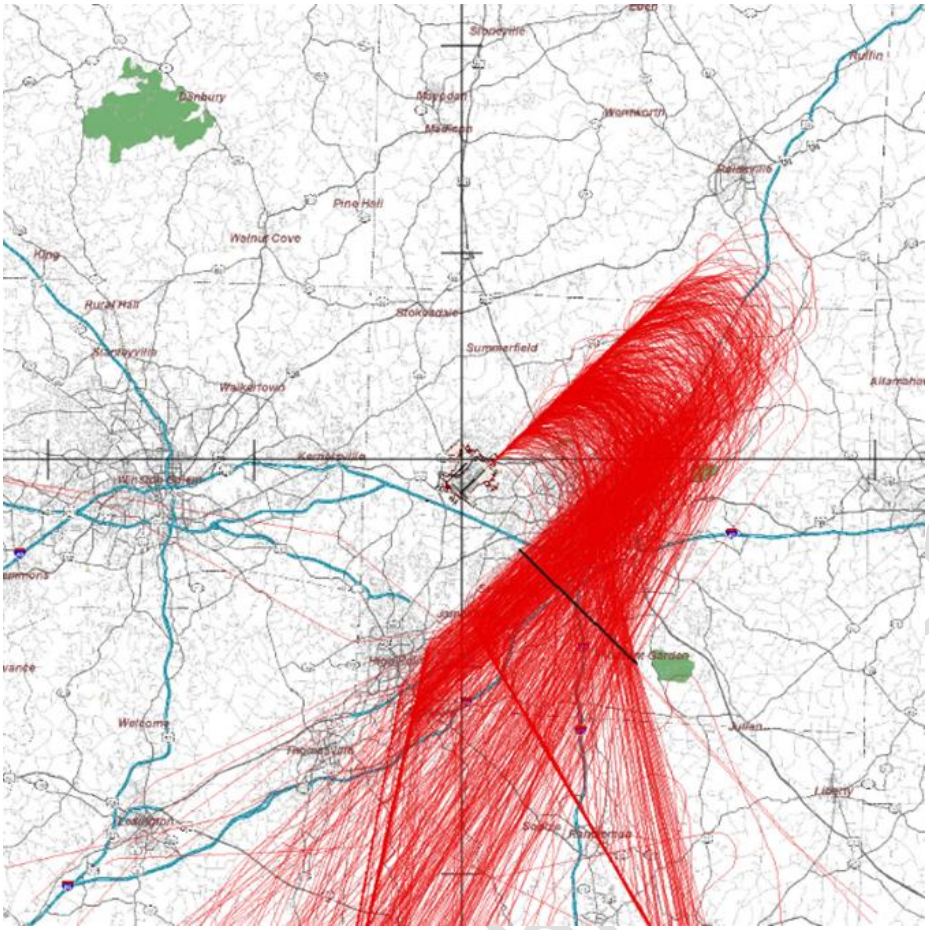


RWY 23L IFR arrivals with western downwind leg

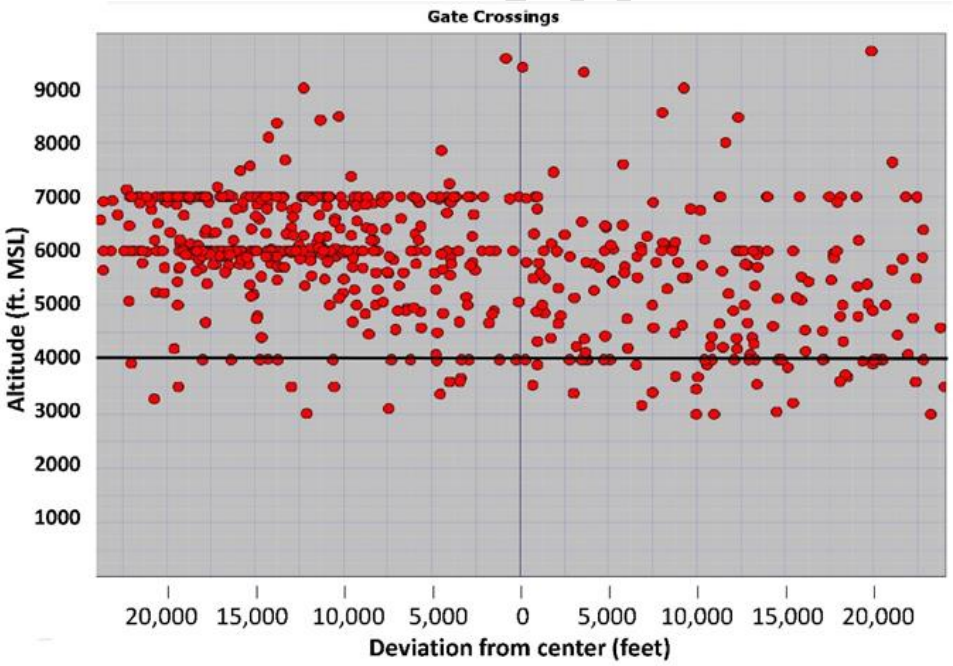


1045/1076 at or above 4,000 ft MSL (97.1%)

Figure 4-18 NA-13 Altitude for Downwind Legs: Runway 23L Arrivals on West Side
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

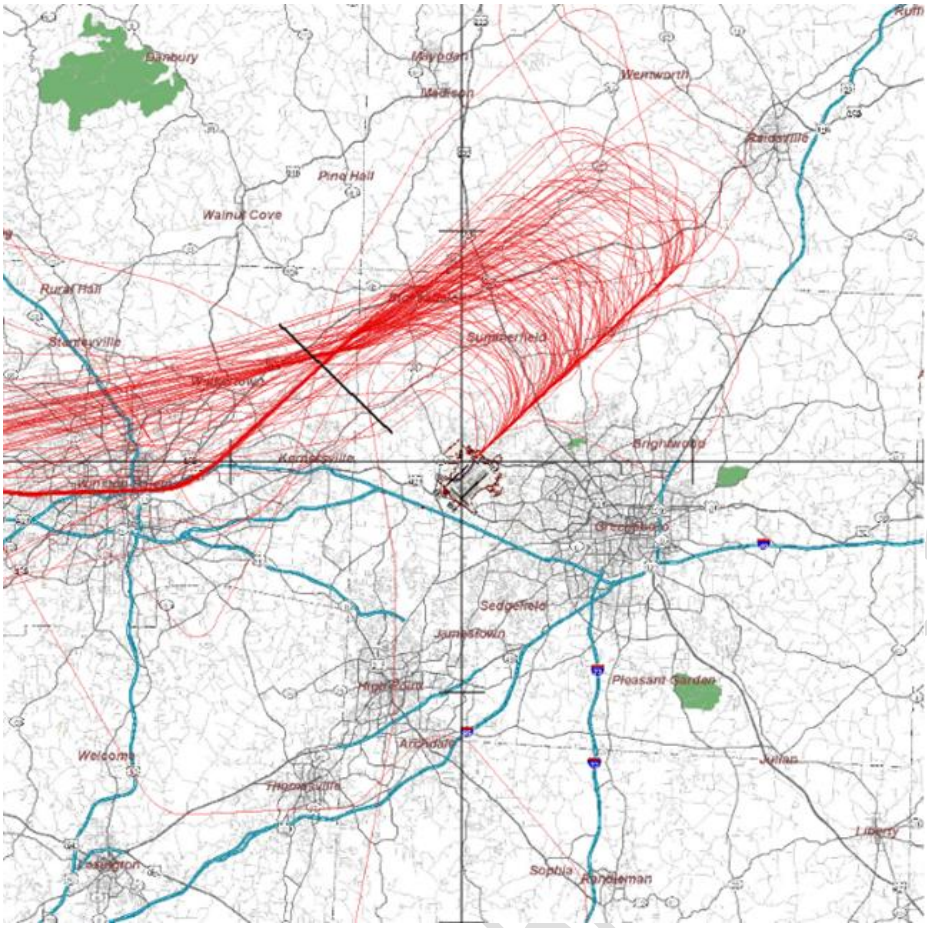


RWY 23L IFR arrivals with eastern downwind leg

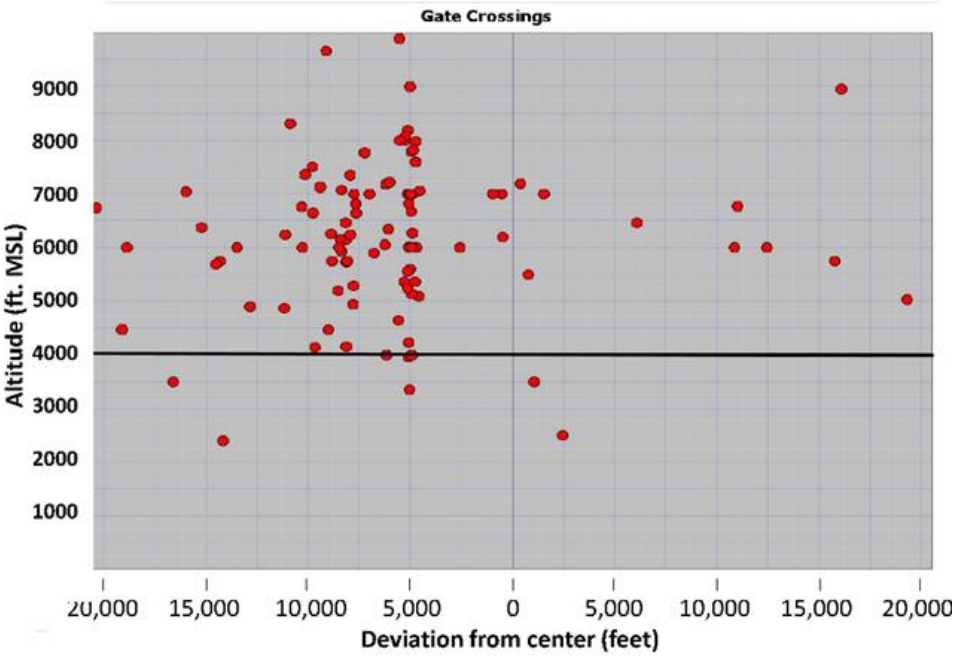


536/603 at or above 4,000 ft MSL (88.8%)

Figure 4-19 NA-13 Altitude for Downwind Legs: Runway 23L Arrivals on East Side
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

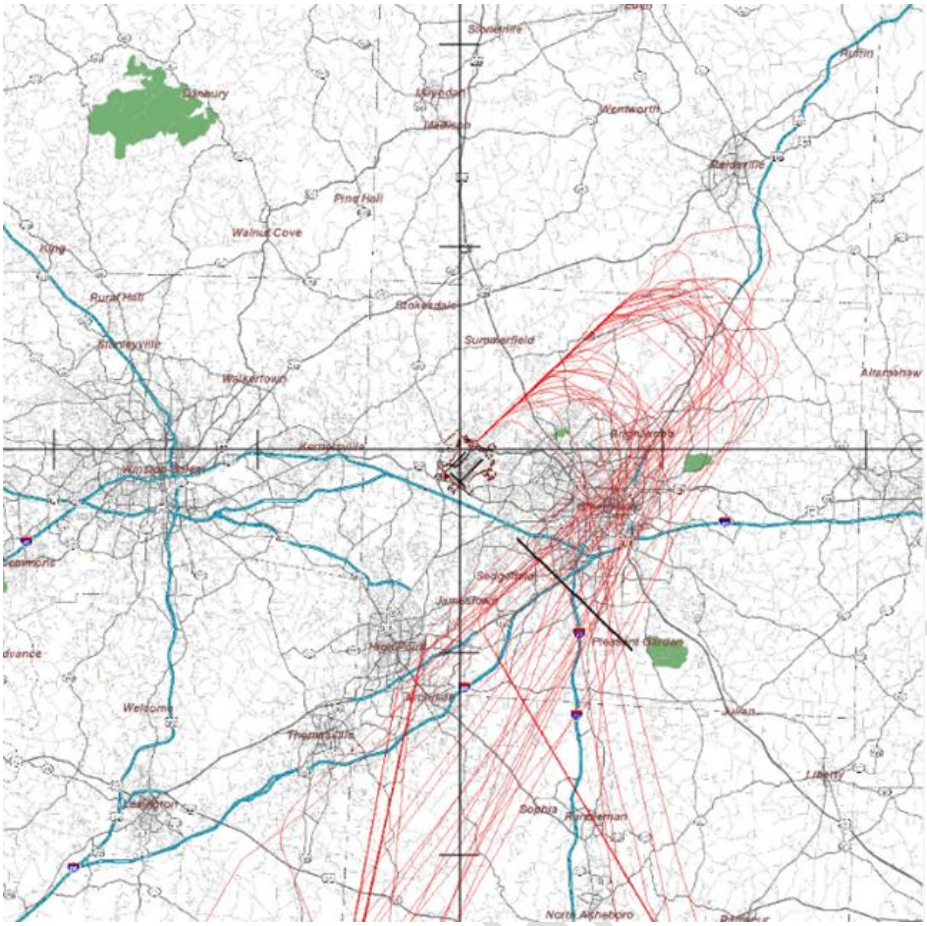


RWY 23R IFR arrivals with western downwind leg

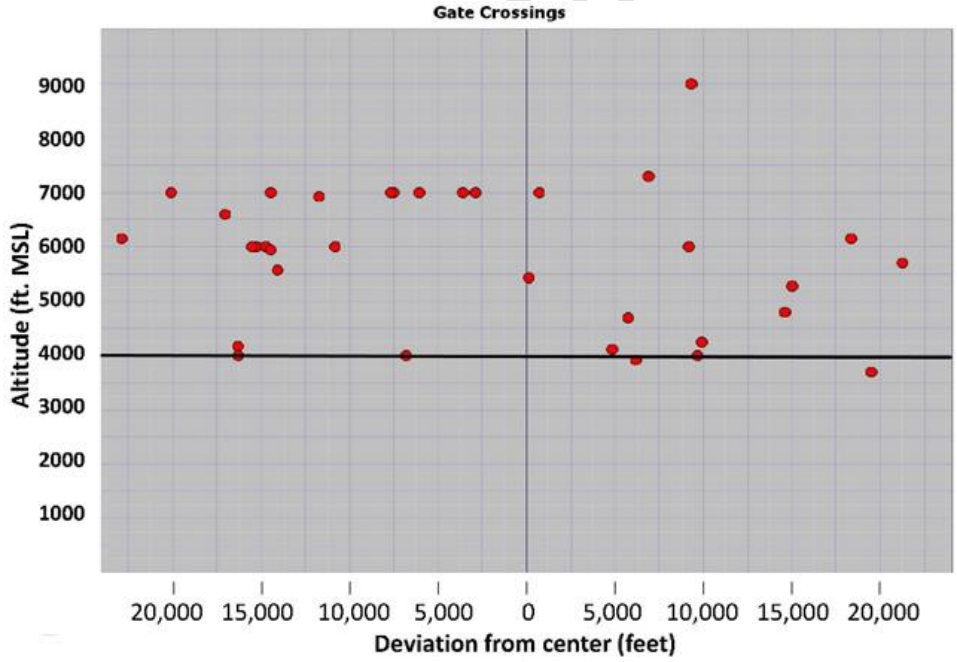


95/103 at or above 4,000 ft MSL (92.2%)

Figure 4-20 NA-13 Altitude for Downwind Legs: Runway 23R Arrivals on West Side
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019



RWY 23R IFR arrivals with eastern downwind leg



29/34 at or above 4,000 ft MSL (85.2%)

Figure 4-21 NA-13 Altitude for Downwind Legs: Runway 23R Arrivals on East Side
Source: PTAA NOIARS Dec 15, 2018 - March 31, 2019

PTAA Recommendation: Maintain measure as is.

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 PTAA has regulatory authority to control land uses around airports. PTAA recognizes that state and local governments are responsible for land use planning, zoning, and regulation.

Table 4-5 lists the five PTAA recommended land use measures approved by the FAA and summarizes the status of each measure as described in the 2007 NCP and 2008 ROA.

Table 4-5 Implementation Status of 2007 NCP Land Use Measures
Source: PTAA and HMMH, 2020

Measure Number	Land Use Measure	Implementation Status
LU-1	Acquire Noise-Sensitive Properties where DNL Exceeds 70 dB	Fully implemented and complete
LU-2	Sound Insulation of Noise-Sensitive Structures where DNL Exceeds 65 dB	Fully implemented and nearly complete
LU-3	Optional Acquisition of Avigation Easements for Noise-Sensitive Structures where DNL Exceeds 65 dB	Not implemented
LU-4	Other Assistance for Owners of Residential Property where DNL Exceeds 65 dB	Not implemented
LU-5	Pursue Compatible Use Zoning where DNL Exceeds 65 dB	Implemented

Each of the existing land use measures are described in full in the following sections along with the implementation status with each measure as compared to the intention with the measure as provided in the 2007 NCP.

4.2.1 LU-1: Acquire Noise-Sensitive Properties where DNL Exceeds 70 dB

The PTAA will offer to acquire properties with houses or other noise-sensitive land uses where DNL with the 2014 NCP[20] exceeds 70 dB.

Implementation Status: Fully implemented and complete

[20] Note: 2014 NCP refers to the Revised NEM Approved by FAA (2014 NEM with NCP measures).

Consistent with the mitigation measures defined in the 2001 EIS Record of Decision, PTAA has acquired all remaining residential properties (a total of 13 properties) within the 70 DNL contour of the 2001 EIS. Figure 4-22 shows the locations of those properties acquired under the implementation of the Noise Compatibility Program.

PTAA Recommendation: Eliminate this measure because PTAA has fully implemented this measure and there are no residential units or noise sensitive land uses within the 2020 or 2025 70 DNL contours.

4.2.2 Sound Insulation of Noise-Sensitive Structures where DNL Exceeds 65 dB

The PTAA will offer to sound insulate eligible residences and other noise-sensitive structures intended for public use or assembly (i.e., schools, houses of worship and hospitals) where DNL with the 2014 NCP exceeds 65 dB. The PTAA will require property owners participating in the program to grant an avigation easement to the PTAA upon completion of the treatment.

Implementation Status: Fully implemented and nearly complete

This measure was approved in the FAA's ROA for eligible properties within 65 DNL from the 2001 EIS Record of Decision (ROD) rather than for eligible properties under Part 150. The PTAA has accepted the final grant for this program and plans to end the program once the mitigation from the 2001 ROD has been completed. There are no residential units within the 2020 or 2025 DNL contours (65 dB and higher) as shown in Table 7-1 on page 7-1. The Residential Sound Insulation Program (RSIP) associated with the EIS ROD has been a phased project based on availability of FAA funding. To date, 123 homes have been sound insulated through Phase 7. PTAA is working to offer sound insulation to all remaining eligible residences in a final phase, Phase 8, and anticipates completion of the sound insulation program by 2022. Figure 4-23 shows the locations of the sound-proofed homes.

