



Newark Liberty International Airport

Title 14 Code of Federal Regulations (CFR) Part 150

2019 and 2024 Noise Exposure Map Report

January 2019

Prepared for:

The Port Authority of New York and New Jersey

4 World Trade Center | 150 Greenwich Street, 18th Floor | New York, NY 10007

By:



and

Fitzgerald & Halliday, Inc. | Planning Technology, Inc. | RS&H, Inc.

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Executive Summary

Newark Liberty International Airport (EWR) has long been on the forefront of aviation history. Opening in 1928, it is the first major airport in the New York metro area and home to the nation's first commercial airline terminal. In fact, in 1935, Amelia Earhart led the dedication of its landmark terminal building. Located partly in Newark and partly in Elizabeth, EWR is only 14 miles from Manhattan, serving a critical role for the New York-New Jersey metropolitan area. EWR continues to build on its heritage of innovation with leadership roles in congestion mitigation and the campaign for NextGen technology.

The Port Authority of New York and New Jersey (the Port Authority) is conducting a Title 14 Code of Federal Register (CFR) Part 150 Study ("Part 150 Study") at EWR to quantify noise exposure from aircraft operations and assess compatibility of land uses around the airport. This Part 150 Study assesses noise exposure resulting from a current, baseline level of activity (2019) and a future, forecast level of activity anticipated to occur in 2024. The study is part of the broader effort to address noise levels created by aircraft operations and covers a study area that includes EWR and surrounding communities.

A Part 150 Study includes two principal elements:

- 1) The Noise Exposure Map (NEM) and its associated report describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs and the resulting noise/land use compatibility situation. Part 150 requires that NEM documentation

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address aircraft operations during two time periods:

- (A) The year of submission (2019) and
- (B) A forecast year that is at least five years following the year of submission (2024).

- 2) The Noise Compatibility Program (NCP) is a description of the actions the airport proprietor proposes to undertake to reduce existing and future noise and land use incompatibilities. The NCP is forthcoming and is the second phase of the Part 150 Study process.

History of Noise Abatement at Newark Liberty International Airport (EWR)

The Port Authority has a long history of noise abatement at EWR, which predates the Federal Aviation Administration's (FAA) Part 150 Program. The Port Authority has chosen to participate in the Part 150 Program as a continuation of its long history of addressing the noise levels created by aircraft operations at EWR.

Noise abatement at EWR began in 1959, when the Port Authority implemented several noise mitigation programs and a series of aircraft noise abatement programs. For example, the Port Authority installed the world's first aircraft noise monitoring system and contributed to the development of quieter jet engine technology. Current initiatives by the Port Authority at EWR include:

- Establishing an airport system-wide noise office with dedicated staff to respond to individual noise concerns
- A noise monitoring program consisting of three permanent noise monitoring sites

- Introducing a new flight and noise monitoring web portal (WebTrak)
- Enhancing the noise complaint management system

Noise Exposure Map

The fundamental elements of a Noise Exposure Map are noise contours for existing and forecast conditions (2019 and 2024), presented over base maps depicting the airport layout, local use control jurisdictions, major land-use categories, discrete noise-sensitive "receptors," and other information required by Part 150.

Figure 1 on page x presents the Noise Exposure Map figure for current conditions (2019) and Figure 2 on page xi presents the Noise Exposure Map figure for the five-year forecast conditions (2024).¹ Table 1 on page viii and Table 3 on page viii show population and noise sensitive sites, respectively, within the 2019 and 2024 65 DNL contour interval.

The noise contours for this study were prepared using the Integrated Noise Model (INM). The INM is an FAA-approved, industry-accepted tool for determining the cumulative effect of aircraft noise exposure around airports. The airport-specific information required by the INM includes both physical and operational data. The physical data includes airfield geometry (i.e., runway locations and utilization), the altitude of the airfield, weather, and terrain data. Operational data includes the number and types of aircraft operating at the airport and the three-dimensional flight trajectories of aircraft arriving to and departing from

¹ Figures 5-9 and 5-10, the official NEMs, can be found in the back pocket of this document in print or as Attachment C to the electronic version

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the airport.

Stakeholder Engagement

A key element of this Part 150 Study is broad stakeholder engagement. The process employed by the Port Authority provides opportunities for all interested parties to both follow the study's progress and be directly involved when key decisions

are taken. Specific engagement strategies of the NEM include:

- Establishing a Technical Advisory Committee (TAC) which held thirteen meetings as of December 2018 at which the Study Team presented briefings
- Engaging with the Newark Liberty International Airport Community Noise

Roundtable on the Part 150 Process

- Making project-specific materials available on the Port Authority's Part 150 website
- Hosting three workshops open to the general public about the Part 150 Study Process and resulting NEM
- Publishing periodic informational newsletters

Table 1: Population within 2019 and 2024 65 DNL Contour²

Source: 2010 US Census Block Data and HMMH, 2018

Year	Estimated Population			
	65-70 dB DNL	70-75 dB DNL	>75 dB DNL	Total
2019	25,017	804	0	25,821
2024	25,912	1,883	0	27,795

Table 2: Residential Units within 2019 and 2024 65 DNL Contours

Source: 2010 US Census Block Data, HMMH and RS&H, 2018

Year	Estimated Residential Units			
	65-70 dB DNL	70-75 dB DNL	>75 dB DNL	Total
2019	9,040	291	0	9,331
2024	9,399	667	0	10,066

Table 3: Noise Sensitive Sites within 2019 and 2024 65 DNL Contour

Source: HMMH and RS&H, 2018

Year	Noise Sensitive Site	Type	Contour Interval	Address	City
Within 2019 and 2024	SpringHill Suites Newark Liberty International Airport	Transient Lodging	65-70 dB	652 US Highway 1 and 9 South	Newark
	Embassy Suites	Transient Lodging	2019: 65-70 dB 2024: 70-75 dB	95 International Blvd	Elizabeth
	Country Inn & Suites By Carlson Newark Airport,NJ	Transient Lodging	2019: 65-70 dB 2024: 70-75 dB	100 International Blvd	Elizabeth
	Courtyard Newark Elizabeth	Transient Lodging	70-75 dB	34905 Newark Blvd	Newark
	Residence Inn Newark Elizabeth	Transient Lodging	70-75 dB	83 International Blvd	Elizabeth
	Extended Stay America – Elizabeth	Transient Lodging	70-75 dB	45 International Blvd	Elizabeth
	Howard Johnson	Transient Lodging	70-75 dB	20 Frontage Rd	Newark
	George Washington Academy School No. 1*	Elementary School	65-70 dB	250 Broadway	Elizabeth
	Benjamin Franklin School No. 13*	Elementary School	65-70 dB	248 Ripley Place	Elizabeth
	John Marshal School No. 20*	Elementary School	65-70 dB	521 Magnolia Avenue	Elizabeth
	Dr. Martin Luther King Jr. Ecc #52	Nursery/Preschool	65-70 dB	130 Trumbull Street	Elizabeth
	Hawkins Street School*	Elementary School	65-70 dB	8 Hawkins Street	Newark
	iPrep Academy School No 8*	Elementary School	65-70 dB	221-227 Court Street	Elizabeth
	Jerome Dunn Academy No 9	Grades K-8	65-70 dB	201 Livingston Street	Elizabeth

² 2010 US Census Block Data. In order to estimate the number of people residing within the noise contours, existing parcel boundary land use maps were overlaid on 2010 US Census TIGER file maps that depict Census blocks – the smallest Census enumeration unit. "Populated Area" data polygons were then created by combining Census blocks with the residential land use concentrating population and housing unit values into the residential portion of the census block where people actually live. For example, in some areas the population is concentrated along the road rather than over several square miles of open or undeveloped land. Using Geographic Information Systems (GIS) tools, the noise contours were intersected with the "Residential/Census" data for each DNL noise contour interval. The resultant wholly or partially encompassed Residential/Census areas were then identified and the proportion of total area within the contour level was calculated to determine the estimated residential population and housing unit counts.

Executive Summary

Year	Noise Sensitive Site	Type	Contour Interval	Address	City
Within 2019 and 2024 (Continued)	Juan Pablo Duarte - Jose Julian Marti #28	Elementary School	65-70 dB	25 First Street	Elizabeth
	Innovative Education Programs	Pre-School	65-70 dB	697 Market Street	Newark
	Rainbow Land Learning Center II	Pre-School	65-70 dB	115 Gotthardt St.	Newark
	City of Elizabeth Library	Library	65-70 dB	102 Third Street	Elizabeth
	Trinity Reformed Church	Place of Worship	65-70 dB	483 Ferry St.	Newark
	St Aloysius Church	Place of Worship	65-70 dB	66 Flemming Ave	Newark
	Maranatha Fellowship Church	Place of Worship	65-70 dB	97 St Francis St.	Newark
	Universal Church	Place of Worship	65-70 dB	51 St Francis St.	Newark
	St Benedict Church	Place of Worship	65-70 dB	65 Barbara St.	Newark
	St Peter & Paul Roman Catholic	Place of Worship	65-70 dB	211 Ripley Pl.	Elizabeth
	Iglesia De Dios Pentecostal	Place of Worship	65-70 dB	269 Second St.	Elizabeth
	St Adalbert's Church	Place of Worship	65-70 dB	250 E Jersey St.	Elizabeth
	Church of the Nazarene Iglesia	Place of Worship	65-70 dB	214 Fulton St.	Elizabeth
	Greater Faith Temple	Place of Worship	65-70 dB	128 Broadway.	Elizabeth
	St Peter & Paul Byzantine	Place of Worship	65-70 dB	316 1st Ave.	Elizabeth
	Immaculate Heart of Mary and Saint Patrick's Church	Place of Worship	65-70 dB	215 Court St.	Elizabeth
		Place of Worship	65-70 dB	213 Bond Street	Elizabeth
	SDA Del Puerto Church	Place of Worship	65-70 dB	114 South Park Street	Elizabeth
	Iglesia de Dios Pentecostal Cristo Te llama, Inc	Place of Worship	65-70 dB	221 East Jersey St.	Elizabeth
	Liberty Baptist Church	Place of Worship	65-70 dB	515 Court Street	Elizabeth
	Iglesia Nueva Vida	Place of Worship	65-70 dB	51 3rd Street	Elizabeth
	Mount Cavalry United Church of God	Place of Worship	65-70 dB	1st Street & Community Lane	Elizabeth
	Bethel Holy Church	Place of Worship	65-70 dB	242 3rd Street	Elizabeth
	Glorious Hope Baptist Church	Place of Worship	65-70 dB	88 1st Street	Elizabeth
	Jesus Atelie Baptist Church,	Place of Worship	65-70 dB	118 Livingston Street #1	Elizabeth
	Iglesia de Restauracion ELIM	Place of Worship	65-70 dB	80 1st Street	Elizabeth
	Shelter Temple Apostolic Church,	Place of Worship	65-70 dB	70 South Second Street	Elizabeth
	St Adalbert's Church (Hall)	Place of Worship	65-70 dB	30 3rd Street	Elizabeth
	Haitian Smyrna Church of God	Place of Worship	65-70 dB	100 3rd St.	Elizabeth
	Stella Maris Chapel	Place of Worship	65-70 dB	170 Corbin St.	Newark
	Elizabeth Church of God	Place of Worship	65-70 dB	401 Livingston St.	Elizabeth
	Hermanos Unidos En Cristo	Place of Worship	65-70 dB	109 Fulton St.	Elizabeth
	Mundial Igreja Mundial do Poder de Deus	Place of Worship	65-70 dB	418 New York Ave	Newark
	Casa de Oracion - Monte Sinai	Place of Worship	65-70 dB	50 4th St.	Elizabeth
	Mount Carmel Guild	Medical	65-70 dB	56 Freeman St.	Newark
Within 2024 Only	Fairfield Inn & Suites by Marriott Newark	Transient Lodging	65-70 dB	618 US Highway 1 & 9 South	Newark
	Jehovah's Witnesses Kingdom Hall,	Place of Worship	65-70 dB	67 Mott St.	Newark
	Greater St John's MER Church	Place of Worship	65-70 dB	183 6th St.	Elizabeth

