14 CFR Part 150 Noise Compatibility Program Study Update

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

Volume 1 of 2

PRESENTED BY
Landrum & Brown, Incorporated

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CHARLOTTE DOUGLAS®
INTERNATIONAL AIRPORT

August 5, 2024

Peggy Kelley
Federal Aviation Administration
Memphis Airports District Office
2600 Thousand Oaks Boulevard, Suite 2250
Memphis, TN 38118

Dear Mrs. Kelley,

Enclosed please find one (1) copy of the Draft Part 150 Study Update document for the update to the Noise Exposure Maps (NEMs) and Noise Compatibility Program (NCP) for the Charlotte Douglas International Airport (CLT). Copies of the full-size Draft Noise Exposure Maps (NEMs) and supplemental graphics are included in a pocket in the back of Volume 2 of the enclosed draft document.

The Draft NEMs include the Existing (2023) NEM and Future (2028) NEM/NCP, which are an update to NEMs previously found in compliance by FAA. As stated in this document, the Existing (2023) NEM is based on data for a timeframe other than the year of submission. Comparison of the Existing (2023) NEM against current conditions demonstrates the airport layout, runway use percentages, flight tracks, general aircraft mix, operational data, and noncompatible land uses represent current conditions. The Future (2028) NEM/NCP is based on reasonable forecasts and planning assumptions developed for the airport. Furthermore, several existing NCP measures have been recommended for removal or have been modified, and new noise abatement, land use compatibility, and land use mitigation measures have also been recommended in the 2024 NCP that will require FAA approval. As such, the Future (2028) NEM/NCP is reflective of the forecast operating conditions for 2028 with the implementation of the 2024 NCP.

A notification of availability of this document and public hearing opportunity will be published in local newspapers. Public Information Meetings/Public Hearings are scheduled to be held on Wednesday, September 18, 2024 from 6:00 p.m. to 8:00 p.m. at Goodwill Opportunity Campus, 5301 Wilkinson Blvd, Charlotte, NC 2820; and on Thursday, September 19, 2024, from 6:00 p.m. to 8:00 p.m. at Embassy Suites by Hilton Charlotte, 4800 South Tryon Street, Charlotte, NC 28217.

Sincerely,

Jack Christine

PO Box 19066
Charlotte, NC 28219
P. 704.359.4000
cltairport.com

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STATEMENT OF CERTIFICATION AND PUBLIC NOTIFICATION

The Existing (2023) and Future (2028) Noise Exposure Maps (NEMs); the Noise Compatibility Program (NCP); and accompanying documentation for the Charlotte Douglas International Airport, are submitted in accordance with 14 CFR Part 150. To the best of my knowledge and belief, the NEMs were prepared with the best available information and are hereby certified as true, complete, and representative of the existing and future noise levels, under penalty of 18 U.S.C. 1001.

The proposed NCP was prepared in consultation with local public and planning agencies whose area or any portion of whose area of jurisdiction is within the 65 Day-Night Average Sound Level (DNL) contour depicted on the NEM and might be affected by any recommended measures. The consultation also included Federal and local officials having oversight responsibility and regular aeronautic users of the Airport. The proposed NCP includes recommended measures by the City of Charlotte and not by a consultant or other third party.

Interested persons have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft NEMs, descriptions of the forecast of aircraft operations, the formulation and adequacy of the NCP, and the supporting documentation.

_______________________________________ Date ____________________

Marcus D. Jones
City Manager
City of Charlotte

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Noise Exposure Map (NEM) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
I. Submitting And Identifying The NEM:		
A. Submission is properly identified:		
1. 14 C.F.R. Part 150 NEM?	No	N/A
2. NEM and NCP together?	Yes	Letter of Transmittal
3. Revision to NEMs FAA previously determined to be in compliance with Part 150?	Yes	Letter of Transmittal
B. Airport and Airport Operator's name are identified?	Yes	Letter of Transmittal, Chapter 1, page 1-1
C. NCP is transmitted by airport operator's dated cover letter, describing it as a Part 150 submittal and requesting appropriate FAA determination?	Yes	Letter of Transmittal
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?	Yes	Chapter 1 (pages 1-4 to 1-6), and Appendix F, *Public Involvement*
B. Identification of consulted parties:		
1. Are the consulted parties identified?	Yes	Chapter 1 (pages 1-4 to 1-6), and Appendix F
2. Do they include all those required by 150.21(b) and A150.105(a)?	Yes	Chapter 1 (pages 1-4 to 1-6), and Appendix F
3. Agencies in 2., above, correspond to those indicated on the NEM?	Yes	Chapter 1 (pages 1-4 to 1-6), and Appendix F
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)?	Yes	Sponsor's Certification and Appendix F
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?	Yes (Ongoing)	Appendix F will include all comments received on the Draft Part 150, as well as responses to those comments.

Noise Exposure Map (NEM) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
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)?	Yes	Existing (2023) Noise Exposure Map and Future (2028) Noise Exposure Map
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?	No	Letter of Transmittal
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?	No	Letter of Transmittal
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?	Yes	Chapter 3, page 3-1; Chapter 3, page 3-5; Appendix C, page C-39; and Appendix G
C. If the NEM and NCP are submitted together:		
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?	Yes	Letter of Transmittal, Chapter 4, page 4-99
2. If the forecast year map is based on program implementation:		
a. are the specific program measures that are reflected on the map identified?	Yes	Chapter 4, pages 4-66 to 4-98
b. does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?	Yes	Chapter 4, pages 4-66 to 4-98

Noise Exposure Map (NEM) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
3. If the forecast year NEM does not model program implementation, the airport operator must either submit a revised forecast NEM showing program implementation conditions [B150.3(b), 150.35(f)] or the sponsor must demonstrate the adopted forecast year NEM with approved NCP measures would not change by plus/minus 1.5 DNL? (150.21(d))	N/A	N/A
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?	Yes	The official Existing (2023) Noise Exposure Map, Future (2028) Noise Exposure Map, and supporting flight track maps are located in the back pocket of Volume 2 of this document.
B. Is the quality of the graphics such that required information is clear and readable?	Yes	The official Existing (2023) Noise Exposure Map, Future (2028) Noise Exposure Map, and supporting flight track maps are located in the back pocket of Volume 2 of this document.
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?	Yes	
a. Airport boundaries	Yes	
b. Runway configurations with runway end numbers	Yes	
2. Does the depiction of the off-airport data include?		
a. A land use base map depicting streets and other identifiable geographic features	Yes	
b. The area within the DNL 65 dB (or beyond, at local discretion)	Yes	

Noise Exposure Map (NEM) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	**Page No. / Other Reference**
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)	Yes	
D. 1. Continuous contours for at least the DNL 65, 70, and 75 dB?	Yes	
2. Has the local land use jurisdiction(s) adopted a lower local standard and if so, has the sponsor depicted this on the NEMs?	No	N/A
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?	Yes	Letter of Transmittal
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?	Yes	Appendix C, Exhibits C-11 to C-17, and Exhibits C-23 to C-28
F. Locations of any noise monitoring sites (these may be on supplemental graphics which must use the same land use base map as the official NEMs)	Yes	Appendix B, Exhibit B-1
G. Noncompatible land use identification:		
1. Are noncompatible land uses within at least the DNL 65 dB noise contour depicted on the maps?	Yes	Existing (2023) Noise Exposure Map and Future (2028) Noise Exposure Map; Appendix D
2. Are noise sensitive public buildings and historic properties identified?	Yes	Appendix D, Exhibit D-3
3. Are the noncompatible uses and noise sensitive public buildings readily identifiable and explained on the map legend?	Yes	Existing (2023) Noise Exposure Map and Future (2028) Noise Exposure Map
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	Yes	Existing (2023) Noise Exposure Map and Future (2028) Noise Exposure Map; Chapter 3

Noise Exposure Map (NEM) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
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?	Yes	Chapter 3, Appendix C
2. Are the underlying technical data and planning assumptions reasonable?	Yes	Chapter 3, Appendix C
B. Calculation of Noise Contours:		
1. Is the methodology indicated?		
a. Is it FAA approved?	Yes	Chapter 3, Appendix C
b. Was the same model used for both maps?	Yes	Chapter 3, Appendix C
c. Has AEE approval been obtained for use of a model other than those which have previous blanket FAA approval?	N/A	N/A
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?	No	N/A
b. If so, does this have written approval from AEE, and is that written approval included in the submitted document?	N/A	N/A
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?	Yes	Appendix B, page B-1
4. For noise contours below DNL 65 dB, does the supporting documentation include an explanation of local reasons?	N/A	N/A
C. Noncompatible Land Use Identification:		
1. Does the narrative 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?	Yes	Chapter 3, page 3-4; Chapter 4, page 4-99

Noise Exposure Map (NEM) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
2. Does the documentation indicate whether the airport operator used Table 1 of Part 150?	Yes	Appendix A
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?	N/A	N/A
(2) Does the narrative include the airport operator's complete substitution for Table 1?	N/A	N/A
3. Does the narrative include information on self-generated or ambient noise where compatible or noncompatible land use identifications consider non-airport and non-aircraft sources?	N/A	N/A
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?	N/A	N/A
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?	Yes	Chapter 3, Section 3.2, and Chapter 4, Sections 4.4.2 and 4.4.3
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?	Yes	Sponsor's Statement of Certification and Public Notification; Existing (2023) Noise Exposure Map and Future (2028) Noise Exposure Map
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?	Yes	Sponsor's Statement of Certification and Public Notification

Noise Compatibility Program (NCP) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
I. SUBMITTING AND IDENTIFYING THE NCP:		
A. Submission is properly identified:		
1. 14 CFR Part 150 NCP?	Yes	Letter of Transmittal
2. NEM and NCP together?	Yes	Letter of Transmittal
3. Program revision? (To what extent has it been revised?)	Yes	Letter of Transmittal
B. Airport and Airport sponsor's name are identified?	Yes	Letter of Transmittal, Chapter 1, page 1-1
C. NCP transmitted by airport sponsor's cover letter?	Yes	Letter of Transmittal
II. CONSULTATION (INCLUDING PUBLIC PARTICIPATION): [150.23]		
A. Documentation includes narrative of public participation and consultation process?	Yes	Chapter 1, pages 1-4 to 1-6, and Appendix F
B. Identification of consulted parties:		
1. All parties in 150.23(c) consulted?	Yes	Chapter 1, pages 1-4 to 1-6, and Appendix F
2. Public and planning agencies identified?	Yes	Chapter 1, pages 1-4 to 1-6, and Appendix F
3. Agencies in 2., above, correspond to those affected by the NEM noise contours?	Yes	Chapter 1, pages 1-4 to 1-6, and Appendix F
C. Satisfies 150.23(d) requirements by:		
1. Documentation shows active and direct participation of parties in B., above?	Yes	Chapter 1, pages 1-4 to 1-6, and Appendix F
2. Active and direct participation of general public and opportunity to submit their views, data, and comments on the formulation and adequacy of the NCP?	Yes	Chapter 1, pages 1-4 to 1-6, and Appendix F
3. Participation was prior to and during development of NCP and prior to submittal to FAA?	Yes	Chapter 1, pages 1-4 to 1-6, and Appendix F
4. Indicates adequate opportunity afforded to all consulted parties to submit views, data, etc.?	Yes	Chapter 1, pages 1-4 to 1-6, and Appendix F
D. Evidence is included there was notice and opportunity for a public hearing on the final NCP?	Pending	Appendix F will include a copy of the public hearing notice.

Noise Compatibility Program (NCP) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
E. Documentation of comments:		
1. Includes summary of public hearing comments, if hearing was held?	Pending	Appendix F will include any public comments received on the Draft Part 150 Study Update.
2. Includes copy of all written material submitted to operator?	Pending	Appendix F
3. Includes operator's responses / disposition of written and verbal comments?	Pending	Appendix F will contain the responses to comments received on the Draft Part 150 Study Update.
F. Is there written evidence from the appropriate office within the FAA that the sponsor received informal agreement to carry out proposed flight procedures?	Pending	Pending
III. NOISE EXPOSURE MAPS: [150.23, B150.3; 150.35(f)] ***(This section of the checklist is not a substitute for the Noise Exposure Map checklist. It deals with maps in the context of the Noise Compatibility Program submission.)***		
A. Inclusion of NEMs and supporting documentation:		
1. Map documentation either included or incorporated by reference?	Yes	Existing (2023) Noise Exposure Map and Future (2028) Noise Exposure Map
2. Maps previously found in compliance by FAA?	Yes	Letter of Transmittal
3. FAA's compliance determination still valid?	Yes	Letter of Transmittal
4. Does 180-day period have to wait for map compliance finding?	Yes	None
B. Revised NEMs submitted with program: (Review using NEM checklist if map revisions included in NCP submittal. Report the applicable findings in the spaces below after a full review using the NEM checklist and narrative.)		
1. Revised NEMs included with program?	Yes	Existing (2023) Noise Exposure Map and Future (2028) Noise Exposure Map;

Noise Compatibility Program (NCP) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
2. Has airport sponsor requested in writing that FAA make a determination on the NEM(s), showing NCP measures in place, when NCP approval is made?	Yes	Letter of Transmittal
C. If program analysis uses noise modeling:		
1. AEDT or FAA-approved equivalent?	Yes	Appendix C
2. Monitoring in accordance with A150.5?	Yes	Appendix B
D. One existing condition and one forecast-year map clearly identified as the official NEMs?	Yes	Existing (2023) Noise Exposure Map and Future (2028) Noise Exposure Map
IV. CONSIDERATION OF ALTERNATIVES: [B150.7, 150.23(e)]		
A. At a minimum, were the alternatives below considered, or if they were rejected was the reason for rejection reasonable and based on accurate technical information and local circumstances?		
1. Land acquisition and interests therein, including air rights, easements, and development rights?	Yes	Chapter 4 and Appendix E
2. Barriers, acoustical shielding, public building soundproofing	Yes	Chapter 4 and Appendix E
3. Preferential runway system	Yes	Chapter 4 and Appendix E
4. Voluntary flight procedures	Yes	Chapter 4 and Appendix E
5. Restrictions described in B150.7 (taking into account Part 161 requirements)		
a. deny use based on Federal standards	No	N/A
b. capacity limits based on noisiness	No	N/A
c. noise abatement takeoff/approach procedures	Yes	Chapter 4 and Appendix E
d. landing fees based on noise or time of day	No	N/A
e. nighttime restrictions	No	N/A
6. Other actions with beneficial impact not listed in the regulation	Yes	Chapter 4 and Appendix E
7. Other FAA recommendations	No	N/A
B. Responsible implementing authority identified for each considered alternative?	Yes	Chapter 4
C. Analysis of alternative measures:		
1. Measures clearly described?	Yes	Chapter 4 and Appendix E

Noise Compatibility Program (NCP) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
2. Measures adequately analyzed?	Yes	Chapter 4 and Appendix E
3. Adequate reasoning for rejecting alternatives?	Yes	Chapter 4 and Appendix E
D. Other actions recommended by the FAA: As the FAA staff person familiar with the local airport circumstances, determine whether other actions should be added? (List separately, or on back, actions and describe discussions with airport sponsor to have them included prior to the start of the 180-day cycle. New measures recommended by the airport sponsor must meet applicable public participation and consultation with officials before they can be submitted to the FAA for action. See E., below.)	No	N/A
V. ALTERNATIVES RECOMMENDED FOR IMPLEMENTATION: [150.23(e), B150.7(c); 150.35(b), B150.5]		
A. Document clearly indicates:		
1. Alternatives that are recommended for implementation?	Yes	Chapter 4 and Appendix E
2. Final recommendations are airport sponsor’s, not those of consultant or third party?	Yes	Letter of Transmittal
B. Do all program recommendations:		
1. Relate directly or indirectly to reduction of noise and noncompatible land uses?	Yes	Chapter 4 and Appendix E
2. Contain description of each measure’s relative contribution to overall effectiveness of program?	Yes	Chapter 4 and Appendix E
3. Noise/land use benefits quantified to extent possible to be quantified?	Yes	Chapter 4 and Appendix E
4. Does each alternative include actual/anticipated effect on reducing noise exposure within noncompatible area shown on NEM?	Yes	Chapter 4 and Appendix E
5. Effects based on relevant and reasonable expressed assumptions?	Yes	Chapter 4 and Appendix E
6. Does the document have adequate supporting data that the measure contributes to noise/land use compatibility?	Yes	Chapter 4 and Appendix E

Noise Compatibility Program (NCP) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

	Yes / No / N/A	Page No. / Other Reference
C. Analysis appears to support program standards set forth in 150.35(b) and B150.5?	Yes	Chapter 4 and Appendix E
D. When use restrictions are recommended for approval by the FAA:		
1. Does (or could) the restriction affect Stage 2 or Stage 3 aircraft operations (regardless of whether they presently operate at the airport)? (If the restriction affects Stage 2 helicopters, Part 161 also applies.)	N/A	N/A
2. If the answer to D.1 is yes, has the airport sponsor completed the Part 161 process and received FAA Part 161 approval for a restriction affecting Stage 3 aircraft? Is the FAA's approval documented? For restrictions affecting only Stage 2 aircraft, has the airport sponsor successfully completed the Stage 2 analysis and consultation process required by Part 161 and met the regulatory requirements, and is there evidenced by letter from FAA stating this fact?	N/A	N/A
3. Are non-restrictive alternatives with potentially significant noise/compatible land use benefits thoroughly analyzed so that appropriate comparisons and conclusions among all alternatives can be made?	N/A	N/A
4. Did the FAA regional or ADO reviewer coordinate the use restriction with APP-400 prior to making determination on start of 180-days?	N/A	N/A
E. Do the following also meet Part 150 analytical standards:		
1. Recommendations that continue existing practices and that are submitted for FAA re-approval?	Yes	Chapter 4 and Appendix E
2. New recommendations or changes proposed at end of Part 150 process?	Yes	Chapter 4 and Appendix E
F. Documentation indicates how recommendations may change previously adopted noise compatibility plans, programs, or measures?	Yes	Chapter 4 and Appendix E

Noise Compatibility Program (NCP) Checklist

AIRPORT NAME: Charlotte Douglas International Airport REVIEWER: ________________

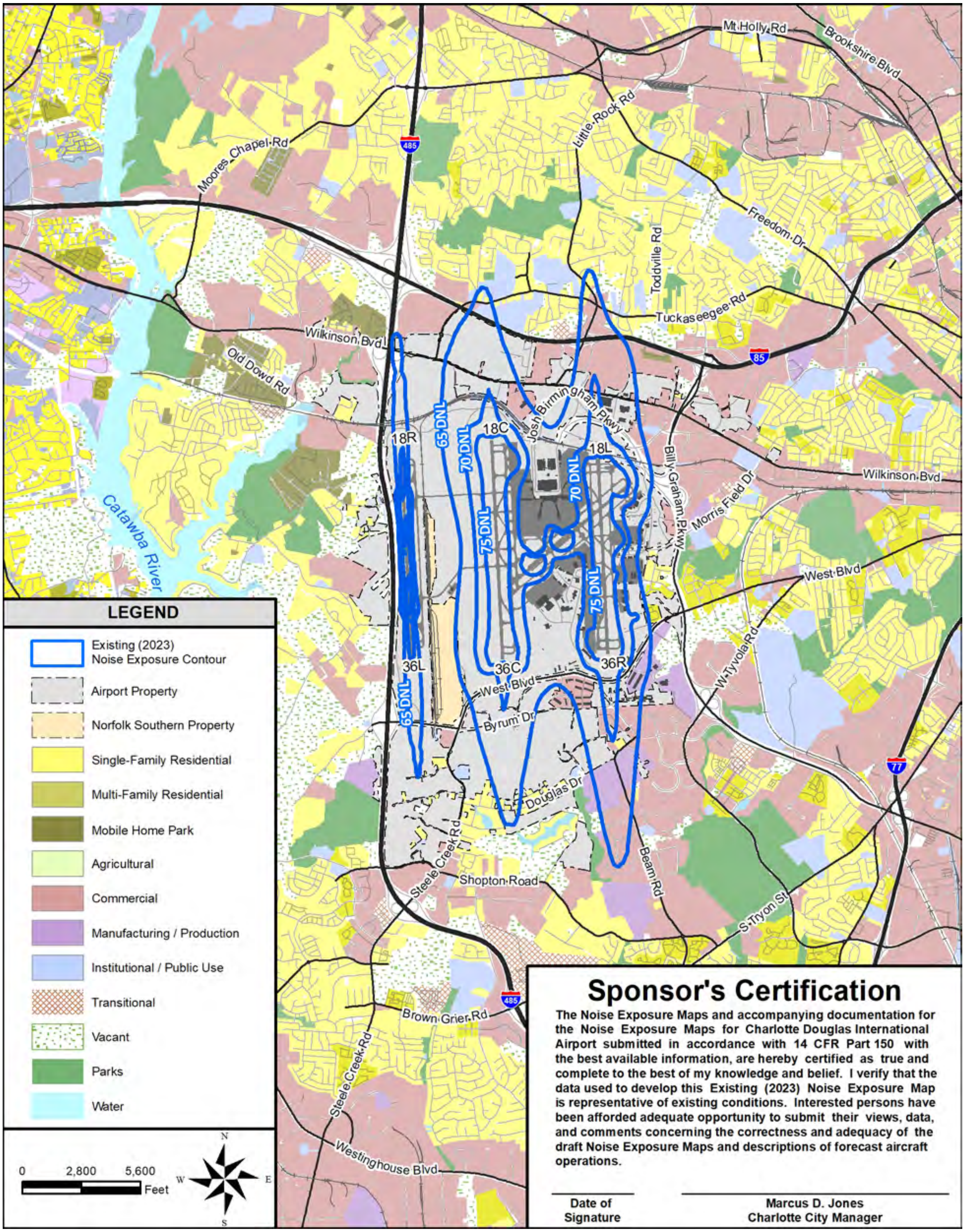
	Yes / No / N/A	Page No. / Other Reference
G. Documentation also:		
1. Identifies agencies that are responsible for implementing each recommendation?	Yes	Chapter 4
2. Indicates whether those agencies have agreed to implement?	Yes	Chapter 4
3. Indicates essential government actions necessary to implement recommendations.	Yes	Chapter 4
H. Timeframe:		
1. Includes agreed-upon schedule to implement alternatives?	Yes	Chapter 4, page 4-102
2. Indicates period covered by the program?	Yes	Chapter 4, page 4-102
I. Funding/Costs:		
1. Includes costs to implement alternatives?	Yes	Chapter 4, page 4-101
2. Includes anticipated funding sources?	Yes	Chapter 4, Section 4.4.3
VI. PROGRAM REVISION: [150.23(e)(9)] Supporting documentation includes provision for revision?	Yes	Chapter 4

OFFICIAL NOISE EXPOSURE MAPS

The following pages contain small-scale representations of the official NEMs for Existing (2023) and Future (2028) conditions and supporting maps for the Charlotte Douglas International Airport. The official NEMs and supplemental maps, at a scale of 1 inch equals 2,000 feet, are included at the back of this document.

The Existing (2023) NEM is based on data developed between 2021 and 2023. Based on the latest activity data for the Airport, the Existing (2023) NEM continues to be a reasonable representation of current conditions. The Future (2028) NEM/NCP is based on an FAA-approved forecast and planning assumptions that were prepared for this Part 150 Study, is reflective of the implementation of the NCP, and continues to be a reasonable representation of noise conditions in the future.

Exhibit NEM-1 Existing (2023) Noise Exposure Map



Source: Landrum & Brown, 2024.

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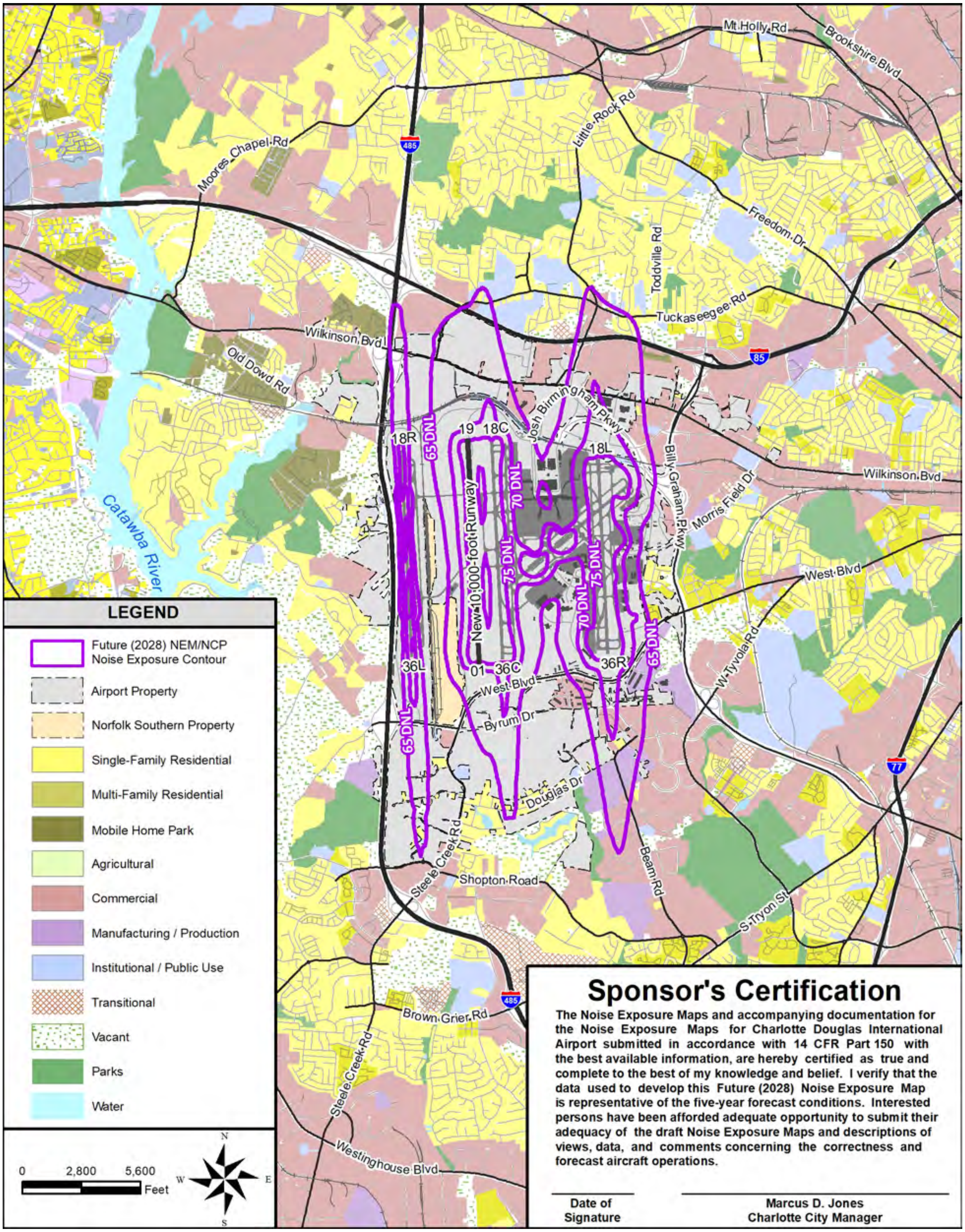
Exhibit NEM-2 Future (2028) Noise Exposure Map/Noise Compatibility Program



Source: Landrum & Brown, 2024.

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Appendix E Noise Abatement Alternatives

<u>VOLUME 2</u>

Appendix F Public Involvement

Appendix G Forecast

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Official Noise Exposure Maps
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Future (2028) Noise Exposure Map *Back of Document*
Supporting Documentation
Existing North Flow Flight Tracks *Back of Document*
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Glossary

GLOSSARY

Airport Improvement Program (AIP) – A Federal funding program for airport improvements. AIP is periodically reauthorized by Congress with funding appropriated from the Aviation Trust Fund. Proceeds to the Trust Fund are derived from excise taxes on airline tickets, aviation fuel, etc.

Airport Layout Plan (ALP) – A scaled drawing of existing and proposed land and facilities necessary for the operation and development of the airport. The ALP shows boundaries and proposed additions to all areas owned or controlled by the airport operator for airport purposes, the location and nature of existing and proposed airport facilities and structures, and the location on the airport of existing and proposed non-aviation areas and improvements thereon.

Airport operations – Landings (arrivals) and takeoffs (departures) from an airport.

Air Traffic Control Tower (ATCT) – The airport traffic control facility located on an airport that is responsible for traffic separation within the immediate vicinity of the airport and on the surface of the airport to provide for safe and efficient flow of aircraft.

Air Traffic Control (ATC) – A service operated to promote the safe, orderly, and expeditious flow of air traffic.

Ambient noise – The total sum of noise from all sources in a given place and time.

Attenuation – Acoustical phenomenon whereby sound energy is reduced between the noise source and the receiver. This energy loss can be attributed to atmospheric conditions, terrain, vegetation, other natural features, and man-made features (e.g., sound insulation).

Aviation Environmental Design Tool (AEDT) – FAA developed software system that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences.

A-weighted sound (dBA) – A system for measuring sound energy that is designed to represent the response of the human ear to sound. Energy at frequencies more readily detected by the human ear is more heavily weighted in the measurement, while frequencies less well detected are assigned lower weights. A-weighted sound measurements are commonly used in studies where the human response to sound is the object of the analysis.

Baseline Condition – The existing condition or conditions prior to future development or the enactment of additional noise abatement procedures, which serve as a foundation for analysis.

Commuter aircraft – Commuters are commercial operators that provide regularly scheduled passenger or cargo service with aircraft seating less than 60 passengers. A typical commuter flight operates over a trip distance of less than 300 miles.

Connecting passenger – An airline passenger who transfers from an arriving aircraft to a departing aircraft in order to reach his or her ultimate destination.

Crosswind leg – A flight path at right angles to the approach runway end off of its upwind end.

Day-night average sound level (DNL) – A noise measure used to describe the average sound level over a 24-hour period, typically an average day over the course of a year. In computing DNL, an extra weight of 10 decibels is assigned to noise occurring between the hours of 10:00 p.m. and 7:00 a.m. to account for increased annoyance when ambient noise levels are lower and people are trying to sleep. DNL may be determined for individual locations or expressed in noise contours.

Decibel (dB) – Sound is measured by its pressure or energy in terms of decibels. The decibel scale is logarithmic. A ten-decibel increase in sound is equal to a tenfold increase in sound energy.

DGPS antenna – Differential Global Positioning System is a way to correct the various inaccuracies in the GPS system by placing a reference antenna on a point that has been accurately surveyed. This antenna receives the same GPS signals as an aircraft but corrects the GPS signal for any inaccuracies.

Displaced Threshold – A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold may be available for takeoffs in both directions and landings from the opposite direction.

Distance measuring equipment (DME) – A flight instrument that measures the line-of-sight distance of an aircraft from a navigational radio station in nautical miles.

Easement – The legal right of one party to use part of the rights of a piece of real estate belonging to another party. This may include, but is not limited to, the right of passage over, on or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity.

Enplanements – The number of passengers boarding an aircraft at an airport. Does not include arriving or through passengers.

Environmental Assessment (EA) – A concise document that assesses the environmental impacts of a proposed Federal Action. It discusses the need for, and environmental impacts of, the proposed action and alternatives. An environmental assessment should provide sufficient evidence and analysis for a Federal determination whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). Public participation and consultation with other Federal, state, and local agencies is a cornerstone of the EA process.

Environmental Impact Statement (EIS) – An EIS is a document that provides a discussion of the significant environmental impacts which would occur as a result of a proposed project, and informs decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts. Public participation and consultation with other Federal, state, and local agencies is a cornerstone of the EIS process.

Equivalent sound level (Leq) – The average A-weighted sound level over any specified time period.

Federal Aviation Administration (FAA) – The FAA is the Federal agency responsible for insuring the safe and efficient use of the nation's airspace, for fostering civil aeronautics and air commerce, and for supporting the requirements of national defense. The activities required to carry out these responsibilities include: safety regulations; airspace management and the establishment, operation, and maintenance of a system of air traffic control and navigation facilities; research and development in support of the fostering of a national system of airports, promulgation of standards and specifications for civil airports, and administration of Federal grants-in-aid for developing public airports; various joint and cooperative activities with the Department of Defense; and technical assistance (under State Department auspices) to other countries.

Federal Aviation Regulations (FAR) – The body of Federal regulations relating to aviation. Published as Title 14 of the Code of Federal Regulations.

Final approach – A flight path that follows the extended runway centerline. It usually extends from the base leg to the runway.

Finding of No Significant Impact (FONSI) – If, following the preparation of an environmental assessment, the Federal agency determines a proposed project will not result in any significant environmental impact, a finding of no significant impact (FONSI) is issued by the Federal Agency. A FONSI is a document briefly explaining the reasons why an action will not have a significant effect on the human environment and for which an EIS, therefore, is not necessary.

Fixed-base operator (FBO) – A business located on the airport that provides services such as hangar space, fuel, flight training, repair, and maintenance to airport users.

Flight track utilization – The use of established routes for arrival and departure by aircraft to and from the runways at the airport.

FMS/GPS – Flight Management System/Global Positioning System equipment onboard an aircraft takes advantage of various radio navigation and/or GPS routes to guide the aircraft.

Geographic Information Systems (GIS) – An information system that is designed for storing, integrating, manipulating, analyzing, and displaying data referenced by spatial or geographic coordinates.

Global Positioning System (GPS) – A system of 24 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude. The accuracy of the system can be further refined by using a ground receiver at a known location to calculate the error in the satellite range data. This is known as differential GPS (DGPS).

Hub – An airport that services airlines that have hubbing operations.

Hubbing – A method of airline scheduling that times the arrival and departure of several aircraft in a close period of time in order to allow the transfer of passengers between different flights of the same airline in order to reach their ultimate destination. Several airlines may conduct hubbing operations at an airport.

Instrument Landing System (ILS) – An electronic system installed at some airports which helps to guide pilots to runways for landing during periods of limited visibility or adverse weather.

Instrument meteorological conditions (IMC) – Weather conditions expressed in terms of visibility, distance from clouds, and cloud ceilings during which all aircraft are required to operate using instrument flight rules (IFR).

Land use compatibility – The ability of land uses surrounding the airport to coexist with airport-related activities with minimum conflict.

Landing and takeoff (LTO) cycle – The time that an aircraft is in operation at or near an airport. An LTO cycle begins when an aircraft starts its final approach (arrival) and ends after the aircraft has made its climb-out (departure).

Ldn – See **DNL**. Ldn is used in place of DNL in mathematical equations only.

Leq – Equivalent Sound Level. The steady A-weighted sound level over any specified period of time (not necessarily 24 hours) that has the same acoustic energy as the fluctuating noise during that period (with no consideration of nighttime weighting). It is a measure of cumulative acoustical energy. Because the time interval may vary, it should be specified by a subscript (such as Leq_8 for an 8-hour exposure to noise) or be clearly understood from the context.

Local passenger – A passenger who either enters or exits a metropolitan area on flights serviced by the area's airport. A local passenger is the opposite of a connecting passenger.

Localizer – The component of an ILS which provides lateral course guidance to the runway.

Loudness – The subjective assessment of the intensity of sound.

Missed approach – A prescribed procedure to be followed by aircraft that cannot complete an attempted landing at an airport.

Narrow-body aircraft – A commercial passenger jet having a single aisle and maximum of three seats on each side of the aisle. Common narrow-body aircraft include A320, B717, B727, B737, B757, DC9, MD80, and MD90.

National Environmental Policy Act of 1969 (NEPA) – The original legislation establishing the environmental review process for proposed Federal actions.

Nautical mile – A measure of distance equal to one minute of arc on the earth's surface (6,076.1 feet or 1,852 meters).

Noise abatement – A measure or action that minimizes the amount of impact of noise on the environs of an airport. Noise abatement measures include aircraft operating procedures and use or disuse of certain runways or flight tracks.

Noise berm – A manmade soil structure designed to interrupt the direct transmission of noise from a source to a noise-sensitive area.

Noise contour – A map feature representing average annual noise levels summarized by lines connecting points of equal noise exposure.

Noise Compatibility Program (NCP) – Program developed in accordance with FAR Part 150 guidance that contains provisions for the abatement of aircraft noise through aircraft operating procedures, air traffic control procedures, or airport facility modifications. It also includes provisions for land use compatibility planning and may include actions to mitigate the impact of noise on incompatible land uses and recommendations for amending local land use controls to affect future land uses and development. The program must contain provisions for updating and periodic revision.

Noise Compatibility Study – The process, methods, and procedures provided in the FAR Part 150 guidance to develop a Noise Compatibility Program, including the development of noise exposure maps, a noise compatibility program, and public participation.

Noise Exposure Map (NEM) – A geographic depiction of an airport, its noise contours for existing conditions and as forecast for five years in the future, and surrounding area developed in accordance with FAR Part 150 guidance. Documentation of the Noise Exposure Maps must include airport operating characteristics for existing conditions and all reasonable and foreseeable airport operating characteristics for the future condition.

Operation – A takeoff or landing by an aircraft.

Positive control – The separation of all air traffic within designated airspace as directed by air traffic controllers.

Primary Runway – The runway on which the majority of operations take place.

Profile – The position of the aircraft during an approach or departure in terms of altitude above the runway and distance from the runway end.

Propagation – Sound propagation is the spreading or radiating of sound energy from the noise source. It usually involves a reduction in sound energy with increased distance from the source. Atmospheric conditions, terrain, natural objects, and manmade objects affect sound propagation.

Run-up – A routine procedure for testing aircraft systems by running one or more engines at a high power setting. Engine run-ups are normally conducted by airline maintenance personnel checking an engine or other on board systems following maintenance.

Runway Protection Zone (RPZ) – An area, trapezoidal in shape and centered about the extended runway centerline, designated to enhance the safety of aircraft operations. It begins 200 feet (60 M) beyond the end of the area usable for takeoff or landing. The RPZ dimensions are functions of the aircraft, type of operation and visibility minimums. (Formerly known as the clear zone).

Runway threshold – The beginning of that portion of the runway usable for landing.

Runway use program – A noise abatement runway selection plan crafted to further noise abatement efforts for communities around airports. A runway selection plan is developed into a runway use program. It typically applies to all turbojet aircraft 12,500 pounds or heavier. Turbojet aircraft less than 12,500 pounds are included only if the airport proprietor determines that the aircraft creates a noise problem. These programs are coordinated with the FAA in accordance with FAA Order 8400.9, *National Safety and Operational Criteria for Runway Use Programs*, and are administered as either “formal” or “informal” programs.

> **Formal** – An approved runway use program outlined in a Letter of Understanding between the FAA–Flight Standards, FAA–Air Traffic Service, the airport proprietor, and the users. It is mandatory for aircraft operators and pilots as provided for in FAR Section 91.87.
>
> **Informal** – An approved runway use program that does not require a Letter of Understanding. Participation in the program by aircraft operators and pilots is voluntary.

Single event – One noise event. For many kinds of analysis, the sound from single events is expressed using the Sound Exposure Level (SEL) metric.

Sound – Sound is the result of vibration in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward from the source in the same way as ripples do on water after a stone is thrown into it. The result of the movement is fluctuation in the normal atmospheric pressure or sound waves.

Sound exposure level (SEL) – A standardized measure of a single sound event, expressed in A-weighted decibels, that takes into account all sound above a specified threshold set at least 10 decibels below the maximum level. All sound energy in the event is integrated over one second.

Through passenger – An airline passenger who arrives at an airport and departs without deplaning the aircraft.

Time Above (TA) – The amount of time that sound exceeds a given decibel level during a 24-hour period (e.g., time in minutes that the sound level is above 75 dBA).

Very High Frequency Omnidirectional Range (VOR) Station – A ground-based radio navigation aid transmitting signals in all directions. A VOR provides azimuth guidance to pilots by reception of electronic signals.

Visual approach – An approach conducted on an IFR flight plan, which authorizes the pilot to proceed visually and clear of clouds to the airport.

Visual flight rules (VFR) – Rules and procedures specified in 14 CFR 91 for aircraft operations under visual conditions. Aircraft operations under VFR are not generally under positive control by ATC. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate a type of flight plan.

Visual meteorological conditions (VMC) – Weather conditions expressed in terms of visibility, distance from cloud, and cloud ceiling equal to or greater than those specified in 14 CFR 91.155 for aircraft operations under Visual Flight Rules (VFR).

Wide-body aircraft - A commercial jet with a wingspan generally greater than 155 feet and, in passenger configuration, having two aisles with 8 to 11 seats across in a row. Common wide-body aircraft include the A300, A310, B747, B767, B777, DC-10, and MD-11.

Yearly Day-Night Average Sound Level – see DNL

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Chapter 1

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Chapter 1 Introduction and Background

The City of Charlotte Aviation Department (Airport Sponsor) is updating the Part 150 Noise Compatibility Study for the Charlotte Douglas International Airport (Airport or CLT) in accordance with the requirements defined in Title 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*. The purpose for conducting an update to the Noise Compatibility Study is to identify noise noncompatible land uses surrounding an airport, and to recommend measures to both mitigate existing noncompatible land uses and to prevent future noncompatible land uses. This chapter provides an introduction and background under which the Part 150 Noise Compatibility Study Update was prepared.

1.1 CLT Noise Compatibility History

The City of Charlotte began the original Part 150 Noise Compatibility Study in 1987, which included Noise Exposure Maps (NEMs) and a Noise Compatibility Program (NCP). Both the NEMs and NCP were approved in 1990, updated in 1996 and further amended in 1998. In 2015, the NEMs were updated to identify noise noncompatible land uses surrounding the Airport and to evaluate if the NCP should also be updated.[1] Based on the results of the 2015 NEM update, no updates to the NCP were determined to be necessary. As such, the currently approved Part 150 Noise Compatibility Program consists of the 2015 NEMs and the 1996 NCP (as amended in 1998).

In March 2022, the Federal Aviation Administration (FAA) issued a Finding of No Significant Impact and Record of Decision (FONSI/ROD) on the Capacity Enhancement Projects Environmental Assessment (Capacity EA) at CLT. The EA evaluated the construction of a new fourth parallel runway among other terminal and airfield capacity enhancement projects. As presented in the Capacity EA, the City of Charlotte has committed to conducting a Part 150 Noise Compatibility Study Update that would update the NEMs and NCP following the Capacity EA. As such, this Part 150 Study is aimed to identify noise noncompatible land uses and evaluate a variety of strategies to reduce noise in communities surrounding CLT given the airfield improvements that are currently under design and construction (decommissioning of Runway 5/23 and construction of the new fourth parallel runway) which are anticipated to be operational by 2028.

1.2 14 CFR Part 150 Process Summary

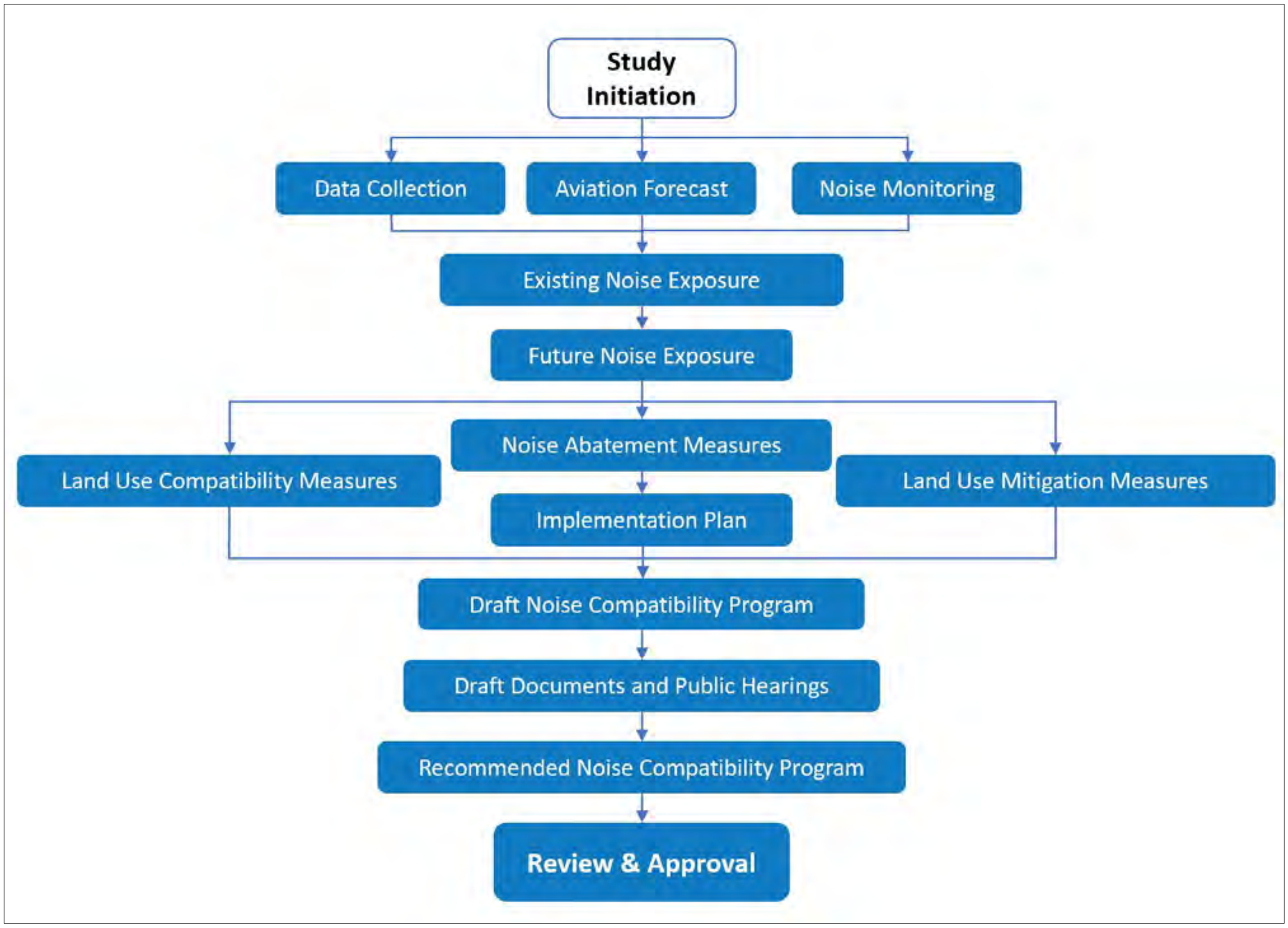
The Noise Compatibility Planning process, herein referred to as the Part 150 process, provides a structured approach for airport sponsors, airlines, pilots, neighboring communities, Federal, state, and local agencies, and other stakeholders to collaborate on efforts to reduce noncompatible land uses. Title 14 CFR Part 150 is the regulation that prescribes the procedures, standards, and methodology governing the development, submission, and review of airport NEMs and NCPs. Airport sponsors prepare two primary elements of the Part 150 Noise Compatibility Study, the NEMs and NCP. Once prepared, the airport sponsor and the FAA analyze the NEMs to identify noncompatible land uses, and prepare the NCP that proposes solutions to mitigate those uses. The Part 150 process concludes with an FAA Record of Approval (ROA) at which time steps may be undertaken to approve the NCP measures for implementation. See **Exhibit 1-1, *Part 150 Study Process***, for a detailed flowchart of the planning process consistent with 14 CFR Part 150.

Through 14 CFR Part 150, the FAA established regulations governing the public participation process for airports choosing to conduct a Part 150 Study. Public participation is required during the Part 150 Study process, which requires the airport sponsor to afford adequate opportunity for

[1] The 2015 NEMs include the Existing (2015) NEM and Future (2020) NEM.

airlines, pilots, neighboring communities, Federal, state, local agencies, and other stakeholders to submit their views, data, and comments on the development of the NEMs and NCP. Specifically, consultation is to be sought out by land use authorities and agencies that may have jurisdiction over any area depicted on the NEM that is within the Day-Night Average Sound Level (DNL) 65 dB and greater contours. Input from the general public includes those that have indicated their interest in the Part 150 Study or are located within the NEMs and may be affected by the outcome of the Part 150 Study.

Exhibit 1-1 Part 150 Study Process



While the decision to undertake Noise Compatibility Planning is typically voluntary on the part of the airport sponsor, the airport sponsor must comply with all applicable statutory and regulatory requirements of 14 CFR Part 150. As an encouragement to undertake the Part 150 process, an airport sponsor becomes eligible for Federal funding assistance from the Airport Improvement Program (AIP) for the implementation of the NCP if the regulations of 14 CFR Part 150 are followed and the NEMs and NCP measures are approved by the FAA.

1.3 Preparation of Noise Exposure Maps (NEMs)

The NEM component of a Part 150 Study provides local communities an opportunity to visualize aircraft noise exposure levels in order to make better informed decisions regarding proposed noise-sensitive development in the vicinity of an Airport. The NEMs present airport noise exposure contours for the existing condition and a forecast condition five years from the date of submission of the documentation for FAA review. This Part 150 Study Update will update the NEMs to reflect the current conditions and future conditions for the Airport.

The year representing the current conditions is 2023; as such, the current conditions are depicted in the Existing (2023) NEM. The data collection and analysis for this Part 150 Study Update began in 2021 and continued through 2022. The Existing (2023) NEM is based on data from April 2021 through March 2022, which was the most recent 12 months of data available at the time the noise modeling began for the purpose of this analysis. The development of the Existing (2023) NEM is described in Chapter 3, Section 3.1.

The year representing the future conditions is 2028 because it is five years from the existing conditions and is the anticipated opening year of the proposed new fourth parallel runway (herein referred to as Runway 01/19) among other terminal and airfield capacity enhancement projects. The future condition also assumes the growth as forecasted in the Aviation Activity Forecast in **Appendix G, *Forecast*.**[2] Additionally, the future conditions assumes the implementation of the updated NCP (see Section 1.4 for more information). The future conditions are depicted in the Future (2028) NEM/NCP as defined in Chapter 4, Section 4.4.2.

The noise contours are superimposed on a land use map to show areas of noncompatible land use, as defined in 14 CFR Part 150 and presented in **Appendix A, *Applicable Laws, Regulations, and Policies***. Chapters 3 and 4, and **Appendix C, *Noise Methodology***, contains detailed information on the inputs and methodology for preparing the noise exposure contours, including use of the DNL noise metric. The official NEMs are located at the front of this document with the NEM and NCP checklists.

1.4 Preparation of the Noise Compatibility Program (NCP)

The NCP component of a Part 150 Study includes provisions for the abatement of aircraft noise through aircraft operating procedures, air traffic control procedures, or airport facility modifications. It also includes provisions for land use compatibility planning and may include actions to mitigate the impact of noise on noncompatible land uses.

The FAA establishes procedures and criteria for evaluation of the NCP in 14 CFR Part 150. Two criteria are of particular importance: (1) the airport sponsor may not take any action that imposes an undue burden on interstate or foreign commerce; (2) nor may the operator unjustly discriminate between different categories of airport users. The FAA also reviews changes in flight procedures proposed for noise abatement for potential effects on flight safety, safe and efficient use of the navigable airspace, management and control of the national airspace and traffic control systems, security and national defense, and compliance with applicable laws and regulations. Because the FAA has the ultimate authority for air traffic control and flight procedures related to air traffic control requirements, any measures relating to these subjects that are recommended in an NCP must be explicitly approved by the FAA and may not be implemented unilaterally by the airport sponsor.

FAA approval or disapproval of NCP measures is issued through a ROA. After issuance of a ROA, the FAA will perform environmental, safety, and other types of reviews for each approved noise abatement measure in the NCP prior to determining whether the measure can be implemented. After these reviews are completed, the airport sponsor will decide to pursue implementation of the measures identified in the NCP and is responsible for applying for FAA funds associated with FAA-approved eligible items included in the NCP.

2 Forecast Technical Memorandum, Technical Memorandum – Final, Charlotte Douglas International Airport Environmental Impact Statement, VHB in association with InterVISTAS, April 18, 2018.

1.5 Consultation and Public Involvement

A key element in the Part 150 process is public involvement. As previously stated, public participation is required during this process to afford adequate opportunity for airlines, pilots, neighboring communities, Federal, state, local agencies, and other stakeholders to submit their views, data, and comments on the development of the NEMs and NCP. In order to inform and gather input from the public regarding the findings of the Part 150 Study Update, the Airport Sponsor convened a Technical Advisory Committee (TAC) composed of airport stakeholders and members of the public that met to review the progress of the Part 150 Study Update process and provide input as necessary. Additionally, Public Information Meetings were held in the community at key points throughout the completion of the Part 150 process.

1.5.1 Technical Advisory Committee (TAC)

A TAC was convened early in the Part 150 process to provide feedback and advice to the CLT staff and consultant team on the contents and preparation of the Part 150 Study Update. The TAC provided members of the public through representatives of the Airport Community Roundtable (ACR), airport users, agencies, and local officials an opportunity to be involved in developing the NEMs and NCP. In refining the NEMs and NCP, staff from CLT, as well as the consultant team wanted to benefit from the TAC members' special viewpoints and the people and resources they represented. A process was therefore designed to encourage the open exchange of creative ideas to achieve results. The members of the TAC assisted the Part 150 Study process in several ways.

- **As a Sound Board** – The TAC provided a forum in which the consultant team and other TAC members could present information, findings, ideas, and recommendations. All benefited from listening to the diverse viewpoints and concerns of the wide range of interests represented on the committee.
- **As a Link to the Community** – Each member represented a key constituent interest – local neighborhoods, local governments, public agencies, or airport users. Committee members provided a link between the Study Team and the people they represented. They were asked to inform their constituents about the Study as it progressed, and to convey the views of others at committee meetings.
- **As a Critical Reviewer** – The consultant team wanted to have its work scrutinized closely for completeness of detail and clarity of thought. The committee membership was urged to review the consultant's work and provide any input to help improve it.
- **As an Aid to Implementation** – Each member has a unique role to play in implementing the plan, ranging from making changes in flight procedures to changes in local land use plans and regulations.

The TAC operated informally, with no compulsory attendance, no voting, and no officers. The final decision on which measures to include in the NCP rests with the Airport Sponsor. The TAC meetings were conducted by the consultant team and were conducted at key points in the Study when committee input was especially needed throughout the Part 150 process. Three meetings have taken place to date to review and receive comments on the development of the Existing (2023) Baseline and Future (2028) Baseline conditions, the alternative noise abatement measures, and the alternative screening process and preliminary NCP scenario development.

A fourth meeting is scheduled in conjunction with the release of this Draft Part 150 Study Update that will offer the TAC to review and discuss the draft NEMs and recommended NCP. Members were urged to attend the general Public Information Meetings held during the Study to listen firsthand to the concerns that were raised and to speak with members of the consultant team and representatives of the City of Charlotte Aviation Department. Many organizations were contacted and invited to designate a representative to serve on the TAC. The resulting membership represents a broad range of interests that includes airlines, commerce, community, air traffic controllers, government and planning, as well as interested and affected citizens through representatives of the ACR. A roster of the membership of the TAC is provided in **Appendix F, *Public Involvement***.

1.5.2 Public Information Meetings

During the course of the Part 150 Study Update, two sets of Public Information Meetings were held at convenient locations within the local community, and a third set of meetings is scheduled in conjunction with the release of this Draft Part 150 Study Update. Meeting dates and times are noted below. The Public Information Meetings were attended by interested citizens and local media representatives. Appendix F includes copies of meeting notices, sign-in sheets, comments received, and meeting handouts.

Public outreach efforts for each Public Information Meeting included the publishing of notifications through print media, social media, direct emails, and the project website. A legal advertisement and display advertisement were published in the Charlotte Observer 30 days prior to each meeting. Spanish language ads were also published in the *Que Pasa Mi Gente* and *La Noticia* publications. Additionally, a social media campaign using Facebook and Instagram was implemented to promote each meeting. The social media campaign was launched 15 days prior to each meeting, using geographic targeting methods to reach zip codes in the area surrounding the Airport. Notifications were also distributed through email 30 days prior to each meeting to individuals who requested additional information about the Study. A notification was also published on the project website (https://cltpart150.com/) 30 days prior to each meeting. See Appendix F for more information.

Public Information Meeting #1 – March 22 & 23, 2023
The first set of Public Information Meetings were held on Wednesday, March 22, 2023, and Thursday, March 23, 2023, from 6:00 p.m. to 8:00 p.m. Meetings were open-house style during which boards identifying the status of the Part 150, the work completed to date, and the next steps for the Part 150 process were displayed. The information presented at this meeting included an overview of Part 150 studies, history of Noise Compatibility Planning at CLT, a review of the temporary noise monitoring program conducted for the Part 150 Study, an overview of the assumptions and results of the Existing (2023) Baseline and Future (2028) Baseline Noise Exposure Contours, and projected schedule. All meeting materials were posted on the project website and methods for submitting public questions and comments were advertised online on the project website.

Public Information Meeting #2 – November 14 & 16, 2023
The second set of Public Information Meetings were held on Tuesday, November 14, 2023, and Thursday, November 16, 2023, from 6:00 p.m. to 8:00 p.m. Meetings were open-house style during which boards identifying the status of the Part 150, the work completed to date, and the next steps for the Part 150 process were displayed. The information presented at this meeting included the Airport Environs, a review of the assumptions and results of the Existing (2023) Baseline and Future (2028) Baseline Noise Exposure Contours, an introduction of the noise abatement alternative screening process, and the preliminary evaluation of the noise abatement alternatives developed to date. All meeting materials were posted on the project website and methods for submitting public questions and comments were advertised online on the project website.

Public Information Meeting #3 – September 18 & 19, 2024
The third and final set of Public Information Meetings are scheduled to be held on September 18, 2024 and September 19, 2024 from 6:00 p.m. to 8:00 p.m. and will be conducted concurrently with a Public Hearing to make it as easy as possible for the public to comment on the Draft Part 150 Study Update. This meeting will offer the public the chance to review the draft NEMs and recommended NCP, and ask technical experts any questions they may have.

1.5.3 Public Hearing and Comment Period

14 CFR Part 150 requires that the Draft Part 150 Study Update documents be made available to the public prior to conducting a Public Hearing. The Draft Part 150 Study Update document was made available to the public at local libraries, the Airport, and online at https://cltpart150.com/documents-reports/. A Public Hearing will be conducted concurrently as a Public Information Meeting, which are both scheduled to be held on September 18, 2024 and September 19, 2024 from 6:00 p.m. to 8:00 p.m. The Public Hearing will offer the public the opportunity to provide oral comments on the Draft Part 150 Study Update which will be documented by a stenographer. Comments will also be accepted through email, mail, and comment form. All comments received by October 4, 2024 will be responded to by the City of Charlotte Aviation Department and incorporated into the Final Part 150 Study Update document. As such, all public comments will be considered by FAA in their decision-making process. A list of document locations, a summary of the Public Information Meeting / Hearing, meeting materials, comments received, and response to those comments will also be included in the Final Part 150 Study Update document.

1.5.4 Additional Public Coordination

Additional efforts to provide information and opportunity for public involvement in this Part 150 process included the following:

- Media briefing at the beginning of the Part 150 Study Update
- Airline briefings at the beginning of the Part 150 and at key milestones
- ACR briefings throughout the process and at key milestones
- Local community group meeting at the beginning of the Part 150 and subsequent outreach at key milestones

Additionally, a project website containing information about the Part 150 Study Update, including general information, upcoming and past meetings, and a method to contact the Study Team, is available online at the following address: https://cltpart150.com/. The project website has built-in translation and accessibility options available to the public as needed.

1.6 Airport Overview

CLT is a publicly-owned airport operated by the City of Charlotte and managed by the Aviation Department under the leadership of the Aviation Director. The Aviation Director provides oversight to the Aviation Department and the Airport's Executive Leadership Team. The Airport is operated financially on a fully self-sustaining basis – no general fund revenues have ever been or are appropriated to the cost of the facilities or operations.

1.6.1 Airport History

Early History
CLT was originally constructed in 1935 with three runways on 500 acres. In 1941, the Federal government took control of the Airport to establish Morris Field Air Base, which was used for bomber training during World War II. At that time, additional land was acquired and two of the

runways were lengthened to 5,000 feet. In 1946, the City of Charlotte took back control of the Airport and has managed and operated the Airport since then.

Airfield

In 1951, the City extended Runway 5/23 to 7,502 feet, and in 1965 Runway 18L/36R was extended to 7,846 feet. In 1979, a new 10,000-foot parallel north/south runway (Runway 18C/36C) was opened. Runway 18L/36R was extended to 8,676 feet in 1994. The third parallel runway (Runway 18R/36L), which is 9,000 feet in length, opened in February 2010. Runway 5/23 was closed as a runway in 2022 and is no longer used for departure and arrival operations.[3]

Terminals

A 70,000 square-foot passenger terminal was opened in 1954 when the Airport was named Douglas Municipal Airport after former Charlotte Mayor Ben E. Douglas, Sr. A new 325,000 square-foot passenger terminal building with 25 gates was constructed in 1982 and the Airport was renamed Charlotte Douglas International Airport. In the late 1970s and early 1980s, the Airport completed improvements to the general aviation facilities and new buildings were constructed for Thurston Aviation and Butler Aviation. In 1990, a new 80,000 square-foot international and commuter concourse opened along with the US Airways maintenance base and two automobile parking decks. In 1994, a 194,000 square-foot passenger terminal expansion was completed.

Airlines

Air carrier service was initiated in 1937 with two daily flights; 3,500 passengers were served that year. United Airlines began service as Capital Airlines in 1946 and by 1952, the Airport had a total of 50 daily flights. In 1962, Eastern Airlines established a connecting hub introducing jet service to Charlotte and became the dominant carrier until the early 1980s. Piedmont Airlines established its main hub at CLT following the Airline Deregulation Act of 1978 and experienced rapid growth to eventually replace Eastern Airlines as the largest carrier serving the Airport.

Between 1983 and 1985, five new airlines, Ozark, Pan Am, American, People Express, and Trans World Airlines (TWA), began service at CLT. In 1989, US Airways merged with Piedmont and continued to operate the CLT hub. Lufthansa began service to Charlotte under an “open skies” agreement in 1990 and Northwest initiated service in 1994. Between 2008 and 2014, several large air carriers merged, including American Airlines/US Airways, Delta Air Lines/Northwest Airlines, Southwest Airlines/AirTran, and United Airlines/Continental Airlines. CLT continues to be a hub for American Airlines following the merger with US Airways.

Recent and Upcoming Development

From 2018 through 2023, the Airport has completed multiple expansion projects that have provided additional passenger space and gates at the Airport through the following projects: Concourse A Phase I Expansion; Concourse E Expansion Phases VIII and IX; and the East Terminal Expansion. In 2022, Runway 5/23 was closed as a runway and is no longer used for departure and arrival operations. Formal decommissioning for the closed Runway 5/23 is anticipated for Autumn 2024.[4] The runway is currently used for taxiing and is planned for rehabilitation and conversion into a taxiway. To date, CLT continues to grow and succeed with airfield construction projects and additional concourse and terminal renovation and expansion projects that are planned to be completed by 2025. As previously stated, a new fourth parallel runway among other terminal and

3 CLT issued a NOTAM on May 1, 2022 permanently closing Runway 5/23 except for taxiing. Formal decommissioning for the closed Runway 5/23 is anticipated for Autum 2024.

4 The FAA issued a NOTAM on April 1, 2024, permanently closing Runway 5/23 except for taxiing.

airfield capacity enhancement projects are under design and construction, which are anticipated to be completed by 2028.

1.6.2 Airport Location

CLT is located on approximately 6,000 acres of land in the City of Charlotte, in west Mecklenburg County, North Carolina. CLT is approximately five miles west of downtown Charlotte. The Airport is bounded to the north by parallel transportation corridors, Interstate 85 (I-85), US 74 (Wilkinson Boulevard) and the Norfolk Southern Railroad. To the east, the Airport is bounded by Billy Graham Parkway (a limited access parkway) which connects the Airport to the north to US 74 and I-85, and to South Charlotte. To the south, the Airport is bounded by West Boulevard, with a future planned east-west corridor. To the west, CLT is bounded by the Interstate 485 (I-485) Outer Beltway.

CLT is located within the Charlotte-Concord-Gastonia, North Carolina-South Carolina Metropolitan Statistical Area (MSA). The MSA includes Anson, Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, and Union counties in North Carolina, and Chester, Lancaster, and York counties in South Carolina. **Exhibit 1-2, *Airport Location,*** shows the location of CLT in relation to the Charlotte Area.

1.6.3 Airport Runways

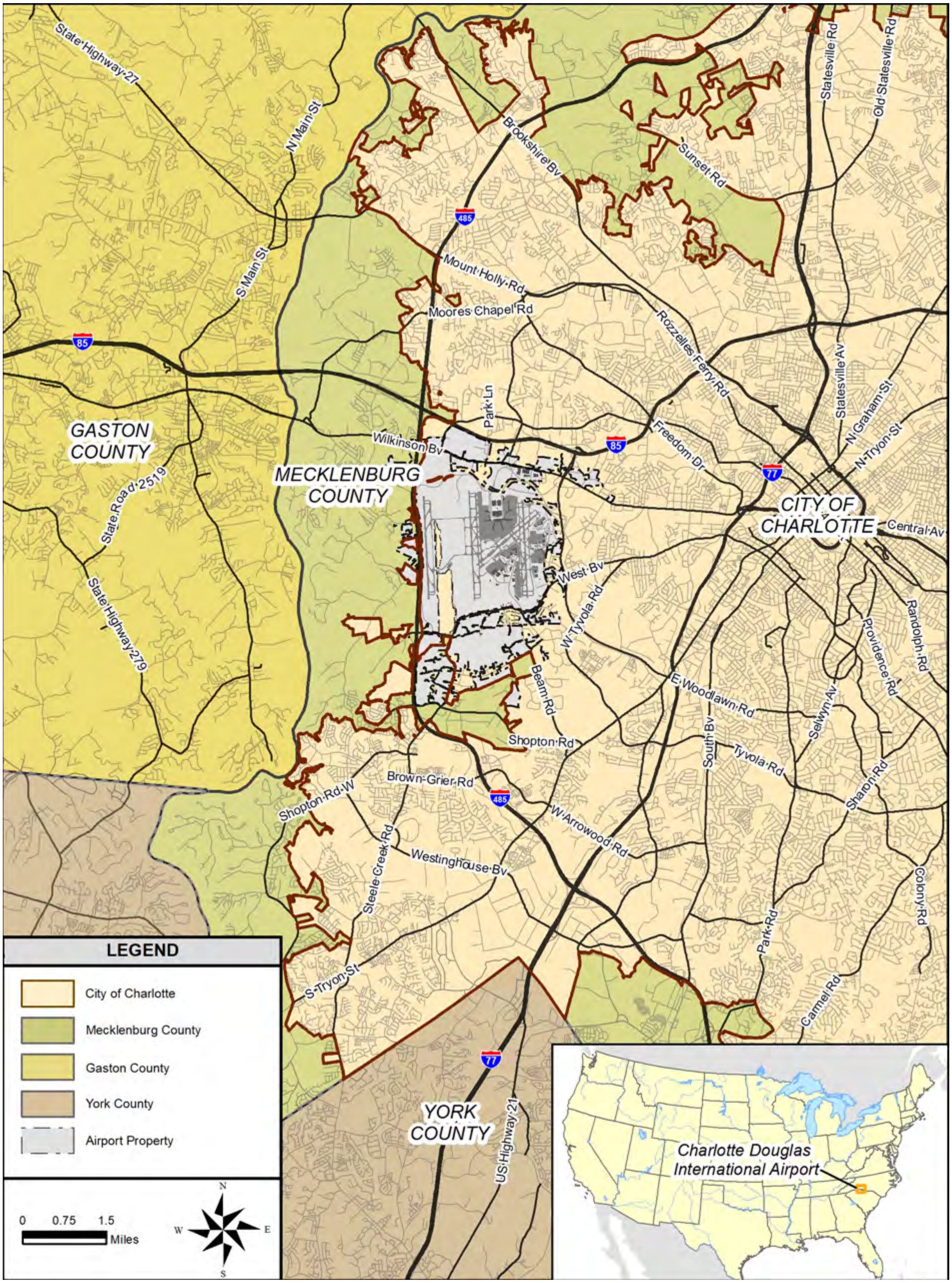
The airfield at CLT consists of three parallel, north/south runways. Runway 18C/36C, the center of the three parallels, is the longest runway on the airfield at 10,000 feet. Runway 18R/36L, the western runway, is 9,000 feet in length. Runway 18L/36R, the eastern runway, is 8,676 feet in length. As previously discussed, Runway 5/23 was closed as a runway and is no longer used for departure and arrival operations; as such, it was not considered an active runway for the purpose of this analysis.

1.6.4 Airport Operators

As of December 2023, CLT was served by the following commercial airline operators:

- Air Canada
- American Airlines
- Contour Airlines
- Delta Air Lines
- Frontier Airlines
- JetBlue Airways
- Lufthansa
- Southwest Airlines
- Spirit Airlines
- Swift Air
- Sun Country Airlines
- United Airlines
- Vacation Express
- Viva Aerobus
- Volaris

Exhibit 1-2 Airport Location



Source: Landrum & Brown, 2023

1.6.5 Terminal Facilities

The passenger terminal at CLT is located at the center of the airfield, between Runway 18L/36R and Runway 18C/36C. The terminal is located on Josh Birmingham Parkway, which connects the Airport to Billy Graham Parkway to the east, Little Rock Road which connects the Airport to Interstate 85 to the north, and Wilkinson Boulevard which connects the Airport to Interstate 485 to the west.

The airport layout at CLT is shown on **Exhibit 1-3, *Existing Airport Layout*.** The Airport's terminal consists of one main building with five passenger concourses designated Concourses A through E. The central core building is one million square feet in size and is divided into the following six levels:

- Basement Level: building maintenance equipment, vendor storage, and receiving areas
- Ground or Ramp Level: baggage claim, ground transportation, and ticket level for Concourse E
- Ticketing Area Level: restaurants, specialty and gift/news stores, lounge area for business travelers, and five security checkpoints at each Concourse provide access to all gates and concession areas
- Administrative Level: administrative offices and conference rooms
- Top two levels: the upper and lower ramp control tower

As of December 2023, the passenger terminal consisted of 114 total gates divided between the five separate concourses. Concourse A is occupied by Air Canada, American Airlines, Contour Airlines, Delta Air Lines, Frontier Airlines, JetBlue Airways, Southwest Airlines, Spirit Airlines, and United Airlines. American Airlines occupies most gates within Concourses B, C, D, and E. Lufthansa and Volaris also use gates within Concourse D. All international arrival gates are located on Concourse D.

1.6.6 Airside Facilities

The airfield system consists of three parallel runways (18R/36L, 18C/36C, and 18L/36R) oriented in a north-south direction. All six runway ends have Instrument Landing System (ILS) approaches. Aircraft can also utilize non-ground-based approach procedures that are based on Global Positioning System data.

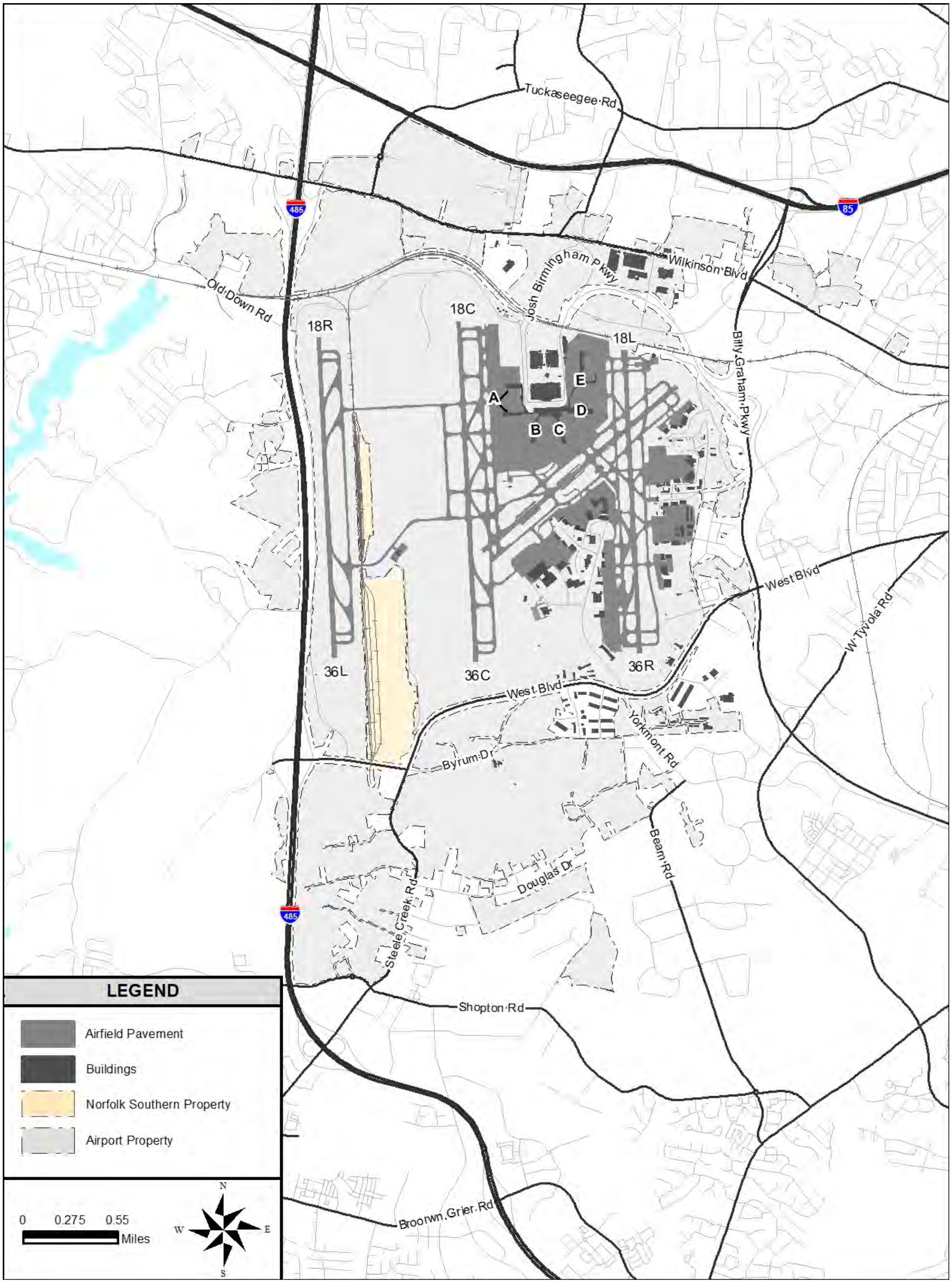
1.6.7 Cargo Facilities

The Air Cargo Center is located in the center of the airport campus to the south of the closed Runway 5/23 in between Runways 18C/36C and 18L/36R. The Air Cargo Center consists of approximately 570,000 square feet of facilities and more than 50 acres of aircraft ramp space. CLT is served by several dedicated cargo operators. The facility is also serviced by numerous freight forwarders, custom house brokers and professional international service providers.

1.6.8 North Carolina Air National Guard

CLT is home to the 145th Airlift Wing of the North Carolina Air National Guard (NCANG). The facility is located on the east side of the airfield. The 145th Airlift Wing maintains a fleet of C-17 aircraft and support assets for prompt mobilization.

Exhibit 1-3 Existing Airport Layout



Source: Landrum & Brown, 2023

1.6.9 General Aviation and Fixed-Base Operator (FBO)

The general aviation parking and fixed based operator (FBO) at CLT are located on the east side of the airfield. There is one FBO facility at CLT, the Wilson Air Center FBO, which provides aircraft services such as fueling services, ramp parking, hangar parking/storage, parts, and maintenance for general aviation aircraft at CLT. A total of 92 aircraft are based at CLT. **Table 1-1, *Based Aircraft*** provides the number of general aviation aircraft based at CLT by aircraft type.

Table 1-1 Based Aircraft

Aircraft Type	Number
Single engine airplanes	8
Multi-engine airplanes	6
Jet airplanes	66
Helicopters	4
Military aircraft	8
Total aircraft based on the field	**92**

Source: CLT FAA Form 5010-1 published January 25, 2024.

1.6.10 Norfolk Southern Property

The Norfolk Southern Railway's Charlotte Regional Intermodal Facility is located on approximately 200 acres of land between Runway 18C/36C and Runway 18R/36L at CLT. The land is owned by Norfolk Southern, and the facility is used to transfer trailers and containers between trucks and trains.

Chapter 2

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Chapter 2 Affected Environment

Title 14 Code of Federal Regulations (CFR) Part 150 requires the identification and evaluation of land uses surrounding an airport. This chapter identifies the existing land uses and the residential and other noise-sensitive land uses in the area surrounding Charlotte Douglas International Airport (Airport or CLT). A further discussion of the land use mapping methodology and zoning information is provided in **Appendix D, *Land Use Methodology***.

2.1 Airport Environs

The Airport Environs refers to the regional area that experiences most of the aircraft overflights from an airport. The Airport Environs for CLT encompasses an area of approximately 45 square miles that includes portions of the City of Charlotte and unincorporated Mecklenburg County as shown in **Exhibit 2-1, *Airport Environs***. The exhibit includes jurisdictional boundaries, local roads and major highways, the Airport property line, and significant geographical features such as a portion of the Catawba River. The Airport Environs extends to the north by approximately 3.8 miles from Runway end 18C, to the east by approximately 1.3 miles east of Runway 18L/36R, to the south by approximately 5.0 miles south of Runway end 36C, and approximately 1.0 mile to the west of Runway 18R/36L.

The Airport Environs boundary was delineated based upon previous noise exposure contours, as well as radar data showing the location of existing flight tracks. The Airport Environs represents the area in which detailed land use data was collected to satisfy Part 150 requirements to assess land use compatibility within the Day-Night Average Sound Level (DNL) 65 dB noise exposure contour.

2.2 Existing Land Uses and Noise-Sensitive Sites Within Airport Environs

Land uses located within the Airport Environs were identified, mapped, and categorized in accordance with the Appendix A in 14 CFR Part 150 Land Use Compatibility Guidelines general land use classifications: residential (single, multi-family, and mobile homes), commercial, manufacturing and production, public uses, recreational, and vacant/open space. Land use compatibility guidelines are presented in Appendix A, Table A-1. These uses were identified based on Mecklenburg County's Geographic Information System (GIS) database, and supplemented as necessary by field verification. Appendix D provides additional detailed information regarding the classification and identification of land uses. **Exhibit 2-2, *Generalized Existing Land Use***, depicts the existing land uses within the Airport Environs.

The area for which existing land uses were identified involves two levels of delineation: 1) the area directly adjacent to the Airport and the areas directly in line with the orientation of the runways; and 2) the regional area that may experience the broader effects of aircraft overflight and noise impacts. To the immediate north and northeast of CLT, land uses are characterized by commercial, institutional, and residential areas. To the south of CLT, land is predominantly residential and open space properties mixed with commercial and institutional land uses. To the east of CLT, land is predominantly residential and commercial land uses. To the west of CLT, land is predominantly vacant with wooded areas and with some scattered residential land uses.

Land uses that could be considered noncompatible with airport operations include more than just residential uses. FAA guidelines define certain public facilities as noise-sensitive, which are herein referred to as noise-sensitive sites and include: places of worship, schools (and daycare facilities at which licensed education occurs), nursing homes, libraries, and hospitals. Detailed information on noise-sensitive sites was collected within the Airport Environs. Within the Airport Environs, there are 18 schools, 45 places of worship, and 36 daycares as shown on **Exhibit 2-3, *Existing Noise-***

Sensitive Sites. Appendix D discusses the methodology for collecting and organizing the noise-sensitive site data and Table D-2 provides a list of all facilities.

2.3 Existing Historic Sites

Per FAA guidance, historic properties in the vicinity of CLT have been identified and displayed on the NEMs. Historic properties include those properties that are listed on the National Register of Historic Places (NRHP) and properties that are listed with the North Carolina State Historic Preservation Office that have been surveyed and determined to be eligible or potentially eligible for inclusion on the NRHP. There are three properties listed on the NRHP within this area, and 15 properties which are potentially eligible or determined eligible as shown on **Exhibit 2-4, *Historic Resources*** and listed in Appendix D.

2.4 Land Use Policies and Regulatory Authority

Neither CLT nor the Federal government has the authority to implement or enforce local land use policies and regulations. That responsibility falls to the local jurisdictions, which in North Carolina could include a county, city, or township.

In most cities and counties, the chief land use regulatory document is the zoning ordinance, which regulates the types of uses, building height, bulk, and density permitted in various locations. Subdivision regulations are another important land use tool, regulating the platting of land. Local communities also regulate development through building codes and, in some cases, enforce noise regulations. The local capital improvements program, a schedule for constructing and improving public facilities such as streets, sewers, and water lines, is another important policy document that could influence development; although, on its own it does not involve regulation.

The Part 150 Study process does not propose, recommend, or fund the mitigation of future proposed development. It does, however, identify areas of potential future noise exposure for use by local planners in the development of comprehensive planning documents and land use policies. By preparing a comprehensive plan and setting land use policies, a jurisdiction or community can develop land appropriately and according to a locally accepted, approved plan. It is important that these planning efforts identify the likely development potential of land near the airport, within the published airport noise contours, or under existing or proposed future aircraft flight tracks. The local land use planning policies provide the airport sponsor with a description of the types of future development that should occur in areas not yet developed or to be redeveloped within the community.

2.4.1 Jurisdictions With Land Use Authority Within the Airport Environs

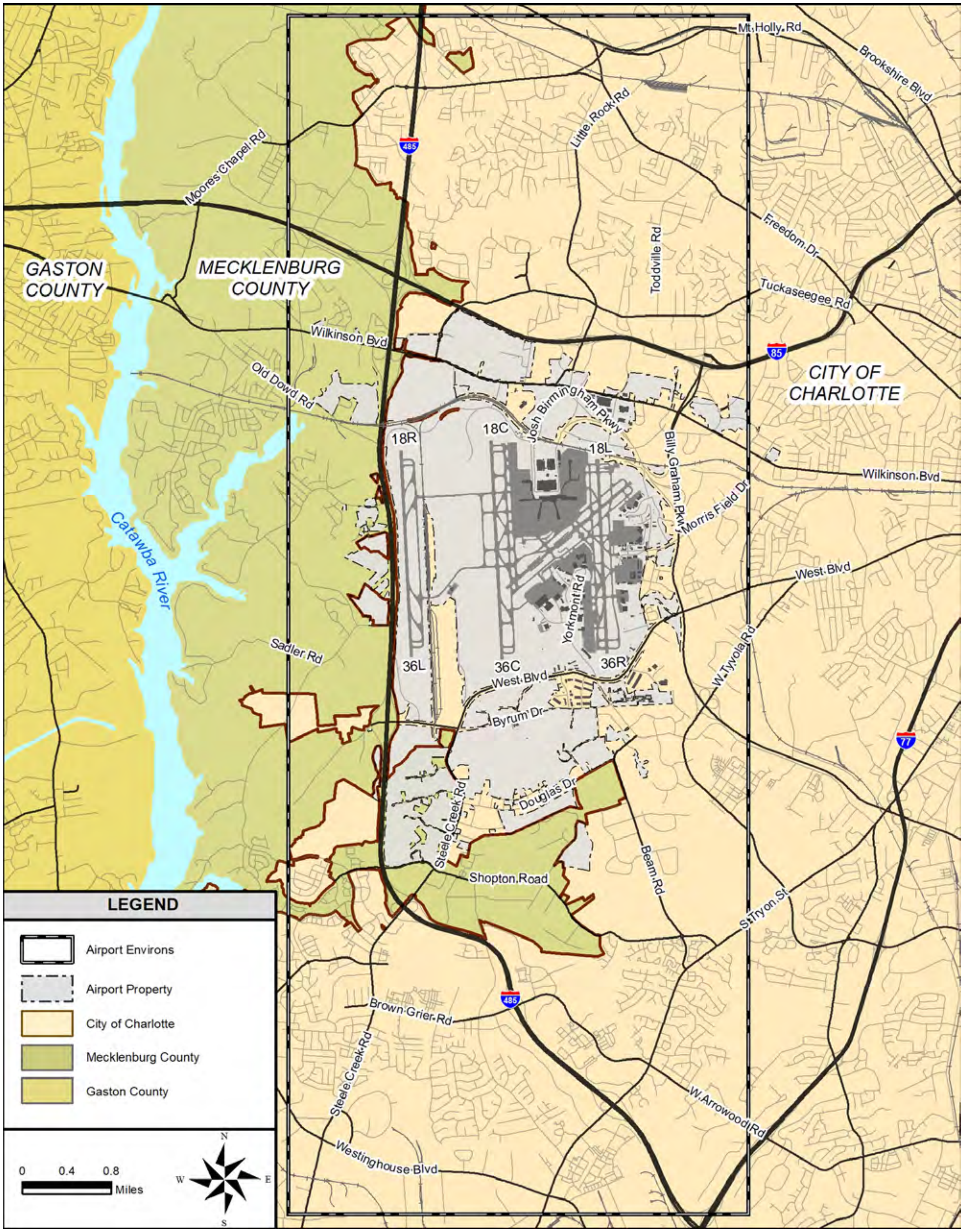
Local jurisdictions have the authority to conduct land use planning and to implement land use controls, such as zoning, subdivision regulations, and building codes. Two jurisdictions have land use authority within the Airport Environs, the City of Charlotte and Mecklenburg County. The City of Charlotte has a City Manager form of government with a Mayor and 11 Council Members and a City Manager that oversees the day-to-day operations of the City. In Mecklenburg County a nine-member Board of County Commissioners is the governing body. Most government services are provided by joint departments that serve both the City of Charlotte and Mecklenburg County, including the Charlotte-Mecklenburg Planning Department. The Charlotte-Mecklenburg Planning Department is directed by Planning and Zoning Commission, was formed by an Inter-local Agreement as a planning advisory body to the City of Charlotte and Mecklenburg County in 1954. The Commission advises City Council on short and long range land use and design plans and general planning matters including zoning, land development, transportation/transit, economic development, and community facilities. The Commission's authority extends to the City of Charlotte and the unincorporated portions of Mecklenburg County.

The previous Part 150 Study (accepted in 1996) recommended the establishment of an Airport Overlay District to assist in controlling residential development within the higher noise levels resulting from Airport activity. The Charlotte-Mecklenburg Planning Department adopted an Airport Noise Disclosure Overlay District to provide a mechanism to disclose to residential property owners and prospective residential property owners in the CLT environs that the use and enjoyment of property located within the district is subject to overflights and aircraft noise that may be objectionable.

2.4.2 Current Zoning and Future Land Uses Within the Airport Environs

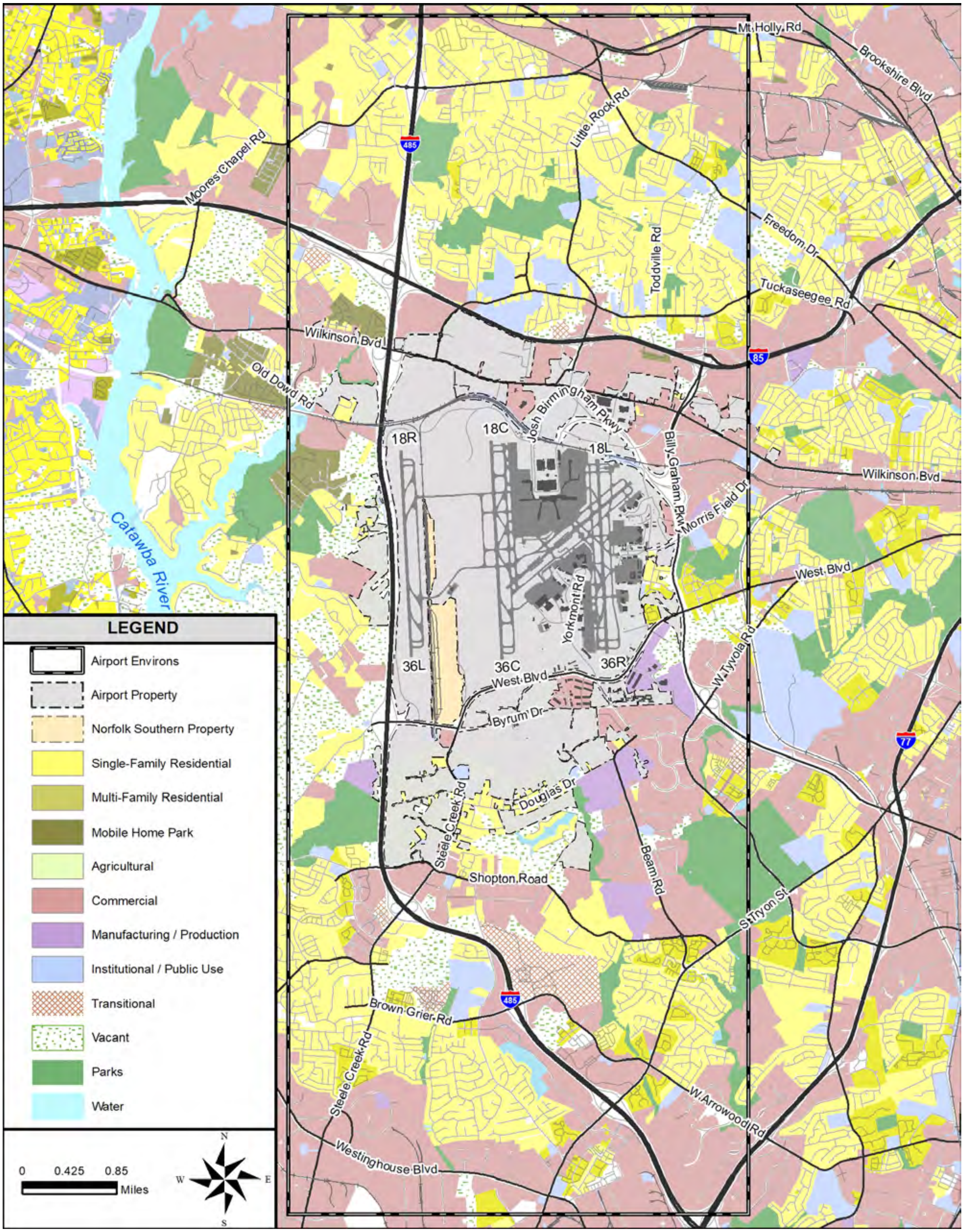
Zoning data was obtained from the Charlotte Mecklenburg Planning Department and was used to identify areas of potential future growth and redevelopment within the Airport Environs. The Charlotte Mecklenburg Planning Department develops plans that are used to guide zoning decisions made by the City and County. Zoning data was mapped and categorized based on Appendix A of 14 CFR Part 150, which includes residential (single, multi-family, and mobile homes), commercial, manufacturing and production, public uses, recreational, and vacant/open space. This data can be used to identify areas in which new noncompatible land uses may be developed. Mapping data showing planned subdivisions submitted by developers to the Planning Department was also used to identify areas in which new development is expected to occur. Appendix D provides additional detailed information regarding the classification and identification of zoning districts. **Exhibit 2-5, *Current Zoning,*** depicts the current zoning within the Airport Environs.

Exhibit 2-1 Airport Environs



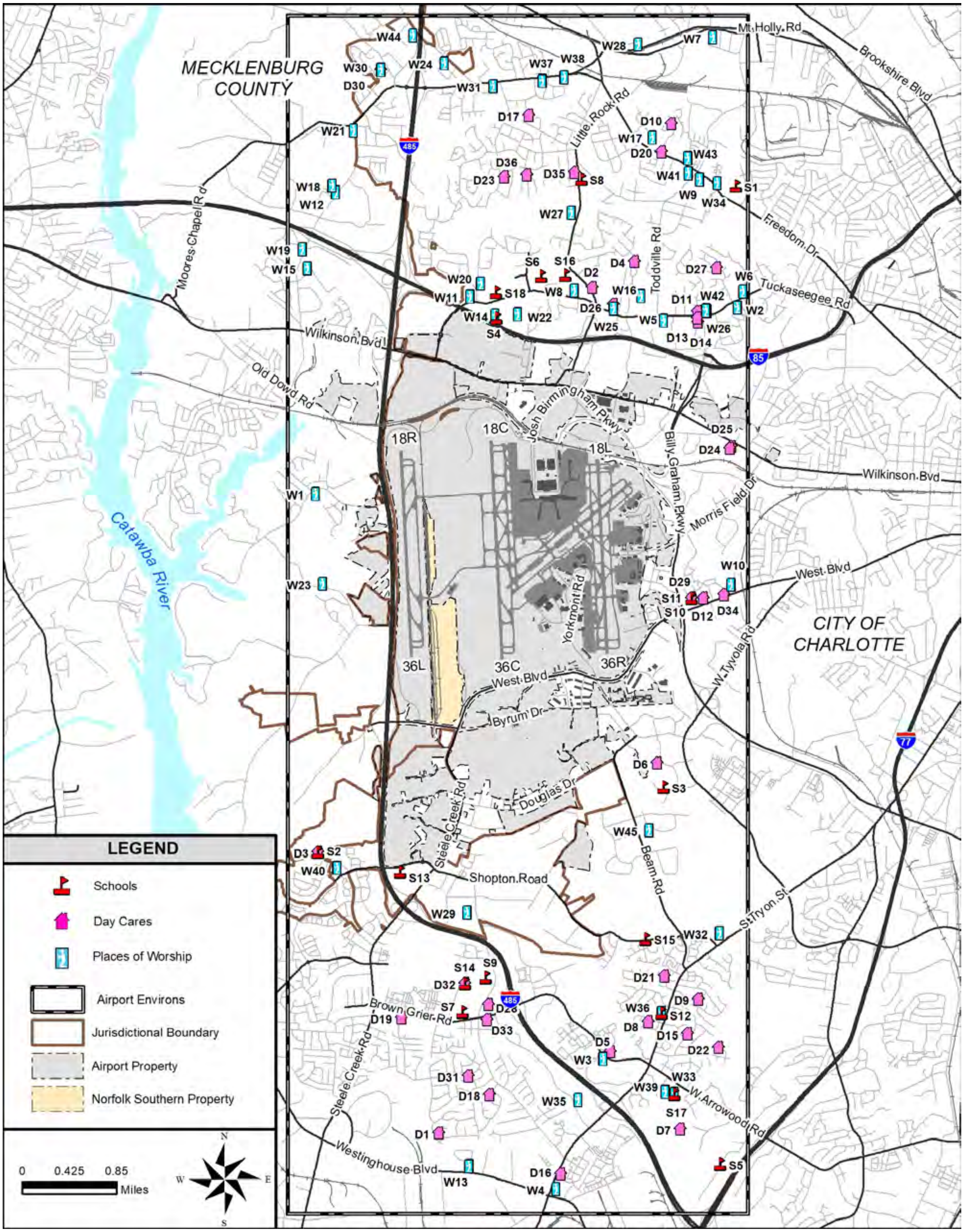
Source: Landrum & Brown, 2023

Exhibit 2-2 Generalized Existing Land Use



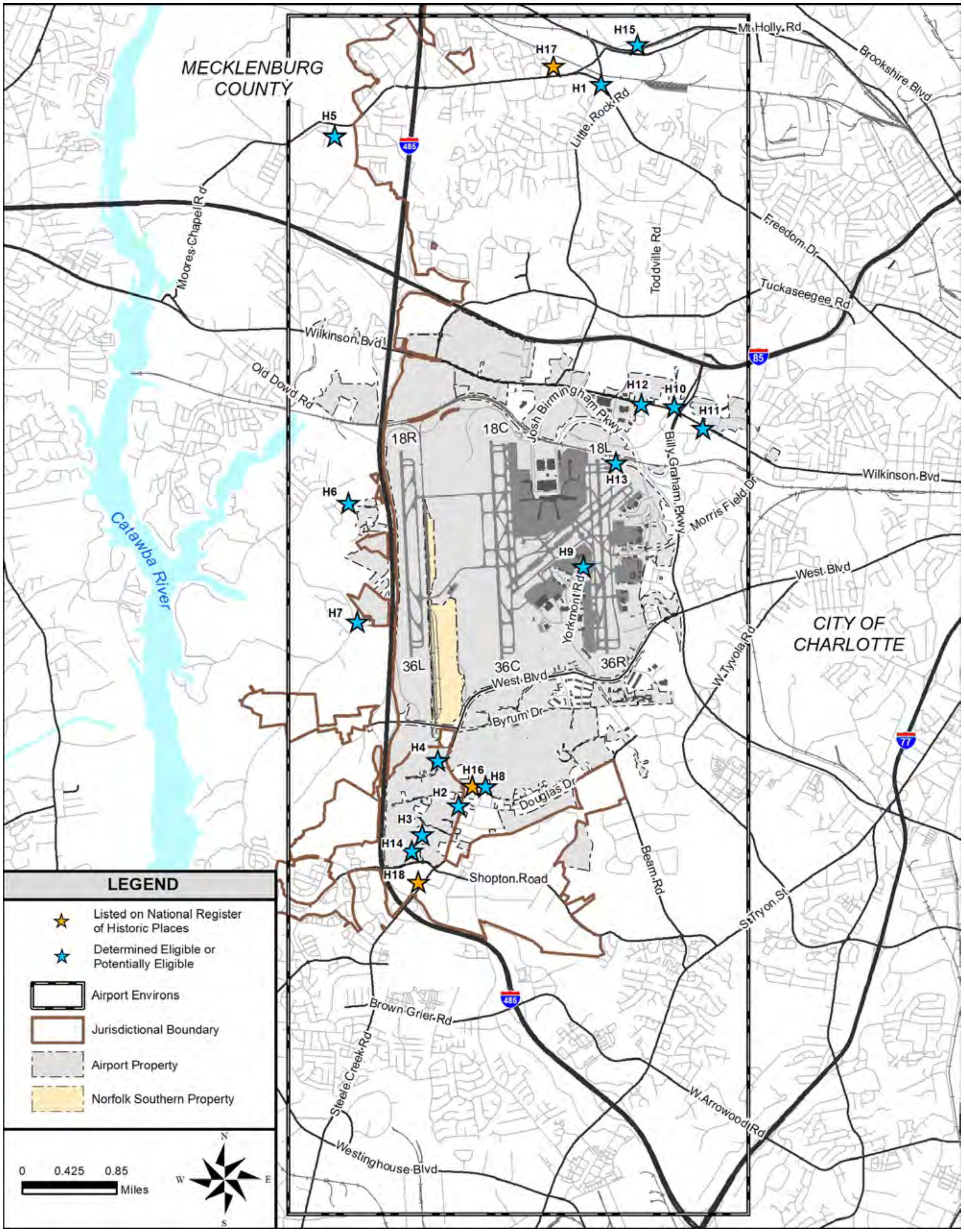
Source: Landrum & Brown, 2023

Exhibit 2-3 Existing Noise-Sensitive Sites



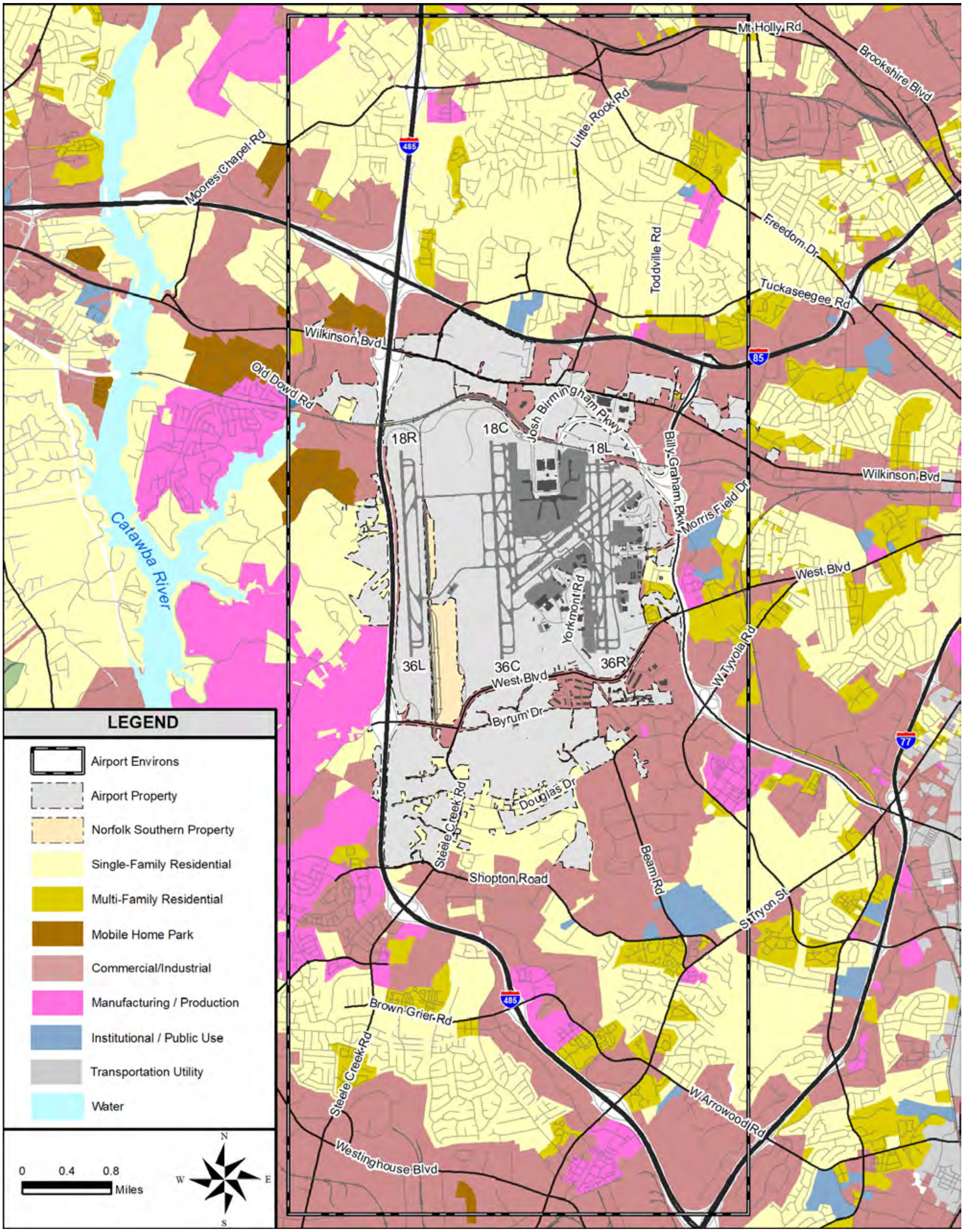
Source: Landrum & Brown, 2023

Exhibit 2-4 Historic Resources



Source: Landrum & Brown, 2023

Exhibit 2-5 Current Zoning



Source: Landrum & Brown, 2023

Chapter 3

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Chapter 3 Baseline Noise Exposure Development

This chapter presents the noise analysis to develop the Existing (2023) Noise Exposure Contour and Future (2028) Noise Exposure Contour without the implementation of any new noise abatement measures recommended in Chapter 4 of this Part 150 Study Update. Aircraft-related noise exposure is defined through noise contours prepared using the FAA Aviation Environmental Design Tool (AEDT) Version 3e.[5] This noise exposure is presented using the Day-Night Average Sound Level (DNL) metric. A DNL noise contour does not represent the noise levels present on any specific day, but represents the average sound energy level of all 365 days of operation during the year. Noise contour patterns extend from an airport along each extended runway centerline, reflective of the combination of average-annual runway use patterns, direction of flow, and flight tracks to and from the runways. The relative distance of a contour from an airport along each route is a function of the frequency of use of each runway end for total arrivals and departures, as well as use at night,[6] and the type of aircraft assigned to each runway end.

For the purpose of this Study, the noise patterns are presented on exhibits, and the number of housing units and estimated population that fall within them are quantified and presented in tables. An explanation of the AEDT and the DNL metric, along with a review of the physics of noise, noise impacts on humans, social impacts of noise, and the data required to develop noise exposure contours, is summarized in **Appendix C, *Noise Methodology*.**

3.1 Existing (2023) Baseline Noise Exposure Contour

3.1.1 Overview

The Existing (2023) Baseline Noise Exposure Contour depicts the existing average-annual noise exposure pattern in the area surrounding the Airport. The Existing (2023) Baseline Noise Exposure Contour is based on a review of FAA's Operations Network (OPSNET) data for April 2021 through March 2022, which was the most recent 12 months of data available at the time the noise modeling began for the purpose of this analysis. The total of annual aircraft operations during this period was 526,454, which converts to 1,442.3 average-annual day operations.[7] For more information, see Appendix C.

3.1.2 Noise Exposure Contour

Exhibit 3-1, *Existing (2023) Baseline Noise Exposure Contour,* depicts existing aircraft noise exposure superimposed on land uses in the vicinity of the Airport and represents the Existing (2023) NEM. Note, the official NEMs are located at the front of this document with the NEM and NCP checklist. **Table 3-1, *Areas Within Existing (2023) Baseline Noise Exposure Contour (in Square Miles)*** summarizes the area within the DNL 65, 70, and 75 dB noise contours.

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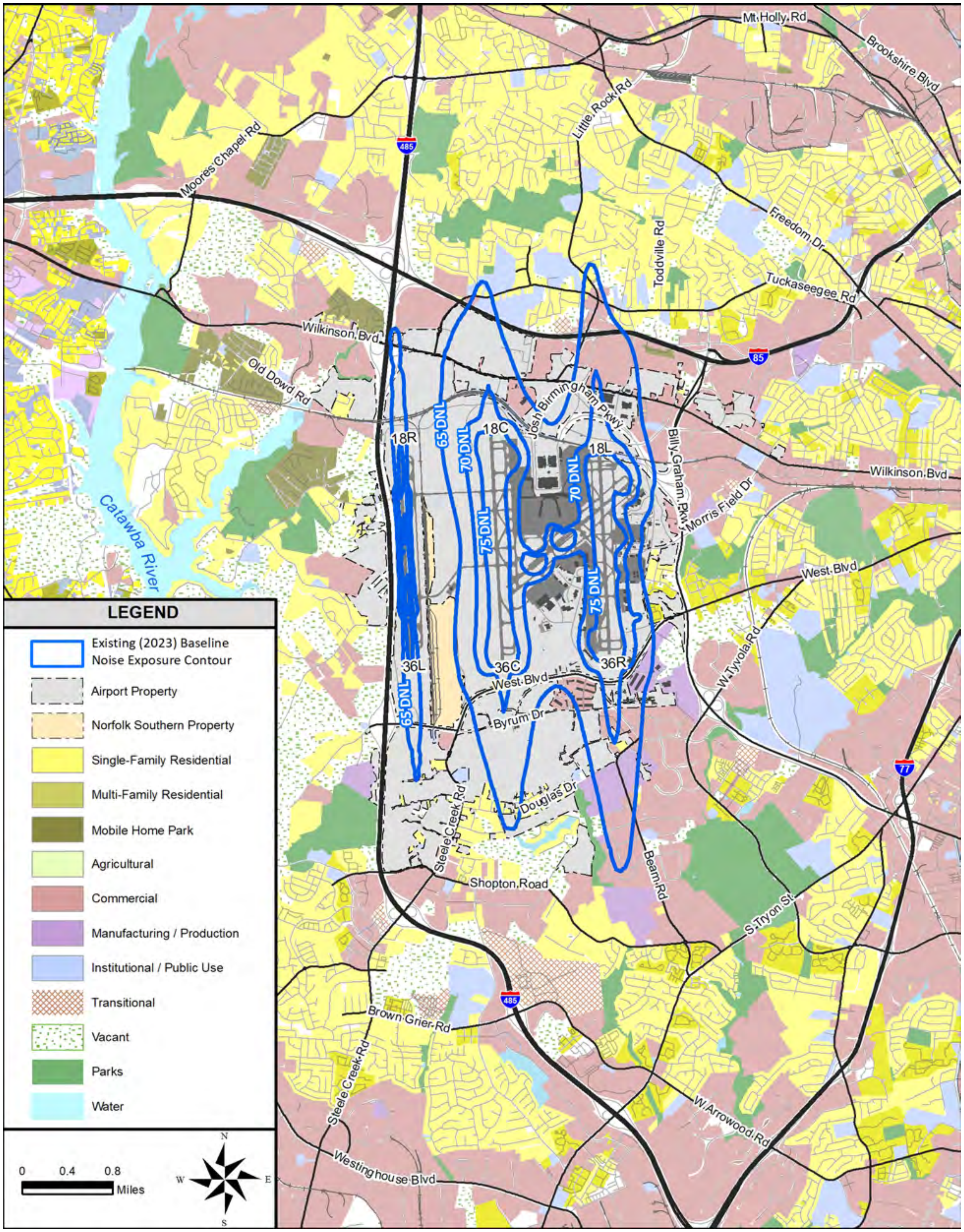
5 AEDT Version 3e was the most recent version of AEDT when the noise modeling began.

6 Nighttime refers to the hours between 10:00 p.m. and 7:00 a.m.

7 The FAA's Terminal Area Forecast (TAF) issued January 2024 reported a total of 541,560 operations for the most recent 12 months for which data was available at the time of this writing (March 2023 to February 2024). The difference between the annual operations used to model the Existing (2023) Baseline condition and those for the FAA's TAF for March 2023 to February 2024 is less than three percent. As such, the Existing (2023) Baseline condition is representative of the operating conditions for the last 12 months (March 2023 to February 2024). See Appendix C, Section C.5.6 for more information.

Exhibit 3-1 Existing (2023) Baseline Noise Exposure Contour



Source: Landrum & Brown, 2023

Table 3-1 Areas Within Existing (2023) Baseline Noise Exposure Contour (in Square Miles)

Contour Range	Existing (2023) Baseline
DNL 65-70 dB	4.42
DNL 70-75 dB	1.36
DNL 75+ dB	1.01
Total	6.79

Note: In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below DNL 65 dB.
Source: Landrum & Brown, 2023.

The DNL 65 dB of the Existing (2023) Baseline Noise Exposure Contour encompasses approximately 6.79 square miles and its shape reflects the runway use, flight tracks, and the balance of time the Airport operates in north and south flow. Runway 18R/36L is an arrival runway which is indicative of the long, thinner noise contour. Runway 18C/36C and Runway 18L/36R are mixed use runways and are used by both arrivals and departures, resulting in a wider contour due to the wider distribution of flight corridors and higher engine thrust settings on departure compared to arrivals. A majority of the lands within the DNL 65 dB of the Existing (2023) Noise Exposure Contour to the north consist of Airport property, and commercial and institutional land uses. Residential land uses are located to the north of Runway 18C/36C and Runway 18L/36R, north of I-85. To the south, the land uses are also Airport property, commercial and manufacturing/production land uses, and residential land uses south of Runway 18C/36C and Runway 18R/36L. The DNL 70 dB of the Existing (2023) Baseline Noise Exposure Contour remains primarily on Airport property, with the north and south end of the DNL 70 dB contour containing commercial land uses. The DNL 75 dB of the Existing (2023) Baseline Noise Exposure Contour remains completely over Airport property.

3.1.3 Land Use Compatibility

A summary of the number of housing units (households), population (residents), and other noise-sensitive sites within the DNL 65 dB noise exposure contour for the Existing (2023) Baseline is provided in **Table 3-2*, Housing, Population, and Noise-Sensitive Sites Within DNL 65+ dB of the Existing (2023) Baseline Noise Exposure Contour.*** The table shows the number of housing units within each noise contour range (e.g., DNL 65-70 dB, DNL 70-75 dB) and the current mitigation status of each housing unit. Some housing units have been previously sound insulated and are considered mitigated. Unmitigated housing units include those that were determined to be ineligible for sound insulation or were potentially eligible but not sound insulated because the owners declined or did not respond to an offer to sound insulate the housing unit.

There are 140 housing units and an estimated 421 residents located within the DNL 65 dB noise exposure contour of the Existing (2023) Baseline condition. There are three schools/educational facilities, the West Mecklenburg High School, East Voyager Academy of Charlotte, and the Beginning Years Day Care, within the DNL 65 dB noise exposure contour of the Existing (2023) Baseline condition. There are four places of worship, the Covenant United Methodist Church, Every Nation Church, Harvest Church, and the Montagnard Alliance Church, within the DNL 65 dB noise exposure contour of the Existing (2023) Baseline condition. There are no libraries, hospitals, or nursing homes located within the DNL 65 dB noise exposure contour of the Existing (2023) Baseline condition.

Table 3-2 Housing, Population, and Noise-Sensitive Sites Within DNL 65+ dB of the Existing (2023) Baseline Noise Exposure Contour

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Residential Housing Units				
Housing Type				
Single-Family Residential	**51**	**0**	**0**	**51**
Mitigated	15	0	0	15
Unmitigated	36	0	0	36
Multi-Family Residential	**88**	**0**	**0**	**88**
Mitigated	0	0	0	0
Unmitigated	88	0	0	88
Manufactured Home	**1**	**0**	**0**	**1**
Unmitigated	1	0	0	1
Total Housing Units	**140**	**0**	**0**	**140**
Residential Population				
Total Population[1]	**421**	**0**	**0**	**421**
Noise-Sensitive Sites				
Schools / Educational Facilities	3	0	0	3
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

Source: Landrum & Brown, 2024.

3.2 Future (2028) Baseline Noise Exposure Contour

3.2.1 Overview

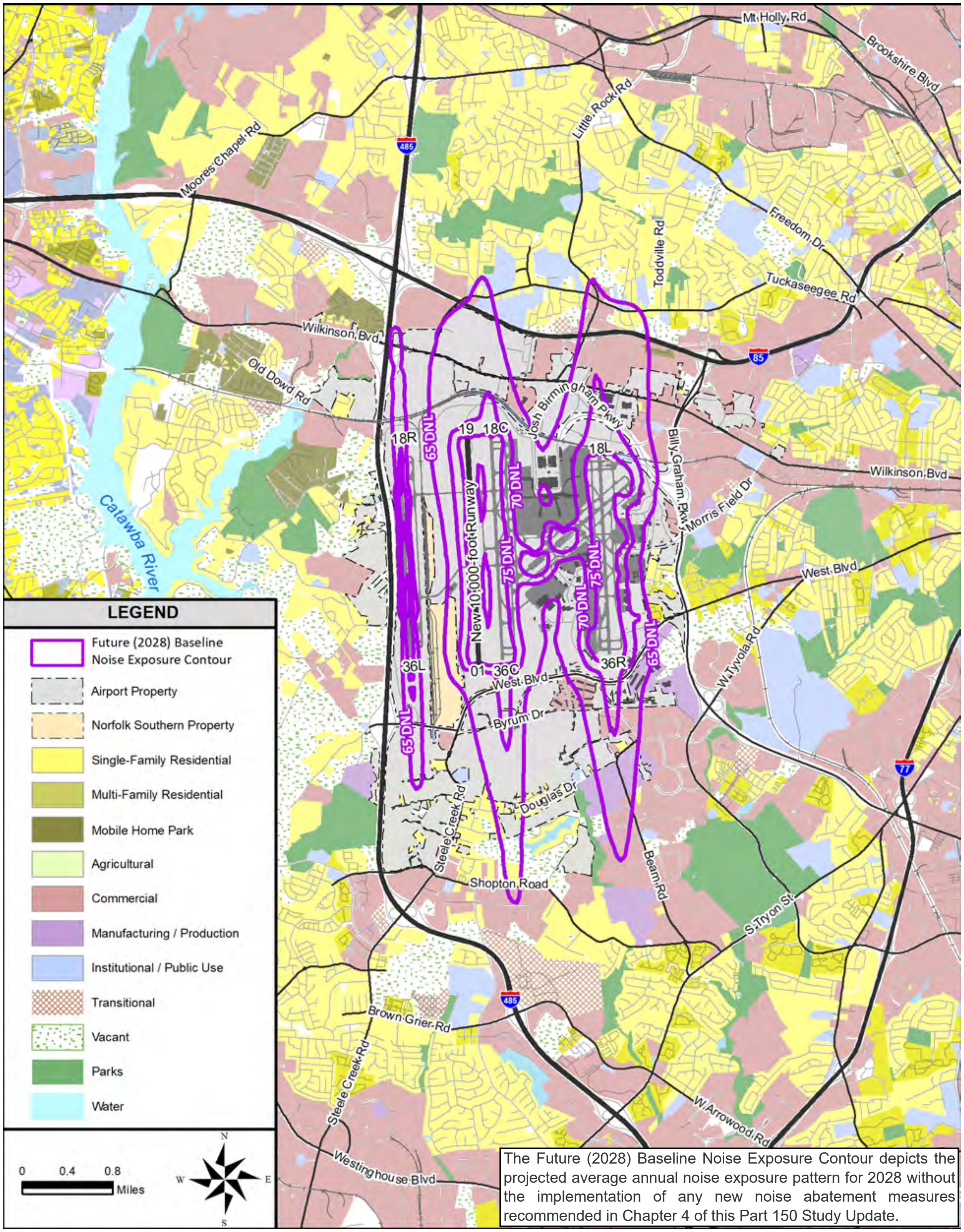
The Future (2028) Baseline Noise Exposure Contour depicts the projected average-annual noise exposure pattern for 2028 without the implementation of any new noise abatement measures recommended in Chapter 4 of this Part 150 Study Update. The Future (2028) Baseline condition assumes the use of a new 10,000-foot runway (referred to as Runway 01/19) in the midfield with 3,200 feet of separation to Runway 18R/36L and 1,100 feet of separation to Runway 18C/36C and other airfield improvement projects which are currently in design or construction. The number of annual operations for the Future (2028) Baseline was based on the forecast of aviation activity developed for the Capacity EA, which estimated 639,783 total annual operations, or 1,752.8 average-annual day operations, in 2028.[8] The runway use patterns for the Future (2028) Baseline are based on data from the Capacity EA that was developed in consultation with FAA ATC personnel and review of airfield simulation modeling.

3.2.2 Noise Exposure Contour

The Future (2028) Baseline Noise Exposure Contour superimposed on the existing land use is shown in **Exhibit 3-2, *Future (2028) Baseline Noise Exposure Contour***. **Table 3-3, *Comparison of Areas Within Existing (2023) Baseline and Future (2028) Baseline Noise Exposure Contour (in Square Miles)*** provides a comparison of the areas within the Existing (2023) Baseline and Future (2028) Baseline Noise Exposure Contours.

[8] Forecast Technical Memorandum, Technical Memorandum – Final, Charlotte Douglas International Airport Environmental Impact Statement, VHB in association with InterVISTAS, April 18, 2018. The FAA's TAF issued January 2024 projected a total of 594,664 operations for CLT in 2028. The difference between the annual operations used to model the Future (2028) Baseline condition and those for the FAA's TAF for 2028 is less than eight percent. As such, the CLT forecast is consistent with the FAA's TAF. See Appendix H for more information.

Exhibit 3-2 Future (2028) Baseline Noise Exposure Contour



The Future (2028) Baseline Noise Exposure Contour depicts the projected average annual noise exposure pattern for 2028 without the implementation of any new noise abatement measures recommended in Chapter 4 of this Part 150 Study Update.

Source: Landrum & Brown, 2023

Table 3-3 Comparison of Areas Within Existing (2023) Baseline and Future (2028) Baseline Noise Exposure Contour (in Square Miles)

Contour Range	Existing (2023) Baseline	Future (2028) Baseline	Difference
DNL 65-70 dB	4.42	4.48	0.06
DNL 70-75 dB	1.36	1.38	0.02
DNL 75+ dB	1.01	1.24	0.23
Total	6.79	7.11	0.32

*Note: In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below DNL 65 dB.

Source: Landrum & Brown, 2023.

The Future (2028) Baseline Noise Exposure Contour increases in size compared to the Existing (2023) Baseline Noise Exposure Contour due to the increase in operations projected for 2028. The shape of the Future (2028) Baseline Noise Exposure Contour remains similar to the Existing (2023) Baseline Noise Exposure Contour because runway use, flight tracks, and the balance of time the Airport operates in north and south flow would be expected to remain similar to Existing (2023) conditions with variations in runway use based on long-term wind and weather patterns and consideration of the new fourth parallel runway, Runway 01/19.

The Future (2028) Baseline Noise Exposure Contour widens along the Runway 18C/36C centerline compared to the Existing (2023) Baseline Noise Exposure Contour due to the addition of Runway 01/19. Due to the close spacing of Runway 18C/36C and Runway 01/19, the noise contour lines surrounding these runways appears as one single shape, similar to the noise contour lines surrounding Runway 18L/36R. Runway 01/19 would be primarily a departure runway; therefore, the noise contour extends farther west from that runway over Airport property.

The Future (2028) Baseline Noise Exposure Contour, along the Runway 18L/36R centerline, shrinks slightly to the north and south as compared to the Existing (2023) Baseline Noise Exposure Contour. This is attributed to the offloading of arrivals onto Runway 18C/36C. As a result, Runway 18L/36R is not as heavily used in the Future (2028) Baseline Noise Exposure Contour for arrivals. The slight bump out on the northeast side of the contour is due to the offloading of northeast bound departures from Runway 36C in the Existing (2023) Baseline Noise Exposure Contour to Runway 36R in the Future (2028) Baseline Noise Exposure Contour. In addition, the Future (2028) Baseline Noise Exposure Contour along Runway 18R/36L extends farther to the north due to the runway being used a small percentage more for arrivals in south flow in order to balance the use of Runway 18L/36R, Runway 18C/36C, and Runway 18R/36L.

The DNL 65 dB of the Future (2028) Baseline Noise Exposure Contour extends approximately 0.5 miles to the east of Runway 18R/36L, 0.1 miles west from Runway 18L/36R, 1.4 miles north of Runway 18C/36C, and 1.1 miles south Runway 18C/36C. A majority of the lands to the north consist of Airport property, and commercial and institutional land uses. Residential lands uses are located to the north of Runway 18C/36C and Runway 18L/36R, north of I-85. To the south, the land uses are also Airport property, commercial and manufacturing/production land uses, and residential land uses south of Runway 18C/36C and Runway 18R/36L. The DNL 70 dB noise exposure contour for the Future (2028) Baseline remains primarily on Airport property, with the north and south end of the contour containing commercial land uses. The DNL 75 dB for the Future (2028) Baseline remains completely over Airport property.

3.2.3 Land Use Compatibility

A summary of the number of housing units (households), population (residents), and other noise-sensitive sites within the DNL 65 dB noise exposure contour for the Future (2028) Baseline Noise Exposure Contours is provided in **Table 3-4*, Housing, Population, and Noise-Sensitive Sites Within DNL 65+ dB of the Future (2028) Baseline Noise Exposure Contour.*** There are 243 housing units and an estimated 687 residents that would be located within the DNL 65+ dB of the Future (2028) Baseline Noise Exposure Contour. There are four schools / educational facilities, the West Mecklenburg High School, East Voyager Academy of Charlotte, Beginning Years Day Care, and the Mulberry Head Start Day Care, within the DNL 65+ dB of the Future (2028) Baseline Noise Exposure Contour. There are four places of worship, the Every Nation Church, Harvest Church, Montagnard Alliance Church, and the Mulberry Baptist Church, within the DNL 65+ dB of the Future (2028) Baseline Noise Exposure Contour. There are no libraries, hospitals, or nursing homes located within the DNL 65+ dB of the Future (2028) Baseline Noise Exposure Contour.

Table 3-4 Housing, Population, and Noise-Sensitive Sites Within DNL 65+ dB of the Future (2028) Baseline Noise Exposure Contour

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Residential Housing Units				
Housing Type				
Single-Family Residential	**86**	**0**	**0**	**86**
Mitigated	48	0	0	48
Unmitigated	38	0	0	38
Multi-Family Residential	**94**	**0**	**0**	**94**
Mitigated	0	0	0	0
Unmitigated	94	0	0	94
Manufactured Home	**63**	**0**	**0**	**63**
Unmitigated	63	0	0	63
Total Housing Units	**243**	**0**	**0**	**243**
Residential Population				
Total Population[1]	**687**	**0**	**0**	**687**
Noise-Sensitive Sites				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

Source: Landrum & Brown, 2024.

A summary comparison of the housing units (households), population (residents), and other noise-sensitive sites within the Existing (2023) Baseline and Future (2028) Baseline Noise Exposure Contours is provided in **Table 3-5*, Existing (2023) Baseline versus Future (2028) Baseline Housing, Population, and Noise-Sensitive Sites.***

Table 3-5 Comparison of Housing, Population, and Noise-Sensitive Sites Within the DNL 65+ dB of the Existing (2023) Baseline and Future (2028) Baseline Noise Exposure Contours

Category	Existing (2023) Baseline	Future (2028) Baseline
Residential Housing Units		
DNL 65-70 dB	140	243
DNL 70-75 dB	0	0
DNL 75+ dB	0	0
Total	140	243
Residential Population		
DNL 65-70 dB	421	687
DNL 70-75 dB	0	0
DNL 75+ dB	0	0
Total	421	687
Noise-Sensitive Sites (Churches, Schools, Libraries, and Nursing Homes)		
DNL 65-70 dB	7	8
DNL 70-75 dB	0	0
DNL 75+ dB	0	0
Total	7	8

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
Source: Landrum & Brown, 2023.

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Chapter 4

Chapter 4 Noise Compatibility Program

The culmination of the 14 Code of Federal Regulations (CFR) Part 150 planning process is the development of a set of measures designed to enhance the compatibility between an airport and its surrounding environs. This chapter presents the analysis conducted to develop the measures recommended for implementation, which are collectively referred to as the 2024 Noise Compatibility Program (NCP). This includes a review of the existing measures approved in the 1996 NCP for CLT, and the evaluation of new measures recommended for implementation.

The 2024 NCP includes noise abatement, land use compatibility, and land use mitigation measures designed to reduce or mitigate the impact of aircraft noise upon the surrounding community. The measures recommended for implementation have resulted from the planning process and public involvement described throughout this document. **Appendix F, *Public Involvement***, contains meeting materials and summaries of the Technical Advisory Committee (TAC) meetings and public meetings, which included discussion of NCP measures. The NCP measures fall within one of three categories:

- Noise Abatement Measures that address noise at the source (i.e., aircraft and how they operate);
- Land Use Compatibility Measures that are intended to prevent new development that is noncompatible with airport noise; and
- Land Use Mitigation Measures that are intended to correct existing noncompatible land uses.

This chapter is organized as shown below:

- Section 4.1 – Noise Abatement Measures
  - Section 4.1.1 – Includes a review of existing Noise Abatement Measures and the recommendation to either continue, modify, or withdraw each measure
  - Section 4.1.2 – Presents the new Noise Abatement Measures recommended for inclusion in the 2024 NCP
  - Section 4.1.3 – Identifies the Alternative Noise Abatement Measures that were considered but not recommended for inclusion in the 2024 NCP
  - Section 4.1.4 – Summary of the Noise Abatement Measures recommended for inclusion in the 2024 NCP
- Section 4.2 – Land Use Compatibility Measures
  - Section 4.2.1 – Includes a review of existing Land Use Compatibility Measures and the recommendation to either continue, modify, or withdraw each measure
  - Section 4.2.2 – Presents the Alternative Land Use Compatibility Measures that were considered but not recommended for inclusion in the 2024 NCP
  - Section 4.2.3 – Summary of the Land Use Compatibility Measures recommended for inclusion in the 2024 NCP
- Section 4.3 – Land Use Mitigation Measures
  - Section 4.3.1 – Includes a review of existing Land Use Mitigation Measures and the recommendation to either continue, modify, or withdraw each measure
  - Section 4.3.2 – Presents the new Land Use Mitigation Measures recommended for inclusion in the 2024 NCP
  - Section 4.3.3 – Summary of Land Use Mitigation Measures recommended for inclusion in the 2024 NCP
- Section 4.4 includes a description of the complete 2024 NCP

4.1 Noise Abatement Measures

4.1.1 Existing Noise Abatement Program

This section provides a review of the nine (9) currently approved noise abatement measures included in the 1996 NCP (as amended in 1998). Of these measures, two (2) measures were previously withdrawn. Provided for each measure is a description, the current status, and the recommendation for this 2024 NCP.

NOISE ABATEMENT MEASURE NA-1

- **Description:** Continue periodic monitoring procedures, initiated as a result of the 1990 Part 150 NCP, within the Airport Environs.
- **Status:** This measure was previously implemented but is no longer active. The initial 1990 Part 150 Study recommended the initiation of noise measurements on a periodic basis, as well as the acquisition of equipment to monitor the locations of aircraft in flight. Equipment was acquired for both purposes, and a monitoring program was initiated. The 1996 NCP measure recommended continuing the noise monitoring and that it be used to monitor trends in noise exposure, as aircraft were transitioned to a 100 percent Stage 3 fleet by 2000.[9] Additionally, it was recommended that where significant differences between measured and forecast noise levels are noted, appropriate measure be taken to address issues which might arise from those differences (preparation of new noise contour maps, discussions with users, evaluation of mitigation program measures).
  The Airport has ceased conducting noise measurements as described in this measure. Many of the older, louder aircraft that operated at CLT in the 1990s and early 2000's have been phased-out or been significantly reduced from commercial airline fleets. Additionally, airlines continue to retire older, noisier aircraft from their fleets and replace them with more modern, quieter, fuel-efficient aircraft. This effort continues to help reduce noise levels at airports often times even as the number of aircraft operations increase.
  Furthermore, temporary noise monitoring efforts have been conducted in the surrounding communities through various efforts. Specifically, temporary noise monitoring efforts were conducted for the Airport's 2015 Noise Exposure Map Update in 2014, for the Major Capacity Enhancement Projects Environmental Assessment (Capacity EA) in 2019, and for this Part 150 Study Update in 2022. In each effort, the measurements were compared with pre-existing database information related to aircraft noise level and performance characteristics in the FAA's noise modeling software used to develop noise exposure contours. The information collected during the measurement program included acoustical output, as measured at known locations, as well as flight trajectory data (the aircraft's three-dimensional location) relative to the noise measurement site. This information was used to ensure the input data into the noise modeling software was as accurate as possible and the resulting noise exposure contours are accurate.
- **Recommendation:** Noise measurement efforts as described in this measure have ceased. As such, the measure is recommended for withdrawal.

NOISE ABATEMENT MEASURE NA-2

- *Measure previously withdrawn. Listed for numeric continuity.*

NOISE ABATEMENT MEASURE NA-3

- *Measure previously withdrawn. Listed for numeric continuity.*

9 See 14 CFR Part 36 for more information.

NOISE ABATEMENT MEASURE NA-4

- **Description:** Provide monthly reports on late night (11:00 p.m. to 7:00 a.m.) runway utilization and variances from NCP assumptions to Airport Traffic Control Tower management and frequent nighttime operators. Conduct follow-up with FAA (ATCT) and carriers to enhance adherence to existing program.
- **Status:** This measure is currently partially implemented. During the preparation of the 1996 NCP, adherence to the existing NCP was lacking. The intent of the measure was to assure that ATCT and the users were aware of the effectiveness of the program. Since approval of Measure NA-4, the Airport has implemented the measure by working closely with ATCT and the users to ensure the effectiveness of the program. While monthly reporting has ceased, the Airport continues to monitor late night runway utilization and variances from NCP assumptions. If a concern is brought forward, a question arises, or a discrepancy is observed at the Airport, an evaluation of runway utilization and variances from NCP assumptions is conducted and further coordination with ATCT is performed.
- **Recommendation:** Continue approved Measure NA-4 with modification. The modified NA-4 would state “Monitor late night (11:00 p.m. to 7:00 a.m.) runway utilization and variances from NCP assumptions. Conduct follow-up with FAA Air Traffic Control Tower (ATCT) and carriers as needed to enhance adherence to existing program.”

NOISE ABATEMENT MEASURE NA-5

- **Description:** Designate Runway 18R or 18L as preferred for takeoffs by turbojet and large four-engine prop aircraft between 11:00 p.m. and 7:00 a.m. when, under the current preferential runway use program, Runway 23 or Runway 5 cannot be used for reasons of wind, weather, operational necessity, or required runway length.
- **Status:** This measure is currently implemented. Since the approval of Measure NA-5 in 1996, the existing Runway 18R/36L was constructed (previously referred to as Runway 17/35) and the previous Runway 18R became Runway 18C. Additionally, Runway 5/23 was decommissioned in 2022 and is no longer used for aircraft arrivals or departures. To date, the Airport continues to utilize Runways 18C and 18L for takeoffs by turbojet aircraft between 11:00 p.m. and 7:00 a.m. Additionally, there are no scheduled operations of four-engine prop aircraft at the Airport.
- **Recommendation:** Continue approved Measure NA-5 with modification to remove reference to Runway 5/23 and large four-engine prop aircraft, and to update the names of the existing runways. The modified NA-5 would state “Designate Runway 18C or 18L as preferred for takeoffs by turbojet aircraft between 11:00 p.m. and 7:00 a.m. when wind, weather, and operational conditions allow.”

NOISE ABATEMENT MEASURE NA-6

- **Description:** Reaffirm Airport user policy which designates locations and procedures for aircraft engine run-ups. Establish a run-up position on the US Airways ramp parallel to Runway 5/23.
- **Status:** This measure is currently implemented. In the past, residents of neighborhoods in the Airport Environs have complained about the noise levels produced by aircraft run-ups, which may have been attributed to aircraft run-ups or power up at the initiation of takeoff roll or reverse thrust during landing. To minimize noise levels produced by aircraft run-ups, Measure NA-6 in the approved 1996 NCP reaffirmed the Airport’s user policy which designates locations and procedures for aircraft engine run-ups and identified a new run-up position for American Airlines (the former US Airways) in the midfield of the Airport. To date, the Airport’s established user policy and procedure addresses the location of engine run-ups by the North Carolina Air National Guard (NCANG or the Guard) and the airlines using the Airport. The Guard is directed by that policy to use the NCANG ramp. American Airlines (the former US Airways) is directed to

use the American Airlines maintenance ramp using a heading of either 230 or 050 degrees to assure that the aircraft on the American Airlines (the former US Airways) ramp are facing at least partially into the wind. Other airlines are directed to use taxiways parallel to runways. All run-ups are conducted only after advising ATCT of the requirement for run-up. Run-up activity conducted on the taxiways are to be positioned under the guidance of ATCT ground control.

- **Recommendation:** The intent of this measure is to reaffirm the Airport's existing policy and to maximize the use of midfield run-up locations over those located on the east side of the Airport as recommended in NA-A-1 (see Section 4.1.2). The higher usage of midfield run-up locations over those on the east side of the Airport would help reduce noise levels produced by aircraft run-ups to communities in the Airport Environs. Additionally, two airfield projects that are currently under construction would provide additional run-up locations for use at the Airport. This includes the deice pad located on the south airfield east of Runway 36C and in the northeast airfield east of Taxiway D. Construction is anticipated to conclude in 2025 and would be able to be used for run-ups when commissioned. As such, the recommendation is to continue approved Measure NA-6 with modification to add two new run-up locations and include language to encourage maximizing the use of midfield run-up locations over those located on the east side of the Airport as stated in NA-A-1 (see Section 4.1.2 for more information). The modified NA-6 would state: "Reaffirm Airport user policy which designates locations and procedures for aircraft engine run-ups. Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport."

NOISE ABATEMENT MEASURE NA-7

- **Description:** Departing Runways 36R and 36L, turbojet and large four-engine prop aircraft initiate turns at the 2.5 (36L) and 2.6 DME (36R) north of the CLT VOR/DME, respectively.
- **Status:** This measure is currently implemented. Since the approval of Measure NA-7 in 1996, the existing Runway 18R/36L was constructed and the previous Runway 36L became Runway 36C. The 1996 NCP Measure NA-7 require large aircraft departing from Runway 36R to turn to a heading of 025 degrees at the 2.6 DME north of the CLT VOR/DME, and large aircraft departing Runway 36C (formerly 36L) to turn to a heading of 330 degrees at the 2.5 DME north of the CLT VOR/DME, respectively. The intent is to enhance noise abatement by concentrating overflights into specific corridors of compatible land uses northeast and northwest of the Airport. Additionally, there are no scheduled operations of four-engine prop aircraft at the Airport.
- **Recommendation:** Continue approved Measure NA-7 with modification to update the name of the existing runways and remove reference to large four-engine prop aircraft. Since the approval of Measure NA-7 in 1996, the existing Runway 18R/36L (previously referred to as Runway 17/35) was constructed and the previous Runway 18R/36L is now referred to as Runway 18C/36C. The modified Measure NA-7 would state: "Departing Runways 36R and 36C, all turbojet aircraft initiate turns at the 2.5 DME (36C) and 2.6 DME (36R) north of the CLT VOR/DME, respectively." Note, the measure would be implemented in the short-term and would be withdrawn when Measure NA-13 becomes active (see Section 4.1.2).

NOISE ABATEMENT MEASURE NA-8

- **Description:** After construction of a third parallel runway (17/35) 3,700 feet west of Runway 18R/36L, establish an initial departure turn for Runway 17, to be made as soon as practicable by turbojets and large four-engine prop aircraft, to a heading of 195 degrees.
- **Status:** This measure is currently implemented. Since the approval of Measure NA-8 in 1996, the existing Runway 18R/36L was constructed (previously referred to as Runway 17/35) and the previous Runway 18R/36L became Runway 18C/36C. The approved Measure NA-8 is intended

to assure adequate separation between departures on Runway 18R and missed approaches on Runway 18C as ATCT is required to maintain visual separation between the operations. Departures from Runway 18R may occasionally be diverged to a heading of 210 degrees or more. The heading of 195 degrees is intended to direct traffic along a course roughly parallel to and west of Steele Creek Road and over more compatibly used lands than would a departure along runway heading. Additionally, there are no scheduled operations of four-engine prop aircraft at the Airport.

- **Recommendation:** Continue approved Measure NA-8 with modification to update the name of the existing runways and remove reference to large four-engine prop aircraft. Since the approval of Measure NA-8 in 1996, the proposed Runway 17/35 was constructed and is now referred to as existing Runway 18R/36L. The modified Measure NA-8 would state: "Departing Runway 18R, turbojet aircraft initiate turns as soon as practicable to a heading of 195 degrees."

NOISE ABATEMENT MEASURE NA-9

- **Description:** After commissioning of a third parallel runway west of Runway 18R/36L, establish an initial departure turn, as soon as practicable, by turbojets and large four-engine prop aircraft to a heading of 315 degrees from Runway 35.
- **Status:** This measure is currently implemented. Since the approval of Measure NA-9 in 1996, the existing Runway 18R/36L was constructed (previously referred to as Runway 17/35). The approved Measure NA-9 is intended to turn departures from Runway 36C (formerly Runway 36L) and Runway 36L to diverging headings. This is to prevent the Runway 36C route (as described in Measure NA-7) from crossing the extended centerline of Runway 18R/36L between one and two miles north of the north end of the new runway. The heading of 315 degrees from Runway 36L is intended to direct any turbojet departures from that runway along an initial course roughly aligned with the intersections of Wilkinson Blvd and Sam Wilson Road and of I-85 and Moores Chapel Road. Additionally, there are no scheduled operations of four-engine prop aircraft at the Airport.

  To assure adequate separation between departures on Runway 36L and missed approaches on Runway 36C (a combination which is not the normal expected operating configuration), ATCT is required to maintain visual separation between the operations. Departures from Runway 36L may occasionally be delayed until the missed approach has cleared or, optionally, the missed approach course from Runway 36C may be revised to provide for climbs along the runway heading prior to transitioning to the missed approach fix.
- **Recommendation:** Continue approved Measure NA-9 with modification to update the name of the existing runways and remove reference to large four-engine prop aircraft. Since the approval of Measure NA-9 in 1996, the proposed Runway 17/35 was constructed and is now referred to as existing Runway 18R/36L. The modified Measure NA-9 would state: "Departing Runway 36L, turbojets aircraft initiate turns as soon as practicable to a heading of 315 degrees."

4.1.2 New Noise Abatement Measures Recommended for Inclusion in the 2024 NCP

A total of 34 alternative noise abatement measures were considered and evaluated for inclusion in the 2024 NCP, labeled NA-A-1 through NA-I-3. The alternative noise abatement measures were developed based on comments received from members of the TAC, including the local FAA ATCT, airlines operating at CLT, and the Airport Community Roundtable (ACR).

The following list includes examples of the types of alternatives that were considered.

Facility Modifications
- Run-up Locations
- Displaced Arrival Thresholds

Preferential Runway Use
- Airport Flow
- Daytime Runway Use
- Nighttime Runway Use

Flight Procedures
- Divergent Headings - North and South Flow Operations
- Departure Flight Corridors
- Arrival Flight Corridors

In order to evaluate each alternative, a set of evaluation criteria was established and used to identify the benefits and drawbacks of each alternative. The criteria include safety and feasibility, noise reduction, operational considerations, and implementation considerations. After it was determined that an alternative was feasible and safe, a noise impact assessment was prepared to document increases and decreases in various noise levels as compared to the Future (2028) Baseline. If the alternative was determined to result in noise reductions, the alternative was evaluated for operational efficiency. If the alternative was determined to not result in any impacts to operational efficiency, the alternative was evaluated for implementation considerations. **Exhibit 4-1** summarizes the noise abatement alternative evaluation process. While not all alternatives may be practical or achievable, all potential alternatives were considered in accordance with 14 CFR Part 150 §150.23(e) and § B150.7.

Exhibit 4-1 Noise Abatement Alternative Screening Process

The alternatives identified for further evaluation cannot all be implemented at the same time due to recommendations that would conflict with each other. As such, the combined effect of various alternatives yield different levels of noise exposure. Therefore, the most promising alternatives were compiled into NCP operating scenarios for further analysis, as described in **Appendix E, *Noise Abatement Alternatives***. Based on the scenario analysis, Scenario 2 (which consists of six alternative noise abatement measures) was selected as the preferred scenario because it provides the most capacity, delay, and flexibility benefits.

This section describes the six alternative noise abatement measures which comprise Scenario 2 that are recommended for inclusion in this 2024 NCP. See Section 4.1.3 for a description of the 28 alternative noise abatement measures that are not recommended for inclusion in this 2024 NCP.

The following information is provided for each alternative noise abatement measure:

- Title – includes a brief descriptive title of the measure.
- Background and Intent – includes the intent of the measure as a means to mitigate noise impacts and the background and setting to which the measure relates where applicable.
- Benefits – includes a statement of how the measure would provide noise mitigation benefits
- Drawbacks – identifies any potential negative consequences of implementing the measure
- Cost to Implement – identifies the potential cost to implement each measure
- Evaluation Method – provides the method by which the measure was evaluated for changes in noise impacts. This was either accomplished as a qualitative analysis or a quantitative evaluation using the FAA's Aviation Environmental Design Tool (AEDT) model to develop an alternative noise exposure contour and develop counts of noise-sensitive land uses within the DNL 65+ dB to compare to the Future (2028) Baseline. For each alternative in which a quantitative analysis was performed, an exhibit is included showing a comparison of the noise exposure contour that would result from the implementation of the alternative and the Future (2028) Baseline noise exposure contour. In addition, a table of noise impacts that would result from the implementation of the alternative is included to either show an increase or a decrease in housing units and noise-sensitive sites within the DNL 65 dB.
- Findings and Recommendations – indicates if the alternative was carried forward for further evaluation and if it was recommended for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-A-1: Update to Measure NA-6

TITLE:	Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport. Refer to **Exhibit 4-2, *Run-Up Locations*** for the existing run-up locations.

BACKGROUND AND INTENT:	The Airport user policy currently identifies six run-up locations and procedures for aircraft engine run-ups. The measure would establish two new run-up locations that are currently under construction: on the deice pad located on the south airfield east of Runway 36C (ID 7); and in the northeast airfield east of Taxiway D (ID 8). Construction is anticipated to conclude in 2025 and the sites would be able to be used for run-ups when completed. The measure would maximize the use of midfield run-up locations (ID 2, 3, 7) and reduce the use of those located on the east side of the Airport (ID 4, 5, 6, 8). The intent of the measure is to reduce sideline noise from run-ups on the east side of the Airport.

BENEFITS:	The addition of two new run-up locations would allow for increased flexibility for carriers to conduct run-ups. Evaluations conducted at major airports throughout the United States have indicated that run-up activity has little effect on the location of the noise contours. However, sustained single-event noise levels associated with run-ups are often sources of complaint within neighborhoods near airports. The maximized use of midfield locations over those located on the east side of the Airport would appear to result in reduced sideline noise from run-ups for homes directly east of Airport Drive.

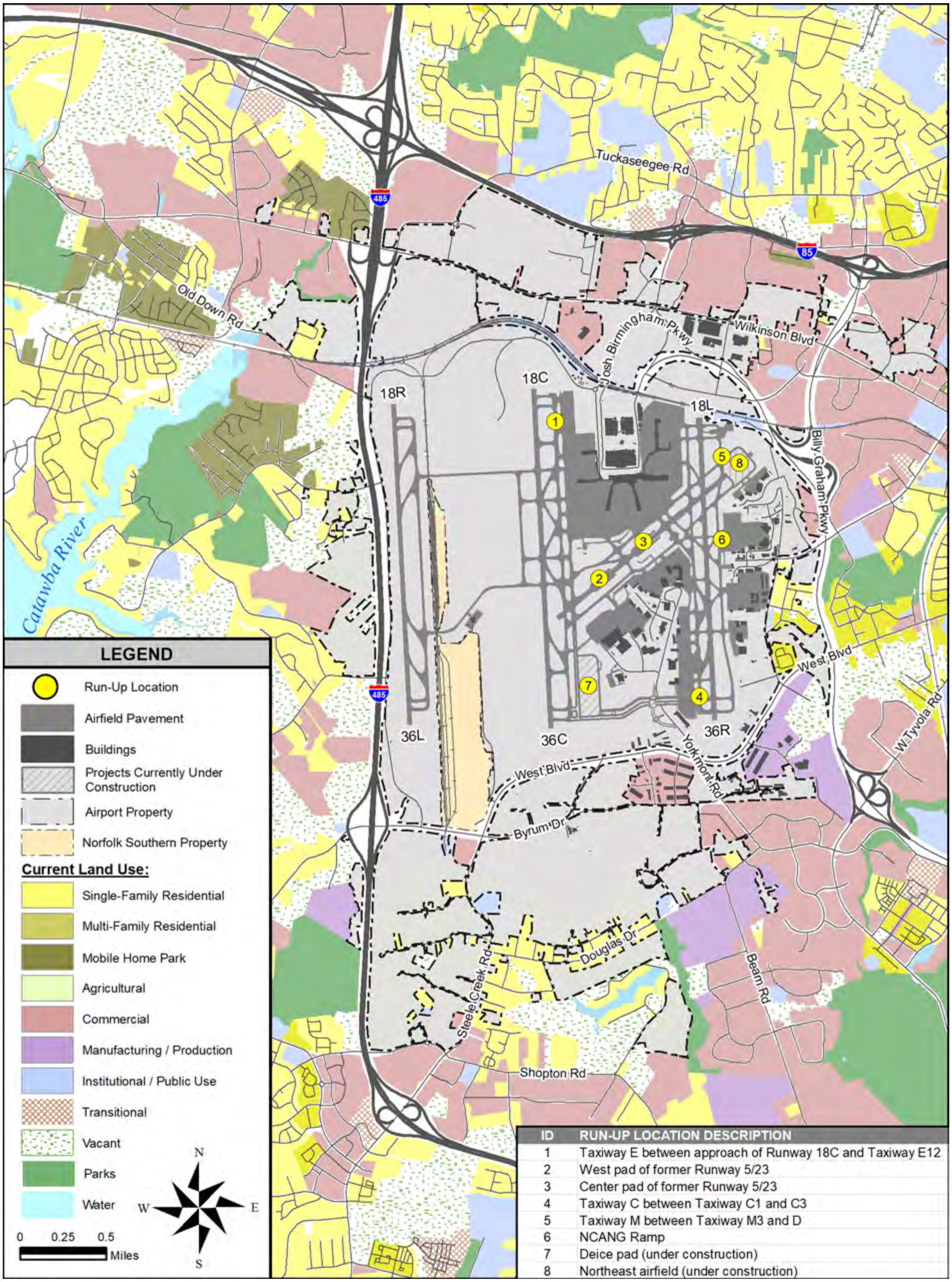
DRAWBACKS:	None

COST TO IMPLEMENT:	Minimal cost for development and publication of new airport procedures.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The measure is anticipated to result in reduced sideline noise from run-ups for homes directly east of Airport Drive. For this reason, this measure is **RECOMMENDED** for inclusion in this 2024 NCP.

Exhibit 4-2 Run-Up Locations



ID	RUN-UP LOCATION DESCRIPTION
1	Taxiway E between approach of Runway 18C and Taxiway E12
2	West pad of former Runway 5/23
3	Center pad of former Runway 5/23
4	Taxiway C between Taxiway C1 and C3
5	Taxiway M between Taxiway M3 and D
6	NCANG Ramp
7	Deice pad (under construction)
8	Northeast airfield (under construction)

Source: Landrum & Brown, 2024

Alternative Noise Abatement Measure NA-A-2: New Measure NA-10

TITLE:	Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport.

BACKGROUND AND INTENT:	The Airport user policy currently identifies six run-up locations and procedures for aircraft engine run-ups. Based on approval of the modification to Measure NA-6, two additional run-up locations would be available and operational in 2025. When the new fourth parallel runway is constructed and operational, run-up ID 1 would be removed as a run-up location. This measure would conduct an assessment of ground run-up locations to identify additional locations in the midfield in the future airport layout after construction of the new fourth parallel runway (anticipated 2028). The intent of this measure is to reduce sideline noise from run-ups after construction of the new fourth parallel runway.

BENEFITS:	Evaluations conducted at major airports throughout the United States have indicated that run-up activity has little effect on the location of the noise contours. However, sustained single-event noise levels associated with run-ups are often sources of complaint within neighborhoods near airports. The maximized use of midfield locations over those located on the east side of the Airport would appear to result in reduced sideline noise from run-ups for homes directly east of Airport Drive.

DRAWBACKS:	None

COST TO IMPLEMENT:	Cost related to conducting an assessment of ground run-up procedures after construction of the new fourth parallel runway. Minimal costs related to development and publication of new airport procedures to document new run-up locations based on the assessment.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The measure is anticipated to result in reduced sideline noise from run-ups for homes directly east of Airport Drive. For this reason, this measure is **RECOMMENDED** for inclusion in this 2024 NCP.

Alternative Noise Abatement Measure NA-E-1: New Measure NA-11

TITLE:	Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates Runway 36C and Runway 36R would be primarily used for north flow arrivals in the nighttime (10:00 p.m. to 7:00 a.m.).[10] This measure would designate Runway 36R and Runway 36L primarily for nighttime north flow arrivals. Refer to **Exhibit 4-3, *Alternative Noise Abatement Measure NA-E-1***. The intent of the measure is to shift the nighttime overflights over residential land uses off Douglas Drive and Shopton Road to noise-compatible land uses over Airport property west of Steele Creek Road and to the east off Beam Road.

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. NA-E-1 and NA-E-3 are conflicting alternative noise abatement measures and cannot be implemented at the same time. Because both alternative noise abatement measures would result in a similar decrease in housing units within the DNL 65+ dB noise exposure contour, noise impacts between the DNL 60- and 65-dB noise exposure contour were estimated to evaluate if there are any notable differences between the two alternatives. The results demonstrated NA-E-1 would perform better than NA-E-3. See Appendix E for more information.

DRAWBACKS:	None

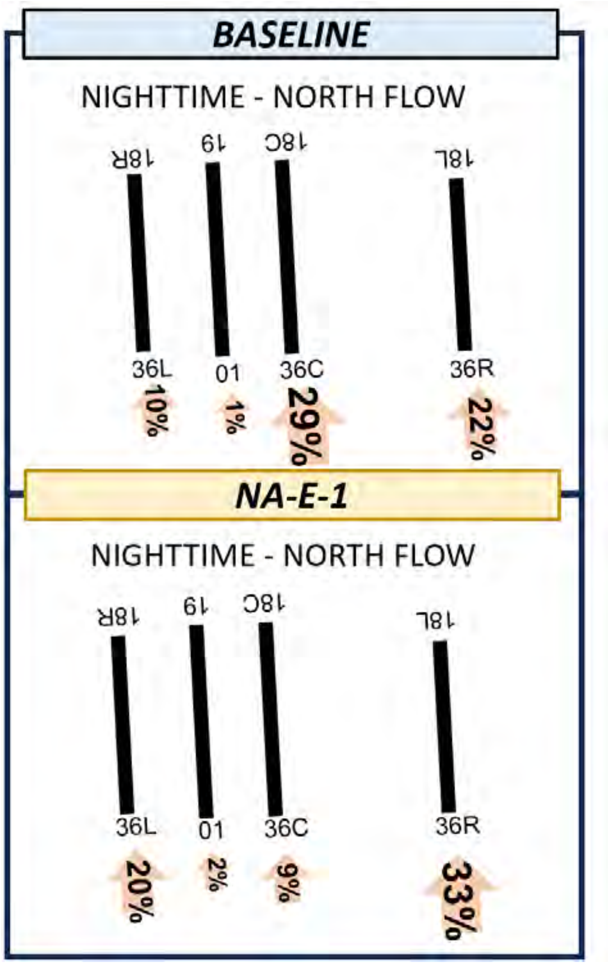
COST TO IMPLEMENT:	The cost for additional training, development, and revision to the Tower Order would be the responsibility of the FAA. The cost related to the required environmental processing per the National Environmental Policy Act (NEPA) for the implementation of the measure would be the responsibility of the Airport.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure was recommended for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments. Further analysis determined that NA-E-1 performed better than NA-E-3 between the DNL 60- and 65-dB noise exposure contour. As such, NA-E-1 is **RECOMMENDED** for inclusion in the 2024 NCP.

10 The runway use patterns for the Future (2028) Baseline are based on data from the Capacity EA that was developed in consultation with FAA ATC personnel and review of airfield simulation modeling.

Exhibit 4-3 Alternative Noise Abatement Measure NA-E-1



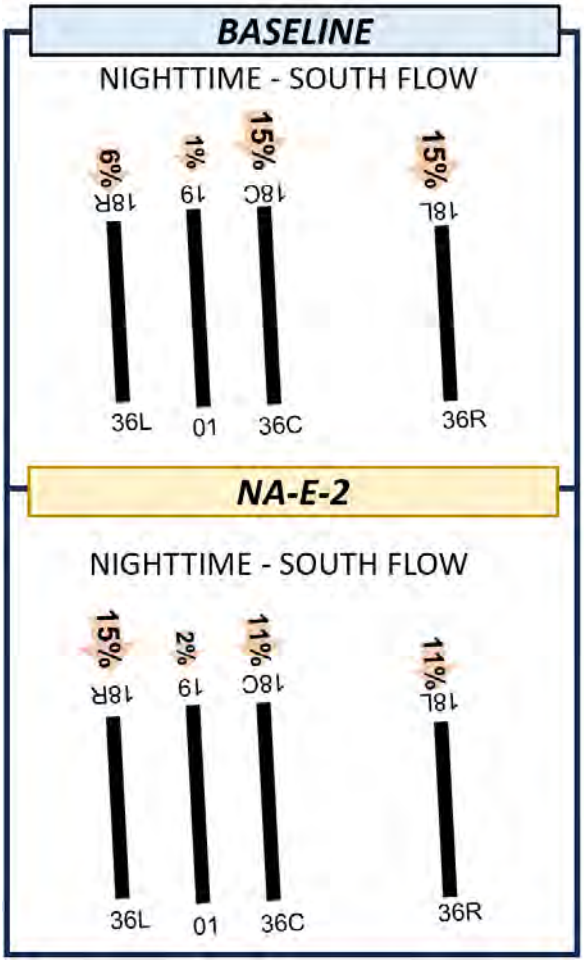
Note: Orange arrows denote average-annual arrival operation conditions.
Source: Landrum & Brown, 2024

Alternative Noise Abatement Measure NA-E-2: New Measure NA-12

TITLE:	Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.
BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates Runway 18C and Runway 18L would be primarily used for south flow arrivals in the nighttime (10:00 p.m. to 7:00 a.m.).[11] This measure would designate Runway 18R, Runway 18C, and Runway 18L for south flow arrivals in the nighttime. Refer to **Exhibit 4-4, *Alternative Noise Abatement Measure NA-E-2***. The intent of this measure is to spread out south flow arrivals in the nighttime to reduce the nighttime traffic over residential land uses off Tuckaseegee Road, Westwood Drive, and Little Rock Road. In turn, this would increase nighttime arrival overflights over Interstate 485 and Airport property.
BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
DRAWBACKS:	None
COST TO IMPLEMENT:	The cost for additional training, development, and revision to the Tower Order would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure would be the responsibility of the Airport.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure was recommended for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments. Based on further evaluation, NA-E-2 is **RECOMMENDED** for inclusion in the 2024 NCP.

11 The runway use patterns for the Future (2028) Baseline are based on data from the Capacity EA that was developed in consultation with FAA ATC personnel and review of airfield simulation modeling.

Exhibit 4-4 Alternative Noise Abatement Measure NA-E-2



Note: Orange arrows denote average-annual arrival operation conditions.
Source: Landrum & Brown, 2024

Alternative Noise Abatement Measure NA-F-2: New Measure NA-13

TITLE:	Maximize the number of divergent headings for north flow departures while maintaining a 15° separation between headings on Runway 36C, Runway 36R, and Runway 01.

BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts north of the Airport by providing additional flight corridors over as wide of an area as possible. This measure would replace the existing headings with the following divergent headings, as shown in **Exhibit 4-5, *Alternative Noise Abatement Measure NA-F-2***: • Runway 36R: Runway Heading (RWH), 20°, 35°, 50°, 65°, 80° • Runway 36C and Runway 01: RWH, 345°, 330°, 315°, 300°, 285° Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 01 and Runway 36R for daytime departure operations and Runway 36C and Runway 36R for nighttime departure operations. Additionally, Runway 36C would be used for departures in the daytime if Runway 01 could not be used for reasons of operational necessity. As such, headings proposed for Runway 01 are also proposed for Runway 36C. *While a straight-out heading is identified for Runways 36R and 01 (or 36C), these headings cannot be used simultaneously because a 15-degree separation is required per 7110.65Z.*

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. NA-F-2 and NA-F-1 are conflicting alternative noise abatement measures and cannot be implemented at the same time. Because both alternative noise abatement measures would result in a similar decrease in housing units within the DNL 65+ dB noise exposure contour, a simulation modeling analysis was conducted to evaluate the capacity and delay implications of each measure. The results demonstrated NA-F-2 would provide more capacity and delay benefits than NA-F-1.

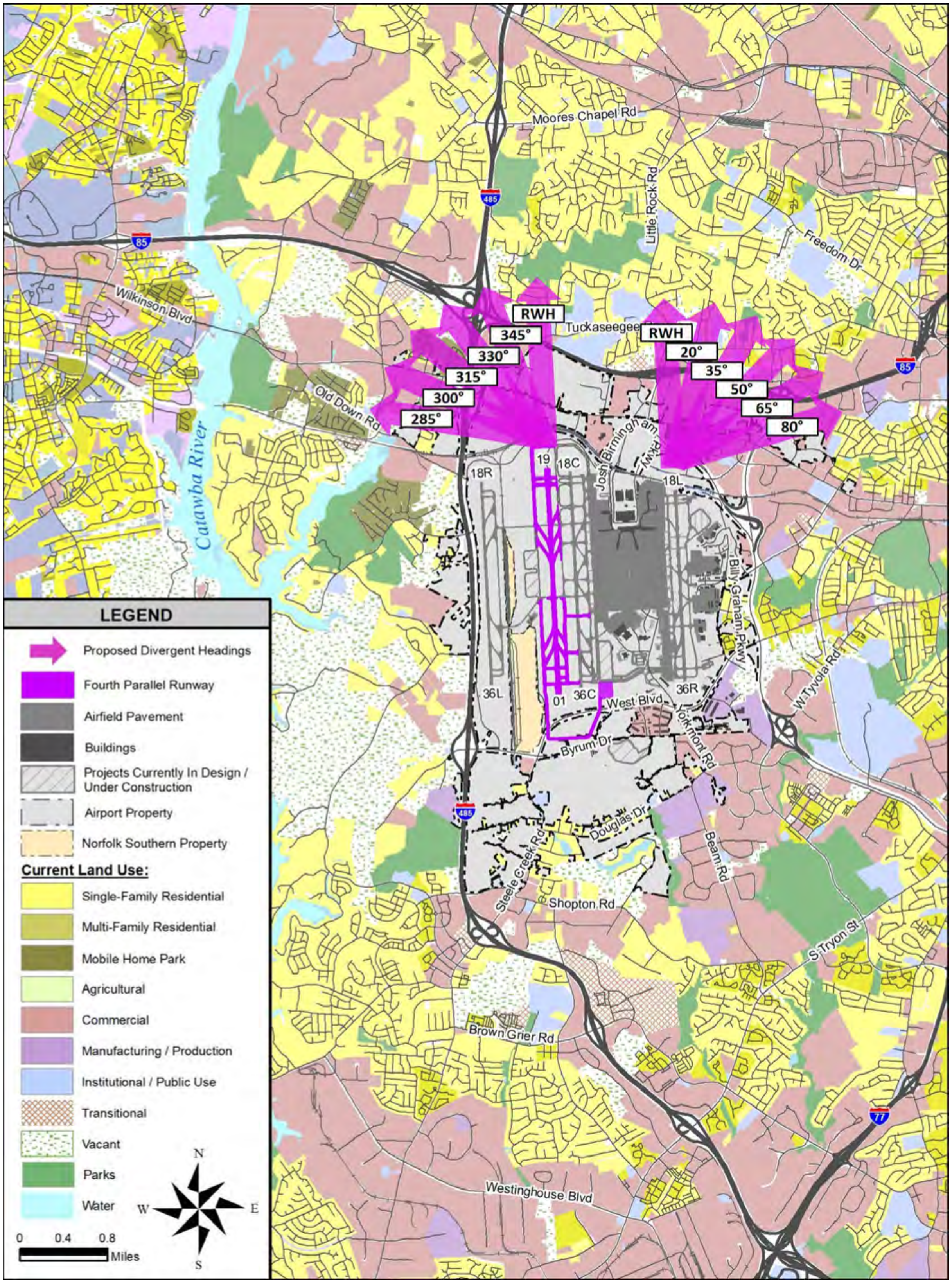
DRAWBACKS:	None

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment: AEDT and Air Traffic Optimization (AirTOP) modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure was recommended for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments. Because NA-F-2 provides more capacity and delay benefits than those provided by NA-F-1, NA-F-2 measure is **RECOMMENDED** for inclusion in the 2024 NCP.

Exhibit 4-5 Alternative Noise Abatement Measure NA-F-2



Source: Landrum & Brown, 2024.

Alternative Noise Abatement Measure NA-G-4: New Measure NA-14

TITLE:	Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings on Runway 18C, Runway 18L, and Runway 19. This would require the elimination of the 2-mile restriction.

BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts to the south of the Airport by dispersing flights over a wider area. The measure would implement the maximum number of divergent headings while maintaining a 15° separation between headings to spread noise over as wide an area surrounding the Airport as possible. The measure would implement the following divergent headings, as shown in **Exhibit 4-6, *Alternative Noise Abatement Measure NA-G-4***: • Runway 18L: RWH, 165°, 150°, 135°, 120°, 105° • Runway 18C and Runway 19: RWH, 200°, 215°, 230°, 245°, 260° Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 19 are also proposed for Runway 18C. *While a straight-out heading is identified for Runways 18L and 19, these headings cannot be used simultaneously because a 15° separation is required per 7110.65Z.*

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. NA-G-1, NA-G-2, NA-G-3, and NA-G-4 are conflicting alternative noise abatement measures and cannot be implemented at the same time. Because NA-G-2, NA-G-3, and NA-G-4 would result in a similar decrease in housing units within the DNL 65+ dB noise exposure contour, a simulation modeling analysis was conducted to evaluate the capacity and delay implications of these alternatives. The results demonstrated NA-G-4 would provide more capacity and delay benefits than NA-G-2 and NA-G-3.

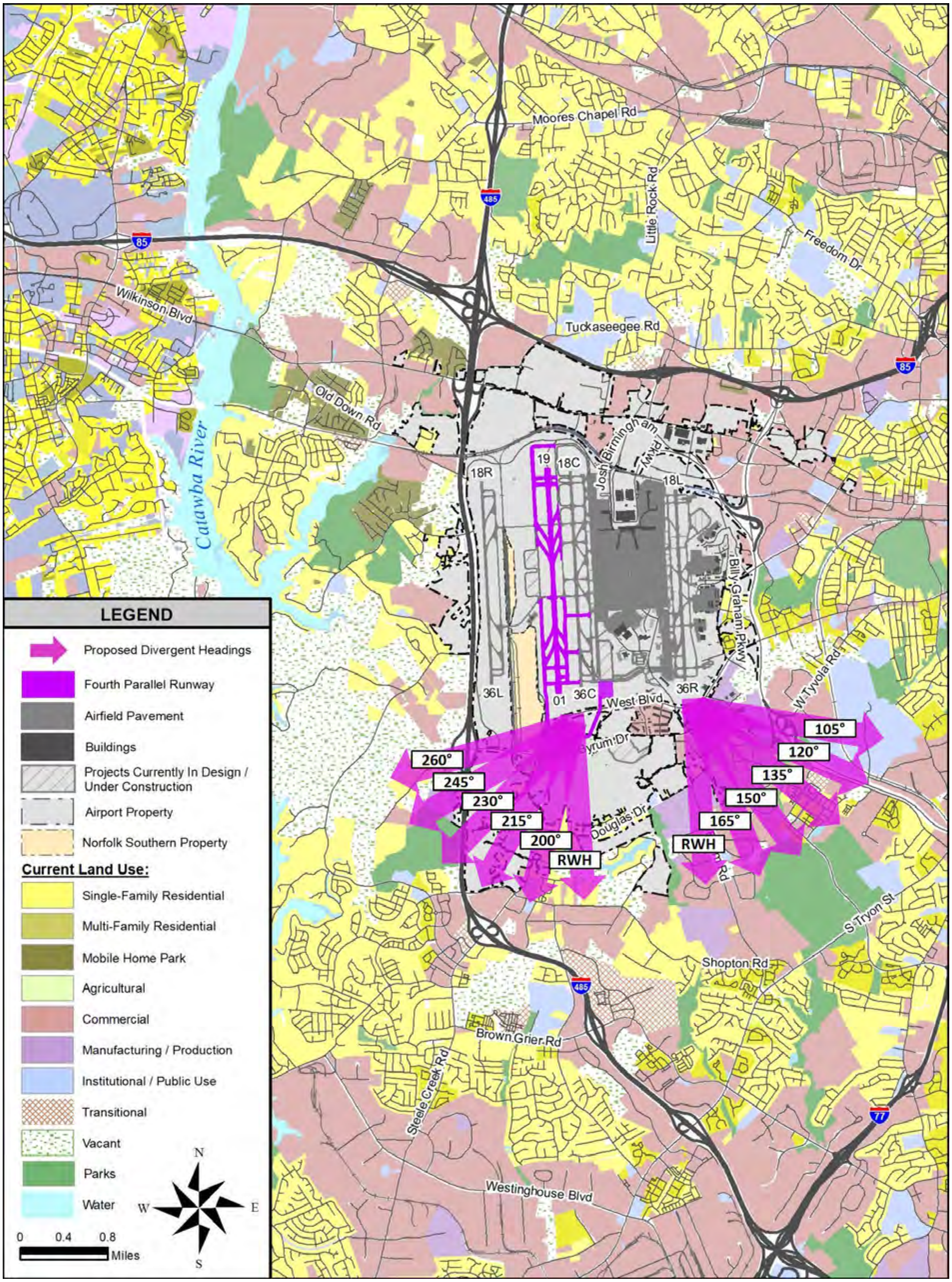
DRAWBACKS:	None

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT and AirTOP modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure was recommended for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments. Because NA-G-4 provides the most capacity and delay benefits than those provided by NA-G-2 and NA-G-3, NA-G-4 is **RECOMMENDED** for inclusion in the 2024 NCP.

Exhibit 4-6 Alternative Noise Abatement Measure NA-G-4



Source: Landrum & Brown, 2024.

4.1.3 Alternative Noise Abatement Measures Considered but Not Recommended for Inclusion in the 2024 NCP

This section describes the 28 alternative noise abatement measures that are not recommended for inclusion in this 2024 NCP.

Alternative Noise Abatement Measure NA-B-1

TITLE:	Implement a 1,235-foot displaced arrival threshold on Runway 36C.
BACKGROUND AND INTENT:	Aircraft arriving from the south to Runway 36C currently land at the runway end. The implementation of the displaced arrival threshold would direct aircraft to land 1,235 north of the Runway 36C end. The intent of the measure is to increase the altitude of arriving aircraft to reduce noise levels over residential areas south of the Airport, including those off Douglas Drive and Shopton Road. Refer to Appendix E for more information.
BENEFITS:	None
DRAWBACKS:	The measure would not result in a decrease in the number of housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-B-2

TITLE:	Implement a 1,376-foot displaced arrival threshold on Runway 36R.
BACKGROUND AND INTENT:	Aircraft arriving from the south to Runway 36R currently land at the runway end. The implementation of the displaced arrival threshold would direct aircraft to land 1,376 north of the Runway 36R end. The intent of the measure is to increase the altitude of arriving aircraft to reduce noise levels over residential areas south of the Airport, including those off Beam Road. Refer to Appendix E for more information.
BENEFITS:	None
DRAWBACKS:	The measure would not result in a decrease in the number of housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-B-3

TITLE:	Implement a 1,376-foot displaced arrival threshold on Runway 18L.
BACKGROUND AND INTENT:	Aircraft arriving from the north to Runway 18L currently land at the runway end. The implementation of the displaced arrival threshold would direct aircraft to land 1,376 feet south of the Runway 18L end. The intent of the measure is to increase the altitude of arriving aircraft to reduce noise levels over residential areas to the north of the Airport including Tuckaseegee Road and Little Rock Road. Refer to Appendix E for more information.
BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
DRAWBACKS:	Negative operational impacts would occur due to the existing high-speed taxiways not being positioned for a displaced threshold. The results would be greater runway occupancy times, longer taxi distance, and potentially increased congestion due to where aircraft would exit the runway. Furthermore, the cost to redesign and reconstruct the taxiways along the runway would far exceed any benefits.
COST TO IMPLEMENT:	The cost to redesign and reconstruct all taxiways along Runway 18L/36R would be the responsibility of the Airport. The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative Assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would result in a decrease in the number of housing units and noise-sensitive facilities that would be located within the DNL 65+ dB noise exposure contour. However, the measure would result in negative operational impacts that could only be resolved by redesigning and reconstructing the taxiways along the runway. The cost of such redesigning and reconstruction would far exceed any benefits. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-B-4

TITLE:	Implement a 1,100-foot displaced arrival threshold on Runway 01.
BACKGROUND AND INTENT:	Aircraft arriving from the south to Runway 01 currently land at the runway end. The implementation of the displaced arrival threshold would direct aircraft to land 1,100 feet north of the Runway 01 end. The intent of the measure is to increase the altitude of arriving aircraft over residential areas south of the Airport including those off Douglas Drive and Steeleberry Drive. The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures. As such, this measure would only be implemented in conjunction with NA-D-1, which would revise the new fourth parallel runway to be used as a primarily arrival runway. See Alternative Noise Abatement Measure *NA-D-1* for more information. Refer to Appendix E for more information.
BENEFITS:	None
DRAWBACKS:	The measure would result in an increase in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-B-4-A

TITLE:	Implement a 1,100-foot displaced arrival threshold on Runway 01.

BACKGROUND AND INTENT:	This measure is similar to NA-B-4, as it is aimed to implement a displaced arrival threshold for aircraft to land 1,100 feet north of the Runway 01 end. The intent of the measure is to increase the altitude of arriving aircraft over residential areas south of the Airport including those off Douglas Drive and Steeleberry Drive. The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures. As such, this measure would only be implemented in conjunction with NA-D-1-A, which would revise the runway use for the new fourth parallel runway as a primarily arrival runway. See *Alternative Noise Abatement Measure NA-D-1-A* for more information. In summary, this measure would implement the displaced arrival threshold identified in NA-B-4 with runway use identified in NA-D-1-A. Refer to Appendix E for more information.

BENEFITS:	None

DRAWBACKS:	The measure would result in an increase in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-C-1

TITLE:	Balanced Mix of North v. South Flow: Increase the amount of time the Airport operates in south flow to achieve a 50/50 balance of north versus south flow

BACKGROUND AND INTENT:	Historically, the Airport has operated approximately 64 percent in north flow (arriving to and departing from Runways 36L/36C/36R) and 36 percent in south flow (arriving to and departing from Runways 18L/18C/18R). While the annual direction of flow may vary year to year from the historical direction of flow, the long-term percentage is a better representation of typical annual conditions. The intent of this measure is to evaluate the balancing of the direction of flow by increasing the amount of time the Airport operates in south flow to achieve a 50/50 balance of north flow and south flow.

BENEFITS:	None

DRAWBACKS:	Coordination with the local FAA ATCT was conducted to identify if setting guidelines in attempt to increase the amount of time the Airport operates in south flow would result in potential safety and/or feasibility issues. The local FAA ATCT stated the direction of flow is primarily determined by wind direction and wind speed on the surface and aloft (above the ground). It is also determined by the location of severe weather systems within a hundred miles of the Airport. Additionally, local FAA ACTC stated the amount of time when the direction of flow is not dictated by these factors, but is up to the discretion of the local FAA ATCT operators, is negligible. The point being that even though surface wind reports might suggest the potential for achieving balanced north/south operations, the Airport and the airspace is too dynamic and complex to actually achieve the goal. There are examples of other airports attempting to put artificial goals on runway use and those goals not being achievable for similar reasons. Based on these factors, it was determined implementation of any guidelines to dictate or maintain an annual direction of flow is not likely to result in the intended goal (not feasible) and to try to force it would limit the air traffic controller's ability to choose the safest direction of flow for the operation of the Airport (safety).

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. Additionally, the cost related to the monitoring and documentation of the Airport's direction of flow would be the responsibility of the Airport. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	Because the measure was found to be neither safe nor feasible, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-C-2

TITLE:	Limit One Direction Flow to a Maximum Number of Days: Prevent continuous flow in one direction over more than [two consecutive days] to bring relief to people who have been getting noise/flow from one type of operation continuously for multiple days. After [two consecutive days] of flow in the same direction, flow should be reversed at the first reasonable opportunity and maintained in the reverse direction for a reasonable period.
BACKGROUND AND INTENT:	Similar to NA-C-1, the measure is aimed to balance the direction of flow by increasing the amount of time the Airport operates in south flow to achieve a 50/50 balance of north flow and south flow. This measure would further require setting a cap on the number of days the Airport operates in the same direction of flow. The intent of this measure is to reduce net residential noise impacts to the north by reducing departure operations over residential land uses and to the south by reducing arrival operations over residential land uses.
BENEFITS:	None
DRAWBACKS:	Coordination with the local FAA ATCT was conducted to identify if setting guidelines in attempt to increase the amount of time the Airport operates in south flow would result in potential safety and/or feasibility issues. The local FAA ATCT stated the direction of flow is primarily determined by wind direction and wind speed on the surface and aloft (above the ground). It is also determined by the location of severe weather systems within a hundred miles of the Airport. Additionally, local FAA ACTC stated the amount of time when the direction of flow is not dictated by these factors, but is up to the discretion of the local FAA ATCT operators, is negligible. The point being that even though surface wind reports might suggest the potential for achieving balanced north/south operations, the airport and the airspace is too dynamic and complex to actually achieve the goal. There are examples of other airports attempting to put artificial goals on runway use and those goals not being achievable for similar reasons. Based on these factors, it was determined implementation of any guidelines to dictate the runway flow is not feasible and to try to force it generally or on a day-to-day basis would likely limit the air traffic controller's ability to choose the safest direction of flow for the operation of the Airport.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. Additionally, the cost related to the monitoring and documentation of the Airport's direction of flow would be the responsibility of the Airport. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Because the measure was found to be neither safe nor feasible, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-1

TITLE:	Evaluate the new runway as an arrival runway. Designate Runways 18R/36L and 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures by turbojet aircraft between 7:00 a.m. and 10:00 p.m.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures in the daytime (7:00 a.m. to 10:00 p.m.). This measure would designate Runway 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures in the daytime. The intent of this measure is to reduce net residential noise impacts to the north and south of the Airport by shifting arrivals to the west of residential land uses. Refer to Appendix E for more information.

BENEFITS:	None

DRAWBACKS:	The measure would result in an increase in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. This measure could be implemented in conjunction with NA-B-4 for additional noise abatement benefits.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-1-A

TITLE:	Evaluate the new runway as an arrival runway. Designate Runways 18R/36L and 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures by turbojet aircraft between 7:00 a.m. and 10:00 p.m.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures in the daytime (7:00 a.m. to 10:00 p.m.). This measure is similar to NA-D-1 which would designate the new fourth parallel runway, Runway 01/19, as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures in the daytime. The intent of this measure is to reduce net residential noise impacts to the north and south of the Airport by shifting arrivals to the west of residential land uses. Refer to Appendix E for more information.

BENEFITS:	None

DRAWBACKS:	The measure would result in an increase in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. This measure could be implemented in conjunction with NA-B-4-A for additional noise abatement benefits.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-2

TITLE:	At low periods, spread operations to avoid concentration of a particular mode of operation (e.g., most/all departures or most/all arrivals) to a single runway, leaving others underutilized for the same mode of operation. For example: Avoid sending all arrivals to Runway 18R while Runways 18L and 18C are held open for occasional departures.

BACKGROUND AND INTENT:	The intent of the measure is to spread operations during low periods of operations by avoiding concentration of a particular mode of operation on a runway to reduce net residential noise impacts.

BENEFITS:	None

DRAWBACKS:	During low periods of operation, FAA ATCT personnel currently spreads operations to avoid concentration of a particular mode of operation to a single runway, which is the stated goal of this measure. As such, the measure is already part of the Future (2028) Baseline as it is anticipated that the Airport would continue to operate this way in the future after construction of the new fourth parallel runway. Therefore, implementation of this measure would not result in a reduction of noise impacts within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline.

COST TO IMPLEMENT:	None

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	Because the measure is already part of the Future (2028) Baseline, implementation would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-3

TITLE:	Ensure that the new fourth parallel runway (Runway 01/19), Runway 18R/36L (for arrivals), and Runway 18C/36C (for departures) will never have more, in the aggregate, than [50%] of arrivals/departures over any single daily period.
BACKGROUND AND INTENT:	The intent of this measure is to ensure the spreading of operations and avoid a concentration of a volume of flights on one area on an average-annual day.
BENEFITS:	None
DRAWBACKS:	The suggestion of caps on runways inherently creates barriers to implementation from a feasibility perspective because the Airport is a dynamic environment that may require the use of runways that would exceed the limits of this measure. To force caps and percentages into a complex system like the one at CLT would reduce operational capability and potentially reduce safety. As such, the measure is not feasible for implementation.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Because the measure was found to not be feasible for implementation, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-4

TITLE:	Set guidelines that require a minimum allocation of departures for Runway 18R/36L for a given timeframe (e.g., over the course of a quarter or year), with the goal of achieving at least ten percent of daily departures on that runway.

BACKGROUND AND INTENT:	Runway 18R/36L was planned (location) and designed (length) to be primarily used as an arrival runway. The runway has the capability to be used for departures, but due to its location in relationship to the terminal area, it is used for departures only under extenuating circumstances. The Future (2028) Baseline runway use indicates Runway 18R/36L would continue to be primarily used for arrivals. This measure would designate Runway 18R/36L as a departure runway for up to ten percent of departures on an average-annual day. The intent of this measure is to reduce net residential noise impacts to the north of the Airport by reducing departures north of Runway 18L/36R and the new fourth parallel runway, Runway 01/19, and increasing them over noise-compatible land uses and major transportation corridors. Refer to Appendix E for more information.

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	Implementation of this measure would require aircraft to routinely taxi across two active runways (Runway 18C/36C and Runway 01/19), which reduces the operational efficiency of those active runways due to the need for ATC to space operations to maintain adequate separation between aircraft taxiing across the runway(s) and aircraft on final approach. This would increase ATC workload and result in increased delays to ensure no runway incursions occur. Therefore, this measure is not considered feasible due to operational and safety concerns.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Implementation of this measure would result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. However, the measure is not considered feasible due to operational and safety concerns. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-5

TITLE:	Between 7am-10pm, do not use the new fourth parallel runway (Runway 01/19) and Runway 18R/36L to receive arrivals in “dual stream” mode during non-peak periods.

BACKGROUND AND INTENT:	The intent of this measure is to prevent dual stream arrivals during non-peak periods to reduce net residential noise impacts to the north and south of the Airport.

BENEFITS:	None

DRAWBACKS:	Dual stream arrival operations take place at CLT during daytime arrival peaks when there is a high demand for arrivals. After the construction of the new fourth parallel runway, dual stream arrivals would typically only occur at the Airport during arrival peaks, as captured in the Future (2028) Baseline. Because the measure is already part of the Future (2028) Baseline, implementation would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour.

COST TO IMPLEMENT:	None

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	Because the measure is already part of the Future (2028) Baseline, implementation would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-6

TITLE:	Alternate use of runways so that no two adjacent runways will be used primarily for the same mode of operation (arrival or departure) over a daily period.
BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts by dispersing departure and arrival operations as much as possible.
BENEFITS:	None
DRAWBACKS:	Currently, no two adjacent runways are used primarily for the same mode of operation (west runway for arrivals, center runway for departures, and east runway for mixed operations). The new fourth parallel runway was evaluated in the Major Capacity Enhancement Projects Environmental Assessment (Capacity EA) and was approved as a primarily departure runway. As approved in the Capacity EA, the Airport would continue to have alternative modes of operation (west runway for arrivals, new fourth parallel runway for departures, center runway for arrivals, and east runway for mixed operations). As such, the runway use proposed in this measure was captured in the Future (2028) Baseline. Therefore, implementation of this measure would not result in a reduction of noise impacts within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline
COST TO IMPLEMENT:	None
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-7

TITLE:	Utilize Runway 01/19 and Runway 18C/36C primarily for departures and Runway 18R/36L and Runway 18L/36R primarily for arrivals.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures in the daytime (7:00 a.m. to 10:00 p.m.). This measure would designate the new fourth parallel runway, Runway 01/19, and Runway 18C/36C primarily for departures and Runway 18R/36L and Runway 18L/36R primarily for arrivals in the daytime. Refer to Appendix E for more information. The intent of this measure is to reduce net residential noise impacts to the north and south of the Airport by shifting arrivals to the west and east of residential land uses and concentrating departures north and south of the new fourth parallel runway, Runway 01/19, and Runway 18C/36C.

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	The measure would result in an increase in one place of worship within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. Implementation of the measure would result in an increase in delay at the Airport when compared to the Future (2028) Baseline scenario. Arrival delays would increase during periods of high arrival demand due to the loss of a runway used for arrivals when compared to the Future (2028) Baseline.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Implementation of this measure would result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. However, the measure is not considered feasible due to operational concerns. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-D-8

TITLE:	Utilize Runway 01/19 and Runway 18C/36C for both arrivals and departures.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures and Runway 18C/36C primarily for arrivals in the daytime (7:00 a.m. to 10:00 p.m.). This measure would designate Runway 01/19 and Runway 18C/36C for both arrival and departure operations in the daytime. The intent of this measure is to reduce net residential noise impacts to the south of the Airport by shifting arrivals to the east over noise-compatible land uses and to the north of the Airport by shifting departures to the west of residential land uses. Refer to Appendix E for more information.

BENEFITS:	None

DRAWBACKS:	The measure would result in an increase in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-E-3

TITLE:	Focus nighttime north flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 36R). Due to their close proximity, consider Runways 1/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates Runway 36C and Runway 36R would be primarily used for nighttime (10:00 p.m. to 7:00 a.m.) north flow arrivals. This measure would designate Runway 36R as the primary runway for nighttime north flow arrivals. Refer to Appendix E for more information. The intent of this measure is to shift nighttime arrival traffic east of residential land uses south of Runway 36C and 36L towards noise-compatible land use off Beam Road.

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	NA-E-1 and NA-E-3 are conflicting alternative noise abatement measures and cannot be implemented at the same time. Because both alternative noise abatement measures would result in a similar decrease in housing units within the DNL 65+ dB noise exposure contour, noise impacts between the DNL 60- and 65-dB noise exposure contour were estimated to evaluate if there are any notable differences between the two alternatives. The results demonstrated NA-E-1 would perform better than NA-E-3. See Appendix E for more information.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure was recommended for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments. Further analysis determined that NA-E-3 performed worse than NA-E-1 between the DNL 60- and 65-dB noise exposure contour. As such, NA-E-3 is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-E-4

TITLE:	Focus nighttime south flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 18L). Due to their close proximity, consider Runways 01/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates Runway 18C and Runway 18L would be primarily used for nighttime (10:00 p.m. to 7:00 a.m.) south flow arrivals. This measure would designate Runway 18L as the primary runway for nighttime north flow arrivals. The intent of this measure is to shift nighttime arrival traffic east of residential land uses north of Runway 18C.

BENEFITS:	None

DRAWBACKS:	The measure would result in an increase in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-F-1

TITLE:	Increase the number of departure headings for north flow departures while maintaining existing approved headings and maximizing departure corridors.

BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts north of the Airport by providing additional flight corridors over noise-compatible land uses. This measure would keep existing headings as follows: • Runway 36R: 25° • Runway 36L: 315° This measure would add divergent headings as follows: • Runway 36R: 85° heading to follow the Wilkinson Boulevard corridor and 55° & 70° heading to follow the Interstate 85 corridor • Runway 36C and Runway 01: Implement the existing Runway 36C's approved 330° heading, 345° heading to follow the I-85/485 Interchange and follow the I-485 corridor, 305° heading to follow the Wilkinson Boulevard corridor Divergent headings for Runway 36R departures would reduce noise impacts on homes off Tuckaseegee Road and direct more flights over transportation corridors and commercial and industrial land uses. The divergent heading for Runway 01 and Runway 36C departures would direct more flights over Airport property, transportation corridors and commercial and industrial land uses. This measure assumes the runway use for the Future (2028) Baseline which designates Runway 01 and Runway 36R for daytime departure operations and Runway 36C and Runway 36R for nighttime departure operations. Additionally, Runway 36C would be used for departures in the daytime if Runway 01 could not be used for reasons of operational necessity. As such, headings proposed for Runway 01 are also proposed for Runway 36C. Refer to Appendix E for more information.