PTAA Recommendation: Eliminate this measure because PTAA has accepted the final grant for this program; PTAA prefers to eliminate the NCP measure under Part 150 because there are no residential units within the 2020 or 2025 65 DNL contours

4.2.3 Optional Acquisition of Avigation Easements for Noise-Sensitive Structures where DNL Exceeds 65 dB

The PTAA may at its option offer to acquire noise easements for selected residences where the DNL with the 2014 NCP exceeds 65 dB.

Implementation Status: Not implemented

This measure was approved in the FAA's ROA for eligible properties between the 2001 EIS Record of Decision (ROD) 65 and 70 DNL contours whose owners chose not to participate in RSIP. This measure has never been implemented and is no longer needed as the RSIP is almost complete. There are no residential units within the 2020 or 2025 DNL contours (65 dB and higher) as shown in Table 7-1 on page 7-1. In addition, PTAA preferred to either acquire the land or sound insulate the structures rather than only obtaining an avigation easement for a property. The RSIP requires easements as part of the program.

PTAA Recommendation: Eliminate this measure because PTAA has not implemented this measure and has accepted the final grant for the RSIP program. There are no residential units within the 2020 or 2025 65 DNL contours.

4.2.4 Other Assistance for Owners of Residential Property where DNL Exceeds 65 dB

The PTAA may at its option offer assistance in the form of Sales Assistance or in the form of Purchase Assurance to owners of selected residential property where the DNL with the 2014 NCP exceeds 65 dB. Homeowners participating in the Sales Assistance Program would grant an avigation easement to the PTAA upon the closing of the sale.

Implementation Status: Not implemented

The FAA approved this measure for study only. The FAA's ROA stated that this measure could be an option, but PTAA would have to submit an updated NCP identifying the details for implementation. This measure is no longer needed as all non-compatible residential uses have been mitigated and there are zero residential units within the 2020 or 2025 DNL contours (65 dB and higher) as shown in Table 7-1 on page 7-1. In addition, PTAA preferred to either acquire the land or sound insulate the structures rather than pursuing this measure. The PTAA has not studied these options further and, therefore, has offered no sales assistance to property owners. Because PTAA has acquired properties within the 70 DNL contour and has been sound insulating the homes within the existing 65 DNL contour, there has been no need to provide Purchase Assurance or Sales Assistance to homeowners

PTAA Recommendation: Eliminate this measure because PTAA has not studied these options further and PTAA preferred to either acquire the land or sound insulate the structures over pursuing this measure. There are no residential units within the 2020 or 2025 65 DNL contours.

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 4-22

Properties Acquired by PTAA in the Implementation of LU-1

- Acquired Properties
- EIS 70 DNL Contour
- Airport Boundary
- Airport Buildings
- Runway
- Taxiway / Apron
- Helicopter Pad
- Run-Up Location
- Permanent Monitor Sites
- Municipal Boundary
- Highways
- Major Roads
- Local Roads
- Railroad
- Stream / Creek
- School
- Library
- Place of Worship
- Hospital / Health Care
- Residential Use
- Commercial Use
- Multi-Family Residential Use
- Manufacturing / Production
- Mobile Home
- Golf Course
- Transient Lodging
- Recreational / Open Space
- Mixed Use
- Transportation / Utility
- Public Use 1
- Vacant / Undeveloped
- Public Use 2
- Water

Note: Entire area depicted on the figure is within Guilford County and the City of Greensboro and High Point, The City of Greensboro and High Point have jurisdictional and land use control.

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); PTAA; AirNav.com; HMMH Inc.

0 3,000 6,000 Feet

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure4-22_Acquired_Property.mxd Author: MJHamilton

This page intentionally left blank

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 4-23

Properties Included in PTAA's Residential Sound Insulation Program as of August 2019

- Noise Mitigation Complete
- Noise Mitigation Eligible
- EIS 65 DNL Contour
- Airport Boundary
- Airport Buildings
- Runway
- Taxiway / Apron
- Helicopter Pad
- Run-Up Location
- Permanent Monitor Sites
- Municipal Boundary
- Highways
- Major Roads
- Local Roads
- Railroad
- Stream / Creek
- School
- Library
- Place of Worship
- Hospital / Health Care
- Residential Use
- Commercial Use
- Multi-Family Residential Use
- Manufacturing / Production
- Mobile Home
- Golf Course
- Transient Lodging
- Recreational / Open Space
- Mixed Use
- Transportation / Utility
- Public Use 1
- Vacant / Undeveloped
- Public Use 2
- Water

Note: Entire area depicted on the figure is within Guilford County and the City of Greensboro and High Point, The City of Greensboro and High Point have jurisdictional and land use control.

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); PTAA; AirNav.com; HMMH Inc.

0 3,000 6,000 Feet

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure4-23_RSIP_Property.mxd Author: MJHamilton

This page intentionally left blank

4.2.5 Pursue Compatible Use Zoning where DNL Exceeds 65 dB

The PTAA will work with land use authorities of jurisdictions in the vicinity of the airport to adopt compatible use zoning.

Implementation Status: Implemented

Land use planning and control, including zoning, is the responsibility of the local jurisdictions and not the responsibility of PTAA or FAA. Planning staff from eight local jurisdictions participate in the Technical Advisory Committee of the Part 150 Update. The cities of High Point and Greensboro and Guilford County, which are most directly affected by aircraft noise from the Airport, have adopted land use and zoning policies to encourage compatible development within and beyond the area of 65 dB and greater aircraft noise exposure in terms of the DNL metric.

As a result of the EIS for Runway 5L/23R and New Overnight Express Air Cargo Sorting and Distribution Facility, the City of High Point established an Airport Overlay District in 2003 using noise contours based on a Number-of-Events Above (NA) metric, as well as the DNL metric. PTAA's noise consultant prepared updated NA contours for the City of High Point's use when the consultant prepared Noise Exposure Map DNL contours during the prior Part 150 Study. Figure 4-24 shows High Point's Airport Overlay District as published on the City of High Point's website[21], amended through June 20, 2019.

The City of Greensboro established an Airport Overlay Zone based on the EIS DNL 60 dB contour. Figure 4-25 shows Greensboro's Airport Overlay District as published on the city's website[22].

Guilford County has established an Airport Overlay District to limit residential densities near the Airport. The Airport Overlay District prohibits residential uses within the 65 DNL contour of the Airport.

PTAA Recommendation: Maintain measure as is.

[21] City of High Point website, Airport Noise Resources page: https://www.highpointnc.gov/1642/Airport-Noise-Resources
[22] City of Greensboro website, Overlay Zoning Districts page: https://www.greensboro-nc.gov/departments/planning/learn-more-about/zoning-rezoning/land-development-ordinance/unified-development-ordinance-udo/overlay-zoning-districts-udo

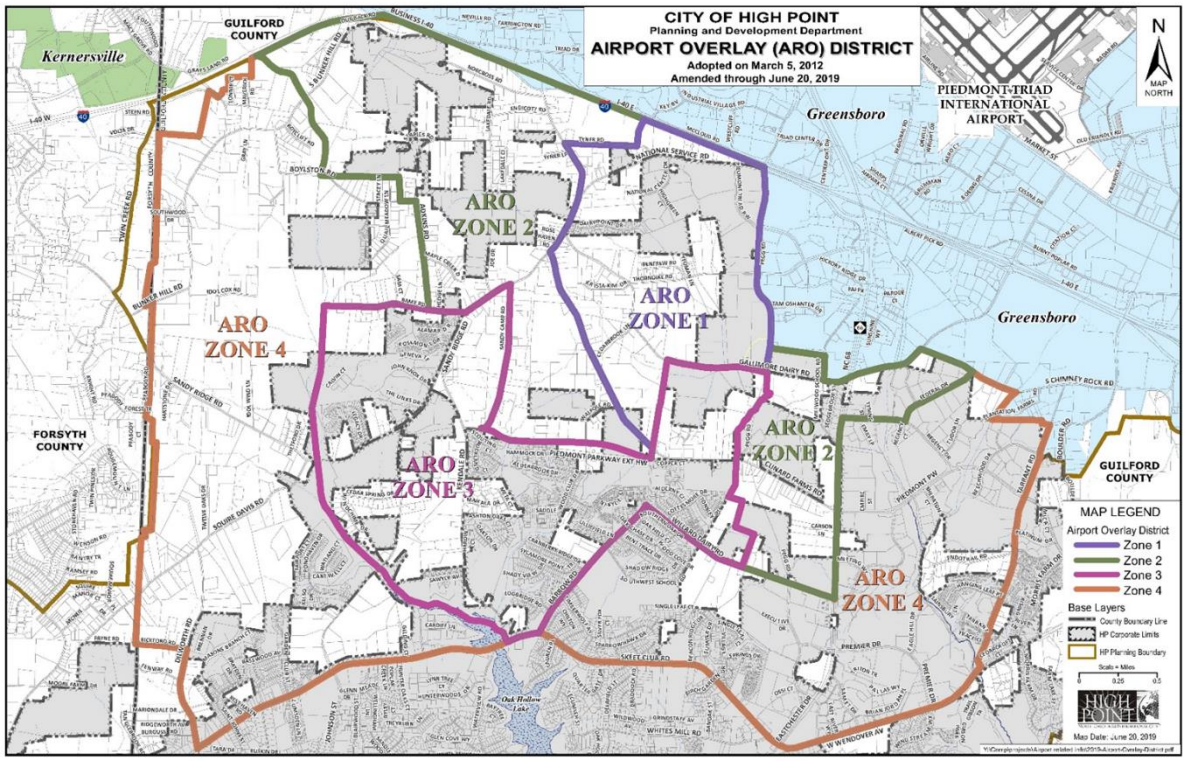


Figure 4-24 City of High Point Airport Overlay District
Source: City of High Point Website, accessed 9/8/2020

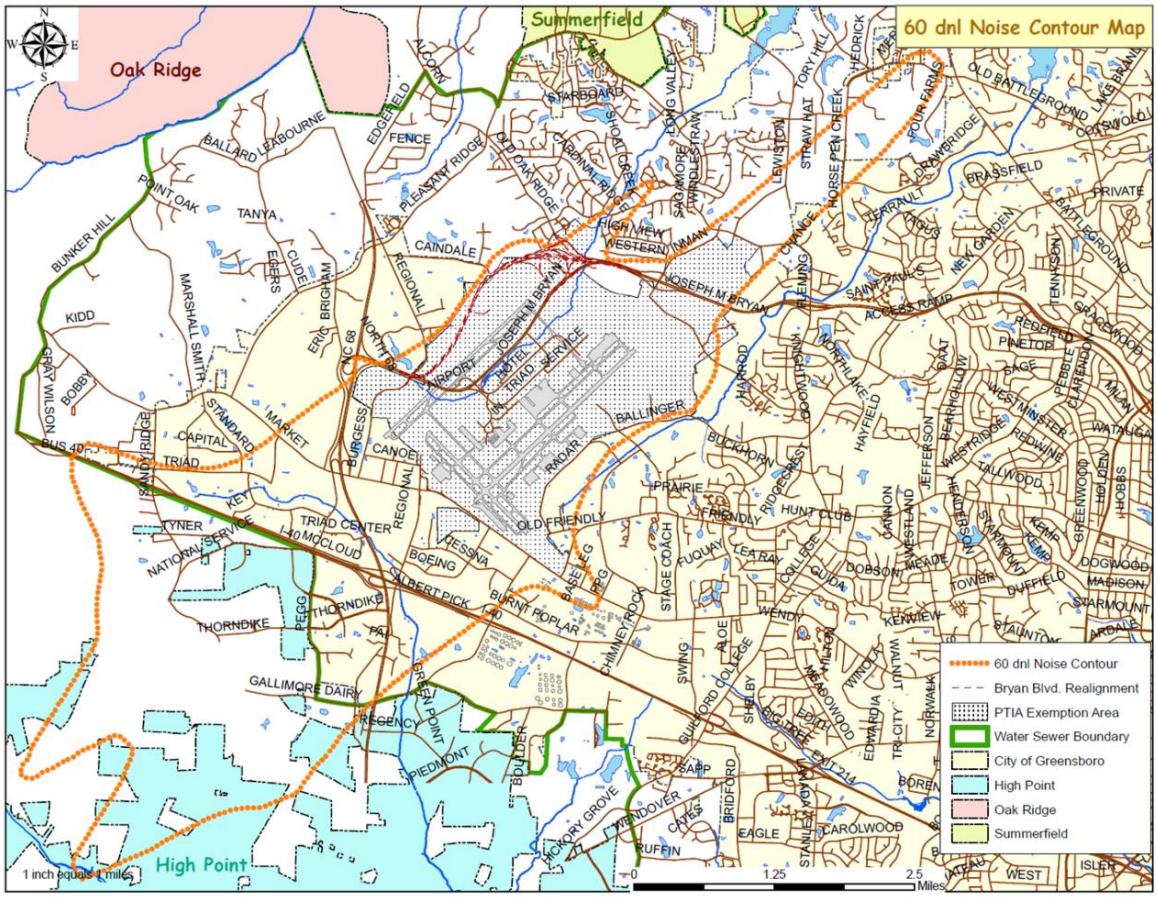


Figure 4-25 City of Greensboro Airport Overlay Zone, based on EIS DNL 60 contour
Source: City of Greensboro website, accessed 9/8/2020

4.3 Program Management Measures

Program management measures enable PTAA 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 4-6 lists the three PTAA recommended program management measures approved by the FAA and summarizes the status of each measure as described in the 2007 NCP and 2008 ROA.

Table 4-6 Implementation Status of 2007 NCP Program Management Measures
Source: PTAA and HMMH, 2020

Measure Number	Land Use Measure	Implementation Status
NM-1	Establish a Noise Monitoring Function at PTI	Implemented
NM-2	Publish DNL Contours for DNL 60 and Above	Implemented

NM-3	Install and Operate an Aircraft Noise and Operations Monitoring System	Implemented

Each of the existing program management measures are described in full below along with the implementation status with each measure as compared to the intention with the measure as provided in the 2007 NCP.

4.3.1 Establish a Noise Monitoring Function at PTI

The PTAA will establish a noise monitoring function within the PTAA with responsibilities that include: to monitor aircraft noise; to provide a point of contact within the PTAA for issues related to aircraft noise; to serve as a liaison with the community for such issues; and to keep air carriers and the public informed about compliance with measures in the NCP.

Implementation Status: Implemented

Following approval of the NCP, PTAA established a staff position for "Project Manager - Noise Programs", whose duties include:

- Managing the Noise Program, which includes the Sound Insulation Program for PTAA.
- Assessing aircraft noise and coordinating aircraft abatement issues.
- Responding to and addressing airport/airplane noise complaints from the community, including technical and administrative support to persons and groups as needed.
- Working with homeowners, architects, and contractors from the onset and design of abatement measures through the completion of construction projects and inspections.
- Serving as a liaison between PTAA and various civic and neighborhood associations, city, state and federal offices regarding the Part 150 Noise Compatibility Program, Capital Improvement Program, Master Plans, and other PTAA development projects.
- Evaluating and recommending changes concerning air traffic control and flight operations procedures.

The position is currently filled by Suzanne Akkoush, project manager for the Part 150 Update.

PTAA Recommendation: Maintain measure as is.

4.3.2 Publish DNL Contours for DNL 60 and Above

When the PTAA publishes aircraft noise contours, it will publish contours at 5-dB intervals for values of DNL of 60 dB and above. The most recent contours will be published on the PTAA web site. The contours will be updated as required by FAR Part 150.

Implementation Status: Implemented

The PTAA website[23] contains a "noise information" page with the following links:

- A "View the Noise Contours" button which displays the most recent FAA-accepted DNL contours at 5-dB intervals for values of DNL of 60, 65, 70 and 75 dB
- Links to the Part 150 Study website[24] with current information on this Part 150 Update as well as access to the full text of the original Part 150 Study documentation
- An "FAQs" page providing answers to frequently asked questions about noise-related issues specific to PTI
- Forms for submitting noise complaints or noise questions/comments

4.3.3 *PTAA Recommendation:* Maintain measure as is.Install and Operate an Aircraft Noise and Operations Monitoring System

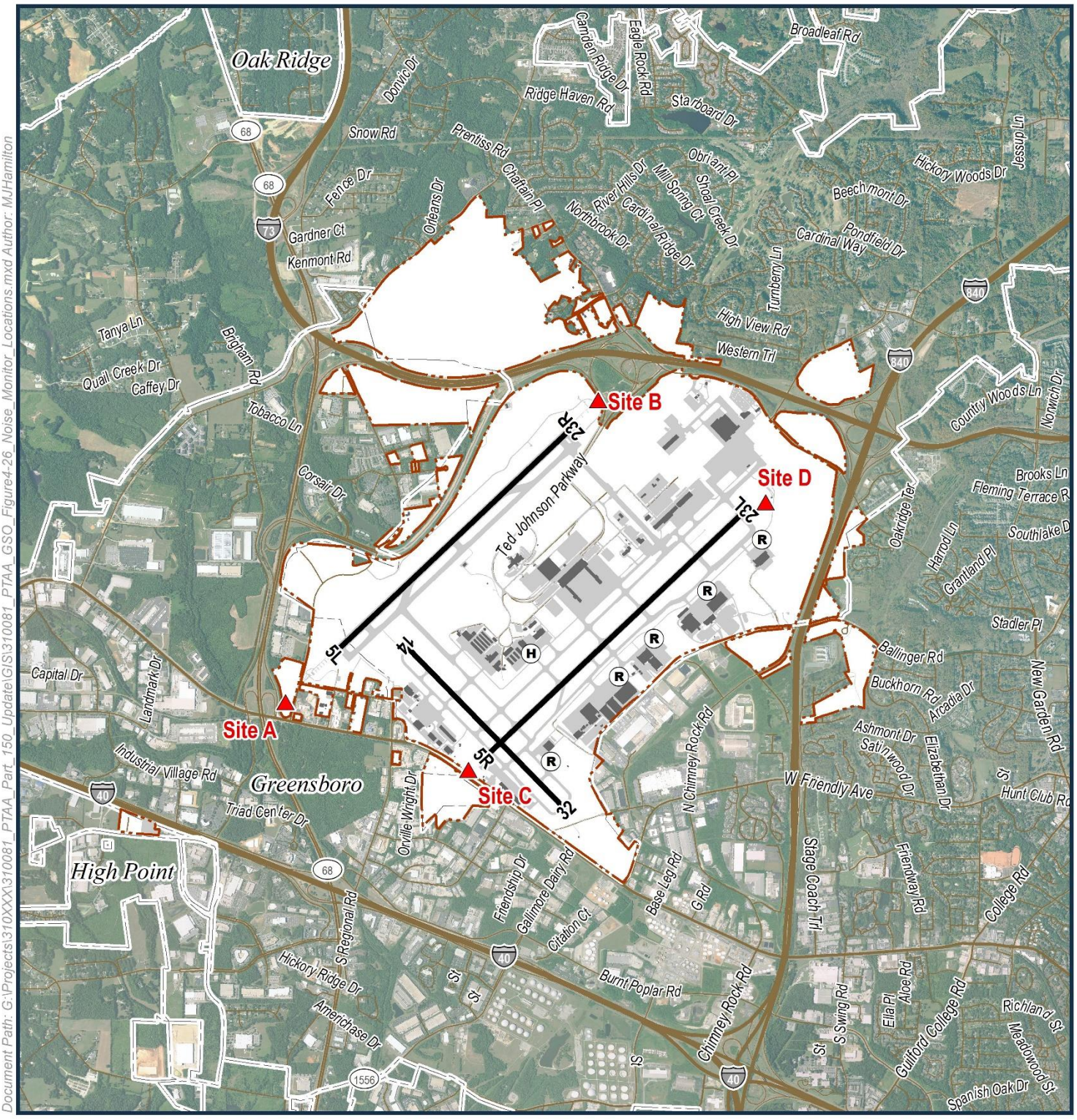
The PTAA will install and operate an aircraft noise and operations monitoring system to monitor aircraft noise and aircraft operations in the vicinity of the airport. The system will reflect state-of-the-art technology. It is expected that the system will have six or more permanent monitoring microphones and one or two portable monitoring microphones. To the extent feasible, the permanent microphones will be at locations used during the Part 150 study. Summaries of the monitoring results will be reported regularly on the PTAA web site.