Note 1: Schools designated with a * have been soundproofed as part of the School Soundproofing Program discussed in Section 2.4 on page 2-7, Subsection "School Soundproofing Projects" on page 2-8.

THE PORT AUTHORITY OF NY & NJ

Newark Liberty International Airport

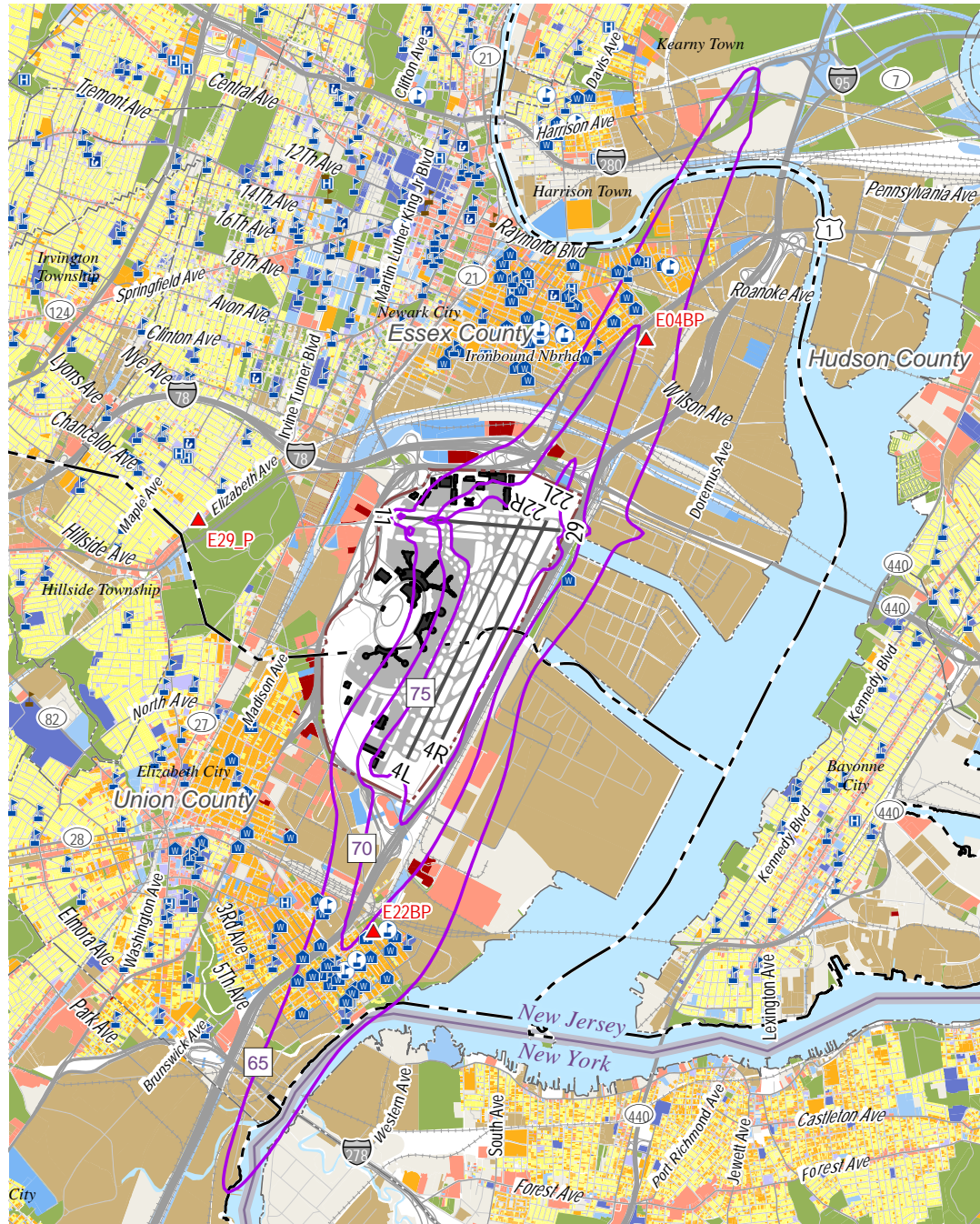
Airport Noise Compatibility

Part 150 Study

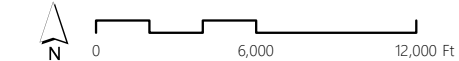
2019 and 2024 Noise Exposure Maps

Figure: 1

Existing Conditions (2019) Noise Exposure Map



- 2019 DNL Contours (65-75)
- EWR Airport Boundary (Approximate)
- Runway
- ▲ RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- 🏫 School
- 📖 Library
- 🏥 Hospital
- 🎓 School (Sound Insulated)
- 🎓 College/University
- 🏠 Place of Worship



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Newark Liberty International Airport

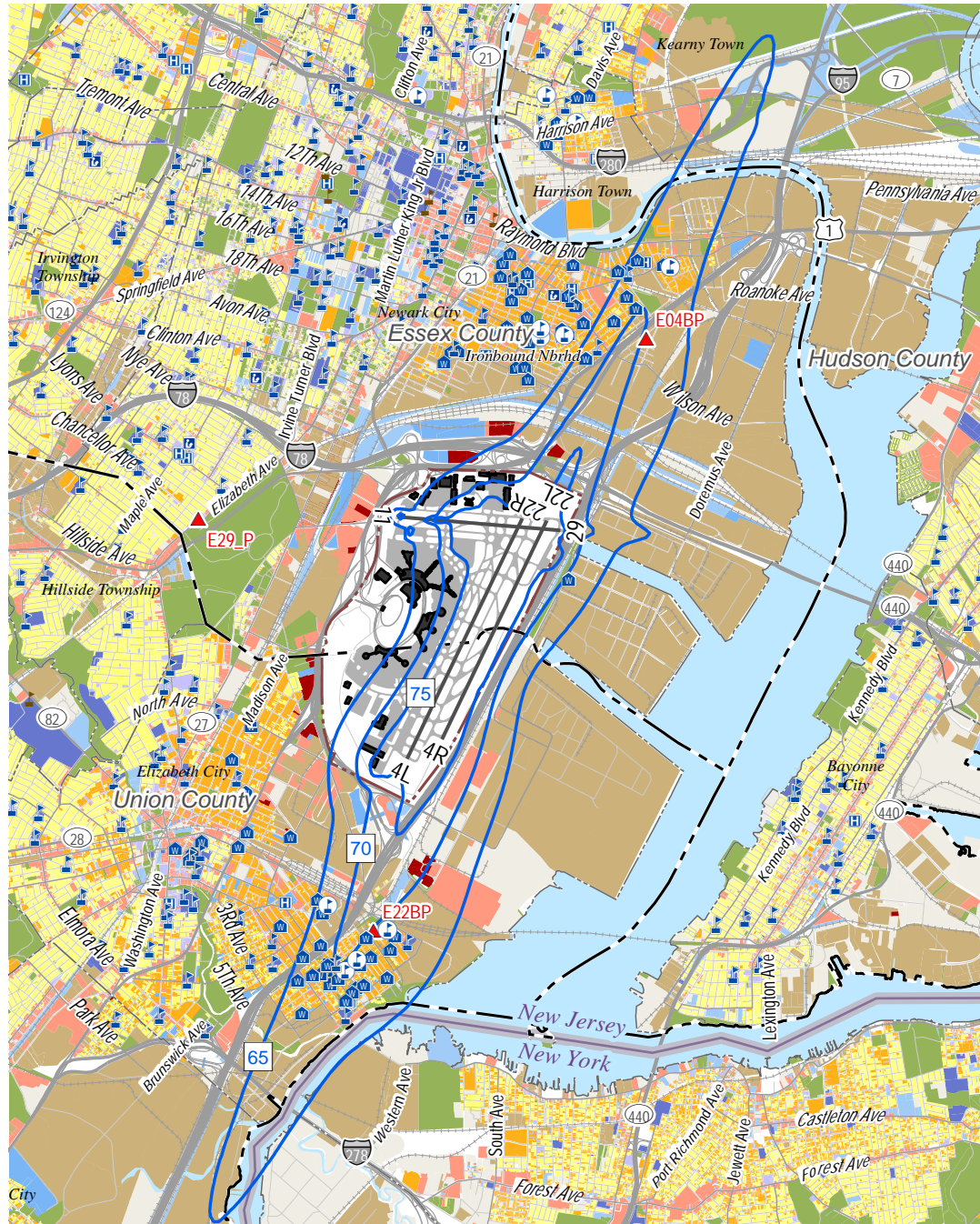
Airport Noise Compatibility

Part 150 Study

2019 and 2024 Noise Exposure Maps

Figure: 2

Forecast Conditions (2024) Noise Exposure Map



- 2024 DNL Contours (65-75)
- EWR Airport Boundary (Approximate)
- Runway
- ▲ RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- 🏫 School
- 📖 Library
- 🏥 Hospital
- 🎓 School (Sound Insulated)
- 🎓 College/University
- 🏠 Place of Worship