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	NA-F-2 and NA-F-1 are conflicting alternative noise abatement measures and cannot be implemented at the same time. Because both alternative noise abatement measures would result in a similar decrease in housing units within the DNL 65+ dB noise exposure contour, a simulation modeling analysis was conducted to evaluate the capacity and delay implications of each measure. The results demonstrated NA-F-2 would provide more capacity and delay benefits than NA-F-1.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT and AirTOP modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure was recommended for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments. Because NA-F-1 provides less capacity and delay benefits than those provided by NA-F-2, NA-F-1 is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-G-1

TITLE:	Increase the number of departure headings for south flow departures while keeping the 2-mile restriction on the new fourth parallel runway, Runway 01/19 and the existing Runway 18C/36C.
BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts to the south of the Airport by providing additional flight corridors over noise-compatible land uses. The measure would keep the existing headings and implement divergent headings for Runway 18L and Runway 18R departures that would direct more flights over transportation corridors and commercial and industrial land uses. The measure would keep existing headings as follows: • Runway 18R: 200° heading • Runway 18L: RWH° The measure would add divergent headings as follows: • Runway 18R (remove 2-mile restriction): 220° heading to follow the Garrison Road corridor • Runway 18C and Runway 19 (keep 2-mile restriction): Implement the existing Runway 18C's approved RWH • Runway 18L (remove 2-mile restriction): 120° heading to follow the Billy Graham Parkway corridor, 150° heading and 165° heading to follow the W Tyvola Road corridor Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 19 are also proposed for Runway 18C. *While a straight-out heading is identified for Runways 18L and 19, these headings cannot be used simultaneously because a 15° separation is required per 7110.65Z.*
BENEFITS:	None
DRAWBACKS:	The measure would not result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. NA-G-1, NA-G-2, NA-G-3, and NA-G-4 are conflicting alternative noise abatement measures and cannot be implemented at the same time.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-G-2

TITLE:	Increase the number of departure headings for south flow departures while keeping the 2-mile restriction on Runway 18L.

BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts to the south of the Airport by utilizing flight corridors over noise-compatible land uses. The measure would keep the existing headings and implement divergent headings for Runway 18L and Runway 18R departures that would direct more flights over transportation corridors and commercial and industrial land uses. The measure would keep existing headings as follows: • Runway 18R: 200° • Runway 18L (keep 2-mile restriction): RWH The measure would add divergent headings as follows: • Runway 18R (remove 2-mile restriction): 220° heading to follow the Garrison Road corridor • Runway 18C and Runway 19 (remove 2-mile restriction): Implement the existing Runway 18C's approved RWH, 200° heading and 215° heading to follow the Steele Creek Road corridor Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 19 are also proposed for Runway 18C. *While a straight-out heading is identified for Runways 18L and 19, these headings cannot be used simultaneously because a 15° separation is required per 7110.65Z.*

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	NA-G-1, NA-G-2, NA-G-3, and NA-G-4 are conflicting alternative noise abatement measures and cannot be implemented at the same time. Because NA-G-2, NA-G-3, and NA-G-4 would result in a similar decrease in housing units within the DNL 65+ dB noise exposure contour, a simulation modeling analysis was conducted to evaluate the capacity and delay implications of these alternatives. The results demonstrated NA-G-4 would provide more capacity and delay benefits than NA-G-2 and NA-G-3.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT and AirTOP modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure was recommended for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments. Because NA-G-2 provides less capacity and delay benefits than those provided by NA-G-4, this measure is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-G-3

TITLE:	Increase the number of departure headings for south flow departures while maintaining existing approved headings and maximizing departure corridors. This requires eliminating the 2-mile restriction for all runways.

BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts to the south of the Airport by utilizing flight corridors over noise-compatible land uses. The measure would keep the existing headings and implement divergent headings for Runway 18L, Runway 18C, and Runway 18R departures that would direct more flights over transportation corridors and commercial and industrial land uses. The divergent heading for Runway 19 and Runway 18C departures would direct more flights over Airport property, transportation corridors and commercial and industrial land uses. The measure would keep the existing headings as follows: • Runway 18L: RWH • Runway 18R: 200° Th measure would eliminate the 2-mile restriction and add divergent headings as follows: • Runway 18L: 120° heading to follow the Billy Graham Parkway corridor, 150° heading and 165° heading to follow the W Tyvola Road corridor • Runway 18R: 220° heading to follow the Garrison Road corridor • Runway 18C and Runway 19: Implement the existing Runway 18C's approved RWH, 200° heading and 215° heading to follow the Steele Creek Road corridor Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 19 are also proposed for Runway 18C. *While a straight-out heading is identified for Runways 18L and 19, these headings cannot be used simultaneously because a 15° separation is required per 7110.65Z.*

BENEFITS:	The measure would result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	NA-G-1, NA-G-2, NA-G-3, and NA-G-4 are conflicting alternative noise abatement measures and cannot be implemented at the same time. Because NA-G-2, NA-G-3, and NA-G-4 would result in a similar decrease in housing units within the DNL 65+ dB noise exposure contour, a simulation modeling analysis was conducted to evaluate the capacity and delay implications of these alternatives. The results demonstrated NA-G-4 would provide more capacity and delay benefits than NA-G-2 and NA-G-3.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT and AirTOP modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure was recommended for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments. Because NA-G-3 provides less capacity and delay benefits than those provided by NA-G-4, this measure is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-H-1

TITLE:	Evaluate helicopter operations in the south general aviation apron to takeoff towards the south and stay between Yorkmont and Billy Graham Parkway before turning on course.

BACKGROUND AND INTENT:	The intent of this measure is to reduce helicopter flights over non-mitigated homes directly east of Airport Drive by implementing additional helicopter corridors. Refer to Appendix E for more information.

BENEFITS:	None

DRAWBACKS:	The measure would not result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-H-2

TITLE:	Change Headings of First Turns off Runways 18L and 18C.
BACKGROUND AND INTENT:	The intent of the measure is to reduce the effect of noise on more densely populated areas and foster the desire by the ACR to return to pre-Metroplex flight paths. Refer to Appendix E for more information.
BENEFITS:	None
DRAWBACKS:	The measure would not result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-H-3

TITLE:	For south flow departures, revert to 2016 procedures where aircraft depart from the Runway 18C at a 183° heading and fly between 2 to 4 nautical miles before turning to a 270° heading.

BACKGROUND AND INTENT:	The intent of the measure is to reduce the effect of noise on more densely populated areas and foster the desire by the ACR to return to 2016 flight paths. Refer to Appendix E for more information.

BENEFITS:	None

DRAWBACKS:	This noise abatement alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in housing units within the 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-I-1

TITLE:	For south flow arrivals along the CHSLY procedure, maintain the published altitude of 6,000 feet at the HEELZ procedure so flights will not cut the corner.
BACKGROUND AND INTENT:	The intent of this measure is to reduce the effect of noise on more densely populated areas by utilizing noise abatement corridors for arrival procedures.
BENEFITS:	None
DRAWBACKS:	This noise abatement alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in housing units within the 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	The alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-I-2

TITLE:	For south flow arrivals, extend the eastern downwind so that flights intercept the final approach over the main channel of Mountain Island Lake keeping an altitude of 6,000 feet until turning final approach course.

BACKGROUND AND INTENT:	The intent of this measure is to reduce the effect of noise on more densely populated areas by utilizing noise abatement corridors for arrival procedures.

BENEFITS:	None

DRAWBACKS:	This noise abatement alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

Alternative Noise Abatement Measure NA-I-3

TITLE:	For north flow arrivals, utilize Interstate 77 as a flight corridor.
BACKGROUND AND INTENT:	The intent of the measure is to reduce the effect of noise on more densely populated areas by utilizing noise abatement corridors for arrival procedures.
BENEFITS:	None
DRAWBACKS:	This noise abatement alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	The alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is not recommended for further evaluation and is **NOT RECOMMENDED** for inclusion in the 2024 NCP.

4.1.4 Summary

This 2024 NCP includes eleven (11) noise abatement measures of which one (1) is recommended for the short-term, five (5) are recommended for the long-term, and five (5) are recommended as described below. Recommendation for a measure to be included in the NCP in the short-term means that the measure would be active after approval of the 2024 NCP until it is withdrawn and replaced by a long-term measure. Long-term measures may become active after the new fourth parallel runway has been constructed and/or all required environmental processing per the NEPA is approved and the development of air traffic procedures and implementation to the CLT Tower Order is complete.

- NA-4: Monitor late night (11:00 p.m. to 7:00 a.m.) runway utilization and variances from NCP assumptions. Conduct follow-up with FAA ATCT and carriers as needed to enhance adherence to existing program. (Modified)
- NA-5: Designate Runway 18C or 18L as preferred for takeoffs by turbojet aircraft between 11:00 p.m. and 7:00 a.m. when wind, weather, and operational conditions allow. (Modified)
- NA-6: Reaffirm Airport user policy which designates locations and procedures for aircraft engine run-ups. Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport. (Modified with NA-A-1)
- NA-7 (Short-Term): Departing Runways 36R and 36C, all turbojet aircraft initiate turns at 2.5 DME (36C) and 2.6 DME (36R) north of the CLT VOR/DME, respectively. (Modified)
- NA-8: Departing Runway 18R, turbojet aircraft initiate turns as soon as practicable to a heading of 195 degrees. (Modified)
- NA-9: Departing Runway 36L, turbojet aircraft initiate turns as soon as practicable to a heading of 315 degrees. (Modified)
- NA-10 (Long-Term): Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport. (NA-A-2)
- NA-11 (Long-Term): Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m. (NA-E-1)
- NA-12 (Long-Term): Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m. (NA-E-2)
- NA-13 (Long-Term): Maximize the number of divergent headings for north flow departures while maintaining a 15° separation between headings. (NA-F-2)
- NA-14 (Long-Term): Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction. (NA-G-4)

4.2 Land Use Compatibility Measures

4.2.1 Existing Land Use Compatibility Measures

This section provides a review of the nine (9) currently approved land use compatibility measures included in the 1996 NCP. Of these measures, three (3) were previously withdrawn. Provided for each measure is a description, the current status, and the recommendation for this 2024 NCP.

LAND USE COMPATIBILITY MEASURE LU-1

- **Description:** Promote compatible land use planning within the 65 DNL of the combined 1996 NEM and 1996 NCP contours.
- **Status:** The measure is currently implemented. The initial 1990 NCP recommended amending local land use policies (zoning, density, and capital improvement recommendations) to reduce the development of new noncompatible land uses within the Airport Environs. The intent of this measure is to amend land use policies to be consistent with Part 150 compatible land use guidelines outlined in 14 CFR Part 150 Appendix A. In the 1996 NCP, the Airport Environs was defined as the area within the DNL 65 dB of the combined 1996 NEM and 1996 NCP contours. This area is also referred to as the Airport Noise Disclosure Overlay District which was implemented through the approval of Measure LU-7.
  Since the implementation of Measure LU-1, the City of Charlotte Aviation Department has continued to coordinate with the Charlotte Planning, Design and Development Department regarding land use planning and zoning. The Airport has addressed a majority of concerns related to noise-sensitive land uses within the DNL 65 dB of the combined 1996 NEM and 1996 NCP contours through acquisition and sound insulation (where eligible). Additionally, the City of Charlotte supports compatible development through Land Use Maps that recommend compatible development within this area. However, some areas are proposed for residential use in the current City of Charlotte Proposed Land Use Map as there is an increased demand for residential land uses in the area.
- **Recommendation:** Continue approved Measure LU-1 with modification to clarify that the DNL 65 dB of the combined 1996 NEM and 1996 NCP contours is the same as the Airport Noise Disclosure Overlay District. The modified LU-1 would state “Promote compatible land use planning within the Airport Noise Disclosure Overlay District (DNL 65 dB of the combined 1996 NEM and 1996 NCP contours).”

LAND USE COMPATIBILITY MEASURE LU-2

- **Description:** Pursue zoning for compatible development.
- **Status:** This measure is ongoing. This is a continuation of Measure LU-2 in the approved 1990 NCP which recommended the rezoning of property to permit only compatible uses within specific noise contours, to retain compatible zoning, and to limit the density of residential development permitted within' noise contours. This measure is intended to establish the policy of making airport-compatible land uses the priority within the Airport Noise Disclosure Overlay District (DNL 65 dB noise exposure of the combined 1996 NEM and 1996 NCP noise contours). The 1996 NCP called for the immediate implementation of this measure through amending the local zoning ordinances. Ongoing coordination takes place between the City of Charlotte Aviation Department the Charlotte-Mecklenburg Planning Commission regarding land use planning and zoning.
- **Recommendation:** Continue approved Measure LU-2.

LAND USE COMPATIBILITY MEASURE LU-3

- *Measure previously withdrawn. Listed for numeric continuity.*

LAND USE COMPATIBILITY MEASURE LU-4

- **Description:** Pursue the dedication of an avigation easement as a condition to approval of development of property located in the Airport Environs.
- **Status:** This measure is not implemented. This measure is a continuation of the approved Measure LU-4 in the 1990 NCP which recommended the dedication of avigation easement as a condition of approval for the development of property located in the Airport Environs. Amending local zoning and subdivision regulations to provide for the dedication of an easement as a condition of approval for residential rezoning or subdivision plats within the DNL 65 dB noise contour of the combined 1996 NCP and 1996 NEM contours would alert developers, lenders. and prospective purchasers to the proximity of the Airport and to the existence of a potential noise issue. The implementation of the avigation easement would also protect the Airport from future litigation by purchasers of the rezoned or subdivided property.
  Since the approval of this measure in the initial 1990 NCP, the Airport has not been successful in the implementation of this measure despite continuous efforts. As such, there is no requirement for dedication of an avigation easement as a condition of new development, rezoning, or subdividing property in the City's zoning or subdivision ordinances.
- **Recommendation:** Implementation of Measure LU-4 has not been successful and has not resulted in any benefits to the Airport or its surrounding community. As such, the measure is recommended for withdrawal.

LAND USE COMPATIBILITY MEASURE LU-5

- *Measure previously withdrawn. Listed for numeric continuity.*

LAND USE COMPATIBILITY MEASURE LU-6

- *Measure previously withdrawn. Listed for numeric continuity.*

LAND USE COMPATIBILITY MEASURE LU-7

- **Description:** Pursue the establishment of an Airport Overlay District that corresponds to the Airport Environs in which there will be special requirements relating to developing, rezoning, and transferring residential property.
- **Status:** The measure is implemented. The approved Measure LU-7 in the 1996 NCP recommended the pursuit of establishment of an Airport Overlay District that corresponds to the Airport Environs in which there will be special requirements relating to developing, rezoning, and transferring residential property. The Airport Environs were defined as the area within the DNL 65 dB of the combined 1996 NEM and 1996 NCP contours.
  The Charlotte Planning, Design and Development Department adopted an Airport Noise Disclosure Overlay District to provide mechanisms for the disclosure to residential property owners and prospective residential property owners in the Airport Environs that the use and enjoyment of property located within the district is subject to overflights and aircraft noise that may be objectionable. The Airport Noise Disclosure Overlay District boundary includes all parcels intersecting the DNL 65 dB of the combined 1996 NEM and 1996 NCP contours. An Airport Noise Disclosure Overlay District Notice is included with every building permit and certificate of occupancy issued for residential construction and use located in the Airport Noise Disclosure Overlay District, which states: "Noise Warning—This property, either partially or wholly, is zoned Airport Noise Disclosure Overlay District and lies within or near the Noise Exposure Map Areas of Charlotte/Douglas International Airport and may be subject to noise that may be objectionable."
- **Recommendation:** Continuation of measure.

LAND USE COMPATIBILITY MEASURE LU-8

- **Description:** Pursue amending the state building code to authorize the City of Charlotte and Mecklenburg County to raise the minimum building standards (Noise Level Reduction requirements) by incorporating noise attenuation requirements for new residential construction within an Airport Overlay District.
- **Status:** This measure is not implemented. The approved Measure LU-8 in the 1996 NCP aimed to raise the minimum building standards for new residential construction within the Airport Noise Overlay District. However, judicial precedent in North Carolina precludes local variations in the state building code without prior approval by the North Carolina Building Code Council.
  Since the approval of this measure in 1996 NCP, the Airport has not been successful in the implementation of this measure despite continuous efforts. As such, the Airport Noise Overlay District does not include building code requirements.
- **Recommendation:** Implementation of Measure LU-8 has not been successful and has not resulted in any benefits to the Airport or its surrounding community. As such, the measure is recommended for withdrawal.

LAND USE COMPATIBILITY MEASURE LU-9

- **Description:** Develop a purchaser disclosure notice and pursue method of enforcement.
- **Status:** This measure is partially implemented. The Charlotte-Mecklenburg Planning Department adopted an Airport Noise Disclosure Overlay District to provide mechanisms for the disclosure to residential property owners and prospective residential property owners in the Airport Environs that the use and enjoyment of property located within the district is subject to overflights and aircraft noise that may be objectionable. The Airport Noise Disclosure Overlay District boundary includes all parcels intersecting the DNL 65 dB of the combined 1996 NEM and 1996 NCP contours. The following Airport Noise Disclosure Overlay District Notice is included with every building permit and certificate of occupancy issued for residential construction and use located in the Airport Noise Disclosure Overlay District: "Noise Warning—This property, either partially or wholly, is zoned Airport Noise Disclosure Overlay District and lies within or near the Noise Exposure Map Areas of Charlotte/Douglas International Airport and may be subject to noise that may be objectionable." To date, no method of enforcement has been implemented.
- **Recommendation:** Continue approved Measure LU-9 with modification to remove the requirement to “pursue method of enforcement.” The modified measure would state “Continue efforts to maintain the use of the Airport Noise Disclosure Overlay District Notice.”

4.2.2 Alternative Land Use Compatibility Measures Considered but Not Recommended for Inclusion in the 2024 NCP

Land use compatibility measures seek to prevent the introduction of additional noise-sensitive land uses within existing and future airport noise contours. These potential measures are discussed in **Appendix D**, ***Land Use Methodology*** and summarized below:

Preventative (Compatibility)
- Compatible Use Zoning
- Subdivision Regulations
- Building Codes
- Capital Improvement Programs
- Growth Risk Assessment
- Fair Disclosure Policies

One (1) land use compatibility measure, LU-A, was considered and evaluated for inclusion in the 2024 NCP in accordance with 14 CFR Part 150 §150.23(e) and § B150.7. However, the measure was not recommended for inclusion in this 2024 NCP.

The following information is provided for each alternative:

- Title – includes a brief descriptive title of the measure.
- Background and Intent – includes the intent of the measure and the background and setting to which the measure relates where applicable.
- Benefits – includes a statement of how the measure would provide benefits.
- Drawbacks – identifies any potential negative consequences of implementing the measure.
- Findings and Recommendations – indicates if the alternative was recommended for inclusion in the 2024 NCP.

Alternative Land Use Compatibility Measure LU-A

TITLE:	Modify the definition of the Airport Environs and Airport Overlay District referred to in the approved 1996 NCP Land Use Compatibility measures to reflect the DNL 65 dB of the Future (2028) NEM/NCP Noise Exposure Contour.

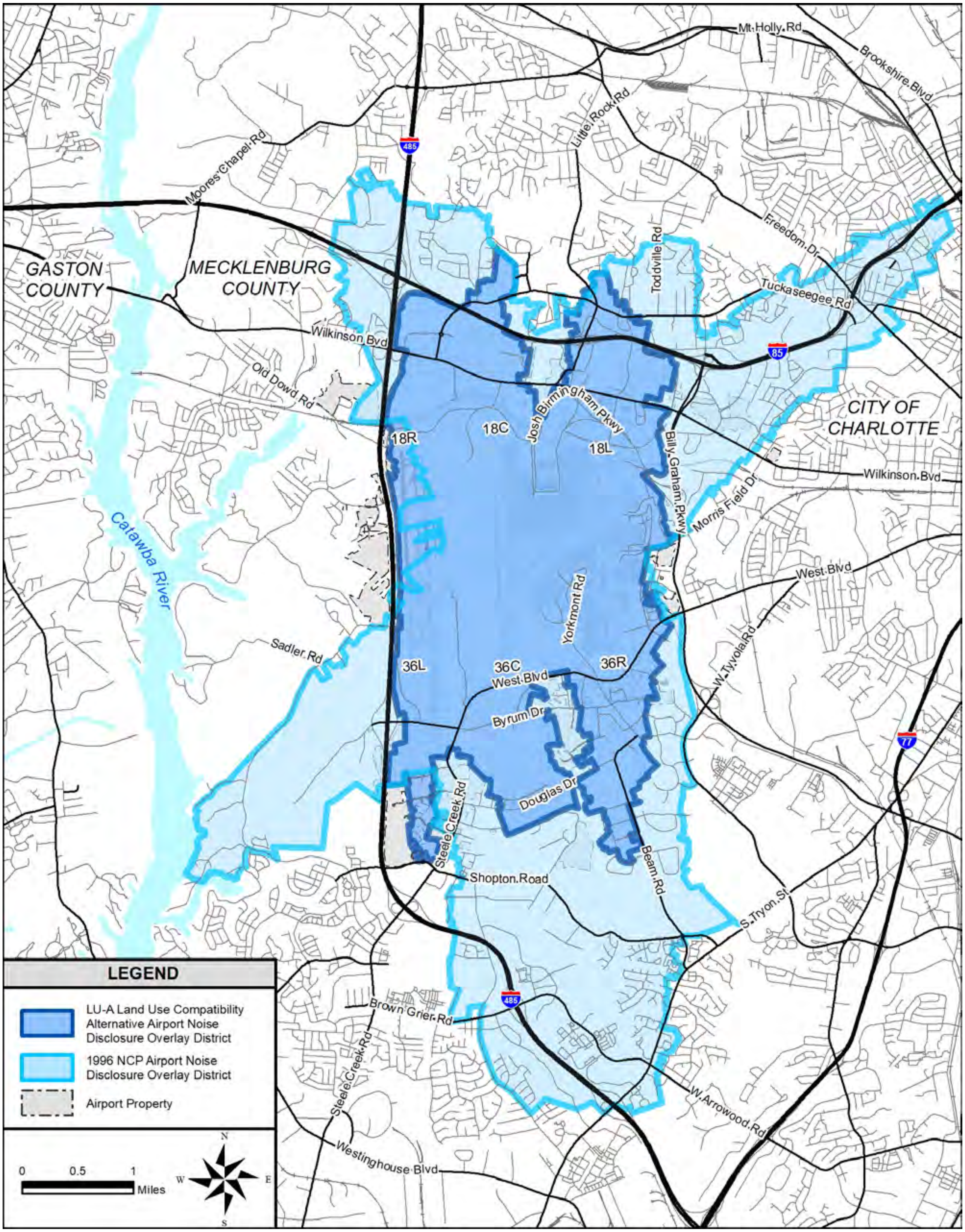
BACKGROUND AND INTENT:	The Airport Environs and Airport Overlay District referred to in the approved 1996 NCP were based on the DNL 65 dB noise exposure patterns of the combined 1996 NEM and 1996 NCP contours. This alternative would redefine the Airport Environs and Airport Overlay District to reflect the DNL 65 dB noise exposure patterns of the Future (2028) NEM/NCP Noise Exposure Contour, as shown in **Exhibit 4-7, *Alternative Airport Noise Disclosure Overlay District***. Since the approval of the initial 1990 NCP and the current 1996 NCP, the noise exposure contours for the Airport have reduced in size due to various factors. Many of the older, louder aircraft that operated at CLT in the 1990s and early 2000's have been phased-out or been significantly reduced from commercial airline fleets. Additionally, airlines continue to retire older, noisier aircraft from their fleets and replace them with more modern, quieter, fuel-efficient aircraft. Furthermore, the implementation of the 1996 NCP has helped the Airport minimize noise impact to the areas surrounding the Airport. These efforts continue to help minimize and reduce noise levels at airports often times even as the number of aircraft operations have increased. Furthermore, the Airport has addressed a majority of concerns related to noise-sensitive land uses within the combined 1996 NEM and 1996 NCP contours through acquisition and sound insulation (where eligible). As such, the intent for this measure is to update the definition of the Airport Environs and Airport Overlay District to reflect the reduced DNL 65 dB noise exposure patterns anticipated and estimated for the Future (2028) NEM/NCP Noise Exposure Contour.

BENEFITS:	Updating the Airport Environs and Airport Overlay District to include the reduced area within the DNL 65 dB of the Future (2028) NEM/NCP Noise Exposure Contour would reflect the anticipated noise exposure at CLT which has been reduced since the 1990s.

DRAWBACKS:	The implementation of this measure would reduce the area near the Airport where noise-compatible development would be encouraged. This would result in areas being excluded that are currently being developed for noise-compatible development.

FINDINGS AND RECOMMENDATION:	This alternative is **NOT RECOMMENDED** for inclusion in the NCP.

Exhibit 4-7 Alternative Airport Noise Disclosure Overlay District



Source: Landrum & Brown, 2024.

4.2.3 Summary

This 2024 NCP includes four (4) land use compatibility measures, as summarized below.

- LU-1: Promote compatible land use planning within the Airport Noise Disclosure Overlay District (DNL 65 dB of the combined 1996 NEM and 1996 NCP contours). (Modified)
- LU-2: Pursue zoning for compatible development. (Continuation)
- LU-7: Pursue the establishment of an Airport Overlay District that corresponds to the Airport Environs in which there will be special requirements relating to developing, rezoning, and transferring residential property. (Continuation)
- LU-9: Continue efforts to maintain the use of the Airport Noise Disclosure Overlay District Notice. (Modified)

4.3 Land Use Mitigation Measures

4.3.1 Existing Land Use Mitigation Measures

This section provides a review of the nine (9) currently approved land use mitigation measures included in the 1996 NCP. Of these measures, two (2) were previously withdrawn. Provided for each measure is a description, the current status, and the recommendation for this 2024 NCP.

LAND USE MITIGATION MEASURE NM-1

- **Description:** Establish a public information program which distributes noise and noise abatement information to the public.
- **Status:** This measure is ongoing. This measure is a continuation of the approved Measure NM-1 in the 1990 NCP. A public information program is in place that provides the general public, land developers, lending institutions, planning officials, and real estate professionals with the current status of Airport operations, proposed Airport development, noise impacts, and mitigation programs. This is implemented through the Airport's noise office and website. Additionally, two newsletters are currently in place: *Connections* provides information of interest to business and development concerns, and *Neighborhood Update* focuses on the implementation of mitigation programs, neighborhood meetings, and noise issues of community importance. The newsletters are published on the Airport's website and are distributed to the interested public through email.
- **Recommendation:** Continuation of measure.

LAND USE MITIGATION MEASURE NM-2

- **Description:** Sound insulate noise-sensitive buildings intended for public use, instruction (e.g., schools), or assembly (e.g., churches) within the DNL 65 dB noise contour of the combined 1996 NCP contours and 1996 NEM contours.
- **Status:** This measure is ongoing. This measure is a continuation of the approved Measure NM-2 in the 1990 NCP. The Airport's noise office sound insulation program actively implements this measure. To date, six churches and three schools have been sound insulated.
- **Recommendation:** Continue approved Measure NM-2 with modification to refer to area within the Future (2028) NEM/NCP Noise Exposure Contour. The modified Measure NM-2 would state: "Sound insulate noise-sensitive public building intended for public use, instruction (e.g., schools) or assembly (e.g., churches) located within the Future (2028) NEM/NCP Noise Exposure Contour."

LAND USE MITIGATION MEASURE NM-3

- **Description:** Sound insulate eligible houses located within the 65 DNL noise contour of the 1996 NCP contours and 1996 NEM contours, whichever is greater, which may be benefited under FAA design criteria.
- **Status:** This measure is ongoing. This measure was originally approved in the 1990 NCP and updated in the 1996 NCP to recommend sound insulation of eligible properties within the DNL 65 dB of the combined 1996 NCP and 1996 NEM contours, whichever is greater. This program provides mitigation to all private residences (other than mobile homes) that meet the FAA design objective for interior noise level reduction. This program is voluntary on the part of the homeowner. In order for homeowners to participate in the sound insulation program, noncompatible structures would first have to be deemed eligible. The design objective for sound insulation is to achieve a DNL of 45 dB in all habitable rooms. Eligibility criteria requires that residential sound insulation projects be designed to provide at least 5 dB improvement in noise level reduction (NLR). Only those structures able to achieve the minimum improvement in NLR

and a DNL of 45 dB are eligible for participation mitigation program. If the structure already has an interior DNL of 45 dB in all habitable rooms, it is not eligible for the program. Program eligibility determination is a two-step process. The first step is identifying potentially eligible houses within the program boundary. The second step is to determine whether or not the house (or portions of the house) meets the FAA design objective for interior NLR.
This measure is implemented through the Airport's noise office sound insulation program and continues to offer sound insulation based on eligibility. To date, nearly 1,000 homes have been sound insulated.

- **Recommendation:** Continue approved Measure NM-3 with modification to refer to the sound insulation program boundary as recommended in NM-A (see Section 4.3.2). The modified Measure NM-3 would state: "Sound insulate eligible houses located within the 2024 NCP sound insulation program boundary which may be benefited under FAA design criteria."

LAND USE MITIGATION MEASURE NM-4

- *Measure previously withdrawn. Listed for numeric continuity.*

LAND USE MITIGATION MEASURE NM-5

- *Measure previously withdrawn. Listed for numeric continuity.*

LAND USE MITIGATION MEASURE NM-6

- **Description:** Acquire mobile homes located within the 70 DNL noise contour of the 1996 NCP and 1996 NEM, whichever is greater.
- **Status:** This measure has been completed. The approved Measure NM-6 in the 1996 NCP recommended acquisition of mobile homes within the DNL 70 dB noise exposure pattern of the combined 1996 NEM and 1996 NCP noise contours. According to the Federal Aviation Regulation (FAR) Part 150 noise compatibility guidelines, mobile homes are not compatible land uses within the DNL 65 dB noise contour. Additionally, mobile home construction materials are not conducive to sound insulation treatment. Because mobile homes cannot be effectively sound insulated, the approved Measure NM-6 recommended the voluntary acquisition of these structures. Since the approval of this measure, all mobile home parks previously identified within the DNL 70 dB noise exposure pattern of the combined 1996 NEM and 1996 NCP noise contours have been acquired and no longer exist.
- **Recommendation:** No mobile homes have been identified within the DNL 70 dB noise exposure pattern of the combined 1996 NEM and 1996 NCP noise contours or that of the Future (2028) NEM/NCP noise exposure contours from this Part 150 Study. As such, this measure is recommended for withdrawal.

LAND USE MITIGATION MEASURE NM-7

- **Description:** At the Airport's option, purchase avigation easements, sound insulate, or acquire houses within the combined 65 DNL of the 1996 NEM contours and 1996 NCP contours, whichever is greater, where sound insulation is infeasible or not cost-effective because the property does not comply with the building code.
- **Status:** This measure is ongoing. This measure is implemented through the Airport's noise office sound insulation program and continues to offer sound insulation based on eligibility. Under this measure, the Airport would provide the flexibility by offering equitable solutions to the owners of those structures which are not up to the standards of the building code. The purchase of avigation easements, sound insulation, or acquisition of the property are recommended only in areas where sound insulation measures are being offered and then only in instances where a residential structure is not in compliance with the current standards of the state building code or when the condition of the structure makes it economically infeasible to implement the sound

insulation measures. Terms of an easement may require that any money be used for building code, sound insulation, or other compatibility improvements. Acquisition is only accomplished when the property is valued at less than the cost of insulation.

- **Recommendation:** Continue approved Measure NM-7 with modification to refer to the sound insulation program boundary as recommended in NM-A (see Section 4.3.2). The modified Measure NM-7 would state: “At the Airport’s option, purchase avigation easements, sound insulate, or acquire houses within the 2024 NCP sound insulation program boundary, where sound insulation is infeasible or not cost-effective because the property does not comply with the building code.”

LAND USE MITIGATION MEASURE NM-8

- **Description:** Sound insulate eligible houses located within the 65 DNL noise contour of the 2001 NCP, if any remain to be treated.
- **Status:** This measure is ongoing. This measure is implemented through the Airport’s noise office sound insulation program and continues to offer sound insulation based on eligibility.
- **Recommendation:** This measure is recommended for withdrawal because all residential sound insulation is recommended in NM-3. The 1996 NCP included sound insulation two phases: phase 1 (pre-west runway) and phase 2 (post-west runway). The 2024 NCP would include all sound insulation for the future 2028 conditions in one measure (Measure NM-3).

LAND USE MITIGATION MEASURE NM-9

- **Description:** Acquire mobile homes located within the 65 DNL noise contour of the 2001 NCP/NEM.
- **Status:** This measure is ongoing. According to the FAR Part 150 noise compatibility guidelines, mobile homes are not compatible land uses within the DNL 65 dB noise contour. Additionally, mobile home construction materials are not conducive to sound insulation treatment. As such, the approved Measure NM-9 of the 1996 NCP recommended the voluntary acquisition of these structures within the DNL 65 dB noise contour of the 2001 NCP/NEM. Three mobile home parks were identified for acquisition. To date, one mobile home park was acquired, and another was closed before an offer could be made.
- **Recommendation:** Continue approved Measure NM-9 with modification to refer to the sound insulation program boundary as recommended in NM-A (see Section 4.3.2). One mobile home park, the Interstate Mobile Home Park, is located within the 2024 NCP sound insulation program boundary. As such, the modified Measure NM-9 would state: “Acquire mobile homes located within the 2024 NCP sound insulation program boundary.”

4.3.2 New Land Use Mitigation Measures Recommended for Inclusion in the 2024 NCP

Land use mitigation measures are intended to mitigate or convert existing, noncompatible uses to compatible uses. These potential measures are discussed in **Appendix D**, ***Land Use Methodology*** and summarized below:

Mitigation (Corrective)

- Sound Insulation
- Land Acquisition
- Purchase Guarantee
- Avigation Easements

A total of one (1) land use mitigation measure, NM-A, was considered and evaluated for inclusion in the 2024 NCP in accordance with 14 CFR Part 150 §150.23(e) and §B150.7. The measure was recommended for inclusion in this 2024 NCP.

The following information is provided for each alternative:

- Title – includes a brief descriptive title of the measure.
- Background and Intent – includes the intent of the measure and the background and setting to which the measure relates where applicable.
- Benefits – includes a statement of how the measure would provide benefits.
- Drawbacks – identifies any potential negative consequences of implementing the measure.
- Findings and Recommendations – indicates if the alternative was recommended for inclusion in the 2024 NCP.

Alternative Land Use Mitigation Measure NM-A: Update to Measures NM-3, NM-7, and NM-9

TITLE:	Modify the residential sound insulation program boundary referred to in Measures NM-3, NM-7, and NM-9 to the 2024 NCP sound insulation program boundary which reflects the Future (2028) NEM/NCP Noise Exposure Contour.

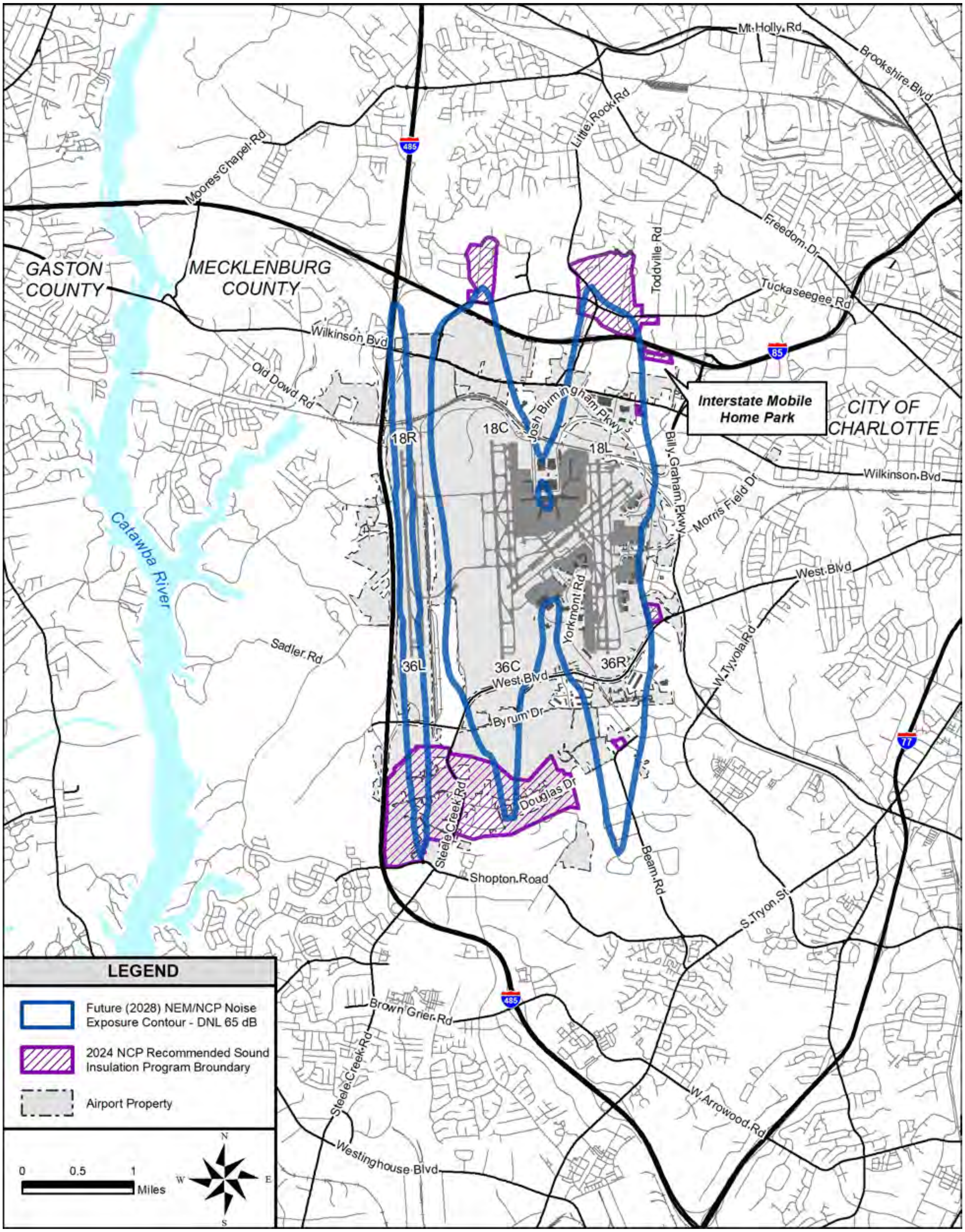
BACKGROUND AND INTENT:	Approximately 60 single-family residential units and 94 multi-family residential units located on parcels that intersect the DNL 65+ dB noise exposure contour of the Future (2028) NEM/NCP would be potentially eligible for sound insulation. The City of Charlotte has developed a methodology for providing sound insulation for specific areas outside but adjacent to the DNL 65+ dB noise exposure contour of the Future (2028) NEM/NCP contour. The policy of providing sound insulation to the areas adjacent to the DNL 65+ dB noise exposure contour is intended to preserve the integrity of contiguous, stable, and viable residential neighborhoods of similar housing design, construction type and materials. The resulting sound insulation boundary would be expanded to follow physical and geographic boundaries (also referred to as block rounding). The methodology for implementing this policy is to provide sound insulation for homes where a majority of the neighborhood would be eligible for sound insulation because of their location within the DNL 65+ dB noise exposure contour of the Future (2028) NEM/NCP noise exposure contour. The sound insulation program boundary would include the residential units located on parcels that intersect the DNL 65+ dB noise exposure contour of the Future (2028) NEM/NCP and be expanded to follow physical and geographic boundaries to include entire neighborhoods. Applying this methodology would result in a total of 374 single-family residential units and 104 multi-family residential units to be potentially eligible for sound insulation. See **Exhibit 4-8, *Recommended Sound Insulation Program Boundary*** for reference.

BENEFITS:	The implementation of this measure would reduce interior noise levels for the homes impacted by aircraft noise at or near the DNL 65+ dB noise exposure contour.

DRAWBACKS:	Sound insulation does not alter the noise impacts outside the home.

FINDINGS AND RECOMMENDATION:	This alternative is RECOMMENDED for inclusion in the NCP, which would modify approved measures NM-3, NM-7, and NM-9.

Exhibit 4-8 Recommended Sound Insulation Program Boundary



Source: Landrum & Brown, 2024.

4.3.3 Summary

This 2024 NCP includes five (5) land use mitigation measures, as summarized below.

- NM-1: Establish a public information program which distributes noise and noise abatement information to the public. (Continuation)
- NM-2: Sound insulate noise-sensitive public building intended for public use, instruction (e.g., schools) or assembly (e.g., churches) located within the Future (2028) NEM/NCP Noise Exposure Contour. (Modified)
- NM-3: Sound insulate eligible houses located within the 2024 NCP sound insulation program boundary which may be benefited under FAA design criteria. (Modified)
- NM-7: At the Airport's option, purchase avigation easements, sound insulate, or acquire houses within the 2024 NCP sound insulation program boundary, where sound insulation is infeasible or not cost-effective because the property does not comply with the building code. (Modified)
- NM-9: Acquire mobile homes located within the 2024 NCP sound insulation program boundary. (Modified)

4.4 2024 Noise Compatibility Program

4.4.1 2024 Noise Compatibility Program Description

The 2024 NCP measures are presented as a series of “plates” that summarize pertinent information required about each of the measures by 14 CFR Part 150 guidance. This information includes:

- A description and the background and intent of the measure
- The anticipated effect on land use compatibility
- The party (or parties) responsible for implementation
- The steps necessary for implementation, the anticipated cost, and the projected timing of implementation
- The relationship to other planning programs and other measures

Where helpful for clarification, an exhibit associated with the measure is provided. **Table 4-1, *2024 Noise Compatibility Program Recommendations,*** summarizes the measures included in the 2024 NCP for CLT.

Table 4-1 2024 Noise Compatibility Program Recommendations

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Noise Abatement Recommendations					
NA-4: *Revise measure to read as such:* Monitor late night (11:00 p.m. to 7:00 a.m.) runway utilization and variances from NCP assumptions. Conduct follow-up with FAA Air Traffic Control Tower (ATCT) and carriers as needed to enhance voluntary adherence to existing program. **Continuation with modification to remove reference to monthly reporting**	City of Charlotte Aviation Department	Annual $75,000 and minimal administrative costs	None	None	Currently being partially implemented. **Modification requires FAA approval.**
NA-5: *Revise measure to read as such:* Designate Runway 18C or 18L as preferred for takeoffs by turbojet aircraft between 11:00 p.m. and 7:00 a.m. when wind, weather, and operational conditions allow. **Continuation with modification to remove reference to Runway 05/23 and large four-engine prop aircraft, and to update the names of the existing runways**	City of Charlotte Aviation Department, ATCT, Airlines	None	None	None	Currently being implemented as conditions allow and recommended to continue with modification. **Modification does not require FAA approval.**

Table 4-1 2024 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Noise Abatement Recommendations *(continued)*					
NA-6: *Revise measure to read as such:* Reaffirm Airport user policy which designates locations and procedures for aircraft engine run-ups. Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport. (NA-A-1) **Continue with modification to add two new run-up locations and encourage maximizing the use of midfield run-up locations**	City of Charlotte Aviation Department, ATCT, Airlines	None	None	None	Currently being implemented as conditions allow and recommended to continue as previously approved. **Modification on approval of measure by FAA.**
NA-7 (Short-Term): *Revise measure to read as such:* Departing Runways 36R and 36C, all turbojet aircraft initiate turns at 2.5 DME (36C) and 2.6 DME (36R) north of the CLT VOR/DME, respectively. **Continue with modification to update the name of the existing runways and remove reference to large four-engine prop aircraft**	City of Charlotte Aviation Department, ATCT, Airlines	None	None	None	Currently being implemented as conditions allow and recommended to continue with modification. **Modification does not require FAA approval. This measure would be replaced with Measure NA-13 when it becomes active.**

Table 4-1 2024 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Noise Abatement Recommendations *(continued)*					
NA-8: *Revise measure to read as such:* Departing Runway 18R, turbojet aircraft initiate turns as soon as practicable to a heading of 195 degrees. **Continuation with modification to update the name of the existing runways and remove reference to large four-engine prop aircraft**	City of Charlotte Aviation Department, ATCT, Airlines	None	None	None	Currently being implemented as conditions allow and recommended to continue with modification. **Modification does not require FAA approval.**
NA-9: *Revise measure to read as such:* Departing Runway 36L, turbojet aircraft initiate turns as soon as practicable to a heading of 315 degrees. **Continuation with modification to update the name of the existing runways and remove reference to large four-engine prop aircraft**	City of Charlotte Aviation Department, ATCT, Airlines	None	None	None	Currently being implemented as conditions allow and recommended to continue with modification. **Modification does not require FAA approval.**
NA-10 (Long-Term): Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport. (NA-A-2)	City of Charlotte Aviation Department, Airlines	$25,000 to $100,000	None	None	This is a new measure that would be implemented after FAA approval and the construction of the new Runway 01/19 (estimated 2028).

Table 4-1 2024 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Noise Abatement Recommendations *(continued)*					
NA-11 (Long-Term): Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m. (NA-E-1)	City of Charlotte Aviation Department, ATCT, Airlines	NEPA	None	None	This is a new measure that would be implemented after FAA approval of the measure and the required environmental processing per the NEPA, the CLT Tower Order has been updated, and the construction of the new Runway 01/19 is completed (estimated 2028).
NA-12 (Long-Term): Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m. (NA-E-2)	City of Charlotte Aviation Department, ATCT, Airlines	NEPA	None	None	This is a new measure that would be implemented after FAA approval of the measure and the required environmental processing per the NEPA, the CLT Tower Order has been updated, and the construction of the new Runway 01/19 is completed (estimated 2028).

Table 4-1 2024 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Noise Abatement Recommendations *(continued)*					
NA-13 (Long-Term): Maximize the number of divergent headings for north flow departures while maintaining a 15° separation between headings on Runway 36C, Runway 36R, and Runway 01. (NA-F-2)	City of Charlotte Aviation Department, ATCT, Airlines	NEPA	None	None	This is a new measure that would be implemented after FAA approval of the measure and the required environmental processing per the NEPA, and the development of the air traffic procedures and implementation to the CLT Tower Order is completed. **This measure would replace Measure NA-7 when it becomes active.**
NA-14 (Long-Term): Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings on Runway 18C, Runway 18L, and Runway 19. This would require the elimination of the 2-mile restriction. (NA-G-4)	City of Charlotte Aviation Department, ATCT, Airlines	NEPA	None	None	This is a new measure that would be implemented after FAA approval of the measure and the required environmental processing per the NEPA, and the development of the air traffic procedures and implementation to the CLT Tower Order is completed.

Table 4-1 2024 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Land Use Compatibility Recommendations					
LU-1: *Revise measure to read as such:* Promote compatible land use planning within the Airport Noise Disclosure Overlay District (DNL 65 dB of the combined 1996 NEM and 1996 NCP contours). **Continuation with modification to clarify the area of reference.**	City of Charlotte Aviation Department, City of Charlotte, Mecklenburg County	Minimal	Minimal	None	Currently being implemented. **Modification does not require FAA approval.**
LU-2: Pursue zoning for compatible development. **Continuation**	City of Charlotte Aviation Department, City of Charlotte, Mecklenburg County	Minimal	Minimal	None	Currently being partially implemented. **Continuation does not require FAA approval of measure.**
LU-7: Pursue the establishment of an Airport Overlay District that corresponds to the Airport Environs in which there will be special requirements relating to developing, rezoning, and transferring residential property. **Continuation**	City of Charlotte Aviation Department, City of Charlotte, Mecklenburg County	Minimal	Minimal	None	Currently being partially implemented. **Continuation does not require FAA approval of measure.**
LU-9: *Revise measure to read as such:* Continue efforts to maintain the use of the Airport Noise Disclosure Overlay District Notice. **Continuation with modification to remove the requirement to pursue method of enforcement.**	City of Charlotte Aviation Department, City of Charlotte, Mecklenburg County	Minimal	Minimal	None	Partially implemented. **Modification requires FAA approval of measure.**

Table 4-1 2024 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Land Use Mitigation Recommendations					
NM-1: Establish a public information program which distributes noise and noise abatement information to the public. **Continuation**	City of Charlotte Aviation Department	Minimal	None	None	Partially implemented. **Continuation does not require FAA approval of measure.**
NM-2: *Revise measure to read as such:* Sound insulate noise-sensitive public building intended for public use, instruction (e.g., schools) or assembly (e.g., churches) located within the Future (2028) NEM/NCP Noise Exposure Contour. **Continuation with modification to update the sound insulation area to refer to the area within the Future (2028) NEM/NCP Noise Exposure Contour**	City of Charlotte Aviation Department	Approximately $2,250,000	None	None	Currently being implemented. **Modification requires FAA approval of measure and implementation may be based on the availability of funding.**
NM-3: *Revise measure to read as such:* Sound insulate eligible houses located within the 2024 NCP sound insulation program boundary which may be benefited under FAA design criteria. **Continuation with modification to update the sound insulation area to refer to the area within the Future (2028) NEM/NCP Noise Exposure Contour**	City of Charlotte Aviation Department	Approximatel y $23,775,000	None	None	Currently being implemented. **Modification requires FAA approval of measure and implementation may be based on the availability of funding.**

Table 4-1 2024 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Land Use Mitigation Recommendations *(continued)*					
NM-7: *Revise measure to read as such:* At the Airport's option, purchase avigation easements, sound insulate, or acquire houses within the 2024 NCP sound insulation program boundary, where sound insulation is infeasible or not cost-effective because the property does not comply with the building code. **Continuation with modification to update the sound insulation area to refer to the area within the Future (2028) NEM/NCP Noise Exposure Contour**	City of Charlotte Aviation Department	Approximately $1,500,000	None	None	Currently being implemented. **Modification requires FAA approval of measure and implementation may be based on the availability of funding.**
NM-9: *Revise measure to read as such:* Acquire mobile homes located within the 2024 NCP sound insulation program boundary. **Continuation with modification to update the sound insulation area to refer to the area within the Future (2028) NEM/NCP Noise Exposure Contour**	City of Charlotte Aviation Department	Approximately $4,000,000 to $6,000,000	None	None	Currently being implemented. **Modification requires FAA approval of measure and implementation may be based on the availability of funding.**

Noise Compatibility Program Measure: NA-4

Description: Monitor late night (11:00 p.m. to 7:00 a.m.) runway utilization and variances from NCP assumptions. Conduct follow-up with FAA Air Traffic Control Tower (ATCT) and carriers as needed to enhance adherence to existing program.

Background and Intent: This is a continuation with modification of Measure NA-4 in the approved 1996 NCP, which is currently partially implemented. Measure NA-4 recommends monitoring late night (11:00 p.m. to 7:00 a.m.) runway utilization and variances from the NCP assumptions and conducting follow-up with ATCT management and frequent nighttime operators if a concern is brought forward or if a question arises regarding nighttime operations at the Airport. The intent of this measure is to monitor late night runway utilization and variances from NCP assumptions. The measure would assure that ATCT and the users are aware of the effectiveness of the program and to provide a basis for discussion to maintain the maximum utility of the 2024 NCP.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NA-4 in the 1996 NCP.

Land Use Compatibility Improvement: Measure will provide a reduction in noise exposure by ensuring that the 2024 NCP is followed as it would result in noise improvements north and south of the Airport.

Responsible Implementing Parties: The City of Charlotte Aviation Department, through its Noise Abatement Specialist, will be responsible for implementation of this measure.

Implementation Steps, Costs, and Phasing:
Steps: The Airport Noise Abatement Specialist will continue to review runway use statistics each month and prepare a letter report relating the use of each runway during total hours, as well as those hours between 11:00 p.m. and 6:59 a.m. The Airport will receive these statistics from a vendor that tracks the Airport's aircraft operations. The report will be delivered to ATCT management at CLT, as well as to each frequent operator of night flights by turbojets.
Costs: Preparation of statistics from Airport vendor costs approximately $75,000 annually, and any coordination with the FAA and/or users is anticipated to result in minimal administrative costs.
Schedule: Since this is a continuation of an approved measure, implementation is immediate.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-5

Description: Designate Runway 18C or 18L as preferred for takeoffs by turbojet aircraft between 11:00 p.m. and 7:00 a.m. when wind, weather, and operational conditions allow.

Background and Intent: This is a continuation with modification of Measure NA-5 in the approved 1996 NCP, which is currently implemented. Measure NA-5 of the 1996 NCP previously approved measure designated Runway 18R (existing Runway 18C) and Runway 18L as preferred for takeoffs by turbojet aircraft between 11:00 p.m. and 7:00 a.m. when, under the current preferential runway use program, Runway 23 or Runway 5 could not be used for reasons of wind, weather, operational necessity, or required runway lengths. Since the approval of Measure NA-5, the existing Runway 18R/36L was constructed (previously referred to as Runway 17/35) and the previous Runway 18R became Runway 18C. Furthermore, Runway 5/23 was decommissioned in 2022 and is no longer used for aircraft arrivals or departures. To date, the Airport continues to utilize Runways 18C and 18L for takeoffs by turbojet aircraft between 11:00 p.m. and 7:00 a.m. As such, the measure was modified to remove reference to the decommissioned Runway 5/23 and update the names of the existing runways. The intent of this measure is to continue the utilization of Runways 18C and 18L for takeoffs by turbojet aircraft between 11:00 p.m. and 7:00 a.m. as conditions allow.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NA-5 in the 1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: The FAA ATCT management at CLT is responsible for modifying the CLT Tower Order as needed and continuing to implement the air traffic management procedures.

Implementation Steps, Costs, and Phasing: N/A

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-6

Description: Reaffirm Airport user policy which designates locations and procedures for aircraft engine run-ups. Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport.

Background and Intent: This is a continuation with modification of Measure NA-6 in the approved 1996 NCP, which is currently implemented. In the past, residents of neighborhoods in the Airport Environs have complained about the noise levels produced by aircraft run-ups, which may have been attributed to aircraft run-ups or power up at the initiation of takeoff roll or reverse thrust during landing. To minimize noise levels produced by aircraft run-ups, Measure NA-6 in the approved 1996 NCP reaffirmed the Airport's user policy which designates locations and procedures for aircraft engine run-ups and identified a new run-up position for American Airlines (the former US Airways) in the midfield of the Airport.

To date, the Airport's established user policy and procedure addresses the location of engine run-ups by the NCANG or the Guard) and the airlines using the Airport. The Guard is directed by that policy to use the NCANG ramp. American Airlines (the former US Air) is directed to use the American Airlines maintenance ramp using a heading of either 230 or 050 degrees to assure that the aircraft on the American Airlines (the former US Air) ramp is facing at least partially into the win. Other airlines are directed to use taxiways parallel to runways. All run-ups are to be conducted only after advising ATCT of the requirement for run-up. Run-up activity conducted on the taxiways are to be positioned under the guidance of ATCT ground control. Furthermore, two airfield projects are currently under construction that would provide additional run-up locations. This includes the deice pad located on the south airfield east of Runway 36C and in the northeast airfield east of Taxiway D. Construction is anticipated to conclude in 2025 and would be able to be used for run-ups when completed.

As such, the intent of this measure is to reaffirm the Airport's existing policy, establish two new run-up locations, and to maximize the use of midfield run-up locations over those located on the east side of the Airport. The higher usage of midfield run-up locations over those on the east side of the Airport would help reduce noise levels produced by aircraft run-ups to communities in the Airport Environs.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NA-6 in the 1996 NCP.

Land Use Compatibility Improvement: No effect on contours, but the measure will abate single-event levels generated by run-ups.

Responsible Implementing Parties: The ATCT is responsible for enforcing this measure as they would position any run-ups conducted on taxiways. The NCANG and American Airlines are responsible for implementation of the run-up orientation and the other airlines will be responsible for coordination of the other run-up locations.

Implementation Steps, Costs, and Phasing:

Steps: The City of Charlotte Aviation Department should schedule a meeting with ATCT and the airlines who use taxiways parallel to runways for run-ups to discuss the two new run-up locations and the maximizing of the use of midfield run-up locations over those located on the east side of the Airport.

Costs: No costs are anticipated.

Schedule: The portion of the measure related to the two new run-up locations and the maximizing of the midfield run-up locations over those located on the east side of the Airport may be implemented by the Airport and ATCT on adoption and acceptance of the 2024 NCP. The action should be accomplished within three months of initiation. The two new run-up locations will be implemented when the projects have completed construction which is anticipated to conclude in 2025.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-7 (Short-Term)

Description: Departing Runways 36R and 36C, all turbojet aircraft initiate turns at 2.5 DME (36C) and 2.6 DME (36R) north of the CLT VOR/DME, respectively.

Background and Intent: This is a continuation with modification of the previously approved Measure NA-7 of the 1996 NCP, which is currently implemented. The 1996 NCP Measure NA-7 require large aircraft departing from Runway 36R to turn to a heading of 025 degrees at the 2.6 DME north of the CLT VOR/DME, and large aircraft departing Runway 36C (formerly 36L) to turn to a heading of 330 degrees at the 2.5 DME north of the CLT VOR/DME, respectively. The intent is to enhance noise abatement by concentrating overflights into specific corridors of compatibly used land northeast and northwest of the Airport.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NA-7 in the 1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: The ATCT at CLT is responsible for continuing to implement the air traffic management procedures.

Implementation Steps, Costs, and Phasing:
Steps: Local ATCT should continue implementing measure as approved.
Costs: No costs are anticipated.
Schedule: The program has been initiated and will continue without interruption.

Effects on Other Programs/Measures: This measure would be replaced with Measure NA-13. when it becomes active

Noise Compatibility Program Measure: NA-8

Description: Departing Runway 18R, turbojet aircraft initiate turns as soon as practicable to a heading of 195 degrees.

Background and Intent: This is a continuation with modification of Measure NA-8 in the approved 1996 NCP, which is currently implemented. The approved Measure NA-8 is intended to assure adequate separation between departures on Runway 18R and missed approaches on Runway 18C as ATCT is required to maintain visual separation between the operations. Departures from Runway 18R may occasionally be diverged to a heading of 210 degrees or more. The heading of 195 degrees is intended to direct traffic along a course roughly parallel to and west of Steele Creek Road and over more compatibly used lands than would a departure along runway heading. While the measure is intended for application to turbojet aircraft, it may also be used by smaller prop aircraft at the discretion of the controller.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NA-8 in the 1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: The ATCT at CLT is responsible for continuing to implement the air traffic management procedures.

Implementation Steps, Costs, and Phasing:
Steps: Local ATCT should continue implementing measure as approved.
Costs: No costs are anticipated.
Schedule: The program has been initiated and will continue without interruption.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-9

Description: Departing Runway 36L, turbojet aircraft initiate turns as soon as practicable to a heading of 315 degrees.

Background and Intent: This is a continuation with modification of Measure NA-9 in the approved 1996 NCP, which is currently implemented. The previously approved Measure NA-9 is intended to turn departures from Runway 36C (formerly Runway 36L) and Runway 36L to diverging headings. This is to prevent the Runway 36C route (as described in Measure NA-7) from crossing the extended centerline of Runway 18R/36L between one and two miles north of the north end of the new runway. The heading of 315 degrees from Runway 36L is intended to direct any turbojet departures from that runway along an initial course roughly aligned with the intersections of Wilkinson Blvd and Sam Wilson Road and of I-85 and Moores Chapel Road. While the measure is intended for application to turbojet aircraft, it may also be used by smaller prop aircraft at the discretion of the controller.
To assure adequate separation between departures on Runway 36L and missed approaches on Runway 36C (a combination which is not the normal expected operating configuration), ATCT will be required to maintain visual separation between the operations. Departures from Runway 36L may occasionally be delayed until the missed approach has cleared or, optionally, the missed approach course from Runway 36C may be revised to provide for climbs along the runway heading prior to transitioning to the missed approach fix.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NA-9 in the 1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: The ATCT at CLT is responsible for continuing to implement the air traffic management procedures.

Implementation Steps, Costs, and Phasing:
Steps: Local ATCT should continue implementing measure as approved.
Costs: No costs are anticipated.
Schedule: The program has been initiated and will continue without interruption.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-10 (Long-Term)

Description: Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport.

Background and Intent: The Airport user policy currently identifies six run-up locations and procedures for aircraft engine run-ups, of which five are anticipated to be in operation after construction of the new fourth parallel runway due to future terminal development. After construction of the new fourth parallel runway, an assessment of ground run-up procedures and locations would be conducted to identify additional locations in the midfield in the future airport layout. The intent of this measure is to reduce sideline noise from run-ups after construction of the new fourth parallel runway.

Relationship to 1996 NCP: None

Land Use Compatibility Improvement: No effect on contours, but the measure will abate single-event levels generated by run-ups.

Responsible Implementing Parties: The City of Charlotte Aviation Department is responsible for conducting the assessment. If additional midfield ground run-up locations are identified, the ATCT is responsible for enforcing this measure as they would position any run-ups conducted on taxiways. The airlines will be responsible for coordination of the on-ramp run-up location if along a taxiway.

Implementation Steps, Costs, and Phasing:
Steps: The City of Charlotte Aviation Department should conduct an assessment of ground run-up locations after the measure is approved and construction of the new fourth parallel runway has been completed. Based on the findings of the assessment, the ATCT will be responsible for implementing additional ground run-up locations in the midfields.
Costs: Cost related to conducting an assessment of ground run-up procedures after construction of the new fourth parallel runway, at an estimated cost of $25,000 to $100,000. Minimal costs related to development and publication of new airport procedures to document new run-up locations based on the assessment.
Schedule: The ground run-up procedure assessment may be implemented after the measure is approved and construction of the new fourth parallel runway has been completed.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-11 (Long-Term)

Description: Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

Background and Intent: After construction of the new fourth parallel runway, this measure would designate Runway 36R and Runway 36L primarily for nighttime north flow arrivals. The intent of the measure is to reduce noise impacts by shifting the nighttime overflights from residential land uses off Douglas Drive and Shopton Road to noise-compatible land uses over Airport property west of Steele Creek Road and to the east off Beam Road.

Relationship to 1996 NCP: None

Land Use Compatibility Improvement: The measure will shift the nighttime overflights over residential land uses off Douglas Drive and Shopton Road to noise-compatible land uses over Airport property west of Steele Creek Road and to the east off Beam Road.

Responsible Implementing Parties: The City of Charlotte Aviation Department and FAA will be responsible for the completion of the environmental processing per the NEPA for the measure. The FAA ATCT management at CLT will be responsible for modifying the Tower Order and implementing procedures to effect the change identified in this measure.

Implementation Steps, Costs, and Phasing:
<u>Steps:</u> Environmental processing for the measure per the NEPA will be completed and approval will be required. Before construction of the new fourth parallel runway is complete, the City of Charlotte Aviation Department will request that FAA ATCT management modify the CLT Tower Order based on the description of this measure.
<u>Costs:</u> The cost for the completion of the required environmental processing per the NEPA will be primarily borne by the Airport subject to the availability of Federal AIP grant funding. The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
<u>Schedule:</u> The measure may be implemented after the measure is approved, the required environmental processing per the NEPA is approved, and construction of the new fourth parallel runway has been completed. Planning for the implementation of this measure and the associated environmental processing per the NEPA may be initiated on approval of the measure by the FAA.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-12 (Long-Term)

Description: Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

Background and Intent: After construction of the new fourth parallel runway, this measure would designate Runway 18R, Runway 18C, and Runway 18L for south flow arrivals in the nighttime. The intent of this measure is to reduce noise impacts by spreading nighttime south flow arrivals among the three arrival runways. This would reduce the nighttime traffic over residential land uses off Tuckaseegee Road, Westwood Drive, and Little Rock Road. In turn, this would increase nighttime arrival overflights over Interstate 485 and Airport property.

Relationship to 1996 NCP: None

Land Use Compatibility Improvement: The measure will shift the nighttime traffic from residential land uses off Tuckaseegee Road, Westwood Drive, and Little Rock Road to major transportation corridors (Interstate 485) and noise-compatible land uses (Airport property).

Responsible Implementing Parties: The City of Charlotte Aviation Department and FAA will be responsible for the completion of the environmental processing per the NEPA for the measure. The FAA ATCT management at CLT will be responsible for modifying the Tower Order and implementing procedures to effect the change identified in this measure.

Implementation Steps, Costs, and Phasing:
Steps: Environmental processing per the NEPA for the recommended Part 150 air traffic procedures will be completed and approval is required for the measure's implementation. Before construction of the new fourth parallel runway is complete, the City of Charlotte Aviation Department will request that FAA ATCT management modify the CLT Tower Order based on the description of this measure.
Costs: The cost for the completion of the required environmental processing per the NEPA addressing the recommended Part 150 air traffic procedures would be primarily borne by the Airport subject to the availability of Federal AIP grant funding. The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
Schedule: The measure may be implemented after the measure is approved, the required environmental processing per the NEPA addressing the recommended Part 150 air traffic procedures is completed, and construction of the new fourth parallel runway has been completed. Planning for the implementation of this measure and the associated environmental processing per the NEPA may be initiated on approval of the measure by the FAA.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-13 (Long-Term)

Description: Maximize the number of divergent headings for north flow departures while maintaining a 15° separation between headings on Runway 36C, Runway 36R, and Runway 01.

Background and Intent: The intent of this measure is to reduce net residential noise impacts north of the Airport by providing additional flight corridors over as wide of an area as possible. The measure would implement the maximum number of divergent headings while maintaining a 15° separation between headings to spread noise over as wide an area surrounding the Airport as possible.

This measure would implement the following divergent headings to the following departure runways:

- Runway 36R: Runway Heading (RWH), 20°, 35°, 50°, 65°, 80°
- Runway 36C and Runway 01: RWH, 345°, 330°, 315°, 300°, 285°

The existing runway use program designates Runway 36R and Runway 36C for daytime and nighttime departure operations. After the new Runway 01/19 is constructed, the runway use program designates Runway 01 and Runway 36R for daytime departure operations and Runway 36C and Runway 36R for nighttime departure operations. Additionally, Runway 36C would be used for departures in the daytime if Runway 01 could not be used for reasons of operational necessity. As such, headings proposed for Runway 36C are also proposed for Runway 01.

While a straight-out heading is identified for Runways 36R and 01 (or 36C), these headings cannot be used simultaneously because a 15-degree separation is required per 7110.65Z.

Relationship to 1996 NCP: None

Land Use Compatibility Improvement: The measure will distribute noise impacts over as wide of an area as possible and would result in a net decrease in noise-sensitive facilities within the DNL 65 dB.

Responsible Implementing Parties: The City of Charlotte Aviation Department and FAA will be responsible for the completion of the environmental processing per the NEPA for the measure. The FAA is responsible for developing air traffic management procedures with respect to this measure, and FAA ATCT management at CLT will be responsible for modifying the Tower Order to implement the new procedures to effect the change.

Implementation Steps, Costs, and Phasing:

Steps: Environmental processing per the NEPA for the recommended measure will be completed and approval will be required. The FAA will develop air traffic management procedures for this measure and the City of Charlotte Aviation Department will request that FAA ATCT management modify the CLT Tower Order based on the procedures. During implementation of the new measure, CLT will monitor aircraft in flight and will coordinate with ATCT on its implementation.

Costs: The cost for the completion of the required environmental processing per the NEPA will be primarily borne by the Airport subject to the availability of Federal AIP grant funding. The cost for development, training, and publication of new procedures would be the responsibility of the FAA.

Schedule: The measure may be implemented after the measure is approved, the required environmental processing per the NEPA is approved, and the development of the air traffic procedures and implementation to the CLT Tower Order is completed. Planning for the implementation of this measure and the environmental processing per the NEPA may be initiated on approval of the measure by the FAA.

Effects on Other Programs/Measures: This measure would replace Measure NA-7.

Noise Compatibility Program Measure: NA-14 (Long-Term)

Description: Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings on Runway 18C, Runway 18L, and Runway 19. This would require the elimination of the 2-mile restriction.

Background and Intent: The intent of this measure is to reduce net residential noise impacts to the south of the Airport by dispersing flights over as wide of an area as possible. The measure would implement the maximum number of divergent headings while maintaining a 15° separation between headings to spread noise over as wide an area surrounding the Airport as possible. This would require the elimination of the existing 2-mile restriction.

This measure would implement the following divergent headings to the following departure runways:

- Runway 18L: RWH, 165°, 150°, 135°, 120°, 105°
- Runway 18C and Runway 19: RWH, 200°, 215°, 230°, 245°, 260°

The existing runway use program designates Runway 18L and Runway 18C for daytime and nighttime departure operations. After the new Runway 01/19 is constructed, the runway use program designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 18C are also proposed for Runway 19.

While a straight-out heading is identified for Runways 18L and 19 (or 18C), these headings cannot be used simultaneously because a 15-degree separation is required per 7110.65Z.

Relationship to 1996 NCP: None

Land Use Compatibility Improvement: The measure will distribute noise impacts over as wide of an area as possible and would result in a net decrease in noise-sensitive facilities within the DNL 65 dB.

Responsible Implementing Parties: The City of Charlotte Aviation Department and FAA will be responsible for the completion of the environmental processing per the NEPA for the measure. The FAA is responsible for developing air traffic management procedures with respect to this measure, and FAA ATCT management at CLT will be responsible for modifying the Tower Order to implement the new procedures to effect the change.

Implementation Steps, Costs, and Phasing:
Steps: Environmental processing per the NEPA for the recommended measure will be completed and approval will be required. The FAA will develop air traffic management procedures for this measure and the City of Charlotte Aviation Department will request that FAA ATCT management modify the CLT Tower Order based on the procedures. During implementation of the new measure, CLT will monitor aircraft in flight and will coordinate with ATCT on its implementation.
Costs: The cost for the completion of the required environmental processing per the NEPA will be primarily borne by the Airport subject to the availability of Federal AIP grant funding. The cost for development, training, and publication of new procedures would be the responsibility of the FAA.
Schedule: The measure may be implemented after the measure is approved, the required environmental processing per the NEPA is approved, and the development of the air traffic procedures and implementation to the CLT Tower Order is complete. Planning for the implementation of this measure and the environmental processing per the NEPA may be initiated on approval of the measure by the FAA.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: LU-1

Description: Promote compatible land use planning within the Airport Noise Disclosure Overlay District (DNL 65 dB of the combined 1996 NEM and 1996 NCP contours).

Background and Intent: This is a continuation with modification of Measure LU-1 in the approved 1996 NCP, which is implemented. The measure recommended amending local land use planning policies (zoning, density, and capital improvement recommendations) to reduce the development of new noncompatible land uses within the Airport Environs. The intent of this measure is for the Planning Commission to be proactive in developing land use policies to be consistent with FAR Part 150 compatible land use guidelines. (See Table A-13 in Appendix A of this document, FAA Land Use Compatibility Appendix A, Table 1.)

The compatible land use policies would apply to the Airport Noise Disclosure Overlay District, also referred to as the areas within the DNL 65 dB of the combined 1996 NEM contours and 1996 NCP contours. The implementation of compatible land use planning should be continued in all future actions of the Charlotte-Mecklenburg Planning Commission.

Relationship to 1996 NCP: Continuation with modification of the approved Measure LU-1 in the 1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: The City of Charlotte, the Charlotte-Mecklenburg Planning Commission, and the Airport Planner.

Implementation Steps, Costs, and Phasing:

Steps: The Airport and Planning Commission should continue to work cooperatively in implementing Measure LU-1 through recommending to the governing bodies to be proactive in developing land use policies for the Airport Environs to be consistent with FAR Part 150 compatible land use guidelines.

Costs: The costs of implementing the measure will be confined to administrative costs for the City of Charlotte Aviation Department and Planning Commission staff.

Schedule: As an approved measure, implementation may continue.

Effects on Other Programs/Measures: The implementation of this measure is not expected to adversely affect any other mitigation program measures and it will enhance the compatibility of land uses surrounding the Airport.

Noise Compatibility Program Measure: LU-2

Description: Pursue zoning for compatible development.

Background and Intent: This is a continuation of Measure LU-2 in the approved 1996 NCP, which is implemented. Measure LU-2 recommends the rezoning of property to permit only compatible uses within specific noise contours, to retain compatible zoning, and to limit the density of residential development permitted within noise contours. This measure is intended to establish the policy of making Airport-compatible land uses the priority within the Airport Noise Disclosure Overlay District, also referred to as the area within the DNL 65 dB noise exposure of the combined 1996 NEM and 1996 NCP noise contours, so that the Planning Commission will be proactive in initiating the rezoning of large undeveloped tracts of non-compatibly zoned property. As this measure is currently practiced by CLT, a zoning change request is initiated by the Airport as noncompatible property is acquired. The implementation of zoning for compatible development should continue to be the first priority within the Airport Environs in all future actions of the Charlotte-Mecklenburg Planning Commission.

Relationship to 1996 NCP: Continuation of the approved Measure LU-2 in the 1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: The City of Charlotte, the Charlotte-Mecklenburg Planning Commission, and the Airport Planner.

Implementation Steps, Costs, and Phasing:
Steps: The Charlotte-Mecklenburg Planning Commission should continue to rezone areas zoned as noncompatible within the Airport Environs to compatible zoning. The Airport Environs include the area south of Tuckaseegee Road, west of Billy Graham Parkway and W. Tyvola Road, east of the I 485 Outer Belt, and north of the intersection of York Road and Arrowood Road. These boundaries generally follow the Airport's DNL 65 dB noise exposure patterns of the combined 1996 NCP and 1996 NEM contours. As the Airport acquires noncompatible zoned property, the Airport Community Programs Office and Airport Planner should also continue to initiate rezonings.
Costs: The costs of implementing the measure will be limited to administrative costs attributable to the City of Charlotte Aviation Department and Planning Commission staff.
Schedule: As an approved measure, implementation may continue.

Effects on Other Programs/Measures: The implementation of this measure is not expected to adversely affect any other mitigation program measures and it will enhance the compatibility of land uses surrounding the Airport.

Noise Compatibility Program Measure: LU-7

Description: Pursue the establishment of an Airport Overlay District ("District") that corresponds to the Airport Environs in which there will be special requirements relating to developing, rezoning, and transferring residential property.

Background and Intent: This is a continuation of Measure LU-7 in the approved 1996 NCP which was previously implemented. Measure LU-7 in the 1996 NCP recommended establishing the Airport Overlay District
to coordinate the City's and the FAA's definition of the area affected by the Airport. Establishing this area also allows measures to be implemented to mitigate the negative effects of noise in a way that would be compatible with the overall zoning in the City and Mecklenburg County.
The Charlotte-Mecklenburg Planning Department adopted an Airport Noise Disclosure Overlay District to provide mechanisms for the disclosure to residential property owners and prospective residential property owners in the Airport Environs that the use and enjoyment of property located within the district is subject to overflights and aircraft noise that may be objectionable. The Airport Noise Disclosure Overlay District boundary includes all parcels intersecting the DNL 65 dB of the combined 1996 NEM and 1996 NCP contours. The following Airport Noise Disclosure Overlay District Notice is included with every building permit and certificate of occupancy issued for residential construction and use located in the Airport Noise Disclosure Overlay District: *"Noise Warning—This property, either partially or wholly, is zoned Airport Noise Disclosure Overlay District and lies within or near the Noise Exposure Map Areas of Charlotte/Douglas International Airport and may be subject to noise that may be objectionable."*

Relationship to 1996 NCP: Continuation of the approved Measure LU-7 in the 1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: Charlotte-Mecklenburg Planning Commission, City of Charlotte Aviation Department.

Implementation Steps, Costs, and Phasing:
Steps: The City of Charlotte Aviation Department would continue to encourage the Charlotte-Mecklenburg Planning Commission to enforce the Airport Noise Disclosure Overlay District.
Costs: The cost of continuing to implement the measure will be confined to continuing costs to administer and enforce the Airport Noise Disclosure Overlay District Ordinance.
Schedule: As an approved measure, implementation may continue.

Effects on Other Programs/Measures: The implementation of this measure is not expected to adversely affect any other mitigation program measures and it will enhance the compatibility of land uses surrounding the Airport.

Noise Compatibility Program Measure: LU-9

Description: Continue efforts to maintain the use of the Airport Noise Disclosure Overlay District Notice.

Background and Intent: This is a continuation with modification of Measure LU-9 in the approved 1996 NCP, which was partially implemented. The intent of the previously approved Measure LU-9 in the 1996 NCP was to accommodate continued residential land use while providing a mechanism to enhance the awareness of new residents of the potential non-compatibility of the structure. However, no method of enforcement has been implemented.

This measure recommends continuing to support the Charlotte-Mecklenburg Planning Department's mechanisms for the disclosure to residential property owners and prospective residential property owners in the Airport Environs that the use and enjoyment of property located within the district is subject to overflights and aircraft noise that may be objectionable. The Airport Noise Disclosure Overlay District boundary includes all parcels intersecting the DNL 65 dB of the combined 1996 NEM and 1996 NCP contours. The following Airport Noise Disclosure Overlay District Notice is currently included with every building permit and certificate of occupancy issued for residential construction and use located in the Airport Noise Disclosure Overlay District: *"Noise Warning—This property, either partially or wholly, is zoned Airport Noise Disclosure Overlay District and lies within or near the Noise Exposure Map Areas of Charlotte/Douglas International Airport and may be subject to noise that may be objectionable."*

Relationship to 1996 NCP: Continuation with modification of the approved Measure LU-9 of the 1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: The City of Charlotte Aviation Department, the City/Airport attorney, the City of Charlotte City Council, Mecklenburg County, and the Charlotte-Mecklenburg Planning Commission.

Implementation Steps, Costs, and Phasing:

<u>Steps:</u> The Airport's planner will coordinate with Planning Commission staff and the City/Airport attorney to ensure the appropriate distribution of the Airport Noise Disclosure Overlay District Notice.

<u>Costs:</u> The costs of implementing the measure will be confined to administrative costs for the City of Charlotte Aviation Department and the Planning Commission. These costs will be incurred in the continued coordination and implementation of the Airport Noise Disclosure Overlay District Notice.

<u>Schedule:</u> As an approved measure, implementation may continue.

Effects on Other Programs/Measures: This measure is not expected to adversely affect any other mitigation program measures.

Noise Compatibility Program Measure: NM-1

Description: Establish a public information program which distributes noise and noise abatement information to the public.

Background and Intent: This is a continuation of Measure NM-1 of the approved 1996 NCP, which was implemented. A public information program is in place that provides the general public, land developers, lending institutions, planning officials, and real estate professionals with the current status of Airport operations, proposed Airport development, noise impacts, and mitigation programs. Additionally, two newsletters which are currently in place, were implemented: *Connections* provides information of interest to business and development concerns, and *Neighborhood Update* focuses on the implementation of mitigation programs, neighborhood meetings, and noise issues of community importance. The newsletters are published on the Airport's website and are distributed to the interested public through email.

Relationship to 1996 NCP: Continuation of the approved Measure NM-1 in the1996 NCP.

Land Use Compatibility Improvement: N/A

Responsible Implementing Parties: The City of Charlotte Aviation Department Public Information Specialist.

Implementation Steps, Costs, and Phasing:
Steps: The Public Information Specialist, working with the Airport Planner, Community Programs Manager, Aviation Director, and, as warranted, the Airport's consultants, will review current projects, studies and analyses to identify information which should be provided to the general public via the *Neighborhood Update* or to the business community via the *Connections* newsletter.
Costs: The costs of implementation will be borne by the Airport. There is no Federal funding reimbursement for this measure. The Airport will underwrite the administrative costs associated with researching, writing, preparing the newsletters for publication, and for digital publication and email distribution.
Schedule: As an approved measure, implementation may continue.

Effects on Other Programs/Measures: This measure is not expected to adversely affect any other mitigation program measures.

Noise Compatibility Program Measure: NM-2

Description: Sound insulate noise-sensitive public building intended for public use, instruction (e.g., schools) or assembly (e.g., churches) located within the Future (2028) NEM/NCP Noise Exposure Contour.

Background and Intent: This is a continuation with modification of Measure NM-2 approved in the 1996 NCP, which has been implemented. Measure NM-2 of the approved 1996 NCP recommended the sound insulation of public buildings (schools and churches) located within the DNL 65 dB of the combined 1996 NCP contours and 1996 NEM contours. The intent of this measure is to continue providing for the voluntary participation of noise-sensitive public buildings (e.g. schools and churches) in the recommended sound insulation program within the Future (2028) NEM/NCP Noise Exposure Contour. The following provides a list of the noise-sensitive public facilities identified within the Future (2028) NEM/NCP Noise Exposure Contour:

Churches
Every Nation Church (sound insulated)
Harvest Center Church
Montagnard Alliance Church
Mulberry Baptist Church (sound insulated)

Schools (Includes Schools and Day Cares):
West Mecklenburg High School (sound insulated)
East Voyager Academy of Charlotte
Beginning Years Day Care
Mulberry Head Start (sound insulated)

The untreated noise-sensitive public buildings located within the Future (2028) NEM/NCP Noise Exposure Contour are two churches (Harvest Church and Montagnard Alliance Church), one school (East Voyager Academy of Charlotte), and one daycare (Beginning Years Day Care).

Relationship to 1996 NCP: Continuation with modification of the approved Measure NM-2 in the 1996 NCP.

Land Use Compatibility Improvement: This noise mitigation measure will reduce the number of noncompatible noise-sensitive sites within the Future (2028) NEM/NCP Noise Exposure Contour by two churches and two schools.

Responsible Implementing Parties: The Community Programs Office of the City of Charlotte Aviation Department and the governing body of each of the four potentially eligible churches and schools. The Community Programs Office would be responsible for coordinating the development of the sound insulation specifications for these facilities.

Implementation Steps, Costs, and Phasing:

Steps: The Airport Community Programs Manager will take "before" interior and exterior noise measurements at the structure. These data will be given to the Airport's noise consultant and a local architectural firm. From the analysis of this data, the consultants advise the City of Charlotte Aviation Department whether treatment is required. If treatment is warranted, the architect will develop the sound insulation specifications and put the contract for construction out to bid. The architect will select the contractor and oversee the construction. When the sound insulation is completed, the Airport Community Programs Manager will take "after" interior and exterior noise measurements to verify that the FAA and City-design objectives for interior NLR has been reached.

Costs: The costs of implementation will be borne by the Airport subject to the availability of Federal Airport Improvement Program (AIP) grant funding. There will be administrative costs in terms of coordinating and managing the program, and design and construction costs associated with the sound insulation of each structure. There will also be costs for noise measurements, architectural design specifications, cost of materials, labor, and final inspection of completed work. The estimated cost of sound insulating two churches is approximately $1,000,000 and two schools is approximately $1,250,000.[12] The actual cost for sound insulation of these facilities will vary and depend on construction estimates.

Schedule: The measure may be implemented on approval by the FAA and based on the availability of funding.

Effects on Other Programs/Measures: Supports Measures NM-3 which calls for sound insulation of private residences.

[12] The cost is based on the previous costs for completing sound insulation at schools and churches in the surrounding area of the Airport.

Noise Compatibility Program Measure: NM-3

Description: Sound insulate eligible houses located within the 2024 NCP sound insulation program boundary which may be benefited under FAA design criteria.

Background and Intent: This is a continuation with modification of Measure NM-3 in the approved 1996 NCP. The purpose of a sound insulation program is to reduce the adverse effect of airport-related noise on building occupants. This measure recommends that the City of Charlotte Aviation Department update the existing sound insulation program to include existing houses within the 2024 NCP sound insulation program boundary.

Exhibit 4-8 shows the Future (2028) NCP/NEM noise contours and the 2024 NCP sound insulation program boundary. This program measure will be voluntary, and provide mitigation to all private residences (other than mobile homes) that meet the FAA design objective for interior NLR. In order for homeowners to participate in the sound insulation program, noncompatible structures would first have to be deemed eligible.

The design objective for sound insulation, as stated in the FAA AIP Handbook, is to achieve a DNL of 45 dB in all habitable rooms. Eligibility criteria, as defined by FAA Order 5100.38A, requires that residential sound insulation projects be designed to provide at least 5 dB improvement in noise level reduction (NLR). Since it takes an improvement of at least 5 dB in noise level reduction (NLR) to be clearly perceptible to the average person, the residential sound insulation program will be designed to provide at least that level of noise reduction. Only those structures able to achieve the minimum improvement in NLR and a DNL of 45 dB will be eligible for participation in the Federally funded mitigation program. If the structure already has an interior DNL of 45 dB in all habitable rooms, it will not be eligible for the program.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NM-3 of 1996 NCP.

Land Use Compatibility Improvement: This noise mitigation measure will reduce the number of noncompatible structures that are eligible for sound insulation within the 2024 NCP sound insulation program boundary. All of these noncompatible dwelling units will be potentially eligible for participation in the sound insulation program.

Responsible Implementing Parties: City of Charlotte Aviation Department

Implementation Steps, Costs, and Phasing:

Steps: The implementation of sound insulation measures within the 2024 NCP sound insulation program boundary will require the evaluation of interior and exterior noise levels at the structure to determine program eligibility. These evaluations will be prepared by the Airport Community Programs Manager. Those residential structures which demonstrate a 45 decibel DNL interior noise level would not be eligible to participate in the sound insulation program. This eligibility criterion would most likely apply to houses constructed since the implementation of building code measures to achieve energy conservation (i.e., residential structures constructed since January 1, 1975).

Once eligibility is determined, the homeowner will complete a program application and submit it to the Airport Community Programs Office. Following the same implementation procedures of the 1996 NCP, the CLT staff will determine the design specifications for each individual structure and submit them to the homeowner in writing along with the request for an avigation easement. Once the homeowner accepts the design specifications and signs the avigation easement, CLT staff will develop the construction bid and award the contract. The Community Programs Manager oversees the construction.

To check the effectiveness of the sound insulation measures, the Community Programs Manager periodically will "spot check" the completed structures. This is accomplished by taking interior and exterior noise measurements to verify that the FAA design objective for interior noise level reduction has been reached.

While the program is guided by 2024 NCP sound insulation program boundary, the phasing for action of specific neighborhoods will be at the discretion of the Airport in accordance with local concerns and Federal funding availability. As with the existing sound insulation program of the approved 1996 NCP, the Community Programs Manager will identify and determine the eligibility of individual dwelling units within the noise contour. The extent of neighborhood participation in the program will be based on natural geographic features or developmental divisions found within or between neighborhood, as determined by the Airport.

Costs: The costs of implementation will be borne by the Airport, subject to the availability of Federal AIP grant funding. There will be administrative costs, in terms of coordinating and managing the program, and design and construction costs associated with the sound insulation of each residential structure. This will involve noise measurements, architectural design specifications, cost of materials, labor, and final inspection of completed work. The estimated cost of implementation will be approximately $75,000 per structure. It is anticipated approximately 161 houses within the 2024 NCP sound insulation program boundary have been previously sound insulated and would not be eligible for further mitigation. As such, approximately 317 houses are anticipated to be potentially eligible for sound insulation at an estimated cost of $23,775,000.

Schedule: The measure may be implemented on approval by the FAA and based on the availability of funding.

Effects on Other Programs/Measures: This measure is not expected to adversely affect any other mitigation program measures.

Noise Compatibility Program Measure: NM-7

Description: At the Airport's option, purchase avigation easements, sound insulate, or acquire houses within the 2024 NCP sound insulation program boundary, where sound insulation is infeasible or not cost-effective because the property does not comply with the building code.

Background and Intent: This is a continuation with modification of Measure NM-7 in the approved 1996 NCP. According to FAA Order 5100.38A, *AIP Handbook*, an airport project cannot provide funding to compensate for inadequate maintenance, to bring nonconforming structures up to building code standards, or to improve the comfort or attractiveness of a building. Under this measure, the Airport is provided the flexibility to provide equitable solutions to the owners of those structures which are not up to the standards of the building code. The purchase of avigation easements, sound insulation, or acquisition of the property is recommended only in areas where sound insulation measures are being offered, and then only in instances where a residential structure is not compliant with the current standards of the state building code or when the condition of the structure makes it economically infeasible to implement the sound insulation measures. Terms of an easement may require that any money be used for building code, sound insulation or other compatibility improvements. Acquisition should be accomplished when the property is valued at less than the cost of insulation.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NM-7 in the 1996 NCP.

Land Use Compatibility Improvement: This noise mitigation measure will reduce the number of noncompatible structures within the 2024 NCP sound insulation program boundary. The Airport Community Programs Manager will identify these structures during the inventory of property to determine program eligibility.

Responsible Implementing Parties: City of Charlotte Aviation Department

Implementation Steps, Costs, and Phasing:
Steps: In the assessment of properties for the sound insulation program, residential structures not meeting the current standards of the state building code should be identified. The Airport Community Programs Office should then initiate steps to secure purchase of an avigation easement, to provide partial insulation, or to acquire the property.
Costs: For planning purposes, the unit cost of implementing this action is estimated to be the same as the average unit cost for sound insulation of a single residence ($75,000). It is not possible to determine the exact number of residential structures within the 2024 NCP sound insulation program boundary that do not meet the state building code standards without an inspection of each unit. The Airport will need to identify those structures as they proceed with the implementation of the sound insulation program. For the purposes of this document, it is estimated that 20 structures may be eligible for participation under this measure. At an approximate cost of $75,000 per structure, the estimated total implementation costs of this measure would total $1,500,000.
Schedule: The measure may be implemented on approval by the FAA and based on the availability of funding.

Effects on Other Programs/Measures: This measure will reduce, on a one for one basis, participation in the sound insulation program recommended in Measure NM-3.

Noise Compatibility Program Measure: NM-9

Description: Acquire mobile homes located within the 2024 NCP sound insulation program boundary.

Background and Intent: This is a continuation with modification of Measure NM-9 of the approved 1996 NCP. According to the FAR Part 150 noise compatibility guidelines (see Table 2, FAA Land Use Compatibility Appendix A, Table 1), mobile homes are not compatible land uses within the DNL 65 dB noise contour. Additionally, mobile home construction materials are not conducive to sound insulation treatment. Measure NM-9 recommends continuing the voluntarily sound insulation of private residences within the 2024 NCP sound insulation program boundary. Because mobile homes cannot be effectively sound insulated, this measure recommends continuing the voluntary acquisition of these structures.

There is one mobile home park, the Interstate Mobile Home Park, located within the 2024 NCP sound insulation program boundary. The Interstate Mobile Home Park is located north of the Airport and south of I-85. As part of the 1996 NCP, the Interstate Mobile Home Park was previously offered acquisition and relocation pursuant to the Federal guidelines as published in FAA Order 5100.37A, *Land Acquisition and Relocation Assistance for Airport Projects, April 4, 1994*. However, the owner of the mobile home park declined the proposed acquisition. Because the mobile home park is located within the 2024 NCP sound insulation program boundary, this measure recommends continuing to offer voluntary acquisition for these structures.

The acquisition and relocation of the mobile home park and the mobile homes within these parks will be conducted pursuant to the Federal guidelines as published in FAA Order 5100.37A, Land Acquisition and Relocation Assistance for Airport Projects, April 4, 1994. This Order provides guidance on the necessity for and a means of preparing the appraisal and acquisition of real property; rendering relocation services; moving, relocation and replacement housing payments; and other expense payments under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1978 (PL 91-646). The mobile home park, and the homes located within, will be assessed on an individual basis regarding the type of relocation assistance for which they would be eligible. The specific program requirements, definitions, and plans for relocation will be prepared by the Department of Aviation.

Estimated Population	Mobile Home Park	Approximate Mobile Homes	Acreage
156	Interstate Mobile Home Park	62 homes	12.8 acres

There may also be individually-sited mobile homes scattered throughout the 2024 NCP sound insulation program boundary. As these mobile homes are located within the 2024 NCP sound insulation program boundary, the owners will be offered the opportunity to voluntarily participate in the acquisition program. As mobile homes (trailers) are considered to be personal property in the State of North Carolina, the structures do not appear on real estate tax records. Therefore, individual mobile homes, not located within trailer parks, could not be specifically identified for the Part 150 Study's land use data base. The Airport Community Programs Manager will attempt to locate these structures during the implementation and inventory for the mitigation programs.

The acquisition and relocation of the scattered mobile homes also will be conducted pursuant to the Federal guidelines as published in FAA Order 5100.37A, *Land Acquisition and Relocation Assistance for Airport Projects*, April 4, 1994. Each mobile home will be assessed on an individual basis regarding the type of relocation assistance for which they would be eligible.

Relationship to 1996 NCP: Continuation with modification of the approved Measure NM-9 in the 1996 NCP.

Land Use Compatibility Improvement: The acquisition of mobile homes will reduce the number of noncompatible land uses within the DNL 65 dB by approximately 12.8 acres and 62 mobile homes. One additional mobile home (trailer) was identified south of Wilkinson Boulevard on Eatonton St. Furthermore, because mobile homes (trailers) do not appear on the real estate tax records it was not possible to determine the exact number of potentially eligible mobile homes located outside of mobile home (trailer) parks. The Airport Community Programs Manager will be able to locate any individual mobile home units scattered within the DNL 65 dB noise contour during the implementation process of inventory and appraisal.

Responsible Implementing Parties: City of Charlotte Aviation Department.

Implementation Steps, Costs, and Phasing:
Steps: The Airport Community Programs Office will coordinate the assessment and inventory of the mobile home parks and the individual mobile home units located within the three eligible parks. The specific recommendations for each unit will be determined by the guidelines in FAA Order 5100.37A.
Costs: The cost is estimated to a total of $4,000,000 to $6,000,000, which includes the administrative costs of developing the voluntary acquisition program, the cost for the acquisition of park acreage and individual mobile home units, and relocation costs of units within the 2024 NCP sound insulation boundary.
Schedule: The measure may be implemented on approval by the FAA and based on the availability of funding.

Effects on Other Programs/Measures: This measure is not expected to adversely affect any other mitigation program measures.

4.4.2 Future (2028) NEM/NCP Noise Exposure Contour

The Future (2028) NEM/NCP Noise Exposure Contour constitutes the official NEM for the year 2028 and is reflective of the forecast operating conditions for 2028 with the implementation of the 2024 NCP as presented in Section 4.4.1. The Future (2028) NEM/NCP Noise Exposure Contour superimposed on the existing land use is shown in **Exhibit 4-9, *Future (2028) NEM/NCP Noise Exposure Contour***.

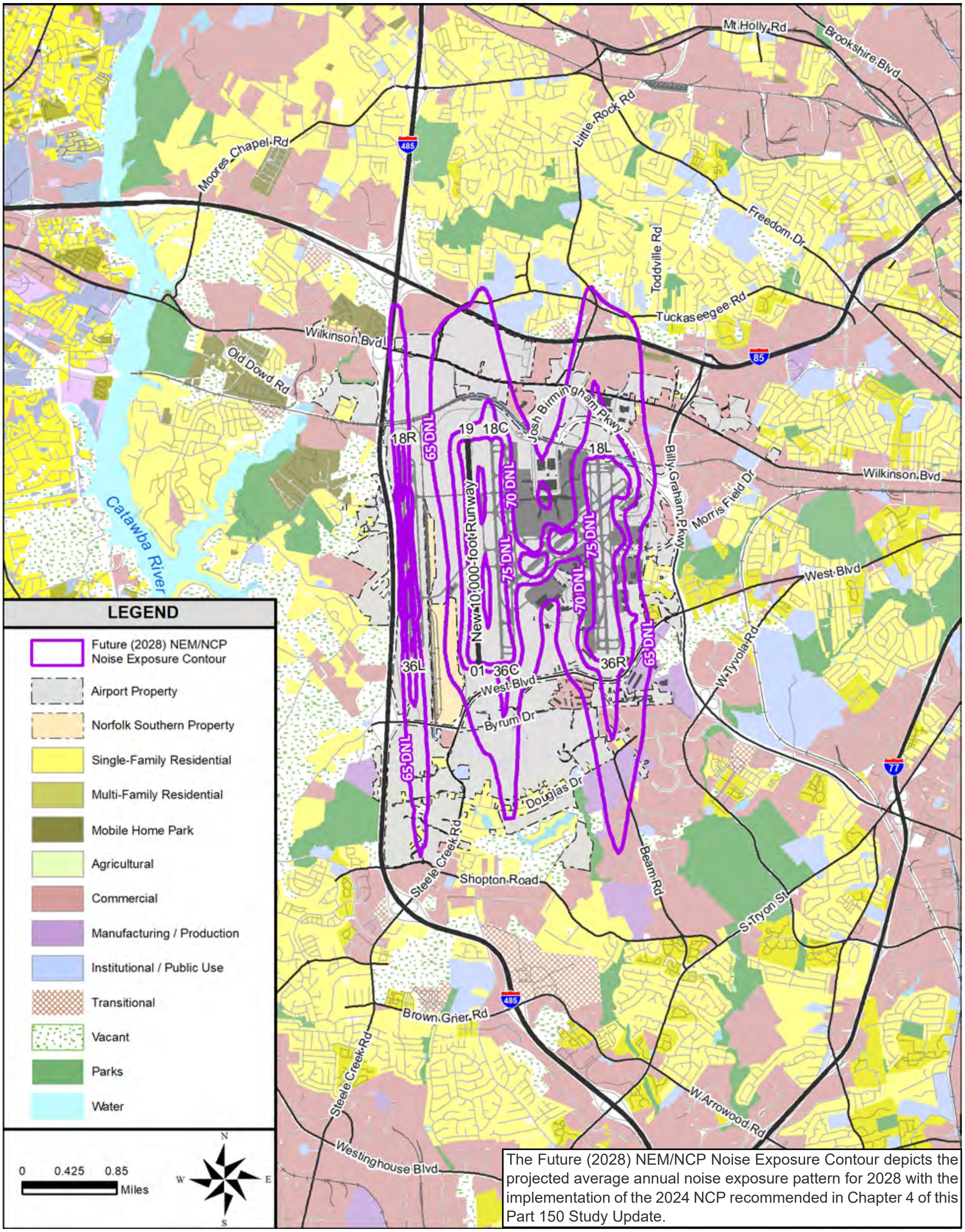
Table 4-2, *Future (2028) NEM/NCP Housing, Population, and Noise-Sensitive Sites* presents a summary of the number of housing units (households), population (residents), and other noise-sensitive sites within the DNL 65 dB noise exposure contour for the Future (2028) NEM/NCP. There are 217 housing units and eight noise-sensitive facilities within the DNL 65 dB for the Future (2028) NEM/NCP noise exposure contour.

Table 4-2 Future (2028) NEM/NCP Residential Housing, Population, and Noise-Sensitive Sites

Category	Future (2028) NEM/NCP
Housing Units	
DNL 65 – 70 dB	217
DNL 70 – 75 dB	0
DNL 75+ dB	0
DNL 65+ dB	217
Population	
DNL 65 – 70 dB	621
DNL 70 – 75 dB	0
DNL 75+ dB	0
DNL 65+ dB	621
Noise-Sensitive Facilities	
DNL 65 – 70 dB	8
DNL 70 – 75 dB	0
DNL 75+ dB	0
DNL 65+ dB	8

Source: Landrum & Brown, 2024.

Exhibit 4-9 Future (2028) NEM/NCP Noise Exposure Contour



Source: Landrum & Brown, 2024.

4.4.3 Noise Compatibility Program Costs

The City of Charlotte Aviation Department, supplemented by potential funding from the FAA, will incur the direct costs associated with the recommended NCP measures. Costs have been estimated in 2024 dollars and are presented in **Table 4-3, *NCP Implementation Costs***. These costs are separated between the City of Charlotte Aviation Department, local governments, and users (e.g. airlines, corporate aviation, general aviation) if any, with CLT carrying the vast majority of responsibility for the costs of the program measures. The City of Charlotte Aviation Department-funded mitigation actions recommended for implementation are eligible for Federal matching funds amounting to approximately 80 percent of the total program cost. The costs of each individual measure are detailed earlier in this chapter.

Annual costs consist of the administrative expenses to coordinate public outreach efforts and land use compatibility planning meetings related to implementation of land use efforts. Annual costs also include payment to vendors to provide Airport aircraft operations data, and administrative costs for staff to review statistics and coordinate with ATCT management as needed. One-time costs include the expenditures to implement the sound insulation program. The total estimated cost for all NCP recommendations is between $32,125,000 to $35,200,000.

Table 4-3 NCP Implementation Costs

Type of Measure	Direct Cost to CLT	Direct Cost to Local Government	Direct Cost to Users
Noise Abatement Measures			
NA-4	Annual $75,000 and minimal administrative costs	None	None
NA-10	$25,000 to $100,000	None	None
NA-11 through NA-14	Approximately $500,000 to $1,500,000 for NEPA	None	None
Subtotal	*$600,000 to $1,675,000*	*None*	*None*
Land Use Compatibility Measures			
LU-1 through LU-9	Minimal	Minimal	None
Subtotal	*Minimal*	*Minimal*	*None*
Land Use Mitigation Measures			
NM-1	Minimal	None	None
NM-2	$2,250,000	None	None
NM-3	$23,775,000	None	None
NM-7	$1,500,000	None	None
NM-9	$4,000,000 to $6,000,000	None	None
Subtotal	*$31,525,000 to $33,525,000*	*Minimal*	*None*
Total	***$32,125,000 to $35,200,000***	***Minimal***	***None***

Notes: The City of Charlotte Aviation Department-funded mitigation actions recommended for implementation are eligible for Federal matching funds amounting to approximately 80 percent of the total program cost.

Source: Landrum & Brown, 2024.

4.4.4 Implementation Schedule

As shown in Table 4-1, the existing noise abatement measures (NA-4 through NA-9) are from the previously approved 1996 NCP and can continue uninterrupted. Measure NA-6 can continue as approved in the 1996 NCP and the proposed modification will require FAA approval (anticipated 2024-2025). Measure NA-10 is a new measure that will require FAA approval (anticipated 2024-2025). The new Measures NA-11 and NA-12 would change runway use, which will require FAA approval, environmental processing per the NEPA and approval, the update of the CLT Tower Order, and the construction of the new fourth parallel runway is completed. The new Measures NA-13 and NA-14 would implement divergent headings, which will require FAA approval, environmental processing per the NEPA and approval, development of new air traffic procedures, and the update of the CLT Tower Order.

The existing land use compatibility measures (LU-1 through LU-9) are from the previously approved 1996 NCP and can continue uninterrupted. The existing land use mitigation measures (NM-1 through NM-9) are proposed for continuation with modification from the previously approved 1996 NCP, which may be implemented on approval by the FAA and based on the availability of funding.

Appendix A

Appendix A, Applicable Laws, Regulations, and Policies

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

PRESENTED BY
Landrum & Brown, Incorporated

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Appendix A Applicable Laws, Regulations, and Policies

This appendix presents information applicable to airport noise compatibility planning and analysis of aviation noise.

A.1 Federal Laws and Policies Related to Noise/Land Use Compatibility

The Federal Aviation Administration (FAA) adopted land use compatibility guidelines relating types of land use to airport sound levels in 1985. These guidelines were promulgated in 14 Code of Federal Regulations (CFR) Part 150. These guidelines, reproduced here as **Table A-1, *Land Use Compatibility Guidelines – 14 CFR Part 150***, show the compatibility parameters for residential, public (schools, churches, nursing homes, hospitals, libraries), commercial, manufacturing and production, and recreational land uses.

The Part 150 guidelines are the basis for defining areas potentially eligible for Federal funding through the Airport Improvement Program (AIP). The Airport Improvement Handbook states, "Noise compatibility projects usually must be located in areas where noise measured in day-night average sound level (DNL) is 65 decibel (dB) or greater."[1] Federal funding is available at noise levels below 65 DNL if the airport operator (Sponsor) determines that incompatible land uses exist below 65 DNL and the FAA concurs with the Sponsor's determination.

As shown in **Table A-1**, all land uses within areas below 65 DNL are considered to be compatible with airport operations. Residential land uses are generally incompatible with noise levels above 65 DNL. In some areas, residential land use may be permitted in the 65 to 70 DNL with appropriate sound insulation measures implemented. This is done at the discretion of local communities. Schools and other public use facilities located between 65 and 75 DNL are generally incompatible without sound insulation. Above 75 DNL, schools, hospitals, nursing homes, and churches are considered incompatible land uses. The information presented in Table 4-1 is meant to act as a guideline. According to 14 CFR Part 150, "Adjustments or modifications of the descriptions of the land-use categories may be desirable after consideration of specific local conditions."[2]

1 FAA Order 5300.38C, Chapter 7, paragraph 706.

2 14 CFR Part 150, Part B Noise Exposure Map Development, Section A150.101 Noise contours and land usages, paragraph (c).

Table A-1 Land Use Compatibility Guidelines – 14 CFR Part 150

Yearly Day-Night Average Sound Level (DNL) in Decibels						
Land Use	**Below 65**	**65-70**	**70-75**	**75-80**	**80-85**	**Over 85**
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
PUBLIC USE						
Schools, hospitals, 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]	N[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	Y[5]	N[5]	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

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable 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.

Key to Table A-1

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, 35 Land use and related structures generally compatible; measures to achieve a NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Notes for Table 4-1

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 dB and 30 dB should be incorporated into

building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as five, 10, or 15 dB 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 dB 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 dB 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 dB 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 a NLR of 25 dB.
7. Residential buildings require a NLR of 30 dB.
8. Residential buildings not permitted.

Source: 14 CFR Part 150 Airport Noise Compatibility Planning, Appendix A, Table 1.

A.1.1 FAA Final Policy on Part 150 Noise Mitigation Measures

The FAA issued a final policy to establish a distinction between remedial and preventive noise mitigation measures proposed by airport operators and submitted for approval by the FAA under noise compatibility planning regulations. In the notice of final policy[3] effective October 1, 1998, the FAA stated the following:

- As of October 1, 1998, the FAA will approve under 14 CFR Part 150 only remedial noise mitigation measures for existing incompatible development and only preventative noise mitigation measures in areas of potential new incompatible development.
- The FAA will not approve remedial noise mitigation measures for new incompatible development that occurs in the vicinity of airports.
- The use of AIP funds will be affected to the extent that such used depends on approval under Part 150.

The Airport Noise Compatibility Planning Program (14 CFR Part 150) was established under the Aviation Safety and Noise Abatement Act of 1979 (ASNA). The Part 150 program allows airport operators to submit Noise Exposure Maps (NEMs) and Noise Compatibility Programs (NCPs) to the FAA voluntarily. According to the ASNA, an NCP sets forth the measures that an airport operator has taken or has proposed for the reduction of existing incompatible land uses and the prevention of additional incompatible land uses within the area covered by NEMs.

The ASNA embodies strong concepts of local initiative and flexibility. The submission of NEMs and NCPs is left to the discretion of local airport operators. Airport operators also may choose to submit NEMs without preparing and submitting an NCP. The types of measures that airport operators may include in an NCP are not limited by the ASNA, allowing airport operators substantial latitude to submit a broad array of measures—including innovative measures—that respond to local needs and circumstances.

3 FAA Notice of Final Policy, October 1, 1998.

The criteria for approval or disapproval of measures submitted in a Part 150 program are set forth in the ASNA. The ASNA directs the Federal approval of an NCP, except for measures relating to flight procedures: (1) if the program measures do not create an undue burden on interstate or foreign commerce; (2) if the program measures are reasonably consistent with the goal of reducing existing incompatible land uses and preventing the introduction of additional incompatible land uses; and (3) if the program provides for its revision if necessitated by the submission of a revised NEM. Failure to approve or disapprove an NCP within 180 days, except for measures relating to flight procedures, is deemed to be an approval under the ASNA.

Finally, the ASNA sets forth criteria under which grants may be made to carry out noise compatibility projects, consistent with ASNA's overall deference to local initiative and flexibility.

The FAA is authorized, but not obligated, to fund projects via the AIP to carry out measures in an NCP that are not disapproved by the FAA. Such projects also may be funded with local Passenger Facility Charge (PFC) revenue upon the FAA's approval of an application filed by a public agency that owns or operates a commercial service airport, although the use of PFC revenue for such projects does not require an approved NCP under Part 150.

In establishing the airport noise compatibility planning program, which became embodied in 14 CFR Part 150, the ASNA did not change the legal authority of state and local governments to control the uses of land within their jurisdictions. Public controls on the use of land are commonly exercised by zoning. Zoning is a power reserved to the states under the U.S. Constitution. It is an exercise of the police powers of the states that designates the uses permitted on each parcel of land. This power is usually delegated in states enabling legislation to local levels of government.

Many local land use control authorities (cities, counties, etc.) have not adopted zoning ordinances or other controls to prevent incompatible development (primarily residential) within the noise impact areas of airports. An airport noise impact area, identified within noise contours on an NEM, may extend over a number of different local jurisdictions that individually control land uses.

While airport operators have included measures in NCPs submitted under Part 150 to prevent the development of new incompatible land uses through zoning and other controls under the authorities of appropriate local jurisdictions, success in implementing these measures has been mixed.

One or more of the factors hindering effective land use controls may be of sufficient importance to preclude some jurisdictions from following through on the land use recommendations of an airport's Part 150 NCP. When either an airport sponsor's or a non-airport sponsor's jurisdiction allows additional incompatible development within the airport noise impact area. This can, in turn, result in noise problems for the airport operator in the form of inverse condemnation or noise nuisance lawsuits, public opposition to proposals by the airport operator to expand the airport's capacity, and local political pressure for airport operational and capacity limitations to reduce noise. Some airport operators have taken the position that they will not provide any financial assistance to mitigate aviation noise for new incompatible development. Other airport operators have determined that it is a practical necessity for them to include at least some new residential areas within their noise assistance programs to mitigate noise impacts that they were unable to prevent in the first place. Over a relatively short period of time, the distinctions blur between what is "new" and what is "existing" residential development with respect to airport noise issues.

Airport operators currently may include new incompatible land uses, as well as existing incompatible land uses, within their Part 150 NCPs and recommend that remedial noise mitigation measures--usually either property acquisition or noise insulation--be applied to both situations. These measures have been considered to qualify for approval by the FAA under 49 U.S. Code (U.S.C.) § 47504 and 14 CFR Part 150. The Part 150 approval enables noise mitigation measures to be considered for Federal funding under the AIP, although it does not guarantee that Federal funds will be provided.

Final Policy

Therefore, as of October 1, 1998, the FAA will approve remedial noise mitigation measures under Part 150 only for incompatible development which exists as of that date. Incompatible development that potentially may occur on or after October 1, 1998, may only be addressed in Part 150 programs with preventative noise mitigation measures. This policy will affect the use of AIP funds to the extent that such funding is dependent on approval under 14 CFR Part 150.

Approval of remedial noise mitigation measures for bypassed lots or additions to existing structures within noise impacted neighborhoods, additions to existing noise impacted schools or other community facilities required by demographic changes within their service areas, and formerly noise compatible uses that have been rendered incompatible as a result of airport expansion or changes in airport operations, and other reasonable exceptions to this policy on similar grounds must be justified by airport operators in submittals to the FAA and will be considered by the FAA on a case-by-case basis. This policy does not affect AIP funding for noise mitigation projects that do not require Part 150 approval, that can be funded with PFC revenue, or that are included in FAA-approved environmental documents for airport development.

A.1.2 FAA Airport Improvement Program Handbook

The AIP Handbook[4] provides guidance and sets forth policy and procedures used in the administration of the AIP. Appendix R, Noise Compatibility Planning/Projects, provides guidance and eligibility requirements for airport noise mitigation programs. The following sections provide the general steps for determining eligibility for mitigation under AIP guidelines.

A.1.2.1 General Eligibility Requirements

Table A-1, *Land Use Compatibility Guidelines – 14 CFR Part 150*, defines the requirements for determining when various land uses are noncompatible with aircraft noise, and therefore potentially eligible for AIP funding. The DNL 65 dB noise contour is the noise level at or above which certain land uses are not considered to be compatible (49 U.S.C. § 47502, as defined in Table A-1). The converse is also true – because DNL 65 dB is the Federal threshold for considering certain land uses as compatible, noise-sensitive land uses located outside of the DNL 65 dB noise contour are not considered to be impacted by airport related noise. They are not eligible for mitigation funding unless a lower local standard is formally adopted.

A.1.2.2 Interior Noise Level Requirements

The 45 dB standard has been adopted by the FAA for interior noise. This is based on 46 Federal Register 8316 (January 26, 1981), which established the interim rule for 14 CFR part 150 and included specific requirements regarding interior noise level. This was further clarified in 1992 by

[4] U.S. Department of Transportation, Federal Aviation Administration, Order 5100.38D, Change 1, February 26, 2019.

the Federal Interagency Committee on Noise (FICON) findings of 45 dB to be the interior noise level that will accommodate indoor conversations or sleep. A noise-impacted noncompatible structure must be experiencing existing interior noise levels that are 45 dB or greater with the windows closed to be considered eligible. For residences, the calculation of interior noise level must be based on the average noise level of only the habitable rooms (e.g. living, sleeping, and kitchen areas). For schools, the interior noise level during school hours should be calculated for determination of eligibility. Eligibility for noise insulation is limited to classrooms, libraries, fixed seat auditoriums, and educators' offices.

A.1.2.3 Block Rounding

Block rounding refers to expanding the noise mitigation program area beyond the limits of the 65 DNL noise contour to a logical breakpoint (such as a neighborhood boundary, significant arterial surface street, highway, river, other physical or natural barrier or feature). The FAA will review a request for block rounding under a noise mitigation program (or environmental study). If approved under block rounding, the property must meet the interior noise level requirements described in Section A.1.2.2.

A.1.2.4 Neighborhood Equity

A sponsor may consider the use of neighborhood equity when residences in the eligible noise contour threshold that do not meet the interior noise level requirements are scattered among residences that do meet the interior noise level criteria. If sponsor proposes to use neighborhood equity provisions, the FAA has the option to approve this request under the following circumstances.

- The residence must be in the eligible noise contour threshold
- The sponsor must develop a separate neighborhood equity package limited to improvements such as caulking, weather stripping, installation of storm doors or ventilation packages. The FAA must not approve the use of the standard noise insulation package for neighborhood equity residences.
- Per FAA policy, approval should not exceed more than 10% of the residences in the neighborhood, or 20 residences in a phase of the noise insulation program, whichever is less.
- In extremely rare cases, the FAA may determine that the program will benefit by providing noise equity packages to more than the 10% or 20 residence limit.
- The sponsor must provide the FAA, Airports District Office (ADO) with a complete list of the specific residences (by address) that are proposed for neighborhood equity.
- The sponsor must provide the ADO with detailed information comparing the cost of the proposed neighborhood equity package with the cost of a standard noise insulation package.
- The ADO must review and approve or disapprove the sponsor's proposed neighborhood equity package.
- In their determination, the ADO must ensure that the use of the minimal neighborhood equity packages on non-eligible residences is required to allow successful completion of the overall noise insulation program in the neighborhood, thus allowing these residences to be noise insulated within the guidelines of AIP eligibility. The ADO must document the determination and place a copy of the determination in the grant file.

A.1.2.5 Pre- and Post-Testing Criteria for Noise Insulation Projects

The AIP Handbook sets forth requirements for testing potentially eligible structures to determine if the interior noise level requirements are met. This guidance includes requirements for testing methodology, equipment, and the determination of an adequate sample size, which could impact program startup and implementation costs and funding reimbursement.

A.1.2.6 Disposal of Excess/Unneeded AIP Funded Land

Section 5-68 of the AIP Handbook sets forth requirements for disposal of land acquired under an airport NCP, commonly referred to as “noise land.” 49 U.S.C. § 47107(c)(2) requires a sponsor to promptly dispose of AIP funded land when the land is no longer needed for airport purposes. In this specific case, airport purpose includes land needed for an existing or future aeronautical purpose (including runway protection zone) or land that serves as a noise buffer. If it is determined that the land is no longer need for these purposes, the airport sponsor has the choice of either selling or keeping the land for non-airport purposes. In either case, the airport sponsor must use the Federal share of the fair market value on projects in the following order of precedence:

1. Reinvestment in an approved noise compatibility project
2. Reinvestment in an approved project that is eligible for funding under 49 U.S.C. § 47117(e)
3. Reinvestment in all other approved airport development projects at the airport
4. Transfer to a sponsor of another public airport for a noise compatibility project at the other airport
5. Repay the proceeds as directed by the FAA Office of Finance and Management

A.1.3 Program Guidance Letters

Program Guidance Letters (PGLs) are issued to update or clarify elements of the AIP Handbook. One current PGL is related to changes outlined in the FAA Reauthorization Act of 2018 dealing with noise and environmental issues is R-PGL 19-06.

A.1.3.1 Reauthorization Program Guidance Letter (R-PGL) 19-06

This Reauthorization Program Guidance Letter (R-PGL) 19-06 explains and implements provisions in the FAA Reauthorization Act of 2018 (the 2018 Act) (P.L.115-254) that impact environmental and noise programs.

Section 49 U.S.C. § 47503(b) requires airport operators with noise exposure maps to submit a revised map if a change, which is not reflected in either the existing conditions map or forecast map currently on file with the FAA, in the operation of the airport:

1. Establishes a substantial new noncompatible use; or
2. Would significantly reduce noise over existing noncompatible uses.

Section 174 amends 49 U.S.C. § 47503(b) by requiring submission of an updated noise exposure map only if the relevant change occurs during:

1. The forecast period of the applicable noise exposure map; or
2. The implementation period of the airport operator’s noise compatibility program.

This provision applies only to airport sponsors that have a noise exposure map on file with the FAA.

A.2 14 CFR Part 150

Title 14, Part 150 of the CFR sets forth the standards under which a Part 150 Noise Compatibility Study is conducted. Notably, the preparation of a NCP under 14 CFR Part 150 is a voluntary action by an airport proprietor. The process of preparing the plan is intended to open/enhance lines of communication between the airport, its neighbors, and users. It is the only mechanism to provide for the mitigation of aircraft noise impacts on noise-sensitive surrounding areas that is not directly tied to airfield development or airspace utilization conducted subject to the rules for preparation of an Environmental Impact Statement (EIS) or Environmental Assessment (EA).

The Part 150 Program allows airport operators to voluntarily submit NEMs and NCPs to the FAA for review and approval. An NCP sets forth the measures that an airport operator "has taken" or "has proposed" for the reduction of existing incompatible land uses and the prevention of additional incompatible land uses within the area covered by NEMs.

A.3 Federal Requirements to use DNL in Environmental Noise Studies

DNL is the standard metric used for environmental noise analysis in the United States. This practice originated with the United States Environmental Protection Agency's (USEPA's) effort to comply with the Noise Control Act of 1972. The USEPA designated a task group to "consider the characterization of the impact of airport community noise and develop a community noise exposure measure."[5] The task group recommended using the DNL metric. The USEPA accepted the recommendation in 1974, based on the following considerations:

1. The measure is applicable to the evaluation of pervasive, long-term noise in various defined areas and under various conditions over long periods of time.
2. The measure correlates well with known effects of the noise environment on individuals and the public.
3. The measure is simple, practical, and accurate.
4. Measurement equipment is commercially available.
5. The metric at a given location is predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.[6]

The Schultz Curve, which is depicted in **Exhibit A-1, *Schultz Curve***, was first published by T.J. Schultz in *Synthesis of Social Surveys on Noise Annoyance* in 1978. The curve relates specific DNL levels to the percent of people in a community whom those noise levels highly annoy. The Curve provided a widely-accepted dose-response relationship between cumulative environmental noise and annoyance. Like other Federal agencies that have established Federal land use guidelines for noise, FAA used the Schultz Curve, when it designated the DNL 65 dB contour as the cumulative noise exposure level above which residential land uses are not compatible without mitigation. At DNL 65 dB, the Schultz Curve predicts that approximately 12.5 percent of the population will be highly annoyed.

5 Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, P. A-10.

6 Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, Pp. A-1–A-23.

Soon thereafter, the Department of Housing and Urban Development (HUD), Department of Defense, and the Veterans Administration adopted the use of the DNL.

At about the same time, the Acoustical Society of America developed a standard (ANSI S3.23-1980) which established DNL as the preferred metric for outdoor environments. This standard was reevaluated in 1990 and they reached the same conclusions regarding the use of DNL (ANSI S12.40-1990).

In 1980, the Federal Interagency Committee on Urban Noise (FICUN) met to consolidate Federal guidance on incorporating noise considerations in local land use planning. The committee selected DNL as the best noise metric for the purpose, thus endorsing the USEPA's earlier work and making it applicable to all Federal agencies.[7]

In response to the requirements of the ASNA Act of 1979 and the recommendations of FICUN and USEPA, the FAA established DNL in 1981 as the single metric for use in airport noise and land use compatibility planning. This decision was incorporated into the final rule implementing ASNA, 14 CFR Part 150, in 1985. Part 150 established the DNL as the noise metric for determining the exposure of individuals to aircraft noise and identified residential land uses as being normally compatible with noise levels below DNL 65 dB.

In the early 1990s, Congress authorized the creation of a new interagency committee to study airport noise issues. The FICON was formed with membership from the USEPA, the FAA, the U.S. Air Force, the U.S. Navy, HUD, the Department of Veterans Affairs, and others. FICON concluded in its 1992 report that Federal agencies should "continue the use of the DNL metric as the principal means for describing long term noise exposure of civil and military aircraft operations."[8] FICON further concluded that there were no new sound descriptors of sufficient scientific standing to substitute for the DNL cumulative noise exposure metric."[9]

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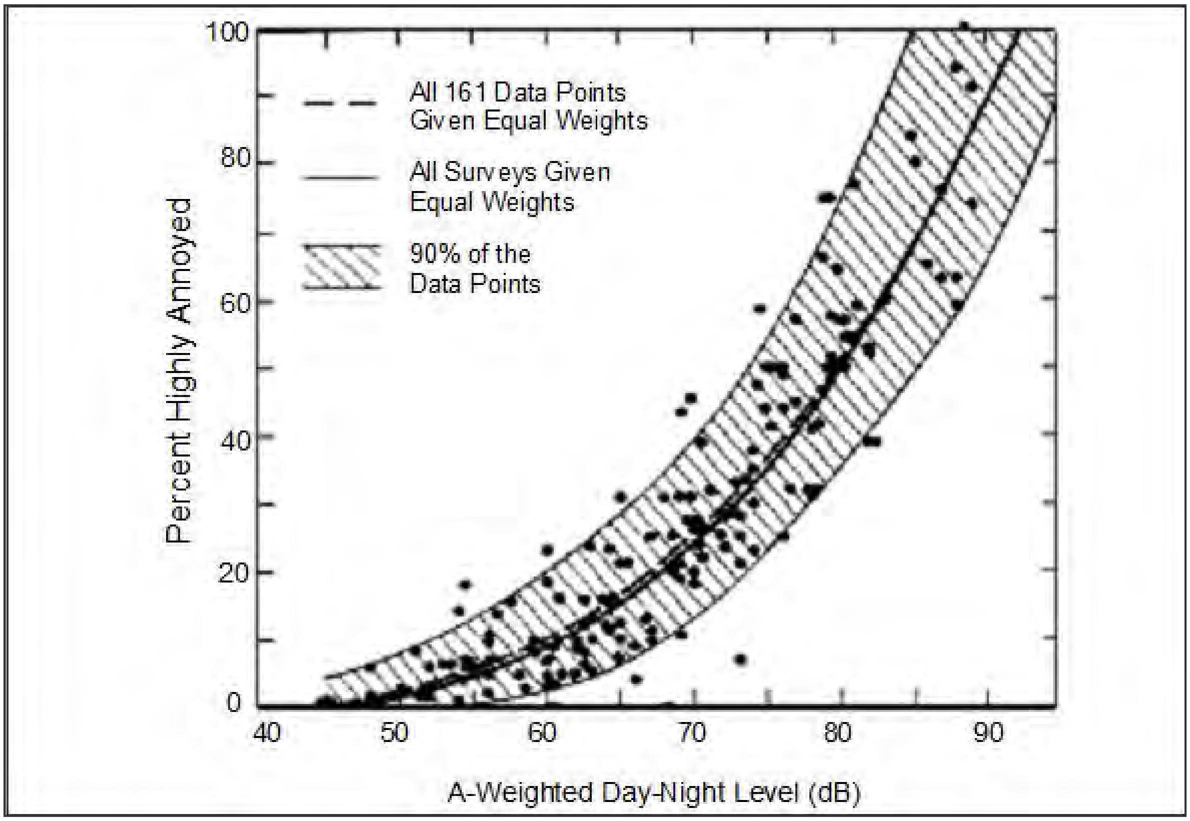
[7] Guidelines for Considering Noise in Land Use Planning and Control. Federal Interagency Committee on Urban Noise (FICUN). 1980.

[8] Federal Agency Review of Selected Airport Noise Analysis Issues. Federal Interagency Committee on Noise (FICON). August 1992, Pp. 3-1.

[9] Federal Agency Review of Selected Airport Noise Analysis Issues, Technical Report, Volume 2. Federal Interagency Committee on Noise (Technical). August 1992, Pp. 2-3.

Exhibit A-1 Schultz Curve



In 1993, the FAA issued its *Report to Congress on Effects of Airport Noise*. Regarding DNL, the FAA stated, "Overall, the best measure of the social, economic, and health effects of airport noise on communities is the DNL."[10] According to this report, DNL 65 dB "…as a criterion of significance, and of the land use compatibility guidelines in Part 150 is reasonable."[11] In April 2020, the FAA issued a report to Congress in accordance with section 188 in the 2018 FAA Reauthorization Act which stated that the DNL metric is the metric to be used for FAA decision-making.[12] The report further noted that other supplemental metrics could be used for informational purposes. Information regarding supplemental metrics can be found in **Appendix C, *Noise Methodology***.

A.3.1 FAA Noise Policy Review (Ongoing)

The FAA is currently reviewing the existing federal requirements to address aircraft noise through the FAA's Noise Policy Review.[13] The Noise Policy Review is evidence-based, thorough, and collaborative. Through the program, the FAA is considering findings from ongoing noise research, including the Neighborhood Environmental Survey which provided an updated dose-response curve, and other research related to health impacts, speech interference, sleep disturbance, and economic impacts. The FAA is also examining the distribution of environmental risks, tradeoffs, and resulting impacts across communities.

10 Report to Congress on Effects of Airport Noise. Federal Aviation Administration. 1993, P. 1.
11 Report to Congress on Effects of Airport Noise. Federal Aviation Administration. 1993, P. 13.
12 Report to Congress, FAA Reauthorization Act of 2018 (Pub. L. 115-254), Section 188 and Sec 173. Federal Aviation Administration, 2020.
13 FAA Noise Policy Review, Federal Aviation Administration. January 10, 2024. Available online: https://www.faa.gov/noisepolicyreview Accessed February 9, 2024.

As part of the review, the FAA is:

- Looking at the current use of DNL as the primary noise metric for assessing cumulative aircraft noise exposure;
- Reviewing whether to continue to use the DNL 65 dB level as the metric and threshold for determining significant noise impacts in environmental reviews under the NEPA or the definition of the limit of residential land use compatibility; and
- Considering if and how alternative noise metrics may be used in lieu of or in addition to DNL to better inform agency decisions and improve FAA's disclosure of noise impacts.

The FAA is engaging with the public and other stakeholders through meaningful opportunities in order to learn more about aviation noise, hear from the FAA, and provide input for the agency's consideration. As part of this engagement, the FAA issued a Federal Register Notice on May 1, 2023, seeking public comment on the Noise Policy Review through September 29, 2023. The FAA received 4,857 comments from across the country. The FAA currently is analyzing these comments to identify the range of input on noise metrics, noise thresholds, and other noise policy issues. This analysis will inform the development of any future policy recommendations.

A.4 Additional Information

To learn more about aviation noise, see the following:

- Federal Aviation Noise Abatement Policy Noise Control Act: https://www.epa.gov/laws-regulations/summary-noise-control-act
- U.S. Environmental Protection Agency Noise Assessment Guidelines: https://archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html
- Airport Capacity Act of 1990: https://www.congress.gov/bill/101st-congress/senate-bill/3094
- Aviation Safety and Noise Abatement Act of 1979: https://www.congress.gov/bill/96th-congress/house-bill/3547
- Title 14 CFR, Part 36: https://www.ecfr.gov/current/title-14/chapter-I/subchapter-C/part-36?toc=1
- Title 14 CFR, Part 91: https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-91
- Title 14 CFR, Part 161: https://www.ecfr.gov/current/title-14/chapter-I/subchapter-I/part-161
- Federal Interagency Committee on Noise (FICON): https://fican1.wordpress.com/#:~:text=About%20FICAN&text=FICON%20recommended

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Appendix B

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Appendix B, Noise Measurements and Complaints

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

PRESENTED BY
Landrum & Brown, Incorporated

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Appendix B Noise Measurements and Complaints

B.1 Noise Measurement Program

A temporary noise measurement program was conducted from October 4, 2022 to October 10, 2022. The temporary noise measurement program was conducted in accordance with 14 Code of Federal Regulations (CFR) Part 150 guidelines as provided in Section A150.5. Noise meters were located at different public locations to measure noise from aircraft operations. Noise measurements were taken using two methods, short-term measuring (up to one-hour per site) and long-term measuring (five days per site). Each site was selected relative to flight patterns, proximity to other measuring sites, areas of past noise concern, and lack of ambient (background) noise sources. The following sections describe the methodologies, locations, and results of the short-term and long-term noise measurement efforts.

B.1.1 Equipment Type

State of the art equipment used in this program included the Larson Davis LxT and 831 sound level meters. These are Class I Precision Sound Level Meters (as defined by American National Standards Institute (ANSI) and International Electrotechnical Commission (IEC)). The equipment was calibrated in compliance with manufacturer's procedures. Microphones and recording equipment were of the highest quality and capable of recording and calculating the various noise metrics. The equipment settings included the "A" frequency, weighting, filter characteristics, and the "slow response" characteristics. The instrumentation that was used for collecting short-term and long-term measurements as listed in **Table B-1, *Acoustical Measurement Instrumentation***.

Table B-1 Acoustical Measurement Instrumentation

Method	Equipment Type		
	Sound Level Meter	Microphone	Pre-amp
Long-Term	Larson Davis 831C	377B02	PRM831
Short-Term	Larson Davis LxT1	377B02	PRMLxT

Source: Landrum & Brown, 2023.

B.1.2 Noise Measurement Site Selection

Noise measurements were taken at eight long-term sites and 20 short-term sites. The long-term and short-term noise measurement sites were chosen based on their proximity to the Airport, the flow of aircraft operations during the measurement program, and areas of past noise concerns. General sites were selected on the basis of ambient noise level (or more specifically, the absence of loud ambient noise such as vehicular traffic), locations of flight tracks derived from radar data, locations of noise complaints received by the Airport, and the locations of concentrations of residential land uses that experience high numbers of aircraft overflights. Specific locations were suggested by Airport staff, as well as through application of consultant experience. Attempts were also made to select sites where noise measurements were taken during previous noise studies. Specific selection criteria included the following:

- Emphasis on areas of numerous aircraft noise events according to earlier evaluations;
- Representative sampling of all major types of operations and aircraft operating at CLT;

- Screening of each site for local (ambient) noise sources or unusual terrain characteristics, which could affect measurements; and
- Location where there are concentrations of residential development.

For the seven long-term noise measurement sites, additional emphasis was placed upon the location of flight corridors for operations arriving and departing each runway end. While there are numerous locations available for measuring, the selected sites fulfil the above criteria and provide a representative sampling of the varying aircraft noise conditions in the vicinity of the Airport. **Exhibit B-1, *Noise Measurement Sites*** illustrates the locations of both the short-term and long-term noise measurement sites. **Table B-2, *Short-Term Noise Measurement Sites*** lists the 20 short-term sites and **Table B-3, *Long-Term Noise Measurement Sites*** lists the eight (8) long-term sites.

Table B-2 Short-Term Noise Measurement Sites

Site ID	Site Description
S1	Winget Park
S2	River Cabin Lane
S3	Berewick Commons Parkway near Loch Lomond Drive
S4	Griers Fork Drive & Brown Grier Road
S5	Gerald Drive at Sullivan Trace Drive
S6	Farmhurst Drive - Treetops Apartments
S7	Thornfield Road cul-de-sac - west end
S8	Central Steele Creek Church - 9401 S Tryon St
S9	Harvest Center Church - 5415 Airport Drive
S10	Peachtree Road and Emmanuel Drive - Church Parking
S11	Prairiegrouse Court
S12	Coulwood Drive & Fielding Road
S13	Community west of Sam Wilson Rd on Farrhill Rd
S14	Verde Creek Road west of San Gabriel Avenue
S15	Chappell Baptist Church – 110 Bradford Drive
S16	Eagles Landing Drive
S17	Still Pond Court
S18	Cabe Lane
S19	St Johns Chapel Baptist Church - 8833 Moores Chapel Road
S20	Margo Drive & Taimi Drive

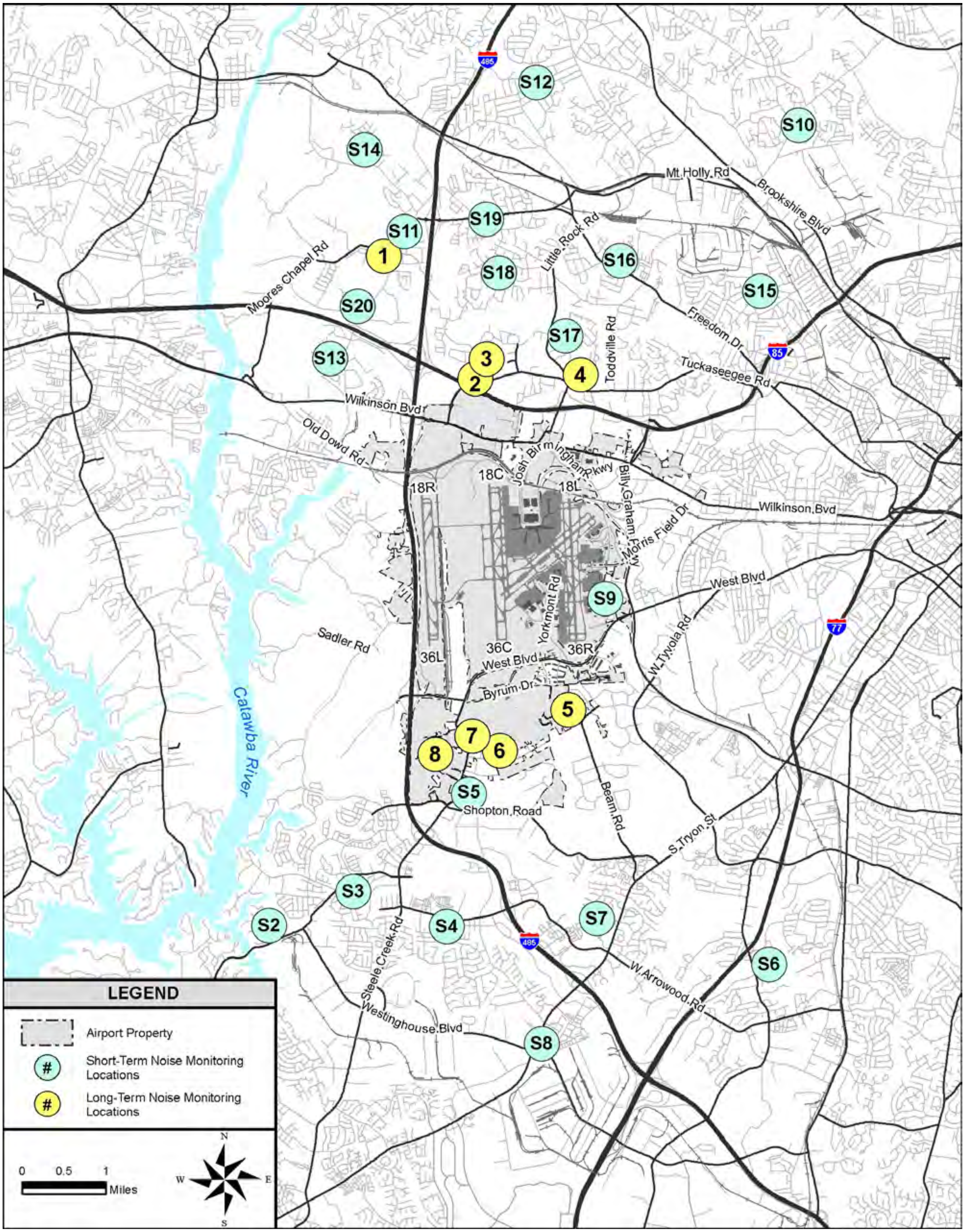
Source: Landrum & Brown, 2024

Table B-3 Long-Term Noise Measurement Sites

Site ID	Site Description
1	Moore’s Chapel United Methodist Church, 10601 Moores Chapel Road, Charlotte, NC 28214
2	Every Nation Baptist Church, 7700 Tuckaseegee Road, Charlotte, NC 28214
3	West Mecklenburg High School, 7400 Tuckaseegee Road, Charlotte, NC 28214
4	Mulberry Baptist Church,6450 Tuckaseegee Road, Charlotte, NC 28214
5	Airport-Owned Property off Belle-Oaks Drive
6	Airport-Owned Property on McAlpine Drive
7	Steele Creek Presbyterian Church, 7407 Steele Creek Road, Charlotte, NC 28217
8	Airport Property, 9410 Markswood Road, Charlotte, NC 28278

Source: Landrum & Brown, 2024

Exhibit B-1 Noise Measurement Sites



Source: Landrum & Brown, 2024

B.1.3 Weather Information

The temporary noise measuring was conducted for approximately one (1) hour at some sites and five (5) days at other sites. The weather during the measuring period ranged from sunny and clear skies to rainy/overcast conditions. Both north and south air traffic flow occurred during the measurement dates.

B.2 Noise Measurement Methodology

B.2.1 Short-Term Measurement Procedures

Aircraft noise levels were recorded using the equipment indicated in Table B-1 for each of the 20 short-term sites. Radar data was obtained from the Airport flight tracking system to correspond to the times of measurement. The noise-measurement program was designed to provide a sampling of single events throughout the study area. It was not designed to record cumulative noise levels. The measurement equipment was field calibrated at each location at the beginning of each measurement session. The monitors were attended while active to ensure that only aircraft noise events were recorded, or to note instances where a non-aircraft noise event was recorded simultaneously with an aircraft noise event. The measuring procedure called for the operator to enable the noise monitor when an aircraft noise event first became audible and continue measuring that event until the noise level receded back to ambient levels, usually lasting a duration of 30-90 seconds. After the event, the operator recorded the average noise level (Leq), the sound exposure level (SEL), the event duration, and the maximum sound level (Lmax). Other event information, such as aircraft type and operational characteristics, was also annotated, as available. Ambient noise levels, without aircraft noise or intermittent community noise, were recorded at each site. Short-term measurements were suspended during periods of heavy rain.

The short-term noise measurement program provided for the collection of a large number of single-event measurements at a variety of locations throughout the community at distances ranging from several hundred feet to several miles between the aircraft and the measuring site. This information, when correlated with the radar data and operating schedules, allowed for a comparison to the determination of applicable noise curves and performance characteristics within the AEDT database for the most significant aircraft and operators. Section 6.4 discusses the analysis of short-term noise measurement data and comparison to AEDT aircraft profiles based on the initial results of the noise measurement data correlation and further investigation of average aircraft weights upon departure.

B.2.2 Long-Term Measurement Procedures

For the long-term measurement program, equipment was placed at eight (8) sites and ran continuously for approximately seven days. The equipment was set up on October 4, 2022 and taken down on October 10, 2022. This provided for 120 consecutive hours of measurements starting at 12:00 am on October 5, 2022 and ending at 11:59 pm on October 9, 2022. Measurement staff coordinated with property owners and caretakers to gain access to these properties; which included churches and undeveloped land in the vicinity of CLT.

The measuring equipment was field calibrated at each location at the beginning of each measurement session. Staff periodically checked the equipment to ensure proper operation. The calibration was checked at the end of the measurement session to confirm the equipment remained in calibration throughout the measurement period.

The sound level meters were programmed to record one-second Leq in addition to "event" Leq, SEL, Lmax, and duration. The sound level meters were programmed to classify an "event" as a period of time in which the noise level rose above 65 dB for a duration of at least five seconds. Noise event data was then correlated to radar data to determine if the noise was likely caused by an aircraft overflight that occurred over the site at the time of the noise event.

B.3 Noise Measurement Results

B.3.1 Short-Term Measurement Results

The noise measurement program collected a wide range of noise exposure levels from aircraft activity in the airport environs. The measured noise levels from departing aircraft tended to produce peak decibel levels several decibels higher than those of arriving aircraft. This difference is caused by two characteristics of the separate operations. First, exposure to noise above the background levels from arriving aircraft is typically shorter than from departing aircraft. Second, the power settings used during approach are lower than those necessary to climb during the take-off, resulting in noise levels for arrivals of several decibels less than measured at similar locations during departure. **Table B-4, *Short-Term Noise Measurement Results*** provides a summary of the short-term noise measurement results.

Table B-4 Short-Term Noise Measurement Results

Site ID	Site Description	Date of Measurement	Time of Measurement	Ambient Noise Level	Type of Event	Number of Events	Loudest Event (Lmax)	Loudest Aircraft	SEL Range
S1	Winget Park	10/6/2022	3:42 pm to 4:18 pm	39.4 - 43.2	Departures	11	72.0	B737	61.0 - 81.3
S2	River Cabin Lane	10/6/2022	5:45 pm to 6:32 pm	47.1 - 55.1	Departures	19	67.1	A319	60.7 - 78.3
S3	Berewick Commons Parkway near Loch Lomond Drive	10/6/2022	4:46 pm to 5:24 pm	43.9 - 56.9	Departures	27	72.4	A320	62.1 - 80.8
S4	Griers Fork Drive & Brown Grier Road	10/10/2022	1:59 pm to 2:51 pm	46.1 - 49.6	Arrivals	15	77.2	A321	77.7 - 86.1
S5	Gerald Drive at Sullivan Trace Drive	10/6/2022	9:21 am to 10:08 am	47.9 - 52.6	Arrivals	34	69.8	A319	69.4 - 78.6
S6	Treetops Apartments	10/6/2022	2:37 pm to 3:12 pm	45.0 - 54.3	Departures	15	75.7	B737	64.3 - 84.5
S7	Thornfield Road west end cul-de-sac	10/11/2022	8:33 am to 9:18 am	47.4 - 51.7	Arrivals	5	76.0	B737	67.8 - 85.8
S8	Central Steele Creek Church	10/5/2022	9:06 am to 9:49 am	55.3 - 59.6	Arrivals	30	76.0	CRJ900	67.4 - 83.7
S9	Harvest Center Church	10/6/2022	10:46 am to 11:46 am	42.9 - 56.9	Departures	30	69.0	A321	64.2 - 79.3
S10	Peachtree Road & Emmanuel Drive	10/10/2022	12:40 pm to 13:27 pm	42.6 - 49.7	Departures	13	77.4	A321	70.6 - 86.3
S11	Prairiegrouse Lane	10/4/2022	10:12 pm to 11:12 pm	54.1 - 57.6	Departures	11	69.2	A306	57.8 - 64.1
S12	Coulwood Drive & Fielding Road	10/11/2022	10:29 am to 10:55 am	42.8 - 45.5	Departures	7	69.8	CRJ900	70.6 - 80.3
S13	Community west of Sam Wilson Road on Farrhill Road	10/5/2022	5:55 pm to 6:37 pm	44.9 - 46.9	Departures	16	63.8	CRJ900	61.1 - 75.6
S14	Verde Creek Road west of San Gabriel Avenue	10/5/2022	11:12 am to 11:53 am	51.1 - 55.4	Departures	25	72.4	B738	48.9 - 82.8
S15	Chappell Baptist Church	10/5/2022	3:36 pm to 4:49 pm	45.8 - 48.3	Departures	13	62.4	A320	60.3 - 79.5
S16	Eagles Landing Drive	10/4/2022	9:05 am to 10:05 am	50.6 - 53.4	Departures	3	67.1	B757	74.3 - 78.4
S17	Still Pond Court	10/5/2022 10/6/2022	7:09 pm to 8:03 pm 1:19 pm to 1:51 pm	47.0 - 51.6 51.9 - 60.8	Departures Arrivals	23 11	75.3 82.1	B737 B737	61.1 - 86.0 67.4 - 89.5
S18	Cabe Lane	10/5/2022	2:35 pm to 3:33 pm	49.1 - 51.3	Departures	22	64.1	A321	55.0 - 76.0
S19	St Johns Chapel Baptist Church	10/10/2022	4:23 pm to 5:24 pm	46.7 - 49.8	Departures	55	86.1	B777	61.8 - 93.6
S20	Taimi Drive	10/5/2022	4:51 pm to 5:32 pm	47.3 - 48.0	Departures	25	77.2	A321	66.6 - 86.2

Source: Landrum & Brown, 2024

B.3.2 Long-Term Noise Measurement Results

Noise level readings were used to characterize the noise environment at each location and to distinguish the various noise levels associated with individual aircraft operations. The primary objective of the noise measurement program was to collect a sampling of noise and operational data for specific aircraft events and to measure ambient (background) noise levels. Secondarily, data from the long-term sites also included the average aircraft DNL for the 120-hour period; although, measured DNL levels for short periods of time can differ from average-annual levels due to differences in runway use and the other operational factors, as well as influences from non-aircraft noise sources. **Table B-5, *Long-Term Noise Measurement Results*** summarizes the results of the long-term noise measurement program.

Table B-5 Long-Term Noise Measurement Results

Site ID	Ambient Noise Level (L_{50})	DNL	Average Number of Aircraft Overflights Per Day	Loudest Event (Lmax)	Loudest Aircraft
1	51.9	62.2	346	92.6	B772
2	60.3	74.4	434	103.3	B772
3	53.3	60.6	497	94.2	B772
4	50.4	61.7	369	94.6	MD11
5	50.5	63.4	350	98.3	E145
6	46.3	66.7	410	96.6	A321
7	51.1	60.5	349	94.4	A321
8	54.7	62.4	429	90.3	B738

Source: Landrum & Brown, 2024

The noise measurement process was designed to capture the noise levels of a representative mix of aircraft operations at CLT. Some of the noise events collected at the measurement sites were produced by non-aircraft, e.g., cars, people, pets, wildlife, etc. However, at each site, the majority of noise events were produced by aircraft operations based on observations and aircraft radar data.

B.4 Noise Event Correlation

Measured noise events were matched to specific aircraft operations from radar data using the following two-step method:

1) Once the noise measurement data was downloaded, noise levels greater than 65 dB for a duration longer than five seconds were identified as individual noise events. Once an event fell below the 65 dB trigger level for more than two seconds, the event was considered to have ended
2) Using the flight data from the Airport's operations monitoring system, noise events that occurred while an aircraft flight path passed within one nautical mile (6,076 feet) along the ground from the measurement site were correlated and classified as aircraft noise events.

Although this method provided positive identification of aircraft operations and highly accurate correlation with measured noise events, some community noise (e.g. cars, lawnmowers, animals) and aircraft noise occurred simultaneously and correlated as aircraft noise events. Unfortunately, there is currently no technology to separate aircraft noise levels from simultaneous non-aircraft noise levels.

B.4.1 Ambient Noise Levels

The data collected at the long-term noise measurement sites included 50th percentile data (L_{50}), which is the noise level at which 50 percent of the measured levels are higher. The FAA typically recommends using the L_{50} level to determine ambient noise levels (i.e., the noise level that would occur in the absence of identifiable noise events such as continuous automobile traffic, wind, wildlife, etc.). Table 6-5 also shows the L_{50} level at each long-term measurement site. Ambient noise levels were reported for informational purposes and were not incorporated into the noise contour modelling because per Part 150 guidance, ambient noise is not an input requirement for the noise model and ambient noise levels can differ from location to location and between different times of day.

B.4.2 Comparison to AEDT Database

The primary purpose of the noise measurement program was to provide a sample of noise levels generated by individual aircraft events for comparison to the AEDT database. This effort was focused on the five most common aircraft that operate at CLT, and the two largest passenger aircraft that operate at CLT. The five most common aircraft provide for the greatest sample size, and the two largest passenger aircraft are the heaviest, thus having the greatest influence on the Airport's noise contours. For this analysis, data was obtained from the long-term noise measurement sites 1, 2, 4, 5, and 6.

A comparison of the average measured aircraft noise level and the average AEDT predicted aircraft noise level at four sites is shown in **Table B-6, *Aircraft Noise Single Event Data***. As shown, the difference in average measured and modelled noise level for arrivals and departures of these seven aircraft ranges between 0.0 and +/- 3.6 dB; and in most cases, the difference is at the lower end of this range. Analytical models (such as AEDT) often have a 95% confidence interval of ±3 dB to ±5 dB. Therefore, a difference of 3.9 dB between an estimate from measurements and one from an analytical model may not be significant.[1]

The comparison of measured and modelled noise levels, both single event and cumulative, are within an acceptable range of tolerance. The results of the temporary noise measurement program identified no significant inconsistencies between measured noise levels and AEDT predicted noise levels. Therefore, no adjustments to the existing aircraft noise profiles in the AEDT database are recommended for this study.

[1] Sec. 7.7.1, SAE ARP4721 – Part 1, Monitoring Aircraft Noise and Operations in the Vicinity of Airports: System Description, Acquisition and Operation, Issued 2006-08.

Table B-6 Aircraft Noise Single Event Data

Aircraft Type	AEDT ID	Operation Type	Measured Noise Level*	AEDT Modelled Noise Level	Difference
Airbus A300F4-600 Series	A300-622R	Arrival	91.69	95.52	3.8
		Departure	86.37	85.90	-0.5
Airbus A319-100 Series	A319-131	Arrival	85.43	88.26	2.8
		Departure	87.17	84.56	-2.6
Airbus A320-200 Series	A320-232	Arrival	85.62	88.53	2.9
		Departure	88.10	86.59	-1.5
Airbus A321-200 Series	A321-232	Arrival	86.07	87.44	1.4
		Departure	90.14	89.58	-0.6
Boeing 737-800 Series	737-800	Arrival	86.82	87.50	0.7
		Departure	90.01	90.07	0.1
Bombardier CRJ-700-ER / Bombardier CRJ-900-ER	CRJ9-ER	Arrival	84.59	85.89	1.3
		Departure	84.04	81.22	-2.8
Embraer ERJ175	EMB-175	Arrival	85.02	87.44	2.4
		Departure	87.68	85.40	-2.3

Note: The measured noise level represents the average SEL noise levels for each aircraft type at long-term noise measurement sites 1, 2, 4, 5, and 6.
Source: Landrum & Brown analysis, 2023

B.5 Noise Complaint History

Noise complaint records from January 1, 2020 to May 30, 2024 were gathered in a database format for analysis in this study. **Table B-7, *Summary of Noise Complaints*** provides a summary of the number of noise complaints received and **Table B-8, *Noise Complaints by Time of Day*** presents the noise complaints by time of day they were received. **Exhibit B-2, *Location of Noise Complaints***, illustrates the geographic locations of these noise complaints. Between January 1, 2020 through May 30, 2024, there were 3,16,279 total complaints from 994 individual households. Approximately 66 percent of all complaints during this timeframe came from four individual households.

Table B-7 Summary of Noise Complaints

Year	Number of Noise Complaints	Number of Individuals Submitting One or More Complaints
2020	55,036	230
2021	97,676	260
2022	97,703	181
2023	56,729	221
2024 (partial)	9,044	123
Total	316,279	**1,015**

Source: Charlotte Douglas International Airport, 2024.

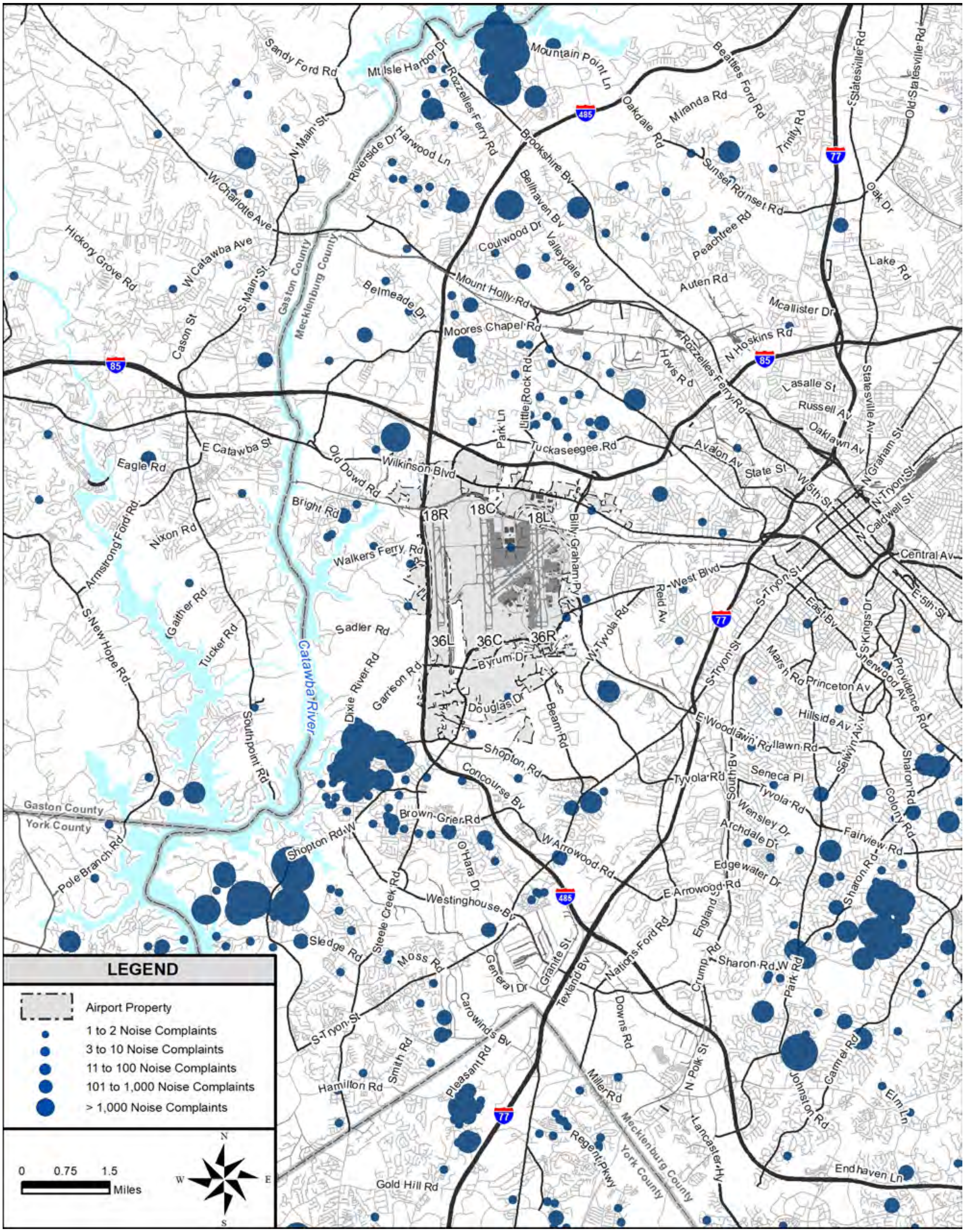
The majority of complaints were made regarding aircraft noise levels. Other reasons for complaints included complaints about aircraft altitude, frequency of overflights, disturbance of speech, disturbance of sleep, vibration, early morning or late night flights, and helicopter overflights. Staff from CLT reviews and responds to all complaints.

Table B-8 Noise Complaints by Time of Day

Time of Day	Percent of Complaints
0:00 - 1:00	0.4%
1:00 - 2:00	0.1%
2:00 - 3:00	0.0%
3:00 - 4:00	0.0%
4:00 - 5:00	0.1%
5:00 - 6:00	0.5%
6:00 - 7:00	1.1%
7:00 - 8:00	4.3%
8:00 - 9:00	3.5%
9:00 - 10:00	6.6%
10:00 - 11:00	4.6%
11:00 - 12:00	6.8%
12:00 - 13:00	3.8%
13:00 - 14:00	7.5%
14:00 - 15:00	4.5%
15:00 - 16:00	7.2%
16:00 - 17:00	6.3%
17:00 - 18:00	5.9%
18:00 - 19:00	7.4%
19:00 - 20:00	6.5%
20:00 - 21:00	8.5%
21:00 - 22:00	9.0%
22:00 - 23:00	3.1%
23:00 - 0:00	2.4%
Total	100.0%

Source: Charlotte Douglas International Airport, 2024; Landrum & Brown analysis, 2024.

Exhibit B-2 Noise Complaint Locations



Source: Landrum & Brown, 2024

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Appendix C

Appendix C, Noise Methodology

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

PRESENTED BY
Landrum & Brown, Incorporated

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Appendix C Noise Methodology

The following appendix describes the existing noise exposure on communities surrounding Charlotte Douglas International Airport (CLT or Airport). The noise analysis for this Part 150 Noise Compatibility Study (Part 150 Study) included the development of the noise contours for the existing conditions with a base year of 2023 and the future conditions with a year of 2028. Aircraft related noise exposure is defined through noise contours prepared using the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool Version (AEDT) 3e per Title 14 Code of Federal Regulations (14 CFR) Part 150 guidelines. Inputs into the noise model include: the number of average-annual day aircraft operations (arrivals and departures) by aircraft type and time of day, the percent of time each runway end is used for arrival and departure, and flight paths to and from the runway ends.

An explanation of the AEDT and standard noise descriptors, along with a review of the physics of noise, research regarding noise impacts on humans, social impacts of noise, and the data required to develop noise contours are explained in the sections below.

C.1 Characteristics of Sound

Sound is created by a source that induces vibrations in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward from the source like ripples on a pond. Sound waves dissipate with increasing distance from the source. Sound waves can also be reflected, diffracted, refracted, or scattered. When the source stops vibrating, the sound waves disappear almost instantly and the sound ceases.

Sound conveys information to listeners. It can be instructional, alarming, pleasant, relaxing, or annoying. Identical sounds can be characterized by different people or even by the same person at different times, as desirable or unwanted. Unwanted sound is commonly referred to as "noise."

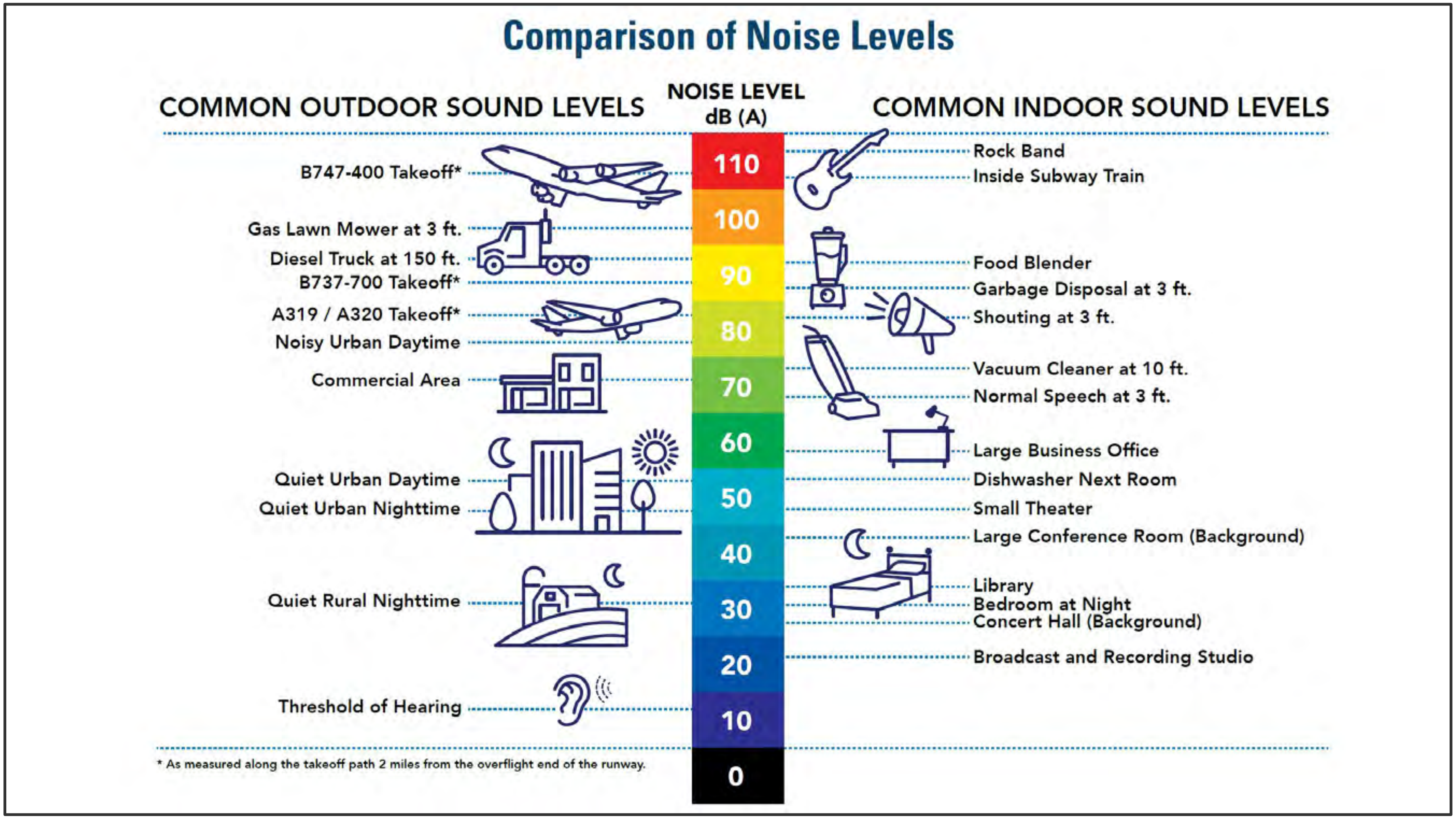
Sound can be defined in terms of three components:

- Level (amplitude)
- Pitch (frequency)
- Duration (time pattern)

C.1.1 Sound Level

The level or amplitude of sound is measured by the difference between atmospheric pressure (without the sound) and the total pressure (with the sound). Amplitude of sound is like the relative height of the ripples caused by the stone thrown into the water. Although physicists typically measure pressure using the linear Pascal scale, sound is measured using the logarithmic decibel (dB) scale. This is because the range of sound pressures detectable by the human ear can vary from *1 to 100 trillion units*. A logarithmic scale allows us to discuss and analyze noise using more manageable numbers. The range of audible sound ranges from approximately 1 to 140 dB, although everyday sounds rarely rise above about 120 dB. The human ear is extremely sensitive to sound pressure fluctuations. A sound of 140 dB, which is sharply painful to humans, contains *100 trillion (10^{14}) times more* sound pressure than the least audible sound. **Exhibit C-1, *Comparison of Sound***, shows a comparison of common sources of indoor and outdoor sounds measured on the dB scale.

Exhibit C-1 Comparison of Sound

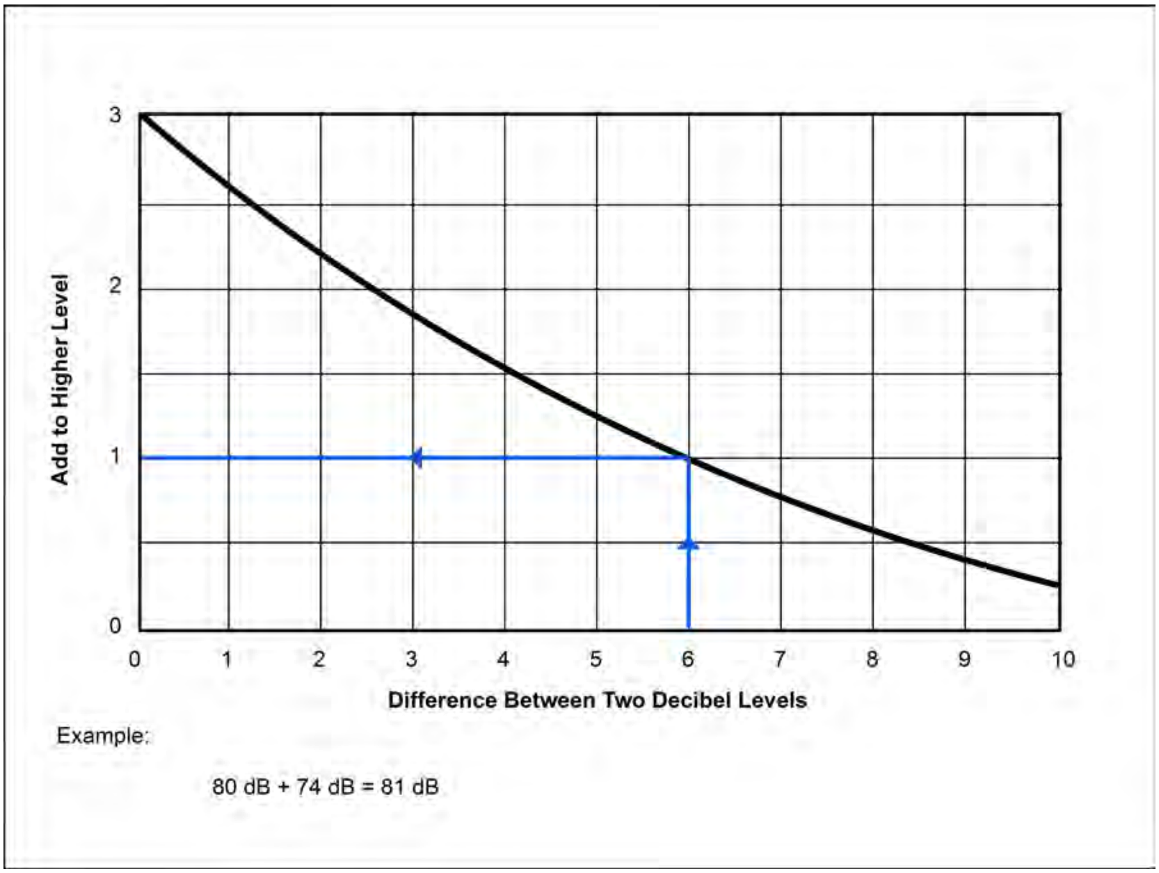


Source: Landrum & Brown, 2023.

By definition, a 10 dB increase in sound is equal to a tenfold (10^1) increase in the mean square sound pressure of the reference sound. A 20 dB increase is a 100-fold (10^2) increase in the mean square sound pressure of the reference sound. A 30 dB increase is a 1,000-fold (10^3) increase in mean square sound pressure.

A logarithmic scale requires different mathematics than used with linear scales. The sound pressures of two separate sounds, expressed in dB, are not arithmetically additive. For example, if a sound of 80 dB is added to another sound of 74 dB, the total is a 1 dB increase in the louder sound (81 dB), not the arithmetic sum of 154 dB (See **Exhibit C-2, *Example Addition of Two Decibels***). If two equally loud noise events occur simultaneously, the sound pressure level from the combined events is 3 dB higher than the level produced by either event alone.

Exhibit C-2 Example of Addition of Two Decibel Levels

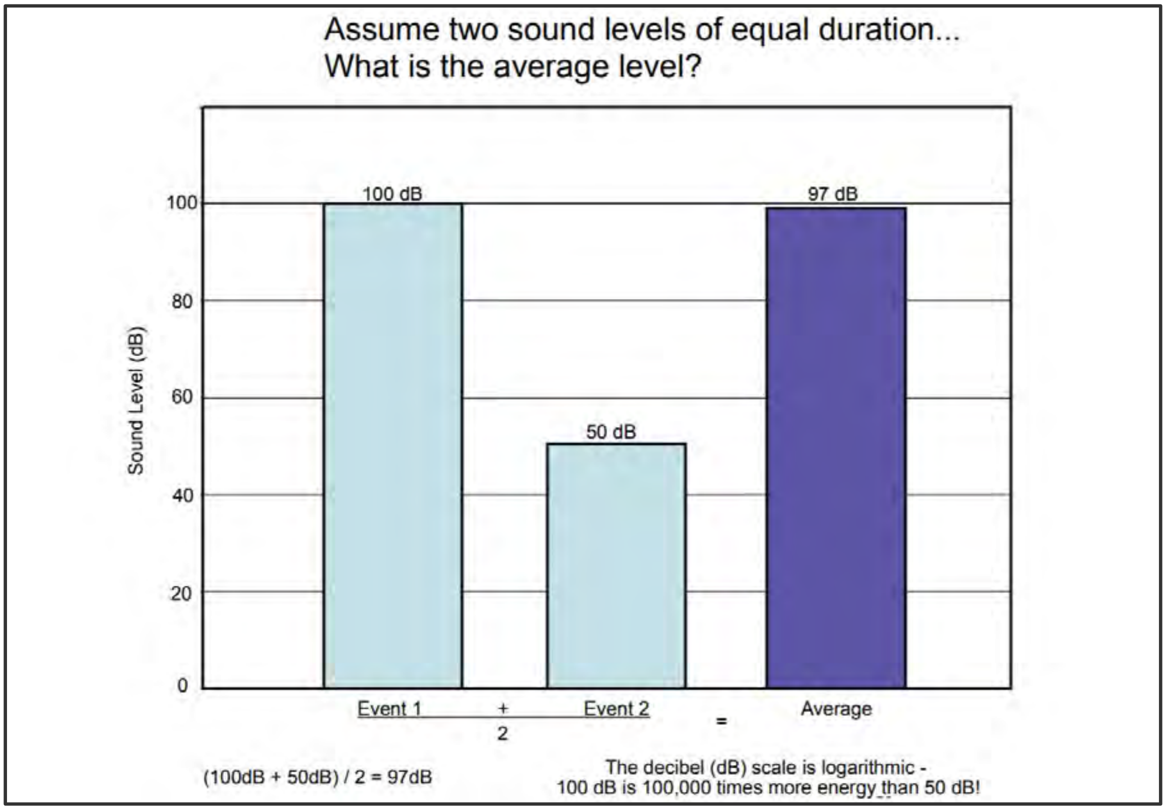


Source: Information on Levels of Environmental Noise, USEPA, March 1974

Logarithmic averaging also yields results that are quite different from simple arithmetic averaging. Consider the example shown in **Exhibit C-3, *Example of Sound Level Averaging***. Two sound levels of equal duration are averaged. One has a maximum sound level (Lmax) of 100 dB, the other 50 dB. Using conventional arithmetic, the average would be 75 dB. The true result, using logarithmic math, is 97 dB. This is because 100 dB has far more energy than 50 dB (100,000 times as much) and is overwhelmingly dominant in computing the average of the two sounds.

Human perceptions of changes in sound pressure are less sensitive than a sound level meter. People typically perceive a tenfold increase in sound pressure, a 10 dB increase, as a doubling of loudness. Conversely, a 10 dB decrease in sound pressure is normally perceived as half as loud. In community settings, most people perceive a 3 dB increase in sound pressure (a doubling of the sound pressure or energy) as just noticeable. (In laboratory settings, people with good hearing are able to detect changes in sounds of as little as 1 dB).

Exhibit C-3 Examples of Sound Level Averaging

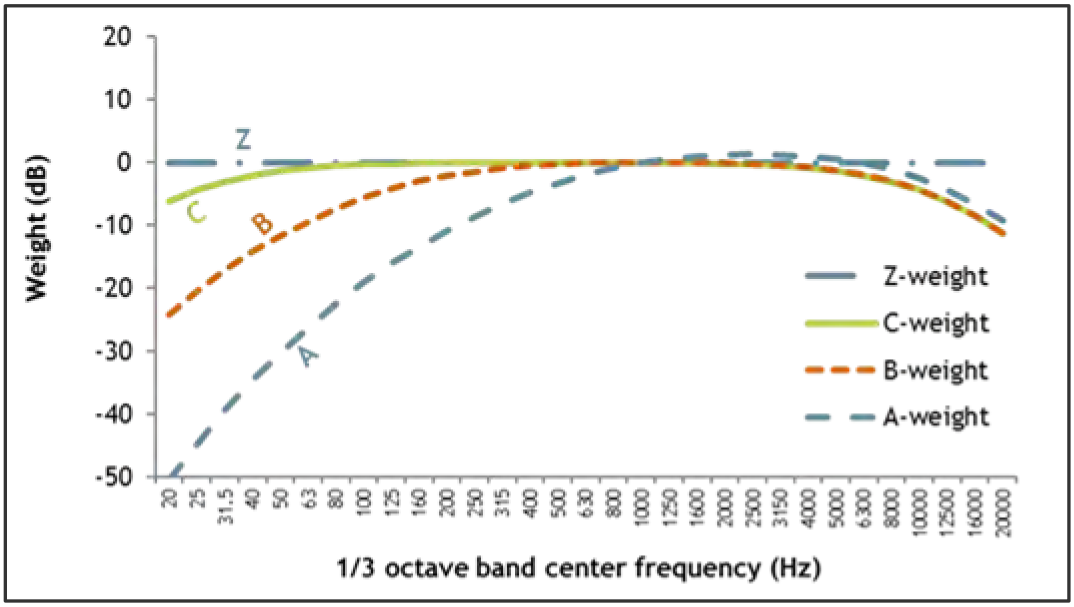


Source: Landrum & Brown, 2023.

The pitch (or frequency) of sound can vary greatly from a low-pitched rumble to a shrill whistle. If we consider the analogy of ripples in a pond, high frequency sounds are vibrations with tightly spaced ripples, while low rumbles are vibrations with widely spaced ripples. The rate at which a source vibrates determines the frequency. The rate of vibration is measured in units called "Hertz" -- the number of cycles, or waves, per second. One's ability to hear a sound depends greatly on the frequency composition. Humans hear sounds best at frequencies between 1,000 and 6,000 Hertz. Sound at frequencies above 10,000 Hertz (high-pitched hissing) and below 100 Hertz (low rumble) are much more difficult to hear.

When attempting to measure sound in a way that approximates what our ears hear, we must give more weight to sounds at the frequencies we hear well and less weight to sounds at frequencies we do not hear well. Acousticians have developed several weighting scales for measuring sound. The A-weighted scale was developed to correlate with the judgments people make about the loudness of sounds. The A weighted decibel scale (dBA) is used in studies where audible sound is the focus of inquiry. **Exhibit C-4, *Sound Frequency Weighting Curves***, shows the A, B, and C sound weighting scale. The U.S. Environmental Protection Agency (USEPA) has recommended the use of the A-weighted decibel scale in studies of environmental noise.[1] Its use is required by the FAA in airport noise studies.[2] For the purposes of this analysis, dBA was used as the noise metric and dB and dBA are used interchangeably.

Exhibit C-4 Sound Frequency Weighting Curves



Source: Noise Measurement Handbook, Federal Highway Administration, 2018, Sec. 17.3.3.3.

C.1.2 Duration of Sounds

The duration of sounds – their patterns of loudness and pitch over time – can vary greatly. Sounds can be classified as continuous like a waterfall, impulsive like a firecracker, or intermittent like aircraft overflights. Intermittent sounds are produced for relatively short periods, with the instantaneous sound level during the event roughly appearing as a bell-shaped curve. An aircraft event is characterized by the period during which it rises above the background sound level, reaches its peak, and then recedes below the background level.

C.1.3 Perceived Noise Level

Perceived noisiness is another method of rating sound that was originally developed for the assessment of aircraft noise. Perceived noisiness is the subjective measure of the degree to which noise is unwanted or causes annoyance to an individual. To determine perceived noise level, individuals are asked to judge in a laboratory setting when two sounds are equally noisy or disturbing if heard regularly in their own environment. These surveys are inherently subjective and thus subject to greater variability. For example, two separate events of equal noise energy may be perceived differently if one sound is more annoying to the listener than the other.

C.1.4 Propagation of Noise

Outdoor sound levels decrease as a function of distance from the source, and as a result of wave divergence, atmospheric absorption, and ground attenuation. If sound is radiated from a source in an

1 Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, P. A-10.
2 "Airport Noise Compatibility Planning." 14 CFR Part 150, Sec. A150.3.

homogeneous and undisturbed manner, the sound travels as spherical waves. As the sound wave travels away from the source, the sound energy is distributed over a greater area, dispersing the sound energy of the wave. Spherical spreading of the sound wave reduces the noise level at a rate of 6 dB per doubling of the distance.

Atmospheric absorption also influences the levels that are received by the observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances of greater than 1,000 feet. The degree of absorption is a function of the frequency of the sound as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest at high humidity and higher temperatures. Sample atmospheric attenuation graphs are presented in **Exhibit C-5, *Sound Attenuation Graphs***. The graphs show noise absorption rates based on temperature, relative humidity, and distance at five different frequency ranges. For example, sounds at a frequency of 2,000 Hz, with a relative humidity of 10 percent and a temperature of 90° Fahrenheit (32° Celsius), will be dissipate by 10 dB per for every 1,000 feet (305 meters) from the source.

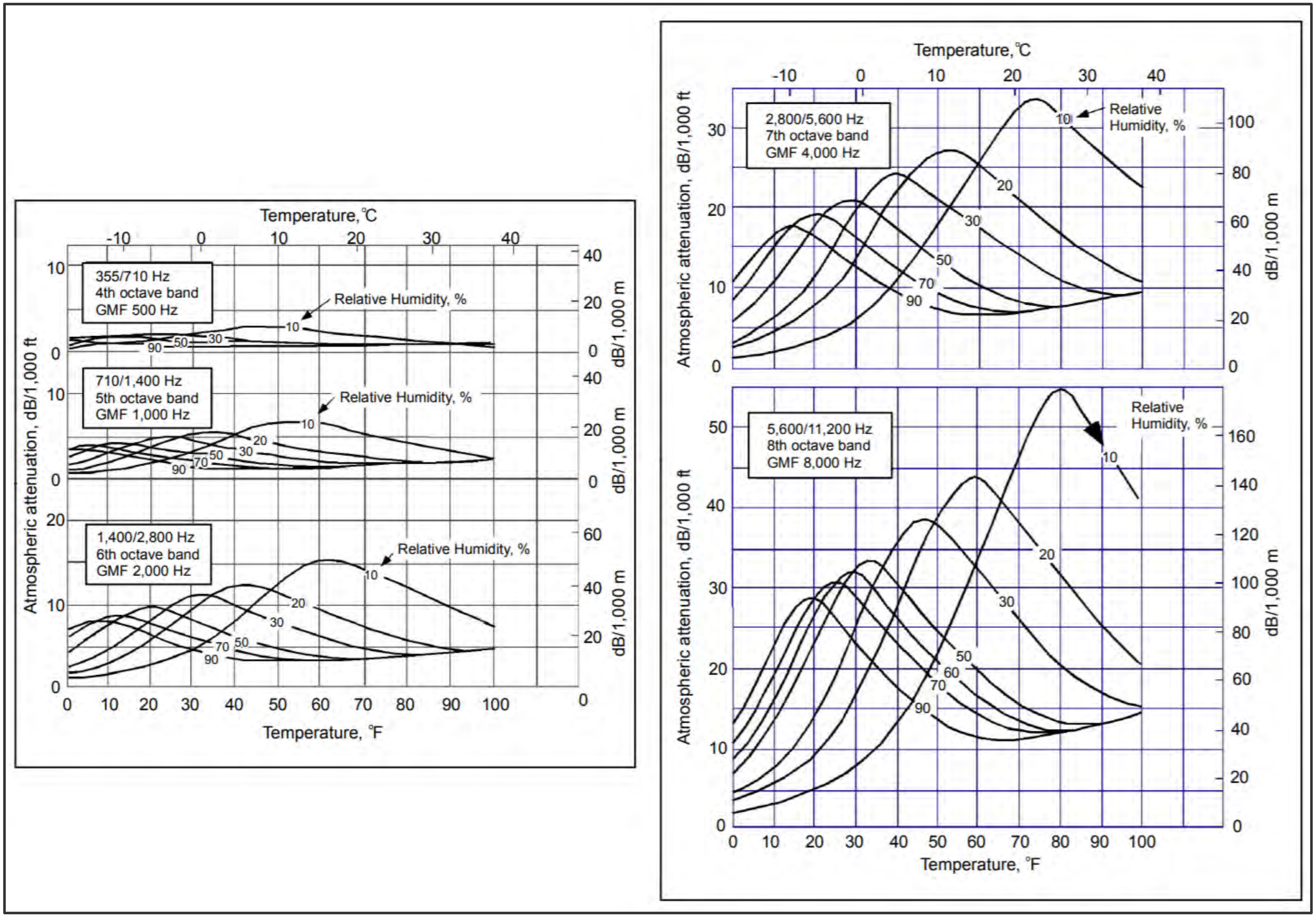
The rate of atmospheric absorption varies with sound frequency. The higher frequencies are more readily absorbed than the lower frequencies. Over large distances, the lower frequencies become the dominant sound as the higher frequencies are attenuated.

Turbulence and gradients of wind, temperature, and humidity also play a significant role in determining the degree of attenuation. Certain conditions, such as inversions, can also result in higher noise levels than would result from spherical spreading as a result of channeling or focusing the sound waves.

The effect of ground attenuation on noise propagation is a function of the height of the source and/or receiver and the characteristics of the terrain. The closer the source of noise is to the ground, the greater the ground absorption. Terrain consisting of soft surfaces such as vegetation provide for more ground absorption than hard surfaces. Ground attenuation is important for the study of noise from airfield operations (such as, thrust reversals) and in the design of noise berms or engine run-up facilities.

These factors are an important consideration for assessing in-flight and ground noise in the Charlotte area. Atmospheric conditions will play a significant role in affecting the sound levels on a daily basis and how these sounds are perceived by the population.

Exhibit C-5 Sound Attenuation Graphs



Source: Baraneck, 1981

C.2 Factors Influencing Human Response to Sound

Many factors influence how a sound is perceived and whether or not it is considered annoying to the listener. These factors include not only physical (acoustic) characteristics of the sound but also secondary (non-acoustic) factors, such as sociological and external factors.

Sound rating scales are developed to account for the factors that affect human response to sound. Nearly all of these factors are relevant in describing how sounds are perceived in the community. Many of the non-acoustic parameters play a prominent role in affecting individual response to noise. Background sound (ambient noise) is also important in describing sound in rural settings. Some non-acoustic factors that may influence an individual's response to aircraft noise include:

- Predictability of when the sound/noise will occur;
- How the noise affects certain activities;
- Fear of an aircraft crashing;
- Belief that aircraft noise could be prevented or reduced by aircraft designers, pilots, or authorities related to airlines or airports; and
- Sensitivity to noise in general.

Thus, it is important to recognize that non-acoustic factors such as those described above, as well as acoustic factors, contribute to human response to noise.

C.3 Standard Noise Descriptors

Given the multiple dimensions of sound, a variety of descriptors, or metrics, have been developed for describing sound and noise. Some of the most commonly used metrics are discussed in this section.

C.3.1 Maximum Level

Maximum level (Lmax) is simply the highest sound level, or peak level, recorded during an event or over a given period of time. It provides a simple and understandable way to describe a sound event and compare it with other events. In addition to describing the peak sound level, the Lmax can be reported on an appropriate weighted decibel scale (A-weighted, for example) so that it can disclose information about the frequency range of the sound event in addition to the loudness.

The Lmax, however, fails to provide any information about the duration of the sound event. This can be a critical shortcoming when comparing different sounds. Even if they have identical Lmax values, sounds of greater duration contain more sound energy than sounds of shorter duration. Research has demonstrated that for many kinds of sound effects, the total sound energy, not just the peak sound level, is a critical consideration.

C.3.2 Time Above Level

The time above level (TA) metric indicates the amount of time that sound at a particular location exceeds a given sound level threshold. The TA is often expressed in terms of the total time per day that the threshold is exceeded. The TA metric explicitly provides information about the duration of sound events, although it conveys no information about the peak levels during the period of observation.

C.3.3 Number of Events Above Level

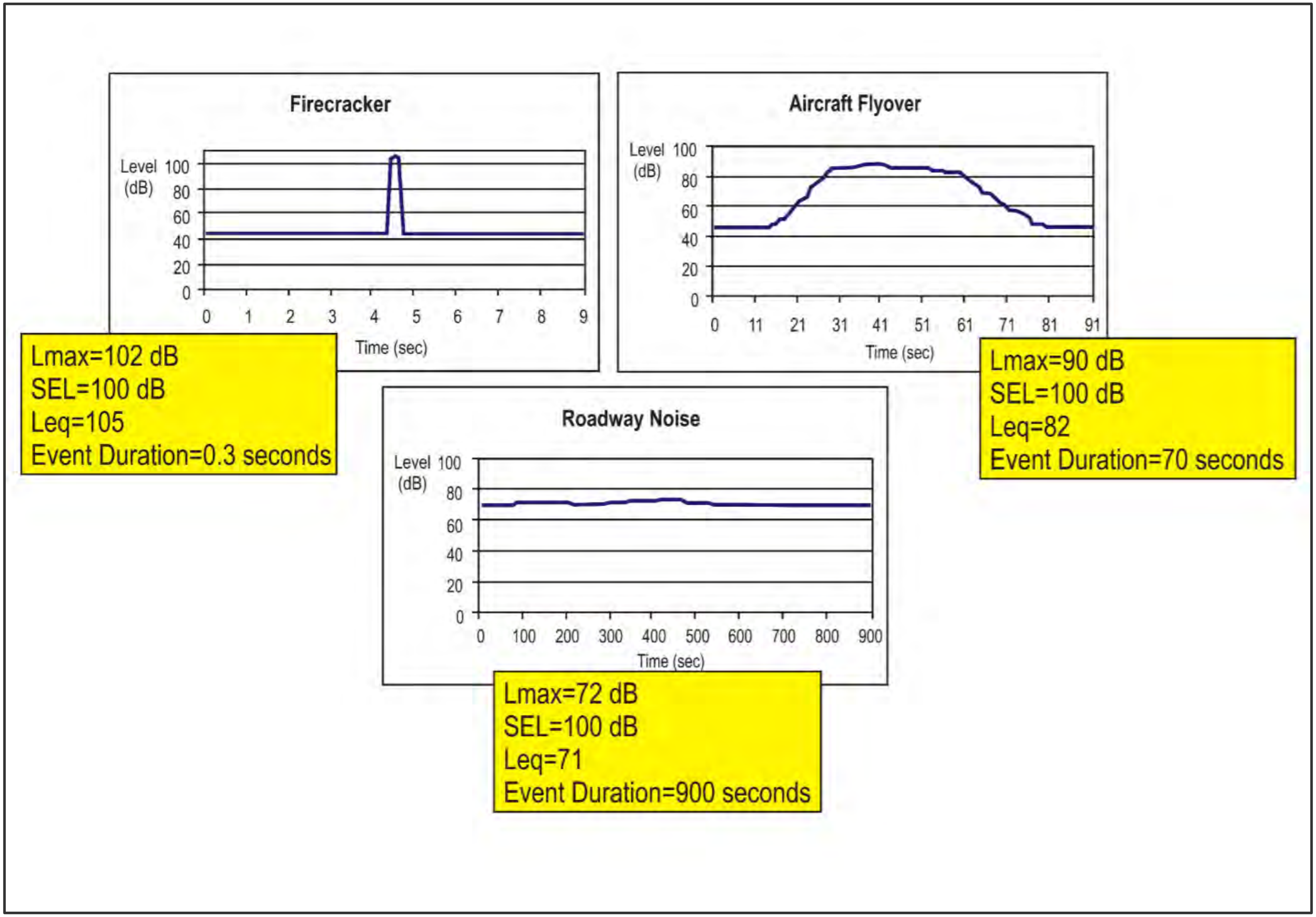
Similar to the TA, the number of events above (NA) metric indicates the total number of aircraft events at particular location that exceed a given sound level threshold in dB. The NA metric explicitly provides information about the number of sound events, although it conveys no information about the duration of the event(s).