Implementation Status: Implemented

PTAA installed the Noise and Operations Integration, Analysis and Reporting System (NOIARS) in 2012 which acquires flight track and aircraft identification data and is capable of correlating that data with measured noise levels. The system has four permanently installed noise monitors on Airport property; one at each end of the two parallel runways. Figure 4-26 shows the locations of these monitors, which are named A, B, C, and D. In addition, three portable noise monitors are available for temporary monitoring in other locations. PTAA staff regularly monitor the system, respond to individual noise complaints as they occur, and provide requested information on operations causing specific noise events.

PTAA Recommendation: Maintain measure as is.

[23] https://flyfrompti.com/noise-information
[24] PTIPart150Update.com



Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure4-26_Noise_Monitor_Locations.mxd Author: MJHamilton

▲ Permanent Monitor Sites

Airport Boundary

Runway

Helicopter Pad

Airport Buildings

Taxiway / Apron

Run-Up Location

Draft - Subject to Change

0 3,000 6,000 Feet

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 4-26

PTAA Fixed Noise Monitor Locations

5 Noise Measurement Program

An aircraft noise measurement program was conducted in November 2019 as part of the PTI Part 150 Update. Though Part 150 does not require noise measurements, noise measurements may be included and provide the results as supplementary information to help describe the existing aircraft noise environment. Since measurements were collected for both the 1999 EIS for Runway 5L/23R and the original Part 150 Study, which PTAA submitted to the FAA in 2007, PTAA opted to include measurements with this Part 150 Update for consistency.

The measurement program included six distinct measurement locations that collected data from November 11 to November 17, 2019, using portable noise monitors[25] capable of extended, continuous, unattended operation. Over 850 hours of noise measurement data was collected altogether at the six measurement sites.

All the monitors met American National Standards Institute S1.4-983 standards for Type I (precision) sound level meters and were calibrated prior to and after each measurement period. The monitors measure continuous A-weighted[26] noise levels at 1-second increments and compute a broad range of noise values, including:

- Cumulative noise exposure metrics, such as:
  - Hourly equivalent noise level (L_{EQ})
  - Day-Night Average Sound Level (DNL)
- Single-event noise metrics, such as:
  - The maximum sound level (L_{MAX})
  - Sound Exposure Level (SEL).

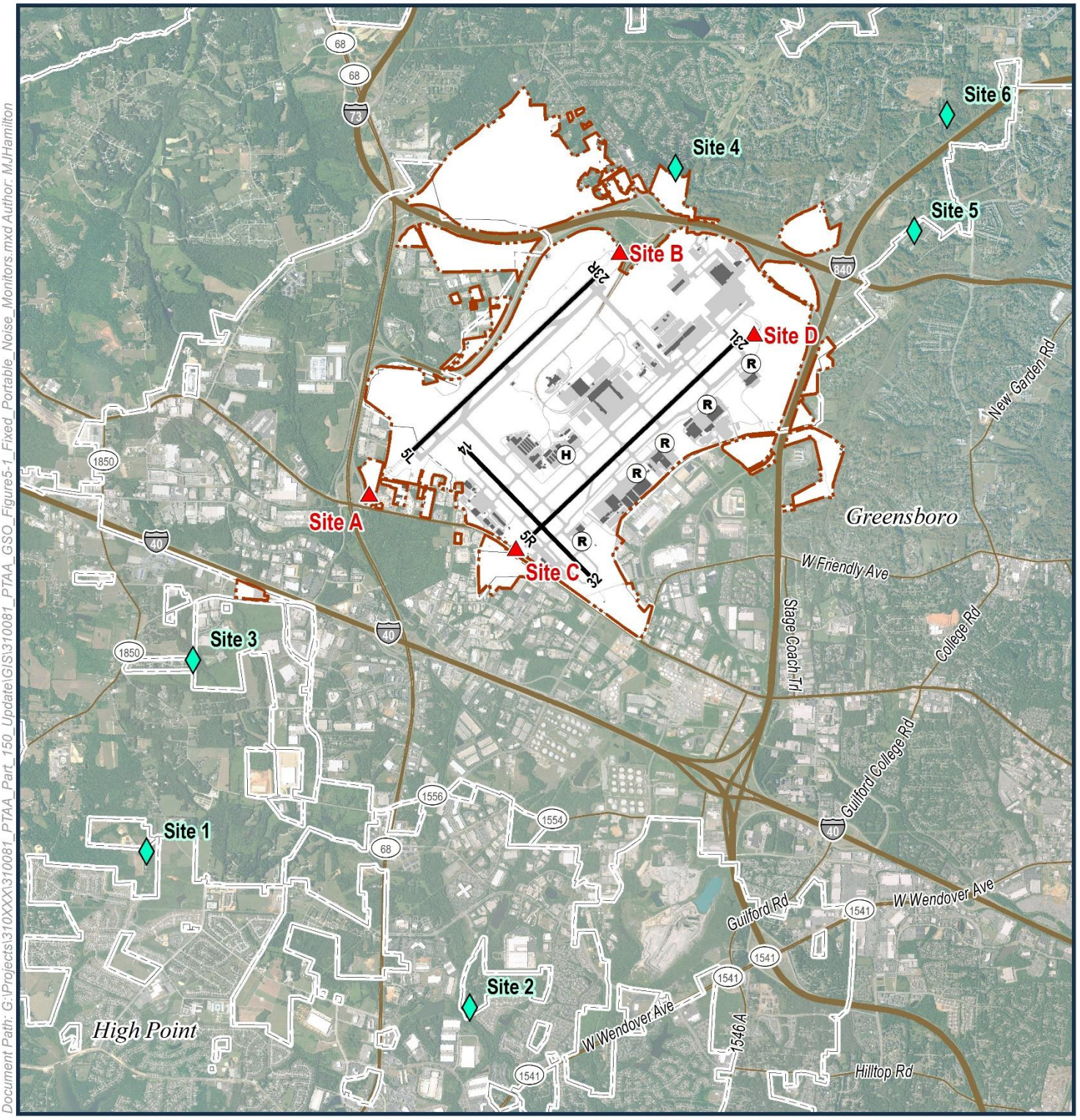
See Appendix A for a more in-depth description of these metrics.

PTAA has four fixed noise monitors[27] installed on airport property close to the ends of the parallel runways (Runways 5L/23R and 5R/23L). The PTAA monitors meet the same standards as the Part 150 temporary measurement equipment and measure continuous A-weighted ½-second noise levels. The PTAA provided data from their permanent noise monitors for the same time period as the six portable noise monitors collected data.

[25] Bruel & Kjaer Model 2270 Sound Level Meters.

[26] EPA recommends environmental noise be measured and reported using A-weighting to account for how humans perceive loudness of noise sources. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, Environmental Protection Agency, April 2, 1974.

[27] Larson Davis Model 820 Sound Level Meters.



Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure5-1_Fixed_Portable_Noise_Monitors.mxd Author: MJHamilton

- Permanent Monitor Sites
- Portable Monitor Sites
- Airport Boundary
- Runway
- Helicopter Pad
- Airport Buildings
- Taxiway / Apron
- Run-Up Location

Draft - Subject to Change

0 5,000 10,000 Feet

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 5-1

PTAA Fixed and Portable Part 150 Noise Monitor Locations

Table 5-1 Part 150 Portable and PTAA Fixed Noise Monitoring Sites
Source: PTAA and HMMH, 2020

Type of Monitor	Site Number	Monitor Number	Address
Portable	1	BK-2	4532 Walpole Rd, High Point, NC 27265
Portable	2	BK-5	1701 River Knoll Court, Greensboro, NC 27409
Portable	3	BK-4	3625 Dairy Point Dr, High Point, NC 27265
Portable	4	BK-6	6502 Lytham Court, Greensboro, NC 27410
Portable	5	BK-1	4703 Clarkson Rd, Greensboro, NC 27410
Portable	6	BK-3	3600 Lewiston Rd, Greensboro, NC 27410
Fixed	A	A	Approach end, Runway 5L (36.0951, -79.9641)
Fixed	B	B	Approach end, Runway 23R (36.1189, -79.9342)
Fixed	C	C	Approach end, Runway 5R (36.0899, -79.9464)
Fixed	D	D	Approach end, Runway 23L (36.1111, -79.9180)

5.2 Reportable Conditions During the Noise Measurement Program

Figure 5-2 graphically depicts the weather conditions and airport operating direction during the weeklong noise measurement program. The Airport was operating in south flow[29] for most of Monday and Thursday (November 11 and 14) and in north flow[30] for most of the rest of the week. Runway use (south flow vs. north flow) is often dictated by weather conditions, particularly wind direction. Figure 5-2 shows the prevailing wind direction, color-coded to align with the runways. When the wind was from the southwest, which would result in south flow airport operations, the color appears green. Conversely, wind from the northeast is color-coded purple, corresponding with north flow airport operation. Other wind directions are colored on a continuum between those extremes, and times of calm or variable winds are not colored. Cloud cover and temperature conditions are also color-coded to show their variation during the measurement program.

As specified by the noise abatement procedures, the preference for nighttime cargo hub operations (four nights a week starting with Monday night arrivals and ending with Friday morning departures during the measurement program) is for aircraft to arrive from the southwest and depart to the southwest. The noise abatement measure designates Runways 5L/5R as the preferred arrival runways and Runways 23L/23R as the preferred departure runways. Therefore, runway use often shifts after the bank of arrivals (generally occurring between 11:00 pm and 1:00 am) and before the subsequent hub departure operations (usually between 3:00 am and 4:30 am). During the week of observation this pattern was followed Tuesday through Thursday nights for arrivals and Tuesday through Friday early mornings for departures.

[29] South flow operation uses runways 23L and 23R, which results in aircraft landing from the northeast and departing to the southwest.

[30] North flow operation uses runways 5L and 5R, which results in aircraft landing from the southwest and departing to the northeast.

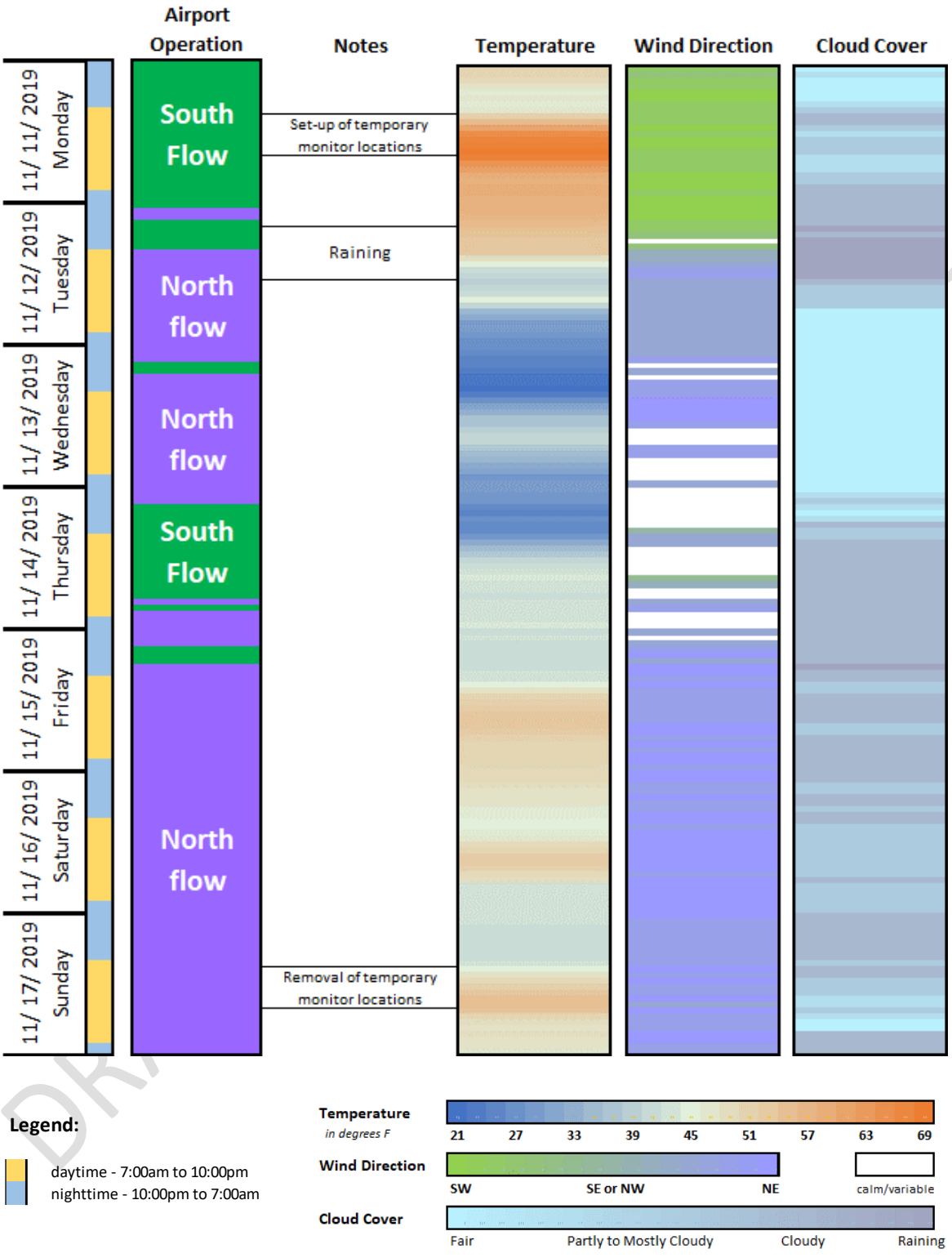


Figure 5-2 Weather and Airport Operating Conditions During the Measurement Program
Source: https://www.wunderground.com/history/daily/us/nc/greensboro/KGSO/date/2019-11-11_to_2019-11-17

5.3 Noise Measurement Program Results

The portable noise monitors were set out at each of the six temporary sites on Monday, November 11, 2019. The monitors recorded the A-weighted sound level every second until the monitors were removed on Sunday, November 17, 2019. The only breaks in this data collection were for a few minutes each on November 13 and 15 for battery changing and microphone calibration. At the end of the week-long measurement period, the one-second sound level data files were processed to determine first the number of noise "events", and second those events that could be correlated with aircraft operations.

A noise event is defined as the sound level rising above a noise level threshold for a minimum duration of time. A noise analyst sets the threshold and duration based on the ambient and aircraft noise environment where the measurements are taking place.[31] The noise events, once identified, were then correlated with aircraft operations data from NOIARS. For each site, a noise event occurring at the same time as an aircraft flight passing within a certain radius[32] of the site is matched with that flight.

After all the noise events were classified as either aircraft-generated events or community-generated (non-aircraft) noise events,[33] the noise energy associated with aircraft events was summed for each hour of the day. Subtracting aircraft noise energy from total noise energy for each hour yielded the hourly community noise energy values. The resulting values are presented in the form of decibel averages, or L_{eq}, for every hour of the week-long measurement program in Appendix C.

The DNL metric is calculated from 24 consecutive hours (beginning at midnight) of L_{eq} values. In that calculation, the L_{eq} for all nighttime hours[34] are increased by 10 decibels, and then the noise energy associated with the L_{eq} values is averaged across the 24-hour period. Using the aircraft noise L_{eq} values, an aircraft only DNL value was calculated for each complete day of measurements. Similarly, using the total L_{eq} values, the total measured DNL value for the day was computed. Table 5-2 provides a summary of the calculated DNL values at each site.

From one day to the next, the measured DNL varies as shown below. Of the temporary monitor locations, Site 5 had the highest aircraft DNL with a 5-day average DNL of 57 dB. Site 4 had the lowest aircraft DNL with an average of 28 dB, and was the site showing the greatest difference between aircraft DNL and total average DNL (56 dB). Two days at site 4 show an aircraft DNL of zero because, although a few aircraft did pass within 5,000 feet of the site on those days, the aircraft noise levels were not distinguishable from the ambient or background noise; therefore no noise events were correlated with aircraft operations during that time. All temporary noise measurement sites measured aircraft noise levels well below the Part 150 noise compatibility threshold DNL of 65 dB. The fixed monitors (sites A through D) are located immediately adjacent to the runway ends, so one would expect that the aircraft DNL would be greater at those locations than at the temporary sites placed in residential areas.

[31] The threshold and duration values for the six temporary sites in this measurement program are 50 dB and 10 seconds. For permanent sites A and D the threshold is 65 dB and for permanent site C it is 70 dB.

[32] The radius for sites 1 through 6 was set to 5,250 feet (1,600 meters); for sites A through D it was 8,202 feet (2,500 meters).

[33] A noise event that cannot be correlated with aircraft operations is deemed a community noise event, which would include sounds from road traffic, human activities, animal noises, or the like.

[34] Nighttime hours are defined as 10:00pm to 7:00am for the calculation of DNL, which is the FAA's required metric for Noise Exposure Map contours for purposes of aircraft noise and land use planning associated with Part 150.

Measured levels at sites C and D (DNL of 75 and 67 dB, respectively) are the highest due to the sites' proximity to the predominantly used runways – Runways 5L and 23R – during the measurement program.