Executive Summary

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January 9, 2019

Mr. Andrew Brooks
Environmental Program Manager
Federal Aviation Administration
Eastern Regional Office
1 Aviation Plaza
Jamaica, NY 11434

Subject: Noise Exposure Map (NEM) Submission pursuant to Title 14 of the Code of
Federal Regulations, Part 150 for Newark Liberty International Airport (EWR)

Dear Mr. Brooks:

The Port Authority of New York and New Jersey (PANYNJ) is pleased to submit Noise Exposure Maps (NEMs) and supporting documentation for Newark Liberty International Airport (EWR) prepared in accordance with 14 CFR Part 150 ("Airport Noise Compatibility Planning"). As of January 1, 2019, the aircraft operations at Newark Liberty International Airport within this document are hereby certified by the PANYNJ to be consistent with the fleet mix, forecast operational levels, and flight procedures depicted for calendar years 2019 and 2024.

In accordance with 14 CFR Part 150, Section 150.21(c), PANYNJ requests that Federal Aviation Administration (FAA) confirm receipt of these Existing (2019) and Forecast (2024) Noise Exposure Maps (NEMs) and indicate whether they are in compliance with the applicable requirements. Both the Existing (2019) and Forecast (2024) NEMs were prepared using the forecast operations reviewed and approved by the FAA.

As discussed in Chapter 6 of the document, the PANYNJ provided all interested parties adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft noise exposure map and descriptions of forecast aircraft operations, consistent with Part 150, §150.21(b). The Sponsor's Certification, the formal certification required by Part 150, is provided on page xv of the document. As requested, each document contains a CD attached to the rear cover containing electronic copies of the document.

The PANYNJ is grateful for the meaningful participation provided throughout this project by your office, the New York Airports District Office, FAA Washington D.C. headquarters, New York TRACON, and the EWR Airport Traffic Control Tower. We look forward to continuing to work with the FAA during preparation of the NCP and implementation of the NCP measures.

Please do not hesitate to contact me with any questions.

Sincerely yours,



Michael Moran
General Manager, Aviation
Planning and Environmental Services
enc.

4 World Trade Center
150 Greenwich Street, 18th Floor
New York, NY 10007

Cover Letter

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Sponsor's Certification

THE PORT AUTHORITY OF NY & NJ

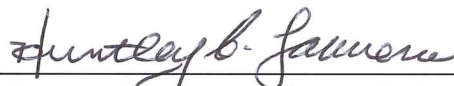
Sponsor's Certification

The Port Authority of New York and New Jersey has completed a comprehensive Title 14 Code of Federal Regulations (CFR) Part 150 Noise Exposure Map Report for Newark Liberty International Airport.

This is to certify the following:

- 1) The 2019 and 2024 Noise Exposure Maps for Newark Liberty International Airport, and the associated documentation the Port Authority of New York and New Jersey submitted in this volume to the Federal Aviation Administration under Title 14 CFR Part 150, Subpart B, Section 150.21, are true and complete, under penalty of 18 U.S.C. 1001.
- 2) Pursuant to Title 14 CFR Part 150, Subpart B, Section 150.21(b), all interested parties have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft noise exposure maps, and of the descriptions of forecast aircraft operations.
- 3) The "2019 Existing Condition Noise Exposure Map" (Figure 5-9 from Chapter 5, located in Attachment C to the Noise Exposure Map document) accurately represents conditions as of the date of submission of this document..
- 4) The "2024 Five-Year Forecast Condition Noise Exposure Map" (Figure 5-10 from Chapter 5, located in Attachment C to the Noise Exposure Map document) accurately represents expected forecast conditions.

By:



Title:

Director, Aviation Dept., Port Authority of New York & New Jersey

Date:

1/9/2019

Airport Name: Newark Liberty International Airport

Airport Owner/Operator: Port Authority of New York and New Jersey

Address: 4 World Trade Center, 150 Greenwich Street, 18th Floor, New York, NY 10007

Sponsor's Certification

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FAA Checklist

The FAA produced Advisory Circular 150/5020, "Airport Noise and Land Use Compatibility Planning", that includes a checklist for FAA's use in reviewing NEM submissions. The FAA prefers that the NEM documentation include a copy of the checklist with appropriate page numbers or other references and other notes and comments to assist in the document's review, as presented in Table 4.

Table 4: Part 150 Noise Exposure Maps Checklist

Source: FAA/APP, Washington, DC, March 1989; revised June 2005; reviewed for currency 01/2019

Part 150		
Noise Exposure Maps Checklist - Part 1		
Airport name: Newark Liberty International Airport		Reviewer:
Program Requirement	Yes/No/NA	Supporting Pages/Review Comments
I. SUBMITTING AND IDENTIFYING THE NEM:		
A. Submission is properly identified:		
1. 14 C.F.R. Part 150 NEM?	Yes	See Cover Letter on page xiii, cover of document, Sponsor's Certification on page xv and Chapter 1 starting on page 1-1.
2. NEM and NCP together?	No	
3. Revision to NEMs FAA previously determined to be in compliance with Part 150?	No	
B. Airport and Airport Operator's name are identified?	Yes	See Cover Letter on page xiii and Sponsor's Certification on page xv.
C. NCP is transmitted by airport operator's dated cover letter, describing it as a Part 150 submittal and requesting appropriate FAA determination?	Yes	See page xiii. The Port Authority has submitted a dated Cover Letter describing this documentation as a Part 150 Noise Exposure Map (NEM) submittal and requests that the Federal Aviation Administration (FAA) confirm receipt of these Existing (2019) and Forecast (2024) NEMs and indicate whether they are in compliance with the applicable requirements.
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	See Chapter 6 and Appendix F - Technical Advisory Committee, Appendix G - Public Outreach, and Appendix H - Public Comments.
B. Identification of consulted parties		
1. Are the consulted parties identified?	Yes	See Chapter 1, Section 1.4 on page 1-4, Chapter 6, Section 6.1 and Table 6-1 on page 6-2 as well as Appendix F - Technical Advisory Committee, Appendix G - Public Outreach, and Appendix H - Public Comments.
2. Do they include all those required by 150.21(b) and 150.105(a)?	Yes	See Section 6.1 on page 6-1 as well as Table 6-1 on page 6-2.
3. Agencies in 2., above, correspond to those indicated on the NEM?	Yes	See Section 6.1 on page 6-1 as well as Table 6-1 on page 6-2.

FAA Checklist

Part 150		
Noise Exposure Maps Checklist - Part 1		
Airport name: Newark Liberty International Airport		Reviewer:
Program Requirement	Yes/No/NA	Supporting Pages/Review Comments
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 is provided on page xv. Information on the consultation process is provided in Chapter 6 and Appendix F - Technical Advisory Committee, Appendix G - Public Outreach, and Appendix H - Public Comments.
D. Does the document indicate whether written comments were received during consultation and, if there were comments, that they are on file with the FAA regional airports division manager?	Yes	Public comments are transcribed and have been responded to in Appendix H.1. Scanned versions of public comments are included in Appendix H.2. Separate electronic and hard copy files of all comments will be submitted to the FAA so that they can be placed on file at the Regional office.
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	Figure 5-9 presents the 2019 Map with existing conditions. Figure 5-10 presents the 2024 Map with 5-year conditions. These are found in the back pocket of this document in print and as Attachment C to the electronic version.
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?	Yes	See Cover Letter on page xiii, Sponsor's Certification on page xv and Figure 5-9 in Attachment C.
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?	Yes	See Cover Letter on page xiii, Sponsor's Certification on page xv and Figure 5-10 in Attachment C. Also see Section 4.2, subsection "Forecast" on page 4-11 and Appendix D.3 starting on page D-39.
3. If the answer to 1 and 2 above is no, has the airport operator verified in writing that data in the documentation are representative of existing conditions and 5-year forecast conditions as of the date of submission?	NA	
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?	NA	
2. If the forecast year map is based on program implementation:	NA	
a. Are the specific program measures that are reflected on the map identified?	NA	
b. Does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?	NA	

FAA Checklist

Part 150		
Noise Exposure Maps Checklist - Part 1		
Airport name: Newark Liberty International Airport		Reviewer:
Program Requirement	Yes/No/NA	Supporting Pages/Review Comments
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 5 DNL? (150.21(d))	NA	
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? <i>(Note if the submittal uses separate graphics to depict flight tracks and/or noise monitoring sites, these must be of the same scale, because they are part of the documentation required for NEMs.)</i> <i>(Note supplemental graphics that are not required by the regulation do not need to be at the 1" to 2,000' scale)</i>	Yes (1" to 2,000')	See Figure 5-9 and Figure 5-10 for Noise Exposure Map figures to this scale. Flight track figures at 1" to 2,000' are provided as Figures 4-13 through 4-20 as Attachment B to the electronic version and in the back pocket of this document in print.
B. Is the quality of the graphics such that required information is clear and readable? (Refer to through G., below, for specific graphic depictions that must be clear and readable)	Yes	GIS-based, parcel-level detail
C. Depiction of the airport and its environs.		
1. Is the following graphically depicted to scale on both the existing condition and forecast year maps?		
a. Airport boundaries	Yes	All contour figures and NEMs
b. Runway configurations with runway end numbers	Yes	All contour figures and NEMs
2. Does the depiction of the off-airport data include?		
a. A land use base map depicting streets and other identifiable geographic features	Yes	All contour figures and NEMs
b. The area within 65 DNL ³ (or beyond, at local discretion)	Yes, beyond	55 and 60 DNL are shown for informational purposes. See Appendix E, starting on page E-5.
c. Clear delineation of geographic boundaries and the names of all jurisdictions with planning and land use control authority within the DNL 65 dB (or beyond, at local discretion)	Yes	All contour figures and NEMs
D.	Yes	Also 55 DNL and 60 DNL, as noted in IV.C.2.b.
1. Continuous contours for at least the DNL 65, 70, and 75 dB?		
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	
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	See Chapter 4 on page 4-1 presents modeling inputs in detail. Also see Section 4.2 and Appendix D, page D-41, document the forecasts.