C.3.4 Sound Exposure Level

The sound exposure level (SEL) metric provides a way of describing the total sound energy of a single event. In computing the SEL value, all sound energy occurring during the event, within 10 dB of the Lmax, is mathematically integrated over one second. (Very little information is lost by discarding the sound below the 10 dB cut-off, since the highest sound levels completely dominate the integration calculation.) Consequently, the SEL is always greater than the Lmax for events with a duration greater than one second. SELs for aircraft overflights typically range from five to 10 dB higher than the Lmax for the event.

Exhibit C-6, *Measurement of Different Types of Sound*, shows graphs of instantaneous sound levels for three different events: an aircraft flyover, steady roadway noise, and a firecracker. The Lmax and the duration of each event differ greatly. The pop of the firecracker is quite loud, 102 dB but lasts less than a second. The aircraft flyover has a considerably lower Lmax at 90 dB, but the event lasts for over a minute. The Lmax from the roadway noise is even quieter at only 72 dB, but it lasts for 15 minutes. By considering the loudness and the duration of these very different events simultaneously, the SEL metric reveals that the total sound energy of all three is identical. This can be a critical finding for studies where total noise dosage is the focus of study. As it happens, research has shown conclusively that noise dosage is crucial in understanding the effects of noise on animals and humans.

Exhibit C-6 Measurement of Different Types of Sound



Source: Landrum & Brown, 2023.

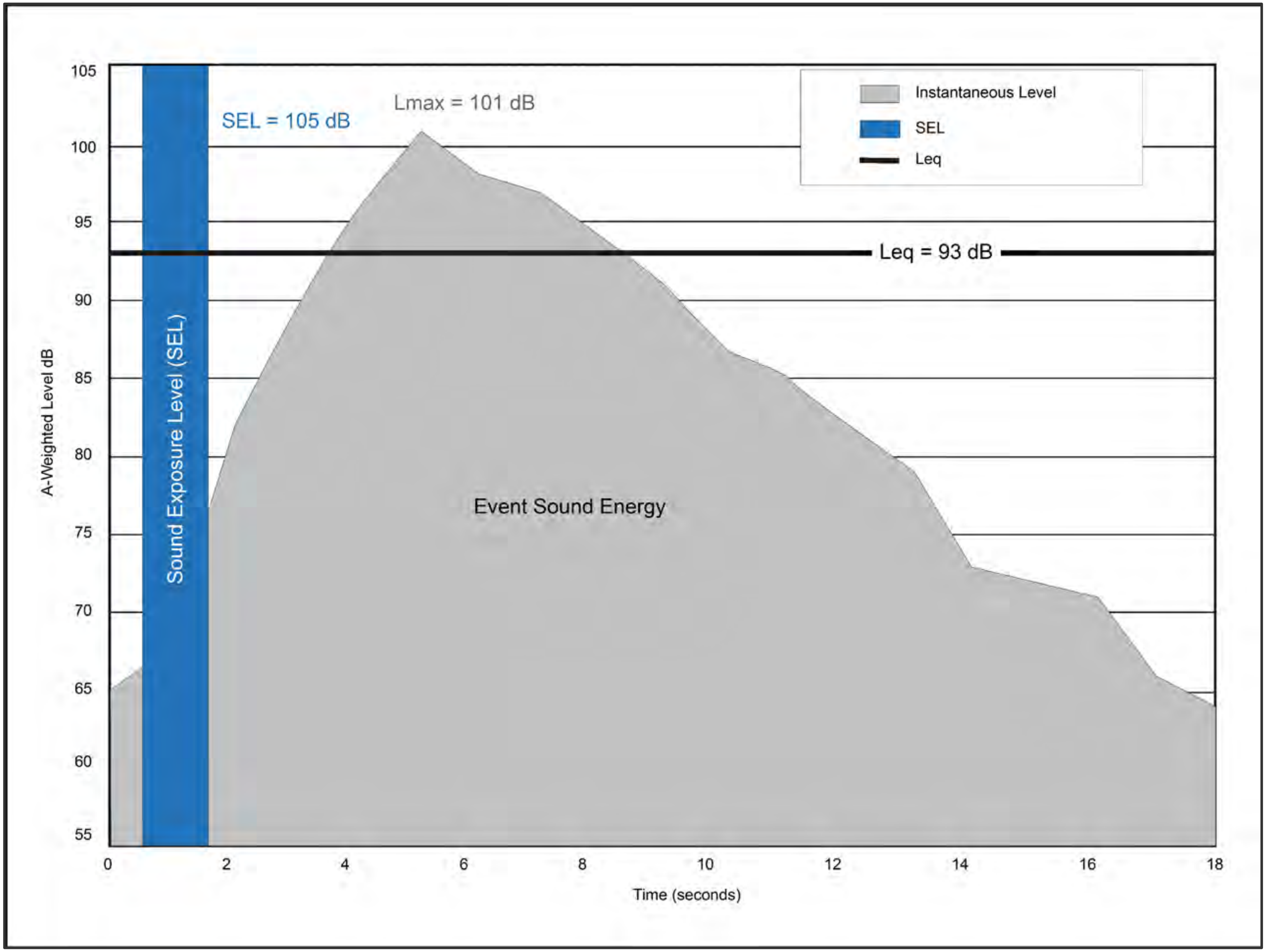
C.3.5 Equivalent Sound Level

The equivalent sound level (Leq) metric may be used to define cumulative noise dosage, or noise exposure, over a period of time. In computing Leq, the total noise energy over a given period of time, during which numerous events may have occurred, is logarithmically averaged over the time period. The Leq represents the steady sound level that is equivalent to the varying sound levels actually occurring during the period of observation. For example, an 8-hour Leq of 67 dB indicates that the amount of sound energy in all the peaks and valleys that occurred in the 8 hour period is equivalent to the energy in a continuous sound level of 67 dB. Leq is typically computed for measurement periods of 1 hour, 8 hours, or 24 hours, although any time period can be specified.

Exhibit C-7, *Relationship Among Sound Metrics*, shows the relationship of Leq to Lmax and SEL. In this example, a single aircraft event lasting 18 seconds is represented. The instantaneous noise levels for the event range from 64 to an Lmax of 101 dBA. The area under the curve represents the sound energy accumulated during the entire event. The compression of this energy into a single second results in an SEL of 105 dBA. The Leq average of the sound energy for each second during the event would be 93 dB. If this event were the only event to occur during an hour, the aircraft sound energy for the other 3,582 seconds would be considered to be zero. When converted to an hourly LEQ, the level would be nearly 70 dB of Leq. This again indicates the dominance of loud events in noise summation and averaging computations.

The Leq is a critical noise metric for many kinds of analysis where total noise dosage, or noise exposure, is under investigation. As already noted, noise dosage is important in understanding the effects of noise on both animals and people. Indeed, research has led to the formulation of the “equal energy rule.” This rule states that it is the total acoustical energy to which people are exposed that explains the effects the noise will have on them. That is, a very loud noise with a short duration will have the same effect as a lesser noise with a longer duration if they have the same total sound energy.

Exhibit C-7 Relationship Among Sound Metrics



Source: Landrum & Brown, 2023.

C.3.6 Day-Night Average Sound Level

The day-night average sound level (DNL) metric is really a variation of the 24 hour Leq metric. Like Leq, the DNL metric describes the total noise exposure during a given period. Unlike Leq, however, DNL, by definition, can only be applied to a 24-hour period. In computing DNL, an extra weight of 10 dB is assigned to any sound levels occurring between the hours of 10:00 p.m. and 7:00 a.m. This is intended to account for the greater annoyance that nighttime noise is presumed to cause for most people. Recalling the logarithmic nature of the dB scale, this extra weight treats one nighttime noise event as equivalent to 10 daytime events of the same magnitude.

As with Leq, DNL values are strongly influenced by the loud events. For example, 30 seconds of sound of 100 dB, followed by 23 hours, 59 minutes, and 30 seconds of silence would compute to a DNL value of 65 dB. If the 30 seconds occurred at night, it would yield a DNL of 75 dB.

This example can be roughly equated to an airport noise environment. Recall that an SEL is the mathematical compression of a noise event into one second. Thus, 30 SELs of 100 dB during a 24-hour period would equal DNL 65 dB, or DNL 75 dB if they occurred at night. This situation could actually occur in places around a real airport. If the area experienced 30 overflights during the day, each of which produced an SEL of 100 dB, it would be exposed to DNL 65 dB. Recalling the relationship of SEL to the Lmax of an aircraft overflight, the Lmax recorded for each of those overflights (the peak level a person would actually hear) would typically range from 90 to 95 dB.

C.4 Health Effects of Noise

A considerable amount of research has been conducted to identify, measure, and quantify the potential effects of aviation noise on health. The various methods by which noise can be measured (e.g. single dose, long-term average, number of events above a certain level, etc.), and difficulties in separating other lifestyle factors from the analysis, increases the complexity of determining the health effects of noise, and has caused considerable variability in the results of past studies. The health effects of noise are often divided into the following topics: cardiovascular effects, hearing loss, sleep disturbance, and speech/communication interference.

C.4.1 Cardiovascular Effects

Several studies have suggested that increased hypertension or other cardiovascular effects, such as increased blood pressure, and change in pulse rate, may be associated with long-term exposure to high levels of environmental noise. When conducting cross-sectional studies of environmental noise exposure, it is difficult to control for other important variables. Subsequent reviews of past research have pointed out that such studies "…are notoriously difficult to interpret. They often report conflicting results, generally do not identify a cause and effect relationship, and often do not report a dose-response relationship between the cause and effect."[3] In 2018, the World Health Organization (WHO) published its Environmental Noise Guidelines report (WHO report) with reference to recent research related to aircraft noise and human response.[4] The WHO report references two ecological studies that provide information on the relationship between aircraft noise and incidence of ischemic heart disease (IHD); however, this "…evidence was rated low quality." Additionally, the WHO report reference one cohort study and several cross-sectional studies of the relationship between aircraft noise and hypertension. The WHO report noted "…inconsistency across studies" and the "…evidence was rated low quality." Similar studies of the

[3] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.
[4] World Health Organization, Regional Office for Europe, Environmental Noise Guidelines for the European Region, 2018.

relationship between aircraft noise and cases of stroke were reviewed. The WHO report noted that this "…evidence was rated very low quality." Therefore, it is difficult to draw any conclusions about the relationship between aircraft noise exposure and cardiovascular effects.

C.4.2 Hearing Loss

The potential for noise-induced hearing loss is commonly associated with occupational noise exposure from working in a noisy work environment or recreational noise such as listening to loud music. Recent studies have concluded that "because environmental noise does not approximate occupational noise levels or recreational noise exposures…it does not have an effect on hearing threshold levels." Furthermore, "aviation noise does not pose a risk factor for child or adolescent hearing loss, but perhaps other noise sources (personal music devices, concerts, motorcycles, or night clubs) are a main risk factor."[5] This conclusion is supported by the 2018 WHO Environmental Noise Guidelines which notes that "no studies were found, and therefore no evidence was available on the association between aircraft noise and hearing impairment and tinnitus."[6] Because aviation noise levels near airports do not approach levels of occupational or recreational noise exposures associated with hearing loss, hearing impairment is likely not caused by aircraft noise for populations living near an airport.

C.4.3 Sleep Disturbance

Sleep disturbance is a common complaint from people who live in the vicinity of an airport. A large amount of research has been published on the topic of sleep disturbance caused by environmental noise. This research has produced variable results due to differing definitions of sleep disturbance, different ways for measuring sleep disturbance (behavioral awakenings or sleep interruption), and different settings in which to measure it (laboratory setting or field setting).

In 1992, the Federal Interagency Committee on Noise (FICON) recommended an interim dose-response curve to predict the percent of the exposed population expected to be awakened (percent awakening) as a function of the exposure to single event noise levels expressed in terms of the SEL. This interim curve was based on statistical adjustment of previous analysis and included data from both laboratory and field studies. In 1997, Federal Interagency Committee on Aviation Noise (FICAN) recommended a revised sleep disturbance relationship based on data and analysis from three field studies.

Exhibit C-8, *Sleep Disturbance Dose-Response Curves*, show the results of the 1992 and 1997 analyses. The top graph shows a comparison of the 1992 FICON and 1997 FICAN curves. The 1997 FICAN curve represents the upper limit of the observed field data and should be interpreted as predicting the "maximum percent of the exposed population expected to be behaviorally awakened", or the "maximum percent awakened" for a given residential population.

In 2008, FICAN recommended the use of a revised method to predict sleep disturbance in terms of percent awakenings based on data published by the American National Standards Institute (ANSI).[7] In contrast to the earlier FICAN recommendation, the 2008 ANSI standard indicates that the probability of awakening is lower for a single noise event in cases where the population is exposed to the given noise source for a long period of time (more than one year) compared to the probability of awakening for sound that is new to an area. In Exhibit C-8, the lower graph shows these two relationships, with Equation 1 (blue dotted line) representing percent awakenings from long-term noise and Equation B1 (pink dashed line) representing percent awakenings from a new noise source based on the 1997 FICAN results. As

5 Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.
6 World Health Organization, Regional Office for Europe, Environmental Noise Guidelines for the European Region, 2018.
7 ANSI S12.9-2008, Quantities and Procedures for Description and Measurement of Environmental Sound — Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes, 2008.

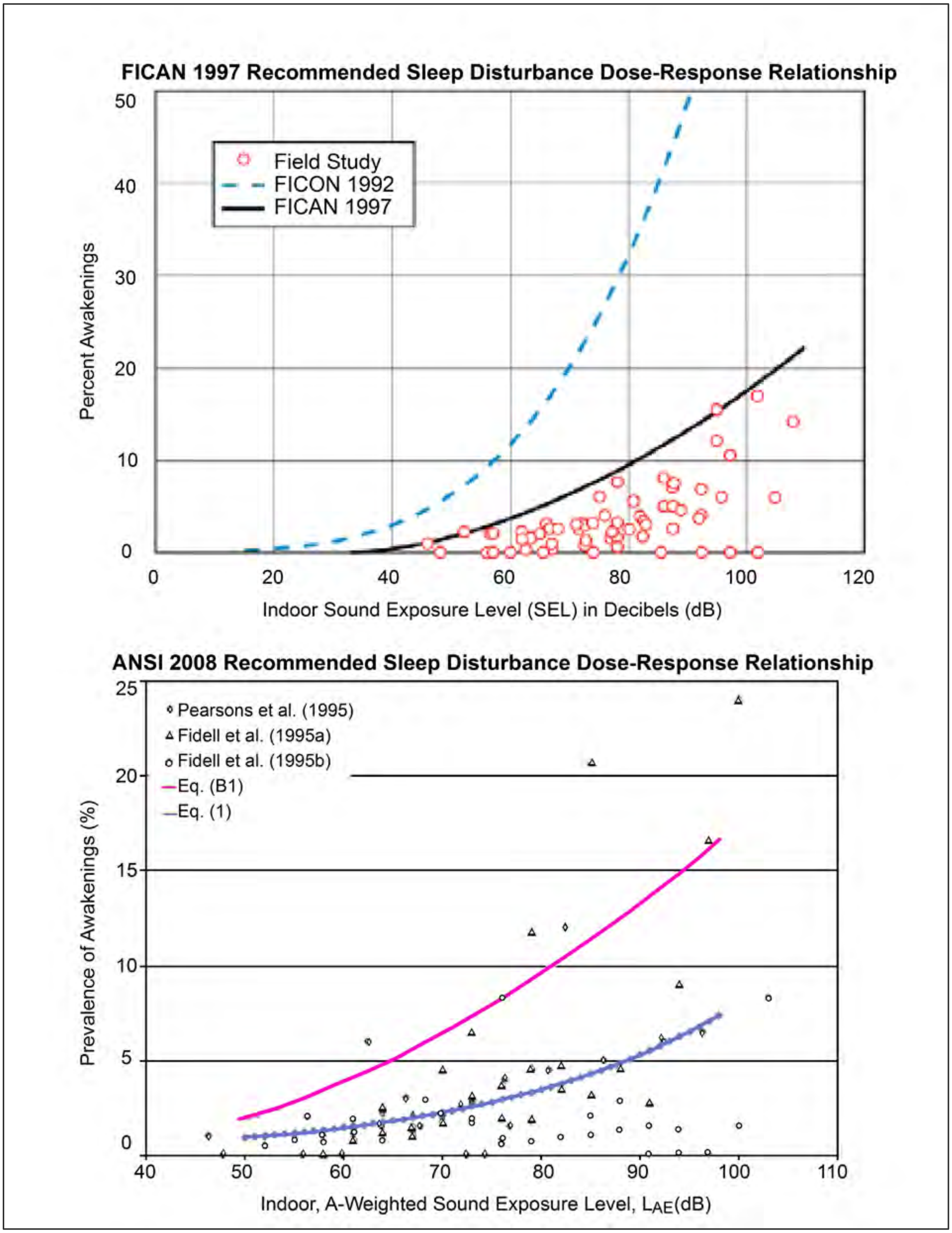
shown in this exhibit, at an indoor SEL of 100 dB, the probability of awakenings would be expected to exceed 15 percent for a new noise source; yet for long-term noise sources, the probability of awakening is expected to be less than 10 percent.

The numerous studies and reports that have been developed on the subject of sleep disturbance related to environmental noise over the past several decades have produced varied results. A review of past studies conducted by the Airport Cooperative Research Program (ACRP) suggests that in-home sleep disturbance studies clearly demonstrate that it requires more noise to cause awakenings than was previously theorized based on laboratory sleep disturbance studies.[8] The 2018 WHO Environmental Noise Guidelines references six studies that attempted to measure sleep disturbance at noise levels between 40 dB and 65 dB. Over 11% of the population was characterized as highly sleep-disturbed at nighttime levels of 40 dB. These studies were based on self-reporting and the "…evidence was rated moderate quality…" for an association between aircraft noise and probability of awakenings.[9]

Due to the variability of study methodologies, particularly studies outside of a laboratory, and other influencing factors, it is difficult to determine the noise level at which a high percentage of the population would be expected to be awakened by aircraft noise. No definitive conclusions have been drawn on the percent of a population that is estimated to be awakened by a certain level of aircraft noise and recent studies have cautioned about the over interpretation of the data.[10]

[8] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.
[9] World Health Organization, Regional Office for Europe, Environmental Noise Guidelines for the European Region, 2018.
[10] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.

Exhibit C-8 Sleep Disturbance Dose-Response Curve



Source: FICAN, June 1997; American National standards Institute, 2008.

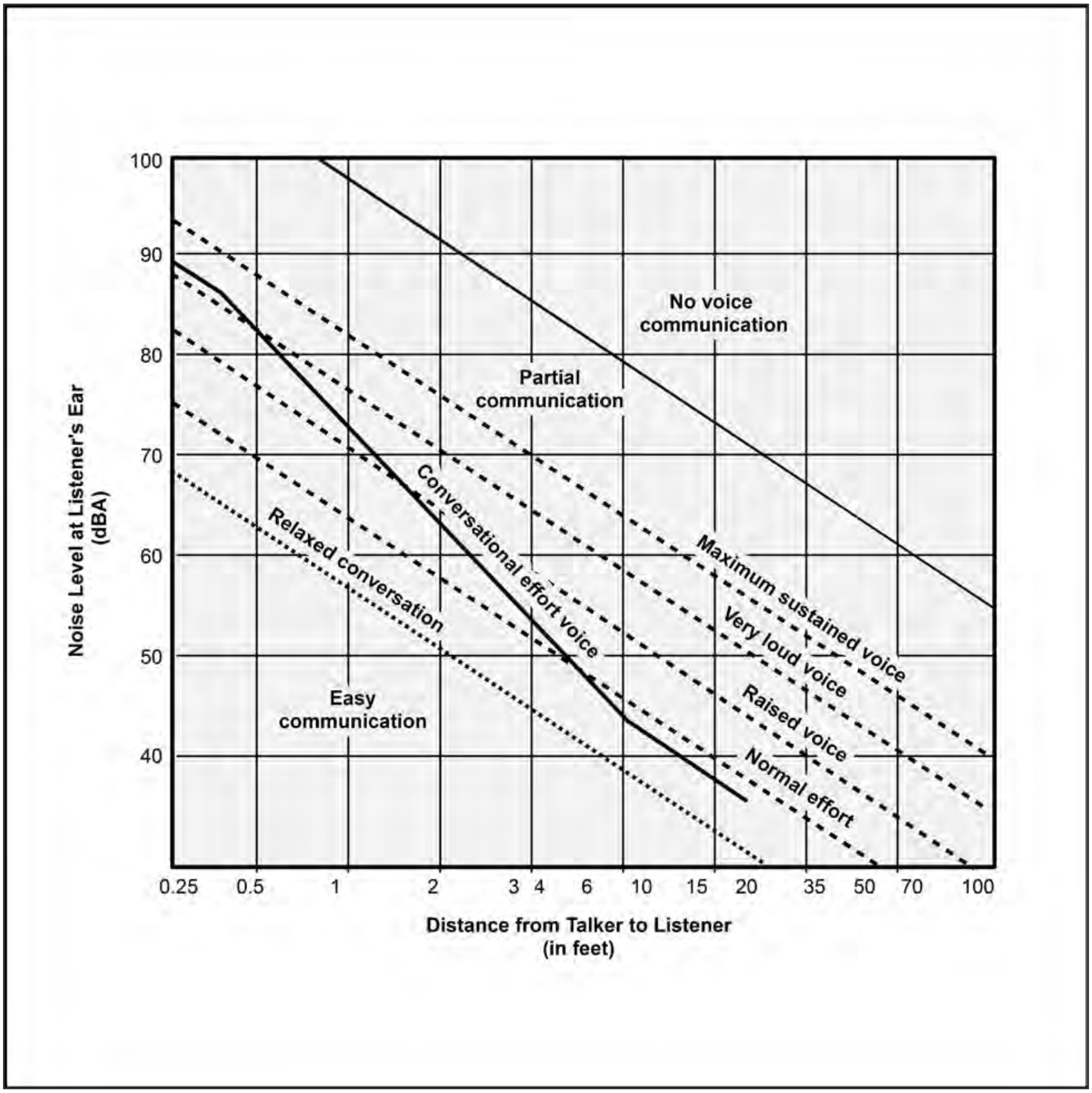
C.4.4 Communication Interference

Communication interference can impact activities such as personal conversations, classroom learning, and listening to radio and television. Most studies have focused on communication interference due to continual noise sources. In 1974, the USEPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, which is one of the few studies to focus on intermittent noise. The study concluded that for voice communication, an indoor Leq of 45 dB allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility. **Exhibit C-9, *Noise Effects on Distance Necessary for Speech Communication***, shows the required distance between talker and listener based on the type of speech communication (normal voice, loud voice, etc.) and the environmental noise level from the 1974 USEPA report.

Noise can also impact communication between student and teacher necessary for learning in a classroom setting. It is usually accepted that noise levels above a certain Leq may affect a child's learning experiences. Research has shown a "decline in reading when outdoor noise levels equal or exceed Leq of 65 dBA."[11] Furthermore, a study conducted by FICAN in 2007 found: "(1) a substantial association between noise reduction and decreased failure (worst-score) rates for high-school students, and (2) significant association between noise reduction and increased average test scores for student/test subgroups. In general, the study found little dependence upon student group and upon test type."[12] A study of noise exposure and the effects on school test scores between 2000/01 and 2008/09 found "…statistically significant associations between airport noise and student mathematics and reading test scores, after taking demographic and school factors into account."[13] This study also found that schools that had been provided sound insulation had better test scores than schools that were not sound insulated. This Study made no recommendation regarding the noise level at which impacts upon learning may occur.

11 Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.
12 Federal Interagency Committee on Aviation Noise (FICAN), Findings of the FICAN Pilot Study on the Relationship between Aircraft Noise Reduction and Changes in Standardized Test Scores, July 2007.
13 National Academies of Sciences, Engineering, and Medicine; Assessing Aircraft Noise Conditions Affecting Student Learning, Volume 1: Final Report; 2014.

Exhibit C-9 Noise Effects on Distance Necessary for Speech Communication



Source: FICON, 1992; from USEPA, 1974.

C.5 Existing (2023) Baseline Noise Exposure Contour

The following sections summarizes the noise modeling methodology and data inputs for the Existing (2023) Baseline noise contour modeling for this Part 150 Noise Compatibility Study Update (Study) for CLT. Data inputs developed include runway definition, number of aircraft operations during the time period evaluated, the types of aircraft flown, the time of day when they are flown, how frequently each runway is used for arriving and departing aircraft, the routes of flight used when arriving to and departing from the runways, helicopter operations, and ground run-up activity. The FAA AEDT version 3e was used to calculate noise exposure for the area around the Airport and outputs contours of equal noise exposure using the DNL metric.[14] The following describes the inputs developed for the Existing (2023) Baseline conditions.

C.5.1 Runway Definition

The Airport currently has three parallel runways (18L/36R, 18C/36C, and 18R/36L). This runway configuration would remain under the Existing (2023) Baseline.[15] The airfield layout for the Existing (2023) Baseline at CLT is shown on **Exhibit C-10, *Airport Layout Plan – Existing (2023) Baseline.*** The runways and lengths at CLT for the Existing (2023) Baseline are listed below:

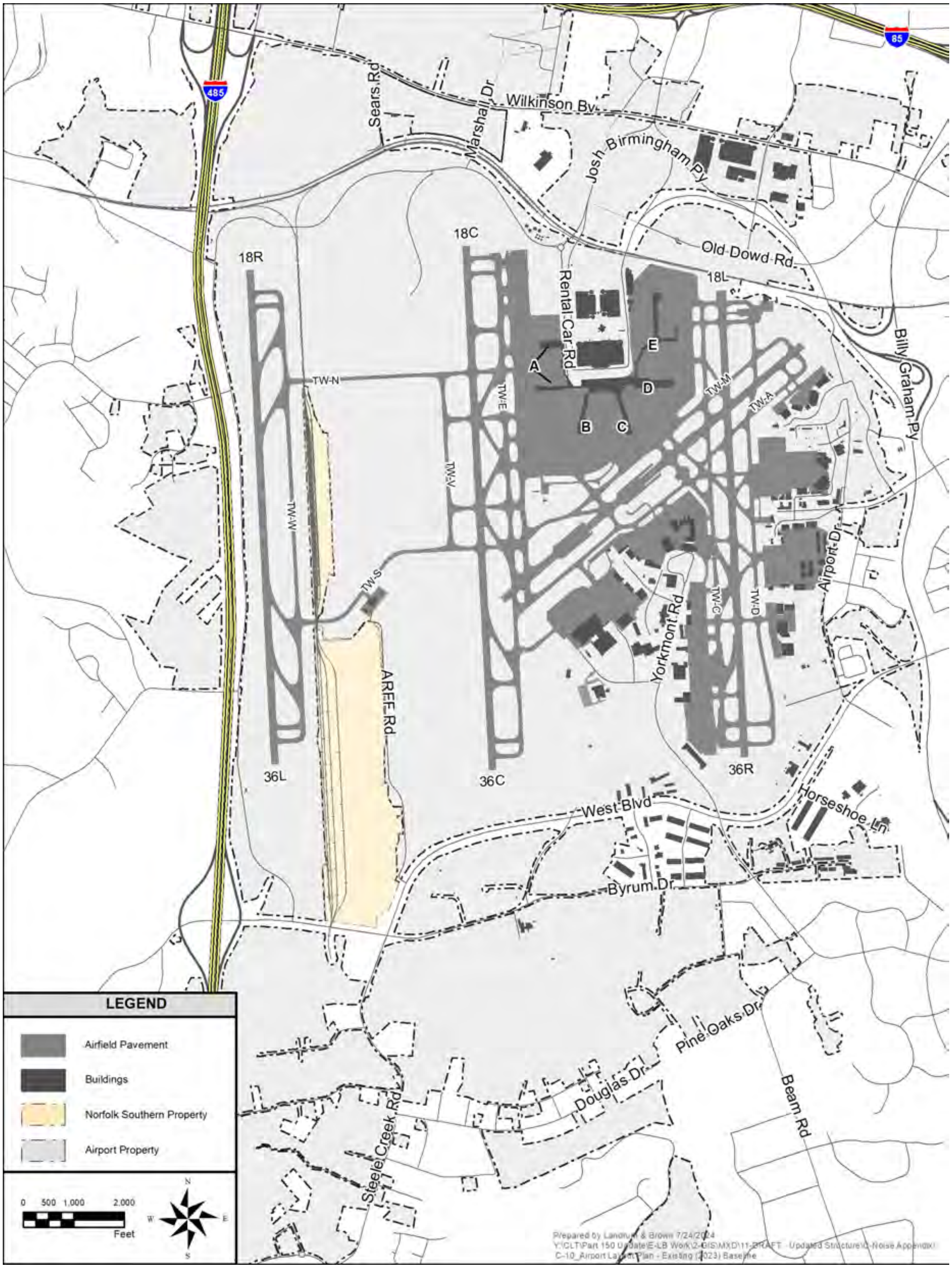
Runway	Length (feet)
18L/36R	8,676
18C/36C	10,000
18R/36L	9,000

C.5.2 Number of Operations and Fleet Mix

The number of annual operations modeled for the Existing (2023) Baseline was developed based on a review of FAA's Operations Network (OPSNET) data for April 2021 through March 2022. The data included 526,454 total annual operations, or 1,442.3 average-annual day operations. Specific aircraft types and times of operation for commercial aircraft were developed from CLT Landing Reports and CLT Flight Tracking System data. **Table C-1, *Distribution Of Average Daily Operations By Aircraft Type - Existing (2023) Baseline*** shows the number of aircraft operations by aircraft type during the daytime (7:00 a.m. – 9:59 p.m.) and nighttime (10:00 p.m. – 6:59 a.m.) for the Existing (2023) Baseline scenario.

14 AEDT Version 3e was the most recent version of AEDT when the noise modeling began.
15 Runway 05/23 was decommissioned in 2022 and is not used for the purpose of this analysis

Exhibit C-10 Airport Layout Plan – Existing (2023) Baseline



Source: Landrum & Brown, 2022

Table C-1 Distribution of Average Daily Operations by Aircraft Type - Existing (2023) Baseline

AEDT Airframe Type	AEDT Engine Code	Arrivals		Departures		Total
		Daytime	Nighttime	Daytime	Nighttime	
Heavy Passenger Jets						
Airbus A350-900 series	01P18RR124	0.3	0.0	0.4	0.0	0.7
Boeing 777-200-ER	2RR027	3.7	0.1	3.7	0.1	7.6
Subtotal		*4.0*	*0.1*	*4.1*	*0.1*	*8.3*
Cargo Jet						
Airbus A300F4-600 Series	1PW048	0.3	0.2	0.3	0.2	1.0
Airbus A300F4-600 Series	2GE039	0.8	0.4	0.7	0.4	2.3
Boeing 757-200 Series Freighter	3RR028	0.3	0.2	0.5	0.1	1.1
Boeing 757-200 Series Freighter	4PW073	0.5	0.4	0.7	0.2	1.8
Boeing 767-200 Series Freighter	1GE012	0.8	0.1	0.0	0.9	1.8
Boeing 767-300 ER Freighter	1GE030	1.2	0.4	0.7	1.0	3.3
Boeing 767-300 ER Freighter	2GE054	0.5	0.2	0.3	0.4	1.4
Boeing MD-11 Freighter	1GE031	0.1	0.7	0.6	0.0	1.4
Subtotal		*4.5*	*2.6*	*3.8*	*3.2*	*14.1*
Large Passenger Jet						
Airbus A319-100 Series	2CM019	31.4	1.5	28.8	4.1	65.8
Airbus A319-100 Series	3IA006	0.2	0.0	0.3	0.0	0.5
Airbus A319-100 Series	3IA007	23.9	1	21.9	3.1	49.9
Airbus A319-100 Series	4CM036	1.5	0.1	1.3	0.2	3.1
Airbus A320-200 Series	1IA003	14.9	1.1	14.1	1.9	32.0
Airbus A320-200 Series	2CM014	17.3	1.2	16.3	2.2	37.0
Airbus A320-200 Series	8IA010	0.3	0.0	0.2	0.0	0.5
Airbus A320-NEO	01P20CM128	2.0	0.8	2.5	0.2	5.5
Airbus A321-200 Series	01P08CM104	24.1	2.7	24.2	2.7	53.7
Airbus A321-200 Series	3IA008	62.1	7.2	62.4	6.9	138.6
Boeing 717-200 Series	4BR005	9.6	2.2	10	2.0	23.8
Boeing 737-700 Series	3CM031	3.0	0.6	3.3	0.3	7.2
Boeing 737-700 Series	3CM032	0.6	0.1	0.6	0.1	1.4
Boeing 737-8	01P20CM135	0.5	0.1	0.5	0.1	1.2
Boeing 737-8	01P20CM140	0.4	0.1	0.5	0.0	1.0
Boeing 737-800 Series	3CM032	43.1	3.3	41.3	5.1	92.8
Boeing 737-800 Series	3CM034	3.1	0.3	3.0	0.4	6.8
Boeing 737-800 Series	8CM051	44.5	3.5	42.7	5.2	95.9
Boeing 737-900-ER	8CM051	0.1	0.0	0.2	0.0	0.3
Bombardier CRJ-700	01P08GE192	1.9	0.1	1.8	0.2	4.0
Bombardier CRJ-700-ER	5GE083	71.7	5.6	69.1	8.2	154.6
Bombardier CRJ-900	01P08GE190	3.2	0.2	2.9	0.4	6.7
Bombardier CRJ-900-ER	01P08GE190	133.0	8.5	125.8	15.7	283.0
Embraer ERJ170	01P08GE197	8.8	0.4	8.3	0.8	18.3
Embraer ERJ170-LR	01P08GE197	7.0	0.2	6.6	0.7	14.5
Embraer ERJ175-LR	01P08GE197	34.0	5.4	34.6	4.9	78.9
Embraer ERJ190-AR	10GE131	1.3	0.1	1.3	0.0	2.7
Subtotal		*543.5*	*46.3*	*524.5*	*65.4*	*1,179.7*
Regional Jet						
Embraer ERJ135	6AL012	1.9	0.0	1.9	0.0	3.8
Embraer ERJ145-LR	6AL005	60.7	5.2	59.0	7.0	131.9
Subtotal		*62.6*	*5.2*	*60.9*	*7.0*	*135.7*

Table C-1 Distribution of Average Daily Operations by Aircraft Type – Existing (2023) Baseline *(Continued)*

AEDT Airframe Type	AEDT Engine Code	Arrivals		Departures		Total
		Daytime	Nighttime	Daytime	Nighttime	
Commuter / Cargo Prop						
Cessna 172 Skyhawk	IO360	0.6	0.1	0.6	0.2	1.5
Pilatus PC-12	PT6A67	3.2	0.2	3.2	0.2	6.8
Piper PA-32 Cherokee Six	TIO540	0.3	0.0	0.3	0.0	0.6
Raytheon Super King Air 300	PT6A60	3.0	0.1	2.9	0.2	6.2
Subtotal		*7.1*	*0.4*	*7.0*	*0.6*	*15.1*
General Aviation Regional Jet						
Bombardier Challenger 300	11HN003	4.2	0.3	4.2	0.2	8.9
Bombardier Challenger 600	01P05GE189	0.8	0	0.8	0.1	1.7
Bombardier Challenger 600	1TL001	0.3	0	0.4	0	0.7
Bombardier Global Express	01P04BR013	0.3	0	0.3	0	0.6
Bombardier Learjet 45	1AS001	0.4	0	0.4	0	0.8
Cessna 550 Citation II	1PW036	0.4	0	0.4	0.2	1
Cessna 560 Citation Excel	PW530	3.2	0.2	3.2	0.1	6.7
Cessna 560 Citation V	1PW037	1.8	0.6	2.1	0.3	4.8
Cessna 560 Citation XLS	PW530	1.1	0	1	0.1	2.2
Cessna 650 Citation III	1AS001	0.3	0	0.4	0	0.7
Cessna 680 Citation Sovereign	03P14PW194	0.9	0	0.9	0.1	1.9
Cessna 680 Citation Sovereign	7PW078	0.5	0	0.6	0.1	1.2
Cessna 680-A Citation Latitude	7PW078	5.7	0.4	5.6	0.3	12
Cessna 750 Citation X	6AL022	0.8	0	0.7	0.1	1.6
Cessna CitationJet CJ/CJ1 (Cessna 525)	1PW035	1.3	0.1	1.4	0.1	2.9
Cessna CitationJet CJ2 (Cessna 525A)	1PW036	0.9	0.1	0.8	0.1	1.9
Cessna CitationJet CJ3 (Cessna 525B)	1PW038	1.3	0.1	1.3	0	2.7
Dassault Falcon 2000	03P14PW194	2.2	0.2	2.1	0.1	4.6
Dassault Falcon 50	1AS002	0.3	0	0.4	0	0.7
Dassault Falcon 900	1AS002	2.1	0.1	2.1	0.1	4.4
Dassault Falcon 900-EX	1AS002	0.9	0.1	0.8	0.1	1.9
Embraer Phenom 100 (EMB-500)	PW530	0.4	0	0.4	0	0.8
Embraer Phenom 300 (EMB-505)	PW530	2.3	0.1	2.3	0.1	4.8
Gulfstream G280	01P11HN012	1.3	0.1	1.4	0.1	2.9
Gulfstream G400	11RR048	0.9	0.1	0.9	0.1	2
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	3BR001	0.6	0.1	0.5	0	1.2
Gulfstream G650	01P11BR016	0.6	0.1	0.6	0.1	1.4
Raytheon Beechjet 400	1PW038	1.7	0.1	1.6	0.1	3.5
Raytheon Hawker 800	1AS002	1	0	0.9	0	1.9
Raytheon Premier I	1PW036	0.4	0	0.4	0	0.8
Subtotal		*38.9*	*2.8*	*38.9*	*2.6*	*83.2*
Helicopters						
Agusta A119	250B17	0.2	0.0	0.2	0.0	0.4
Bell 407 / Rolls-Royce 250-C47B	250B17	0.2	0.0	0.1	0.1	0.4
Eurocopter EC-130	TPE3	0.8	0.3	0.7	0.3	2.1
Subtotal		*1.2*	*0.3*	*1.0*	*0.4*	*2.9*

Table C-1 Distribution of Average Daily Operations by Aircraft Type – Existing (2023) Baseline (Continued)

AEDT Airframe Type	AEDT Engine Code	Arrivals		Departures		Total
		Daytime	Nighttime	Daytime	Nighttime	
Military						
Boeing C17A	F1171	1.6	0.0	1.7	0.0	3.3
Subtotal		*1.6*	*0.0*	*1.7*	*0.0*	*3.3*
Grand Total		**663.4**	**57.7**	**641.9**	**79.3**	**1,442.3**

Notes: Day = 7:00 a.m. to 9:59 p.m., Night = 10:00 p.m. to 6:59 a.m.
Totals may not equal sum due to rounding.
Source: Landing Fee Reports, FAA Operations Network (OPSNET) data, CLT Flight Tracking System Data, Landrum & Brown, 2022.

C.5.3 Runway End Utilization

CLT is operated in one of two primary runway configurations, north flow or south flow. When in north flow, aircraft arrive to CLT from the south in a north direction to land on Runway 36R, Runway 36C, and Runway 36L; and depart heading north from Runway 36R and Runway 36C. When in south flow, aircraft arrive to CLT from the north in a south direction to land on Runway 18L, Runway 18C, and Runway 18R; and depart heading south from Runway 18L and Runway 18C. The runway configuration is primarily dictated by wind direction and airfield efficiency. A review of runway use data derived from the CLT Flight Tracking System for April 2021 through March 2022 shows that CLT operated in north flow approximately 56 percent of the time and south flow approximately 44 percent of the time.

The distribution of landings and take-offs from each runway is determined by FAA airport traffic controllers to maintain airfield and airspace efficiency. Runway use percentages were derived for aircraft types and summarized by category. **Table C-2, *Average Annual Day Runway Use – Existing (2023) Baseline*** summarizes the percentage of use by each aircraft category on each of the runways at CLT during the daytime (7:00 a.m. – 9:59 p.m.) and nighttime (10:00 p.m. – 6:59 a.m.) for the Existing (2023) Baseline condition.

C.5.4 Flight Tracks

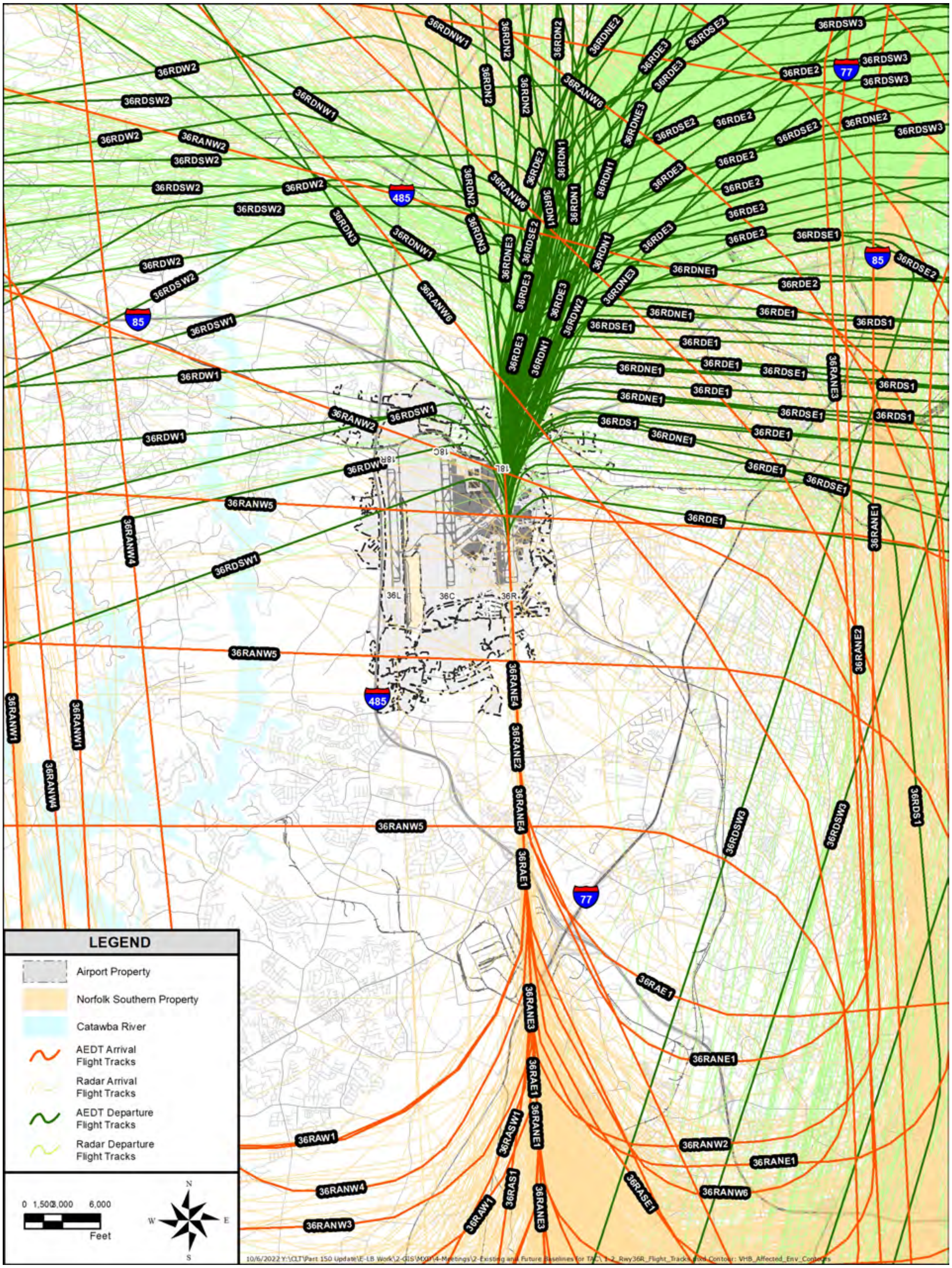
Flight tracks are built in the AEDT to model the noise levels of aircraft along each flight path to and from the runway ends. There are two components to modeling flight tracks, location, and percent distribution. Flight track locations were developed based on a review of radar data from the CLT Flight Tracking System. The percent use of each track was based on a review of radar data and previous studies. The AEDT flight tracks developed for the Existing (2023) Baseline condition are shown on **Exhibit C-11** through **Exhibit C-17**. **Table C-3, Arrival Flight Track Distribution – Existing (2023) Baseline** shows arrival flight track utilization percentages and **Table C-4, *Departure Flight Track Distribution – Existing (2023) Baseline*** shows departure flight track utilization percentages for the Existing (2023) Baseline condition. **Table C-5, *Helicopter Arrival Flight Track Distribution – Existing (2023) Baseline*** shows helicopter arrival flight track utilization percentages and **Table C-6, *Helicopter Departure Flight Track Distribution – Existing (2023) Baseline*** shows helicopter departure flight track utilization percentages for the Existing (2023) Baseline condition. Each flight track is identified by a track ID that corresponds to the label in the flight track exhibits.

Table C-2 Average Annual Day Runway Use – Existing (2023) Baseline

Aircraft Category	18C	18L	18R	36C	36L	36R	Total
Daytime Arrivals							
Heavy Passenger Jet	7.7%	26.5%	10.0%	11.6%	13.3%	30.9%	100.0%
Cargo Jet	4.6%	24.5%	16.5%	1.8%	16.9%	35.6%	100.0%
Large Passenger Jet	3.4%	15.2%	25.1%	4.8%	31.9%	19.6%	100.0%
Regional / GA Jet	2.0%	25.2%	16.8%	1.7%	20.4%	33.9%	100.0%
Commuter / Cargo / GA Prop	1.0%	40.5%	3.1%	0.6%	3.8%	51.0%	100.0%
Military	2.0%	33.8%	0.0%	2.0%	0.0%	62.2%	100.0%
Nighttime Arrivals							
Heavy Passenger Jet	33.3%	7.8%	2.0%	37.3%	0.0%	19.6%	100.0%
Cargo Jet	10.3%	34.7%	1.1%	10.9%	0.4%	42.5%	100.0%
Large Passenger Jet	20.3%	21.0%	4.9%	23.9%	4.4%	25.6%	100.0%
Regional / GA Jet	9.0%	33.3%	3.4%	9.2%	1.6%	43.5%	100.0%
Commuter / Cargo / GA Prop	6.0%	39.9%	0.7%	8.9%	0.4%	44.1%	100.0%
Military	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Daytime Departures							
Heavy Passenger Jet	25.2%	21.0%	0.0%	35.5%	0.0%	18.3%	100.0%
Cargo Jet	12.1%	30.2%	0.0%	7.0%	0.0%	50.7%	100.0%
Large Passenger Jet	26.2%	17.4%	0.0%	35.1%	0.0%	21.2%	100.0%
Regional / GA Jet	19.0%	24.6%	0.0%	25.7%	0.0%	30.8%	100.0%
Commuter / Cargo / GA Prop	2.8%	41.1%	0.0%	5.5%	0.0%	50.6%	100.0%
Military	2.0%	33.8%	0.0%	2.0%	0.0%	62.2%	100.0%
Nighttime Departures							
Heavy Passenger Jet	21.9%	25.0%	0.0%	40.6%	0.0%	12.5%	100.0%
Cargo Jet	13.1%	32.1%	0.0%	9.8%	0.0%	45.0%	100.0%
Large Passenger Jet	26.6%	23.4%	0.0%	29.4%	0.0%	20.5%	100.0%
Regional / GA Jet	21.1%	29.2%	0.0%	22.8%	0.0%	26.9%	100.0%
Commuter / Cargo / GA Prop	6.5%	44.8%	0.0%	7.8%	0.0%	40.9%	100.0%
Military	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

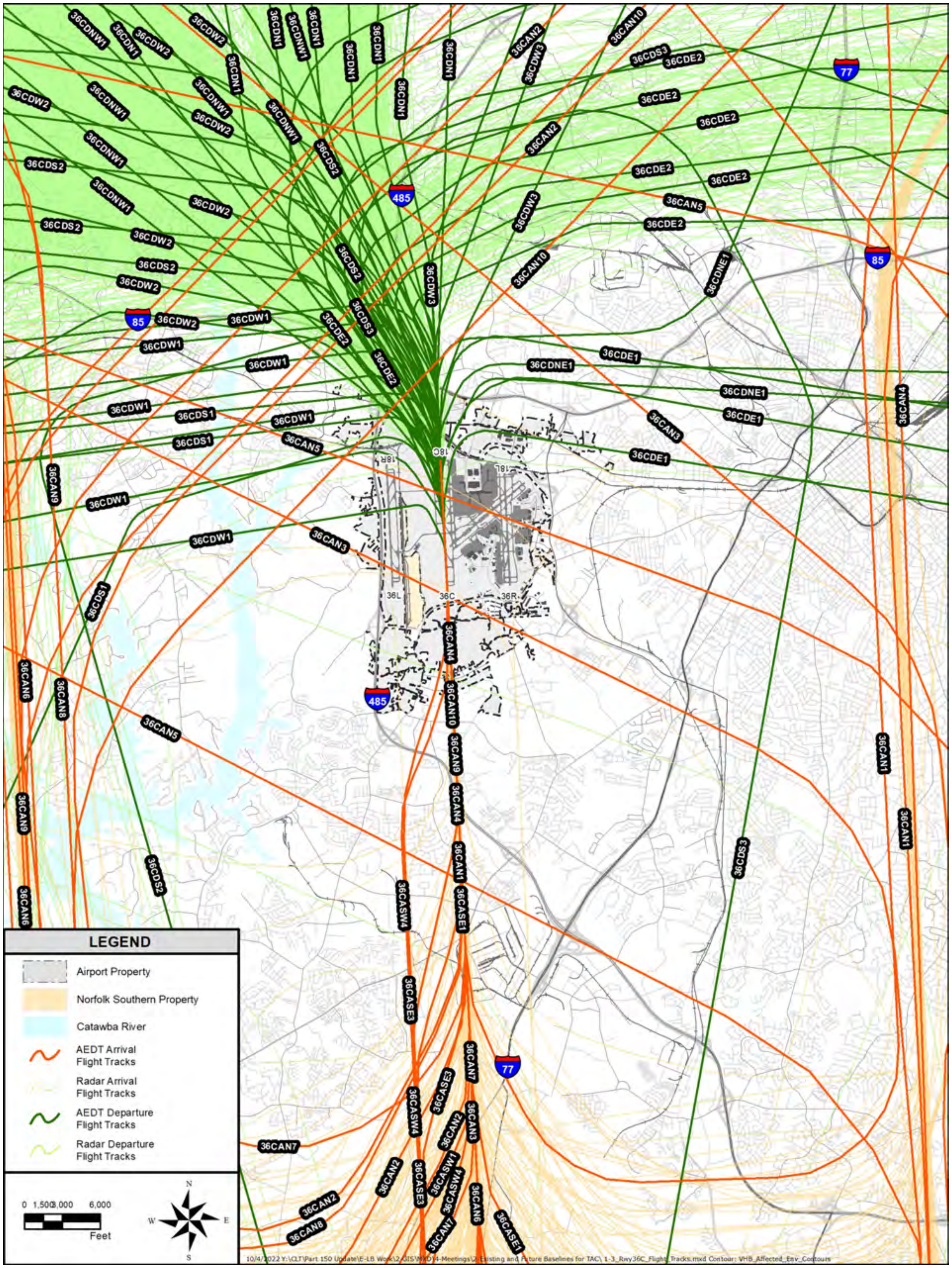
Note: Totals may not equal sum due to rounding.
Source: CLT Flight Tracking System Data, Landrum & Brown analysis, 2022.

Exhibit C-11 Runway 36R Flight Tracks – Existing (2023) Baseline



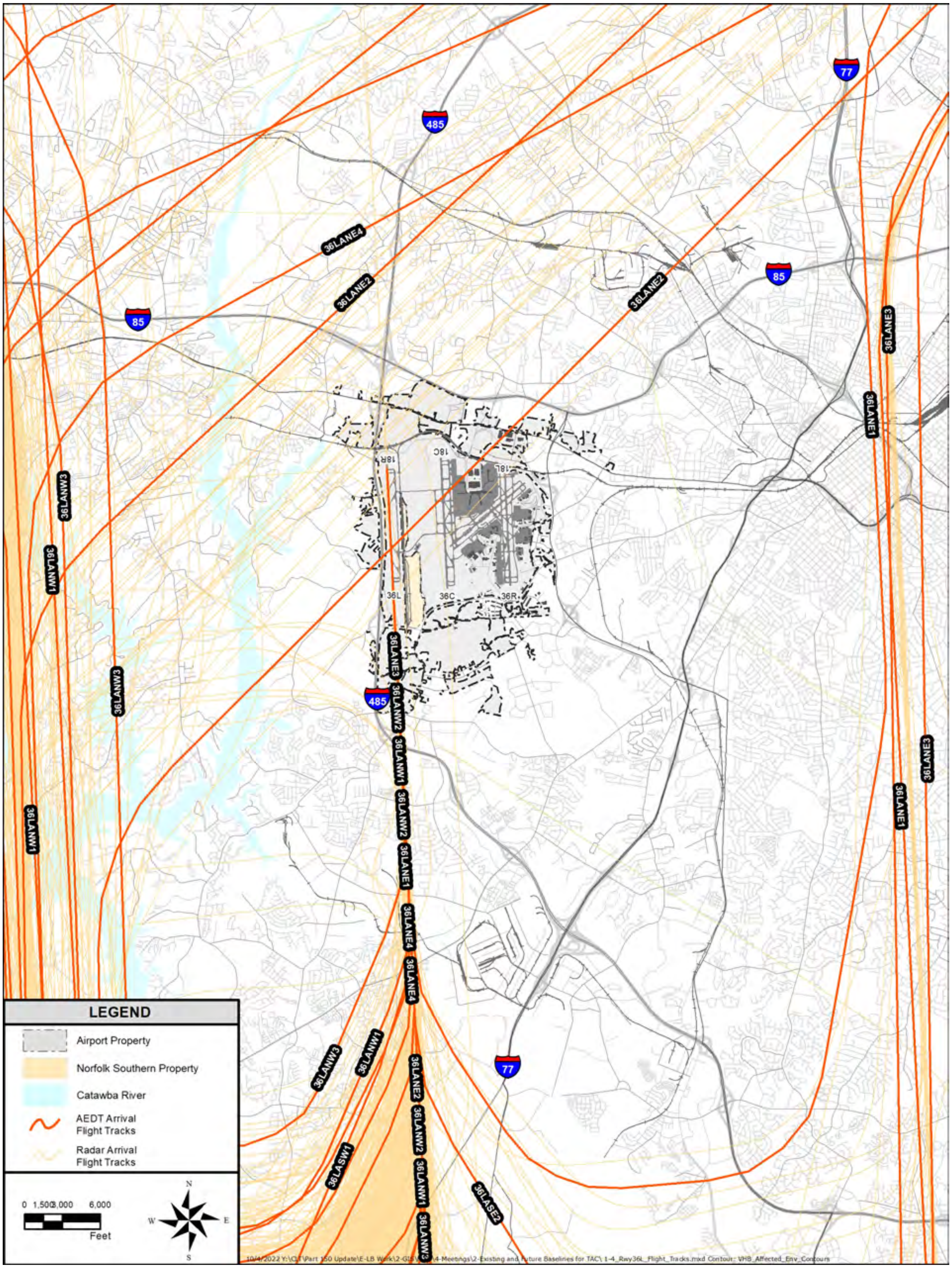
Source: Landrum & Brown, 2022

Exhibit C-12 Runway 36C Flight Tracks – Existing (2023) Baseline



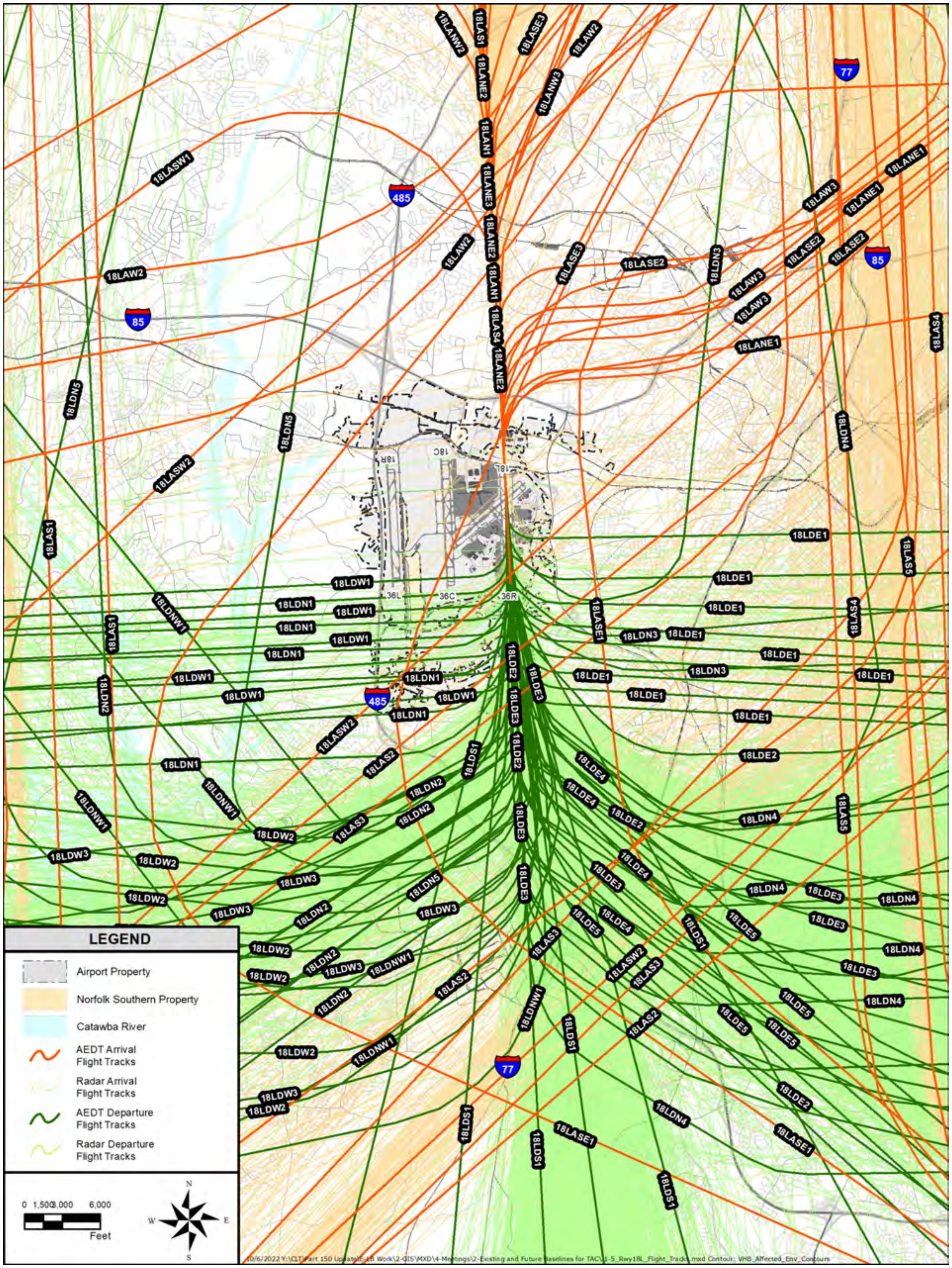
Source: Landrum & Brown, 2022

Exhibit C-13 Runway 36L Flight Tracks – Existing (2023) Baseline



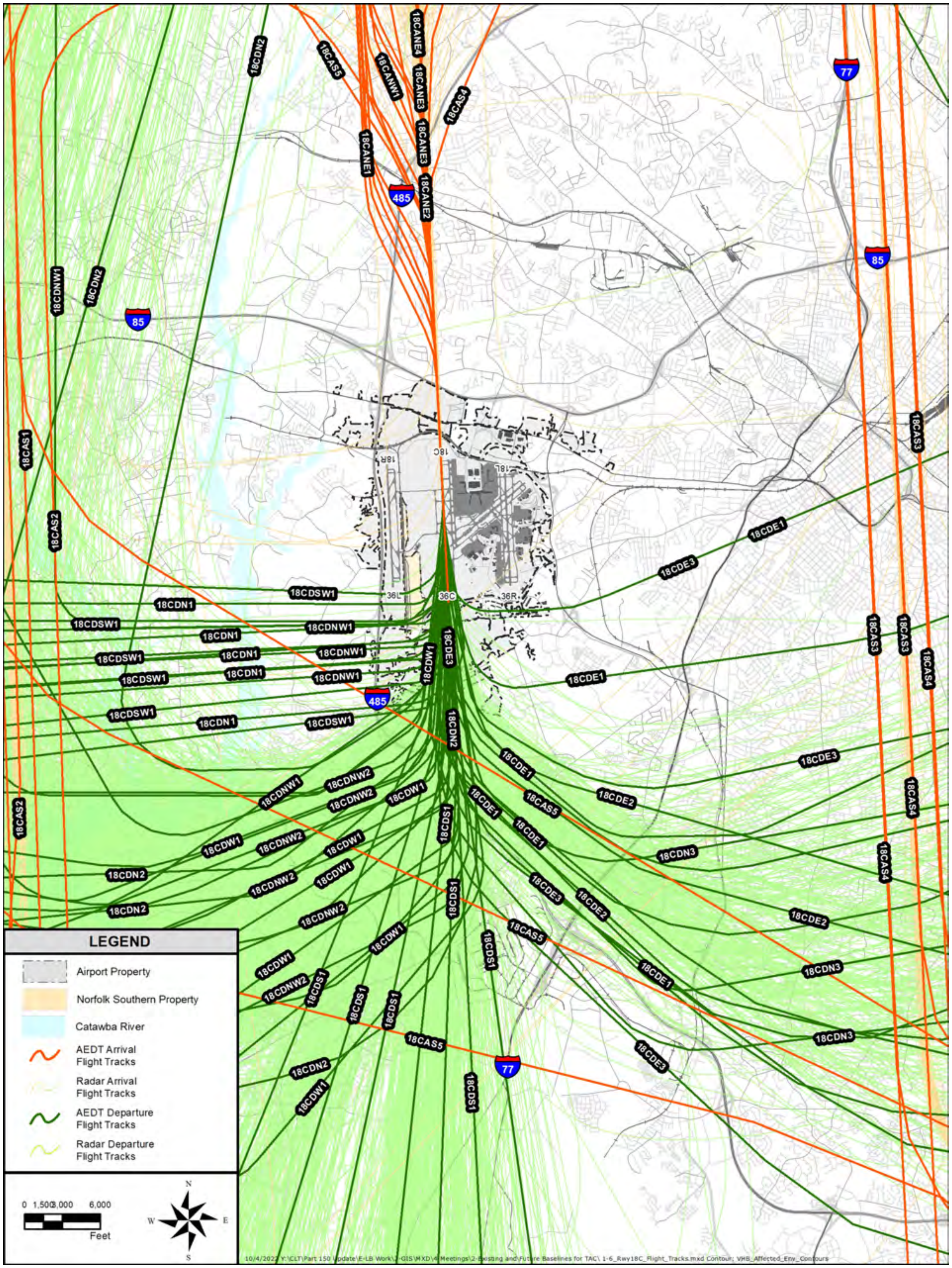
Source: Landrum & Brown, 2022

Exhibit C-14 Runway 18L Flight Tracks – Existing (2023) Baseline



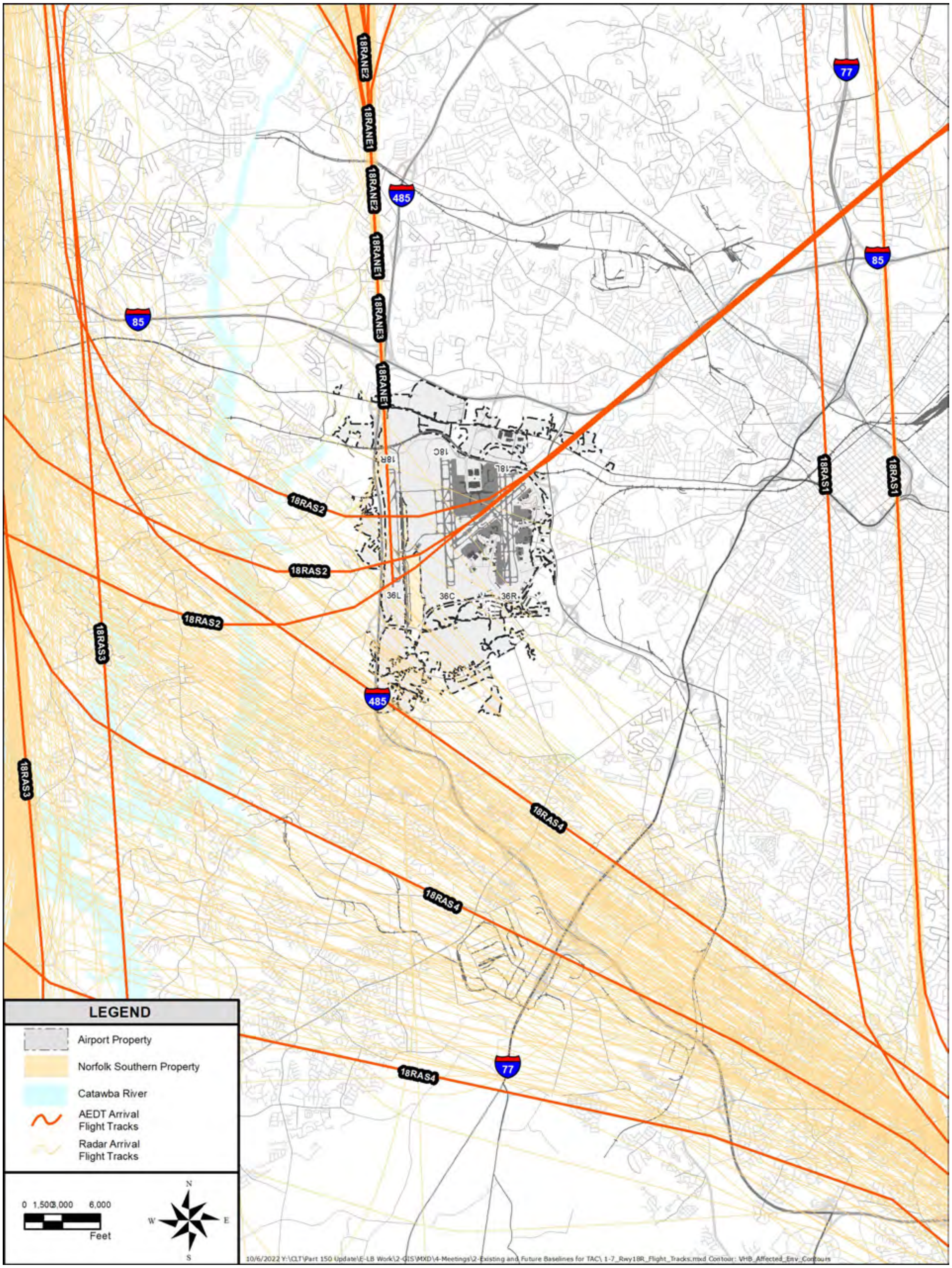
Source: Landrum & Brown, 2022

Exhibit C-15 Runway 18C Flight Tracks – Existing (2023) Baseline



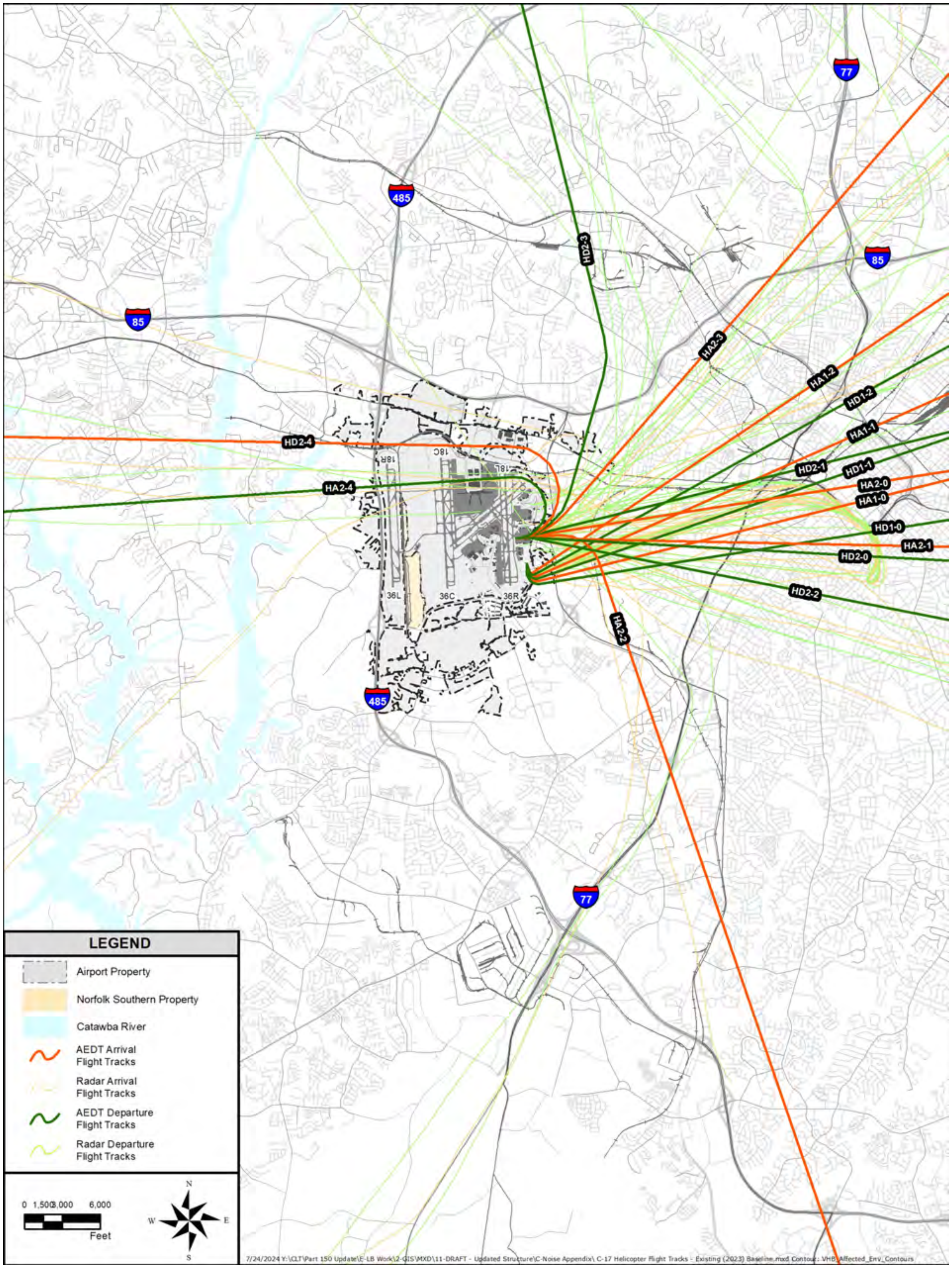
Source: Landrum & Brown, 2022

Exhibit C-16 Runway 18R Flight Tracks – Existing (2023) Baseline



Source: Landrum & Brown, 2022

Exhibit C-17 Helicopter Flight Tracks – Existing (2023) Baseline



Source: Landrum & Brown, 2022

Table C-3 Arrival Flight Track Distribution – Existing (2023) Baseline

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
18L	18LAN1	0.3%	3.4%	0.3%	0.0%	0.0%	0.0%
	18LANE1	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%
	18LANE2	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%
	18LANE3	22.8%	14.0%	22.8%	29.2%	29.2%	29.2%
	18LANE4	19.6%	18.5%	19.6%	8.6%	8.6%	8.6%
	18LANE5	1.3%	3.3%	1.3%	3.2%	3.2%	3.2%
	18LANE6	3.2%	2.8%	3.2%	0.0%	0.0%	0.0%
	18LANW1	0.3%	3.2%	0.3%	0.0%	0.0%	0.0%
	18LANW2	1.0%	5.6%	1.0%	0.0%	0.0%	0.0%
	18LANW3	0.1%	0.7%	0.1%	5.2%	5.2%	5.2%
	18LAS1	2.4%	4.5%	2.4%	5.2%	5.2%	5.2%
	18LAS2	0.9%	3.4%	0.9%	3.0%	3.0%	3.0%
	18LAS3	2.5%	2.1%	2.5%	4.3%	4.3%	4.3%
	18LAS4	21.6%	9.2%	21.6%	1.9%	1.9%	1.9%
	18LAS5	16.8%	13.5%	16.8%	8.1%	8.1%	8.1%
	18LASE1	0.8%	0.1%	0.8%	3.2%	3.2%	3.2%
	18LASE2	0.1%	0.9%	0.1%	0.0%	0.0%	0.0%
	18LASE3	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
	18LASW1	0.6%	0.6%	0.6%	0.0%	0.0%	0.0%
	18LASW2	0.0%	0.4%	0.0%	1.1%	1.1%	1.1%
	18LAW1	5.8%	9.1%	5.8%	26.8%	26.8%	26.8%
	18LAW2	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%
	18LAW3	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%
18L Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
18C	18CANE1	0.4%	0.1%	0.4%	0.0%	0.0%	0.0%
	18CANE2	0.8%	0.1%	0.8%	0.1%	0.1%	0.1%
	18CANE3	13.6%	5.0%	13.6%	1.1%	1.1%	1.1%
	18CANE4	7.6%	4.0%	7.6%	0.7%	0.7%	0.7%
	18CANW1	1.1%	1.3%	1.1%	0.1%	0.1%	0.1%
	18CANW2	1.2%	1.0%	1.2%	0.0%	0.0%	0.0%
	18CANW3	7.1%	9.1%	7.1%	0.2%	0.2%	0.2%
	18CANW4	0.6%	1.1%	0.6%	0.0%	0.0%	0.0%
	18CANW5	15.3%	23.6%	15.3%	1.2%	1.2%	1.2%
	18CAS1	2.3%	6.3%	2.3%	0.0%	0.0%	0.0%
	18CAS2	13.7%	14.5%	13.7%	9.5%	9.5%	9.5%
	18CAS3	0.2%	0.2%	0.2%	1.5%	1.5%	1.5%
	18CAS4	3.0%	1.1%	3.0%	0.0%	0.0%	0.0%
	18CAS5	0.7%	0.3%	0.7%	2.4%	2.4%	2.4%
	18CASW1	2.2%	0.2%	2.2%	7.1%	7.1%	7.1%
	18CAW1	2.5%	4.1%	2.5%	21.2%	21.2%	21.2%
	18CAW2	2.5%	3.1%	2.5%	11.8%	11.8%	11.8%
	18CAW3	25.1%	25.0%	25.1%	43.0%	43.0%	43.0%

Table C-3 Arrival Flight Track Distribution – Existing (2023) Baseline *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
18R	18RANE1	2.3%	1.8%	2.3%	0.0%	0.0%	0.0%
	18RANE2	1.0%	1.2%	1.0%	0.0%	0.0%	0.0%
	18RANE3	7.6%	6.9%	7.6%	0.0%	0.0%	0.0%
	18RANW1	7.3%	13.4%	7.3%	0.1%	0.1%	0.0%
	18RANW2	1.1%	1.4%	1.1%	0.1%	0.1%	0.0%
	18RANW3	8.2%	12.7%	8.2%	0.0%	0.0%	0.0%
	18RANW4	0.3%	0.3%	0.3%	0.8%	0.8%	0.0%
	18RAS1	2.2%	0.9%	2.2%	1.3%	1.3%	0.0%
	18RAS2	0.1%	0.0%	0.1%	0.2%	0.2%	0.0%
	18RAS3	34.3%	18.9%	34.3%	50.5%	50.5%	0.0%
	18RAS4	3.7%	1.7%	3.7%	2.0%	2.0%	0.0%
	18RAW1	6.0%	8.7%	6.0%	10.4%	10.4%	0.0%
	18RAW2	0.2%	0.4%	0.2%	0.5%	0.5%	0.0%
	18RAW3	25.8%	31.7%	25.8%	34.0%	34.0%	0.0%
18R Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	0.0%
36R	36RAE1	0.1%	0.4%	0.1%	0.2%	0.2%	0.2%
	36RANE1	4.7%	4.5%	4.7%	2.1%	2.1%	2.1%
	36RANE2	27.8%	20.2%	27.8%	5.4%	5.4%	5.4%
	36RANE3	38.6%	23.1%	38.6%	8.3%	8.3%	8.3%
	36RANE4	0.1%	0.8%	0.1%	0.0%	0.0%	0.0%
	36RANW1	3.3%	3.5%	3.3%	1.7%	1.7%	1.7%
	36RANW2	0.3%	2.3%	0.3%	7.0%	7.0%	7.0%
	36RANW3	0.9%	0.5%	0.9%	1.2%	1.2%	1.2%
	36RANW4	0.7%	2.0%	0.7%	6.7%	6.7%	6.7%
	36RANW5	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%
	36RANW6	3.8%	7.0%	3.8%	13.3%	13.3%	13.3%
	36RAS1	0.5%	1.0%	0.5%	0.5%	0.5%	0.5%
	36RASE1	12.2%	17.0%	12.2%	27.3%	27.3%	27.3%
	36RASE2	5.5%	10.5%	5.5%	16.3%	16.3%	16.3%
	36RASW1	1.2%	4.1%	1.2%	9.7%	9.7%	9.7%
	36RASW2	0.2%	2.2%	0.2%	0.2%	0.2%	0.2%
	36RAW1	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%
	36RAW2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
36R Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table C-3 Arrival Flight Track Distribution – Existing (2023) Baseline *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
36C	36CAN1	13.0%	6.1%	13.0%	0.1%	0.1%	0.1%
	36CAN2	0.3%	0.2%	0.3%	0.0%	0.0%	0.0%
	36CAN4	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	36CAN5	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%
	36CAN7	1.1%	1.4%	1.1%	8.4%	8.4%	8.4%
	36CAN8	0.0%	1.5%	0.0%	0.0%	0.0%	0.0%
	36CAN9	0.5%	1.4%	0.5%	0.0%	0.0%	0.0%
	36CAN10	3.9%	0.5%	3.9%	0.0%	0.0%	0.0%
	36CASE1	26.6%	26.7%	26.6%	0.3%	0.3%	0.3%
	36CASE2	14.3%	14.3%	14.3%	0.0%	0.0%	0.0%
	36CASE3	3.7%	5.1%	3.7%	0.0%	0.0%	0.0%
	36CASW1	5.7%	15.0%	5.7%	0.1%	0.1%	0.1%
	36CASW2	0.4%	0.5%	0.4%	1.6%	1.6%	1.6%
	36CASW3	11.6%	3.4%	11.6%	4.9%	4.9%	4.9%
	36CASW4	7.1%	17.4%	7.1%	44.8%	44.8%	44.8%
	36CASW5	6.0%	2.1%	6.0%	26.8%	26.8%	26.8%
	36CAN3	1.1%	0.7%	1.1%	4.8%	4.8%	4.8%
	36CAN6	3.7%	3.0%	3.7%	8.0%	8.0%	8.0%
36C Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
36L	36RAW2	2.5%	3.7%	2.5%	54.0%	54.0%	0.0%
	36RAW3	2.0%	1.7%	2.0%	0.3%	0.3%	0.0%
	36RAW4	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%
	36RAW5	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
	36RAW6	12.7%	31.0%	12.7%	2.8%	2.8%	0.0%
	36RAW7	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%
	36RAW8	38.3%	31.2%	38.3%	15.9%	15.9%	0.0%
	36RAW9	6.1%	2.3%	6.1%	0.7%	0.7%	0.0%
	36RAW10	1.9%	0.4%	1.9%	0.2%	0.2%	0.0%
	36RAW11	3.6%	1.5%	3.6%	0.4%	0.4%	0.0%
	36RAW12	5.1%	5.3%	5.1%	0.7%	0.7%	0.0%
	36RAW13	12.5%	11.5%	12.5%	9.1%	9.1%	0.0%
	36RAW14	14.9%	10.9%	14.9%	15.8%	15.8%	0.0%
36L Subtotal		100.0%	100.00%	100.00%	100.00%	100.00%	0.00%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2024

Table C-4 Departure Flight Track Distribution – Existing (2023) Baseline

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
18L	18LDE1	0.2%	3.3%	0.2%	0.0%	0.0%	33.3%
	18LDE2	39.6%	30.6%	39.6%	45.3%	45.3%	5.6%
	18LDE3	4.2%	4.9%	4.2%	23.2%	23.2%	0.0%
	18LDE4	1.0%	2.3%	1.0%	8.0%	8.0%	0.0%
	18LDE5	0.8%	0.5%	0.8%	3.7%	3.7%	0.0%
	18LDN1	0.0%	1.1%	0.0%	0.5%	0.5%	0.0%
	18LDN2	0.9%	3.1%	0.9%	2.1%	2.1%	0.0%
	18LDN3	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
	18LDN4	7.2%	9.1%	7.2%	1.2%	1.2%	0.0%
	18LDN5	0.9%	0.8%	0.9%	0.0%	0.0%	0.0%
	18LDNW1	2.8%	3.8%	2.8%	4.7%	4.7%	0.0%
	18LDS1	40.8%	22.6%	40.8%	4.7%	4.7%	27.8%
	18LDW1	0.0%	2.8%	0.0%	0.0%	0.0%	33.3%
	18LDW2	1.0%	7.6%	1.0%	5.9%	5.9%	0.0%
	18LDW3	0.5%	7.0%	0.5%	0.6%	0.6%	0.0%
18L Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
18C	18CDE1	0.7%	1.3%	0.7%	0.0%	0.0%	0.0%
	18CDE2	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%
	18CDE3	1.8%	1.4%	1.8%	0.0%	0.0%	0.0%
	18CDN1	0.1%	2.0%	0.1%	0.0%	0.0%	0.0%
	18CDN2	17.4%	20.5%	17.4%	17.1%	17.1%	0.0%
	18CDN3	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
	18CDNW1	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%
	18CDNW2	16.7%	22.7%	16.7%	3.3%	3.3%	0.0%
	18CDS1	6.0%	2.6%	6.0%	0.0%	0.0%	6.4%
	18CDSW1	0.4%	0.2%	0.4%	0.0%	0.0%	3.3%
	18CDW1	56.3%	48.7%	56.3%	79.5%	79.5%	90.3%
18C Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
36R	36RDE1	0.2%	5.1%	0.2%	12.5%	12.5%	20.0%
	36RDE2	51.9%	38.6%	51.9%	5.5%	5.5%	40.0%
	36RDE3	22.1%	19.1%	22.1%	3.6%	3.6%	0.0%
	36RDN1	0.9%	2.2%	0.9%	3.5%	3.5%	0.0%
	36RDN2	0.7%	3.4%	0.7%	6.6%	6.6%	0.0%
	36RDN3	0.1%	0.2%	0.1%	0.5%	0.5%	0.0%
	36RDNE1	0.0%	0.5%	0.0%	1.5%	1.5%	0.0%
	36RDNE2	0.2%	0.9%	0.2%	2.1%	2.1%	0.0%
	36RDNE3	0.0%	0.3%	0.0%	1.6%	1.6%	0.0%
	36RDNW1	1.0%	2.4%	1.0%	15.4%	15.4%	0.0%
	36RDS1	0.4%	0.9%	0.4%	11.5%	11.5%	40.0%
	36RDSE1	0.0%	0.6%	0.0%	2.5%	2.5%	0.0%
	36RDSE2	9.5%	18.8%	9.5%	13.6%	13.6%	0.0%
	36RDSW1	0.1%	1.5%	0.1%	0.8%	0.8%	0.0%
	36RDSW2	1.5%	1.1%	1.5%	2.8%	2.8%	0.0%
	36RDSW3	8.9%	1.7%	8.9%	3.0%	3.0%	0.0%
	36RDW1	0.2%	1.1%	0.2%	5.9%	5.9%	0.0%
	36RDW2	2.4%	1.7%	2.4%	7.2%	7.2%	0.0%
36R Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table C-4 Departure Flight Track Distribution – Existing (2023) Baseline *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
36C	36CDE1	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
	36CDE2	3.0%	3.4%	3.0%	2.8%	2.8%	0.0%
	36CDN1	17.1%	24.0%	17.1%	51.1%	51.1%	0.0%
	36CDNE1	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
	36CDNW1	14.8%	19.5%	14.8%	33.7%	33.7%	0.0%
	36CDS1	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
	36CDS2	11.2%	6.4%	11.2%	9.8%	9.8%	0.0%
	36CDS3	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
	36CDW1	0.4%	0.8%	0.4%	0.6%	0.6%	66.7%
	36CDW2	53.3%	45.4%	53.3%	2.0%	2.0%	33.3%
	36CDW3	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
36C Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2024

Table C-5 Helicopter Arrival Flight Track Distribution – Existing (2023) Baseline

Runway End	Track ID	Helicopter
HP-1	HA1-0	34.0%
	HA1-1	33.0%
	HA1-2	33.0%
	HP-1 Subtotal	100.0%
HP-2	HA2-0	35.0%
	HA2-1	35.0%
	HA2-2	5.0%
	HA2-3	20.0%
	HA2-4	5.0%
	HP-2 Subtotal	100.0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2024

Table C-6 Helicopter Departure Flight Track Distribution – Existing (2023) Baseline

Runway End	Track ID	Helicopter
HP-1	HD1-0	34.0%
	HD1-1	33.0%
	HD1-2	33.0%
HP-1 Subtotal		100.0%
HP-2	HD2-0	30.0%
	HD2-1	30.0%
	HD2-2	30.0%
	HD2-3	5.0%
	HD2-4	5.0%
HP-2 Subtotal		100.0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2022

C.5.5 Aircraft Weight and Trip Length

Aircraft weight upon departure is a factor in the dispersion of noise because it impacts the rate at which an aircraft is able to climb. Generally, heavier aircraft have a slower rate of climb and a wider dispersion of noise along their flight routes. Where specific aircraft weights are unknown, the AEDT uses the distance flown to the first stop as a surrogate for the weight, by assuming that the weight has a direct relationship with the fuel load necessary to reach the first destination. The AEDT groups trip lengths into eleven stage categories and assigns standard aircraft weights to each stage category. These categories are:

Stage Category	Stage Length
1	0-500 nautical miles
2	501-1000 nautical miles
3	1001-1500 nautical miles
4	1501-2500 nautical miles
5	2501-3500 nautical miles
6	3501-4500 nautical miles
7	4501-5500 nautical miles
8	5501-6500 nautical miles
9	6501-7500 nautical miles
10	7501-8500 nautical miles
11	8501+ nautical miles

The trip lengths developed for the Existing (2023) Baseline condition are based upon a review of radar data from the CLT Flight Tracking System for April 2021 through March 2022. During this time period, aircraft operations at the Airport were distributed within departure stage lengths one through six, as indicated in **Table C-7, *Departure Stage Length – Existing (2023) Baseline***.

Table C-7 Departure Stage Length – Existing (2023) Baseline

Aircraft Category	Departure Stage Length					
	1	2	3	4	5	6
Heavy Passenger Jet	1%	33%	4%	0%	24%	38%
Cargo Jet	97%	3%	0%	0%	0%	0%
Large Passenger Jet	60%	30%	4%	6%	0%	0%
Regional / GA Jet	96%	3%	0%	0%	0%	0%
Commuter / Cargo / GA Prop	100%	0%	0%	0%	0%	0%
Military	100%	0%	0%	0%	0%	0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2022

C.5.6 Ground Run-Up Activity

Engine run-ups are conducted at CLT for maintenance purposes on civil and military aircraft at aircraft maintenance ramps or on the taxiways at CLT. Military run-ups occur at the North Carolina Air National Guard (NCANG) ramp and civil run-ups typically occur at one of five locations on the airfield16 as listed below in **Table C-8, *Aircraft Engine Run-Up Locations*** and shown on **Exhibit C-18, *Run-Up Locations – Existing (2023) Baseline.***

Table C-8 Aircraft Engine Run-Up Locations

Map ID	Run-Up Location Description
1	Taxiway E between approach of Runway 18C and Taxiway E12
2	West pad of former Runway 5/23
3	Center pad of former Runway 5/23
4	Taxiway C between Taxiway C1 and C3
5	Taxiway M between Taxiway M3 and D
6	NCANG Ramp

Engine run-ups activity was developed based on a review of run-up activity data at the Airport. Approximately 21.5 run-ups are anticipated to occur at the Airport per day. It was assumed that each civil run-up is conducted at low power (50 percent thrust) for up to 20 minutes, and at high power (100 percent thrust) for up to three additional minutes, for a total duration of 23 minutes per run-up. It was assumed that each military run-up is conducted at high power (100 percent thrust) for 30 minutes.

It was assumed that approximately 60 percent of all civil run-ups and 100 percent of all military run-ups occur during the daytime (7:00 am to 9:59 pm). Additionally, it was assumed civil run-up activity would be distributed between the run-up locations, with 40 percent on Taxiway M, 20 percent on Taxiway E, 15 percent on the former Runway 5/23 west pad, 15 percent on the former Runway 5/23 center pad, and ten percent on Taxiway C. Aircraft types for which run-up activity was estimated represent the most common aircraft that are operated at CLT by civil and military operators. **Table C-9, *Aircraft Engine Run-Ups - Existing (2023) Baseline*** shows the number, types, durations and times of day of engine run-ups for the Existing (2023) Baseline condition.

16 Civil engine run-up locations on the taxiways are identified based on the FAA Tower Order (Order CTL 1050.1j) and information provided by the Airport.

Table C-9 Aircraft Engine Run-Ups - Existing (2023) Baseline

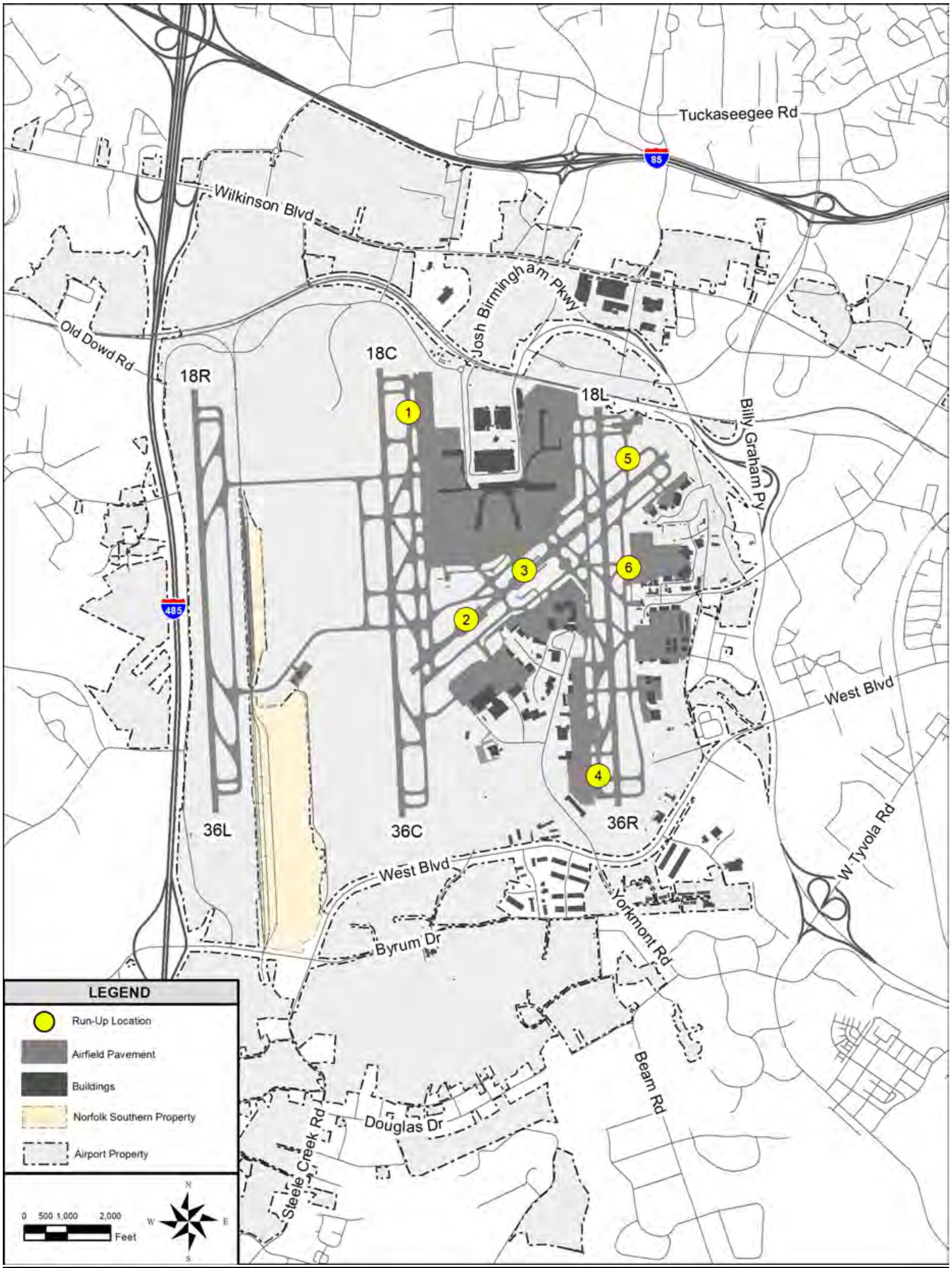
AEDT Aircraft ID	Run-Ups per Day			
	Daytime	Nighttime	Total Run-ups	Total Duration *(h:mm:ss)*
Civil Run-Ups				
Airbus A319-100 Series	0.99	0.66	1.65	0:18:58
Airbus A320-200 Series	0.56	0.37	0.93	0:10:40
Airbus A321-200 Series	2.08	1.39	3.47	0:39:56
Boeing 737-800 Series	1.44	0.96	2.40	0:27:37
Boeing 777-200-ER	0.11	0.08	0.19	0:02:11
Bombardier CRJ-900-ER	4.19	2.79	6.98	1:20:15
Embraer ERJ145-LR	1.98	1.32	3.31	0:38:01
Embraer ERJ175-LR	1.19	0.79	1.98	0:22:43
Subtotal	*12.54*	*8.36*	*20.9*	*4:00:21*
Military Run-Ups				
Boeing C-17A	0.56	0.0	0.56	0:16:52
Subtotal	*0.56*	*0.0*	*0.56*	*0:16:52*
Total	**13.10**	**8.36**	**21.46**	**4:17:13**

Source: FAA Order CLT 7110.65V, Landrum & Brown analysis, 2022.

C.5.7 Comparability of Conditions

As previously stated, total operations used in the modeling of the Existing (2023) Baseline condition are based on actual operating levels for the period of April 2021 through March 2022. The total annual operations during this period was 526,454. The FAA's Terminal Area Forecast (TAF) reported a total of 541,560 operations for the most recent 12 months for which data was available at the time of this writing (March 2023 to February 2024). The difference between the annual operations used to model the Existing (2023) Baseline condition and those for the FAA's TAF for March 2023 to February 2024 is 15,106 operations (2.8 percent difference). As such, the operating levels used to prepare the Existing (2023) Baseline are essentially the same as the operating levels for the last 12 months. Runway 5/23 was minimally used during the period of April 2021 through March 2022 and was decommissioned in 2022; as such, Runway 5/23 was assumed not operational in the Existing (2023) Baseline. Furthermore, no significant changes in runway use, fleet mix, or flight tracks have occurred. Therefore, the Existing (2023) Baseline condition is representative of the operating conditions for the last 12 months (March 2023 to February 2024).

Exhibit C-18 Run-Up Locations – Existing (2023) Baseline



Source: Landrum & Brown, 2022

C.6 Future (2028) Baseline Noise Exposure Contour

The following sections describe the noise modeling methodology and assumptions for the Future (2028) Baseline Noise Exposure Contours at CLT. Data representative of an average-annual day of operations was obtained from an aviation of forecast. This data included the number of operations by individual types of aircraft user classes.

C.6.1 Runway Definition

The Future (2028) Baseline condition includes the implementation of a new 10,000-foot runway (designated Runway 01/19) in the midfield with 3,200 feet of separation to Runway 18R/36L and 1,100 feet of separation to Runway 18C/36C. The Future (2028) Baseline condition additionally includes the implementation of other airfield improvement projects currently in design or construction.[17] The airfield layout for Future (2028) Baseline is shown on **Exhibit C-19** ***Airport Layout – Future (2028) Baseline***. The runways and lengths at CLT for the Future (2028) Baseline are listed below:

Runway	Length (feet)
18L/36R	8,676
18C/36C	10,000
18R/36L	9,000
01/19	10,000

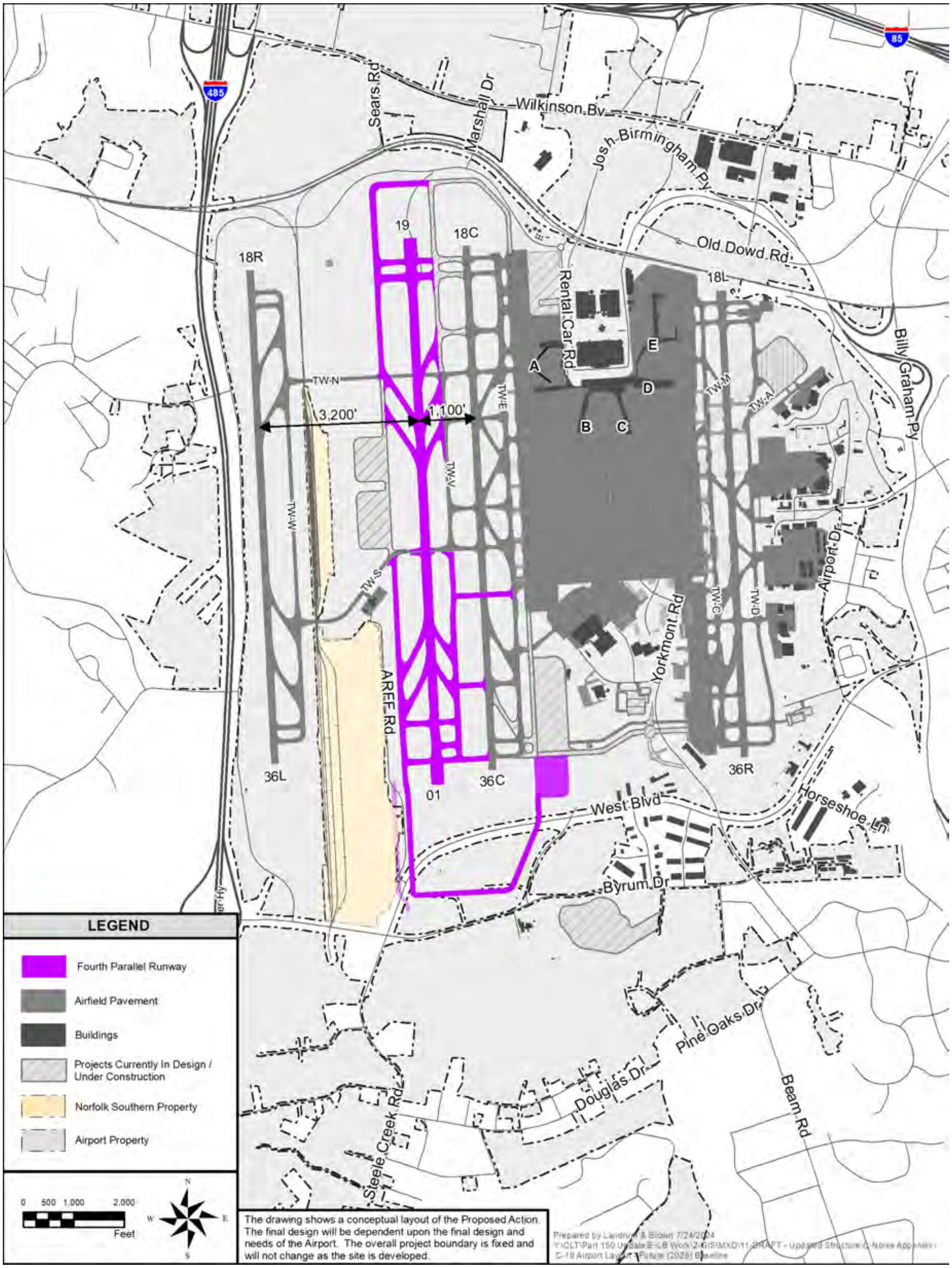
C.6.2 Number of Operations and Fleet Mix

The number of annual operations estimated for the Future (2028) Baseline was based on the latest forecast of aviation activity prepared for the Capacity Enhancement Projects Environmental Assessment.[18] That forecast included 639,783 total annual operations in 2028, or 1,752.8 average-annual day operations. Specific aircraft types and times of operation for commercial aircraft were developed from the future design day schedules prepared for that forecast. The future design day flight schedules provided peak operating levels by aircraft type and time of day. These peak levels were converted to an average-annual day for modeling the Future (2028) Baseline. **Table C-10,** ***Distribution of Average Daily Operations By Aircraft Type - Future (2028) Baseline*** shows the number of aircraft operations during the daytime (7:00 a.m. – 9:59 p.m.) and nighttime (10:00 p.m. – 6:59 a.m.) developed for the Future (2028) Baseline.

17 The future airfield layout includes the construction of a new fourth parallel runway, which is designated Runway 1/19 for this analysis.

18 Forecast Technical Memorandum, Technical Memorandum – Final, Charlotte Douglas International Airport Environmental Impact Statement, VHB in association with InterVISTAS, April 18, 2018.

Exhibit C-19 Airport Layout – Future (2028) Baseline



Source: Landrum & Brown, 2022

Table C-10 Distribution of Average Daily Operations by Aircraft Type - Future (2028) Baseline

AEDT Airframe Type	AEDT Engine Code	Arrivals		Departures		Total
		Daytime	Nighttime	Daytime	Nighttime	
Heavy Passenger Jets						
Airbus A330-200 Series	2RR023	3.6	0.0	3.7	0.0	7.3
Airbus A350-900 Series	01P18RR124	0.8	0.0	0.6	0.0	1.4
Boeing 787-9 Dreamliner	01P17GE211	3.6	0.0	3.7	0.0	7.3
Subtotal		*8.0*	*0.0*	*8.0*	*0.0*	*16.0*
Cargo Jet						
Airbus A300F4-600 Series	1PW048	1.7	1.0	1.2	1.6	5.5
Airbus A300F4-600 Series	2GE039	1.3	0.8	0.9	1.1	4.1
Boeing MD-10-1 Freighter	1GE001	0.5	0.3	0.4	0.4	1.6
Subtotal		*3.5*	*2.1*	*2.5*	*3.1*	*11.2*
Large Passenger Jet						
Airbus A319-100 Series	2CM019	59.3	5.1	57.1	7.2	128.7
Airbus A319-100 Series	3IA007	40.2	3.4	38.6	5	87.2
Airbus A320-100 Series	1IA003	5.6	0.6	5.4	0.7	12.3
Airbus A320-100 Series	2CM014	5.8	0.4	5.6	0.7	12.5
Airbus A320-200 Series	1CM009	2.7	0.2	2.6	0.3	5.8
Airbus A320-200 Series	1IA003	0.7	0.1	0.6	0.1	1.5
Airbus A321-200 Series	3CM025	40.3	3.4	38.8	5	87.5
Airbus A321-200 Series	3IA008	60.5	5.2	58.1	7.5	131.3
Airbus A321-NEO	01P08CM103	19.5	1.7	18.7	2.4	42.3
Boeing 717-200 Series	4BR002	4.7	0.4	4.5	0.6	10.2
Boeing 737-700 Series	3CM031	5.4	0.4	5.2	0.7	11.7
Boeing 737-8	01P20CM135	0.7	0.1	0.6	0.1	1.5
Boeing 737-8	01P20CM137	25.5	2.2	24.5	3.2	55.4
Boeing 737-800 Series	3CM032	7.4	0.6	7.1	0.9	16.0
Boeing 737-9	01P20CM136	1.3	0.1	1.3	0.2	2.9
Boeing MD-90	1IA002	1.3	0.1	1.3	0.2	2.9
Bombardier CRJ-700-ER	5GE083	114.9	9.8	110.5	14.3	249.5
Bombardier CRJ-700-LR	01P08GE190	1.3	0.1	1.3	0.2	2.9
Bombardier CRJ-900-ER	01P08GE190	147.2	12.5	141.5	18.3	319.5
Embraer ERJ170	01P08GE197	3.4	0.3	3.2	0.4	7.3
Embraer ERJ175	01P08GE197	43	3.7	41.4	5.3	93.4
Embraer ERJ190-AR	10GE129	5.4	0.5	5.1	0.7	11.7
Subtotal		*596.1*	*50.9*	*573.0*	*74.0*	*1,294.0*
Regional Jet						
Bombardier CRJ-200-LR	01P05GE189	112.0	6.2	109.0	9.1	236.3
Embraer ERJ145	6AL008	5.0	0.3	4.9	0.5	10.7
Subtotal		*117.0*	*6.5*	*113.9*	*9.6*	*247.0*
Commuter / Cargo Prop						
Cessna T303 Crusader (FAS)	TIO540	0.7	0.1	0.6	0.2	1.6
Cirrus SR22 Turbo (FAS)	TIO540	0.7	0.1	0.6	0.2	1.6
DAHER TBM 900/930	PT6A66	0.7	0.1	0.6	0.2	1.6
Embraer EMB120 Brasilia	PW118	4.8	0.7	3.8	1.3	10.6
Pilatus PC-12	PT6A67	4.4	0.4	3.2	1.5	9.5
Raytheon Beech Baron 58	TIO540	0.7	0.1	0.6	0.2	1.6
Raytheon King Air 90	PT6A60	0.7	0.1	0.6	0.2	1.6
Raytheon Super King Air 300	PT6A60	2.4	0.2	1.8	0.9	5.3
SOCATA TBM 850	PT6A66	0.7	0.1	0.5	0.3	1.6
Subtotal		*15.8*	*1.9*	*12.3*	*5.0*	*35.0*

Table C-10 Distribution of Average Daily Operations by Aircraft Type - Future (2028) Baseline *(Continued)*

AEDT Airframe Type	AEDT Engine Code	Arrivals		Departures		Total
		Daytime	Nighttime	Daytime	Nighttime	
General Aviation Regional Jet						
Bombardier Challenger 300	11HN003	4.7	0.3	4.7	0.4	10.1
Bombardier Challenger 600	01P05GE189	0.7	0.0	0.7	0.1	1.5
Bombardier Global Express	01P04BR013	3.3	0.3	3.2	0.2	7.0
Bombardier Learjet 45	1AS001	5.0	0.3	5.0	0.3	10.6
Bombardier Learjet 60	7PW077	0.8	0.0	0.7	0.1	1.6
Cessna 550 Citation II	1PW036	1.5	0.1	1.5	0.1	3.2
Cessna 560 Citation Excel	PW530	2.3	0.1	2.3	0.2	4.9
Cessna 560 Citation V	1PW037	2.3	0.1	2.2	0.2	4.8
Cessna 560 Citation XLS	PW530	2.5	0.1	2.5	0.3	5.4
Cessna 750 Citation X	6AL022	7.4	0.6	7.4	0.7	16.1
Cessna CitationJet CJ/CJ1 (Cessna 525)	1PW035	2.6	0.1	2.5	0.2	5.4
Cessna CitationJet CJ2 (Cessna 525A)	1PW036	0.8	0.0	0.7	0.1	1.6
Cessna CitationJet CJ3 (Cessna 525B)	1PW038	0.8	0.0	0.7	0.1	1.6
Dassault Falcon 2000	03P14PW194	7.1	0.3	6.9	0.6	14.9
Dassault Falcon 50	1AS002	3.3	0.2	3.2	0.3	7.0
Dassault Falcon 900	1AS002	0.8	0.0	0.7	0.1	1.6
Dornier 328 Jet	7PW078	2.5	0.1	2.5	0.3	5.4
Embraer Phenom 300 (EMB-505)	PW530	10.2	0.7	9.9	0.7	21.5
Gulfstream G150	1AS002	0.8	0.0	0.7	0.1	1.6
Gulfstream G200	TFE731	0.8	0.0	0.7	0.1	1.6
Gulfstream G280	01P11HN012	1.5	0.1	1.5	0.1	3.2
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	3BR001	0.8	0.0	0.7	0.1	1.6
Gulfstream G650	01P11BR016	0.8	0.0	0.7	0.1	1.6
Raytheon Hawker 800	1AS002	2.6	0.1	2.5	0.2	5.4
Subtotal		*69.5*	*3.5*	*64.1*	*5.7*	*139.3*
Helicopters						
Agusta A119	250B17	0.2	0.0	0.1	0.0	0.3
Bell 407 / Rolls-Royce 250-C47B	250B17	0.2	0.0	0.2	0.0	0.4
Eurocopter EC-130	TPE3	0.8	0.3	0.8	0.4	2.3
Subtotal		*1.2*	*0.3*	*1.1*	*0.4*	*3.0*
Military						
Boeing C17A	F1171	3.7	0.0	3.7	0.0	7.4
Subtotal		*3.7*	*0.0*	*3.7*	*0.0*	*7.4*
Grand Total		**811.2**	**65.2**	**778.6**	**97.8**	**1,752.8**

Notes: Day = 7:00 a.m. to 9:59 p.m., Night = 10:00 p.m. to 6:59 a.m.
Totals may not equal sum due to rounding.

Source: OAG, Landing Fee Reports, FAA Operations Network (OPSNET) data, CLT Flight Tracking System Data, Landrum & Brown, 2022.

C.6.3 Runway End Utilization

The percent use of each runway end for the Future (2028) Baseline was based on a review of simulation modeling results that was prepared to determine typical usage of the parallel runways under the Future

(2028) Baseline runway layout. Adjustments were made to convert simulated conditions representing a peak day to average-annual conditions based on the historic ratio of north flow and south flow as well as other variable operating conditions. **Table C-11, Average Annual Day Runway Use – Future (2028) Baseline** summarizes the percentage of use by each aircraft category on each of the runways at CLT during the daytime (7:00 a.m. – 9:59 p.m.) and nighttime (10:00 p.m. – 6:59 a.m.) for the Future (2028) Baseline.

C.6.4 Flight Tracks

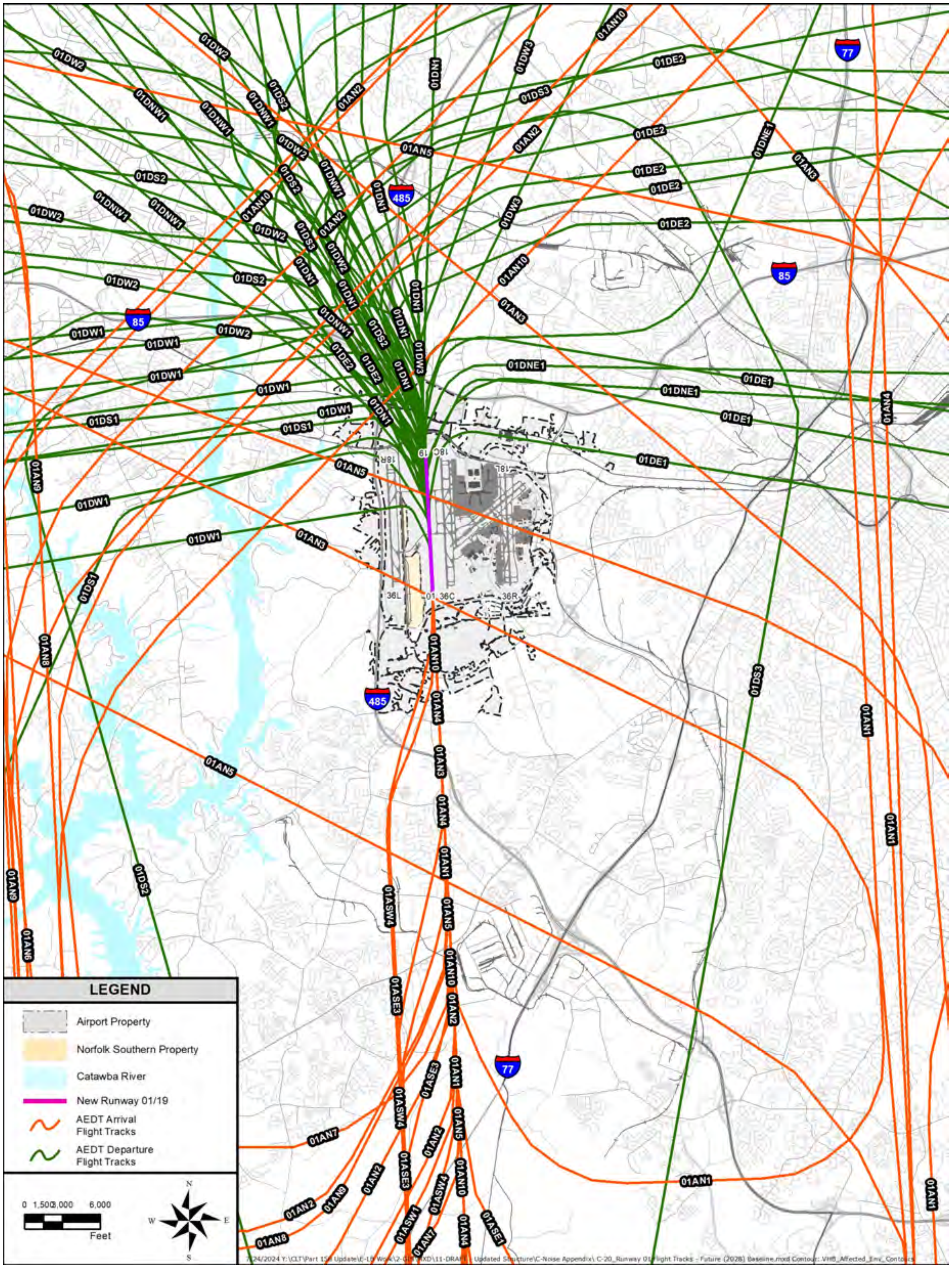
The AEDT flight tracks modeled for Runway 1/19 for the Future (2028) Baseline noise exposure contour are shown on **Exhibit C-20, *Runway 01 Flight Tracks –Future (2028) Baseline*** and **Exhibit C-21, *Runway 19 Flight Tracks – Future (2028) Baseline***. Flight tracks modeled for the other runways and helicopters remain the same as those modeled for the Existing (2023) Baseline condition shown in Exhibits C-11 through C-17. **Table C-12, *Arrival Flight Track Distribution – Future (2028) Baseline*** shows arrival flight track utilization percentages and **Table C-13, *Departure Flight Track Distribution – Future (2028) Baseline*** shows departure flight track utilization percentages for the Future (2028) Baseline. **Table C-14, *Helicopter Arrival Flight Track Distribution – Future (2028) Baseline*** shows helicopter arrival flight track utilization percentages and **Table C-15, *Helicopter Departure Flight Track Distribution – Future (2028) Baseline*** shows helicopter departure flight track utilization percentages for the Future (2028) Baseline condition. Each flight track is identified by a track ID that corresponds to the label in the flight track exhibits.

Table C-11 Average Annual Day Runway Use – Future (2028) Baseline

Aircraft Category	18C	18L	18R	36C	36L	36R	19	01	Total
Daytime Arrivals									
Heavy Passenger Jet	18.9%	12.4%	3.0%	28.2%	3.2%	31.3%	1.5%	1.5%	100.0%
Cargo Jet	6.1%	1.3%	26.9%	7.0%	51.3%	4.4%	1.5%	1.5%	100.0%
Large Passenger Jet	12.6%	4.4%	17.3%	24.0%	29.4%	9.3%	1.5%	1.5%	100.0%
Regional / GA Jet	6.3%	19.0%	9.1%	10.7%	18.4%	33.5%	1.5%	1.5%	100.0%
Commuter / Cargo / GA Prop	5.2%	28.6%	2.0%	0.0%	13.0%	51.2%	0.0%	0.0%	100.0%
Military	2.0%	33.8%	0.0%	2.0%	0.0%	62.2%	0.0%	0.0%	100.0%
Nighttime Arrivals									
Heavy Passenger Jet	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cargo Jet	18.1%	17.3%	1.4%	30.7%	5.0%	26.5%	0.5%	0.5%	100.0%
Large Passenger Jet	16.5%	12.7%	6.7%	31.8%	10.9%	18.4%	1.5%	1.5%	100.0%
Regional / GA Jet	10.1%	23.1%	3.9%	19.6%	5.3%	35.0%	1.5%	1.5%	100.0%
Commuter / Cargo / GA Prop	9.3%	31.2%	0.0%	14.9%	0.7%	40.9%	1.5%	1.5%	100.0%
Military	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Daytime Departures									
Heavy Passenger Jet	0.5%	10.0%	0.0%	0.5%	0.0%	20.0%	25.3%	43.7%	100.0%
Cargo Jet	0.5%	1.0%	0.0%	0.5%	0.0%	6.0%	34.3%	57.7%	100.0%
Large Passenger Jet	0.5%	18.5%	0.0%	0.5%	0.0%	33.2%	16.8%	30.5%	100.0%
Regional / GA Jet	0.6%	16.9%	0.0%	0.6%	0.0%	30.4%	18.3%	33.2%	100.0%
Commuter / Cargo / GA Prop	0.0%	35.8%	0.0%	0.0%	0.0%	64.2%	0.0%	0.0%	100.0%
Military	2.0%	33.8%	0.0%	2.0%	0.0%	62.2%	0.0%	0.0%	100.0%
Nighttime Departures									
Heavy Passenger Jet	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cargo Jet	26.1%	11.6%	0.0%	37.0%	0.0%	24.3%	0.5%	0.5%	100.0%
Large Passenger Jet	18.2%	22.0%	0.0%	29.2%	0.0%	27.6%	1.5%	1.5%	100.0%
Regional / GA Jet	14.7%	25.3%	0.0%	27.9%	0.0%	29.1%	1.5%	1.5%	100.0%
Commuter / Cargo / GA Prop	6.2%	33.7%	0.0%	16.7%	0.0%	40.4%	1.5%	1.5%	100.0%
Military	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

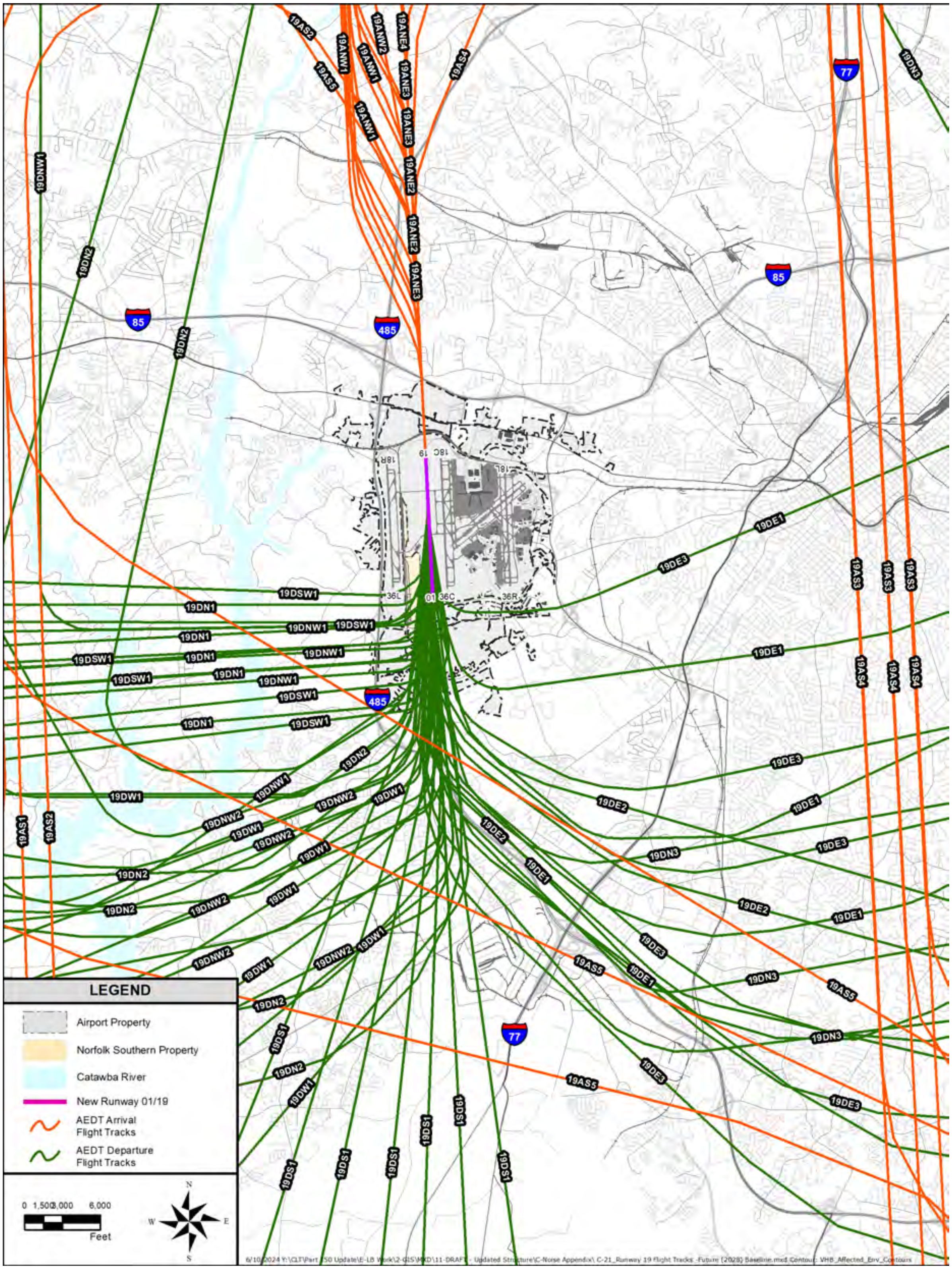
Note: Totals may not equal sums due to rounding.
Source: CLT Flight Tracking System Data, Landrum & Brown analysis, 2022.

Exhibit C-20 Runway 01 Flight Tracks –Future (2028) Baseline



Source: Landrum & Brown, 2022

Exhibit C-21 Runway 19 Flight Tracks – Future (2028) Baseline



Source: Landrum & Brown, 2022

Table C-12 Arrival Flight Track Distribution – Future (2028) Baseline

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
18L	18LAN1	0.3%	3.4%	0.3%	0.1%	0.8%	0.0%
	18LANE1	0.0%	1.0%	0.0%	0.1%	0.6%	0.0%
	18LANE2	0.0%	1.4%	0.0%	0.1%	0.5%	0.0%
	18LANE3	22.8%	14.0%	22.8%	30.0%	34.4%	29.2%
	18LANE4	19.6%	18.5%	19.6%	10.4%	21.2%	8.6%
	18LANE5	1.3%	3.3%	1.3%	3.8%	7.0%	3.2%
	18LANE6	3.2%	2.8%	3.2%	0.1%	0.7%	0.0%
	18LANW1	0.3%	3.2%	0.3%	0.1%	1.0%	0.0%
	18LANW2	1.0%	5.6%	1.0%	0.2%	1.3%	0.0%
	18LANW3	0.1%	0.7%	0.1%	4.8%	2.4%	5.2%
	18LAS1	2.4%	4.5%	2.4%	4.9%	3.2%	5.2%
	18LAS2	0.9%	3.4%	0.9%	2.8%	1.7%	3.0%
	18LAS3	2.5%	2.1%	2.5%	4.0%	2.0%	4.3%
	18LAS4	21.6%	9.2%	21.6%	1.8%	1.4%	1.9%
	18LAS5	16.8%	13.5%	16.8%	7.8%	5.8%	8.1%
	18LASE1	0.8%	0.1%	0.8%	3.0%	1.5%	3.2%
	18LASE2	0.1%	0.9%	0.1%	0.0%	0.0%	0.0%
	18LASE3	0.0%	0.1%	0.0%	0.0%	0.3%	0.0%
	18LASW1	0.6%	0.6%	0.6%	0.0%	0.3%	0.0%
	18LASW2	0.0%	0.4%	0.0%	1.1%	0.8%	1.1%
	18LAW1	5.8%	9.1%	5.8%	24.8%	13.2%	26.8%
	18LAW2	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%
	18LAW3	0.0%	1.0%	0.0%	0.0%	0.0%	0.0%
18L Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
18C	18CANE1	0.4%	0.1%	0.4%	0.0%	0.0%	0.0%
	18CANE2	0.8%	0.1%	0.8%	0.1%	0.1%	0.1%
	18CANE3	13.6%	5.0%	13.6%	1.9%	6.8%	1.1%
	18CANE4	7.6%	4.0%	7.6%	0.9%	2.0%	0.7%
	18CANW1	1.1%	1.3%	1.1%	0.1%	0.3%	0.1%
	18CANW2	1.2%	1.0%	1.2%	0.1%	0.2%	0.0%
	18CANW3	7.1%	9.1%	7.1%	0.4%	1.6%	0.2%
	18CANW4	0.6%	1.1%	0.6%	0.0%	0.2%	0.0%
	18CANW5	15.3%	23.6%	15.3%	1.8%	5.3%	1.2%
	18CAS1	2.3%	6.3%	2.3%	0.1%	1.0%	0.0%
	18CAS2	13.7%	14.5%	13.7%	9.3%	7.7%	9.5%
	18CAS3	0.2%	0.2%	0.2%	1.4%	0.8%	1.5%
	18CAS4	3.0%	1.1%	3.0%	0.1%	0.6%	0.0%
	18CAS5	0.7%	0.3%	0.7%	2.2%	1.2%	2.4%
	18CASW1	2.2%	0.2%	2.2%	6.6%	3.6%	7.1%
	18CAW1	2.5%	4.1%	2.5%	20.1%	13.5%	21.2%
	18CAW2	2.5%	3.1%	2.5%	11.4%	8.9%	11.8%
	18CAW3	25.1%	25.0%	25.1%	43.5%	46.2%	43.0%
18C Subtotal		18.9%	10.6%	12.9%	6.4%	5.6%	2.0%

Table C-12 Arrival Flight Track Distribution – Future (2028) Baseline *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
18R	18RANE1	2.3%	1.8%	2.3%	0.0%	0.0%	0.0%
	18RANE2	1.0%	1.2%	1.0%	0.0%	0.0%	0.0%
	18RANE3	7.6%	6.9%	7.6%	0.0%	0.1%	0.0%
	18RANW1	7.3%	13.4%	7.3%	1.2%	7.9%	0.0%
	18RANW2	1.1%	1.4%	1.1%	0.2%	1.0%	0.0%
	18RANW3	8.2%	12.7%	8.2%	1.2%	8.1%	0.0%
	18RANW4	0.3%	0.3%	0.3%	0.8%	0.7%	0.0%
	18RAS1	2.2%	0.9%	2.2%	1.4%	2.0%	0.0%
	18RAS2	0.1%	0.0%	0.1%	0.2%	0.1%	0.0%
	18RAS3	34.3%	18.9%	34.3%	50.2%	48.4%	0.0%
	18RAS4	3.7%	1.7%	3.7%	2.2%	3.3%	0.0%
	18RAW1	6.0%	8.7%	6.0%	10.6%	11.8%	0.0%
	18RAW2	0.2%	0.4%	0.2%	0.5%	0.6%	0.0%
	18RAW3	25.8%	31.7%	25.8%	31.4%	16.0%	0.0%
18R Subtotal		3.0%	17.4%	16.5%	8.8%	1.8%	0.0%
36C	36CAN1	13.0%	6.1%	13.0%	0.3%	1.4%	0.1%
	36CAN10	0.3%	0.2%	0.3%	0.0%	0.0%	0.0%
	36CAN2	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	36CAN3	0.7%	0.7%	0.7%	0.0%	0.1%	0.0%
	36CAN4	1.1%	1.4%	1.1%	7.7%	4.0%	8.4%
	36CAN5	0.0%	1.5%	0.0%	0.0%	0.2%	0.0%
	36CAN6	0.5%	1.4%	0.5%	0.1%	0.6%	0.0%
	36CAN7	3.9%	0.5%	3.9%	0.3%	2.1%	0.0%
	36CAN8	26.6%	26.7%	26.6%	3.5%	22.2%	0.3%
	36CAN9	14.3%	14.3%	14.3%	1.7%	11.9%	0.0%
	36CASE1	3.7%	5.1%	3.7%	0.6%	3.9%	0.0%
	36CASE2	5.7%	15.0%	5.7%	1.3%	8.8%	0.1%
	36CASE3	0.4%	0.5%	0.4%	1.5%	0.8%	1.6%
	36CASW1	11.6%	3.4%	11.6%	4.6%	2.6%	4.9%
	36CASW2	7.1%	17.4%	7.1%	41.7%	22.9%	44.8%
	36CASW3	6.0%	2.1%	6.0%	24.7%	12.5%	26.8%
	36CASW4	1.1%	0.7%	1.1%	4.4%	2.2%	4.8%
	36CASW5	3.7%	3.0%	3.7%	7.4%	3.9%	8.0%
36C Subtotal		28.2%	15.9%	24.6%	11.2%	1.4%	2.0%

Table C-12 Arrival Flight Track Distribution – Future (2028) Baseline *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
36L	36LANE1	2.5%	3.7%	2.5%	49.7%	24.7%	0.0%
	36LANE2	2.0%	1.7%	2.0%	0.3%	0.1%	0.0%
	36LANE3	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%
	36LANE4	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
	36LANW1	12.7%	31.0%	12.7%	2.6%	1.4%	0.0%
	36LANW2	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%
	36LANW3	38.3%	31.2%	38.3%	14.7%	7.4%	0.0%
	36LASE1	6.1%	2.3%	6.1%	0.6%	0.3%	0.0%
	36LASE2	1.9%	0.4%	1.9%	0.2%	0.1%	0.0%
	36LASE3	3.6%	1.5%	3.6%	0.4%	0.2%	0.0%
	36LASW1	5.1%	5.3%	5.1%	0.7%	0.4%	0.0%
	36LASW2	12.5%	11.5%	12.5%	8.8%	7.3%	0.0%
	36LASW3	14.9%	10.9%	14.9%	21.9%	57.9%	0.0%
36L Subtotal		3.2%	34.0%	28.0%	17.7%	11.8%	0.0%
36R	36RAE1	0.1%	0.4%	0.1%	0.2%	0.4%	0.2%
	36RANE1	4.7%	4.5%	4.7%	2.5%	4.5%	2.1%
	36RANE2	27.8%	20.2%	27.8%	7.2%	17.7%	5.4%
	36RANE3	38.6%	23.1%	38.6%	10.5%	23.1%	8.3%
	36RANE4	0.1%	0.8%	0.1%	0.1%	0.5%	0.0%
	36RANW1	3.3%	3.5%	3.3%	2.0%	3.9%	1.7%
	36RANW2	0.3%	2.3%	0.3%	6.7%	4.8%	7.0%
	36RANW3	0.9%	0.5%	0.9%	1.1%	0.9%	1.2%
	36RANW4	0.7%	2.0%	0.7%	6.2%	3.1%	6.7%
	36RANW5	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%
	36RANW6	3.8%	7.0%	3.8%	12.5%	7.6%	13.3%
	36RAS1	0.5%	1.0%	0.5%	0.5%	0.5%	0.5%
	36RASE1	12.2%	17.0%	12.2%	25.6%	15.3%	27.3%
	36RASE2	5.5%	10.5%	5.5%	15.3%	9.4%	16.3%
	36RASW1	1.2%	4.1%	1.2%	9.1%	5.8%	9.7%
	36RASW2	0.2%	2.2%	0.2%	0.5%	2.1%	0.2%
	36RAW1	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%
	36RAW2	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%
36R Subtotal		31.3%	12.7%	10.0%	33.6%	50.2%	62.2%

Table C-12 Arrival Flight Track Distribution – Future (2028) Baseline *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
01	01AN1	13.0%	6.1%	13.0%	0.3%	1.4%	0.0%
	01AN10	0.3%	0.2%	0.3%	0.0%	0.0%	0.0%
	01AN2	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%
	01AN3	0.7%	0.7%	0.7%	0.0%	0.1%	0.0%
	01AN4	1.1%	1.4%	1.1%	7.7%	4.0%	0.0%
	01AN5	0.0%	1.5%	0.0%	0.0%	0.2%	0.0%
	01AN6	0.5%	1.4%	0.5%	0.1%	0.6%	0.0%
	01AN7	3.9%	0.5%	3.9%	0.3%	2.1%	0.0%
	01AN8	26.6%	26.7%	26.6%	3.5%	22.2%	0.0%
	01AN9	14.3%	14.3%	14.3%	1.7%	11.9%	0.0%
	01ASE1	3.7%	5.1%	3.7%	0.6%	3.9%	0.0%
	01ASE2	5.7%	15.0%	5.7%	1.3%	8.8%	0.0%
	01ASE3	0.4%	0.5%	0.4%	1.5%	0.8%	0.0%
	01ASW1	11.6%	3.4%	11.6%	4.6%	2.6%	0.0%
	01ASW2	7.1%	17.4%	7.1%	41.7%	22.9%	0.0%
	01ASW3	6.0%	2.1%	6.0%	24.7%	12.5%	0.0%
	01ASW4	1.1%	0.7%	1.1%	4.4%	2.2%	0.0%
	01ASW5	3.7%	3.0%	3.7%	7.4%	3.9%	0.0%
01 Subtotal		1.5%	1.1%	1.5%	1.5%	0.1%	0.0%
19	19ANE1	0.4%	0.1%	0.4%	0.0%	0.0%	0.0%
	19ANE2	0.8%	0.1%	0.8%	0.1%	0.1%	0.0%
	19ANE3	13.6%	5.0%	13.6%	1.9%	6.8%	0.0%
	19ANE4	7.6%	4.0%	7.6%	0.9%	2.0%	0.0%
	19ANW1	1.1%	1.3%	1.1%	0.1%	0.3%	0.0%
	19ANW2	1.2%	1.0%	1.2%	0.1%	0.2%	0.0%
	19ANW3	7.1%	9.1%	7.1%	0.4%	1.6%	0.0%
	19ANW4	0.6%	1.1%	0.6%	0.0%	0.2%	0.0%
	19ANW5	15.3%	23.6%	15.3%	1.8%	5.3%	0.0%
	19AS1	2.3%	6.3%	2.3%	0.1%	1.0%	0.0%
	19AS2	13.7%	14.5%	13.7%	9.3%	7.7%	0.0%
	19AS3	0.2%	0.2%	0.2%	1.4%	0.8%	0.0%
	19AS4	3.0%	1.1%	3.0%	0.1%	0.6%	0.0%
	19AS5	0.7%	0.3%	0.7%	2.2%	1.2%	0.0%
	19ASW1	2.2%	0.2%	2.2%	6.6%	3.6%	0.0%
	19AW1	2.5%	4.1%	2.5%	20.1%	13.5%	0.0%
	19AW2	2.5%	3.1%	2.5%	11.4%	8.9%	0.0%
	19AW3	25.1%	25.0%	25.1%	43.5%	46.2%	0.0%
19 Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	0.0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2024

Table C-13 Departure Flight Track Distribution – Future (2028) Baseline

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
18L	18LDE1	0.2%	3.3%	0.2%	0.8%	5.5%	33.3%
	18LDE2	39.6%	30.6%	39.6%	45.6%	47.1%	5.6%
	18LDE3	4.2%	4.9%	4.2%	21.9%	14.3%	0.0%
	18LDE4	1.0%	2.3%	1.0%	7.5%	4.9%	0.0%
	18LDE5	0.8%	0.5%	0.8%	3.5%	2.2%	0.0%
	18LDN1	0.0%	1.1%	0.0%	1.0%	3.8%	0.0%
	18LDN2	0.9%	3.1%	0.9%	1.9%	1.1%	0.0%
	18LDN3	0.0%	0.2%	0.0%	0.1%	0.5%	0.0%
	18LDN4	7.2%	9.1%	7.2%	1.4%	2.4%	0.0%
	18LDN5	0.9%	0.8%	0.9%	0.0%	0.1%	0.0%
	18LDNW1	2.8%	3.8%	2.8%	4.7%	4.7%	0.0%
	18LDS1	40.8%	22.6%	40.8%	4.8%	5.6%	27.8%
	18LDW1	0.0%	2.8%	0.0%	0.3%	2.1%	33.3%
	18LDW2	1.0%	7.6%	1.0%	5.7%	3.9%	0.0%
	18LDW3	0.5%	7.0%	0.5%	0.7%	1.7%	0.0%
18L Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
18C	18CDE1	0.7%	1.3%	0.7%	0.0%	0.0%	0.0%
	18CDE2	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%
	18CDE3	1.8%	1.4%	1.8%	0.0%	0.0%	0.0%
	18CDN1	0.1%	2.0%	0.1%	0.1%	0.4%	0.0%
	18CDN2	17.4%	20.5%	17.4%	15.8%	8.1%	0.0%
	18CDN3	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
	18CDNW1	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%
	18CDNW2	16.7%	22.7%	16.7%	5.0%	14.8%	0.0%
	18CDS1	6.0%	2.6%	6.0%	0.4%	3.0%	6.4%
	18CDSW1	0.4%	0.2%	0.4%	0.2%	1.7%	3.3%
	18CDW1	56.3%	48.7%	56.3%	78.4%	71.9%	90.3%
18C Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
36C	36CDE1	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
	36CDE2	3.0%	3.4%	3.0%	2.6%	1.3%	0.0%
	36CDN1	17.1%	24.0%	17.1%	47.2%	23.9%	0.0%
	36CDNE1	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
	36CDNW1	14.8%	19.5%	14.8%	32.8%	27.6%	0.0%
	36CDS1	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%
	36CDS2	11.2%	6.4%	11.2%	10.0%	11.0%	0.0%
	36CDS3	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%
	36CDW1	0.4%	0.8%	0.4%	1.0%	3.6%	66.7%
	36CDW2	53.3%	45.4%	53.3%	6.4%	32.4%	33.3%
	36CDW3	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
36C Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table C-13 Departure Flight Track Distribution – Future (2028) Baseline *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
36R	36RDE1	0.2%	5.1%	0.2%	12.0%	9.0%	20.0%
	36RDE2	51.9%	38.6%	51.9%	6.7%	14.1%	40.0%
	36RDE3	22.1%	19.1%	22.1%	4.1%	6.9%	0.0%
	36RDN1	0.9%	2.2%	0.9%	4.2%	8.7%	0.0%
	36RDN2	0.7%	3.4%	0.7%	6.6%	6.4%	0.0%
	36RDN3	0.1%	0.2%	0.1%	0.5%	0.2%	0.0%
	36RDNE1	0.0%	0.5%	0.0%	1.4%	0.7%	0.0%
	36RDNE2	0.2%	0.9%	0.2%	2.0%	1.4%	0.0%
	36RDNE3	0.0%	0.3%	0.0%	1.7%	2.4%	0.0%
	36RDNW1	1.0%	2.4%	1.0%	15.1%	13.7%	0.0%
	36RDS1	0.4%	0.9%	0.4%	10.8%	6.9%	40.0%
	36RDSE1	0.0%	0.6%	0.0%	2.3%	1.2%	0.0%
	36RDSE2	9.5%	18.8%	9.5%	12.7%	7.5%	0.0%
	36RDSW1	0.1%	1.5%	0.1%	0.9%	2.0%	0.0%
	36RDSW2	1.5%	1.1%	1.5%	2.9%	3.4%	0.0%
	36RDSW3	8.9%	1.7%	8.9%	2.7%	1.4%	0.0%
	36RDW1	0.2%	1.1%	0.2%	5.7%	4.3%	0.0%
	36RDW2	2.4%	1.7%	2.4%	7.6%	10.0%	0.0%
36R Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
01	01DE1	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
	01DE2	3.0%	3.4%	3.0%	2.6%	1.3%	0.0%
	01DN1	17.1%	24.0%	17.1%	47.2%	23.9%	0.0%
	01DNE1	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
	01DNW1	14.8%	19.5%	14.8%	32.8%	27.6%	0.0%
	01DS1	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%
	01DS2	11.2%	6.4%	11.2%	10.0%	11.0%	0.0%
	01DS3	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%
	01DW1	0.4%	0.8%	0.4%	1.0%	3.6%	0.0%
	01DW2	53.3%	45.4%	53.3%	6.4%	32.4%	0.0%
	01DW3	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
01 Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	0.0%
19	19DE1	0.7%	1.3%	0.7%	0.0%	0.0%	0.0%
	19DE2	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%
	19DE3	1.8%	1.4%	1.8%	0.0%	0.0%	0.0%
	19DN1	0.1%	2.0%	0.1%	0.1%	0.4%	0.0%
	19DN2	17.4%	20.5%	17.4%	15.8%	8.1%	0.0%
	19DN3	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
	19DNW1	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%
	19DNW2	16.7%	22.7%	16.7%	5.0%	14.8%	0.0%
	19DS1	6.0%	2.6%	6.0%	0.4%	3.0%	0.0%
	19DSW1	0.4%	0.2%	0.4%	0.2%	1.7%	0.0%
	19DW1	56.3%	48.7%	56.3%	78.4%	71.9%	0.0%
19 Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	0.0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2024

Table C-14 Helicopter Arrival Flight Track Distribution – Future (2028) Baseline

Runway End	Track ID	Helicopter
HP-1	HA1-0	34.0%
	HA1-1	33.0%
	HA1-2	33.0%
HP-1 Subtotal		100.0%
HP-2	HA2-0	35.0%
	HA2-1	35.0%
	HA2-2	5.0%
	HA2-3	20.0%
	HA2-4	5.0%
HP-2 Subtotal		100.0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2022

Table C-15 Helicopter Departure Flight Track Distribution – Future (2028) Baseline

Runway End	Track ID	Helicopter
HP-1	HD1-0	34.0%
	HD1-1	33.0%
	HD1-2	33.0%
HP-1 Subtotal		100.0%
HP-2	HD2-0	30.0%
	HD2-1	30.0%
	HD2-2	30.0%
	HD2-3	5.0%
	HD2-4	5.0%
HP-2 Subtotal		100.0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2022

C.6.5 Aircraft Weight and Trip Length

The trip lengths modeled for the Future (2028) Baseline noise exposure contour are based upon a review of departure destinations from the design day schedule from the forecast of aviation activity prepared for CLT.[19] **Table C-16, *Departure Stage Length – Future (2028) Baseline*** indicates the proportion of the operations that fell within the trip length categories.

[19] Forecast Technical Memorandum, Technical Memorandum – Final, Charlotte Douglas International Airport Environmental Impact Statement, VHB in association with InterVISTAS, April 18, 2018.

Table C-16 Departure Stage Length – Future (2028) Baseline

Aircraft Category	Departure Stage Length					
	1	2	3	4	5	6
Heavy Passenger Jet	0%	0%	0%	0%	32%	68%
Cargo Jet	100%	0%	0%	0%	0%	0%
Large Passenger Jet	46%	43%	6%	5%	0%	0%
Regional / GA Jet	98%	2%	0%	0%	0%	0%
Commuter / Cargo / GA Prop	100%	0%	0%	0%	0%	0%
Military	100%	0%	0%	0%	0%	0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2022

C.6.6 Ground Run-Up Activity

Engine run-up activity was projected for the Future (2028) Baseline based on the forecast increase in operations CLT. On average, approximately 26 run-ups are expected to occur per day at CLT in 2028. Estimates of run-up times and durations remained the same as described for the Existing (2023) conditions. It is anticipated that run-ups would only occur at run-up locations 2 through 6 in the Future (2028) conditions as listed in **Table C-17, *Aircraft Engine Run-Up Locations*** and shown in **Exhibit C-22, *Run-Up Locations – Future (2028) Baseline.***

Table C-17 Aircraft Engine Run-Up Locations[20]

Map ID	Run-Up Location Description
2	West pad of former Runway 5/23
3	Center pad of former Runway 5/23
4	Taxiway C between Taxiway C1 and C3
5	Taxiway M between Taxiway M3 and D
6	NCANG Ramp

The number, types, durations and times of day of engine run-ups estimated for the Future (2028) condition are shown in **Table C-18, *Aircraft Engine Run-Ups – Future (2028) Baseline*.**

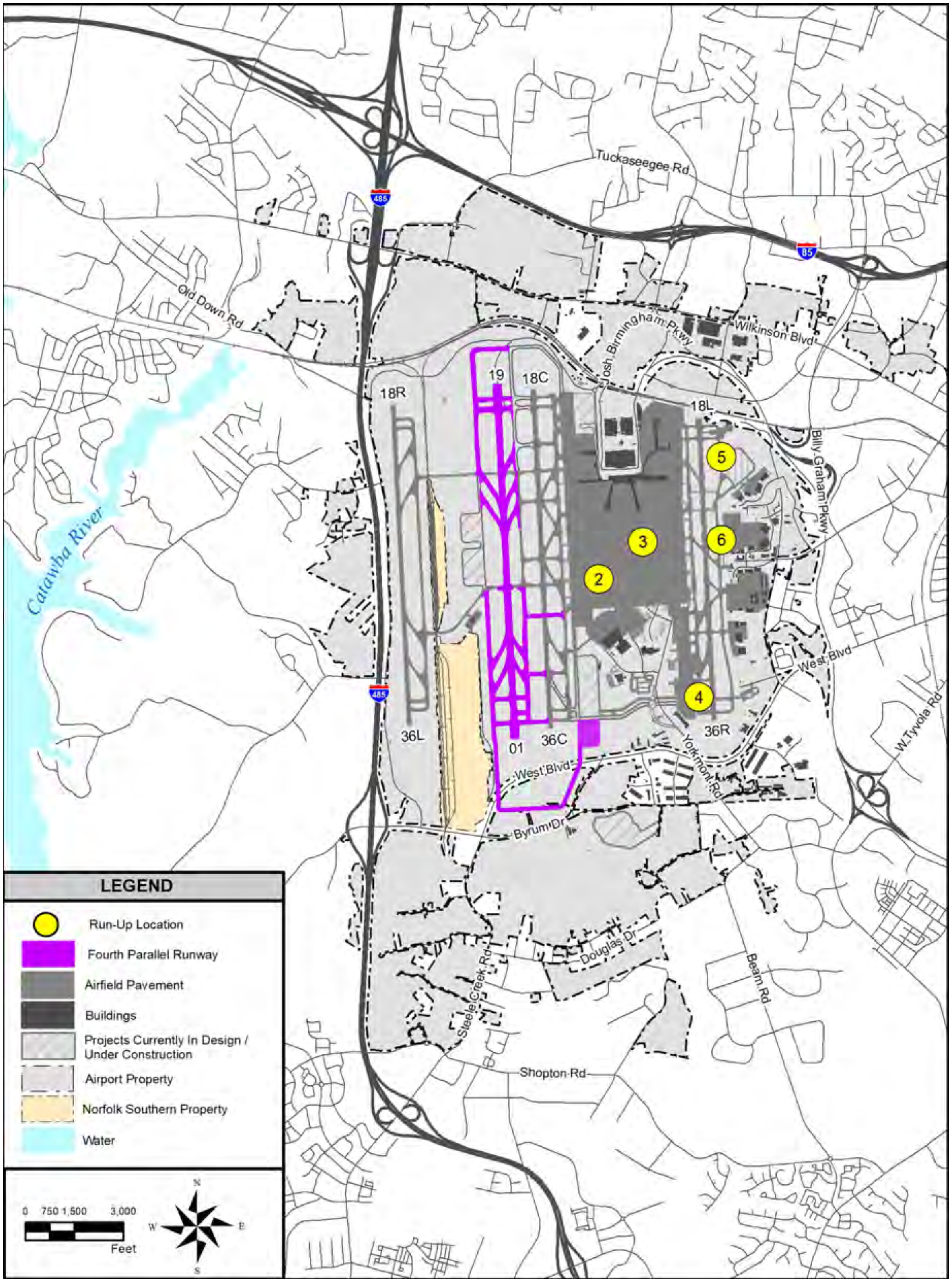
[20] Based on AO-SOP-013 (revised October 21, 2022), Taxiway E is no longer used as a run-up location

Table C-18 Aircraft Engine Run-Ups - Future (2028) Baseline

AEDT Aircraft ID	Run-Ups per Day			
	Daytime	Nighttime	Total Run-ups	Total Duration *(h:mm:ss)*
Civil Run-Ups				
Airbus A319-100 Series	1.20	0.80	2.00	0:23:03
Airbus A320-200 Series	0.68	0.45	1.13	0:12:57
Airbus A321-200 Series	2.53	1.69	4.22	0:48:32
Boeing 737-800 Series	1.75	1.17	2.92	0:33:34
Boeing 787-9 Dreamliner	0.14	0.09	0.23	0:02:39
Bombardier CRJ-900-ER	5.09	3.39	8.48	1:37:31
Embraer ERJ145-LR	2.41	1.61	4.02	0:46:12
Embraer ERJ175-LR	1.44	0.96	2.40	0:27:37
Subtotal	*15.24*	*10.16*	*25.40*	*4:52:05*
Military Run-Ups				
Boeing C-17A	0.68	0.00	0.68	0:20:30
Subtotal	*0.68*	*0.00*	*0.68*	*0:20:30*
Total	**15.92**	**10.16**	**26.08**	**5:12:35**

Source: FAA Order CLT 7110.65V, Landrum & Brown analysis, 2022.

Exhibit C-22 Run-Up Locations – Future (2028) Baseline



Source: Landrum & Brown, 2022.

C.7 Future (2028) NEM/NCP Noise Exposure Contour

The elements of the Noise Compatibility Program (NCP) described in Chapter 4 include several noise abatement measures that would change the operating conditions in respect to what was modeled for the Future (2028) Baseline noise exposure contour. The following sections describe the differences in operating conditions between the Future (2028) Baseline (future conditions without implementation of the 2024 NCP) and Future (2028) NEM/NCP (future conditions with implementation of the 2024 NCP) noise exposure contours from this Study.

C.7.1 Runway Definition

The runway layout discussed for the Future (2028) Baseline condition would remain the same for the Future (2028) NEM/NCP noise exposure contour.

C.7.2 Number of Operations and Fleet Mix

The number of annual aircraft operations and fleet mix discussed for the Future (2028) Baseline condition would remain the same for the Future (2028) NEM/NCP noise exposure contour.

C.7.3 Runway End Utilization

The percent use of each runway end for the Future (2028) NEM/NCP noise exposure contour would change compared to the Future (2028) Baseline due to the implementation of the following noise abatement measures:

- Measure NA-11 – Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.
- Measure NA-12 – Designate Runways 18L, 18C, and18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

The above-listed noise abatement measures would change nighttime (10:00 p.m. to 6:59 a.m.) arrivals only. The percentage of departures and daytime (7:00 a.m. to 9:59 p.m.) arrivals by runway end would remain the same as the Future (2028) Baseline shown in Table C-11. **Table C-19, Average Annual Day Runway Use – Future (2028) NEM/NCP** summarizes the percentage of use by each aircraft category for nighttime arrivals for the Future (2028) NEM/NCP condition.

Table C-19 Average Annual Day Runway Use – Future (2028) NEM/NCP

Aircraft Category	18C	18L	18R	36C	36L	36R	19	01	Total
Nighttime Arrivals									
Heavy Passenger Jet	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cargo Jet	18.1%	17.3%	1.4%	30.7%	5.0%	26.5%	0.5%	0.5%	100.0%
Large Passenger Jet	11.5%	7.7%	16.7%	6.8%	23.4%	30.9%	1.5%	1.5%	100.0%
Regional / GA Jet	6.8%	19.8%	10.5%	13.2%	8.5%	38.2%	1.5%	1.5%	100.0%
Commuter / Cargo / GA Prop	9.3%	31.2%	0.0%	14.9%	0.7%	40.9%	1.5%	1.5%	100.0%
Military	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Note: Totals may not equal sums due to rounding.
Source: Landrum & Brown analysis, 2024.

C.7.4 Flight Tracks

The location and usage of departure flight tracks would change compared to the Future (2028) Baseline due to the implementation of the following noise abatement measures:

- Measure NA-13 – Maximize the number of divergent headings for north flow departures while maintaining a 15° separation between headings on Runway 36C, Runway 36R, and Runway 01.
- Measure NA-14 – Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings on Runway 18C, Runway 18L, and Runway 19. This would require the elimination of the 2-mile restriction.

The above-listed noise abatement measures would change the location and percent utilization of departure flight tracks only. Arrival flight track locations would remain the same as the Future (2028) Baseline shown in Exhibits C-11 to C-15 and C-20 to C-21. Arrival flight track utilization would remain the same as the Future (2028) Baseline shown in Table C-12. New AEDT flight tracks modeled for this scenario are shown in **Exhibits C-23 through C-28**. **Table C-20, *Departure Flight Track Distribution – Future (2028) NEM/NCP***, summarizes the percentage of use by each aircraft category for nighttime arrivals for the Future (2028) NEM/NCP. The noise abatement flight corridors are expected to be utilized by commercial jet traffic. General aviation aircraft are expected to use similar flight procedures as the Existing (2023) Baseline and Future (2028) Baseline as shown in Exhibits C-11 to C-16 and Exhibit C-20 and C-21.

Helicopter flight tracks are expected to remain unchanged from what is shown in Exhibit C-17 and Tables C-14 and C-15.

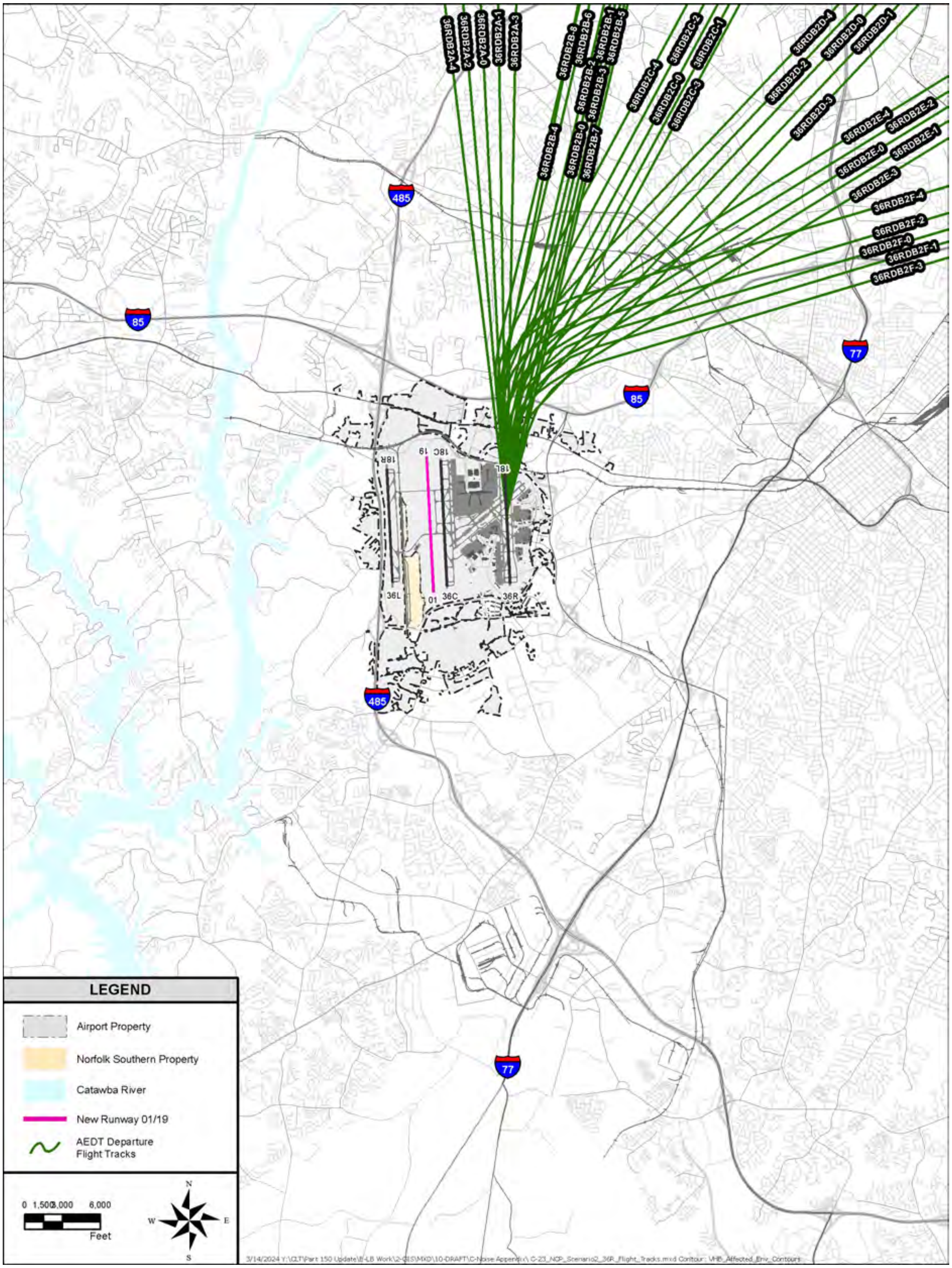
C.7.5 Aircraft Weight and Trip Length

The trip lengths would not change under the Future (2028) NEM/NCP; therefore, the stage length percentages would be the same as modeled for the Future (2028) Baseline shown in Table C-16.

C.7.6 Ground Run-Up Activity

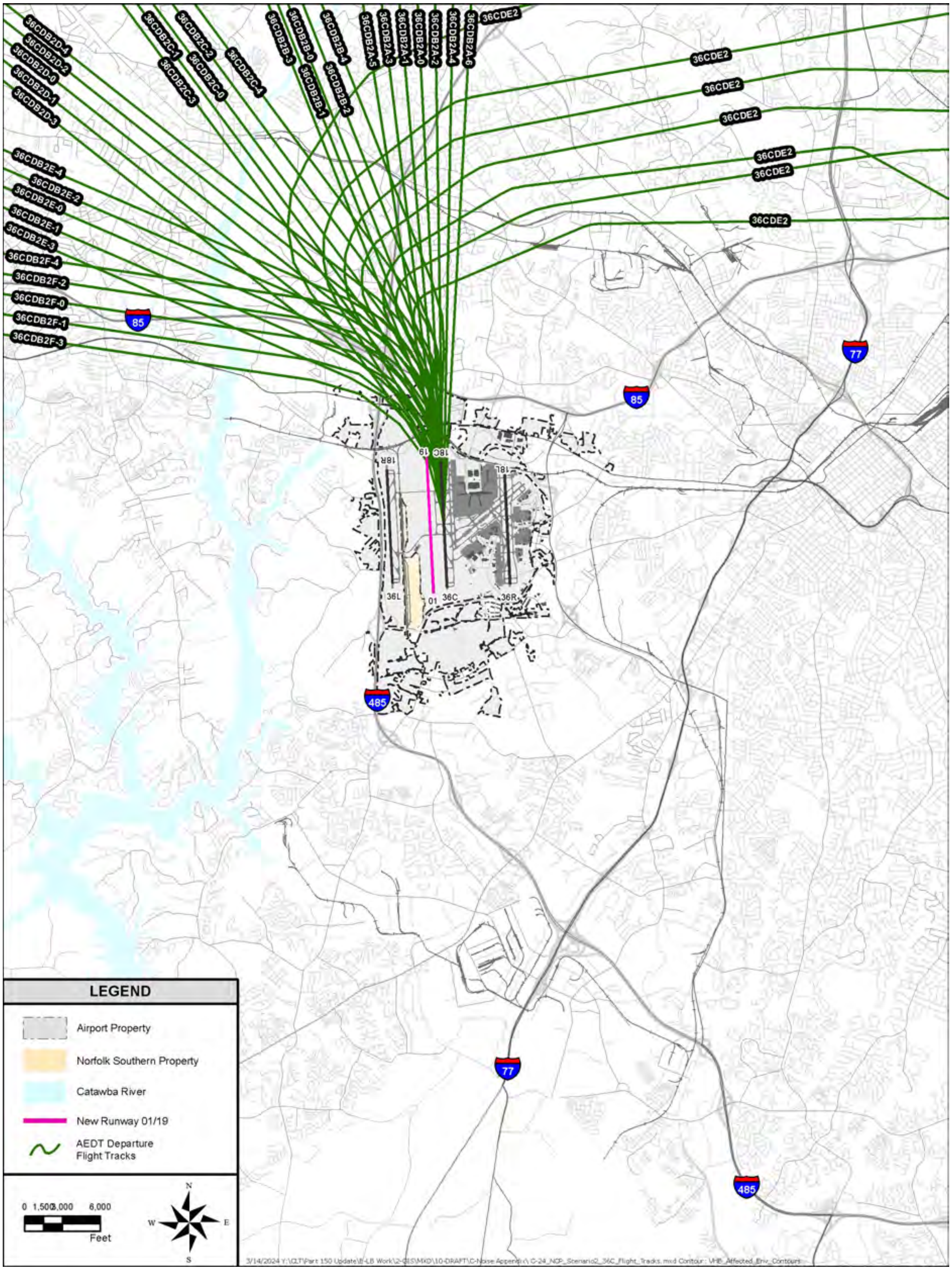
Engine run-up activity would not change under the Future (2028) NEM/NCP; therefore, the run-up locations would remain the same as presented in Exhibit C-22 Table C-17, and the number of modeled run-ups are the same as shown in Table C-18.

Exhibit C-23 Runway 36R Flight Tracks –Future (2028) NEM/NCP



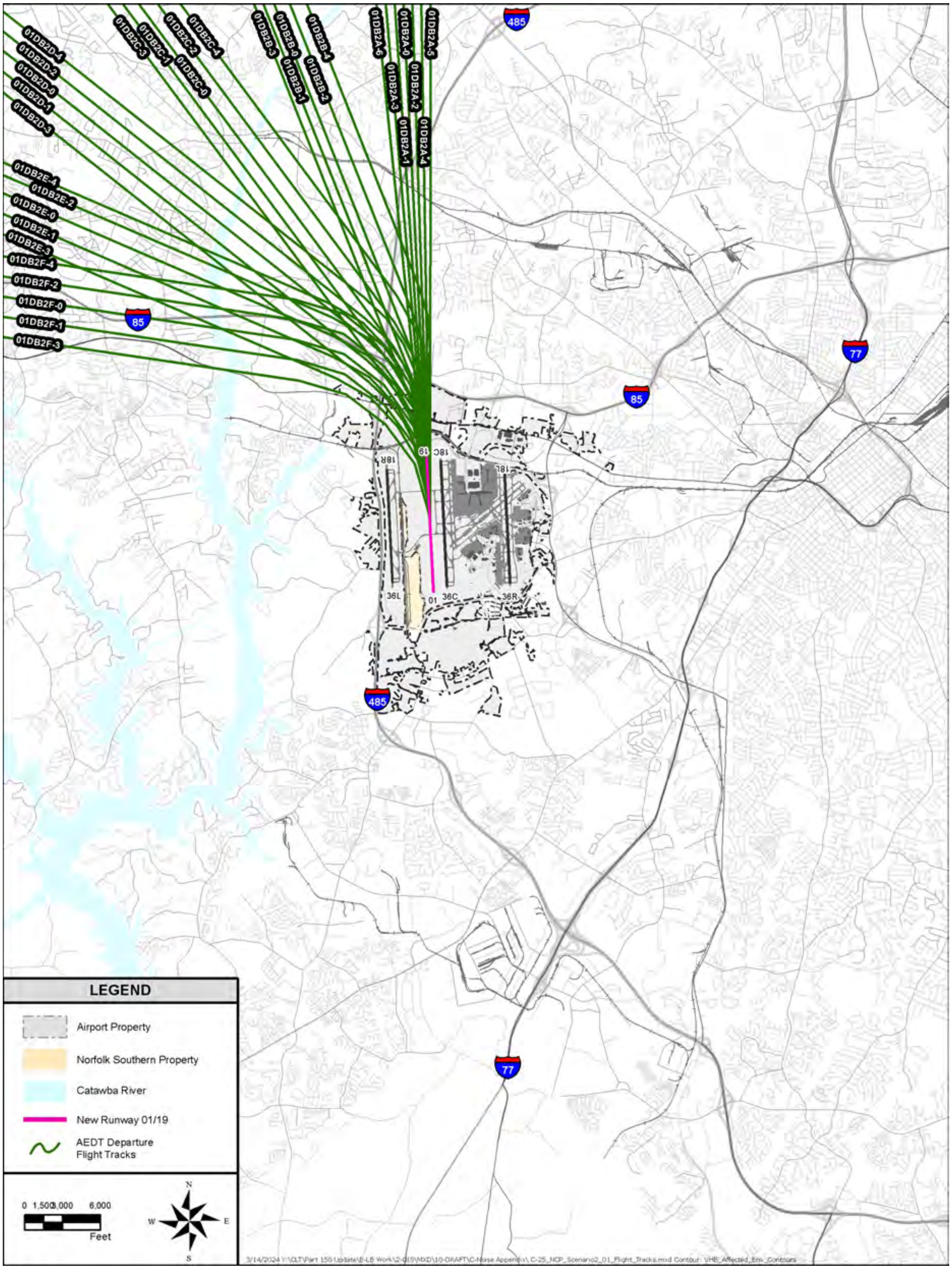
Source: Landrum & Brown, 2024

Exhibit C-24 Runway 36C Flight Tracks –Future (2028) NEM/NCP



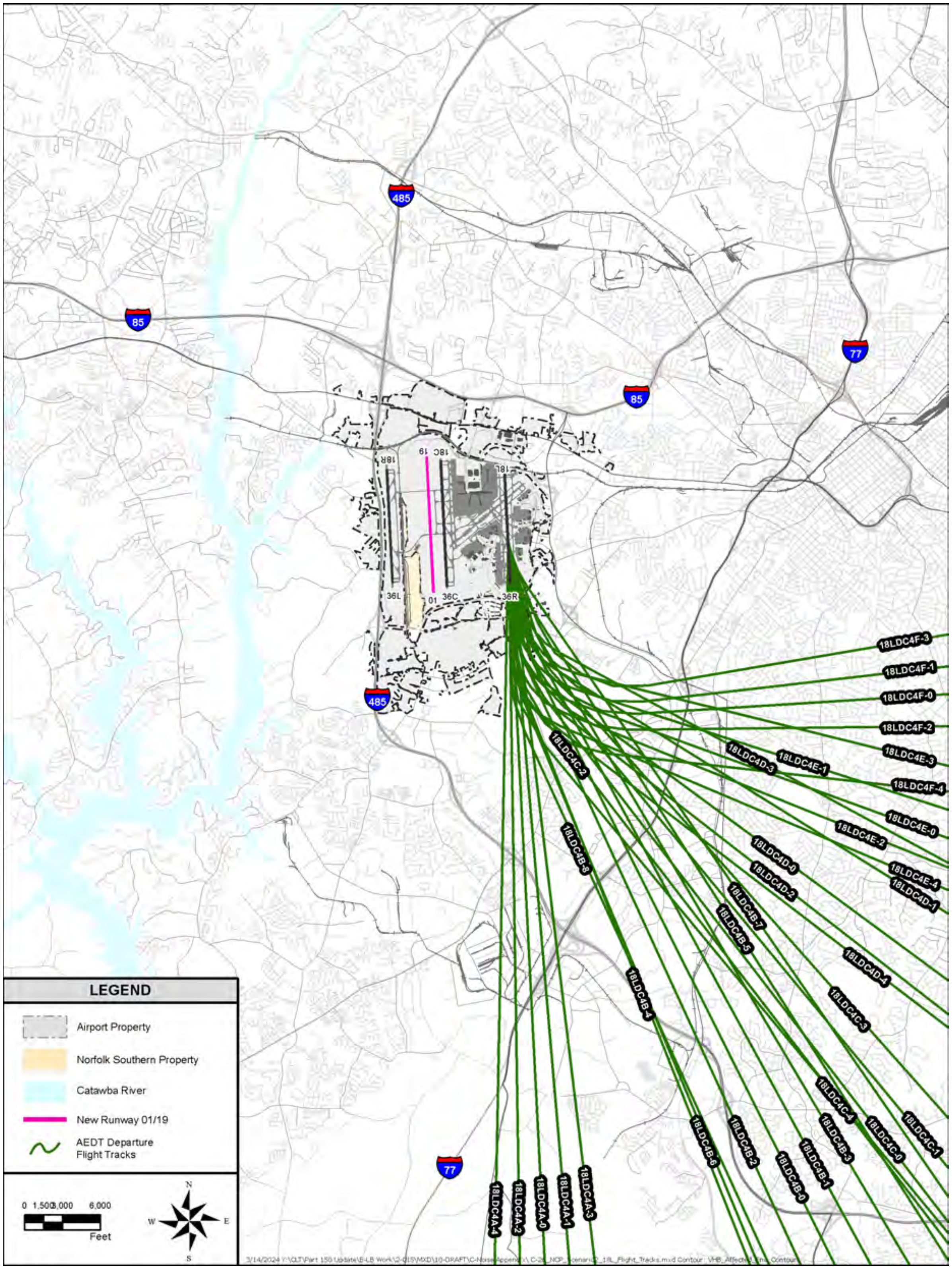
Source: Landrum & Brown, 2024

Exhibit C-25 Runway 01 Flight Tracks –Future (2028) NEM/NCP



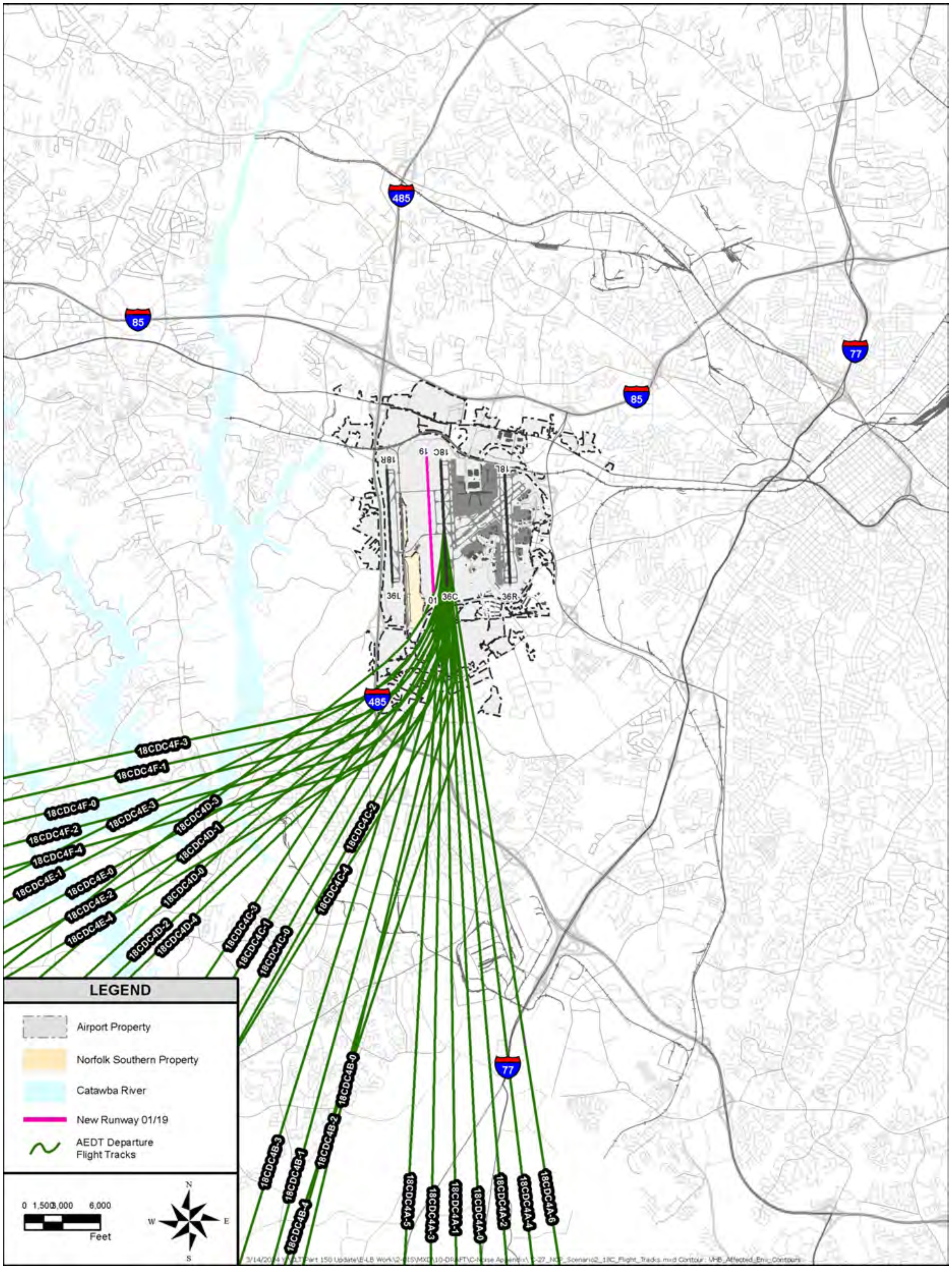
Source: Landrum & Brown, 2024

Exhibit C-26 Runway 18L Flight Tracks –Future (2028) NEM/NCP



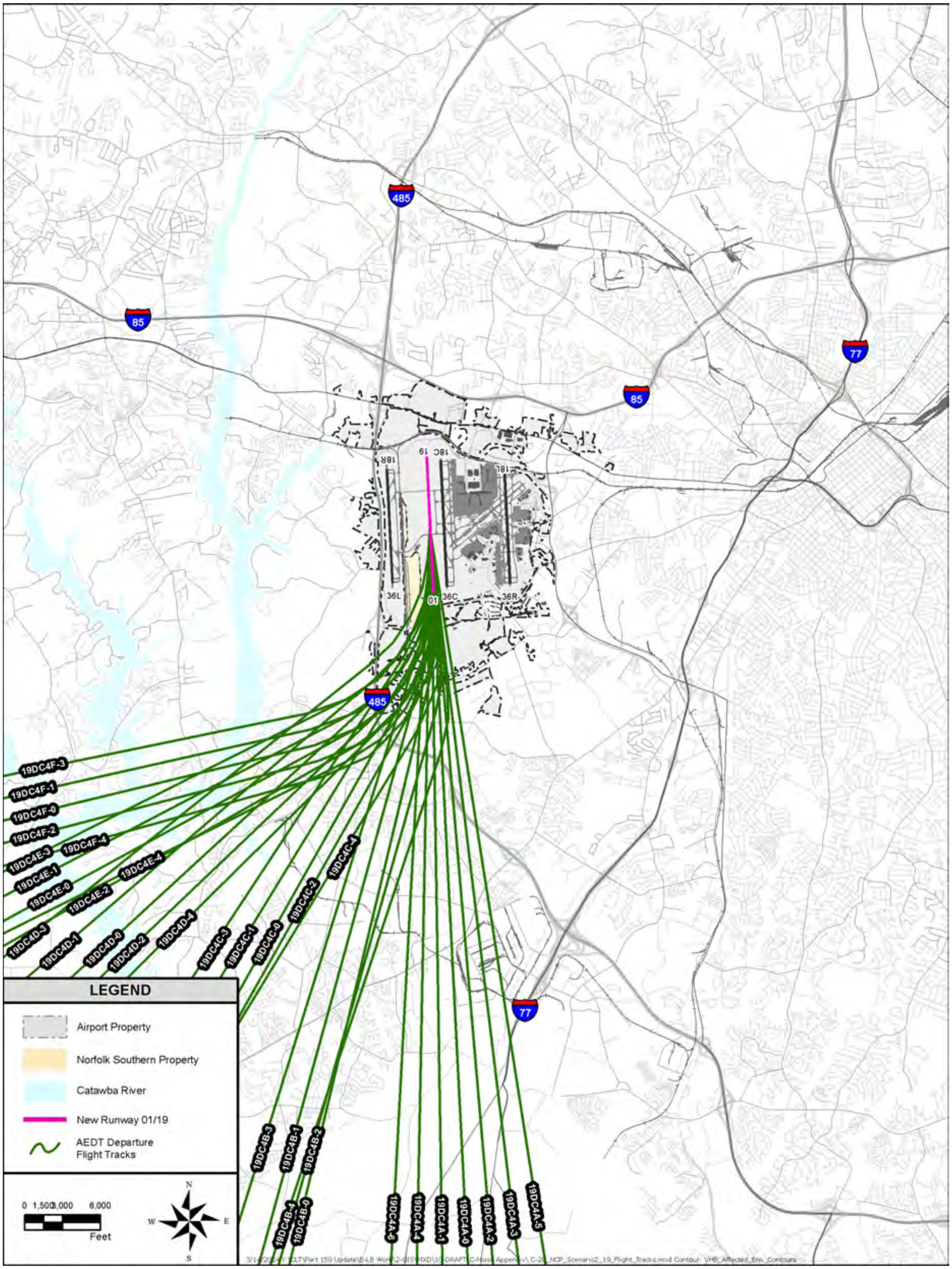
Source: Landrum & Brown, 2024

Exhibit C-27 Runway 18C Flight Tracks –Future (2028) NEM/NCP



Source: Landrum & Brown, 2024

Exhibit C-28 Runway 19 Flight Tracks –Future (2028) NEM/NCP



Source: Landrum & Brown, 2024

Table C-20 Departure Flight Track Distribution – Future (2028) NEM/NCP

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
18L	18LDC4A-0	5.2%	5.2%	5.2%	5.2%	0.0%	0.0%
	18LDC4A-1	3.0%	3.0%	3.0%	3.0%	0.0%	0.0%
	18LDC4A-2	3.0%	3.0%	3.0%	3.0%	0.0%	0.0%
	18LDC4A-3	1.9%	1.9%	1.9%	1.9%	0.0%	0.0%
	18LDC4A-4	1.9%	1.9%	1.9%	1.9%	0.0%	0.0%
	18LDC4B-0	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	18LDC4B-1	3.0%	3.0%	3.0%	3.0%	0.0%	0.0%
	18LDC4B-2	3.0%	3.0%	3.0%	3.0%	0.0%	0.0%
	18LDC4B-3	1.5%	1.5%	1.5%	1.5%	0.0%	0.0%
	18LDC4B-4	1.5%	1.5%	1.5%	1.5%	0.0%	0.0%
	18LDC4B-5	0.8%	0.8%	0.8%	0.8%	0.0%	0.0%
	18LDC4B-6	0.8%	0.8%	0.8%	0.8%	0.0%	0.0%
	18LDC4B-7	0.4%	0.4%	0.4%	0.4%	0.0%	0.0%
	18LDC4B-8	0.4%	0.4%	0.4%	0.4%	0.0%	0.0%
	18LDC4C-0	5.3%	5.3%	5.3%	5.3%	0.0%	0.0%
	18LDC4C-1	3.0%	3.0%	3.0%	3.0%	0.0%	0.0%
	18LDC4C-2	3.0%	3.0%	3.0%	3.0%	0.0%	0.0%
	18LDC4C-3	1.9%	1.9%	1.9%	1.9%	0.0%	0.0%
	18LDC4C-4	1.9%	1.9%	1.9%	1.9%	0.0%	0.0%
	18LDC4D-0	7.1%	7.1%	7.1%	7.1%	0.0%	0.0%
	18LDC4D-1	4.1%	4.1%	4.1%	4.1%	0.0%	0.0%
	18LDC4D-2	4.1%	4.1%	4.1%	4.1%	0.0%	0.0%
	18LDC4D-3	2.5%	2.5%	2.5%	2.5%	0.0%	0.0%
	18LDC4D-4	2.5%	2.5%	2.5%	2.5%	0.0%	0.0%
	18LDC4E-0	6.9%	6.9%	6.9%	6.9%	0.0%	0.0%
	18LDC4E-1	4.0%	4.0%	4.0%	4.0%	0.0%	0.0%
	18LDC4E-2	4.0%	4.0%	4.0%	4.0%	0.0%	0.0%
	18LDC4E-3	2.5%	2.5%	2.5%	2.5%	0.0%	0.0%
	18LDC4E-4	2.5%	2.5%	2.5%	2.5%	0.0%	0.0%
	18LDC4F-0	5.2%	5.2%	5.2%	5.2%	0.0%	0.0%
	18LDC4F-1	3.0%	3.0%	3.0%	3.0%	0.0%	0.0%
	18LDC4F-2	3.0%	3.0%	3.0%	3.0%	0.0%	0.0%
	18LDC4F-3	1.9%	1.9%	1.9%	1.9%	0.0%	0.0%
	18LDC4F-4	1.9%	1.9%	1.9%	1.9%	0.0%	0.0%
	18LDE1	0.0%	0.0%	0.0%	0.0%	5.5%	33.3%
	18LDE2	0.0%	0.0%	0.0%	0.0%	47.1%	5.6%
	18LDE3	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%
	18LDE4	0.0%	0.0%	0.0%	0.0%	4.9%	0.0%
	18LDE5	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%
	18LDN1	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%
	18LDN2	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%
	18LDN3	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%
	18LDN4	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%
	18LDN5	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
	18LDNW1	0.0%	0.0%	0.0%	0.0%	4.7%	0.0%
	18LDS1	0.0%	0.0%	0.0%	0.0%	5.6%	27.8%
	18LDW1	0.0%	0.0%	0.0%	0.0%	2.1%	33.3%

Table C-20 Departure Flight Track Distribution – Future (2028) NEM/NCP *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
18L *(continued)*	18LDW2	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%
	18LDW3	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%
18L Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
18C	18CDC4A-0	1.8%	1.7%	1.8%	1.7%	0.0%	0.0%
	18CDC4A-1	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
	18CDC4A-2	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
	18CDC4A-3	0.6%	0.6%	0.6%	0.6%	0.0%	0.0%
	18CDC4A-4	0.6%	0.6%	0.6%	0.6%	0.0%	0.0%
	18CDC4B-0	6.7%	6.7%	6.7%	6.7%	0.0%	0.0%
	18CDC4B-1	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	18CDC4B-2	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	18CDC4B-3	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	18CDC4B-4	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	18CDC4C-0	7.6%	7.6%	7.6%	7.6%	0.0%	0.0%
	18CDC4C-1	4.4%	4.4%	4.4%	4.4%	0.0%	0.0%
	18CDC4C-2	4.4%	4.4%	4.4%	4.4%	0.0%	0.0%
	18CDC4C-3	2.7%	2.7%	2.7%	2.7%	0.0%	0.0%
	18CDC4C-4	2.7%	2.7%	2.7%	2.7%	0.0%	0.0%
	18CDC4D-0	6.7%	6.7%	6.7%	6.7%	0.0%	0.0%
	18CDC4D-1	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	18CDC4D-2	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	18CDC4D-3	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	18CDC4D-4	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	18CDC4E-0	6.6%	6.6%	6.6%	6.6%	0.0%	0.0%
	18CDC4E-1	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	18CDC4E-2	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	18CDC4E-3	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	18CDC4E-4	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	18CDC4F-0	5.6%	5.6%	5.6%	5.6%	0.0%	0.0%
	18CDC4F-1	3.2%	3.2%	3.2%	3.2%	0.0%	0.0%
	18CDC4F-2	3.2%	3.2%	3.2%	3.2%	0.0%	0.0%
	18CDC4F-3	2.0%	2.0%	2.0%	2.0%	0.0%	0.0%
	18CDC4F-4	2.0%	2.0%	2.0%	2.0%	0.0%	0.0%
	18CDE1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	18CDE2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	18CDE3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	18CDN1	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%
	18CDN2	0.0%	0.0%	0.0%	0.0%	8.1%	0.0%
	18CDN3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	18CDNW1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	18CDNW2	0.0%	0.0%	0.0%	0.0%	14.8%	0.0%
	18CDS1	0.0%	0.0%	0.0%	0.0%	3.0%	6.4%
	18CDSW1	0.0%	0.0%	0.0%	0.0%	1.7%	3.3%
	18CDW1	0.0%	0.0%	0.0%	0.0%	71.9%	90.3%
18C Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table C-20 Departure Flight Track Distribution – Future (2028) NEM/NCP *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
36C	36CDB2A-0	2.4%	2.5%	2.5%	2.5%	0.0%	0.0%
	36CDB2A-1	1.9%	2.0%	2.0%	2.0%	0.0%	0.0%
	36CDB2A-2	1.9%	2.0%	2.0%	2.0%	0.0%	0.0%
	36CDB2A-3	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
	36CDB2A-4	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
	36CDB2A-5	0.7%	0.7%	0.7%	0.8%	0.0%	0.0%
	36CDB2A-6	0.7%	0.7%	0.7%	0.8%	0.0%	0.0%
	36CDB2B-0	5.7%	5.9%	5.9%	5.9%	0.0%	0.0%
	36CDB2B-1	3.3%	3.4%	3.4%	3.4%	0.0%	0.0%
	36CDB2B-2	3.3%	3.4%	3.4%	3.4%	0.0%	0.0%
	36CDB2B-3	2.0%	2.1%	2.1%	2.1%	0.0%	0.0%
	36CDB2B-4	2.0%	2.1%	2.1%	2.1%	0.0%	0.0%
	36CDB2C-0	6.1%	6.3%	6.3%	6.3%	0.0%	0.0%
	36CDB2C-1	3.5%	3.6%	3.6%	3.6%	0.0%	0.0%
	36CDB2C-2	3.5%	3.6%	3.6%	3.6%	0.0%	0.0%
	36CDB2C-3	2.2%	2.2%	2.2%	2.2%	0.0%	0.0%
	36CDB2C-4	2.2%	2.2%	2.2%	2.2%	0.0%	0.0%
	36CDB2D-0	6.4%	6.6%	6.6%	6.6%	0.0%	0.0%
	36CDB2D-1	3.7%	3.8%	3.8%	3.8%	0.0%	0.0%
	36CDB2D-2	3.7%	3.8%	3.8%	3.8%	0.0%	0.0%
	36CDB2D-3	2.3%	2.4%	2.4%	2.4%	0.0%	0.0%
	36CDB2D-4	2.3%	2.4%	2.4%	2.4%	0.0%	0.0%
	36CDB2E-0	6.7%	6.9%	6.9%	6.9%	0.0%	0.0%
	36CDB2E-1	3.8%	4.0%	4.0%	4.0%	0.0%	0.0%
	36CDB2E-2	3.8%	4.0%	4.0%	4.0%	0.0%	0.0%
	36CDB2E-3	2.4%	2.5%	2.5%	2.5%	0.0%	0.0%
	36CDB2E-4	2.4%	2.5%	2.5%	2.5%	0.0%	0.0%
	36CDB2F-0	5.6%	5.8%	5.8%	5.8%	0.0%	0.0%
	36CDB2F-1	3.2%	3.3%	3.3%	3.3%	0.0%	0.0%
	36CDB2F-2	3.2%	3.3%	3.3%	3.3%	0.0%	0.0%
	36CDB2F-3	2.0%	2.1%	2.1%	2.1%	0.0%	0.0%
	36CDB2F-4	2.0%	2.1%	2.1%	2.1%	0.0%	0.0%
	36CDE1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	36CDE2	3.0%	0.0%	0.0%	0.0%	1.3%	0.0%
	36CDN1	0.0%	0.0%	0.0%	0.0%	23.9%	0.0%
	36CDNE1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	36CDNW1	0.0%	0.0%	0.0%	0.0%	27.6%	0.0%
	36CDS1	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
	36CDS2	0.0%	0.0%	0.0%	0.0%	11.0%	0.0%
	36CDS3	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
	36CDW1	0.0%	0.0%	0.0%	0.0%	3.6%	66.7%
	36CDW2	0.0%	0.0%	0.0%	0.0%	32.4%	33.3%
	36CDW3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
36C Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table C-20 Departure Flight Track Distribution – Future (2028) NEM/NCP *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
36R	36RDB2A-0	5.7%	5.7%	5.7%	5.7%	0.0%	0.0%
	36RDB2A-1	3.3%	3.3%	3.3%	3.3%	0.0%	0.0%
	36RDB2A-2	3.3%	3.3%	3.3%	3.3%	0.0%	0.0%
	36RDB2A-3	2.0%	2.0%	2.0%	2.1%	0.0%	0.0%
	36RDB2A-4	2.0%	2.0%	2.0%	2.1%	0.0%	0.0%
	36RDB2B-0	4.0%	4.0%	4.0%	4.0%	0.0%	0.0%
	36RDB2B-1	3.2%	3.2%	3.2%	3.2%	0.0%	0.0%
	36RDB2B-2	3.2%	3.2%	3.2%	3.2%	0.0%	0.0%
	36RDB2B-3	1.6%	1.6%	1.6%	1.6%	0.0%	0.0%
	36RDB2B-4	1.6%	1.6%	1.6%	1.6%	0.0%	0.0%
	36RDB2B-5	0.8%	0.8%	0.8%	0.8%	0.0%	0.0%
	36RDB2B-6	0.8%	0.8%	0.8%	0.8%	0.0%	0.0%
	36RDB2B-7	0.4%	0.4%	0.4%	0.4%	0.0%	0.0%
	36RDB2B-8	0.4%	0.4%	0.4%	0.4%	0.0%	0.0%
	36RDB2C-0	6.5%	6.5%	6.5%	6.5%	0.0%	0.0%
	36RDB2C-1	3.7%	3.7%	3.7%	3.7%	0.0%	0.0%
	36RDB2C-2	3.7%	3.7%	3.7%	3.7%	0.0%	0.0%
	36RDB2C-3	2.3%	2.3%	2.3%	2.3%	0.0%	0.0%
	36RDB2C-4	2.3%	2.3%	2.3%	2.3%	0.0%	0.0%
	36RDB2D-0	6.7%	6.7%	6.7%	6.7%	0.0%	0.0%
	36RDB2D-1	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	36RDB2D-2	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	36RDB2D-3	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	36RDB2D-4	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	36RDB2E-0	4.9%	4.9%	4.9%	4.9%	0.0%	0.0%
	36RDB2E-1	2.8%	2.8%	2.8%	2.8%	0.0%	0.0%
	36RDB2E-2	2.8%	2.8%	2.8%	2.8%	0.0%	0.0%
	36RDB2E-3	1.8%	1.8%	1.8%	1.8%	0.0%	0.0%
	36RDB2E-4	1.8%	1.8%	1.8%	1.8%	0.0%	0.0%
	36RDB2F-0	5.6%	5.6%	5.6%	5.6%	0.0%	0.0%
	36RDB2F-1	3.2%	3.2%	3.2%	3.2%	0.0%	0.0%
	36RDB2F-2	3.2%	3.2%	3.2%	3.2%	0.0%	0.0%
	36RDB2F-3	2.0%	2.0%	2.0%	2.0%	0.0%	0.0%
	36RDB2F-4	2.0%	2.0%	2.0%	2.0%	0.0%	0.0%
	36RDE1	0.0%	0.0%	0.0%	0.0%	9.0%	20.0%
	36RDE2	0.0%	0.0%	0.0%	0.0%	14.1%	40.0%
	36RDE3	0.0%	0.0%	0.0%	0.0%	6.9%	0.0%
	36RDN1	0.0%	0.0%	0.0%	0.0%	8.7%	0.0%
	36RDN2	0.0%	0.0%	0.0%	0.0%	6.4%	0.0%
	36RDN3	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
	36RDNE1	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%
	36RDNE2	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%
	36RDNE3	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%
	36RDNW1	0.0%	0.0%	0.0%	0.0%	13.7%	0.0%
	36RDS1	0.0%	0.0%	0.0%	0.0%	6.9%	40.0%
	36RDSE1	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%
	36RDSE2	0.0%	0.0%	0.0%	0.0%	7.5%	0.0%

Table C-20 Departure Flight Track Distribution – Future (2028) NEM/NCP *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
36R *(continued)*	36RDSE2	0.0%	0.0%	0.0%	0.0%	7.5%	0.0%
	36RDSW1	0.0%	0.0%	0.0%	0.0%	2.0%	0.0%
	36RDSW2	0.0%	0.0%	0.0%	0.0%	3.4%	0.0%
	36RDSW3	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%
	36RDW1	0.0%	0.0%	0.0%	0.0%	4.3%	0.0%
	36RDW2	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%
36R Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
01	01DB2A-0	2.5%	2.5%	2.5%	2.5%	0.0%	0.0%
	01DB2A-1	2.0%	2.0%	2.0%	2.0%	0.0%	0.0%
	01DB2A-2	2.0%	2.0%	2.0%	2.0%	0.0%	0.0%
	01DB2A-3	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
	01DB2A-4	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
	01DB2A-5	0.7%	0.8%	0.7%	0.7%	0.0%	0.0%
	01DB2A-6	0.7%	0.8%	0.7%	0.7%	0.0%	0.0%
	01DB2B-0	5.9%	5.9%	5.9%	5.9%	0.0%	0.0%
	01DB2B-1	3.4%	3.4%	3.4%	3.4%	0.0%	0.0%
	01DB2B-2	3.4%	3.4%	3.4%	3.4%	0.0%	0.0%
	01DB2B-3	2.1%	2.1%	2.1%	2.1%	0.0%	0.0%
	01DB2B-4	2.1%	2.1%	2.1%	2.1%	0.0%	0.0%
	01DB2C-0	6.3%	6.3%	6.3%	6.3%	0.0%	0.0%
	01DB2C-1	3.6%	3.6%	3.6%	3.6%	0.0%	0.0%
	01DB2C-2	3.6%	3.6%	3.6%	3.6%	0.0%	0.0%
	01DB2C-3	2.2%	2.2%	2.2%	2.2%	0.0%	0.0%
	01DB2C-4	2.2%	2.2%	2.2%	2.2%	0.0%	0.0%
	01DB2D-0	6.6%	6.6%	6.6%	6.6%	0.0%	0.0%
	01DB2D-1	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	01DB2D-2	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	01DB2D-3	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	01DB2D-4	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	01DB2E-0	6.9%	6.9%	6.9%	6.9%	0.0%	0.0%
	01DB2E-1	4.0%	4.0%	4.0%	4.0%	0.0%	0.0%
	01DB2E-2	4.0%	4.0%	4.0%	4.0%	0.0%	0.0%
	01DB2E-3	2.5%	2.5%	2.5%	2.5%	0.0%	0.0%
	01DB2E-4	2.5%	2.5%	2.5%	2.5%	0.0%	0.0%
	01DB2F-0	5.8%	5.8%	5.8%	5.8%	0.0%	0.0%
	01DB2F-1	3.3%	3.3%	3.3%	3.3%	0.0%	0.0%
	01DB2F-2	3.3%	3.3%	3.3%	3.3%	0.0%	0.0%
	01DB2F-3	2.1%	2.1%	2.1%	2.1%	0.0%	0.0%
	01DB2F-4	2.1%	2.1%	2.1%	2.1%	0.0%	0.0%
	01DE1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	01DE2	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%
	01DN1	0.0%	0.0%	0.0%	0.0%	23.9%	0.0%
	01DNE1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	01DNW1	0.0%	0.0%	0.0%	0.0%	27.6%	0.0%
	01DS1	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
	01DS2	0.0%	0.0%	0.0%	0.0%	11.0%	0.0%
	01DS3	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%

Table C-20 Departure Flight Track Distribution – Future (2028) NEM/NCP *(Continued)*

Runway End	Track ID	Heavy Passenger Jet	Cargo Jet	Large Passenger Jet	Regional Jet	Prop Aircraft	Military
01 *(Continued)*	01DW1	0.0%	0.0%	0.0%	0.0%	3.6%	0.0%
	01DW2	0.0%	0.0%	0.0%	0.0%	32.4%	0.0%
	01DW3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
01 Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	0.0%
19	19DC4A-0	1.7%	1.8%	1.7%	1.8%	0.0%	0.0%
	19DC4A-1	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
	19DC4A-2	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
	19DC4A-3	0.6%	0.6%	0.6%	0.6%	0.0%	0.0%
	19DC4A-4	0.6%	0.6%	0.6%	0.6%	0.0%	0.0%
	19DC4B-0	6.7%	6.7%	6.7%	6.7%	0.0%	0.0%
	19DC4B-1	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	19DC4B-2	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	19DC4B-3	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	19DC4B-4	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	19DC4C-0	7.6%	7.6%	7.6%	7.6%	0.0%	0.0%
	19DC4C-1	4.4%	4.4%	4.4%	4.4%	0.0%	0.0%
	19DC4C-2	4.4%	4.4%	4.4%	4.4%	0.0%	0.0%
	19DC4C-3	2.7%	2.7%	2.7%	2.7%	0.0%	0.0%
	19DC4C-4	2.7%	2.7%	2.7%	2.7%	0.0%	0.0%
	19DC4D-0	6.7%	6.7%	6.7%	6.7%	0.0%	0.0%
	19DC4D-1	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	19DC4D-2	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	19DC4D-3	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	19DC4D-4	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	19DC4E-0	6.6%	6.6%	6.6%	6.6%	0.0%	0.0%
	19DC4E-1	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	19DC4E-2	3.8%	3.8%	3.8%	3.8%	0.0%	0.0%
	19DC4E-3	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	19DC4E-4	2.4%	2.4%	2.4%	2.4%	0.0%	0.0%
	19DC4F-0	5.6%	5.6%	5.6%	5.6%	0.0%	0.0%
	19DC4F-1	3.2%	3.2%	3.2%	3.2%	0.0%	0.0%
	19DC4F-2	3.2%	3.2%	3.2%	3.2%	0.0%	0.0%
	19DC4F-3	2.0%	2.0%	2.0%	2.0%	0.0%	0.0%
	19DC4F-4	2.0%	2.0%	2.0%	2.0%	0.0%	0.0%
	19DE1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	19DE2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	19DE3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	19DN1	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%
	19DN2	0.0%	0.0%	0.0%	0.0%	8.1%	0.0%
	19DN3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	19DNW1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	19DNW2	0.0%	0.0%	0.0%	0.0%	14.8%	0.0%
	19DS1	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%
	19DSW1	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%
	19DW1	0.0%	0.0%	0.0%	0.0%	71.9%	0.0%
19 Subtotal		100.0%	100.0%	100.0%	100.0%	100.0%	0.0%

Note: Totals may not equal sum due to rounding.
Source: Landrum & Brown, 2024

Appendix D

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Appendix D, Land Use Assessment Methodology

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

PRESENTED BY
Landrum & Brown, Incorporated

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Appendix D Land Use Assessment Methodology

Identifying and evaluating land uses within the Airport Environs is an important step in the Part 150 Noise Compatibility Program Study Update (Study) process. This evaluation is necessary to identify residential and other noise-sensitive land uses that may be affected by Airport noise and operations. The land use assessment includes examining land use classifications, zoning codes, and development trends within the Airport Environs; and applying the Federal Aviation Administration (FAA) Part 150 guidelines for land use compatibility and previous land use mitigation efforts conducted by the City of Charlotte Aviation Department at Charlotte Douglas International Airport (CLT or Airport). A Geographic Information System (GIS) land use database was developed to facilitate the identification of land uses that are noncompatible with Airport operations.