Table 5-2 Summary of Measured DNL Values

Source: HMMH measurement data (sites 1-6), PTAA NOIARS data (sites A-D), 2020

Site	DNL	Tuesday, 12-Nov	Wednesday, 13-Nov	Thursday, 14-Nov	Friday, 15-Nov	Saturday, 16-Nov	5-day* Average Measured DNL
1	**Aircraft**	**48**	**50**	**52**	**51**	**52**	**51**
	Total	56	57	56	58	61	58
2	**Aircraft**	**57**	**45**	**54**	**51**	**31**	**53**
	Total	58	50	55	54	52	55
3	**Aircraft**	**48**	**47**	**50**	**46**	**44**	**48**
	Total	57	56	56	58	60	58
4	**Aircraft**	**0**	**32**	**N/A**	**29**	**0**	**28**
	Total	57	53	N/A	52	57	56
5	**Aircraft**	**57**	**58**	**51**	**57**	**57**	**57**
	Total	68	65	61	58	67	65
6	**Aircraft**	**51**	**54**	**54**	**54**	**52**	**54**
	Total	61	56	58	57	57	58
A	**Aircraft**	**59**	**56**	**56**	**52**	**54**	**56**
	Total	66	64	65	64	64	65
C	**Aircraft**	**75**	**74**	**76**	**76**	**69**	**75**
	Total	77	78	78	79	74	78
D	**Aircraft**	**69**	**65**	**70**	**66**	**62**	**67**
	Total	76	70	74	69	66	72

***** The values for site 4 are 4-day averages. Some hours of data on November 14 were lost at this site due to a data collection error.

Note: PTI permanent Site B was not operational during this measurement period. It has since been repaired.

The individual site results are presented in Appendix C. Measured aircraft DNL values varied from site to site and day to day, but at all of the monitors placed in residential areas, the values were below 65 DNL, the FAA's threshold for land use compatibility with aircraft noise. PTAA's fixed monitor locations, on airport property, recorded higher levels.

Individual aircraft noise events contributing to the overall noise environment are summarized by site in the tables in Appendix C. All sites show multiple aircraft noise events with SEL values over 80 dB, and several sites experienced aircraft overflights with SEL values reaching 90 dB or more.

Table 5-3 presents an overview of the number and magnitude of noise events recorded at each site.

Table 5-3: Range of Aircraft Noise Measured at Each Site
Source: HMMH measurement data (sites 1-6), PTAA NOIARS data (sites A-D), 2020

Site	Total number of events	Count of events with SEL falling in range:			
		70.0-79.9 dB	80.0-89.9 dB	90.0-99.9 dB	over 100 dB
1	**157**	75	35	1	0
2	**109**	50	37	7	0
3	**93**	42	24	2	0
4	**30**	11	2	0	0
5	**229**	113	61	27	1
6	**329**	181	123	3	0
A	**255**	74	153	27	1
C	**901**	0	332	478	91
D	**755**	83	405	221	46

As noted, three of the current measurement sites were located at or near measurement sites used in previous studies. These sites are listed in Table 5-4 with the addresses noted. Site 1 repeated the same address and Site 4 was located next door to the previous location. Site 5 was about 930 feet from the location that was called Site 6 in the original Part 150, and it was about 250 feet from the location that was called Site 6 in the EIS. Since the noise measurement data was not separated as aircraft noise and community/ambient noise in the previous studies[35], the values given in are measured total DNL. The current measurement program spanned one week, covering five full calendar days at each site. The duration of measurement at the sites in the previous studies varied from four to ten days[36].

[35] PTAA did not have the NOIARS at the time of the previous studies that included noise measurements. Therefore, they had no ability to determine aircraft (only) DNL.

[36] Durations of measurements at each of the sites in previous studies were: Site 1: eight days in 2004, 10 days in 1999; Site 4: four days in 2004, 10 days in 1999; and Site 6: not used in 2004, 10 days in 1999.

Table 5-4: Comparison of Noise Measurement Results to Previous Studies
Source: HMMH (2019 data), 2001 EIS (1999 data) and 2007 Part 150 (2004 data), 2020

Current Study				Previous Studies				
Site No.	Address	Measured Total DNL		Site No.	Address	Measured Total DNL		
							2004	1999
1	4532 Walpole Rd, High Point	minimum	56	1	4532 Walpole Rd, High Point	minimum	57	62
		average	58			average	59	63
		maximum	61			maximum	61	64
4	6502 Lytham Court, Greensboro	minimum	52	4	6504 Lytham Court, Greensboro	minimum	61	60
		average	56			average	63	63
		maximum	57			maximum	63	64
5	4703 Clarkson Rd, Greensboro	minimum	58	6 (2004) 6 (1999)	2102 Fleming Rd, Greensboro 3200 Clarkson Rd,	minimum	62	58
		average	65			average	65	62
		maximum	68			maximum	66	65

6 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 outset of the study, Version 3b, without any unauthorized "calibration" or "adjustment". 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.[37] 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.

AEDT includes databases containing information that includes aircraft noise and emissions profiles and airport layout data, which are used in conjunction with carious user inputs to perform the noise computations. Information on the modeling variables is provided in Section 5.2. Table 6-1 lists the required noise modeling inputs for AEDT and the source used to obtain each of the inputs.

Table 6-1: Data Sources of Noise Model Inputs
Source: HMMH, 2020

AEDT Input Category	Data Source(s) – all inputs remain constant from 2020 to 2025 except aircraft operations
Physical description of the airfield layout	FAA 5010 data and PTAA
Aircraft noise and performance characteristics	Standard AEDT database
Aircraft flight operations	CHA forecast for 2020 and 2025
Aircraft runup operations	PTI tenants (HAECO, HondaJet, and Cessna/Textron)
Runway utilization rates	FAA radar track data* from the FAA National Offload Program (NOIARS)
Flight track geometry and utilization rates	FAA radar track data* from the FAA National Offload Program (NOIARS)
Meteorological conditions	AEDT database
Terrain data	USGS National Elevation Dataset Gridfloat

The remainder of this Chapter present the noise modeling input used to prepare the aircraft noise exposure contours for this Part 150 Update.

6.1 Airport Physical Parameters

The airport physical parameters of most importance are the locations of the aircraft noise sources, such as start-of-takeoff roll for departing aircraft and the landing threshold for arriving aircraft. As shown in Figure 6-1, PTI has three runways, which includes six runway ends. Each end of the runways is designated by a number that, with the addition of a trailing "0", reflects the magnetic heading of the runway to the nearest 10 degrees, as seen by the pilot. The parallel Runways 5L/23R and 5R/23L are oriented on approximate magnetic headings of 54 degrees and 234 degrees. Runway 5L/23R is 9,000 feet long by 150 feet wide, while Runway 5R/23L is 10,001 feet long by 150 feet wide. Runway 14/32 is

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

oriented on approximate magnetic headings of 143 degrees and 323 degrees and is 6,380 long by 150 feet wide.
Runway heading, length, runway width, instrumentation, and declared distances affect which aircraft can use a runway and under what conditions, and therefore how often a runway would be used relative to the other runways at the airport.

Figure 6-1 provides the current PTI Airport Diagram along with annotations added to show:

- Five designated aircraft engine 'run-up' locations (R)
- One modeled helipad location, (H)
- Location of the Terminal and other Major Facilities

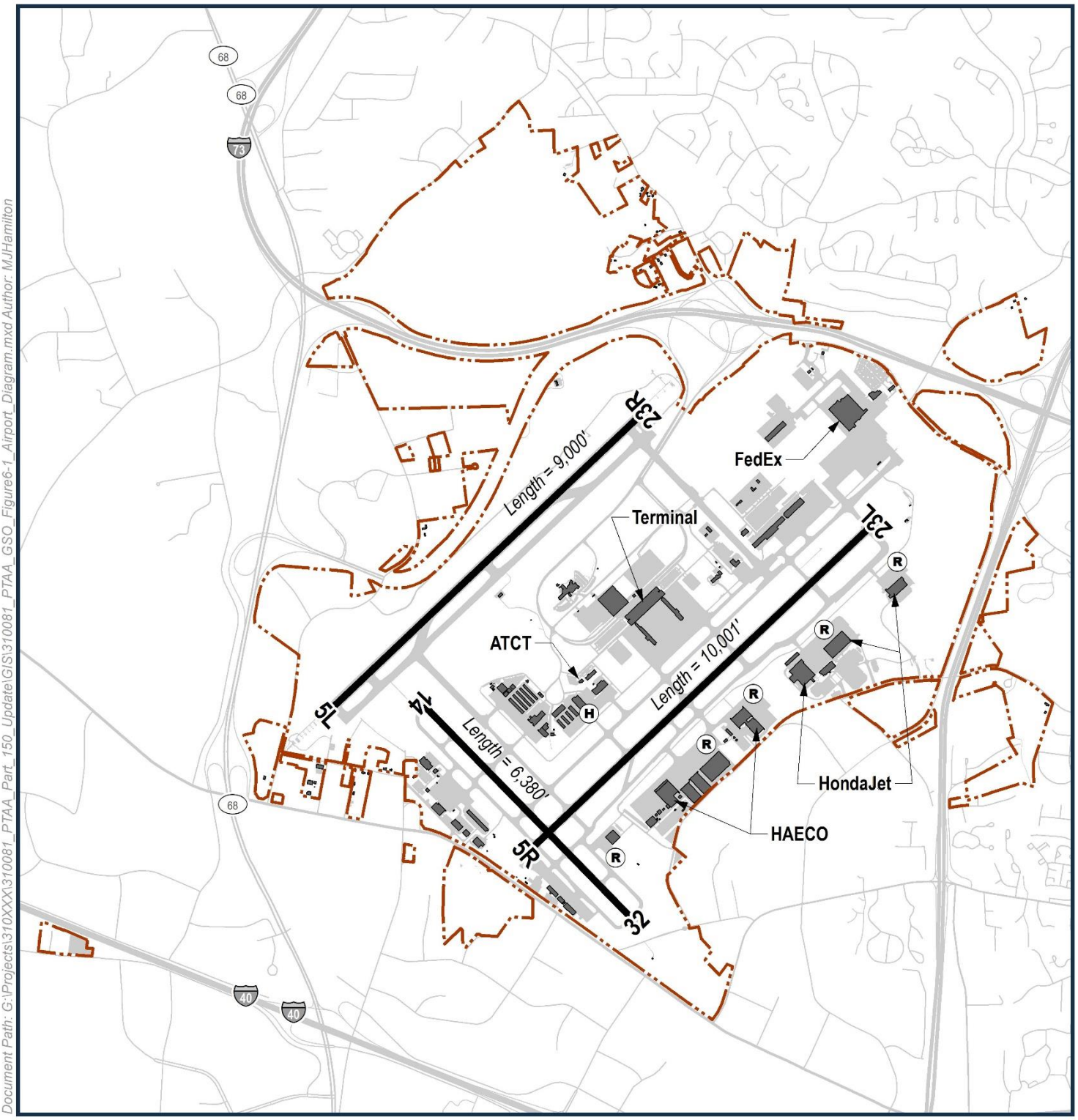
The Piedmont Triad Airport Authority (PTAA) confirmed that there are no planned changes to the runway layout that would affect modeling inputs within the five-year forecast timeframe. Therefore, no change to the 2020 runway details was required for the future conditions (2025 NEM). Helicopters modeled departing from or arriving to the apron area in front of Signature Flight Support. Engine maintenance runups modeled at five locations, all along the eastern side of Runway 5R-23L.

Table 6-2 lists the physical runway, engine runup, and helipad layout information that the AEDT requires as inputs.

Table 6-2: Airfield Layout Noise Model Inputs
Source: FAA National Airspace System Resources (NASR) and PTAA, 2019

Runway	Latitude (degrees)	Longitude (degrees)	Elevation (feet, MSL)	Displaced Landing Threshold (feet)	Glide Slope (degrees)	Threshold Crossing Height (feet)	Magnetic Orientation (degrees)
14	36.099480	-79.952446	925.4	0	3.0[1]	59[1]	143
23L	36.110143	-79.920310	885.8	0	3.0	52[2]	234
23R	36.116433	-79.937139	855.4	0	3.0	55[2]	234
32	36.087056	-79.937218	900.0	0	3.0	53[2]	323
5L	36.099256	-79.959050	916.4	0	3.0	55[2]	54
5R	36.091058	-79.944658	899.5	0	3.0	53[2]	54
RUN_N	36.100328	-79.928603	876.0	North specified engine runup location			
RUN_C	36.097350	-79.931958	870.0	Central specified engine runup location			
RUN_S	36.090661	-79.938450	890.0	South specified engine runup location			
RUN_A	36.104118	-79.923533	882.0	Honda R&D/Production runup area			
RUN_B	36.108145	-79.918304	882.0	Honda Customer Service Center runup area			
PAD_H	36.099086	-79.940464	902.0	location modeled as a helipad			

Note: NASR data retrieved from https://www.faa.gov/airports/airport_safety/airportdata_5010/ on 7/30/2019
1 Runway 14 Glide Slope and Threshold Crossing Height from RNAV (GPS) Rwy 14 Approach.
2 Runways 5L, 5R, 23L, 23R and 32 Threshold Crossing Heights from ILS and RNAV (GPS) Approach.



Airport Boundary
Runway
H Helicopter Pad
Airport Buildings
Taxiway / Apron
R Run-Up Location

PTI
PIEDMONT TRIAD AIRPORT AUTHORITY
Part 150 Update

Figure: 6-1

Draft - Subject to Change

0 3,000 6,000 Feet

Airport Diagram

6.2 Runway Use

Pilots prefer to arrive and depart an airport into the wind. Annual runway use is often a reflection of wind conditions. However, in calm wind situations (less than 5 knots), the FAA has latitude to operate the runways in a direction other than the winds alone would dictate. Also, at PTI there is a noise abatement procedure that recommends that FedEx hub operations arrive from the southwest and depart to the southwest. Therefore, the FAA often complies with this procedure by configuring the airspace to accommodate the arrivals coming in the late night/early morning hours to Runways 5R or 5L and then reconfiguring the airspace after the FedEx arrivals have ceased to accommodate the departures on Runways 23L or 23R.

For modeling purposes, it is customary to use a recent 12 months of airport operations data to determine annual average runway use by time of day. Due to extended periods of runway closures for reconstruction during 2018 and 2019, it was necessary to select airport operations data from three distinct time periods to generate the most recent runway usage rates for a full 12 months. Figure 6-2 shows the complete data set timeline along with periods of runway closures and when FedEx hub operations were in effect.

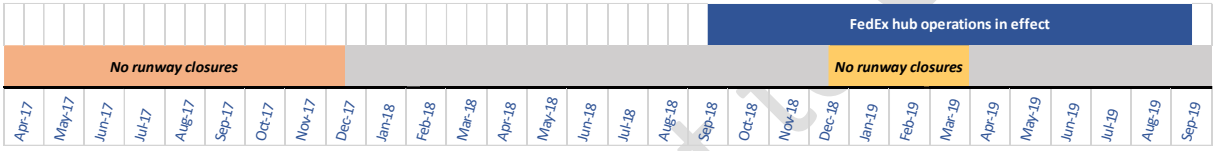


Figure 6-2 Timeline of Data Analyzed to Determine Modeled Annual Runway Use
Source: PTAA and HMMH

Runway use data was accessed from the PTAA NOIARS system. A full 12-month sample of data without runway closures (April 1, 2017 – December 14, 2017 and December 15, 2018 – March 31, 2019, shown on the Figure 6-2 timeline in orange and yellow) provided the basis for the daytime (7am – 10pm) usage. Nighttime (10pm – 7am) directional use (Runway 5L/R vs. 23L/R) was calculated from the full year of operations after hub operations commenced (September 15, 2018 – September 14, 2019, shown on timeline in dark blue). Because Runway 5L-23R was closed for much of that time, a 3.5-month period sample which included hub operations but without runway closures (December 15, 2018 – March 31, 2019, shaded yellow on the timeline) was used to determine splits between the left/right runways for nighttime operations. The same runway use was modeled for both the existing (2020) and the forecast (2025) conditions.

Table 6-3 presents the modeled runway use rates for three categories of aircraft: jets, non-jets, and cargo operations, except those aircraft flying the pattern for circuit (or touch-and-go) operations. The "jet" category is comprised of all jets that were not identified with a cargo airline code in the PTAA NOIARS data so that the categories would be mutually exclusive. Note that non-jet cargo aircraft are included in the "non-jet" category. All helicopter operations in the model used the apron area in front of Signature Flight Support (see helipad identified on Figure 6-1) to arrive and depart PTI, rather than using a runway. Figure 6-3 displays the daytime arrival and departure runway use for all aircraft types and Figure 6-4 displays the nighttime arrival and departure runway use for all aircraft types.

Overall, Runway 23L is used for approximately 50 percent of the arrivals and departures during the day while at night Runway 5R is used 48 percent of the time for arrivals and Runway 23L is used 67 percent of the time for departures.