³ CNEL for California airports

FAA Checklist

Part 150		
Noise Exposure Maps Checklist - Part 1		
Airport name: Newark Liberty International Airport		Reviewer:
Program Requirement	Yes/No/NA	Supporting Pages/Review Comments
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	Flight track figures at 1" = 2000' are available in the back pocket of this document as Figures 4-13 through 4-20 or as Attachment B in the electronic version. Accompanying narrative is found in Section 4.2 on page 4-1. Detailed figures of flight tracks broken down by aircraft type are available in Attachment A to Appendix D, starting on page D-115. Tables 14 through 103 beginning on page D-20 provide further narrative regarding flight tracks.
F. Locations of any noise monitoring sites (these may be on supplemental graphics which must use the same land use base map and scale as the official NEMs)	Yes	See Figure 3-2 and Figures 5-9 and 5-10. Measurements were not used in modeling.
G. Noncompatible land use identification:	Yes	
1. Are noncompatible land uses within at least the DNL 65 dB noise contour depicted on the map graphics?	Yes	See Figures 5-9 and 5-10 in Attachment C.
2. Are noise sensitive public buildings and historic properties identified? <i>(Note: If none are within the depicted NEM noise contours, this should be stated in the accompanying narrative text.)</i>	Yes	See Figures 5-9 and 5-10 in Attachment C as well as Figure 8 in Appendix C - Land Use
3. Are the noncompatible uses and noise sensitive public buildings readily identifiable and explained on the map legend?	Yes	See Figures 5-9 and 5-10 in Attachment C.
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative? ⁴	Yes	See Chapter 5, Section 5.1 on page 5-1 and Chapter 2, Section 2.4, subsection "School Soundproofing Projects" on page 2-8. See also Figure 3-2: Existing Land Use in Attachment A and Figures 5-9 and 5-10 in Attachment C, displaying 2019 Current Conditions Noise Exposure Map and the 2024 Future Conditions Noise Exposure Map, respectively. The legends of these figures denote soundproofed schools with an encircled blue school icon.
V. NARRATIVE SUPPORT OF MAP DATA: [150.21(A), A150.1, A150.101, A150.103]		
A.	Yes	See Chapter 4, Section 4.2 beginning on page 4-2.
1. Are the technical data and data sources on which the NEMs are based adequately described in the narrative?		
2. Are the underlying technical data and planning assumptions reasonable?	Yes	The Technical Advisory Committee (including FAA) carefully vetted all assumptions. See Chapter 4, Section 4.2 beginning on page 4-2 FAA approved forecast.
B. Calculation of Noise Contours:		

⁴ CNEL for California airports

FAA Checklist

Part 150		
Noise Exposure Maps Checklist - Part 1		
Airport name: Newark Liberty International Airport		Reviewer:
Program Requirement	Yes/No/NA	Supporting Pages/Review Comments
1. Is the methodology indicated?	Yes	See Chapter 4, Section 4.1 beginning on page 4-1.
a. Is it FAA approved?	Yes	Memorandum for Continued Use of INM is located in Appendix D, Page D-5.
b. "Was the same model used for both maps? (Note: The same model also must be used for NCP submittals associated with NEM determinations already issued by FAA where the NCP is submitted later, unless the airport sponsor submits a combined NEM/NCP submittal as a replacement, in which case the model used must be the most recent version at the time the update was started.)"	Yes	See Chapter 4, Section 4.1 beginning on page 4-1.
c. Has AEE approval been obtained for use of a model other than those that have previous blanket FAA approval?	NA	
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?	Yes	No model adjustment or calibration. FAA approved all aircraft substitutions and non-standard altitude profiles, as documented in Appendix D, page D-74 and page D-123, respectively.
b. If so, does this have written approval from AEE, and is that written approval included in the submitted document?	Yes	
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?	NA	Noise monitoring was not conducted for this Study; however, monitored noise levels were compared with annual average DNL values from the Port Authority's noise monitoring system (Section 5.3 on page 5-10).
4. For noise contours below DNL 65 dB, does the supporting documentation include an explanation of local reasons? (Note: A narrative explanation, including evidence the local jurisdiction(s) have adopted a noise level less than DNL 65 dB as sensitive for the local community(ies), and including a table or other depiction of the differences from the Federal table, is highly desirable but not specifically required by the rule. However, if the airport sponsor submits NCP measures within the locally significant noise contour, an explanation must be included if it wants the FAA to consider the measure(s) for approval for purposes of eligibility for Federal aid.)	Yes	As noted in Section 4.2 on page 4-1, the Port Authority chose to provide 55 DNL and 60 DNL contours for "informational purposes only" however, the local jurisdictions have not adopted a lower standard than 65 DNL. See Appendix E, starting on page E-5.
C. Noncompatible Land Use Information:		
1. Does the narrative (or map graphics) give estimates of the number of people residing in each of the contours (DNL 65, 70 and 75, at a minimum) for both the existing condition and forecast year maps?	Yes	See Table 5-1 on page 5-6 and Table 1 on page viii.

FAA Checklist

Part 150		
Noise Exposure Maps Checklist - Part 1		
Airport name: Newark Liberty International Airport		Reviewer:
Program Requirement	Yes/No/NA	Supporting Pages/Review Comments
2. Does the documentation indicate whether the airport operator used Table 1 of Part 150?	Yes	Table 1 of Part 150 is used on page 3-2. For the discussion of treatment of mixed-use land uses, see Section 3.2, beginning on page 3-4. Also see Figure 3-1 on page 3-6 and Figure 3-2 in Attachment A.
a. If a local variation to Table 1 was used:	NA	
1) Does the narrative clearly indicate which adjustments were made and the local reasons for doing so?	NA	
2) Does the narrative include the airport operator's complete substitution for table 1?	NA	
3. Does the narrative include information on self-generated or ambient noise where compatible or noncompatible land use identifications consider non-airport and non-aircraft noise sources?	NA	
4. Where normally noncompatible land uses are not depicted as such on the NEMs, does the narrative satisfactorily explain why, with reference to the specific geographic areas?	NA	
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	See Section 5.2 on page 5-1.
VI. MAP CERTIFICATIONS: [150.21(B), 150.21(E)]		
A. Has the operator certified in writing that interested persons have been afforded adequate opportunity to submit views, data, and comments concerning the correctness and adequacy of the draft maps and forecasts?	Yes	See Sponsor's Certification on page xv.
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. § 1001?"	Yes	See Sponsor's Certification on page xv and Figures 5-9 and 5-10 in Attachment C.

Glossary

Acronym	Full Definition	First Reference or Definition in Document
AAD	Average Annual Day	Section 4.2, Page 4-11
ADO	[Federal Aviation Administration] Airports District Office	Section 1.4, Page 1-4
ANOMS	Airport Noise and Operations Management System	Section 2.4, Page 2-7
ATCT	[Federal Aviation Administration] Airport Traffic Control Tower	Section 6.1, Page 6-2
Azimuth	The azimuth of a runway refers to the magnetic compass direction of the runway. Runways are identified by numbers which indicate the nearest 10-degree increment of the runway centerline. For example, where the magnetic azimuth is 193 degrees, the runway designation would be 19.	Section 4.2, Page 4-2
CFR	Code of Federal Regulations	Section 1.3, Page 1-1
dB	Decibel	Section 1.5, Page 1-6
dBA	A-Weighted Decibel	Section 3.3, Page 3-3
DNL	Day-Night Average Sound Level	Section 1.5, Page 1-6
EWR	Newark Liberty International Airport	Chapter 1, Page 1-1
FAA	Federal Aviation Administration	Section 1.1, Page 1-1
FAR	Federal Aviation Regulation	Section 1.3, Page 1-2
FBO	Fixed Base Operator	Section 2.1, Page 2-4
INM	Integrated Noise Model	Section 4.1, Page 4-1
Ldn	Alternative abbreviation for DNL or Day-Night Average Sound level	Section 6.1, Page 6-1
NCP	(Part 150) Noise Compatibility Program	Section 1.1, Page 1-1
NEM	(Part 150) Noise Exposure Map	Section 1.3, Page 1-2
NLR	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure	Section 3.3, Page 3-3
Noise	Sound that is unwelcome because of its undesirable effects on persons (e.g., speech interference, sleep disturbance) or on entire communities (annoyance).	Section 1.5, Page 1-5
NRHP	National Register of Historic Places	Section 3.2, Page 3-5
Part 150	14 CFR (FAR) Part 150, "Airport Noise Compatibility Planning"	Section 1.3, Page 1-2
The Port Authority	The Port Authority of New York and New Jersey	Chapter 1, Page 1-1

Glossary (Continued)

Acronym	Full Definition	First Reference or Definition in Document
REILS	Runway End Identifier Lights	Section 2.1, Page 2-3
SLUCM	Standard Land Use Coding Manual	Section 3.3, Page 3-3
Sound	A physical phenomenon consisting of minute vibrations (waveforms) that travel through a medium such as air or water.	Section 1.5, Page 1-5
SZEA	A Standard State Zoning Enabling Act	Section 3.4, Page 3-4
TAC	Technical Advisory Committee	Section 1.3, Page 1-3
TAF	[FAA] Terminal Area Forecast	Section 4.2, Page 4-9
TEB	Teterboro Airport	Section 4.2, Page 4-8
Threshold	Displaced ends of runways which do not coincide with the end of the pavement. Many runways have displaced arrival thresholds which indicate the location where the available runway pavement for arrivals begins. These are typically added to runways for obstruction or noise abatement reasons.	Section 2.1, Page 2-4

1. Introduction

Newark Liberty International Airport (EWR) has long been at the forefront of aviation history. Opening in 1928, it is the first major airport in the New York and New Jersey Metropolitan area and home to the nation's first commercial airline terminal. In fact, in 1935, Amelia Earhart led the dedication of its landmark terminal building. Located partly in Newark and partly in Elizabeth, EWR is only 14 miles from Manhattan, serving a critical role for the New York-New Jersey metropolitan area. EWR continues to build on its heritage of innovation with leadership roles in congestion mitigation and the campaign for NextGen technology.