D.1 Airport Environs

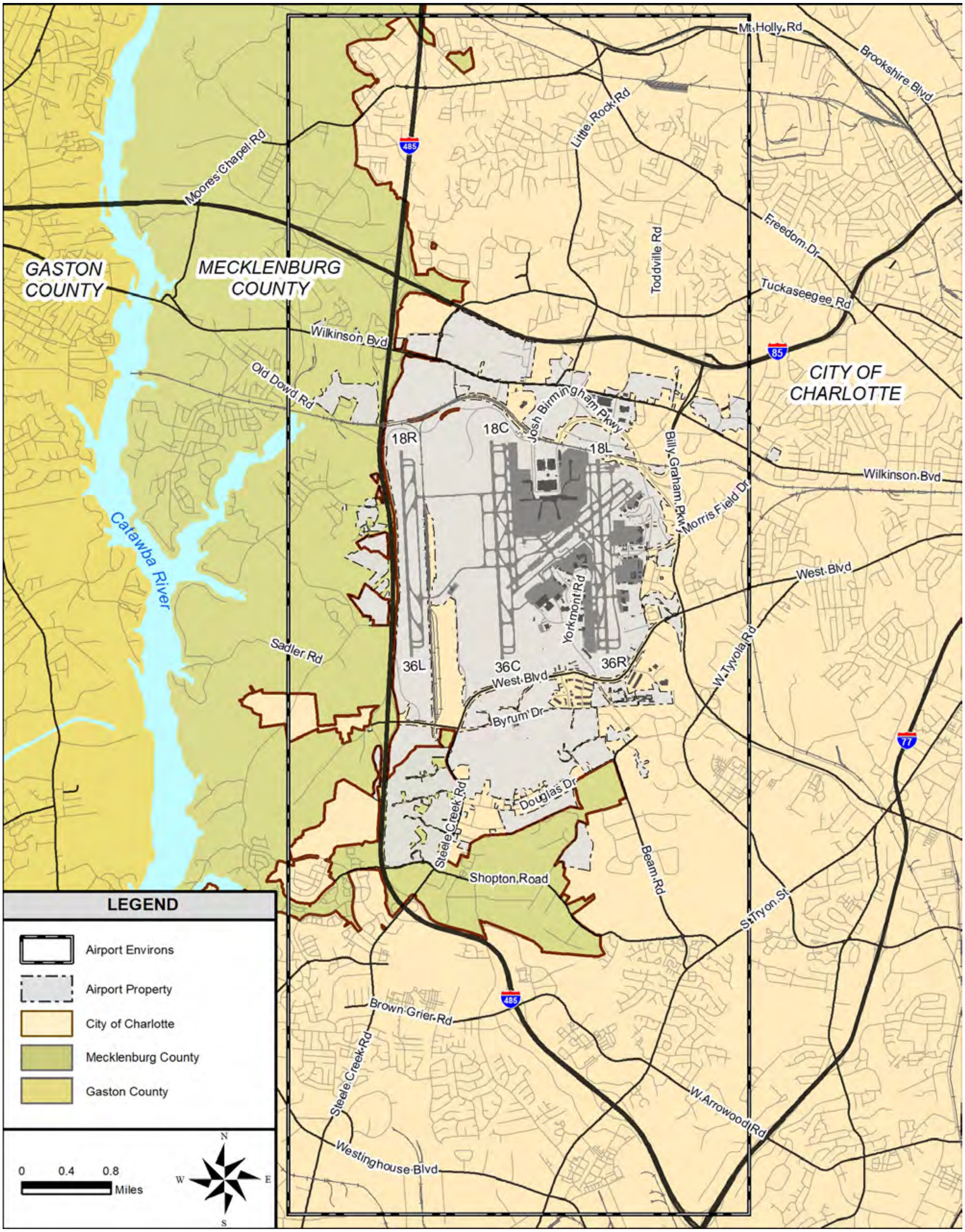
The Airport Environs, as discussed in Chapter 2, *Affected Environment*, refers to the regional area that experience most of the aircraft overflights from an airport. The Airport Environs for CLT is shown in **Exhibit D-1, *Airport Environs***, and depicts the area of southwest Charlotte and Mecklenburg County. The map includes jurisdictional boundaries, local roads and major highways, the Airport property boundary, and other geographical features. The Airport Environs was delineated to identify the approximate area in which aircraft overflights occur at lower altitudes. The Airport Environs is not intended to identify areas in which overflights and noise may cause annoyance to the public since there is a degree of subjectivity to the level of annoyance that can vary among different individuals.

The Airport Environs encompasses an area of approximately 45 square miles. The boundary for this Study was determined by examining the boundaries of previous 65 day-night average sound level (DNL) noise exposure contours (the FAA-defined threshold for significant noise impacts), and by reviewing flight tracks of aircraft operating at CLT. CLT is located within the City of Charlotte, which is the largest city in Mecklenburg County. Both jurisdictions provide various government services to residents within each jurisdiction. Due to the overlapping jurisdictional boundaries, many services are delivered by a joint partnership between City and County agencies.

D.2 Land Use Mapping

Land use data was collected and incorporated into a GIS database that includes jurisdictional boundaries, roads, bodies of water, and other physical features. The database was used to identify existing land use conditions within the Airport Environs and to identify areas impacted by noise per FAA guidelines. This section describes the methodology for collecting and analyzing land use data.

Exhibit D-1 Airport Environs



Source: Landrum & Brown, 2024.

D.2.1 Land Use Classifications

Existing land use data was collected from the Mecklenburg County Division of Geospatial Information Services. Land uses in the vicinity of CLT were categorized in terms of the general land use classifications as outlined in 14 CFR Part 150 and shown in **Table D-1,** ***Generalized Land Use Classifications***. These classifications include residential (single, multi-family and manufactured housing), commercial, industrial and utility (e.g., manufacturing and production), institutional (e.g., public use), park/recreational, agricultural/open space/vacant. These land uses were identified based on each jurisdictions GIS database, published land use and zoning maps and were verified as necessary with aerial photography and site visits. The existing land use patterns within the Airport Environs is shown in **Exhibit D-2,** ***Generalized Existing Land Use***.

D.2.2 GIS Data Compilation

Base mapping information; including roads, county and municipal boundaries, and existing land use; were compiled using ArcMap, version 10.8. ArcMap is an analytical software program that allows manipulation and analysis of spatial data from a variety of sources. The base map information is used for comparison to aircraft noise and operational data analyzed for this study. Flight track data obtained for this Study as described in Appendix C, *Noise Modeling Methodology*, was overlaid onto the land use base map. Noise contours generated by the Aviation Environmental Design Tool (AEDT) version 3e were superimposed over the land use base map to produce the Noise Exposure Maps (NEMs) for this Study.

Land parcel and facility data was obtained from Mecklenburg County in August 2022 for areas within and adjacent to the Airport Environs. This data was verified using existing aerial imagery and field surveying conducted through March 2023. This data was updated to reflect areas of known redevelopment that resulted in a change in land use or a change in the number of housing units or noise-sensitive facilities.

The field verified parcel data was used to identify land uses that would be considered noise-sensitive land per FAA guidelines as described in Appendix A. Data collected from the U.S. 2010 Decennial Census at the tract level was combined with the parcel data to calculate total population based on average household size. An estimated ratio of persons per household was estimated and applied to each parcel to estimate the population within each housing unit. The housing and population within each of the noise contours were determined by overlaying the noise contour and the parcel data using GIS software. The number of residential parcels/structures and population within each DNL noise contour level were then determined by an automated count using the GIS software's built-in capabilities.

Table D-1 Generalized Land Use Categories

Generalized Land Use	Specific Land Use Types
Single Family Residential	Rural Homesite
	Single Family Residential
	Town House
Multi-Family Residential	Condominium
	Multi Family
	Multi Family Duplex/Triplex
	Multi Family Water Access
Mobile Home Park	Mobile Home Park
	Mobile Home Subdivision
Commercial	Auto Sales and Service
	Bank
	Bill Board
	Car Wash
	Cell Tower
	Commercial
	Commercial Condominium
	Commercial Service
	Convenience Store
	Convenience/Fast Food Store
	Day Care Center
	Department Store
	Fast Food
	Forest - Commercial Production
	Horticultural - Commercial Production
	Hotel/Motel
	Laboratory / Research
	Lumber Yard
	Marina Land
	Medical Condominium
	Medical Office
	Mini Warehouse
	Office
	Office Condominium
	Parking
	Restaurant
	Service Garage
	Service Station
	Shopping Center - Strip
	Single Family Residential
	Supermarket
	Warehouse Condominium
	Warehousing
Manufacturing/Production	Industrial
	Light Manufacturing
	Mining
Institutional / Public Use	Air Rights Parcel
	Church
	Club, Lodges, Union Hall, Swim Club
	College - Public
	Fire Department
	Funeral (Mortuary, Cemetery, Crematorium, Mausoleum)

Table D-1 Generalized Land Use Categories *(Continued)*

Generalized Land Use	Specific Land Use Types
Institutional / Public Use *(continued)*	Home for the Aged
	Hospital
	Institutional
	Municipal Airport
	Municipal Education
	Nursing Home
	Other County Property
	Other Federal
	Other Municipal
	Pvt Owned Rr with Rail Row
	Right Of Way
	Roadway Corridor
	School - Public
	School, College, Private
	State Prop
	Utility (Gas, Electric, Telephone, Telegraph, Rail)
	Utility Easement
	Water Plant
Park/Recreation	Club, Lodges, Union Hall, Swim Club
	Conservation - Agricultural Comm
	Conservation - Forestry Comm
	Conservation - Woodland Excess Acreage
	Country Club
	Golf Course
	Greenway Trail
	No Land Interest
	Rec Area
Agricultural	Agricultural - Commercial Production

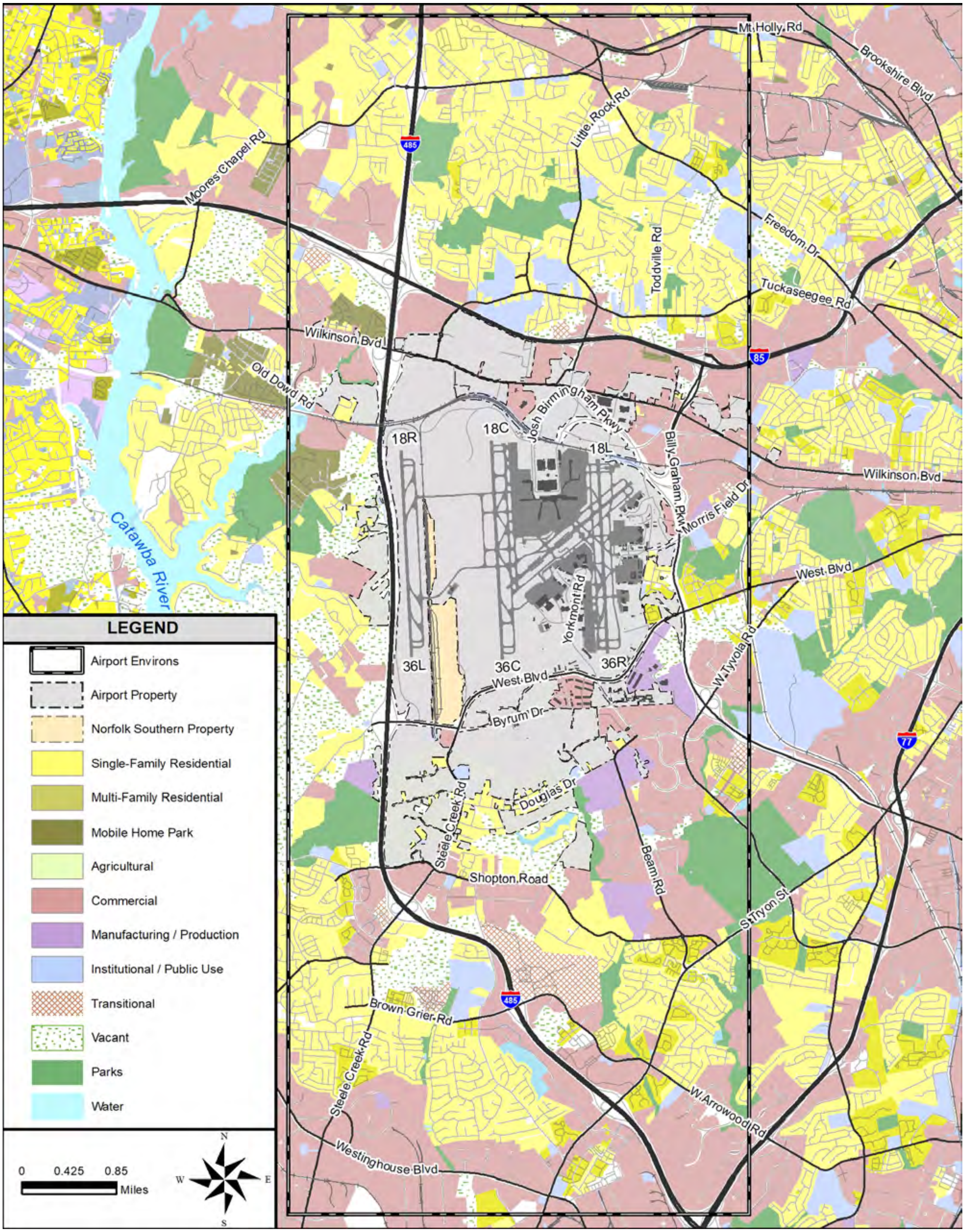
Notes:

1 Agricultural uses are classified as Manufacturing and Production under 14 C.F.R. Part 150 Guidelines but are identified separately for this Part 150 Noise Compatibility Program Update for ease of understanding the land uses neat the Airport.

2 Vacant/Open Space is not an identified use under 14 C.F.R. Part 150 Guidelines but is identified separately for this Part 150 Noise Compatibility Program Update for ease of understanding the land uses near the Airport.

Source: Landrum & Brown, 2024.

Exhibit D-2 Generalized Existing Land Use



Source: Landrum & Brown, 2024.

D.2.3 Noise Sensitive Sites

Land uses that could be considered noncompatible with airport operations include more than just residential uses. FAA guidelines define certain public facilities as noise-sensitive: places of worship, schools (and daycare facilities at which licensed education occurs), nursing homes, libraries, and hospitals. Detailed information on noise-sensitive facilities was collected within the Airport Environs. A variety of sources were obtained to compile GIS data showing the locations of noise-sensitive public facilities within the Airport Environs, including GIS data from Mecklenburg County, aerial imagery, and past studies at CLT.

Within the Airport Environs there are 18 schools, 32 daycare facilities, and 45 places of worship as identified in **Table D-2, *Existing Noise Sensitive Public Facilities***, and shown on **Exhibit D-3, *Existing Noise-Sensitive Public Facilities***.

Table D-2 Existing Noise Sensitive Public Facilities

Map ID	Facility Name	Address
	Schools	
S1	Allenbrook Elementary	1430 Allenbrook Drive
S2	Berewick Elementary	5910 Dixie River Road
S3	Central Piedmont Community College	2201 Water Ridge Py
S4	East Voyager Academy Of Charlotte	7429 Tuckaseegee Rd.
S5	Gordon-Conwell Theology	9401 Southern Pines Blvd
S6	J.W. Wilson Middle School	7020 Tuckaseegee Road
S7	Kennedy Middle School	4000 Gallant Lane
S8	Mountain Island Day School	1209 Little Rock Rd
S9	Olympic High School	4301 Sandy Porter Road
S10	Renaissance West Elementary	3241 New Renaissance Way
S11	Renaissance West Middle School	3241 New Renaissance Way
S12	Rod of God Christian Academy	7300 South Tryon Street
S13	Southwest Charlotte STEM Academy	5203 Shopton Rd
S14	Steele Creek Elementary	4100 Gallant Lane
S15	Steele Creek Preparatory Academy	2200 Shopton Road
S16	Tuckaseegee Elementary	2028 Little Rock Road
S17	Unity Classical Charter School	1929 W Arrowood Rd
S18	West Mecklenburg High School	7400 Tuckaseegee Road
	Daycare Facilities	
D1	Anthony's Day Care Home	2514 Nickelridge Court
D2	Beginning Years Day Care	2211 Little Rock Road
D3	Berewick Elementary A.S.E.P.	5910 Dixie River Road
D4	Busy Beez Child Care	2201 Mary Ann Drive
D5	Cadence Academy Preschool, Whitehall	2726 West Arrowood Road
D6	Children's Academy at Lakepointe	2701 Water Ridge Pkwy
D7	Dogwood Lane Children's Academy	1551 Arrowpoint Lane
D8	Ebenezer Child Care Home Sylvia Pauling	7421 Chital Dr
D9	Gallmon Family Small Day Care Home	7134 Badenoch Ct
D10	Gina's Learn-N-Play Home Day Care	5705 Silver Eagle Dr
D11	Howard Levine Child Development Center	3303 Achievement Lane
D12	Humpty Dumpty Academy I	5721 Tuckaseegee Road
D13	Jaznee's Wonderland	7300 Cormwell Lane
D14	La Petite Academy	9221 South Tryon Street
D15	Lachriston Large Day Care Home	6430 Tomahawk Lane
D16	Lacy'S Little Ones	12236 Taragate Drive
D17	Lil' Bundles of Joy	4106 Cedar Hill Dr
D18	Little Dove's In Home Day Care	1529 Eagles Landing Dr

Table D-1 Existing Noise Sensitive Public Facilities *(Continued)*

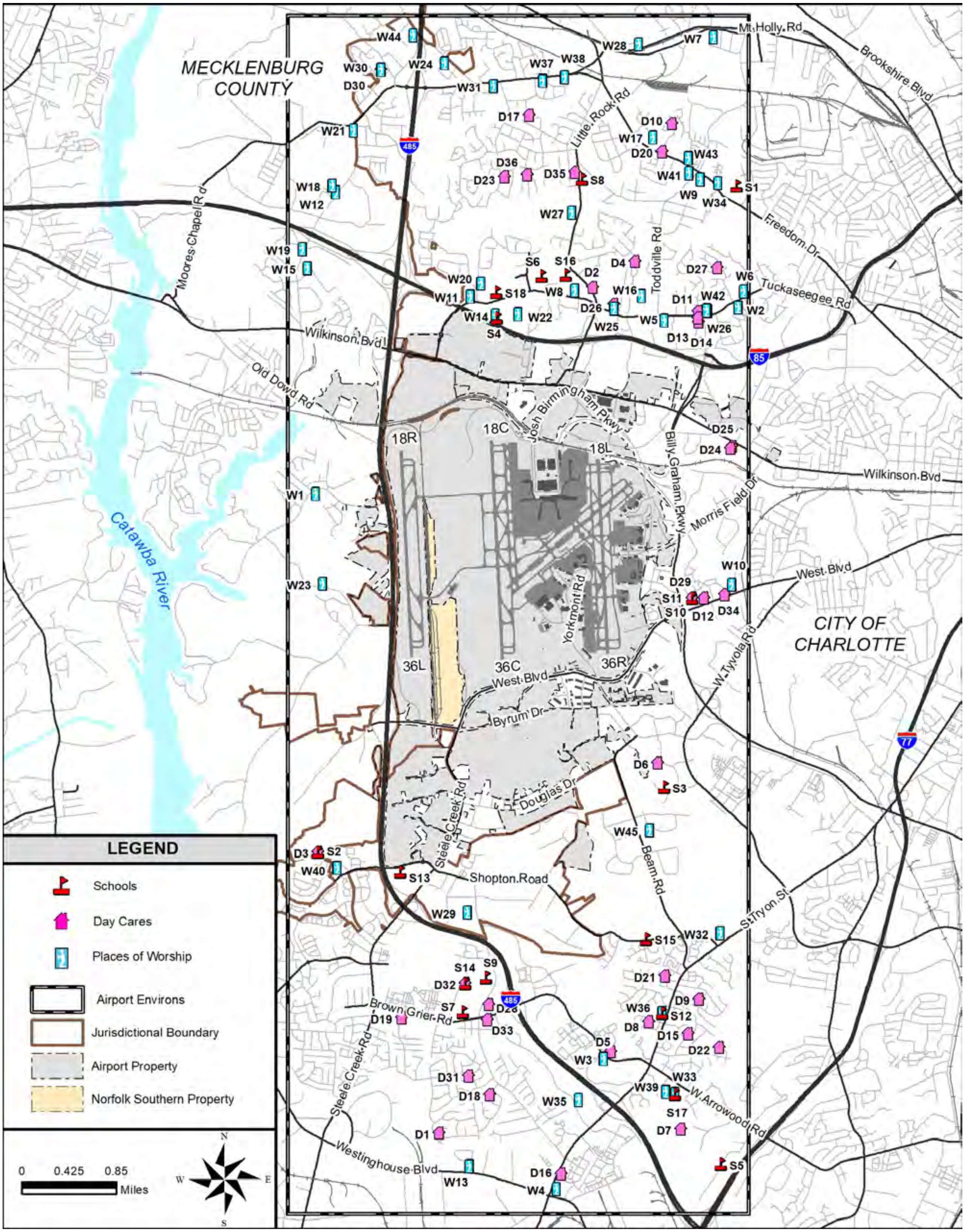
Map ID	Facility Name	Address
	Daycare Facilities *(continued)*	
D19	Little Miracles Home Day Care	2500 Yorkdale Drive
D20	Miss Ethel's Day Care Home	1722 Ranchwood Dr
D21	Miss Miss C's Child Care	7327 Crossridge Road
D22	Mrs. Chris Play and Learn #2	4613 Wilkinson Blvd
D23	Mrs. Chris Play and Learn Preschool	4609 Wilkinson Blvd
D24	Mulberry Head Start	6450 Tuckaseegee Road
D25	Precious Little Angels	2424 Heather Glen Lane
D26	Primrose School of Lake Wylie	3960 W Arrowood Road
D27	Shady Brook Baptist Child Care Center	2940 Belmeade Drive
D28	Spectrum Kids	12122 Red Hickory Lane
D29	The Learning Experience	3937 West Arrowood Road
D30	The Learning Tree Child Care Center	3124 West Boulevard
D31	Tiny Treasures Child Development Center	1136 Little Rock Rd
D32	Vantoinette J. Savage Small Day Care Home	7007 Hunters Glen Drive
	Places of Worship	
W1	Berryhill Baptist Church	9791 Walkers Ferry Rd.
W2	Blessed Assurance Community Church	5303 Tuckaseegee Rd.
W3	Bold Church	2735 West Arrowood Rd.
W4	Central Steele Creek Presbyterian Church	9401 Tryon St.
W5	Charlotte Chin Baptist Church	6031 Tuckaseegee Rd.
W6	Charlotte Immanuel Church of All Nations	5216 Tuckaseegee Rd.
W7	Connections - An Assurance Faith Community	6729 Old Mt Holly Rd.
W8	Covenant United Methodist Church	6824 Tuckaseegee Rd.
W9	Durham Memorial Baptist Church	1601 Toddville Rd.
W10	Epic Church Charlotte/ Hedges and Highways Church	3000 Nobles Av.
W11	Every Nation Church	7700 Tuckaseegee Rd.
W12	Garden Memorial	2324 Sam Wilson Rd.
W13	Greater Newbirth Fellowship	9333 Forsyth Park Dr.
W14	Harvest Church	7429 Tuckaseegee Rd.
W15	Hope Community Church of Metrolina	3205 Sam Wilson Rd.
W16	Iglesia Catolica Nuestra Senora de Guadalupe	6212 Tuckaseegee Rd.
W17	Kingdom Christian Church	5832 Freedom Dr.
W18	Kingdom Embassy International	2324 Sam Wilson Rd.
W19	Liberty Baptist Church	3000 Sam Wilson Rd.
W20	Montagnard Alliance Church	3215 Westerwood Dr.
W21	Moores Chapel	10601 Moores Chapel Rd.
W22	Mt. Carmel Baptist Church	7237 Tuckaseegee Rd.
W23	Mt Olive Presbyterian Church	5125 Mt Olive Church Rd.
W24	Mt Zion Missionary Baptist Church	821 Hawley St.
W25	Mulberry Baptist Church	6450 Tuckaseegee Rd.
W26	Mulberry Presbyterian Church	5600 Tuckaseegee Rd.
W27	New Bethel Church of God in Christ	1520 Little Rock Rd.
W28	Paw Creek Presbyterian Church	7400 Mount Holly Rd.
W29	Saint Joseph Catholic Church	4925 Sandy Porter Rd.
W30	Shadybrook Baptist Church	2940 Belmeade Dr.
W31	St. Johns Chapel Baptist Church	8833 Moores Chapel Rd.
W32	Steele Creek AME Zion Church	6414 Tryon St.
W33	Steele Creek Church	1929 Arrowood Rd.
W34	The Church of Pentecost Charlotte Central	5024 Freedom Dr.
W35	The Restoration Place Church	2520 Whitehall Park Dr.
W36	The Rod of God Ministries	7300 Tryon St.

Table D-2 Existing Noise Sensitive Public Facilities *(Continued)*

Map ID	Facility Name	Address
	Places of Worship *(continued)*	
W37	Thrift Baptist Church	8415 Moores Chapel Rd.
W38	Thrift United Methodist Church	8245 Moores Chapel Rd.
W39	Trinity Baptist Church	2009 Arrowood Rd.
W40	Trinity Worship Center	5735 Dixie River Rd.
W41	West Charlotte Church at Freedom	1646 Toddville Rd.
W42	West Charlotte Spanish SDA Church	5600 Tuckaseegee Rd.
W43	Westview Christian Church	5414 Freedom Dr.
W44	Woodland Presbyterian Church	900 Rhyne Rd.
W45	World Worship Church	3925 Rose Lake Dr.

Source: Mecklenburg County parcel data, Landrum & Brown analysis, 2024.

Exhibit D-3 Existing Noise-Sensitive Sites



Source: Landrum & Brown, 2024.

D.2.4 Existing Historic Sites

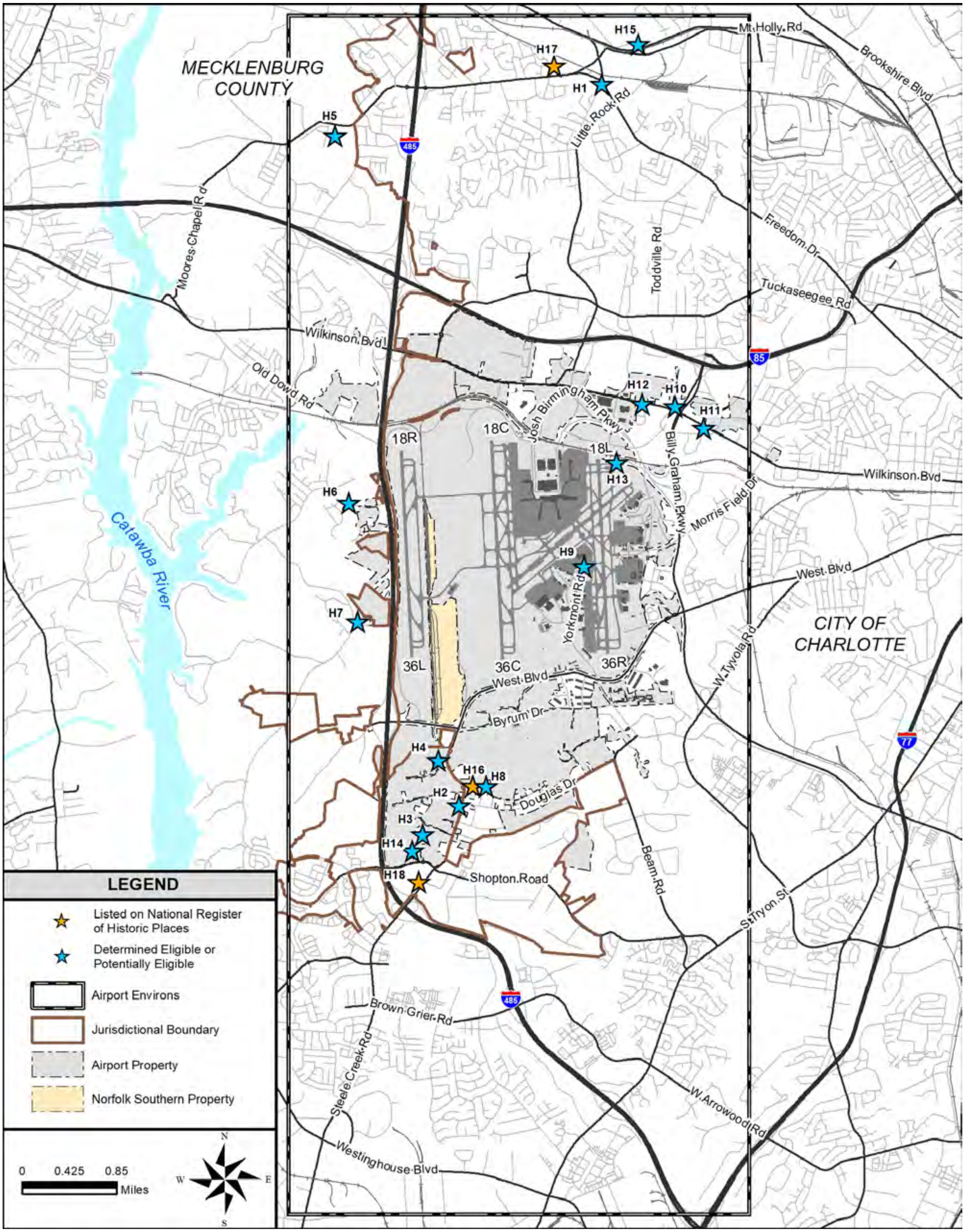
Historic properties listing in or eligible for inclusion in the National Register of Historic Places (NRHP) should be identified on the NEMs per 14 CFR Part 150. The NRHP is the official list of historic places worthy of preservation in the U.S. as authorized by the National Historic Preservation Act of 1966. Within the Airport Environs, there are 18 properties that are listed on or that have been determined eligible for the NRHP as identified in **Table D-3, *Historic Sites***, and shown on **Exhibit D-4, *Historic Resources***.

Table D-3 Historic Resources

Map ID	Facility Name	Status
H1	Love's Service Station	Determined Eligible for the NRHP
H2	Steele Creek Presbyterian Church Manse	Determined Eligible for the NRHP
H3	Spratt-Grier Farm	Determined Eligible for the NRHP
H4	Byrum-Croft House	Determined Eligible for the NRHP
H5	Moore-Sadler House	Determined Eligible for the NRHP
H6	Rogers House	Determined Eligible for the NRHP
H7	Cooper Log House	Determined Eligible for the NRHP
H8	John Douglas House	Determined Eligible for the NRHP
H9	Charlotte Municipal Airport (International Airport Cargo Terminal)	Determined Eligible for the NRHP
H10	Oakden Motel	Determined Eligible for the NRHP
H11	Split Rail Lodge	Determined Eligible for the NRHP
H12	Two Guys Auto Repair Body Shop	Determined Eligible for the NRHP
H13	W.P.A. Douglas Airport Hangar (current site)	Determined Eligible for the NRHP
H14	William Grier House (current site)	Determined Eligible for the NRHP
H15	Paw Creek Presbyterian Church	Determined Eligible for the NRHP
H16	Steele Creek Presbyterian Church	Listed on the NRHP
H17	Thrift Mill	Listed on the NRHP
H18	Hayes-Byrum Store and House (house no longer standing)	Listed on the NRHP

Source: National Register of Historic Places data, Landrum & Brown analysis, 2024.

Exhibit D-4 Historic Resources



Source: Landrum & Brown, 2024.

D.3 Preventative Local Land Use Controls

The evaluation of land use planning techniques is intended to address the potential for future development in areas located within and in the vicinity of the DNL 65 decibel (dB) noise exposure contour where aircraft overflights continue.[1] The responsibility for controlling and managing the development and redevelopment of land outside the Airport boundary is the responsibility of each community. Therefore, it is incumbent upon the local planning and elected officials to monitor and plan for new development in a manner that is compatible with aircraft operations.

According to an FAA land use guidance manual, Land Use Compatibility and Airports,[2] the FAA recognizes that aircraft noise does not stop at the DNL 65 dB noise exposure contour.

> *"While the FAA can provide assistance and funding to encourage compatible land development around airports, it has no regulatory authority for controlling land uses that would protect airport capacity. The FAA recognizes that state and local governments are responsible for land use planning, zoning and regulation, including that necessary to provide land use compatibility with airport operations. However, pursuant to the Federal Airport and Airway Development Act, as a condition precedent to approval of an FAA-funded airport development project, the airport sponsor must provide the FAA with written assurances that "…appropriate action, including the adoption of zoning laws have been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations including the landing and takeoff of aircraft…"*
>
> *FAA has required the phasing out of noisy Stage 1 and Stage 2 aircraft consequently, the aviation industry has spent substantial monies to meet this requirement. To assist in the compatible land use efforts, the FAA, local airport sponsors, and state aviation agencies have expended significant funds related to airport planning and off-airport noise and land use compatibility planning throughout the United States. Airport master plans have been prepared to identify the near-term and long-range projections for airport activity and the development necessary to meet these activity demands. In addition, noise and land use studies (Part 150 studies) have been conducted to evaluate ways to minimize impacts of aircraft noise, and the FAA and airport sponsors have financed land acquisitions and other noise compatibility measures throughout the United States."*

Therefore, the FAA encourages airport sponsors and local governments to work together to establish local land use controls in areas adjacent to an airport and within the flight corridors that extend beyond the DNL 65 dB contour.[3] A brief discussion of typical preventive land use management techniques, and their application by the jurisdictions within the Airport Environs, is provided in the following sections.

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[1] Note that per Part 150 regulations, all land uses are compatible with outdoor noise levels below DNL 65 dB; however, local planning efforts may, at the discretion of local jurisdictions, consider noise below DNL 65 dB independent of the Part 150 process.

[2] Land Use Compatibility and Airports: A Guide for Effective Land Use Planning, FAA Airports Division, Southern Region Office, Atlanta, Georgia, Jacqueline Sweatt-Essick, et al, July 1999. http://www.faa.gov/about/office_org/headquarters_offices/aep/planning_toolkit/media/III.B.pdf

[3] Note that per Part 150 regulations, all land uses are compatible with outdoor noise levels below DNL 65 dB; however, local planning efforts may, at the discretion of local jurisdictions, consider noise below DNL 65 dB independent of the Part 150 process.

D.3.1 Comprehensive Planning

A comprehensive plan sets forth goals, policies, and programs intended to guide the present and future physical, social, and economic development of land within that jurisdiction. A land-use plan uses text and maps to designate the expected future use or reuse of land. A comprehensive plan or land-use plan is intended to guide coordinated, efficient, and orderly development within the planning jurisdiction based on an analysis of present and future needs and expected growth trends. The jurisdiction may then enact other programs or ordinances to further the development goals of the comprehensive land use plan.

In accordance with Chapter 160D, Article 5 of the North Carolina General Statutes, as a condition of adopting and enforcing zoning regulations, a local government shall adopt and reasonably maintain a comprehensive plan or land-use plan. A local government may prepare and adopt other plans as deemed appropriate. This may include, but is not limited to, small area plans, neighborhood plans, hazard mitigation plans, transportation plans, housing plans, and recreation and open space plans.[4]

The City of Charlotte Long Range Planning Division is responsible for developing plans and policies to guide development within Charlotte and unincorporated Mecklenburg County. The Charlotte Future 2040 Comprehensive Plan was adopted in June 2021. In addition to the Comprehensive Plan, the City prepares community area plans for specific communities within its planning jurisdiction.

A comprehensive plan in and of itself does not and cannot control development or relieve noise noncompatibilities without implementing a development plan, but there are other tools available, which are discussed subsequently.

D.3.2 Future Land Use Planning

The formal adoption of a local land use plan by the jurisdictions within the Airport Environs provides the basis for zoning determinations and evaluations regarding the suitability of various development proposals for implementation. The land use plan element of the comprehensive plan should take into account the compatibility of proposed development and the identification of developable lands while also taking into account the existing and anticipated aircraft noise levels in order to plan future land uses accordingly. The land use plan should serve as the basis to guide the development of the community's Capital Improvement Program (CIP) and zoning decisions.

D.3.3 General Purpose Zoning

Zoning is one of the primary tools available to local communities to ensure land use compatibility. Zoning ordinances and regulations are intended to promote public health, safety, and welfare by regulating the use of the land within a jurisdiction based on factors such as land use compatibility and existing and expected socioeconomic conditions. The regulation of land through a zoning ordinance is granted to local jurisdictions pursuant to Chapter 160D, Articles 1 through 14, of the General Statutes of North Carolina.[5]

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4 North Carolina General Statutes - Chapter 160D Article 5, Available online at: https://www.ncleg.gov/EnactedLegislation/Statutes/PDF/ByArticle/Chapter_160D/Article_5.pdf

5 City of Charlotte Zoning Ordinance, Chapter 1, Section 1.102.

Zoning can be a useful tool for controlling land use development and promoting compatibility with airport operations while supporting private land ownership. Typically, a zoning ordinance will identify what types of land use development are and are not permitted in the respective zoning districts. Zoning cannot be relied upon as a "corrective land use management measure" as it can only be applied prospectively and not retroactively. Also, because zoning is a construct of a political body and subject to changing conditions and situations, the zoning classification of any particular tract of land is always subject to change and its implementation and enforcement must be monitored to ensure continuing compatibility and effectiveness.

Overlay Districts

Overlay Districts are zoning districts, which are applied only in conjunction with standard zoning districts, and may grant additional use or development requirements upon the underlying zoning districts. The effect is to have both the overlay district and the underlying zoning controlling the use and development of a lot. According to the City of Charlotte Zoning Ordinance, Overlay Districts are applicable on an area wide basis to support specific public policy objectives and should be consistent with the Generalized Land Plan, District Plans and Area Plans. Overlay districts may be applied to general and conditional districts.

Airport Overlay Zoning

An airport overlay zone establishes a set of development guidelines on areas designated as highly sensitive to aircraft noise. Such a district would serve as an overlay of the underlying land use zoning and would impose various guidelines on the development of land within its boundaries. These constraints may include a requirement for the sound insulation of new or rehabilitated properties, disclosure of the susceptibility of the property to elevated aircraft noise levels, the dedication of an avigation easement for new development, the requirement of development densities for noncompatible uses in concordance with the level of noise exposure, the coordinated review of development proposals, etc. The boundaries of the overlay zone may be established by the local jurisdiction having land use control at any level deemed to be appropriate to the management of the risk of adverse effects and noncompatible land uses between aircraft and noise-sensitive development.

The City of Charlotte Zoning Code includes Airport Zone Overlay Districts that regulate building height and place requirements for airport noise disclosure for residential property owners and prospective residential property owners.[6] The airport height zones include the following zones:

- Approach Zones – established at each end of a runway used for landings and take-offs.
- Transitional Zones – A surface extending outward and upward, at right angles to the runway centerline and runway centerline extended, from the sides of the Primary Surface and the Approach Surfaces.
- Horizontal Zone – This zone shall include that area within a circle whose center is the airport reference point and whose radius is eleven thousand five hundred (11,500) feet.
- Conical Zone – The conical zone includes that area within a ring, seven thousand (7,000) feet wide, around the horizontal zone, measured from the periphery of the horizontal zone.

No structure or tree shall be erected, altered, allowed to grow, or maintained in an approach zone, transition zone, horizontal zone, or conical zone to a height which projects above the upper surface

6 City of Charlotte Zoning Ordinance, Chapter 1, Part 3, Section 10.301 through Section 10.314.

of any such zone. Any tree or structure may go up to a height of 40 feet. The owner of any tree or structure which exceeds the above height limitations and is allowed to continue as nonconforming under the ordinance shall permit the City of Charlotte to install, operate, or maintain thereon, at the City's expense, any markers and lights necessary to indicate the presence of such a hazard to aircraft operators.

See Section D.3.7 for more information about the Airport Noise Overlay District.

D.3.4 Subdivision Regulations

Subdivision regulations apply in cases where a parcel of land is proposed to be divided into lots or tracts, usually for the purpose of allowing new development. Subdivision regulations are established to ensure the proper arrangement of streets, adequate and convenient open space, efficient movement of traffic, adequate and properly-located utilities, access for fire-fighting apparatus, avoidance of congestion, and the orderly and efficient layout and use of land.

Subdivision regulations can be used to enhance noise-compatible land development by requiring developers to plat and develop land so as to minimize noise impacts or reduce the noise sensitivity of new development. The regulations can also be used to protect the airport proprietor from potential litigation for noise impacts at a later date. The most common requirement is the dedication of a noise or avigation easement to the local government by the land subdivider as a condition of the development approval. The easement authorizes overflights of the property with the noise levels attendant to such operations. Subdivision regulations may also require the developer to disclose the aircraft noise levels over the property through the use of a plat notice or other means, or to provide information on noise insulation criteria to be used in the construction of any building on the property.

The City of Charlotte Subdivision Regulations require that if a request for subdivision is wholly or partially located in the Airport Noise Disclosure Overlay District, a disclosure notice as per the requirements of Section 14.8 shall be inscribed on the plat.[7]

D.3.5 Building Codes

Building codes regulate building construction and construction practices ensuring that all safety standards are met and resulting in the issuance of a building permit from the local governing body. (A building code is most easily enforced through a local building permit process.) Sound insulation may be required in new homes, offices, and institutional buildings to mitigate the effects of high aircraft noise levels. Building code requirements intended for energy efficiency may also provide acoustical insulation benefits. Caulking of joints, continuous sheathing, dead air spaces, ceiling and wall insulation, solid core doors, and double-pane windows can attenuate aircraft noise while conserving energy used for home heating and cooling.

Not all sound insulation needs are met by typical energy-conserving building methods. For example, field research has found that some modern and highly energy-efficient storm window designs are less efficient for sound insulation than some older designs that allow for larger dead air spaces. Other sound insulation measures that may not be justifiable for energy efficiency are vent baffling and year-round, closed-window ventilation systems. Building codes apply to existing

[7] City of Charlotte Unified Development Ordinance, Article 30, Subdivision, Available online at: https://read.charlotteudo.org/articles/article-30-subdivision/

buildings only when remodeling or expansion is contemplated. Amendments to building codes do not help to correct noise problems in existing buildings in developed areas.

The City of Charlotte and Mecklenburg County have adopted the North Carolina State Building Code. North Carolina has mandatory statewide code enforcement and these codes adopt the International Building Codes 2015 (IBC2015). The North Carolina Building Code Council is the overall authority responsible for overseeing the code process.[8] The North Carolina State Building Code does not have any provisions that specifically addresses airport noise attenuation.

D.3.6 Coordinated Project Review Process

The coordinated review of proposals for zoning changes, subdivision development, or building permits may be conducted as a means for consideration of the potential effects of aircraft noise on proposed development actions. The coordination assumes the review by both airport and land use management personnel of project compatibility, and may result in a report on each item under consideration which is attached to the project file and reported to the governing bodies as part of their consideration of the suitability of the project action for approval or denial. Such measures may be included in an NCP as separate measures or incorporated into a broader measure such as an Airport Overlay Zone.

D.3.7 Full Disclosure Policy

A program can be developed to ensure that the buyers of residential property within the Airport Environs receive full disclosure of the location of the property relative to an airport. This would require that the sellers of residential property located in the Airport Environs deliver to buyers a purchase disclosure notice referencing the airport overlay zone language. It may also require that all advertisements and listings for sale of residentially zoned or improved property in the airport noise overlay zone include a statement about aircraft noise, such as, “Not recommended for persons who may easily be disturbed by aircraft noise.” Finally, solicitation of the voluntary inclusion of the notice in the Multiple Listing Services by the real estate profession alerts potential buyers of property to aircraft noise conditions.

D.3.8 Transfer of Development Rights

The Transfer of Development Rights (TDR) is a land use regulatory tool under which development rights can be severed from a tract of land and sold in a market transaction. The parcel from which the rights are transferred is then permanently restricted as to future development, and the purchaser of the rights may assign them to a different parcel to gain additional density. A TDR program would allow landowners in a designated “sending” area to transfer the development rights assigned to their property to a landowner in a designated “receiving” area where the community would like to concentrate development. In this case, the designated “sending” district would be residentially-zoned land located in areas substantially affected by aircraft noise. The designated “receiving” district would be in a location not greatly affected by airport noise. The designated “receiving” area would be allowed to develop at a higher density than would be permitted by the underlying zoning. Though the community defines the requirements and parameters associated

8 North Carolina Building Codes. Available online at https://codes.iccsafe.org/codes/north-carolina.

with establishing the sending and receiving districts, any actual transfer is negotiated between the landowner in the sending district and landowner in the receiving district.

D.3.9 Capital Improvement Programs

A Capital Improvement Program (CIP) is a plan created by a jurisdiction outlining major capital improvements planned to be undertaken during each year of the CIP. Most capital improvements have no direct bearing on noise compatibility; few municipal capital improvements are noise-sensitive. The obvious exceptions to this are schools and, in certain circumstances, libraries, medical facilities, and cultural/ recreational facilities.

Some capital improvements may have an indirect, but more profound, relationship to noise compatibility. For instance, the development of new sewer and water facilities may open up large vacant areas for the private development of noise-sensitive residential uses. In contrast, the same types of facilities, sized for industrial users, could promote commercial or industrial development in a noise-impacted area that might otherwise be attractive for residential development.

Mecklenburg County typically updates its CIP every five years. Mecklenburg County is updating its current CIP dated 2018-2023.

D.3.10 Growth Risk Assessment

When evaluating the impact of aircraft noise within the Airport Environs, it is important to understand the likelihood for the future development of residential and other noise-sensitive land uses, especially in the planning timeframe. Understanding development trends in the airport vicinity is of critical importance in noise compatibility planning, because future residential growth can potentially constrain airport operations, if that growth occurs beneath aircraft flight tracks and within areas subject to high noise levels.

The growth risk analysis focuses primarily on undeveloped land which is planned and zoned for residential use. It is recognized that additional development may occur through in-filling and redevelopment of currently developed areas.

The methodology for analyzing potential growth risk is as follows:

- Identify all vacant, unplatted tracts of land zoned for future residential development with the greatest potential for being developed within the next five years.
- Calculate the area of the tracts; apply a factor accounting for development inefficiencies and the platting of streets; multiply by dwelling unit densities specified in the zoning ordinance; and multiply by household size to obtain the population holding capacity of presently vacant, unplatted land.
- Sum the above population holding levels to determine the total population holding capacity of the study area.

The final step in the growth risk analysis is to estimate whether the development is likely to occur before or after the year for which future noise exposure has been calculated. This tends to be quite speculative and should be regarded only as a general indicator of the potential risk of increases in noncompatible land uses.

D.4 Corrective Land Use Mitigation Alternatives

Corrective or remedial measures are intended to convert existing, non-compatible uses to compatible uses. Generally, corrective uses fall into two categories: modify existing use, and maintain existing use. The following is a brief discussion of typical corrective or remedial land use mitigation alternatives included in Part 150 studies.

D.4.1 Modify Existing Use

Land Acquisition to Change Land Use

If the acquisition of property results in a change in land use, from noncompatible to compatible with airport operations (e.g., airport/transportation, commercial, or industrial), the property owner would be eligible for relocation assistance and moving expenses, consistent with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act*. The property would be acquired, residents would be relocated, and the property would be converted to a compatible land use. This would prevent further development of noncompatible land uses. The land acquisition program should assure that the subsequent land use is consistent with local land use plans and policies, including compatibility with noise exposure levels in the area. Because the acquisition is to result in a change in land use, the local jurisdiction may decide to apply its power of eminent domain.

D.4.2 Maintain Existing Use

Sound Insulation of Homes

A program for sound insulation of residences is always voluntary on part of the homeowner and is generally focused on residences located in a 65 DNL to 70 DNL noise contour. Other than the obvious benefit of reducing interior noise levels, a sound insulation program maintains the land use of the area and generally increases the value of the properties. Unfortunately, sound insulation treatments do not reduce the noise outside the residence and as such the benefits of the treatments are reduced when doors and windows are open.

Land Acquisition without Change to Land Use

The acquisition of noncompatible property where no change in land use would result would be a "voluntary" acquisition program, where participation in the program would be voluntary on the part of the property owner. The reason for such a voluntary program is most often due to the owner's inability to the sell the property at fair market value. Acquisition procedures would be implemented in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act* and relocation benefits would not apply.

Purchase Guarantee

Purchase guarantee is a program whereby the airport sponsor agrees to purchase a residence for fair market value should the owner be unable to sell the property on the open market because of noise impacts. Participation in this program is voluntary on the part of the property owner and is implemented in areas where the land use is not going to change. In order to protect potential buyers a stipulation of this program requires that the seller disclose to the buyer the airport noise exposure on the property and the intention of the airport sponsor to retain an easement on the property. Acquisition procedures would be implemented in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act* and relocation benefits would not apply.

Sales Assistance

Under a sales assistance program, the airport sponsor guarantees that the property owner will receive the appraised value, or some increment thereof, regardless of final sales value that is negotiated with a buyer. However, unlike purchase guarantee, the airport sponsor does not take ownership of the property in the event that it does not sell. In return for the assistance, the airport sponsor retains an avigation easement on the property and will typically require sound insulation before the sale.

Avigation Easements

Acquisition of avigation easements should be used to alleviate conflicts if no other land use controls are viable or in some cases, in lieu of outright acquisition of the land. The easement would be noted on the property deed and passed on to any subsequent owners of the property.

Amending local zoning and subdivision regulations to provide for the dedication of an easement to the airport sponsor as a condition of approval for residential rezoning or subdivision plats within the 65 DNL noise contour would alert developers, lenders, and prospective purchasers to the proximity of the airport and to the existence of a potential noise issue. The avigation easement would also protect the airport from future litigation by purchasers of the rezoned or subdivided property.

There is a constitutional issue raised by requiring dedication of an easement as well as imposing more vigorous and expensive standards for construction within the airport environs. Governments may not require a person to give up a constitutional right (i.e., a public use) in exchange for a discretionary benefit conferred by the government unless there is a reasonable relationship between a legitimate governmental objective and the condition that is imposed on the developer. Moreover, the exaction demanded by the permit or condition must be in proportion to the impact of the proposed development that is sought to be alleviated. Whether that balance exists requires an individualized determination. If it were determined not to meet these standards, then the legislation would either be unenforceable, or its enforcement would constitute a taking requiring the payment of just compensation.

D.5 Role of Local Jurisdictions and Planning Organizations in Noise Compatibility Planning

Local planners and elected officials are typically responsible for local land use zoning and control. These entities and individuals prepare comprehensive plans, as well as review and implement zoning and land use regulations in a manner that may consider the effect of those actions as they relate to aviation activity and noise exposure.

The responsibility of regulating land use around an airport, in order to minimize existing and prevent future noncompatible land uses, is traditionally delegated to state and local governments. In addition to regulating land uses, local municipalities may facilitate the acquisition of property or the initiation of sound insulation programs as a means to mitigate and prevent future noncompatible land uses resulting from airport noise. At airports with an approved Part 150 Study, an airport sponsor may apply directly to the FAA for funding of noise mitigation projects.

Local land use planners and elected officials were included in the membership of the Technical Advisory Committee (TAC). Appendix G, *Public Involvement*, includes a summary of coordination with the land use planners and elected officials.

D.5.1 Zoning Data Compilation

Specific zoning information for each jurisdiction within the Airport Environs was collected and reviewed in order to identify tools for prohibiting noncompatible development and encouraging compatible development near the airport. **Table D-4, *Generalized Zoning Classifications***, shows the generalized zoning categories, and the specific zoning classifications included in each generalized category, by jurisdiction. **Exhibit D-5, *Generalized Existing Zoning***, graphically depicts the generalized zoning districts within the Airport Environs around CLT.

Table D-3 Generalized Zoning Classifications

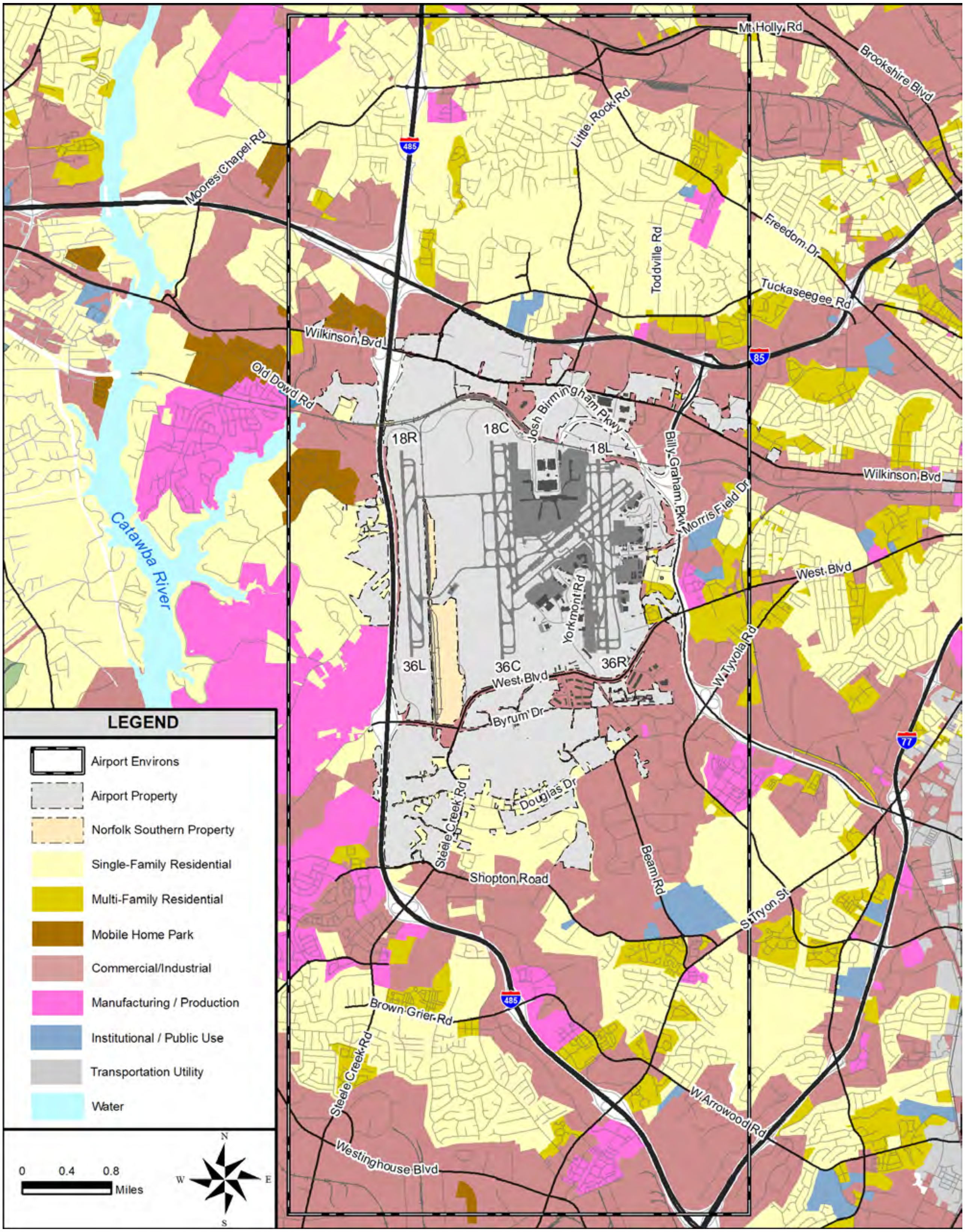
Generalized Zoning	Zoning District Code
Single-Family Residential	SINGLE FAMILY - R-3
	SINGLE FAMILY - R-4
	SINGLE FAMILY - R-5
	SINGLE FAMILY - R-8
	SINGLE FAMILY - R-9
	SINGLE FAMILY - R-15
	NEIGHBORHOOD 1 - N1-A
	NEIGHBORHOOD 1 - N1-B
	NEIGHBORHOOD 1 - N1-C
	NEIGHBORHOOD 1 - N1-D
Multi-Family Residential	MULTI-FAMILY - R-6
	MULTI-FAMILY - R-8
	MULTI-FAMILY - R-9
	MULTI-FAMILY - R-15
	MULTI-FAMILY - R-12
	MULTI-FAMILY - R-17
	MULTI-FAMILY - R-20
	MULTI-FAMILY - R-22
	NEIGHBORHOOD 2 - N2-A
	NEIGHBORHOOD 2 - N2-B
	NEIGHBORHOOD 2 - N2-C
	URBAN RESIDENTIAL - UR-2
	URBAN RESIDENTIAL - UR-3
	URBAN RESIDENTIAL - UR-C
Manufactured Home	MANUFACTURED HOME - MHP
Mixed Use	MIXED USE - CAC-2
	MIXED USE - MUDD
	MIXED USE RESIDENTIAL - MX-1
	MIXED USE RESIDENTIAL - MX-2
	MIXED USE RESIDENTIAL - MX-3
	MIXED USE RESIDENTIAL - R-12
Institutional	INSTITUTIONAL - IC-1
	INSTITUTIONAL - INST
Transit Oriented	TRANIST ORIENTED - TOD
Commercial / Industrial	BUSINESS - B-1
	BUSINESS - B-2
	BUSINESS - CG
	BUSINESS - NS
	BUSINESS - UR-C
	BUSINESS PARK - BP
	BUSINESS PARK - OFC
	BUSINESS-DISTRIBUTION - B-D
	BUSINESS-DISTRIBUTION - ML-1

Table D 4 Generalized Zoning Classifications *(Continued)*

Generalized Zoning	Zoning District Code
Commercial / Industrial *(continued)*	COMMERCIAL CENTER - B-1
	COMMERCIAL CENTER - CC
	GENERAL INDUSTRIAL - I-2
	HEAVY INDUSTRIAL - I-2
	HEAVY INDUSTRIAL - ML-2
	LIGHT INDUSTRIAL - I-1
	LIGHT INDUSTRIAL - ML-1
	MANUFACTURING AND LOGISTICS - ML-2
	OFFICE - O-1
	OFFICE - O-2
	OFFICE - O-6
	OFFICE - O-15
	OFFICE - OFC

Source: City of Charlotte Zoning Ordinance, Available online at https://www.charlottenc.gov/Growth-and-Development/Planning-and-Development/Zoning/Zoning-Ordinance; City of Charlotte Zoning, Mecklenburg County GIS, Date updated, 8/31/2023; Landrum & Brown analysis, 2024

Exhibit D-5 Generalized Existing Zoning



Source: Landrum & Brown, 2024.

Appendix E

Appendix E, Noise Abatement Alternatives

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

PRESENTED BY
Landrum & Brown, Incorporated

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Appendix E Noise Abatement Alternatives

This Appendix provides information on the alternative noise abatement measures that were reviewed for inclusion in the Charlotte Douglas International Airport (CLT) Noise Compatibility Program (NCP) Update. Each measure was evaluated for the anticipated benefits and drawbacks associated with its implementation.

E.1 Potential Noise Abatement Alternatives

The following list includes examples of the types of alternatives that were considered for inclusion in the NCP.

Facility Modifications

- Runup Locations
- Displaced Arrival Thresholds

Preferential Runway Use

- Airport Flow
- Daytime Runway Use
- Nighttime Runway Use

Flight Procedures

- Divergent Headings - North and South Flow Operations
- Departure Flight Corridors
- Arrival Flight Corridors

The alternative noise abatement measures were developed based on comments received from members of the Technical Advisory Committee, including the local Federal Aviation Administration Airport Traffic Control Tower (ATCT), airlines operating at CLT, and the Airport Community Roundtable.

In order to evaluate each alternative, a set of evaluation criteria was established and used to identify the benefits and drawbacks of each alternative. The criteria include feasibility, safety, noise reduction, and operational considerations. After it was determined that an alternative was feasible and safe, a noise impact assessment was prepared to document increases and decreases in various noise levels as compared to the Future (2028) Baseline. If the alternative was determined to result in noise reductions, the alternative was evaluated for operational efficiency and implementation considerations. The diagram below summarizes the noise abatement alternative evaluation process.

Figure 1 Noise Abatement Alternative Screening Process

The following provides a description of each alternative evaluated, along with an assessment of the benefits, drawbacks, and a recommendation.

E.2 Consideration of Alternative Noise Abatement Measures

The following pages describe alternative noise abatement measures that were considered in this Part 150 Study. A total of 34 additional preliminary alternatives were evaluated. These alternatives are labeled NA-A-1 through NA-I-3. While not all alternatives may be practical or achievable, potential alternatives were considered in accordance with 14 CFR Part 150 §150.23(e) and §B150.7.

The following information is provided for each alternative:

- Title – includes a brief descriptive title of the measure.
- Background and Intent – includes the intent of the measure as a means to mitigate noise impacts and the background and setting to which the measure relates where applicable.
- Benefits – includes a statement of how the measure would provide noise mitigation benefits
- Drawbacks – identifies any potential negative consequences of implementing the measure
- Cost to Implement – identifies the potential cost to implement each measure
- Evaluation Method – provides the method by which the measure was evaluated for changes in noise impacts. This was either accomplished as a qualitative analysis or a quantitative evaluation using the FAA’s AEDT model to develop an alternative noise exposure contour and develop counts of noise-sensitive land uses within the DNL 65+ dB noise exposure contour to compare to the Future (2028) Baseline noise impacts presented in **Table E-1**. For each alternative in which a quantitative analysis was performed, an exhibit is included showing a comparison of the noise exposure contour that would result from the implementation of the alternative and the Future (2028) Baseline noise exposure contour. In addition, a table of noise impacts that would result from the implementation of the alternative is included to either show an increase or a decrease in impacted properties when compared to Table E-1.
- Findings and Recommendations – indicates if the alternative was carried forward for further evaluation

Table E-1 Future (2028) Baseline Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	86	0	0	86
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**243**	**0**	**0**	**243**
Population				
Total Population[1]	**687**	**0**	**0**	**687**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-A-1

TITLE:	Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport. Refer to **Exhibit E-1, *Run-Up Locations*** for the run-up locations.

BACKGROUND AND INTENT:	The Airport user policy currently identifies six run-up locations and procedures for aircraft engine runups. The measure would establish two new run-up locations that are currently under construction: on the deice pad located on the south airfield east of Runway 36C; and in the northeast airfield east of Taxiway D. Construction is anticipated to conclude in 2025 and the sites would be able to be used for run-ups when completed. The measure would maximize the use of midfield run-up locations (ID 2, 3, 7) and reduce the use of those located on the east side of the Airport (ID 4, 5, 6, 8). The intent of the measure is to reduce sideline noise from run-ups on the east side of the Airport.

BENEFITS:	The addition of two new run-up locations would allow for increased flexibility for carriers to conduct run-ups. Evaluations conducted at major airports throughout the United States have indicated that run-up activity has little effect on the location of the noise contours. However, sustained single-event noise levels associated with run-ups are often sources of complaint within neighborhoods near airports. The maximized use of midfield locations over those located on the east side of the Airport would appear to result in reduced sideline noise from run-ups for homes directly east of Airport Drive.

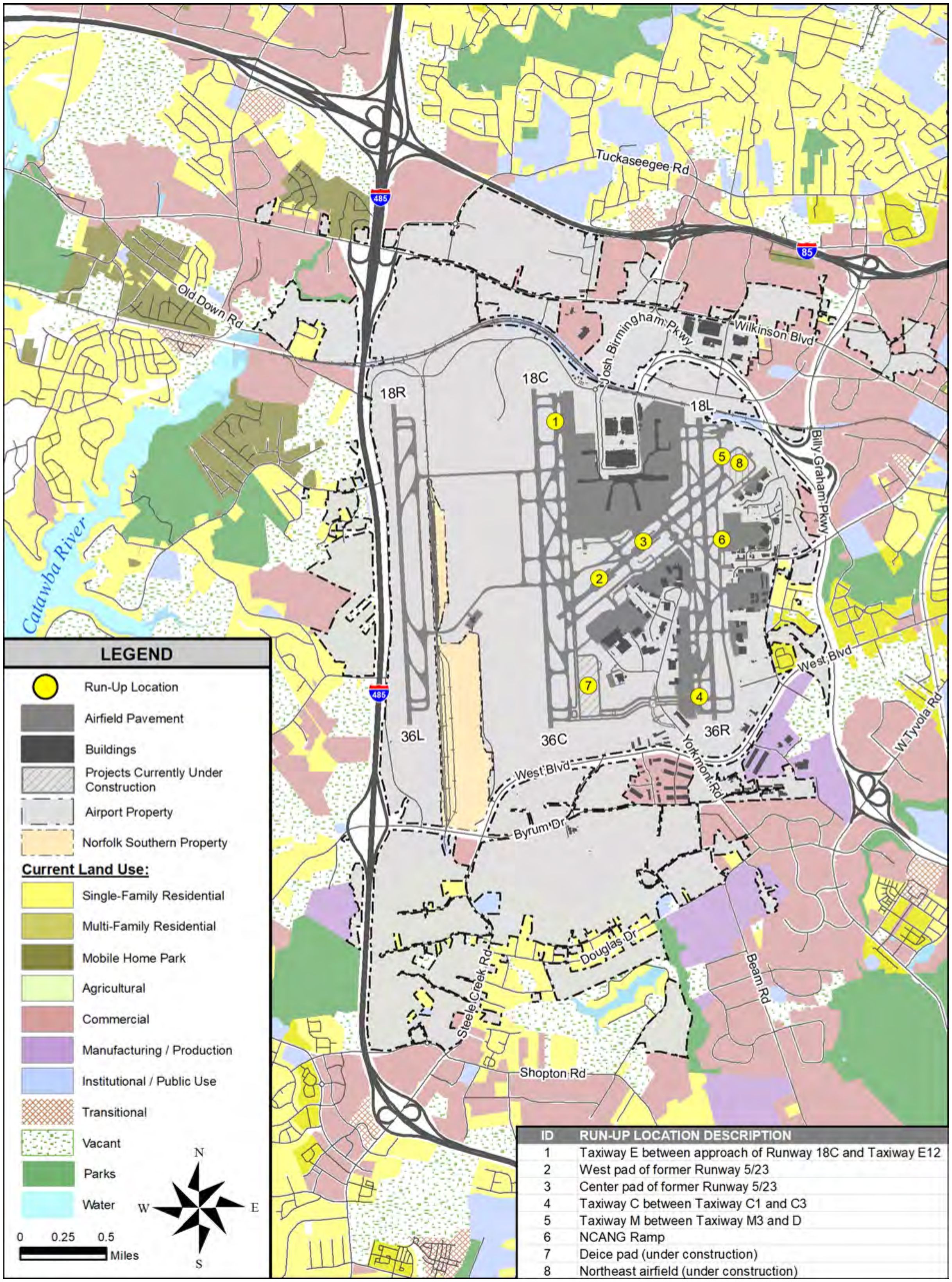
DRAWBACKS:	

COST TO IMPLEMENT:	Minimal cost for development and publication of new airport procedures.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The measure is anticipated to result in reduced sideline noise from run-ups for homes directly east of Airport Drive. For this reason, this measure is **RECOMMENDED** for further evaluation.

Exhibit E-1 Run-Up Locations



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-A-2

TITLE:	Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport. Refer to **Exhibit E-2, *Run-Up Locations on Future Airport Layout*** for the exiting run-up locations in the future airport layout.

BACKGROUND AND INTENT:	The Airport user policy currently identifies six run-up locations and procedures for aircraft engine runups. Based on approval of the modification to Measure NA-6, two additional run-up locations would be available and operational in 2025. When the new fourth parallel runway is constructed and operational, run-up ID 1 would be removed as a run-up location. This measure would conduct an assessment of ground run-up locations to identify additional locations in the midfield in the future airport layout after construction of the new fourth parallel runway (anticipated 2028). The intent of this measure is to reduce sideline noise from run-ups after construction of the new fourth parallel runway.

BENEFITS:	Evaluations conducted at major airports throughout the United States have indicated that run-up activity has little effect on the location of the noise contours. However, sustained single-event noise levels associated with run-ups are often sources of complaint within neighborhoods near airports. The maximized use of midfield locations over those located on the east side of the Airport would appear to result in reduced sideline noise from run-ups for homes directly east of Airport Drive.

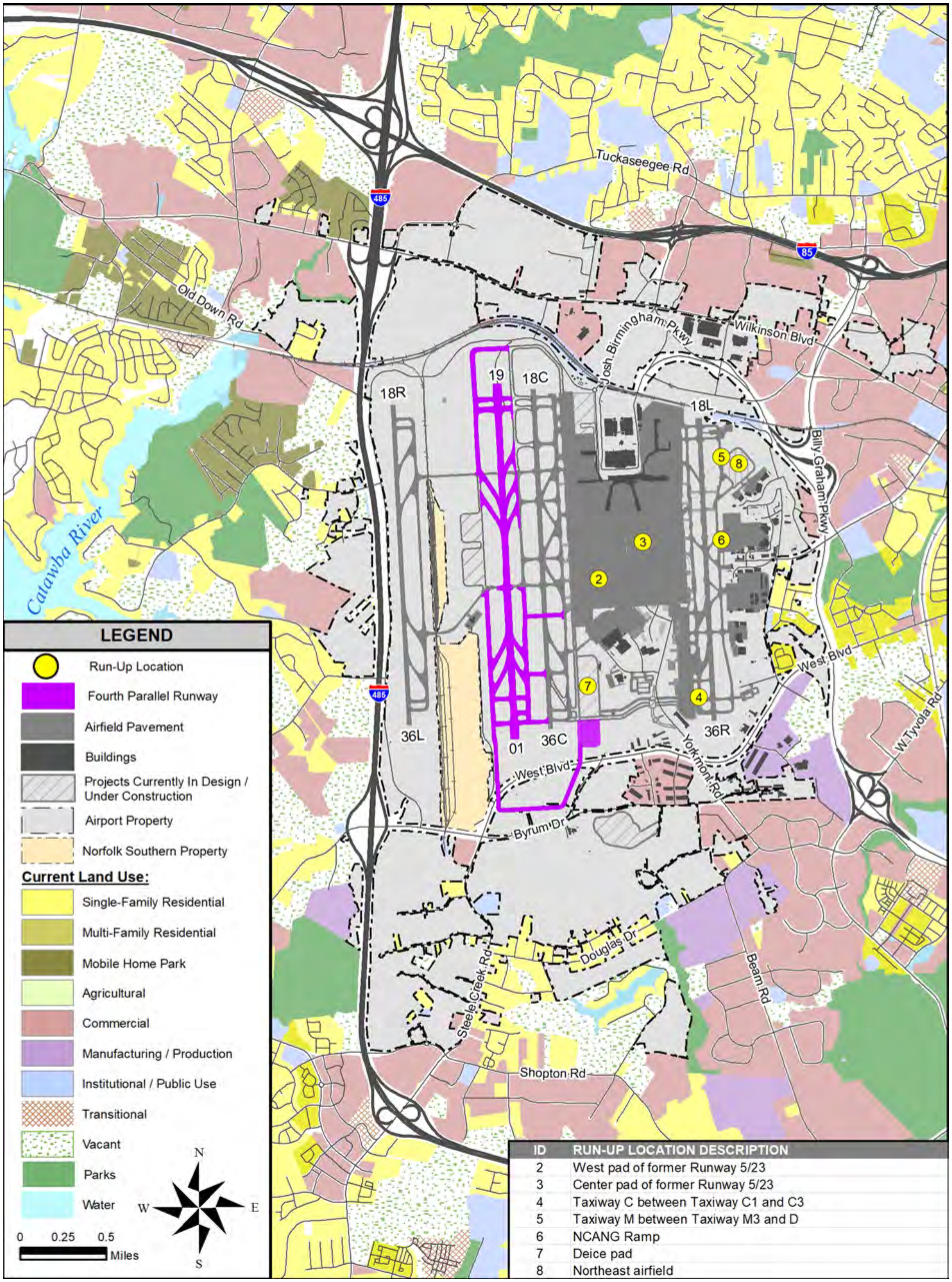
DRAWBACKS:	None

COST TO IMPLEMENT:	Cost related to conducting an assessment of ground run-up procedures after construction of the new fourth parallel runway. Minimal costs related to development and publication of new airport procedures to document new run-up locations based on the assessment.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The measure is anticipated to result in reduced sideline noise from run-ups for homes directly east of Airport Drive. For this reason, this measure is **RECOMMENDED** for further evaluation.

Exhibit E-2 Run-Up Locations on Future Airport Layout



ID	RUN-UP LOCATION DESCRIPTION
2	West pad of former Runway 5/23
3	Center pad of former Runway 5/23
4	Taxiway C between Taxiway C1 and C3
5	Taxiway M between Taxiway M3 and D
6	NCANG Ramp
7	Deice pad
8	Northeast airfield

Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-B-1

TITLE:	Implement a 1,235-foot displaced arrival threshold on Runway 36C.
BACKGROUND AND INTENT:	Aircraft arriving from the south to Runway 36C currently land at the runway end. The implementation of the displaced arrival threshold would direct aircraft to land 1,235 north of the Runway 36C end. The intent of the measure is to increase the altitude of arriving aircraft to reduce noise levels over residential areas south of the Airport, including those off Douglas Drive and Shopton Road. Refer to **Exhibit E-3,** ***Noise Compatibility Program Alternative NA-B-1***.
BENEFITS:	None
DRAWBACKS:	The measure would not result in a decrease in the number of housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the National Environmental Policy Act (NEPA) for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

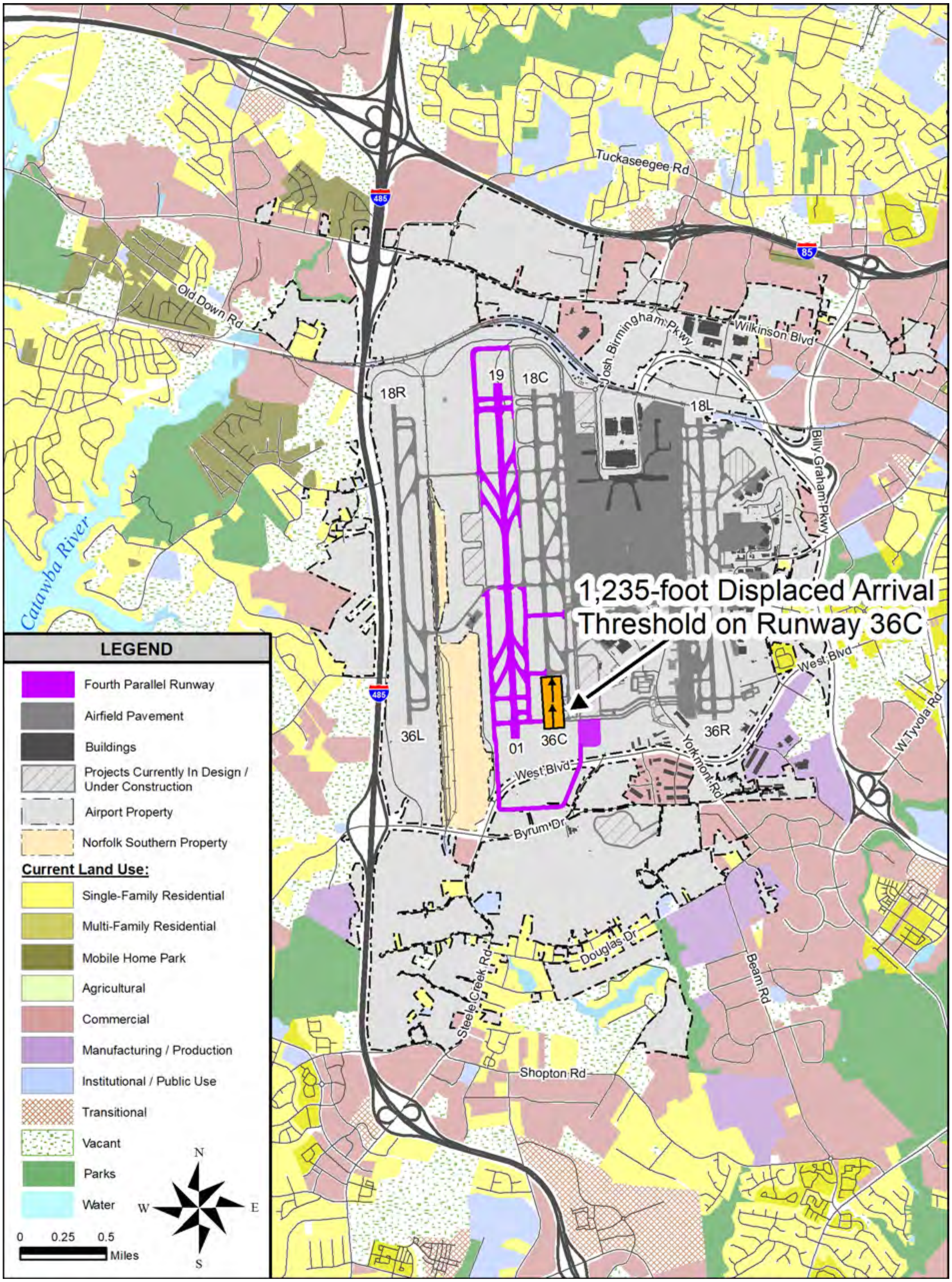
Table E-2 NA-B-1 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	86	0	0	86
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**243**	**0**	**0**	**243**
Population				
Total Population[1]	**687**	**0**	**0**	**687**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

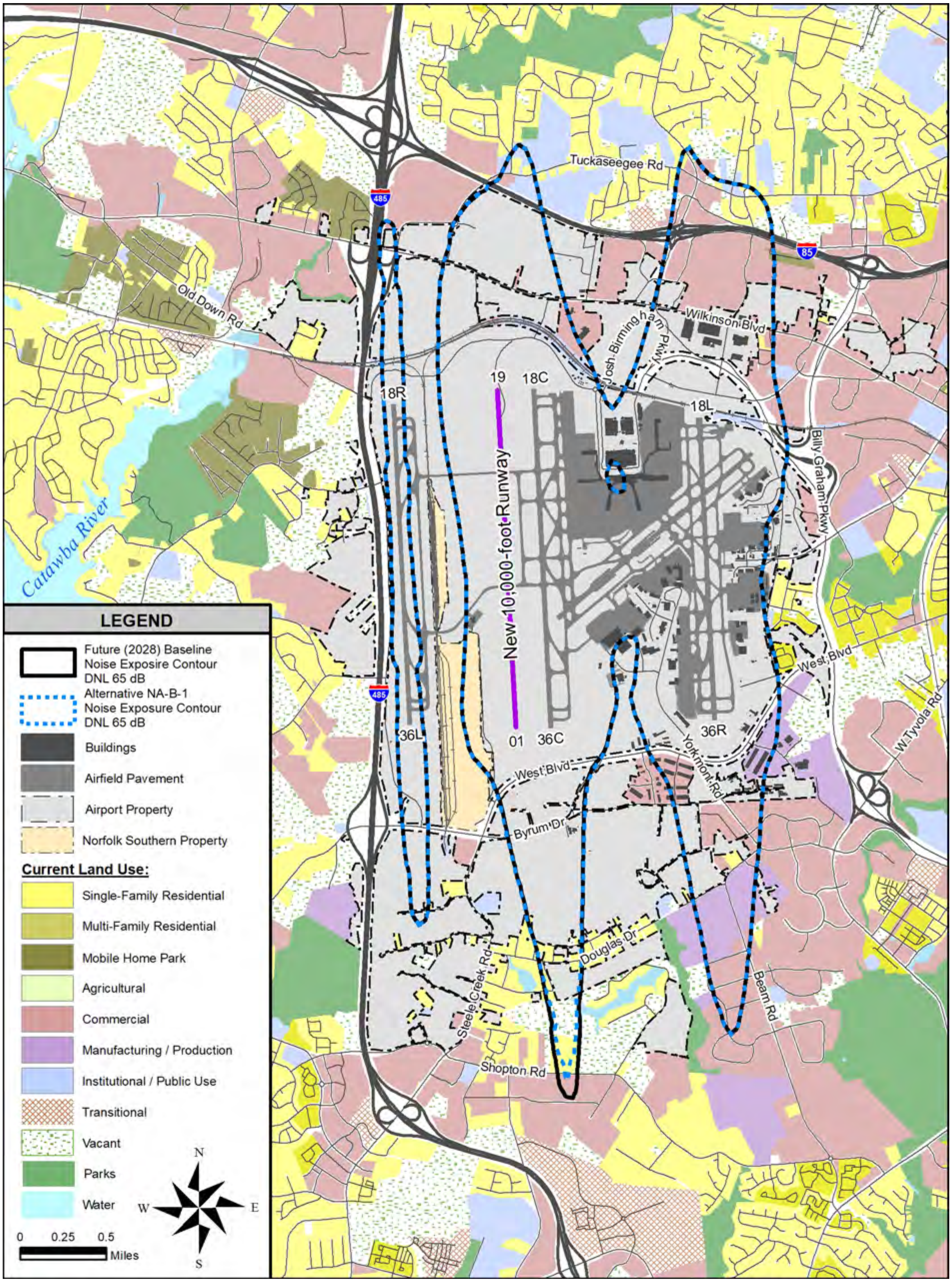
Source: Landrum & Brown, 2024.

Exhibit E-3 Noise Compatibility Program Alternative NA-B-1



Source: Landrum & Brown, 2024

Exhibit E-4 Comparison of Future (2028) Baseline versus NA-B-1 Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-B-2

TITLE:	Implement a 1,376-foot displaced arrival threshold on Runway 36R.

BACKGROUND AND INTENT:	Aircraft arriving from the south to Runway 36R currently land at the runway end. The implementation of the displaced arrival threshold would direct aircraft to land 1,376 north of the Runway 36R end. The intent of the measure is to increase the altitude of arriving aircraft to reduce noise levels over residential areas south of the Airport, including those off Beam Road. Refer to **Exhibit E-5, *Noise Compatibility Program Alternative NA-B-2***.

BENEFITS:	None

DRAWBACKS:	The measure would not result in a decrease in the number of housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

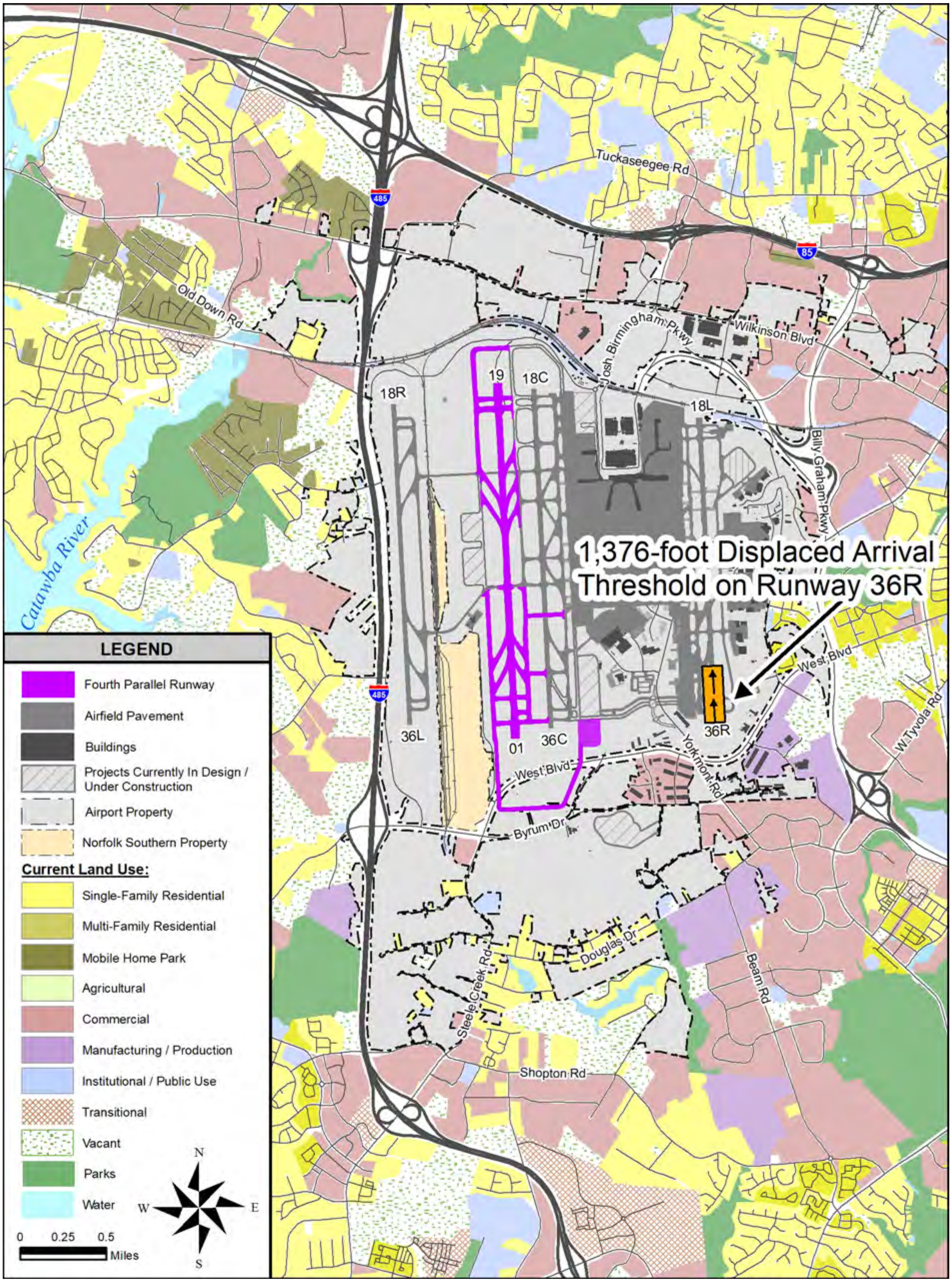
Table E-3 NA-B-2 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	86	0	0	86
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**243**	**0**	**0**	**243**
Population				
Total Population[1]	**687**	**0**	**0**	**687**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

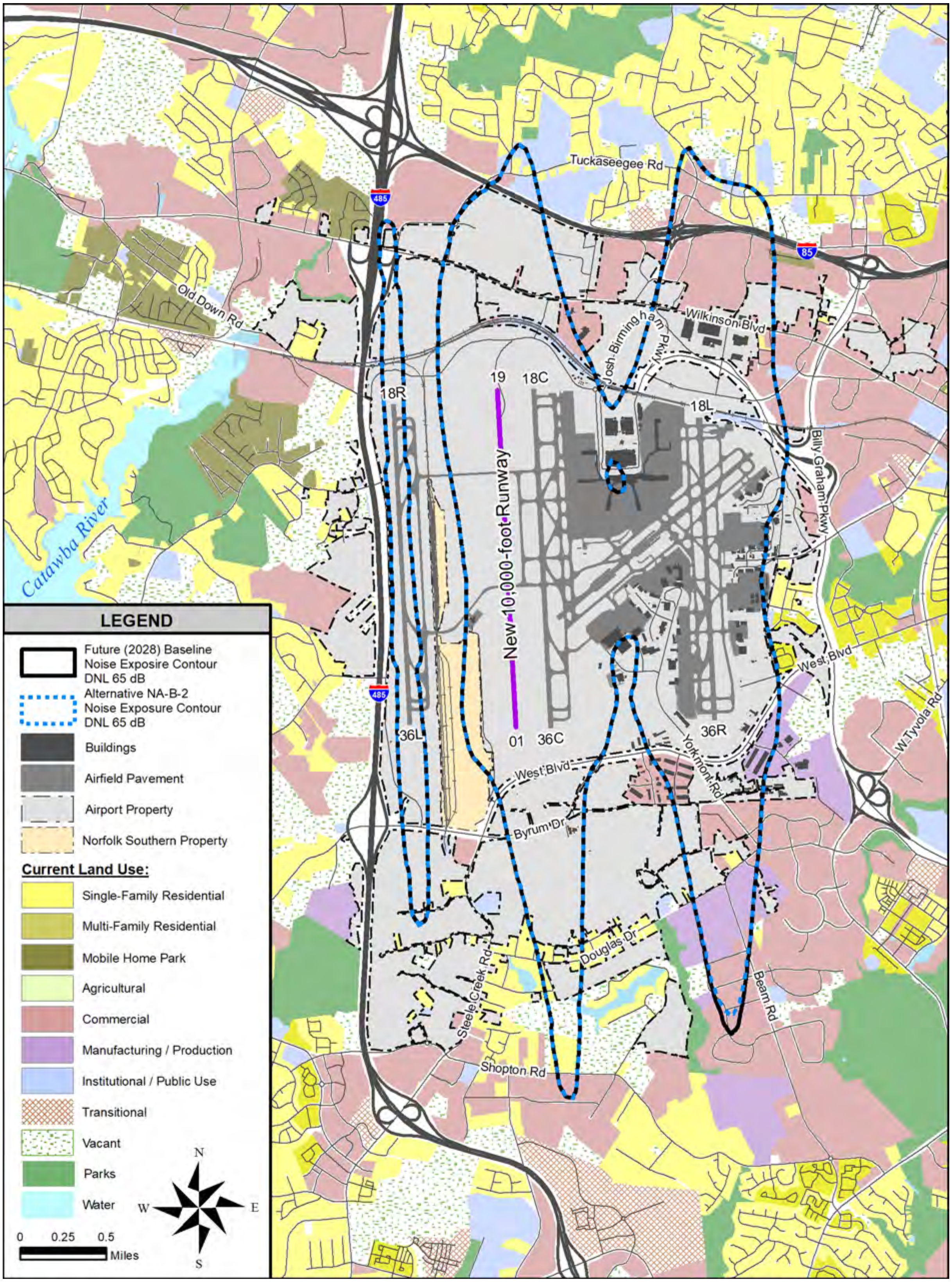
Source: Landrum & Brown, 2024.

Exhibit E-5 Noise Compatibility Program Alternative NA-B-2



Source: Landrum & Brown, 2024

Exhibit E-6 Comparison of Future (2028) Baseline versus NA-B-2 Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-B-3

TITLE:	Implement a 1,376-foot displaced arrival threshold on Runway 18L.
BACKGROUND AND INTENT:	Aircraft arriving from the north to Runway 18L currently land at the runway end. The implementation of the displaced arrival threshold would direct aircraft to land 1,376 feet south of the Runway 18L end. The intent of the measure is to increase the altitude of arriving aircraft to reduce noise levels over residential areas to the north of the Airport including Tuckaseegee Road and Little Rock Road. Refer to ***Exhibit E-7, Noise Compatibility Program Alternative NA-B-3***.
BENEFITS:	The measure would result in a decrease in 6 housing units and 1 noise sensitive facility (day care) within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
DRAWBACKS:	Negative operational impacts would occur due to the existing high-speed taxiways not being positioned for a displaced threshold. The results would be greater runway occupancy times, longer taxi distance, and potentially increased congestion due to where aircraft would exit the runway. Furthermore, the cost to redesign and reconstruct the taxiways along the runway would far exceed any benefits.
COST TO IMPLEMENT:	The cost to redesign and reconstruct all taxiways along Runway 18L/36R would be the responsibility of the Airport. The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative Assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would result in a decrease in the number of housing units and noise sensitive facilities that would be located within the DNL 65+ dB noise exposure contour. However, the measure would result in negative operational impacts that could only be resolved by redesigning and reconstructing the taxiways along the runway. The cost of such redesigning and reconstruction would far exceed any benefits. As such, this measure is **NOT RECOMMENDED** for further evaluation.

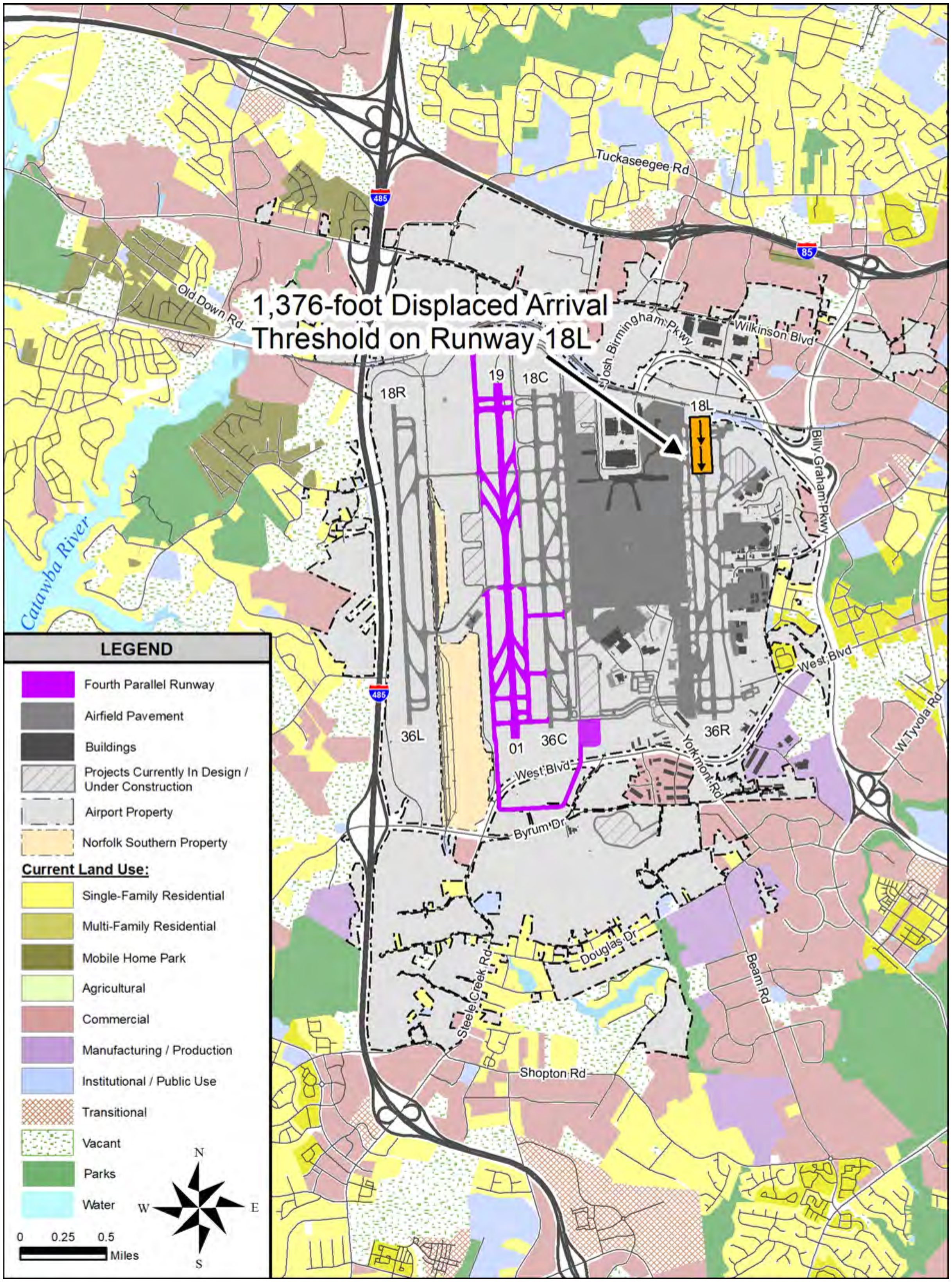
Table E-4 NA-B-3 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	80	0	0	80
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**237**	**0**	**0**	**237**
Population				
Total Population[1]	**670**	**0**	**0**	**670**
Noise-Sensitive Facilities				
Schools / Educational Facilities	3	0	0	3
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

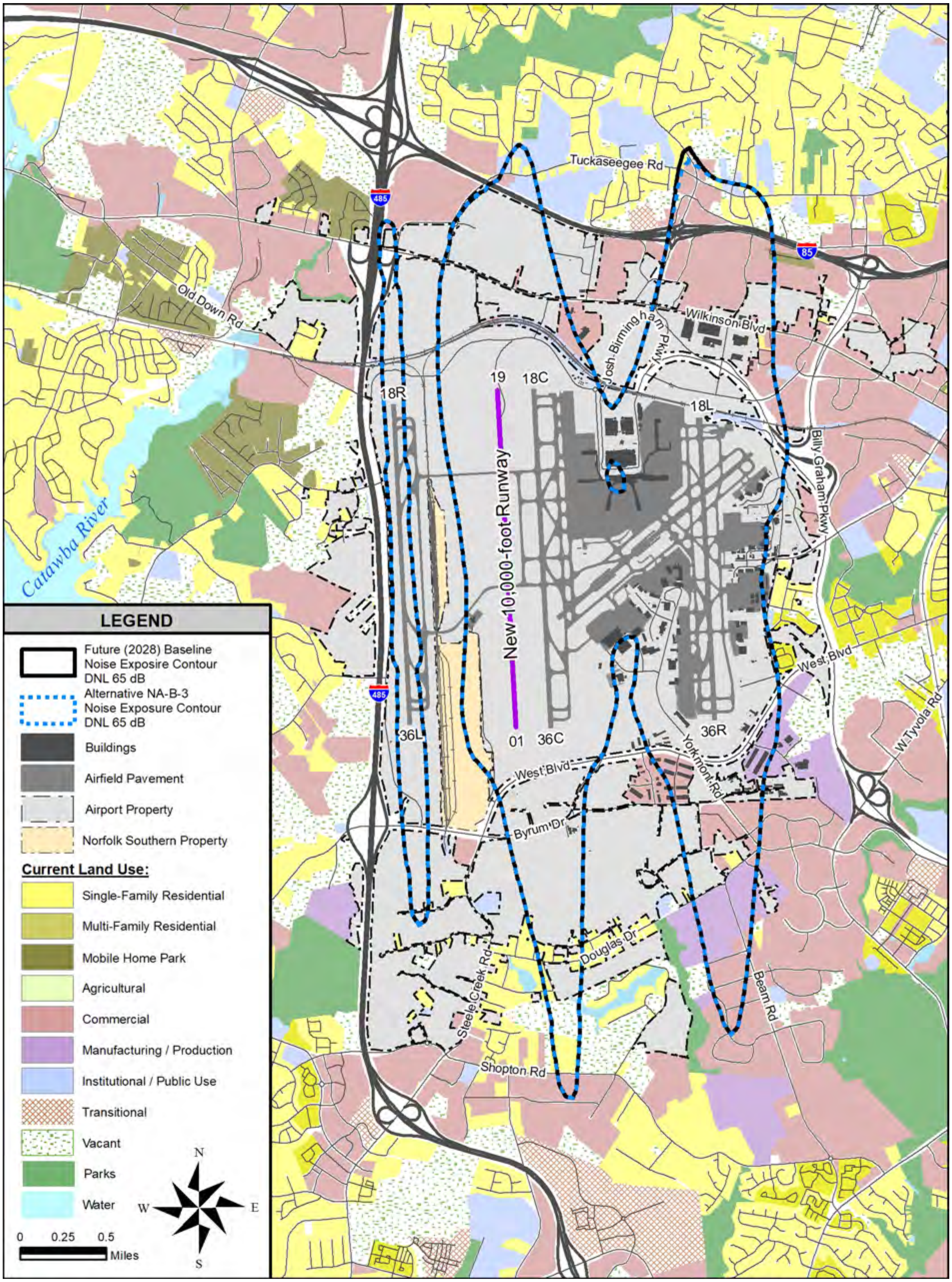
Source: Landrum & Brown, 2024.

Exhibit E-7 Noise Compatibility Program Alternative NA-B-3



Source: Landrum & Brown, 2024

Exhibit E-8 Comparison of Future (2028) Baseline versus NA-B-3 Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-B-4

TITLE:	Implement a 1,100-foot displaced arrival threshold on Runway 01.
BACKGROUND AND INTENT:	Aircraft arriving from the south to Runway 01 currently land at the runway end. The implementation of the displaced arrival threshold would direct aircraft to land 1,100 feet north of the Runway 01 end. The intent of the measure is to increase the altitude of arriving aircraft over residential areas south of the Airport including those off Douglas Drive and Steeleberry Drive. The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures. As such, this measure would only be implemented in conjunction with NA-D-1, which would revise the new fourth parallel runway to be used as a primarily arrival runway. See N*oise Compatibility Program Alternative NA-D-1* for more information. Refer to **Exhibit E-9, *Noise Compatibility Program Alternative NA-B-4***.
BENEFITS:	None
DRAWBACKS:	The measure would result in an increase in 15 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

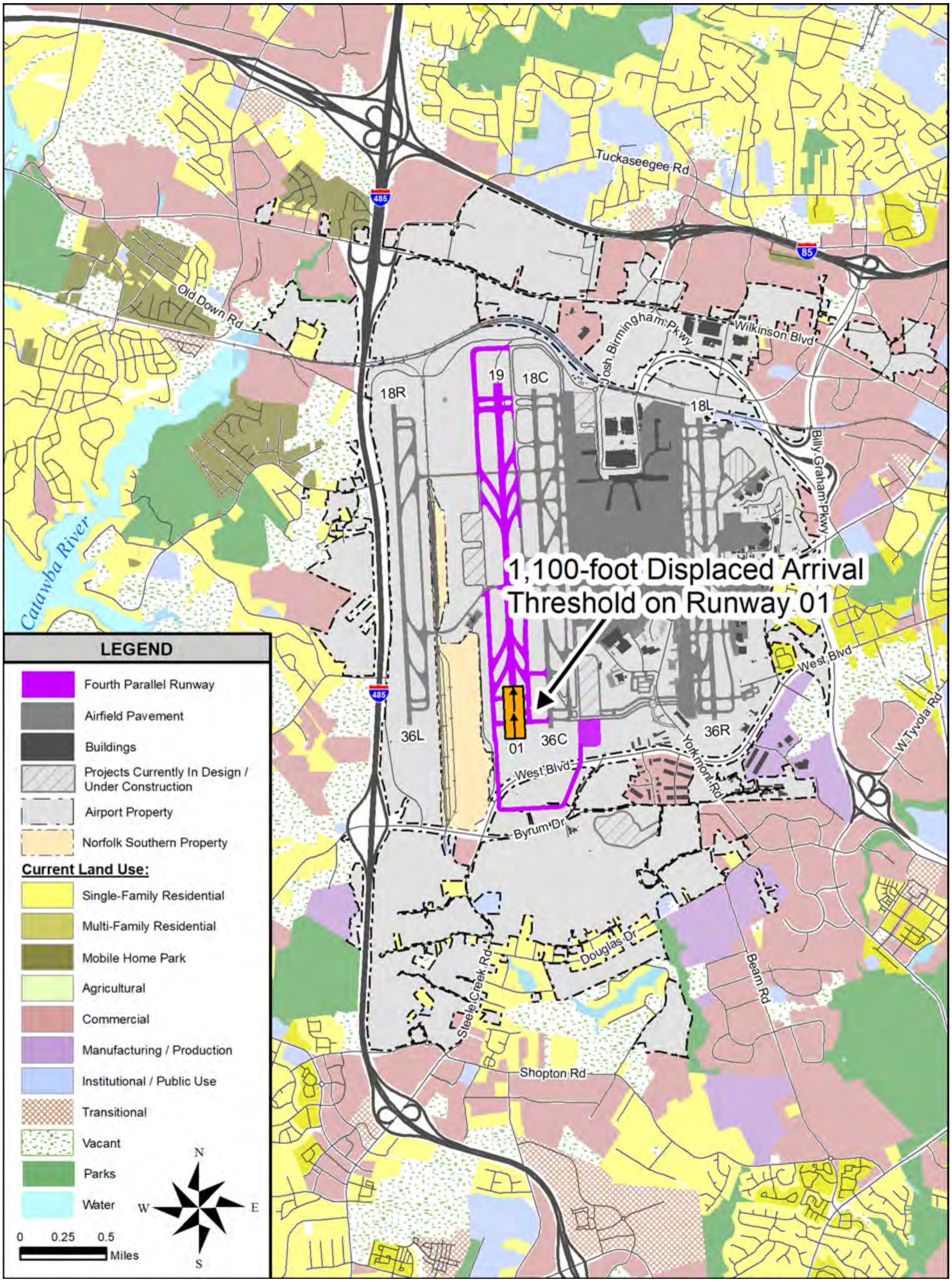
Table E-5 NA-B-4 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	101	0	0	101
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**258**	**0**	**0**	**258**
Population				
Total Population[1]	**727**	**0**	**0**	**727**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

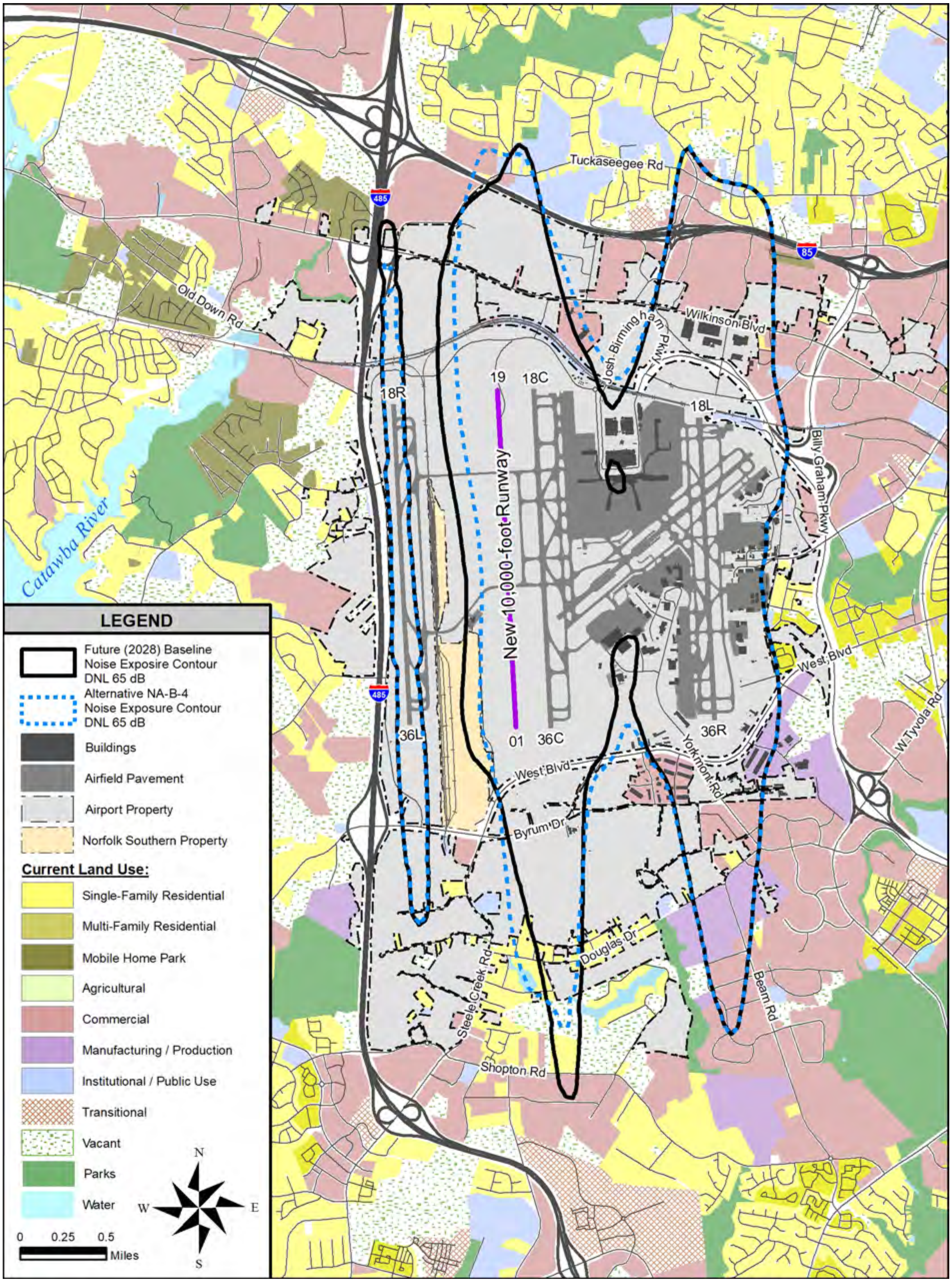
Source: Landrum & Brown, 2024.

Exhibit E-9 Noise Compatibility Program Alternative NA-B-4



Source: Landrum & Brown, 2024

Exhibit E-10 Comparison of Future (2028) Baseline versus NA-B-4 Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-B-4-A

TITLE:	Implement a 1,100-foot displaced arrival threshold on Runway 01.

BACKGROUND AND INTENT:	This measure is similar to NA-B-4, as it is aimed to implement a displaced arrival threshold for aircraft to land 1,100 feet north of the Runway 01 end. The intent of the measure is to increase the altitude of arriving aircraft over residential areas south of the Airport including those off Douglas Drive and Steeleberry Drive. The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures. As such, this measure would only be implemented in conjunction with NA-D-1-A, which would revise the runway use for the new fourth parallel runway as a primarily arrival runway. See *Noise Compatibility Program Alternative NA-D-1-A* for more information. In summary, this measure would implement the displaced arrival threshold identified in NA-B-4 with runway use identified in NA-D-1-A. Refer to *Exhibit E-9, Noise Compatibility Program Alternative NA-B-4*.

BENEFITS:	None

DRAWBACKS:	The measure would result in an increase in 9 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

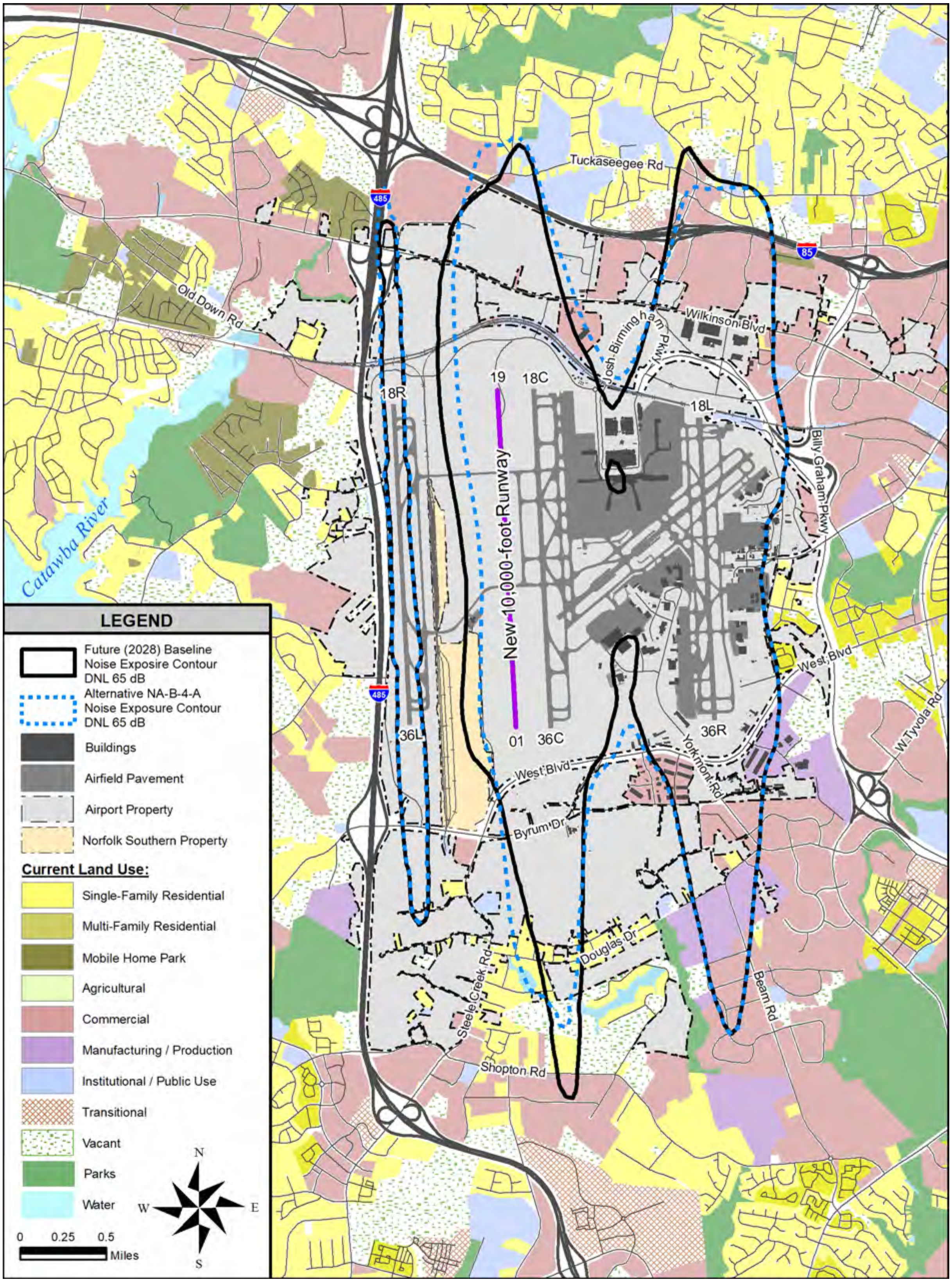
Table E-6 NA-B-4-A Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	95	0	0	95
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**252**	**0**	**0**	**252**
Population				
Total Population[1]	**710**	**0**	**0**	**710**
Noise-Sensitive Facilities				
Schools / Educational Facilities	3	0	0	3
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

Source: Landrum & Brown, 2024.

Exhibit E-11 Comparison of Future (2028) Baseline versus NA-B-4-A Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-C-1

TITLE:	Balanced Mix of North v. South Flow: Increase the amount of time the Airport operates in south flow to achieve a 50/50 balance of north versus south flow
BACKGROUND AND INTENT:	Historically, the Airport has operated approximately 64 percent in north flow (arriving to and departing from Runways 36L/36C/36R) and 36 percent in south flow (arriving to and departing from Runways 18L/18C/18R). The intent of this measure is to evaluate the balancing of the direction of flow by increasing the amount of time the Airport operates in south flow to achieve a 50/50 balance of north flow and south flow. The implementation of this measure would reduce net residential noise impacts to the north by reducing departure operations over residential land uses and to the south by reducing arrival operations over residential land uses.
BENEFITS:	None
DRAWBACKS:	Coordination with the local FAA ATCT was conducted to identify if setting guidelines in attempt to increase the amount of time the Airport operates in south flow would result in potential safety and/or feasibility issues. The local FAA ATCT stated the direction of flow is primarily determined by wind direction and wind speed on the surface and aloft (above the ground). It is also determined by the location of severe weather systems within a hundred miles of the Airport. Additionally, local FAA ACTC stated the amount of time when the direction of flow is not dictated by these factors, but is up to the discretion of the local FAA ATCT operators, is negligible. The point being that even though surface wind reports might suggest the potential for achieving balanced north/south operations, the Airport and the airspace is too dynamic and complex to actually achieve the goal. There are examples of other airports attempting to put artificial goals on runway use and those goals not being achievable for similar reasons. Based on these factors, it was determined implementation of any guidelines to dictate or maintain an annual direction of flow is not likely to result in the intended goal (not feasible) and to try to force it would limit the air traffic controller's ability to choose the safest direction of flow for the operation of the Airport (safety).
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. Additionally, the cost related to the monitoring and documentation of the Airport’s direction of flow would be the responsibility of the Airport. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Because the measure was found to be neither safe nor feasible, this measure is **NOT RECOMMENDED** for further evaluation.

Noise Compatibility Program Alternative NA-C-2

TITLE:	Limit One Direction Flow to a Maximum # Days: Prevent continuous flow in one direction over more than [two consecutive days] to bring relief to people who have been getting noise/flow from one type of operation continuously for multiple days. After [two consecutive days] of flow in the same direction, flow should be reversed at the first reasonable opportunity and maintained in the reverse direction for a reasonable period.
BACKGROUND AND INTENT:	Similar to NA-C-1, the measure is aimed to balance the direction of flow by increasing the amount of time the Airport operates in south flow to achieve a 50/50 balance of north flow and south flow. This measure would further require setting a cap on the number of days the Airport operates in the same direction of flow. The intent of this measure is to reduce net residential noise impacts to the north by reducing departure operations over residential land uses and to the south by reducing arrival operations over residential land uses.
BENEFITS:	None
DRAWBACKS:	Coordination with the local FAA ATCT was conducted to identify if setting guidelines in attempt to increase the amount of time the Airport operates in south flow would result in potential safety and/or feasibility issues. The local FAA ATCT stated the direction of flow is primarily determined by wind direction and wind speed on the surface and aloft (above the ground). It is also determined by the location of severe weather systems within a hundred miles of the Airport. Additionally, local FAA ACTC stated the amount of time when the direction of flow is not dictated by these factors, but is up to the discretion of the local FAA ATCT operators, is negligible. The point being that even though surface wind reports might suggest the potential for achieving balanced north/south operations, the airport and the airspace is too dynamic and complex to actually achieve the goal. There are examples of other airports attempting to put artificial goals on runway use and those goals not being achievable for similar reasons. Based on these factors, it was determined implementation of any guidelines to dictate the runway flow is not feasible and to try to force it generally or on a day-to-day basis would likely limit the air traffic controller's ability to choose the safest direction of flow for the operation of the Airport.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. Additionally, the cost related to the monitoring and documentation of the Airport’s direction of flow would be the responsibility of the Airport. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Because the measure was found to be neither safe nor feasible, this measure is **NOT RECOMMENDED** for further evaluation.

Noise Compatibility Program Alternative NA-D-1

TITLE:	Evaluate the new runway as an arrival runway. Designate Runways 18R/36L and 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures by turbojet aircraft between 7:00 a.m. and 10:00 p.m.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures in the daytime (7:00 a.m. to 10:00 p.m.). This measure would designate Runway 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures in the daytime. The intent of this measure is to reduce net residential noise impacts to the north and south of the Airport by shifting arrivals to the west of residential land uses. Refer to ***Exhibit E-12, Noise Compatibility Program Alternative NA-D-1***.

BENEFITS:	None

DRAWBACKS:	The measure would result in an increase in 18 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. This measure could be implemented in conjunction with NA-B-4 for additional noise abatement benefits.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

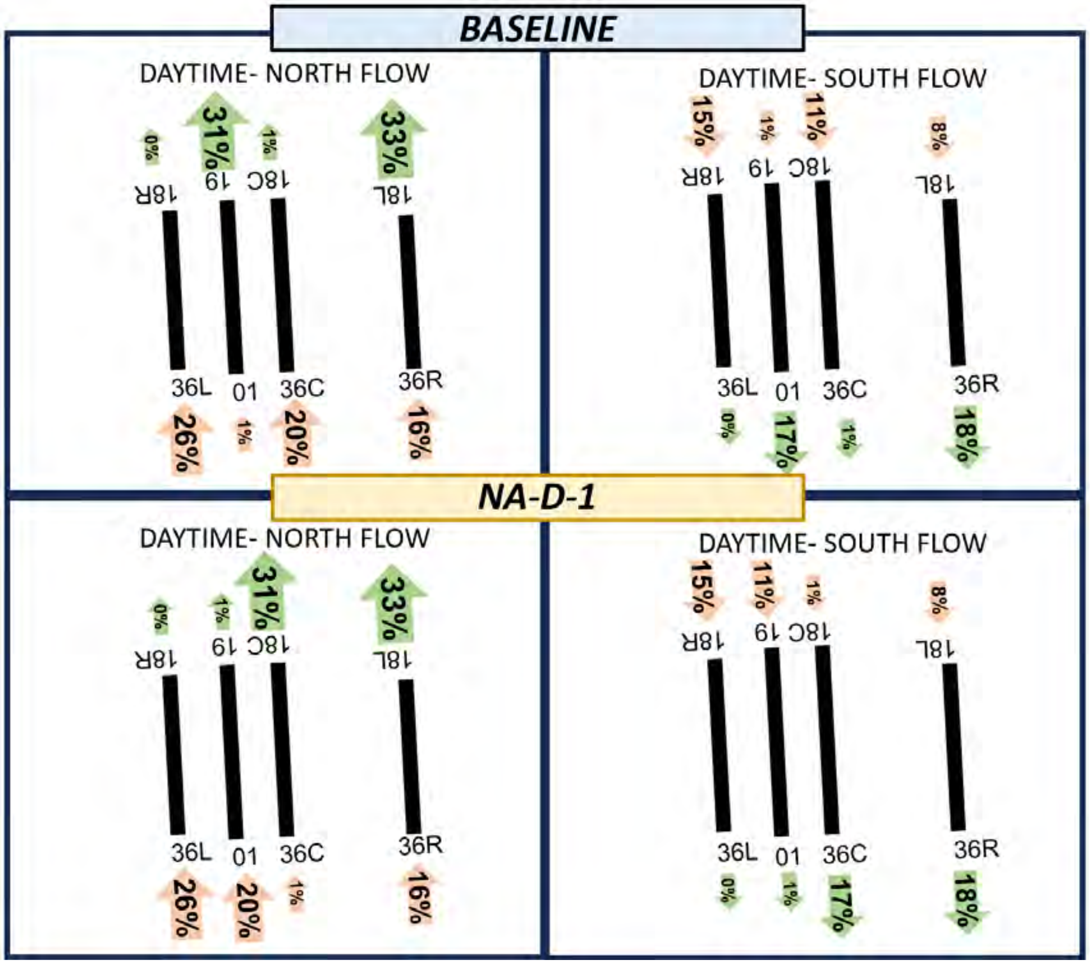
Table E-7 NA-D-1 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	104	0	0	104
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**261**	**0**	**0**	**261**
Population				
Total Population[1]	**734**	**0**	**0**	**734**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

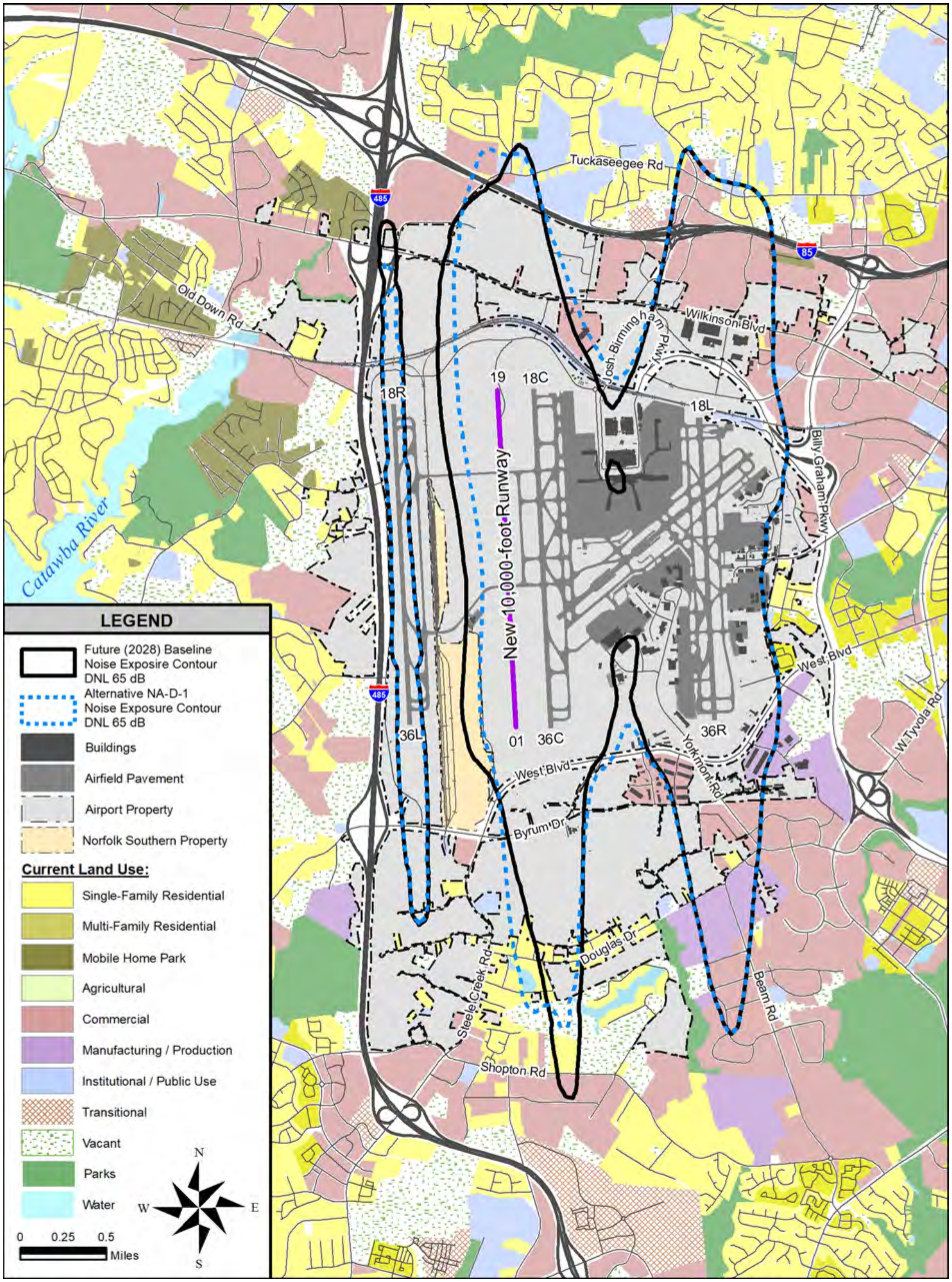
Source: Landrum & Brown, 2024.

Exhibit E-12 Noise Compatibility Program Alternative NA-D-1



Note: Green arrows denote departure operations and orange arrows denote arrival operations.
Source: Landrum & Brown, 2024

Exhibit E-13 Comparison of Future (2028) Baseline versus NA-D-1 Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-D-1-A

TITLE:	Evaluate the new runway as an arrival runway. Designate Runways 18R/36L and 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures by turbojet aircraft between 7:00 a.m. and 10:00 p.m.
BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures in the daytime (7:00 a.m. to 10:00 p.m.). This measure is similar to NA-D-1 which would designate the new fourth parallel runway, Runway 01/19, as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures in the daytime. The intent of this measure is to reduce net residential noise impacts to the north and south of the Airport by shifting arrivals to the west of residential land uses. Refer to ***Exhibit E-14, Noise Compatibility Program Alternative NA-D-1-A***.
BENEFITS:	None
DRAWBACKS:	The measure would result in an increase in 12 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. This measure could be implemented in conjunction with NA-B-4-A for additional noise abatement benefits.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

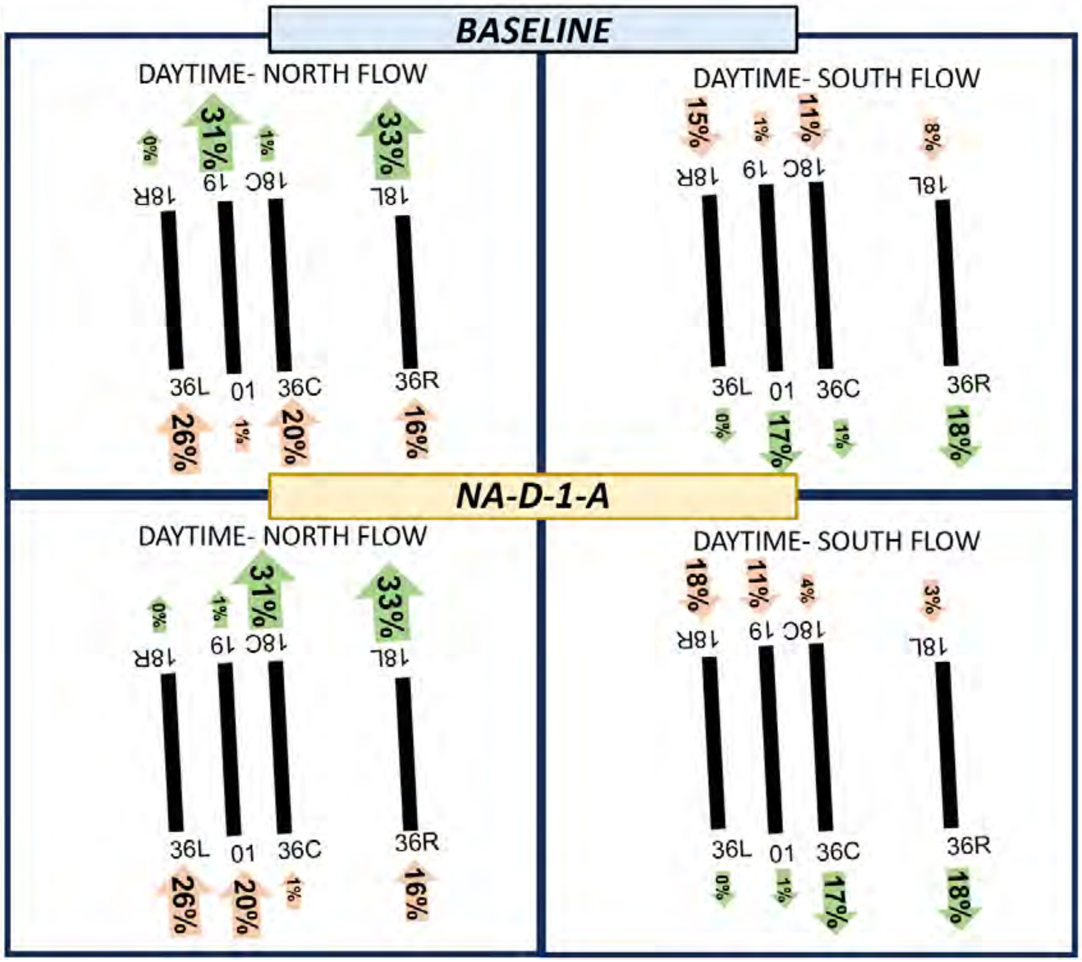
Table E-8 NA-D-1-A Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	98	0	0	98
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**255**	**0**	**0**	**255**
Population				
Total Population[1]	**717**	**0**	**0**	**717**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

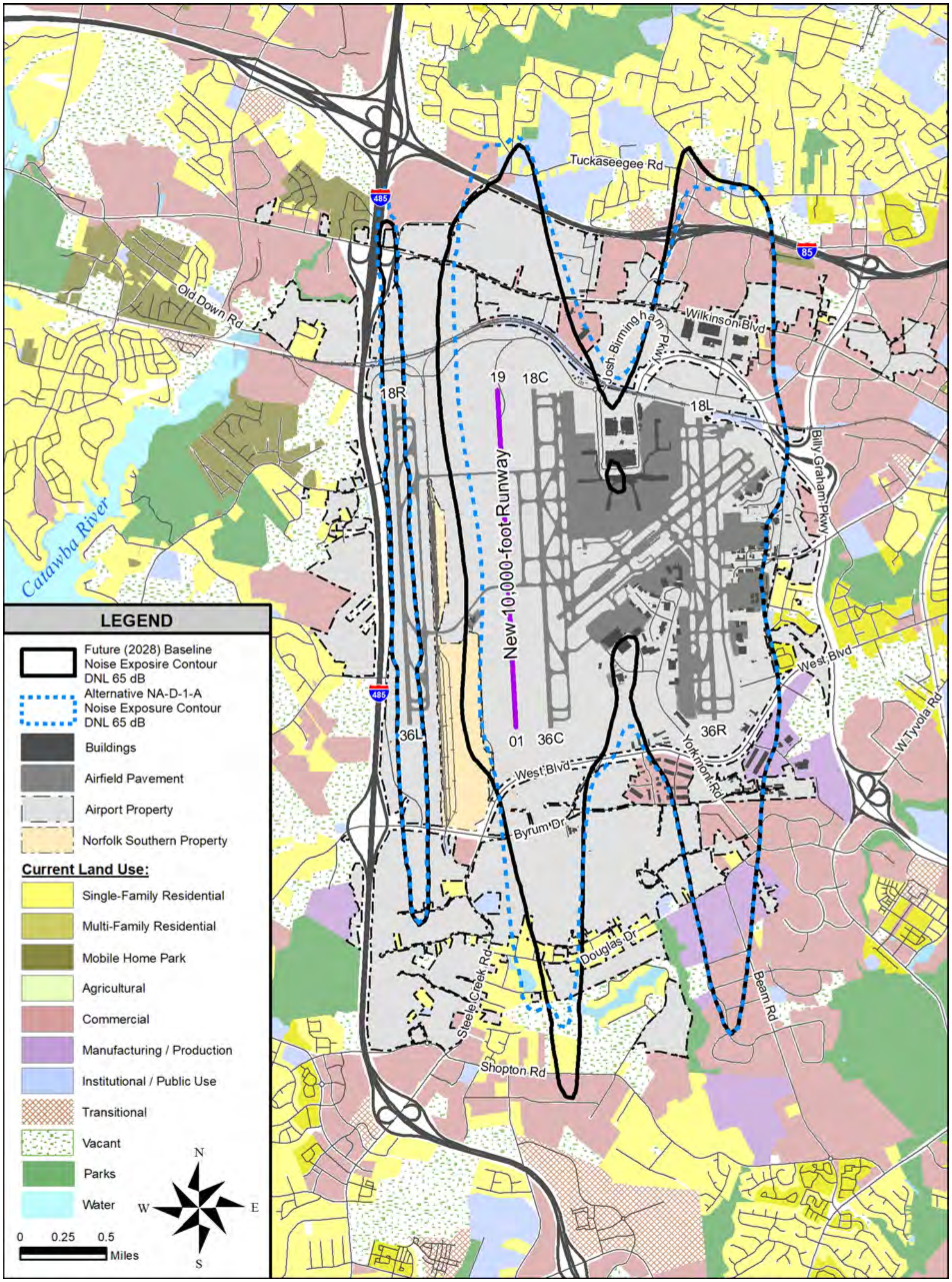
Source: Landrum & Brown, 2024.

Exhibit E-14 Noise Compatibility Program Alternative NA-D-1-A



Note: Green arrows denote departure operations and orange arrows denote arrival operations.
Source: Landrum & Brown, 2024

Exhibit E-15 Comparison of Future (2028) Baseline versus NA-D-1-A Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-D-2

TITLE:	At low periods, spread operations to avoid concentration of a particular mode of operation (e.g., most/all departures or most/all arrivals) to a single runway, leaving others underutilized for the same mode of operation. For example: Avoid sending all arrivals to Runway 18R while Runways 18L and 18C are held open for occasional departures.

BACKGROUND AND INTENT:	The intent of the measure is to spread operations during low periods of operations by avoiding concentration of a particular mode of operation on a runway to reduce net residential noise impacts.

BENEFITS:	None

DRAWBACKS:	During low periods of operation, the Airport currently spreads operations to avoid concentration of a particular mode of operation to a single runway, which is the stated goal of this measure. As such, the measure is already part of the Future (2028) Baseline as it is anticipated that the Airport would continue to operate this way in the future after construction of the new fourth parallel runway. Therefore, implementation of this measure would not result in a reduction of noise impacts within the DNL 65+ dB when compared to the Future (2028) Baseline.

COST TO IMPLEMENT:	None

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	Because the measure is already part of the Future (2028) Baseline, implementation would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

Noise Compatibility Program Alternative NA-D-3

TITLE:	Ensure that the new fourth parallel runway (Runway 01/19), Runway 18R/36L (for arrivals), and Runway 18C/36C (for departures) will never have more, in the aggregate, than [50%] of arrivals/departures over any single daily period.

BACKGROUND AND INTENT:	The intent of this measure is to spread operations on an average annual day to reduce net residential noise impacts.

BENEFITS:	None

DRAWBACKS:	The suggestion of caps on runways inherently creates barriers to implementation from a feasibility perspective because the Airport is a dynamic environment that may require the use of runways that would exceed the limits of this measure. To force caps and percentages into a complex system like the one at CLT would reduce operational capability and potentially reduce safety. As such, the measure is not feasible for implementation.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	Because the measure was found to not be feasible for implementation, this measure is **NOT RECOMMENDED** for further evaluation.

Noise Compatibility Program Alternative NA-D-4

TITLE:	Set guidelines that require a minimum allocation of departures for Runway 18R/36L for a given timeframe (e.g., over the course of a quarter or year), with the goal of achieving at least ten percent of daily departures on that runway.
BACKGROUND AND INTENT:	Runway 18R/36L was planned (location) and designed (length) to primarily be used as an arrival runway. While the runway has the capability to be used for departures, it is currently used for departures only under extenuating circumstances due to its location in relationship to the terminal area. The Future (2028) Baseline runway use indicates Runway 18R/36L would continue to be primarily used for arrivals. This measure would designate Runway 18R/36L as a departure runway for up to ten percent of departures on an average annual day. Refer to ***Exhibit E-16, Noise Compatibility Program Alternative NA-D-4***. The intent of this measure is to reduce net residential noise impacts to the north of the Airport by reducing departures north of Runway 18L/36R and the new fourth parallel runway, Runway 01/19, and increasing them over noise compatible land uses and major transportation corridors.
BENEFITS:	The measure would result in a decrease of 10 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
DRAWBACKS:	Implementation of this measure would require aircraft to routinely taxi across two active runways (Runway 18C/36C and Runway 01/19), which reduces the operational efficiency of those active runways due to the need for ATC to space operations to maintain adequate separation between aircraft taxiing across the runway(s) and aircraft on final approach. This would increase ATC workload and result in increased delays to ensure no runway incursions occur. Therefore, this measure is not considered feasible due to operational and safety concerns.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	Implementation of this measure would result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. However, the measure is not feasible due to operational and safety concerns. As such, this measure is **NOT RECOMMENDED** for further evaluation.

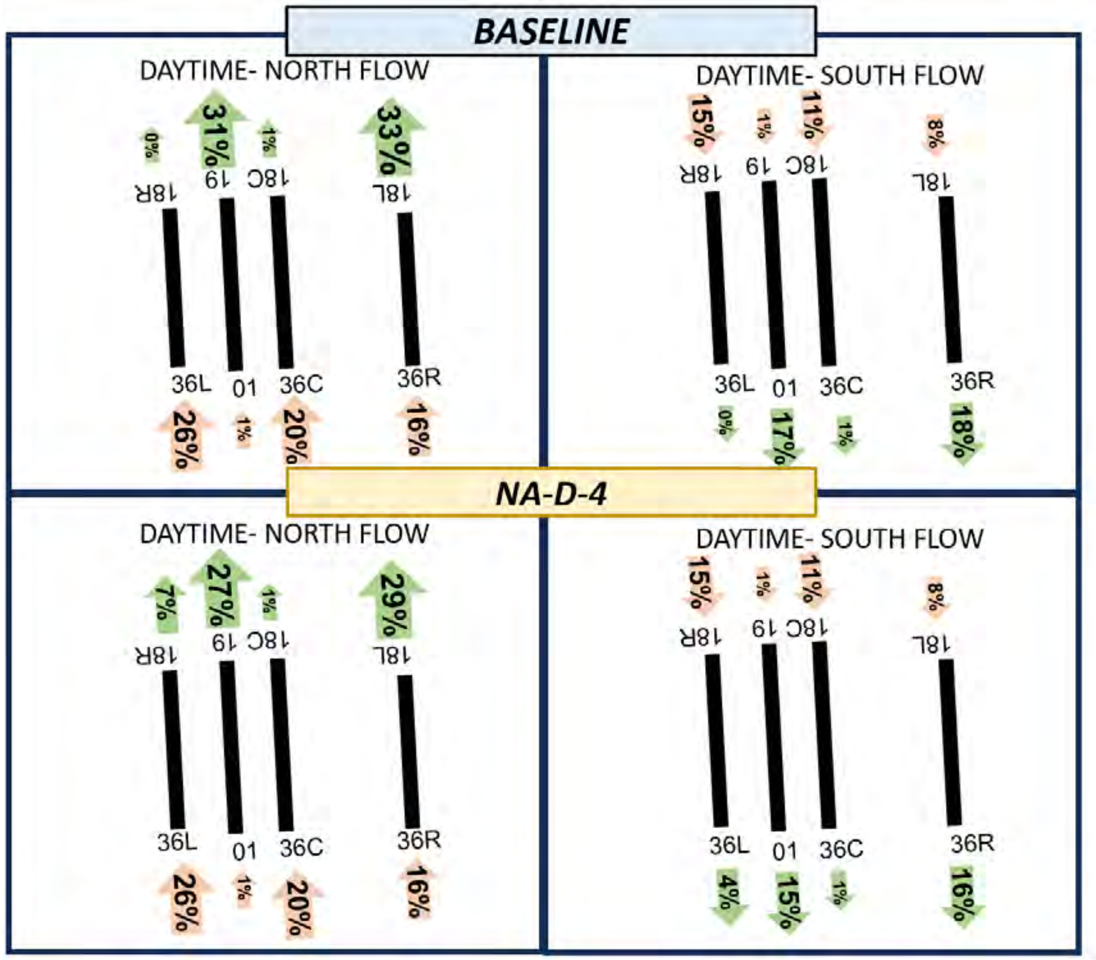
Table E-9 NA-D-4 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	76	0	0	76
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**233**	**0**	**0**	**233**
Population				
Total Population[1]	**659**	**0**	**0**	**659**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

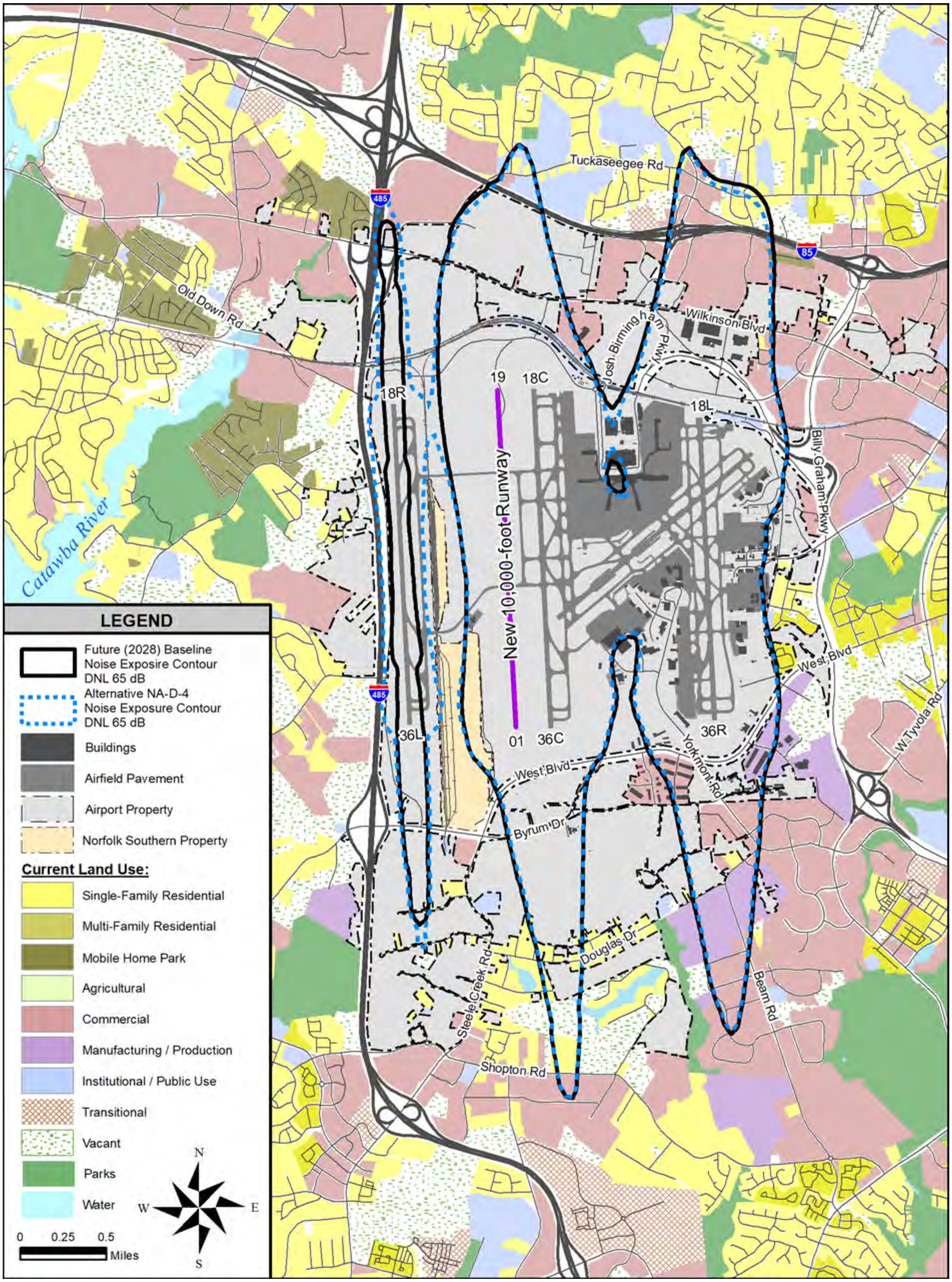
Source: Landrum & Brown, 2024.

Exhibit E-16 Noise Compatibility Program Alternative NA-D-4



Note: Green arrows denote departure operations and orange arrows denote arrival operations.
Source: Landrum & Brown, 2024

Exhibit E-17 Comparison of Future (2028) Baseline versus NA-D-4 Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-D-5

TITLE:	Between 7am-10pm, do not use the new fourth parallel runway (Runway 01/19) and Runway 18R/36L to receive arrivals in “dual stream” mode during non-peak periods.

BACKGROUND AND INTENT:	The intent of this measure is to prevent dual stream arrivals during non-peak periods to reduce net residential noise impacts to the north and south of the Airport.

BENEFITS:	None

DRAWBACKS:	Dual stream arrival operations take place at CLT during daytime arrival peaks when there is a high demand for arrivals. After the construction of the new fourth parallel runway, dual stream arrivals would only continue at the Airport during arrival peaks, as captured in the Future (2028) Baseline. Because the measure is already part of the Future (2028) Baseline, implementation would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour.

COST TO IMPLEMENT:	None

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

Noise Compatibility Program Alternative NA-D-6

TITLE:	Alternate use of runways so that no two adjacent runways will be used primarily for the same mode of operation (arrival or departure) over a daily period.

BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts by dispersing departure and arrival operations as much as possible.

BENEFITS:	None

DRAWBACKS:	Currently, no two adjacent runways are used primarily for the same mode of operation (west runway for arrivals, center runway for departures, and east runway for mixed operations). The new fourth parallel runway was evaluated in the Major Capacity Enhancement Projects Environmental Assessment (EA) and was approved as a primarily departure runway. As approved in the EA, the Airport would continue to have alternative modes of operation (west runway for arrivals, new fourth parallel runway for departures, center runway for arrivals, and east runway for mixed operations). As such, the runway use proposed in this measure was captured in the Future (2028) Baseline. Therefore, implementation of this measure would not result in a reduction of noise impacts within the DNL 65+ dB when compared to the Future (2028) Baseline

COST TO IMPLEMENT:	None

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

Noise Compatibility Program Alternative NA-D-7

TITLE:	Utilize Runway 01/19 and Runway 18C/36C primarily for departures and Runway 18R/36L and Runway 18L/36R primarily for arrivals.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures in the daytime (7:00 a.m. to 10:00 p.m.). This measure would designate the new fourth parallel runway, Runway 01/19, and Runway 18C/36C primarily for departures and Runway 18R/36L and Runway 18L/36R primarily for arrivals in the daytime. Refer to ***Exhibit E-18, Noise Compatibility Program Alternative NA-D-7***. The intent of this measure is to reduce net residential noise impacts to the north and south of the Airport by shifting arrivals to the west of residential land uses.

BENEFITS:	The measure would result in a decrease in 186 housing units and one school/daycare within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	The measure would result in an increase in 1 place of worship within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. Implementation of the measure would result in an increase in delay at the Airport when compared to the Future (2028) Baseline scenario. Arrival delays would increase during periods of high arrival demand due to the loss of a runway used for arrivals when compared to the Future (2028) Baseline.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Implementation of this measure would result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. However, the measure is not considered feasible due to operational concerns. As such, this measure is **NOT RECOMMENDED** for further evaluation.

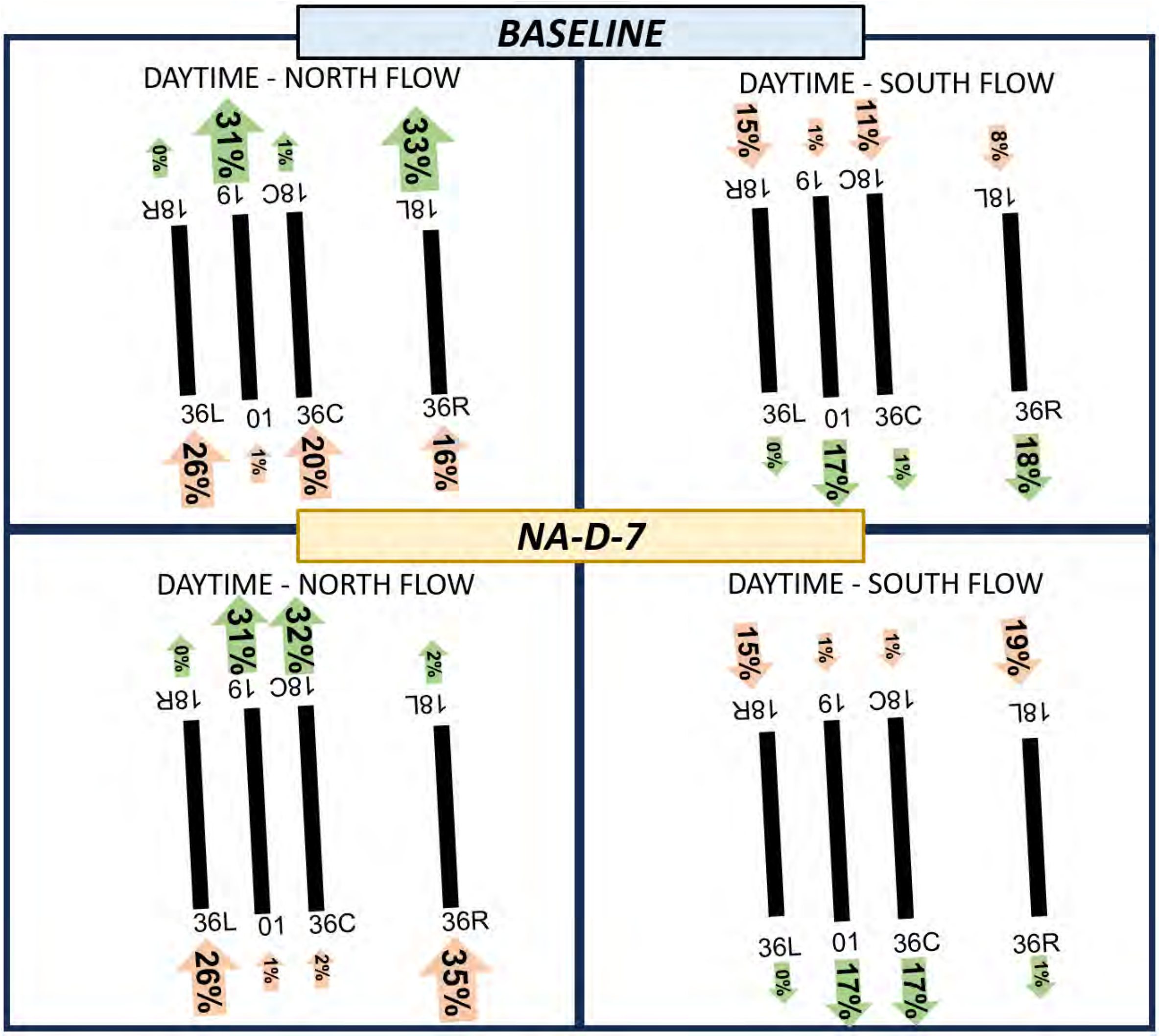
Table E-10 NA-D-7 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	57	0	0	57
Multi-Family Residential	0	0	0	0
Manufactured Home	0	0	0	0
Total Housing Units	**57**	**0**	**0**	**57**
Population				
Total Population[1]	**160**	**0**	**0**	**160**
Noise-Sensitive Facilities				
Schools / Educational Facilities	3	0	0	3
Churches / Places of Worship	5	0	0	5
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

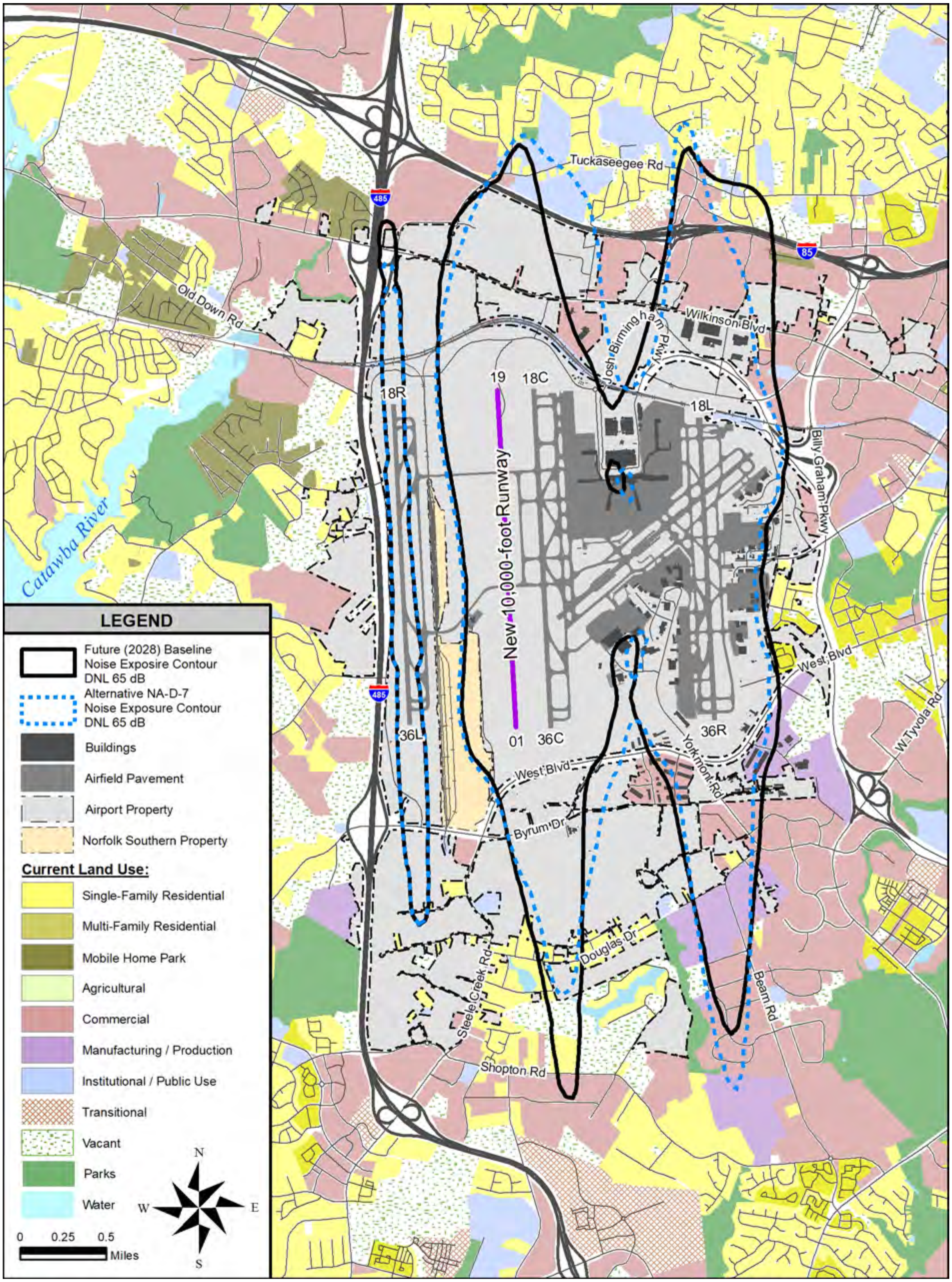
Source: Landrum & Brown, 2024.

Exhibit E-18 Noise Compatibility Program Alternative NA-D-7



Note: Green arrows denote departure operations and orange arrows denote arrival operations.
Source: Landrum & Brown, 2024

Exhibit E-19 Comparison of Future (2028) Baseline versus NA-D-7 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-D-8

TITLE:	Utilize Runway 01/19 and Runway 18C/36C for both arrivals and departures.
BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates the new fourth parallel runway, Runway 01/19, would be primarily used for departures and Runway 18C/36C primarily for arrivals in the daytime (7:00 a.m. to 10:00 p.m.). This measure would designate Runway 01/19 and Runway 18C/36C for both arrival and departures in the daytime. Refer to ***Exhibit E-20, Noise Compatibility Program Alternative NA-D-8***. The intent of this measure is to reduce net residential noise impacts to the south of the Airport by shifting arrivals to the east over noise compatible land uses and to the north of the Airport by shifting departures to the west of residential land uses.
BENEFITS:	None
DRAWBACKS:	The measure would result in an increase in 15 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

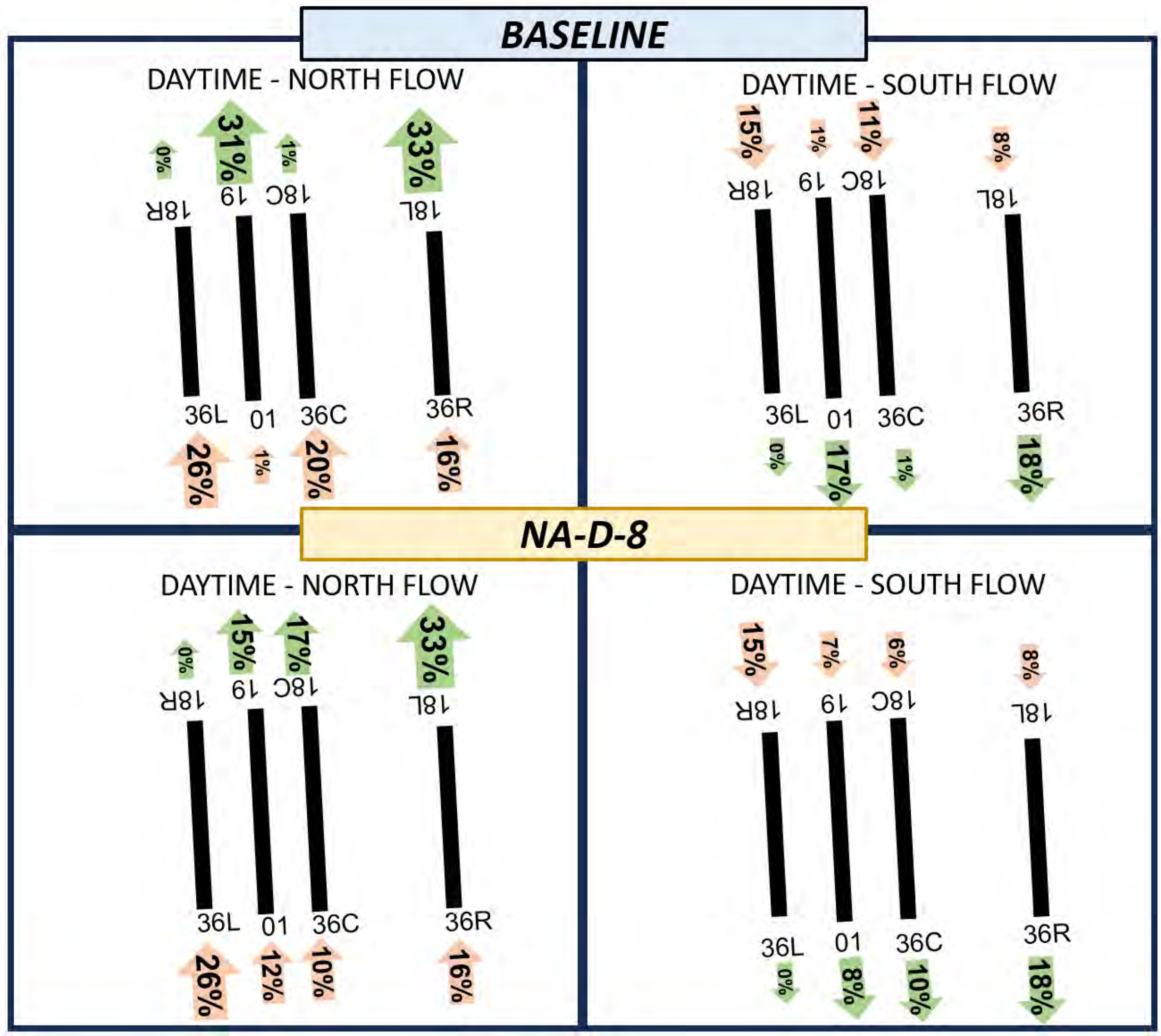
Table E-11 NA-D-8 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	101	0	0	101
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**258**	**0**	**0**	**258**
Population				
Total Population[1]	**726**	**0**	**0**	**726**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

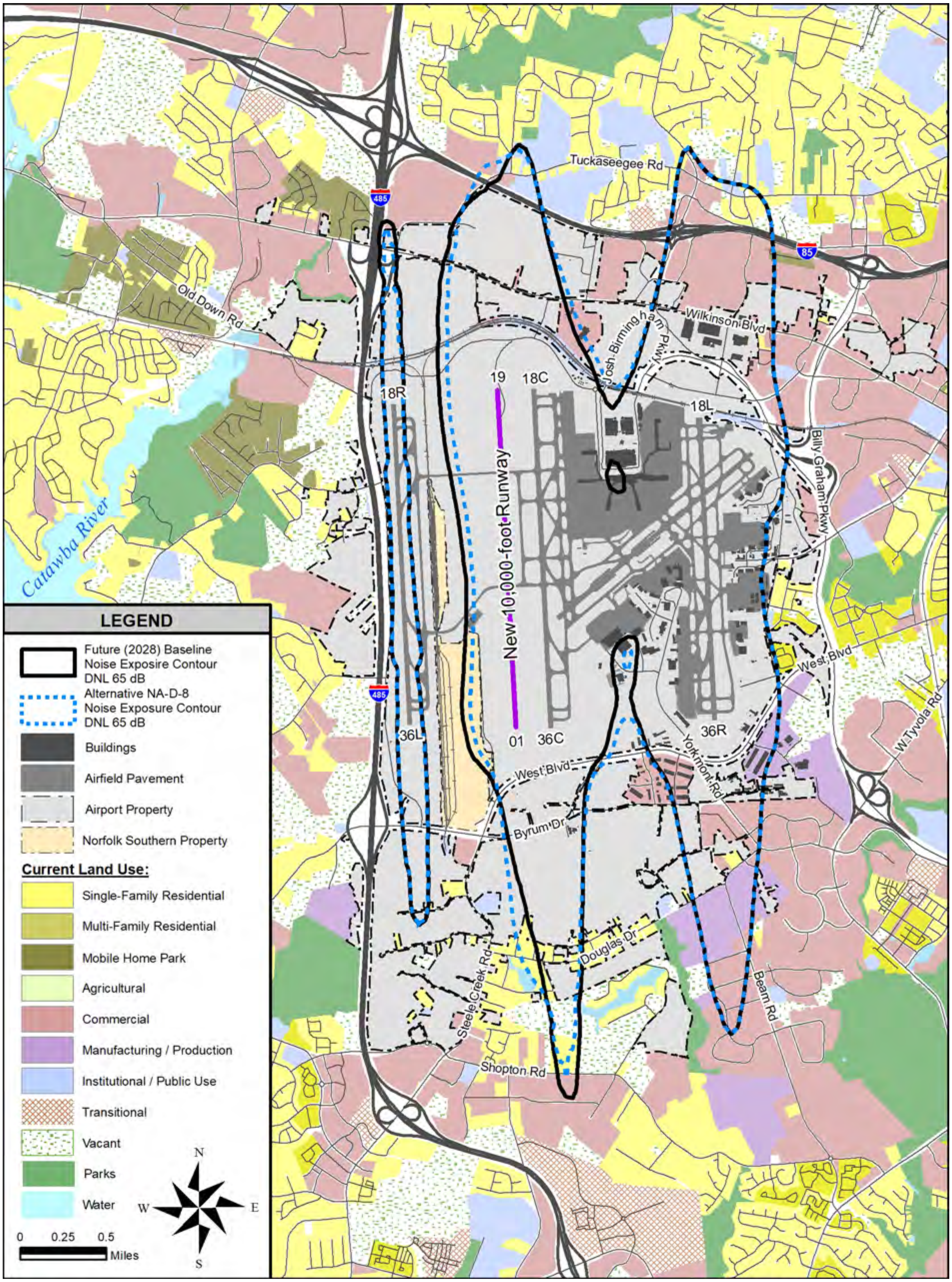
Source: Landrum & Brown, 2024.

Exhibit E-20 Noise Compatibility Program Alternative NA-D-8



Note: Green arrows denote departure operations and orange arrows denote arrival operations.
Source: Landrum & Brown, 2024

Exhibit E-21 Comparison of Future (2028) Baseline versus NA-D-8 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-E-1

TITLE:	Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates Runway 36C and Runway 36R would be primarily used for north flow arrivals in the nighttime (10:00 p.m. to 7:00 a.m.).[1] This measure would designate Runway 36R and Runway 36L primarily for nighttime north flow arrivals. Refer to **Exhibit E-22, *Noise Compatibility Program Alternative NA-E-1***. The intent of the measure is to shift the nighttime overflights over residential land uses off Douglas Drive and Shopton Road to noise-compatible land uses over Airport property west of Steele Creek Road and to the east off Beam Road.

BENEFITS:	The measure would result in a decrease in 13 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	None

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure is **RECOMMENDED** for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments.

1 The runway use patterns for the Future (2028) Baseline are based on data from the Capacity EA that was developed in consultation with FAA ATC personnel and review of airfield simulation modeling.

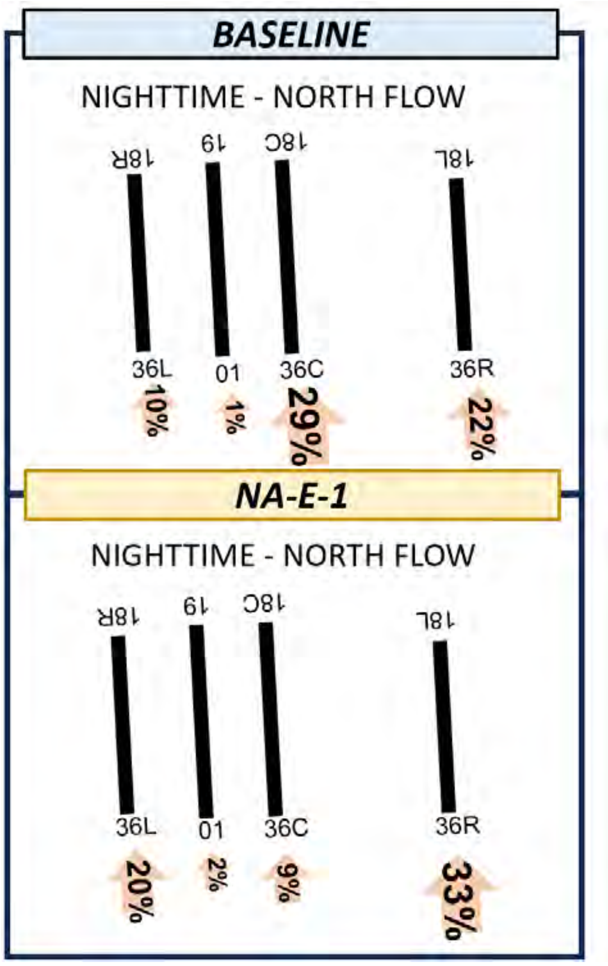
Table E-12 NA-E-1 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	73	0	0	73
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**230**	**0**	**0**	**230**
Population				
Total Population[1]	**655**	**0**	**0**	**655**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

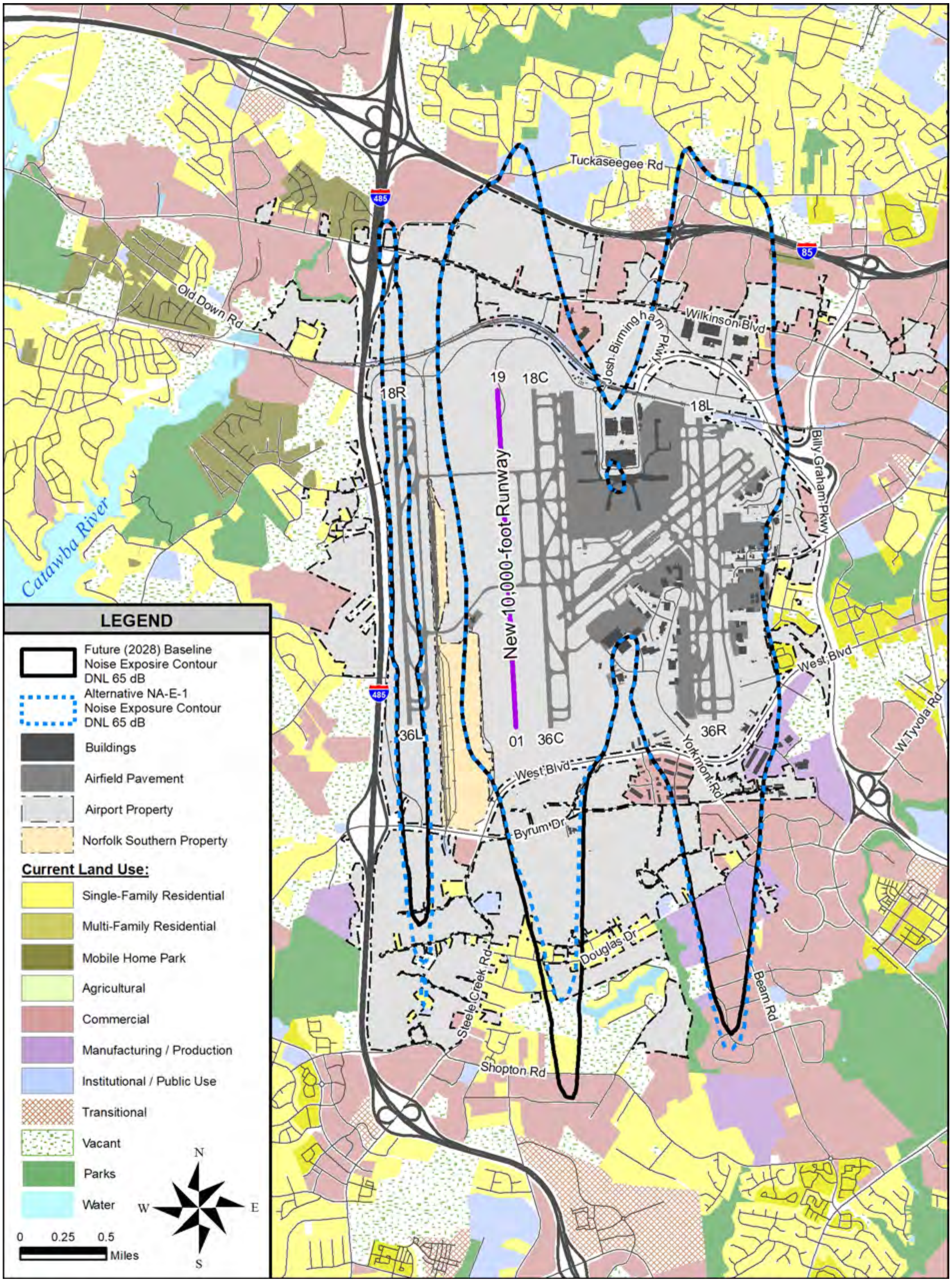
Source: Landrum & Brown, 2024.

Exhibit E-22 Noise Compatibility Program Alternative NA-E-1



Note: Orange arrows denote arrival operations.
Source: Landrum & Brown, 2024

Exhibit E-23 Comparison of Future (2028) Baseline versus NA-E-1 Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-E-2

TITLE:	Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates Runway 18C and Runway 18L would be primarily used for south flow arrivals in the nighttime (10:00 p.m. to 7:00 a.m.).[2] This measure would designate Runway 18R, Runway 18C, and Runway 18L for south flow arrivals in the nighttime. Refer to **Exhibit E-24, *Noise Compatibility Program Alternative NA-E-2***. The intent of this measure is to spread out south flow arrivals in the nighttime to reduce the nighttime traffic over residential land uses off Tuckaseegee Road, Westwood Drive, and Little Rock Road. In turn, this would increase nighttime arrival overflights over Interstate 485 and Airport property.

BENEFITS:	The measure would result in a decrease in 6 housing units and 1 school/daycare within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	None

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure is **RECOMMENDED** for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments.

2 The runway use patterns for the Future (2028) Baseline are based on data from the Capacity EA that was developed in consultation with FAA ATC personnel and review of airfield simulation modeling.