Table 6-3: Day-Night Runway Use by Aircraft Category – Arrivals and Departures
Source: HMMH, 2020

Runway	Daytime							
	Jets *		Non-Jets		Cargo Jets		All Aircraft	
	Arrival	Departure	Arrival	Departure	Arrival	Departure	Arrival	Departure
5L	2.7%	3.4%	9.6%	4.3%	1.4%	2.6%	5.1%	3.9%
5R	31.1%	30.1%	18.3%	21.7%	29.4%	25.9%	26.7%	25.7%
14	0.2%	0.7%	1.7%	3.8%	0.0%	0.0%	0.7%	2.3%
23L	57.5%	55.2%	40.0%	51.4%	64.2%	65.7%	51.6%	53.4%
23R	5.6%	7.9%	20.6%	13.6%	4.4%	5.1%	10.8%	10.8%
32	2.9%	2.7%	9.7%	5.2%	0.6%	0.7%	5.2%	4.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Runway	**Nighttime**							
	Jets *		**Non-Jets**		**Cargo Jets**		**All Aircraft**	
	Arrival	**Departure**	**Arrival**	**Departure**	**Arrival**	**Departure**	**Arrival**	**Departure**
5L	5.3%	4.2%	6.0%	1.7%	6.5%	1.7%	5.8%	2.7%
5R	47.3%	23.1%	42.7%	23.6%	50.8%	15.5%	47.7%	21.1%
14	0.1%	0.8%	5.3%	3.6%	0.0%	0.0%	0.9%	1.5%
23L	42.6%	65.5%	24.8%	57.5%	40.7%	81.1%	39.0%	67.4%
23R	2.9%	4.6%	3.5%	6.5%	1.8%	1.8%	2.6%	4.4%
32	1.8%	1.7%	17.8%	7.1%	0.2%	0.0%	4.0%	3.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Note: * Includes all jet aircraft except cargo airlines

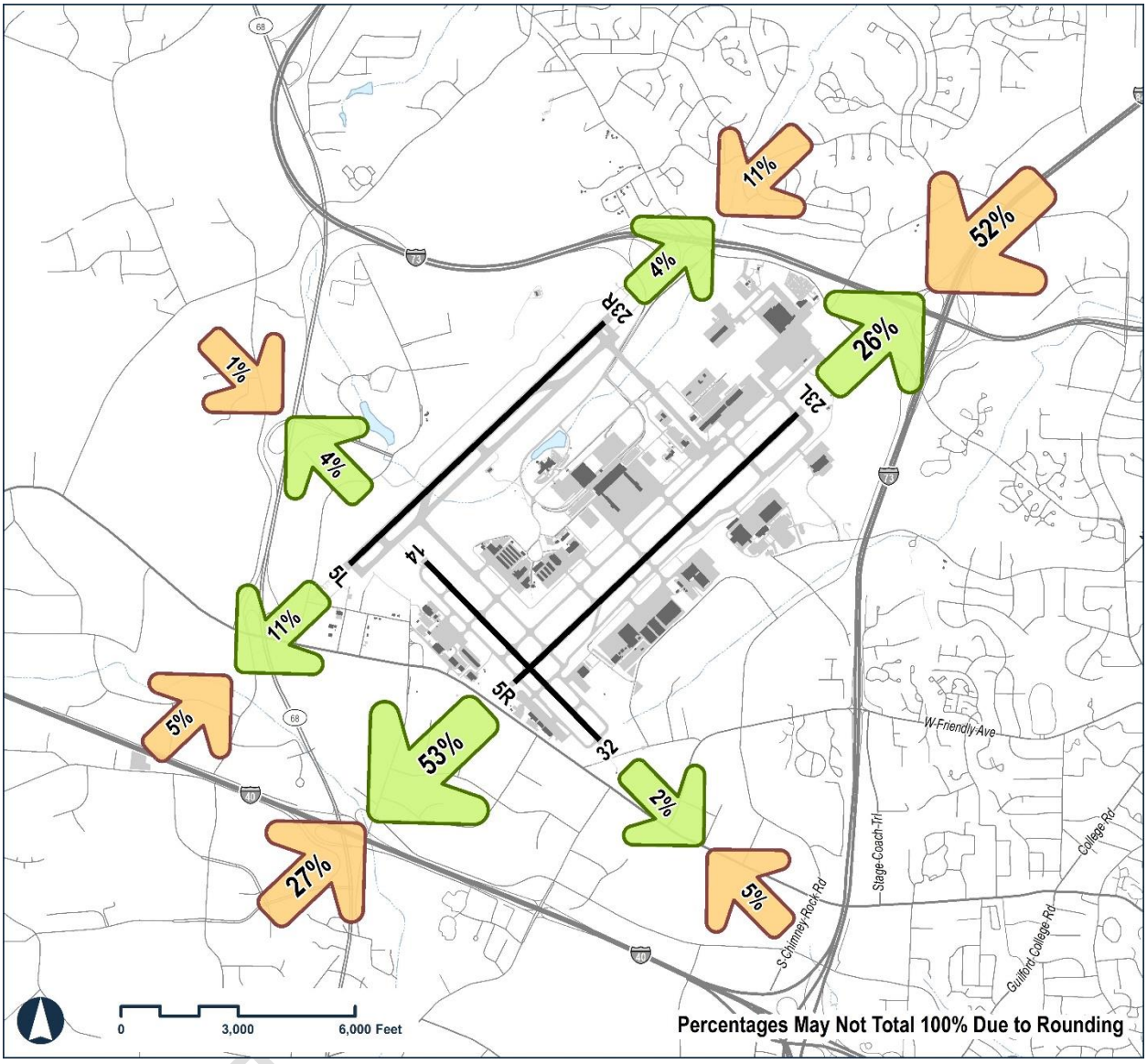


Figure 6-3 Daytime Arrival and Departure Runway Use
Source: HMMH

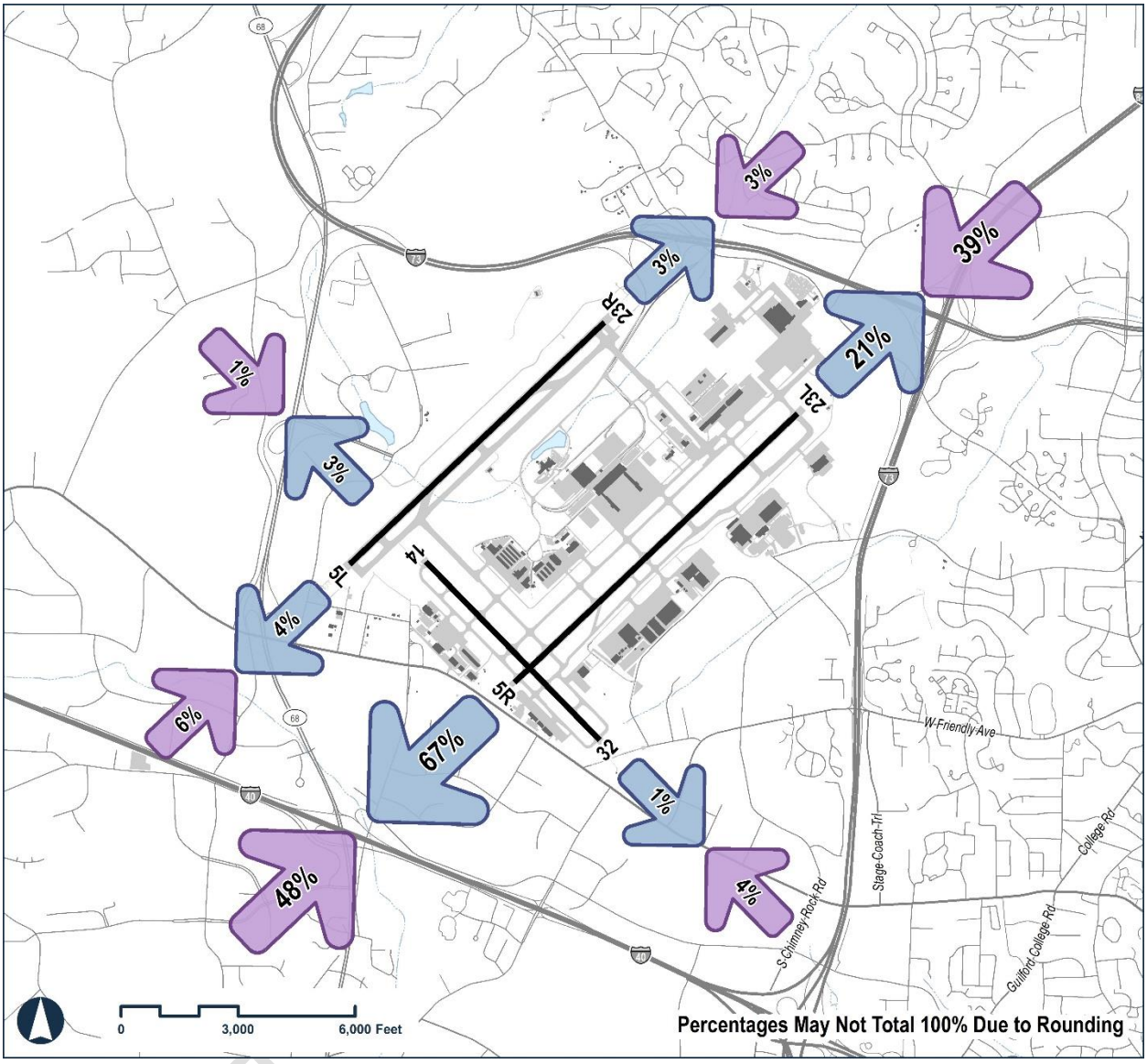


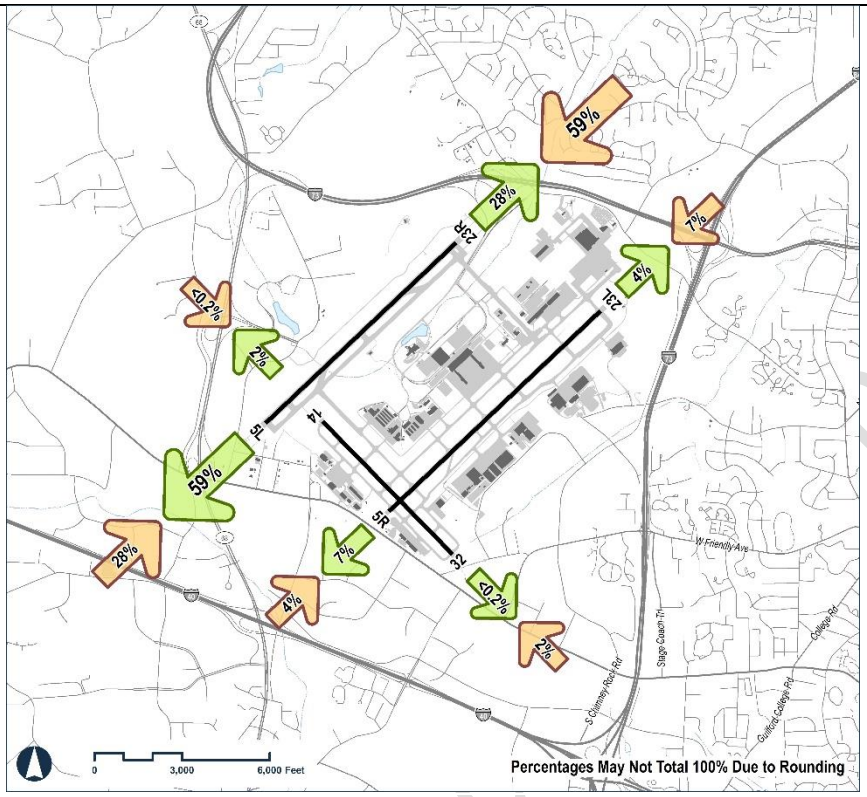
Figure 6-4 Nighttime Arrival and Departure Runway Use
Source: HMMH

Runway use for aircraft that are identified in the data as flying circuit operations was determined separately. Circuit or pattern operations are those that approach the Airport, touch down or almost touch down, reapply power to depart, and circle around to approach the Airport again. Each of these cycles is known as a circuit and some aircraft will perform multiple circuits before landing and taxiing at the Airport or departing to another airport. For runway use modeling purposes, the aircraft operations that have the circuit shape to the flight tracks were used to determine runway use separate from the other aircraft operations.

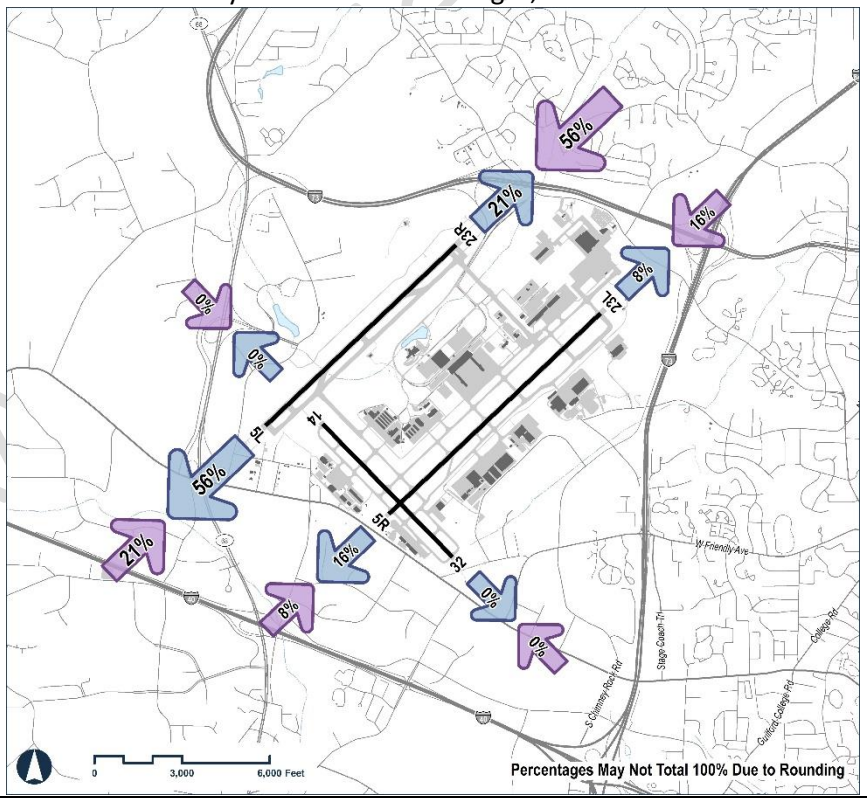
Using the same data ranges described above to obtain a full 12 months of operations, Table 6-4 provides the runway use for circuit operations by aircraft category. Figure 6-5 displays the circuit percentages for all aircraft types for both daytime in the upper portion of the figure and nighttime in the lower portion of the figure.

Table 6-4: Day-Night Runway Use by Aircraft Category – Circuit Operations
Source: HMMH, 2020

	Daytime				Nighttime			
Runway	**GA Jets**	**Military Jets**	**NonJets**	**All Aircraft**	**GA Jets**	**Military Jets**	**NonJets**	**All Aircraft**
5L	18.0%	18.5%	28.9%	28.1%	0.0%	0.0%	21.6%	20.8%
5R	21.8%	22.5%	2.7%	3.7%	0.0%	0.0%	8.1%	7.8%
14	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
23L	34.0%	35.0%	5.6%	7.1%	100.0%	100.0%	12.2%	15.6%
23R	23.3%	24.0%	61.1%	59.3%	0.0%	0.0%	58.1%	55.8%
32	2.9%	0.0%	1.6%	1.7%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**



Daytime Circuit Percentages, All Aircraft



Nighttime Circuit Percentages, All Aircraft

Figure 6-5 Daytime and Nighttime Pattern Runway Use
Source: HMMH

6.3 Aircraft Flight Tracks

Flight track geometry and utilization rates were developed using flight track and aircraft identification data from January 2017 through March 2019 from the PTAA NOIARS. The flight track data were first sorted into seven groups: jet arrivals, jet departures, non-jet arrivals, non-jet departures, helicopter arrivals, helicopter departures and circuit operations. Cargo-only aircraft flight tracks were compared to the "jet" flight track sets. This comparison resulted in the need for no additional flight tracks (i.e. the jet flight tracks sufficiently cover the cargo-only jet operations).

For each of the seven groups, the flight tracks were separated into "bundles" by general direction and waypoints[38]. Statistical analysis of each bundle produced a "backbone" track with an equal number of dispersion tracks to either side. This process led to the development the modeled flight tracks as summarized by aircraft type and arrival/departure groups in Table 6-5. Figures for each group and runway are presented in total in Appendix D. Each figure in Appendix D, includes a table in the legend which lists the percentage of operations assigned to each bundle and the number of model tracks within the bundle. The number of radar tracks is also indicated in the legend on those figures.
Figure 6-6 and Figure 6-7 present the AEDT model flight tracks by flow and Figure 6-8 provides the AEDT model flight tracks for pattern operations. The backbone track for each bundle is portrayed by a bold line, the associated dispersion tracks by dashed lines. The name of the bundle is marked on each backbone track.

Part 150 guidelines specify that the documentation show the model flight tracks out to at least 30,000 feet from the runway ends. The full set of noise modeling flight tracks and utilization rates are presented at a reduced scale on 42 flight track figures presented in Appendix D.3.

[38] A waypoint is a predetermined geographical position that is defined in terms of latitude/longitude coordinates. Waypoints may be a simple named point in space or associated with existing navaids, intersections, or fixes. A waypoint is most often used to indicate a change in direction, speed, or altitude along the desired path. https://tfmlearning.faa.gov/publications/ATpubs/AIM/Chap1/aim0102.html August 18, 2020.

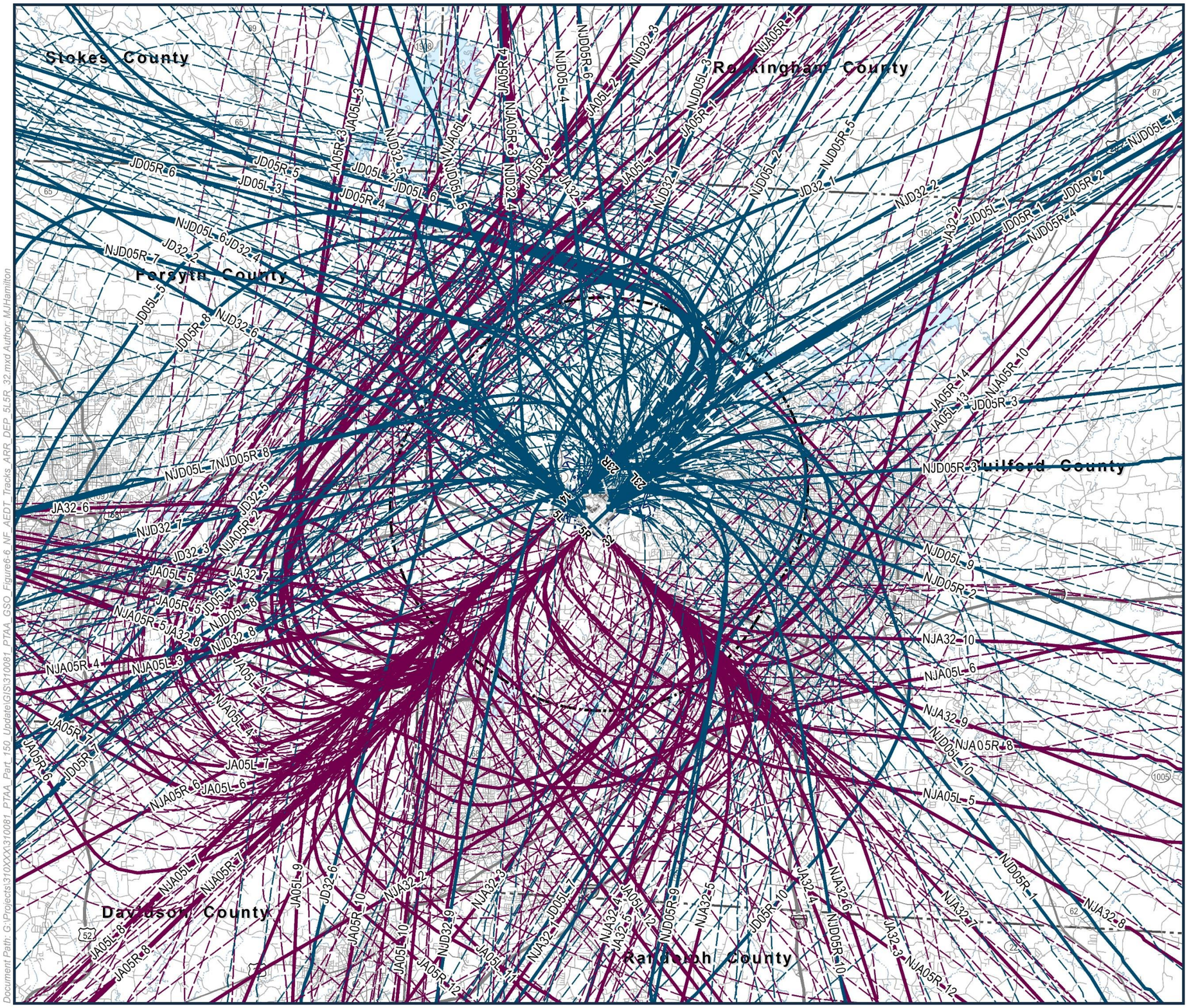
Table 6-5 Summary of Flight Track Bundles by Aircraft Operation Category
Source: HMMH, 2020

Aircraft Category	Arrival Flight Tracks		Departure Flight Tracks	
	Runway	# of Bundles	Runway	# of Bundles
Jet	05L	13	05L	7
	05R	14	05R	10
	14	4	14	2
	23L	12	23L	7
	23R	10	23R	7
	32	8	32	6
Non-Jet	05L	7	05L	11
	05R	13	05R	10
	14	4	14	7
	23L	12	23L	15
	23R	9	23R	11
	32	10	32	9
Total		**116**		**102**

The flight tracks for helicopters that could be identified in the flight track and aircraft identification data were analyzed separately from the fixed-wing aircraft. In Appendix D, there are two figures which present the helicopter arrivals and departures, respectively, with the radar tracks overlaid by the proposed model tracks. All helicopter operations will be modeled as arriving to or departing from the location identified as a "helipad" in Figure 6-1. For modeling purposes, the set of identified helicopter operations in the flight track and aircraft identification data were divided into six arrival bundles and six departure bundles, in a process like the fixed-wing flight track analysis. Each bundle is represented by three model flight tracks: a backbone track with a dispersion track on either side. The tables in the legend of the two helicopter figures in Appendix D list the percentage of operations assigned to each bundle.