The Port Authority is conducting a Title 14 Code of Federal Register (CFR) Part 150 Study ("Part 150 Study") at EWR to quantify noise exposure from aircraft operations and assess compatibility of land uses around the airport. This Part 150 Study assesses noise exposure resulting from a current, baseline level of activity (2019) and a future, forecast level of activity anticipated to occur in 2024. The study is part of the broader effort to address noise levels created by aircraft operations and covers a study area that includes EWR and surrounding communities.

This document is the 2019 Noise Exposure Map (NEM) for EWR, the first of two elements required by Part 150, the second being a Noise Compatibility Program (NCP).

History of Newark Liberty International Airport

EWR was the first major airport in the New York and New Jersey Metropolitan area, opening on October 1, 1928. The airport was built on 68 acres of marshland by the City of Newark and quickly became the world's busiest commercial airport. During World War II, it was operated by the Army Air Corps.



After Port Authority took over the operation of the airport in 1948, the agency immediately began making major improvements. For the public's benefit, Port Authority added a runway equipped with an instrument landing system, a terminal building, a control tower and an air cargo center. It built the Central Terminal Area, Port Authority Administration Building, the Central Heating and Refrigeration Plant, and taxiways and roadways, all of

which opened in the early 1970s. In 1989, a two-building maintenance complex opened as well.

In the 1990s, more improvements were added. In 1996, the International Arrivals Facility opened in Terminal B and the Monorail (now AirTrain Newark) was launched. In 2003, a 325-foot control tower was commissioned, the fourth in the airport's history. EWR is one of the four Port Authority-operated airports serving the region, with each airport fulfilling a particular mission to accommodate the air service requirements of the New York and New Jersey Metropolitan area. See Figure 1-5 on page 1-7.

1.1. How to Use This Document

This document and the Part 150 Study it represents were undertaken in accordance with requirements found in 14 CFR Part 150. A checklist is provided on page xvii that enumerates specific FAA requirements and the associated location of the supporting text in the document and its appendices.

The 2016 Draft NEM was prepared for the years 2016 and 2021. Those were made available for public review and comment from October 17, 2016 through November 18, 2016. While preparing the 2016 Draft NEM, inconsistencies with modeling inputs were found in runway utilization, Runway 22L and 22R aircraft departure locations and land use designations. With corrections applied, the change indicated additional

non-compatible land uses within the 65 DNL contour for 2016 and 2021. Therefore, the Port Authority changed the 2016 Draft NEM and re-released the 2016 Revised Draft NEM for public review between June 26 and July 26, 2017. While preparing responses to comments received on the 2016 Revised Draft NEM, the Port Authority analyzed the airport operations forecast data used to generate the 2016 Revised Draft NEM and determined that the actual 2016 operations at EWR were inconsistent with the 2016 Revised Draft NEM forecasted operations. This was due to the FAA's decision to change aircraft slot rules in 2016. As a result of this determination and forecast discussion at TAC meetings, the Port Authority chose to develop the 2019 NEM,

Chapter 1 — Introduction

using forecast years of 2019 and 2024 to more accurately represent both current and forecast operations at EWR. This is discussed in Chapter 4, Section 4.2 beginning on page 4-1.

Public comments and stakeholder input received on the 2016 Draft NEM, 2016 Revised Draft NEM, and 2019 Draft NEM are included in Appendix H. Responses to all comments received prior to the close of the public comment period on October 15, 2018 are included in Appendix H, beginning on page H-3.

This document is organized as follows:

- Chapter 1 introduces EWR, the Part 150 Study process, and the stakeholders in this process
- Chapter 2 gives background information regarding the airport context and the history of noise abatement at EWR
- Chapter 3 describes land use compatibility and specific land uses in the EWR Part 150 Study area
- Chapter 4 describes the development of the NEMs, including the methodology behind the noise model and noise modeling inputs
- Chapter 5 presents the official 2019 and 2024 NEMs
- Chapter 6 describes stakeholder engagement efforts undertaken during the Part 150 process

As part of an ongoing 14 CFR Part 150 Airport Noise Compatibility Planning Study for Newark Liberty International Airport (EWR), Port Authority completed the Noise Exposure Maps in accordance with the requirements of 14 CFR Part 150.

1.2. History of Noise Abatement at EWR

The Port Authority has a long history of noise abatement at EWR, which predates the Federal Aviation Administration's (FAA) Part 150 Program. The Port Authority has chosen to participate in the Part 150 Program as a continuation of its long history of addressing the noise levels created by aircraft operations at EWR.³

Noise abatement at EWR began in 1959, when Port Authority implemented several noise mitigation programs and a series of aircraft noise abatement programs. For example, Port Authority installed the world's first aircraft noise monitoring system and contributed to the development of quieter jet engine technology. For more information on past noise abatement measures at EWR, see section 2.4 on page 2-7. Current initiatives by Port Authority at EWR include:

- Establishing an airport system-wide noise office with dedicated staff to respond to individual noise concerns
- A noise monitoring program consisting of three permanent noise monitoring sites and one portable monitor
- Introducing a new flight and noise monitoring web portal (WebTrak)⁴
- Enhancing the noise complaint management system

1.3. Part 150 Process

The FAA's emphasis on the relationship between aircraft noise and land use compatibility planning started with

the passage of the Aviation Safety and Noise Abatement Act of 1979 (ASNA). This act gives the FAA the authority to issue regulations on noise compatibility planning and provides a means for federal funding for projects that improve the noise environment around an airport. These regulations are codified in 14 CFR Part 150 "Airport Noise Compatibility Planning."⁵

Part 150 regulations set forth standards for airport operators to use when documenting noise exposure around airports and for establishing programs to minimize noise-related land use incompatibilities. Participation in this program by an airport is voluntary and Port Authority has opted to participate in this program to document aircraft noise exposure and investigate potential measures to improve aircraft noise compatibility in the communities surrounding EWR.

Process and Procedure

Participation in the Part 150 program provides potential access to Federal Aviation Administration (FAA) funding for implementing FAA-approved noise compatibility program measures. 14 CFR Part 150 includes two principal elements:

- 1) A Noise Exposure Map and
- 2) A Noise Compatibility Program

Acceptance of an NEM by the FAA is a prerequisite to their subsequent approval of measures proposed in an NCP. See Figure 1-1 on page 1-3 for an overview of the Part 150 process.

³ Port Authority. (2016). Noise Office. Retrieved March 28, 2016, from the Port Authority <http://www.panynj.gov/airports/noise-office.html>

⁴ <https://www.panynj.gov/airports/webtrak.html>

⁵ 14 CFR (FAR) Part 150, "Airport Noise Compatibility Planning". http://www.ecfr.gov/cgi-bin/text-idx?SID=f8e6df268e3dad2edb848f61b9a0fb51&mc=true&node=pt14.3.150&rgn=div5#se14.3.150_11

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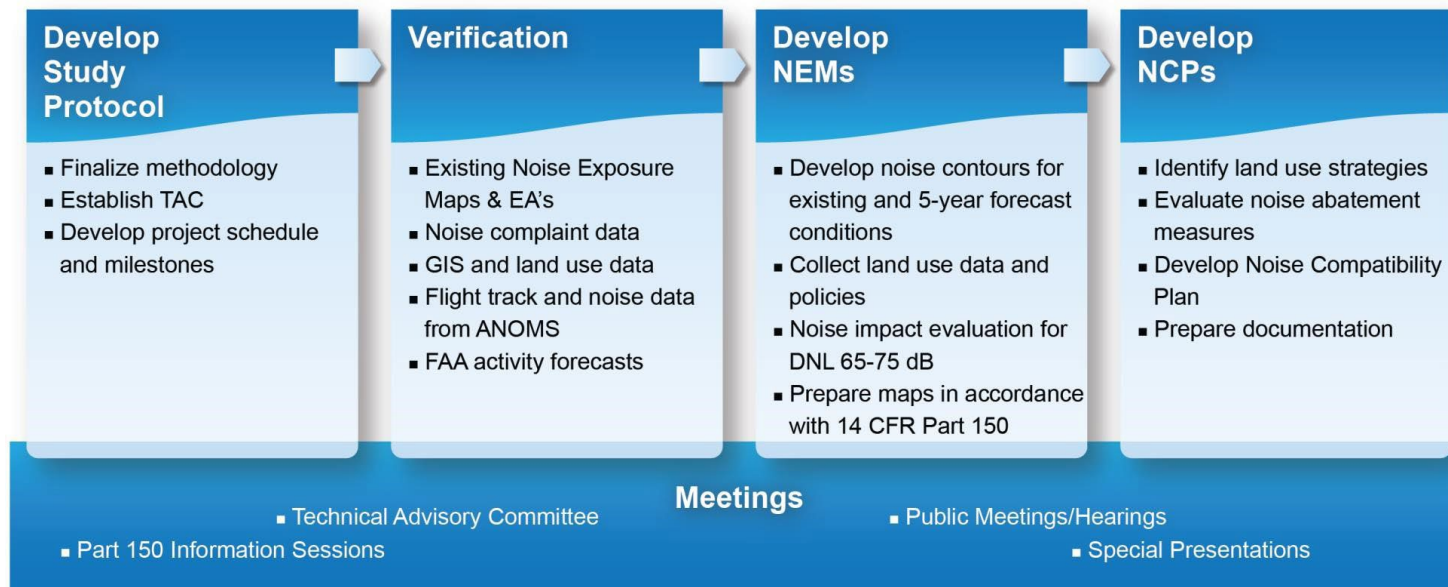


Figure 1-1: Process and Procedure of the Part 150 Process

Source: HMMH, 2016

Noise Exposure Map (NEM)

The NEM document describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs and the resulting noise and land use compatibility situation. Part 150 requires that NEM documentation address aircraft operations during two time periods: (1) a base year and (2) a forecast year that is at least five years following the year of submission (the "forecast conditions").