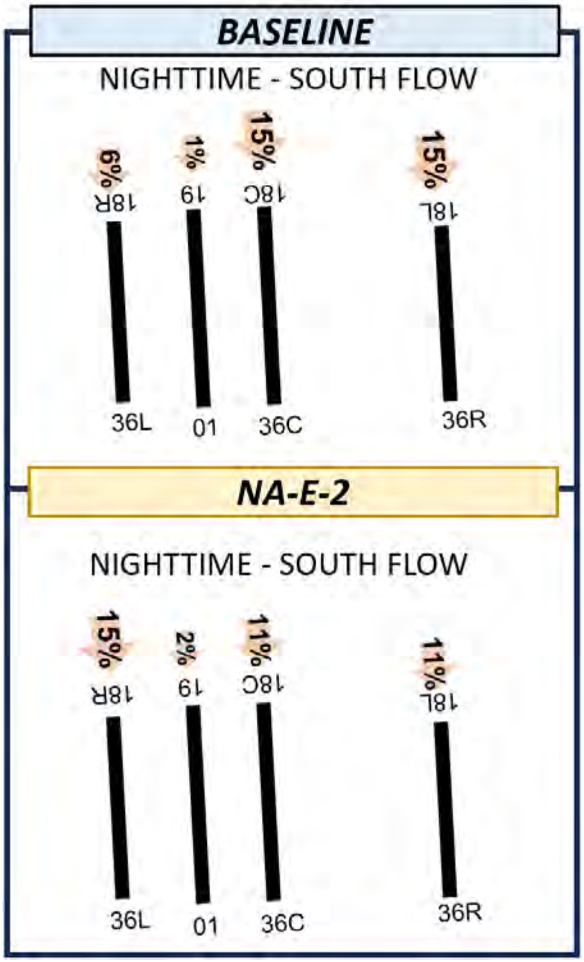
Table E-13 NA-E-2 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	80	0	0	80
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**237**	**0**	**0**	**237**
Population				
Total Population[1]	**670**	**0**	**0**	**670**
Noise-Sensitive Facilities				
Schools / Educational Facilities	3	0	0	3
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

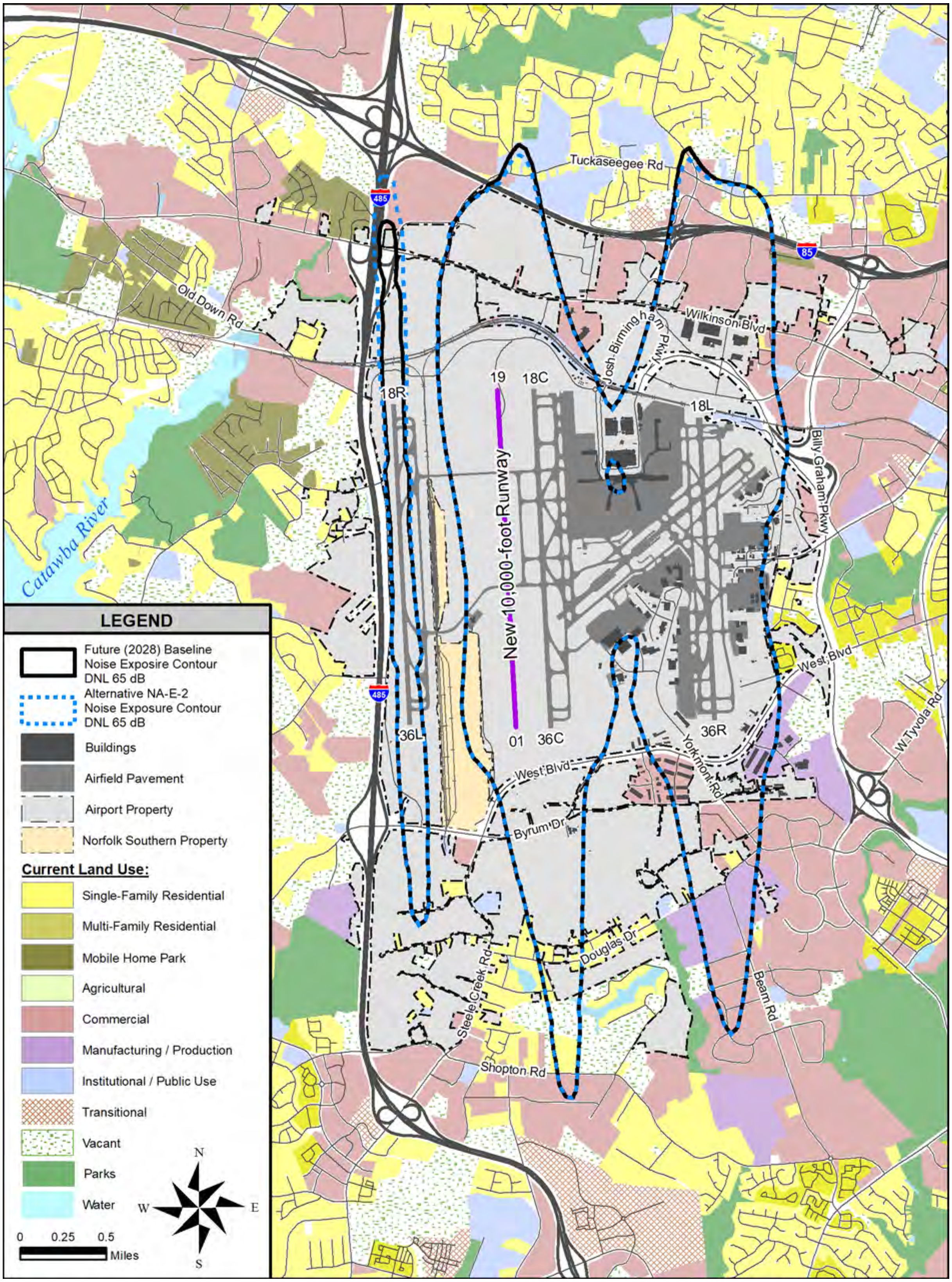
Source: Landrum & Brown, 2024.

Exhibit E-24   Noise Compatibility Program Alternative NA-E-2



Note:	Green arrows denote departure operations and orange arrows denote arrival operations.
Source:	Landrum & Brown, 2024

Exhibit E-25 Comparison of Future (2028) Baseline versus NA-E-2 Noise Exposure Contour



Source: Landrum & Brown, 2024

Noise Compatibility Program Alternative NA-E-3

TITLE:	Focus nighttime north-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 36R). Due to their close proximity, consider Runways 1/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates Runway 36C and Runway 36R would be primarily used for nighttime (10:00 p.m. to 7:00 a.m.) north flow arrivals. This measure would designate Runway 36R as the primary runway for nighttime north flow arrivals. Refer to **Exhibit E-26, *Noise Compatibility Program Alternative NA-E-3***. The intent of this measure is to shift nighttime arrival traffic east of residential land uses south of Runway 36C and 36L towards noise-compatible land use off Beam Road.

BENEFITS:	The measure would result in a decrease in 14 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	None

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure is **RECOMMENDED** for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments.

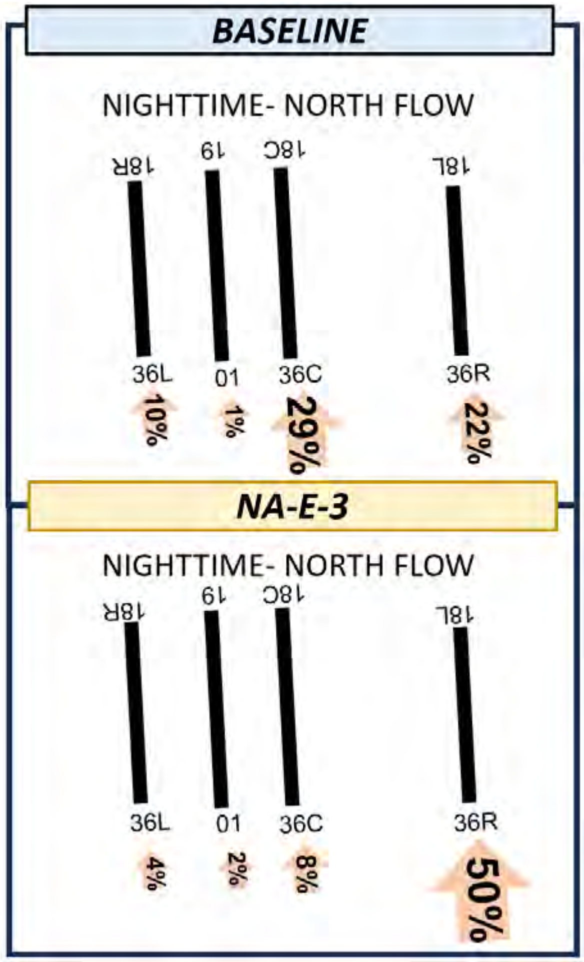
Table E-14 NA-E-3 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	72	0	0	72
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**229**	**0**	**0**	**229**
Population				
Total Population[1]	**652**	**0**	**0**	**652**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

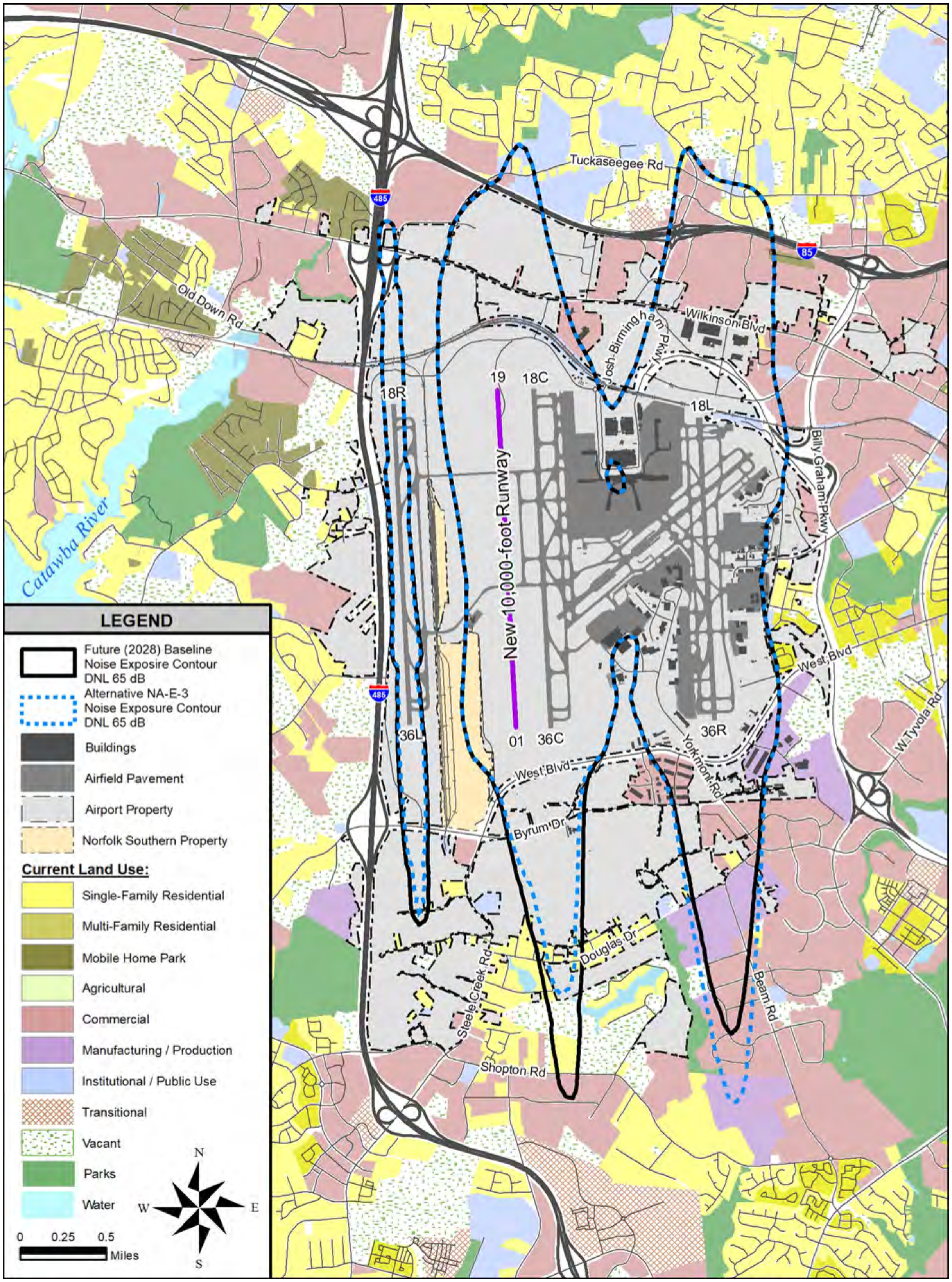
Source: Landrum & Brown, 2024.

Exhibit E-26 Noise Compatibility Program Alternative NA-E-3



Note: Green arrows denote departure operations and orange arrows denote arrival operations.
Source: Landrum & Brown, 2024

Exhibit E-27 Comparison of Future (2028) Baseline versus NA-E-3 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-E-4

TITLE:	Focus nighttime south-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 18L). Due to their close proximity, consider Runways 01/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.

BACKGROUND AND INTENT:	The Future (2028) Baseline runway use indicates Runway 18C and Runway 18L would be primarily used for nighttime (10:00 p.m. to 7:00 a.m.) south flow arrivals. This measure would designate Runway 18L as the primary runway for nighttime north flow arrivals. The intent of this measure is to shift nighttime arrival traffic east of residential land uses north of Runway 18C.

BENEFITS:	None

DRAWBACKS:	The measure would result in an increase in 28 housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would result in an increase in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

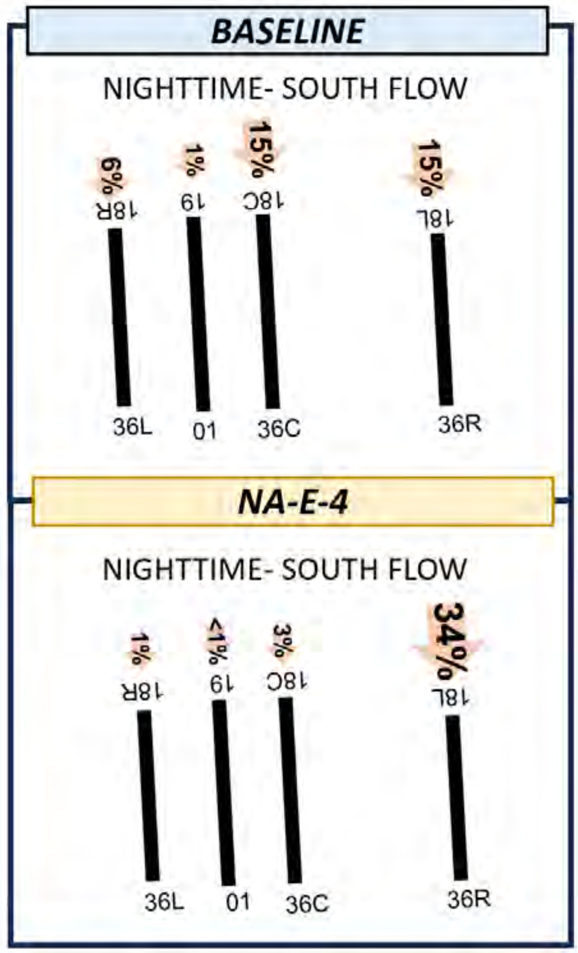
Table E-15 NA-E-4 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	114	0	0	114
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**271**	**0**	**0**	**271**
Population				
Total Population[1]	**766**	**0**	**0**	**766**
Noise-Sensitive Facilities				
Schools / Educational Facilities	2	0	0	2
Churches / Places of Worship	2	0	0	2
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

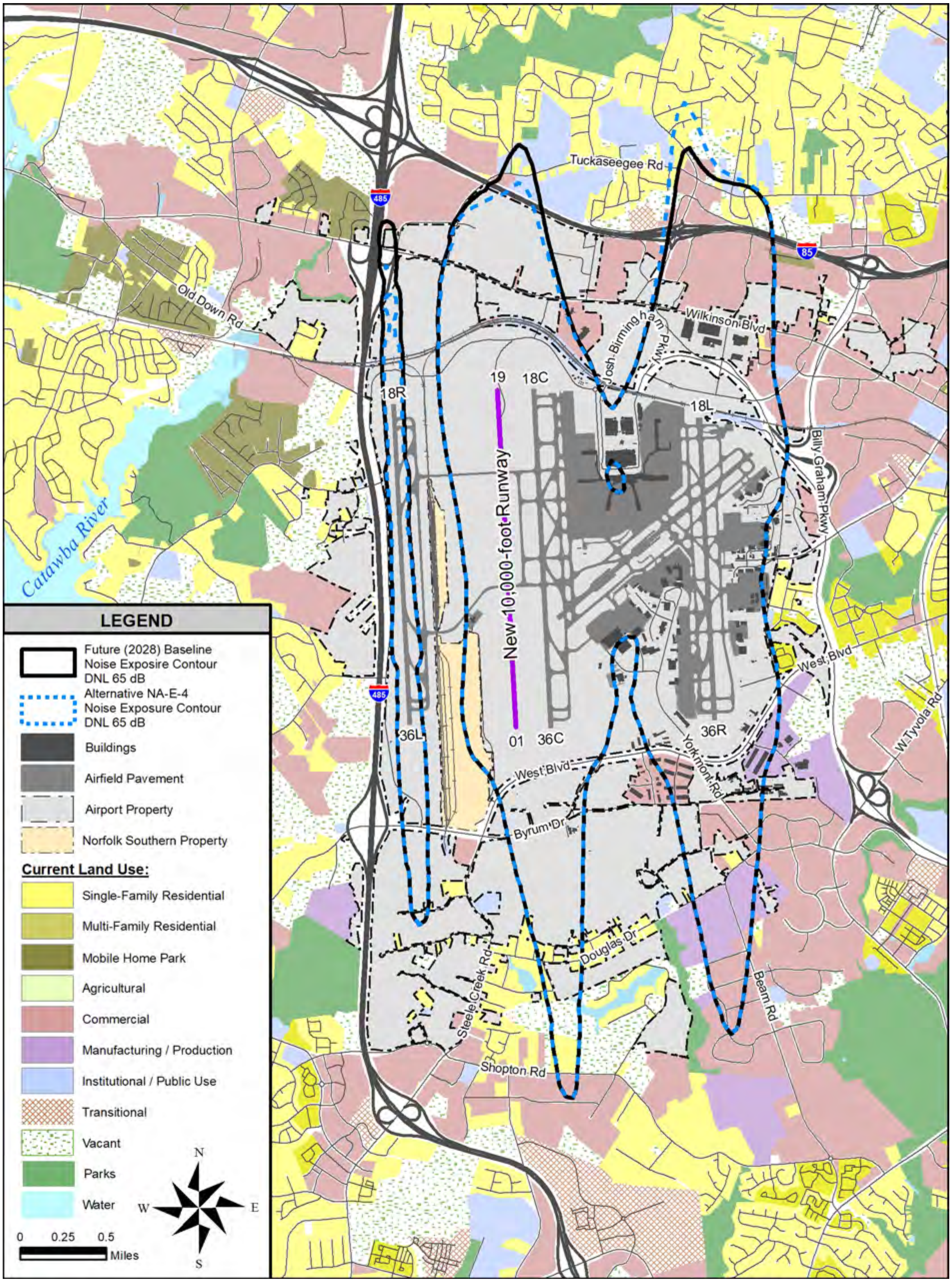
Source: Landrum & Brown, 2024.

Exhibit E-28 Noise Compatibility Program Alternative NA-E-4



Note: Green arrows denote departure operations and orange arrows denote arrival operations.
Source: Landrum & Brown, 2024

Exhibit E-29 Comparison of Future (2028) Baseline versus NA-E-4 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-F-1

TITLE:	Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.
BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts north of the Airport by providing additional flight corridors over noise compatible land uses. This measure would keep existing headings as follows: • Runway 36R: 25° • Runway 36L: 315° This measure would add divergent headings as follows: • Runway 36R: 85° heading to follow the Wilkinson Boulevard corridor and 55° & 70° heading to follow the Interstate 85 corridor • Runway 36C and Runway 01: Implement the existing Runway 36C's approved 330° heading, 345° heading to follow the I-85/485 Interchange and follow the I-485 corridor, 305° heading to follow the Wilkinson Boulevard corridor Refer to **Exhibit E-30, *Existing Initial Headings at CLT*** for the existing departure headings and **Exhibit E-31, *Noise Compatibility Program Alternative NA-F-1***. Divergent headings for Runway 36R departures would reduce noise impacts on homes off Tuckaseegee Road and direct more flights over transportation corridors and commercial and industrial land uses. The divergent heading for Runway 01 and Runway 36C departures would direct more flights over Airport property, transportation corridors and commercial and industrial land uses. This measure assumes the runway use for the Future (2028) Baseline which designates Runway 01 and Runway 36R for daytime departure operations and Runway 36C and Runway 36R for nighttime departure operations. Additionally, Runway 36C would be used for departures in the daytime if Runway 01 could not be used for reasons of operational necessity. As such, headings proposed for Runway 01 are also proposed for Runway 36C. Refer to Appendix E for more information.
BENEFITS:	The measure would result in a decrease in five housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
DRAWBACKS:	NA-F-2 is an option to this measure.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure is **RECOMMENDED** for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments.

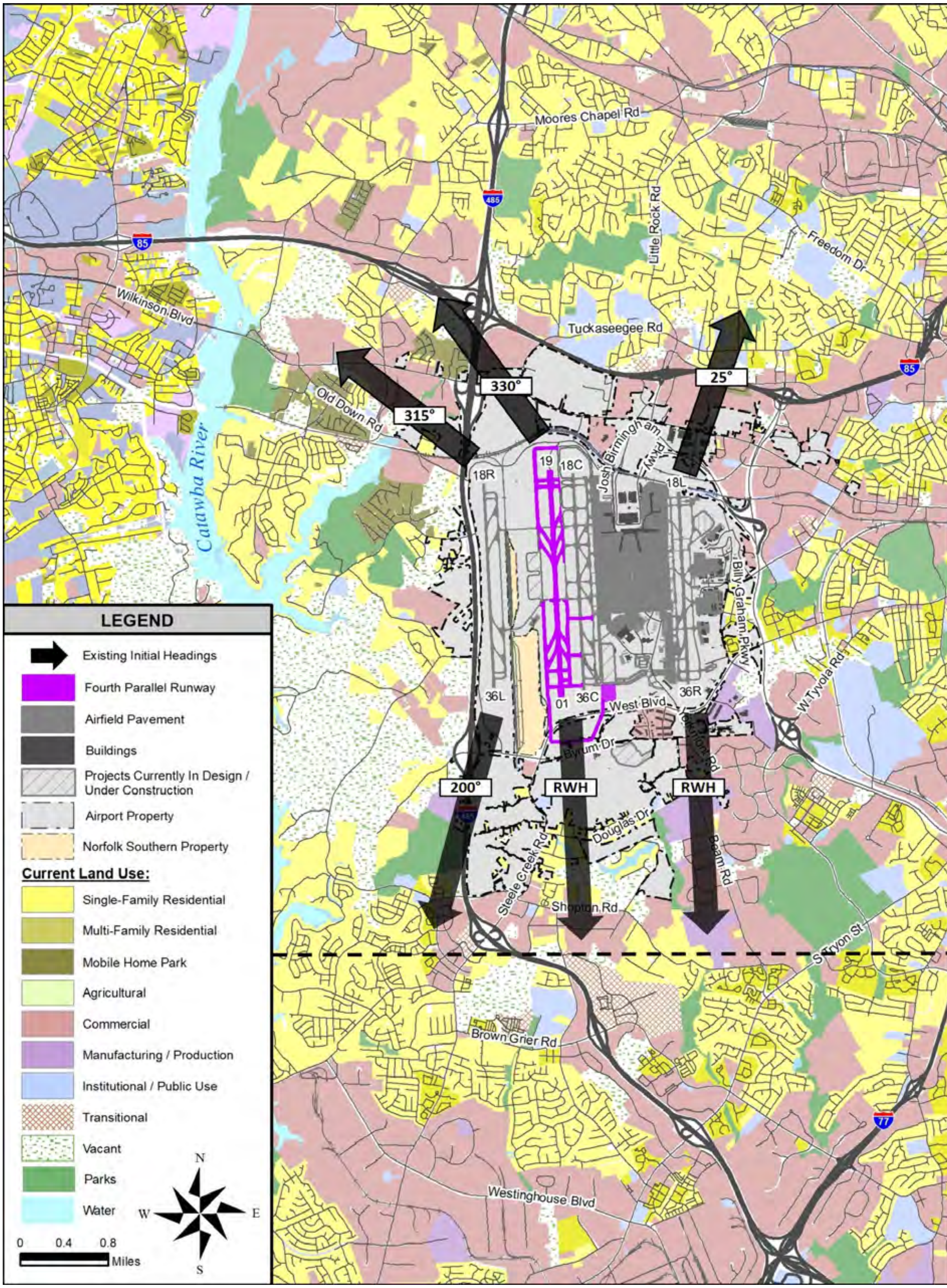
Table E-16 NA-F-1 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	81	0	0	81
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**238**	**0**	**0**	**238**
Population				
Total Population[1]	**673**	**0**	**0**	**673**
Noise-Sensitive Facilities				
Schools / Educational Facilities	3	0	0	3
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

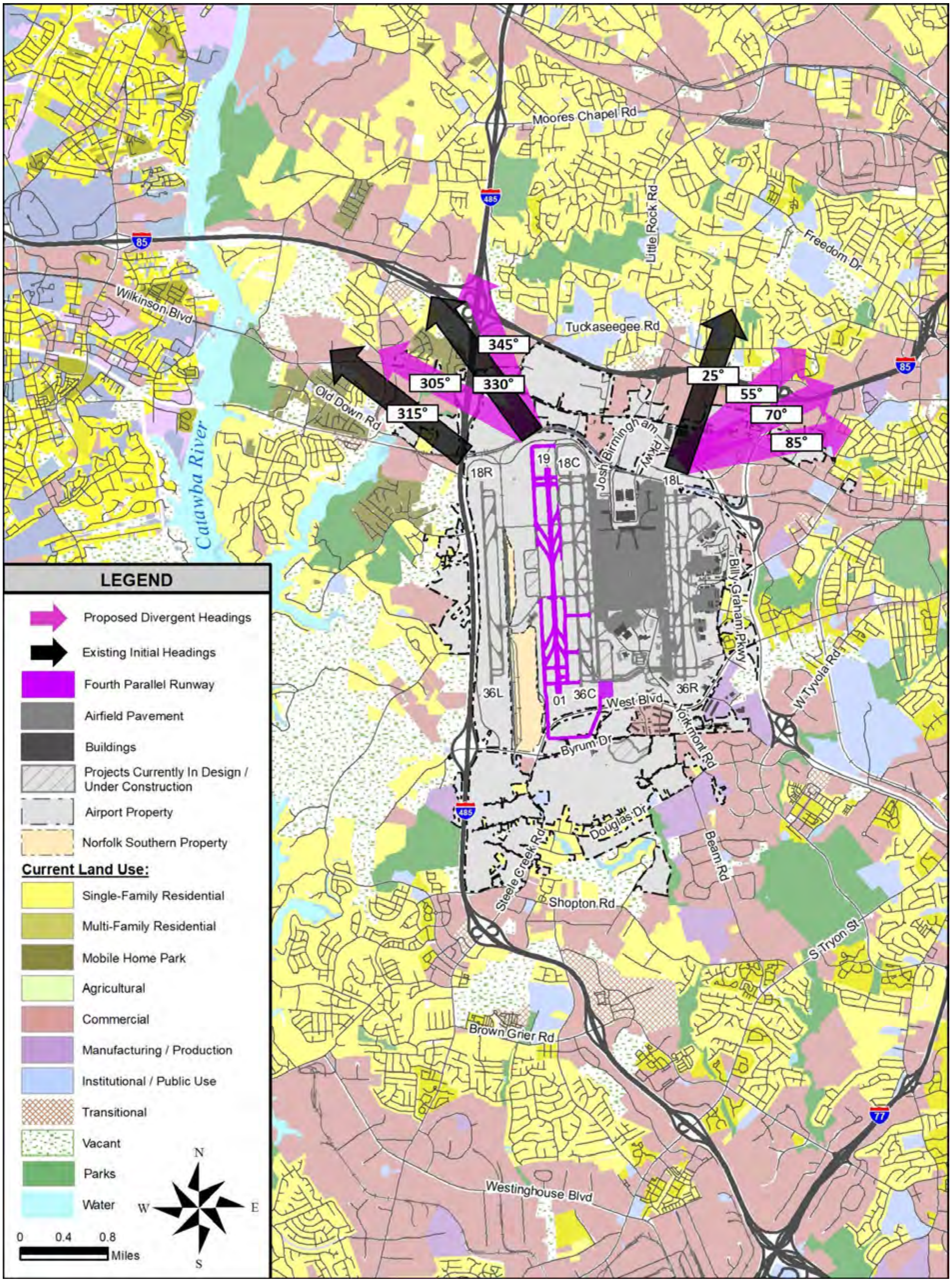
Source: Landrum & Brown, 2024.

Exhibit E-30 Existing Initial Headings at CLT



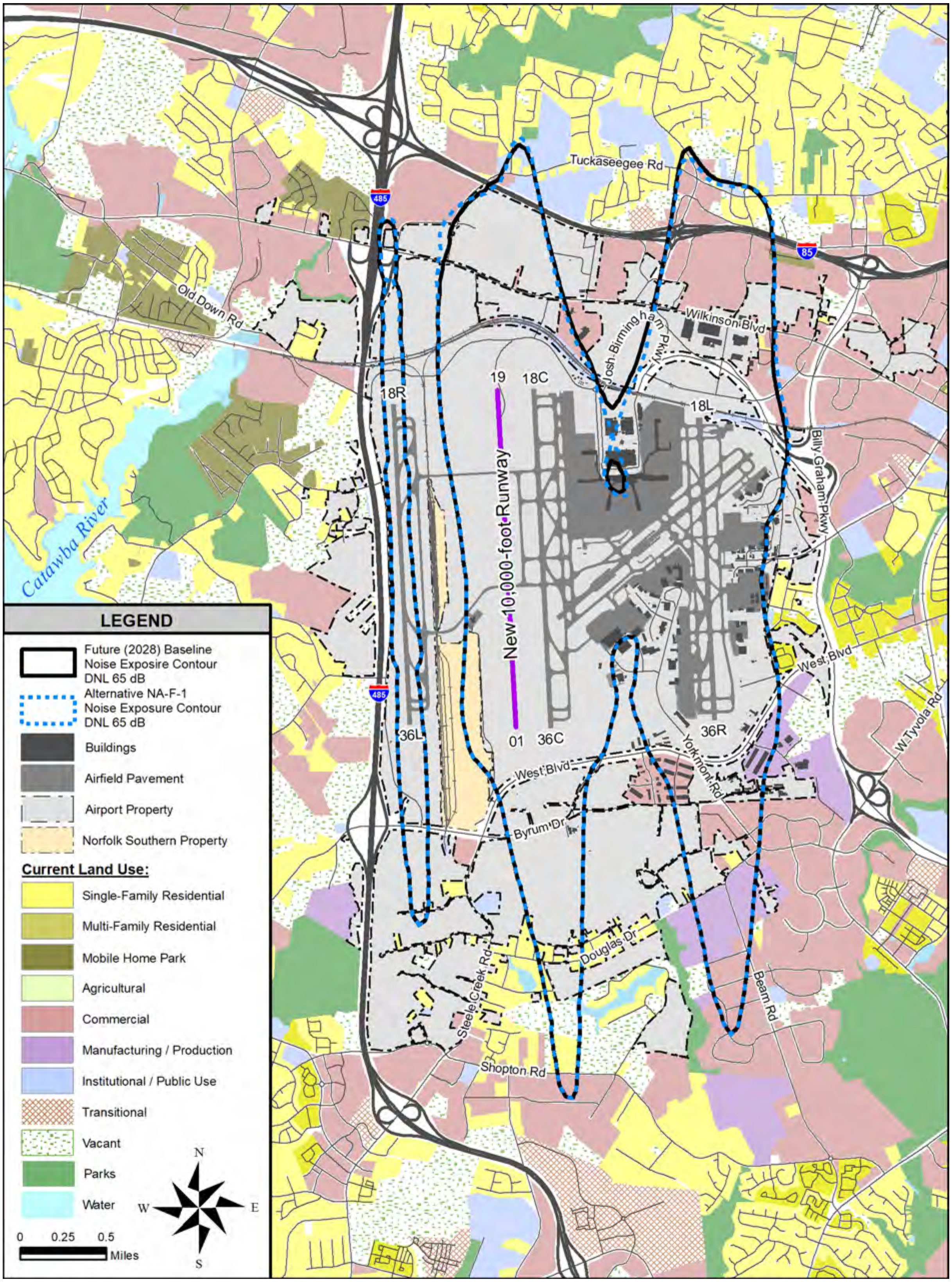
Source: Landrum & Brown, 2024.

Exhibit E-31 Noise Compatibility Program Alternative NA-F-1



Source: Landrum & Brown, 2024.

Exhibit E-32 Comparison of Future (2028) Baseline versus NA-F-1 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-F-2

TITLE:	Maximize the number of divergent headings for north flow operations while maintaining a 15° separation between headings.

BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts north of the Airport by providing additional flight corridors over as wide of an area as possible. This measure would replace the existing headings with the following divergent headings: • Runway 36R: Runway Heading (RWH), 20°, 35°, 50°, 65°, 80° • Runway 36C and Runway 01: RWH, 345°, 330°, 315°, 300°, 285° Refer to **Exhibit E-32, *Noise Compatibility Program Alternative NA-F-2*** for the proposed headings. Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 01 and Runway 36R for daytime departure operations and Runway 36C and Runway 36R for nighttime departure operations. Additionally, Runway 36C would be used for departures in the daytime if Runway 01 could not be used for reasons of operational necessity. As such, headings proposed for Runway 01 are also proposed for Runway 36C. *While a straight-out heading is identified for Runways 36R and 01 (or 36C), these headings cannot be used simultaneously because a 15-degree separation is required per 7110.65Z.*

BENEFITS:	The measure would result in a decrease in two housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	NA-F-1 is an option to this measure

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure is **RECOMMENDED** for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments.

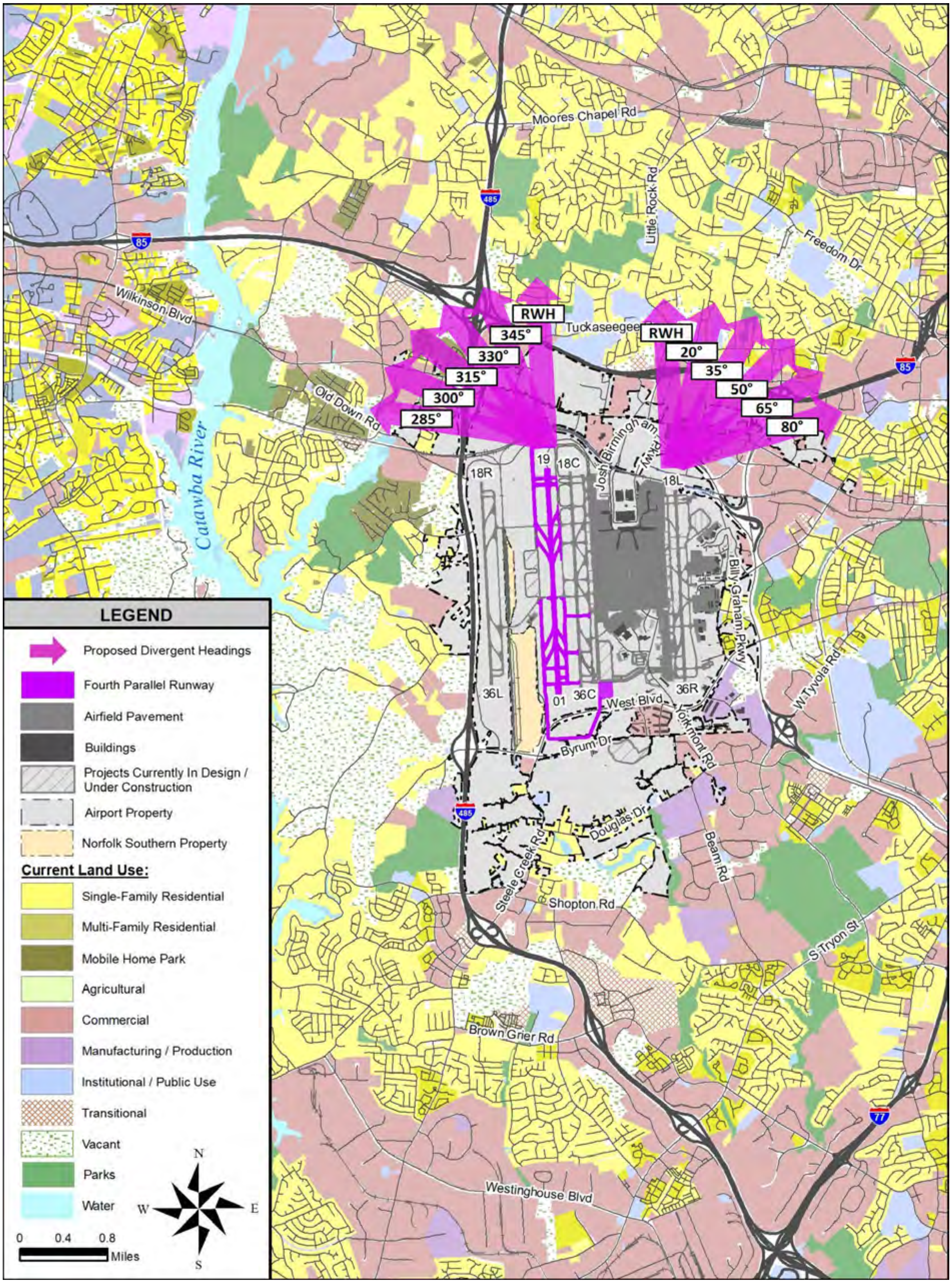
Table E-17 NA-F-2 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	84	0	0	84
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**241**	**0**	**0**	**241**
Population				
Total Population[1]	**682**	**0**	**0**	**682**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

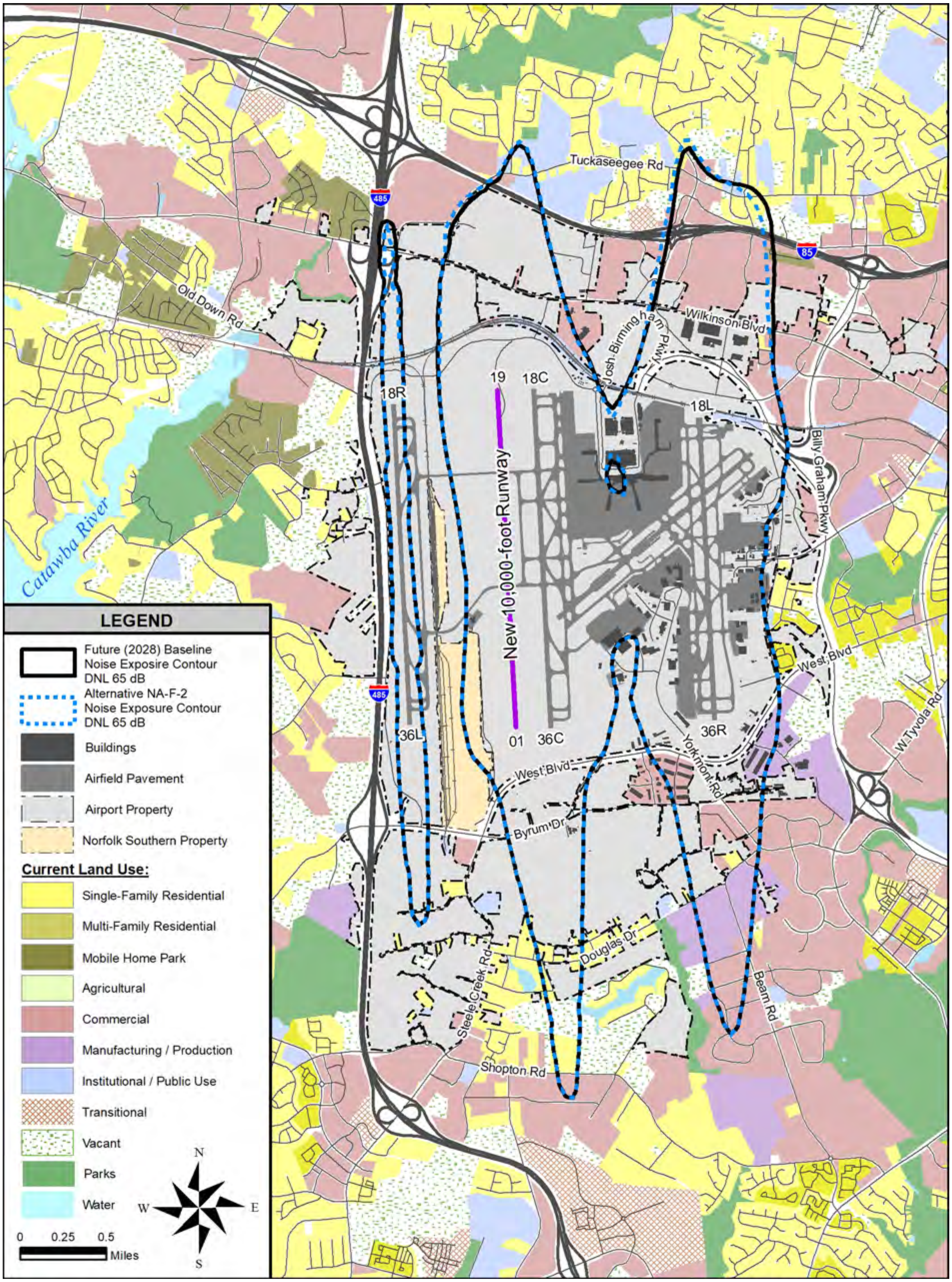
Source: Landrum & Brown, 2024.

Exhibit E-33 Noise Compatibility Program Alternative NA-F-2



Source: Landrum & Brown, 2024.

Exhibit E-34 Comparison of Future (2028) Baseline versus NA-F-2 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-G-1

TITLE:	Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on the new fourth parallel runway, Runway 01/19 and the existing Runway 18C/36C.
BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts to the south of the Airport by providing additional flight corridors over noise compatible land uses. The measure would keep the existing headings and implement divergent headings for Runway 18L and Runway 18R departures that would direct more flights over transportation corridors and commercial and industrial land uses. The measure would keep existing headings as follows: • Runway 18R: 200° heading • Runway 18L: RWH° The measure would add divergent headings as follows: • Runway 18R (remove 2-mile restriction): 220° heading to follow the Garrison Road corridor • Runway 18C and Runway 19 (keep 2-mile restriction): Implement the existing Runway 18C's approved RWH • Runway 18L (remove 2-mile restriction): 120° heading to follow the Billy Graham Parkway corridor, 150° heading and 165° heading to follow the W Tyvola Road corridor Refer to **Exhibit E-35, *Noise Compatibility Program Alternative NA-G-1***. Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 19 are also proposed for Runway 18C. *While a straight-out heading is identified for Runways 18L and 19, these headings cannot be used simultaneously because a 15° separation is required per 7110.65Z.*
BENEFITS:	The measure would not result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
DRAWBACKS:	NA-G-2, NA-G-3, and NA-G-4 are options to this measure.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

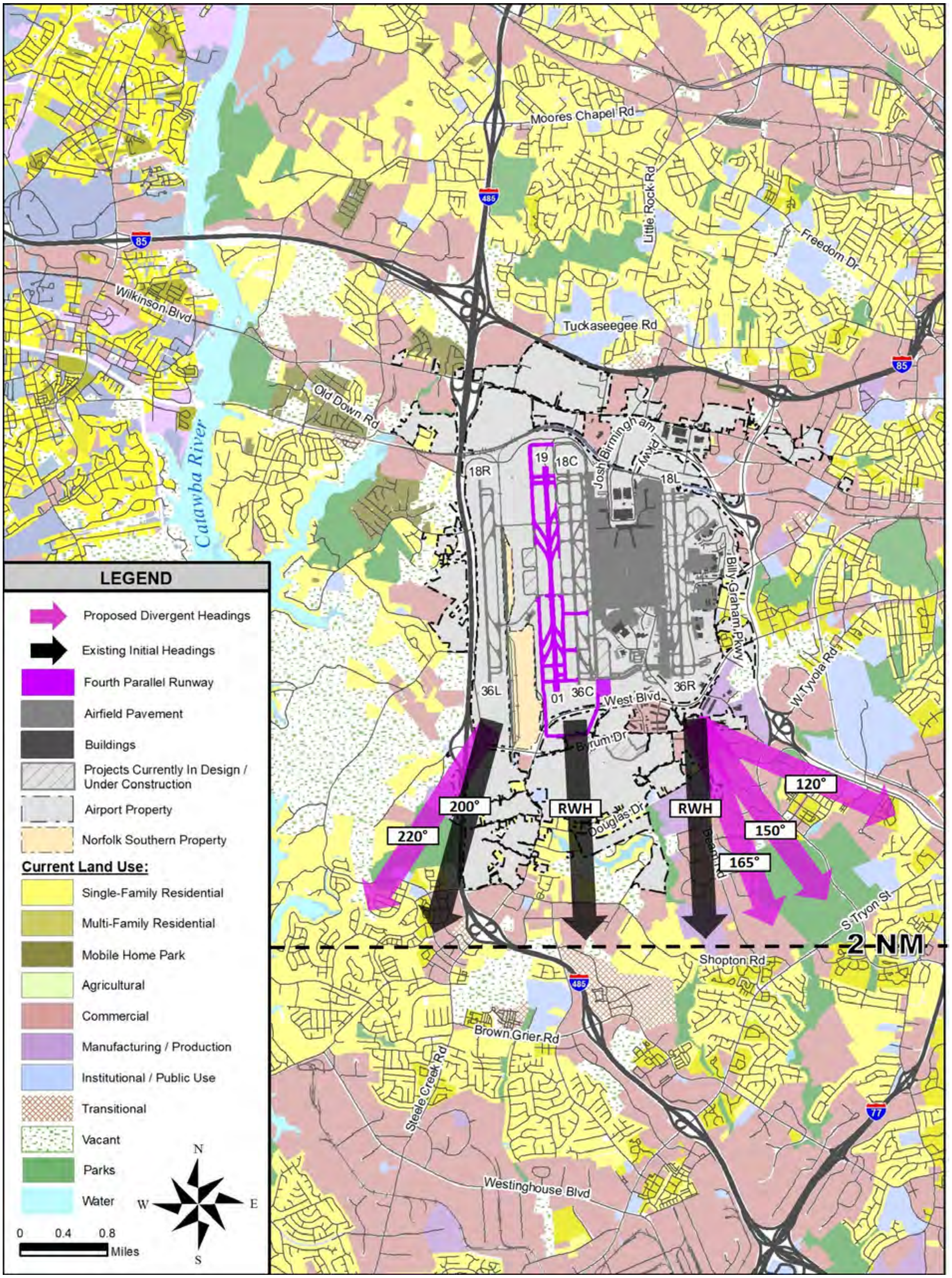
Table E-18 NA-G-1 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	86	0	0	86
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**243**	**0**	**0**	**243**
Population				
Total Population[1]	**687**	**0**	**0**	**687**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

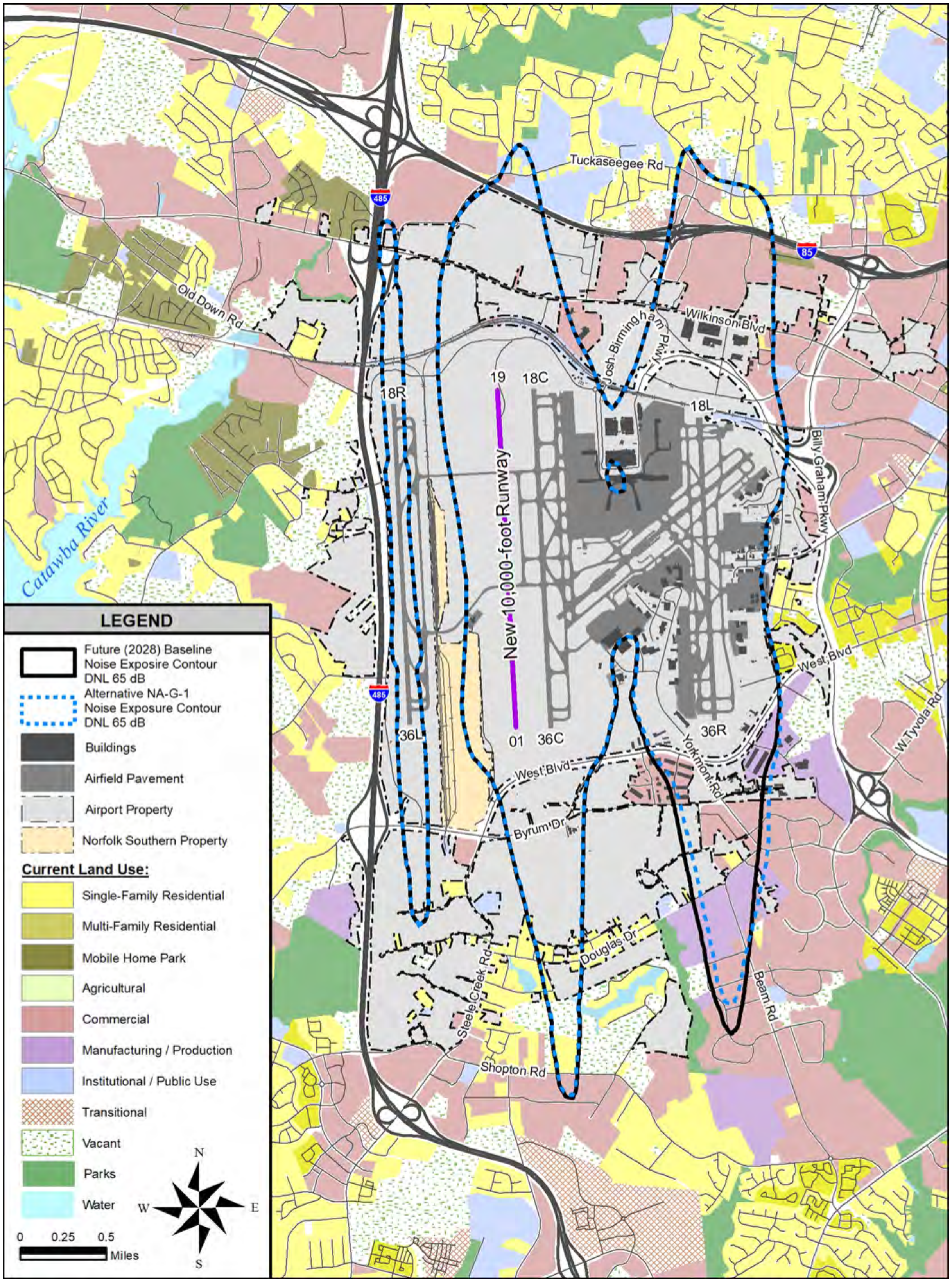
Source: Landrum & Brown, 2024.

Exhibit E-35 Noise Compatibility Program Alternative NA-G-1



Source: Landrum & Brown, 2024.

Exhibit E-36 Comparison of Future (2028) Baseline versus NA-G-1 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-G-2

TITLE:	Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on Runway 18L.
BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts to the south of the Airport by utilizing flight corridors over noise compatible land uses. The measure would keep the existing headings and implement divergent headings for Runway 18L and Runway 18R departures that would direct more flights over transportation corridors and commercial and industrial land uses. The measure would keep existing headings as follows: • Runway 18R: 200° • Runway 18L (keep 2-mile restriction): RWH The measure would add divergent headings as follows: • Runway 18R (remove 2-mile restriction): 220° heading to follow the Garrison Road corridor • Runway 18C and Runway 19 (remove 2-mile restriction): Implement the existing Runway 18C's approved RWH, 200° heading and 215° heading to follow the Steele Creek Road corridor Refer to **Exhibit E-37, *Noise Compatibility Program Alternative NA-G-2***. Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 19 are also proposed for Runway 18C. *While a straight-out heading is identified for Runways 18L and 19, these headings cannot be used simultaneously because a 15° separation is required per 7110.65Z.*
BENEFITS:	The measure would result in a decrease in two housing unit within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
DRAWBACKS:	NA-G-1, NA-G-3, and NA-G-4 are options to this measure.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure is **RECOMMENDED** for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments.

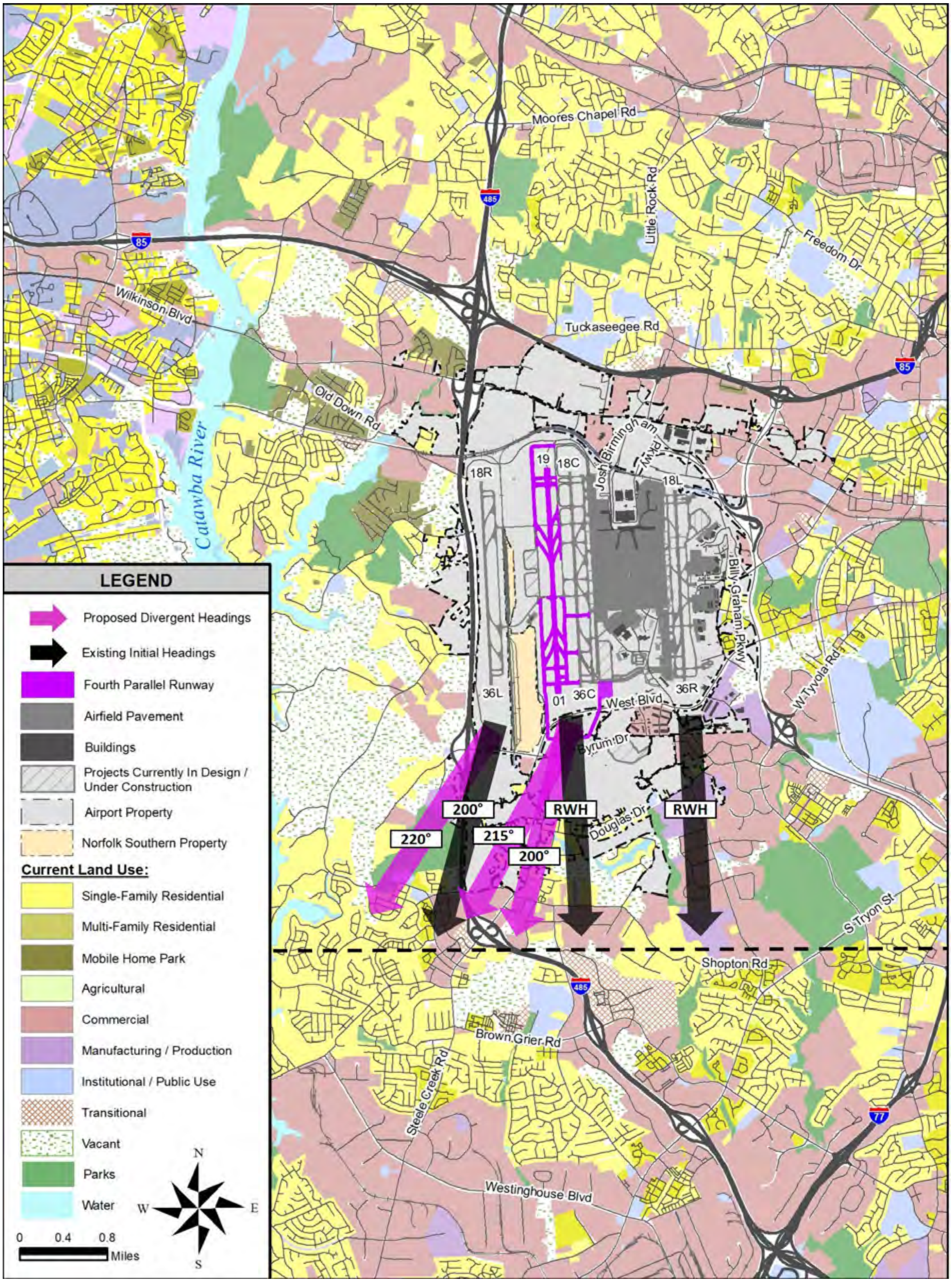
Table E-19 NA-G-2 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	84	0	0	84
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**241**	**0**	**0**	**241**
Population				
Total Population[1]	**683**	**0**	**0**	**683**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

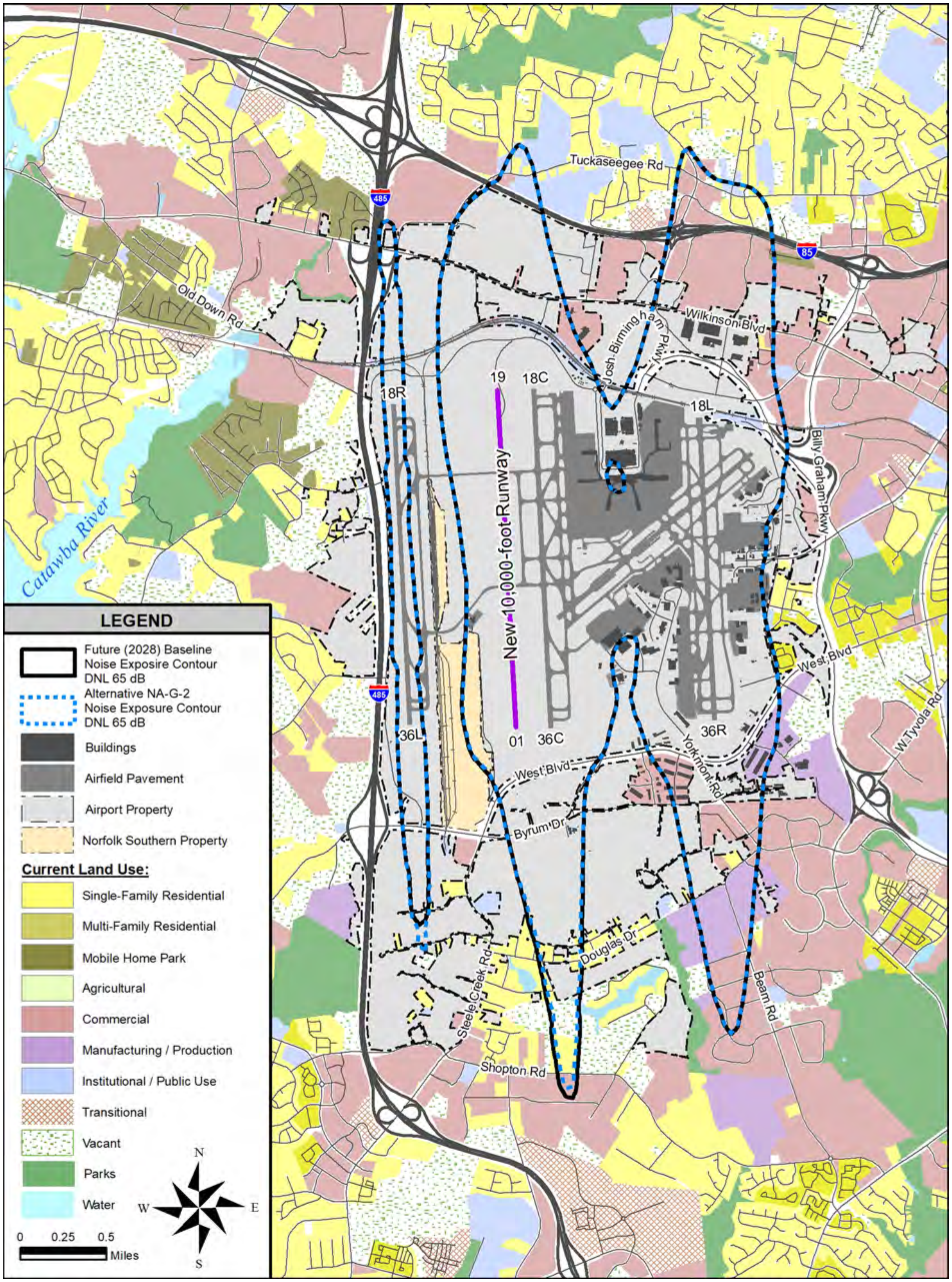
Source: Landrum & Brown, 2024.

Exhibit E-37 Noise Compatibility Program Alternative NA-G-2



Source: Landrum & Brown, 2024.

Exhibit E-38 Comparison of Future (2028) Baseline versus NA-G-2 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-G-3

TITLE:	Increase the number of departure headings for south flow operations while maintaining existing approved headings and maximizing departure corridors. This requires eliminating the 2-mile restriction for all runways.
BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts to the south of the Airport by utilizing flight corridors over noise compatible land uses. The measure would keep the existing headings and implement divergent headings for Runway 18L, Runway 18C, and Runway 18R departures that would direct more flights over transportation corridors and commercial and industrial land uses. The divergent heading for Runway 19 and Runway 18C departures would direct more flights over Airport property, transportation corridors and commercial and industrial land uses. The measure would keep the existing headings as follows: • Runway 18L: RWH • Runway 18R: 200° Th measure would eliminate the 2-mile restriction and add divergent headings as follows: • Runway 18L: 120° heading to follow the Billy Graham Parkway corridor, 150° heading and 165° heading to follow the W Tyvola Road corridor • Runway 18R: 220° heading to follow the Garrison Road corridor • Runway 18C and Runway 19: Implement the existing Runway 18C's approved RWH, 200° heading and 215° heading to follow the Steele Creek Road corridor Refer to **Exhibit E-39, *Noise Compatibility Program Alternative NA-G-3***. Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 19 are also proposed for Runway 18C. *While a straight-out heading is identified for Runways 18L and 19, these headings cannot be used simultaneously because a 15° separation is required per 7110.65Z.*
BENEFITS:	The measure would result in a decrease in one housing unit within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
DRAWBACKS:	NA-G-1, NA-G-2, and NA-G-4 are options to this measure.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure is **RECOMMENDED** for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments.

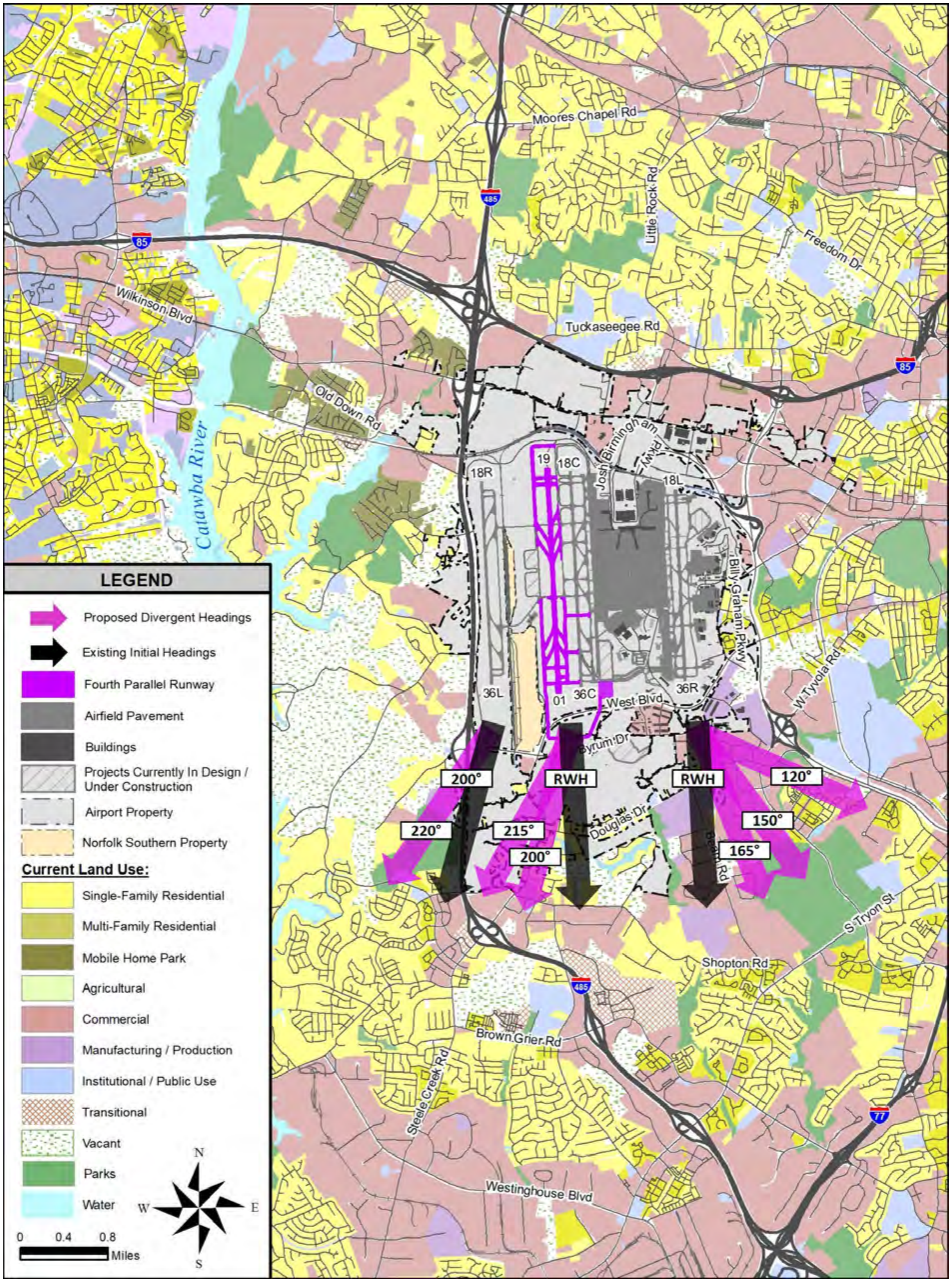
Table E-20 NA-G-3 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	85	0	0	85
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**242**	**0**	**0**	**242**
Population				
Total Population[1]	**685**	**0**	**0**	**685**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

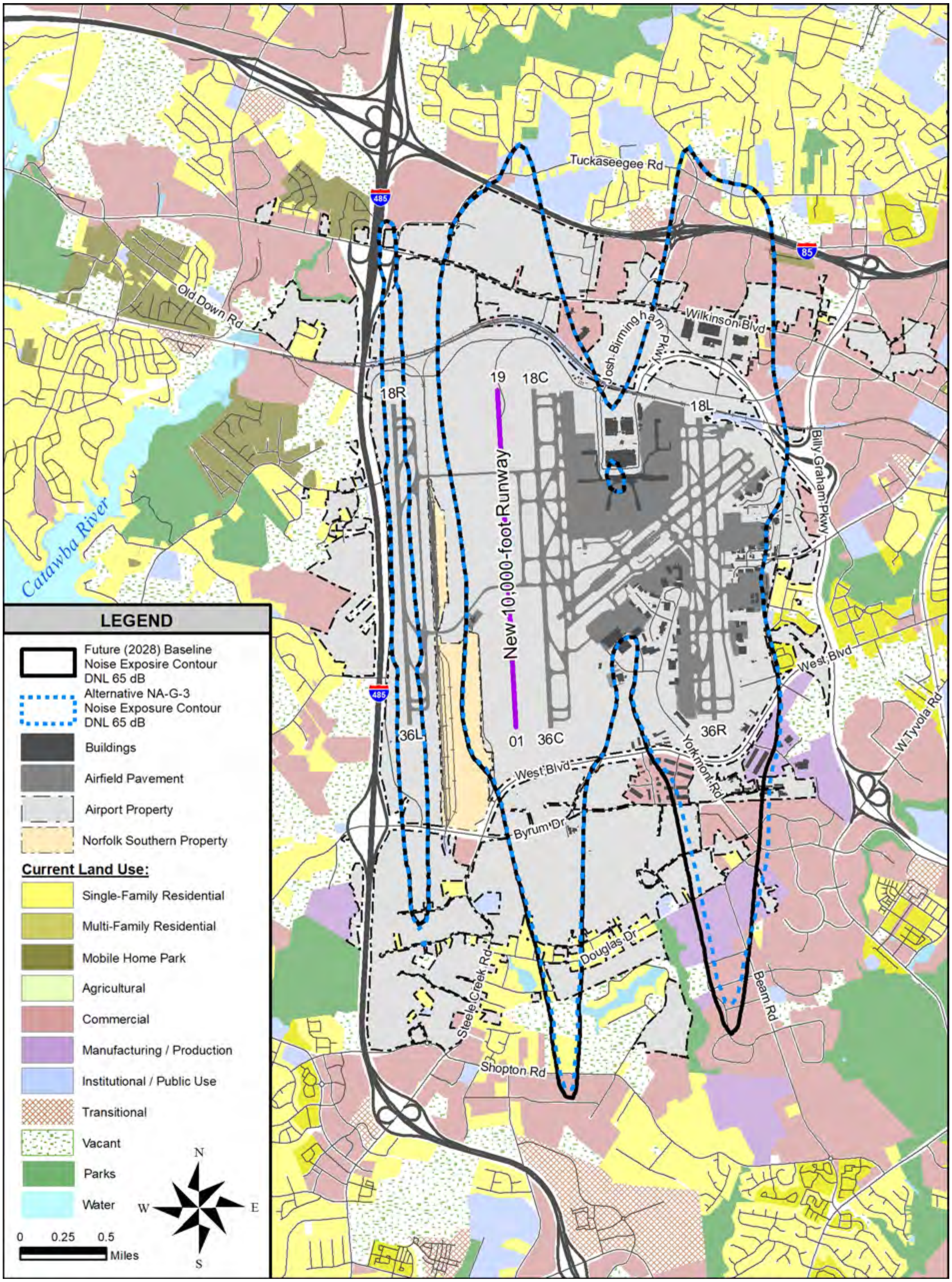
Source: Landrum & Brown, 2024.

Exhibit E-39 Noise Compatibility Program Alternative NA-G-3



Source: Landrum & Brown, 2024.

Exhibit E-40 Comparison of Future (2028) Baseline versus NA-G-3 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-G-4

TITLE:	Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction.

BACKGROUND AND INTENT:	The intent of this measure is to reduce net residential noise impacts to the south of the Airport by dispersing flights over a wider area. The measure would implement the maximum number of divergent headings while maintaining a 15° separation between headings to spread noise over as wide an area surrounding the Airport as possible. The measure would implement divergent headings as follows: • Runway 18L: RWH, 165°, 150°, 135°, 120°, 105° • Runway 18C and Runway 19: RWH, 200°, 215°, 230°, 245°, 260° Refer to **Exhibit E-41, *Noise Compatibility Program Alternative NA-G-4*.** Note, this measure assumes the runway use for the Future (2028) Baseline which designates Runway 19 and Runway 18L for daytime departure operations and Runway 18C and Runway 18L for nighttime departure operations. Additionally, Runway 18C would be used for departures in the daytime if Runway 19 could not be used for reasons of operational necessity. As such, headings proposed for Runway 19 are also proposed for Runway 18C. *While a straight-out heading is identified for Runways 18L and 19, these headings cannot be used simultaneously because a 15° separation is required per 7110.65Z.*

BENEFITS:	The measure would result in a decrease in eight housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

DRAWBACKS:	NA-G-1, NA-G-2, and NA-G-3 are options to this measure.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA. The cost related to the required environmental processing per the NEPA for the implementation of the measure.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	Due to the decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour, this measure is **RECOMMENDED** for further evaluation, including coordination with the local FAA ATCT, the TAC, and the public to obtain input and comments.

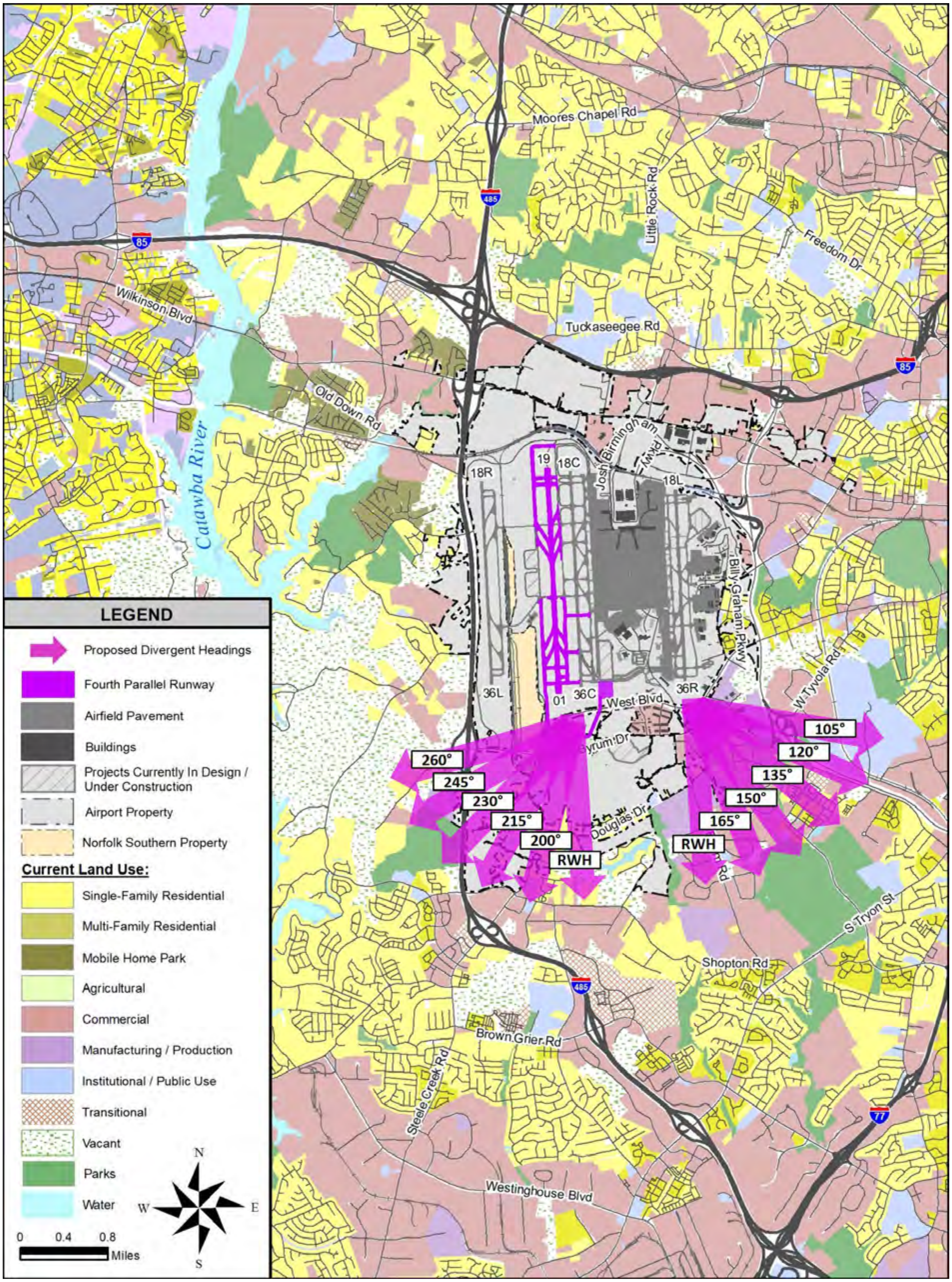
Table E-21 NA-G-4 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	78	0	0	78
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**235**	**0**	**0**	**235**
Population				
Total Population[1]	**668**	**0**	**0**	**668**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

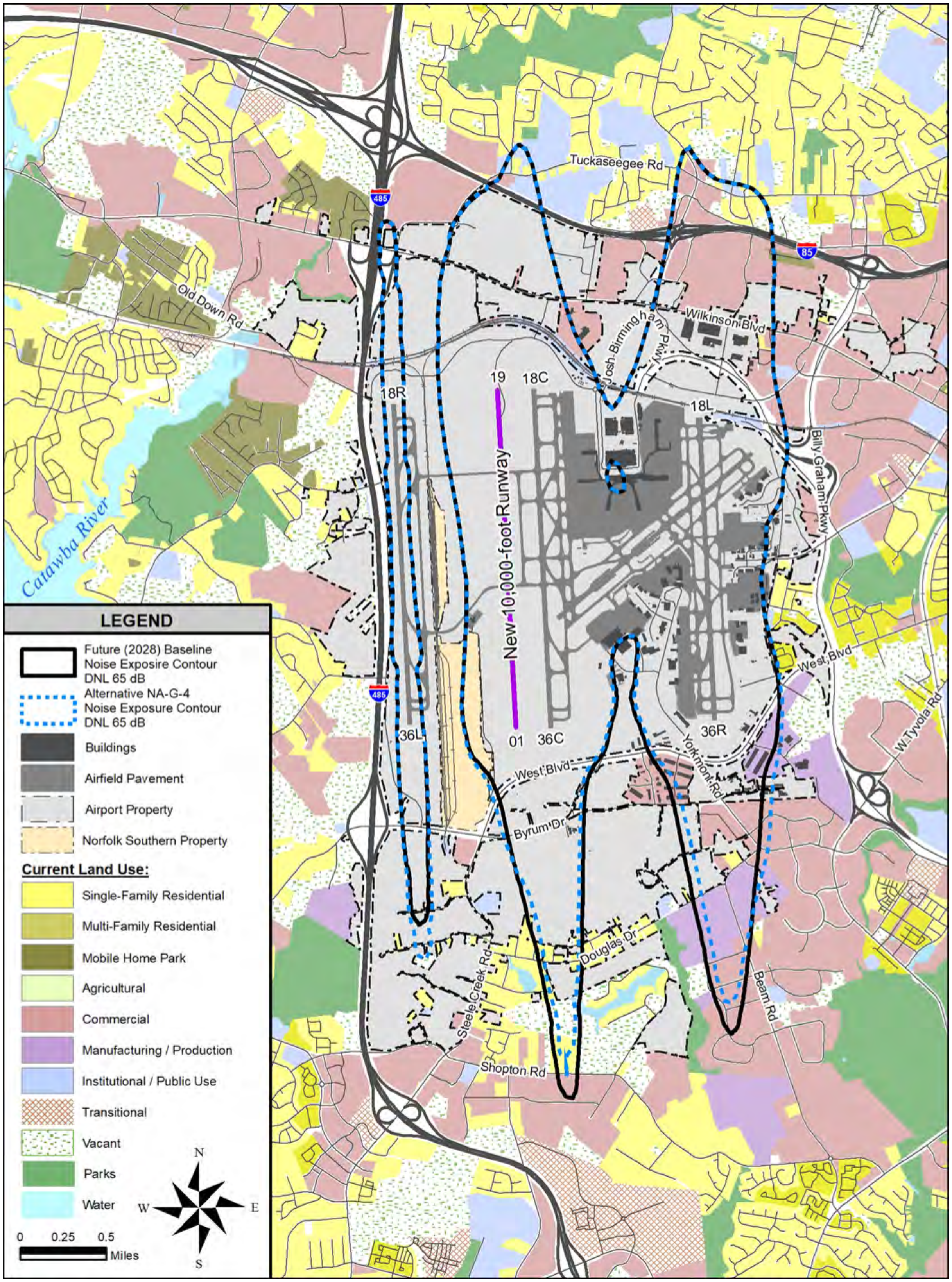
Source: Landrum & Brown, 2024.

Exhibit E-41 Noise Compatibility Program Alternative NA-G-4



Source: Landrum & Brown, 2024.

Exhibit E-42 Comparison of Future (2028) Baseline versus NA-G-4 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-H-1

TITLE:	Evaluate helicopter operations in the south general aviation apron to takeoff towards the south and stay between Yorkmont and Billy Graham Parkway before turning on course.

BACKGROUND AND INTENT:	The intent of this measure is to reduce helicopter flights over non-mitigated homes directly east of Airport Drive by implementing additional helicopter corridors. Refer to **Exhibit E-43, *Noise Compatibility Program Alternative NA-H-1.***

BENEFITS:	None

DRAWBACKS:	The measure would not result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.

EVALUATION METHOD:	Quantitative assessment – AEDT modeling

FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

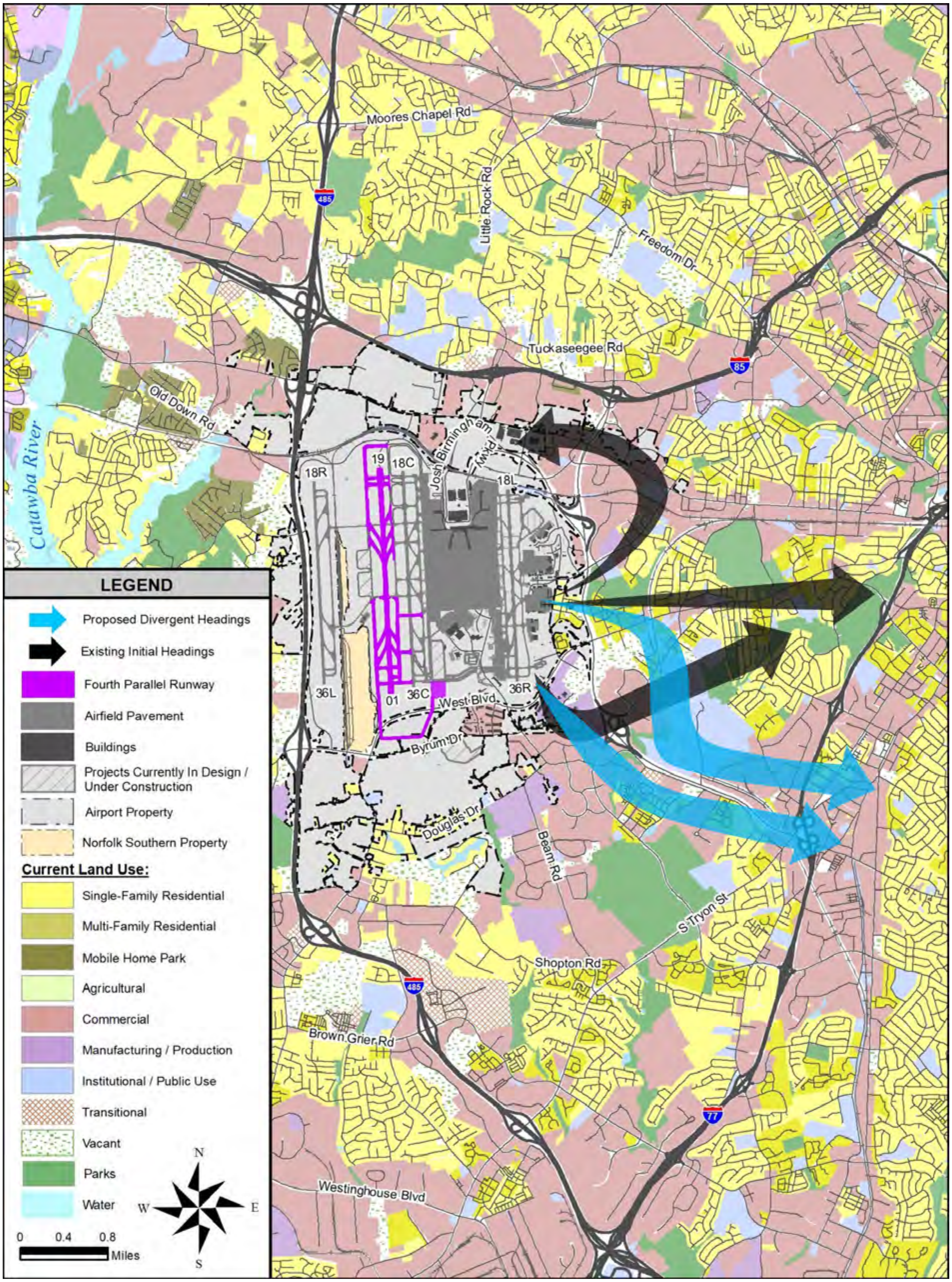
Table E-22 NA-H-1 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	86	0	0	86
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**243**	**0**	**0**	**243**
Population				
Total Population[1]	**687**	**0**	**0**	**687**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

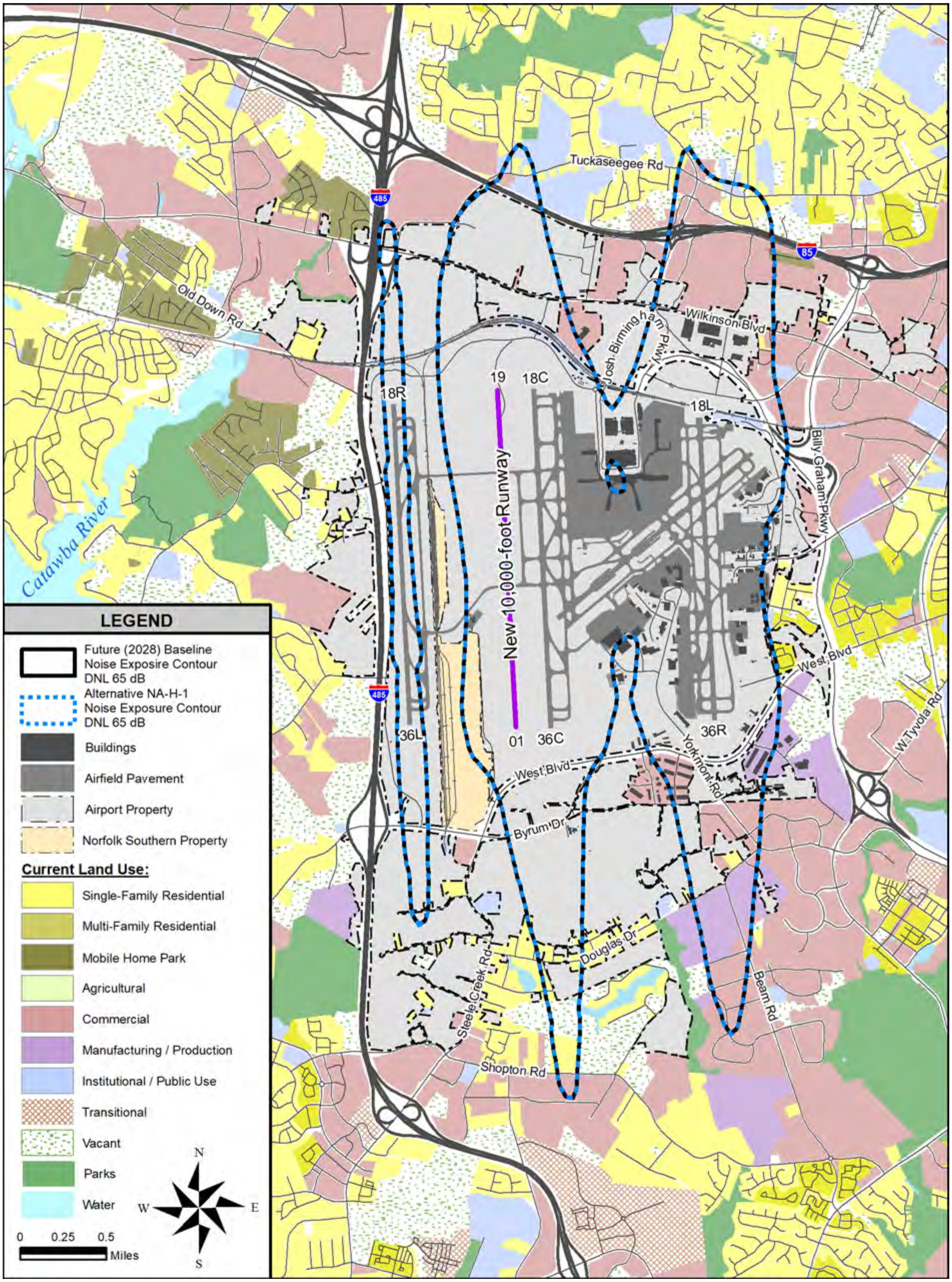
Source: Landrum & Brown, 2024.

Exhibit E-43 Noise Compatibility Program Alternative NA-H-1



Source: Landrum & Brown, 2024.

Exhibit E-44 Comparison of Future (2028) Baseline versus NA-H-1 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-H-2

TITLE:	Change Headings of First Turns off Runways 18L and 18C.
BACKGROUND AND INTENT:	The intent of the measure is to reduce the effect of noise on more densely populated areas and foster the desire by the ACR to return to pre-Metroplex flight paths. Refer to **Exhibit E-45, *Noise Compatibility Program Alternative NA-H-2.***
BENEFITS:	None
DRAWBACKS:	The measure would not result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour. NA-G-1, NA-G-2, NA-G-3 and NA-G-4 are options to this measure.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
EVALUATION METHOD:	Quantitative assessment – AEDT modeling
FINDINGS AND RECOMMENDATIONS:	The measure would not result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is **NOT RECOMMENDED** for further evaluation.

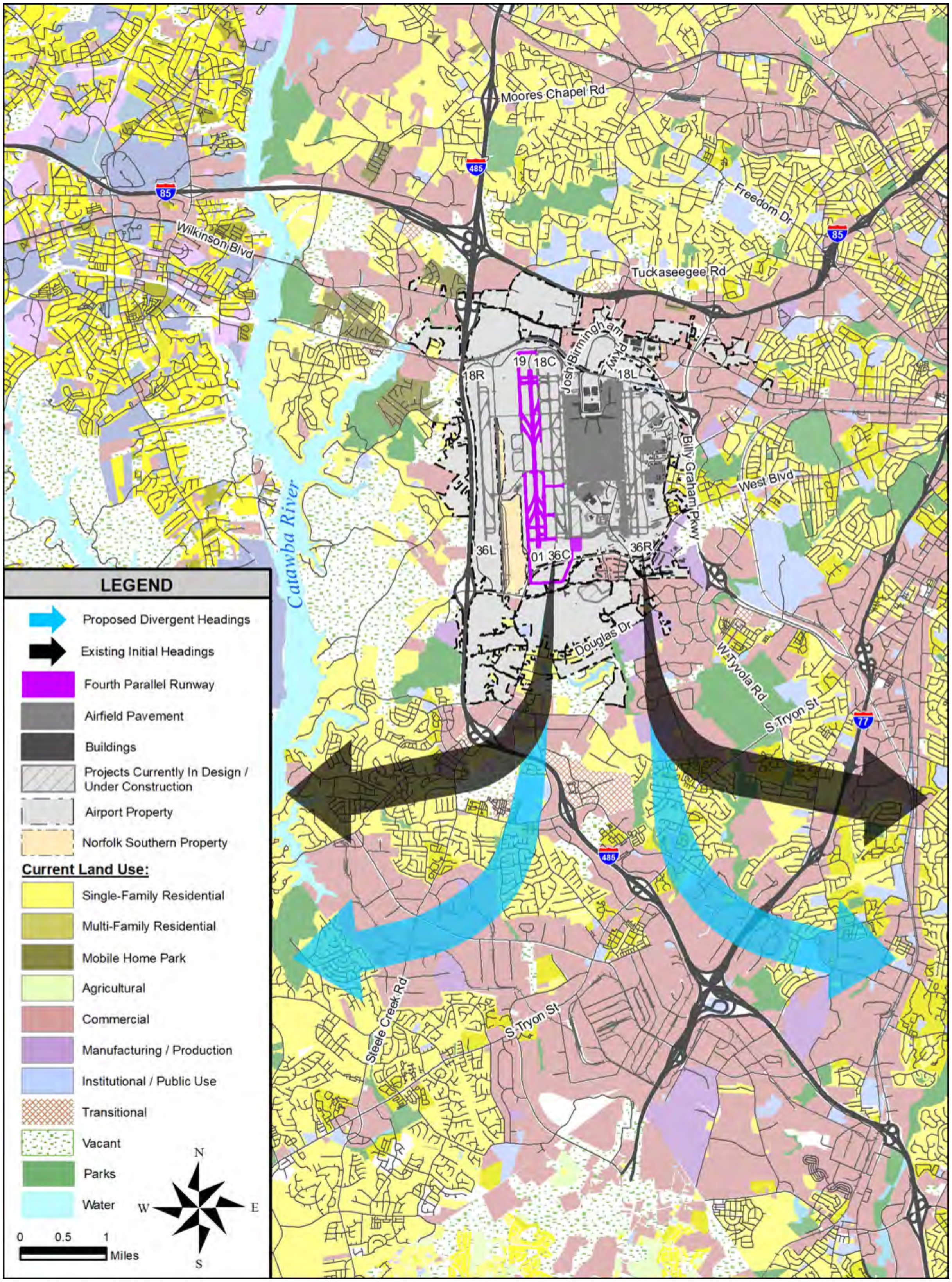
Table E-23 NA-H-2 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	86	0	0	86
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**243**	**0**	**0**	**243**
Population				
Total Population[1]	**687**	**0**	**0**	**687**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

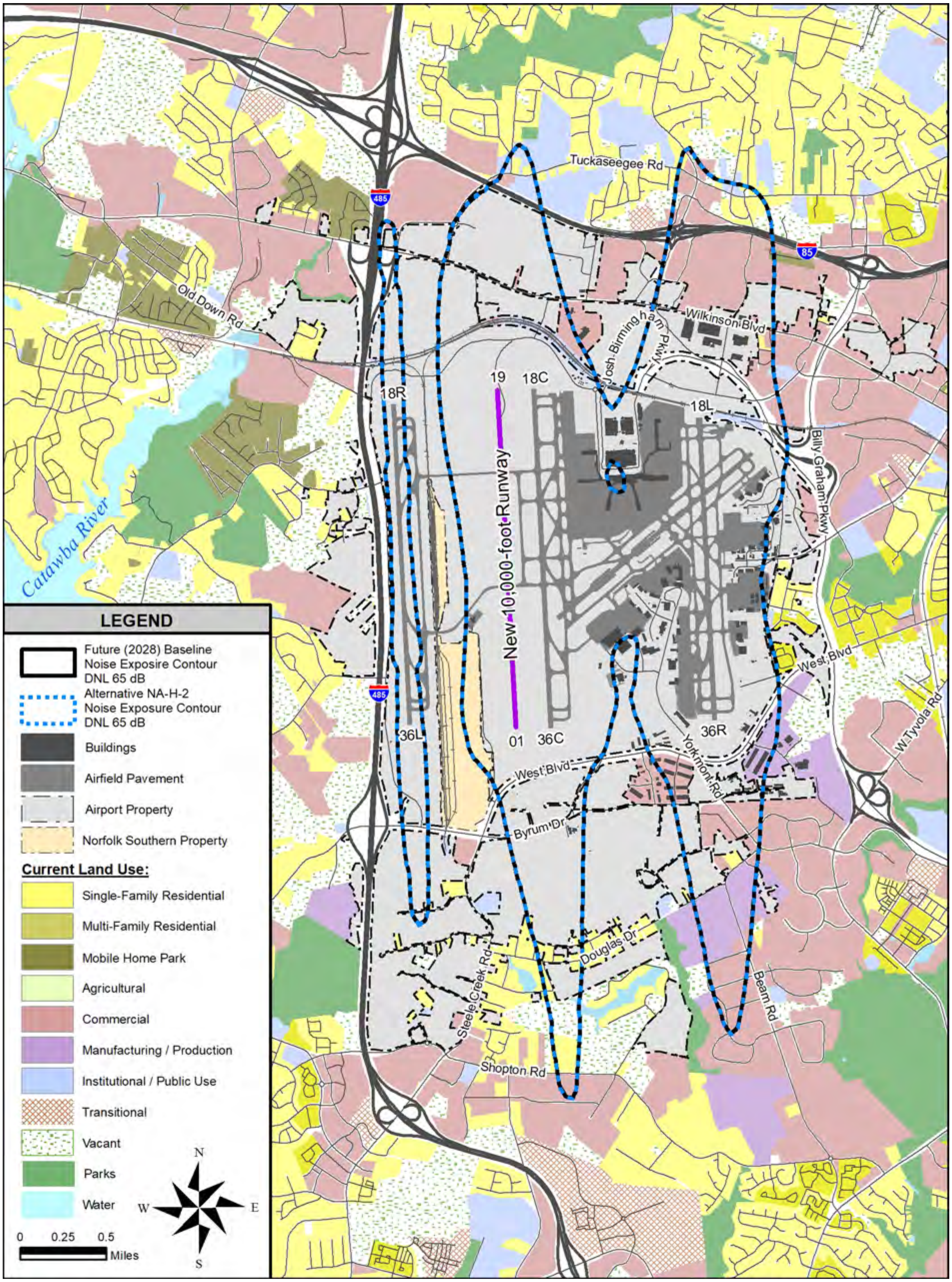
Source: Landrum & Brown, 2024.

Exhibit E-45 Noise Compatibility Program Alternative NA-H-2



Source: Landrum & Brown, 2024.

Exhibit E-46 Comparison of Future (2028) Baseline versus NA-H-2 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Noise Compatibility Program Alternative NA-H-3

TITLE:	For south flow departures, revert to 2016 procedures where aircraft depart from the Runway 18C at a 183° heading and fly between 2 to 4 nautical miles before turning to a 270° heading.

BACKGROUND AND INTENT:	The intent of the measure is to reduce the effect of noise on more densely populated areas and foster the desire by the ACR to return to 2016 flight paths.

BENEFITS:	None

DRAWBACKS:	This noise abatement alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in housing units within the 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this measure is NOT RECOMMENDED for further evaluation.

Noise Compatibility Program Alternative NA-I-1

TITLE:	For south flow arrivals along the CHSLY procedure, maintain the published altitude of 6,000 feet at the HEELZ procedure so flights will not cut the corner.

BACKGROUND AND INTENT:	The intent of this measure is to reduce the effect of noise on more densely populated areas by utilizing noise abatement corridors for arrival procedures.

BENEFITS:	None

DRAWBACKS:	This noise abatement alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in housing units when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this alternative is **NOT RECOMMENDED** for further evaluation.

Noise Compatibility Program Alternative NA-I-2

TITLE:	For south flow arrivals, extend the eastern downwind so that flights intercept the final approach over the main channel of Mountain Island Lake keeping an altitude of 6,000 feet until turning final approach course.

BACKGROUND AND INTENT:	The intent of this measure is to reduce the effect of noise on more densely populated areas by utilizing noise abatement corridors for arrival procedures.

BENEFITS:	None

DRAWBACKS:	This noise abatement alternative targets procedures outside of the DNL 65 dB and is not anticipated to result in a decrease in housing units within the 6 DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	The alternative targets procedures outside of the DNL 65+ dB and is not anticipated to result in a decrease in the number of housing units that would be located within the DNL 65+ dB noise exposure contour. As such, this alternative is **NOT RECOMMENDED** for further evaluation.

Noise Compatibility Program Alternative NA-I-3

TITLE:	For north flow arrivals, utilize Interstate 77 as a flight corridor.
BACKGROUND AND INTENT:	The intent of the measure is to reduce the effect of noise on more densely populated areas by utilizing noise abatement corridors for arrival procedures.
BENEFITS:	None
DRAWBACKS:	This noise abatement alternative targets procedures outside of the DNL 65 dB and is not anticipated to result in a decrease in housing units within the DNL 65+ dB noise exposure contour when compared to the Future (2028) Baseline Noise Exposure Contour.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	The alternative targets procedures outside of the DNL 65+ dB noise exposure contour and is not anticipated to result in a decrease in the number of housing units that would be located within the 65+ DNL noise exposure contour. As such, this alternative is **NOT RECOMMENDED** for further evaluation.

E.3 Noise Abatement Scenarios

The alternatives identified for further evaluation cannot all be implemented at the same time due to recommendations that would conflict with each other. Furthermore, the combined effect of various alternatives will yield different levels of impacts. Therefore, the most promising alternatives were compiled into four NCP operating scenarios for further evaluation. Each of the NCP operating scenarios is briefly described below along with a discussion of their relative benefits and drawbacks.

Scenario 1 (NCP 1)

NCP Scenario 1 (NCP 1) includes six noise abatement alternatives:

Run-Up Locations

- NA-A-1: Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport.
- NA-A-2: Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport.

Divergent Headings – North Flow

- NA-F-1: Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.

Divergent Headings – South Flow

- NA-G-3: Increase the number of departure headings for south flow operations while maintaining existing approved headings and maximizing departure corridors. This requires eliminating the 2-mile restriction for all runways.

Nighttime Runway Use

- NA-E-1: Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.
- NA-E-2: Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

NCP 1 decreased the number of housing units in the DNL 65+ dB noise exposure contour from the Future (2028) Baseline Noise Exposure Contour by 21 housing units. Furthermore, the scenario would provide additional departure headings which would in turn provide additional capacity and delay benefits at the Airport as presented in **Table E-24** and **Table E-25**. Additionally, the scenario would provide additional flexibility for operational conditions at the Airport.

Although NCP 1 presents various benefits, including a decrease in the number of housing units in the DNL 65+ dB noise exposure contour, NCP 1 was not selected as the preferred scenario due to NCP 2 providing the most capacity, delay, and flexibility benefits offered by NCP 2 (see **Table E-26** and **Exhibit 47**).

Table E-24 Scenario 1 Capacity Benefits

		North Flow		South Flow	
		Existing	NA-F-1	Existing	NA-G-3
Total # of Headings on Departure Runways		*2*	*7*	*2*	*7*
VMC (~79%)	Departure Throughput	82	83	82	82
	Count of 60 sec separation (approx.)	620	50	570	80
	Count of <60 sec separation (approx.)	-	510	-	430
IMC (~21%)	Departure Throughput	73	77	74	78
	Count of 72 sec separation (approx.)	470	40	510	90
	Count of <72 sec separation (approx.)	-	440	-	420

Source: Landrum & Brown, 2024.

Table E-25 Scenario 1 Delay Benefits

		North Flow		South Flow	
		Existing	NA-F-1	Existing	NA-G-3
Total # of Headings on Departure Runways		*2*	*7*	*2*	*7*
VMC (~79%)	Avg arrival delay (min)	4.9	4.8	4.8	4.6
	Avg departure delay (min)	4.6	3.4	4.3	3.5
IMC (~21%)	Avg arrival delay (min)	6.2	6.1	7.1	7.1
	Avg departure delay (min)	9.4	7.0	8.0	5.6

Source: Landrum & Brown, 2024.

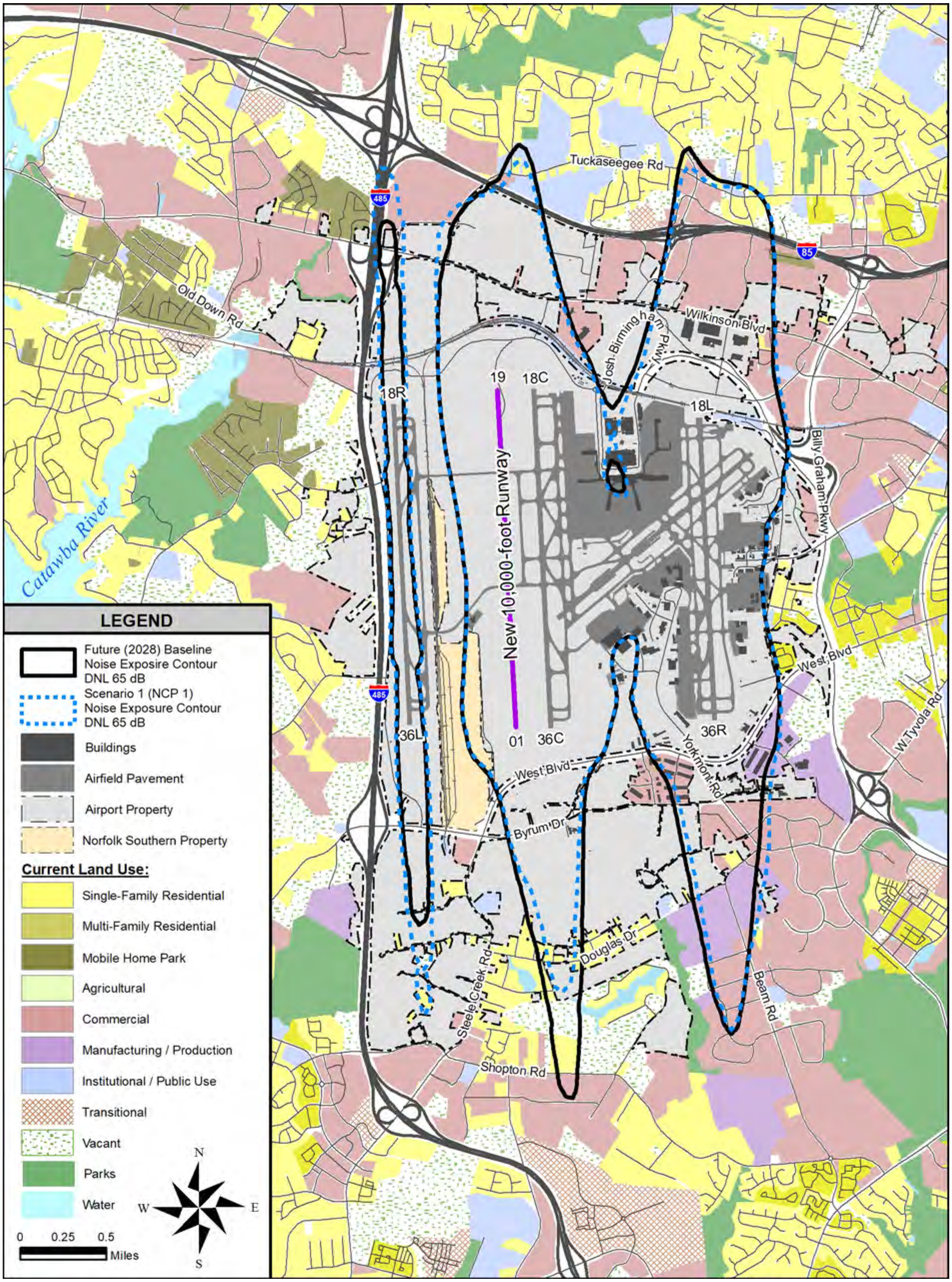
Table E-26 Scenario 1 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	65	0	0	65
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**222**	**0**	**0**	**222**
Population				
Total Population[1]	**632**	**0**	**0**	**632**
Noise-Sensitive Facilities				
Schools / Educational Facilities	3	0	0	3
Churches / Places of Worship	3	0	0	3
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

Source: Landrum & Brown, 2024.

Exhibit E-47 Comparison of Future (2028) Baseline versus Scenario 1 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Scenario 2 (NCP 2)

NCP Scenario 2 (NCP 2) includes six noise abatement alternatives:

Run-Up Locations

- NA-A-1: Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport.
- NA-A-2: Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport.

Divergent Headings – North Flow

- NA-F-2: Maximize the number of divergent headings for north flow operations while maintaining a 15° separation between headings.

Divergent Headings – South Flow

- NA-G-4: Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction.

Nighttime Runway Use

- NA-E-1: Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.
- NA-E-2: Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

NCP 2 decreased the number of housing units in the DNL 65+ dB noise exposure contour from the Future (2028) Baseline Noise Exposure Contour by 26 housing units. Furthermore, the scenario would provide the most additional departure headings out of the scenarios considered, which would in turn provide the most capacity and delay benefits at the Airport as presented in **Table E-27** and **Table E-28**. Additionally, the scenario would provide the most flexibility for operational conditions at the Airport.

NCP 2 was selected as the preferred scenario because it provides the most capacity, delay, and flexibility benefits (see **Table E-29** and **Exhibit 48**).

Table E-27 Scenario 2 Capacity Benefits

		North Flow		South Flow	
		Existing	NA-F-2	Existing	NA-G-4
Total # of Headings on Departure Runways		*2*	*12*	*2*	*12*
VMC (~79%)	Departure Throughput	82	83	82	83
	Count of 60 sec separation (approx.)	620	10	570	20
	Count of <60 sec separation (approx.)	-	530	-	510
IMC (~21%)	Departure Throughput	73	78	74	79
	Count of 72 sec separation (approx.)	470	20	510	30
	Count of <72 sec separation (approx.)	-	470	-	500

Source: Landrum & Brown, 2024.

Table E-28 Scenario 2 Delay Benefits

		North Flow		South Flow	
		Existing	NA-F-2	Existing	NA-G-4
Total # of Headings on Departure Runways		*2*	*12*	*2*	*12*
VMC (~79%)	Avg arrival delay (min)	4.9	4.8	4.8	4.6
	Avg departure delay (min)	4.6	3.3	4.3	3.4
IMC (~21%)	Avg arrival delay (min)	6.2	6.0	7.1	7.0
	Avg departure delay (min)	9.4	6.8	8.0	5.5

Source: Landrum & Brown, 2024.

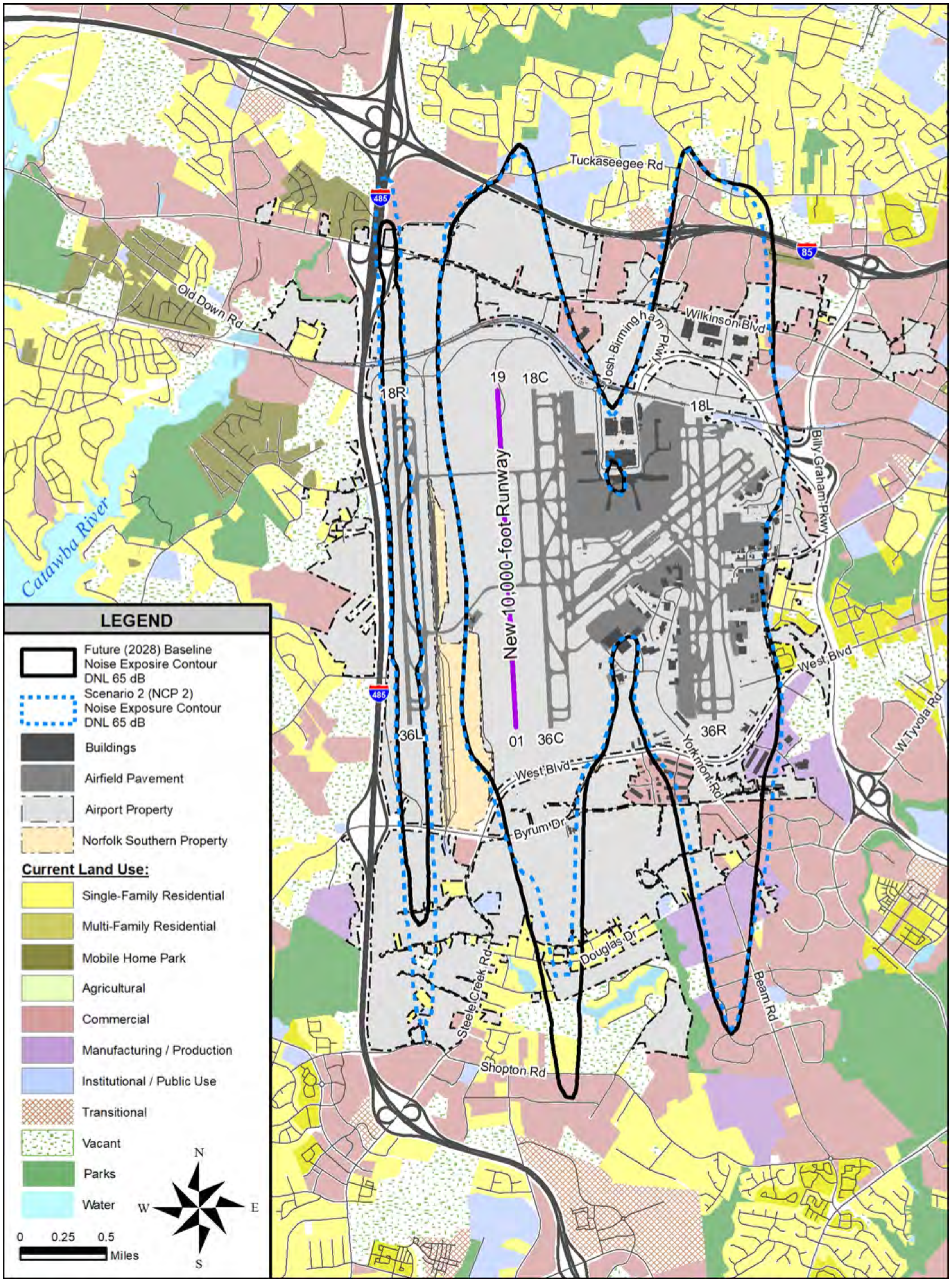
Table E-29 Scenario 2 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	60	0	0	60
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**217**	**0**	**0**	**217**
Population				
Total Population[1]	**621**	**0**	**0**	**621**
Noise-Sensitive Facilities				
Schools / Educational Facilities	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

Source: Landrum & Brown, 2024.

Exhibit E-48 Comparison of Future (2028) Baseline versus Scenario 2 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Scenario 3 (NCP 3)

NCP Scenario 3 (NCP 3) includes six noise abatement alternatives:

Run-Up Locations

- NA-A-1: Maximize the use of midfield run-up locations over those located on the east side of the Airport (Short-Term)
- NA-A-2: Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport.

Divergent Headings – North Flow

- NA-F-1: Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.

Divergent Headings – South Flow

- NA-G-4: Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction.

Nighttime Runway Use

- NA-E-1: Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.
- NA-E-2: Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

NCP 3 decreased the number of housing units in the DNL 65+ dB noise exposure contour from the Future (2028) Baseline Noise Exposure Contour by 26 housing units. Furthermore, the scenario would provide additional departure headings which would in turn provide additional capacity and delay benefits at the Airport as presented in **Table E-30** and **Table 31**. The scenario would also provide additional flexibility for operational conditions at the Airport.

Although NCP 3 presents various benefits, including a decrease in the number of housing units in the DNL 65+ dB noise exposure contour, NCP 3 was not selected as the preferred scenario because it does not provide the most capacity, delay, and flexibility benefits offered by NCP 2 (see **Table E-32** and **Exhibit 49**).

Table E-30 Scenario 3 Capacity Benefits

		North Flow		South Flow	
		Existing	NA-F-1	Existing	NA-G-4
Total # of Headings on Departure Runways		*2*	*7*	*2*	*12*
VMC (~79%)	Departure Throughput	82	83	82	83
	Count of 60 sec separation (approx.)	620	50	570	20
	Count of <60 sec separation (approx.)	-	510	-	510
IMC (~21%)	Departure Throughput	73	77	74	79
	Count of 72 sec separation (approx.)	470	40	510	30
	Count of <72 sec separation (approx.)	-	440	-	500

Source: Landrum & Brown, 2024.

Table E-31 Scenario 3 Delay Benefits

		North Flow		South Flow	
		Existing	NA-F-1	Existing	NA-G-4
Total # of Headings on Departure Runways		*2*	*7*	*2*	*12*
VMC (~79%)	Avg arrival delay (min)	4.9	4.8	4.8	4.6
	Avg departure delay (min)	4.6	3.4	4.3	3.4
IMC (~21%)	Avg arrival delay (min)	6.2	6.1	7.1	7.0
	Avg departure delay (min)	9.4	7.0	8.0	5.5

Source: Landrum & Brown, 2024.

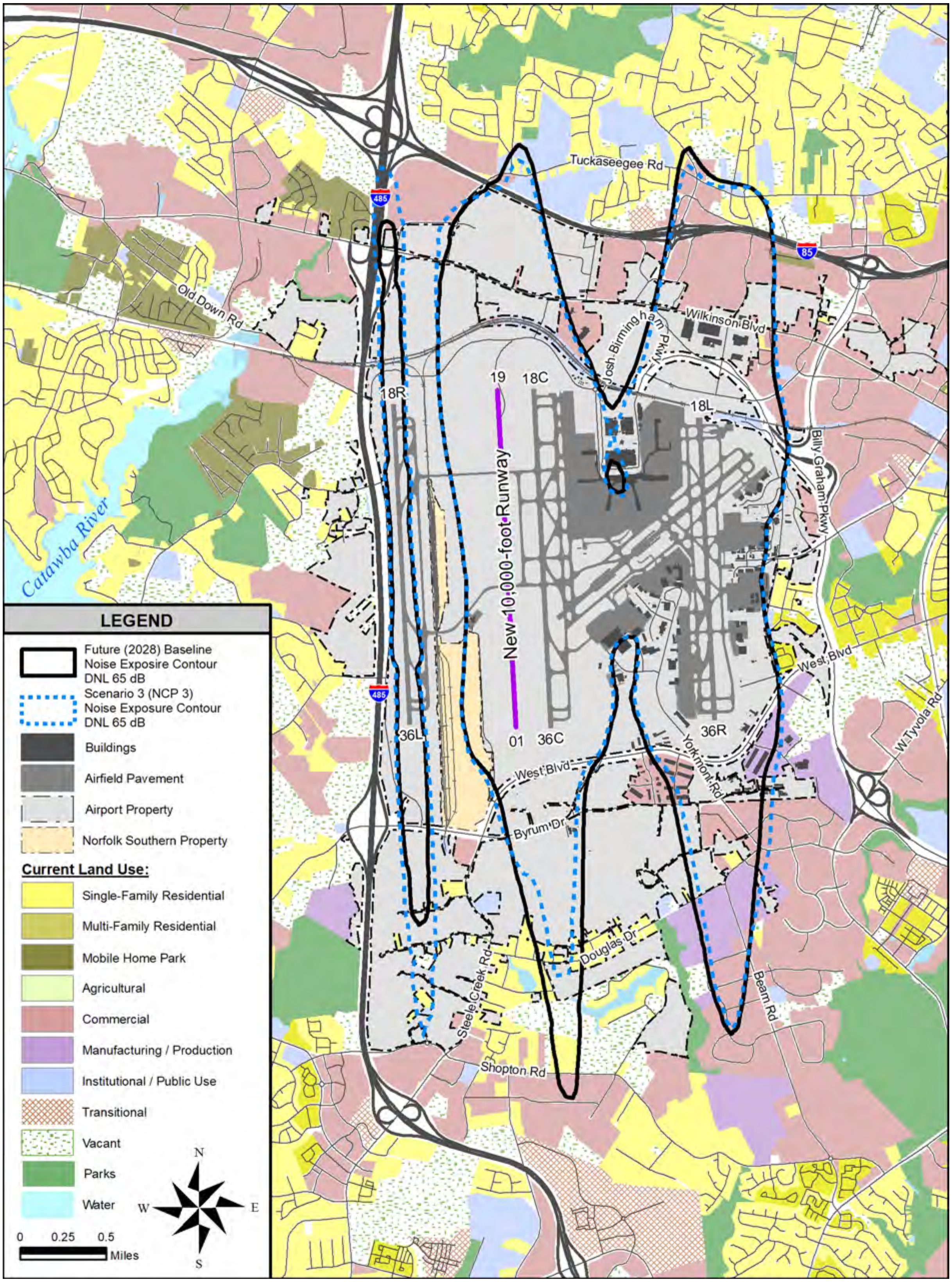
Table E-32 Scenario 3 Housing, Population, and Noise-Sensitive Sites

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
Housing Units				
Housing Type				
Single-Family Residential	60	0	0	60
Multi-Family Residential	94	0	0	94
Manufactured Home	63	0	0	63
Total Housing Units	**217**	**0**	**0**	**217**
Population				
Total Population[1]	**620**	**0**	**0**	**620**
Noise-Sensitive Facilities				
Schools / Educational Facilities	3	0	0	3
Churches / Places of Worship	3	0	0	3
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheater	0	0	0	0
Other Uses[2]	n/a	0	0	0

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above DNL 70 dB includes sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities.

Source: Landrum & Brown, 2024.

Exhibit E-49 Comparison of Future (2028) Baseline versus Scenario 3 Noise Exposure Contour



Source: Landrum & Brown, 2024.

Scenario 4 (NCP 4)

NCP Scenario 4 (NCP 4) includes four noise abatement alternatives:

Run-Up Locations

- NA-A-1: Establish a run-up location on the deice pad and northeast airfield that are currently under construction. Maximize the use of midfield run-up locations over those located on the east side of the Airport.
- NA-A-2: Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport.

Divergent Headings – North Flow

- NA-F-1: Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.

Divergent Headings – South Flow

- NA-G-4: Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction.

Nighttime Runway Use

- NA-E-3: Focus nighttime north-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 36R). Due to their close proximity, consider Runways 1/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.
- NA-E-2: Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

NCP 4 is identical to NCP 3, replacing NA-E-1 with NA-E-3 for nighttime north-flow arrivals. Noise impacts between the DNL 60 and 65 dB noise exposure contour for NA-E-1 and NA-E-3 were estimated to evaluate if there are any notable differences between the two alternatives. The results demonstrated NA-E-3 would result in a notably higher increase in noise impacts between the DNL 60 and 65 dB noise exposure contour when compared to the Future (2028) Baseline than E-1 (NA-E-1 had an increase of 237 housing units and NA-E-3 had an increase of 572 housing units). Therefore, NA-E-3 performed worse than NA-E-1. As such, NCP 4 was eliminated from consideration and did not proceeding for consideration.

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14 CFR Part 150 Noise Compatibility Program Study Update

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

Volume 2 of 2

PRESENTED BY
Landrum & Brown, Incorporated

Appendix F

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Appendix F, Public Involvement

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

PRESENTED BY
Landrum & Brown, Incorporated

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Appendix F Public Involvement

The process of providing opportunities for public review and comment during the development of the Part 150 Study Update includes three techniques: Technical Advisory Committee Meetings, Public Information Meetings, and a formal Public Hearing. Each technique facilitates the active and direct participation of members of the public and the opportunity for them to submit comments to Charlotte Douglas International Airport (CLT or Airport) staff.

This appendix provides the information related to the public involvement process undertaken during the CLT Part 150 Study Update and is divided into the following sections:

- Discussion of the Technical Advisory Committee
- Discussion of the Public Information Meetings
- Discussion of the Public Hearing
- Location of Study Documents for Public Review
- Part 150 Study Update Website

F.1 Technical Advisory Committee

A Technical Advisory Committee was established by CLT staff and was composed of groups representing a broad range of interested stakeholders, including airlines, commerce, community, air traffic controllers, government and planning, as well as interested and affected citizens through representatives of the ACR. The Technical Advisory Committee included participation from public and planning agency officials of the areas within the 65 DNL noise contour per 14 CFR §150.21, which includes the City of Charlotte and Mecklenburg County. The Planning Commission was formed by an Interlocal Agreement as a planning advisory body to the City of Charlotte and Mecklenburg County in 1954. There is no land under state or Federal land use control within the 65 DNL noise contour. The Technical Advisory Committee provided feedback and advice to the consultant team on the contents and preparation of the Part 150 Study Update.

Three meetings have taken place to date to review and receive comments on the development of the Existing (2023) Baseline and Future (2028) Baseline condition, the preliminary noise abatement alternatives, and the noise screening process and preliminary scenario development. A fourth meeting is scheduled in conjunction with the release of this Draft Noise Compatibility Study Update. Presentations were made at each meeting, followed by open discussion. Presentations, meeting materials, and summary meeting notes from each of the meetings are provided at the end of this appendix. The date, time, and location of each Technical Group meeting is provided below.

TAC Meeting #1
September 14, 2022
2:00 p.m. to 4:00 p.m.
CLT Center at Charlotte Douglas International Airport

TAC Meeting #2
March 22, 2023
1:30 p.m. to 3:00 p.m.
Harris Conference Center at Central Piedmont Community College

TAC Meeting #3
November 14, 2023
1:00 p.m. to 3:00 p.m.
CLT Center at Charlotte Douglas International Airport

F.2 Public Information Meetings

During the course of the Study, two sets of public information meetings were held in local communities, and a third set of meetings is scheduled in conjunction with the release of this Draft Noise Compatibility Study Update. Public Information Meetings provided the public with ample opportunity to participate in one-on-one discussions with Airport staff and the Airport consultants, and to review the noise exposure maps, preliminary noise abatement alternatives, and other study analysis. Public outreach efforts for each public information meeting included the publishing of notifications through print media, social media, direct emails, and the project website. Specifically, direct emails were distributed to local community groups and individuals who requested additional information about the Study. Public Information Meetings is included later in this appendix.

Two sets of Public Information Meetings (four meetings total) were held over the course of this Part 150 Study Update during key milestones in the process. The third set of meetings will be conducted concurrently with a Public Hearing. The meetings were conducted on multiple nights at different locations to make it convenient for the public to attend. Appendix G, Public Involvement, includes copies of meeting notifications, sign-in sheets, comments received, copies of the boards presented, and meeting handouts from these Public Information Meetings. The specific meetings dates, times, and locations are shown below.

Public Information Meeting #1

Location #1:
March 22, 2023
6:00 p.m. to 8:00 p.m.
Harris Conference Center at Central Piedmont Community College
3216 CPCC Harris Campus Drive
Charlotte, NC 28208

Location #2:
March 23, 2023
6:00 p.m. to 8:00 p.m.
Aloft Charlotte Airport
3928 Memorial Parkway
Charlotte, NC 28217

Public Information Meeting #2

Location #1:
November 14, 2023
6:00 p.m. to 8:00 p.m.
Harris Conference Center at Central Piedmont Community College
3216 CPCC Harris Campus Drive
Charlotte, NC 28208

Location #2:
November 16, 2023
6:00 p.m. to 8:00 p.m.
Embassy Suites by Hilton Charlotte
4800 South Tyron Street
Charlotte, NC 28217

Public Information Meeting #3

Location #1:
September 18, 2024
6:00 p.m. to 8:00 p.m.
Goodwill Opportunity Campus
5301 Wilkinson Blvd,
Charlotte, NC 2820

Location #2:
September 19, 2024
6:00 p.m. to 8:00 p.m.
Embassy Suites by Hilton Charlotte
4800 South Tryon Street,
Charlotte, NC 28217

F.3 Public Hearing

Public Hearings are scheduled to be held concurrently with the third set of Public Information Meeting to satisfy the requirement that the public be given an opportunity to comment on the Noise Exposure Maps and Noise Compatibility Program prior to submission to the FAA as specified in 14 CFR 150.21(b). A transcript of the oral testimony and the written comments received at the Public Hearing, as well as response to all comments, will be included in the final document. Comments will also be on file with the FAA Southern Region.

F.4 Availability of the Document for Public Review

The Draft Part 150 Study Update document is available for public review from August 5, 2024 through October 4, 2024. Copies of the Draft Part 150 Study Update document are located in the locations listed below and on the project website (https://cltpart150.com/documents-reports/). Newspaper notices were published announcing the availability of the document for review and comment prior to the Public Hearing.

Locations for Draft Part 150 Document Review

1. Steele Creek Library Branch
   13620 Steele Creek Road, Charlotte, NC 28273
2. Mountain Island Library Branch
   4420 Hoyt Galvin Way, Charlotte, NC 28214
3. West Boulevard Library Branch
   2157 West Boulevard, Charlotte, NC 28208
4. Belmont Branch Library
   125 N Central Ave, Belmont, NC 28012
5. Hickory Grove Library
   5935 Hickory Grove Road, Charlotte, NC 28215

6. South Park Regional
   7015 Carnegie Boulevard, Charlotte, NC 28211
7. Charlotte International Airport - Aviation Department, CLT Center, 5601 Wilkinson Boulevard (accessed from Harlee Avenue)
8. CLT Part 150 Study Update Project Website: https://cltpart150.com/documents-reports/

Technical Advisory Committee Meeting #1
September 14, 2022

Meeting Invitations

Sign-in Sheet

Presentation

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August 17, 2022

To Whom It May Concern,

The City of Charlotte is initiating a study to document the noise effects from aircraft operations at Charlotte Douglas International Airport (CLT). The study is commonly referred to as a Part 150 Noise Compatibility Study Update (Part 150 Study Update). The purpose for conducting a Part 150 Study Update is to develop a balanced and cost-effective plan to reduce current noise impacts, where practical, and to limit the potential for future noise impacts.

We are writing to ask for your participation on the Technical Advisory Committee (TAC) that is being formed as part of the Part 150 Study Update. The TAC will consist of airport users and tenants; Federal Aviation Administration (FAA) representatives; local planning organizations; Airport staff and miscellaneous stakeholders. The TAC will review study findings, comment on study recommendations before they are presented to the public at-large and will participate in discussions related to aircraft noise issues.

The TAC will meet four times over the 18 months anticipated to complete the Part 150 Study Update. The first meeting of the TAC is scheduled for 2:00 pm on September 14, 2022 in the Eagle Conference Room at the CLT Center located at 5601 Wilkinson Blvd, Charlotte, NC 28208. If you are not able to attend the meeting in person, a teleconference option will be made available. The meeting will last approximately two hours. TAC members will receive a meeting agenda in advance for all meetings.

We value your input and look forward to your participation in this process. Please RSVP by August 31, 2022 with whether or not you accept this invitation and wish to participate in the TAC. Email your RSVPs to gaby.elizondo@landrumbrown.com.

Sincerely,

Haley H. Gentry

Haley H. Gentry
Chief Executive Officer

INVITATION LIST
TECHNICAL ADVISORY COMMITTEE MEETING #1

REPRESENTING	NAME
Charlotte Mecklenburg Police Department, Aviation Unit	Kenneth Anderson
City of Charlotte City Council	Victoria Watlington
City of Charlotte Planning, Design, and Development Department	Alyson Craig
Aircraft Owners and Pilots Association	Chris Hudson - Mid-Atlantic Rep
	Mike Flilucci
	Stacey Heaton
Airport Community Roundtable	Natalie Rutzell (Chair)
	Phillip Gussman (Co-chair)
HMMH	Gene Reindel
Federal Aviation Administration, Air Traffic Division	Anthony Limon
	Mark Libby
Federal Aviation Administration, Airports Division	Jamal Stovall
	Jennifer Adams
	Wes Mittlesteadt
National Air Traffic Controller Association	Anthony Schifano
	Chris Riddle
ABX Air	Andy McAviney
Air Canada	Kevin Oliphant
	Ronald Todd
	Sara Whitley
	Victor Toala
American Airlines	Bob Berlucchi
	Michael Wanner
	Ryan Jorgenson
	Scott Pressley
	Tracy Montross
	Wes Googe
Delta Air Lines	Jose Fernandez
	Keith Fidler
FedEx	Daniel Allen
	Jason Fricke
Frontier Airlines	Taylor Wilson
JetBlue	Matt Detcher
Lufthansa	Rikard Hinrichs
Southwest Airlines	George Hodgson
	Lawrence Turner
Spirit Airlines	Garry Jones
United Airlines	Mike Acosta
	Rob Galbraith
	Vinnie Pestrichella
UPS	Danny Ndingwan
USAF 145th Airlift Wing	Billy Prather
	James R. Eaton II
	Jayce Bass
Wilson Air (FBO)	Vince Papke

CLT Part 150 Study Update

Technical Advisory Committee, Meeting #1

September 14, 2022, 2:00 p.m.

SIGN-IN SHEET – PLEASE PRINT

NAME	ORGANIZATION	PHONE NUMBER	EMAIL
Tracy Montross	American Airlines	704/808-9278	Tracy.Montross@aa.com
Chris Riddle	FAA Tower /NATCA	704 491 5597	CRNATCA@GMAIL.com
Keith Fidler	Delta Air Lines	404 398 5071	Keith.E.Fidler@Delta.com
Jose Fernandez	Delta Air Lines	646 345 4293	jose.l.fernandez@delta.com
Ryan Jorgenson	American Airlines	614-264-1560	ryan.jorgenson@aa.com
Coaby Elizondo	L&B	956 357 2778	

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CLT Part 150 Study Update

Technical Advisory Committee, Meeting #1

September 14, 2022, 2:00 p.m.

SIGN-IN SHEET – PLEASE PRINT

NAME	ORGANIZATION	PHONE NUMBER	EMAIL
Phillip Gussman	ACR	704-608-1323	phil@Gussmanconsult.com
[illegible]	~~AA~~ CLT		
Gene Reindel	ACR (HMMH)	339 234 2035	ereindel@hmmh.com
Michael Wanner	AA	904-347-8836	michael.wanner@aa.com
Kevin Oliphant	PrimeFlight / AIR CANADA	346.451-5235	koliphant@primeflight.
JACK CHRISTINE	CLT	704. 359. 4932	jlchristine@cltairport.com
Kevin Hennessey	CLT	704-359-4008	kevinhennessey@cltairport.com
MIKE PILARSKI	CLT	704-240-0838	mopilarski@cltairport.com

2/2

Part 150 Noise Compatibility Study Update

CLT CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT

Welcome to the

Technical Advisory Committee Meeting #1

September 14, 2022

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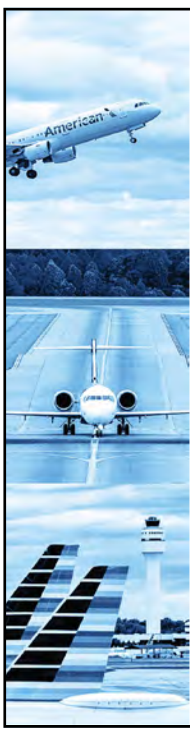

Agenda

- Welcome and Introductions
- Overview of CLT’s Part 150 Study Update
- Role of the Technical Advisory Committee
- History of Noise Compatibility Planning
- Overview of Data Collected / Input Model
- Noise Monitoring Program
- Current Procedures and Measures
- Questions & Answers
- Next Steps / Schedule

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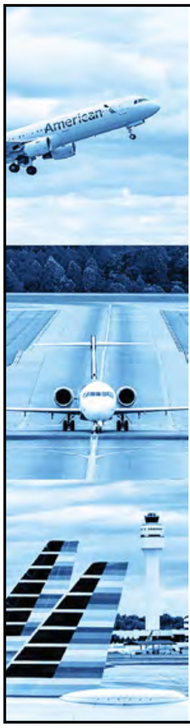
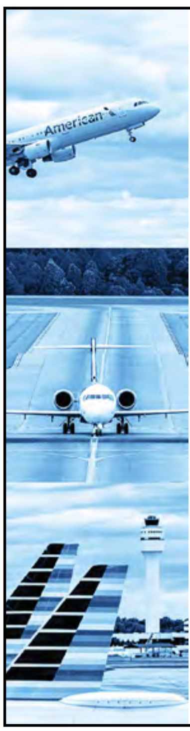


Welcome and Introductions

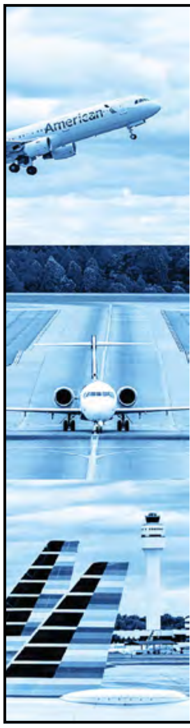
- Charlotte Douglas International Airport
  - Sponsor of the CLT Part 150 Study Update
  - Team: Amber Leathers, Mike Pilarski, Kevin Hennessey, Dan Gardon
- Consultant Team
  - Landrum & Brown is the lead consultant
  - 70 years of aviation planning
  - Experts in aircraft noise and land use planning
- Federal Aviation Administration
  - Developed guidelines for Part 150 that must be followed
  - Review NEMs for accuracy and determination that guidelines were met
  - Review recommendations for consistency with Part 150 guidelines



Overview of CLT's Part 150 Study Update

Key Terms

- Federal Aviation Administration (FAA)
  - The FAA is responsible for administering the Part 150 program
    - Guidelines for preparing the study
    - Participates as technical experts (air traffic controllers)
    - Reviews the NEMs and NCP, and issues a record of approval
    - Provide public notice via the Federal Register process
    - Providing funding for studies and implementation of approved recommendations
- Day-Night Average Sound Level (DNL)
  - This is a way of describing average noise from aircraft around an airport
  - DNL takes into account all noise from aircraft and puts extra emphasis on aircraft that operate at nighttime
  - FAA has established 65 dB DNL as where residential land uses are considered incompatible
- New Runway or Fourth Parallel Runway
  - The Airport recently received environmental approval to construct a fourth north-south runway
  - The new runway is expected to be operational by 2028



Part 150 Study Update – Overview

- **Part 150 Studies are Planning Studies**
  - Identify noise and land use impacts in accordance with FAA guidance
  - Work to develop solutions within the FAA's framework
  - City council ultimately recommends measures, FAA approves measures
- **Part 150 Studies <u>can</u> open funding sources**
  - May be eligible for grants to implement recommendations
  - Funding is not guaranteed
- **Part 150 Studies do <u>not</u>:**
  - Recommend closing an airport
  - Recommend implementing mandatory restrictions
  - Give environmental approval for implementing measures

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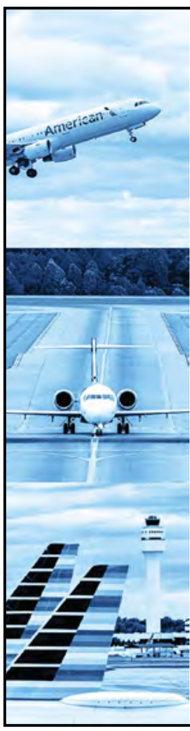

Part 150 Study Update – Primary Elements

- **Noise Exposure Maps:**
  - Description of the noise levels for existing and future (+5 years) conditions
  - Existing conditions
    - Last 12 months of activity
  - Future conditions (2028)
    - Takes into account physical and operational changes
    - Physical changes include: new runway, runway threshold relocation, etc
    - Operational changes include: aircraft operating levels, fleet mix, new flight tracks, new destinations

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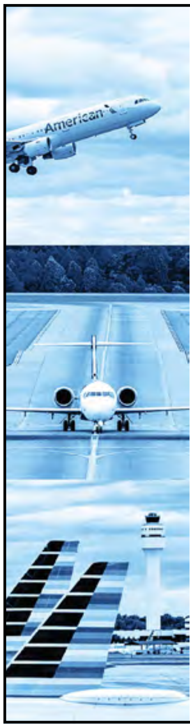

Part 150 Study Update – Primary Elements

- **Noise Compatibility Program:**
  - Recommendations for reducing, minimizing, and/or mitigating aircraft noise and land use conflicts
    - Noise Abatement
    - Land Use Mitigation
    - Implementation Measures
  - May reflect short-term and long-term time periods
    - Short term – pre-runway opening (before 2028)
    - Long term – post-runway opening (after 2028)

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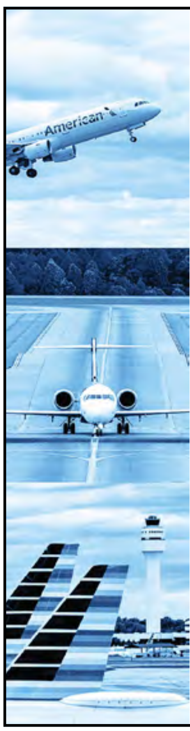

Part 150 Study Update – Primary Elements

- **Public Involvement:**
  - **Technical Advisory Committee** – Group of stakeholders affected by, or having oversight responsibilities for, issues covered by the Part 150 Study Update
    - Airport officials
    - Aircraft operators/airlines
    - Government Officials / Land Use Planners
    - Airport Community Roundtable (ACR)
    - Air Traffic Controllers
  - **Public Workshops** - Informational meetings to discuss and gather comments on potential aviation noise, land use, and other mitigation measures
  - **Public Hearings** - Receive comments (either oral or written) from the public on the Draft Part 150 Study Update document

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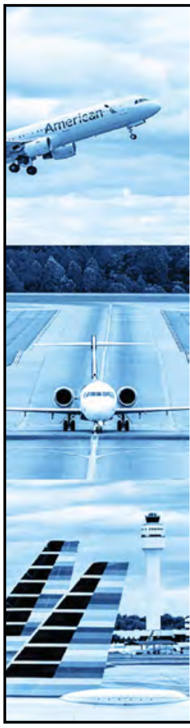

Part 150 Study Update – Primary Elements

- **Public Involvement:**
  - **Project Website / Social Media / Virtual Meeting**
    - Project website and social media will be updated with study information, including images and documents pertinent to the study
    - Posting of all meeting notices
    - Posting of study process and draft findings
    - Active/passive comment collection through website and/or virtual meeting capabilities

Visit us at:
CLTpart150.com

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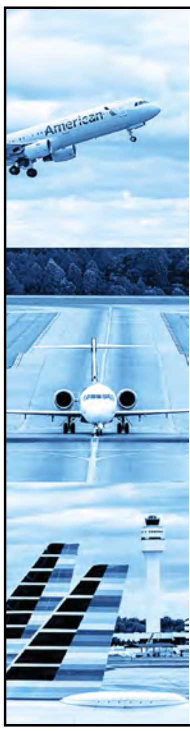
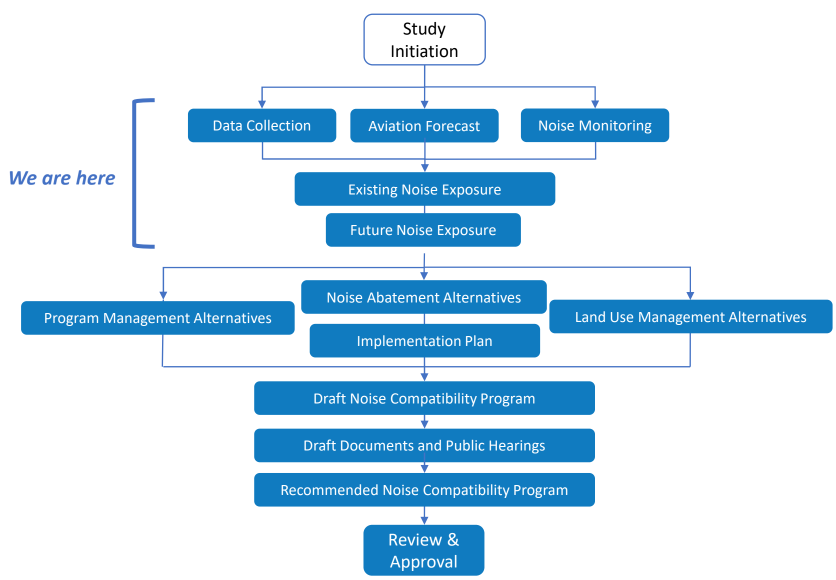


Part 150 Noise Compatibility Study Update Process



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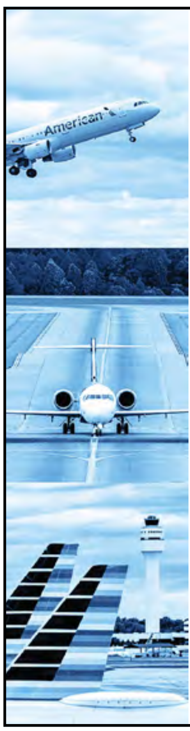
Part 150 Noise Compatibility Study Update Process

Part 150 Task and Subtasks	2022								2023												2024
	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan
Project Kick-Off and Data Collection																					
Review Aviation Demand Forecasts																					
Conduct Noise Monitoring																					
Existing Noise Exposure																					
Future Noise Exposure Map																					
Noise Abatement Alternatives																					
Land Use Alternatives																					
Noise Compatibility Program																					
Draft Part 150 Report and Public Hearing																					
Part 150 NCP Adoption by City																					
Prepare and Submit Final Part 150 NCP to FAA																					
FAA Record of Approval *(Summer 2024)*																					
Meetings and Coordination																					
Technical Advisory Committee Meetings					1			2					3					4			
Public Information Meetings								1					2					3			
Public Hearing/Responses																					

Charlotte Douglas International Airport



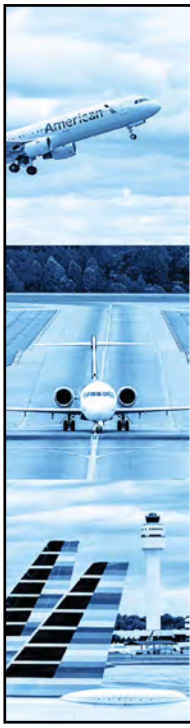
Role of the Technical Advisory Committee

Role of the Technical Advisory Committee (TAC)

- Sounding Board
- Link to the Community
- Technical Review
- Aid to Implementation

TAC Meeting Schedule

- Meeting #1 – September 2022
- Meeting #2 – Winter 2022/2023
  - Review preliminary noise exposure maps, and results of noise measurement program
- Meeting #3 – Summer 2023
  - Analysis of noise abatement measures
- Meeting #4 – Fall 2023
  - Review Draft Noise Compatibility Program



History of Noise Compatibility Planning

Federal Regulations and Guidelines

- Jet Age + Rapid Expansion of Airports + Continued Suburban Development/Sprawl = Adverse Noise Impacts
- Aviation Noise Abatement Policy of 1976
- Aviation Safety and Noise Abatement Act of 1979
  - 14 CFR Part 150 (1981) established requirements for airport owners who choose to submit noise exposure maps and develop noise compatibility planning programs to the FAA for review and approval
  - Typically voluntary on the part of the sponsor and is not an automatic requirement of the Federal government
- Airport Noise and Capacity Act of 1990
  - Established phase-out of Stage 2 aircraft
  - Restricted airports from imposing locally based, non-voluntary restrictions without first completing a Part 161 Study
- FAA Final Policy on Part 150 Noise Mitigation Measures (Oct 1, 1998)
  - New homes constructed within an FAA-approved and published noise exposure contour are NOT eligible for remedial noise mitigation

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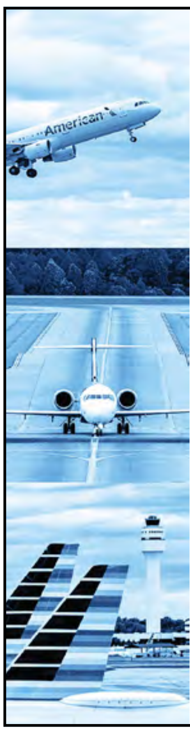
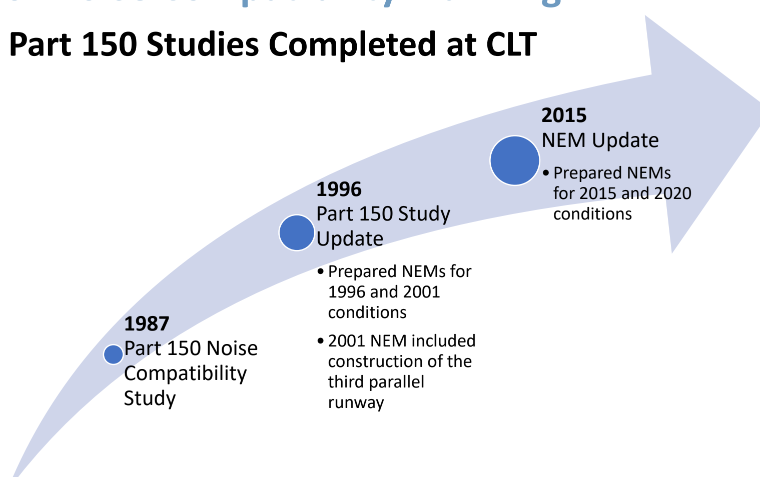


History of Noise Compatibility Planning

Previous Part 150 Studies Completed at CLT



CLT has invested more than $120 million in local community projects directly related to reducing or mitigating airport noise issues through a **Residential Sound Insulation Program** and **Residential Acquisition Program**

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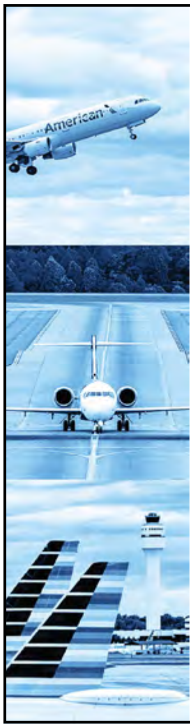
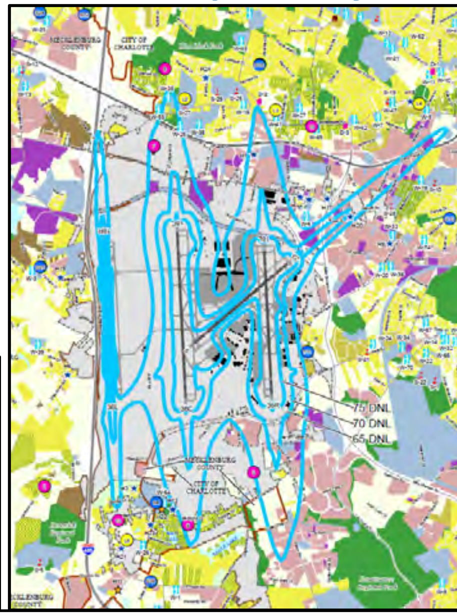


History of Noise Compatibility Planning



Current 2020 NEM

- Based on projections of aircraft operations prepared in 2015
- Approximately 170 residential properties and 500 people within the 65 DNL
- 5 schools and churches within 65 DNL

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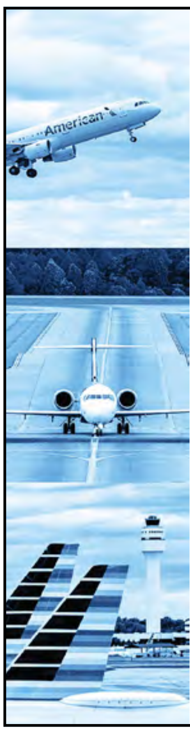

Overview of Data Collected / Input Model

Technical Requirements

- Represents an annual-average day (1 year of operations/365 days)
- Described with a set of continuous lines that represent equal levels of noise
- Prepared using the FAA's Airport Environmental Design Tool (AEDT) Version 3e
- Must use specific noise metric: Day-Night Average Sound Level (DNL)
  - National standard for all Federal agencies
  - DNL represents 24-hour average noise level
  - Penalty for nighttime (10:00 p.m. - 6:59 a.m.) flights (x 10)
  - 65 DNL identified as threshold for impact to noise sensitive land uses

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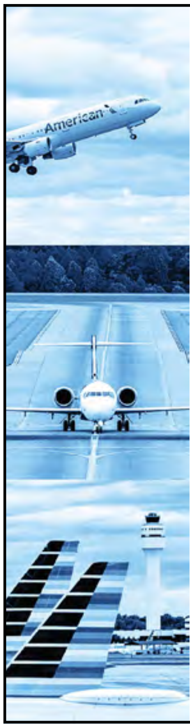

Charlotte Douglas International Airport

Overview of Data Collected / Input Model

Data Sources
- Airport Layout Plan
- Radar Data
- OAG Data
- Landing Reports
- ATCT Counts

+

Input Data
- Runway Layout
- Operating Levels
- Fleet Mix
- Runway Use
- Flight Tracks

Airport Environmental Design Tool (AEDT)
- Aircraft Database (over 3,500 aircraft / engine types)
- Aircraft Performance Data
- Aircraft Noise Data

Noise Contours

Tabular Reports

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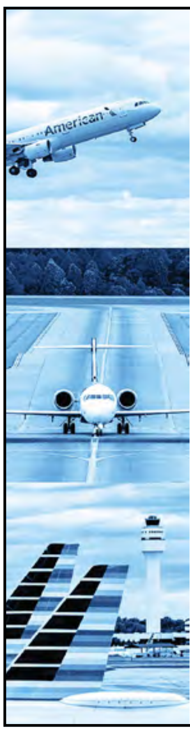
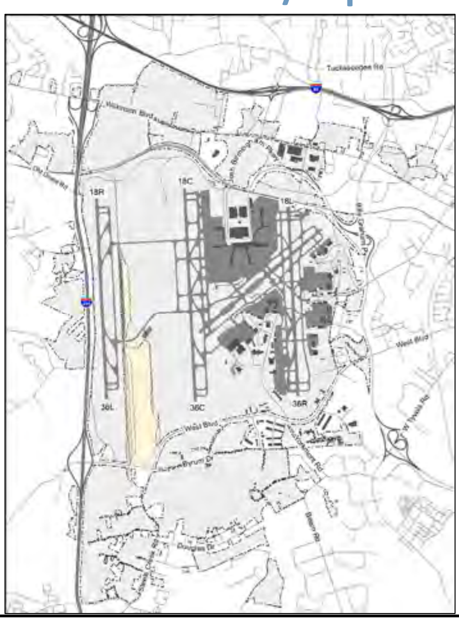


Charlotte Douglas International Airport

Overview of Data Collected / Input Model

Existing (2022) Runway Layout



Note: Runway 5/23 assumed closed for operations

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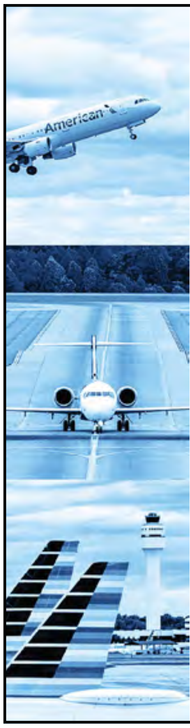

Overview of Data Collected / Input Model

Existing (2022) Operating Levels

Based on FAA Air Traffic Control Tower records for April 2021 through March 2022

Aircraft Category	2022 Existing Operations		
	Actual	Average Annual Day	Percent
Air Carrier & Commuter	499,472	1,368.4	94.9%
General Aviation	25,785	70.6	4.9%
Military	1,197	3.3	0.2%
Total	**526,454**	**1,442.3**	**100.0%**

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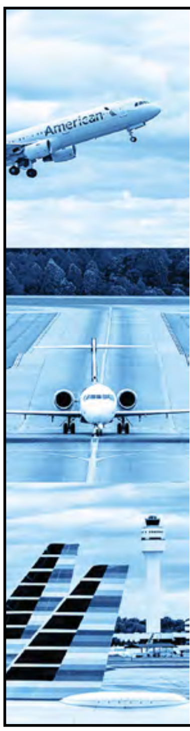

Overview of Data Collected / Input Model

Existing (2022) Fleet Mix

AEDT Airframe Type	Total Daily Operations
Heavy Passenger Jets	
Airbus A350-900 series	0.7
Boeing 777-200-ER	7.6
Subtotal	*8.3*
Large Passenger Jet	
Airbus A319-100 Series	119.4
Airbus A320-200 Series	69.5
Airbus A320-NEO	5.5
Airbus A321-200 Series	192.4
Boeing 717-200 Series	23.8
Boeing 737-700 Series	8.6
Boeing 737-8	2.2
Boeing 737-800	195.4
Boeing 737-900-ER	0.3
Bombardier CRJ-700	4.0
Bombardier CRJ-700-ER	154.6
Bombardier CRJ-900	6.7
Bombardier CRJ-900-ER	283.0
Embraer ERJ170	18.3
Embraer ERJ170-LR	14.5
Embraer ERJ175-LR	78.9
Embraer ERJ190-AR	2.7
Subtotal	*1,179.7*
Regional Jet	
Embraer ERJ135	3.8
Embraer ERJ145-LR	131.9
Subtotal	*135.7*
Cargo Jet	
Airbus A300F4-600 Series	3.3
Boeing 757-200 Series Freighter	2.9
Boeing 767-200 Series Freighter	1.8
Boeing 767-300 ER Freighter	4.6
Boeing MD-11 Freighter	1.4
Subtotal	*14.1*
Commuter / General Aviation Prop	
Cessna 172 Skyhawk	1.5
Pilatus PC-12	6.8
Piper PA-32 Cherokee Six	0.6
Raytheon Super King Air 300	6.2
Subtotal	*15.1*

AEDT Airframe Type	Total Daily Operations
General Aviation Jet	
Bombardier Challenger 300	9.0
Bombardier Challenger 600	2.4
Bombardier Global Express	0.6
Bombardier Learjet 45	0.8
Cessna 550 Citation II	1.0
Cessna 560 Citation Excel	6.7
Cessna 560 Citation V	4.8
Cessna 560 Citation XLS	2.2
Cessna 650 Citation III	0.7
Cessna 680 Citation Sovereign	3.1
Cessna 680-A Citation Latitude	12.0
Cessna 750 Citation X	1.6
Dassault Falcon 2000	4.6
Dassault Falcon 50	0.7
Dassault Falcon 900	4.4
Dassault Falcon 900-EX	1.9
Gulfstream G280	2.9
Gulfstream G400	2.0
Raytheon Beechjet 400	3.5
Raytheon Hawker 800	1.9
Raytheon Premier I	0.8
Cessna 525	2.9
Cessna 525A	1.9
Cessna 525B	2.7
Embraer Phenom 100	0.8
Embraer Phenom 300	4.8
Gulfstream G650	1.4
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	1.2
Subtotal	*83.2*
Helicopter	
Agusta A119	0.3
Eurocopter EC-130	2.3
Bell 407 / Rolls-Royce 250-C47B	0.4
Subtotal	*3.0*
Military	
Boeing C17A	3.3
Subtotal	*3.3*
Grand Total	**1,442.3**

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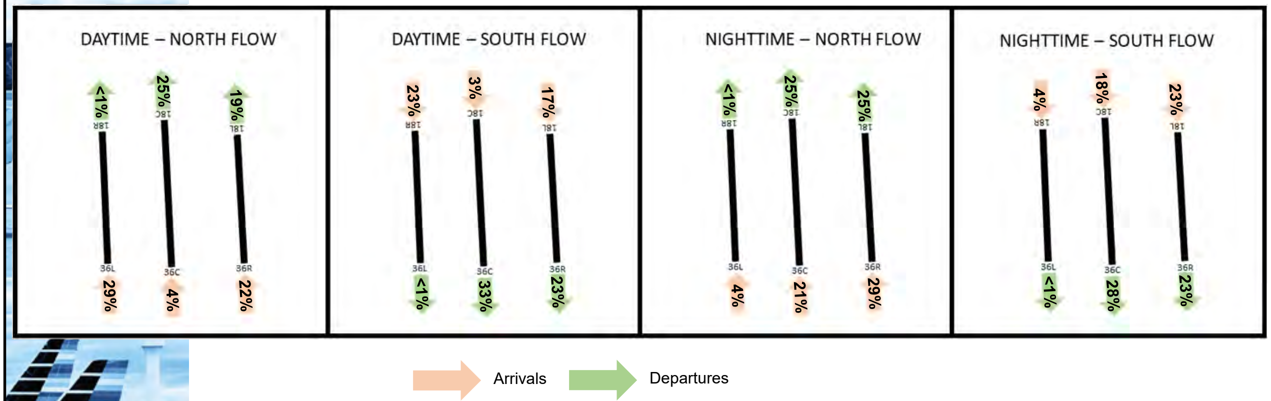
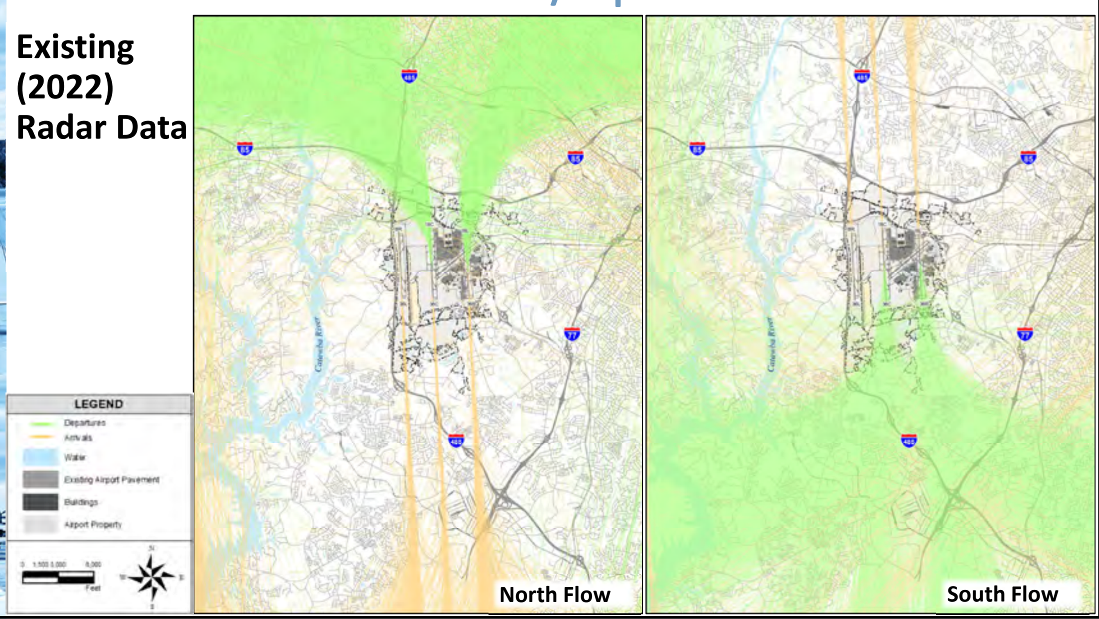
Overview of Data Collected / Input Model

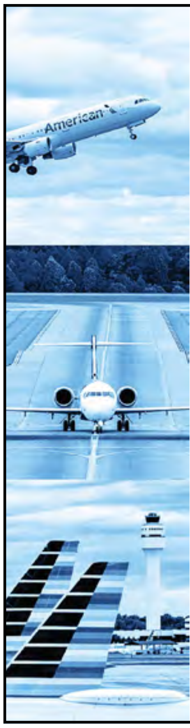
Existing (2022) Runway Use Patterns



Overview of Data Collected / Input Model

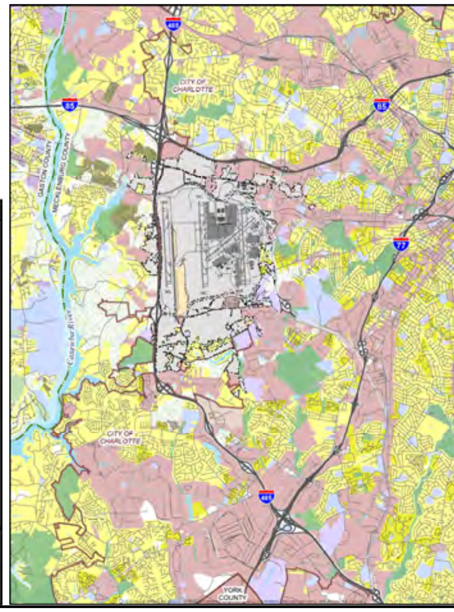
Existing (2022) Radar Data





Overview of Data Collected / Input Model

Existing Airport Environs



LEGEND

- Airport Property
- Norfolk Southern Property
- Single-Family Residential
- Multi-Family Residential
- Mobile Home Park
- Agricultural
- Commercial
- Manufacturing / Production
- Institutional / Public Use
- Transitional
- Vacant
- Parks
- Water

0 2,000 4,500 Feet

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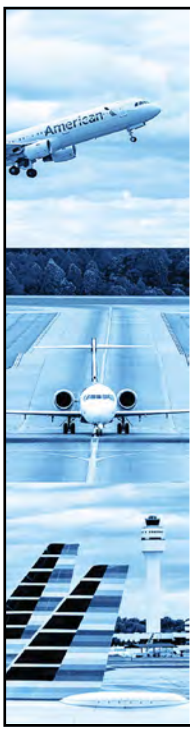
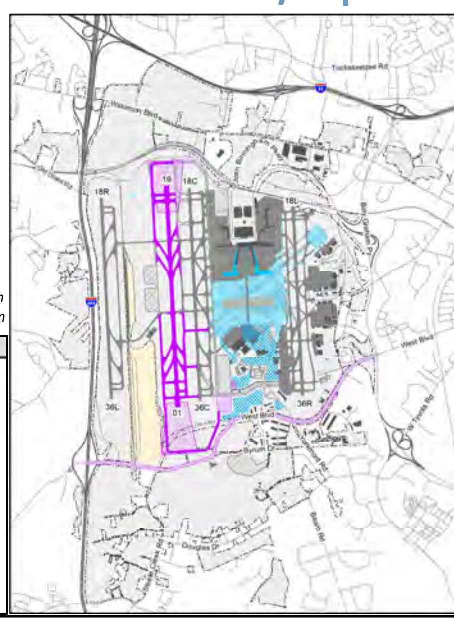


Overview of Data Collected / Input Model

Future (2028) Runway Layout

Note: New Fourth Parallel Runway, Terminal Expansion, and Other Projects Currently In Design and Under Construction



LEGEND

- Fourth Parallel Runway Construction
- Fourth Parallel Runway Connected Actions
- Terminal Expansion
- Terminal Expansion Connected Actions
- Terminal Expansion Enabling Projects
- Projects Currently In Design / Under Construction
- Norfolk Southern Property
- Airport Property

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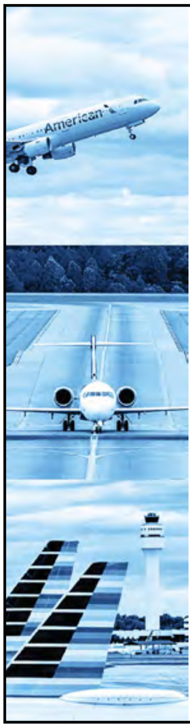
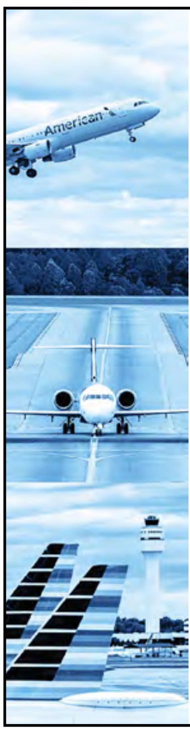


Overview of Data Collected / Input Model

Future (2028) Operating Levels

Based on aviation activity forecast used in the Capacity Enhancement Projects Environmental Assessment (FONSI / ROD issued March 2022).

Aircraft Category	2028 Forecast Operations		
	Forecast	Average Annual Day	Percent
Air Carrier & Commuter	611,620	1,675.7	95.6%
General Aviation	25,487	69.8	4.0%
Military	2,676	7.3	0.4%
Total	**639,783**	**1,752.8**	**100.0%**



Overview of Data Collected / Input Model

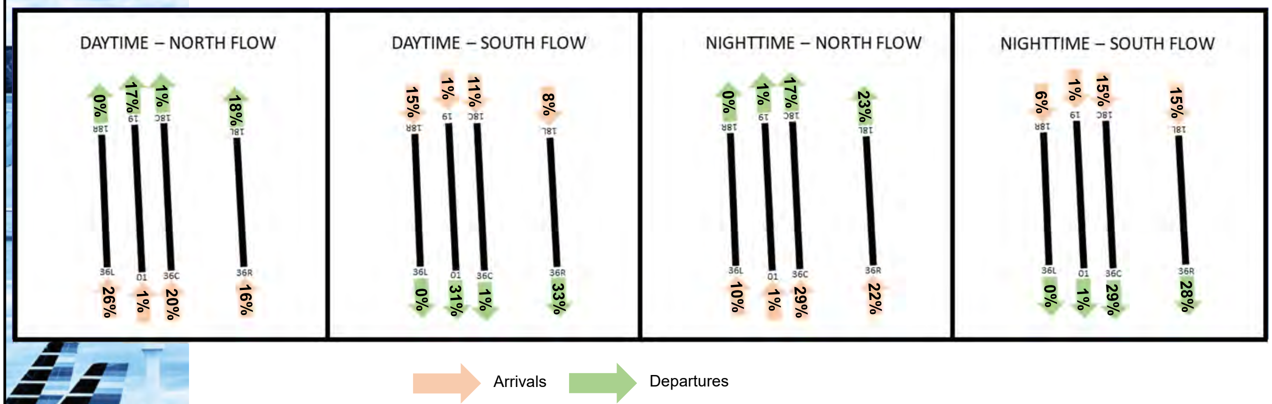
Future (2028) Fleet Mix

AEDT Airframe Type	Total Daily Operations
Heavy Passenger Jets	
Airbus A330-200 Series	7.3
Airbus A350-900 series	1.5
Boeing 787-9 Dreamliner	7.3
Subtotal	*16.0*
Large Passenger Jet	
Airbus A319-100 Series	215.9
Airbus A320-100 Series	24.8
Airbus A320-200 Series	7.3
Airbus A321-200 Series	218.8
Airbus A321-NEO	42.3
Boeing 717-200 Series	10.2
Boeing 737 MAX 7	1.5
Boeing 737 MAX 8	55.4
Boeing 737 MAX 9	2.9
Boeing 737-700 Series	11.7
Boeing 737-800 Series	16.0
Boeing MD-90	2.9
Bombardier CRJ-700-ER	249.5
Bombardier CRJ-700-LR	2.9
Bombardier CRJ-900-ER	319.5
Embraer ERJ170	7.3
Embraer ERJ175	93.4
Embraer ERJ190-AR	11.7
Subtotal	*1,294.0*
Regional Jet	
Bombardier Challenger 300	10.1
Bombardier CRJ-200-LR	236.3
Bombardier Global Express	7.0
Bombardier Learjet 45	10.7
Cessna 525 Citation Jet	5.4
Cessna 560 Citation XLS	5.4
Cessna 750 Citation X	16.1
Dassault Falcon 2000	14.9
Dassault Falcon 50	7.0
Dornier 328 Jet	5.4
Embraer 505	21.5
Subtotal	*355.7*
Cargo Jet	
Airbus A300F4-600 Series	9.6
Boeing MD-10-1 Freighter	1.6
Subtotal	*11.2*

AEDT Airframe Type	Total Daily Operations
Commuter / Cargo Prop	
Embraer EMB120 Brasilia	10.7
Raytheon Super King Air 300	5.4
Subtotal	*16.1*
General Aviation Jet	
Bombardier Challenger 600	1.6
Bombardier Learjet 60	1.6
Cessna 525A Citation Jet	1.6
Cessna 525B Citation Jet	1.6
Cessna 550 Citation II	3.2
Cessna 560 Citation Excel	4.9
Cessna 560 Citation V	4.8
Dassault Falcon 900	1.6
Gulfstream G150	1.6
Gulfstream G200	1.6
Gulfstream G280	3.2
Gulfstream G500	1.6
Gulfstream G650	1.6
Subtotal	*30.3*
General Aviation Prop	
Cessna 303 Crusader (FAS)	1.6
Cirrus SR22	1.6
DAHER TBM 900/930	1.6
Pilatus PC-12	9.5
Raytheon Beech Baron 58	1.6
Raytheon King Air 90	1.6
SOCATA TBM 850	1.6
Subtotal	*19.0*
Helicopter	
Agusta A119	0.3
Eurocopter EC-130	2.3
Bell 407/Rolls-Royce 250-C47B	0.4
Subtotal	*3.0*
Military	
Boeing C17A	7.3
Subtotal	*7.3*
Grand Total	**1,752.8**

Overview of Data Collected / Input Model

Future (2028) Runway Use Patterns



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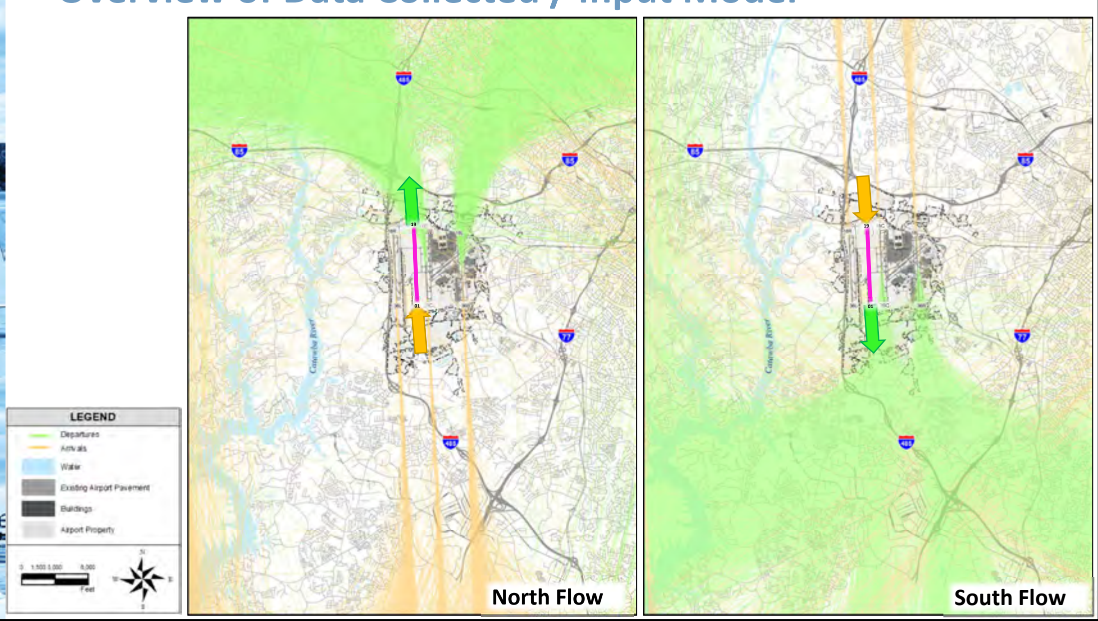
Overview of Data Collected / Input Model



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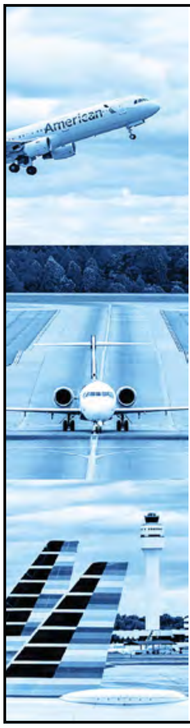
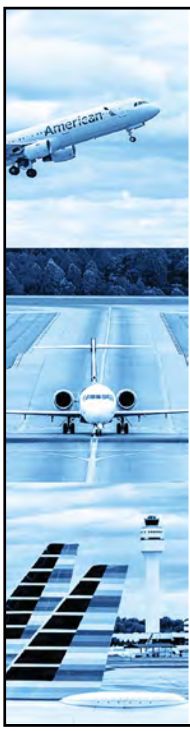


Overview of Data Collected / Input Model

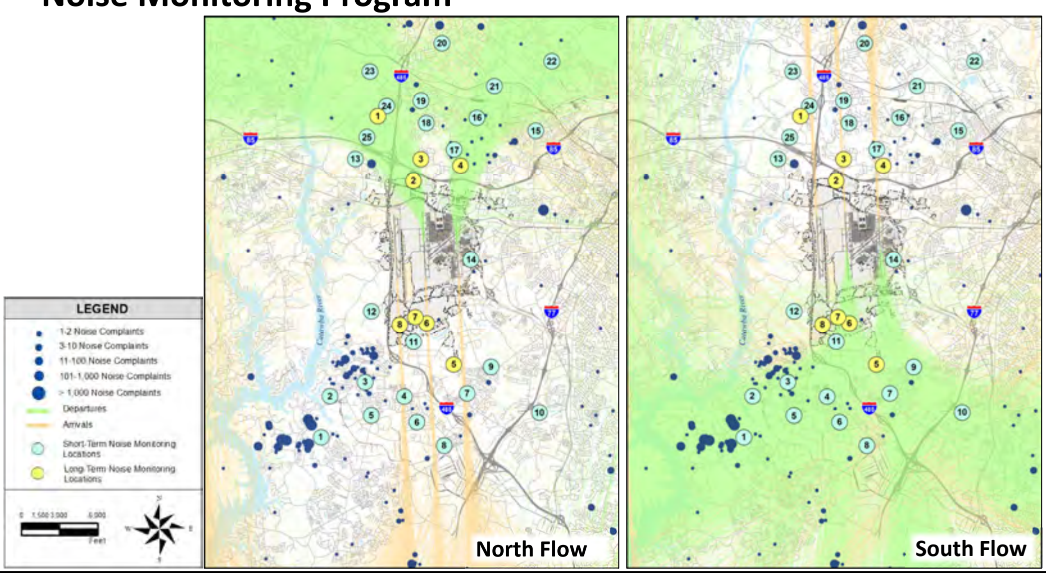
Noise Monitoring Program

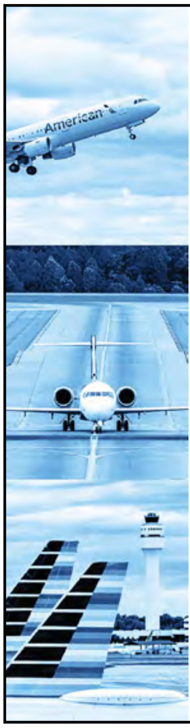
- Purpose
  - Validate/verify the input data in the AEDT (focus on departures)
  - Obtain "real-life" noise measurements to assist in understanding the total noise environment
- Collect noise readings at short-term and long-term sites
  - Sites selected to provide wide coverage within residential areas and areas of noise complaints
  - Preference given to sites monitored for the Capacity EA
- To be conducted for one week in Fall 2022



Overview of Data Collected / Input Model

Noise Monitoring Program





Current Procedures and Measures

Types of Noise Compatibility Measures

1. Noise Abatement Measures

Measures to control noise at the source (i.e. aircraft)

- Flight location (e.g., departure flight corridors)
- Runway use program (e.g., how often runway ends are used)
- Ground activity restrictions (e.g., run-up locations/time)
- Facility modifications (e.g., runway extensions, berms)
- Flight management (e.g., mandatory curfews / restrictions)

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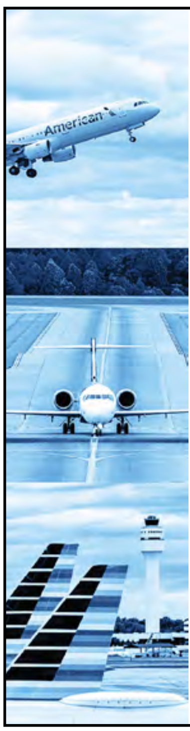

Current Procedures and Measures

Types of Noise Compatibility Measures

2. Land Use Measures

Preventive Strategies	Corrective Strategies
• **Prevent** the introduction of additional noise-sensitive land uses within existing and future noise exposure contours • May also be applicable outside of the 65 DNL noise contour • Examples: ✓Zoning Codes ✓Subdivision Regulations ✓Airport Environs Overlay Zone	• **Mitigate** existing and projected future unavoidable noise impacts in areas of existing incompatible land use • Applicable to 65+ DNL noise contour • Examples ✓Property acquisition ✓Sound Insulation ✓Avigation Easements

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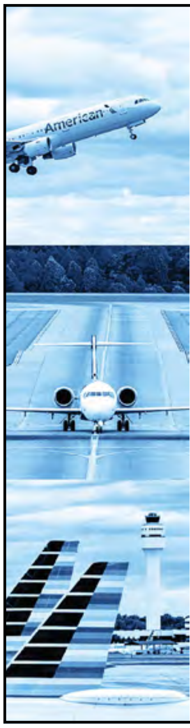


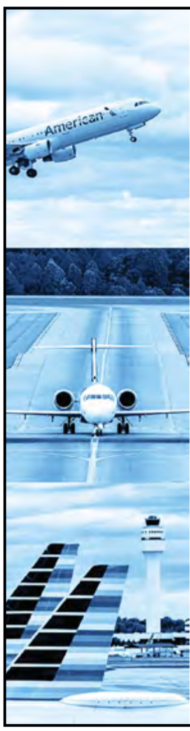
Current Procedures and Measures

Types of Noise Compatibility Measures

3. Implementation Measures

Measures designed to assist with the implementation and management of the Noise Compatibility Program (NCP)

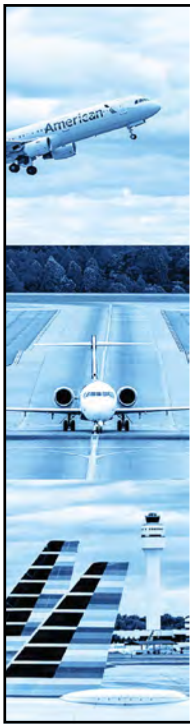
- Noise Program Office and Staff Support
- Flight tracking / Noise Monitoring System
- Focus Groups / Roundtables
- Periodic Review / Update to the Program



Current Procedures and Measures

What is Currently Included in CLT's Part 150 Program?

- **Current CLT Noise Abatement Measures**
  - Nine measures that address monitoring, reporting, designating certain runways for different times of day, and prescribing certain flight patterns
- **Current CLT Land Use Control Measures**
  - Nine measures that promote compatible land use planning, disclosures to the public
- **Current CLT Land Use Mitigation Measures**
  - Nine measures that provide mitigation for homes and other noise sensitive uses within the 65 DNL (sound insulation, acquisition, purchase assurance, and easements)



Charlotte Douglas International Airport

Questions & Answers

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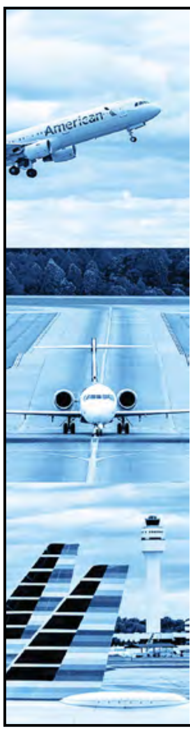

Charlotte Douglas International Airport

Group Discussion

Question #1:

What issues / concerns do you have related to airport noise compatibility?

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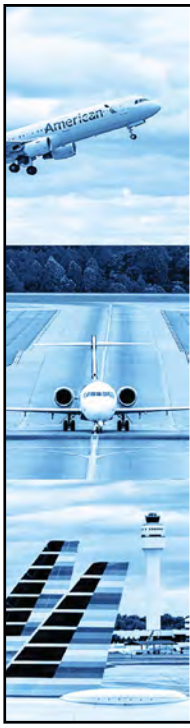
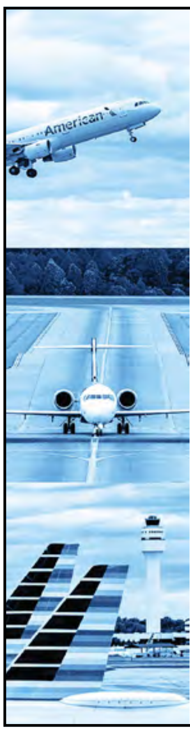


Group Discussion

Question #2:

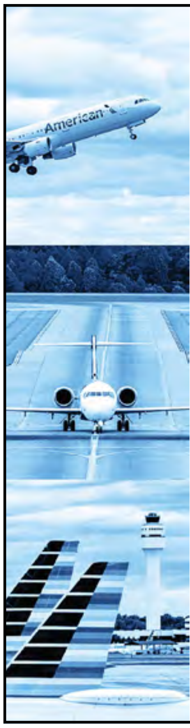
The TAC includes representatives from airport users, planning and zoning officials, and ACR. Is there anyone else you would recommend be included? If so, who?



Group Discussion

Question #3:

Does your organization have any data that might be helpful to this study – e.g. growth projections, proposed developments in the area? If so, what?



Group Discussion

Question #4:

How can you help get the word out when we are ready to promote public meetings?

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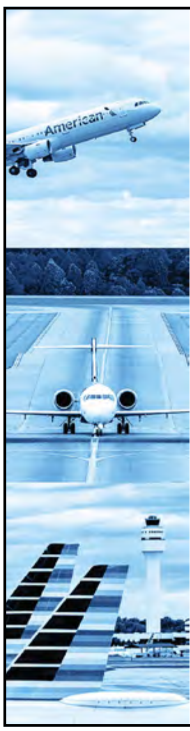

Group Discussion

Question #5:

Any questions regarding the proposed noise monitoring program?

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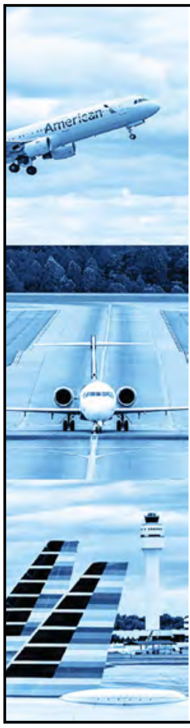
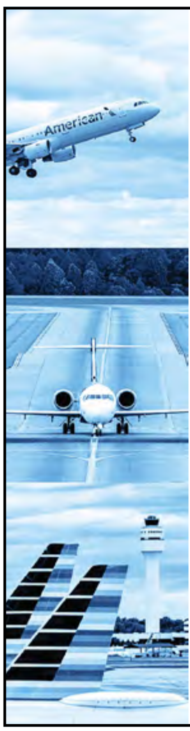


Group Discussion

Other Questions or Comments to aid this process



Next Steps / Schedule

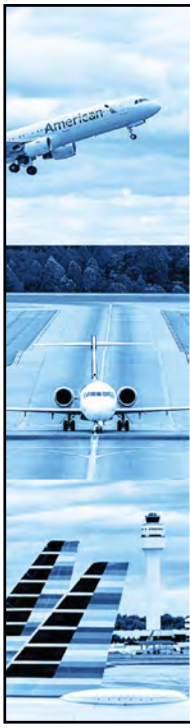
Complete review of Noise Measurement Data

Prepare the Existing and Future Noise Exposure Contours

Identify Preliminary Noise Abatement, Land Use Management, and Implementation Alternatives

Analysis and discussion of potential alternatives

Next TAC Meeting – Winter 2022/2023



Next Steps / Schedule

May 2022
Project Kickoff

Fall 2022
First Public Workshops

2022–2023
Technical Work

Spring/Summer 2023
Release of Draft Findings

Fall 2023
Final Recommendations

End of 2023 / Start of 2024
FAA Review & Approval

Technical Advisory Committee Meeting #2
March 22, 2023

Meeting Invitations

Sign-in Sheet

Presentation

CHARLOTTE DOUGLAS
INTERNATIONAL AIRPORT

February 27, 2023

To Whom It May Concern,

The City of Charlotte is conducting a Part 150 Study Update is to develop a balanced and cost-effective plan to reduce current noise impacts, where practical, and to limit the potential for future noise impacts. We are writing to ask for your participation on the second meeting of the Technical Advisory Committee (TAC) formed as part of the Part 150 Study Update. The TAC consists of airport users and tenants; Federal Aviation Administration (FAA) representatives; representatives of the Airport Community Roundtable (ACR); local planning organizations; and Airport staff. The TAC will review study findings, comment on study recommendations before they are presented to the public at-large and will participate in discussions related to aircraft noise issues.

The second meeting of the TAC is scheduled for **Wednesday, March 22, 2023** from 1:30 pm to 3:00 pm. It will be held in the Ash Conference Room at the Harris Conference Center at Central Piedmont Community College, 3216 CPCC Harris Campus Drive, Charlotte, NC 28208 . TAC members will receive a meeting agenda and other pertinent material in advance of the meeting.

We value and look forward to your input and participation in this process. Please RSVP by March 9, 2023 with whether or not you accept this invitation and wish to participate in the TAC. Contact Gaby Elizondo via phone at (513) 530-1205 or gaby.elizondo@landrumbrown.com to submit your RSVP or with any questions.

Sincerely,

Haley H Gentry

Haley Gentry
Chief Executive Officer

INVITATION LIST
TECHNICAL ADVISORY COMMITTEE MEETING #2

REPRESENTING	NAME
Charlotte Mecklenburg Police Department, Aviation Unit	Kenneth Anderson
City of Charlotte City Council	Victoria Watlington
City of Charlotte Planning, Design, and Development Department	Alan Goodwin
	Alberto Gonzales
	Alyson Craig
Aircraft Owners and Pilots Association	Chris Hudson - Mid-Atlantic Rep
	Mike Flilucci
	Stacey Heaton
Airport Community Roundtable	Natalie Rutzell (Chair)
	Phillip Gussman (Co-chair)
HMMH	Gene Reindel
Federal Aviation Administration, Air Traffic Division	Anthony Limon
	Mark Libby
Federal Aviation Administration, Airports Division	Jamal Stovall
	Lopa Naik
	Peggy Kelley
National Air Traffic Controller Association	Anthony Schifano
	Chris Riddle
ABX Air	Andy McAviney
Air Canada	Kevin Oliphant
	Ronald Todd
	Sara Whitley
	Victor Toala
American Airlines	Bob Berlucchi
	Michael Wanner
	Ryan Jorgenson
	Scott Pressley
	Steven Holt
	Tracy Montross
	Wes Googe
Delta Air Lines	Jose Fernandez
	Keith Fidler
FedEx	Daniel Allen
	Jason Fricke
Frontier Airlines	Ben Booker
JetBlue	Matt Detcher
Lufthansa	Rikard Hinrichs
Southwest Airlines	George Hodgson
	Lawrence Turner
Spirit Airlines	Garry Jones
United Airlines	Mike Acosta
	Rob Galbraith
	Vinnie Pestrichella
UPS	Danny Ndingwan
	Seth Garrett
USAF 145th Airlift Wing	James R. Eaton II
	Jayce Bass
Wilson Air (FBO)	Vince Papke

CLT Part 150 Study Update

Technical Advisory Committee, Meeting #2

March 22, 2023, 1:30 p.m.