Local circuit pattern tracks were developed from the flight track and aircraft identification data as well. Figure 6-8 presents the circuit tracks for each runway. In Appendix D there is a separate figure for each runway end displaying the local circuit pattern tracks with track usage percent tables in the legend of each figure.

This page intentionally left blank.



Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure6-6_NF_AEDT_Tracks_ARR_DEP_5L5R_32.mxd Author: MJHamilton

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 6-6

North Flow AEDT Model Flight Tracks Arrivals and Deps 5L/5R and 32

- Arrival Backbone Model Track
- Arrival Model Subtrack
- Departure Backbone Model Track
- Departure Model Subtrack
- Airport Boundary
- Airport Buildings
- Runway
- Taxiway / Apron
- 30,000 ft. Extent from Runway End
- County Boundary
- Highways
- Major Roads
- Local Roads
- Railroad
- Water / Stream / Creek

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH

0 4 8 NMi

hmmh

This page intentionally left blank

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 6-7

South Flow AEDT Model Flight Tracks Arrivals and Deps 23L/23R and 14

- Arrival Backbone Model Track
- Arrival Model Subtrack
- Departure Backbone Model Track
- Departure Model Subtrack
- Airport Boundary
- Airport Buildings
- Runway
- Taxiway / Apron
- 30,000 ft. Extent from Runway End
- County Boundary
- Highways
- Major Roads
- Local Roads
- Railroad
- Water / Stream / Creek

Draft - Subject to Change

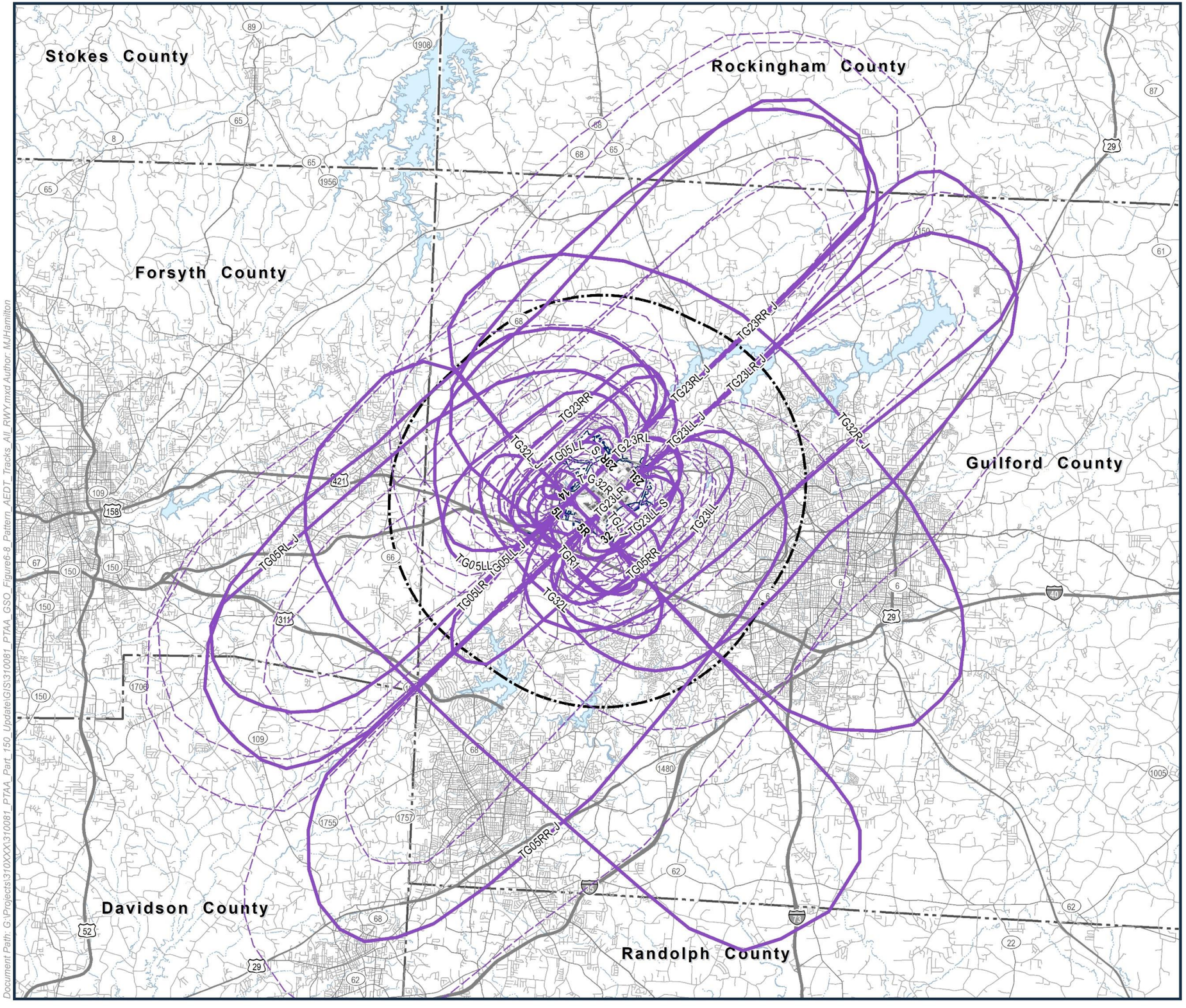
Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

0 4 8 NMi

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure6-7_SF_AEDT_Tracks_ARR_DEP_5L5R_32.mxd Author: MJHamilton

This page intentionally left blank



PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 6-8

Pattern AEDT Model Tracks
All Runways

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

0 4 8 NMi

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure6-8_Pattern_AEDT_Tracks_All_RWY.mxd Author: MJHamilton

This page intentionally left blank

6.4 Annual Aircraft Operations

CHA, a member of the Study Team, prepared aircraft operations forecasts by analyzing market trends in air carrier passenger, cargo, air taxi and general aviation, as detailed in the FAA-approved forecast in Appendix D.[39] Table 6-6 presents a summary of the forecast operations by aircraft category, with the top half of the table showing annual totals and the bottom half showing corresponding average annual day operations for each year. From 2018 to 2020, the number of total operations at PTI is expected to grow by 10.5 percent, and from 2020 to 2025 to grow by another 4.2 percent. The traffic at PTI is about 60 percent commercial flights, the majority of which are passenger flights. General aviation, when counting itinerant and local together, comprises almost as much of the annual activity as the passenger operations. Military activity represents only about two percent of annual operations. Within the air carrier classification, passenger operations are forecast to grow at a slower rate than cargo, due partly to the expected gradual replacement of small regional jet aircraft with aircraft capable of seating more passengers. The recent expansion of cargo operations is expected to continue, driving much of the growth from 2020 to 2025.

Table 6-6: Legend for Flight Tracks by Runway and Aircraft Category to Flight Track Figures
Source: CHA Aviation Forecast, 2019

Year	Commercial				General Aviation			Military			Total Operations
	Passenger Aircraft	Air Taxi	Cargo Aircraft	Total	Itinerant	Local	Total	Itinerant	Local	Total	
2018	32,774	10,034	6,458	**49,267**	24,596	5,816	**30,412**	1,453	383	**1,836**	**81,514**
2020	36,359	10,053	8,204	**54,616**	26,964	6,656	**33,620**	1,453	383	**1,836**	**90,072**
2025	37,265	10,099	10,456	**57,821**	27,413	6,767	**34,180**	1,453	383	**1,836**	**93,836**
Average Annual Day	**Commercial**				**General Aviation**			**Military**			**Total Operations**
	Passenger Aircraft	**Air Taxi**	**Cargo Aircraft**	**Total**	**Itinerant**	**Local**	**Total**	**Itinerant**	**Local**	**Total**	
2018	89.8	27.5	17.7	135.0	67.4	15.9	83.3	4.0	1.0	5.0	223.3
2020	99.6	27.5	22.5	149.6	73.9	18.2	92.1	4.0	1.0	5.0	246.8
2025	102.1	27.7	28.6	158.4	75.1	18.5	93.6	4.0	1.0	5.0	257.1

The forecast provides annual arrival and departure operations by aircraft type for day (7 am - 10 pm) and night (10 pm - 7 am) time periods used in calculating DNL. The given aircraft types are matched to AEDT modeling types. In some cases, the same AEDT type may model multiple aircraft types in the forecast, as shown in the following tables. CHA's "derivative" forecasts in Appendix D address supplemental detail required for the noise model input, including identifying stage lengths for departure operations.

AEDT uses departure "stage length", determined by the distance between the departure and arrival airport, as a surrogate for aircraft departure weight, since fuel load is the largest factor affecting

[39] The FAA forecasts were approved prior to the COVID-19 pandemic and downturn in operations

variation in aircraft weight and therefore climb performance. AEDT includes performance profiles for most commercial aircraft types for a range of stage length values; however, many smaller aircraft types have a single representative weight used for all operations, identified as stage length 1. If an aircraft in the forecast is listed at a departure stage length that exceeds its available performance profiles in AEDT, the profile for the greatest stage length available for that aircraft type in AEDT is used instead.

Longer stage lengths were modeled for DC870 operations by airport tenant Samaritan's Purse, a non-profit organization with occasional direct flights to overseas destinations. Based on the organization's records, approximately 20 percent of their flights fell into the stage length 1 classification; the rest distributed mainly among stage lengths 2 through 6. These operations, estimated at 21 departures per year in 2020 and 2025, were conservatively modeled as stage length 6.

A question arose in an advisory committee meeting about whether the aircraft departing PTI are within the weight assumptions used by the AEDT, or if possibly some cargo flights could be heavier than model assumptions and therefore might be more accurately modeled with higher stage lengths. Discussions with the airlines and PTAA did not provide any basis for further evaluation of passenger flights. To answer this question for cargo flights, U.S. Department of Transportation data was reviewed. Specifically, data from the T100 "Air Carrier Statistics database" for four months (January through April 2019) were examined. Of the 910 FedEx flights in that sample, none of them exceeded the payload assumptions contained in the AEDT database. Therefore, there was no indication that cargo flights were heavier than the AEDT model assumptions.

Table 6-7 through Table 6-13 on the following pages present the forecasts of annual aircraft operations to be modeled for 2020 and 2025, respectively. The tables present forecast detail in categories that the AEDT requires for calculation of DNL:

- Actual aircraft type and associated AEDT type
- Type of operation – arrival, departure, or local pattern
- DNL "day" and "night" time periods
- Departure stage length (marked as SL1 or SL2)

In addition to the itinerant arrival and departure flight operations, PTI has local pattern operations which will be modeled on closed circuit flight paths. CHA's detailed derivative forecast provided the breakdown of "touch and go" operations by aircraft category; this data was incorporated into the operations counts presented in Table 6-7 through Table 6-13. The AEDT model does not include circuit flight profiles for some of the specific AEDT aircraft types represented in the forecast data, so these operations were modeled using itinerant arrivals and departures to complete a circuit.

Table 6-7: Annual Average Day Commercial Passenger Operations - 2020
Source: CHA Aviation Forecast, 2019

Aircraft Type	AEDT Type	Arrivals		Departures				Total Operations
		Day	Night	Day		Night		
				SL 1	SL 2	SL 1	SL 2	
A220-300 or 737-700/LR	737700	4	1	4	0	1	0	10
A319	A319-131	186	34	145	46	22	7	439
A320-100/200	A320-232	648	118	312	352	48	54	1,531
A320-200N	A320-	18	3	9	10	1	1	42
A321	A321-232	8	2	9	0	1	0	20
B717-200	717200	865	157	886	0	135	0	2,043
B737-800 or B737-900	737800	426	77	437	0	67	0	1,007
MD-80/1/2/3/8	MD83	832	151	851	1	130	0	1,966
MD-90	MD9025	1	0	1	0	0	0	3
CRJ900 or CRJ700	CRJ9-ER	3,292	598	3,372	3	515	0	7,780
E175	EMB175	1,533	278	724	847	110	129	3,622
CRJ200ER/440	CL600	2,838	515	2,047	862	313	132	6,706
ERJ140	EMB145	1,587	288	1,626	1	248	0	3,750
ERJ145	EMB14L	3,147	572	2,126	1,100	325	168	7,438
Commercial Passenger totals		15,385	2794	12,550	3,222	1,916	492	36,359

Table 6-8: Annual Average Day Commercial Passenger Operations - 2025
Source: CHA Aviation Forecast, 2019

Aircraft Type	AEDT Type	Arrivals		Departures				Total Operations
		Day	Night	Day		Night		
				SL 1	SL 2	SL 1	SL 2	
A220-300 or 737-700/LR	737700	431	78	441	1	67	0	1,019
A319	A319-131	191	35	148	47	23	7	450
A320-100/200	A320-232	877	159	422	477	64	73	2,073
A320-200N	A320-	18	3	9	10	1	2	43
A321	A321-232	9	2	9	0	1	0	20
B717-200	717200	886	161	908	0	139	0	2,094
B737-800 or B737-900	737800	651	118	668	0	102	0	1,540
CRJ900 or CRJ700	CRJ9-ER	4,087	742	4,185	4	639	1	9,658
E175	EMB175	1,900	345	897	1,050	137	160	4,490
CRJ200ER/440	CL600	2,250	409	1,623	683	248	104	5,318
ERJ140	EMB145	1,626	295	1,666	1	254	0	3,843
ERJ145	EMB14L	2,842	516	1,920	993	293	152	6,717
Commercial Air Carrier totals		15,769	2,864	12,898	3,268	1,969	499	37,265

Table 6-9: Annual Average Day Cargo Operations - 2020
Source: CHA Aviation Forecast, 2019

Aircraft Type	AEDT Type	Arrivals		Departures				Total Operations
		Day	Night	Day		Night		
				SL 1	SL 2	SL 1	SL 2	
A300	A300B4-203	91	598	93	0	389	225	1,396
B767(200)	767CF6	137	338	136	0	336	0	948
B767(300)	767300	39	95	38	0	95	0	267
DC10	DC1030	92	668	92	0	668	0	1,521
B757(PW)	757PW	81	585	81	0	396	189	1,332
B757(RR)	757RR	111	808	111	0	547	261	1,839
ATR42	DHC8	55	396	55	0	396	0	901
Cargo totals		605	3,490	606	0	2,827	676	8,204

Table 6-10: Annual Average Day Cargo Operations - 2025
Source: CHA Aviation Forecast, 2019

Aircraft Type	AEDT Type	Arrivals		Departures				Total Operations
		Day	Night	Day		Night		
				SL 1	SL 2	SL 1	SL 2	
A300	A300B4-203	98	723	100	0	429	312	1,662
B767(200)	767CF6	150	372	149	0	369	0	1,041
B767(300)	767300	42	105	42	0	104	0	294
B757(PW)	757PW	118	1,186	118	0	858	328	2,609
B757(RR)	757RR	163	1,638	163	0	1,185	453	3,603
ATR42	DHC8	56	568	56	0	568	0	1,248
Cargo totals		629	4,592	630	0	3,514	1,092	10,456

Table 6-11: Annual Average Day Air Taxi and General Aviation Operations - 2020
Source: CHA Aviation Forecast, 2019

Aircraft Type	AEDT Type	Arrivals		Departures				Local Circuit Patterns		Total Operations
		Day	Night	Day		Night		Day	Night	
				SL 1	SL 2*	SL 1	SL 2*			
General Aviation Jets	BD-700-1A10	38	4	38	0	4	0	0	0	84
	BD-700-1A11	31	3	31	0	3	0	0	0	69
	CIT3	390	43	388	2	43	0	0	0	866
	CL600	812	90	809	3	90	0	0	0	1,805
	CL601	128	14	127	1	14	0	0	0	284
	CNA500	34	4	34	0	4	0	0	0	77
	CNA510	207	23	207	0	23	0	0	0	460
	CNA525C	1,157	129	1,154	3	129	0	0	0	2,572
	CNA55B	628	70	627	1	70	0	0	0	1,395