The year of submission for this study is 2019. Chapter 5 presents an existing conditions NEM for that year, and a 2024 five-year forecast conditions NEM. The Port Authority has also generated supplemental noise contours consisting of 55 DNL and 60

DNL contours. These supplemental contours are for informational purposes only and can be found in Appendix E, Part E.1 beginning on page E-5.

Noise Compatibility Program (NCP)

The NCP is a description of the actions the airport proprietor proposes to undertake to minimize existing and future noise and land use incompatibilities. The development of the NCP is underway, and is the second phase of the Part 150 Study process. The NCP documentation will describe:

- The development of the program
- Each measure the proprietor considered
- The reasons the proprietor elected to include or exclude particular measures
- The entities responsible for

implementing each measure

- Implementation and funding mechanisms
- The predicted effectiveness of both individual measures and of the overall program

Roles and Responsibilities

Several groups are involved in the preparation of EWR's Part 150 Study. Primary groups included: The Port Authority, its staff and consultant team; an EWR Part 150 Study Technical Advisory Committee (TAC) chartered to advise Port Authority throughout the process; the FAA; and members of the general public. For more information, see Figure 1-2 on page 1-4 and Chapter 6.

Chapter 1 — Introduction

1.4. Stakeholder Engagement

The Port Authority is conducting the Part 150 Study in a transparent fashion, including engaging a variety of stakeholders in a manner that exceeds Part 150 consultation requirements. The process employed by Port Authority provides opportunities for all interested parties to both follow the study's progress and be involved when key decisions are taken. Specific engagement strategies of the NEM, which exceed Part 150 requirements, were designed to ensure that all interested parties are given ample opportunity to review and comment on all aspects of the Part 150 Study. These include:

- Establishing a Technical Advisory Committee (TAC) which held thirteen meetings as of December 2018 at which the Study Team presented briefings
- Engaging with the Newark Liberty International Airport Community Noise Roundtable on the Part 150 Process
- Consulting with agencies that have jurisdiction and responsibility within the 65 DNL contour
- Affording opportunities for public review and comment during NEM development
- Making project-specific materials available on Port Authority's Part 150 website
- Hosting public workshops about the Part 150 Study Process and resulting NEM
- Publishing informational newsletters

Chapter 6 and Appendices F, G and H document the public consultation process required under 14 CFR 150 in greater detail.

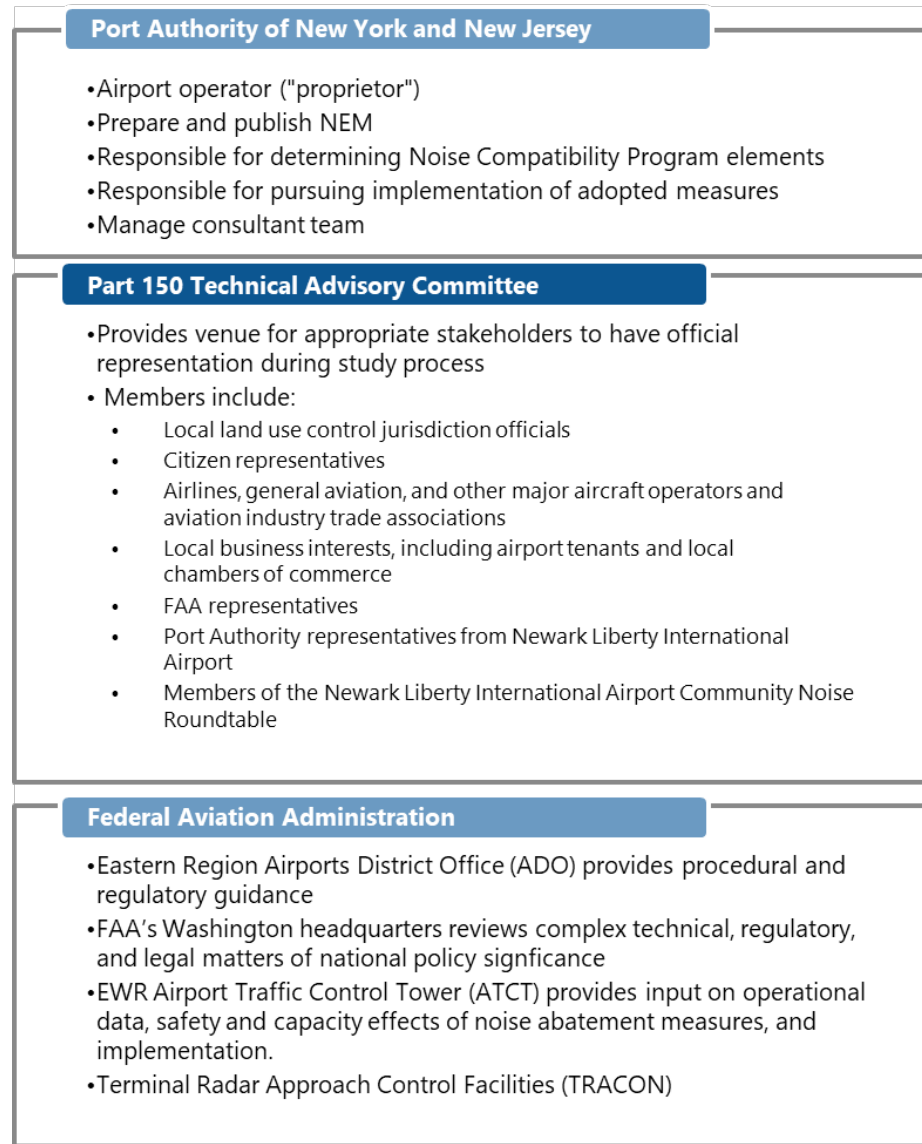


Figure 1-2: Roles and Responsibilities in the EWR Part 150 Process
Source: HMMH, 2016

Chapter 1 — Introduction

1.5. Noise Terminology

Information presented in this NEM document relies upon a reader's understanding of the characteristics of noise (unwanted sound), the effects noise has on persons and communities, and the metrics or descriptors most commonly used to quantify noise.

The properties, measurement, and presentation of noise involve specialized terminology that can be difficult to understand. Where possible, the Part 150 Study uses graphics and everyday comparisons to communicate noise-related quantities and effects in reasonably simple terms. Figure 1-3 shows common environmental A-weighted sound levels in dB (See Appendix A - Fundamentals of Characterizing Sound, Noise Effects, and Metric for more information on noise metrics).

Introduction to Noise Terminology

Sound is a physical phenomenon consisting of minute vibrations (waveforms) that travel through a medium such as air or water.

Noise is sound that is unwelcome because of its undesirable effects on persons (e.g., speech interference, sleep disturbance) or on entire communities (annoyance).

Noise Metrics

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

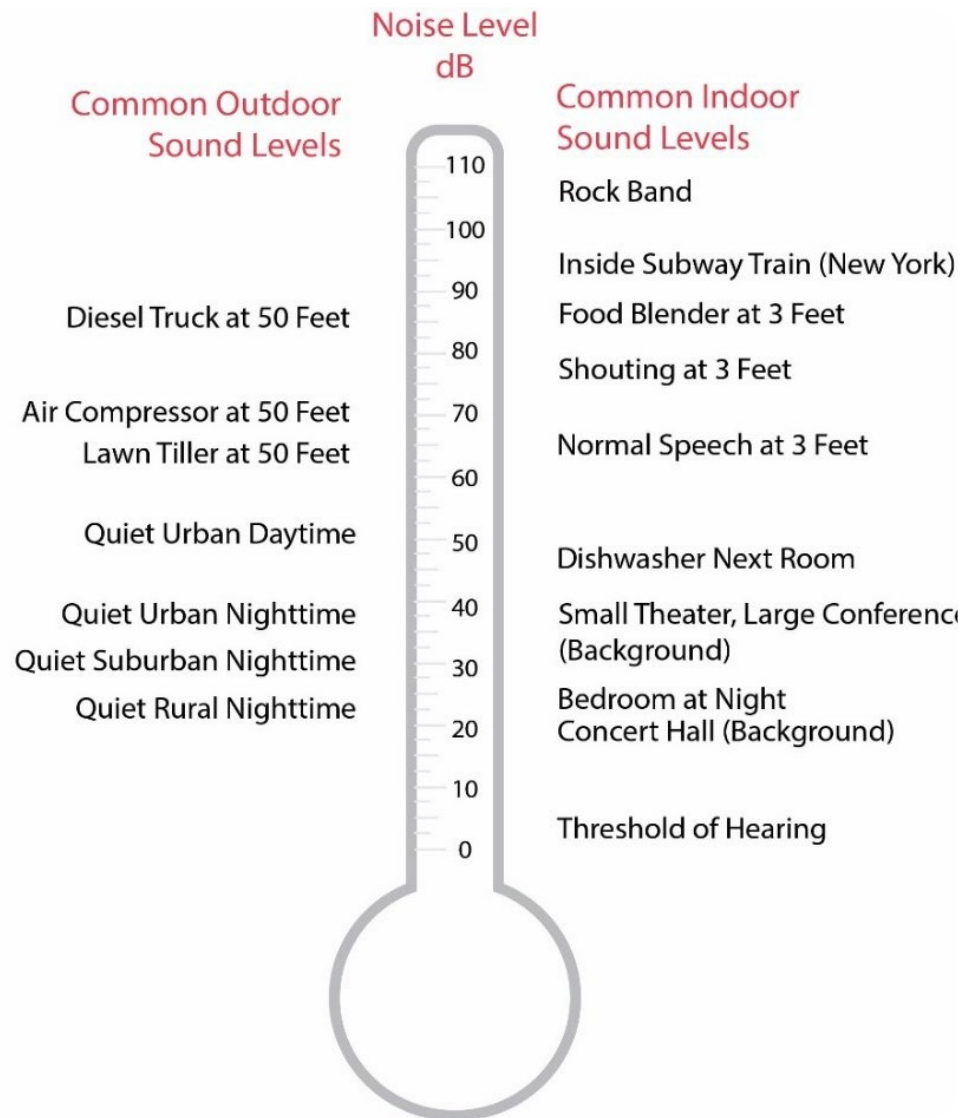


Figure 1-3: Common Environmental Sound Levels
Source: HMMH, 2016

Chapter 1 — Introduction

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

Day Night Average Sound Level (DNL)

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

The Day-Night Average Sound Level (DNL)⁶ represents noise as it occurs over a 24-hour period, with the assumption that noise events occurring at night (10 p.m. to 7 a.m.) are 10 dB louder than actual. This 10 dB weighting is applied to account for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive than daytime (see Figure 1-4).