SIGN-IN SHEET – PLEASE PRINT

NAME	ORGANIZATION	PHONE NUMBER	EMAIL
Tommy Dupree	FAA	901-322-8181	tommy.dupree@faa.gov
Chris Riddle	FAA	704 421 5597	crnatca@gmail.com
Gene Reindel	HMMH	339 234 2035	ereindel@hmmh.com
Stuart Hair	CLT	7-280-0223	Stuart.Hair@CLTairport.com
Jayce Bass	NCANG	704-813-1094	jayce.bass@us.af.mil
Natalie Rutzell	ACR	980-307-0093	nrutzell@gmail.com
Kevin Hennessey	CLT	704 359 4008	Kevin.hennessey@cltairport.com
Tony Limon	FAA	734 717 1272	Anthony.Limon@FAA.Gov
Jack Christine	CLT	704.359.4932	
MIKE WANNER	AA	904.347.5836	MIKE.WANNER@AA.COM
Jude Starrett	CLT	980-364-3240	jude.starrett@cltairport.com
Tracy Montross	AA	704-808-9278	tracy.montross@aa.com
Ryan Jorgenson	AA	614-264-1560	ryan.jorgenson@AA.com

CLT Part 150 Study Update

Technical Advisory Committee, Meeting #2

March 22, 2023, 1:30 p.m.

SIGN-IN SHEET – PLEASE PRINT

NAME	ORGANIZATION	PHONE NUMBER	EMAIL
Anthony Schifano	NATCA / FAA	317-698-1431	ASCHIFANO20@GMAIL.COM
Dan Gard	CLT	980-257-9380	~~[illegible]~~ daniel.garda@cltairport.com

2 of 3

CLT Part 150 Study Update

Technical Advisory Committee, Meeting #2

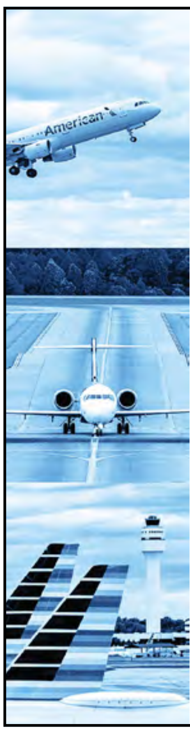
March 22, 2023, 1:30 p.m.

SIGN-IN SHEET – PLEASE PRINT

NAME	ORGANIZATION	PHONE NUMBER	EMAIL
Peggy S. Kelley	FAA MEM-ADO	901-322-8286	peggy.kelley@faa.gov

Part 150 Noise Compatibility Study Update

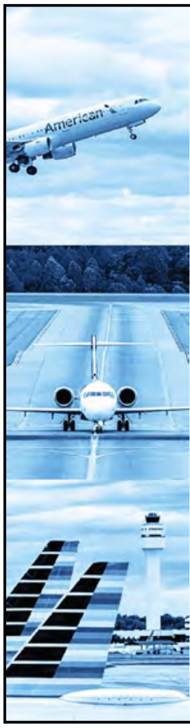
1



Agenda

- Welcome and Introductions
- Summary of Part 150 Study Update Process
- Noise Monitoring Program
- Baseline Noise Exposure
- Current Noise Compatibility Program Measures
- Preliminary Noise Abatement Measures
- Next Steps / Schedule

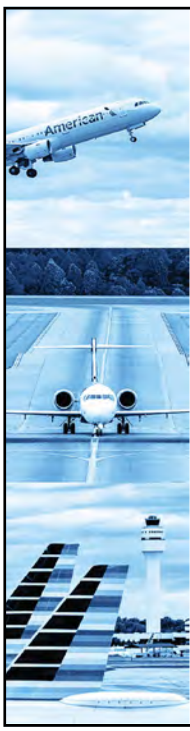
2



Welcome and Introductions

- Charlotte Douglas International Airport
  - Sponsor of the CLT Part 150 Study Update
  - Team: Amber Perry, Mike Pilarski, Kevin Hennessey, Dan Gardon
- Consultant Team
  - Landrum & Brown is the lead consultant
  - 70 years of aviation planning
  - Experts in aircraft noise and land use planning
- Federal Aviation Administration
  - Developed guidelines for Part 150 that must be followed
  - Review NEMs for accuracy and determination that guidelines were met
  - Review recommendations for consistency with Part 150 guidelines

3



Summary of Part 150 Study Update Process

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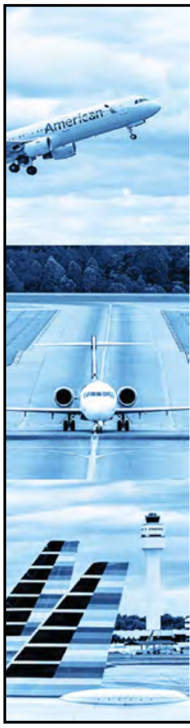

Part 150 Study Update – Primary Elements

- **Noise Exposure Maps:**
  - Description of the noise levels for existing and future (+5 years) conditions
  - Existing conditions
    - Last 12 months of activity
    - April 2021 through March 2022
  - Future conditions (2028)
    - Takes into account physical and operational changes
    - Physical changes include: new runway, runway threshold relocation, etc
    - Operational changes include: aircraft operating levels, fleet mix, new flight tracks, new destinations

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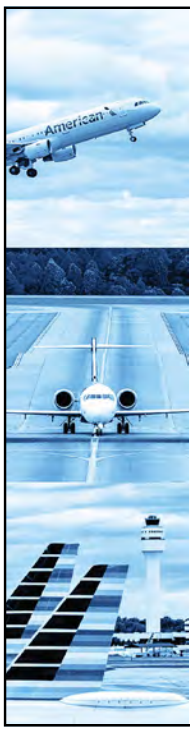

Part 150 Study Update – Primary Elements

- **Noise Compatibility Program:**
  - Recommendations for reducing, minimizing, and/or mitigating aircraft noise and land use conflicts
    - Noise Abatement
    - Land Use Mitigation
    - Implementation Measures
  - May reflect short-term and long-term time periods
    - Short term – pre-runway opening (before 2028)
    - Long term – post-runway opening (after 2028)

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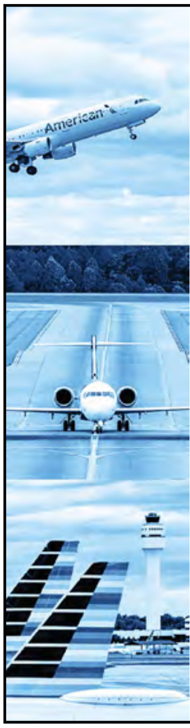
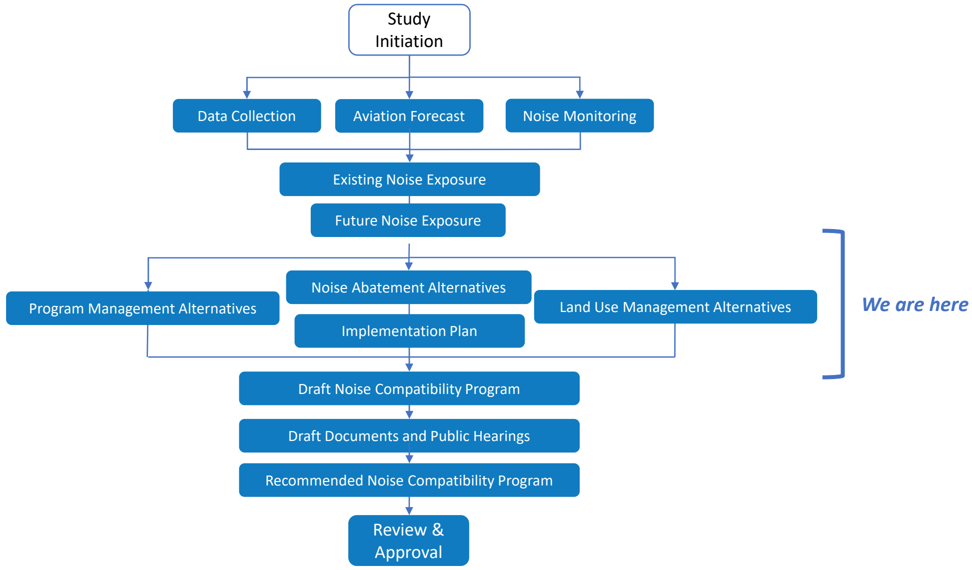


Part 150 Noise Compatibility Study Update Process



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Part 150 Noise Compatibility Study Update Process

Part 150 Task and Subtasks	2022 May	2022 June	2022 July	2022 Aug	2022 Sep	2022 Oct	2022 Nov	2022 Dec	2023 Jan	2023 Feb	2023 Mar	2023 Apr	2023 May	2023 June	2023 July	2023 Aug	2023 Sep	2023 Oct	2023 Nov	2023 Dec	2024 Jan	2024 Feb	2024 Mar	2024 Mar
Project Kick-Off and Data Collection	■	■																						
Review Aviation Demand Forecasts	■	■	■																					
Conduct Noise Monitoring				■	■	■																		
Existing Noise Exposure			■	■	■	■																		
Future Noise Exposure Map						■	■																	
Noise Abatement Alternatives							■	■	■	■	■	■	■											
Land Use Alternatives											■	■	■	■	■	■								
Noise Compatibility Program																■	■	■	■					
Draft Part 150 Report and Public Hearing																			■	■	■			
Part 150 NCP Adoption by City																						■		
Prepare and Submit Final Part 150 NCP to FAA																						■	■ ★	
FAA Record of Approval *(Summer 2024)*																								
Meetings and Coordination																								
Technical Advisory Committee Meetings					1						2						3					4		
Public Information Meetings											1						2					3		
Public Hearing/Responses																						★		

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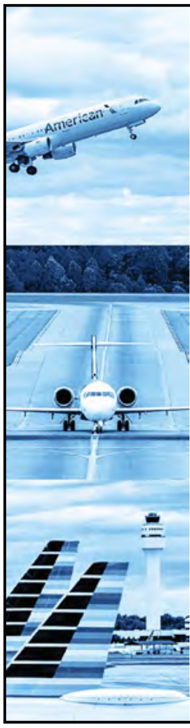


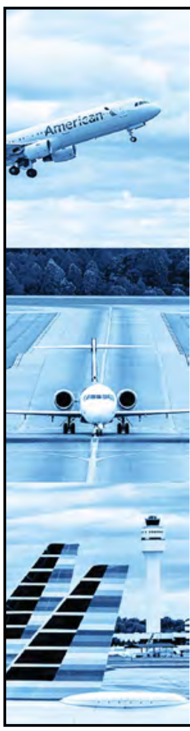
Role of the Technical Advisory Committee

Role of the Technical Advisory Committee (TAC)

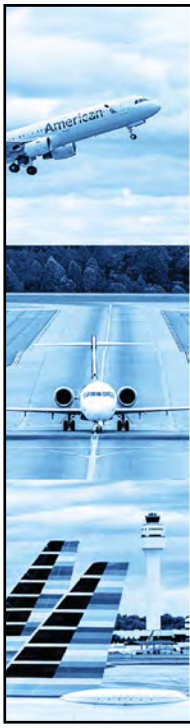
- Sounding Board
- Link to the Community
- Technical Review
- Aid to Implementation

TAC Meeting Schedule

- Meeting #1 – September 2022
- **Meeting #2 – Spring 2023**
  - Review preliminary noise exposure maps, results of noise measurement program, and preliminary noise abatement alternatives
- Meeting #3 – Summer/Fall 2023
  - Analysis of noise abatement measures
- Meeting #4 – Winter 2023/2024
  - Review Draft Noise Compatibility Program



Noise Monitoring Program



Noise Monitoring Program

- Purpose:
  - Validate and verify the input data in the AEDT
  - Obtain “real-life” noise measurements to assist in understanding the total noise environment
- Conducted from October 4, 2022 to October 10, 2022
- Long-Term Sites
  - Conducted at 8 sites for five continuous days
  - Sites were selected based on location along flight corridors, property access, and avoidance of high background noise levels
- Short-Term Sites
  - Conducted at 20 sites for about an hour at each site
  - Sites were selected to provide additional sampling within residential areas and near public facilities
- Provided a sample of single events for comparison to AEDT input data

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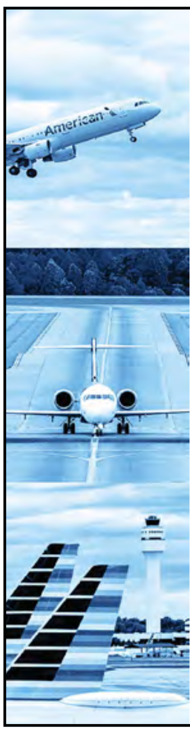
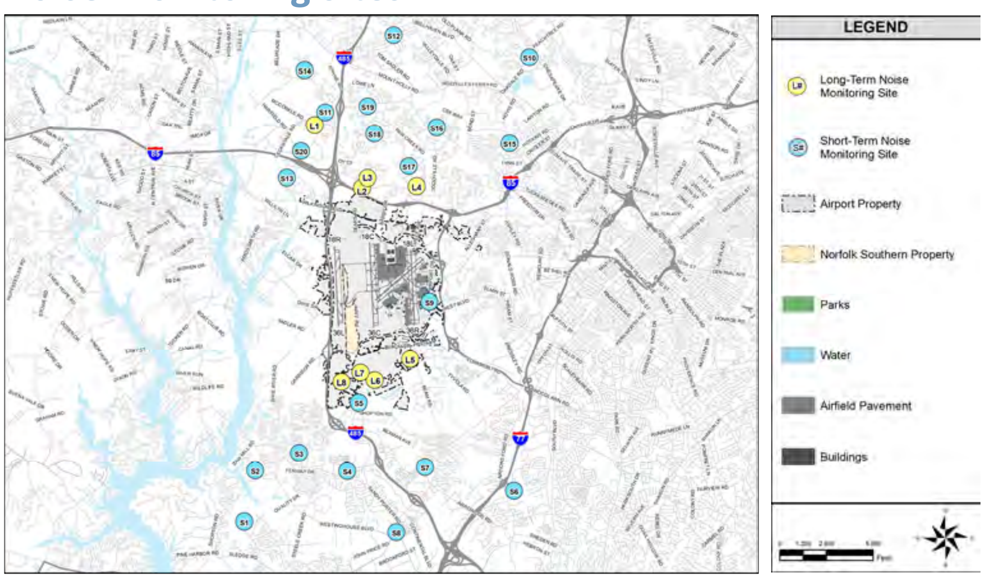


Noise Monitoring Sites



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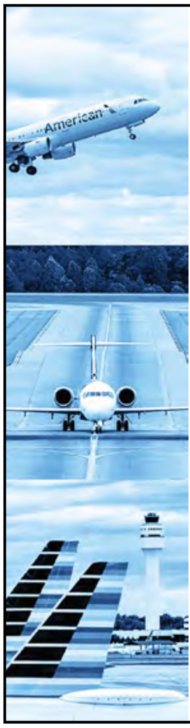

Charlotte Douglas International Airport

Noise Monitoring Program Results

LONG-TERM SITE RESULTS:

- Results showed that the AEDT profiles were consistent with actual conditions

SHORT-TERM SITE RESULTS:

SITE ID	SITE DESCRIPTION	DATE	TIME OF MEASUREMENT	TYPE OF EVENT	# EVENTS	LOUDEST AIRCRAFT
1	Winget Park	10/6/2022	3:42 pm to 4:18 pm	Departures	11	B737
2	River Cabin Lane	10/6/2022	5:45 pm to 6:32 pm	Departures	19	A319
3	Berewick Commons Parkway near Loch Lomond Drive	10/6/2022	4:46 pm to 5:24 pm	Departures	27	A320
4	Griers Fork Drive & Brown Grier Rd	10/10/2022	1:59 pm to 2:51 pm	Arrivals	15	A321
5	Gerald Drive at Sullivan Trace Drive	10/6/2022	9:21 am to 10:08 am	Arrivals	34	A319
6	Treetops Apartments	10/6/2022	2:37 pm to 3:12 pm	Departures	15	B737
7	Thornfield Road west end cul-de-sac	10/11/2022	8:33 am to 9:18 am	Arrivals	5	B737
8	Central Steele Creek Church	10/5/2022	9:06 am to 9:49 am	Arrivals	30	CRJ9
9	Harvest Center Church	10/6/2022	10:46 am to 11:46 am	Departures	30	A321
10	Peachtree Road & Emmanuel Drive	10/10/2022	12:40 pm to 13:27 pm	Departures	13	A321
11	Prairiegrouse Lane	10/4/2022	10:12 pm to 11:12 pm	Departures	11	A306
12	Coulwood Drive & Fielding Road	10/11/2022	10:29 am to 10:55 am	Departures	7	CRJ9
13	Community west of Sam Wilson Road on Farrhill Road	10/5/2022	5:55 pm to 6:37 pm	Departures	16	CRJ9
14	Verde Creek Road west of San Gabriel Avenue	10/5/2022	11:12 am to 11:53 am	Departures	25	B737
15	Chappell Baptist Church	10/5/2022	3:36 pm to 4:49 pm	Departures	13	A320
16	Eagles Landing Drive	10/4/2022	9:05 am to 10:05 am	Departures	3	B757
17	Still Pond Court	10/5/2022 10/6/2022	7:09 pm to 8:03 pm 1:19 pm to 1:51 pm	Departures Arrivals	23 11	B737 B737
18	Cabe Lane	10/5/2022	2:35 pm to 3:33 pm	Departures	22	A321
19	St Johns Chapel Baptist Church	10/10/2022	4:23 pm to 5:24 pm	Departures	55	B777
20	Taimi Drive	10/5/2022	4:51 pm to 5:32 pm	Departures	25	A321

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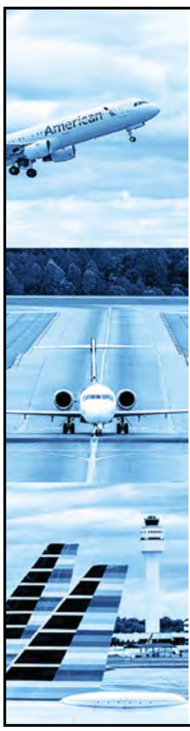

Charlotte Douglas International Airport

Baseline Noise Exposure

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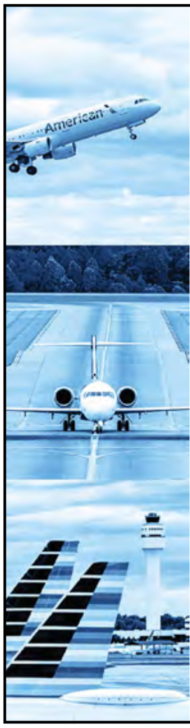
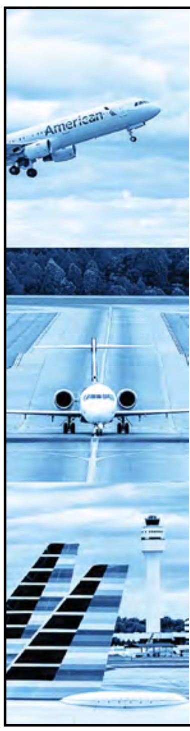


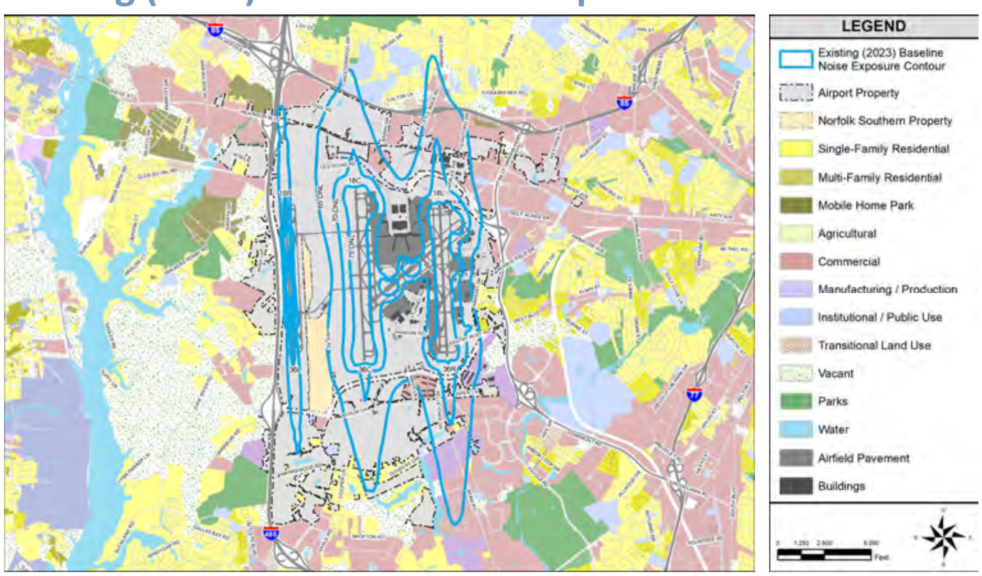
Overview of Data Collected / Input Model

Technical Requirements

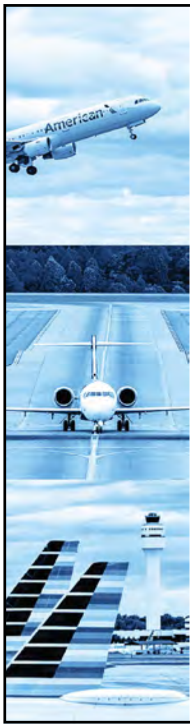
- Represents an annual-average day (1 year of operations/365 days)
- Described with a set of continuous lines that represent equal levels of noise
- Prepared using the FAA's Airport Environmental Design Tool (AEDT) Version 3e
- Must use specific noise metric: Day-Night Average Sound Level (DNL)
  - National standard for all Federal agencies
  - DNL represents 24-hour average noise level
  - Penalty for nighttime (10:00 p.m. - 6:59 a.m.) flights (x 10)
  - 65 DNL identified as threshold for impact to noise sensitive land uses



Existing (2023) Baseline Noise Exposure Contour



DRAFT – Deliberative Material

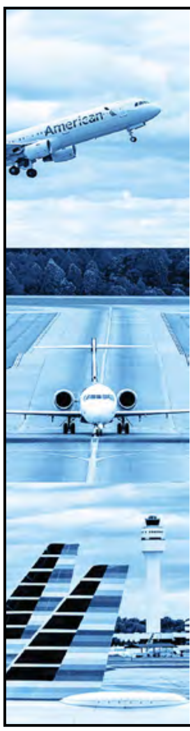


Existing (2023) Baseline Land Use Incompatibilities

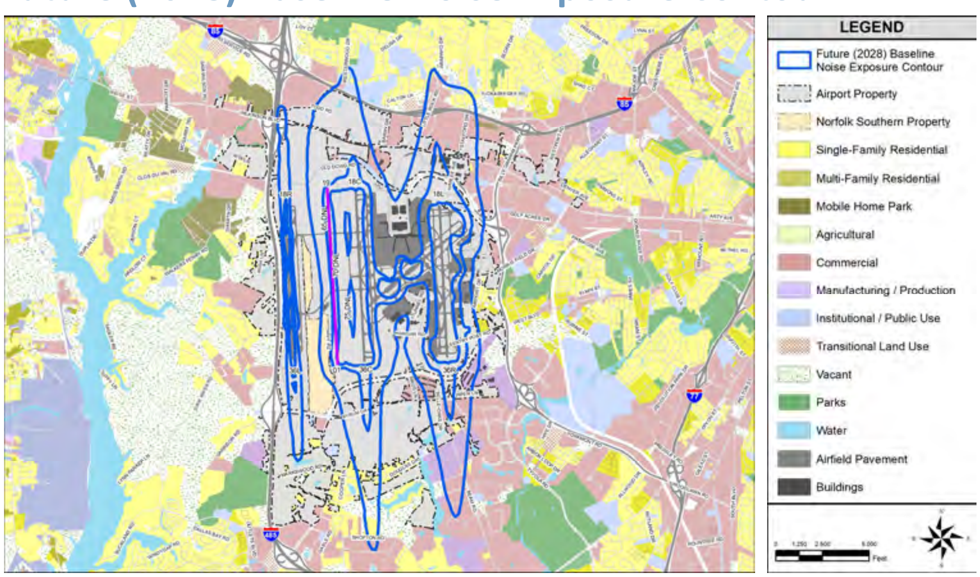
	65-<70 DNL	70-<75 DNL	75+ DNL	65+ DNL
HOUSING UNITS				
Housing Type				
Single-Family	51	0	0	51
Multi-Family	90	0	0	90
Manufactured Home	1	0	0	1
Total Housing Units	**142**	**0**	**0**	**142**
POPULATION				
Total Population[1]	**412**	**0**	**0**	**412**
NOISE-SENSITIVE FACILITIES				
Schools / Daycares	3	0	0	3
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheaters	0	0	0	0
Other Uses[2]	n/a	0	0	0
Total Noise-Sensitive Facilities	**7**	**0**	**0**	**7**

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above 70 DNL include sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities

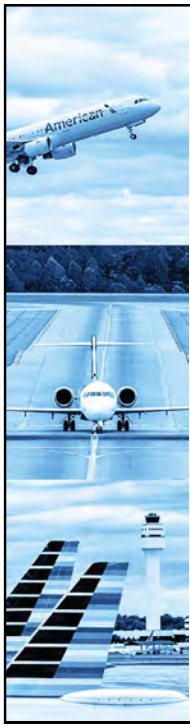
Source: Landrum & Brown, 2023



Future (2028) Baseline Noise Exposure Contour



DRAFT – Deliberative Material



Future (2028) Baseline Land Use Incompatibilities

	65-<70 DNL	70-<75 DNL	75+ DNL	65+ DNL
HOUSING UNITS				
Housing Type				
Single-Family	85	0	0	85
Multi-Family	96	0	0	96
Manufactured Home	63	0	0	63
Total Housing Units	**244**	**0**	**0**	**244**
POPULATION				
Total Population[1]	**675**	**0**	**0**	**675**
NOISE-SENSITIVE FACILITIES				
Schools / Day Cares	4	0	0	4
Churches / Places of Worship	4	0	0	4
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Outdoor Music / Amphitheaters	0	0	0	0
Other Uses[2]	n/a	0	0	0
Total Noise-Sensitive Facilities	**8**	**0**	**0**	**8**

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above 70 DNL include sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities

Source: Landrum & Brown, 2023

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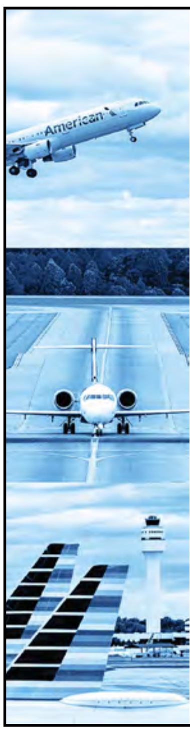

Current Noise Compatibility Program Measures

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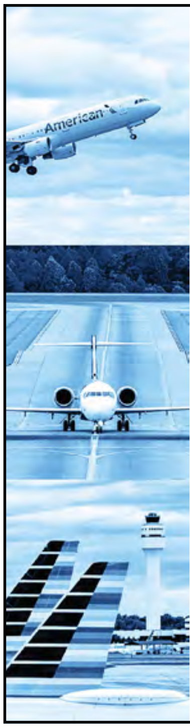

Charlotte Douglas International Airport

Current Procedures and Measures

What is Currently Included in CLT's Part 150 Program?

- **Current CLT Noise Abatement Measures**
  - Nine measures that address monitoring, reporting, designating certain runways for different times of day, and prescribing certain flight patterns
- **Current CLT Land Use Control Measures**
  - Nine measures that promote compatible land use planning, disclosures to the public
- **Current CLT Land Use Mitigation Measures**
  - Nine measures that provide mitigation for homes and other noise sensitive uses within the 65 DNL (sound insulation, acquisition, purchase assurance, and easements)

Part 150 Noise Compatibility Study Update | 21

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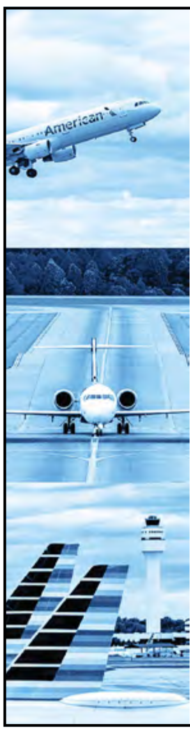

Charlotte Douglas International Airport

Preliminary Noise Abatement Alternatives

Part 150 Noise Compatibility Study Update | 22

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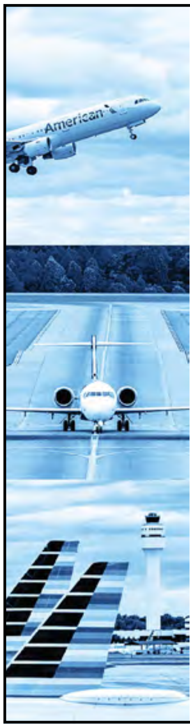

Proposed Preliminary Noise Abatement Alternatives

Facility Modifications
(e.g. run-up locations, runway extensions, etc)

Flight Procedures
(e.g., departure flight corridors, etc)

Preferential Runway Use
(e.g., how often runway ends are used, etc.)

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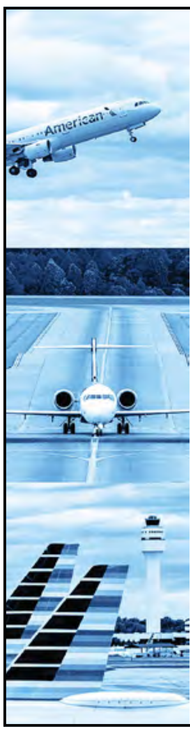
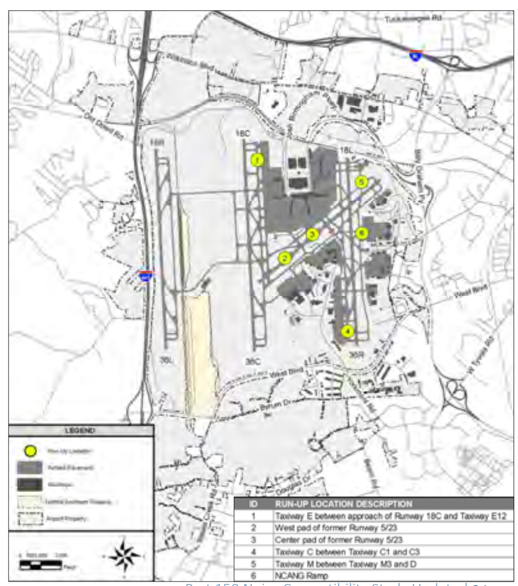


Proposed Preliminary Noise Abatement Alternatives

NA-A-1
Facility Modification

Maximize the use of midfield run-up locations (ID 2, 3) over those located on the east side of the Airport (ID 4, 5, 6).

Short-Term



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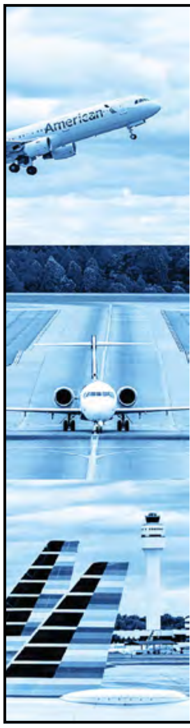
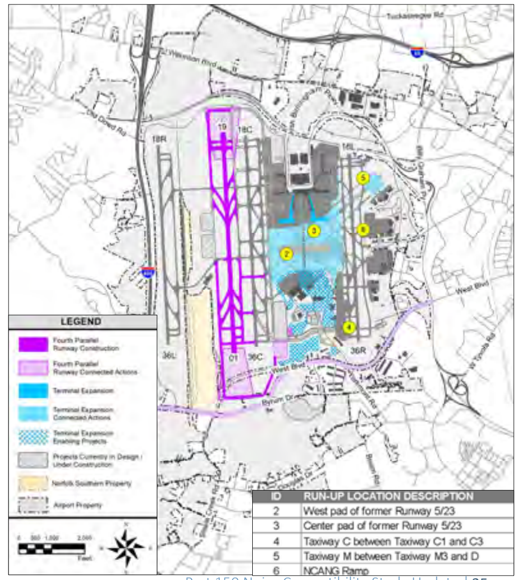


Proposed Preliminary Noise Abatement Alternatives

NA-A-2
Facility Modification

Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport.

Long-Term



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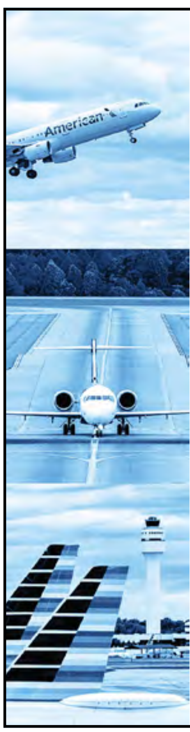


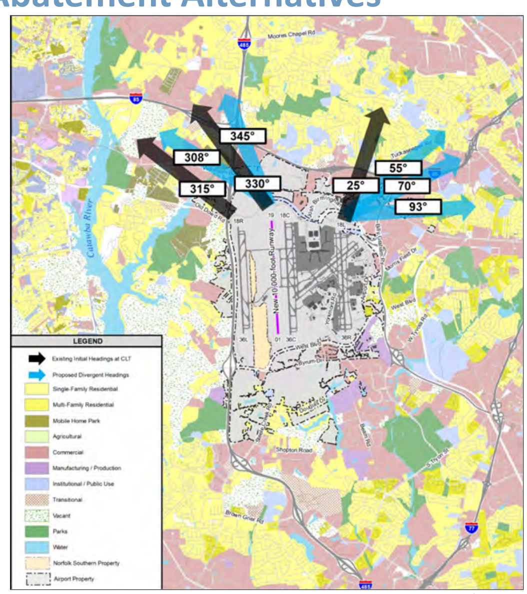
Proposed Preliminary Noise Abatement Alternatives

NA-B-1
Flight Procedure

Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.

Keep existing headings as follows:
- Runway 36R: 25°
- Runway 36L: 315°

Add additional divergent headings as follows:
- Runway 36R:
  - 93° to follow the Wilkinson Boulevard corridor
  - 55° and 70° to follow the Interstate 85 corridor
- Runway 01:
  - Implement the existing Runway 36C's approved 330° heading
  - 345° to overfly the Interstate 85/485 Interchange and follow the Interstate 485 corridor
  - 308° to follow the Wilkinson Blvd corridor



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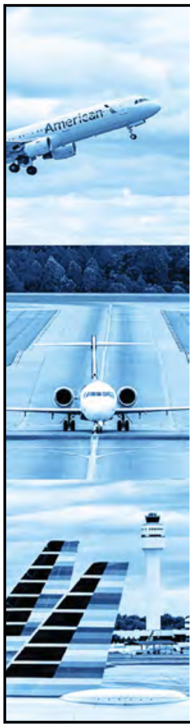


Proposed Preliminary Noise Abatement Alternatives

NA-B-2

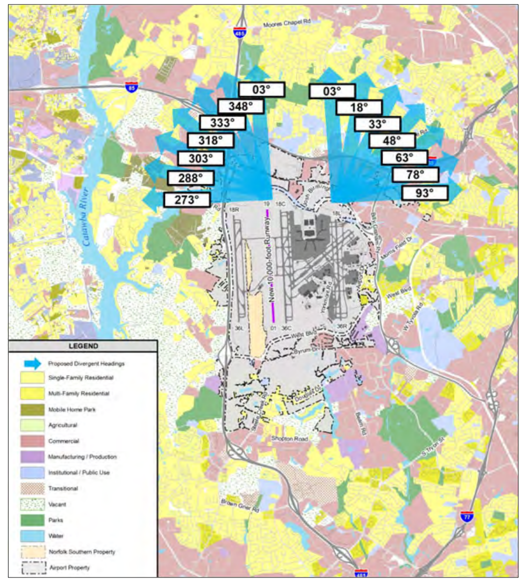
Flight Procedure

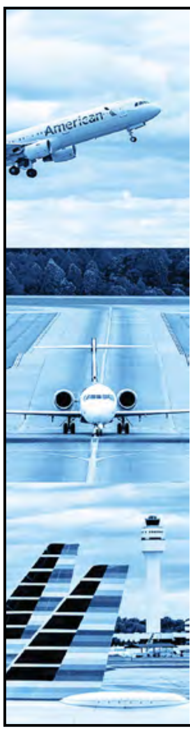
Maximize the number of divergent headings for north flow operations while maintaining a 15° separation between headings.

Add additional divergent headings as follows:

- Runway 36R:
  - 03°, 18°, 33°, 48°, 63°, 78°, 93°
- Runway 01:
  - 03°, 348°, 333°, 318°, 303°, 288°, 273°

While a straight-out heading is identified for Runways 36R and 01, these headings cannot be used simultaneously because a 15-degree separation is required per 7110.65Z.





Proposed Preliminary Noise Abatement Alternatives

NA-C-1

Flight Procedure

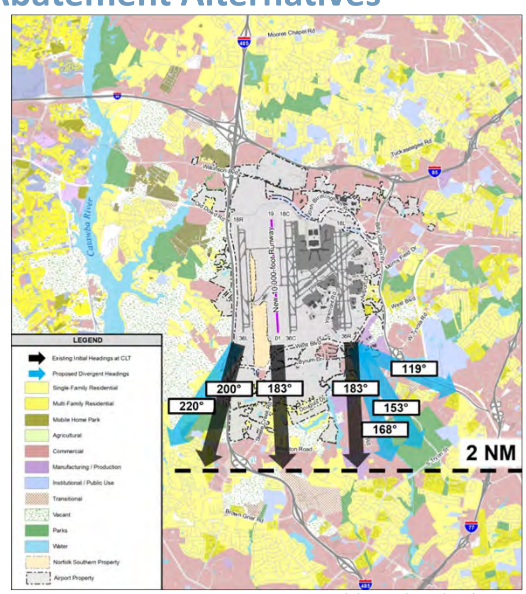
Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on the new Runway 19.

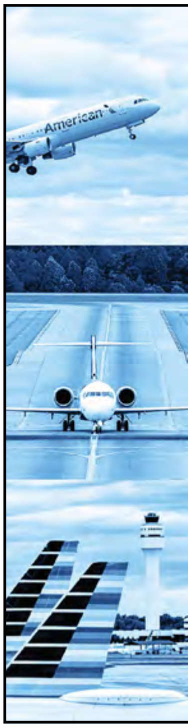
Keep existing headings as follows:

- Runway 18R: 200°
- Runway 18L: 183°

Add additional divergent headings as follows:

- Runway 18R:
  - 220° to follow the Garrison Road corridor
- Runway 19:
  - Implement the existing Runway 18C's approved 183° heading
- Runway 18L:
  - 119° to follow the Billy Graham Parkway corridor
  - 153° and 168° to follow the W Tyvola Road corridor





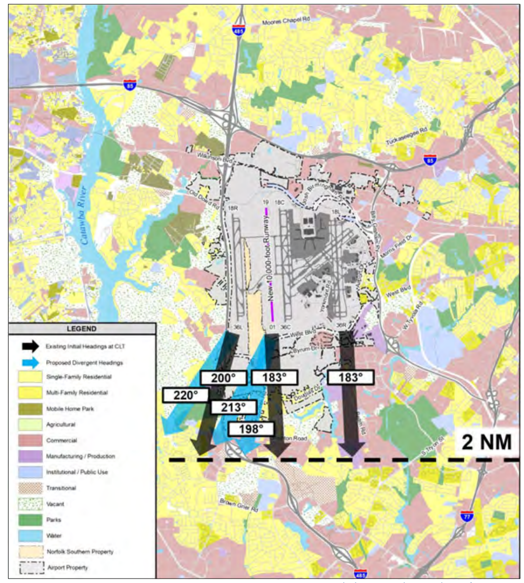
Proposed Preliminary Noise Abatement Alternatives

NA-C-2
Flight Procedure

Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on Runway 18L.

Keep existing headings as follows:
- Runway 18R: 200°

Add additional divergent headings as follows:
- Runway 18R:
  - 220° to follow the Garrison Road corridor
- Runway 19:
  - Implement the existing Runway 18C's approved 183° heading
  - 198° and 213° to follow the Steele Creek Road corridor



Charlotte Douglas International Airport

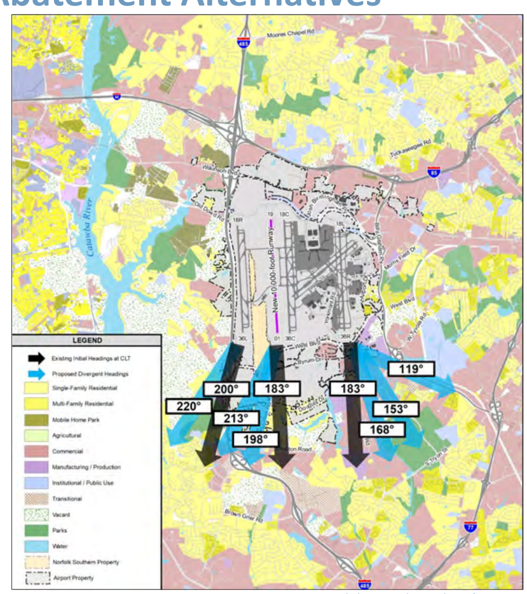
Proposed Preliminary Noise Abatement Alternatives

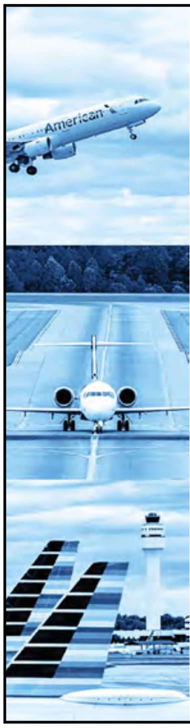
NA-C-3
Flight Procedure

Increase the number of departure headings for south flow operations while maintaining existing approved headings and maximizing departure corridors. This requires eliminating the 2-mile restriction.

Keep existing headings as follows:
- Runway 18L: 183°
- Runway 18R: 200°

Add additional divergent headings as follows:
- Runway 18L:
  - 119° to follow the Billy Graham Parkway corridor
  - 153° and 168° to follow the W Tyvola Road corridor
- Runway 18R:
  - 220° to follow the Garrison Rd corridor
- Runway 19:
  - Implement the existing Runway 18C's approved 183° heading
  - 198° and 213° to follow the Steele Creek Road corridor





Proposed Preliminary Noise Abatement Alternatives

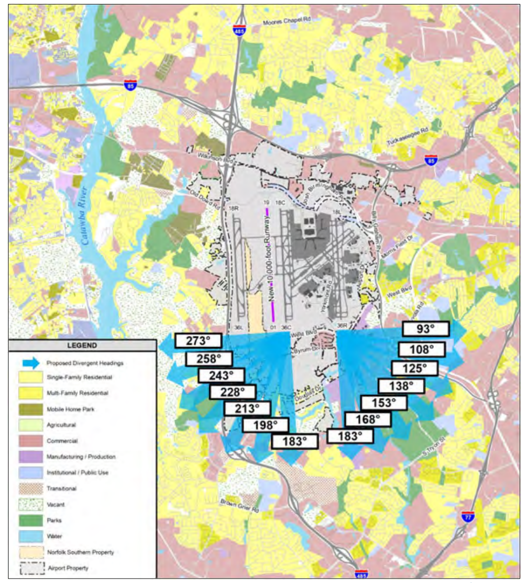
NA-C-4

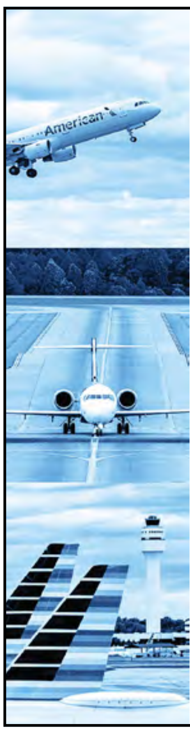
Flight Procedure

Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction.

Add additional divergent headings as follows:

- Runway 18L:
  - 183°, 168°, 153°, 138°, 123°, 108°, 93°
- Runway 19:
  - 183°, 198°, 213°, 228°, 243°, 258°, 273°



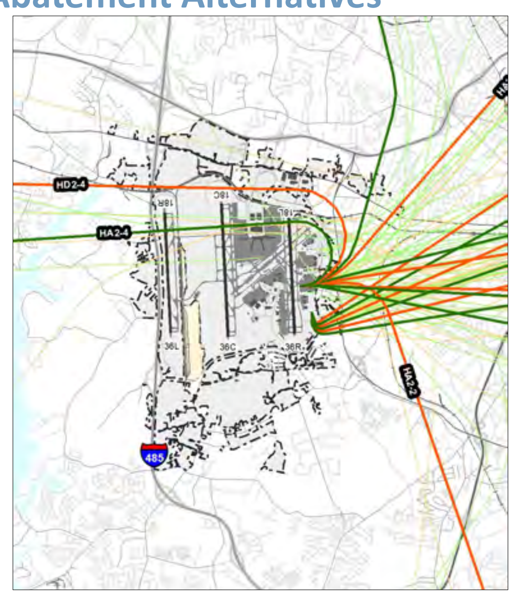


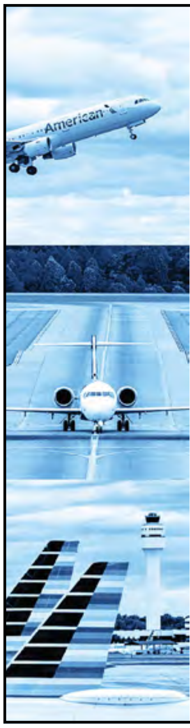
Proposed Preliminary Noise Abatement Alternatives

NA-K

Flight Procedure

Evaluate helicopter operations in the south general aviation apron to takeoff towards the south (stay between Yorkmont and Billy Graham Parkway before turning on course)

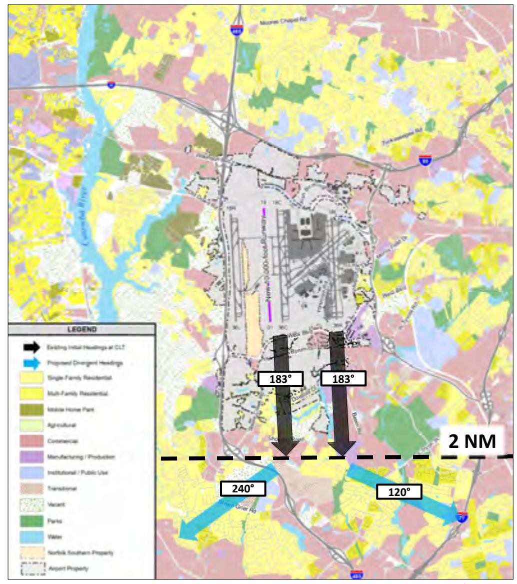


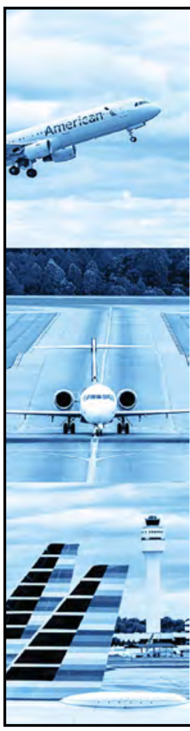


Proposed Preliminary Noise Abatement Alternatives

NA-L
Flight Procedure

Change Headings of First Turns off Runways 18L and 18C
Reduce the effect of noise on more densely populated areas and foster the desire by the ACR to return to pre-Metroplex flight paths.





Proposed Preliminary Noise Abatement Alternatives

NA-D
Facility Modification / Flight Procedure

- Implement a 1,235-foot displaced arrival threshold on Runway 36C

NA-E
Facility Modification / Flight Procedure

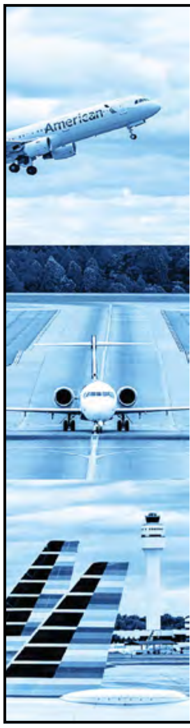
- Implement a 1,376-foot displaced arrival threshold on Runway 36R

NA-F
Facility Modification / Flight Procedure

- Implement a 1,376-foot displaced arrival threshold on Runway 18L

NA-G
Facility Modification / Flight Procedure

- Implement a 1,100-foot arrival displaced threshold on Runway 01
- Only applicable in conjunction with NA-J (evaluate the new runway as an arrival runway)



Proposed Preliminary Noise Abatement Alternatives

NA-H

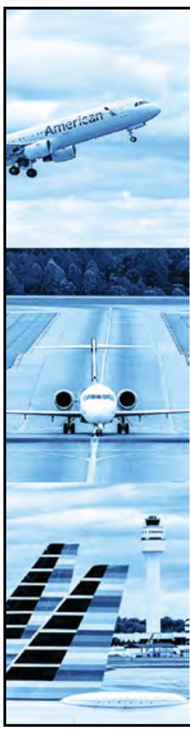
Preferential Runway Use

Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet and large four-engine prop aircraft between 10:00 p.m. and 7:00 a.m.

NA-I

Preferential Runway Use

Increase use of Runway 18R for south flow arrivals by turbojet and large four-engine prop aircraft between 10:00 p.m. and 7:00 a.m.



Proposed Preliminary Noise Abatement Alternatives

NA-J

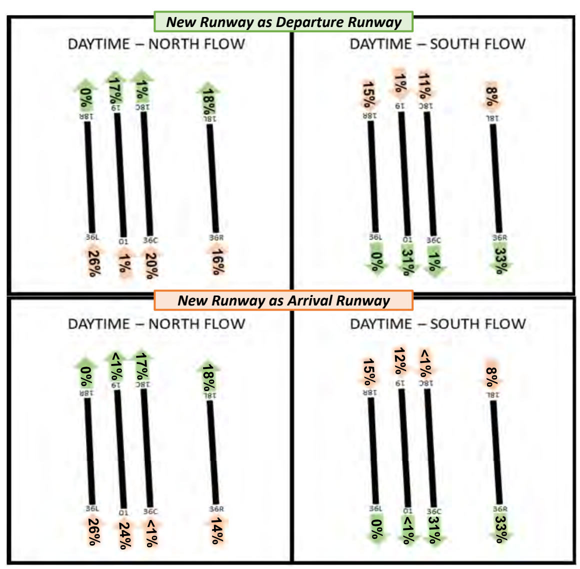
Preferential Runway Use

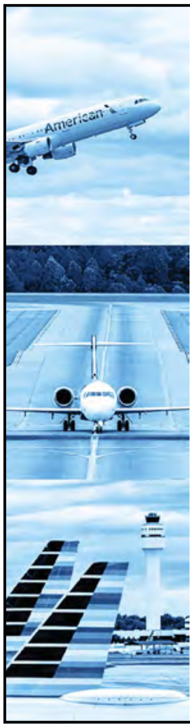
Evaluate the new runway as an arrival runway

Designate Runways 18R/36L and 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures by turbojet and large four-engine prop aircraft between 7:00 a.m. and 10:00 p.m.

Arrivals

Departures





Alternative Evaluation

Safety / Feasibility → Reduces Impacts in 65 DNL → Operational Impacts → Implementation Considerations → Move to Recommend

Eliminate from Evaluation

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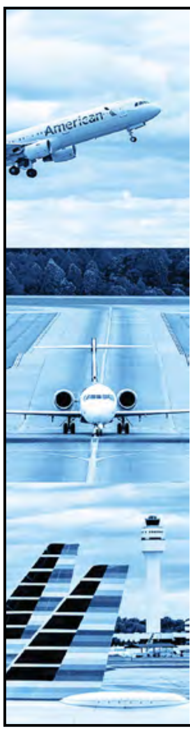

Alternative Evaluation

Safety / Feasibility → Reduces Impacts in 65 DNL → Operational Impacts → Implementation Considerations → Move to Recommend

Eliminate from Evaluation

<u>Safety / Feasibility</u>
- Our team of experts will evaluate each alternative for safety/feasibility issues
- Outreach to airport, airlines, and FAA ATCT to provide feedback on any safety/feasibility concerns
- If no safety or feasibility issues identified, move to the next step

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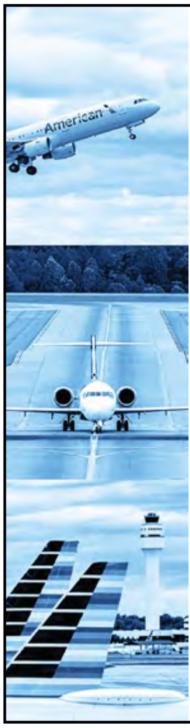
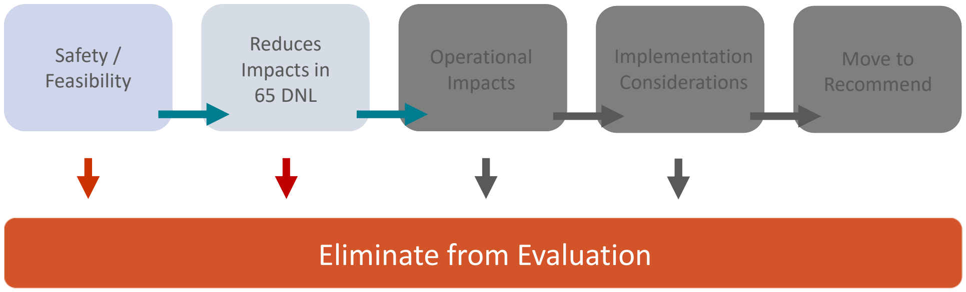
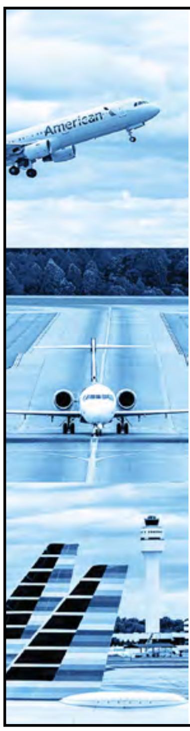


Alternative Evaluation

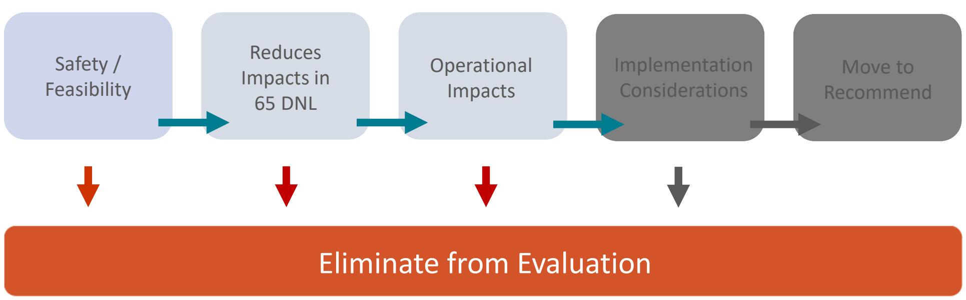


Reduces Impacts in 65 DNL

- Build alternative assumptions into noise model
- Would the alternative result in a net reduction in non-compatible land uses within the 65 DNL?
- If there is a net reduction in impacts within the 65 DNL, move to the next step

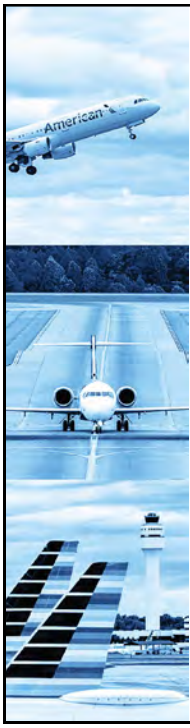


Alternative Evaluation



Operational Impacts

- Does the alternative negatively impact operational efficiency (increased delays, reduced capacity, increased flight time, etc.)?
- Outreach to airport, airlines, and FAA ATCT to provide feedback on any operational concerns
- If there are no operational impacts identified, move to the next step



Alternative Evaluation

Safety / Feasibility → Reduces Impacts in 65 DNL → Operational Impacts → Implementation Considerations → Move to Recommend

Eliminate from Evaluation

Implementation Considerations

- Discuss implementation with Airport, ATCT, and other stakeholders
- Who is responsible to implement or support the implementation of the alternative?
- Consideration of the process, timeline, and cost of implementation
- If no implementation issues are identified, move to the next step

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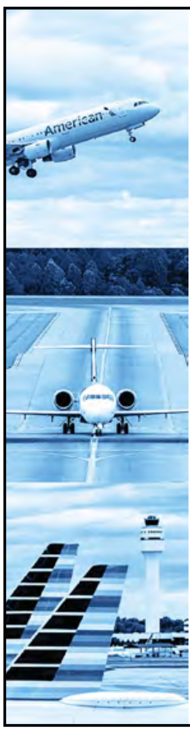

Alternative Evaluation

Safety / Feasibility → Reduces Impacts in 65 DNL → Operational Impacts → Implementation Considerations → Move to Recommend

Eliminate from Evaluation

Move to Recommend

- Include the alternative as a recommended measure for further evaluation with other recommended measures
- Various scenarios of recommended measures will be evaluated

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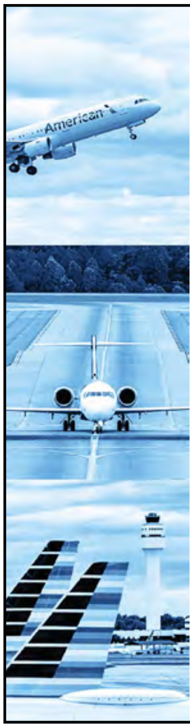
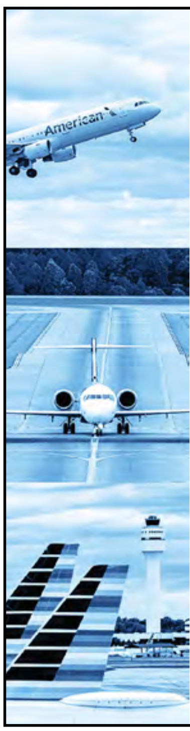


Next Steps



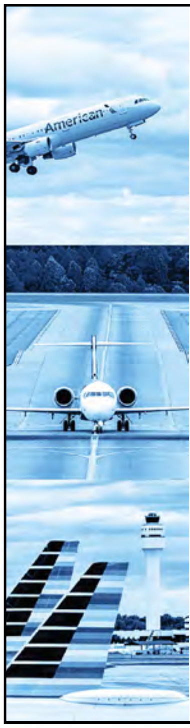
Next Steps / Schedule - requests

- TAC to provide feedback on baseline noise exposure contour memo
- TAC to provide feedback on noise abatement alternatives
  - Feasibility or safety concerns?
  - Additional alternatives that should be investigated?
- Part 150 Study Update team to conduct follow-up meetings with ATCT and airlines to discuss alternatives
- Part 150 Study Update team to follow up with ACR

Please submit all comments by

April 5, 2023 to:

gaby.elizondo@landrumbrown.com



Next Steps / Schedule

May 2022
Project Kickoff

2022–2023
Initiate and Conduct Technical Work

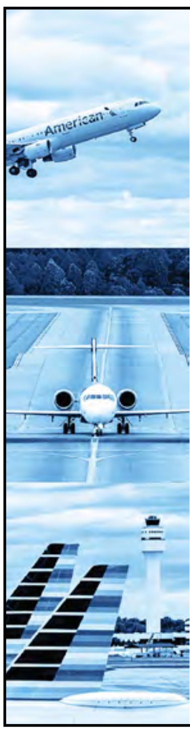
Summer / Fall 2023
Release of Draft Findings

T

Start of 2024
Final Recommendations

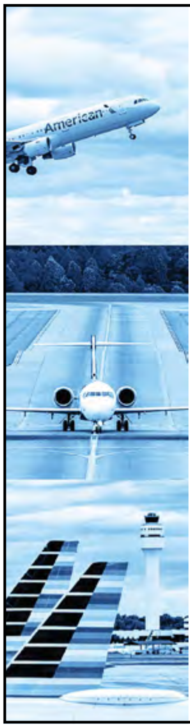
Spring 2024
FAA Review & Approval

45



Questions & Answers

46



Please submit all comments by

April 5, 2023 to:

gaby.elizondo@landrumbrown.com

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Technical Advisory Committee Meeting #3
November 14, 2023

Meeting Invitations

Sign-in Sheet

Presentation

CHARLOTTE DOUGLAS
INTERNATIONAL AIRPORT

October 17, 2023

To Whom It May Concern,

The City of Charlotte is conducting a Part 150 Study Update to develop a balanced and cost-effective plan to reduce current noise impacts, where practical, and to limit the potential for future noise impacts. We are writing to ask for your participation on the third meeting of the Technical Advisory Committee (TAC) formed as part of the Part 150 Study Update. The TAC consists of airport users and tenants; Federal Aviation Administration (FAA) representatives; representatives of the Airport Community Roundtable (ACR); local planning organizations; and Airport staff. The TAC will review study findings, comment on study recommendations before they are presented to the public at-large and will participate in discussions related to aircraft noise issues.

The third meeting of the TAC is scheduled from 1:00-3:00 pm on **Tuesday, November 14, 2023,** in the Eagle Conference Room at the CLT Center. TAC members will receive a meeting agenda and other pertinent material in advance of the meeting.

Please RSVP by November 1, 2023, to Gaby Elizondo via phone at (513) 530-1205 or email gaby.elizondo@landrumbrown.com with whether you accept this invitation and wish to participate in the TAC. Gaby can also answer any questions you may have.

We value your input and look forward to your participation in this process.

Sincerely,
Haley H Gentry
Haley Gentry
Chief Executive Officer

INVITATION LIST
TECHNICAL ADVISORY COMMITTEE MEETING #3

REPRESENTING	NAME
Charlotte Mecklenburg Police Department, Aviation Unit	Kenneth Anderson
City of Charlotte City Council	Victoria Watlington
City of Charlotte Planning, Design, and Development Department	Alan Goodwin
	Alyson Craig
	Kathy Cornett
Aircraft Owners and Pilots Association	Eric Gallinek
Aircraft Owners and Pilots Association	Stacey Heaton
Airport Community Roundtable	Natalie Rutzell (Chair)
Airport Community Roundtable	Phillip Gussman (Co-chair)
HMMH	Gene Reindel
Federal Aviation Administration, Air Traffic Division	Anthony Limon
	Mark Libby
Federal Aviation Administration, Airports Division	Lopa Naik
	Peggy Kelley
	Stephanie Saloom
	Tommy Dupree
National Air Traffic Controller Association	Anthony Schifano
	Chris Riddle
Air Canada	Kevin Oliphant
Air Canada	Ronald Todd
Air Canada	Sara Whitley
Air Canada	Victor Toala
American Airlines	Amanda Zhang
	Michael Wanner
	Reshma Soni
	Ryan Jorgenson
	Scott Pressley
	Steven Holt
	Tracy Montross
	Wes Googe
Delta Air Lines	Jose Fernandez
	Keith Fidler
FedEx	Daniel Allen
	Jason Fricke
Frontier Airlines	Ben Booker
	Mike Cox
	Tosha Sonderson
	Kip Turner
JetBlue	Matt Detcher
Southwest Airlines	George Hodgson
	Lawrence Turner
Spirit Airlines	Garry Jones
United Airlines	Mike Acosta
	Rob Galbraith
UPS	Danny Ndingwan
	Seth Garrett
USAF 145th Airlift Wing	James R. Eaton II
	Jayce Bass
Wilson Air (FBO)	Vince Papke

CLT Part 150 Study Update

Technical Advisory Committee, Meeting #3

November 14, 2023, 1:00 p.m.

SIGN-IN SHEET – PLEASE PRINT

NAME	ORGANIZATION	PHONE NUMBER	EMAIL
Shane C Jackson	FAA		Shane.C.Jackson@FAA.gov
Lopa Naik	FAA		lopa.naik@faa.gov
Peggy Kelley	FAA MEM-ADO		peggy.Kelley@faa.gov
Anthony Schifano	NATCA		ASCHIFANO20@GMAIL.com
Reshma Soni	AA		reshma.soni@aa.com
Kevin Hennessey	CLT		

CLT Part 150 Study Update

Technical Advisory Committee, Meeting #3

November 14, 2023, 1:00 p.m.

SIGN-IN SHEET – PLEASE PRINT

NAME	ORGANIZATION	PHONE NUMBER	EMAIL
Phillip Gussman	ACR	704-608-1323	Phil@Gussmanconsulting.com
Stephanie Saloom	FAA-MEM-ADO	901-322-8161	stephanie.saloom@faa.gov
Chris Riddle	NATCA	7044915597	christopher.t.riddle@faa.gov
Eric Gallinek	AOPA volunteer	646-236-1756	egallinek@earthlink.net
Gene Reindel	HMMH	339-234-2035	ereindel@hmmh.com
Steven Holt	AA	817 874 2483	Steven.holt@aa.com
Michael Warner	AA	904-347 5836	Michael.Warner@AA.com

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CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT

Part 150 Noise Compatibility Study Update

Welcome to the

Technical Advisory Committee Meeting #3

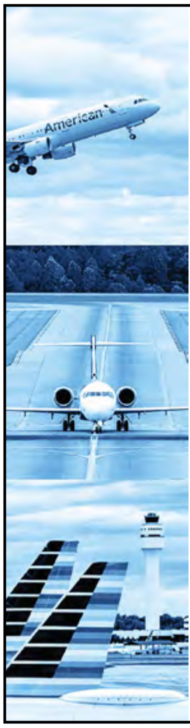
Tuesday, November 14, 2023

1

Agenda

- Welcome and Introductions
- Screening Process
- Noise Abatement Alternatives
- Preliminary Noise Compatibility Program Scenarios
- Next Steps / Schedule

2

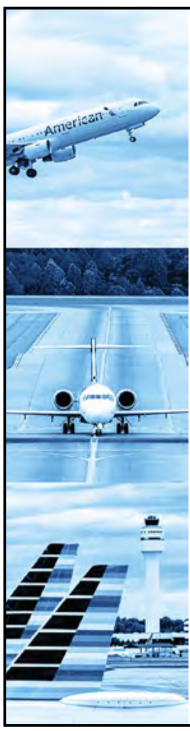


Charlotte Douglas International Airport

Welcome and Introductions

- Charlotte Douglas International Airport
  - Sponsor of the CLT Part 150 Study Update
  - Team: Amber Perry, Mike Pilarski, Kevin Hennessey, Alex Helmke, Matt Reese
- Consultant Team
  - Landrum & Brown is the lead consultant
  - 70+ years of aviation planning
  - Experts in aircraft noise and land use planning
- Federal Aviation Administration
  - Developed guidelines for Part 150 that must be followed
  - Review NEMs for accuracy and determination that guidelines were met
  - Review recommendations for consistency with Part 150 guidelines

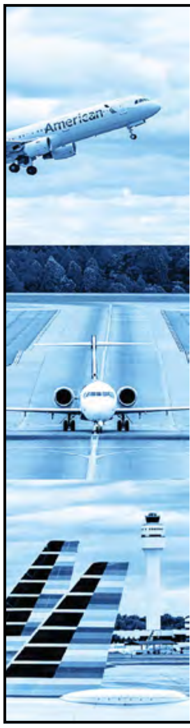
3



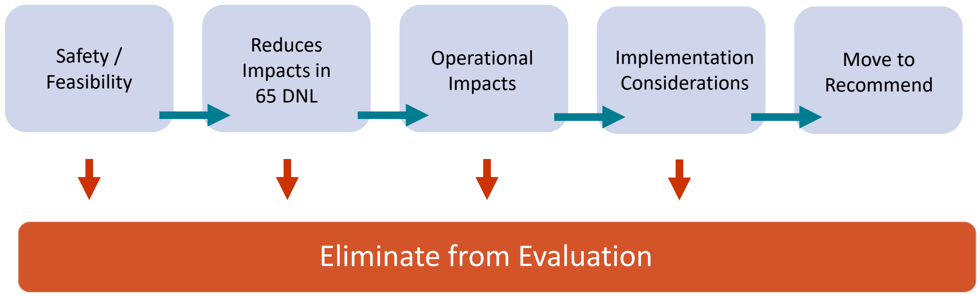
Charlotte Douglas International Airport

Alternative Screening Process

4



Alternative Evaluation



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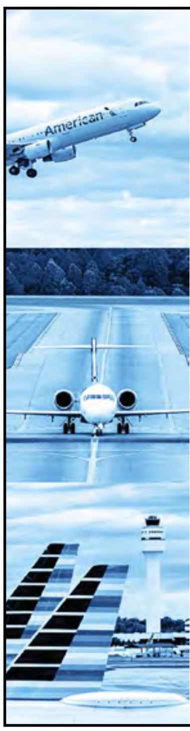

Noise Abatement Alternatives

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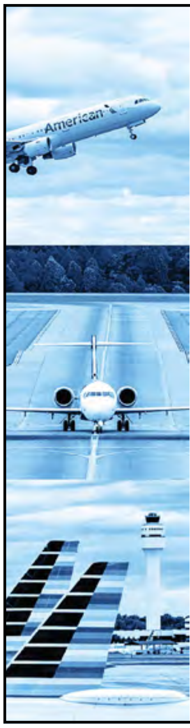


Charlotte Douglas International Airport

Proposed Noise Abatement Alternatives

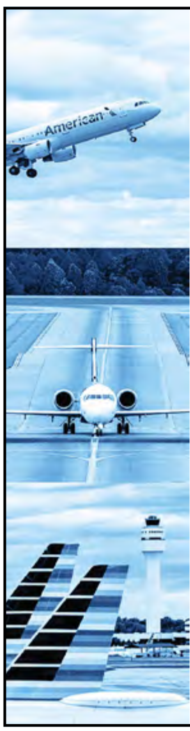
Facility Modifications
(e.g. run-up locations, runway extensions, etc.)

Preferential Runway Use
(e.g., how often runway ends are used, etc.)

Flight Procedures
(e.g., departure flight corridors, etc.)

Part 150 Noise Compatibility Study Update | 7

7



Charlotte Douglas International Airport

Facility Modification: Run-Ups

Part 150 Noise Compatibility Study Update | 8

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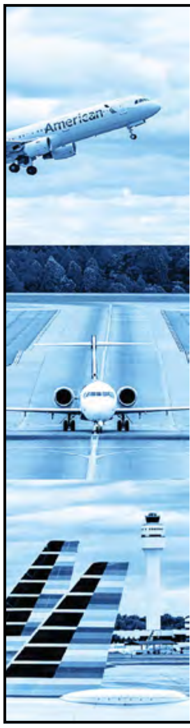


Facility Modification: Run-Ups

NA-A-1

Maximize the use of midfield run-up locations (ID 2, 3) over those located on the east side of the Airport (ID 4, 5, 6).

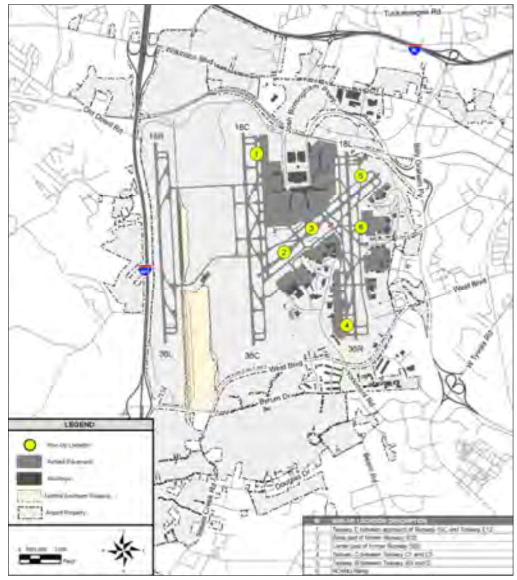
Short-Term

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? Has potential

Operational impacts: No operational impacts identified.

Continue in Evaluation



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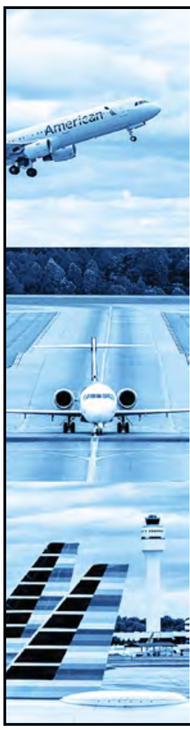


Facility Modification: Run-Ups

NA-A-2

Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport.

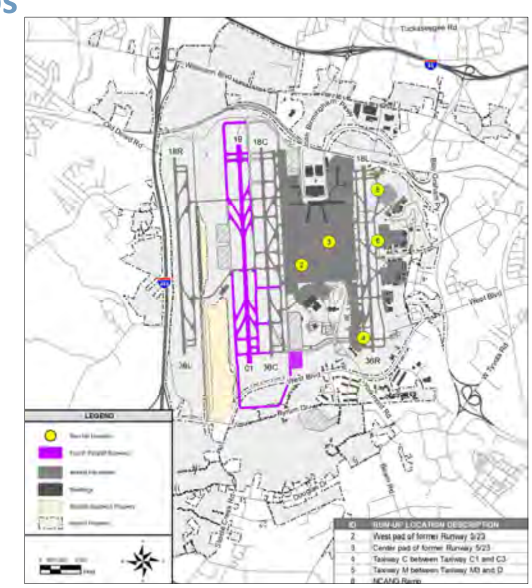
Long-Term

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? Has potential

Operational impacts: No operational impacts identified.

Continue in Evaluation



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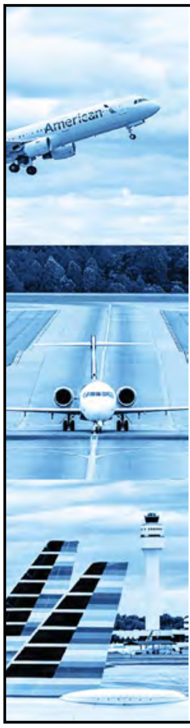
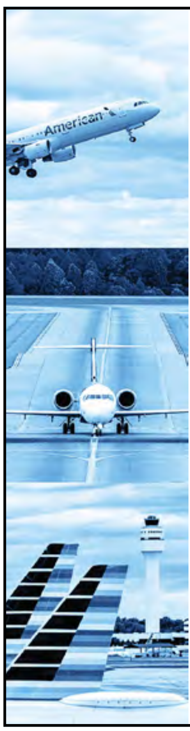


Facility Modification: Displaced Arrival Threshold

11



Facility Modification: Displaced Arrival Threshold

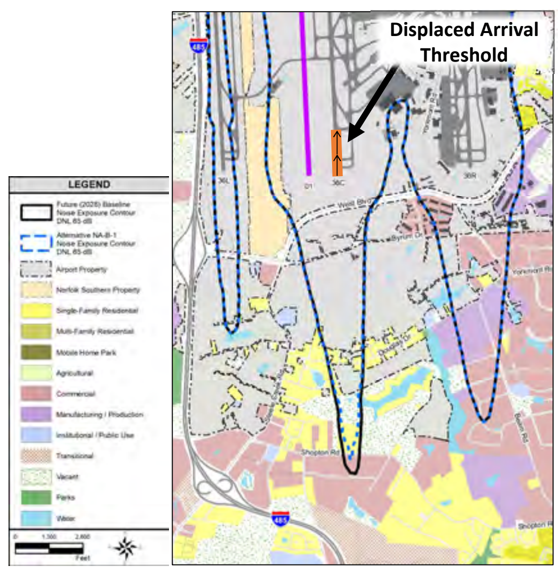
NA-B-1

Implement a 1,235-foot displaced arrival threshold on Runway 36C

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.

Eliminate from Evaluation



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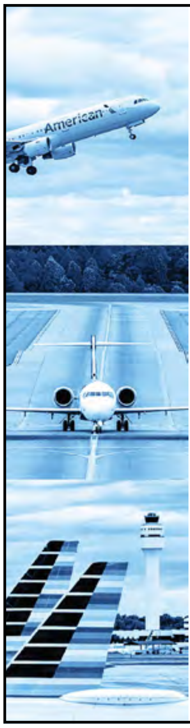


Facility Modification: Displaced Arrival Threshold

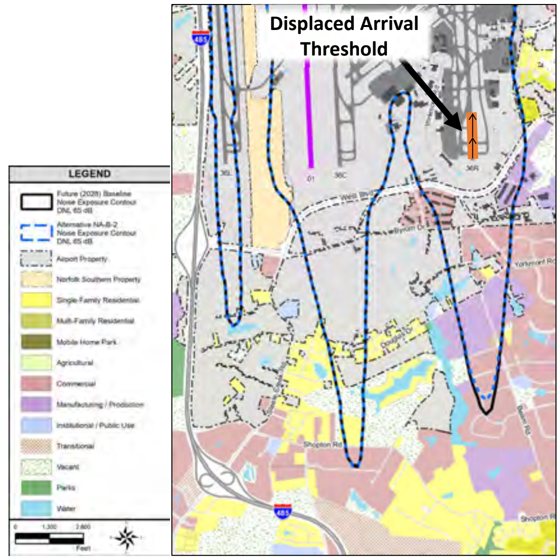
NA-B-2

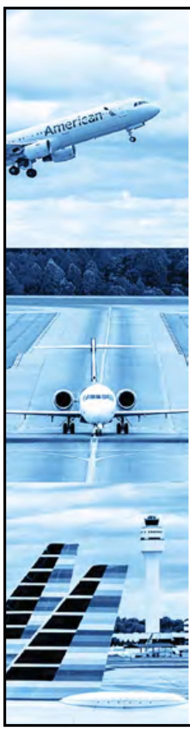
Implement a 1,376-foot displaced arrival threshold on Runway 36R

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.

Eliminate from Evaluation





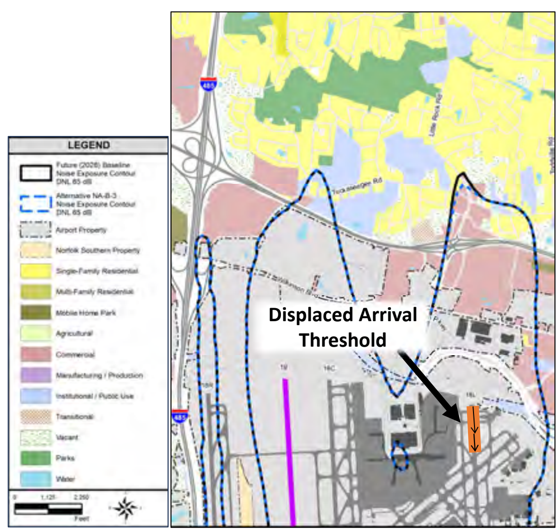
Facility Modification: Displaced Arrival Threshold

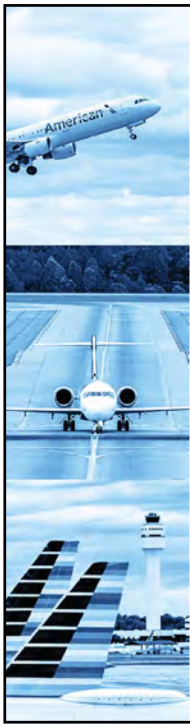
NA-B-3

Implement a 1,376-foot displaced arrival threshold on Runway 18L

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? Yes. Reduces impacts compared to the Future (2028) Baseline by **6 housing units** and **1 day care** within the 65+ DNL.





Facility Modification: Displaced Arrival Threshold

NA-B-3

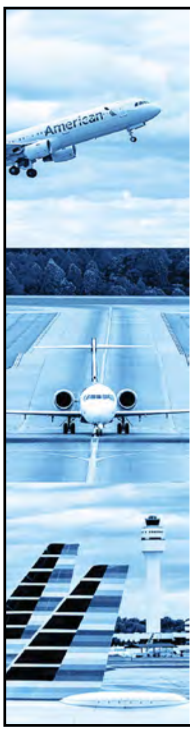
Operational impacts:

- Negative operational impacts would occur due to the existing high-speed taxiways not being positioned for a displaced threshold.
- The results would be **greater runway occupancy times, longer taxi distance, and potentially increased congestion** due to where aircraft would exit the runway.
- These operational impacts could be resolved by redesigning and reconstructing all of the taxiways along the runway. However, the cost of that would far exceed any benefits.

↓

Eliminate from Evaluation

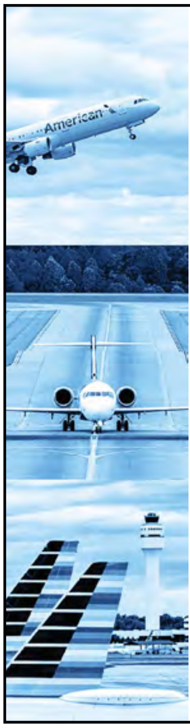
15



Charlotte Douglas International Airport

Preferential Runway Use: Airport Flow

16



Preferential Runway Use: Airport Flow

NA-C-1

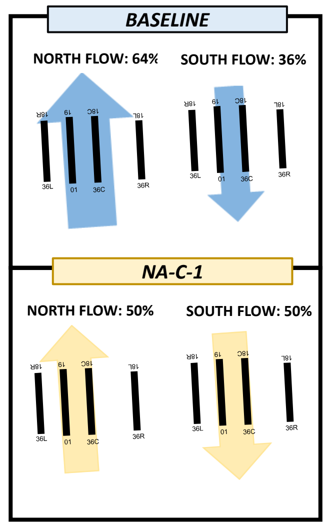
Balanced Mix of North v. South Flow:

Increase the amount of time the Airport operates in south flow to achieve a 50/50 balance of north v. south flow

Safety/Feasibility: Direction of flow is primarily determined by **wind direction and wind speed on the surface and aloft (at higher altitude).** It is also determined by the **location of severe weather** for a hundred miles from the Airport.

Based on these factors, **it is not feasible for the ATCT to maintain a balanced runway flow and to try and force it would reduce safety**.

Eliminate from Evaluation



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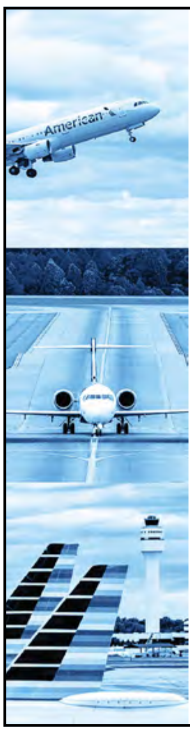


Preferential Runway Use: Airport Flow

NA-C-2

Limit One Direction Flow to a Maximum # Days:

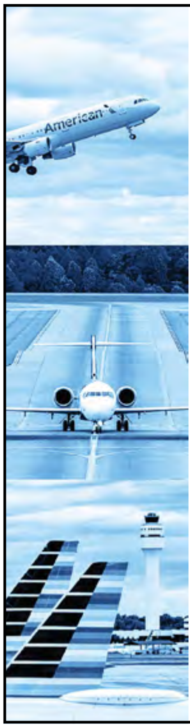
Prevent continuous flow in one direction over more than [two consecutive days] to bring relief to people who have been getting noise/flow from one type of operation continuously for multiple days. After [two consecutive days] of flow in the same direction, flow should be reversed at the first reasonable opportunity and maintained in the reverse direction for a reasonable period.

Safety/Feasibility:

- Direction of flow is primarily determined by **wind direction and wind speed on the surface and aloft (above the ground)**. It is also determined by the **location of severe weather** for a hundred miles from the Airport.
- **Based on these factors, it is not feasible for the ATCT to alternate runway flow counter to weather conditions and to try and force it would reduce safety.**

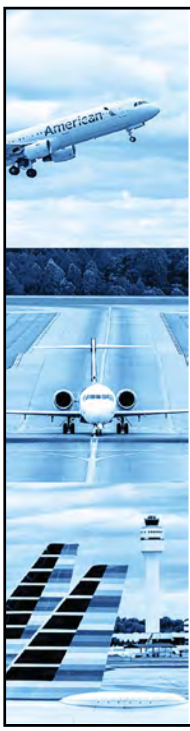
Eliminate from Evaluation

18



Preferential Runway Use: Daytime Runway Use

19



Preferential Runway Use: Daytime Runway Use

NA-D-1

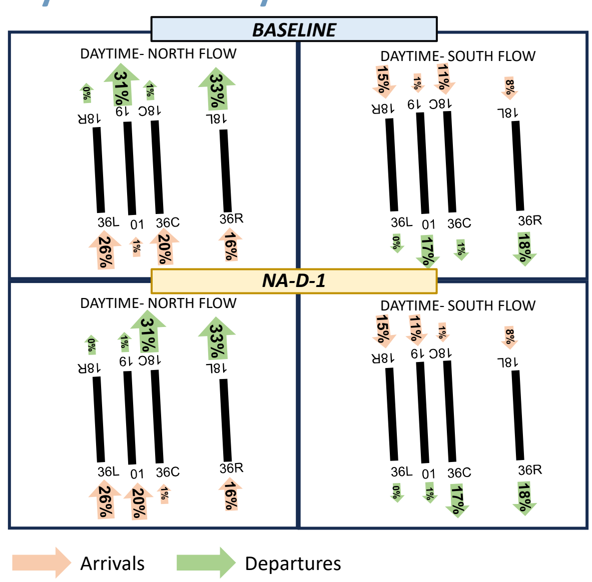
Evaluate the new runway as an arrival runway

Designate Runways 18R/36L and 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures by turbojet aircraft between 7:00 a.m. and 10:00 p.m.

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Increases impacts compared to the Future (2028) Baseline by **18 housing units** within the 65+ DNL.

Eliminate from Evaluation



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Preferential Runway Use: Daytime Runway Use

NA-D-1

NORTH OF AIRPORT
+ 5 (increase)
- 0 (no decrease)
+ 5 (increase)

SOUTH OF AIRPORT
+ 19 (increase)
- 6 (decrease)
+ 13 (increase)

Total increase of 18 housing units

Charlotte Douglas International Airport

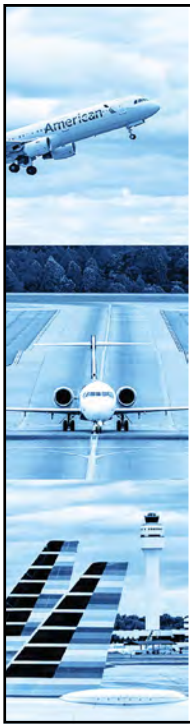
Preferential Runway Use: Daytime Runway Use

NA-D-1

NORTH OF AIRPORT
+ 5 (increase)
- 0 (no decrease)
+ 5 (increase)

SOUTH OF AIRPORT
+ 19 (increase)
- 6 (decrease)
+ 13 (increase)

Total increase of 18 housing units



Preferential Runway Use: Daytime Runway Use & Displaced Arrival Threshold

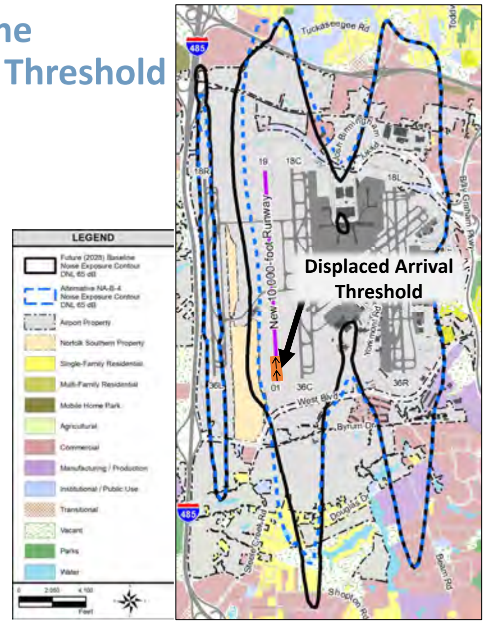
NA-B-4

Evaluate the new runway as an arrival runway and implement an 1,100-foot arrival displaced threshold on Runway 01

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Increases in impacts compared to the Future (2028) Baseline by **15 housing units** within the 65+ DNL.

Eliminate from Evaluation



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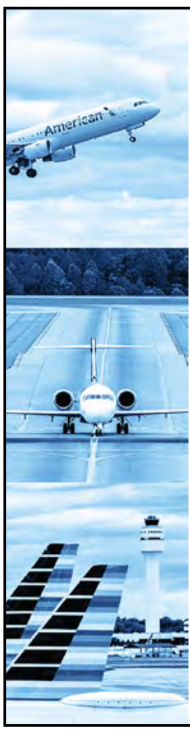


Preferential Runway Use: Daytime Runway Use

NA-D-2

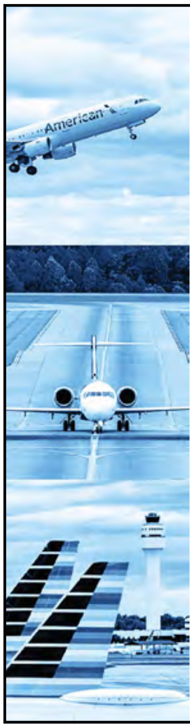
At low periods, spread operations to avoid concentration of a particular mode of operation (e.g., most/all departures or most/all arrivals) to a single runway, leaving others underutilized for the same mode of operation. For example: Avoid sending all arrivals to Runway 18R while Runways 18L and 18C are held open for occasional departures.

Safety/Feasibility: No safety/feasibility issues identified. In general, this is how the Airport currently operates.

Reduces impacts in 65 DNL? No. This recommendation is already accounted for in the Future (2028) Baseline scenario. There would be no reductions in impacts compared to the Future (2028) Baseline within the 65+ DNL.

Eliminate from Evaluation

24



Preferential Runway Use: Daytime Runway Use

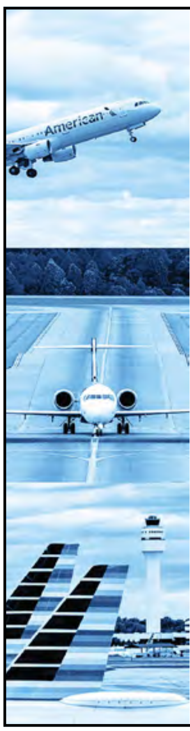
NA-D-3

Ensure that the new fourth parallel runway (Runway 01/19), Runway 18R/36L (for arrivals), and Runway 18C/36C (for departures) will never have more, in the aggregate, than [50%] of arrivals/departures over any single daily period.

Safety/Feasibility: The suggestion of caps on runways inherently creates barriers to implementation from a feasibility perspective because the airport is a dynamic environment that may require the use of runways that would exceed the limits of this alternative. **To force caps and percentages into a complex system like the one at CLT would reduce operational capability and potentially reduce safety.** As such, this alternative is not feasible for implementation.

Eliminate from Evaluation

25



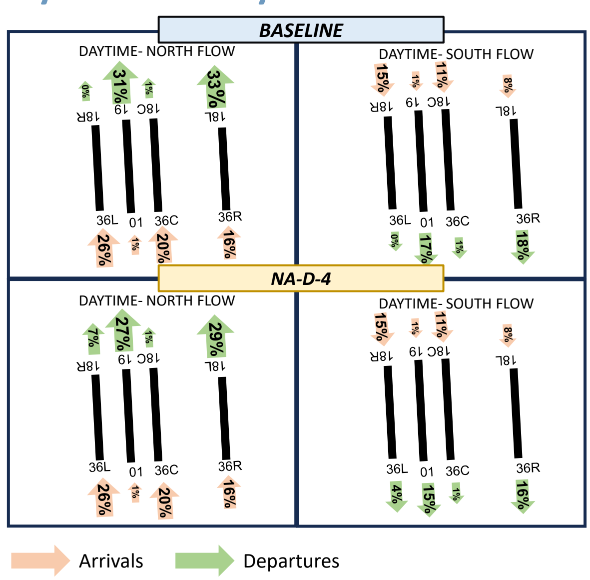
Preferential Runway Use: Daytime Runway Use

NA-D-4

Set guidelines that require a minimum allocation of departures for Runway 18R/36L for a given timeframe (e.g., over the course of a quarter or year), with the goal of achieving at least ten percent of daily departures on that runway.

Safety/Feasibility: No safety/feasibility issues identified.

Reduces impacts in 65 DNL? Yes. Reduces impacts compared to the Future (2028) Baseline by **12 housing units** in the 65+ DNL.



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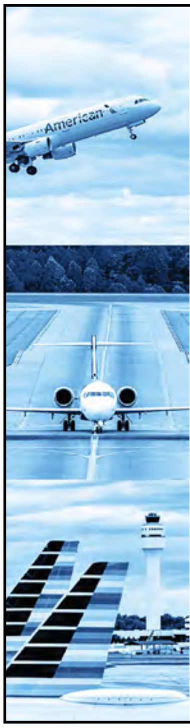


Preferential Runway Use: Daytime Runway Use

NA-D-4

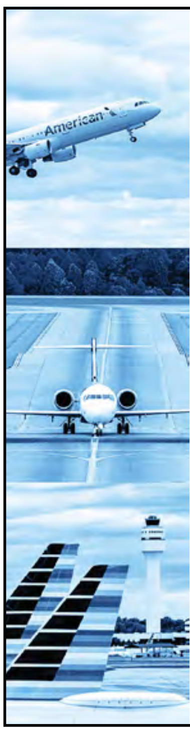
Operational impacts:

- Runway 18R/36L was planned (location) and designed (length) to primarily be used as an arrival runway.
- It has the capability to be used for departures, but **due to its location in relationship to the terminal area it is used for departures only under extenuating circumstances**.
- Implementation of this alternative would **require aircraft to routinely taxi across two active runways (Runway 18C/36C and Runway 01/19)**, which reduces the operational efficiency of those active runways due to the need to create safe gaps. This would result in significantly **increased delay to ensure no runway incursions occur**. Therefore, this alternative is **not considered feasible due to operational and safety concerns**.

↓

Eliminate from Evaluation

27



Preferential Runway Use: Daytime Runway Use

NA-D-5

Between 7am-10pm, do not use the new fourth parallel runway (Runway 01/19) and Runway 18R/36L to receive arrivals in “dual stream” mode during non-peak periods.

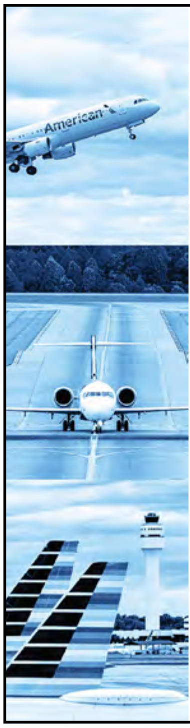
Safety/Feasibility: No safety/feasibility issues identified. In general, this is how the Airport currently operates.

Reduces impacts in 65 DNL? No. This recommendation is already accounted for in the Future (2028) Baseline scenario. There would be no reductions in impacts compared to the Future (2028) Baseline within the 65+ DNL.

↓

Eliminate from Evaluation

28



Preferential Runway Use: Daytime Runway Use

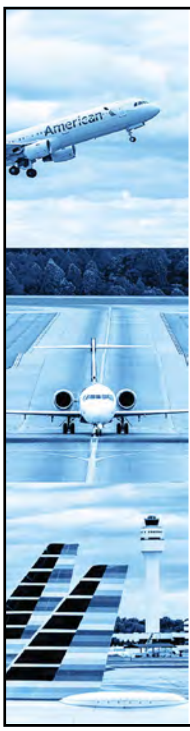
NA-D-6

Alternate use of runways so that no two adjacent runways will be used primarily for the same mode of operation (arrival or departure) over a daily period.

Safety/Feasibility: No safety/feasibility issues identified. In general, this is how the Airport currently operates.

Reduces impacts in 65 DNL? No. This recommendation is already accounted for in the Future (2028) Baseline scenario. There would be no reductions in impacts compared to the Future (2028) Baseline within the 65+ DNL.

Eliminate from Evaluation

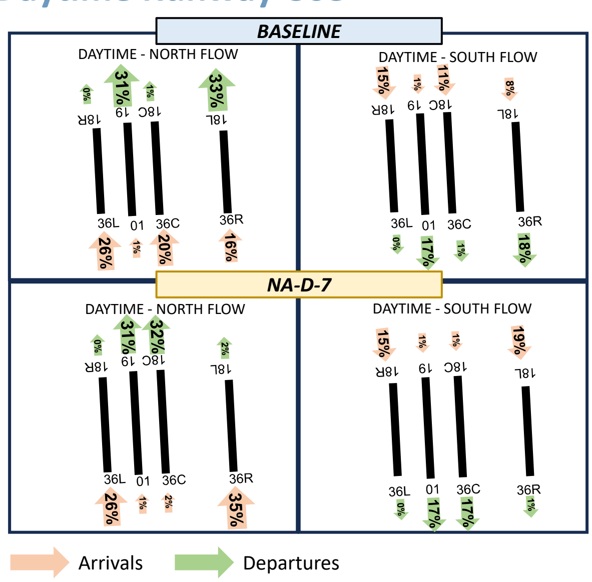


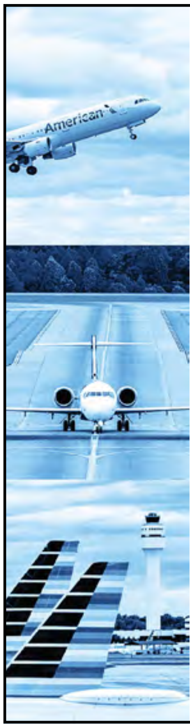
Preferential Runway Use: Daytime Runway Use

NA-D-7

Utilize Runway 01/19 and Runway 18C/36C primarily for departures and Runway 18R/36L and Runway 18L/36R primarily for arrivals

Currently under review



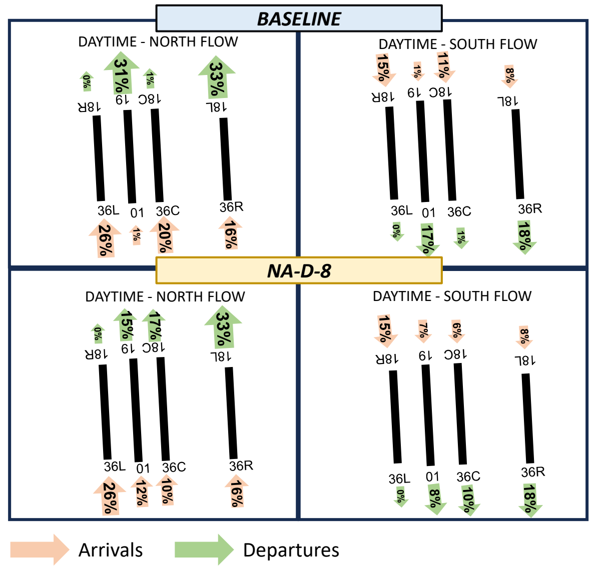


Preferential Runway Use: Daytime Runway Use

NA-D-8

Utilize Runway 01/19 and Runway 18C/36C for both arrivals and departures

Currently under review



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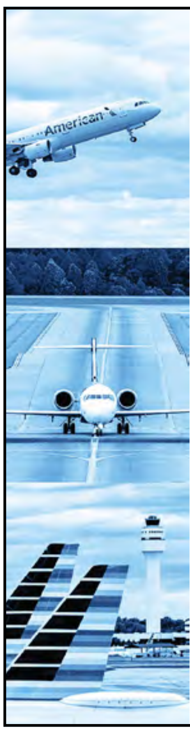
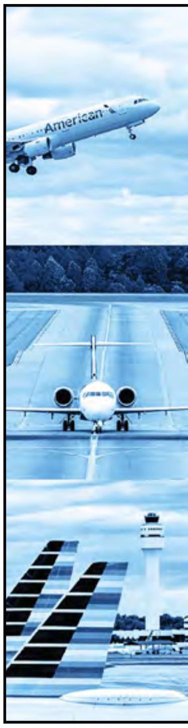


Preferential Runway Use: Nighttime Runway Use

32



Preferential Runway Use: Nighttime Runway Use

NA-E-1

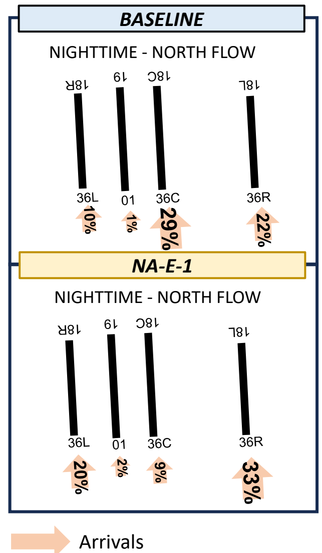
Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? Yes. Reduces impacts compared to the Future (2028) Baseline by **13 housing units** in the 65+ DNL.

Operational impacts: No operational impacts identified.

Continue in Evaluation



33

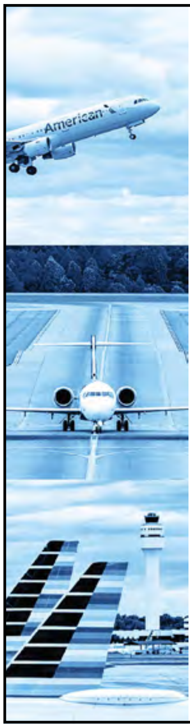
Preferential Runway Use: Nighttime Runway Use

NA-E-1

+ 3 (increase)
- 16 (decrease)
-13 (decrease)

Total reduction of 13 housing units

34



Preferential Runway Use: Nighttime Runway Use

NA-E-2

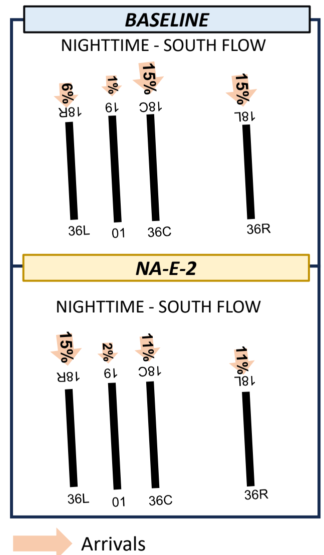
Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? Yes. Reduces impacts compared to the Future (2028) Baseline by **7 housing units** in the 65+ DNL.

Operational impacts: No operational impacts identified.

Continue in Evaluation



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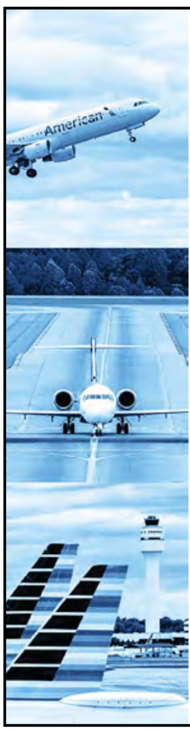


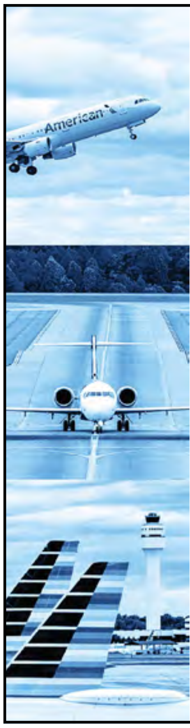
Preferential Runway Use: Nighttime Runway Use

NA-E-2

+ 0 (no increase)
- 7 (decrease)
-7 (decrease)

Total reduction of 7 housing units

36



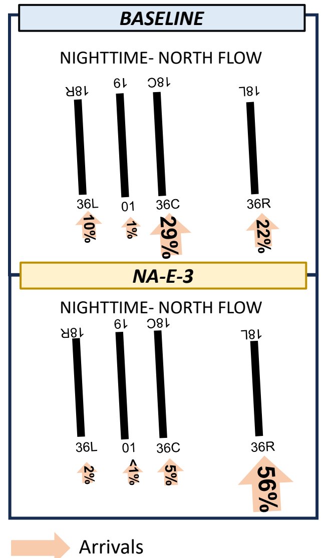
Preferential Runway Use: Nighttime Runway Use

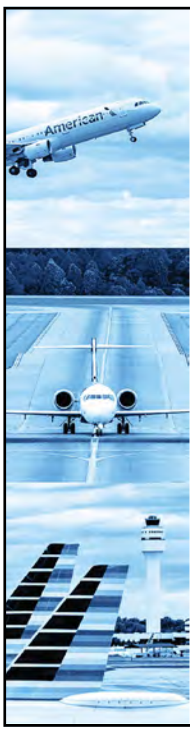
NA-E-3

Focus nighttime north-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 36R). Due to their close proximity, consider Runways 1/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.

Safety/Feasibility: No safety/feasibility issues identified

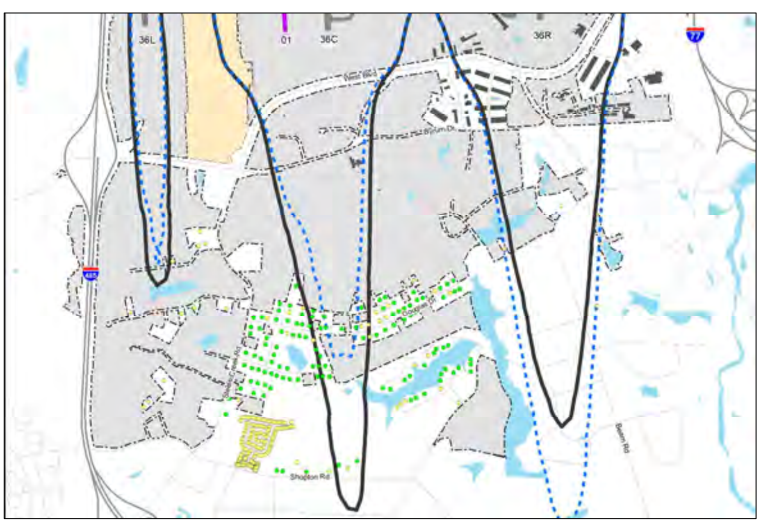
Reduces impacts in 65 DNL? Yes. Reduces impacts compared to the Future (2028) Baseline by **19 housing units** in the 65+ DNL.





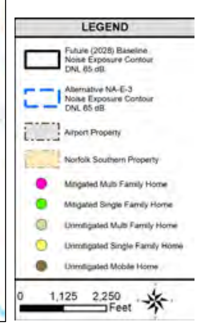
Preferential Runway Use: Nighttime Runway Use

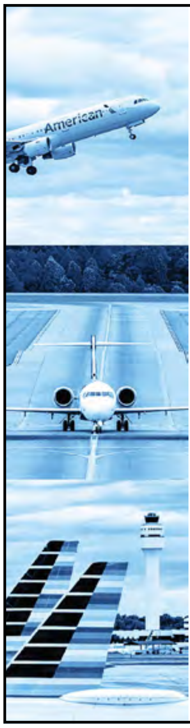
NA-E-3



+ 2 (increase)
<u>- 21 (decrease)</u>
- 19 (decrease)

Total reduction of 19 housing units





Preferential Runway Use: Nighttime Runway Use

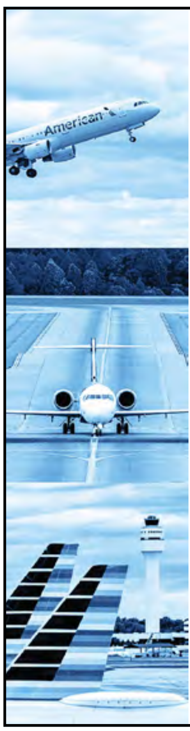
NA-E-3

Operational Impacts:

- Nighttime runway use is highly dependent on runway closures due to maintenance and/or construction.
- Nighttime is the only time extended runway closures can be accomplished without impacting operational efficiency of the Airport
- This is anticipated to continue into the future as maintenance to the airfield will continue
- Therefore, further investigation is needed to determine how often this measure can be implemented without affecting maintenance schedules

Currently under review

39



Preferential Runway Use: Nighttime Runway Use

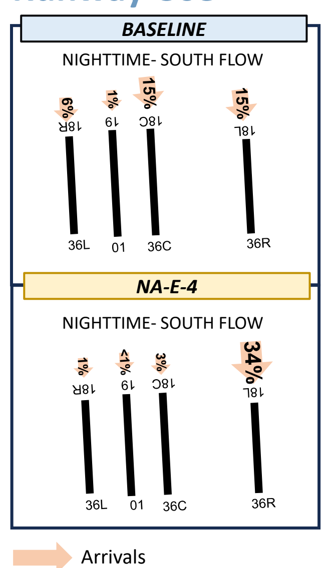
NA-E-4

Focus nighttime south-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 18L). Due to their close proximity, consider Runways 1/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Increases impacts compared to the Future (2028) Baseline by **28 housing units** in the 65+ DNL.

Eliminate from Evaluation



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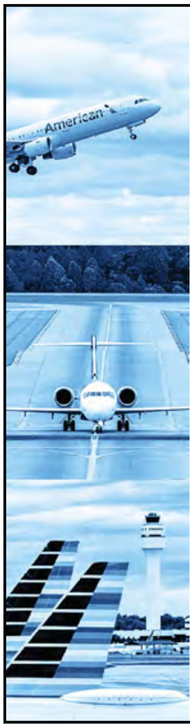


Preferential Runway Use: Nighttime Runway Use

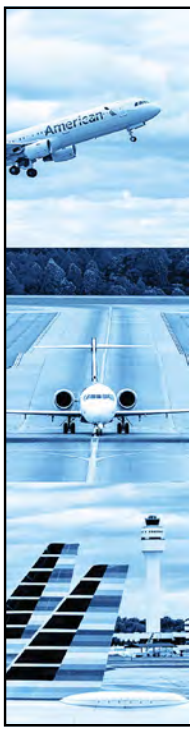
NA-E-4

NORTH OF AIRPORT
+ 36 (increase)
- 8 (decrease)
+ 28 (increase)

SOUTH OF AIRPORT
+ 0 (increase)
- 0 (decrease)
+ 0 (no change)

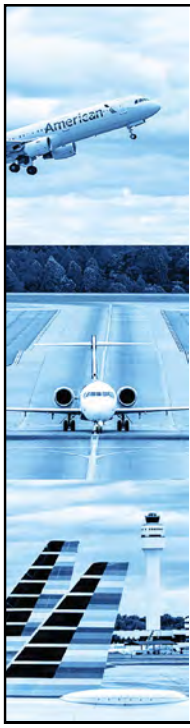
Total increase of 28 housing units

41



Flight Procedure: Divergent Headings - North Flow

42



Flight Procedure: Divergent Headings- North Flow

NA-F-1

Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.

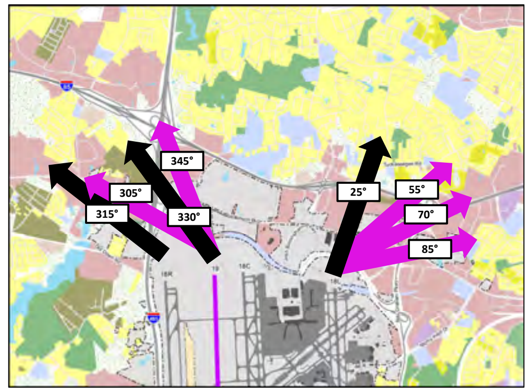
Keep existing headings as follows:

- Runway 36R: 25°
- Runway 36L: 315°

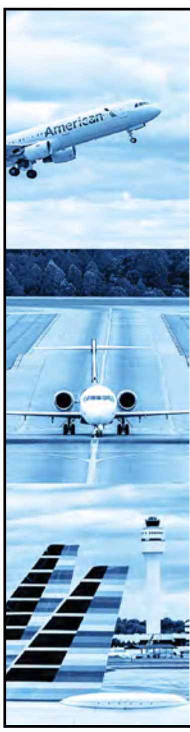
Add additional divergent headings as follows:

- Runway 36R:
  - 85° to follow the Wilkinson Boulevard corridor
  - 55° and 70° to follow the Interstate 85 corridor
- Runway 01:
  - Implement the existing Runway 36C's approved 330° heading
  - 345° to overfly the Interstate 85/485 Interchange and follow the Interstate 485 corridor
  - 305° to follow the Wilkinson Blvd corridor

Safety/Feasibility: No safety/feasibility issues identified

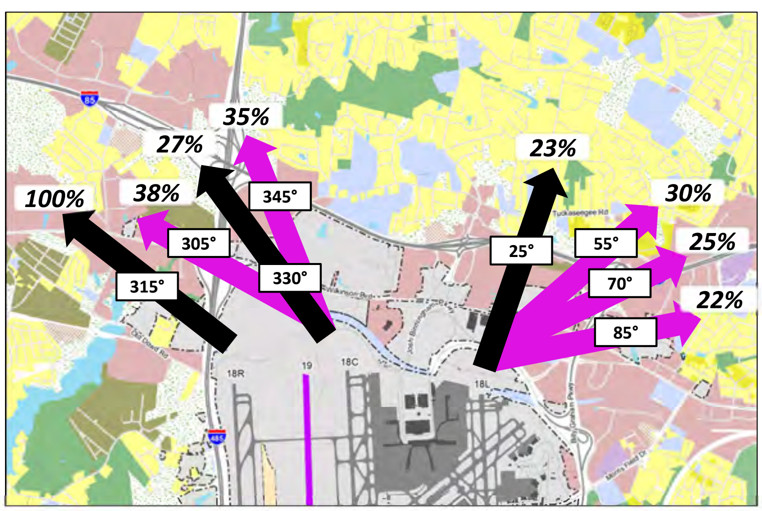


43



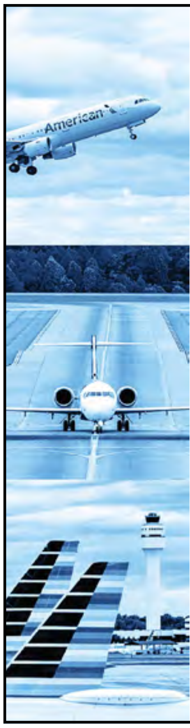
Flight Procedure: Divergent Headings - North Flow

NA-F-1



- *% denotes percentage of jet aircraft modeled on each heading for each runway*
- *modeling methodology assumes the same headings and percent use on both Runway 36C and Runway 01*

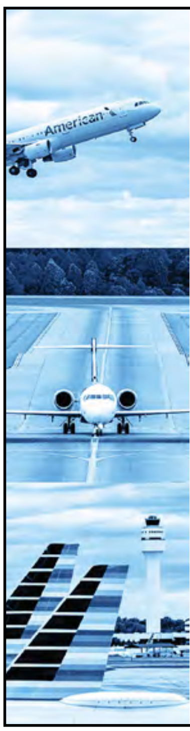
44



Flight Procedure: Divergent Headings - North Flow

NA-F-1

+ 1 (increase)
- 6 (decrease)
- 5 (decrease)
Total reduction of 5 housing units



Flight Procedure: Divergent Headings - North Flow

NA-F-1

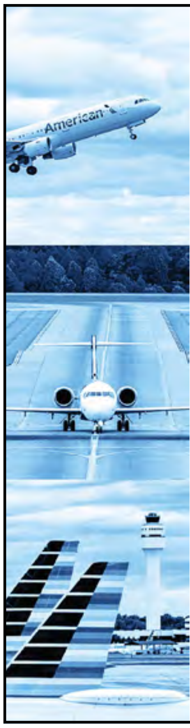
	65-<70 DNL	70-<75 DNL	75+ DNL	65+ DNL	Future (2028) Baseline 65+ DNL
HOUSING UNITS					
Housing Type					
Single-Family	80	0	0	80	85
Multi-Family	94	0	0	94	94
Manufactured Home	63	0	0	63	63
Total Housing Units	**237**	**0**	**0**	**237**	**242**
POPULATION					
Total Population[1]	**670**	**0**	**0**	**670**	**685**
NOISE-SENSITIVE FACILITIES					
Schools / Day Cares	3	0	0	3	4
Churches / Places of Worship	4	0	0	4	4
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0
Outdoor Music / Amphitheaters	0	0	0	0	0
Other Uses[2]	n/a	0	0	0	0
Total Noise-Sensitive Facilities	**7**	**0**	**0**	**7**	**8**

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above 70 DNL include sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities
Source: Landrum & Brown, 2023

Reduces impacts in 65 DNL?
Yes. Reduces impacts compared to the Future (2028) Baseline by **5 housing units** and **1 day care** within the 65+ DNL.

Operational impacts:
No operational impacts identified.

Continue in Evaluation



Flight Procedure: Divergent Headings - North Flow

NA-F-2

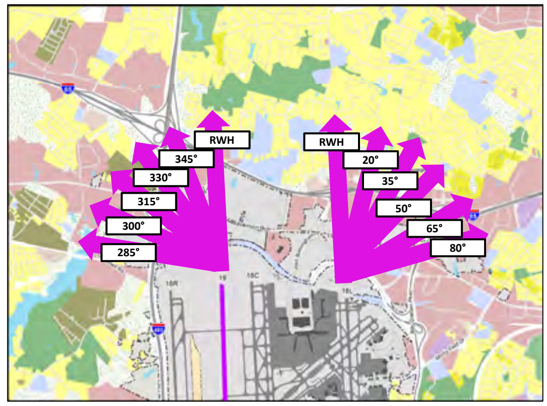
Maximize the number of divergent headings for north flow operations while maintaining a 15° separation between headings.

Add additional divergent headings as follows:

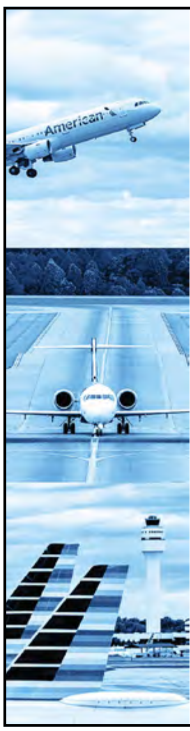
- Runway 36R: RWH, 20°, 35°, 50°, 65°, 80°
- Runway 01: RWH, 345°, 330°, 315°, 300°, 285°

While a straight-out heading is identified for Runways 36R and 01, these headings cannot be used simultaneously because a 15-degree separation is required per 7110.65Z.

Safety/Feasibility: No safety/feasibility issues identified

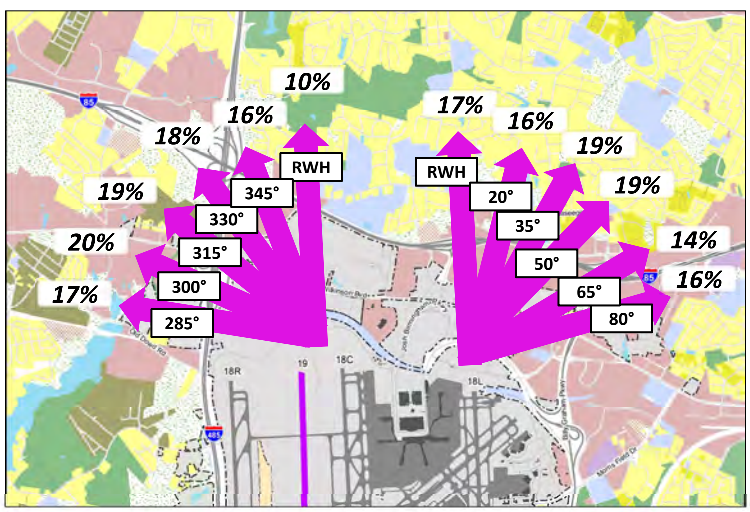


47



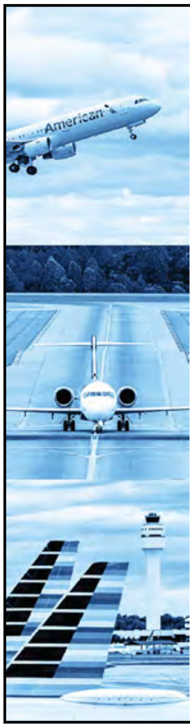
Flight Procedure: Divergent Headings - North Flow

NA-F-2



- *% denotes percentage of jet aircraft modeled on each heading for each runway*
- *modeling methodology assumes the same headings and percent use on both Runway 36C and Runway 01*

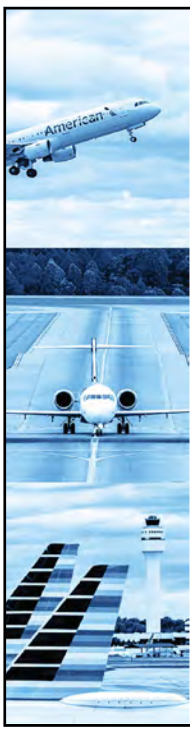
48



Flight Procedure: Divergent Headings - North Flow

NA-F-2

+ 5 (increase)
- 7 (decrease)
- 2 (decrease)
Total reduction of 2 housing units



Flight Procedure: Divergent Headings - North Flow

NA-F-2

	65-<70 DNL	70-<75 DNL	75+ DNL	65+ DNL	Future (2028) Baseline 65+ DNL
HOUSING UNITS					
Housing Type					
Single-Family	83	0	0	83	85
Multi-Family	94	0	0	94	94
Manufactured Home	63	0	0	63	63
Total Housing Units	**240**	**0**	**0**	**240**	**242**
POPULATION					
Total Population[1]	**679**	**0**	**0**	**679**	**685**
NOISE-SENSITIVE FACILITIES					
Schools / Day Cares	4	0	0	4	4
Churches / Places of Worship	4	0	0	4	4
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0
Outdoor Music / Amphitheaters	0	0	0	0	0
Other Uses[2]	n/a	0	0	0	0
Total Noise-Sensitive Facilities	**8**	**0**	**0**	**8**	**8**

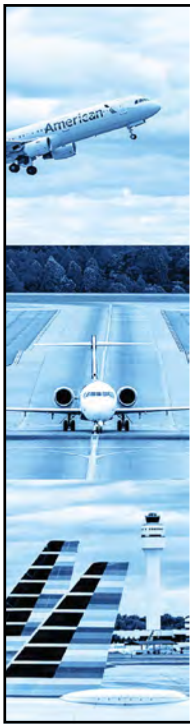
Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above 70 DNL include sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities

Source: Landrum & Brown, 2023

Reduces impacts in 65 DNL?
Yes. Reduces impacts compared to the Future (2028) Baseline by 2 housing units within the 65+ DNL.

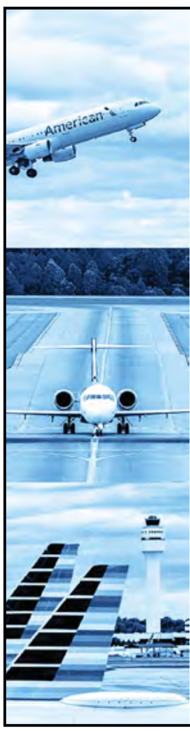
Operational impacts:
No operational impacts identified.

Continue in Evaluation



Flight Procedure: Divergent Headings - South Flow

51



Flight Procedure: Divergent Headings - South Flow

NA-G-1

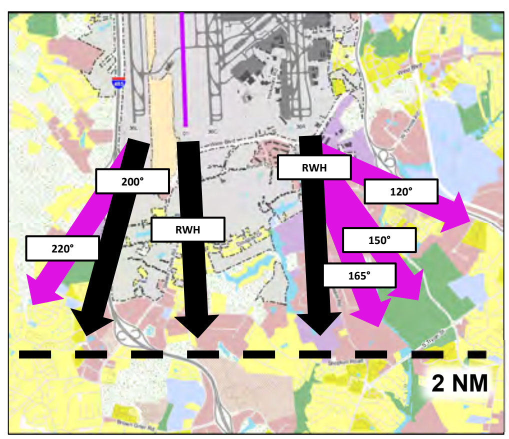
Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on the new Runway 19.

Keep existing headings as follows:

- Runway 18R: 200°
- Runway 18L: RWH

Add additional divergent headings as follows:

- Runway 18R (remove 2-mile restriction):
  - 220° to follow the Garrison Road corridor
- Runway 19 (keep 2-mile restriction):
  - Implement the existing RWH
- Runway 18L (remove 2-mile restriction):
  - 120° to follow the Billy Graham Parkway corridor
  - 150° and 165° to follow the W Tyvola Road corridor

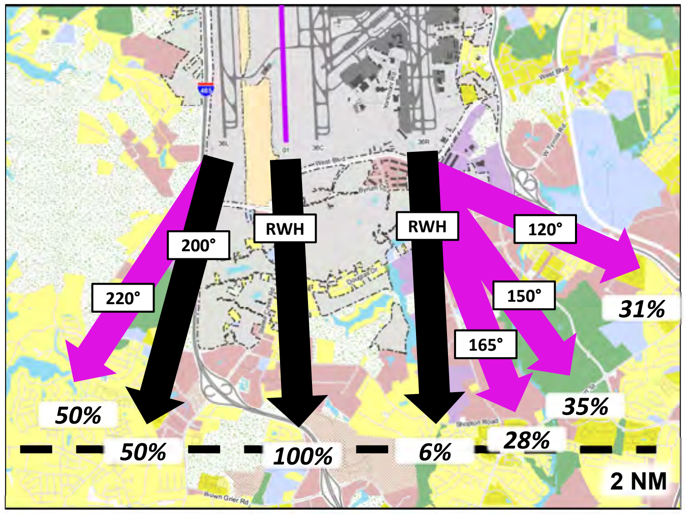


Safety/Feasibility: No safety/feasibility issues identified

52

Flight Procedure: Divergent Headings - South Flow

NA-G-1



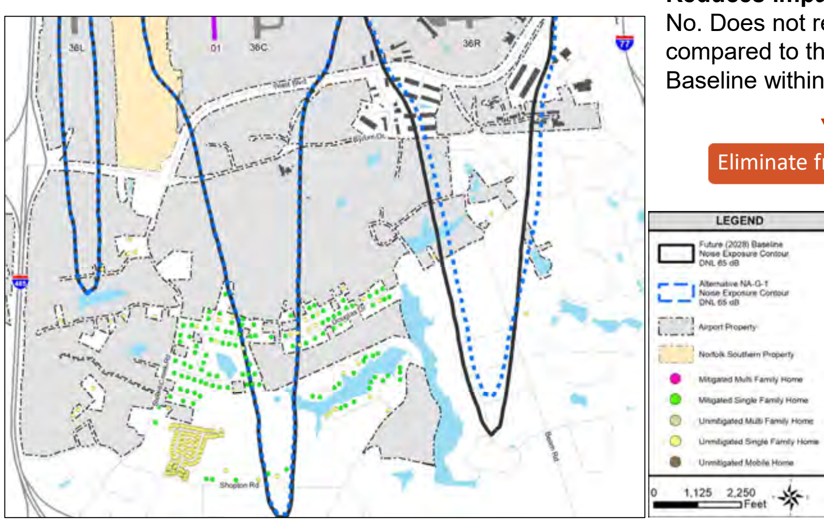
- *% denotes percentage of jet aircraft modeled on each heading for each runway*
- *modeling methodology assumes the same headings and percent use on both Runway 18C and Runway 19*

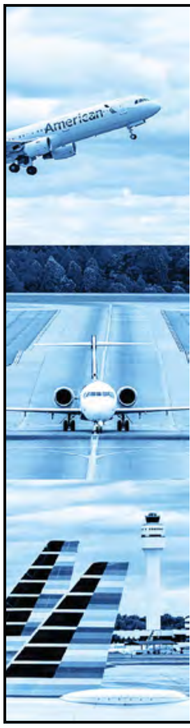
Flight Procedure: Divergent Headings - South Flow

NA-G-1

Reduces impacts in 65 DNL?
No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.

Eliminate from Evaluation





Flight Procedure: Divergent Headings - South Flow

NA-G-2

Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on Runway 18L.

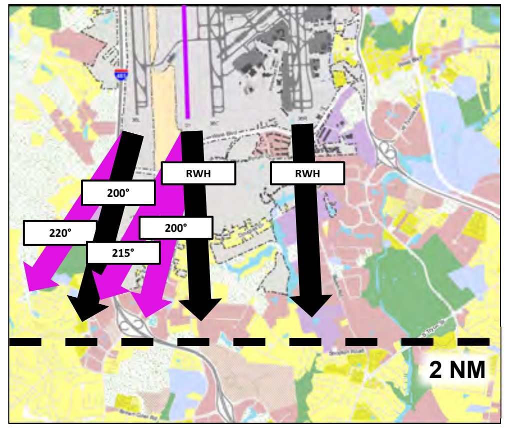
Keep existing headings as follows:

- Runway 18R: 200°
- Runway 18L: RWH (keep 2-mile restriction)

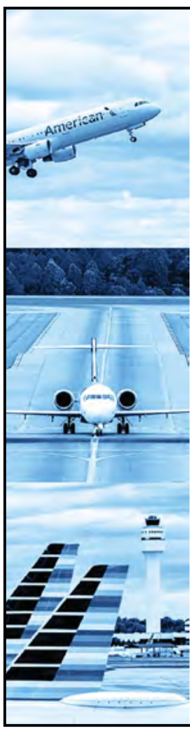
Add additional divergent headings as follows:

- Runway 18R (remove 2-mile restriction):
  - 220° to follow the Garrison Road corridor
- Runway 19 (remove 2-mile restriction):
  - Implement the existing RWH
  - 200° and 215° to follow the Steele Creek Road corridor

Safety/Feasibility: No safety/feasibility issues identified

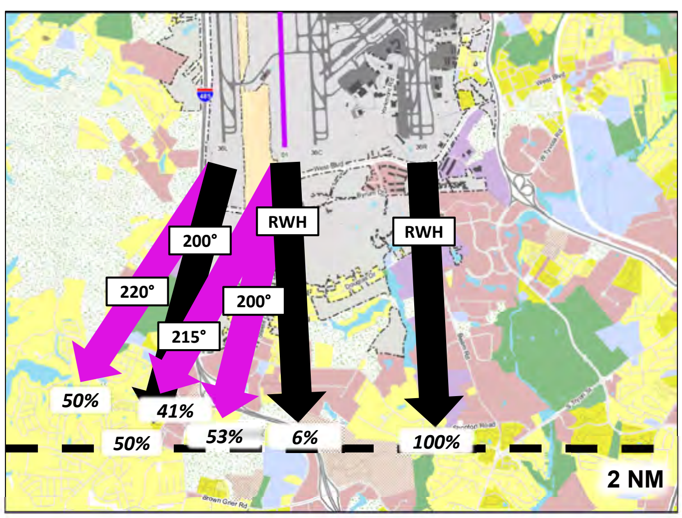


55



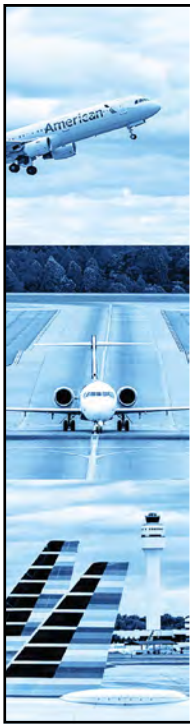
Flight Procedure: Divergent Headings - South Flow

NA-G-2



- *% denotes percentage of jet aircraft modeled on each heading for each runway*
- *modeling methodology assumes the same headings and percent use on both Runway 18C and Runway 19*

56

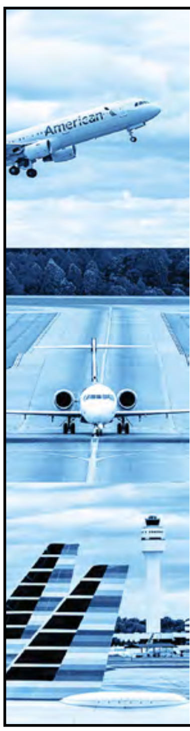


Flight Procedure: Divergent Headings - South Flow

NA-G-2

+ 1 (increase)
- 2 (decrease)
-1 (decrease)

Total reduction of 1 housing unit



Flight Procedure: Divergent Headings - South Flow

NA-G-2

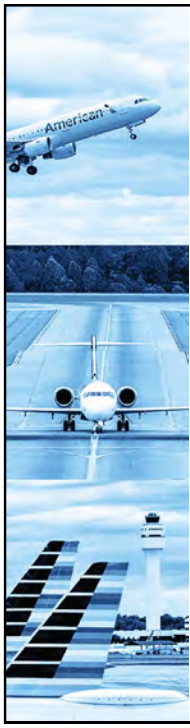
	65-<70 DNL	70-<75 DNL	75+ DNL	65+ DNL	Future (2028) Baseline 65+ DNL
HOUSING UNITS					
Housing Type					
Single-Family	84	0	0	84	85
Multi-Family	94	0	0	94	94
Manufactured Home	63	0	0	63	63
Total Housing Units	**241**	**0**	**0**	**241**	**242**
POPULATION					
Total Population[1]	**682**	**0**	**0**	**682**	**685**
NOISE-SENSITIVE FACILITIES					
Schools / Day Cares	4	0	0	4	4
Churches / Places of Worship	4	0	0	4	4
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0
Outdoor Music / Amphitheaters	0	0	0	0	0
Other Uses[2]	n/a	0	0	0	0
Total Noise-Sensitive Facilities	**8**	**0**	**0**	**8**	**8**

Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above 70 DNL include sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities
Source: Landrum & Brown, 2023

Reduces impacts in 65 DNL?
Yes. Reduces impacts compared to the Future (2028) Baseline by **1 housing unit** within the 65+ DNL.

Operational impacts:
No operational impacts identified.

Continue in Evaluation



Flight Procedure: Divergent Headings - South Flow

NA-G-3

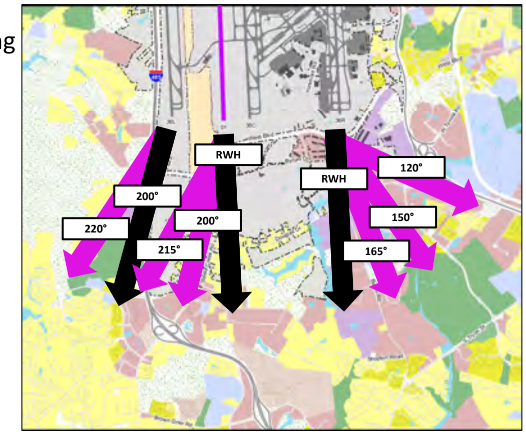
Increase the number of departure headings for south flow operations while maintaining existing approved headings and maximizing departure corridors. This requires eliminating the 2-mile restriction for all runways.

Keep existing headings as follows:

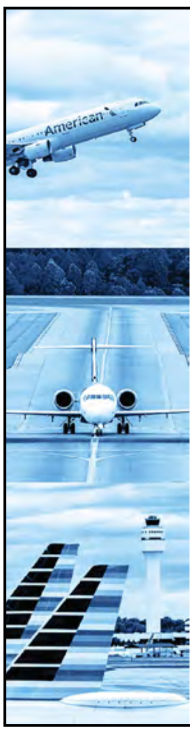
- Runway 18L: RWH
- Runway 18R: 200°

Eliminate the 2-mile restriction and add divergent headings as follows:

- Runway 18L:
  - 120° to follow the Billy Graham Parkway corridor
  - 150° and 165° to follow the W Tyvola Road corridor
- Runway 18R:
  - 220° to follow the Garrison Rd corridor
- Runway 19:
  - Implement the existing RWH
  - 200° and 215° to follow the Steele Creek Road corridor

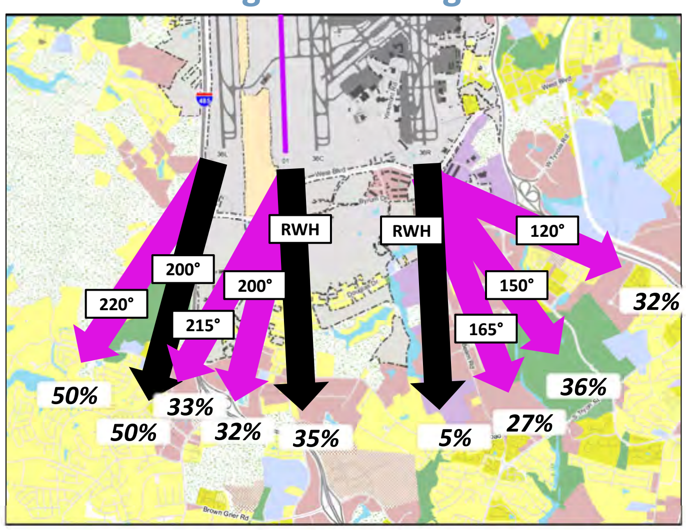


Safety/Feasibility: No safety/feasibility issues identified

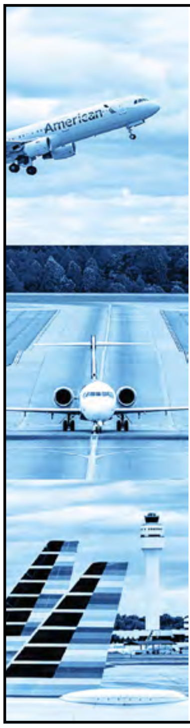


Flight Procedure: Divergent Headings - South Flow

NA-G-3

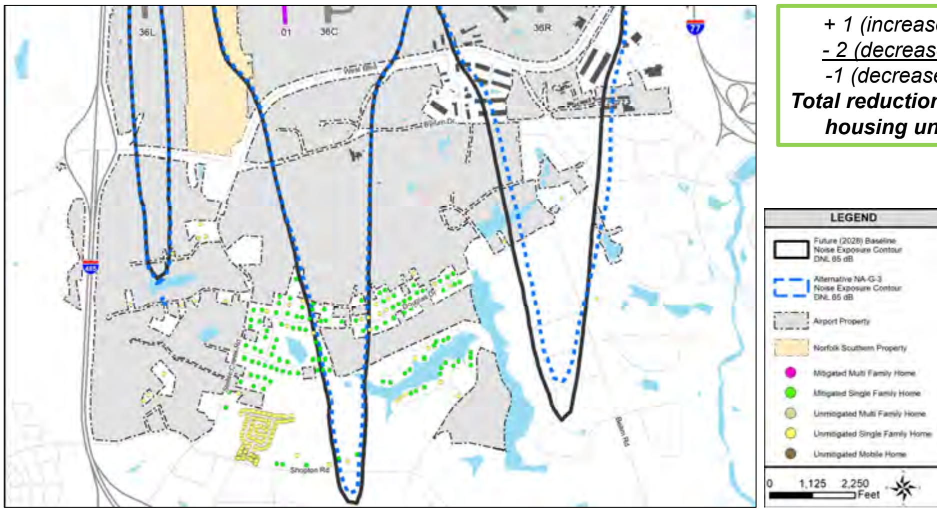


- *% denotes percentage of jet aircraft modeled on each heading for each runway*
- *modeling methodology assumes the same headings and percent use on both Runway 18C and Runway 19*

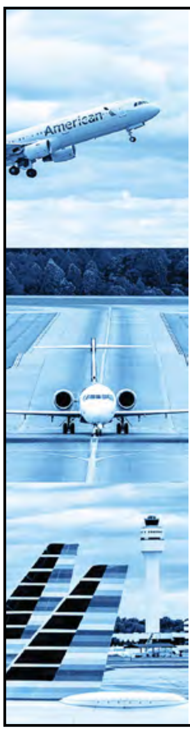


Flight Procedure: Divergent Headings - South Flow

NA-G-3



+ 1 (increase)
- 2 (decrease)
-1 (decrease)
Total reduction of 1 housing unit



Flight Procedure: Divergent Headings - South Flow

NA-G-3

	65-<70 DNL	70-<75 DNL	75+ DNL	65+ DNL	Future (2028) Baseline 65+ DNL
HOUSING UNITS					
Housing Type					
Single-Family	84	0	0	84	85
Multi-Family	94	0	0	94	94
Manufactured Home	63	0	0	63	63
Total Housing Units	**241**	**0**	**0**	**241**	**242**
POPULATION					
Total Population[1]	**682**	**0**	**0**	**682**	**685**
NOISE-SENSITIVE FACILITIES					
Schools / Day Cares	4	0	0	4	4
Churches / Places of Worship	4	0	0	4	4
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0
Outdoor Music / Amphitheaters	0	0	0	0	0
Other Uses[2]	n/a	0	0	0	0
Total Noise-Sensitive Facilities	**8**	**0**	**0**	**8**	**8**

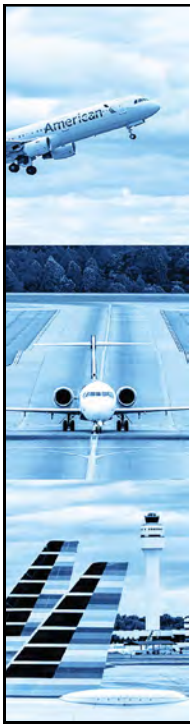
Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above 70 DNL include sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities

Source: Landrum & Brown, 2023

Reduces impacts in 65 DNL?
Yes. Reduces impacts compared to the Future (2028) Baseline by **1 housing unit** within the 65+ DNL.

Operational impacts:
No operational impacts identified.

Continue in Evaluation



Charlotte Douglas International Airport

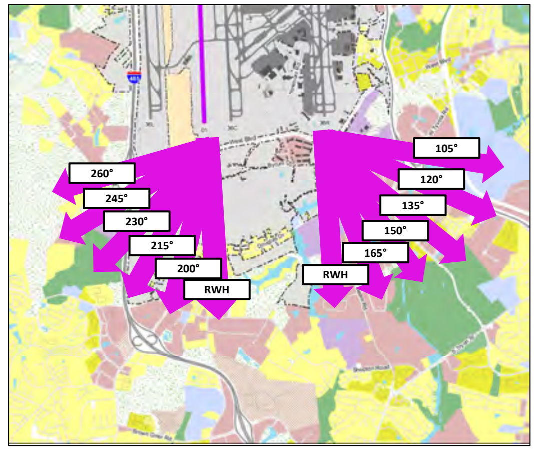
Flight Procedure: Divergent Headings - South Flow

NA-G-4

Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction.

Eliminate the 2-mile restriction and add additional divergent headings as follows:

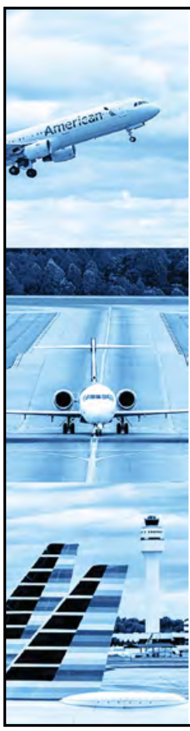
- Runway 18L: RWH, 165°, 150°, 135°, 120°, 105°
- Runway 19: RWH, 200°, 215°, 230°, 245°, 260°



Safety/Feasibility: No safety/feasibility issues identified

Part 150 Noise Compatibility Study Update | 63

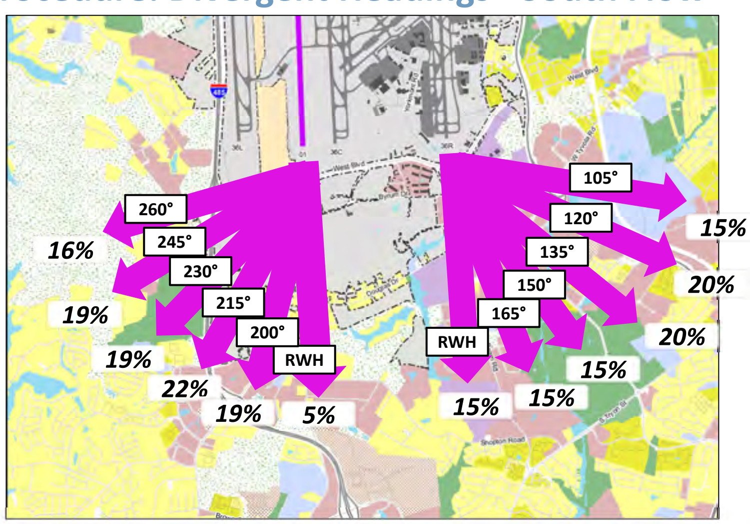
63



Charlotte Douglas International Airport

Flight Procedure: Divergent Headings - South Flow

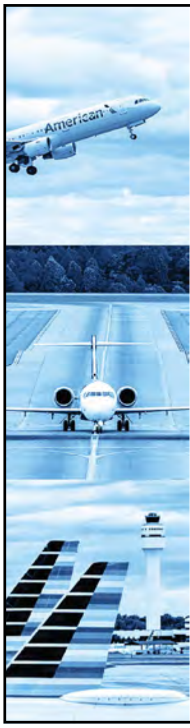
NA-G-4



- *% denotes percentage of jet aircraft modeled on each heading for each runway*
- *modeling methodology assumes the same headings and percent use on both Runway 18C and Runway 19*

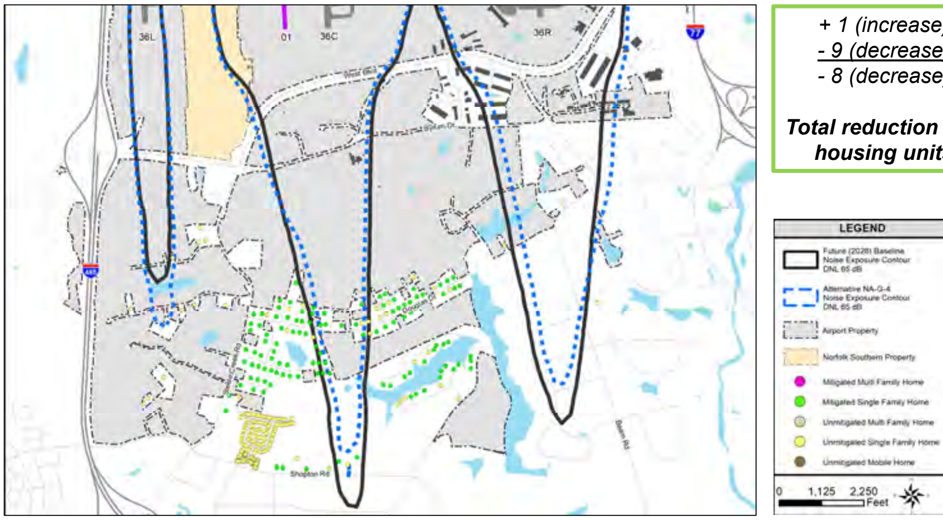
Part 150 Noise Compatibility Study Update | 64

64



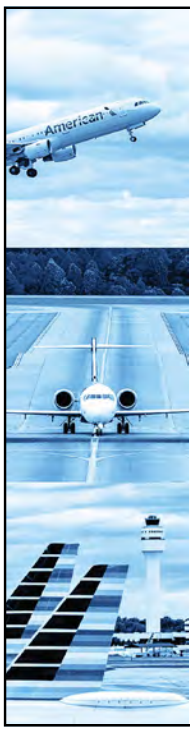
Flight Procedure: Divergent Headings - South Flow

NA-G-4



+ 1 (increase)
- 9 (decrease)
- 8 (decrease)

Total reduction of 8 housing units



Flight Procedure: Divergent Headings - South Flow

NA-G-4

	65-<70 DNL	70-<75 DNL	75+ DNL	65+ DNL	Future (2028) Baseline 65+ DNL
HOUSING UNITS					
Housing Type					
Single-Family	77	0	0	77	85
Multi-Family	94	0	0	94	94
Manufactured Home	63	0	0	63	63
Total Housing Units	**234**	**0**	**0**	**234**	**242**
POPULATION					
Total Population[1]	**665**	**0**	**0**	**665**	**685**
NOISE-SENSITIVE FACILITIES					
Schools / Day Cares	4	0	0	4	4
Churches / Places of Worship	4	0	0	4	4
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0
Outdoor Music / Amphitheaters	0	0	0	0	0
Other Uses[2]	n/a	0	0	0	0
Total Noise-Sensitive Facilities	**8**	**0**	**0**	**8**	**8**

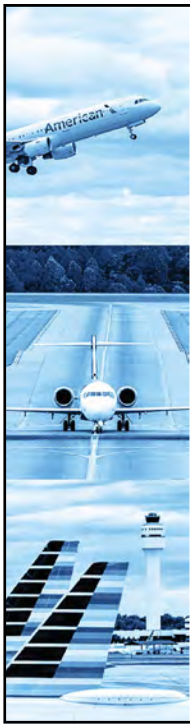
Notes: 1. Total population estimated based upon the housing counts multiplied by the 2010 Census average household size for each Census Block Group.
2. Other uses that are considered noise-sensitive at or above 70 DNL include sports arenas, zoos, nature exhibits, amusement parks, camps, resorts, golf courses, stables, and office or publicly accessible portions of commercial or manufacturing facilities

Source: Landrum & Brown, 2023

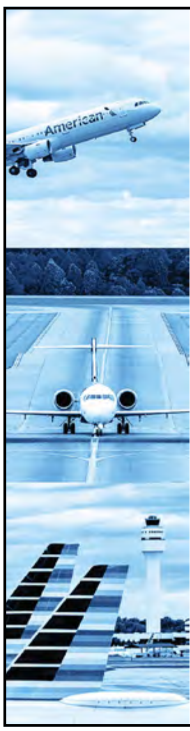
Reduces impacts in 65 DNL?
Yes. Reduces impacts compared to the Future (2028) Baseline by **8 housing units** within the 65+ DNL.

Operational impacts:
No operational impacts identified.

Continue in Evaluation



Flight Procedure: Departure Flight Corridors



Flight Procedure: Departure Flight Corridors

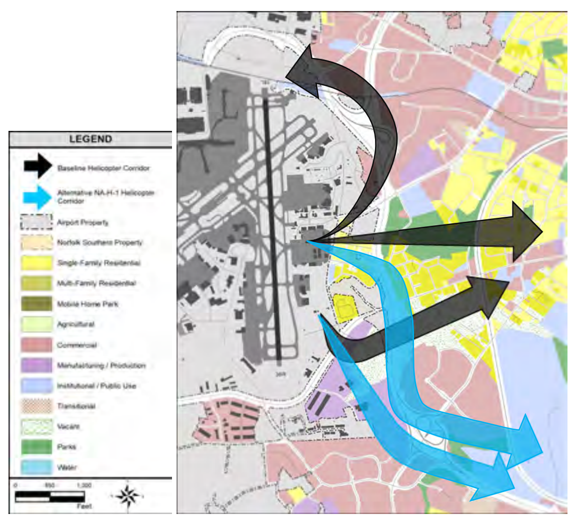
NA-H-1

Evaluate helicopter operations in the south general aviation apron to takeoff towards the south (stay between Yorkmont and Billy Graham Parkway before turning on course)

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.

Eliminate from Evaluation



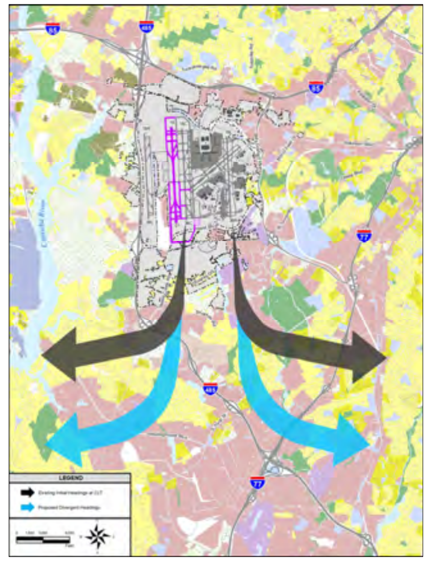
Flight Procedure: Departure Flight Corridors

NA-H-2

Change Headings of First Turns off Runways 18L and 18C

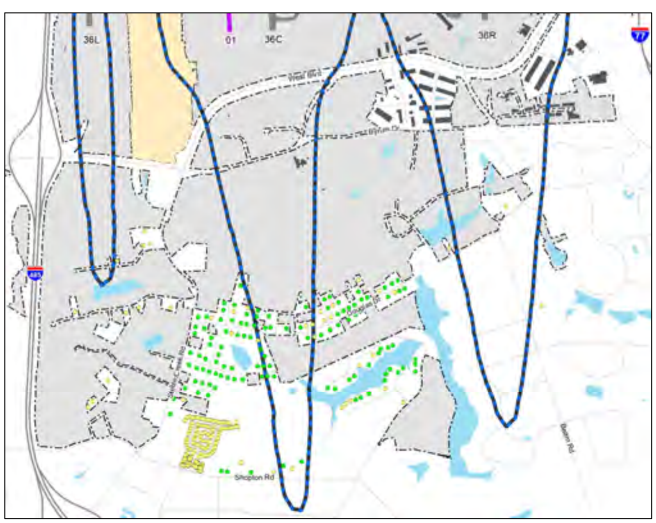
Reduce the effect of noise on more densely populated areas and foster the desire by the ACR to return to pre-Metroplex flight paths.

Safety/Feasibility: No safety/feasibility issues identified



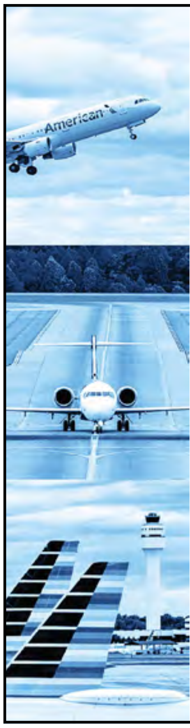
Flight Procedure: Departure Flight Corridors

NA-H-2



Reduces impacts in 65 DNL?
No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.

Eliminate from Evaluation



Flight Procedure: Departure Flight Corridors

NA-H-3

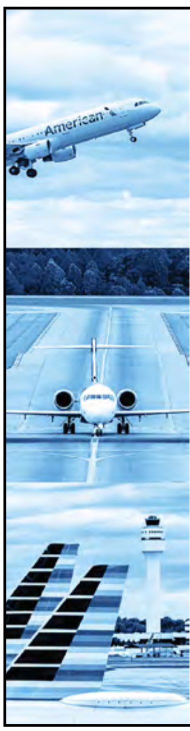
For south flow departures, revert to 2016 procedures where aircraft depart from the Runway 18C at a 183° heading and fly between 2 to 4 nautical miles before turning to a 270° heading.

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Because this alternative targets procedures outside of the 65 DNL, no change would occur when compared to the Future (2028) Baseline 65+ DNL.

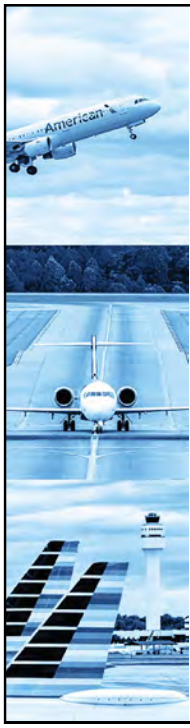
Eliminate from Evaluation

71



Flight Procedure: Arrival Flight Corridors

72



Flight Procedure: Arrival Flight Corridors

NA-I-1

For south flow arrivals along the CHSLY procedure, maintain the published altitude of 6,000 feet at the HEELZ procedure so flights will not cut the corner.

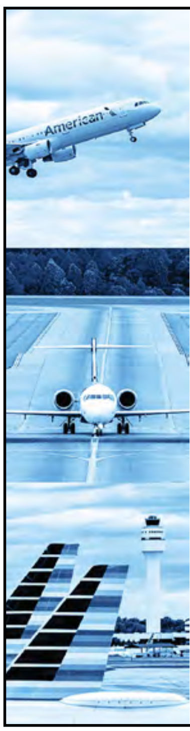
Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Because this alternative targets procedures outside of the 65 DNL, no change would occur when compared to the Future (2028) Baseline 65+ DNL.

↓

Eliminate from Evaluation

73



Charlotte Douglas International Airport

Flight Procedure: Arrival Flight Corridors

NA-I-2

For south flow arrivals, extend the eastern downwind so that flights intercept the final approach over the main channel of Mountain Island Lake keeping an altitude of 6,000 feet until turning final approach course.

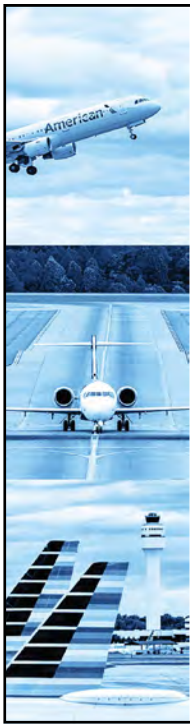
Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Because this alternative targets procedures outside of the 65 DNL, no change would occur when compared to the Future (2028) Baseline 65+ DNL.

↓

Eliminate from Evaluation

74



Flight Procedure: Arrival Flight Corridors

NA-I-3

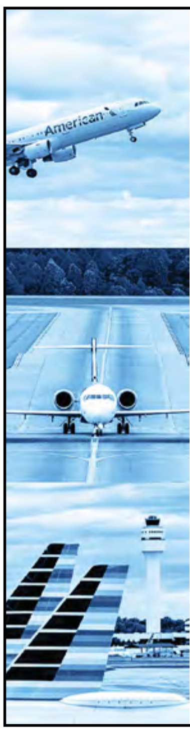
For north flow arrivals, utilize Interstate 77 as a flight corridor.

Safety/Feasibility: No safety/feasibility issues identified

Reduces impacts in 65 DNL? No. Because this alternative targets procedures outside of the 65 DNL, no change would occur when compared to the Future (2028) Baseline 65+ DNL.

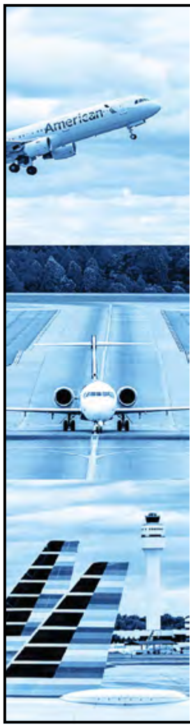
Eliminate from Evaluation

75



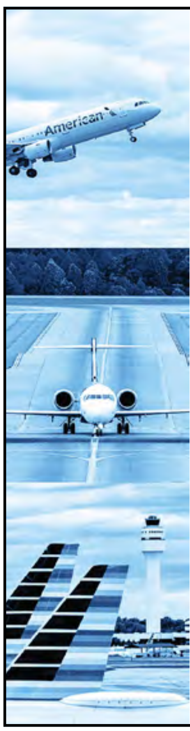
Screening Process Results Summary

76



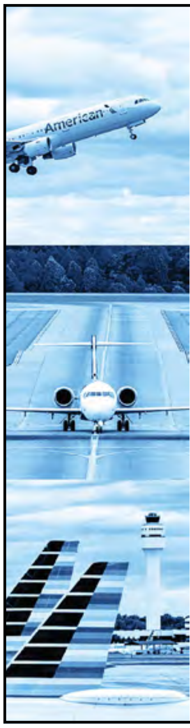
Screening Process Summary: Facility Modification

Alternative	Safety/Feasibility	Reduces impacts in 65 DNL?	Operational Impacts	Implementation Considerations
Run-Up Locations				
NA-A-1	✓	✓	✓	TBD
NA-A-2	✓	✓	✓	TBD
Displaced Arrival Threshold				
NA-B-1	✓	✗		
NA-B-2	✓	✗		
NA-B-3	✓	✓	✗	
NA-B-4	✓	✗		



Screening Process Summary: Preferential Runway Use

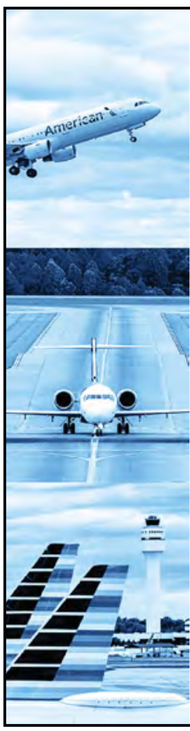
Alternative	Safety/Feasibility	Reduces impacts in 65 DNL?	Operational Impacts	Implementation Considerations
Airport Flow				
NA-C-1	✗			
NA-C-2	✗			
Daytime Runway Use				
NA-D-1	✓	✗		
NA-D-2	✓	✗		
NA-D-3	✗			
NA-D-4	✓	✓	✗	
NA-D-5	✓	✗		
NA-D-6	✓	✗		
NA-D-7	🔍	TBD	TBD	TBD
NA-D-8	🔍	TBD	TBD	TBD
Nighttime Runway Use				
NA-E-1	✓	✓	✓	TBD
NA-E-2	✓	✓	✓	TBD
NA-E-3	✓	✓	🔍	TBD
NA-E-4	✓	✗		



Screening Process Summary: Flight Procedure

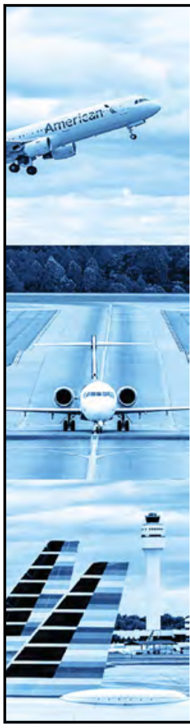
Alternative	Safety/Feasibility	Reduces impacts in 65 DNL?	Operational Impacts	Implementation Considerations
Divergent Headings – North Flow				
NA-F-1	✓	✓	✓	TBD
NA-F-2	✓	✓	✓	TBD
Divergent Headings – South Flow				
NA-G-1	✓	✗		
NA-G-2	✓	✓	✓	TBD
NA-G-3	✓	✓	✓	TBD
NA-G-4	✓	✓	✓	TBD
Departure Flight Corridors				
NA-H-1	✓	✗		
NA-H-2	✓	✗		
NA-H-3	✓	✗		
Arrival Flight Corridors				
NA-I-1	✓	✗		
NA-I-2	✓	✗		
NA-I-3	✓	✗		

79



Preliminary Noise Compatibility Program Scenarios

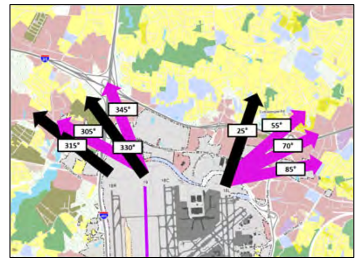
80



Preliminary Scenario 1

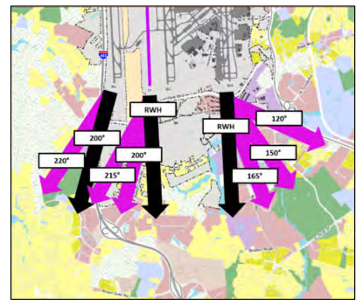
Divergent Headings – North Flow

NA-F-1: Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.



Divergent Headings – South Flow

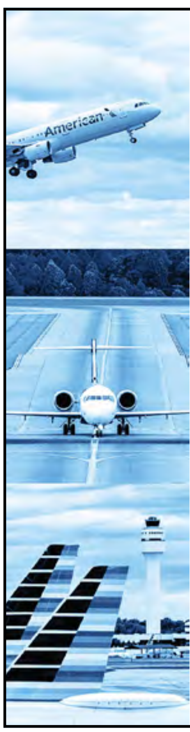
NA-G-3: Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.



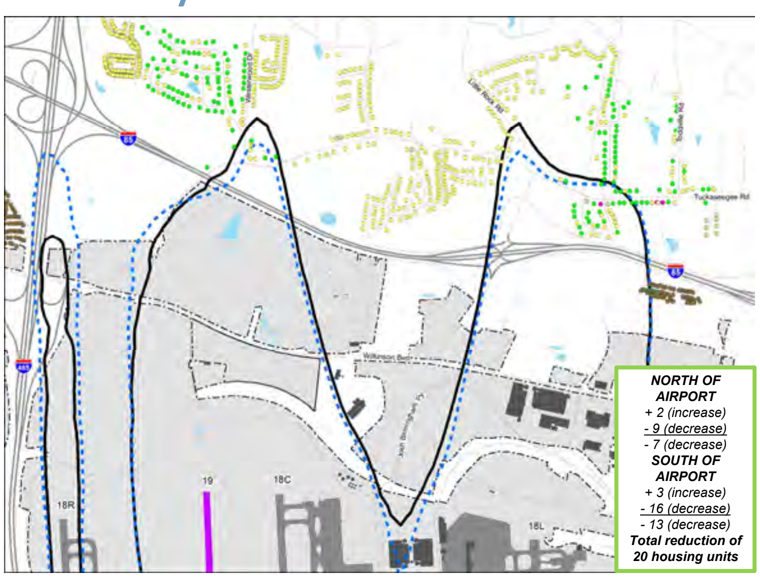
Nighttime Runway Use

NA-E-1: Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

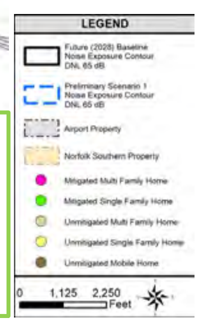
NA-E-2: Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.



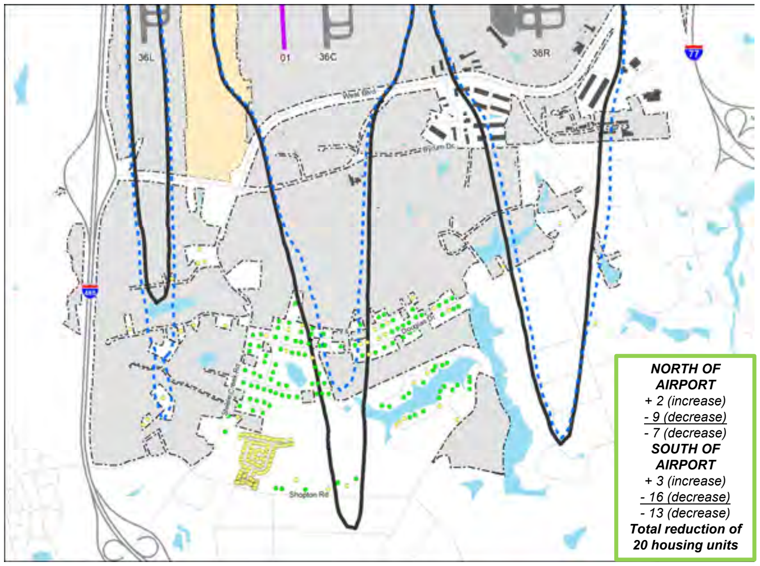
Preliminary Scenario 1



Reduces impacts compared to the Future (2028) Baseline by **20 housing units, 1 daycare, and 1 place of worship** in the 65+ DNL.



Preliminary Scenario 1



Reduces impacts compared to the Future (2028) Baseline by **20 housing units, 1 daycare, and 1 place of worship** in the 65+ DNL.

Preliminary Scenario 2

Divergent Headings – North Flow

NA-F-2: Maximize the number of divergent headings for north flow operations while maintaining a 15° separation between headings.

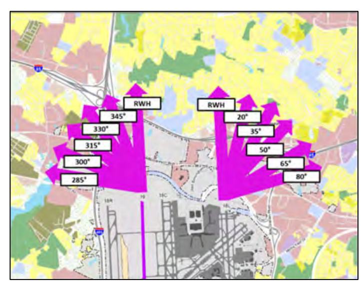
Divergent Headings – South Flow

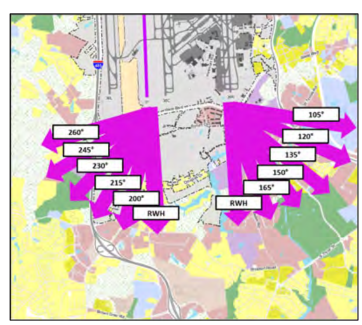
NA-G-4: Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction.

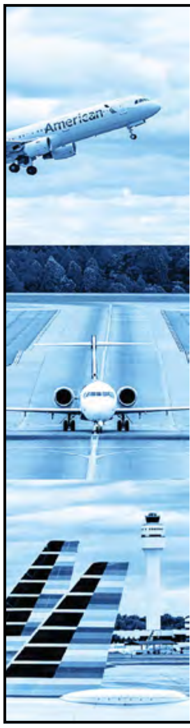
Nighttime Runway Use

NA-E-1: Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

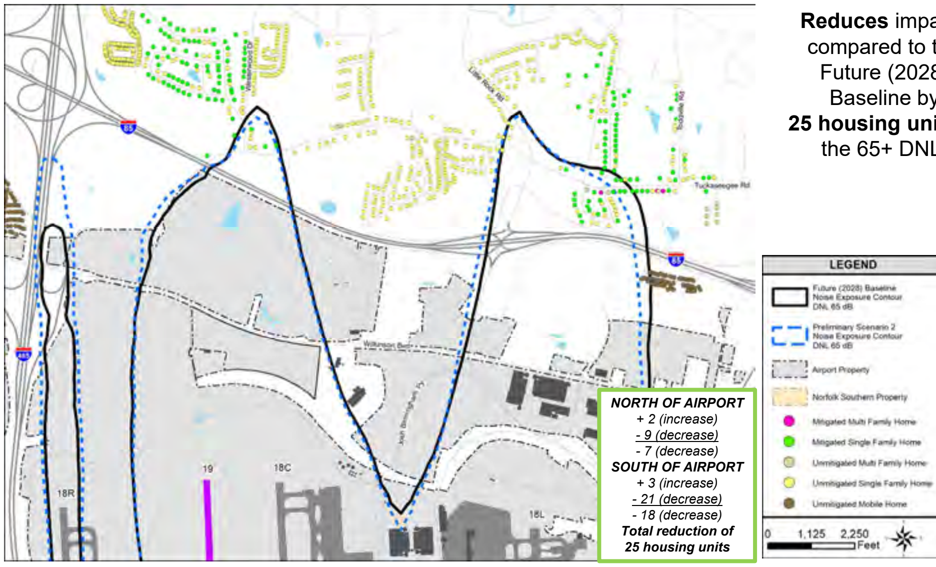
NA-E-2: Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.





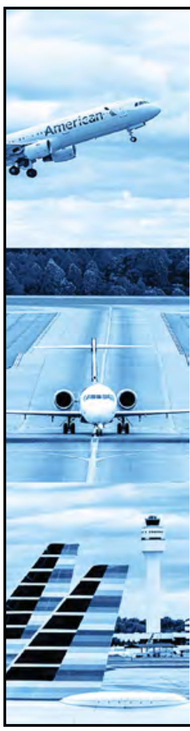


Preliminary Scenario 2

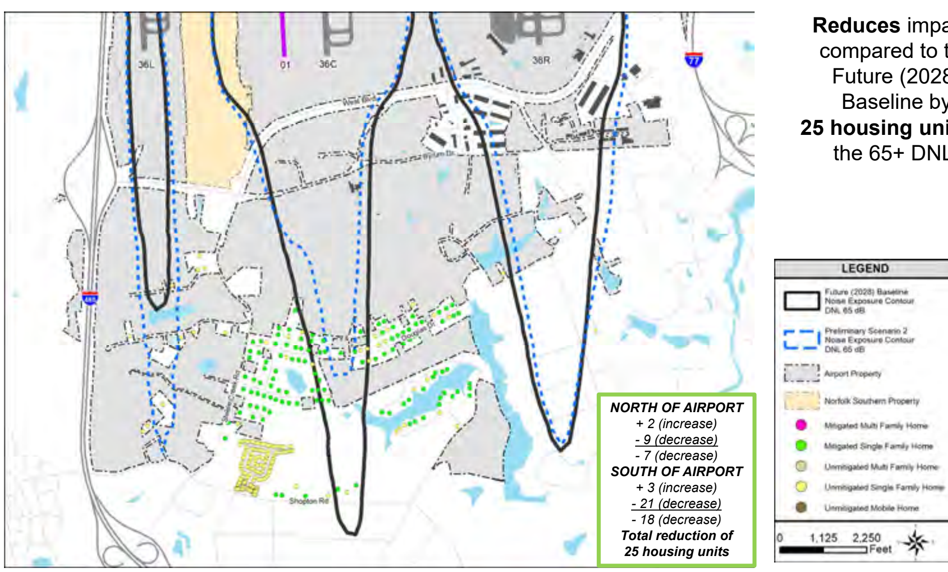


Reduces impacts compared to the Future (2028) Baseline by **25 housing units** in the 65+ DNL.

85

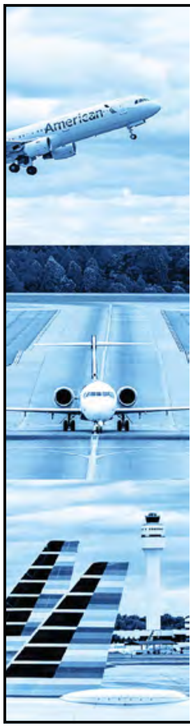


Preliminary Scenario 2



Reduces impacts compared to the Future (2028) Baseline by **25 housing units** in the 65+ DNL.

86



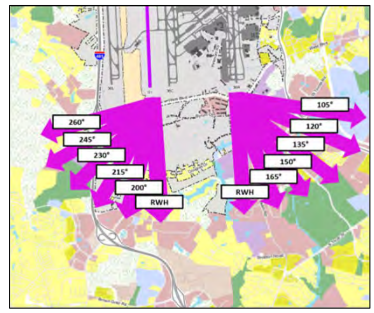
Preliminary Scenario 3

Divergent Headings – North Flow

NA-F-1: Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.

Divergent Headings – South Flow

NA-G-4: Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction.

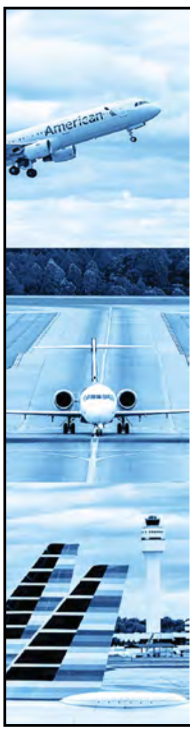


Nighttime Runway Use

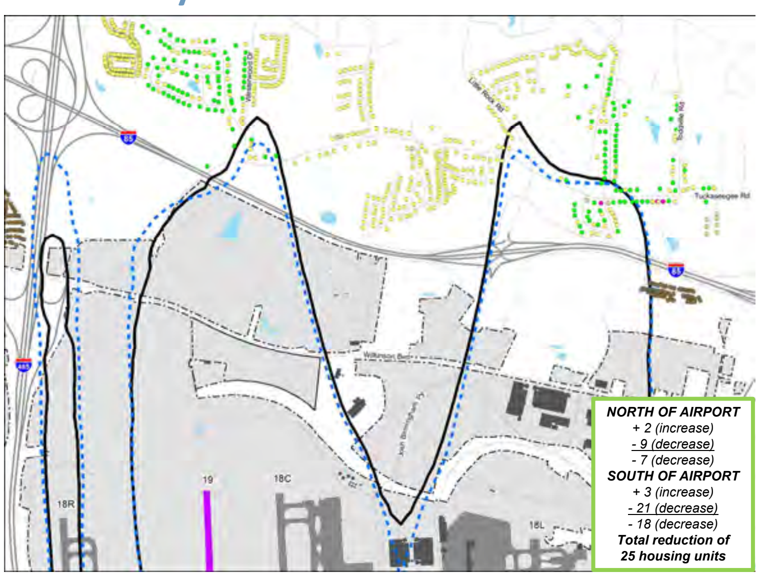
NA-E-1: Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

NA-E-2: Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.

87

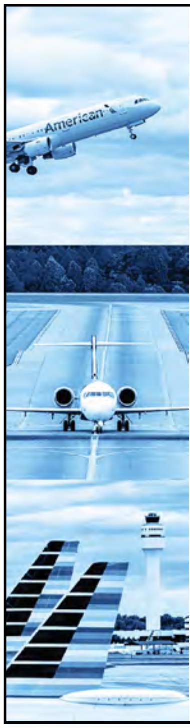


Preliminary Scenario 3

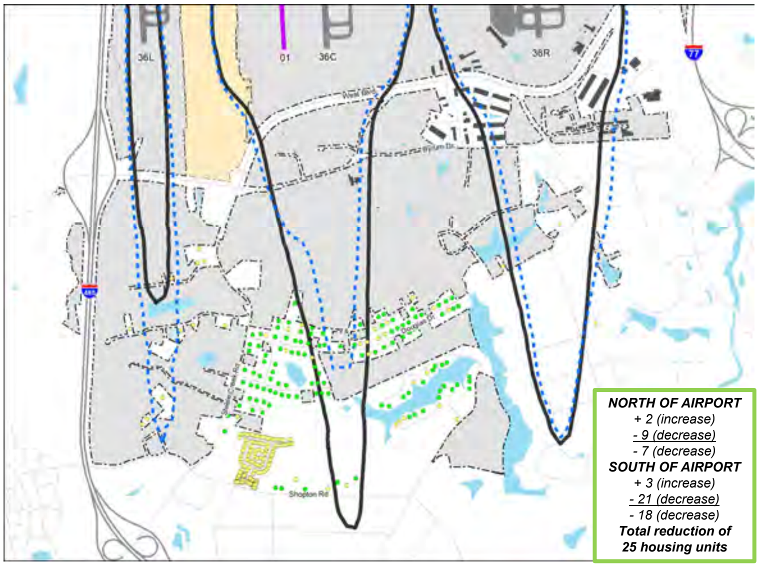


Reduces impacts compared to the Future (2028) Baseline by **25 housing units, 1 daycare, and 1 place of worship** in the 65+ DNL.

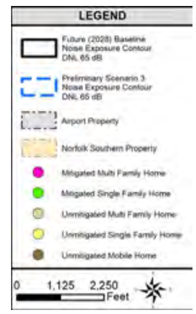
88



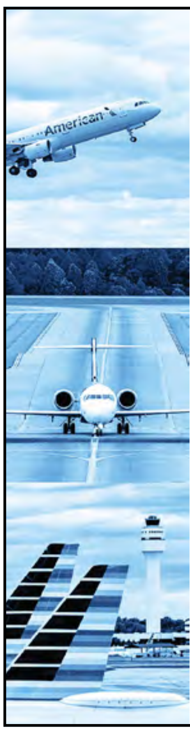
Preliminary Scenario 3



Reduces impacts compared to the Future (2028) Baseline by **25 housing units, 1 daycare, and 1 place of worship** in the 65+ DNL.

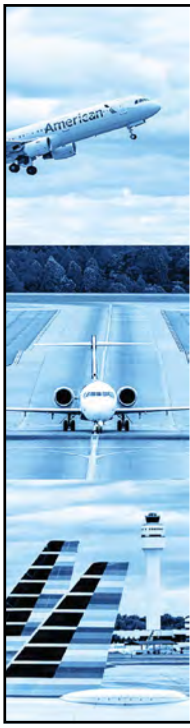


89



Next Steps / Schedule

90



Next Steps / Schedule

- Finalize noise abatement alternative evaluation
  - Operational issues?
  - Implementation considerations (process, timeline, cost, etc)?
- Identify Land Use Management and Implementation Alternatives
- Develop Draft Report

May 2022
Project Kickoff

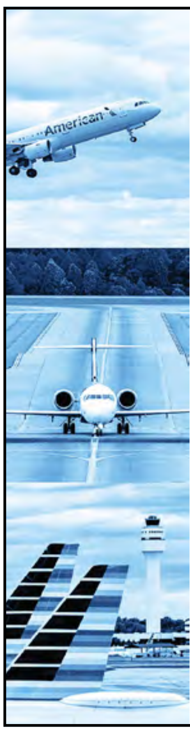
2022–2023
Initiate and Conduct Technical Work

Early Spring 2024
Release of Draft Findings and Recommended NCP & Next Public Hearing

Late Spring 2024
Final Recommendations

Early Summer 2024
FAA Review & Approval

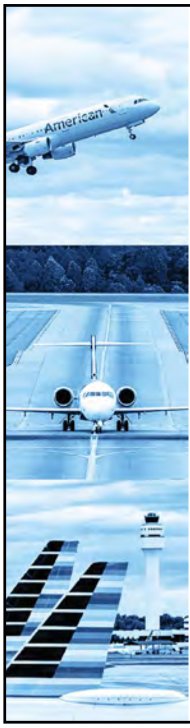
91



Final Questions & Answers

92

Charlotte Douglas International Airport



Please submit all comments by

November 30, 2023 to:

gaby.elizondo@landrumbrown.com

Public Information Meeting #1
March 22 & 23, 2023

Outreach Summary

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Charlotte Douglas International Airport

Part 150 Study Update

Public Meeting #1 Summary Report

March 22 & 23, 2023

Overview

The City of Charlotte is currently updating the Part 150 Noise Compatibility Study for the Charlotte Douglas International Airport (CLT). The Part 150 Study process uses a balanced approach to identify noise incompatibilities surrounding an airport, and to recommend measures to both correct existing incompatibilities and to prevent future incompatibilities.

The City of Charlotte hosed Public Informational Meetings on Wednesday, March 22, 2023 and Thursday, March 23, 2023. The Public Informational Meetings were open-house style during which boards identifying the status of the Part 150, the work completed to date, and the next steps for the Part 150 process were displayed. The agendas for each meeting were identical and there was an opportunity for the public to submit written comments at each meeting. Comments could also be submitted via email or mail for a month following the meetings. Approximately 29 people signed in at the public meetings.

Public Meeting – Location 1
Wednesday, March 22, 2023
6 p.m. to 8 p.m.

Harris Conference Center, Central Piedmont Community College
3216 CPCC Harris Campus Drive
Charlotte, NC 28208

Public Meeting – Location 2
Thursday, March 23, 2023
6 p.m. to 8 p.m.

Aloft Charlotte Airport
3928 Memorial Parkway
Charlotte, NC 28217

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Charlotte Observer

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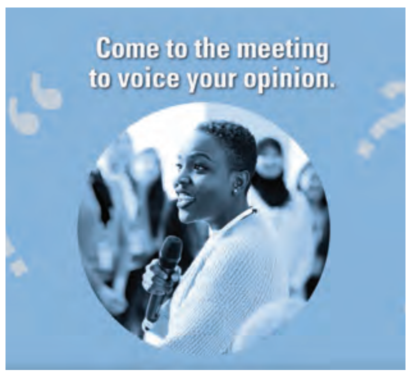
La Noticia

Print Media Affidavits 6
Que Pasa Mi Gente

07
SOCIAL MEDIA CAMPAIGN



CLT Public Meeting Ads 1 & 2,
By The Numbers Table 7

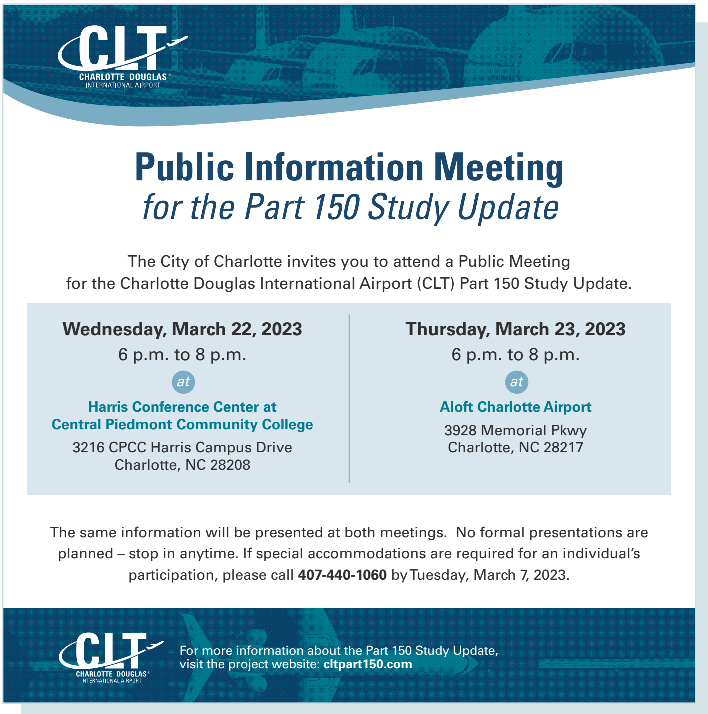
08
COMMENTS

Meeting Materials

Materials were created for the meeting to help the attending public gain a better understanding of the project. There were 26 boards displayed at both meetings that included a synopsis of the project, the Part 150 process, project maps, and Spanish language display ads were placed in the weekly publications, *Que Pasa Mi Gente* and *La Noticia*. A project overview handout was also available at the meeting, which was printed in English and Spanish. Meeting boards and handouts can be viewed in Appendix A, as a separate attachment.

Print Media Campaign

To make the public aware of the upcoming public meetings, legal notice ads were published in local Charlotte newspapers. In addition, a display ad was placed in *The Charlotte Observer,* and Spanish language ads were placed in *Que Pasa Mi Gente* and *La Noticia*. The ads provided the dates and times of the two meetings, a brief overview of the meeting format, and a link to the project website for more information. The legal and display ads in *The Charlotte Observer* were published 30 days before the public meeting.



Ad published in *The Charlotte Observer* on February 21, 2023

Ad published in *Que Pasa Mi Gente* on March 1, 2023

Ad published in *La Noticia* on March 1, 2023

McCLATCHY

Beaufort Gazette
Belleville News-Democrat
Bellingham Herald
Bradenton Herald
Centre Daily Times
Charlotte Observer
Columbus Ledger-Enquirer
Fresno Bee
The Herald - Rock Hill
Herald Sun - Durham
Idaho Statesman
Island Packet
Kansas City Star
Lexington Herald-Leader
Merced Sun-Star
Miami Herald
el Nuevo Herald - Miami
Modesto Bee
Raleigh News & Observer
The Olympian
Sacramento Bee
Fort Worth Star-Telegram
The State - Columbia
Sun Herald - Biloxi
Sun News - Myrtle Beach
The News Tribune Tacoma
The Telegraph - Macon
San Luis Obispo Tribune
Tri-City Herald
Wichita Eagle

AFFIDAVIT OF PUBLICATION

Account #	Order Number	Identification	Order PO	Amount	Cols	Depth
14603	385108	Print Legal Ad-IPL01104740 - IPL0110474		$492.88	1	41 L

Attention: Kevin Price

Landrum & Brown
4445 LAKE FOREST DRIVE 700
CINCINNATI, OH 45242

Notice of Public Meetings for the Charlotte Douglas International Airport Part 150 Study Update

The City of Charlotte will conduct two Public Information Meetings with respect to the Part 150 Study Update being prepared for the Charlotte Douglas International Airport (CLT). The Public Information Meetings will be held from 6:00 p.m. to 8:00 p.m. on Wednesday, March 22, 2023 at the Harris Conference Center at Central Piedmont Community College, 3216 CPCC Harris Campus Drive, Charlotte, NC 28208; and from 6:00 p.m. to 8:00 p.m. on Thursday, March 23, 2023 at the Aloft Charlotte Airport, 3928 Memorial Pkwy, Charlotte, NC 28217. The same information will be presented both nights. No formal presentations are planned. Attendees are welcome to come anytime between 6:00 p.m. and 8:00 p.m. If special accommodations are required for an individual's participation, please call 407-440-1060 by Tuesday, March 7, 2023. These meetings will present preliminary information related to the ongoing Part 150 Study Update for CLT and to provide an opportunity for public comment early in the study process. Airport staff and noise consultants will be available at the Public Information Meetings to answer questions and provide information regarding the study. More information about the Part 150 Study Update is available online at https://cltpart150.com/.
IPL0110474
Feb 21 2023

North Carolina } ss
Mecklenburg County }

Before the undersigned, a Notary Public of said County and State, duly authorized to administer oaths affirmations, etc., personally appeared, being duly sworn or affirmed according to law, doth depose and say that he/she is a representative of The Charlotte Observer Publishing Company, a corporation organized and doing business under the laws of the State of Delaware, and publishing a newspaper known as The Charlotte Observer in the city of Charlotte, County of Mecklenburg, and State of North Carolina and that as such he/she is familiar with the books, records, files, and business of said Corporation and by reference to the files of said publication, the attached advertisement was inserted. The following is correctly copied from the books and files of the aforesaid Corporation and Publication.

1 insertion(s) published on:
02/21/23

Tara Pennington

In Testimony Whereof I have hereunto set my hand and affixed my seal on the 21th day of February,2023

Stephanie Hatcher

Notary Public in and for the state of Texas, residing in Dallas County

STEPHANIE HATCHER
My Notary ID # 133534406
Expires January 14, 2026

Extra charge for lost or duplicate affidavits.
Legal document please do not destroy!