Aircraft Type	AEDT Type	Arrivals		Departures				Local Circuit Patterns		Total Operations
		Day	Night	Day		Night		Day	Night	
				SL 1	SL 2*	SL 1	SL 2*			
	CNA560U	297	33	297	0	33	0	0	0	659
	CNA560XL	1,221	145	1,217	4	145	0	200	4	2,936
	CNA680	2,637	293	2,623	14	293	0	0	0	5,861
	CNA750	823	91	819	4	91	0	0	0	1,828
	DC870	25	3	5	20	1	2	0	0	56
	DC93LW	7	1	7	0	1	0	0	0	15
	ECLIPSE500	150	17	150	0	17	0	0	0	333
	FAL900EX	247	27	247	0	27	0	0	0	548
	G650ER	21	2	21	0	2	0	0	0	46
	GIV	464	52	464	0	52	0	0	0	1,031
	GV	86	10	86	0	10	0	0	0	192
	IA1125	114	13	114	0	13	0	0	0	253
	LEAR35	816	91	811	5	91	0	0	0	1,813
	MU3001	538	60	537	1	60	0	0	0	1,196
Twin-Engine Turboprop	CNA441	154	17	154	0	17	0	2	0	345
	DHC6	1,632	182	1,631	1	182	0	26	1	3,657
	DHC830	65	7	65	0	7	0	1	0	146
Single-Engine Turboprop	CNA208	702	125	700	2	125	0	1,205	40	2,898
Twin-Engine Piston	BEC58P	1,452	219	1,452	0	219	0	1,477	49	4,868
	PA30	71	8	71	0	8	0	0	0	157
Single-Engine Piston	CNA172	105	20	105	0	20	0	218	7	475
	CNA182	87	17	87	0	17	0	181	6	395
	CNA206	26	5	26	0	5	0	55	2	119
	CNA20T	16	3	16	0	3	0	33	1	73
	COMSEP	485	93	485	0	93	0	1,010	34	2,200
	GASEPF	70	13	70	0	13	0	146	5	318
	GASEPV	611	117	609	2	117	0	1,272	42	2,771
	PA28	281	31	280	1	31	0	0	0	625
	PA31	88	10	88	0	10	0	0	0	195
General Aviation Helicopters	B429	5	1	5	0	1	0	0	0	11
	EC130	3	0	3	0	0	0	0	0	8
	S70	5	1	5	0	1	0	0	0	11
	S76	9	1	9	0	1	0	0	0	19
Air Taxi and GA totals		16,739	2,088	16,675	64	2,086	2	5,827	191	43,673

Table 6-12: Annual Average Day Air Taxi and General Aviation Operations - 2025
Source: CHA Aviation Forecast, 2019

Aircraft Type	AEDT Type	Arrivals		Departures				Local Circuit Patterns		Total Operations
		Day	Night	Day		Night		Day	Night	
				SL 1	SL 2*	SL 1	SL 2*			
General Aviation Jet Aircraft	BD-700-1A10	38	4	38	0	4	0	0	0	85
	BD-700-1A11	31	3	31	0	3	0	0	0	70
	CIT3	395	44	393	2	44	0	0	0	878
	CL600	824	92	821	3	92	0	0	0	1,830
	CL601	129	14	128	1	14	0	0	0	288
	CNA500	35	4	35	0	4	0	0	0	78
	CNA510	210	23	210	0	23	0	0	0	466
	CNA525C	1,173	130	1,170	3	130	0	0	0	2,608
	CNA55B	637	71	636	1	71	0	0	0	1,415
	CNA560U	301	33	301	0	33	0	0	0	668
	CNA560XL	1,239	147	1,235	4	147	0	200	4	2,977
	CNA680	2,674	297	2,660	14	297	0	0	0	5,942
	CNA750	834	93	830	4	93	0	0	0	1,854
	DC870	26	3	5	20	1	2	0	0	57
	DC93LW	7	1	7	0	1	0	0	0	15
	ECLIPSE500	152	17	152	0	17	0	0	0	338
	FAL900EX	250	28	250	0	28	0	0	0	556
	G650ER	21	2	21	0	2	0	0	0	47
	GIV	470	52	470	0	52	0	0	0	1,045
	GV	87	10	87	0	10	0	0	0	194
	IA1125	115	13	115	0	13	0	0	0	256
	LEAR35	827	92	822	5	92	0	0	0	1,838
	MU3001	546	61	545	1	61	0	0	0	1,213
Twin-Engine Turboprop	CNA441	156	17	156	0	17	0	2	0	350
	DHC6	1,655	185	1,654	1	185	0	26	1	3,708
	DHC830	66	7	66	0	7	0	1	0	148
Single-Engine Turboprop	CNA208	707	126	705	2	126	0	1,230	41	2,938
Twin-Engine Piston	BEC58P	1,470	222	1,470	0	222	0	1,503	50	4,936
	PA30	72	8	72	0	8	0	0	0	159
Single-Engine Piston	CNA172	106	20	106	0	20	0	222	7	482
	CNA182	88	17	88	0	17	0	185	6	400
	CNA206	26	5	26	0	5	0	56	2	120
	CNA20T	16	3	16	0	3	0	34	1	74
	COMSEP	489	94	489	0	94	0	1,029	34	2,231
	GASEPF	71	14	71	0	14	0	149	5	323
	GASEPV	616	119	614	2	119	0	1,296	43	2,810
	PA28	285	32	284	1	32	0	0	0	633

Aircraft Type	AEDT Type	Arrivals		Departures				Local Circuit Patterns		Total Operations
		Day	Night	Day		Night		Day	Night	
				SL 1	SL 2*	SL 1	SL 2*			
	PA31	89	10	89	0	10	0	0	0	198
General Aviation Helicopters	B429	5	1	5	0	1	0	0	0	12
	EC130	3	0	3	0	0	0	0	0	8
	S70	5	1	5	0	1	0	0	0	12
	S76	9	1	9	0	1	0	0	0	19
Air Taxi and GA totals		16,958	2,117	16,894	64	2,114	2	5,934	195	44,279

Table 6-13: Annual Average Day Military Operations – 2020 and 2025
Source: CHA Aviation Forecast, 2019

Aircraft Type	AEDT Type	Arrivals		Departures				Local Circuit Patterns		Total Operations
		Day	Night	Day		Night		Day	Night	
				SL 1	SL 2	SL 1	SL 2			
Military Single-Engine Aircraft	GASEPV	51	3	51	0	3	0	0	0	108
Small Military Multi-Engine Turboprop	DHC6	108	6	108	0	6	0	18	1	247
Large Military Multi-Engine Turboprop	C130	82	4	82	0	4	0	14	0	186
Military Jet: P8	737800	78	4	78	0	4	0	18	1	182
Large Military Jet	DC1030	172	9	172	0	9	0	40	1	405
Military Jet, fighter/trainer type	F-18	58	3	58	0	3	0	0	0	122
Medium Military Jet	GV	129	7	129	0	7	0	30	1	304
Military Rotorcraft	S70	134	7	134	0	7	0	0	0	282
Military totals		812	44	812	0	44	0	121	4	1,836

6.5 Maintenance Runup Operations

PTAA collected maintenance runup information from HAECO Americas, Honda Aircraft Company, and Cessna/Textron, which were used to develop runup modeling inputs, including:

- Number of annual operations
- Aircraft type
- Location
- Heading
- Power setting
- Duration
- Time (classified as daytime or nighttime, defined as 7:00 am – 10:00pm or 10:00pm – 7:00 am)

Table 6-14 and Table 6-15 summarize the annual aircraft engine runup activity to be modeled for 2020 and 2025, respectively. The data include the location, aircraft type, magnetic heading, percent engine thrust, and typical runup duration for each set of operations. The location given in the table is denoted by a letter which corresponds to the five runup areas marked on Figure 6-1. The runup operations are assumed to increase by 4.2 percent from 2020 to 2025, the same proportion of increase as the overall number of airport operations.

Table 6-14: Annual Average Day Aircraft Engine Runup Activity – 2020

Source: PTAA, HMMH, HAECO, Cessna/Textron, and Honda, 2019

Runup Location	Aircraft Type	AEDT type	Aircraft Heading (degrees)	Modeled Thrust	Duration (minutes)	Annual Runup Operations		
						Day	Night	Total
C	KC-10 (incoming)	DC1030	234	100%	60	37.0	0.0	**37**
	KC-10 (outbound)	DC1030	234	100%	210	37.0	0.0	**37**
C	A300	A300B4-203	234	100%	60	31.9	2.1	**34**
	A300	A300B4-203	234	Idle thrust	45	30.9	3.1	**34**
	B767	767CF6	234	100%	60	15.9	1.1	**17**
	B767	767CF6	234	Idle thrust	45	15.5	1.5	**17**
C/N	A319	A319-131	234	100%	60	7.5	0.5	**8**
	A319	A319-131	234	Idle thrust	45	7.3	0.7	**8**
	A320	A320-232	234	100%	60	40.3	2.7	**43**
	A320	A320-232	234	Idle thrust	45	39.1	3.9	**43**
	A321	A321-232	234	100%	60	3.7	0.3	**4**
	A321	A321-232	234	Idle thrust	45	3.6	0.4	**4**
	B737	737800	234	100%	60	92.8	6.2	**99**
	B737	737800	234	Idle thrust	45	90.1	8.9	**99**
S	Citation	CNA525C	323	100%	30	2,010.0	0.0	**2,010**
	King Air	DHC6	323	100%	30	506.0	0.0	**506**
	Hawker	CNA750	323	100%	30	26.0	0.0	**26**
	Premier	MU3001	323	100%	30	14.0	0.0	**14**
A	HondaJet 420	CNA680	143	Idle thrust	57	142.5	7.5	**150**
	HondaJet 421	CNA680	143	100%	3	142.5	7.5	**150**
B	HondaJet 422	CNA680	143	Idle thrust	14	285.0	15.0	**300**
	HondaJet 423	CNA680	143	100%	1	285.0	15.0	**300**
Total Annual Runup Operations						**3863.6**	**76.4**	**3940.0**
Note: "C/N" indicates that operations are split – half at location C and half at location N.								

Table 6-15: Annual Average Day Aircraft Engine Runup Activity – 2020
Source: PTAA, HMMH, HAECO, Cessna/Textron, and Honda, 2019

Runup Location	Aircraft Type	AEDT type	Aircraft Heading (degrees)	Modeled Thrust	Duration (minutes)	Annual Runup Operations		
						Day	Night	Total
C	KC-10 (incoming)	DC1030	234	100%	60	38.6	0.0	**38.6**
	KC-10 (outbound)	DC1030	234	100%	210	38.6	0.0	**38.6**
C	A300	A300B4-203	234	100%	60	33.2	2.2	**35.4**
	A300	A300B4-203	234	Idle thrust	45	32.2	3.2	**35.4**
	B767	767CF6	234	100%	60	16.6	1.1	**17.7**
	B767	767CF6	234	Idle thrust	45	16.2	1.6	**17.7**
C/N	A319	A319-131	234	100%	60	7.8	0.5	**8.3**
	A319	A319-131	234	Idle thrust	45	7.6	0.7	**8.3**
	A320	A320-232	234	100%	60	42.0	2.8	**44.8**
	A320	A320-232	234	Idle thrust	45	40.7	4.1	**44.8**
	A321	A321-232	234	100%	60	3.9	0.3	**4.2**
	A321	A321-232	234	Idle thrust	45	3.8	0.4	**4.2**
	B737	737800	234	100%	60	96.7	6.5	**103.2**
	B737	737800	234	Idle thrust	45	93.9	9.3	**103.2**
S	Citation	CNA525C	323	100%	30	2094.4	0.0	**2094.4**
	King Air	DHC6	323	100%	30	527.3	0.0	**527.3**
	Hawker	CNA750	323	100%	30	27.1	0.0	**27.1**
	Premier	MU3001	323	100%	30	14.6	0.0	**14.6**
A	HondaJet 420	CNA680	143	Idle thrust	57	148.5	7.8	**156.3**
	HondaJet 421	CNA680	143	100%	3	148.5	7.8	**156.3**
B	HondaJet 422	CNA680	143	Idle thrust	14	297.0	15.6	**312.6**
	HondaJet 423	CNA680	143	100%	1	297.0	15.6	**312.6**
Total Annual Runup Operations						**4025.9**	**79.6**	**4105.5**

6.6 Meteorological Data

AEDT uses meteorological data to adjust aircraft performance and sound propagation. The AEDT database includes 30-year average weather for each airport. These data for PTI are:

- Temperature: 58° F
- Station Pressure: 985.75 mbar
- Sea Level Pressure: 1018.04 mbar
- Dew point: 46.99° F
- Relative humidity: 67.35%
- Wind speed 6.15 knots

6.7 Terrain Data

AEDT uses 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 were obtained from the United States Geological Survey National Elevation Dataset with 1/3 arc second (approximately 33 ft.) resolution covering the Study Area.

7 Noise Exposure Maps and Land Use Compatibility

The fundamental elements of an NEM are DNL contours for existing and forecast conditions (2020 and 2025), presented over base 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 aircraft noise exposure contours resulting from the Study and the associated land use compatibility that represents the existing condition (2020) and forecast condition (2025) for Piedmont Triad International Airport. Both NEMs include the current implementation of the 2007 NCP measures as described in Chapter 4.

Figure 7-1 and Figure 7-2 are the official NEMs that the PTAA is submitting under Part 150 for appropriate FAA review and determination of compliance, pursuant to §150.21. 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" 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 6, Section 6.3). The 60 DNL noise contour is shown for informational purposes only, because the 2007 NCP included a measure to publish contours for 60 DNL and above.

The Federal Aviation Administration (FAA) considers all land uses compatible outside of the 65 DNL contour. The 65 DNL contour is almost entirely contained within the airport boundary. As shown in Figure 7-1 and Figure 7-2, thel 65 DNL contours for both 2020 and 2025 extend off airport property in only one area which is to the southeast of Runway 5R/23L, the contour extends over the industrial area towards N. Chimney Rock Rd.

Figure 7-3, which shows both sets of NEM contours, is provided for easy comparison between the existing and forecast contour sets.

As required under Part 150, Table 7-1 shows the population and housing units within the 65 dB contour. There are neither population nor housing units in the existing (2020) or forecast (2025) condition NEMs.

Table 7-1: Land Use Compatibility Analysis Results
Source: HMMH, 2020

Noise Level (DNL)	Existing Contours (2020)		Forecast Contours (2025)	
	Estimated Population	Estimated Number of Housing Units	Estimated Population	Estimated Number of Housing Units
65 – 70 dB	0	0	0	0
70 – 75 dB	0	0	0	0
75+ dB	0	0	0	0
Total	0	0	0	0

This page intentionally left blank.

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 7-1

Existing Conditions (2020) Noise Exposure Map

- 2020 DNL 65-75 Contours
- 2020 DNL 60 Contour (Informational Only)
- Airport Boundary
- Airport Buildings
- Runway
- Taxiway / Apron
- Helicopter Pad
- Run-Up Location
- Permanent Monitor Sites
- Municipal Boundary
- Highways
- Major Roads
- Local Roads
- Railroad
- Stream / Creek
- School
- Library
- Place of Worship
- Hospital / Health Care
- Residential Use
- Commercial Use
- Multi-Family Residential Use
- Manufacturing / Production
- Mobile Home
- Golf Course
- Transient Lodging
- Recreational / Open Space
- Mixed Use
- Transportation / Utility
- Public Use 1
- Vacant / Undeveloped
- Public Use 2
- Water

Note: Entire area depicted on the figure is within Guilford County and the City of Greensboro and High Point, The City of Greensboro and High Point have jurisdictional and land use control.

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

0 2,000 4,000 Feet

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure7-1_2020_Noise_Contour.mxd Author: MJHamilton

This page intentionally left blank

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 7-2

Forecast Conditions (2025) Noise Exposure Map

- 2025 DNL 65-75 Contours
- 2025 DNL 60 Contour (Informational Only)
- Airport Boundary
- Airport Buildings
- Runway
- Taxiway / Apron
- Helicopter Pad
- Run-Up Location
- Permanent Monitor Sites
- Municipal Boundary
- Highways
- Major Roads
- Local Roads
- Railroad
- Stream / Creek
- School
- Library
- Place of Worship
- Hospital / Health Care
- Residential Use
- Commercial Use
- Multi-Family Residential Use
- Manufacturing / Production
- Mobile Home
- Golf Course
- Transient Lodging
- Recreational / Open Space
- Mixed Use
- Transportation / Utility
- Public Use 1
- Vacant / Undeveloped
- Public Use 2
- Water

Note: Entire area depicted on the figure is within Guilford County and the City of Greensboro and High Point, The City of Greensboro and High Point have jurisdictional and land use control.

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

0 2,000 4,000 Feet

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure7-2_2025_Noise_Contour.mxd Author: MJHamilton

This page intentionally left blank

PIEDMONT TRIAD AIRPORT AUTHORITY

Part 150 Update

Figure: 7-3

Existing Conditions (2020) and Forecast Conditions (2025) Noise Exposure Map Comparison

- 2020 DNL 65-75 Contours
- 2020 DNL 60 Contour (Informational Only)
- 2025 DNL 65-75 Contours
- 2025 DNL 60 Contour (Informational Only)

- Airport Boundary
- Runway
- Helicopter Pad
- Permanent Monitor Sites
- Municipal Boundary
- Airport Buildings
- Taxiway / Apron
- Run-Up Location

- Highways
- Major Roads
- Local Roads
- Railroad
- Stream / Creek
- School
- Library
- Place of Worship
- Hospital / Health Care

- Residential Use
- Multi-Family Residential Use
- Mobile Home
- Transient Lodging
- Mixed Use
- Public Use 1
- Public Use 2
- Commercial Use
- Manufacturing / Production
- Golf Course
- Recreational / Open Space
- Transportation / Utility
- Vacant / Undeveloped
- Water

Note: Entire area depicted on the figure is within Guilford County and the City of Greensboro and High Point, The City of Greensboro and High Point have jurisdictional and land use control.

Draft - Subject to Change

Data Sources: Guilford County GIS; Davidson County GIS; Forsyth County GIS; NC OneMap GeoSpatial Portal; Environmental Systems Research Institute (ESRI); AirNav.com; HMMH Inc.

0 2,000 4,000 Feet

hmmh

Document Path: G:\Projects\310XXX\310081_PTAA_Part_150_Update\GIS\310081_PTAA_GSO_Figure7-3_2020_2025_Noise_Contour_Comparison.mxd Author: MJHamilton

This page intentionally left blank

7.1 Comparison of Measured and Modeled Aircraft Noise Exposure

As discussed in Chapter 5, a week-long noise measurement program was conducted in November 2019 at six residential locations and PTI has a noise and operations monitoring system with four permanent noise monitors. Table 7-2 lists the ten noise measurement locations, the daily average measured aircraft-only DNL, and the 2020 model DNL values as calculated in AEDT.

The aircraft-only noise levels measured and shown in Table 7-2 are only from a five-full-day measurement period and represent noise levels for activity at PTI during that period. Variation from the annual average values is to be expected due to variations in fleet mix, operating times and runway use between that subset of days and the annual average. During the measurement week, PTI was in north flow (arrivals to and departures from Runway 5L/5R) more than it is on an annual average basis. This resulted in higher measured levels at Sites 5 and 6 due to greater than average departures in that direction and a lower value at Site 3 compared to the modeled average annual day results.

Table 7-2: Comparison of Average Measured to 2020 Annual Modeled Aircraft Noise Exposure
Source: HMMH and PTAA NOIARS, 2020

Site	Average Measured[1] DNL	2020 Annual AEDT-Calculated[2] DNL	Difference (Measured – AEDT)
1	51	51	0
2	53	50	3
3	48	54	-6
4[3]	N/A	50	N/A
5	57	48	9
6	54	48	6
A	56	56	0
B[4]	N/A	56	N/A
C	75	68	7
D	67	63	4

Notes:

(1) Measured DNL represents the five-day average DNL and the measured data includes only aircraft noise events.