An alternative way of describing this adjustment is that each event occurring during the nighttime period is calculated as if it were equivalent to ten daytime events.

For more information regarding noise and noise metrics, please see Appendix A, Fundamentals of Characterizing Sound, Noise Effects, and Metrics, page A-1.

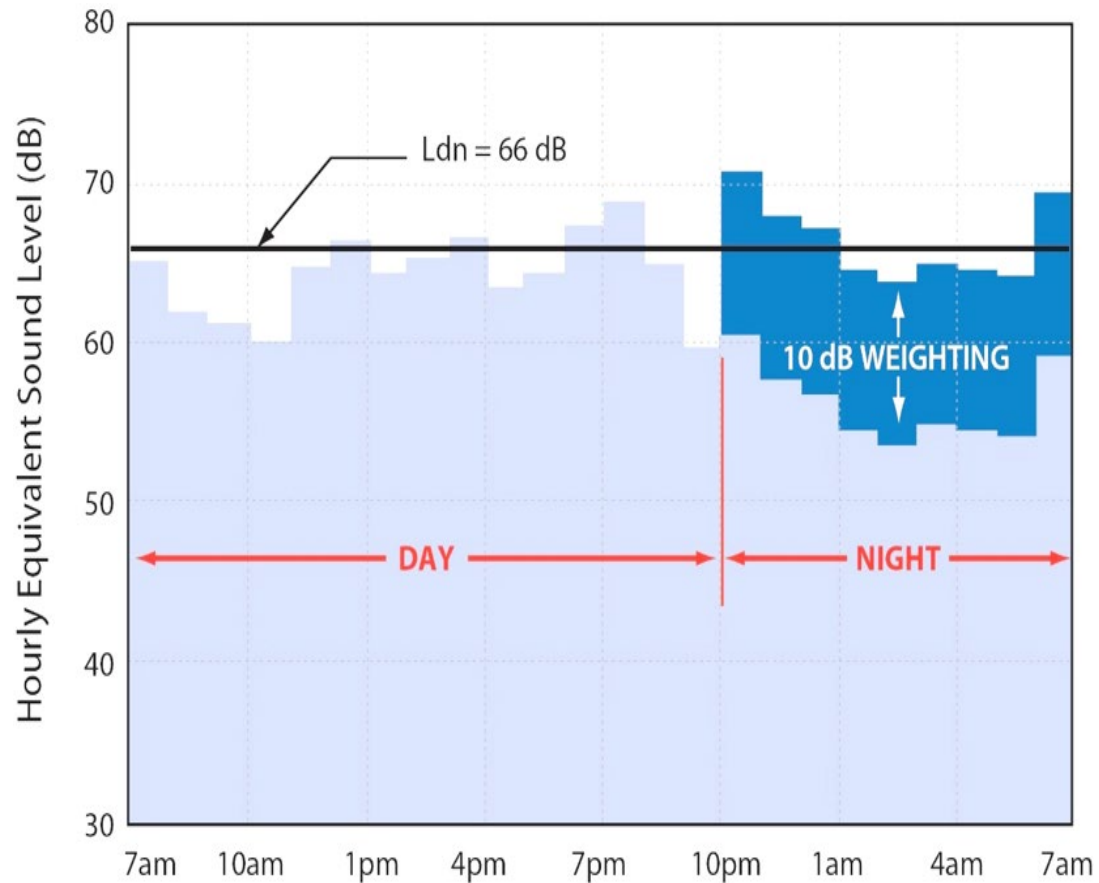


Figure 1-4: Example of a Day-Night Average Sound Level Calculation

Source: HMMH, 2018

⁶ For the regulatory definition of DNL see 14 CFR Part 150 §150.7 Definitions. <http://www.ecfr.gov/cgi-bin/text-idx?SID=f8e6df268e3dad2edb848f61b9a0fb51&m=c=true&node=pt14.3.150&rgn=div5>

NEWARK LIBERTY INTERNATIONAL AIRPORT

\$5.3 billion invested at EWR by the Port Authority since 1948 | 2,027 acres of land | 425 acre Central Terminal Area

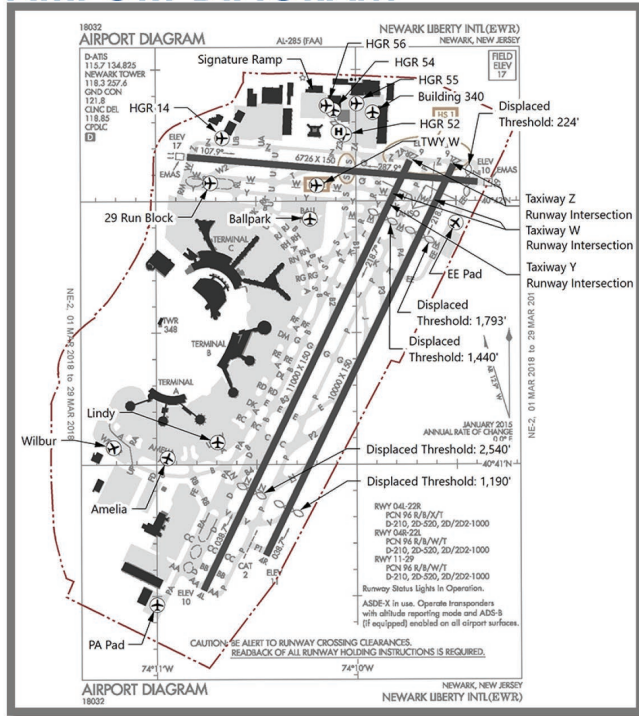


ECONOMY

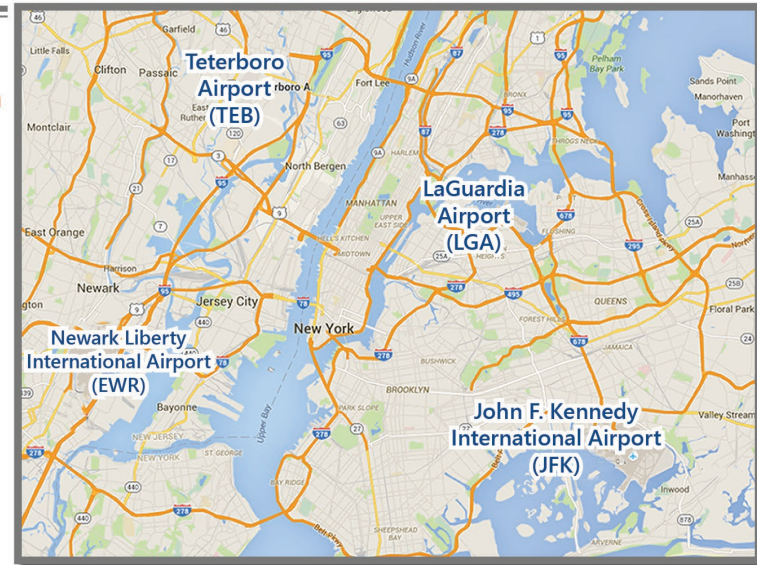
188,000 TOTAL JOBS GENERATED | \$10 BILLION IN ANNUAL WAGES

- 21,000 people employed at EWR
- 27.2 billion in economic activity in the New York-New Jersey metro region

AIRPORT DIAGRAM



REGIONAL CONTEXT



RUNWAY LAYOUT

THREE RUNWAYS: TWO PARALLEL (4R-22L, 4L-22R) | ONE INTERSECTING (11-29)

- Runway 4R-22L: 10,000 ft long, 150 ft wide
- Runway 4L-22R: 11,000 ft long, 150 ft wide
- Runway 11-29: Primarily used for crosswind & commuter aircraft traffic
- Approximately 12 miles of taxiways
- 325-foot air traffic control tower built in 2003



AIRFIELD & LANDSIDE FACILITIES

TERMINAL GATES: A - 28 GATES | B - 15 INTERNATIONAL ARRIVAL GATES | C - 57 GATES

- The CTA consists of three central terminals and a 585-room hotel
- In 1996, AirTran Newark, the airport's automated monorail, opened for service between terminals and parking lots
- EWR is the overnight express package center for the NY/NJ region

Figure 1-5: EWR Facts and Figures

Source: HMMH and The Port Authority, 2018

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2. Background

Newark Liberty International Airport (EWR) is located in New Jersey, partly in the cities of Newark and Elizabeth, only 14 miles from Manhattan, serving a critical role for the New York and New Jersey Metropolitan area. EWR remains a major international and domestic hub, handling more than 35 million passengers and over 880,000 metric tons of cargo. EWR is one of the four Port Authority-operated airports serving the region, with each airport fulfilling a particular mission to accommodate the air service requirements of the metropolitan New York and New Jersey area.

2.1. Airport Context

History

The metropolitan area's first major airport, Newark Airport was built by the City of Newark on 68 acres of marshland. After the airport opened October 1, 1928, it quickly became the world's busiest commercial airport.

During World War II, the Army Air Corps operated the airport. After the Port Authority assumed responsibility for Newark Airport's operations on March 22, 1948, the agency added an instrument runway, a passenger terminal, a control tower, and an air cargo center. In 2002, EWR was renamed Newark Liberty International Airport to memorialize all those who lost their lives on September 11, 2001. Also in 2002, the Port Authority and the City of Newark agreed to extend the lease through 2065. Figure 2-1 displays a timeline of the history at EWR.

Size and Location

EWR covers 2,027 acres, including a 425-acre Central Terminal Area. The airport is bordered by the New Jersey Turnpike, Interstate 78 and U.S. Routes 1-9 in the cities of Newark and Elizabeth, N.J.

Contribution to Economy

About 21,000 people are employed at EWR. The airport contributes approximately 27.2

billion USD in economic activity to the New York-New Jersey metropolitan region, generating about 188,000 total jobs and 10 billion USD in annual wages.