The Charlotte Observer–published on February 21, 2023

6A | THE CHARLOTTE OBSERVER | TUESDAY **FEBRUARY 21** 2023

3 dead, more than 200 hurt as new quake hits Turkey, Syria

BY SUZAN FRASER
Associated Press

ANKARA, TURKEY

A new 6.4 magnitude earthquake on Monday killed three people and injured more than 200 in parts of Turkey laid waste two weeks ago by a massive quake that killed tens of thousands, authorities said. More buildings collapsed, trapping some people, while scores of injuries were recorded in neighboring Syria too.

Monday's earthquake was centered in the town of Defne, in Turkey's Hatay province, one the worst-hit regions in the magnitude 7.8 quake that struck on Feb. 6. It was felt in Syria, Jordan, Cyprus, Israel and as far away as Egypt, and followed by a second, magnitude 5.8 temblor.

Turkish Interior Minister Suleyman Soylu said three people were killed and 213 injured. Search and rescue efforts were underway in three collapsed buildings where six people were believed trapped.

In Hatay, police rescued one person trapped inside a three-story building and were trying to reach three others inside, HaberTurk television reported. It said those trapped included movers helping people shift furniture and other belongings from the building that was damaged in the massive quake.

Syria's state news agency, SANA, reported that six people were injured in Aleppo by falling debris. The White Helmets, northwest Syria's civil defense organization, reported more than 130 injuries, most of them non-life threatening, including fractures and cases of people fainting from fear, while a number of buildings in areas already damaged by the quake collapsed.

The Feb. 6 quake killed nearly 45,000 people in both countries — the vast majority of them in Turkey, where more than a million and a half people are in temporary shelters. Turkish authorities have recorded more than 6,000 aftershocks since.

HaberTurk journalists reporting from Hatay said they were jolted violently by Monday's quake and held onto to each other to avoid falling.

In the Turkish city of Adana, eyewitness Alejandro Malaver said people left homes for the streets, carrying blankets into their cars. Malaver said everyone is really scared and "no one wants to get back into their houses."

Mehmet Salhaoglullari, from a village near Samandag, said he was eating at a restaurant when the building began to shake.

"We all threw ourselves outside and we continued to shake outside," he said.

In the Syrian city of Idlib, frightened residents were preparing to sleep in parks and other public places, while fuel lines formed at gas stations as people attempted to get as far as possible from any buildings that might collapse.

The Syrian American Medical Society, which runs hospitals in northern Syria, said it had treated a number of patients — including a 7-year-old boy — who suffered heart attacks brought on by fear following the new quake.

President Recep Tayyip Erdogan visited Hatay earlier on Monday, and said his government would begin constructing close to 200,000 new homes in the quake-devastated region as early as next month.

Erdogan said the new buildings will be no taller than three or four stories, built on firmer ground and to higher standards and in consultation with "geophysics, geotechnical, geology and seismology professors" and other experts.

The Turkish leader said destroyed cultural monuments would be rebuilt in accordance with their "historic and cultural texture."

Erdogan said around 1.6 million people are currently being housed in temporary shelters.

The Turkish disaster management agency AFAD on Monday raised the number of confirmed fatalities from the Feb. 6 earthquake in Turkey to 41,156. That increased the overall death toll in both Turkey and Syria to 44,844.

Search and rescue operations for survivors have been called off in most of the quake zone, but AFAD chief Yunus Sezer said earlier that search teams were continuing their efforts in more than a dozen collapsed buildings — mostly in Hatay province.

There were no signs of anyone being alive under the rubble since three members of one family — a mother, father and 12-year-old boy — were extracted from a collapsed building in Hatay on Saturday. The boy later died.

Authorities said more than 110,000 buildings across 11 quake-hit Turkish provinces were either destroyed or so severely damaged by the Feb. 6 quake that they need to be torn down.

ETHAN HYMAN ehyman@newsobserver.com

N.C. Gov. Roy Cooper prepares to crank the warning siren to kick off the Carolina Hurricanes Fan Fest in downtown Raleigh on Friday. The festival was part of the festivities before the Carolina Hurricanes' Stadium Series outdoor game against the Washington Capitals on Saturday at Carter-Finley Stadium.

NC mobile sports betting bill expected to pass in 2023

BY DAWN BAUMGARTNER VAUGHAN
dvaughan@newsobserver.com

RALEIGH

Online sporting betting could become legal in North Carolina this year, with both the Democratic governor and a key Republican lawmaker optimistic on Friday ahead of a big weekend in North Carolina sports.

A new bill is expected to be filed this coming week in the General Assembly.

"You know, I think it's going to pass, from what I hear," Gov. Roy Cooper told reporters on Friday after cranking the siren kicking off the Carolina Hurricanes hockey team's downtown Fan Fest. The Canes play an outdoor NHL game against the Washington Capitals at Carter-Finley Stadium on Saturday. The N.C. State vs. UNC men's basketball game is on Sunday in Raleigh.

That doesn't mean Cooper will be placing bets.

"I would be a poor sports wagerer, because I would wager with my heart and not my mind," he said when asked how much he would bet on the Hurricanes game if it was legal.

People can bet on games at casinos in Western North Carolina, but it would take a change in the law for them to be allowed to wager elsewhere. That would include at lounges located at professional sports venues, and on their cell phones and other devices, The News & Observer reported.

Cooper said he thinks lawmakers are "trying to make sure that we get good legislation that is fair to the taxpayers, but also recognize this is something that's going on anyway."

"So we might as well get benefit for our schools and our state out of it. So we'll see how it goes," Cooper said.

A lead Republican sponsor of previous legislation confirmed Cooper's outlook to The News & Observer on Friday.

"I believe Gov. Cooper is right in his optimism about sports betting," said Rep. Jason Saine, a Lincolnton Republican.

SPORTS BETTING BILL NEXT WEEK

"Last session's process helped identify matters that needed to be worked on with the legislation, as well as giving members (time) to talk to their constituents about the possibility of legalized sports betting," Saine said.

The measure failed by one vote in the House last summer.

"This past week, the bipartisan group of legislators who are formulating the bill saw language of the coming bill and worked to tweak a few items," he said. "We fully expect to see the bill filed this week and begin filing and moving the legislation through the committee process."

Dawn Baumgartner Vaughan: 919-829-4877, @dawnbvaughan

CLT CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT

Public Information Meeting
for the Part 150 Study Update

The City of Charlotte invites you to attend a Public Meeting for the Charlotte Douglas International Airport (CLT) Part 150 Study Update.

Wednesday, March 22, 2023	**Thursday, March 23, 2023**
6 p.m. to 8 p.m.	6 p.m. to 8 p.m.
at	at
Harris Conference Center at Central Piedmont Community College	**Aloft Charlotte Airport**
3216 CPCC Harris Campus Dr. Charlotte, NC 28208	3928 Memorial Pkwy. Charlotte, NC 28217

The same information will be presented at both meetings. No formal presentations are planned – stop in anytime. If special accommodations are required for an individual's participation, please call **407-440-1060** by Tuesday, March 7, 2023.

CLT CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT

For more information about the Part 150 Study Update, visit the project website: **cltpart150.com**

***The Charlotte Observer*–published on February 21, 2023**

La Noticia™

The Spanish-Language Newspaper

AFFIDAVIT

I, Alvaro J. Gurdian (Name), in my capacity as Sales Executive (Title) of the newspaper

La Noticia (Newspaper Name) in Charlotte (City), NC (State)

hereby certify that the ☒ ROP/☐ Preprinted Inserts (choose one) for (Advertiser)

Sharp & Company

it was published in the above newspaper on 03/01/23 (Run Date)

Signature of Person Making Affidavit

Subscribed and sworn to before me in the County of Mecklenburg (County) in the State of

NC (State), on this 7 (Date) day of March (Month), 2023 (Year).

Notary Public Seal:

Maria E. Benton
NOTARY PUBLIC
Union County, NC
My Commission Expires February 22, 2027

Maria E. Benton
Notary Public Signature

February 22, 2027
Commission Expires

Advertising Affidavit

Customer N° SHAR15

QUE PASA
LATINO COMMUNICATIOS, INC.
PO. BOX 12876
WINSTON SALEM, NC 27117

Date: 03/01/2023

Sharp & Company
1301 Highland Drive.
Silver Spring,MD 20910

QUE PASA
LATINO COMMUNICATIOS, INC.
PO. BOX 12876
WINSTON SALEM, NC 27117

Before the undersigned, a Notary Public of Forsyth County, North Carolina, duly commissioned, qualified, and authorized to make this affidavit and sworn statement, that the notice or other legal advertisement, a copy of which is attached hereto, was published in the QUE PASA Newspaper on the following dates: 02/28/2023 to 03/06/2023

And that the said newspaper in which such notice, or legal advertisement was published, was a newspaper meeting all the requirements and qualifications of Section 1-597 of the General Statues of North Carolina

Publication Fee $ 250.00

Invoice No N217649

Elva Hernandez — Billing Department | 03/01/2023 — Date

Newspaper Reference:

Sworn to and subscribed before me, this 1 day of March / 2023

M. Teresita Ysasi-Diaz
Notary Public

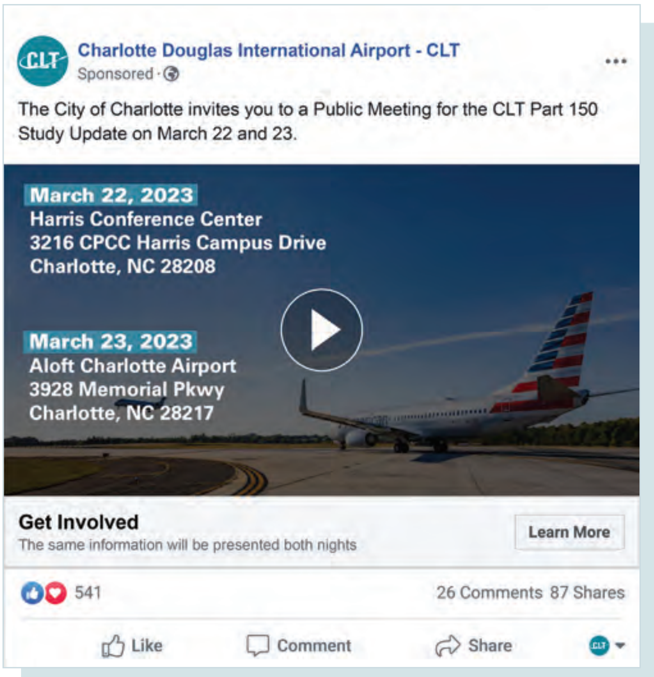
My Commission expires:

M. TERESITA YSASI-DIAZ
Notary Public, North Carolina
Forsyth County
My Commission Expires
December 21, 2027

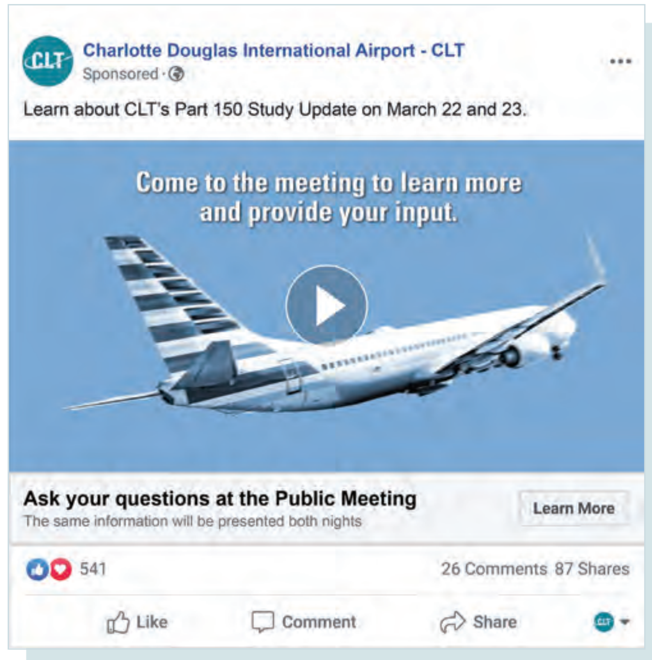
THIS IS NOT A BILL, PLEASE PAY FROM INVOICE, THANK YOU

Social Media Campaign

Two video ads were placed on Facebook and Instagram, running from March 8th to March 23rd, 2023. Targeting included residents within and in a 5-mile radius around the following zip codes: 28214, 28278, 28273, and 28216.



CLT Public Meeting Ad 1



CLT Public Meeting Ad 2

BY THE NUMBERS TABLE

DATE	POST	IMPRESSIONS	REACH	RESULTS (LINK CLICKS)	CTR
3/8	CLT Public Meeting Ad 1	106,789	40,760	1,443	1.35%
3/8	CLT Public Meeting Ad 2	8,013	4,982	153	1.91%
	TOTAL	**114,802**	**43,032**	**1,596**	**AVG: 1.39%**

Impressions: The number of times the ad appeared in someone's feed
Reach: The number of potential unique viewers of the ad
Link Clicks: The number of times the link was clicked within the ad
CTR: The percentage of clicks there were out of the total number of impressions *(Click-through rate)*

Comments

Comments were accepted from the public at both meetings, as well as through email at **CLTPart150@landrumbrown.com**, and through U.S. postal mail to **Gaby Elizondo**, *Landrum & Brown, 4445 Lake Forest Drive, Suite 700, Cincinnati, OH 45242*. In total, 20 comments were received from the public.

COMMENT	NAME	DATE	SOURCE
Thank you all for doing this! I would love to see additional noise measurement (in addition to the 5-7 days in Oct 2022) as the noise levels fluctuate so much day to day, week to week, month to month. We would also like to see consideration for a wider scope of areas as the noise level effects not only ascends + descends but when the planes turn (seemingly right over our backyard). Lastly, would love better follow up + solution ideation with those who submit noise complaints. They seem to go nowhere. Even short term suggestions about how to better sound proof your hoe would be appreciated. Thank you again! This is important work :)	**Jennifer Laubmeier**	**3/22/23**	**Comment Form**
Receive notifications throughout the Part 150 Study Update process	**Joshua Patton**	**3/22/23**	**Email**
I am requesting to receive notifications throughout the Part 150 Study.	**Jan Robbins**	**3/22/23**	**Email**
Subscribing for updates, thanks.	**Don Webber**	**3/22/23**	**Email**

continue

COMMENT	NAME	DATE	SOURCE
Please send all update	Rashmi Naladkar	3/23/23	Email
Hi, My name is Sandeep and I am a resident of city park Charlotte. We have been hearing lot of flights noise lately, especially those sounds getting imcreased since few days and it's causing lot of disturbance. Could you please help the residents of city park by resolving this issue.	Sandeep Maryala	3/23/23	Email
Hi, Amulya is my name, and I live in Charlotte's Meritage City Park Area. We have been hearing a lot of airplane noise, particularly those that have been getting worse recent and are upsetting us greatly. Because of this, we are having sleepless nights as noise is too loud. Please resolve this problem so the Residents of City Park can benefit. Thanks, Amulya	Manchana Amulya	3/23/23	Email
Hi, My name is Sandeep and I am a resident of city park Charlotte. My home address: 605 Millennium Ave, Charlotte, NC, 28217. We have been hearing lot of flights noise lately, especially those sounds getting increased since few days and it's causing lots of disturbance. Our sleep is getting impacted as its even louder during nights and causing sleepless nights. Our health is also started impacting due to this. Could you please help the residents of city park by resolving this issue. Thanks, Sandeep	Sandeep Maryala	3/23/23	Email
Subscription for the updates. Flights noise is unbearable, i live in city park meritage homes. Its causing health issues and sleep less nights.	Sandeep	3/24/23	Email
I would like to receive notifications. Best, Kenley	Kenley Farmer	3/24/23	Email
Hi, I am a resident of city park Charlotte staying in Meritage homes. We have been hearing lot of flights noise, especially those sounds are getting bigger and bigger since few days and it's causing lot of disturbance. In addition to it, this is making us have sleepless nights thus impacting health. Could you please help the residents of city park by resolving this issue. Thanks in advance. Regards, Sandeep Maryala	Sandeep Maryala	3/26/23	Email

continue

COMMENT	NAME	DATE	SOURCE
Hi, I am a resident of city park Charlotte. We have been hearing lot of flights noise and that noise is getting worse since few days. this is a serious problem, we are having sleepless nights and our daytime work and health impacting too with this. Please help us with this.	**Amulya**	**3/26/23**	**Email**
Subscribe to Part 150 Study updates	**Richard Marby**	**3/29/23**	**Email**
Would like to receive notifications of the Part 150 study. I'm on a 10.1 mile final for Runway 36L, which wasn't there when I build my house in 2007. I'm a pilot. Although I love flying I really like quiet when I'm home. I get woke up at 0505 am when on a northbound operation. As 36L isn't open yet, it has to be a base leg for planes landing on 36C. Thanks so much!	**Diane Powell**	**3/30/23**	**Email**
Would like to receive Part 150 Study Update process.	**Emilie Davis**	**4/17/23**	**Email**
I live close to the airport and would like to receive notifications of the Part 150 study.	**Angela Riggins**	**4/20/23**	**Email**
Requested to receive future notifications	**Andrew Gale**	**4/20/23**	**Email**
Request to receive notifications throughout the Part 150 Study Update process.	**Scott Orloff**	**4/21/23**	**Email**
Sorry, a few more questions on the "Reduces Impacts in 65 DNL", does it make sense that this step requires an actual "reduction" rather than simply not increasing impacts in the 65 DNL? By framing the requirement as "reduction" it would pretty much rule out any measure that is targeted to address noise impacts outside the 65 DNL. Relating to the baseline for this criterion, I believe you confirmed that the baseline should reflect the use of Runway 1/19 as a departures runway. If this is the case, and if an "reduction" in 65 DNL is required, how can proposal NA-J possibly meet this requirement if American is proposing to shift arrivals back to 18C/36C? It will clearly bubble out the 65DNL boundary from north and south of 1/19 back to where it is now north and south of 18C/36C, failing this step. Thanks. Regarding the process as laid out in attached flow diagram from the Part 150 Overview Presentation I had the following questions: 	**Jacob Pollack**	**4/23/23**	**Email**

continue

COMMENT	NAME	DATE	SOURCE
(1) Could you help me to understand how the safety / feasibility criterion is applied. Is this based on objective factors like "65 DNL" or is this based on subjective feedback from the relevant agencies. For example, can FAA and ATC simply look at a proposal and say "we think that makes things less safe" and that's the end of the process? How is "safety" determined? What is to stop an agency from claiming "safety" when any safety concern is truly minimal but the agency just doesn't want to implement the change because it will require more work or delays? (2) Regarding the 65 DNL, could you let me know what data makes up the 65 DNL baseline that will be used? What flight data will be included in this? (3) Regarding "Operational Impacts" and "Implementation Considerations" I have similar questions as #1, that this basically allows an insider stakeholder to say "I don't like that" and that's the end of the process for that proposal. What actual standard is applied to determine if there is a substantive operational or implementation impact? Is there some sort of "de minimus" standard that prevents airlines or the airport from rejecting a proposal just because it raises the cost per passenger of the airport by a penny, or the cost of a $5 billion runway project by $1,000,000 (a de minimus figure truly based on the overall cost) or may increase average gate-to-gate times by 15 seconds? I am quite concerned that these proposals basically give these stakeholders veto powers, while leaving the ACR or affected without similar powers, relying on the unprotective 65 DNL standard. (4) On the Move to Recommend step, exactly how would a measure that snakes its way through this process be stopped? For example, if any of alternatives NA-H, I and J make it to the end because the 65 DNL standard is not impacted and because stakeholders with veto powers at the other steps don't care about noise outside of the 65 DNL boundary, then what stops them from them being automatically implemented?	**Jacob Pollack**	**4/23/23** *(Continued from previous page)*	**Email**

continue

COMMENT	NAME	DATE	SOURCE
(5) Please explain to me the role that political organs like the Charlotte City Council and play in reviewing and approving Part 150 alternatives/recommendations? as #1, that this basically allows an insider stakeholder to say "I don't like that" and that's the end of the process for that proposal. What actual standard is applied to determine if there is a substantive operational or implementation impact? Is there some sort of "de minimus" standard that prevents airlines or the airport from rejecting a proposal just because it raises the cost per passenger of the airport by a penny, or the cost of a $5 billion runway project by $1,000,000 (a de minimus figure truly based on the overall cost) or may increase average gate-to-gate times by 15 seconds? I am quite concerned that these proposals basically give these stakeholders veto powers, while leaving the ACR or affected without similar powers, relying on the unprotective 65 DNL standard. (6) On the Move to Recommend step, exactly how would a measure that snakes its way through this process be stopped? For example, if any of alternatives NA-H, I and J make it to the end because the 65 DNL standard is not impacted and because stakeholders with veto powers at the other steps don't care about noise outside of the 65 DNL boundary, then what stops them from them being automatically implemented? (7) Please explain to me the role that political organs like the Charlotte City Council and play in reviewing and approving Part 150 alternatives/recommendations?	**Jacob Pollack**	**4/23/23** *(Continued from previous page)*	**Email**
Hello, to the extent these proposals are not included on the ACR proposal list, I would like to propose the following for inclusion as Part 150 alternatives for the Part 150 analysis now being conducted for Charlotte Douglas Airport (1) Raise the minimum altitudes for all initial approach fix points for Runways 1, 36C and 36L which are more than 9 nm from the end of the runways by the maximum amounts that can be implemented safely to cause planes to descend at quicker rates into the first IAFs within 9 nm to cause pilots to decrease throttle and associated noise. If it would improve proposal safety and/or diminish operational and implementation issues, expand this proposal to include, as appropriate, Runways 36R, 19, 18R, 18C and/or 18L. (2) Reorder assigned altitudes on airport "downlegs" so that the runway with the most arrivals has the highest assigned altitude, the runway with the second most arrivals the second highest assigned altitude, the runway with the third most arrivals the third highest assigned altitude and the runway with the least arrivals the lowest assigned altitude. The purpose is to raise average flight altitude on the downlegs for noise mitigation and to increase rates of descent through the base legs and initial portions of the final approaches to cause pilots to reduce throttle and associated noise. Thanks. Jacob Pollack 704-517-2317 195 Melbourne Drive Fort Mill, SC 29708 jacobpollack@pollackfamily.us	**Jacob Pollack**	**4/24/23**	**Email**

CLT
CHARLOTTE DOUGLAS®
INTERNATIONAL AIRPORT

APPENDIX A

Charlotte Douglas International Airport

Part 150 Study Update

Public Meeting #1 Summary Report

March 22 & 23, 2023

Meeting Materials

FACTSHEETS **1**

- *English Handout (Front)* 1
- *English Handout (Back)* 2
- *Spanish Handout (Front)* 3
- *Spanish Handout (Back)* 4

MEETING BOARDS **5**

- *Introduction* 5
- *What is a Part 150 Study?* 6
- *Airfield Improvements-Perviously Approved* 7
- *Part 150 Process* 8
- *History of Noise Compatiblity Planning at CLT* 9
- *History of Noise Compatibility Planning Currently Approved Noise Abatement Measures* 10
- *History of Noise Compatibility Planning Currently Approved Land Use Control Measures* 11
- *Airport Noise Disclosure Overlay District* 12
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- *Land Use Noise Sensitivity Matrix* 14
- *How Noise Contours are Generated* 15
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- *Aircraft Noise Footprints* 17
- *Noise Monitoring Program* 18
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Charlotte Douglas International Airport
PART 150 STUDY UPDATE

What is a Part 150 Noise Compatibility Study?

The City of Charlotte is currently updating the Part 150 Noise Compatibility Study for the Charlotte Douglas International Airport (CLT). The study gets its name from Part 150 of the Code of Federal Regulations, which provides guidance for airports preparing a Noise Compatibility Study. Airports prepare Part 150 Studies in accordance with Federal Aviation Administration (FAA) guidance. The Part 150 Study process uses a balanced approach to identify noise incompatibilities surrounding an airport, and to recommend measures to both correct existing incompatibilities and to prevent future incompatibilities.

Part 150 Studies are planning studies.

- They identify noise and land use impacts in accordance with FAA guidance
- They work to develop solutions within the FAA's framework
- The City Council ultimately recommends measures and the FAA approves measures

Part 150 Studies can open funding sources.

- Grants may be available to implement recommendations
- Funding is not guaranteed

Part 150 Studies do not:

- Recommend closing an airport
- Recommend implementing mandatory restrictions

Part 150 Study Primary Elements:

NOISE EXPOSURE MAPS (NEM)	NOISE COMPATIBILITY PROGRAMS (NCP)	PUBLIC INVOLVEMENT
• Description of the noise levels for existing and future (+5 years) conditions • Existing conditions (last 12 months of activity) • Future conditions (2028) (considers physical and operational changes)	• Recommendations for reducing, minimizing, and/or mitigating aircraft noise and land use conflicts • May reflect short-term (before 2028) and long-term (after 2028)	• Project website and social media • Meeting notices, study process, and draft findings • Comment collection

Previous and Ongoing Noise Compatibility Planning at CLT

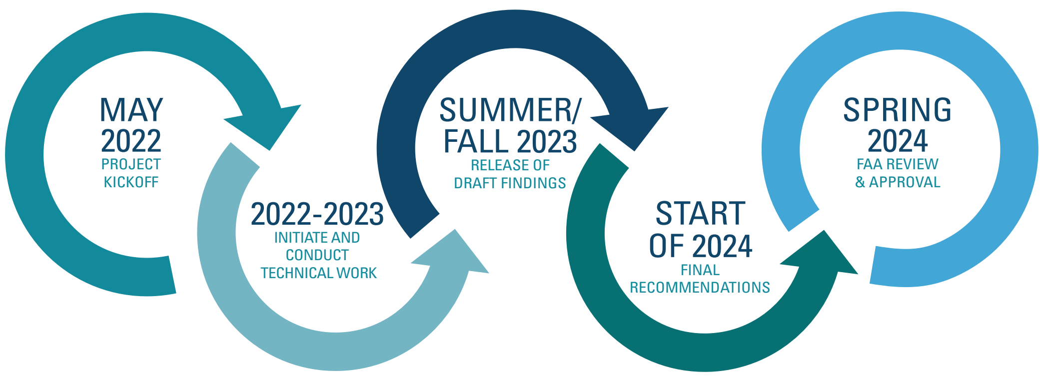
There is a long history of noise compatibility planning at CLT. The Airport began to implement its first federally-approved Federal Aviation Regulation (FAR) Part 150 NCP in 1987. The program was designed to use various methods to mitigate noise impact. The study was updated in 1996 and updated NEMs were developed in 2015. Since the NCP's inception, the Airport has spent more than $120 million in local community projects directly related to reducing or mitigating airport noise issues through a Residential Sound Insulation Program and Residential Acquisition Program.

Progress to Date

Since this Part 150 Study Update began in the Summer 2022, the study has concentrated on data collection and the development of preliminary noise contours for the existing conditions and the five-year future condition. The Part 150 Study Update will re-evaluate noise with respect to the decommissioning of runway 5/23 that took place in 2022 and the implementation of multiple previously-approved airfield and terminal improvement projects, including the construction of a new runway, to be operational by 2028. The following lists the major tasks completed for the Part 150 Study Update to date:

- Held kickoff with Technical Advisory Committee
- Compiled and evaluated radar flight track and noise monitoring data
- Conducted field noise measurements (week of October 4, 2022)
- Prepared preliminary existing and future baseline noise contours

Anticipated Schedule & Next Steps



What are the Opportunities for Providing Input?

Members of the public may comment at the meeting by completing and submitting a comment form. Please submit your comments by **April 24, 2023** using one of these methods:

Email:
CLTpart150@landrumbrown.com

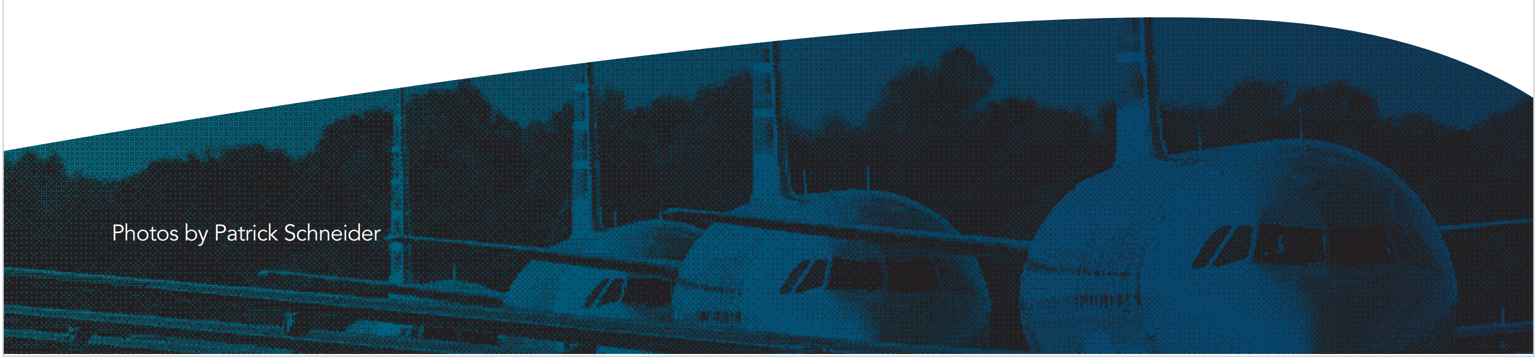
Mail:
Gaby Elizondo
4445 Lake Forest Dr,
Suite 700
Cincinnati, OH 45242
(Postmarked by April 24, 2023)

Online:
Visit the project website and submit a comment on the "Contact" page: **CLTPart150.com**

The public will have additional opportunities to provide input and comments throughout the Part 150 process.

For additional information regarding the EA, please visit: CLTpart150.com

The website will be updated throughout the Part 150 process with project updates, meeting information, status reports and schedules, and other information.



Photos by Patrick Schneider

¿Qué es un Estudio de Compatibilidad de Ruido Parte 150?

La Ciudad de Charlotte se encuentra actualizando el Estudio de Compatibilidad de Ruido Parte 150 para el Aeropuerto Internacional de Charlotte Douglas (CLT). El estudio recibe su nombre de la Parte 150 del Código de Regulaciones Federales, que brinda orientación para los aeropuertos que eligen preparar un Estudio de Compatibilidad de Ruido. Los aeropuertos preparan los estudios de la Parte 150 de acuerdo con la guía de la Administración Federal de Aviación (FAA por sus siglas en inglés). El proceso de estudio de la Parte 150 utiliza un enfoque equilibrado para identificar las incompatibilidades de ruido que rodean a un aeropuerto y para recomendar medidas, tanto para corregir las incompatibilidades existentes, como para prevenir futuras incompatibilidades.

Los estudios Parte 150 son estudios de planeación:

- Identifican los impactos del ruido y el uso de la tierra de acuerdo con la guía de la FAA
- Trabajan para desarrollar soluciones dentro de los lineamientos de la FAA
- La municipalidad finalmente recomienda las medidas, la FAA las aprueba

Los estudios Parte 150 pueden abrir fuentes de financiamiento:

- Pueden ser elegibles para subsidios adicionales con el fin de implementar recomendaciones
- El financiamiento no está garantizado

Los estudios Parte 150 no:

- Recomiendan cerrar un aeropuerto
- Recomiendan la implementación de restricciones obligatorias

Elementos principales del Estudio Parte 150:

MAPAS DE EXPOSICIÓN DE RUIDO (NEM POR SUS SIGLAS EN INGLÉS)

- Descripción de los niveles de ruido para las condiciones existentes y futuras (+5 años)
- Condiciones existentes (últimos 12 meses de actividad)
- Condiciones futuras (2028) (considera cambios físicos y operativos)

PROGRAMAS DE COMPATIBILIDAD DE RUIDO (NCP POR SUS SIGLAS EN INGLÉS)

- Recomendaciones para reducir, minimizar y/o mitigar el ruido de las aeronaves y los conflictos por el uso del suelo
- Podrían reflejarse a corto plazo (antes de 2028) y a largo plazo (después de 2028)

PARTICIPACIÓN PÚBLICA

- Sitio web del proyecto y redes sociales
- Avisos de reuniones, proceso de estudio y borradores de conclusiones
- Recolección de comentarios

Planeación de compatibilidad de ruido previo y en curso en el CLT

Hay una larga historia de planificación de compatibilidad de ruido en el CLT. El aeropuerto comenzó a implementar su primer Reglamento Federal de Aviación (FAR por sus siglas en inglés) Parte 150 NCP aprobado por el gobierno federal en 1987. El programa fue diseñado para utilizar varios métodos para mitigar el impacto del ruido. El estudio se actualizó en 1996 y se desarrollaron NEMS actualizados en 2015. Desde el inicio del NCP, el aeropuerto ha gastado más de $120 millones en proyectos en la comunidad local, directamente relacionados con la reducción o mitigación de los problemas de ruido del aeropuerto a través de un Programa de Aislamiento Acústico Residencial y un Programa de Adquisición de Residencias.

Progreso hasta la fecha

Desde que comenzó esta actualización del Estudio Parte 150 en el verano de 2022, el estudio se ha concentrado en la recopilación de datos y el desarrollo de contornos de ruido preliminares para las condiciones existentes y las condiciones futuras a cinco años. La actualización del Estudio Parte 150 volverá a evaluar el ruido con respecto al desmantelamiento de la pista 5/23 que tuvo lugar en 2022, y la implementación de múltiples proyectos de mejora de terminales y aeródromos previamente aprobados, incluyendo la construcción de una nueva pista, para que esté operativa en el 2028. A continuación, se enumeran las principales tareas completadas para la actualización del Estudio Parte 150 hasta la fecha:

- Se realizó una reunión de lanzamiento con el Comité Técnico Asesor
- Se recopiló y evaluó la data de rastreo de vuelos por radar y monitoreo de ruido
- Se realizaron medidas de ruido de campo (semana del 4 de octubre de 2022)
- Se prepararon contornos preliminares de ruido de referencia existentes y futuros

Calendario previsto y próximos pasos

¿Cuáles son las oportunidades para proporcionar información?

El público puede comentar en la reunión, completando y enviando un formulario de comentarios. Por favor, envía tus comentarios hasta el **24 de abril de 2023** utilizando uno de estos métodos:

Email:
CLTpart150@landrumbrown.com

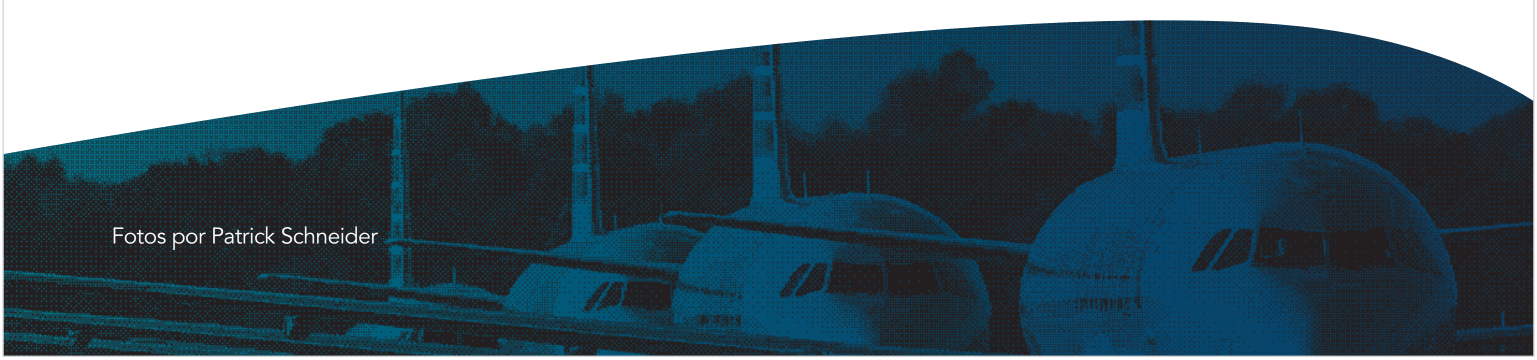
Correo:
Gaby Elizondo
4445 Lake Forest Dr, Suite 700
Cincinnati, OH 45242
(Con timbre postal hasta el 24 de abril de 2023)

Online:
Visita el sitio web del proyecto y envía un comentario en la página "Contacto": **CLTPart150.com**

El público tendrá oportunidades adicionales para brindar aportes y comentarios a lo largo del proceso de la Parte 150.

Para obtener información adicional sobre el EA, visita CLTpart150.com

El sitio web se actualizará a lo largo del proceso Parte 150 con actualizaciones del proyecto, información de la reunión, informes de estado, calendarios y otra información.



Fotos por Patrick Schneider

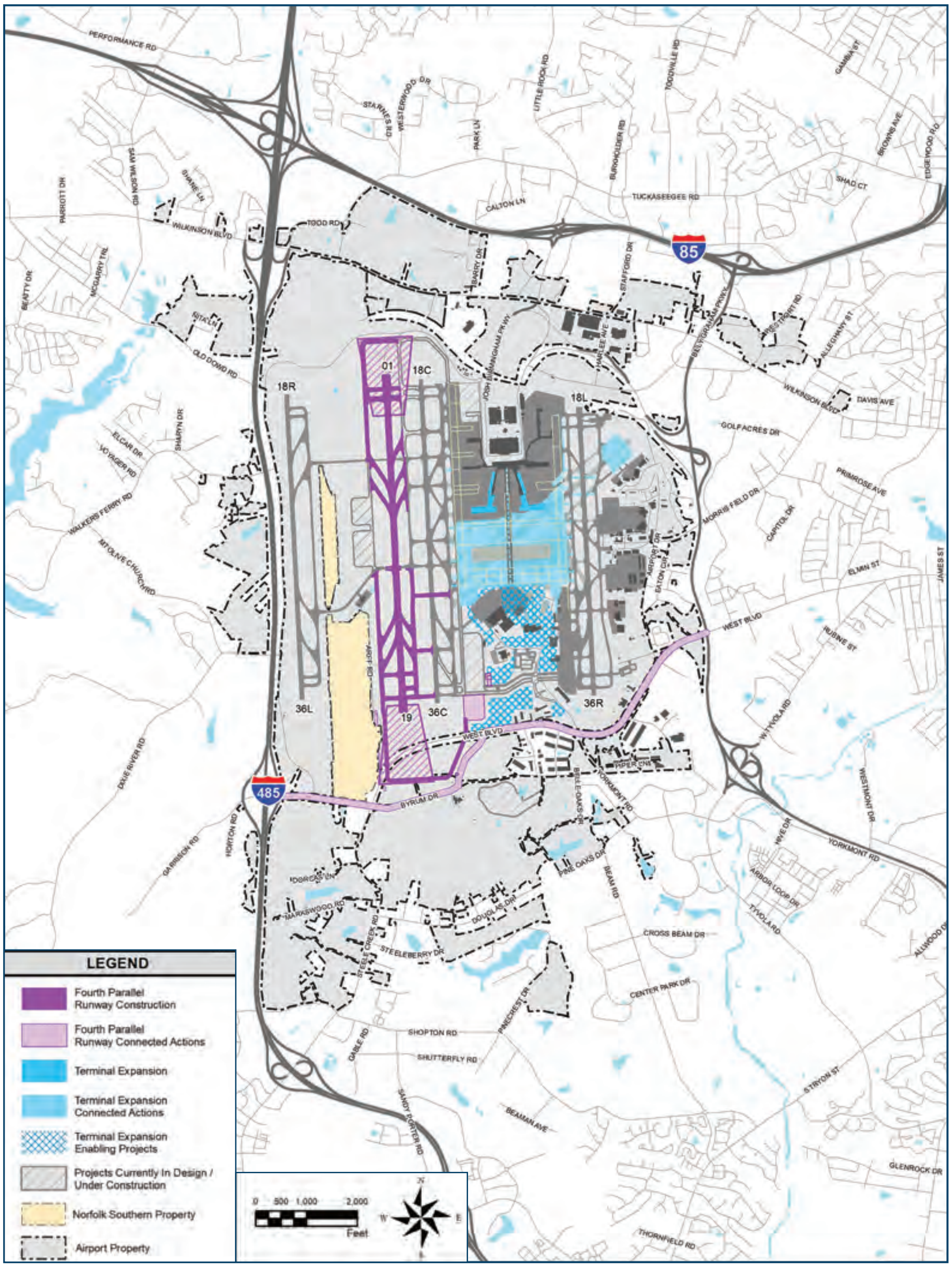
Welcome to the

Public Information Meeting

What is a Part 150 Study?

- **Code of Federal Regulations (14 CFR) Part 150**
  - » Part 150 is the common name for the process outlined in 14 CFR Part 150
  - » The purpose of a Part 150 study is to identify where land uses are not compatible with aircraft noise and to recommend solutions
  - » Airports prepare Part 150 studies in accordance with Federal Aviation Administration (FAA) guidance
- **Part 150 Studies are Planning Studies**
  - » Identify noise and land use impacts in accordance with FAA guidance
  - » Work to develop solutions within the FAA's framework
  - » City Council ultimately recommends measures, FAA approves measures
- **Part 150 Studies *can* open funding sources**
  - » May be eligible for grants to implement recommendations
  - » Funding is not guaranteed
- **Part 150 Studies do *not*:**
  - » Recommend closing an airport
  - » Recommend implementing mandatory restrictions
- **Purpose for conducting this Part 150 Study**
  - » Re-evaluate noise with respect to the decommissioning of Runway 5/23 and implementation of multiple previously-approved airfield and terminal improvement projects to be constructed and operational by 2028
  - » Develop a balanced and cost-effective plan for reducing noise impacts from the updated airfield and to limit additional impacts in the future where possible

Airfield Improvements – Previously Approved



PLANNED CONSTRUCTION TIMELINE

2022 EARLY

FAA Issued Finding of No Significant Impact/Record of Decision

2022 MID

Initiate Design

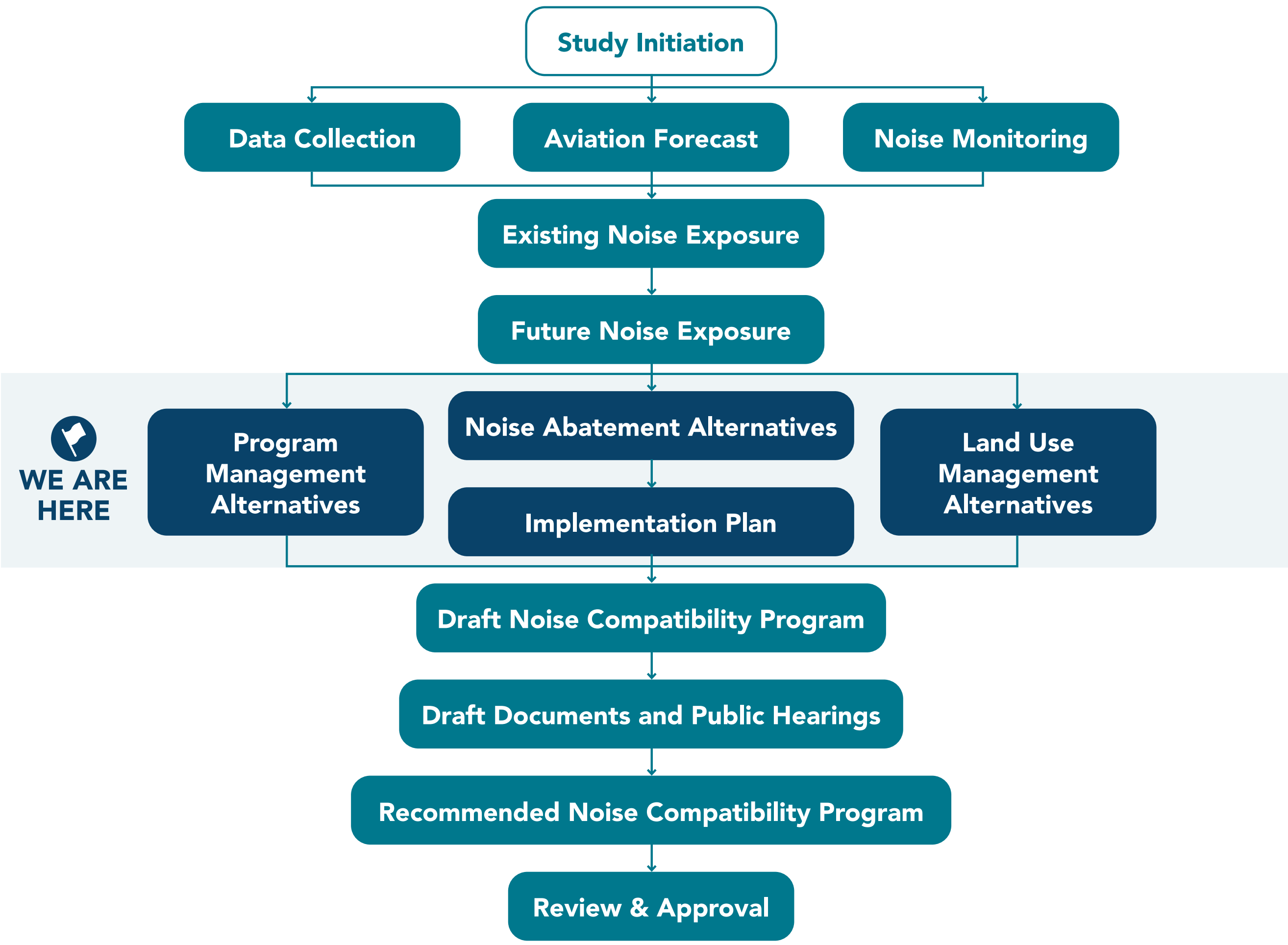
2023 to 2028

Construction

2028

Project Completion

Part 150 Process



Part 150 Study – Primary Elements:

Noise Exposure Maps

- Description of the noise levels for existing and future (+5 years) conditions

Noise Compatibility Programs

- Recommendations for reducing, minimizing, and/or mitigating aircraft noise and land use conflicts
- May reflect short-term and long-term

Public Involvement

- Project website and social media
- Meeting notices, study process, and draft findings
- Comment collection

History of Noise Compatibility Planning at CLT

1987
Part 150 Noise Compatibility Study

1996
Part 150 Study Update

- Prepared NEMs for 1996 and 2001 conditions
- 2001 NEM included construction of the third parallel runway

2015
Noise Exposure Map (NEM) Update

- Prepared NEMs for 2015 and 2020 conditions

CLT has invested more than $120 million in local community projects directly related to reducing or mitigating airport noise issues through a **Residential Sound Insulation Program** and **Residential Acquisition Program**. To date, nearly 1,000 homes, six churches and three schools have been insulated. Additionally, almost 400 properties in high noise zones, including mobile home parks, have been purchased by the Airport.

History of Noise Compatibility Planning

CURRENTLY APPROVED NOISE ABATEMENT MEASURES

Measure ID	DESCRIPTION	STATUS
NA-1	Continue periodic monitoring procedures, initiated as a result of the 1990 Part 150 Noise Compatibility Program (NCP), within the Airport Environs. (Continuation of implemented Measure NA-1 of adopted 1990 NCP.) (Phase I) Approved in 1996	Inactive
NA-4	Provide monthly reports on late night (11:00 p.m. to 7:00 a.m.) runway utilization and variances from NCP assumptions to Air Traffic Control Tower management and frequent nighttime operators. Conduct follow-up with FAA and carriers to enhance voluntary adherence to existing program. (Phase I) Approved in 1996	Active
NA-5	Designate Runway 18C or 18L as preferred for takeoffs by turbojet and large four-engine prop aircraft between 11:00 p.m. and 7:00 a.m. when, under the current preferential runway use program, Runway 23 or Runway 5 cannot be used for reasons of wind, weather, operational necessity, or required runway length. (Phase I) Approved in 1996	Active
NA-6	Reaffirm Airport user policy which designates locations and procedures for aircraft engine runups. Establish a runup position on the USAir ramp parallel to Runway 5/23. (Phase I) Approved in 1996	Active
NA-7	Departing Runways 36R and 36C, turbojet and large four-engine prop aircraft initiate turns at the 2.6 and 2.5 DME north of the CLT VOR/DME, respectively. (Phase I) Approved in 1996	Active
NA-8	After construction of Runway 18R/36L, 3,700 feet west of Runway 18C/36C, establish an initial departure turn for Runway 18R, to be made as soon as practicable by turbojets and large four-engine prop aircraft, to a heading of 195 degrees. (Phase II) Approved in 1996	Active
NA-9	After commissioning of a third parallel runway west of Runway 18C/36C, establish an initial departure turn, as soon as practicable, by turbojets and large four-engine prop aircraft to a heading of 315 degrees from Runway 36L. (Phase II) Approved in 1996	Active

*Measures that are not active and have been revoked are not included.

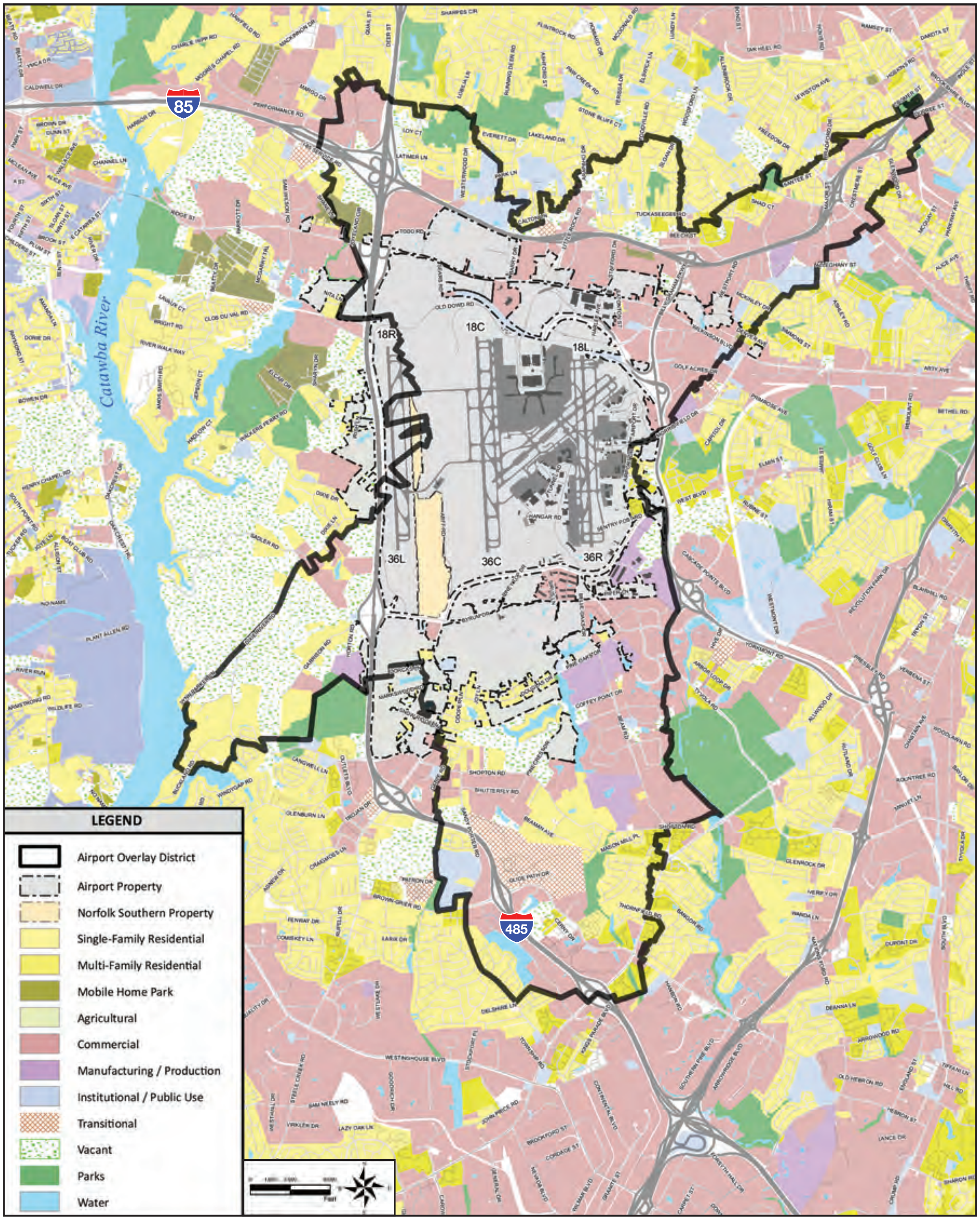
History of Noise Compatibility Planning

CURRENTLY APPROVED LAND USE CONTROL MEASURES

Measure ID	DESCRIPTION	STATUS
LU-1	Promote compatible land use planning within the 65 DNL of the combined 1996 NEM contours and 1996 NCP contours. (Phase I) Approved in 1996	Active
LU-2	Pursue zoning for compatible development. (Phase I) Approved in 1996	Active
LU-4	Require the dedication of an avigation easement as a condition to approval of development of property located in the Airport Environs. (Phase I) Approved in 1996	Active
LU-7	Pursue the establishment of an Airport Overlay District that corresponds to the Airport Environs. (Phase I) Approved in 1996	Active
LU-8	Pursue amending the state building code to authorize the City of Charlotte and Mecklenburg County to raise the minimum building standards (Noise Level Reduction requirements) by incorporating noise attenuation requirements for new residential construction within an Airport Overlay District. (Phase I) Approved in 1996	Active
LU-9	Develop a purchaser disclosure notice and pursue method of enforcement. (Phase I) Approved in 1996	Active

*Measures that are not active and have been revoked are not included.

Airport Noise Disclosure Overlay District



History of Noise Compatibility Planning

CURRENTLY APPROVED LAND USE MITIGATION MEASURES

Measure ID	Description	Status
NM-1	Establish a public information program which distributes noise and noise abatement information to the public. (Phase I) Approved in 1996	Active
NM-2	Sound insulate noise-sensitive public building intended for public use, instruction (e.g., schools) or assembly (e.g., churches) located within the 65 DNL noise contour of the combined 1996 NCP/NEM contours, whichever is greater. (Phase I) Approved in 1996 and again in 1998 to add churches	Active
NM-3	Sound insulate eligible houses located within the 65 DNL noise contour of the 1996 NCP/NEM contours, whichever is greater, which may be benefited under the FAA design criteria. (Phase I)	Active
NM-4	Reduce existing noise-sensitive uses within 70-75 DNL zone of the 1994 NEM via purchase assurance, sound insulate residences to NLR standards, purchase avigation easements, or acquisition of developed incompatible property. (Phase I) Approved in 1996	Completed
NM-5	Acquire property within the 75 DNL of the 1994 NEM contours. Listed for numeric continuity.	Completed
NM-6	Acquire mobile homes located within the 70 DNL noise contour of the 1996 NCP and 1996 NEM, whichever is greater. (Phase I) Approved in 1996	Active
NM-7	At the Airport's option, purchase avigation easements, sound insulate, or acquire houses within the combined 65 DNL of the 1996 NEM/NCP contour, whichever is greater, where sound insulation is infeasible or not cost-effective because the property does not comply with the Building Code. (Phase I) Approved in 1996	Active
NM-8	Sound insulate eligible houses located within the 65 DNL noise contour of the 2001 NCP, if any remain to be treated. (Phase II) Approved in 1996	Active
NM-9	Acquire mobile homes located within the 65 DNL noise contour of the 2001 NCP. (Phase II) Approved in 1996	Active

Land Use Noise Sensitivity Matrix

Per Part 150:

Compatible | Compatible with Sound Insulation | Incompatible

OUTDOOR NOISE LEVEL

Land Use		< 65 DNL	65-75 DNL	75+ DNL
Residential	1-2 Family	Compatible	Compatible with Sound Insulation	Incompatible
	Multi-Family	Compatible	Compatible with Sound Insulation	Incompatible
	Mobile Homes	Compatible	Incompatible	Incompatible
	Dorms, etc.	Compatible	Compatible with Sound Insulation	Incompatible
Institutional	Schools	Compatible	Compatible with Sound Insulation	Incompatible
	Places of Worship	Compatible	Compatible with Sound Insulation	Incompatible
	Hospitals	Compatible	Compatible with Sound Insulation	Incompatible
	Nursing Homes	Compatible	Compatible with Sound Insulation	Incompatible
	Libraries	Compatible	Compatible with Sound Insulation	Incompatible
Recreational	Sports/Play	Compatible	Compatible	Incompatible
	Amphitheaters, Music Shells	Compatible	Incompatible	Incompatible
	Camping	Compatible	Compatible	Incompatible
Commercial*	All Uses	Compatible	Compatible	Compatible
Industrial*	All Uses	Compatible	Compatible	Compatible
Agricultural	All Uses	Compatible	Compatible	Compatible

*Appropriate noise level reduction must be incorporated into the design of areas where the public is received, office areas, and other noise-sensitive areas.

How Noise Contours are Generated

AVIATION ENVIRONMENTAL DESIGN TOOL (AEDT)

Data Sources

- Airport Layout Plan
- Radar Data
- Air Traffic Control Tower Counts
- Forecasted Operations

+

Input Data

- Runway Layout
- Operating Levels
- Fleet Mix
- Runway Use
- Flight Tracks
- Flight Profiles

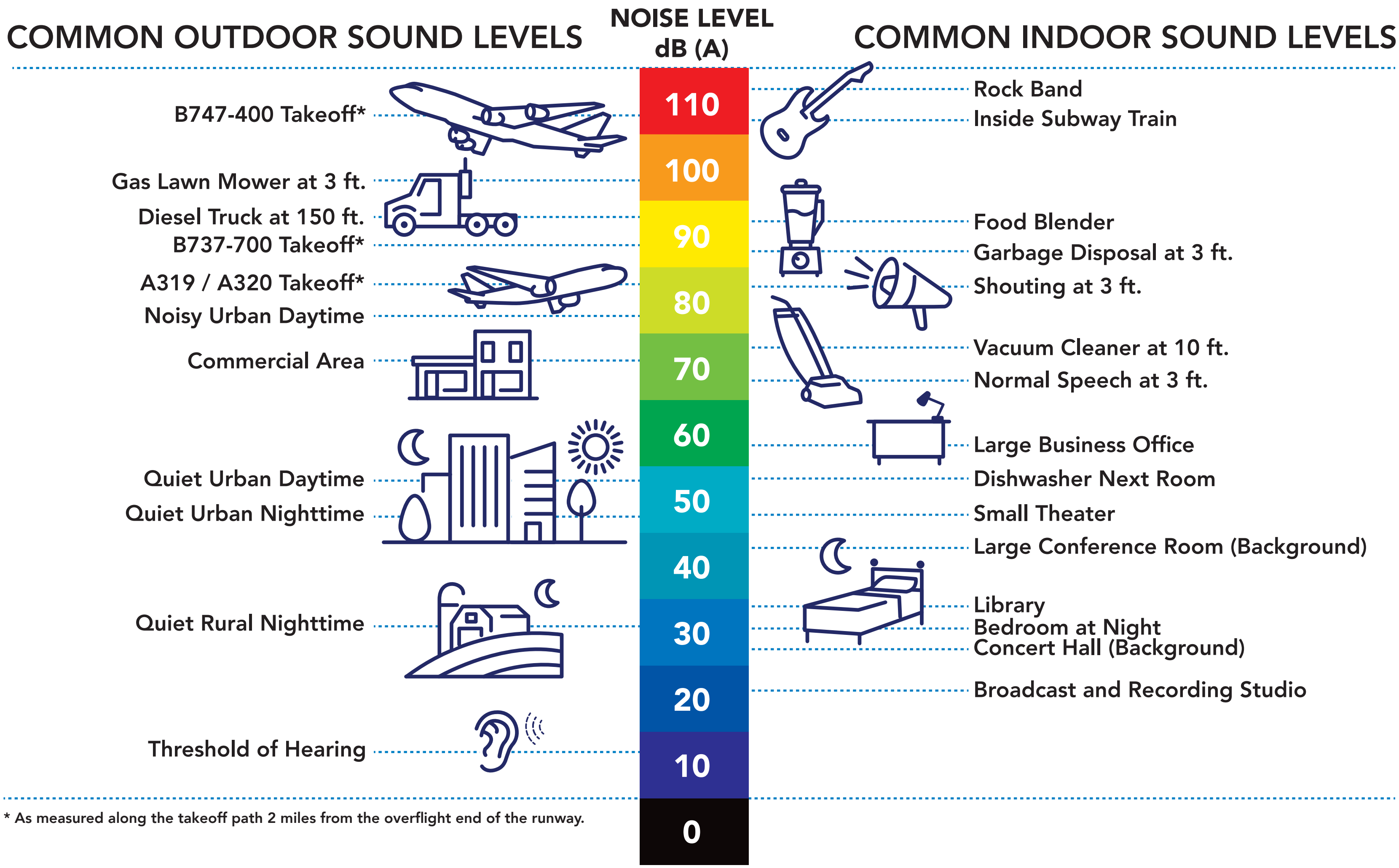
- Aircraft Database
- Aircraft Performance Data
- Aircraft Noise Data

Noise Contours

Tabular Reports

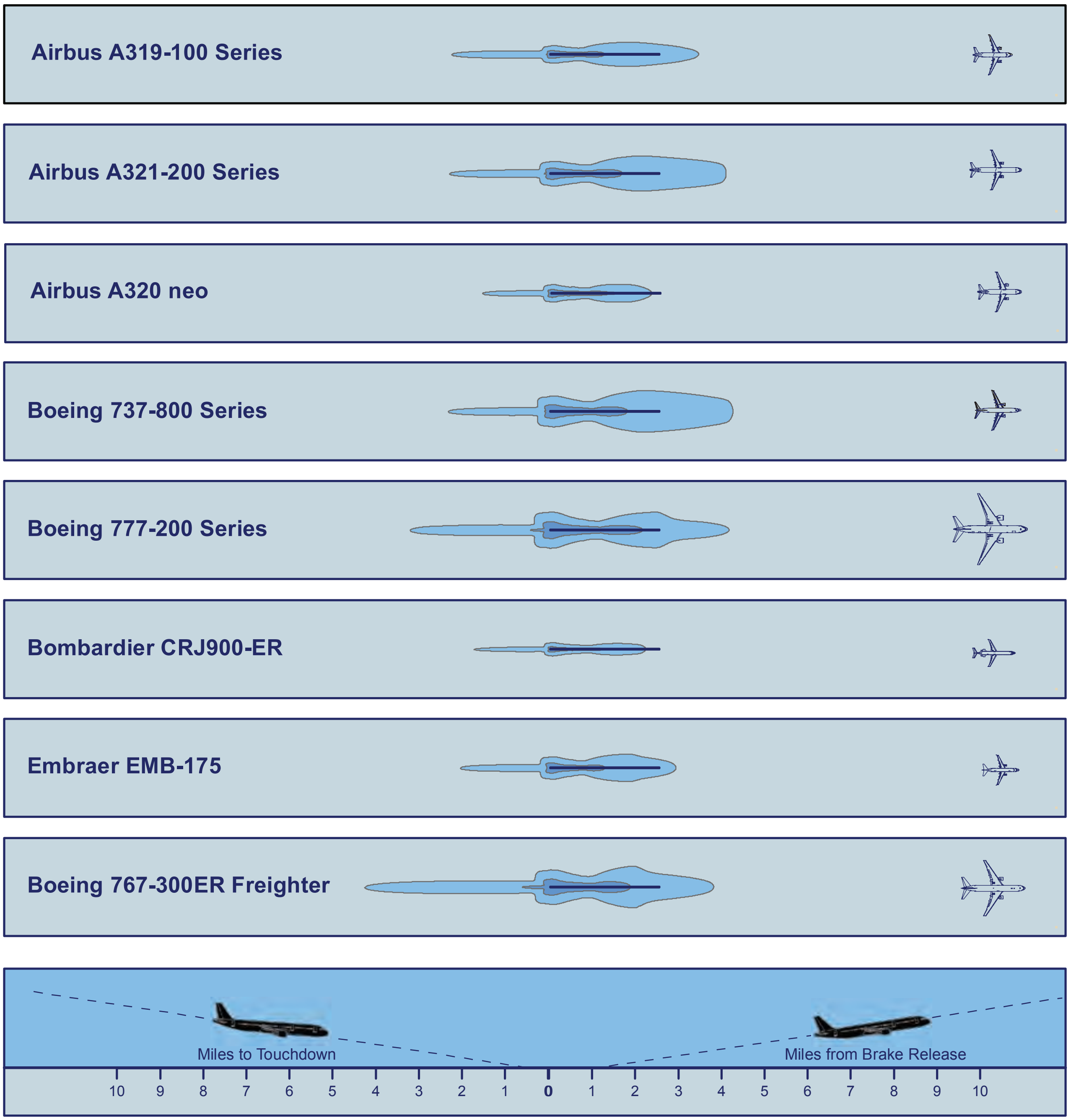
Grid Point Analysis

Comparison of Noise Levels

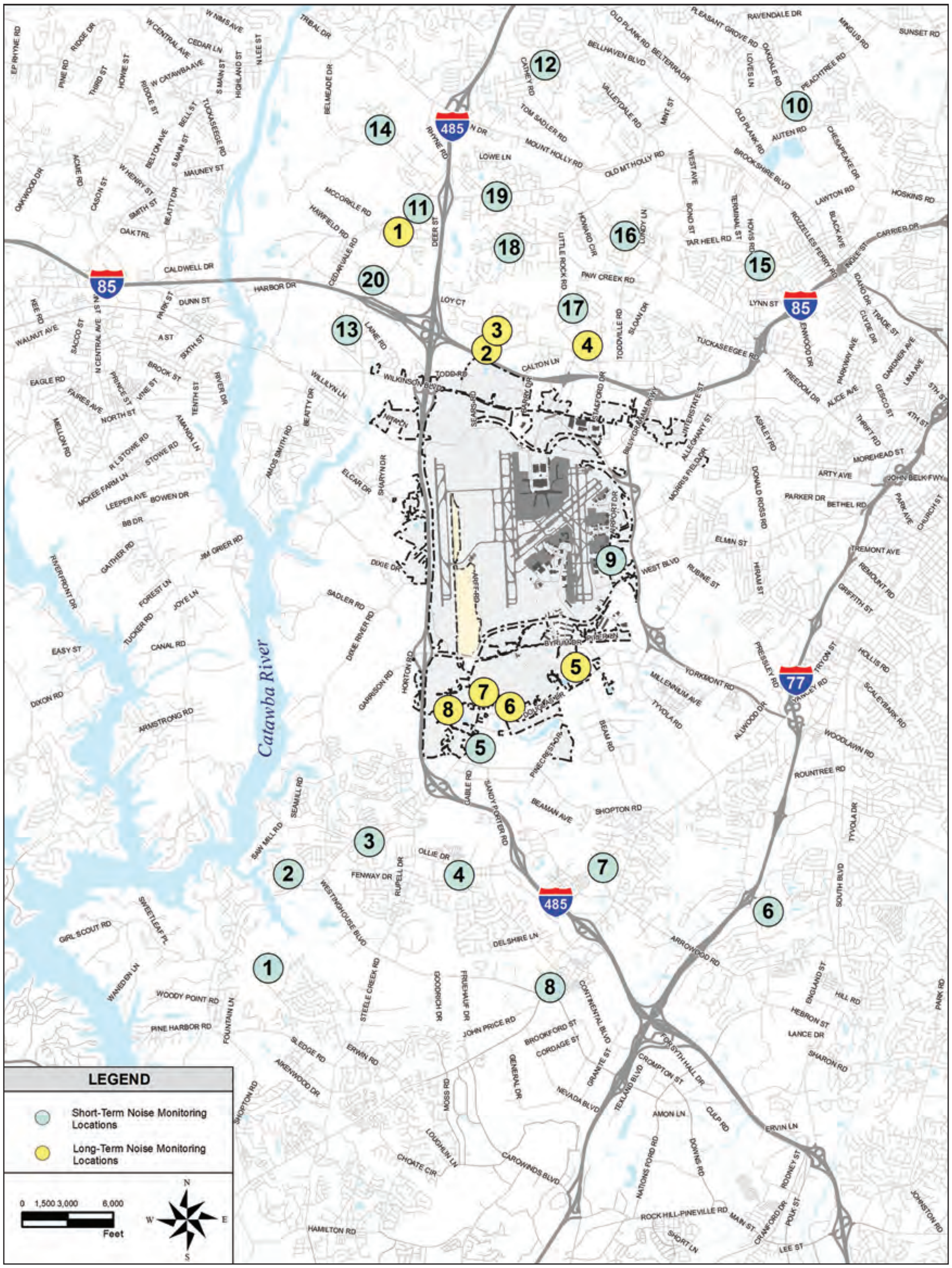


* As measured along the takeoff path 2 miles from the overflight end of the runway.

Aircraft Noise Footprints



Noise Monitoring Program



Noise Monitoring Program

PURPOSE:

- Validate and verify the input data in the AEDT
- Obtain "real-life" noise measurements to assist in understanding the total noise environment

METHODS:

- Conducted the week of October 4, 2022
- Collected noise measurements at 20 short-term sites (approximately one hour at each site) and eight long-term sites (up to seven days)
- Correlated noise measurement data to radar data

LONG-TERM SITE RESULTS:

- Results showed that the AEDT profiles were consistent with actual conditions

SHORT-TERM SITE RESULTS:

Site ID	Site Description	Date	Time of Measurement	Type of Event	# of Events	Loudest Aircraft
1	Winget Park	10/6/22	3:42 pm to 4:18 pm	Departures	11	B737
2	River Cabin Lane	10/6/22	5:45 pm to 6:32 pm	Departures	19	A319
3	Berewick Commons Parkway near Loch Lomond Drive	10/6/22	4:46 pm to 5:24 pm	Departures	27	A320
4	Griers Fork Drive & Brown Grier Rd	10/10/22	1:59 pm to 2:51 pm	Arrivals	15	A321
5	Gerald Drive at Sullivan Trace Drive	10/6/22	9:21 am to 10:08 am	Arrivals	34	A319
6	Treetops Apartments	10/6/22	2:37 pm to 3:12 pm	Departures	15	B737
7	Thornfield Road west end cul-de-sac	10/11/22	8:33 am to 9:18 am	Arrivals	5	B737
8	Central Steele Creek Church	10/5/22	9:06 am to 9:49 am	Arrivals	30	CRJ9
9	Harvest Center Church	10/6/22	10:46 am to 11:46 am	Departures	30	A321
10	Peachtree Road & Emmanuel Drive	10/10/22	12:40 pm to 1:27 pm	Departures	13	A321
11	Prairiegrouse Lane	10/4/22	10:12 pm to 11:12 pm	Departures	11	A306
12	Coulwood Drive & Fielding Road	10/11/22	10:29 am to 10:55 am	Departures	7	CRJ9
13	Community west of Sam Wilson Road on Farrhill Road	10/5/22	5:55 pm to 6:37 pm	Departures	16	CRJ9
14	Verde Creek Road west of San Gabriel Avenue	10/5/22	11:12 am to 11:53 am	Departures	25	B737
15	Chappell Baptist Church	10/5/22	3:36 pm to 4:49 pm	Departures	13	A320
16	Eagles Landing Drive	10/4/22	9:05 am to 10:05 am	Departures	3	B757
17	Still Pond Court	10/5/22 10/6/22	7:09 pm to 8:03 pm 1:19 pm to 1:51 pm	Departures Arrivals	23 11	B737 B737
18	Cabe Lane	10/5/22	2:35 pm to 3:33 pm	Departures	22	A321
19	St Johns Chapel Baptist Church	10/10/22	4:23 pm to 5:24 pm	Departures	55	B777
20	Taimi Drive	10/5/22	4:51 pm to 5:32 pm	Departures	25	A321

Existing (2023) Operating Levels and Fleet

Aircraft Category	2023 Existing Operations		
	Annual Operations	Average Annual Day	Percent
Air Carrier & Commuter	499,472	1,368.4	94.9%
General Aviation	25,785	70.6	4.9%
Military	1,197	3.3	0.2%
Total	**526,454**	**1,442.3**	**100.0%**

AEDT Airframe Type	Average Annual Day Operations
Heavy Passenger Jet	
Airbus A350-900 series	0.7
Boeing 777-200-ER	7.6
Subtotal	**8.3**
Large Passenger Jet	
Airbus A319-100 Series	119.4
Airbus A320-200 Series	69.5
Airbus A320-NEO	5.5
Airbus A321-200 Series	192.4
Boeing 717-200 Series	23.8
Boeing 737-700 Series	8.6
Boeing 737-8	2.2
Boeing 737-800	195.4
Boeing 737-900-ER	0.3
Bombardier CRJ-700	4.0
Bombardier CRJ-700-ER	154.6
Bombardier CRJ-900	6.7
Bombardier CRJ-900-ER	283.0
Embraer ERJ170	18.3
Embraer ERJ170-LR	14.5
Embraer ERJ175-LR	78.9
Embraer ERJ190-AR	2.7
Subtotal	**1,179.7**
Regional Jet	
Embraer ERJ135	3.8
Embraer ERJ145-LR	131.9
Subtotal	**135.7**
Cargo Jet	
Airbus A300F4-600 Series	3.3
Boeing 757-200 Series Freighter	2.9
Boeing 767-200 Series Freighter	1.8
Boeing 767-300 ER Freighter	4.6
Boeing MD-11 Freighter	1.4
Subtotal	**14.1**
Commuter / General Aviation Prop	
Cessna 172 Skyhawk	1.5
Pilatus PC-12	6.8
Piper PA-32 Cherokee Six	0.6
Raytheon Super King Air 300	6.2
Subtotal	**15.1**

AEDT Airframe Type	Average Annual Day Operations
General Aviation Jet	
Bombardier Challenger 300	9.0
Bombardier Challenger 600	2.4
Bombardier Global Express	0.6
Bombardier Learjet 45	0.8
Cessna 550 Citation II	1.0
Cessna 560 Citation Excel	6.7
Cessna 560 Citation V	4.8
Cessna 560 Citation XLS	2.2
Cessna 650 Citation III	0.7
Cessna 680 Citation Sovereign	3.1
Cessna 680-A Citation Latitude	12.0
Cessna 750 Citation X	1.6
Dassault Falcon 2000	4.6
Dassault Falcon 50	0.7
Dassault Falcon 900	4.4
Dassault Falcon 900-EX	1.9
Gulfstream G280	2.9
Gulfstream G400	2.0
Raytheon Beechjet 400	3.5
Raytheon Hawker 800	1.9
Raytheon Premier I	0.8
Cessna 525	2.9
Cessna 525A	1.9
Cessna 525B	2.7
Embraer Phenom 100	0.8
Embraer Phenom 300	4.8
Gulfstream G650	1.4
Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500	1.2
Subtotal	**83.2**
Helicopter	
Agusta A119	0.3
Eurocopter EC-130	2.3
Bell 407 / Rolls-Royce 250-C47B	0.4
Subtotal	**3.0**
Military	
Boeing C17A	3.3
Subtotal	**3.3**
Grand Total	**1,442.3**

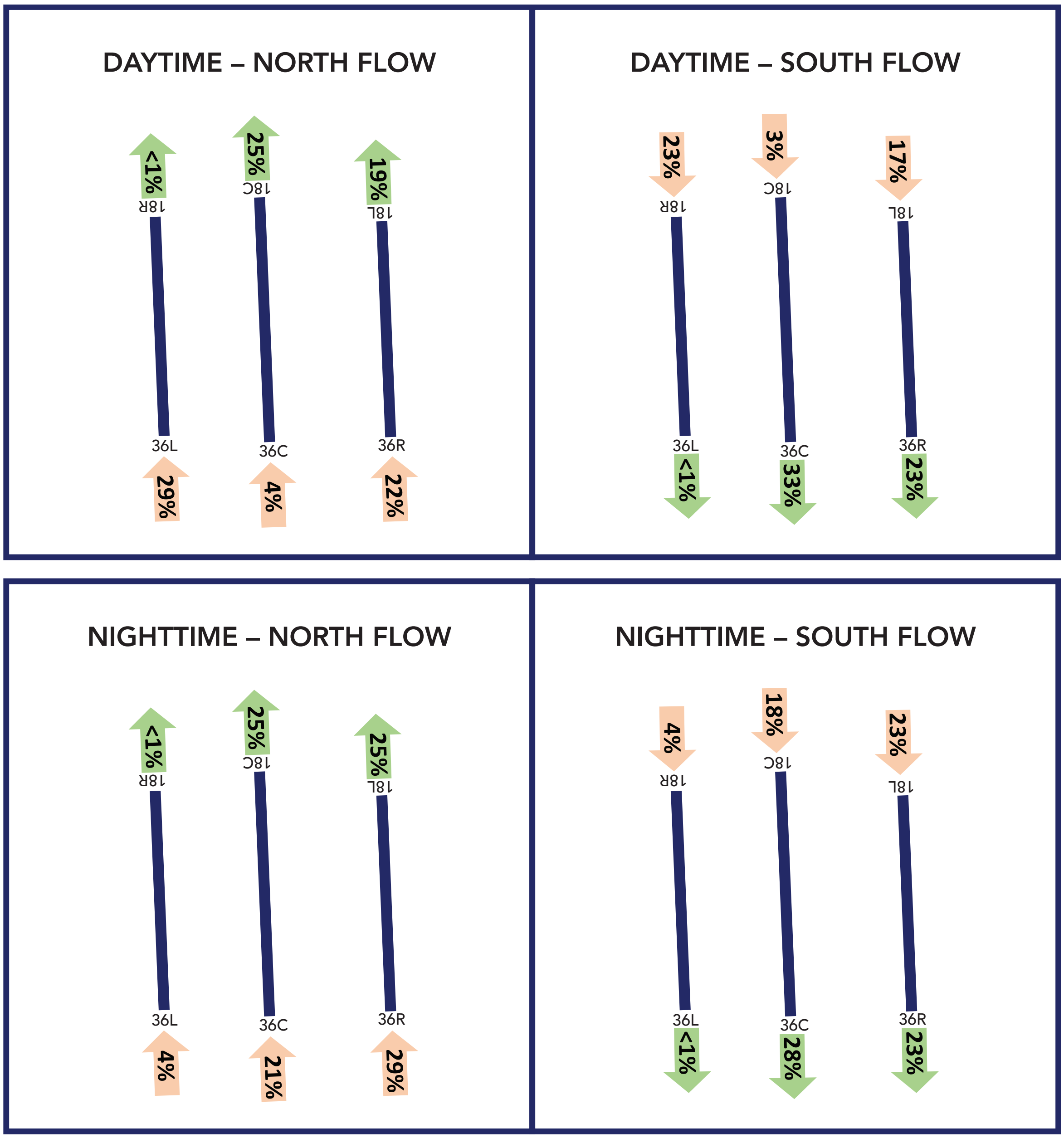
Future (2028) Operating Levels and Fleet

Aircraft Category	2028 Forecast Operations		
	Annual Operations	Average Annua l Day	Percent
Air Carrier & Commuter	611,620	1,675.7	95.6%
General Aviation	25,487	69.8	4.0%
Military	2,676	7.3	0.4%
Total	**639,783**	**1,752.8**	**100.0%**

AEDT Airframe Type	Average Annual Day Operations
Heavy Passenger Jets	
Airbus A330-200 Series	7.3
Airbus A350-900 series	1.5
Boeing 787-9 Dreamliner	7.3
Subtotal	**16.0**
Large Passenger Jet	
Airbus A319-100 Series	215.9
Airbus A320-100 Series	24.8
Airbus A320-200 Series	7.3
Airbus A321-200 Series	218.8
Airbus A321-NEO	42.3
Boeing 717-200 Series	10.2
Boeing 737 MAX 7	1.5
Boeing 737 MAX 8	55.4
Boeing 737 MAX 9	2.9
Boeing 737-700 Series	11.7
Boeing 737-800 Series	16.0
Boeing MD-90	2.9
Bombardier CRJ-700-ER	249.5
Bombardier CRJ-700-LR	2.9
Bombardier CRJ-900-ER	319.5
Embraer ERJ170	7.3
Embraer ERJ175	93.4
Embraer ERJ190-AR	11.7
Subtotal	**1,294.0**
Regional Jet	
Bombardier Challenger 300	10.1
Bombardier CRJ-200-LR	236.3
Bombardier Global Express	7.0
Bombardier Learjet 45	10.7
Cessna 525 Citation Jet	5.4
Cessna 560 Citation XLS	5.4
Cessna 750 Citation X	16.1
Dassault Falcon 2000	14.9
Dassault Falcon 50	7.0
Dornier 328 Jet	5.4
Embraer 505	21.5
Subtotal	***355.7***
Cargo Jet	
Airbus A300F4-600 Series	9.6
Boeing MD-10-1 Freighter	1.6
Subtotal	**11.2**

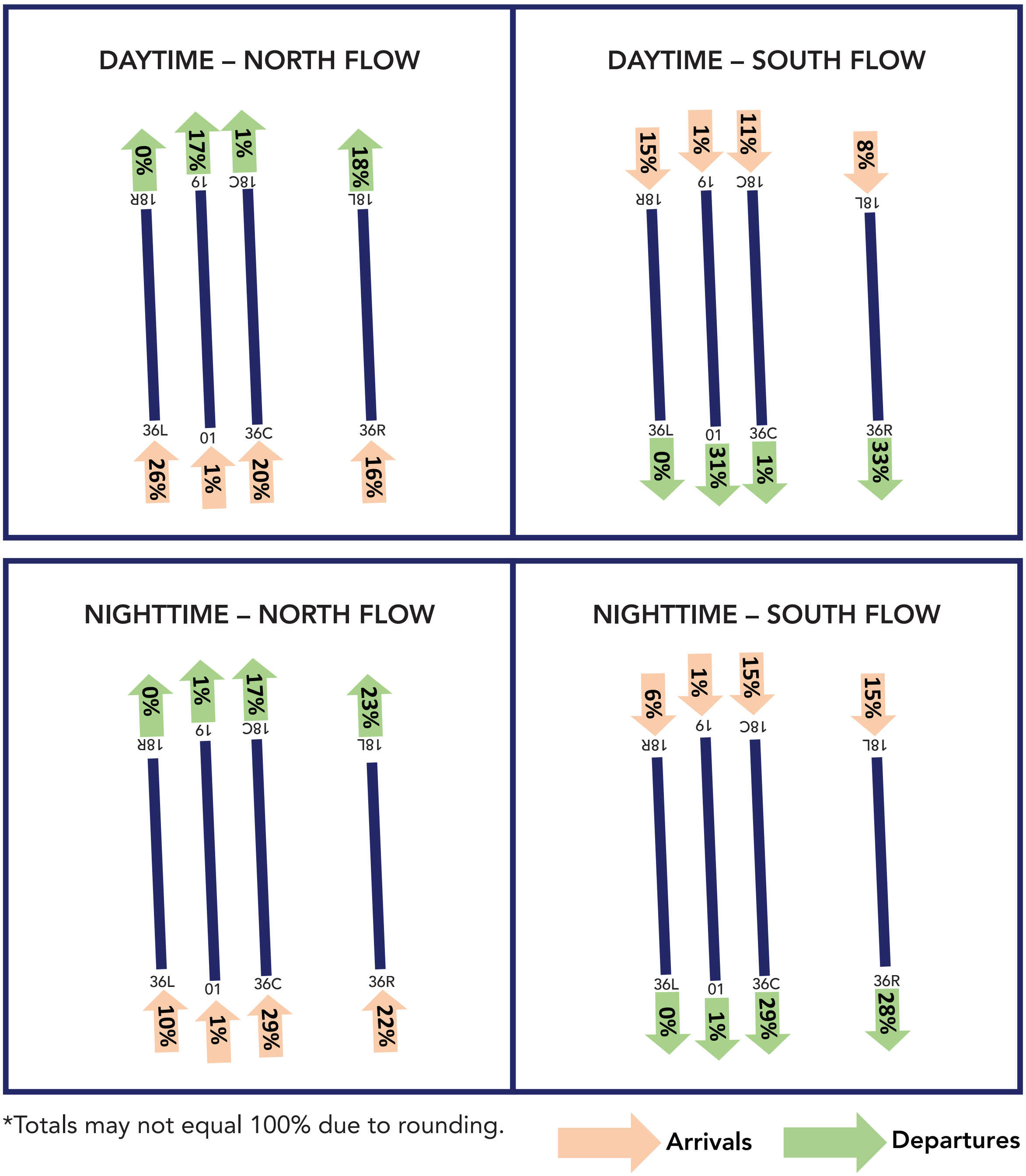
AEDT Airframe Type	Average Annual Day Operations
Commuter / Cargo Prop	
Embraer EMB120 Brasilia	10.7
Raytheon Super King Air 300	5.4
Subtotal	**16.1**
General Aviation Jet	
Bombardier Challenger 600	1.6
Bombardier Learjet 60	1.6
Cessna 525A Citation Jet	1.6
Cessna 525B Citation Jet	1.6
Cessna 550 Citation II	3.2
Cessna 560 Citation Excel	4.9
Cessna 560 Citation V	4.8
Dassault Falcon 900	1.6
Gulfstream G150	1.6
Gulfstream G200	1.6
Gulfstream G280	3.2
Gulfstream G500	1.6
Gulfstream G650	1.6
Subtotal	**30.3**
General Aviation Prop	
Cessna 303 Crusader (FAS)	1.6
Cirrus SR22	1.6
DAHER TBM 900/930	1.6
Pilatus PC-12	9.5
Raytheon Beech Baron 58	1.6
Raytheon King Air 90	1.6
SOCATA TBM 850	1.6
Subtotal	**19.0**
Helicopter	
Agusta A119	0.3
Eurocopter EC-130	2.3
Bell 407/Rolls-Royce 250-C47B	0.4
Subtotal	**3.0**
Military	
Boeing C17A	7.3
Subtotal	**7.3**
Grand Total	**1,752.8**

Existing (2023) Baseline Runway Use
Average Annual Conditions*



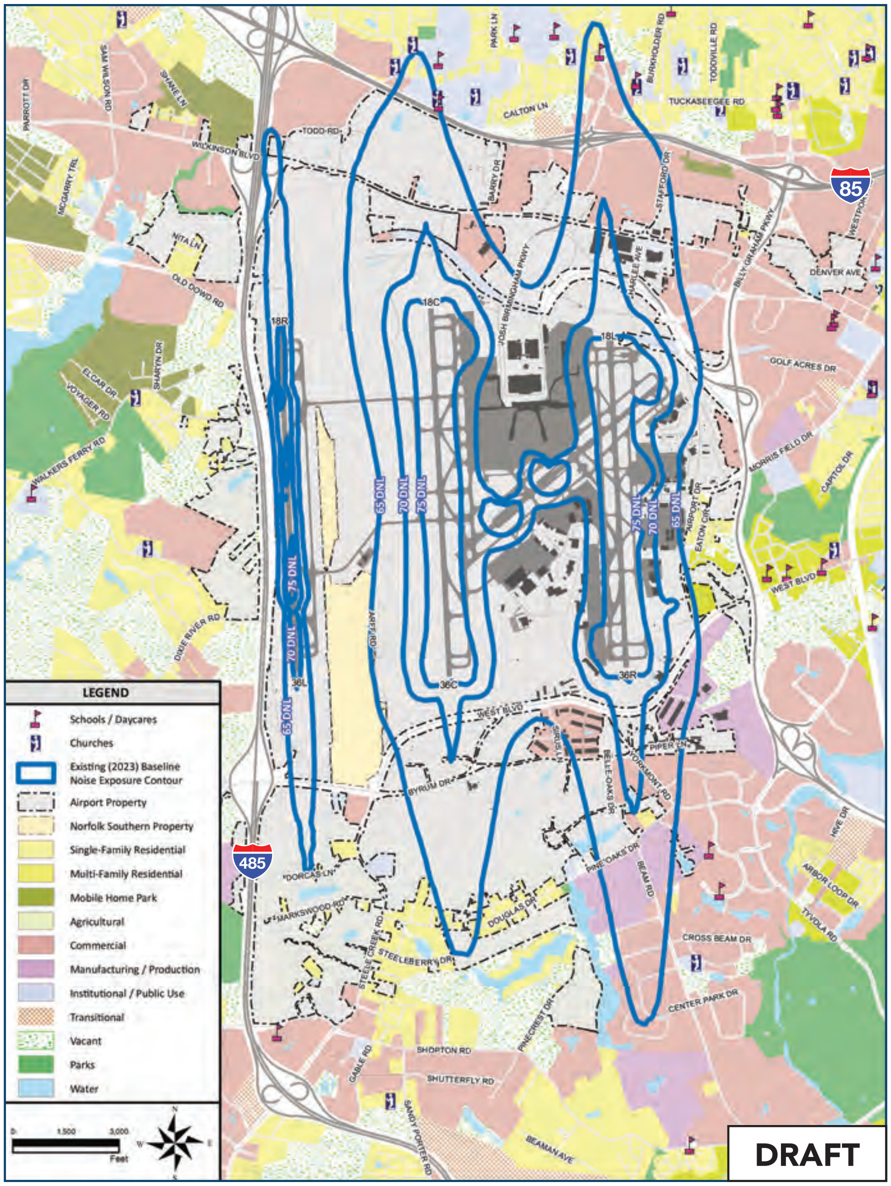
*Totals may not equal 100% due to rounding.

Future (2028) Baseline Runway Use
Average Annual Conditions*



*Totals may not equal 100% due to rounding.

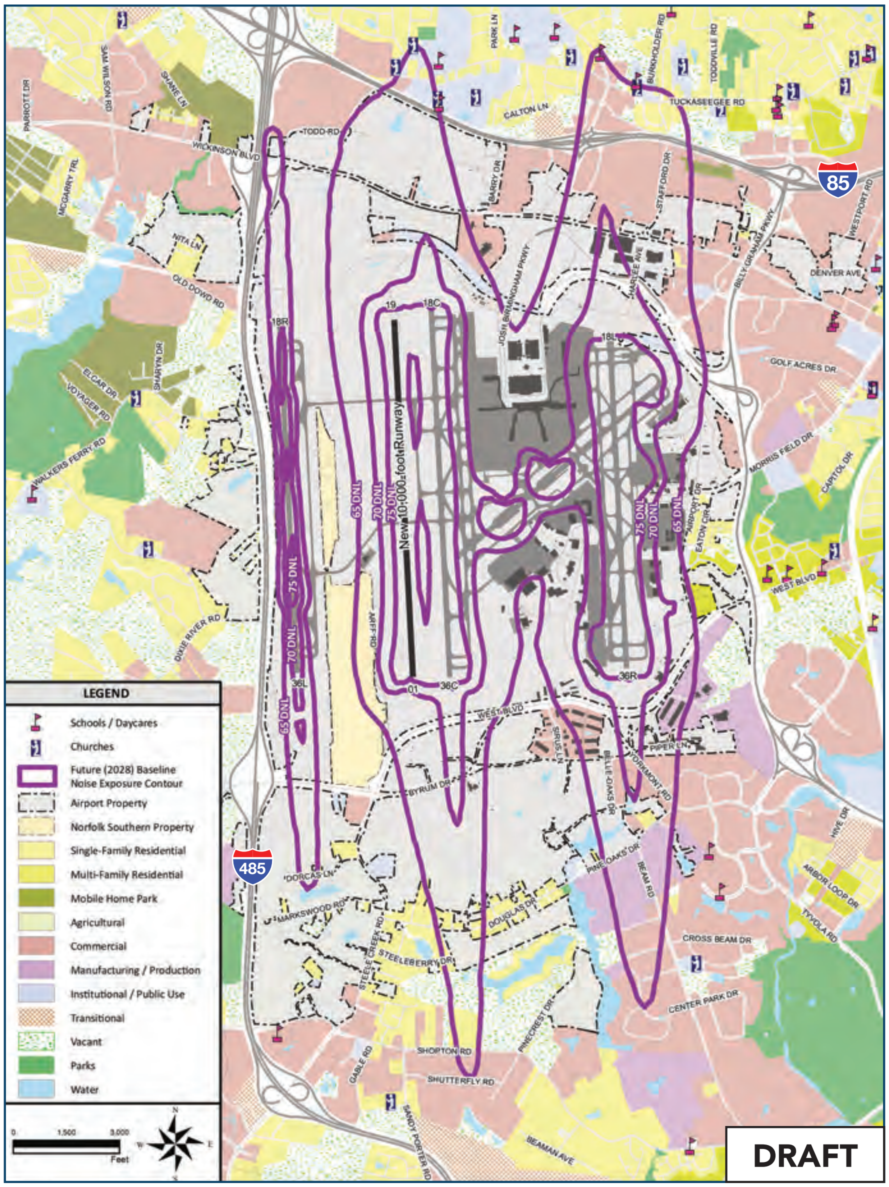
Existing (2023) Baseline Noise Exposure Contour



Housing Units within the 65 DNL	
Single-Family Residential	**51**
Mitigated	15
Not Mitigated	36
Multi-Family Residential	**90**
Not Mitigated	90
Manufactured Home	**1**
Not Mitigated	1
Total Housing Units	**142**

Noise Sensitive Facilities within the 65 DNL	
Churches / Places of Worship	4
Schools / Educational Facilities	3
Libraries	0
Hospitals	0
Nursing Homes	0
Total Noise Sensitive Facilities	**7**

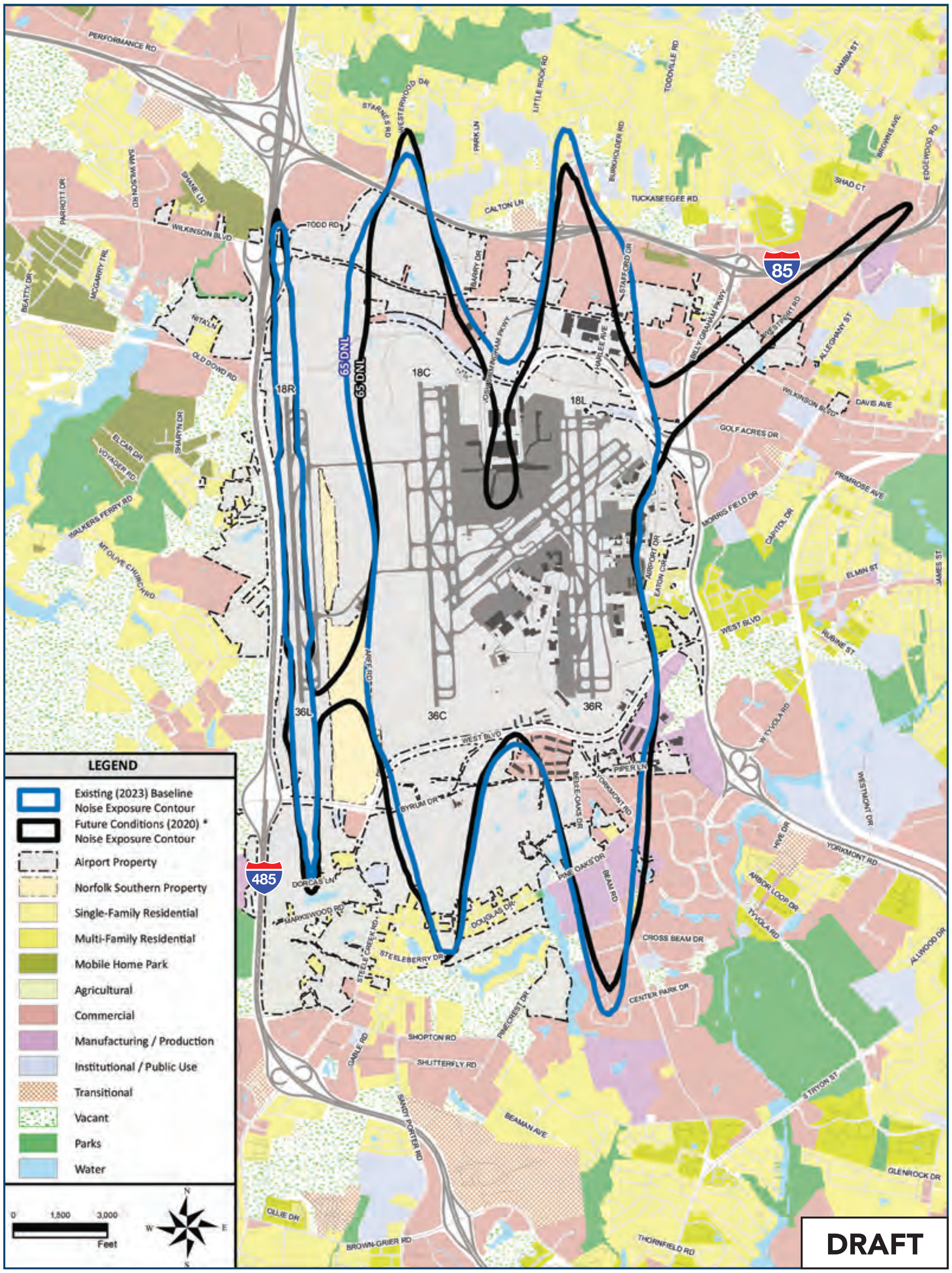
Future (2028) Baseline Noise Exposure Contour



Housing Units within the 65 DNL	
Single-Family Residential	**85**
Mitigated	47
Not Mitigated	38
Multi-Family Residential	**96**
Mitigated	2
Not Mitigated	94
Manufactured Home	**63**
Not Mitigated	63
Total Housing Units	**244**

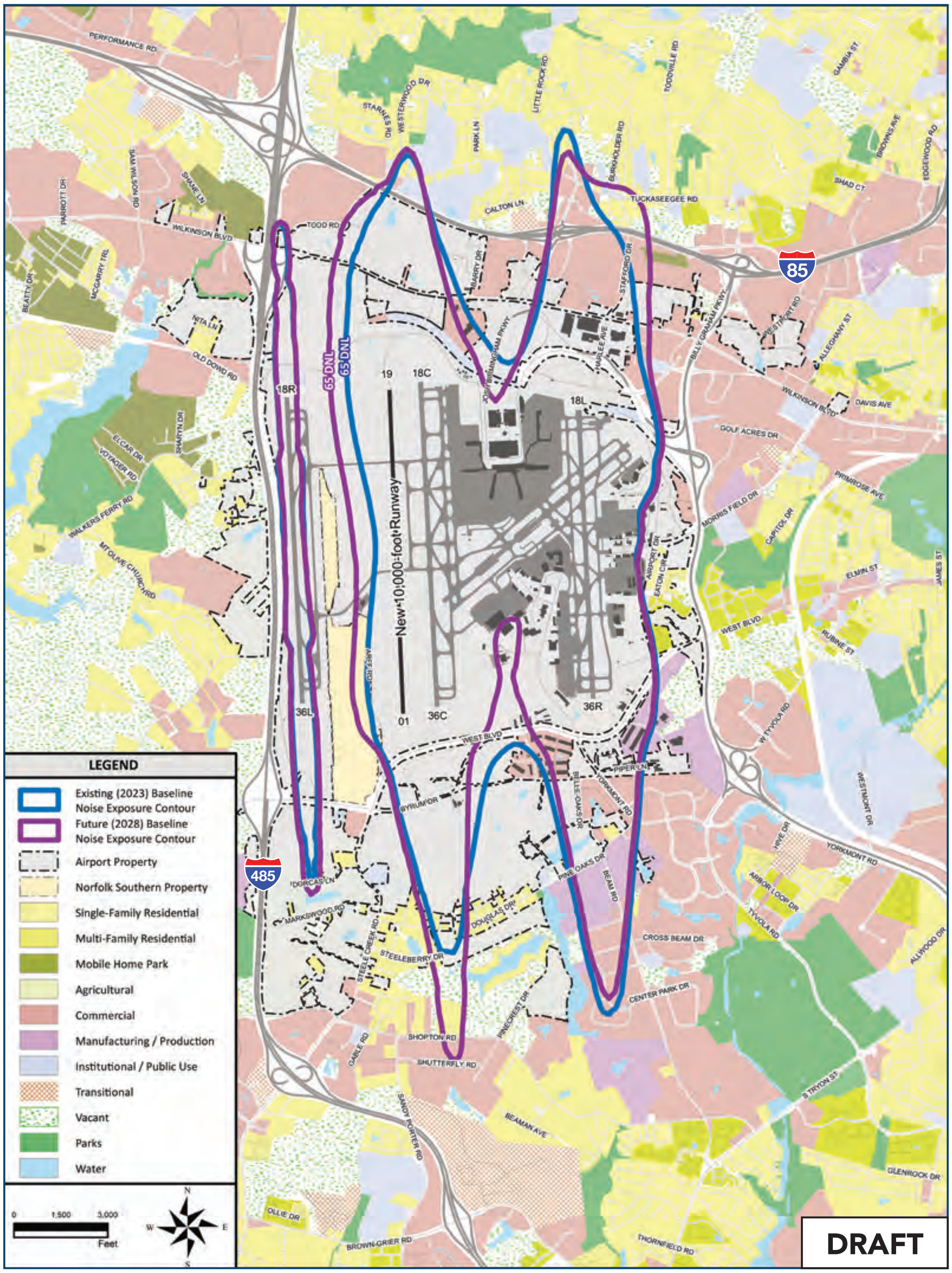
Noise Sensitive Facilities within the 65 DNL	
Churches / Places of Worship	4
Schools / Educational Facilities	4
Libraries	0
Hospitals	0
Nursing Homes	0
Total Noise Sensitive Facilities	**8**

Existing (2023) Baseline vs. Previous Part 150 (2020) Noise Exposure Contour



* Future Conditions (2020) Noise Exposure Contour was taken from a previous Part 150 Study modeled in 2015

Existing (2023) Baseline vs. Future (2028) Baseline Noise Exposure Contour



Examples of Noise Compatibility Measures

1. NOISE ABATEMENT MEASURES

Measures to control noise at the source (i.e. aircraft)

- Flight location (e.g., departure flight corridors)
- Runway use program (e.g., how often runway ends are used)
- Ground activity restrictions (e.g., run-up locations/time)
- Facility modifications (e.g., runway extensions, berms)
- Flight management (e.g., restrictions)

2. LAND USE MEASURES

Preventive Strategies

- **Prevent** the introduction of additional noise-sensitive land uses within existing and future noise exposure contours
- May also be applicable outside of the 65 DNL noise contour
- Examples:
  - Zoning Codes
  - Subdivision Regulations
  - Airport Environs Overlay Zone

Corrective / Remedial Strategies

- **Mitigate** existing and projected future unavoidable noise impacts in areas of existing incompatible land use
- Applicable to 65+ DNL noise contour
- Examples
  - Voluntary Property Acquisition
  - Voluntary Sound Insulation
  - Avigation Easements

3. IMPLEMENTATION MEASURES

Measures designed to assist with the implementation and management of the Noise Compatibility Program (NCP)

- Noise Program Office and Staff Support
- Flight Tracking / Noise Monitoring System
- Focus Groups / Roundtables
- Periodic Review / Update to the Program

Next Steps / Schedule

How to Comment

Please submit your comments by April 24, 2023 using one of these methods:

IN PERSON
Members of the public may fill out and submit their comment forms today

MAIL
Gaby Elizondo
4445 Lake Forest Dr. Suite 700
Cincinnati, OH 45242

EMAIL
CLTPart150@landrumbrown.com

PROJECT WEBSITE
Visit the project website and submit a comment on the "Contact" page: *CLTPart150.com*

All comments must be submitted or postmarked by

April 24, 2023

Public Information Meeting #2
November 14 & 16, 2023

Outreach Summary

Charlotte Douglas International Airport

Part 150 Study Update

Public Meeting #2 Summary Report

November 14 & 16, 2023

Overview

The City of Charlotte is currently updating the Part 150 Noise Compatibility Study for the Charlotte Douglas International Airport (CLT). The Part 150 Study process uses a balanced approach to identify noise incompatibilities surrounding an airport, and to recommend measures to both correct existing incompatibilities and to prevent future incompatibilities.

The City of Charlotte hosed Public Informational Meetings on Tuesday, November 14, 2023 and Thursday, November 16, 2023. The Public Informational Meetings were open-house style during which boards identifying the status of the Part 150, the work completed to date, and the next steps for the Part 150 process were displayed. The agendas for each meeting were identical and there was an opportunity for the public to submit written comments at each meeting. Comments could also be submitted via email or mail for a month following the meetings. Approximately 29 people signed in at the public meetings.

Public Meeting – Location 1
Tuesday, November 14, 2023
6 p.m. to 8 p.m.
Harris Conference Center, Central Piedmont Community College
3216 CPCC Harris Campus Drive
Charlotte, NC 28208

Public Meeting – Location 2
Thursday, November 16, 2023
6 p.m. to 8 p.m.
Embassy Suites by Hilton Charlotte
4800 South Tyron Street
Charlotte, NC 28217

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MEETING MATERIALS

PRINT MEDIA CAMPAIGN

Print Ads 2
Charlotte Observer & La Noticia

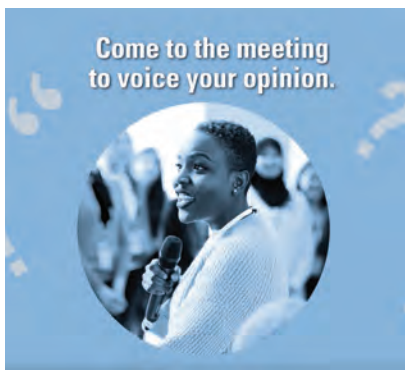
Print Media Affidavits 3
Charlotte Observer

Print Media Affidavits 5
La Noticia

Print Media Affidavits 6
Que Pasa Mi Gente

07

SOCIAL MEDIA CAMPAIGN



CLT Public Meeting Ads 1 & 2,
By The Numbers Table 7

08

COMMENTS

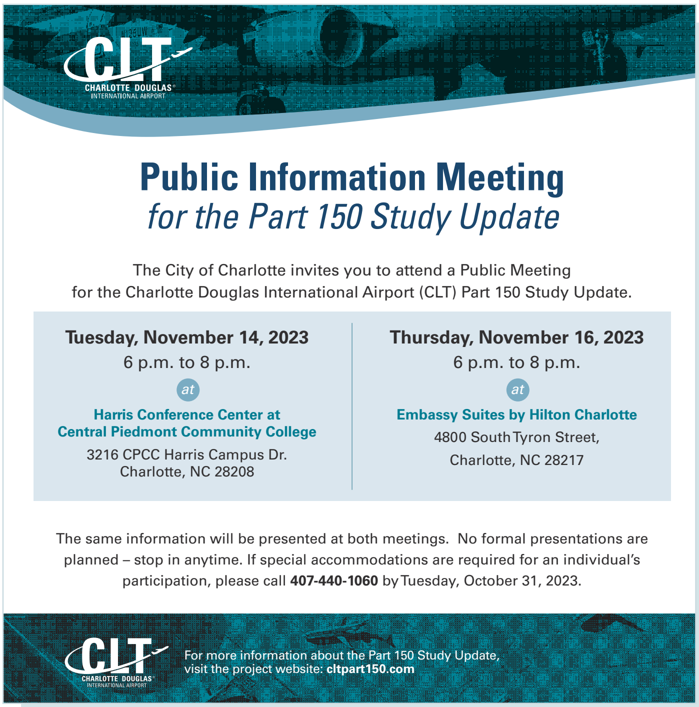
Meeting Materials

Materials were created for the meeting to help the attending public gain a better understanding of the project. There were 27 boards displayed at both meetings that included a synopsis of the project, the Part 150 process, project maps, and Spanish language display ads were placed in the weekly publications, *Que Pasa Mi Gente* and *La Noticia*. A project overview handout was also available at the meeting, which was printed in English and Spanish. Meeting boards and handouts can be viewed in Appendix A, as a separate attachment.

Print Media Campaign

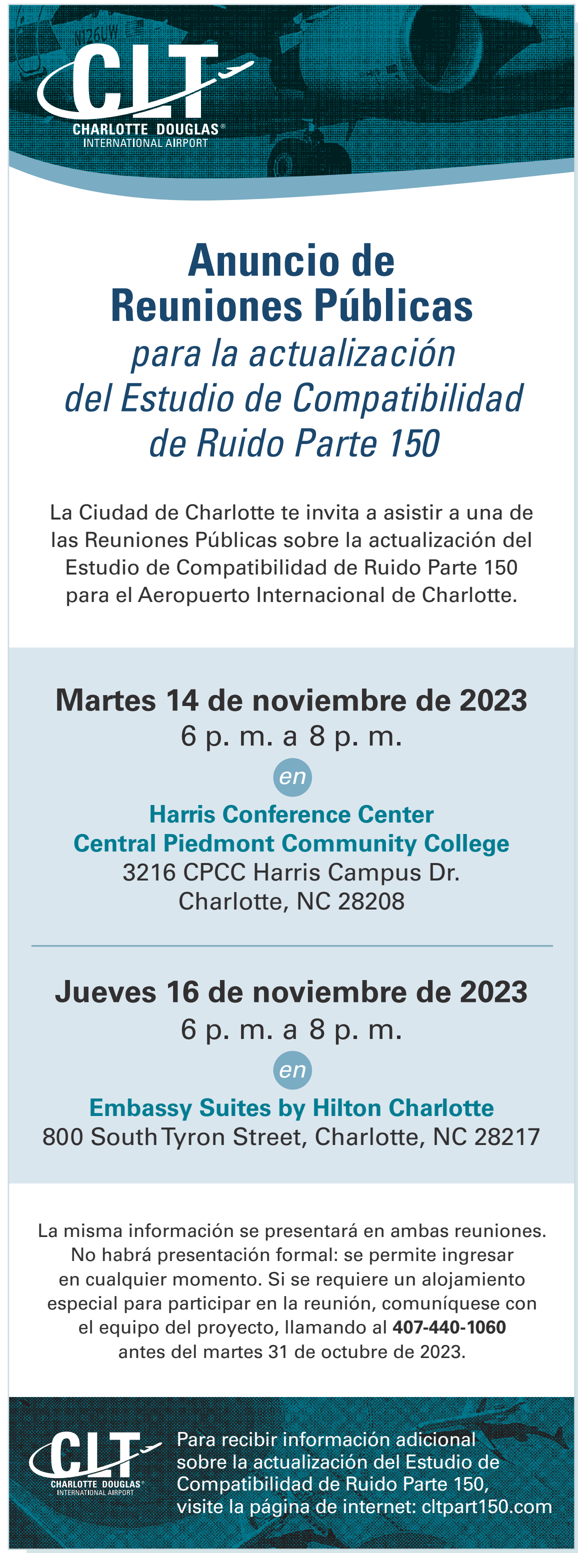
To make the public aware of the upcoming public meetings, legal notice ads were published in local Charlotte newspapers. In addition, a display ad was placed in *The Charlotte Observer,* and Spanish language ads were placed in *Que Pasa Mi Gente* and *La Noticia*. The ads provided the dates and times of the two meetings, a brief overview of the meeting format, and a link to the project website for more information. The legal and display ads in *The Charlotte Observer* were published 30 days before the public meeting.

PRINT MEDIA



Ad published in *The Charlotte Observer* on October 16, 2023

Ad published in *Que Pasa Mi Gente* on October 31, 2023



Ad published in *La Noticia* on October 25, 2023

McCLATCHY

Beaufort Gazette
Belleville News-Democrat
Bellingham Herald
Bradenton Herald
Centre Daily Times
Charlotte Observer
Columbus Ledger-Enquirer
Fresno Bee
The Herald - Rock Hill
Herald Sun - Durham
Idaho Statesman
Island Packet
Kansas City Star
Lexington Herald-Leader
Merced Sun-Star
Miami Herald
el Nuevo Herald - Miami
Modesto Bee
Raleigh News & Observer
The Olympian
Sacramento Bee
Fort Worth Star-Telegram
The State - Columbia
Sun Herald - Biloxi
Sun News - Myrtle Beach
The News Tribune Tacoma
The Telegraph - Macon
San Luis Obispo Tribune
Tri-City Herald
Wichita Eagle

AFFIDAVIT OF PUBLICATION

Account #	Order Number	Identification	Order PO	Amount	Cols	Depth
14603	478397	Print Legal Ad-IPL01436550 - IPL0143655		$529.68	2	21 L

Attention: Kevin Price

SHARP & COMPANY
4445 LAKE FOREST DRIVE 700
CINCINNATI, OH 45242

gelizondo@landrum-brown.com

Notice of Public Meetings for the Charlotte Douglas International Airport Part 150 Study Update

The City of Charlotte will conduct two Public Information Meetings with respect to the Part 150 Study Update being prepared for the Charlotte Douglas International Airport (CLT). The Public Information Meetings will be held from 6:00 p.m. to 8:00 p.m. on Tuesday, November 14, 2023 at the Harris Conference Center at Central Piedmont Community College, 3216 CPCC Harris Campus Drive, Charlotte, NC 28208; and from 6:00 p.m. to 8:00 p.m. on Thursday, November 16, 2023 at the Embassy Suites by Hilton Charlotte, 4800 South Tryon Street, Charlotte, NC 28217. The same information will be presented both nights. No formal presentations are planned. Attendees are welcome to come anytime between 6:00 p.m. and 8:00 p.m. If special accommodations are required for an individual's participation, please call 407-440-1060 by Tuesday, October 31, 2023. These meetings will present information related to the ongoing Part 150 Study Update for CLT and provide an opportunity for public comment on the study process. Airport staff and noise consultants will be available at the Public Information Meetings to answer questions and provide information regarding the study. More information about the Part 150 Study Update is available online at https://cltpart150.com/.
IPL0143655
Oct 13 2023

North Carolina } ss
Mecklenburg County }

Before the undersigned, a Notary Public of said County and State, duly authorized to administer oaths affirmations, etc., personally appeared, being duly sworn or affirmed according to law, doth depose and say that he/she is a representative of The Charlotte Observer Publishing Company, a corporation organized and doing business under the laws of the State of Delaware, and publishing a newspaper known as The Charlotte Observer in the city of Charlotte, County of Mecklenburg, and State of North Carolina and that as such he/she is familiar with the books, records, files, and business of said Corporation and by reference to the files of said publication, the attached advertisement was inserted. The following is correctly copied from the books and files of the aforesaid Corporation and Publication.

1 insertion(s) published on:
10/13/23

Tara Pennington

In Testimony Whereof I have hereunto set my hand and affixed my seal on the 13th day of October,2023

Stephanie Hatcher

Notary Public in and for the state of Texas, residing in Dallas County

STEPHANIE HATCHER
My Notary ID # 133534406
Expires January 14, 2026

Extra charge for lost or duplicate affidavits.
Legal document please do not destroy!

The Charlotte Observer–published on October 16, 2023

MONDAY **OCTOBER 16** 2023 | THE CHARLOTTE OBSERVER | 5A

Palestinian death toll surpasses 2,300, Israel 1,300

ILAN ASSAYAG Xinhua/Sipa USA/USA TODAY NETWORK

This photo, taken on Sunday from the Israeli side of Sderot near the Israel-Gaza border, shows smoke billowing after an Israeli airstrike.

BY DON JACOBSON
UPI.com

The Palestinian death toll in the 9-day-old conflict between Israel and Hamas has reached 2,329, Gaza health officials announced Sunday, as violence spread to Israel's northern border with Lebanon.

In addition to those killed, 9,042 have been wounded in the Palestinian enclave since the start of the conflict, triggered last weekend when Hamas militants staged an unprecedent rocket and ground attack against civilian targets inside Israel.

Israel casualties in the conflict stand at 1,300 killed and more than 3,400 wounded.

The Gaza Ministry of Health said the number of Palestinian killed in the current conflict already surpasses the death toll of the 2014 Israel-Hamas war that lasted 51 days, which it said "confirms that the crimes they commit against our people have been promoted to ethnic cleansing."

Meanwhile, the health situation inside the besieged Gaza Strip is quickly deteriorating as Israeli forces have massed at the northern border in preparation for an anticipated ground invasion. The Israeli Defense Forces have ordered a mass evacuation of 1.1 million residents from the area ahead of what it promises will be an "attack with great force."

Electricity and water supplies have been cut off in anticipation of the assault, greatly escalating what aid workers have called a humanitarian disaster in the making.

Palestinian health officials said Sunday that 70% of the residents of both Gaza and North Gaza regions "are deprived of health services for refugees" after UNRWA, the United Nations Palestine refugee agency, evacuated its centers and withdrew its services in the face of a massive Israeli bombardment.

UNRWA chief Philippe Lazzarini urged Israel to protect Palestinian civilians in Gaza, declaring that with water supplies running dry and utilities cut off, "it has become a matter of life and death."

"It is a must," he said. "Fuel needs to be delivered now into Gaza to make water available for 2 million people."

The World Health Organization on Saturday strongly condemned Israel's order for 22 hospitals in northern Gaza to be evacuated, describing it as a "death sentence" for the sick and injured.

The health organization said the hospitals hold around 2,000 "desperately ill patients" and warned that forced evacuation of patients and health workers "will further worsen the current humanitarian and public health catastrophe."

Palestinians and foreign nationals struggling to escape the fighting have gathered at the Rafah border crossing into Egypt, which remained closed.

British and American diplomats said Saturday they have "not been successful" in their efforts to negotiate its reopening with Hamas, Egypt and Israel, all of whom control access to the critical chokepoint.

The much-anticipated ground invasion of northern Gaza appeared to be on hold early Sunday as heavy rains pelted the region, adding to the plight of the evacuees.

Israel Prime Minister Benjamin Netanyahu on Saturday visited troops in the border area for the first time since the conflict began. He appeared at the kibbutzim of Be'eri and Kfar Aza to view the homes destroyed in what he called the "horrific massacre" of last weekend, his office said.

"I've seen our amazing soldiers who are now on the front line," he said Sunday before the first meeting of Israel's emergency Cabinet, during which he vowed to "demolish Hamas."

Poles vote in most pivotal election since Berlin Wall's fall

BY ANTHONY FAIOLA AND ANNABELLE CHAPMAN
Washington Post

Poles were voting Sunday in their most pivotal election since the fall of the Berlin Wall, with stark consequences for the future of Polish democracy, European unity and the West's effort to confront Russian aggression.

The highly charged campaign included some of the largest rallies on Warsaw's streets since the restoration of democracy three decades ago. Opposition leader Donald Tusk is seeking a "breakthrough moment" in his long and personal fight against the hard-right Law and Justice party (PiS) led by Jaroslaw Kaczynski. In eight years of rule, the archconservatives have boosted Poland's economy while exerting control over the courts and the media, backing severe restrictions on abortion, targeting LBGTQ+ rights and undermining the bonds of the European Union.

The campaign has been swathed in nationalism, with both sides staking out anti-migrant stances. Tusk has also sought to portray the vote as a referendum on democracy.

"The stakes are the highest possible," Tusk – Poland's prime minister from 2007 to 2014 and a former president of the European Council – told supporters on Friday.

Kaczynski, currently Poland's deputy prime minister, though long considered the country's most powerful politician, reviles Tusk. Last week, he encouraged his countrymen to vote for continuity for "peaceful development and a safe future."

Nearly 30 million Poles were eligible to vote in what was projected to be the highest turnout in years. At noon Sunday, the National Election Commission said turnout stood at 22.59%, higher than at the same time in 2019. Especially if the vote is inclusive, it could take days or longer for a government to emerge and could lead to another vote next year.

Some analysts question whether Law and Justice would go peacefully if it loses or seek to challenge the results. It has already limited the independence of the National Electoral Commission and the Supreme Court, which would probably be involved in adjudicating a contested vote.

In what many analysts have criticized as a bid to stoke support for the ruling party, Poles are also being presented with four referendum questions. One asks whether "you support the admission of thousands of illegal immigrants from the Middle East and Africa." The opposition has encouraged voters to boycott the referendum, but to do that, they must actively decline the referendum ballot – making their private voting preference known to poll workers.

The outcome is being especially watched in Washington, Brussels, Kyiv and Moscow, as Poland is central to the West's response to the Russian invasion of Ukraine. It has equipped Ukraine with German-made Leopard 2 tanks and Polish MiG-29 fighters. It has also taken in millions of Ukrainian refugees since the start of the war.

But domestic politics have clouded that support. Last month, a dispute over the impact of Ukrainian grain exports on Polish farmers escalated to the point where Prime Minister Mateusz Morawiecki raised the prospect of an end to Polish arms shipments.

CLT CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT

Public Information Meeting
for the Part 150 Study Update

The City of Charlotte invites you to attend a Public Meeting for the Charlotte Douglas International Airport (CLT) Part 150 Study Update.

Tuesday, November 14, 2023	Thursday, November 16, 2023
6 p.m. to 8 p.m.	6 p.m. to 8 p.m.
at	at
Harris Conference Center at Central Piedmont Community College	Embassy Suites by Hilton Charlotte
3216 CPCC Harris Campus Dr. Charlotte, NC 28208	4800 South Tyron Street, Charlotte, NC 28217

The same information will be presented at both meetings. No formal presentations are planned – stop in anytime. If special accommodations are required for an individual's participation, please call **407-440-1060** by Tuesday, October 31, 2023.

CLT CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT

For more information about the Part 150 Study Update, visit the project website: **cltpart150.com**

***The Charlotte Observer*–published on October 16, 2023**

La Noticia™

AFFIDAVIT

I, Hilda Gurdian (Name), in my capacity as Sales Executive (Title) of the newspaper

La Noticia (Newspaper Name) in Charlotte (City), NC (State)

hereby certify that the ☒ ROP/☐ Preprinted Inserts (choose one) for (Advertiser)

Sharp & Company

it was published in the above newspaper on 10/25/2023 (Run Date)

Hilda Gurdian
Signature of Person Making Affidavit

Subscribed and sworn to before me in the County of Mecklenburg (County) in the State of

NC (State), on this 11 (Date) day of December (Month), 2023 (Year).

Notary Public Seal:

Maria E. Benton
NOTARY PUBLIC
Union County, NC
My Commission Expires February 22, 2027

Maria E. Benton
Notary Public Signature

February 22, 2027
Commission Expires

***La Noticia*–published October 25, 2023**

Advertising Affidavit

Date: 11/1/2023

SHAR05-Sharp & Company
1701 Rhode Island Ave. NW
Washington, DC 20036

QUE PASA
LATINO COMMUNICATIONS,LLC
PO BOX 12876
WINSTON SALEM, NC 27117

Before the undersigned, a Notary Public of Forsyth County, North Carolina, duly commissioned, qualified, and authorized to make this affidavit and sworn statement, that the notice or other legal advertisement, a copy of which is attached hereto, was published in the QUE PASA Newspaper on the following dates:

10/31/2023 to 11/6/2023

And that the said newspaper in which such notice, or legal advertisement was published, was a newspaper meeting all the requirements and qualifications of Section 1-597 of the General Statues of North Carolina

Elva Hernandez
Signature of Person Making Affidavit
Date: 11/1/2023

Newspaper Reference:
Sworn to and subscribed before me,

this 1st day of November, 2023

M. Teresita Ysasi-Diaz
Notary Public

My Commission expires: ________.

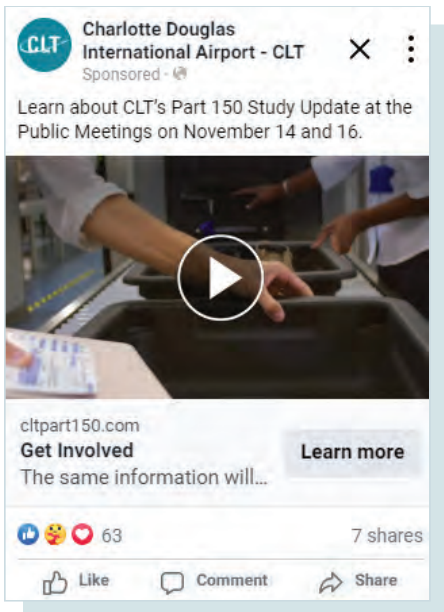
M. TERESITA YSASI-DIAZ
Notary Public, North Carolina
Forsyth County
My Commission Expires
December 21, 2027

THIS IS NOT A BILL, PLEASE PAY FROM INVOICE, THANK YOU

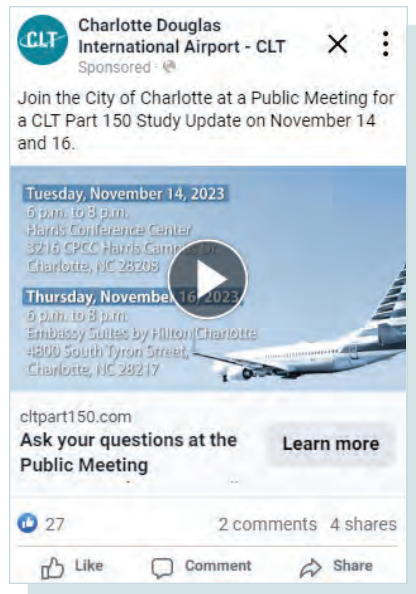
***Que Pasa Mi Gente*–published on October 31, 2023**

Social Media Campaign

Two video ads were placed on Facebook and Instagram, running from October 31st to November 16th, 2023. Targeting included residents within and in a 5-mile radius around the following zip codes: 28214, 28278, 28273, and 28216.



CLT Public Meeting Ad 1



CLT Public Meeting Ad 2

BY THE NUMBERS TABLE

DATE	POST	IMPRESSIONS	REACH	RESULTS (LINK CLICKS)	CTR
10/31	CLT Public Meeting Ad 1	55,139	22,743	904	1.64%
10/31	CLT Public Meeting Ad 2	46,208	19,874	559	1.21%
	TOTAL	**101,347**	**42,617**	**1,463**	**AVG: 1.44%**

Impressions: The number of times the ad appeared in someone's feed
Reach: The number of potential unique viewers of the ad
Link Clicks: The number of times the link was clicked within the ad
CTR: The percentage of clicks there were out of the total number of impressions *(Click-through rate)*

Comments

Comments were accepted from the public at both meetings, as well as through email at **CLTPart150@landrumbrown.com**, and through U.S. postal mail to **Gaby Elizondo**, *Landrum & Brown, 4445 Lake Forest Drive, Suite 700, Cincinnati, OH 45242*. In total, 14 comments were received from the public.

COMMENT	NAME	DATE	SOURCE
Planes increased over South Shore Residents will greatly decrease property values in the near future.	**Scott Daukus**	**11/15/23**	**Email**
Sign me up for updates. I live Mclean South Shore.	**Christine Bury**	**11/15/23**	**Email**
And the noise of the air traffic– all hours of the night from freight flights – wakes us up.	**Christine Bury**	**11/15/23**	**Email**
Against any reduction in the noise abatement program.	**George Cline**	**11/15/23**	**Email**
Far too many CLT departures flying far too low and far too near my home.	**Jeffrey Diamond**	**11/15/23**	**Email**
Why don't you focus on all the 2nd hand smoke from airport employees instead? Disgusting.	**Paul Lustig**	**11/16/23**	**Email**

continue

COMMENT	NAME	DATE	SOURCE
To Whom it May Concern: I am writing to express concern about changes I understand being considered that might generate increased flight noise in the area west of the Charlotte airport. Particularly concerned to hear about what I understand may be a proposal to lift the 2 mile restriction for departures from CLT. Doing so would appear to project more frequent, low altitude flights over the peninsula area south of Belmont. We already have plenty of flight noise in that area and many of us who have built homes here in recent years will not welcome an increase. While I very much support the factors, like the airport, that contribute to economic growth in our area, I do believe there need to be reasonable restrictions on things like flight noise that have a significant impact on the quality of life for residents in the area. One thing in particular that makes this area problematic for flight noise is its proximity to Lake Wylie since noise of any kind carries much further and can be amplified due to the surface water. Innovative and high impact steps should be taken to make sure that noise associated with the airport's growth is contained or abated in every way possible. I was not able to attend either of the public hearings on this topic, but wanted to share my concerns. Thanks.	**William Menefee**	**11/16/23**	**Email**
Looking to stay up-to-date with the project.	**Justin Martin**	**11/16/23**	**Email**
You should have a meeting closer to Belmont where the impact will be. For us, to get to Charlotte at rush hour is ridulous and not allowing folks an opportunity to really submit/voice their concerns. Be well, Christine	**Christine Bury**	**11/16/23**	**Email**
I am a homeowner in Mclean South Shore on Lake Wylie in Belmont and am very interested in how we can control the current noise. All hours of the night over our homes and future projects that will bring more traffic and hours.	**Christine Bury**	**11/16/23**	**Email**
I believe serious consideration must be given to reduce noise caused by hundreds of flights that approach the airport over the same routes each day. The CLT airport favors northbound arrivals which causes too many planes to flying at low altitudes above communities like mine on Fort Mill SC. Airport staff has told me the goal is to "spread the pain" of noise as much as possible; but the fact that arrivals are northbound the majority of the time condenses noise pollution to the south of the airport. Arriving flights could maintain a higher altitude upon approach along with using a zipper merge method that would put noise over different areas versus condensing it in Fort Mill and other communities.	**Kevin Harvel**	**11/16/23**	**Email**

continue

COMMENT	NAME	DATE	SOURCE
Thank you for arranging and hosting the update meetings the week of November 13th. I attended one of the meetings and received some new information. I later researched the CLT 150 web site and found additional interesting information. On a more depressing note, I learned that my house is directly under an arrival flight path. I always thought I had a lot of traffic, but this now confirms that thought (attached). My question is "Is this flight path set in stone, regardless of the three or four runway scenarios, or does the FAA review these paths periodically to help ensure not one set of residents is constantly subject to the noise pollution?" Thanks again for your recent forum. Steve	**Steve & Maralee**	**11/18/23**	**Email**
We moved to Steele creek close to RiverGate in 2019. We would see airplanes in the sky at that time but noise really wasn't an issue. Now it seems like the planes are directly overhead and the noise is super loud, like the planes are gonna land on our house. Are the landing paths going to change again?	**Zachary**	**11/23/23**	**Email**
I think the terms noise compatibility part 150 needs a clearer explanation for non-technical individuals. The displays are helpful but current and proposed i.e. 2023/ 2028 should be together at some point to compare. Thanks.	**Thelma**	**11/14/23**	**Comment Form**

CLT
CHARLOTTE DOUGLAS®
INTERNATIONAL AIRPORT

APPENDIX A

Charlotte Douglas International Airport

Part 150 Study Update

Public Meeting #2 Summary Report

November 14 & 16, 2023

Meeting Materials

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What is a Part 150 Noise Compatibility Study?

The City of Charlotte is updating the Part 150 Noise Compatibility Study for the Charlotte Douglas International Airport (CLT). The study gets its name from Part 150 of the Code of Federal Regulations, which provides guidance for airports choosing to prepare a Noise Compatibility Study. Airports prepare Part 150 Studies in accordance with Federal Aviation Administration (FAA) guidance. The Part 150 Study process uses a balanced approach to identify noise incompatibilities surrounding an airport, and to recommend measures to both correct existing incompatibilities and to prevent future incompatibilities.

Part 150 Study Primary Elements:

NOISE EXPOSURE MAPS (NEM)	NOISE COMPATIBILITY PROGRAMS (NCP)	PUBLIC INVOLVEMENT
• Description of the noise levels for existing and future (+5 years) conditions • Existing conditions (last 12 months of activity) • Future Conditions (2028) (considers physical and operational changes)	• Recommendations for reducing, minimizing, and/or mitigating aircraft noise and land use conflicts • May reflect short-term (before 2028) and long-term (after 2028)	• Project website and social media • Meeting notices, study process, and draft findings • Comment collection

Purpose of this Meeting:

The Airport is hosting the second in a series of public informational meetings to invite the public to comment on the findings of the Part 150 Study Update. The purpose of this meeting is to review noise abatement alternatives developed to help minimize impacts from previously approved airfield improvements, including a new runway. Potential noise impacts from each noise abatement alternative are also presented. The public is encouraged to provide written comments regarding the study and its findings to date.

Noise Abatement Alternatives:

A Noise Compatibility Program includes noise abatement alternatives, which are developed to address aircraft operating procedures. For the purpose of this Part 150 Study Update, noise abatement alternatives have been developed based on input from the Airport and local stakeholders, including airlines, air traffic controllers, and the Airport Community Roundtable. Alternatives being considered for noise abatement as part of this Part 150 Study Update fall into the following categories:

Facility Modification

- **Run-Up Locations:** Alternatives that would change the designated locations on the Airport where aircraft engine testing is conducted
- **Displaced Arrival Threshold:** Alternatives that would change the location on the runway where arriving aircraft would land. This would reduce the length of runway available for landings.

Preferential Runway Use:

- **Airport Flow:** Alternatives that would change the amount of time the Airport operates in north flow and south flow
- **Daytime Runway Use:** Alternatives that would change the previously approved use of runways in the future (when the new runway is constructed) in the daytime (7am to 10pm)
- **Nighttime Runway Use:** Alternatives that would change the previously approved use of runways in the future (when the new runway is constructed) in the nighttime (10pm to 7am)

Flight Procedure:

- **Divergent Headings:** Alternatives that would change the existing departure flight procedures for aircraft departing to the north and south and eliminate the two-mile restriction for aircraft departing to the south
- **Departure Flight Corridors:** Alternatives that would change where departing aircraft fly for specific flight corridors
- **Arrival Flight Corridors:** Alternatives that would change where arriving aircraft fly for specific flight corridors

Screening Process

Alternatives will only be considered for implementation if they do not present potential safety or feasibility issues, would result in a reduction in noise impacts within the 65 DNL, have no or minimal operational impacts, and do not present insurmountable implementation issues.

Anticipated Schedule & Next Steps

What are the Opportunities for Providing Input?

Members of the public may comment at the meeting by completing and submitting a comment form.
Please submit your comments by **November 30, 2023** using one of these methods:

Email:
CLTpart150@landrumbrown.com

Online:
Visit the project website and submit a comment on the "Contact" page: **CLTPart150.com**

Mail:
Gaby Elizondo
4445 Lake Forest Dr, Suite 700
Cincinnati, OH 45242
(Postmarked by **November 30, 2023**)

The public will have additional opportunities to provide input and comments throughout the Part 150 process. **For additional information regarding the EA, please visit: CLTpart150.com**

The website will be updated throughout the Part 150 process with project updates; meeting information; status reports and schedules; and other information.

Photos by Patrick Schneider

¿Qué es un Estudio de Compatibilidad de Ruido Parte 150?

La ciudad de Charlotte está actualizando el Estudio de Compatibilidad de Ruido Parte 150 para el Aeropuerto Internacional de Charlotte Douglas (CLT). El estudio recibe su nombre de la Parte 150 del Código de Reglamentos Federales, que proporciona orientación a los aeropuertos que deciden realizar un Estudio de Compatibilidad de Ruido. Los aeropuertos preparan los Estudios Parte 150 de acuerdo con las directrices de la Administración Federal de Aviación (FAA por sus siglas en inglés). El proceso del Estudio Parte 150 identifica las incompatibilidades del ruido alrededor de un aeropuerto y recomienda medidas tanto para corregirlas como para evitarlas en el futuro.

Elementos principales del Estudio Parte 150:

MAPAS DE EXPOSICIÓN AL RUIDO (NEM por sus siglas en inglés)

- Descripción de los niveles de ruido en las condiciones actuales y en el futuro (más de 5 años).
- Condiciones existentes (últimos 12 meses de actividad).
- Condiciones futuras (2028) (considera cambios físicos y operativos).

PROGRAMAS DE COMPATIBILIDAD DE RUIDO (NCP por sus siglas en inglés)

- Recomendaciones para reducir, minimizar y/o mitigar el ruido de las aeronaves y los conflictos por el uso del suelo.
- Puede reflejar el corto plazo (antes de 2028) y el largo plazo (después de 2028).

PARTICIPACIÓN PÚBLICA

- Sitio web del proyecto y redes sociales.
- Avisos de reuniones, proceso de estudio y borradores de conclusiones.
- Recopilación de comentarios.

Propósito de esta reunión

El aeropuerto está organizando la segunda de una serie de reuniones públicas informativas, para invitar al público a comentar sobre los resultados de la Actualización del Estudio Parte 150. El propósito de esta reunión es revisar las alternativas de reducción del ruido, desarrolladas para ayudar a minimizar los impactos de las mejoras del aeropuerto previamente aprobadas, incluyendo una nueva pista. También se presentarán los posibles impactos acústicos de cada alternativa de reducción del ruido. Se invita al público a presentar comentarios por escrito sobre el estudio y sus conclusiones a la fecha.

Alternativas para la reducción del ruido

Un programa de compatibilidad de ruido incluye una serie de alternativas de reducción del ruido que se desarrollan para abordar los procedimientos operativos de las aeronaves. Para efectos de esta actualización del Estudio Parte 150, se han desarrollado alternativas de reducción del ruido, basadas en los aportes del aeropuerto y las partes locales interesadas, incluidas las aerolíneas, los controladores de tráfico aéreo y la mesa redonda de la comunidad aeroportuaria. Las alternativas que se están considerando para la reducción del ruido como parte de esta actualización del Estudio Parte 150, se califican en las siguientes categorías:

Modificación a las instalaciones:

- **Lugares de prueba:** Alternativas que cambiarían las ubicaciones designadas en el aeropuerto donde se realizan las pruebas de motores de las aeronaves.
- **Desplazamiento del umbral de la pista de llegada:** Alternativas que implican cambiar el punto de inicio de la pista donde las aeronaves tocan tierra al aterrizar. Esto efectivamente reduce la longitud de la pista utilizada para aterrizajes.

Uso preferencial de pistas:

- **Flujo aeroportuario:** Alternativas que modificarían la cantidad de tiempo que el aeropuerto opera en flujo norte y sur.
- **Uso de pistas durante el día:** Alternativas que cambiarían a futuro el uso de pistas, previamente aprobado, (cuando se construya la nueva pista) durante el día (de 7 a. m. a 10 p. m.).
- **Uso de pistas durante la noche:** Alternativas que cambiarían a futuro el uso de pistas, previamente aprobado, (cuando se construya la nueva pista) en el horario nocturno (de 10 p. m. a 7 a. m.).

Procedimiento de vuelo:

- **Rumbos divergentes:** Alternativas que modificarían los procedimientos actuales de salida de vuelos para aeronaves que despegan hacia el norte y el sur, y eliminarían la restricción de dos millas para aeronaves que despegan hacia el sur.
- **Corredores de salida de vuelos:** Alternativas que modificarían la ruta de vuelo de las aeronaves que despegan en corredores de vuelo específicos.
- **Corredores de llegada de vuelos:** Alternativas que modificarían la ruta de vuelo de las aeronaves que llegan por corredores de vuelo específicos.

Proceso de selección

Solo se considerarán alternativas que, para su proceso de implementación, no presenten posibles problemas de seguridad o viabilidad, que tengan como resultado una reducción de los impactos del ruido dentro del 65 DNL, que tengan mínimos o nulos impactos operativos y que no presenten problemas de implementación insuperables.

Programa previsto y próximos pasos

¿Cuáles son las opciones para proporcionar comentarios?

El público puede comentar en la reunión completando y enviando un formulario de comentarios.

Por favor, envíe sus comentarios antes del **30 de noviembre de 2023** utilizando uno de estos métodos:

Correo electrónico:
CLTpart150@landrumbrown.com

En línea:
Visite el sitio web del proyecto y envíe su comentario en la página de "contacto": **CLTPart150.com**

Correo:
Gaby Elizondo
4445 Lake Forest Dr, Suite 700
Cincinnati, OH 45242
(con sello postal antes del **30 de noviembre de 2023**)

El público tendrá oportunidades adicionales para proporcionar sus opiniones y comentarios a lo largo del proceso de la Parte 150. **Para obtener información adicional sobre el Estudio Ambiental, por favor visite: CLTpart150.com**

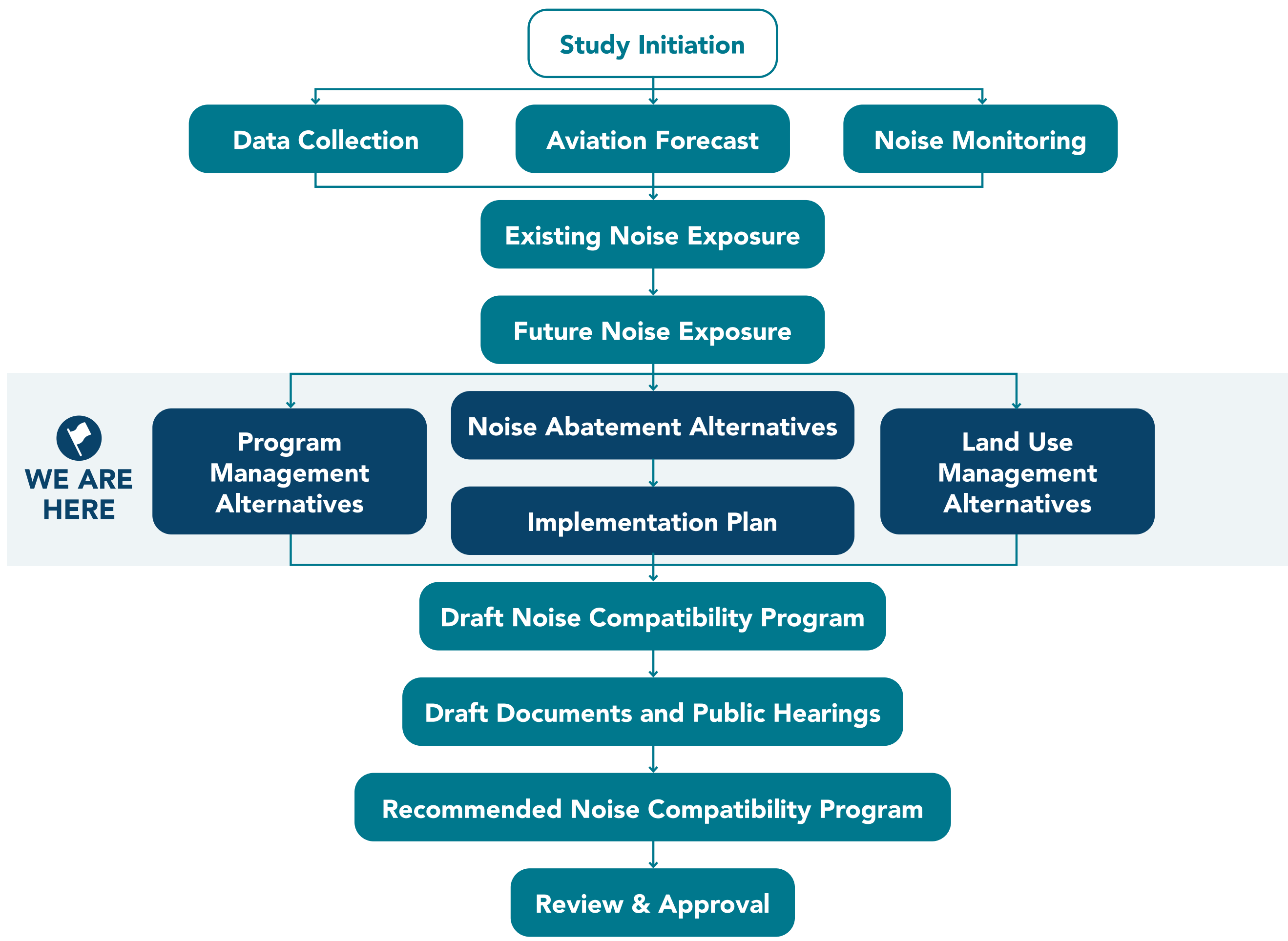
El sitio web se mantendrá al día durante todo el proceso de la Parte 150 con actualizaciones del proyecto, información sobre reuniones, informes del estado, horarios y otra información.

Photos by Patrick Schneider

Welcome to the

Public Information Meeting

Part 150 Process



Part 150 Study – Primary Elements:

Noise Exposure Maps

- Description of the noise levels for existing and future (+5 years) conditions

Noise Compatibility Programs

- Recommendations for reducing, minimizing, and/or mitigating aircraft noise and land use conflicts
- May reflect short-term and long-term

Public Involvement

- Project website and social media
- Meeting notices, study process, and draft findings
- Comment collection

How Noise Contours are Generated

AVIATION ENVIRONMENTAL DESIGN TOOL (AEDT)

Data Sources

- Airport Layout Plan
- Radar Data
- Air Traffic Control Tower Counts
- Forecasted Operations

+

Input Data

- Runway Layout
- Operating Levels
- Fleet Mix
- Runway Use
- Flight Tracks
- Flight Profiles

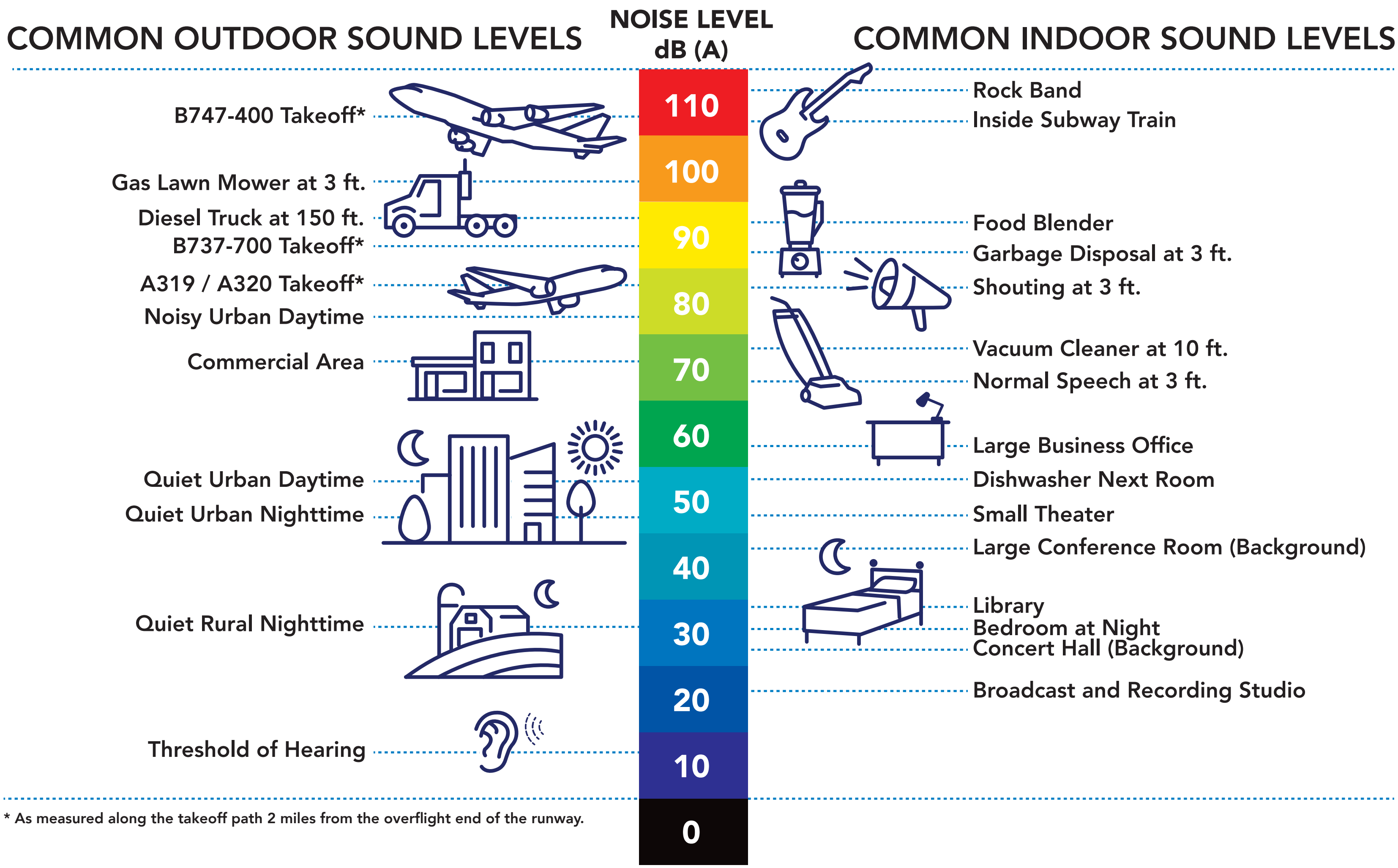
- Aircraft Database
- Aircraft Performance Data
- Aircraft Noise Data

Noise Contours

Tabular Reports

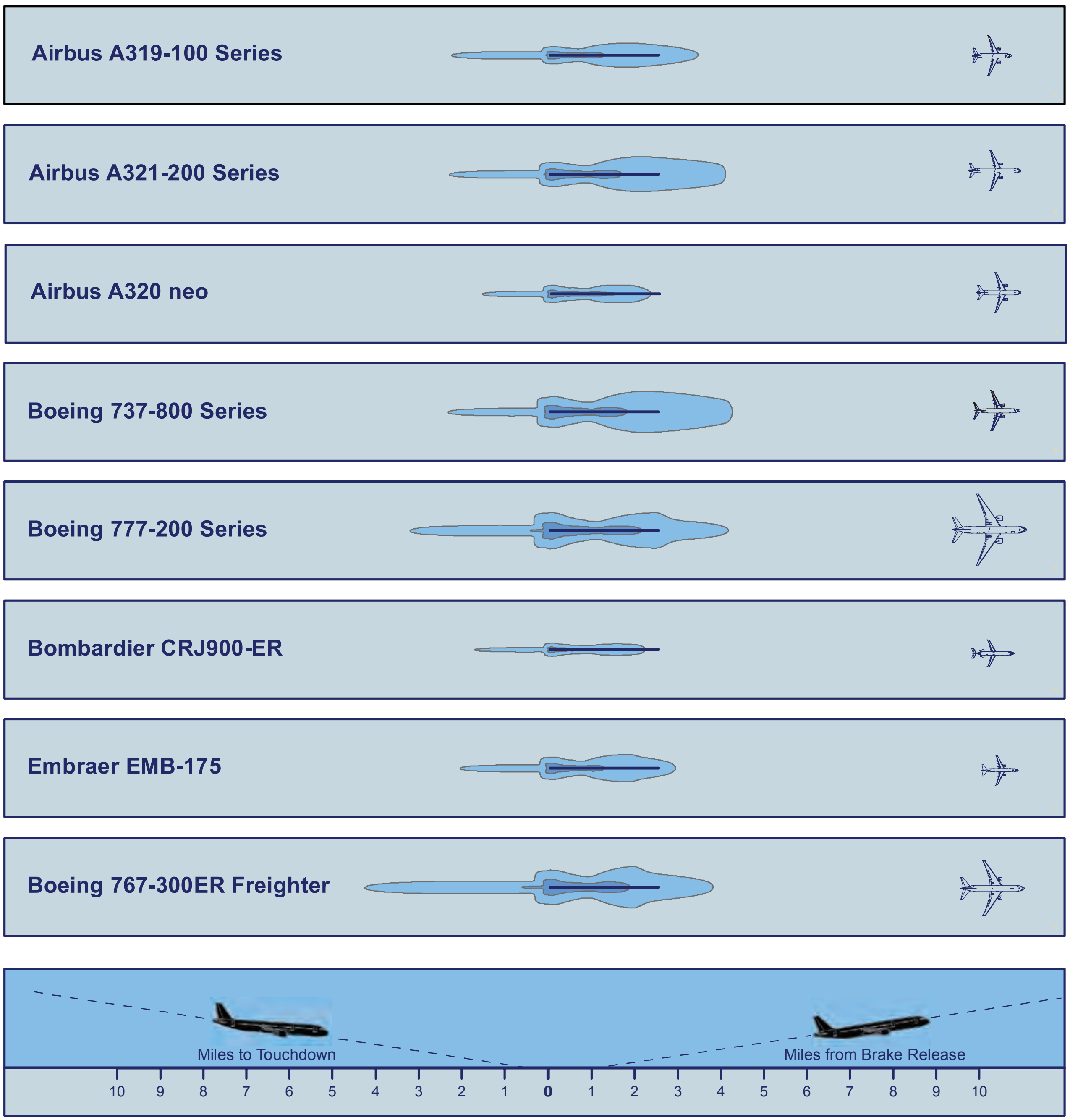
Grid Point Analysis

Comparison of Noise Levels

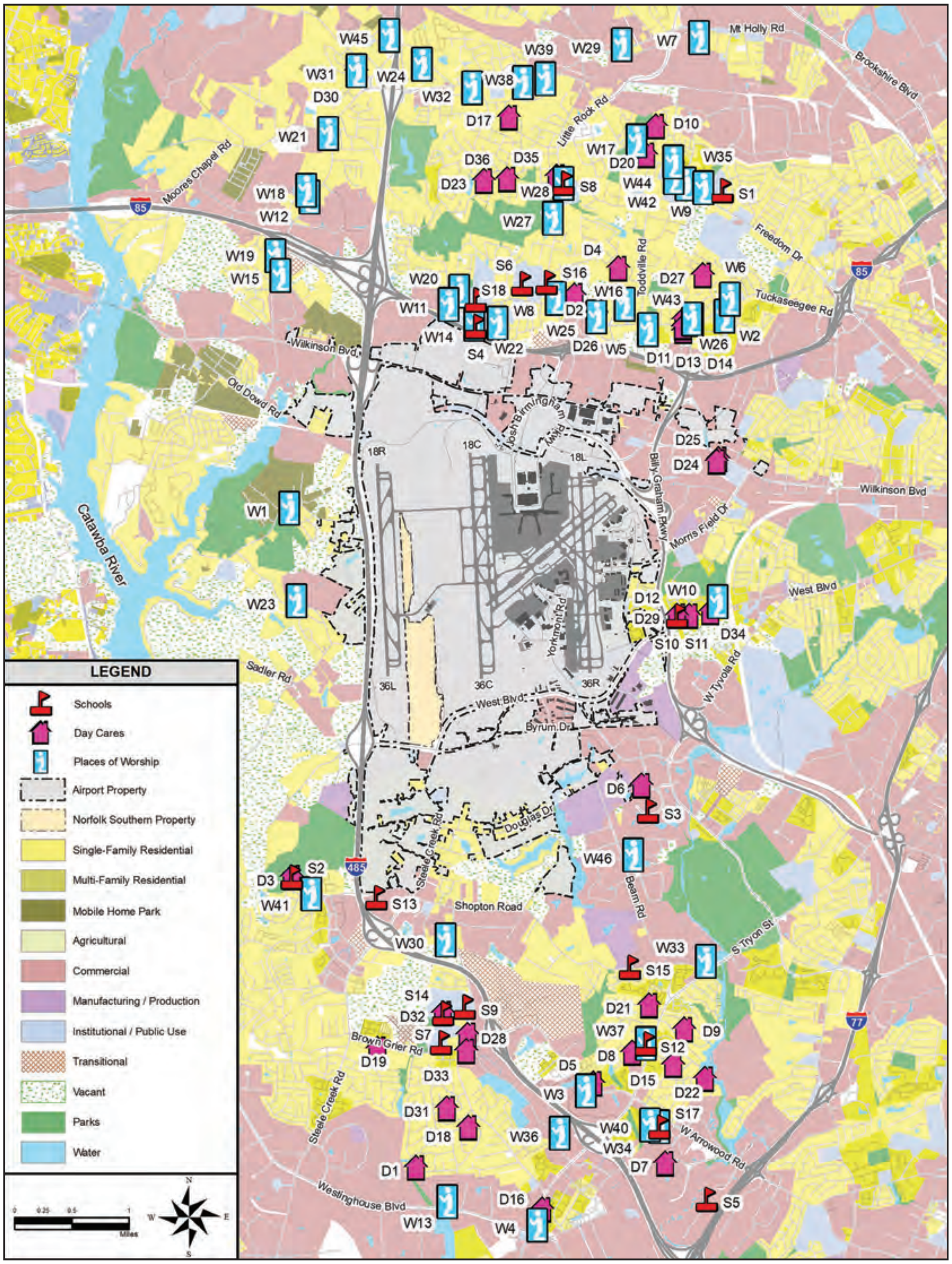


* As measured along the takeoff path 2 miles from the overflight end of the runway.

Aircraft Noise Footprints



Airport Environs



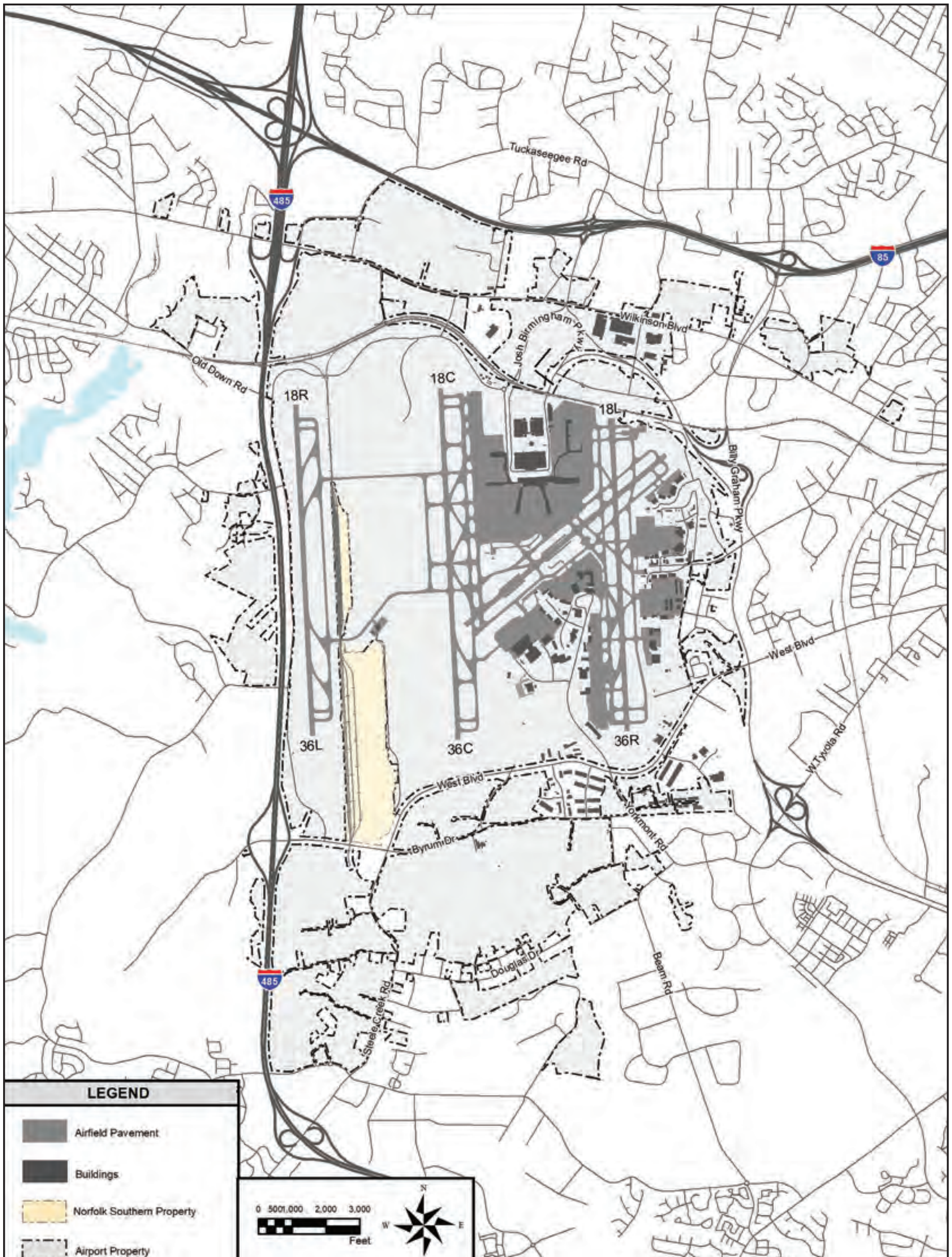
Airport Environs

Schools	
ID	Name
S1	Allenbrook Elementary School
S2	Berewick Elementary School
S3	Central Piedmont Community College
S4	East Voyager Academy of Charlotte
S5	Gordon-Conwell Theology
S6	J.W. Wilson Middle School
S7	Kennedy Middle School
S8	Mountain Island Day School
S9	Olympic High School
S10	Renaissance West Elementary School
S11	Renaissance Middle Elementary School
S12	Rod of God Christian Academy
S13	Southwest Charlotte STEM Academy
S14	Steele Creek Elementary School
S15	Steele Creek Preparatory Academy
S16	Tuckaseegee Elementary School
S17	Unity Classical Charter School
S18	West Mecklenburg High School

Day Cares	
ID	Name
D1	Anthony's Day Care Home
D2	Beginning Years Day Care
D3	Berewick Elementary A.S.E.P.
D4	Busy Beez Child Care
D5	Cadence Academy Preschool, Whitehall
D6	Children's Academy At Lakepointe
D7	Dogwood Lane Children's Academy
D8	Ebenezer Child Care Home Sylvia Pauling
D9	Gallmon Family Small Day Care Home
D10	Gina's Learn-N-Play Home Day Care
D11	Gleaton's Learning Immersion Academic Center
D12	Howard Levine Child Development Center
D13	Humpty Dumpty Academy I
D14	Humpty Dumpty Academy II
D15	Jaznee's Wonderland
D16	La Petite Academy
D17	Lachriston Large Day Care Home
D18	Lacy's Little Ones
D19	Lil' Bundles Of Joy
D20	Little Dove's In Home Day Care
D21	Little Miracles Home Day Care
D22	Miss Ethel's Day Care Home
D23	Miss Miss C's Child Care
D24	Mrs. Chris Play And Learn #2
D25	Mrs. Chris Play And Learn Preschool
D26	Mulberry Head Start
D27	Precious Little Angels
D28	Primrose School Of Lake Wylie
D29	Renaissance West A.S.E.P.
D30	Shady Brook Baptist Child Care Center
D31	Spectrum Kids
D32	Steele Creek A.S.E.P.
D33	The Learning Experience
D34	The Learning Tree Child Care Center
D35	Tiny Treasures Child Development Center
D36	Vantoinette J. Savage Small Day Care Home

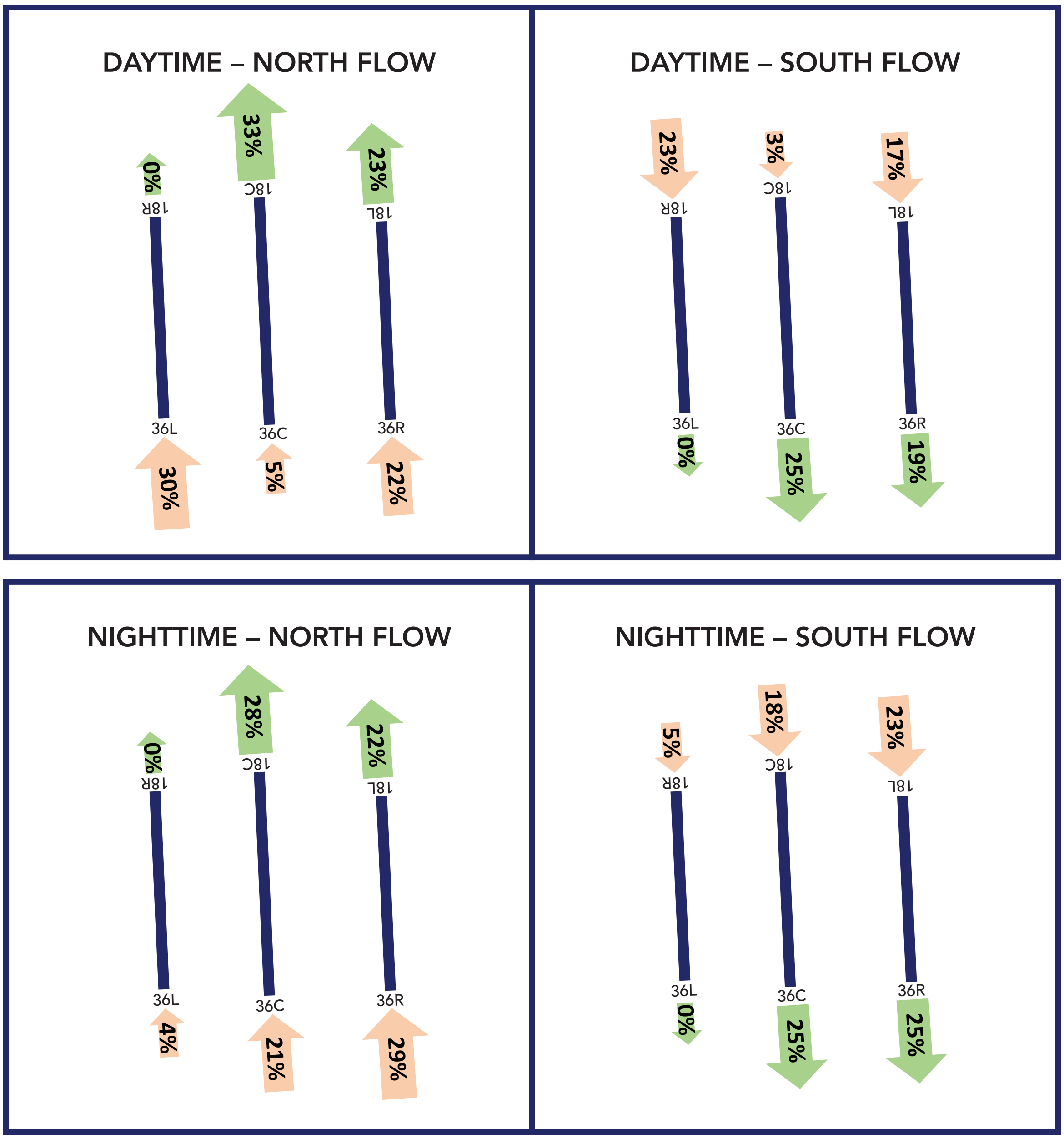
Places of Worship	
ID	Name
W1	Berryhill Baptist Church
W2	Blessed Assurance Community Church
W3	BOLD Church
W4	Central Steele Creek Presbyterian Church
W5	Charlotte Chin Baptist Church
W6	Charlotte Immanuel Church of All Nations
W7	Connections - An Assurance Faith Community
W8	Covenant United Methodist Church
W9	Durham Memorial Baptist Church
W10	EPIC Church Charlotte/ Hedges and Highways Church
W11	Every Nation Church
W12	Garden Memorial
W13	Greater Newbirth Fellowship
W14	Harvest Church
W15	Hope Community Church of Metrolina
W16	Iglesia Catolica Nuestra Senora de Guadalupe
W17	Kingdom Christian Church
W18	Kingdom Embassy International
W19	Liberty Baptist Church
W20	Montagnard Alliance Church
W21	Moores Chapel
W22	Mt Carmel Baptist Church
W23	Mt Olive Presbyterian Church
W24	Mt Zion Missionary Baptist Church
W25	Mulberry Baptist Church
W26	Mulberry Presbyterian Church
W27	New Bethel Church of God in Christ
W28	Paw Creek
W29	Paw Creek Presbyterian Church
W30	Saint Joseph Catholic Church
W31	Shadybrook Baptist Church
W32	St Johns Chapel Baptist Church
W33	Steele Creek AME Zion Church
W34	Steele Creek Church
W35	The Church of Pentecost Charlotte Central
W36	The Restoration Place Church
W37	The Rod of God Ministries
W38	Thrift Baptist Church
W39	Thrift United Methodist Church
W40	Trinity Baptist Church
W41	Trinity Worship Center
W42	West Charlotte Church at Freedom
W43	West Charlotte Spanish SDA Church
W44	Westview Christian Church
W45	Woodland Presbyterian Church
W46	World Worship Church

Existing Airfield



*Note Runway 5/23 assumed closed for operation

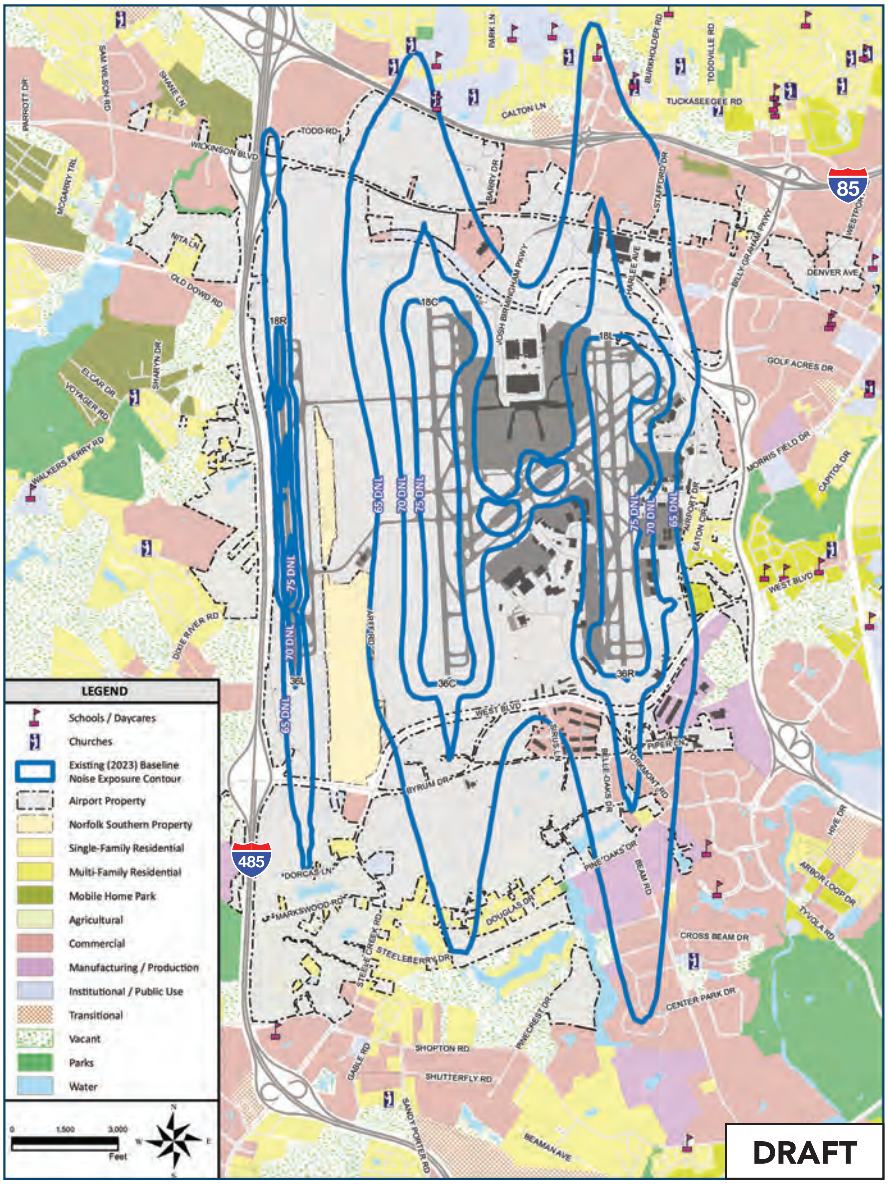
Existing (2023) Baseline Runway Use
Average Annual Conditions*



*Totals may not equal 100% due to rounding.

Arrivals Departures

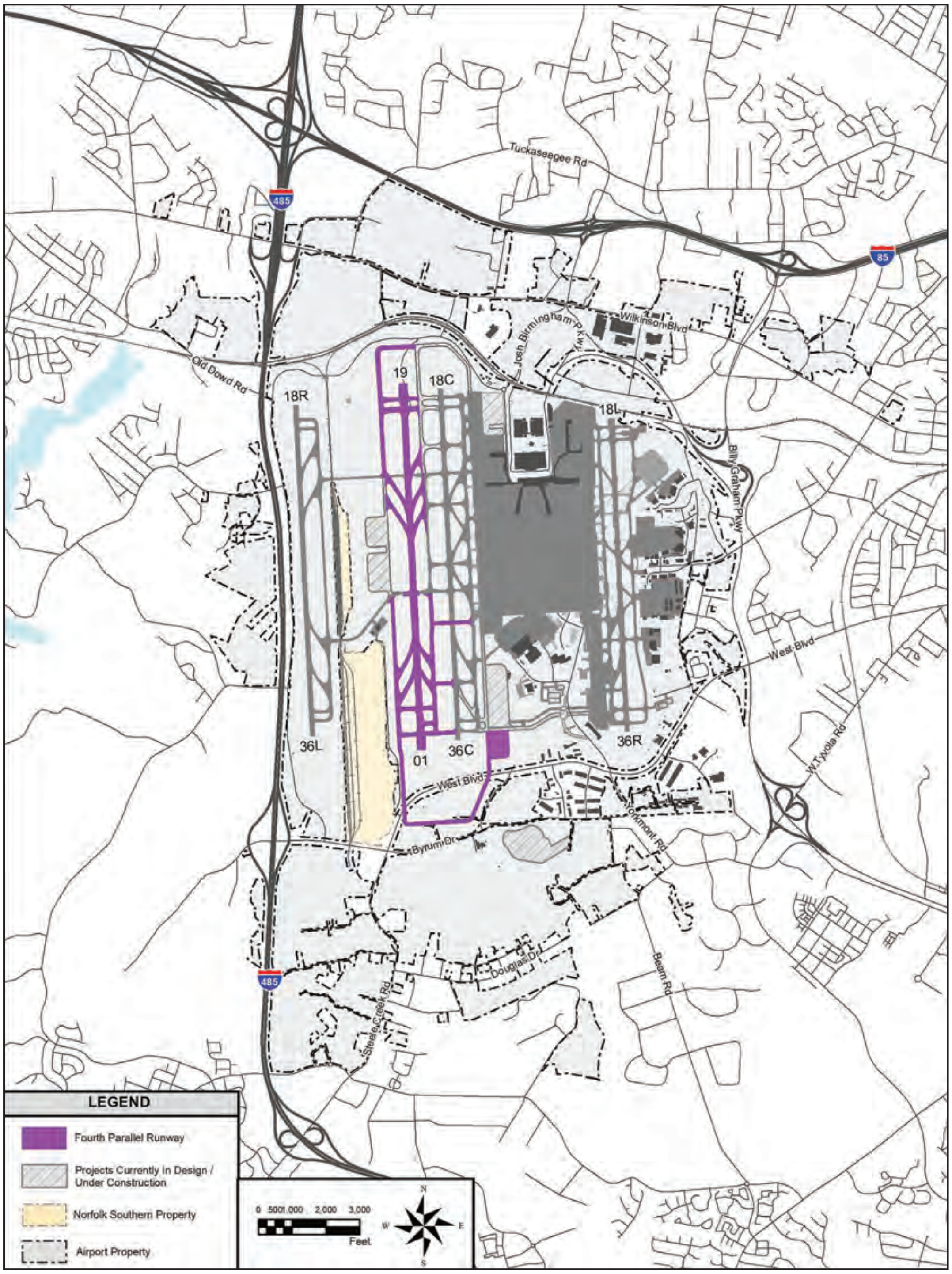
Existing (2023) Baseline Noise Exposure Contour



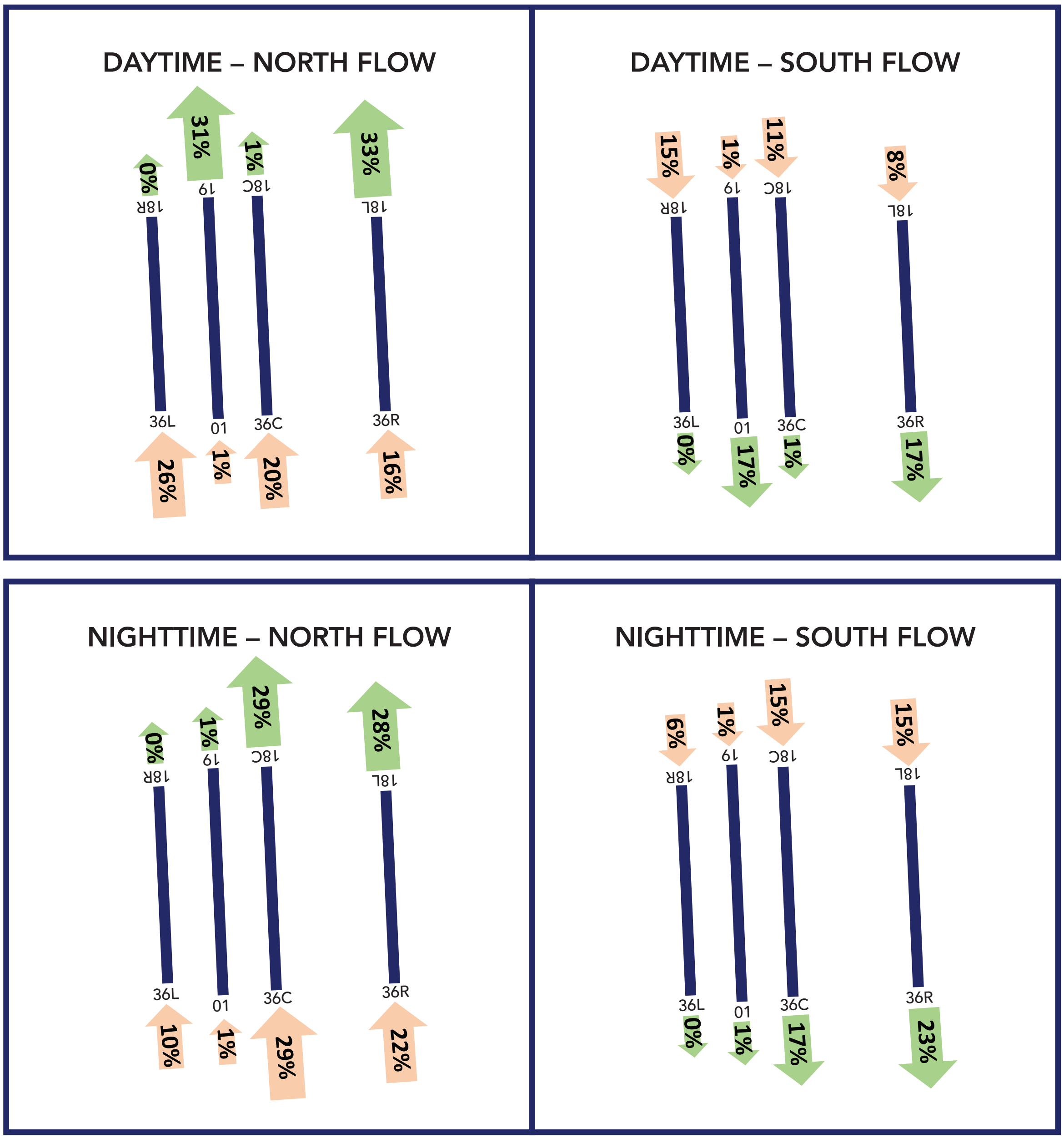
Housing Units within the 65 DNL	
Single-Family Residential	**51**
Mitigated	15
Not Mitigated	36
Multi-Family Residential	**88**
Not Mitigated	88
Manufactured Home	**1**
Not Mitigated	1
Total Housing Units	**140**

Noise Sensitive Facilities within the 65 DNL	
Churches / Places of Worship	4
Schools / Education	3
Libraries	0
Hospitals	0
Nursing Homes	0
Total Noise Sensitive Facilities	**7**

Future Airfield

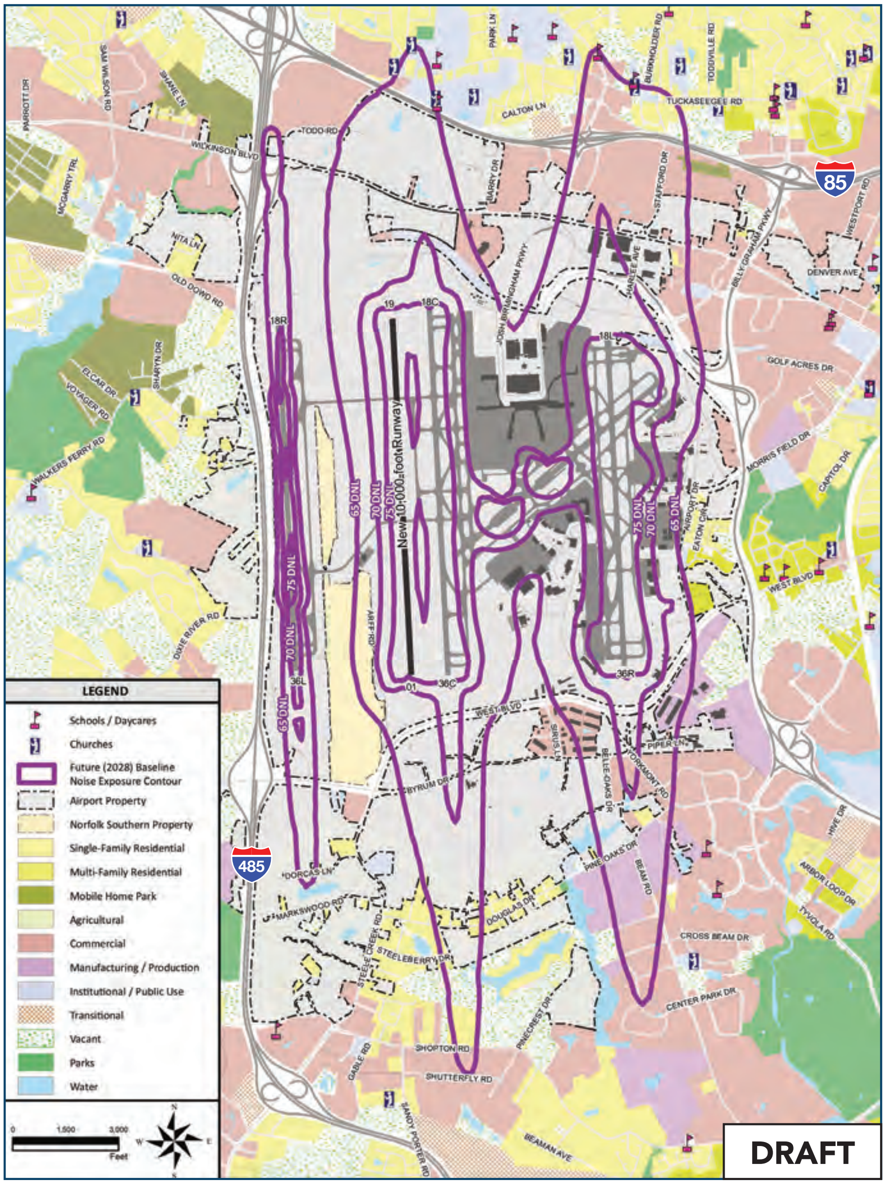


Future (2028) Baseline Runway Use Average Annual Conditions*



*Totals may not equal 100% due to rounding.

Future (2028) Baseline Noise Exposure Contour



Housing Units within the 65 DNL	
Single-Family Residential	**85**
Mitigated	47
Not Mitigated	38
Multi-Family Residential	**94**
Mitigated	2
Not Mitigated	92
Manufactured Home	**63**
Not Mitigated	63
Total Housing Units	**242**

Noise Sensitive Facilities within the 65 DNL	
Churches / Places of Worship	4
Schools / Education	4
Libraries	0
Hospitals	0
Nursing Homes	0
Total Noise Sensitive Facilities	**8**

History of Noise Compatibility Planning

CURRENTLY APPROVED NOISE ABATEMENT MEASURES

Measure ID	DESCRIPTION	STATUS
NA-1	Continue periodic monitoring procedures, initiated as a result of the 1990 Part 150 Noise Compatibility Program (NCP), within the Airport Environs. (Continuation of implemented Measure NA-1 of adopted 1990 NCP.) (Phase I) Approved in 1996	Inactive
NA-4	Provide monthly reports on late night (11:00 p.m. to 7:00 a.m.) runway utilization and variances from NCP assumptions to Air Traffic Control Tower management and frequent nighttime operators. Conduct follow-up with FAA and carriers to enhance voluntary adherence to existing program. (Phase I) Approved in 1996	Active
NA-5	Designate Runway 18C or 18L as preferred for takeoffs by turbojet and large four-engine prop aircraft between 11:00 p.m. and 7:00 a.m. when, under the current preferential runway use program, Runway 23 or Runway 5 cannot be used for reasons of wind, weather, operational necessity, or required runway length. (Phase I) Approved in 1996	Active
NA-6	Reaffirm Airport user policy which designates locations and procedures for aircraft engine runups. Establish a runup position on the USAir ramp parallel to Runway 5/23. (Phase I) Approved in 1996	Active
NA-7	Departing Runways 36R and 36C, turbojet and large four-engine prop aircraft initiate turns at the 2.6 and 2.5 DME north of the CLT VOR/DME, respectively. (Phase I) Approved in 1996	Active
NA-8	After construction of Runway 18R/36L, 3,700 feet west of Runway 18C/36C, establish an initial departure turn for Runway 18R, to be made as soon as practicable by turbojets and large four-engine prop aircraft, to a heading of 195 degrees. (Phase II) Approved in 1996	Active
NA-9	After commissioning of a third parallel runway west of Runway 18C/36C, establish an initial departure turn, as soon as practicable, by turbojets and large four-engine prop aircraft to a heading of 315 degrees from Runway 36L. (Phase II) Approved in 1996	Active

Noise Abatement Alternative Screening Process

Safety/Feasibility → Reduce Impacts in 65 DNL → Operational Impacts → Implementation Considerations → Move to Recommend

Eliminate from Evaluation

Safety / Feasibility

- Our team of experts will evaluate each alternative for safety/feasibility issues
- If no safety or feasibility issues identified, move to the next step

Reduces Impacts in 65 DNL

- Would the alternative result in a net reduction in non-compatible land uses within the 65 DNL?
- If there is a net reduction in impacts within the 65 DNL, move to the next step

Operational Impacts

- Does the alternative negatively impact operational efficiency (increased delays, reduced capacity, increased flight time, etc.)?
- If there are no operational impacts identified, move to the next step

Implementation Considerations

- Who is responsible to implement or support the implementation of the alternative?
- Consideration of the process, timeline, and cost of implementation
- If no implementation issues are identified, move to the next step

Move to Recommend

- Include the alternative as a recommended measure for further evaluation with other recommended measures
- Various scenarios of recommended measures will be evaluated

ID	CATEGORY	DESCRIPTION	ASSESSMENT METHOD	SAFETY / FEASIBILITY	REDUCES IMPACTS IN 65DNL?	OPERATIONAL IMPACTS?
			RUN-UP LOCATIONS			
NA-A-1	Facility Modification	Maximize the use of midfield run-up locations (ID 2, 3) over those located on the east side of the Airport (ID 4, 5, 6). (Short-Term)	Qualitative	No safety/feasibility issues identified	Has potential	No operational impacts identified.
NA-A-2	Facility Modification	Conduct an assessment of ground run-up procedures after construction of the new fourth parallel runway to identify run-up locations in the midfield of the Airport. (Long-Term)	Qualitative	No safety/feasibility issues identified	Has potential	No operational impacts identified.
			DISPLACED ARRIVAL THRESHOLD			
NA-B-1	Facility Modification	Implement a 1,235-foot displaced arrival threshold on Runway 36C	Quantitative	No safety/feasibility issues identified	No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.	
NA-B-2	Facility Modification	Implement a 1,376-foot displaced arrival threshold on Runway 36R	Quantitative	No safety/feasibility issues identified	No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.	
NA-B-3	Facility Modification	Implement a 1,376-foot displaced arrival threshold on Runway 18L	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 6 housing units within the 65+ DNL.	Yes. Negative operational impacts would occur due to the existing high-speed taxiways not being positioned for a displaced threshold. The results would be greater runway occupancy times, longer taxi distance, and potentially increased congestion due to where aircraft would exit the runway. These operational impacts could be resolved by redesigning and reconstructing all of the taxiways along the runway. However, the cost of that would far exceed any benefits.
NA-B-4	Facility Modification & Preferential Runway Use	*Evaluate the new runway as an arrival runway:* Evaluate the new runway as an arrival runway and implement an 1,100-foot arrival displaced threshold on Runway 01	Quantitative	No safety/feasibility issues identified	No. Increases impacts compared to the Future (2028) Baseline by 15 housing units within the 65+ DNL.	
			AIRPORT FLOW			
NA-C-1	Preferential Runway Use	*Balanced Mix of North v. South Flow:* Increase the amount of time the Airport operates in south flow to achieve a 50/50 balance of north v. south flow	Qualitative	Safety/Feasibility concerns. Direction of flow is primarily determined by wind direction and wind speed on the surface and aloft (above the ground). It is also determined by the location of severe weather for a hundred miles from the Airport. Based on these factors, it is not feasible for the ATCT to maintain an annual runway flow and to try and force it would likely reduce safety. As such, the implementation of such policy would limit the air traffic controller's ability to choose the safest direction of flow for the operation of the Airport.		
NA-C-2	Preferential Runway Use	*Limit One Direction Flow to a Maximum # Days:* Prevent continuous flow in one direction over more than [two consecutive days] to bring relief to people who have been getting noise/flow from one type of operation continuously for multiple days. After [two consecutive days] of flow in the same direction, flow should be reversed at the first reasonable opportunity and maintained in the reverse direction for a reasonable period.	Qualitative	Safety/Feasibility concerns. Direction of flow is primarily determined by wind direction and wind speed on the surface and aloft (above the ground). It is also determined by the location of severe weather for a hundred miles from the Airport. Based on these factors, it is not feasible for the ATCT to maintain an annual runway flow and to try and force it would likely reduce safety. As such, the implementation of such policy would limit the air traffic controller's ability to choose the safest direction of flow for the operation of the Airport.		