(2) AEDT-Calculated DNL for all sites represent the annual-average day DNL for calendar year 2020 for only aircraft noise sources.

(3) The values for Site 4 were well below the ambient noise levels due to lack of aircraft overflights and 1 day of missing data due to data collection error and are therefore not reported.

(4) PTI permanent Site B was not operational during this measurement period. It has since been repaired.

8 Noise Compatibility Program Amendments

As presented in Chapter 4, PTAA has an existing Noise Compatibility Program to address the noncompatible land uses determined through the 2007 Part 150 Study. The PTI NCP includes three categories of measures: (1) noise abatement measures intended to reduce aircraft noise at the source, (2) land use measures intended to mitigate existing non-compatible land uses and to discourage the introduction of new non-compatible land uses and (3) program measures intended to implement and monitor compliance with the PTI NCP.

As part of the 2020 Part 150 Update, PTAA is recommending amendments to the existing NCP to merely bring it up to date. PTAA is not intending, at this time, to do a full NCP update. Table 8-1 summarizes the PTAA-recommended amendments with full descriptions of the 13 amended measures following the table. The PTAA recommends seven measures be eliminated as noted in the table below.

Table 8-1: PTAA-Recommended Amendments to the Noise Compatibility Program
Source: PTAA and HMMH, 2020

Original Number	Original Name	Amended Number	Proposed Amendment
NA-1	Evaluate Noise Barriers	NA-1	No change
NA-2	Preferred Night Runway Use	NA-2	Clarify description
NA-3	Night Runway Use Assignments	--	Eliminate – outdated
NA-4	Night Departure Corridor from Runway 23L	NA-3	Clarify to include northeast destinations and to initiate development of an RNAV procedure
NA-5	Night Departure Procedures from Runway 23R	NA-4	Incorporate NA-3, Item 5
NA-6	Night Northbound Departure Corridor from Runway 23L	--	Eliminate – not needed
NA-7	Not Applicable	--	--
NA-8	Departures from Runway 5L	NA-5	No change
NA-9	Departures from Runway 5R	NA-6	No change
NA-10	Restrictions on Use of APUs	NA-7	No change
NA-11	Noise Abatement Departure Profiles	--	Eliminate – not needed
NA-12	Noise Abatement Approach Procedures	NA-8	No change
NA-13	Altitude for Downwind Legs	NA-9	No change
LU-1	Acquire Noise-Sensitive Properties where DNL Exceeds 70 dB	--	Eliminate - complete
LU-2	Sound Insulation of Noise-Sensitive Structures where DNL Exceeds 65 dB	--	Eliminate – completing last phase
LU-3	Optional Acquisition of Avigation Easements for Noise-Sensitive Structures where DNL Exceeds 65 dB	--	Eliminate – not needed
LU-4	Other Assistance for Owners of Residential Property where DNL Exceeds 65 dB	--	Eliminate – not needed
LU-5	Pursue Compatible Use Zoning where DNL Exceeds 65 dB	LU-1	No change
PM-1	Maintain a Noise Monitoring Function at PTI	PM-1	No change
PM-2	Publish DNL Contours for 60 DNL and Above	PM-2	No change

Original Number	Original Name	Amended Number	Proposed Amendment
PM-3	Operate and Maintain an Aircraft Noise and Operations Monitoring System	PM-3	No change

8.1 Noise Abatement Measures

PTAA recommended and the FAA approved 12 noise abatement measures in the 2007 PTI NCP. For the 2020 amended NCP, PTAA recommends six (6) remain as written, three (3) be amended, and three (3) be eliminated, resulting in the following set of nine (9) recommended noise abatement measures.

NA-1: Evaluate Noise Barriers

Under this measure, PTAA would adopt a policy to evaluate potential benefits of noise barriers to control off-airport noise levels from future airport facilities. The policy would commit the PTAA to work with tenants to have the tenant install noise barriers if the PTAA considers the use of a barrier appropriate.

NA-2: Preferred Night Runway Use

Original Description: When new runway 5L/23R is available for use during nighttime hub operations, designate runways 23L and 23R as the preferred departure runways and runways 5L and 5R as the preferred arrival runways. This head-to-head pattern of runway use will be used when permitted by weather and runway conditions. To the extent feasible, equal numbers of aircraft shall use the left and right runways for arrivals. Runway use assignments for departures shall be as established by Proposed Measure NA-3.

Recommendation: Eliminate the following wording from the measure "To the extent feasible, equal numbers of aircraft shall use the left and right runways for arrivals. Runway use assignments for departures shall be as established by Proposed Measure NA-3."
(recommended description below)

During nighttime hub operations, designate runways 23L and 23R as the preferred departure runways and runways 5L and 5R as the preferred arrival runways. This head-to-head pattern of runway use will be used when permitted by weather and runway conditions.

NA-3: Night Departure Corridor from Runway 23L

Original Description: Promptly after FAA approval of this measure, establish a new nighttime departure procedure for aircraft departing runway 23L for southern destinations so that the initial flightpath is in a southerly direction, east of and parallel to NC Highway 68. Departing aircraft shall initiate the left

departure turn onto this flight path as soon as practicable. Aircraft may make a transition to another heading after reaching 4,000 feet MSL.

Recommendation: Initiate development of a Performance Based Navigation (PBN) departure procedure for south and northeast destinations
(recommended description below)

For jet departures from Runway 23L to south or northeast destinations, develop and implement an RNAV departure procedure that makes an initial left turn and concentrates the flight path over NC Highway 68. Aircraft may make a transition to another heading after reaching 4,000 feet MSL.

NA-4: Night Northbound Departure Corridor from Runway 23R

Original Description: Aircraft departing runway 23R at night and turning right shall initiate the right departure turn as soon as practicable. (NA-3, Item 5) Aircraft departing on runway 23R and needing to make a transition to a more southerly heading should delay the transition until they have reached an altitude of 4,000 MSL.

Recommendation: Incorporate original Part 150 NA-3, Item 5 language
(recommended description below)

Aircraft departing runway 23R at night and turning right shall initiate the right departure turn as soon as practicable. Aircraft departing on runway 23R and needing to make a transition to a more southerly heading should delay the transition until they have reached an altitude of 4,000 MSL.

NA-5: Departures from Runway 5L

When runway 5L/23R is available for use, establish a procedure to delay initial turns from runway heading by aircraft departing on runway 5L until such aircraft reach an altitude of 4,000 MSL.

NA-6: Departures from Runway 5R

Revise the existing procedure to delay initial left turns from runway heading by aircraft using runway 5R until such aircraft reach an altitude of 4,000 MSL.

NA-7: Restrictions on Use of APUs

Under this measure, PTAA will adopt a policy for future airport facilities, and for new tenants after FAA approval of this measure, that would require that auxiliary power units, either on-board units or ground units, except for units in use for engine starts, not produce night-time noise levels in off-airport residential neighborhoods that exceed the ambient noise level at those locations.

NA-8: Noise Abatement Approach Procedure

Under this measure, the PTAA requests that FAA Air Traffic Control Tower personnel direct all jet aircraft arriving at the airport, whether on an IFR or a visual approach, to intercept the final approach at least

5.5 nautical miles from the intended landing runway and to stay at or above the glideslope throughout the remainder of their approach. The PTAA requests that FAA Air Traffic Control Tower personnel direct all jet aircraft arriving at the airport and on the final approach within 12.5 nautical miles from the intended landing runway, whether on an IFR or a visual approach, to stay at or above the glideslope throughout the remainder of their approach.

NA-9: Altitude for Downwind Legs

Under this measure, the PTAA requests that FAA Air Traffic Control Tower personnel direct IFR aircraft on the downwind leg for arrival on runways 5L, 5R, 23L or 23R to remain at or above 4,000' MSL until crossing the extended centerline of runway 14/32 at the airport. When implementing this measure and there are simultaneous approaches to runways 5L and 5R, the PTAA requests that FAA Air Traffic Control Tower personnel direct IFR aircraft on the downwind leg for runway 5R to remain at or above 5,000' MSL and aircraft on the downwind leg for runway 5L to remain at or above 4,000' MSL.

8.2 Land Use Measures

PTAA recommended and the FAA approved five (5) land use measures in the PTI NCP. Of the five land use measures, PTAA recommends only one (1) remains as provided in the 2007 PTI NCP and the other four (4) be eliminated as PTAA has completed the implementation or implementation was not required to achieve land use compatibility. The resulting one PTAA-recommended and implemented land use measure (LU-5 in the 2007 NCP) for the 2020 amended NCP is below.

LU-1: Pursue Compatible Use Zoning where DNL Exceeds 65 dB

The PTAA will work with land use authorities of jurisdictions in the vicinity of the airport to adopt compatible use zoning.

8.3 Program Management Measures

PTAA recommended and the FAA approved three (3) program management measures in the PTI NCP. PTAA recommends all three (3) remain as provided in the 2007 PTI NCP as they all have been fully implemented and continue to assist PTAA with managing noise at PTI.

PM-1: Maintain a Noise Monitoring Function at PTI

The PTAA will establish a noise monitoring function within the PTAA with responsibilities that include: to monitor aircraft noise; to provide a point of contact within the PTAA for issues related to aircraft noise; to serve as a liaison with the community for such issues; and to keep air carriers and the public informed about compliance with measures in the NCP.

PM-2: Publish DNL Contours for 60 DNL and Above

When the PTAA publishes aircraft noise contours, it will publish contours at 5-dB intervals for values of DNL of 60 dB and above. The most recent contours will be published on the PTAA web site. The contours will be updated as required by FAR Part 150.

PM-3: Operate and Maintain an Aircraft Noise and Operations Monitoring System

The PTAA will install and operate an aircraft noise and operations monitoring system to monitor aircraft noise and aircraft operations in the vicinity of the airport. The system will reflect state-of-the-art technology. It is expected that the system will have six or more permanent monitoring microphones and one or two portable monitoring microphones. To the extent feasible, the permanent microphones will be at locations used during the Part 150 study. Summaries of the monitoring results will be reported regularly on the PTAA web site.

9 Stakeholder Engagement

A critical element of the Part 150 Process is stakeholder engagement. This chapter describes outreach efforts conducted as part of the development of this draft Part 150 document. The Part 150 Update process includes several efforts to engage the stakeholders. Two advisory committees made up of key stakeholders met throughout the project to review materials and provide input to PTAA. The Airport Authority also hosted two public workshops, one at the beginning of the study to introduce the purpose and schedule, and another near the end of the study, to summarize the results of the study. A 30-day public comment period allowed the public to comment on the completed draft document.

9.1 Technical Advisory Committee

The Part 150 Update process benefits from the creation and participation of a TAC, which serves several important functions:

- Represents a broad range of stakeholder groups
- Receives information about the Study and shares it with their constituencies
- Reviews information and provides timely input to the Study
- In some cases, provides technical advice to the Study Team

In order for the TAC to be effective and to be representative of technical stakeholders involved in aircraft noise issues, PTAA composed a diverse group of key stakeholders including, but not limited to, community representatives, aircraft operators/airlines, affected jurisdictions, land use planners, and FAA Air Traffic Control. While representation needed to be broad, the TAC needed to remain a reasonable size to allow efficient participation. The PTAA identified and invited members to serve on the TAC for the PTI Part 150 Update. Table 9-1 provides member organizations that were invited to participate on the TAC based on regulations governing the Part 150 process at 14 CFR 150.21 (b) and 14 CFR 150.105(a). Not all member organizations invited to the TAC chose to send a representative, but a broad range of representatives took part.

Table 9-1 Member Organizations Represented on the Technical Advisory Committee
Source: PTAA and RMA, 2019

States, Public Agencies or Planning Agencies	FAA Regional Officials	Regular Aeronautical Users of the Airport	Interested Persons
▪ Guilford County ▪ Greensboro ▪ High Point ▪ Jamestown ▪ Kernersville ▪ Summerfield ▪ Oak Ridge ▪ Forsyth County ▪ Winston-Salem	▪ FAA Airport Traffic Control Tower (ATCT) ▪ National Air Traffic Controllers Association (NATCA) ▪ FAA Flight Standards District Office (FSDO) ▪ Memphis Airports District Office (ADO) ▪ FAA Southern Region	▪ Allegiant Air ▪ American Airlines ▪ Delta Airlines ▪ Spirit Airlines ▪ United Airlines ▪ Signature Flight Support ▪ Koury Aviation ▪ FedEx ▪ DHL ▪ UPS ▪ HAECO Americas ▪ Cessna/Textron ▪ Honda Aircraft Company ▪ Samaritan's Purse ▪ US Customs and Border Protection	▪ Guilford Technical Community College ▪ Citizens Advisory Committee Chair ▪ Citizens Advisory Committee Co-Chair

TAC meetings were open to the public, but since the purpose of the TAC is to provide technical input to PTAA, members of the public were not given the opportunity to comment during the meetings. Two public workshops were conducted during the Part 150 update which provided a venue for public comment.

It is important to note that the TAC role is advisory only. That is, the TAC offers opinions, advice, and guidance to the Study, but PTAA has the sole discretion to accept or reject the TAC recommendations in accordance with Part 150 regulations.

PTAA scheduled TAC meetings and provided an agenda in advance of each meeting. The Study Team prepared presentations and meeting materials for each TAC meeting and served as the facilitator for the TAC meetings. Major topics discussed at each of the TAC meetings are found in Table 9-2.

Table 9-2 Meeting Topics of the Technical Advisory Committee
Source: HMMH, 2020

TAC Meeting #	Date	Topics Covered
1	6/27/2019	Overview of the Part 150 process, the CAC, and roles and responsibilities
2	10/2/2019	Operations forecast development, land use mapping, noise model inputs
3	5/20/2020	Preliminary noise model results and noise measurement program results
4	12/3/2020	Overview of the Part 150 document out for public review and comment

Copies of agendas, presentations and summaries for the TAC meetings are provided in Appendix E.1.

9.2 Citizens Advisory Committee

The Part 150 Update process benefited from the creation and participation of a CAC, which served several important functions:

- Represented a broad range of communities
- Received information about the Study to share with their constituencies
- Reviewed information and provided timely input to the Study

In order for the CAC to be effective and to be representative of surrounding communities near the Airport, PTAA identified nine jurisdictions to be represented. While representation needed to be broad, the CAC needed to remain a reasonable size to allow robust participation. PTAA invited eighteen residents to the CAC within nine surrounding cities, towns and counties, listed in Table 9-3. The residents were nominated by the elected officials' offices to represent their neighborhoods.

Table 9-3 Member Jurisdictions Represented on the Citizens Advisory Committee
Source: PTAA and RMA, 2019

Jurisdiction	Representatives	Jurisdiction	Representatives
Greensboro	5	Summerfield	1
Guilford County	2	Jamestown	1
Winston-Salem	1	Oak Ridge	1
Forsyth County	1	Kernersville	1
High Point	5		

As with the TAC, CAC meetings were open to the public, but because the purpose of the CAC is to provide input to PTAA, members of the public were not given the opportunity to comment during the meetings. It is important to note that the role of the CAC is advisory only. That is, the CAC offers opinions, advice, and guidance to the Study, but PTAA has the sole discretion to accept or reject the CAC recommendations in accordance with 14 CFR Part 150.

PTAA scheduled CAC meetings and provided an agenda in advance of each meeting. The Study Team prepared presentations and meeting materials for each CAC meeting and served as the facilitator for the CAC meetings. PTAA held an additional meeting/workshop with the CAC to review the proposed NCP amendments to gather their opinion and views before incorporating the amendments into this study. The Major topics discussed at each of the CAC meetings are found in Table 9-4.

Table 9-4 Meeting Topics of the Citizens Advisory Committee
Source: HMMH, 2020

CAC Meeting #	Date	Topics Covered
1	6/26/2019	Overview of the Part 150 process, the CAC, and roles and responsibilities
2	10/2/2019	Operations forecast development, land use mapping, noise model inputs
3	5/20/2020	Preliminary noise model results and noise measurement program results
4	8/13/2020	Workshop to review of the existing Noise Compatibility Program
5	12/3/2020	Overview of the Part 150 document out for public review and comment

Copies of agendas, presentations and summaries for the CAC meetings are provided in Appendix E.2.

9.3 Public Workshops and Hearing

Members of the public who have an interest in the Study had numerous opportunities to participate. The public was encouraged to stay informed regarding the Study's progress by visiting the Study's website, attending TAC and CAC meetings, participating in public workshops, attending the public hearing for the PTAA-proposed NCP amendment, and submitting comments on the documentation prior to PTAA submittal to the FAA.

The Study Team worked with PTAA to create and distribute press releases about the public meetings, inform media and elected officials about the public meetings, and develop documentation for each meeting. The Study Team worked with the PTAA to identify meeting locations, manage logistics, secure meeting space and assure that meeting spaces would be Americans with Disabilities Act (ADA) compliant.

The Study Team members as well as PTAA staff served as facilitators at various stations at the public workshops and answered questions from the public. As shown in Table 9-5, PTAA hosted two public workshops and one public hearing.

Table 9-5 Public Meetings
Source: HMMH, 2020

Meeting #	Date	Topics Covered
Workshop #1	6/27/2019	Workshop provided overview of the Part 150 process, the advisory committees and roles and responsibilities of all interested stakeholders
Workshop #2	12/8/2020	Workshop to present the results of the Part 150 Update and the draft document prior to submittal to the FAA
Hearing #1	12/8/2020	Hearing to provide an opportunity for the public to comment on the PTAA-proposed amendments to the PTI Noise Compatibility Program

All workshop materials, including copies of presentations, are provided in Appendix F.

Public comments could be submitted in writing at either of the public workshops or through the project website anytime throughout the project duration. Public comments are provided in Appendix G.

9.4 Project Newsletters

The Study Team prepared two newsletters, which were distributed in electronic format to TAC and CAC members, community representatives, elected officials, and other interested stakeholders. The first newsletter, announcing the study and publicizing the time and place for the first public workshop, was also mailed to 12,000 households within a three-mile radius of the airport. The newsletter was also distributed electronically to residents in neighborhoods surrounding the airport, publicized on the Study website and on the websites of participating jurisdictions. The email addresses were provided by the PTAA and CAC members. The second newsletter provided the results of the study and publicized the Public Workshop and Hearing. The second newsletter was posted on the website and distributed electronically. Copies of the newsletters are provided in Appendix F.1.

9.5 Project Website

The PTI Part 150 Study website is found at https://ptipart150update.com/. All Study related information and resources are posted on this site. Throughout the project, interested parties could submit comments through the website or request to join the project mailing list. Additional information on the PTI Part 150 Study website can be found in Appendix F.2