ID	CATEGORY	DESCRIPTION	ASSESSMENT METHOD	SAFETY / FEASIBILITY	REDUCES IMPACTS IN 65DNL?	OPERATIONAL IMPACTS?
DAYTIME RUNWAY USE						
NA-D-1	Preferential Runway Use	*Evaluate the new runway as an arrival runway* Designate Runways 18R/36L and 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures by turbojet aircraft between 7:00 a.m. and 10:00 p.m.	Quantitative	No safety/feasibility issues identified	No. Increases in impacts compared to the Future (2028) Baseline by 18 housing units within the 65+ DNL.	
NA-D-2	Preferential Runway Use	*Spread Operations:* At low periods, spread operations to avoid concentration of a particular mode of operation (e.g., most/all departures or most/all arrivals) to a single runway, leaving others underutilized for the same mode of operation. For example: Avoid sending all arrivals to Runway 18R while Runways 18L and 18C are held open for occasional departures.	Qualitative	No safety/feasibility issues identified. In general, this is how the Airport currently operates.	No. This recommendation is already accounted for in the Future (2028) Baseline scenario. There would be no reductions in impacts compared to the Future (2028) Baseline within the 65+ DNL.	
NA-D-3	Preferential Runway Use	*Cap Arrival/Departure Mix by Runway:* Ensure that the new fourth parallel runway (Runway 01/19), Runway 18R/36L (for arrivals), and Runway 18C/36C (for departures) will never have more, in the aggregate, than [50%] of arrivals/departures over any single daily period.	Qualitative	Safety/Feasibility concerns. The suggestion of caps on runways inherently creates barriers to implementation from a feasibility perspective because the airport is a dynamic environment that may require the use of runways that would exceed the limits of this alternative. To force caps and percentages into a complex system like the one at CLT would reduce operational capability and potentially reduce safety. As such, this alternative is not feasible for implementation.		
NA-D-4	Preferential Runway Use	*Require Departures on 18R/36L:* Set guidelines that require a minimum allocation of departures for Runway 18R/36L for a given timeframe (e.g., over the course of a quarter or year), with the goal of achieving at least ten percent of daily departures on that runway.	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 12 housing units within the 65+ DNL.	Yes. Runway 18R/36L was planned (location) and designed (length) to primarily be used as an arrival runway. It has the capability to be used for departures, but due to its location in relationship to the terminal area it is used for departures only under extenuating circumstances. Implementation of this alternative would require aircraft to routinely taxi across two active runways (Runway 18C/36C and Runway 01/19), which reduces the operational efficiency of those active runways due to the need to create safe gaps. This would result in significantly increased delay to insure no runway incursions occur. Therefore, this alternative is not considered feasible due to operational and safety concerns.
NA-D-5	Preferential Runway Use	*Avoid Dual Stream Arrivals during Non-peak Daytime Operations:* Between 7a-10p, do not use the new fourth parallel runway (Runway 01/19) and Runway 18R/36L to receive arrivals in "dual stream" mode during non-peak periods.	Qualitative	No safety/feasibility issues identified. In general, this is how the Airport currently operates.	No. This recommendation is already accounted for in the Future (2028) Baseline scenario. There would be no reductions in impacts compared to the Future (2028) Baseline within the 65+ DNL.	
NA-D-6	Preferential Runway Use	*Alternate Primary Operation for Adjacent Runways:* Alternate use of runways so that no two adjacent runways will be used primarily for the same mode of operation (arrival or departure) over a daily period.	Qualitative	No safety/feasibility issues identified. In general, this is how the Airport currently operates.	No. This recommendation is already accounted for in the Future (2028) Baseline scenario. There would be no reductions in impacts compared to the Future (2028) Baseline within the 65+ DNL.	
NA-D-7	Preferential Runway Use	Utilize Runway 01/19 and Runway 18C/36C primarily for departures and Runway 18R/36L and Runway 18L/36R primarily for arrivals	Quantitative	Currently under review		
NA-D-8	Preferential Runway Use	Utilize Runway 01/19 and Runway 18C/36C for both arrivals and departures	Quantitative	Currently under review		

ID	CATEGORY	DESCRIPTION	ASSESSMENT METHOD	SAFETY / FEASIBILITY	REDUCES IMPACTS IN 65DNL?	OPERATIONAL IMPACTS?
PREFERENTIAL NIGHTTIME RUNWAY USE						
NA-E-1	Preferential Runway Use	Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 13 housing units within the 65+ DNL.	No operational impacts identified.
NA-E-2	Preferential Runway Use	Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 7 housing units and 1 day care within the 65+ DNL.	No operational impacts identified.
NA-E-3	Preferential Runway Use	Focus nighttime north-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 36R). Due to their close proximity, consider Runways 1/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 19 housing units within the 65+ DNL.	Currently under review
NA-E-4	Preferential Runway Use	Focus nighttime south-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 18L). Due to their close proximity, consider Runways 1/19 and 18C/36C as one runway by aggregating their volumes when determining which runway receives fewest arrivals.	Quantitative	No safety/feasibility issues identified	No. Increases impacts compared to the Future (2028) Baseline by 28 housing units within the 65+ DNL.	
DIVERGENT HEADINGS - NORTH FLOW						
NA-F-1	Flight Procedure	Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors. > Keep existing headings as follows: Runway 36R: 25° Runway 36L: 315° > Add additional divergent headings as follows: Runway 36R: - 85° to follow the Wilkinson Boulevard corridor - 55° and 70° to follow the Interstate 85 corridor Runway 01: - Implement the existing Runway 36C's approved 330° heading - 345° to overfly the Interstate 85/485 Interchange and follow the Interstate 485 corridor - 305° to follow the Wilkinson Blvd corridor	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 5 housing units and 1 day care within the 65+ DNL.	No operational impacts identified.
NA-F-2	Flight Procedure	Maximize the number of divergent headings for north flow operations while maintaining a 15° separation between headings. > Add additional divergent headings as follows: Runway 36R: RWH, 20°, 35°, 50°, 65°, 80° Runway 01: RWH, 345°, 330°, 315°, 300°, 285° While a straight-out heading is identified for Runways 36R and 01, these headings cannot be used simultaneously because a 15-degree separation is required per 7110.65Z.	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 2 housing units within the 65+ DNL.	No operational impacts identified.
DIVERGENT HEADINGS - SOUTH FLOW						
NA-G-1	Flight Procedure	Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on the new Runway 19. > Keep existing headings as follows: Runway 18R: 200° Runway 18L: RWH > Add additional divergent headings as follows: Runway 18R (remove 2-mile restriction): - 220° to follow the Garrison Road corridor Runway 19 (keep 2-mile restriction): - Implement the existing RWH Runway 18L (remove 2-mile restriction): - 120° to follow the Billy Graham Parkway corridor - 150° and 165° to follow the W Tyvola Road corridor	Quantitative	No safety/feasibility issues identified	No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.	
NA-G-2	Flight Procedure	Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on Runway 18L. > Keep existing headings as follows: Runway 18R: 200° Runway 18L: RWH (keep 2-mile restriction) > Add additional divergent headings as follows: Runway 18R (remove 2-mile restriction): - 220° to follow the Garrison Road corridor Runway 19 (remove 2-mile restriction): - Implement the existing RWH - 200° and 215° to follow the Steele Creek Road corridor	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 1 housing unit within the 65+ DNL.	No operational impacts identified.

ID	CATEGORY	DESCRIPTION	ASSESSMENT METHOD	SAFETY / FEASIBILITY	REDUCES IMPACTS IN 65DNL?	OPERATIONAL IMPACTS?
DIVERGENT HEADINGS - SOUTH FLOW (continued)						
NA-G-3	Flight Procedure	Increase the number of departure headings for south flow operations while maintaining existing approved headings and maximizing departure corridors. This requires eliminating the 2-mile restriction for all runways. > Keep existing headings as follows: Runway 18L: RWH Runway 18R: 200° > Eliminate the 2-mile restriction and add divergent headings as follows: Runway 18L: - 120° to follow the Billy Graham Parkway corridor - 150° and 165° to follow the W Tyvola Road corridor Runway 18R: - 220° to follow the Garrison Rd corridor Runway 19: - Implement the existing RWH - 200° and 215° to follow the Steele Creek Road corridor	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 1 housing unit within the 65+ DNL.	No operational impacts identified.
NA-G-4	Flight Procedure	Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This would require the elimination of the 2-mile restriction. > Eliminate the 2-mile restriction and add additional divergent headings as follows: Runway 18L: RWH, 165°, 150°, 135°, 120°, 105° Runway 19: RWH, 200°, 215°, 230°, 245°, 260°	Quantitative	No safety/feasibility issues identified	Yes. Reduces impacts compared to the Future (2028) Baseline by 8 housing units within the 65+ DNL.	No operational impacts identified.
DEPARTURE FLIGHT CORRIDORS						
NA-H-1	Flight Procedure	Evaluate helicopter operations in the south general aviation apron to takeoff towards the south (stay between Yorkmont and Billy Graham Parkway before turning on course)	Quantitative	No safety/feasibility issues identified	No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.	
NA-H-2	Flight Procedure	*Change Headings of First Turns off Runways 18L and 18C* Reduce the effect of noise on more densely populated areas and foster the desire by the ACR to return to pre-Metroplex flight paths.	Quantitative	No safety/feasibility issues identified	No. Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL.	
NA-H-3	Flight Procedure	For south flow departures, revert to 2016 procedures where aircraft depart from the Runway 18C at a 183° heading and fly between 2 to 4 nautical miles before turning to a 270° heading.	Qualitative	No safety/feasibility issues identified	Because this alternative targets procedures outside of the 65 DNL, no change would occur when compared to the Future (2028) Baseline 65+ DNL.	
ARRIVAL FLIGHT CORRIDORS						
NA-I-1	Flight Procedure	For south flow arrivals along the CHSLY procedure, maintain the published altitude of 6,000 feet at the HEELZ procedure so flights will not cut the corner	Qualitative	No safety/feasibility issues identified	Because this alternative targets procedures outside of the 65 DNL, no change would occur when compared to the Future (2028) Baseline 65+ DNL.	
NA-I-2	Flight Procedure	For south flow arrivals, extend the eastern downwind so that flights intercept the final approach over the main channel of Mountain Island Lake keeping an altitude of 6,000 feet until turning final approach course.	Qualitative	No safety/feasibility issues identified	Because this alternative targets procedures outside of the 65 DNL, no change would occur when compared to the Future (2028) Baseline 65+ DNL.	
NA-I-3	Flight Procedure	For north flow arrivals, utilize Interstate 77 as a flight corridor	Qualitative	No safety/feasibility issues identified	Because this alternative targets procedures outside of the 65 DNL, no change would occur when compared to the Future (2028) Baseline 65+ DNL.	

Displaced Arrival Threshold

ALTERNATIVE NA-B-1

Implement a 1,235-foot displaced arrival threshold on Runway 36C

Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL

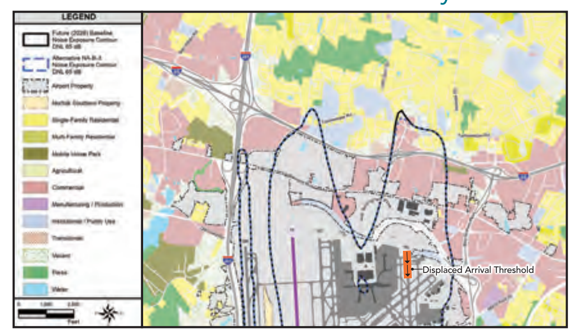
ALTERNATIVE NA-B-2

Implement a 1,376-foot displaced arrival threshold on Runway 36R

Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL

ALTERNATIVE NA-B-3

Implement a 1,376-foot displaced arrival threshold on Runway 18L

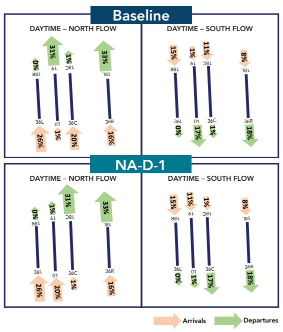


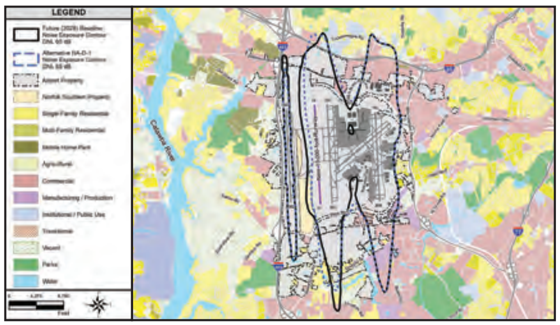
Reduces impacts compared to the Future (2028) Baseline by 6 housing units and 1 day care within the 65+ DNL

Preferential Daytime Runway Use

ALTERNATIVE NA-D-1

Designate Runways 18R/36L and 01/19 as preferred for arrivals and Runway 18C/36C and 18L/36R as preferred for departures by turbojet aircraft between 7:00 a.m. and 10:00 p.m.

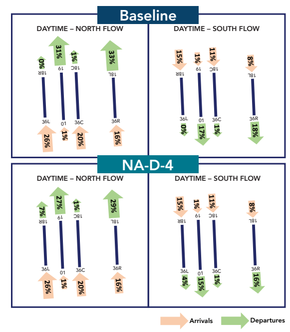


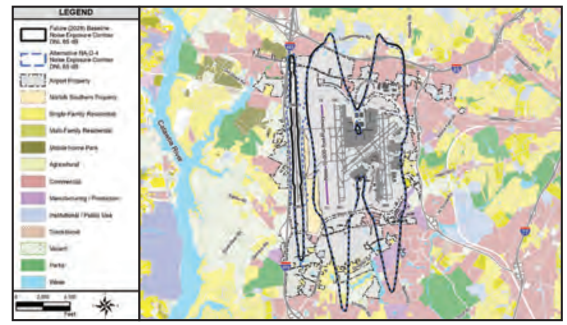


Increases *impacts compared to the Future (2028) Baseline by 18 housing units within the 65+ DNL*

ALTERNATIVE NA-D-4

Set guidelines that require a minimum allocation of departures for Runway 18R/36L for a given timeframe (e.g., over the course of a quarter or year), with the goal of achieving at least ten percent of daily departures on that runway.





Reduces *impacts compared to the Future (2028) Baseline by 12 housing units within the 65+ DNL*

Preferential Daytime Runway Use & Displaced Arrival Threshold

ALTERNATIVE NA-B-4

Implement a 1,100-foot displaced arrival threshold on Runway 01 when the runway is evaluated as preferred for arrivals.

Increases *impacts compared to the Future (2028) Baseline by 15 housing units within the 65+ DNL*

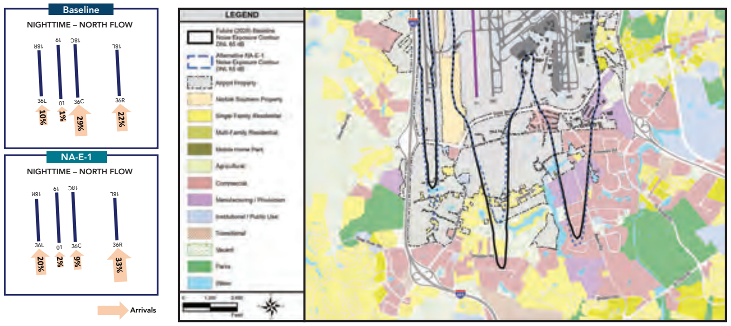
CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT

Charlotte Douglas International Airport
PART 150 STUDY UPDATE

Preferential Nighttime Runway Use

ALTERNATIVE NA-E-1

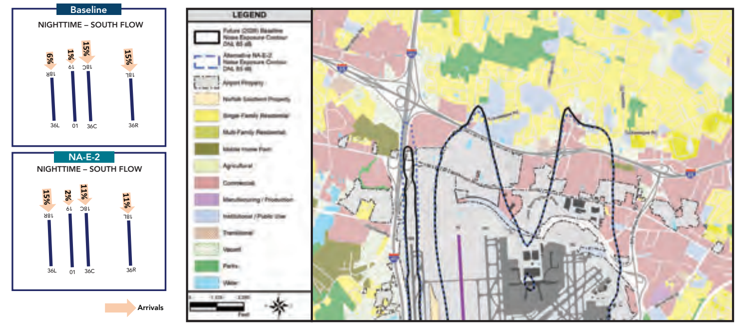
Designate Runway 36L and 36R as preferred for north flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.



Reduces impacts compared to the Future (2028) Baseline by 13 housing units within the 65+ DNL

ALTERNATIVE NA-E-2

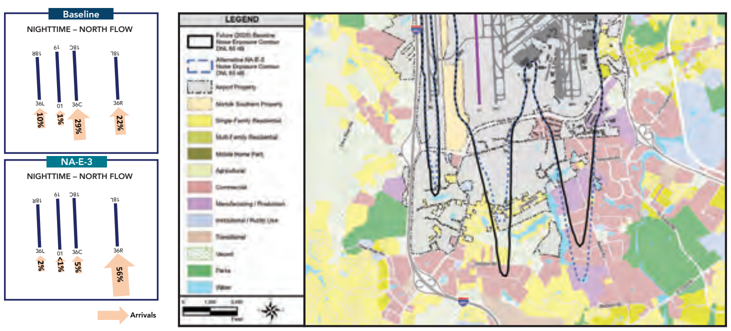
Designate Runways 18L, 18C, and 18R for south flow arrivals by turbojet aircraft between 10:00 p.m. and 7:00 a.m.



Reduces impacts compared to the Future (2028) Baseline by 7 housing units and 1 daycare within the 65+ DNL

ALTERNATIVE NA-E-3

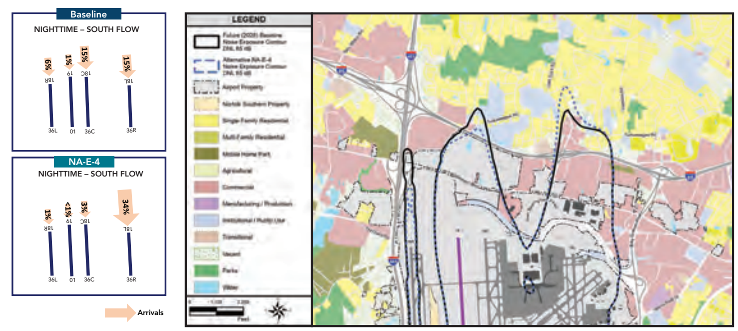
Focus nighttime north-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 36R).



Reduces impacts compared to the Future (2028) Baseline by 19 housing units within the 65+ DNL

ALTERNATIVE NA-E-4

Focus nighttime south-flow arrivals on the runway that typically receives fewer arrivals during the full 24-hour period (Runway 18L).

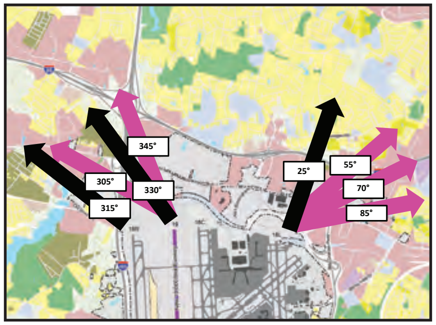


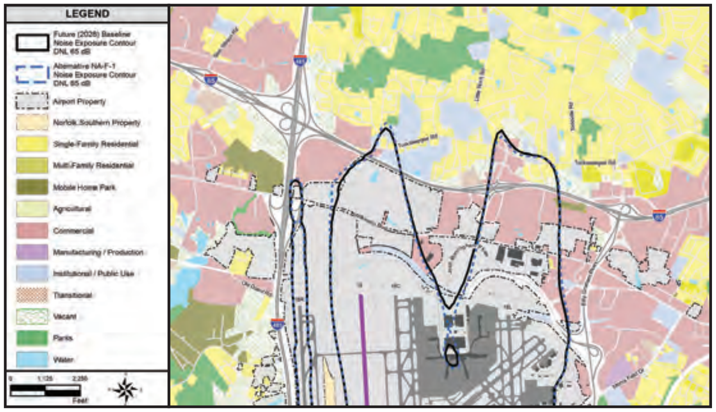
Increases impacts compared to the Future (2028) Baseline by 28 housing units within the 65+ DNL

Divergent Headings – North Flow

ALTERNATIVE NA-F-1

Increase the number of departure headings for north flow operations while maintaining existing approved headings and maximizing departure corridors.

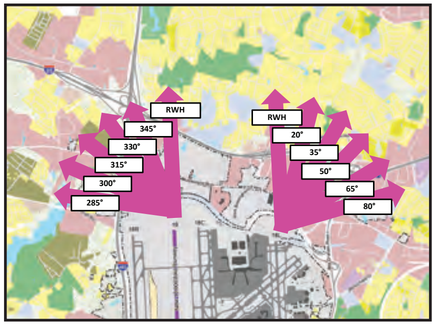


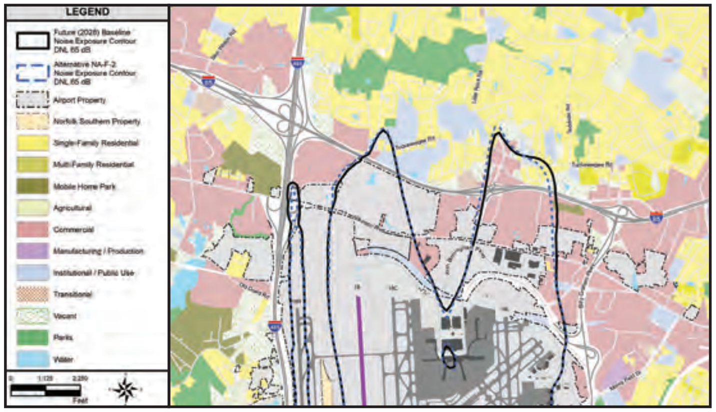


Reduces impacts compared to the Future (2028) Baseline by 5 housing units and 1 daycare within the 65+ DNL

ALTERNATIVE NA-F-2

Maximize the number of divergent headings for north flow operations while maintaining a 15° separation between headings.



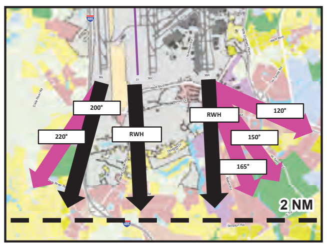


Reduces impacts compared to the Future (2028) Baseline by 2 housing units within the 65+ DNL

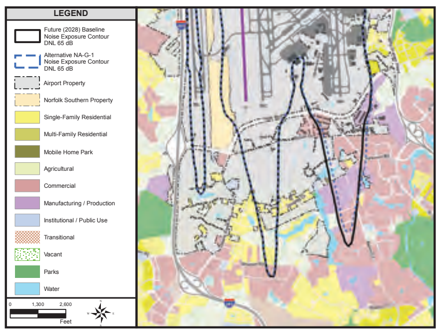
Divergent Headings – South Flow

ALTERNATIVE NA-G-1

Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on the new Runway 19.

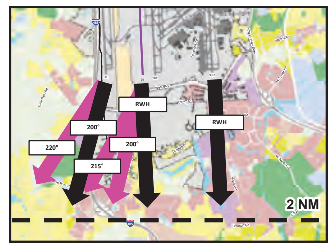


Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL

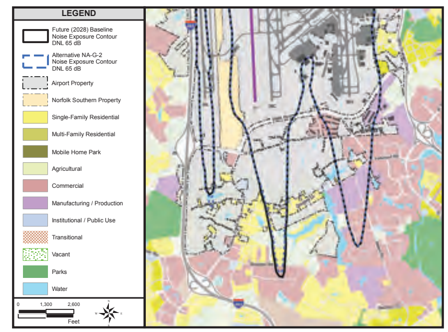


ALTERNATIVE NA-G-2

Increase the number of departure headings for south flow operations while keeping the 2-mile restriction on Runway 18L.

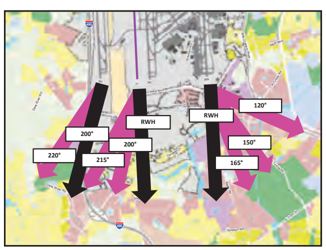


Reduces impacts compared to the Future (2028) Baseline by 1 housing unit within the 65+ DNL

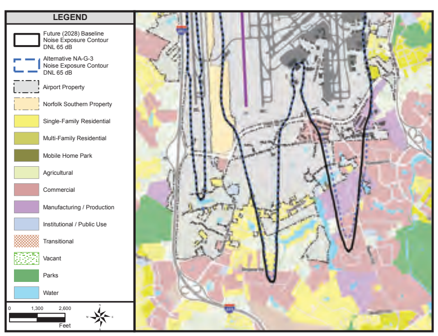


ALTERNATIVE NA-G-3

Increase the number of departure headings for south flow operations while maintaining existing approved headings and maximizing departure corridors. This requires eliminating the 2-mile restriction for all runways.

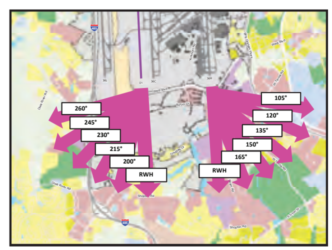


Reduces impacts compared to the Future (2028) Baseline by 1 housing unit within the 65+ DNL

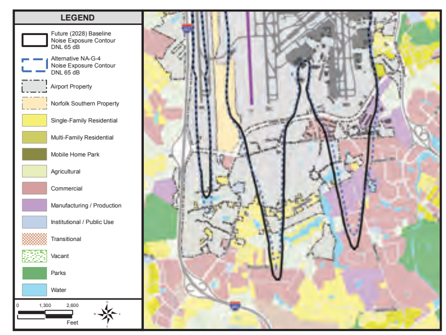


ALTERNATIVE NA-G-4

Maximize the number of divergent headings for south flow departures while maintaining a 15° separation between headings. This requires eliminating the 2-mile restriction for all runways.



Reduces impacts compared to the Future (2028) Baseline by 8 housing units within the 65+ DNL



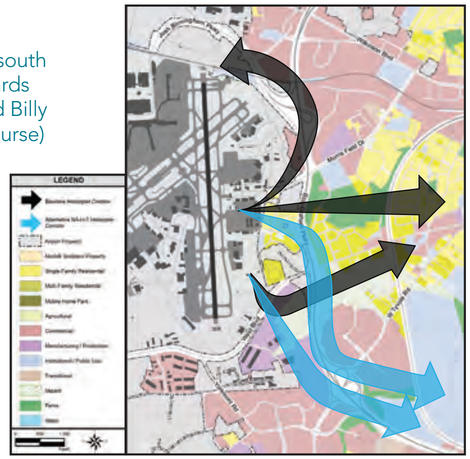
Charlotte Douglas International Airport
PART 150 STUDY UPDATE

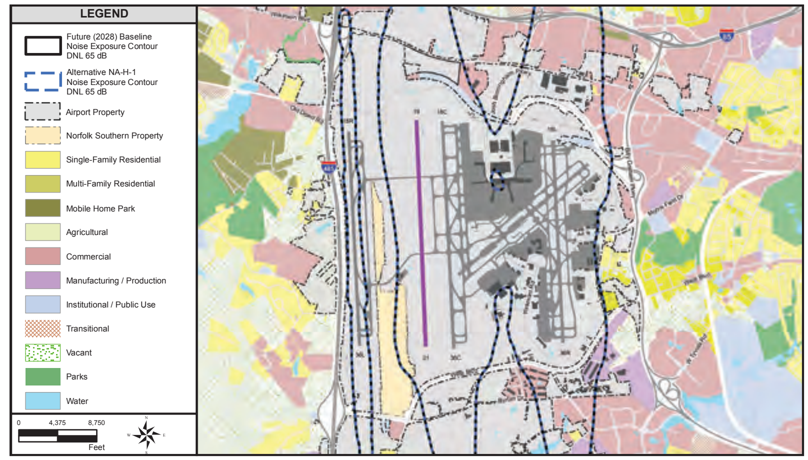
Departure Flight Corridors

ALTERNATIVE NA-H-1

Evaluate helicopter operations in the south general aviation apron to takeoff towards the south (stay between Yorkmont and Billy Graham Parkway before turning on course)

Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL



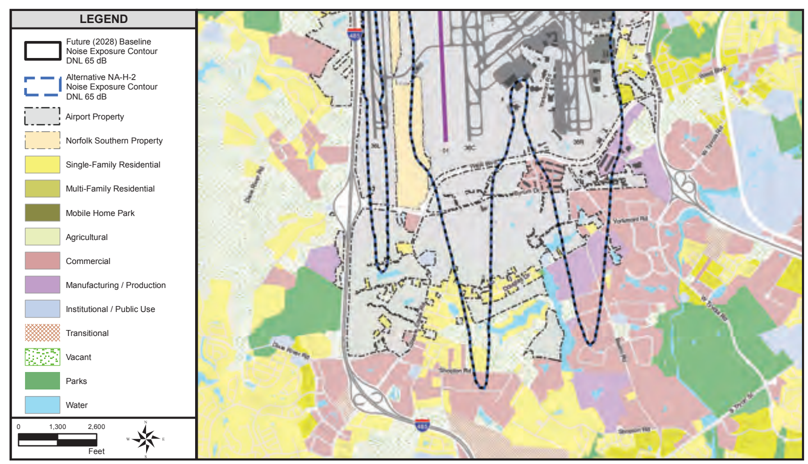


ALTERNATIVE NA-H-2

Change Headings of First Turns off Runways 18L and 18C

Reduce the effect of noise on more densely populated areas and foster the desire by the ACR to return to pre-Metroplex flight paths.

Does not reduce impacts compared to the Future (2028) Baseline within the 65+ DNL



Next Steps / Schedule

MAY 2022
PROJECT KICKOFF

2022–2023
INITIATE AND CONDUCT TECHNICAL WORK

EARLY SPRING 2024
RELEASE OF DRAFT FINDINGS AND RECOMMENDED NCP

LATE SPRING 2024
FINAL RECOMMENDATIONS

EARLY SUMMER 2024
FAA REVIEW & APPROVAL

How to Comment

Please submit your comments by November 30, 2023 using one of these methods:

IN PERSON
Members of the public may fill out and submit their comment forms today

MAIL
Gaby Elizondo
4445 Lake Forest Dr. Suite 700
Cincinnati, OH 45242

EMAIL
CLTPart150@landrumbrown.com

PROJECT WEBSITE
Visit the project website and submit a comment on the "Contact" page

CLTPart150.com

All comments must be submitted or postmarked by

November 30, 2023

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Appendix G

memorandum

Landrum & Brown, Incorporated
4445 Lake Forest Dr. Suite 700
Cincinnati, Ohio 45242
513.530.5333

Project:	Charlotte Douglas International Airport (CLT) Part 150 Study Update
Subject:	Forecast Verification
From:	Landrum & Brown, Inc.
Date:	April 19, 2024

This CLT Part 150 Study Update used aircraft activity levels for the forecast year of 2028 based on the approved *Forecast Technical Memorandum, Technical Memorandum – Final* prepared for CLT.[1] Based on AC 150/5070, *Airport Master Plans*, a forecast is considered to be consistent with the Federal Aviation Administration's (FAA) Terminal Area Forecast if the Airport's forecast and the FAA's TAF differ by less than 10 percent in the 5-year forecast. The FAA TAF issued January 2024 projected a total of 594,664 operations for CLT in 2028 and the CLT forecast projected a total of 639,783 operations for 2028. The difference in operations is 45,119, or 7.6 percent (less than 10 percent). As such, the CLT forecast is consistent with the FAA's TAF.

1 Forecast Technical Memorandum, Technical Memorandum – Final, Charlotte Douglas International Airport Environmental Impact Statement, VHB in association with InterVISTAS, April 18, 2018.

Forecast
Technical Memorandum

Charlotte Douglas International Airport
Environmental Impact Statement

PREPARED FOR

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PREPARED BY

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IN ASSOCIATION WITH

InterVISTAS

4/18/2018

Record of Changes/Version History

Change/ Version Number	Date of Change	Sections Changed	Description	Person Entering Change
1	11/10/2017	All	Original Draft	VHB/InterVISTAS
2	1/17/2018	1, Appendix	Additional data added to tables	VHB/InterVISTAS
3	03/27/2018	All	Response to FAA Comments	VHB/InterVISTAS
4	04/18/2018	None.	Finalized.	VHB

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1

Introduction

In accordance with FAA Order 1050.1F "Environmental Impacts: Policies and Procedures, an EIS requires a Purpose and Need section. In order to demonstrate part of the need for capacity-related components of the Project, a passenger and operations forecast ("EIS forecast") has been completed for Charlotte Douglas International Airport ("the Airport" or "CLT"). This technical memorandum covers analysis of the historical traffic at CLT as well as the methodology and results of the long-term traffic forecast. This long-term annual forecast was used as the basis of derivative forecasts (busy day, peak hour, design day schedules), which served as inputs into the simulation modeling. Summary forecast results are shown below in **Table 1-1**. The most recent calendar year of data available as of the writing of this memorandum is 2016; therefore, 2016 was selected as the base year for this EIS.

In addition to showing the results of the EIS forecast, this memorandum also compares the EIS forecast to the Federal Aviation Administration's (FAA) 2016 Terminal Area Forecast (TAF) and the forecast completed by the Charlotte Aviation Department (the Department) in 2014 for the CLT Master Plan (known as the Airport Capacity Enhancement Plan or ACEP).[1] The service and outlook for CLT is now updated to reflect changing conditions since completion of the ACEP.

1 The ACEP was released in February 2016; however, the latest full year of data shown in the report and used in the forecast is 2013.

Table 1-1 Summary of Charlotte Douglas International Airport Forecast

	Forecast				Compound Annual Growth Rates		
	Base Year 2016	Base Year+1 2017	Build Year 2028	Build Year +5 2033	Base Year+1 2017	Build Year 2028	Build Year +5 2033
Passenger Enplanements							
Air Carrier	15,640,736	15,850,803	19,824,450	21,720,151	1.3%	2.0%	2.0%
Commuter	6,533,011	6,895,699	8,068,898	8,578,173	5.6%	1.8%	1.6%
Total	**22,173,747**	**22,746,502**	**27,893,348**	**30,298,324**	**2.6%**	**1.9%**	**1.9%**
Aircraft Operations							
Air Carrier	400,819	409,357	482,269	513,764	2.1%	1.6%	1.5%
Air Taxi	117,378	118,994	129,351	133,460	1.4%	0.8%	0.8%
Subtotal	*518,197*	*528,351*	*611,620*	*647,224*	*2.0%*	*1.4%*	*1.3%*
General Aviation	24,869	24,935	25,487	25,742	0.3%	0.2%	0.2%
Military	2,676	2,676	2,676	2,676	0.0%	0.0%	0.0%
Total Operations	**545,742**	**555,962**	**639,783**	**675,643**	**1.9%**	**1.3%**	**1.3%**
Peak Hour Operations	114	116	134	146	1.8%	1.4%	1.5%
Cargo/Mail							
Enplaned and Deplaned Tons	154,477	169,152	235,242	261,000	9.5%	3.6%	3.1%
Operational Factors							
Average Aircraft Size (seats)							
Air Carrier	144	144	148	150	0.0%	0.2%	0.2%
Air Taxi	59	59	62	63	0.0%	0.4%	0.4%
Average Enplaning Load Factor							
Air Carrier	83.6%	83.7%	84.3%	84.6%			
Air Taxi	80.2%	80.3%	81.4%	81.4%			

Source: FAA Operations Network (OPSNET); InterVISTAS analysis for forecast.

Note: This summary table shows is based on a Build Year of 2028. A similar version of this table reflecting Base Year + 5, 10 and 15 years is shown in the Appendix.

Note: The forecast does not reallocate air taxi operations to air carrier as the seating capacity increases; therefore, the average aircraft size (seats) for air taxi goes above 60 seats.

2

Historical Traffic Analysis

This chapter presents background information on the Charlotte Douglas International Airport ("the Airport" or "CLT"), the economics of the surrounding catchment area, historical traffic growth, the relationship between local economics and airport traffic, as well as the Airport's role as a hub in the network of the dominant air carrier American Airlines.

2.1 Catchment Area

The Airport serves the 20-county Charlotte-Gastonia-Salisbury economic area, which includes portions of both North Carolina and South Carolina (**Figure 2-1**).[2] Included in this economic area is the Charlotte-Concord Combined Statistical Area (CSA), which in turn covers the 10-county Charlotte-Concord-Gastonia Metropolitan Statistical Area (MSA) and two micropolitan areas (Albemarle and Shelby). The largest county, Mecklenburg County in North Carolina, includes the City of Charlotte and the Airport itself.

2 City of Charlotte, Official Statement, Bond Series 2017 A-C, May 19, 2017.

Figure 2-1 CLT Catchment Area

Source: County data from U.S. Census Bureau

Within the United States, Charlotte was the 17th largest city and the 21st largest CSA (**Table 2-1**) in 2016.

Table 2-1 Top 20 U.S. Cities Ranked by Population, CY 2016

Rank	City	State	Population
1	New York City	New York	8,537,673
2	Los Angeles	California	3,976,322
3	Chicago	Illinois	2,704,958
4	Houston	Texas	2,303,482
5	Phoenix	Arizona	1,615,017
6	Philadelphia	Pennsylvania	1,567,872
7	San Antonio	Texas	1,492,510
8	San Diego	California	1,406,630
9	Dallas	Texas	1,317,929
10	San Jose	California	1,025,350
11	Austin	Texas	947,890
12	Jacksonville	Florida	880,619
13	San Francisco	California	870,887
14	Columbus	Ohio	860,090
15	Indianapolis	Indiana	855,164
16	Fort Worth	Texas	854,113
17	**Charlotte**	**North Carolina**	**842,051**
18	Seattle	Washington	704,352
19	Denver	Colorado	693,060
20	El Paso	Texas	683,080

Source: United States Census Bureau, 2017.

While the Airport's entire catchment area represents approximately a two-hour drive time, the core of the Airport's catchment is the Charlotte-Concord CSA with a population of 2.6 million (**Table 2-2**).

Table 2-2 Population Comparison, CY 2016

Area	Counties	Population
City of Charlotte	n/a	842,051
Charlotte-Concord-Gastonia MSA	10	2,474,314
Charlotte-Concord CSA	**12**	**2,632,249**
Charlotte-Gastonia-Salisbury	20	3,179,393

Source: United States Census Bureau, 2017.

Historically, the population of the Charlotte-Concord CSA has grown at a rate higher than that of the United States (**Table 2-3)**. In addition, the CSA population is estimated to grow at an average annual rate of almost double that of the United States through 2050.

Table 2-3 Select Historical and Forecast Populations (in thousands)

Year	United States	10-Yr CAGR	North Carolina	10-Yr CAGR	South Carolina	10-Yr CAGR	Charlotte-Concord CSA	10-Yr CAGR
Historical								
2000	282,162		8,082		4,024		1,883	
2010	309,347	0.9%	9,559	1.7%	4,636	1.4%	2,382	2.4%
2016	324,161		10,169		4,951		2,626	
Forecast								
2020	336,383	0.8%	10,723	1.2%	5,192	1.1%	2,807	1.7%
2030	368,644	0.9%	12,215	1.3%	5,836	1.2%	3,3007	1.7%
2040	399,419	0.8%	13,732	1.2%	6,475	1.0%	3,839	1.5%
2050	428,119	0.7%	15,246	1.1%	7,096	0.9%	4,393	1.4%
CAGRs								
2000-2016	0.9%		1.4%		1.3%		2.1%	
2016-2020	0.9%		1.3%		1.2%		1.7%	
2016-2050	0.8%		1.2%		1.1%		1.5%	

Source: Complete Economic and Demographic Data Source (CEDDS), Woods & Poole Economics, Inc., 2017.
CAGR - Compound Annual Growth Rate

Real per capita income in the Charlotte-Concord CSA is expected to grow at 1.1 percent annually over the period of 2016-2050 (**Table 2-4**). Comparatively, the United States anticipates similar annual real growth in per capital income over the same period (1.2 percent).

Table 2-4 Select Historical and Projected Per Capita Income (in 2009 USD)

Year	United States	10-Yr CAGR	North Carolina	10-Yr CAGR	South Carolina	10-Yr CAGR	Charlotte-Concord CSA	10-Yr CAGR
Historical								
1990	29,082		25,370		23,376		26,531	
2000	36,833	2.4%	32,719	2.6%	29,840	2.5%	34,205	2.6%
2010	39,622	0.7%	34,757	0.6%	31,638	0.6%	36,846	0.7%
2016	44,637		37,884		35,477		41,295	
Forecast								
2020	47,378	1.8%	40,272	1.5%	37,757	1.8%	43,677	1.7%
2030	54,339	1.4%	46,262	1.4%	43,450	1.4%	49,564	1.3%
2040	60,336	1.1%	51,212	1.0%	48,040	1.0%	54,367	0.9%
2050	66,890	1.0%	56,621	1.0%	53,055	1.0%	59,481	0.9%
CAGRs								
2000-2016	1.2%		0.9%		1.1%		1.2%	
2016-2020	1.5%		1.5%		1.6%		1.4%	
2016-2050	1.2%		1.2%		1.2%		1.1%	

Source: Complete Economic and Demographic Data Source (CEDDS), Woods & Poole Economics, Inc., 2017.

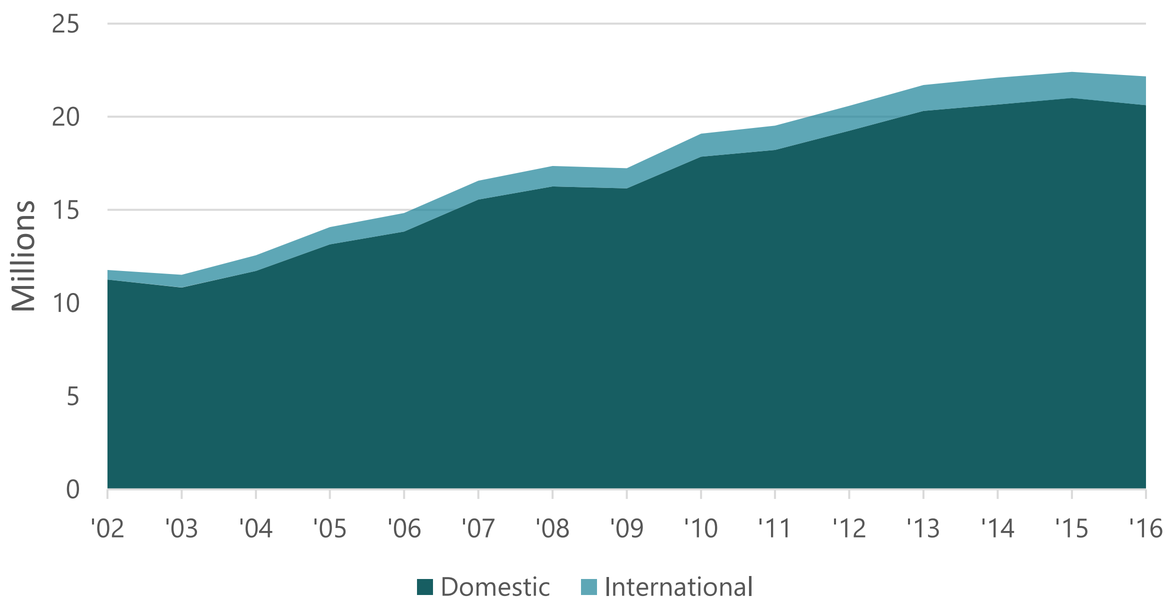
2.2 Background and Historical Passenger Traffic

One of the most important inputs into a traffic forecast is the historical traffic. This section shows historical data for enplaned passengers (including both Origin and Destination (O&D) passengers and connecting passengers) as well as discusses CLT's role as a hub for American Airlines.

2.2.1 Enplaned Passengers

Since 2002, the Airport has grown 4.6 percent annually on average in terms of enplaned passengers, reaching 22.2 million in 2016. During this period, average international growth (8.1 percent) almost doubled that of domestic growth (4.4 percent). As shown in **Figure 2-2** below, enplanements only dipped by 0.6 percent in 2009 following the 2008-2009 economic crisis – compared to a 7.2 percent drop in the United States as a whole.[3] Traffic rebounded in 2010 with a rate of 10.7 percent. In 2016, traffic declined by 1.1 percent, driven by a decrease in domestic connecting passengers (O&D passengers increased). However, in the first half of 2017, enplaned passenger traffic was three percent higher than the first six months of 2016; international enplaned passengers are 20 percent higher than the same period in 2016.

Figure 2-2 Historical Enplaned Passengers at CLT, 2002-2016



Source: CLT Monthly Activity Reports

3 FAA Aerospace Forecast, FY 2011-2031

Since 2002, domestic traffic has increased by an average of 4.4 percent annually and international traffic has increased by an average of 8.1 percent annually (**Table 2-5**).

Table 2-5 Compound Annual Growth Rates for Historical Enplaned Passengers at CLT

CAGRs	2002-06	2006-11	2011-16	2002-16
Domestic	5.3%	5.6%	2.5%	4.4%
International	17.7%	5.7%	3.5%	8.1%
Total	**5.9%**	**5.6%**	**2.6%**	**4.6%**

Source: CLT Monthly Activity Reports
CAGR - Compound Annual Growth Rate

Among the 30 large hub airports in the United States, CLT accounts for the 10th most enplaned passengers (see **Table 2-6** below).

Table 2-6 Enplaned Passengers at Top 30 U.S. Airports, CY 2016

Rank	Airport	Enplaned Passengers (millions)
1	Atlanta Hartsfield – Jackson International	50.5
2	Los Angeles International	39.6
3	Chicago O'Hare International	37.6
4	Dallas-Fort Worth International	31.3
5	NYC John F. Kennedy International	29.2
6	Denver International	28.3
7	San Francisco International	25.7
8	Las Vegas McCarran International	22.8
9	Seattle-Tacoma International	21.9
10	Charlotte/Douglas International	**21.5**
11	Phoenix Sky Harbor International	20.9
12	Miami International	20.9
13	Orlando International	20.3
14	Houston George Bush Intercontinental	20.1
15	Newark Liberty International	19.9
16	Minneapolis-St Paul International	18.1
17	Boston Logan International	17.8
18	Detroit Metropolitan Wayne County	16.8
19	NYC LaGuardia	14.8
20	Philadelphia International	14.6
21	Fort Lauderdale/Hollywood International	14.3
22	Baltimore/Washington International Thurgood Marshall	12.3
23	Ronald Reagan Washington National	11.5
24	Salt Lake City International	11.1
25	Chicago Midway International	11.0
26	Washington Dulles International	10.6
27	San Diego International	10.3
28	Honolulu Daniel K Inouye International	9.7
29	Tampa International	9.2
30	Portland International	9.1

Source: FAA, Enplanements at All Commercial Service Airports (by Rank), October 10, 2017.

The ACEP was released in February 2016; however, the latest full year of data shown in the report is from 2013. In 2013, CLT accounted for the 8th most enplaned passengers in the U.S. airport;[4] it has since been surpassed in the rankings by Las Vegas McCarran International Airport and Seattle-Tacoma International Airport.

4 ACI, 2012 World Annual Traffic Report as shown in the ACEP

2.2.2 Current Service and Role as Hub

Passenger traffic at CLT comprises of O&D traffic (travel to and from Charlotte) and connecting traffic (passengers making connections at CLT) as illustrated below. As can be seen in **Table 2-7**, connecting traffic comprises 71 percent of passenger movements and consists mostly of domestic connections.

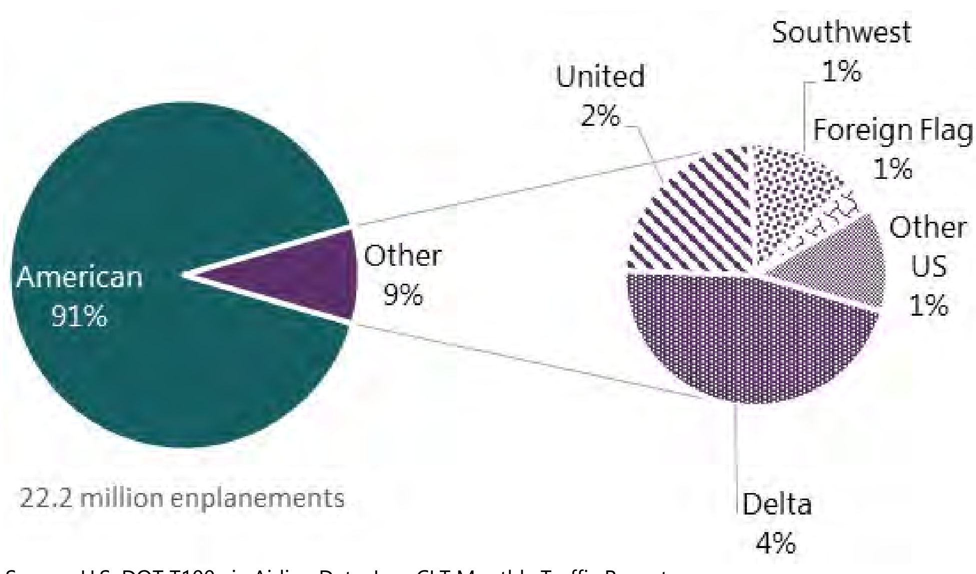
Table 2-7 Charlotte Passenger Traffic CY 2016

Traffic Type	Share
Domestic O&D	25.6%
International O&D	3.2%
Domestic Connecting	67.5%
International Connecting	3.7%
Total	**100.0%**

Source: U.S. DOT O&D and T100 data, via Flight Global's Diio Mi database.

The high rate of connections at CLT reflects its role as a hub for American Airlines which accounted for 91 percent of seat capacity and passengers in CY 2016 (**Figure 2-3**).[5] Of the remaining nine percent of passengers, Delta Air Lines serves the largest share at four percent, followed by United Airlines at two percent.

Figure 2-3 Airline Share of CLT Enplanements, CY 2016



Source: U.S. DOT T100 via Airline Data, Inc.; CLT Monthly Traffic Reports.

Before the merger of American Airlines and US Airways in 2013,[6] Charlotte was the largest of US Airways' four hubs. Now, Charlotte is American Airlines' second largest hub after Dallas/Fort Worth, as illustrated in (**Table 2-8**) below. After carriers merge, it is typical for changes to be made

5 Innovata schedule data via Flight Global's Diio Mi database.

6 Although the merger was announced in 2013, the two airlines did not begin operating under one Air Operator's Certificate (AOC) until 2015.

to the hub structure in order to optimize operations. As an example, the largest international connect flow was the U.S. Northeast-Caribbean market. Some of this traffic has since shifted to American Airlines' largest Caribbean gateway, Miami (**Figure 2-4**).

Table 2-8 Overview of Capacity at American Airlines Hubs, CY 2016

Seat Rank	Airport	Markets Served	Daily Departures	Daily Seats
1	Dallas/Fort Worth	202	749	95,927
2	Charlotte	158	660	71,170
3	Chicago O'Hare	133	481	49,938
4	Miami	129	333	48,061
5	Philadelphia	114	379	37,549
6	Phoenix	86	253	33,557
7	Los Angeles	70	202	27,723
8	Washington DCA	72	239	20,654
9	New York JFK	46	93	13,225

Source: Airport Records, U.S. DOT, O&D Survey, via Flight Global's Diio Mi database.

Figure 2-4 American Airlines Hub Locations

Source: Innovata schedule data via Flight Global's Diio Mi database, August 2017.

Flights from CLT reach 169 destinations; 135 of those in the United States (**Table 2-9**). These 135 destinations account for 95 percent of weekly departing flights. International service connects Charlotte to 34 airports with the 50 percent of those located in the Caribbean. American Airlines' focus at Charlotte is on domestic connections as it connects the United States to Latin American via its hub at Miami; Europe via its hub at New York JFK; and Asia from Los Angeles.

Table 2-9 Weekly Frequencies from CLT by Region, August 2017

Region	Weekly Departures	Weekly Departing Seats	Number of Destinations
Domestic	4,893	509,388	135
Europe	63	16,926	8
Caribbean	112	16,876	17
Mexico	30	5,048	4
Canada	46	2,984	2
Central America	7	882	3
Total	**5,150**	**552,104**	**169**

Source: Innovata Schedule Data via Flight Global's Diio Mi database, August 2017.

As noted above, the air service offerings at CLT has changed since the ACEP. In 2013, international flights accounted for 6.5 percent of total scheduled flights[7] whereas in August 2017 they accounted for 5 percent. Of these international flights, 65 percent were to Latin America in 2013;[8] this share has dropped to 57.8 percent in 2017.

Of the 5,150 weekly nonstop departures at CLT in August 2017, 67.8 percent are operated with narrowbody equipment **(Table 2-10**). Ten routes are operated with widebody aircraft.

Table 2-10 Weekly Frequency from CLT by Aircraft Type, August 2017

Aircraft Group	Weekly Departures	Weekly Departing Seats	Number of Destinations
Narrowbody	3,493	442,823	124
Regional Jet/Turboprop	1,584	89,985	90
Widebody	73	19,296	10
Total	**5,150**	**552,104**	**N/A**

Source: Innovata Schedule Data via Flight Global's Diio Mi database, August 2017

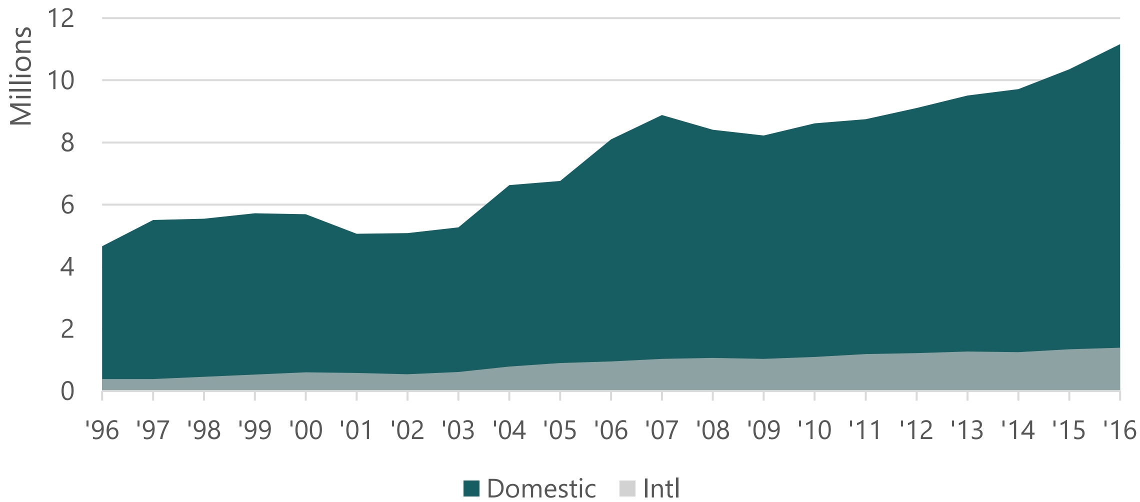
2.2.3 Origin and Destination (O&D) Passengers

While connections account for 71.2 percent of passengers at CLT, O&D passengers play an increasing role at the Airport. Over the last 20 years, O&D passengers have increased by 4.7 percent annually on average (**Table 2-11**), with slightly larger growth in the international segment (see **Figure 2-5)**. In 1996, international passengers accounted for 7.6 percent of total passengers; this share has increased to 11.1 percent in 2016. In 2016, both international and domestic O&D passengers grew, by 7.8 percent and 3.8 percent, respectively compared to 2015.

7 OAG schedules as shown in the ACEP

8 Ibid.

Figure 2-5 Historical O&D Passengers at CLT, 1996-2016



Source: U.S. DOT O&D Survey via Flight Global's Diio Mi database.

Table 2-11 Compound Annual Growth Rates for Historical O&D Passengers at CLT

CAGRs	1996-06	2006-16	1996-16
Domestic	5.7%	3.3%	4.5%
International	9.5%	3.9%	6.7%
Total	**6.0%**	**3.3%**	**4.7%**

Source: U.S. DOT O&D Survey via Flight Global's Diio Mi database.

New York City (as represented by JFK, LaGuardia and Newark airports) is the largest O&D destination from CLT, followed by Chicago (O'Hare and Midway) (see **Table 2-12**).

Table 2-12 Top 10 O&D Destinations from CLT, CY 2016

Rank	City	O&D Passengers
1	New York City	1,514,506
2	Chicago	594,468
3	Boston	474,979
4	Dallas	422,592
5	Philadelphia	339,573
6	Orlando	281,049
7	Baltimore	274,187
8	Los Angeles	272,809
9	Washington D.C.	244,093
10	San Francisco	240,379

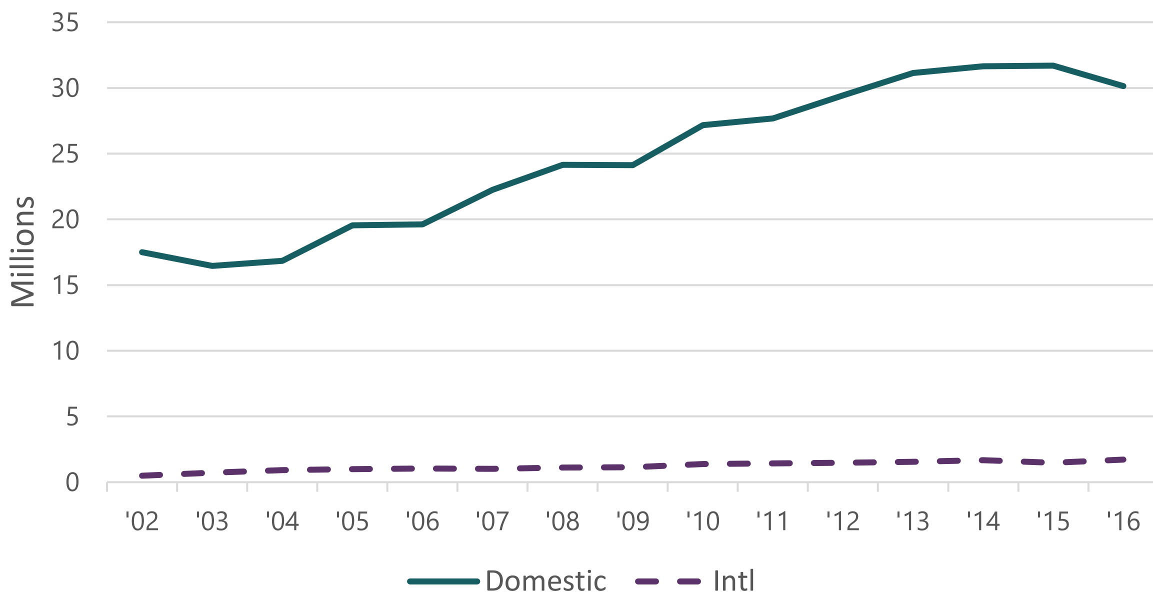
Source: U.S. DOT O&D Survey via Airline Data, Inc.
CAGR - Compound Annual Growth Rate

2.2.4 Connecting Passengers at CLT

Since 2002, the number of connecting passengers at CLT has increased by 4.2 percent annually on average (**Figure 2-6** and **Table 2-13**), reaching 31.9 million passengers in 2016. International connections, which include connections between domestic and international flights have increased at a faster rate than domestic-to-domestic connections, likely due to the increase in the number of international flights.

Connecting traffic is a function of air carrier hubbing and network decisions (primarily American Airlines at CLT). While underlying demand can grow connecting traffic, it is American Airlines decision to flow traffic through specific hubs that will ultimately affect traffic volumes at CLT.

Figure 2-6 Historical Connecting Passengers at CLT, 2002-2016



Source: U.S. DOT O&D Survey via Flight Global's Diio Mi database

Table 2-13 Compound Annual Growth Rates for Historical Connecting Passengers at CLT

CAGRs	2002-06	2006-11	2011-16	2002-16
Domestic	2.9%	7.1%	1.7%	4.0%
International	20.5%	6.6%	3.8%	9.3%
Total	**3.5%**	**7.1%**	**1.8%**	**4.2%**

Source: U.S. DOT O&D Survey via Flight Global's Diio Mi database

Table 2-14 below shows the major domestic connecting flows (domestic-to-domestic) and **Table 2-15** shows international connecting flows (domestic-to-international and international-to-international) at CLT in 2016. The major domestic-domestic flows tend to be north-to-south in nature, particularly on the eastern side of the country. CLT is geographically well-positioned to continue to handle these flows within America Airlines' network, compared with the Airline's other major hubs.

Table 2-14 Charlotte Domestic Connecting Flows, CY 2016

Domestic Connecting Flows	
Northeast-to-Southeast	16.7%
Florida-to-Northeast	14.1%
Northeast-to-Southwest	7.5%
Florida-to-Southeast	6.9%
Great Lakes-to-Southeast	6.8%
Florida-to-Great Lakes	6.0%
Northeast-to-Pacific	5.3%
Southeast-to-Southwest	5.0%
Other	31.7%
Total	**100.0%**

Source: U.S. DOT, O&D Database via Airline Data, Inc.

As shown in **Table 2-15**, for international, nearly two thirds of the flows are to the Caribbean and Mexico, which overlaps with American Airlines' Miami hub. Similarly, the flows to Europe overlap with Dallas and American Airlines' hubs in the Northeast.

Table 2-15 Charlotte International Connecting Flows, CY 2016

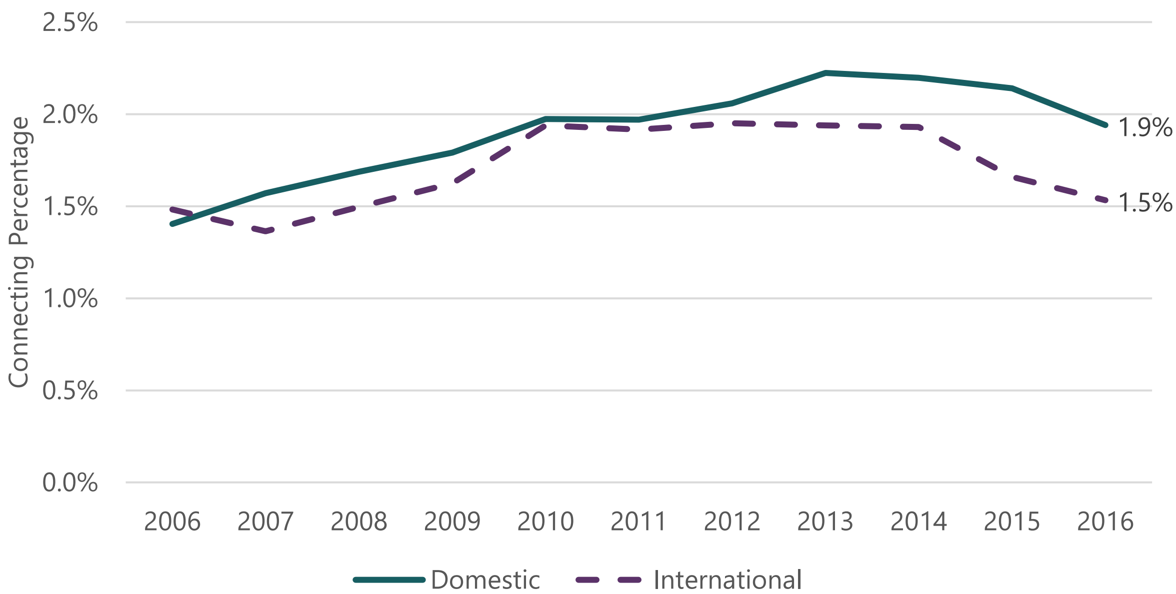
International Connecting Flows	
Domestic-to-Caribbean	50.8%
Domestic-to-Europe	23.6%
Domestic-to-Mexico	15.7%
Domestic-to-Canada	5.3%
Domestic-to-Other	2.9%
International-to-International	1.7%
Total	**100.0%**

Source: U.S. DOT, O&D Database via Airline Data, Inc.

In 2016, domestic connecting traffic at CLT accounted for 1.9 percent of total U.S. domestic passenger traffic, while international connecting traffic accounted for 1.5 percent of total U.S. international passenger traffic (see **Figure 2-7**).[9] Both the international and domestic connecting share of CLT compared to the national aviation market have been declining since 2013. This decline is due to an industry-wide trend towards more direct services as well as a consolidation of American Airlines' connecting traffic at other hubs such as Miami and Dallas. As discussed in the next chapter, this is a trend that is expected to continue, and it serves as one of the inputs into the long-term passenger forecast prepared for this EIS.

9 "International" here includes U.S.-Transatlantic, U.S.-Latin American, and U.S.-Canadian markets

Figure 2-7 CLT Connecting Share of Total U.S. Traffic, 2006-2016



Source: U.S. DOT O&D Survey via Flight Global's Diio Mi database, FAA

2.3 Aircraft Operations

2.3.1 Types of Aircraft Operations

Aircraft operations can be divided into categories based on aircraft size or operation purpose. The following definitions are used in the FAA's annual TAF forecast and in this technical memorandum.

1. **Commercial operations** (those operated as a business) can be defined based on the size of the aircraft involved:
   a. **Air carrier** – "takeoffs or landings of commercial aircraft with seating capacity of more than 60 seats"[10]
   b. **Air taxi** includes**:**
      i. Commuter – itinerant operations performed by commercial aircraft with seating capacity of 60 seats or less on scheduled flights
      ii. On-demand – itinerant operations performed by commercial aircraft with seating capacity of 60 seats or less on non-scheduled or for-hire flights

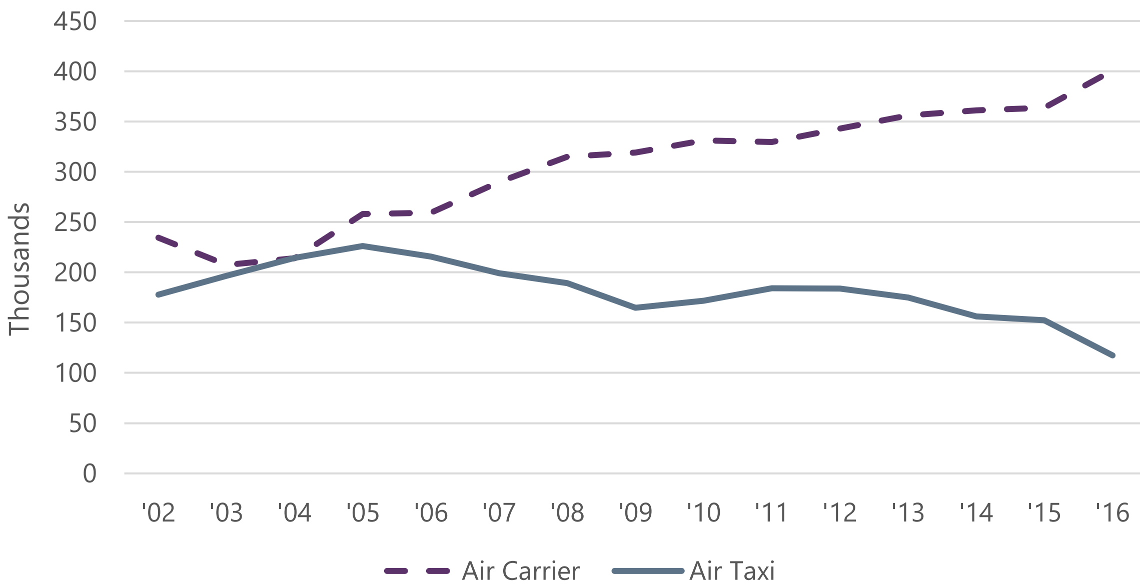
10 FAA TAF, Appendix A: Description of Activity Measures, page 26.

2. **Non-commercial operations**
   a. **General Aviation (GA) – "**all civil aviation aircraft takeoffs and landings not classified as commercial or military"[11]
   b. **Military – "**takeoffs and landings by military aircraft"[12]

2.3.2 Historical Aircraft Operations at CLT

Overall commercial operations at CLT have increased by 1.7 percent on average annually since 2002, reaching 518,197 in 2016 (**Figure 2-8**).

Figure 2-8 Historical Commercial Operations at CLT, 2002-2016



Source: FAA OPSNET

This growth has been driven by increases in air carrier operations as air taxi operations have declined over this period by 2.9 percent per annum on average (**Table 2-16**). The number of both international and domestic air carrier operations have increased by 6.1 percent and 4.1 percent, respectively.[13]

Table 2-16 Compound Annual Growth Rates for Historical Commercial Operations at CLT

CAGRs	2002-06	2006-11	2011-16	2002-16
Air Carrier	2.6%	4.9%	4.0%	3.9%
Air Taxi	4.9%	-3.1%	-8.6%	-2.9%
Total Commercial	**3.6%**	**1.6%**	**0.2%**	**1.7%**

Source: CLT Monthly Activity Reports
CAGR - Compound Annual Growth Rates

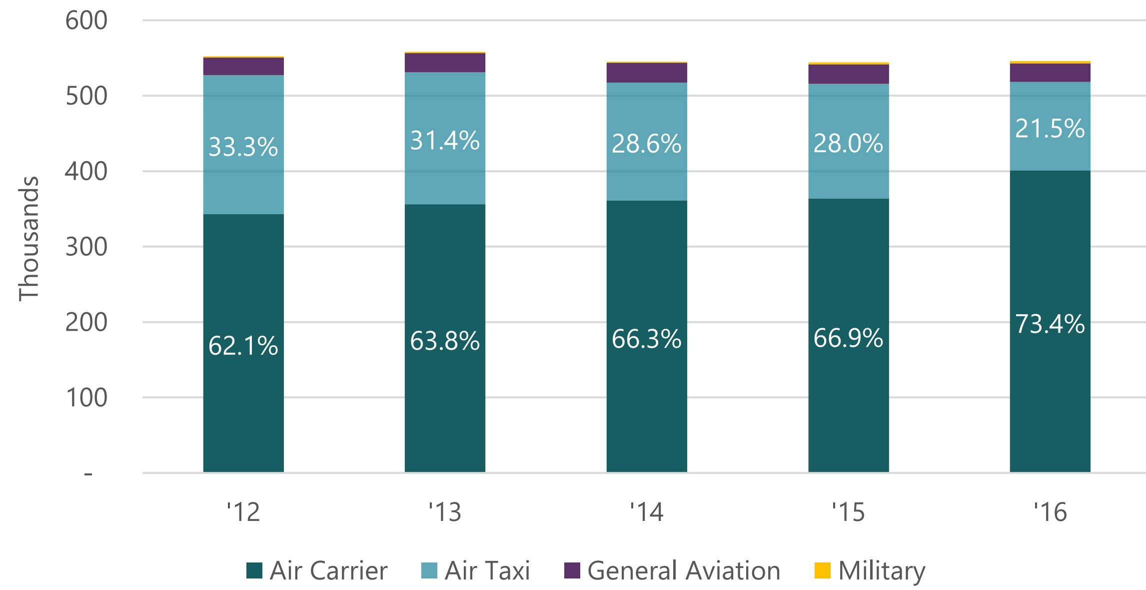
11 FAA TAF, Appendix A: Description of Activity Measures, page 26.

12 Ibid.

13 U.S. DOT T100 via Airline Data, Inc.

In 2016, 73.4 percent of total aircraft operations were air carrier. Almost 22 percent of operations were air taxis; 4.6 percent were General Aviation (GA); and 0.5 percent were military (**Figure 2-9**). General Aviation operations have been steadily falling and represent 60 percent of the level in 2002. Military operations have typically remained within a band of 1,700-2,500 per year, increasing slightly to 2,676 in 2016.

Figure 2-9 Operations by Category, 2012-2016

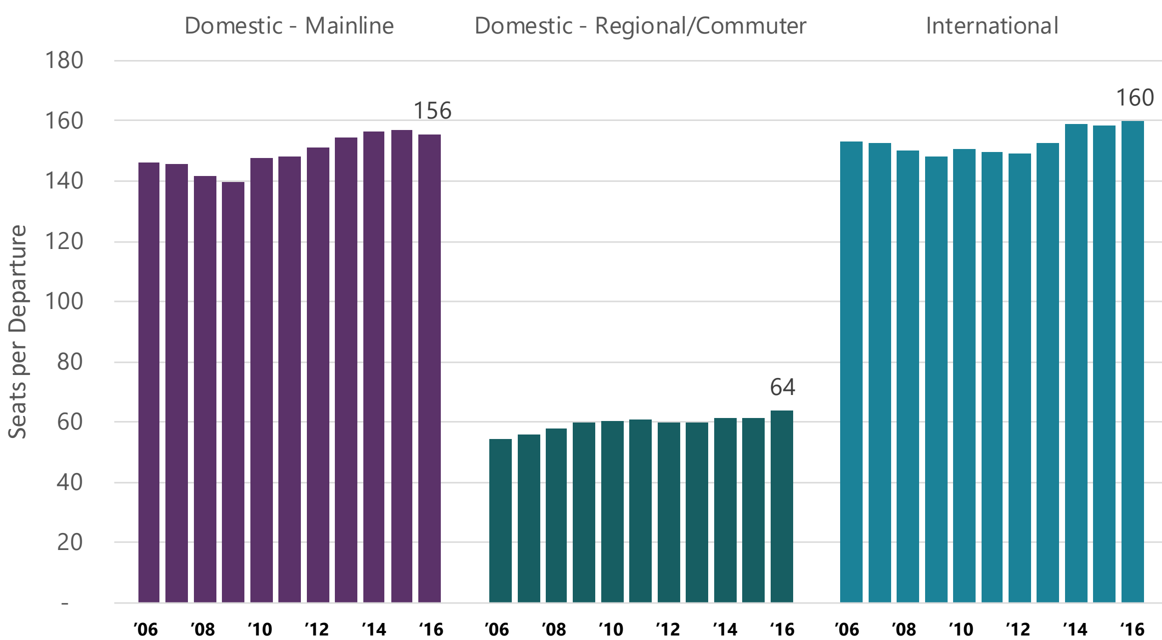


Source: FAA OPSNET

2.4 Aircraft Fleet Mix

As is the case nationwide, average aircraft size at CLT has been increasing (**Figure 2-10**). However, the growth rate of these larger aircraft in the CLT fleet has been faster than the national rate over the last 10 years. Since 2006, the average number of scheduled seats per departure at CLT has increased from 91 to 107, an average annual growth rate of 1.6 percent or 1.6 seats per year. For comparison, among U.S. commercial carriers over the same period, average annual growth was 1.1 percent. The reason for faster growth at Charlotte is the historically large share of CLT departures operated by smaller, regional/commuter aircraft. In 2006, over 60 percent of CLT's departures were operated on regional/commuter aircraft; in 2016, this share has dropped to 53.2 percent; at the same time, the regional carriers have started operating larger regional jets, such as the CRJ 700 and Embraer 170, which typically have a capacity between 65 and 90 seats. Both these factors have contributed to an increasing aircraft size at CLT.

Figure 2-10 Average Seats per Departure at CLT (Scheduled), 2006-2016

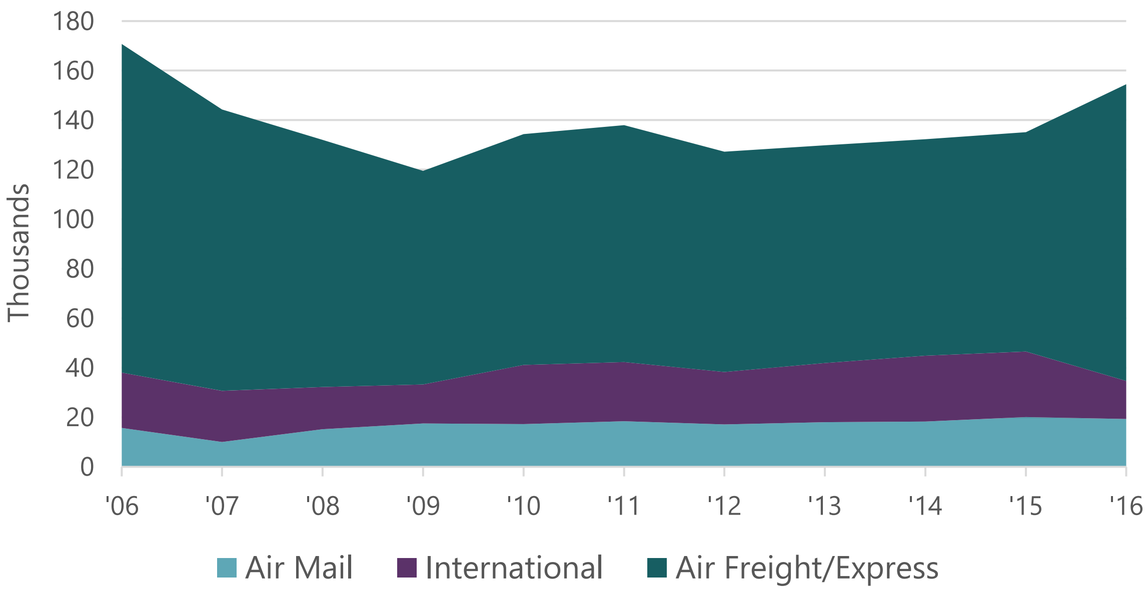


Source: Airline Schedules, via Airline Data, Inc.

2.5 Air Cargo

Air cargo tonnage has averaged 2.1 percent growth since the financial crisis (2009-15 growth). Domestic cargo accounts for 81 percent of total cargo enplaned and deplaned at CLT, while international makes up the remaining 19 percent. Historically, Charlotte has been served primarily by FedEx and UPS (which serve the air freight/express mail market), which together carried nearly 100 percent of cargo on scheduled cargo flights between 2012 and 2015. Belly cargo (cargo carried in the hold of commercial passenger aircraft) accounts for 33 percent of total cargo at CLT. Cargo volumes increased by 14.4 percent in 2016 to 154,000 tons (**Figure 2-11** and **Table 2-17**) much of which can be attributed to Amazon, which contracted services with both ABX Air and Air Transport for cargo operations in and out of Charlotte. In 2016, 77.5 percent of cargo served at CLT was air freight/express mail.[14]

Figure 2-11 Historical Cargo at CLT (tons), 2006-2016



Source: CLT Monthly Activity Reports

Table 2-17 Compound Annual Growth Rates for Historical Cargo at CLT

CAGRs	2006-11	2011-16	2006-16
Air Freight/Express	-6.3%	4.6%	-1.0%
Air Mail	3.1%	1.0%	2.1%
International	1.4%	-8.5%	-3.6%
Total	**-4.2%**	**2.3%**	**-1.0%**

Source: CLT Monthly Activity Reports

14 Air freight/express mail includes all cargo that is not international or regular mail.

3

Traffic Forecast

3.1 Introduction

In the process of conducting this EIS, it is necessary to update the long-term traffic forecast for the Charlotte Douglas International Airport ("the Airport" or "CLT"). This updated forecast will be used as an input into several subsequent analyses completed for the Environmental Impact Statement (EIS) including (among others): aircraft delay modeling, noise modeling, establishment of the design aircraft type, and determination of the optimal runway length. This chapter first presents the methodology and results for projecting passengers, operations and cargo. The most recent calendar year of data available as of the writing of this memorandum is 2016; therefore, 2016 was selected as the base year for this EIS forecast. The two benchmark years chosen for this study are 2028 (the "Build Year," when the Project is expected to open) and the Build Year plus five years (2033). Both the passenger and operations forecasts are compared to both the Airport Capacity Enhancement Plan (ACEP) and the FAA's Terminal Area Forecast (TAF) to determine consistency. Where the EIS forecast differs from either the ACEP or TAF forecasts, explanations are discussed. The forecasts presented in this chapter for CLT have been submitted to the FAA's Airport District Office (ADO) for approval for use in the EIS study.

3.2 Passenger Forecast Methodology

This section presents the separate approaches used to forecast Origin and Destination (O&D) and connecting traffic.

3.2.1 Origin-Destination Traffic Forecast Methodology

The long-term passenger forecasts prepared for this EIS are based on an econometric model for domestic, Canada, the Caribbean (including Mexico and Central America), South America, trans-Atlantic, and trans-Pacific origin-destination passengers. Separate outbound (Charlotte residents) and inbound (overseas residents) models were developed using data sourced from the U.S. DOT. Various models were tested to explain traffic volumes in terms of: relevant GDP measures, population, air fares and fuel prices. The most robust models, in terms of statistical fit (adjusted r-squared and parameter t-statistics), were found to be those based on measures of real GDP (as well as dummy variables in 2001 and 2002 to capture the impacts of the events of September 11, 2001). For the domestic and outbound international models, Charlotte Combined Statistical Area (CSA) gross domestic product (GDP) was found to be the most effective explanatory variable, while the real GDP of the international regions were used for the inbound markets. The dependent variables used in the econometric analysis were in natural log terms. The key results from the econometric analysis are summarized in Appendix 1.

As the markets mature, the responsiveness of demand to economic growth is expected to decline. To capture this, the GDP elasticities were gradually declined by 25 percent by 2035 - this of level decline is based on expert judgement and reflects the expected maturing of the market. To generate forecasts of O&D traffic, the parameters were applied to projections of real GDP sourced from Woods & Poole[15] for Charlotte GDP and the U.S. Department of Agriculture Economic Research Service.[16]

3.2.2 Connecting Traffic

Connecting traffic at CLT is primarily a function of air carrier decisions (primarily American Airlines). While underlying demand can grow connecting traffic, it is carriers' decisions regarding flow traffic through specific hubs that will ultimately affect traffic volumes.

Connecting traffic was modelled as a function of national demand for travel and CLT's share of that demand. In 2016, domestic connecting traffic at CLT accounted for 1.9 percent of total domestic passenger traffic. The FAA forecasts that in the U.S., domestic traffic will increase by 1.7 percent per annum up to 2035. It is assumed that CLT's share of this traffic will decline by 10 percent over the forecast period as new direct services reduce the need for connecting itineraries (CLT's share will decline to 1.7 percent). As noted in Section 2.2.4, CLT's share of domestic connecting traffic has been declining in recent years, and this trend is expected to continue. This trend of declining connecting share was broadly confirmed by interviews with American Airlines. As a result, domestic connecting traffic is forecast to increase by 1.2 percent per annum (forecast values are shown in the Appendix).

The forecasts of international connecting traffic were based on the FAA forecasts of traffic to/from Canada, Latin America and Trans-Atlantic. CLT's share of these total traffic flows is assumed to decline by 25 percent, due to the development of direct services and the increased concentration of connecting flows at other hubs. As with domestic connecting traffic, CLT's share of international connecting traffic has been declining and this trend is expected to continue. This results in average growth of 2.1 percent per annum over the forecast period (compared with 3.6 percent per annum growth in total demand). Forecast connecting passenger values are shown in the Appendix.

3.3 Passengers

The EIS passenger forecast projects passengers by route group (domestic and international) as well as type of passenger. The two types of passengers projected are O&D and connecting.

- **O&D passengers** at CLT are those beginning or ending their trip at CLT. An example of an O&D passenger would be someone traveling between Charlotte and New York City.
- **Connecting passengers** at CLT are those changing planes in the Airport on their way to another destination. An example of a connecting passenger would be someone flying from New York City to Charlotte and then to Dallas.

15 Complete Economic and Demographic Data Source (CEDDS), Woods & Poole Economics, Inc., 2017.

16 U.S. Department of Agriculture Economic Research Service, https://www.ers.usda.gov/

3.3.1 Passenger Forecast Assumptions

The next three sections describe the different assumptions used to create the Base, High, and Low forecasts. Although the Base Case is that used for the majority of EIS analyses, it is important to have High and Low cases in order to test the range of possible outcomes.

3.3.1.1 Base Case

The following assumptions were made in creating the passenger forecast:

- The United States economy as well as Charlotte's local economy will experience moderate and steady growth between 2016 and 2035 in line with current forecasts;
- No large demand shock, such as terrorism or war, will significantly affect demand for air travel in the U.S.;
- No significant change in airfares from Charlotte will dramatically affect demand for air travel;
- No large change in jet fuel prices will dramatically affect the airlines' ability to serve Charlotte's from their respective bases;
- The U.S. air traffic control system will be able to absorb incremental capacity throughout the forecast period;
- The airport's facilities will not constrain demand; and,
- CLT's share of the U.S. industry domestic connects is forecast to decline from 1.9 percent to 1.7 percent while the share of international connections declines from 1.5 percent to 1.1 percent. This is an industry trend that reflects greater passenger volumes flying on a nonstop itinerary to reach their destination. Even though the CLT share of connecting passengers is declining, the actual volume of connecting passengers will increase.

3.3.1.2 High Case

In order to test the outer limit of the passenger forecast, a High Case was created. The following assumptions were made regarding the high forecast scenario for CLT:

- In an iterative process, O&D adjustments upward were made to the underlying independent variables in the regression analysis, i.e., economic growth rates forecast by Woods & Poole[17] and the U.S. Department of Agriculture Economic Research Service. The revised economic growth rates will drive changes to O&D passengers. In the High Case, the GDP growth rate increased by 0.1 percentage points.
- Connecting adjustments upward were made on the share of U.S. passenger growth that CLT connecting traffic represents. In the High Case, connecting shares of 1.9 percent for domestic, and 1.5 percent for international are held constant through the forecast period.

17 Complete Economic and Demographic Data Source (CEDDS), Woods & Poole Economics, Inc., 2017.

However, after review of the output, it was determined that a larger adjustment to the O&D forecast was necessary to reflect a more meaningful change in the underlying conditions. The GDP growth rate was then increased by +0.5 percentage points per annum throughout the forecast period. No change was made to initial assumptions for the connecting passenger forecast.

3.3.1.3 Low Case

In order to test the lower limit of the passenger forecast, a Low Case was created. The following assumptions were made regarding the Low Case for CLT:

- In the Low Case, the GDP growth rated was decreased by -0.1 percentage points per annum.
- Connecting shares were decreased from 1.9 percent to 1.6 percent for domestic, and 1.5 percent to 1.0 percent for international over the forecast period.

Similar to the high forecast, the results of the low forecast scenario were further analyzed and it was determined that an additional adjustment to the O&D passenger forecast was required. The GDP growth rate was adjusted to reflect a -0.5 percentage point change per year throughout the forecast period.

A high/low variance range of 20-25 percent was assumed when reviewing the outputs of the scenarios above.

3.3.2 Annual Passenger Forecasts

For 2017, the number of enplaned/deplaned passengers is expected to increase 2.4 percent from 2016, which reflects anticipated seat capacity growth shown in the 2017 schedule data and the year-to-date passenger figures as of April 2017. Based on the methodology and assumptions described above, the average growth rate is forecast to average 2.4 percent per annum between 2016 and 2020 (figures below **Table 3-1**). In the longer run, between 2016 and 2035, total enplanements will increase at 1.8 percent per annum. Yearly passengers at Charlotte will reach approximately 62.6 million by 2035, compared to 44.4 million in 2016. The resulting passenger forecasts are presented in **Table 3-1**, **Table 3-2**, and **Table 3-3** below.

Table 3-1 Passenger Forecast – Base Case

Year	Domestic O&D	Int'l O&D	Connecting	Total
2005	6,762,157	899,855	20,544,040	28,206,052
2010	8,613,655	1,091,525	28,549,027	38,254,207
2011	8,752,758	1,193,081	29,097,869	39,043,708
2012	9,107,012	1,217,000	30,904,360	41,228,372
2013	9,513,203	1,266,955	32,676,733	43,456,891
2014	9,718,241	1,248,403	33,309,205	44,275,849
2015	10,353,573	1,343,355	33,173,903	44,870,831
2016	11,162,763	1,393,853	31,865,406	44,422,022
2017	11,547,629	1,491,064	32,454,311	45,493,004
2020	12,686,885	1,761,671	34,343,300	48,791,856
2025	14,615,653	2,285,876	36,120,282	53,021,811
2030	16,524,455	2,903,787	38,265,291	57,693,533
2035	18,378,400	3,621,209	40,604,915	62,604,524
Compound Annual Growth Rates (CAGRs)				
2005 – 2010	5.0%	3.9%	6.8%	6.3%
2010 – 2015	3.7%	4.2%	3.0%	3.2%
2016 – 2020	3.3%	6.0%	1.9%	2.4%
2020 – 2025	2.9%	5.3%	1.0%	1.7%
2025 – 2030	2.5%	4.9%	1.2%	1.7%
2030 – 2035	2.1%	4.5%	1.2%	1.6%
2016 – 2035	2.7%	5.2%	1.3%	1.8%

Source: Airport Statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.
Note: Data is reflected in calendar years

Table 3-2 Passenger Forecast – High Case

Year	Domestic O&D	Int'l O&D	Connecting	Total
2005	6,762,157	899,855	20,544,040	28,206,052
2010	8,613,655	1,091,525	28,549,027	38,254,207
2011	8,752,758	1,193,081	29,097,869	39,043,708
2012	9,107,012	1,217,000	30,904,360	41,228,372
2013	9,513,203	1,266,955	32,676,733	43,456,891
2014	9,718,241	1,248,403	33,309,205	44,275,849
2015	10,353,573	1,343,355	33,173,903	44,870,831
2016	11,162,763	1,393,853	31,865,406	44,422,022
2017	11,612,917	1,506,527	32,616,771	45,736,215
2020	12,970,619	1,836,321	35,048,853	49,855,794
2025	15,335,467	2,508,638	37,877,975	55,722,080
2030	17,760,411	3,351,055	41,311,086	62,422,552
2035	20,196,602	4,387,422	45,223,392	69,807,416
Compound Annual Growth Rates (CAGRs)				
2005 – 2010	5.0%	3.9%	6.8%	6.3%
2010 – 2015	3.7%	4.2%	3.0%	3.2%
2016 – 2020	3.8%	7.1%	2.4%	2.9%
2020 – 2025	3.4%	6.4%	1.6%	2.2%
2025 – 2030	3.0%	6.0%	1.8%	2.3%
2030 – 2035	2.6%	5.5%	1.8%	2.3%
2016 – 2035	3.2%	6.2%	1.9%	2.4%

Source: Airport Statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.
Note: Data is reflected in calendar years

Table 3-3 Passenger Forecast – Low Case

Year	Domestic O&D	Int'l O&D	Connecting	Total
2005	6,762,157	899,855	20,544,040	28,206,052
2010	8,613,655	1,091,525	28,549,027	38,254,207
2011	8,752,758	1,193,081	29,097,869	39,043,708
2012	9,107,012	1,217,000	30,904,360	41,228,372
2013	9,513,203	1,266,955	32,676,733	43,456,891
2014	9,718,241	1,248,403	33,309,205	44,275,849
2015	10,353,573	1,343,355	33,173,903	44,870,831
2016	11,162,763	1,393,853	31,865,406	44,422,022
2017	11,482,340	1,475,601	32,319,802	45,277,743
2020	12,407,831	1,689,593	33,762,591	47,860,015
2025	13,926,024	2,082,707	34,695,996	50,704,728
2030	15,368,749	2,517,566	35,829,682	53,715,997
2035	16,715,958	2,993,229	36,958,319	56,667,506

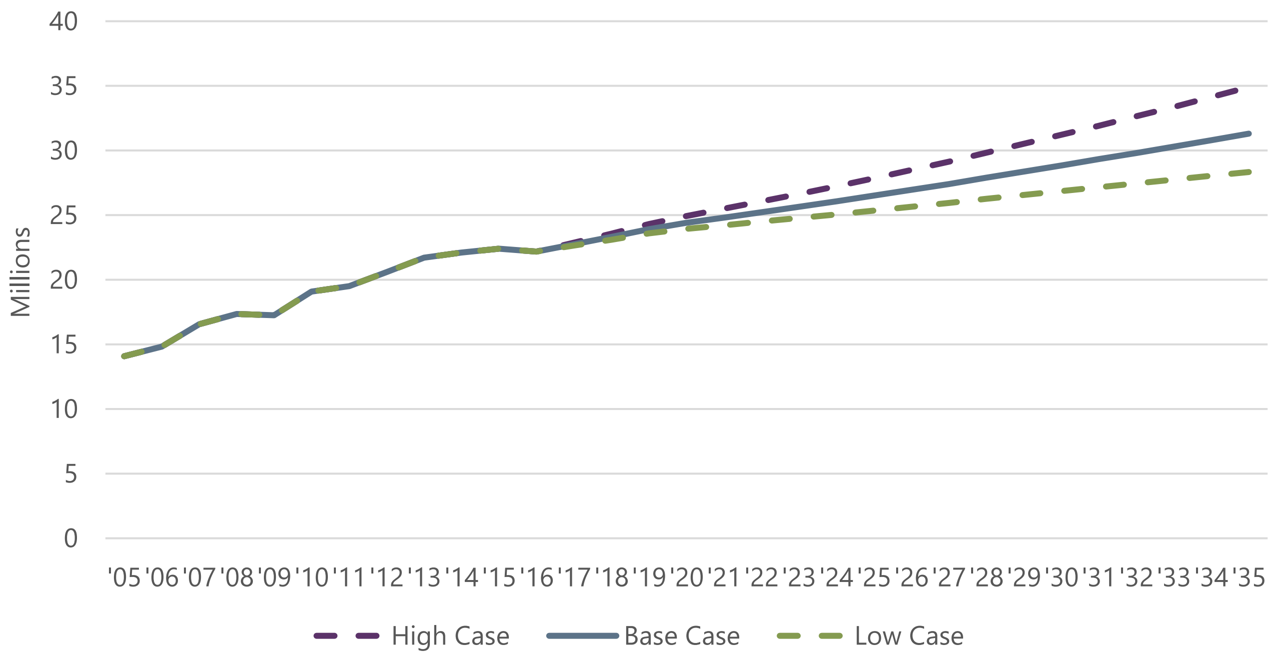
Compound Annual Growth Rates (CAGRs)

2005 – 2010	5.0%	3.9%	6.8%	6.3%
2010 – 2015	3.7%	4.2%	3.0%	3.2%
2016 – 2020	2.7%	4.9%	1.5%	1.9%
2020 – 2025	2.3%	4.3%	0.5%	1.2%
2025 – 2030	2.0%	3.9%	0.6%	1.2%
2030 – 2035	1.7%	3.5%	0.6%	1.1%
2016 – 2035	2.1%	4.1%	0.8%	1.3%

Source: Airport Statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.
Note: Data is reflected in calendar years

The figure below (**Figure 3-1**) reflects the high and low growth scenarios compared to the base case. Forecasted enplanements for the high case are 12 percent above the base case, reaching 33.8 million enplanements in 2035. As for the low scenario, enplanements are projected to be 28.3 million, nine percent below the base case scenario. The variance for the revised high/low forecast is 23 percent.

Figure 3-1 Enplanements Forecast – Base, High, Low Cases



Source: CLT statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.

3.3.3 Comparative Enplaned Passenger Forecasts

Forecasts that are part of an EIS are required to be approved by the FAA. The FAA "must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods."[18] In addition, forecasts must be deemed to be consistent with the FAA's Terminal Area Forecast (TAF). The TAF is an annual forecast of passengers and aircraft operations produced by the FAA for all existing airports in the National Plan of Integrated Airport Systems[19]. The comparison shown below (**Figure 3-2**) shows the most recent version of the TAF, which uses FY 2016 as the base year and provides forecasts for FY 2017-2045. In addition to its baseline forecast, the TAF also shows optimistic and pessimistic scenarios. In order to be approved, this EIS forecast must fall within a defined, acceptable range of the baseline TAF forecast: ±10 percent in the five-year forecast period and ±15 percent in the 10-year forecast period.

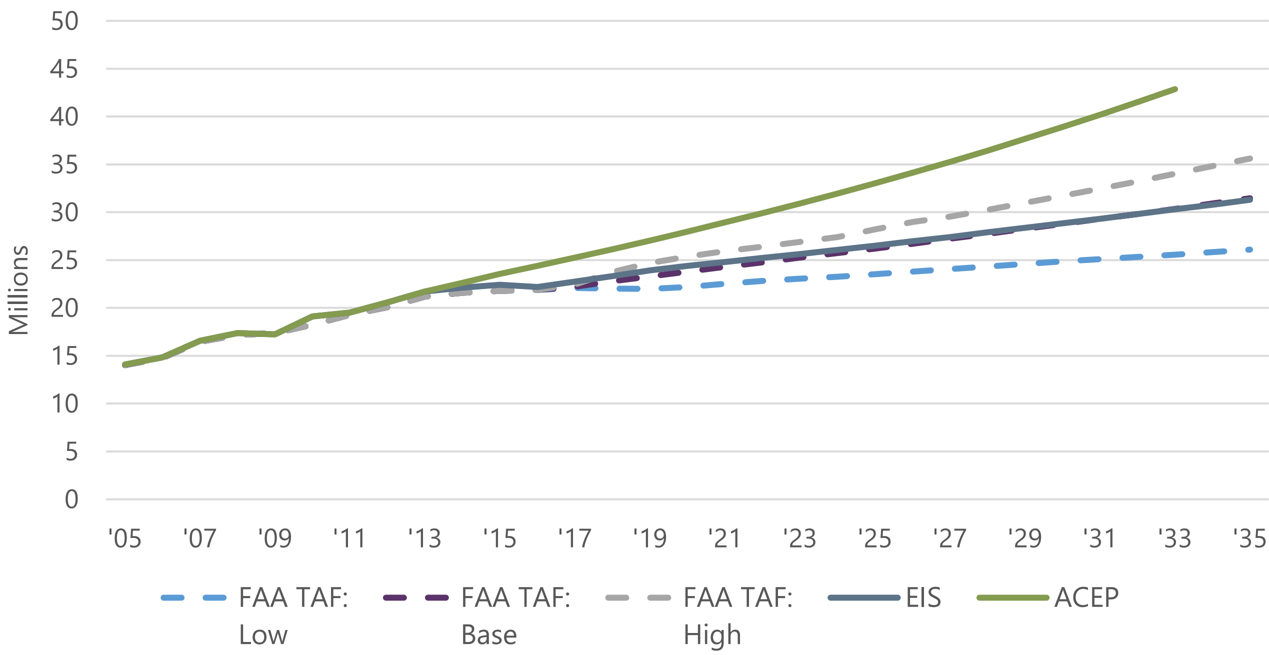
As shown in the table below **(Table 3-4**), the EIS passenger forecast matches closely with the FAA TAF for the future forecast years.[20] The EIS forecast is 0.5 percent below the TAF base forecast by 2035, which is within the TAF consistency requirements required by the FAA. This forecast technical memorandum is accompanied by a letter to the FAA requesting approval for its use in this EIS process.

18 FAA, Approval of Local Forecasts, 2008, page 1.

19 CLT is a large hub airport.

20 The TAF forecast has been converted into calendar years for comparison purposes. Calendar year figures were determined by assuming 75 percent of operations in the base fiscal year and 25 percent of operations in the following fiscal year (i.e., for CY 2016: 75 percent of FY 2016 and 25 percent of FY 2017).

Figure 3-2 Historical and Forecast Enplaned Passengers – EIS, TAF and ACEP



Source: Airport statistics data for historical; U.S. DOT T100 data; InterVISTAS analysis for forecasts.
FAA TAF: https://www.faa.gov/data_research/aviation/taf/
CLT Master Plan Update: Phase 1, Airport Capacity Enhancement Plan
Note: The forecast in the ACEP ends in 2033

Table 3-4 Historical and Forecast Enplaned Passengers Compound Average Growth Rates – EIS, TAF, and ACEP

Period	EIS	TAF	ACEP
2010 – 2016	2.5%	3.1%	4.2%
2016 – 2020	2.4%	2.1%	3.5%
2020 – 2025	1.7%	2.0%	3.4%
2025 – 2030	1.7%	1.9%	3.3%
2030 – 2035	1.6%	1.8%	3.3%
2016 – 2035	1.8%	1.9%	3.5%

Source: Airport statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.
FAA TAF: https://www.faa.gov/data_research/aviation/taf/
CLT Master Plan Update: Phase 1, Airport Capacity Enhancement Plan
Note: ACEP Growth Rates are for 2030-2033, and 2013-2033
Note: Comparison is made between the baseline EIS and TAF forecasts.

The graph (**Figure 3-2**) and table (**Table 3-4**) above, also show a comparison of the EIS forecast to that in the ACEP. When compared to the enplanement forecast in the ACEP, both the EIS and TAF forecasts are 29.3 percent and 29.2 percent below the ACEP in 2033, respectively. The ACEP forecast used 2013 as a base year, while 2016 is the base year in the EIS forecast, and has overestimated enplanements in 2016 by over 2 million passengers.

Since the ACEP forecast was completed, several of the assumptions used in the forecast have changed.

- At the time the ACEP forecast was created, the merger of American Airlines and US Airways had only recently been announced. The ACEP forecast assumed that the merger "is not expected to negatively affect passenger growth at CLT."[21] While the merger has not negatively affected passenger traffic at CLT as of yet, American Airlines has altered the role of CLT in its network, specifically in international routes.
- The ACEP assumed that "Growth in the Latin American economies will be the primary driver of continued growth in international air travel at CLT."[22] While Charlotte maintained service to the Caribbean, American Airlines shifted international service among its hub and withdrew its service from Charlotte to Sao Paulo and Rio de Janeiro in Brazil, instead relying on its flights from Miami to connect the U.S. to South America. In 2016, Charlotte had no flights to South America and American Airlines is not expected to add any in the near future according to the carrier's network planners.
- In addition, the ACEP report states that "Domestic enplanements at CLT increased 4.8 percent annually between 1990 and 2013…This was primarily driven by domestic connections…"[23] However, since the ACEP forecast was completed, domestic O&D passengers continued to grow, while domestic connections have grown more slowly or even decline (-1.1 percent on average per annum from 2013-2016).
- The ACEP "assumed that connecting domestic enplanements would account for 75.0 percent of the total domestic enplanements throughout the forecast period."[24] Instead, the connecting share of passengers has declined to 71.7 percent in 2016.
- The ACEP assumed continued high fuel prices; however, fuel prices have plummeted in recent years, changing the economics of airline operations.

All of these factors/assumptions explain why the ACEP forecast is higher than that of the more recent TAF and EIS forecasts.

3.4 Operations

This section presents the methodology and results for projected aircraft operations at CLT for the 2017-2035 period.

3.4.1 Operations Forecast Assumptions

Forecasts of annual commercial passenger aircraft operations are based on forecast passenger traffic demand. Passenger aircraft landings depend on the average aircraft size and average load factor (i.e., average passenger per flight), as represented by the formula below:

$$\boldsymbol{Passenger\ Aircraft\ Operations} = (Passenger\ Forecasts)/(Avg.\ Aircraft\ Size\ x\ Avg.\ Load\ Factor)$$

$$where\ Avg.\ Aircraft\ Size\ x\ Avg.\ Load\ Factor = Avg.\ Passengers\ per\ Aircraft\ Movement$$

21 CLT Master Plan Update: Phase 1, Airport Capacity Enhancement Plan

22 Ibid.

23 Ibid.

24 Ibid.

Forecasts of average load factors were prepared (including marginal growth) and applied to the passenger figures (**Table 3-5**).

Table 3-5 Load Factor Assumptions

Region	2016	2035
Commuter – Domestic	80.2%	81.4%
Air Carrier – Domestic	84.0%	85.0%
Air Carrier – Canada	77.4%	82.0%
Air Carrier – Caribbean, Mexico, Central America	83.8%	85.0%
Air Carrier – South America	80.0%	82.0%
Air Carrier – Trans-Atlantic	75.1%	80.0%
Air Carrier – Trans-Pacific	80.0%	85.0%

Source: InterVISTAS assumptions.

Projections of passenger operations for Base, High and Low Cases were created by applying these load factor assumptions and assumptions regarding aircraft size (discussed in Section 3.4.5 below). Forecasts of annual general aviation and military operations were increased in line with the FAA TAF forecast.

3.4.2 Cargo Operations Forecasts

In 2016, there were 2,696 air cargo operations at CLT, 0.5 percent of total aircraft operations. The forecast of cargo aircraft operations was based on historical operations and forecast air cargo tonnage. It was assumed that the proportion of air cargo that would be transported by cargo aircraft (as opposed to passenger aircraft bellyhold), would remain at 2016 levels throughout the forecast period. Furthermore, it was assumed that the tonnage per cargo aircraft would remain constant over the forecast period.

3.4.3 Annual Operations Forecasts

The resulting base case operations forecasts are presented in **Table 3-6** below. Air carrier aircraft movements are forecast to increase by an average of 1.4 percent per annum, compared with passenger growth of 1.8 percent per annum (the lower growth due to rising load factors and the number of passengers per aircraft). Total operations for the base case forecasted are projected to grow at an average annual rate of 1.2 percent.

Table 3-6 Operations Forecast – Base Case – Charlotte Douglas International Airport

Year	Air Carrier	Air Taxi	GA	Military	Total
2010	331,110	171,836	24,414	1,741	529,101
2011	329,680	184,122	24,131	1,909	539,842
2012	343,121	183,870	23,400	1,702	552,093
2013	356,079	175,051	25,426	1,392	557,948
2014	361,273	156,188	26,321	1,396	545,178
2015	363,667	152,215	25,639	2,423	543,944
2016	400,819	117,378	24,869	2,676	545,742
2017	409,357	118,994	24,935	2,676	555,962
2020	431,503	122,231	25,083	2,676	581,494
2025	464,250	127,137	25,335	2,676	619,399
2030	494,758	130,959	25,588	2,676	653,981
2035	526,759	135,135	25,845	2,676	690,415
Compound Annual Growth Rates					
2010 – 2015	1.9%	-2.4%	1.0%	6.8%	0.6%
2016 – 2020	1.9%	1.0%	0.2%	0.0%	1.6%
2020 – 2025	1.5%	0.8%	0.2%	0.0%	1.3%
2025 – 2030	1.3%	0.6%	0.2%	0.0%	1.1%
2030 – 2035	1.3%	0.6%	0.2%	0.0%	1.1%
2016 – 2035	1.4%	0.7%	0.2%	0.0%	1.2%

Source: Airport Statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.
Note: Data is reflected in calendar years.
Note: The forecast does not reallocate air taxi operations to air carrier as the seating capacity increases; therefore, the average aircraft size (seats) for air taxi goes above 60 seats.

Table 3-7 Operations Forecast – High Case – Charlotte Douglas International Airport

Year	Air Carrier	Air Taxi	GA	Military	Total
2010	331,110	171,836	24,414	1,741	529,101
2011	329,680	184,122	24,131	1,909	539,842
2012	343,121	183,870	23,400	1,702	552,093
2013	356,079	175,051	25,426	1,392	557,948
2014	361,273	156,188	26,321	1,396	545,178
2015	363,667	152,215	25,639	2,423	543,944
2016	400,819	117,378	24,869	2,676	545,742
2017	411,504	119,523	24,935	2,676	558,638
2020	440,726	124,439	25,083	2,676	592,925
2025	483,014	129,731	25,335	2,676	640,757
2030	531,968	138,249	25,588	2,676	698,481
2035	585,654	147,635	25,845	2,676	761,810
Compound Annual Growth Rates					
2010 – 2015	1.9%	-2.4%	1.0%	6.8%	0.6%
2016 – 2020	2.4%	1.5%	0.2%	0.0%	2.1%
2020 – 2025	1.8%	0.8%	0.2%	0.0%	1.6%
2025 – 2030	1.9%	1.3%	0.2%	0.0%	1.7%
2030 – 2035	1.9%	1.3%	0.2%	0.0%	1.8%
2016 – 2035	2.0%	1.2%	0.2%	0.0%	1.8%

Source: Airport Statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.
Note: Data is reflected in calendar years
Note: The forecast does not reallocate air taxi operations to air carrier as the seating capacity increases; therefore, the average aircraft size (seats) for air taxi goes above 60 seats.

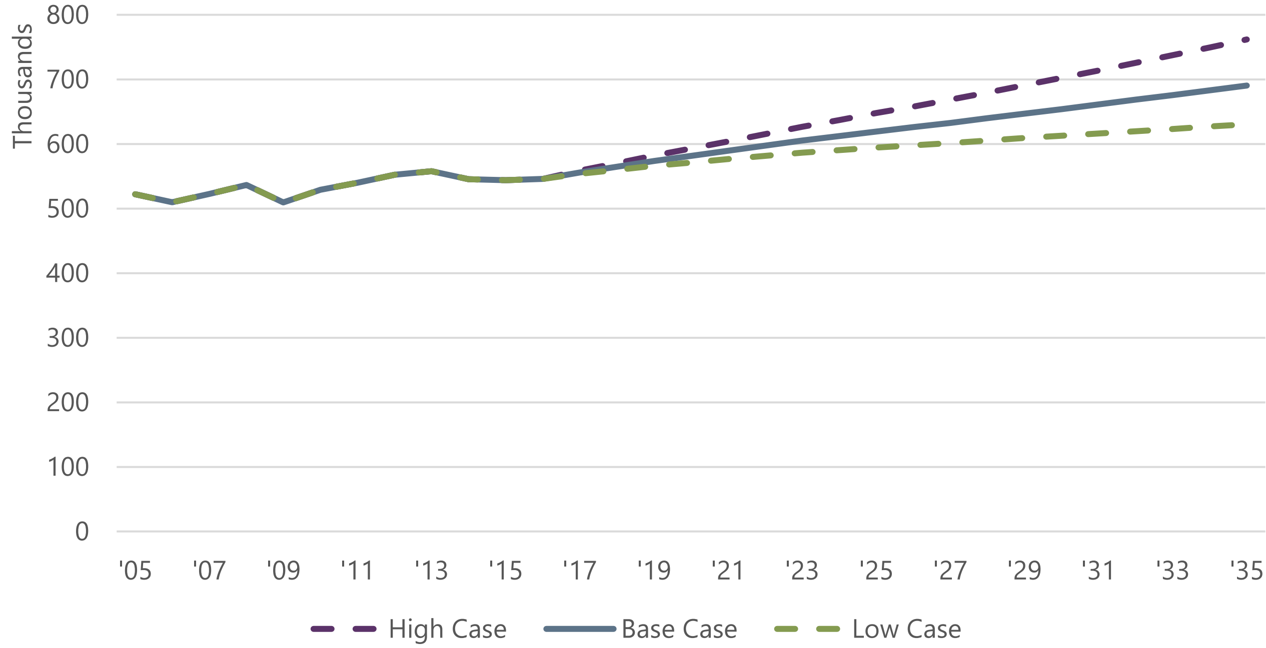
Table 3-8 Operations Forecast – Low Case – Charlotte Douglas International Airport

Year	Air Carrier	Air Taxi	GA	Military	Total
2010	331,110	171,836	24,414	1,741	529,101
2011	329,680	184,122	24,131	1,909	539,842
2012	343,121	183,870	23,400	1,702	552,093
2013	356,079	175,051	25,426	1,392	557,948
2014	361,273	156,188	26,321	1,396	545,178
2015	363,667	152,215	25,639	2,423	543,944
2016	400,819	117,378	24,869	2,676	545,742
2017	407,441	118,506	24,935	2,676	553,557
2020	423,357	120,210	25,083	2,676	571,326
2025	440,261	119,856	25,335	2,676	588,129
2030	459,150	121,963	25,588	2,676	609,377
2035	477,630	124,175	25,845	2,676	630,326
Compound Annual Growth Rates					
2010 – 2015	1.9%	-2.4%	1.0%	6.8%	0.6%
2016 – 2020	1.4%	0.6%	0.2%	0.0%	1.2%
2020 – 2025	0.8%	-0.1%	0.2%	0.0%	0.6%
2025 – 2030	0.8%	0.3%	0.2%	0.0%	0.7%
2030 – 2035	0.8%	0.4%	0.2%	0.0%	0.7%
2016 – 2035	0.9%	0.3%	0.2%	0.0%	0.8%

Source: Airport Statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.
Note: Data is reflected in calendar years
Note: The forecast does not reallocate air taxi operations to air carrier as the seating capacity increases; therefore, the average aircraft size (seats) for air taxi goes above 60 seats.

In the high growth scenario, total aircraft operations at Charlotte Douglas International will reach over 761,800 operations, with an average annual growth rate of 1.8 percent through 2035 (**Figure 3-3** and **Table 3-7**). While a period of low growth is projected to reach 630,300 operations in 2035 with an average annual growth rate of 0.8 percent (**Table 3-8**).

Figure 3-3 Operations Forecast – Base, High, Low Cases – Charlotte Douglas International Airport



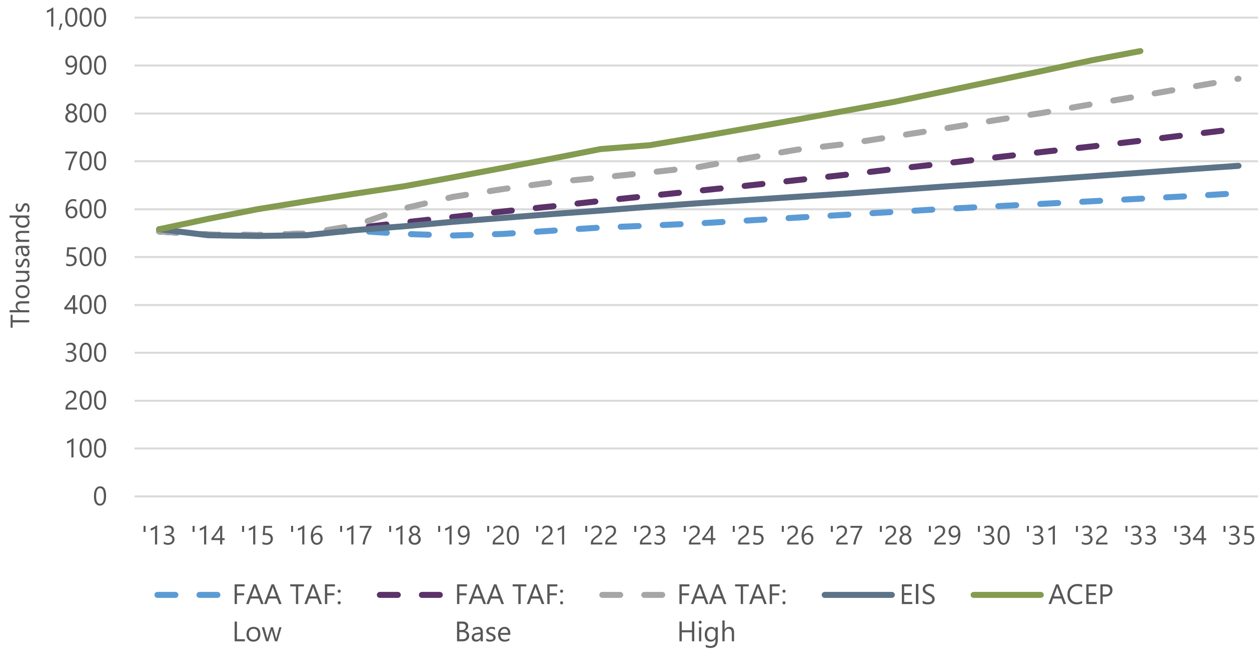
Source: Airport Statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.

3.4.4 Comparative Operations Forecasts

The chart (**Figure 3-4)** and table (**Table 3-9**) below provide a comparison with the FAA TAF forecasts and the ACEP forecasts. The EIS forecast is lower than the baseline FAA forecast, with forecast volumes in 2033 being 9.1 percent below that of the TAF, and 27.4 percent below the ACEP forecast in 2033.[25]

25 The ACEP forecast extended to 2033 only.

Figure 3-4 Historical and Forecast Aircraft Operations – EIS, TAF and ACEP



Source: Airport statistics data for historical; U.S. DOT T100 data; InterVISTAS analysis for forecasts.
FAA TAF: https://www.faa.gov/data_research/aviation/taf/
CLT Master Plan Update: Phase 1, Airport Capacity Enhancement Plan

Table 3-9 Historical and Forecast Operations– EIS, TAF and ACEP

	Year	EIS	FAA TAF	ACEP	EIS vs. TAF	EIS vs. ACEP
Passenger Enplanements						
Base Year	2016	22,173,747	21,900,456	24,408,300	1.2%	-9.2%
Base Year + 1	2017	22,746,502	22,231,446	25,266,400	2.3%	-10.0%
Build Year	2028	27,893,348	27,735,137	36,449,000	0.6%	-23.5%
Build Year + 5	2033	30,298,324	30,353,627	42,865,500	-0.2%	-29.3%
Commercial Operations						
Base Year	2016	518,197	521,304	579,260	-0.6%	-10.5%
Base Year + 1	2017	528,351	532,647	594,800	-0.8%	-11.2%
Build Year	2028	611,620	655,739	783,220	-6.7%	-21.9%
Build Year + 5	2033	647,224	714,678	886,260	-9.4%	-27.0%
Total Operations						
Base Year	2016	545,742	548,653	616,400	-0.5%	-11.5%
Base Year + 1	2017	555,962	560,057	632,300	-0.7%	-12.1%
Build Year	2028	639,783	683,696	824,740	-6.4%	-22.4%
Build Year + 5	2033	675,643	742,889	930,080	-9.1%	-27.4%

Source: Airport statistics data for historical; U.S. DOT T100 data; InterVISTAS analysis for forecasts.
FAA TAF: https://www.faa.gov/data_research/aviation/taf/
CLT Master Plan Update: Phase 1, Airport Capacity Enhancement Plan
Note: A version of this table with Base Year +5,10,15 years is shown in the Appendix.
Note: Comparison is made between the baseline EIS and TAF forecasts.

3.4.5 Aircraft Fleet Mix

One of the other major assumptions required to convert the passenger forecast into aircraft operations is the average aircraft size, which includes assumptions regarding how the fleet of aircraft using CLT will change in the future. Forecasts of average aircraft size were prepared and applied, pointing to a trend of larger aircraft. In particular, the fleet orders of American Airlines which include large orders for the Airbus A321neo (starting in 2019) and the Boeing B737Max8 (starting in 2021), were included. The addition of these aircraft are expected to increase the average aircraft size at CLT (confirmed in interviews with American Airlines).

Average Aircraft Size (Seats per Departure) Assumptions:

› **Commuter** – commuter aircraft, including large and small regional jets, are assumed to increase from 59 seats in 2016 to 62 seats in 2022 and 64 seats by 2035. This increase assumes network carriers will continue retiring smaller regional jets and replace them with more efficient larger regional jets.

› **Domestic** – seats per aircraft increase from 142 in 2016 to 145 in 2022 and 148 by 2035, as airlines upgauge; e.g., moving some operations from A319 to A320, and from A320 to A321Neo, etc.

› **Canada** – seats per departure to Canada decreased following the 2008-2010 financial crisis. However, seats per departure have stabilized since 2013. Average seats are forecast to increase gradually from 62 seats in 2016 to 64 in 2022 and 67 in 2035.

- **Caribbean, Mexico, South America** – seats per departures has stayed relatively flat for this region at 159 seats - assumed to be 162 seats by 2022 and 166 seats by 2035.
- **South America** – US Airways previously serviced Brazil from 2009-2015, with average seats per departure of 204 in 2015. Service is assumed to resume by 2020, operating with 209 seats.
- **Trans-Atlantic** – seats per departures are projected to increase from 261 seats in 2016 to 265 in 2035.
- **Trans-Pacific** – does not currently have service, assumed this would remain the case through 2035

3.5 Cargo

This section presents the methodology and forecast results for cargo tonnage at CLT for the 2017-2035 period.

3.5.1 Cargo Forecast Assumptions

Cargo forecasts were prepared for Base, High and Low Cases, with differing assumptions for each case. The cargo growth forecast is based on expert judgement.

3.5.1.1 Base Case

The continuation of activity is expected to spur growth in the short term, averaging 6 percent per annum up to 2019. After that, cargo activity growth at the airport is expected to taper off in the long term as Amazon plans to build a centralized air hub at Cincinnati/Northern Kentucky Airport to support its growing fleet of Prime Air cargo planes. Cargo growth after 2020 is projected to range from 2-3 percent per annum in line with historical levels. While the Department does not currently have plans to expand its cargo facilities, the Department recently completed an expansion of the cargo ramp, providing 12,000 square yards of additional space. Airport facilities are assumed to accommodate future cargo activity levels.

The following assumptions were made concerning the cargo forecast at Charlotte:

- The U.S. economy as well as Charlotte's local economy will experience moderate and steady growth between 2016 and 2041;
- Rapid growth due to Amazon will slow by 2019;
- Key integrated carriers (e.g., FedEx, UPS, etc.) will maintain their services at Charlotte airport;
- Passenger air carriers would continue to provide cargo services through their belly capacity; regional jets would provide limited cargo capacity
- Long-term (2020-2035) growth is forecast to average 2.4 percent per annum, close to the average between 2011 and 2016 (2.3 percent per annum – see Section 2.5).

3.5.1.2 High Case

To reflect a high growth scenario, an adjustment of +0.5 percentage points was made to the annual cargo growth rate.

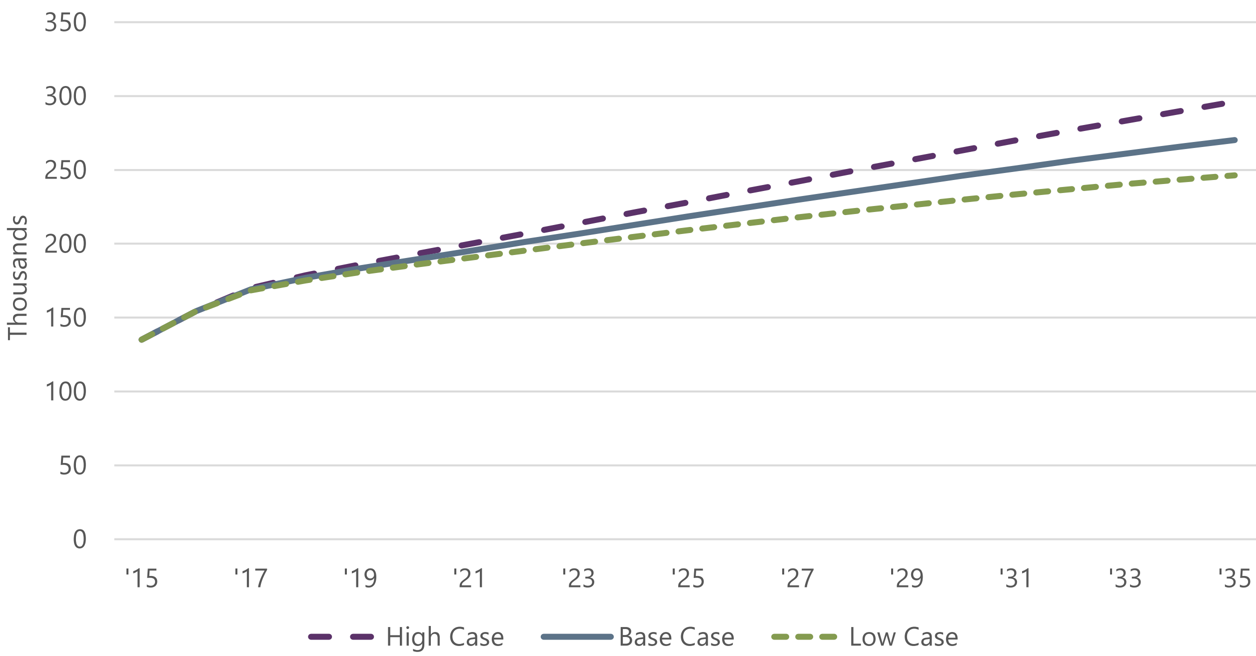
3.5.1.3 Low Case

For the low growth scenario, it was assumed Amazon growth in the early part of the forecast is curtailed, and an adjustment of -0.5 percentage points was made to the annual cargo growth rate.

3.5.2 Annual Cargo Forecasts

In the Base Case forecast, cargo tonnage is expected to grow an average of 3.0 percent per year reaching 270,215 tons in 2035, compared to 154,477 tons in 2016 (**Figure 3-5**). In the High Case forecast average annual growth increases to 3.5 percent per year, reaching 296,264 tons in 2035. While in the Low Case, cargo is projected to reach 246,346 tons by 2035, with an average annual growth rate of 2.5 percent.

Figure 3-5 Historical and Forecast Cargo Tonnage – Base, High, Low Cases – Charlotte Douglas International Airport



Source: Airport Statistics data for historical; U.S. DOT T100; InterVISTAS analysis for forecasts.

3.6 Conclusion

The forecasts presented in this technical memorandum will be used as an input into several subsequent analyses in the EIS. The Base Case forecast serves as the most likely future demand scenario given no constraints on traffic growth at the Airport; the High and Low Cases serve as indicators of how actual demand could vary above/below the Base Case depending on changes in the economic environment or changes in strategic decisions made by American Airlines. The annual forecasts for 2028 (Build Year) and 2033 (Build Year + 5) will be converted into Design Day Schedules including details of individual flights. Such schedules are required to conduct the capacity delay analysis and evaluate delays in airspace, runway usage, taxi-in/out times, and gate usage. Simulation of a Design Day Schedule for 2016 (based on current OAG schedules) will determine the presence and location of existing delays; the schedules for 2028 and 2033 will be used as inputs to model future delays in the absence of the Project (No Action).

Appendix 1: Additional Data

Domestic O&D Traffic Parameter Estimates (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-22.53	-5.92
Ln (Charlotte GDP)	1.19	10.10
Ln (2001 Dummy)	-0.13	-1.41
Ln (2002 Dummy)	-0.17	-1.83
Adjusted-R^2	0.89	

Canada O&D Traffic Parameter Estimates – Outbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-20.19	-5.09
Ln (Charlotte GDP)	0.97	7.91
Ln (2001 Dummy)	-0.05	-0.48
Ln (2002 Dummy)	0.17	1.72
Adjusted-R^2	0.79	

Canada O&D Traffic Parameter Estimates – Inbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-43.24	-10.38
Ln (Canadian GDP)	1.93	13.00
Ln (2001 Dummy)	-0.07	-0.92
Ln (2002 Dummy)	0.01	0.10
Adjusted-R^2	0.91	

Caribbean (including Mexico and the Caribbean) O&D Traffic Parameter Estimates – Outbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-73.08	-12.37
Ln (Charlotte GDP)	2.64	14.48
Ln (2001 Dummy)	-0.11	-0.78
Ln (2002 Dummy)	-0.03	-0.23
Adjusted-R^2	0.93	

Caribbean (including Mexico and the Caribbean) O&D Traffic Parameter Estimates – Inbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-87.26	-11.52
Ln (Regional GDP)	3.50	12.93
Ln (2001 Dummy)	-0.27	-1.74
Ln (2002 Dummy)	-0.22	-1.41
Adjusted-R^2	0.92	

South America O&D Traffic Parameter Estimates – Outbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-88.11	-8.93
Ln (Charlotte GDP)	3.03	9.94
Ln (Dummy 2001)	-0.01	-0.04
Ln (Dummy 2002)	-0.13	-0.55
Adjusted-R^2	0.87	

South America O&D Traffic Parameter Estimates – Inbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-97.56	-12.83
Ln (SAM GDP)	3.67	14.06
Ln (Dummy 2001)	0.10	0.48
Ln (Dummy 2002)	0.01	0.06
Adjusted-R^2	0.93	

Trans-Atlantic O&D Traffic Parameter Estimates – Outbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-27.81	-3.97
Ln (Charlotte GDP)	1.24	5.74
Ln (Dummy 2001)	0.08	0.47
Ln (Dummy 2002)	-0.36	-2.11
Adjusted-R^2	0.72	

Trans-Atlantic O&D Traffic Parameter Estimates – Inbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-87.76	-7.27
Ln (EU-28 GDP)	3.27	8.26
Ln (Dummy 2001)	-0.06	-0.44
Ln (Dummy 2002)	-0.40	-2.93
Adjusted-R^2	0.84	

Trans-Pacific O&D Traffic Parameter Estimates – Outbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-69.67	-10.26
Ln (Charlotte GDP)	2.49	11.85
Ln (Dummy 2001)	0.06	0.34
Ln (Dummy 2002)	0.00	0.02
Adjusted-R^2	0.90	

Trans-Pacific O&D Traffic Parameter Estimates – Inbound (1998-2016)

Variable	Parameter Estimate	T-Statistic
Constant	-37.41	-16.85
Ln (Asia GDP)	1.57	21.47
Ln (2001 Dummy)	0.04	0.51
Ln (2002 Dummy)	0.00	-0.04
Adjusted-R^2	0.97	

Historical Values of the Independent Variables

Year	CLT GRP Real 2009 ($mns)	Canada GDP Real 2010 ($bns)	Caribbean GDP Real 2010 ($bns)	South America GDP Real 2010 ($bns)	Trans-Atlantic GDP Real 2010 ($bns)	Trans-Pacific GDP Real 2010 ($bns)	2001 Dummy	2002 Dummy
1998	79,625	1,211	297	3,742	14,627	9,932	0	0
1999	84,943	1,271	308	3,743	15,050	10,262	0	0
2000	86,498	1,337	318	3,887	15,634	10,741	0	0
2001	89,212	1,359	332	3,920	15,973	11,052	1	0
2002	92,383	1,397	341	3,933	16,178	11,465	0	1
2003	96,233	1,424	351	3,998	16,405	12,012	0	0
2004	102,951	1,469	362	4,245	16,834	12,685	0	0
2005	111,670	1,515	379	4,437	17,191	13,382	0	0
2006	122,351	1,555	399	4,675	17,785	14,223	0	0
2007	128,762	1,586	415	4,937	18,346	15,251	0	0
2008	137,250	1,605	423	5,127	18,456	15,808	0	0
2009	128,097	1,561	419	5,062	17,669	16,128	0	0
2010	116,819	1,614	427	5,354	18,038	17,399	0	0
2011	120,718	1,662	437	5,599	18,350	18,250	0	0
2012	129,882	1,694	446	5,760	18,278	19,140	0	0
2013	126,752	1,728	457	5,918	18,308	20,096	0	0
2014	131,396	1,771	470	5,975	18,547	20,986	0	0
2015	140,388	1,789	483	5,959	18,882	21,922	0	0
2016	144,331	1,829	499	6,013	19,264	22,867	0	0

Source: US Department of Agriculture Economics Research Centre; Woods & Poole 2017

Summary of Domestic Connecting Traffic Forecast (millions)

Year	U.S. Domestic Traffic	CLT Share	CLT Domestic Connections
2016	718.7	1.9%	14.0
2017	738.0	1.9%	14.2
2020	791.4	1.9%	15.0
2025	847.6	1.8%	15.7
2030	917.9	1.8%	16.5
2035	998.0	1.7%	17.4
CAGR			
2016 – 2020	**2.4%**		**1.9%**
2020 – 2025	**1.4%**		**0.8%**
2025 – 2030	**1.6%**		**1.0%**
2030 – 2035	**1.7%**		**1.1%**
2016 – 2035	1.7%		1.2%
Total Change in CLT Share		-10.0%	

Summary of International Connecting Traffic Forecast (millions)

Year	U.S. International Traffic	CLT Share	CLT International Connections
2016	102.3	1.5%	1.6
2017	105.2	1.5%	1.6
2020	118.3	1.5%	1.7
2025	142.7	1.4%	1.9
2030	169.9	1.2%	2.1
2035	201.3	1.1%	2.3
CAGR			
2016 – 2020	**3.7%**		**2.3%**
2020 – 2025	**3.8%**		**2.4%**
2025 – 2030	**3.5%**		**1.9%**
2030 – 2035	**3.4%**		**1.7%**
2016 – 2035	3.6		2.1%
Total Change in CLT Share		-25.0%	

Summary of Charlotte Douglas International Airport Forecast – FAA Template

	Forecast					Compound Annual Growth Rates			
	Base Year 2016	Base Year+1 2017	Base Year+5 2021	Base Year+10 2026	Base Year+15 2031	Base Year+1 2017	Base Year+5 2021	Base Year+10 2026	Base Year+15 2031
Passenger Enplanements									
Air Carrier	15,640,736	15,850,803	17,411,598	19,089,474	20,951,150	1.3%	2.2%	2.0%	2.0%
Commuter	6,533,011	6,895,699	7,398,772	7,864,182	8,374,605	5.6%	2.5%	1.9%	1.7%
Total	**22,173,747**	**22,746,502**	**24,810,370**	**26,953,656**	**29,325,755**	**2.6%**	**2.3%**	**2.0%**	**1.9%**
Aircraft Operations									
Air Carrier	400,819	409,357	438,230	469,999	501,066	2.1%	1.8%	1.6%	1.5%
Air Taxi	117,378	118,994	123,291	127,823	131,798	1.4%	1.0%	0.9%	0.8%
Subtotal	*518,197*	*528,351*	*561,520*	*597,822*	*632,864*	*2.0%*	*1.6%*	*1.4%*	*1.3%*
General Aviation	24,869	24,935	25,134	25,386	25,639	0.3%	0.2%	0.2%	0.2%
Military	2,676	2,676	2,676	2,676	2,676	0.0%	0.0%	0.0%	0.0%
Total Operations	**545,742**	**555,962**	**589,330**	**625,884**	**661,180**	**1.9%**	**1.5%**	**1.4%**	**1.3%**
Peak Hour Operations	114	116	*	*	*	1.8%			
Cargo/Mail									
Enplaned and Deplaned Tons	154,477	169,152	195,221	224,125	251,111	9.5%	4.8%	3.8%	3.3%
Operational Factors									
Average Aircraft Size (seats)									
Air Carrier	144	144	146	147	149	0.0%	0.3%	0.2%	0.2%
Air Taxi	59	59	61	62	63	0.0%	0.7%	0.5%	0.4%
Average Enplaning Load Factor									
Air Carrier	83.6%	83.7%	83.9%	84.2%	84.5%				
Air Taxi	80.2%	80.3%	80.7%	81.2%	81.4%				

Source: Airport Statistics data for 2016; InterVISTAS analysis for forecast

* Forecast peak hour was only estimated for 2028 (Build Year) and 2033 (Build Year +5). See Table 1-1.

Comparison of EIS and TAF Forecasts – FAA Template

	Year	EIS	FAA TAF	EIS vs TAF
Passenger Enplanements				
Base Year	2016	22,173,747	21,900,456	1.2%
Base Year + 1	2017	22,746,502	22,231,446	2.3%
Base Year + 5	2021	24,810,370	24,283,346	2.2%
Base Year + 10	2026	26,953,656	26,714,161	0.9%
Base Year + 15	2031	29,325,755	29,301,711	0.1%
Commercial Operations				
Base Year	2016	518,197	521,304	-0.6%
Base Year + 1	2017	528,351	532,647	-0.8%
Base Year + 5	2021	561,520	578,313	-2.9%
Base Year + 10	2026	597,822	632,765	-5.5%
Base Year + 15	2031	632,864	691,018	-8.4%
Total Operations				
Base Year	2016	545,742	548,653	-0.5%
Base Year + 1	2017	555,962	560,057	-0.7%
Base Year + 5	2021	589,330	605,921	-2.7%
Base Year + 10	2026	625,884	660,623	-5.3%
Base Year + 15	2031	661,180	719,127	-8.1%

Source: Airport statistics data for historical; U.S. DOT T100 data; InterVISTAS analysis for forecasts.
FAA TAF: https://www.faa.gov/data_research/aviation/taf/
Note: TAF has been converted to Calendar Years for comparison.

Appendix H

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Appendix H, Simulations Analysis

Charlotte Douglas International Airport

DRAFT – August 2024

PREPARED FOR
Charlotte Douglas International Airport

PRESENTED BY
Landrum & Brown, Incorporated

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Appendix H, Simulations Analysis

H.1 Introduction

As part of the Charlotte Douglas International Airport (CLT) Part 150 Study, Landrum & Brown (L&B) conducted a simulation modeling analysis of select alternatives using the Air Traffic Optimization (AirTOP) model, a rule-based, fast-time simulation tool. AirTOP computes aircraft travel times and delay statistics which are used as evaluation metrics to determine differences between various simulated alternatives.

The simulation study focuses on airport operations in 2028, the first full year of operations after the opening of the new fourth parallel runway. The aim of the simulations was to quantify the operational impact of the noise abatement alternatives compared to the Future (2028) Baseline operating conditions (see **Appendix E, *Noise Abatement Alternatives,*** for more information).

H.2 Design Day Flight Schedule

The design day flight schedule forecasts 1,860 daily operations at CLT.[1] The design day represents operations on an average day in the peak month (PMAD). The use of a PMAD schedule instead of an average annual day for airside simulation modeling is a standard planning practice as discussed in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5060-6B, *Airport Master Plans*. The use of PMAD activity ensures that the airside has adequate capacity to accommodate activity most days of the year without overbuilding for the busiest days of the year. **Table H-1** and **Table H-2** provides a summary of the aircraft fleet mix by flight type and FAA Airplane Design Group (ADG).

Table H-1, Fleet Mix by Flight Type

Flight Type	2028	
	Design Day Operations	% of Design Day Operations
Passenger	1,760	95%
General Aviation	84	5%
Cargo	14	1%
Military	2	0%
Total	**1,860**	**100%**

Source: Landrum & Brown analysis, 2020

Table H-2, Fleet Mix by Design Group

FAA ADG	2028	
	Number of Operations	% of Total Operations
I	20	1%
II	494	27%
III	1,309	70%
IV	16	1%
V	21	1%
Total	**1,860**	**100%**

Source: Landrum & Brown analysis, 2020

1 *Capacity/Delay Analysis and Airfield Modeling Technical Memorandum*, Charlotte Douglas International Airport Environmental Impact Statement, VHB in association with TransSolutions, 7/6/2018.

H.3 Future (2028) Baseline Operating Assumptions

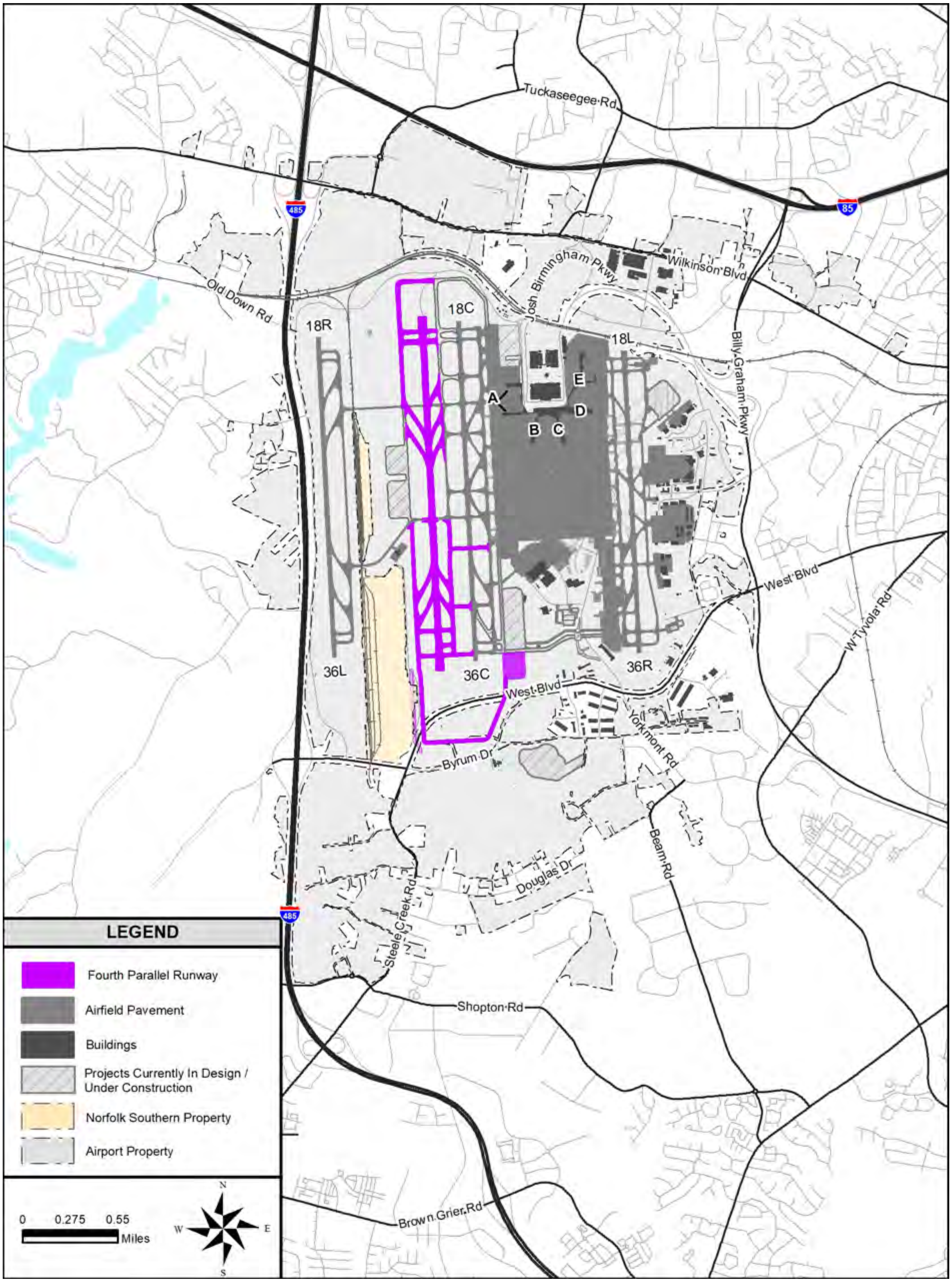
A 10,000-foot long fourth parallel runway (herein referred to as Runway 01/19) is expected to be operational in the Future (2028) Baseline condition, as shown on **Exhibit H-1**. The north end around taxiway (NEAT) and south end around taxiway (SEAT) on the west side of the airport are expected to be operational as well. The simulations of the Future (2028) Baseline condition assume terminal area taxiway improvements and additional gate capacity are also in place. The Part 150 Future (2028) Baseline operating assumptions are summarized in the sections that follow.[2]

H.3.1 Runway Configuration

Runway 01/19 has 3,200 feet of separation to Runway 18R/36L and 1,100 feet of separation to Runway 18C/36C. In the Future (2028) Baseline scenario, Runways 18R/36L, 18C/36C, and 18L/36R were assumed to be used by arrivals to provide simultaneous triple independent approaches capability during arrival peaks. Runways 01/19 and 18L/36R were assumed to be used for departures. During off-peak periods when arrival demand is sparse, Runway 18C/36C can be used for departures instead of Runway 01/19 to avoid crossing Runway 18C/36C. The Future (2028) Baseline runway operating configuration is depicted on **Exhibit H-2**.

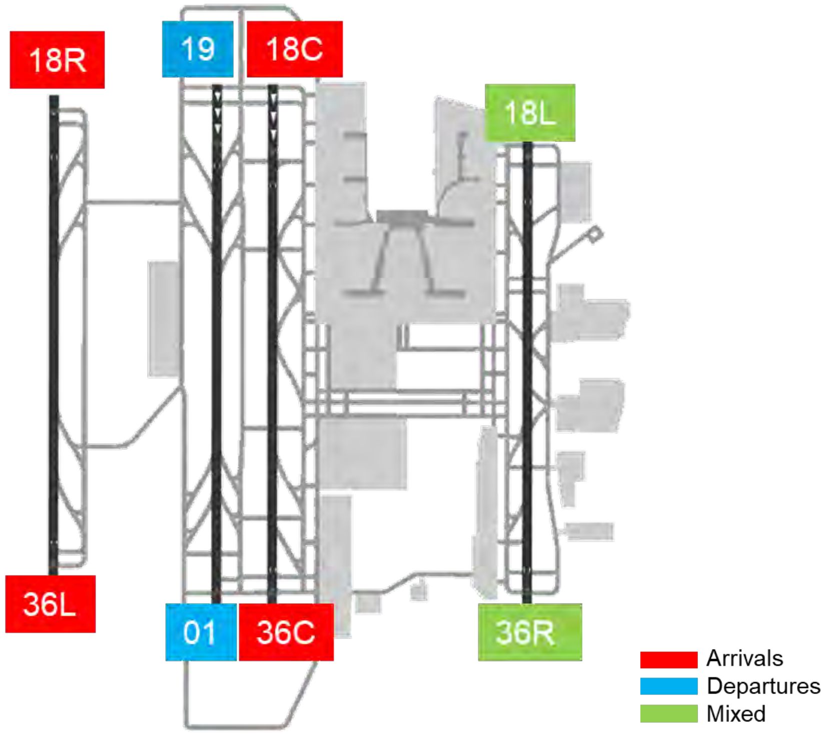
[2] See February 2022 *Environmental Assessment for Capacity Enhancement Projects* (EA), Appendix B, *Purpose and Need and Alternatives*, for a more detailed description of the modeling assumptions that were used as the basis of the Part 150 modeling.

Exhibit H-1, Future Airport Layout



Source: Landrum & Brown analysis, 2024.

Exhibit H-2, Future (2028) Baseline Runway Configuration



Notes: Mixed refers to use of the runway for arrivals and departures.
Runway 18C/36C is primarily an arrival runway but can be used for departures when traffic is sparse.
Source: Landrum & Brown analysis, 2023

H.3.2 Runway Operating Configurations

For each simulation scenario, the four primary (most frequently used) runway operating configurations at CLT were modeled:

- North Flow Visual Meteorological Conditions (VMC)
- North Flow Instrument Meteorological Conditions (IMC)
- South Flow VMC
- South Flow IMC

The FAA Aviation System Performance Metrics (ASPM) runway usage/weather data from 2019 was used to determine the frequency of each configuration. The usage shares are shown in **Table H-3**.

Table H-3, Runway Configuration Usage

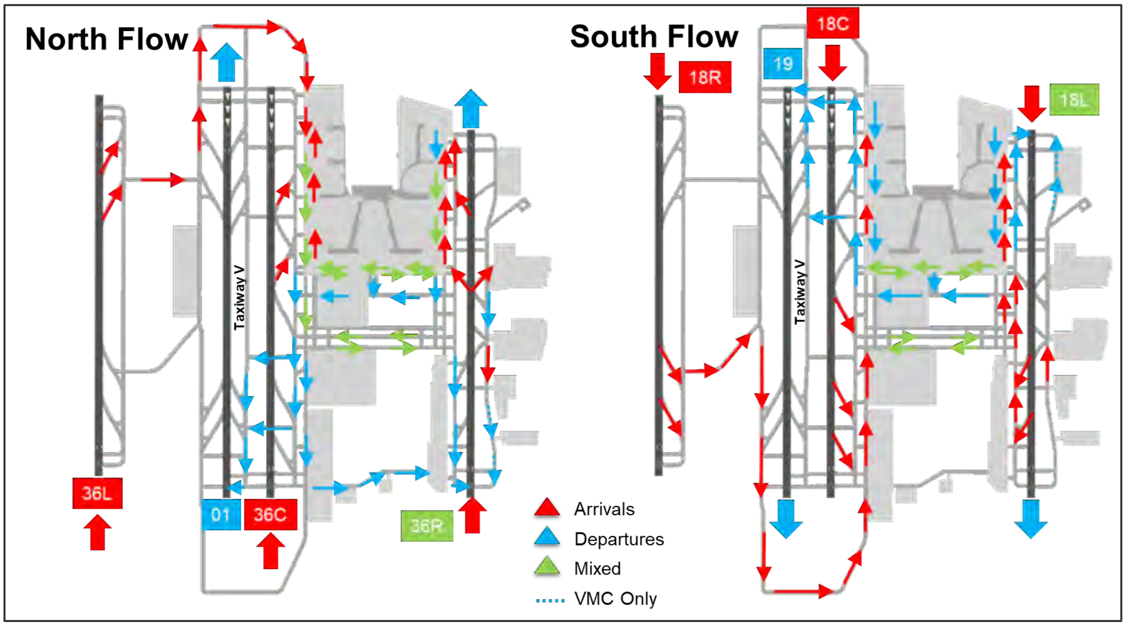
Configuration	Usage Share
North VMC	51.8%
North IMC	11.7%
South VMC	27.5%
South IMC	9.0%

Notes: Percentages reflect average annual use.
VMC=visual meteorological conditions; IMC=instrument meteorological conditions.
Source: FAA ASPM Airport Efficiency Report for 2019

H.3.3 Airfield Taxi Flows

The taxi flows assumed for the Future (2028) Baseline are shown on **Exhibit H-3**. Aircraft use the crossfield taxiways to move traffic between the east and west sides of the airfield. Traffic on the dual taxilanes abutting the ramp area is unidirectional to avoid head-on conflicts. Runway 01/19 departures cross Runway 18C/36C to access the departure queue on Taxiway V. Two locations are used in both flows to allow for two simultaneous crossings of Runway 18C/36C between each pair of arrivals. The departures would not use the EAT to reach Runway 01/19 to avoid taxiing under approaching aircraft, which would require coordination with arriving aircraft.

Exhibit H-3, Future (2028) Baseline Taxi Routes



Note: Mixed refers to use by arrivals and departures.
Source: Landrum & Brown analysis and ATCT feedback, 2023

H.3.4 Aircraft Separations

Aircraft separation is measured as the space between consecutive aircraft operations. **Table H-4** presents the simulated minimum in-trail separations in terms of distance for arrivals and in terms of time for departures. The separation required depends on the airport weather conditions. IMC conditions occur when there is low visibility and/or a low cloud ceiling. Aircraft are required to maintain greater separations during IMC. The separation requirements have a large effect on the operating capacity of the Airport.

Table H-4, Simulated Aircraft Separations

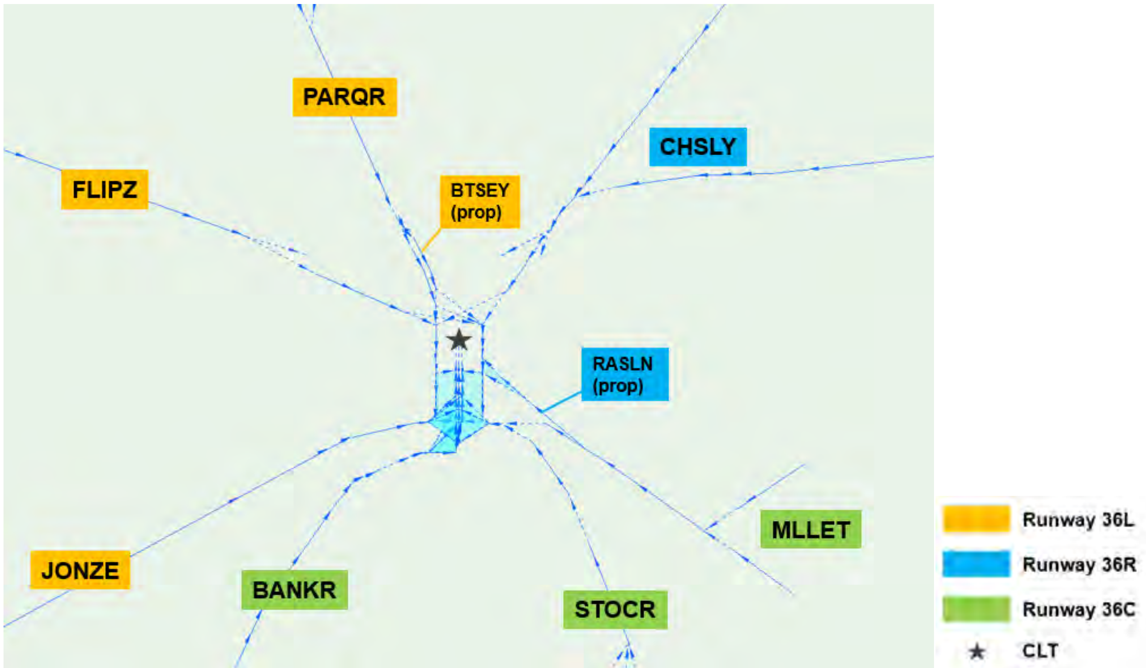
	VMC	IMC
Minimum Arrival Separation	2.5 nautical miles	3.8 nautical miles
Minimum Departure Separation	60 seconds	72 seconds

Notes: Departure heading separations reflect the fact that each departure runway has a single departure heading. VMC=visual meteorological conditions; IMC=instrument meteorological conditions.
Source: February 2022 *Environmental Assessment for Capacity Enhancement Projects*; Landrum & Brown analysis, 2020

H.3.5 Airspace Structure

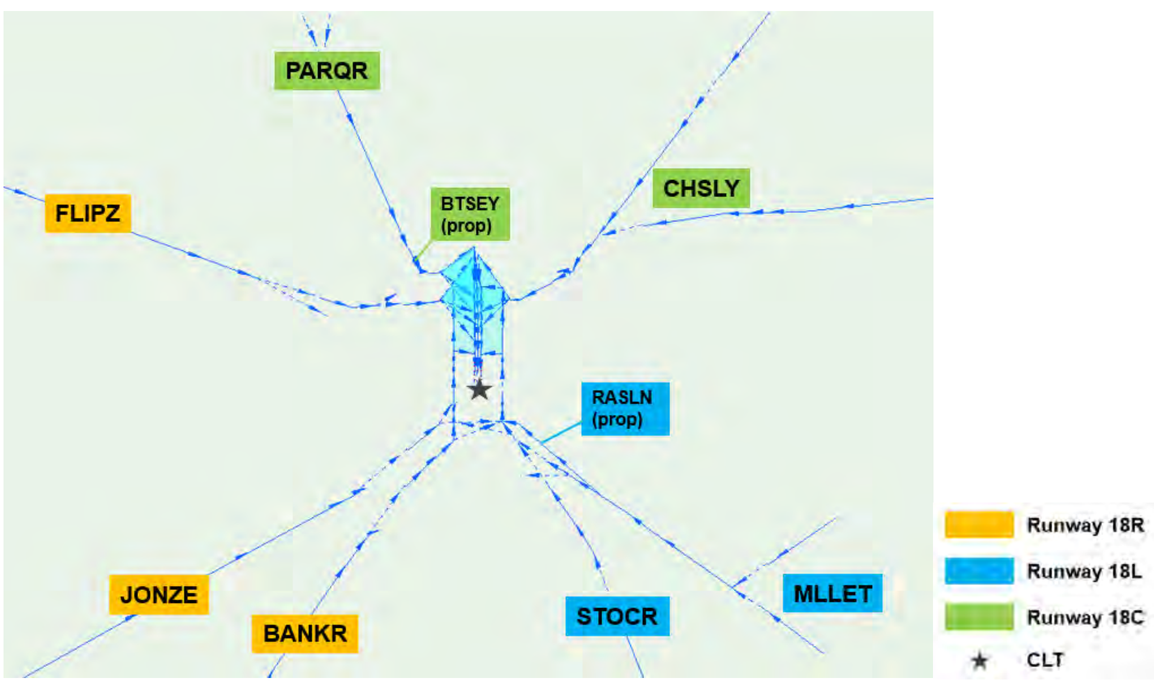
Exhibit H-4 and **Exhibit H-5** show the Future (2028) Baseline arrival fix assignments for each arrival runway. Arrival traffic can be swapped between runways to balance runway loads.

Exhibit H-4, Future (2028) Baseline North Flow Arrival Route Structure



Note: Arrivals can be offloaded to other runways during busy periods.
Source: FAA terminal procedures; Landrum & Brown analysis, 2020

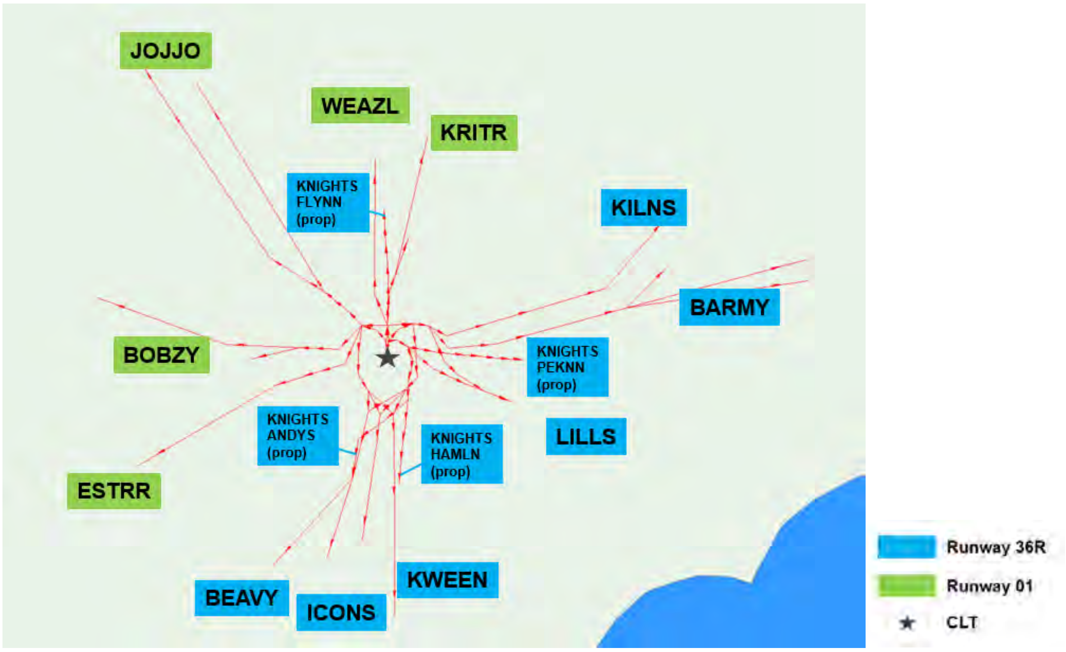
Exhibit H-5, Future (2028) Baseline South Flow Arrival Route Structure



Note: Arrivals can be offloaded to other runways during busy periods.
Source: FAA terminal procedures; Landrum & Brown analysis, 2020

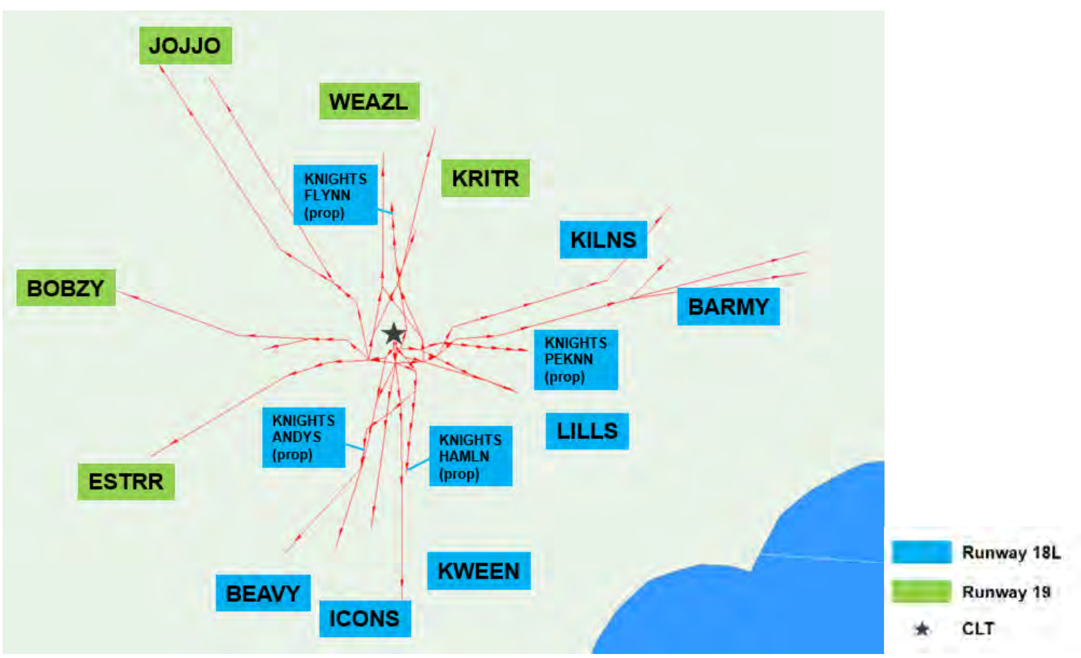
Exhibit H-6 and **Exhibit H-7** present the primary fix allocation for each departure runway for the Future (2028) Baseline condition. Departures to the north and west are assigned to Runway 01/19, while all propeller traffic and departures to the east and south are assigned to Runway 18L/36R.

Exhibit H-6, Future (2028) Baseline North Flow Departure Route Structure



Note: Departures to north and south fixes can be swapped between runways to balance the airfield.
Source: FAA terminal procedures; Landrum & Brown analysis, 2020

Exhibit H-7, Future (2028) Baseline South Flow Departure Route Structure



Note: Departures to north and south fixes can be swapped between runways to balance the airfield.
Source: FAA terminal procedures; Landrum & Brown analysis, 2020

H.4 Future (2028) Baseline Modeling Results

The results of the Future (2028) Baseline simulation models are presented in **Table H-5**. The unimpeded taxi time, delay, and hourly throughput results are listed for arrivals, departures, and total airport operations by weather and flow configurations.

Table H-5, Future (2028) Baseline Results

		North Flow		South Flow	
		VMC	IMC	VMC	IMC
Unimpeded Taxi Time	Avg arrival (min)	8.6	8.4	10.3	10.6
	Avg departure (min)	14.1	14.3	11.9	12.2
	Avg total (min)	11.4	11.4	11.1	11.4
Delay	Avg arrival (min)	4.9	6.2	4.8	7.1
	Avg departure (min)	4.6	9.4	4.3	8.0
	Avg total (min)	4.7	7.8	4.5	7.6
Throughput	Peak arrival	80	77	80	75
	Peak departure	82	73	82	74
	Peak total	147	139	147	139

Notes: The 90th percentile hourly departure throughput is shown in as an approximation of peak throughput. VMC=visual meteorological conditions; IMC=instrument meteorological conditions.
Source: Landrum & Brown analysis, 2023

The unimpeded taxi time captures the time the aircraft spends taxiing from the runway exit to the gate for arrivals and from gate pushback to the runway end for departures. North flow and south flow have similar unimpeded taxi times.

The delay results are a function of congestion experienced by the aircraft. Arrival delay includes air delay and taxi delay. Departure delay includes gate delay, taxi delay, and runway queue delay. IMC delay is higher than VMC delay because of the increased runway separation requirements and runway dependencies between the center runways.

The throughput shown are the 90th percentile hourly throughput rates, which are used as a measure of sustained, repeatable capacity. Higher throughputs are achievable for brief time periods or can be achieved with a higher scheduled demand level (and higher delay). The airport is well balanced between arrivals and departures throughputs.

H.5 Part 150 Noise Abatement Alternatives

The Part 150 study identified several noise abatement alternatives for consideration at CLT. Select alternatives were simulated to analyze their impact on airport operations, taxi time, and delay. Noise abatement alternatives were selected for simulation if it were felt they would have an impact on operational capacity or performance.

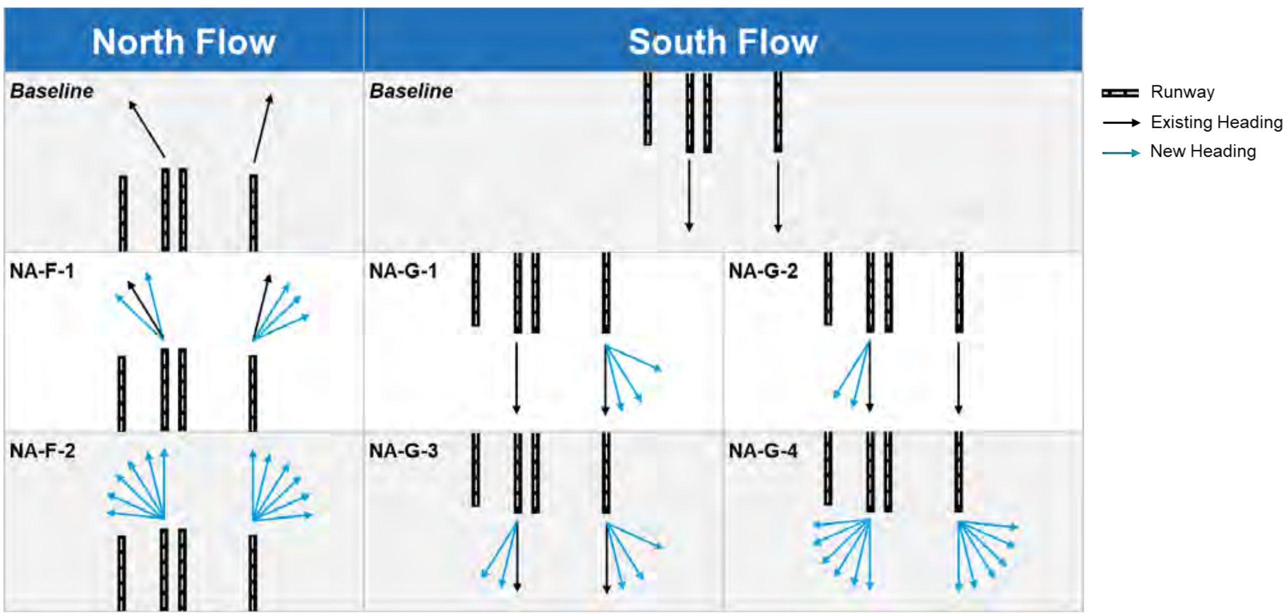
H.5.1 Diverging Headings Alternatives

CLT currently operates with one departure heading per runway in both north and south flows, an assumption maintained in the Future (2028) Baseline. In addition, south flow has an additional restriction that requires departures to maintain the runway heading within two miles of the runway end.

One set of Part 150 alternatives considers allowing multiple diverging headings from the departure runways. The diverging headings alternatives increase the number of headings per runway from one to anywhere from three to six, depending on the alternative. The departure load for each runway was assumed to be distributed evenly across the headings. The simulations assume the airspace would be able to be redesigned to allow multiple headings and not be constrained. The implementation of the proposed headings aims to reduce net noise impacts by dispersing flights over a wider area.

Exhibit H-8 summarizes the diverging heading alternatives simulated in this study. Two alternatives were considered for north flow (Alternatives NA-F-1 and NA-F-2) and four alternatives were considered for south flow (Alternatives NA-G-1, NA-G-2, NA-G-3, and NA-G-4). The first two south flow alternatives only add diverging headings to one runway to maintain the existing procedure of not turning within two miles of the runway end on the other runway. North flow does not have a similar restriction, so all north flow alternatives have diverging headings on both runways.

Exhibit H-8, Diverging Headings Alternatives



Note: Runway 18L/36R and the new fourth parallel runway were assumed to be the primary departure runways so only departure headings from those two runways are shown.
Source: Landrum & Brown analysis, 2023

H.5.1.1 Assumptions

Departure aircraft separation requirements for the diverging headings alternatives are shown in **Table H-6**. Consecutive aircraft using the same heading maintain the 60 seconds (VMC) or 72 seconds (IMC) minimum separation requirement from the Future (2028) Baseline. Consecutive aircraft using different headings can depart if the front aircraft has traveled at least 6,000 feet (VMC) or 8,000 feet (IMC) along the runway and has become airborne. Depending on the speed of the aircraft, the distance usually equates to a time less than the consecutive heading times, allowing aircraft to depart sooner if it is using a different heading than the preceding aircraft (about 45-55 seconds in VMC and 55-65 seconds in IMC).

Table H-6, Departure Aircraft Minimum Separations

	VMC	IMC
Consecutive aircraft using same heading	60 seconds	72 seconds
Consecutive aircraft using different headings	6,000 ft and front aircraft airborne (~45-55 seconds)	8,000 ft and front aircraft airborne (~55-65 seconds)

Note: VMC=visual meteorological conditions; IMC=instrument meteorological conditions.
Source: Landrum & Brown analysis and ATCT feedback, 2023

The diverging headings alternatives retain the same arrival runway separation requirement, runway configuration, taxi flow, and airspace structure as the Future (2028) Baseline.

H.5.1.2 North Flow Diverging Headings Results

The results of the north flow divergent headings alternatives (NA-F-1 and NA-F-2) are compared to the Future (2028) Baseline results in **Table H-7.** In VMC, the departure throughput increases by 1 operation/hour during the peak hour in Alternatives NA-F-1 and NA-F-2 as compared to the Future (2028) Baseline. In IMC, when airport operations are more constrained, the throughput increases by four to five operations/hour during the peak hour. Alternative NA-F-2, with 12 total headings, performs similar to Alternative NA-F-1, which has seven total headings. The incremental improvement of additional headings beyond seven are small, however they do provide additional flexibility to air traffic controllers.

Table H-7, Future (2028) Baseline and Diverging Heading Alternatives North Flow Capacity Results

		North Flow		
		Baseline	NA-F-1	NA-F-2
Total # of Headings on Departure Runways		*2*	*7*	*12*
VMC	Departure Throughput	*82*	*83*	*83*
	Count of 60 sec separation (approx)	620	50	10
	Count of <60 sec separation (approx)	-	510	530
IMC	Departure Throughput	*73*	*77*	*78*
	Count of 72 sec separation (approx)	470	40	20
	Count of <72 sec separation (approx)	-	440	470

Notes: The airport-wide 90th percentile hourly departure throughput is shown as an approximation of capacity.
The count of separations for each alternative do not sum to the same number because separations greater than 60/72 seconds are not listed in the table.
VMC=visual meteorological conditions; IMC=instrument meteorological conditions.
Source: Landrum & Brown analysis, 2023

The daily count of flights that depart with a of separation of 60/72 seconds and a separation of less than 60/72 seconds are also listed. Note that the counts do not add up to the total number of operations per day because departures with separation greater than 60/72 seconds are not listed. Those flights depart during the off-peak periods and are not relevant to the throughput capacity comparison. In the Future (2028) Baseline, all flights depart with a separation of 60/72 seconds or greater. In the diverging headings alternatives, most flights depart with less than 60/72 seconds separation, and the departure queue dissipates quicker, allowing more flights operations to occur after the departure peak passes.

The reduced separation requirements allow for an increase in throughput on the runways. However, the increase is small because operations are not constrained by runway capacity at the simulated

2028 demand, particularly in VMC. Additionally, the schedule is highly banked, with periods of decreased demand that allow queues to dissipate and prevent departures from spilling over to the next hour. Greater throughput improvements are likely to be observed at higher demand levels. It is important to note that the additional headings provide controllers with operational flexibility and the ability to sequence departures, which may not be discernable in the 2028 simulations.

Table H-8 describes the unimpeded taxi time and delay for both VMC and IMC, comparing the Future (2028) Baseline with Alternatives NA-F-1 and NA-F-2. Unimpeded taxi times remain the same because all alternatives share the same taxi routes and runway assignment assumptions. Slight differences in the taxi time results are due to modeling variation. Departure delay decreases because the additional headings allow aircraft to depart with smaller separations, and therefore reduce wait times in the departure queue. Arrival delay decreases slightly because runways can switch from departure priority to arrival priority sooner. As with the throughput results, Alternative NA-F-2 only provides slight improvement over Alternative NA-F-1.

Table H-8, Future (2028) Baseline and Diverging Heading Alternatives North Flow Taxi Time and Delay Results

North Flow			Baseline	NA-F-1	NA-F-2
Total # of Headings on Departure Runways			*2*	*7*	*12*
Unimpeded Taxi Time	VMC	Avg arrival (min)	8.6	8.5	8.5
		Avg departure (min)	14.1	14.1	14.1
		Avg total (min)	11.4	11.3	11.3
	IMC	Avg arrival (min)	8.4	8.3	8.4
		Avg departure (min)	14.3	14.2	14.3
		Avg total (min)	11.4	11.3	11.3
Delay	VMC	Avg arrival (min)	4.9	4.8	4.8
		Avg departure (min)	4.6	3.4	3.3
		Avg total (min)	4.7	4.1	4.0
	IMC	Avg arrival (min)	6.2	6.1	6.0
		Avg departure (min)	9.4	7.0	6.8
		Avg total (min)	7.8	6.6	6.4

Notes: Arrival delay includes air delay and taxi delay. Departure delay includes gate delay, taxi delay, and runway queue delay.
VMC=visual meteorological conditions; IMC=instrument meteorological conditions.
Source: Landrum & Brown analysis, 2023

H.5.1.3 South Flow Diverging Headings Result

The results of the south flow divergent headings alternatives (Alternatives NA-G-1, NA-G-2, NA-G-3, and NA-G-4) are compared to the Future (2028) Baseline results in **Table H-9.** In VMC, the departure throughput increases by one operation/hour during the peak hour for Alternative NA-G-4 and does not change for the other alternatives. Departure throughput in IMC increases by three to five operations/hour during the peak hour.

Table H-9, Future (2028) Baseline and Diverging Heading Alternatives South Flow Capacity Results

		South Flow				
		Baseline	NA-G-1	NA-G-2	NA-G-3	NA-G-4
Total # of Headings on Departure Runways		*2*	*5*	*4*	*7*	*12*
VMC	Departure Throughput	*82*	*82*	*82*	*82*	*83*
	Count of 60 sec separation (approx)	570	280	410	80	20
	Count of <60 sec separation (approx)	-	270	170	430	510
IMC	Departure Throughput	*74*	*77*	*77*	*78*	*79*
	Count of 72 sec separation (approx)	510	210	400	90	30
	Count of <72 sec separation (approx)	-	280	120	420	500

Notes: The airport-wide 90th percentile hourly departure throughput is shown in as an approximation of capacity. The count of separations for each alternative do not sum to the same number because separations greater than 60/72 seconds are not listed in the table.
VMC=visual meteorological conditions; IMC=instrument meteorological conditions.
Source: Landrum & Brown analysis, 2023

The additional headings increase the number of occurrences of separations less than 60/72 seconds. Alternative NA-G-2, with the fewest number of headings, results in the lowest number of separations less than 60/72 seconds. Alternative NA-G-1, with one additional heading, performs slightly better. Alternatives NA-G-3 and NA-G-4, with multiple headings on each runway, result in the highest number of reduced separations.

As observed in the north flow models, diverging heads increase the throughput on the runways. However, the increase is small because operations are not constrained by runway capacity at the simulated 2028 demand, especially in VMC.

Table H-10 describes the unimpeded taxi time and delay for both VMC and IMC, comparing the Future (2028) Baseline with Alternative NA-G-1, NA-G-2, NA-G-3, and NA-G-4. Similar to north flow, unimpeded taxi times are unchanged across the different alternatives. Departure delay decreases across the board because diverging headings allow aircraft to depart faster and therefore reduce wait times in the departure queue, particularly in IMC. Arrival delay also decreases slightly.

Table H-10, Future (2028) Baseline and Diverging Heading Alternatives South Flow Taxi Time and Delay Results

South Flow			Baseline	NA-G-1	NA-G-2	NA-G-3	NA-G-4
Total # of Headings on Departure Runways			*2*	*5*	*4*	*7*	*12*
Unimpeded Taxi Time	VMC	Avg arrival (min)	10.3	10.3	10.4	10.3	10.3
		Avg departure (min)	11.9	11.9	12.0	11.9	11.9
		Avg total (min)	11.1	11.1	11.2	11.1	11.1
	IMC	Avg arrival (min)	10.6	10.6	10.6	10.5	10.5
		Avg departure (min)	12.2	12.1	12.2	12.1	12.0
		Avg total (min)	11.4	11.3	11.4	11.3	11.3
Delay	VMC	Avg arrival (min)	4.8	4.6	4.6	4.6	4.6
		Avg departure (min)	4.3	3.8	4.0	3.5	3.4
		Avg total (min)	4.5	4.2	4.3	4.1	4.0
	IMC	Avg arrival (min)	7.1	6.9	7.0	7.1	7.0
		Avg departure (min)	8.0	6.5	7.2	5.6	5.5
		Avg total (min)	7.6	6.7	7.1	6.4	6.2

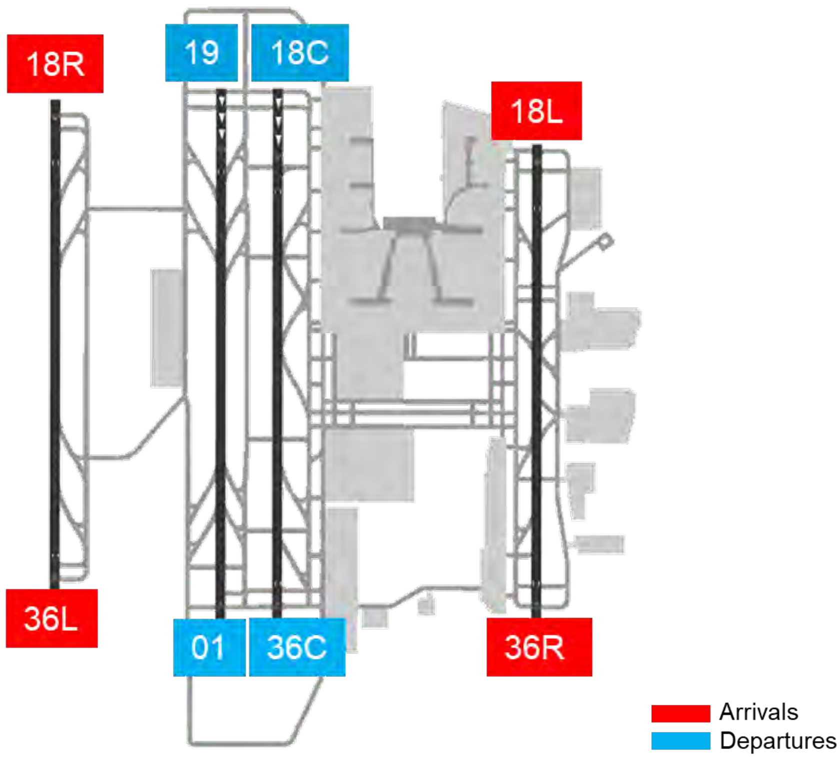
Notes: Arrival delay includes air delay and taxi delay. Departure delay includes gate delay, taxi delay, and runway queue delay. VMC=visual meteorological conditions; IMC=instrument meteorological conditions.
Source: Landrum & Brown analysis, 2023

H.5.2 Alternative NA-D-7

H.5.2.1 Assumptions

NA-D-7 assumes a different runway usage configuration than the Future (2028) Baseline for VMC. In the Future (2028) Baseline, Runways 18R/36L, 18C/36C, and 18L/36R are used for arrivals whereas Runways 01/19 and 18L/36R are used for departures. In NA-D-7, Runways 18R/36L and 18L/36R are used primarily for arrivals, while the two center runways, Runways 01/19 and 18C/36C, are used primarily for departures. During off-peak periods when demand is sparse, Runway 18C/36C could be used for arrivals. The runway usage is depicted in **Exhibit H-9**.

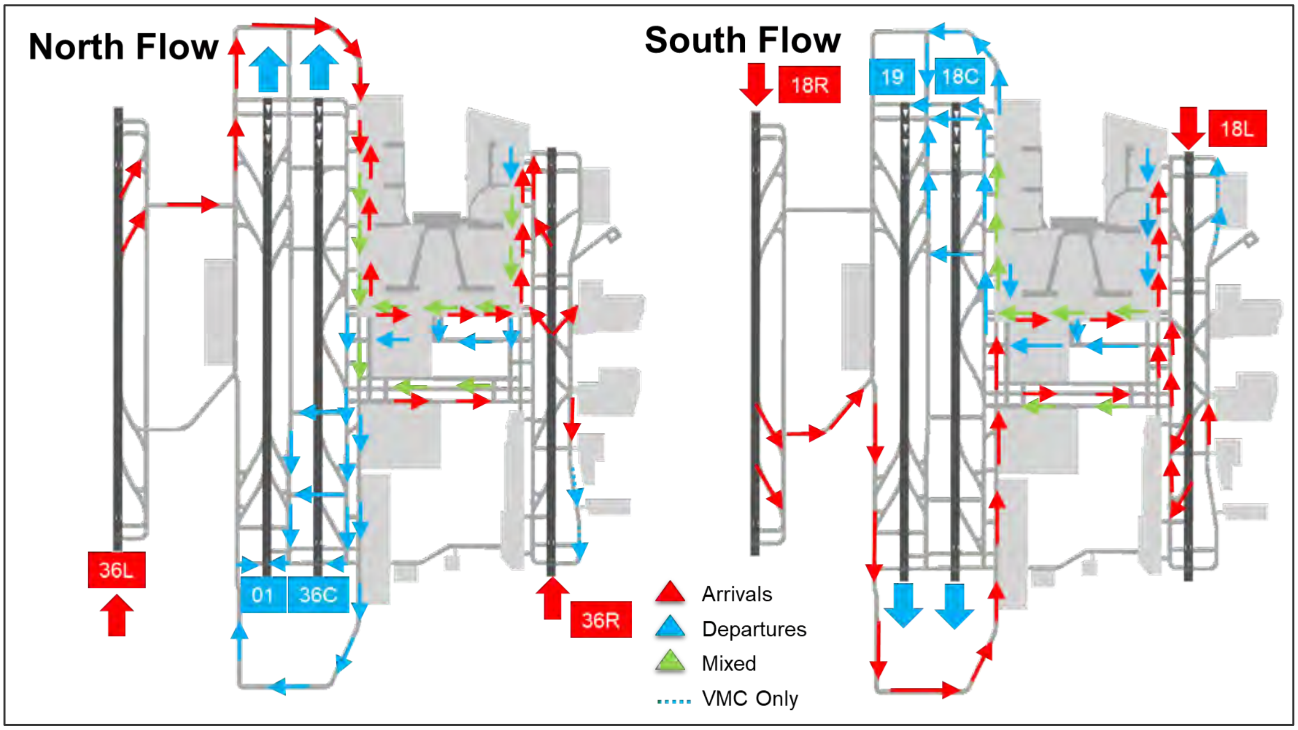
Exhibit H-9, NA-D-7 Runway Configuration



Source: Landrum & Brown analysis, 2023

To feed the departure runways, all traffic from the terminal area must taxi west to reach the two center runways. Runway 01/19 departures cross Runway 18C/36C to access the runway entry when there is no queue on Runway 18C/36C. When there are aircraft waiting to depart Runway 18C/36C, Runway 01/19 departures use the NEAT or SEAT. Departures can use the EAT because there are no approaching aircraft overhead. Arrivals to Runways 18R/36L and 18L/36R taxi to the terminal area following the same path as in the Future (2028) Baseline. The taxi flows are depicted in **Exhibit H-10**.

Exhibit H-10, NA-D-7 Taxi Routes



Note: Mixed refers to use by arrivals and departures.
Source: Landrum & Brown analysis and ATCT feedback, 2023

The airspace structure of NA-D-7 remains similar to the Future (2028) Baseline airspace. Arrivals to Runways 18R/36L and 18L/36R retain their Future (2028) Baseline fix assignments, whereas arrivals originally assigned to Runway 18C/36C are split among Runways 18R/36L and 18L/36R. Departures from Runways 01/19 retain their fix assignments, whereas departures from Runway 18L/36R in the Future (2028) Baseline are reassigned to Runway 18C/36C. General aviation (GA) propeller departures remain on Runway 18L/36R due to the proximity of the GA apron to Runway 18L/36R.

H.5.2.2VMC Results

The results of the NA-D-7 simulation runs are listed in **Table H-11**. Compared with the Future (2028) Baseline, NA-D-7 results in higher taxi time, higher delay, and lower throughput. The increase in departure taxi time is partially due to a larger concentration of gates being located closer to Runway 18L/36R than to Runway 18C/36C, and partially due to the use of the EATs for Runway 01/19 departures. The increase in arrival delay and decrease in arrival throughput is caused by the loss of triple independent approaches and the resulting capacity decrease. The change in runway usage allows two runways to be fully dedicated to departures, reducing departure delay. However, the reduction in departure delay is smaller than the increase in arrival delay, resulting in an overall increase in delay.

Table H-11, Future (2028) Baseline and NA-D-7 VMC Results

		North Flow		South Flow	
		Baseline	NA-D-7	Baseline	NA-D-7
Unimpeded Taxi Time	Avg arrival (min)	8.6	8.6	10.3	10.9
	Avg departure (min)	14.1	15.9	11.9	13.5
	Avg total (min)	11.4	12.3	11.1	12.2
Delay	Avg arrival (min)	4.9	7.5	4.8	7.0
	Avg departure (min)	4.6	3.4	4.3	3.6
	Avg total (min)	4.7	5.4	4.5	5.3
Throughput	Peak arrival	80	75	80	75
	Peak departure	82	83	82	82
	Peak total	147	144	147	146

Notes: The 90th percentile hourly departure throughput is shown in as an approximation of peak throughput. VMC=visual meteorological conditions.
Source: Landrum & Brown analysis, 2024

H.5.2.3IMC Operations

Under IMC, departures from the two center runways would run with a stagger equal to same runway separations, causing the two runways to effectively operate with the capacity of one runway. Simulation modeling showed the runways are unable to satisfy the demand, with departure queues building up throughout the day and not dissipating until past midnight. Therefore, CLT should not operate with the NA-D-7 configuration during IMC. CLT should operate with the Future (2028) Baseline runway operating configuration if visual approaches are no longer possible.

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