The City of Newark spent more than 8.2 million USD on the construction and development of Newark Airport. The U.S. government spent more than 15.1 million USD prior to 1948. Since assuming the airport's lease in 1948, the Port Authority has invested more than 5.3 billion USD at the airport.

A major capital program combined about 3.8 billion USD in Port Authority, federal, and private funds and delivered numerous improvements, including AirTrain Newark, new ticket counters, parking garages, terminal upgrades, and runway and taxiway improvements. Further, a 347 million USD modernization of Terminal B was recently completed.

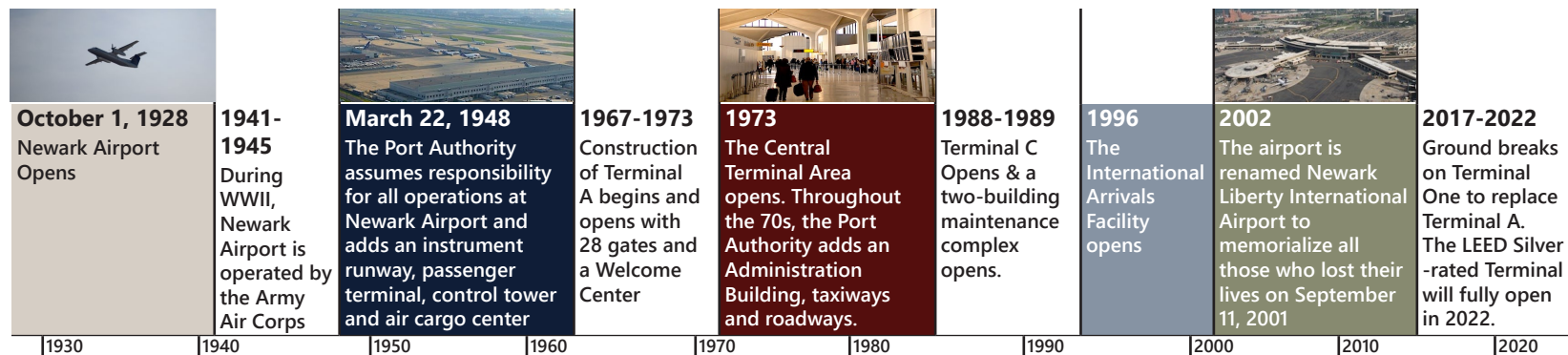


Figure 2-1: Timeline of Newark Liberty International Airport Major Events

Source: The Port Authority, 2018

Chapter 2 — Background

The Port Authority conducted a review to determine whether ongoing or planned capital improvement projects would be constructed and in operation at EWR by 2024 specifically, projects that have the potential to substantially affect the level of activity, runway use, or flight patterns at EWR either during or after construction. Known current and future projects for EWR include the Terminal One Redevelopment project, which will replace Terminal A, and an extension of PATH service to EWR. No effect to airside operations will occur due to AirTrain replacement and the Port Authority anticipates that its completion will not occur during the forecast period of this Study. Terminal One Redevelopment construction began in 2017 and will be complete by 2022. The forecast, runway utilization, and fleet mix for 2019 and 2024 are consistent with Terminal One construction.⁷

Airfield and Landside Facilities

Figure 2-2 on page 2-3 depicts major airfield and landside facilities.

Central Terminal Area

The 425-acre oval Central Terminal Area (CTA) was built as part of a large-scale airport redevelopment program in the 1960s and early 1970s. The CTA consists of three passenger terminals: A, B, and C, and a first-class, ten-story, 585-room hotel with meeting rooms, a pool and fitness center, two restaurants and a bar.

As part of the 2014 remodeling of the Terminal B food court, now named Liberty Terrace, Westfield Concessions invested approximately 65,000 USD to add a custom wall shop unit in the corridor adjacent to the food court with a variety of tenants hailing from the state of New Jersey. Travelex America opened in a converted space on the International Arrivals level on the U.S. Customs exit ramp. Garden State Diner, an icon at EWR since the early 1990s, opened in a new location in August 2015. To reduce congestion and improve airport access, the Port Authority widened and reconfigured the roadways in the passenger terminal area and airport entrances, giving vehicles the option to bypass terminals and proceed directly to parking areas.

Parking

The airport offers more than 18,400 parking spaces. The airport features two parking garages: a six-level facility at AirTrain Station P4 that offers optional valet service, as well as five charging stations for electric vehicles, and another facility across from Terminal C. E-Z Pass Plus, which allows customers to use their E-Z Pass to pay for parking, is accepted at all parking lots. The introduction of a reservation system occurred in 2011.

Passenger Terminals

Construction of Terminal A began in October 1967, and the facility opened in August 1973. The main terminal building measures approximately 800 by 165 feet, and includes a Welcome Center. Terminal A is the oldest terminal at the airport and

is nearing the end of its useful service life as it suffers from frequent delays and overcrowding. The Terminal One Redevelopment is already underway and the new Terminal One will replace current Terminal A. Terminal One is designed to accommodate existing passengers and currently forecasted passenger growth. It is expected to be fully open in 2022.

Terminal One is designed as a multi-level, T-shaped structure with three concourse piers connected to a central head house to optimize space and efficiency for passengers and aircraft alike. The LEED Silver-rated Terminal One will incorporate a variety of sustainable concepts and is designed with the potential to expand from its current 33-gate plan to a 45-gate configuration. A pedestrian bridge, constructed with passenger convenience in mind, will link the terminal, its adjacent parking garage, and the airport's AirTrain rail system. The existing Terminal A will continue operations while construction occurs on Terminal One. After Terminal One is fully functional, the completion of the redevelopment will include the demolition of Terminal A.⁸

Terminal B's modernization expanded the two-level facility to three levels. Highlights include inline baggage and passenger screening systems, a baggage claim hall, departure areas, ticket counters, additional passenger lounges, concessions, and a Welcome Center.

⁷ The Port Authority, 2018. <https://www.panynj.gov/airports/pdf-traffic/ATR2017.pdf> Much of the information in this section can be found in the Port Authority's Airport Traffic Report

⁸ The Port Authority, 2018. <https://www.ewrredevelopment.com/setting-a-new-standard-for-air-travel/new-terminal/>. For further information on redevelopment at EWR, specifically the Terminal One Redevelopment project, see <https://www.ewrredevelopment.com/>

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Newark Liberty International Airport

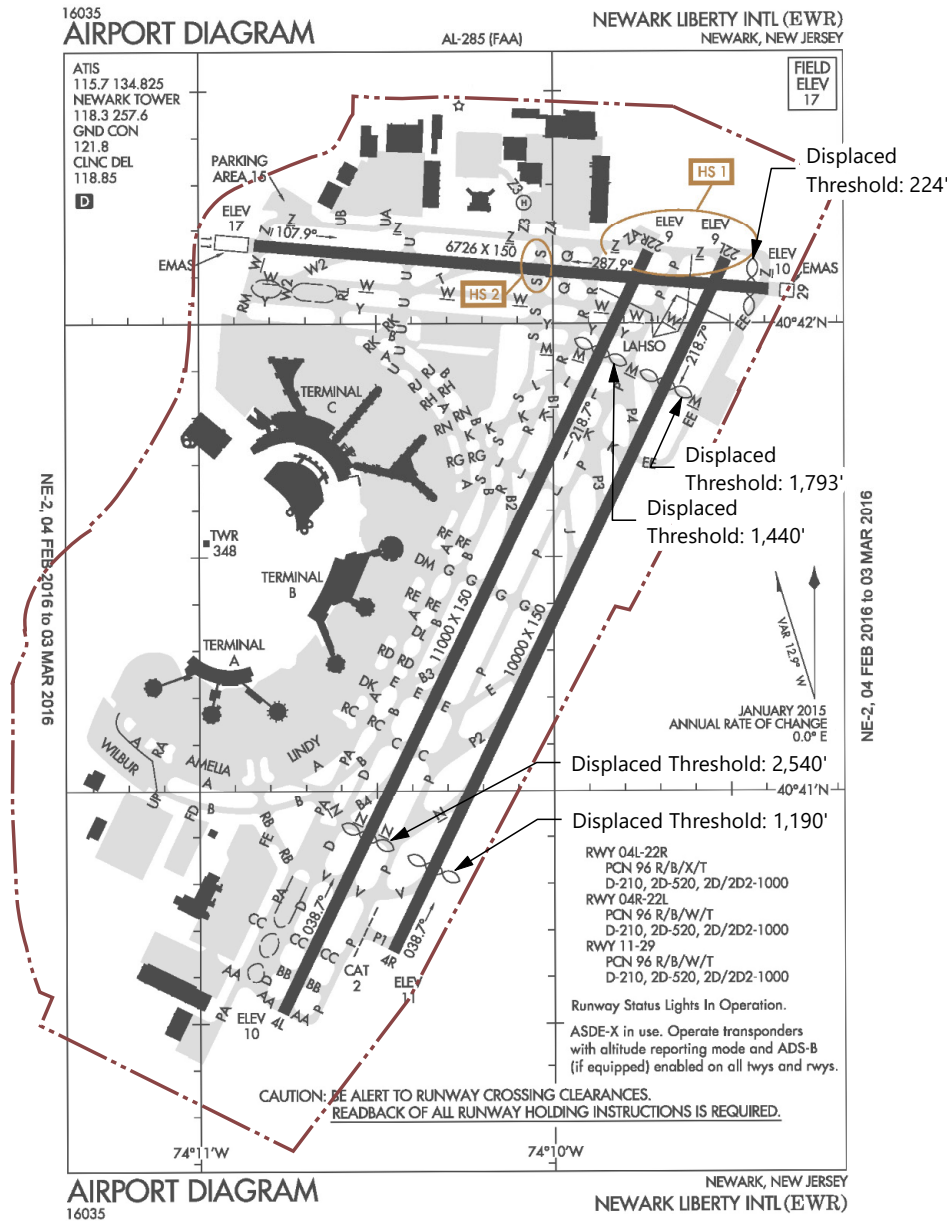
Airport Noise Compatibility

Part 150 Study

2019 and 2024 Noise Exposure Maps

Figure: 2-2

Major Airfield and Landside Facilities



Chapter 2 — Background

Terminal C opened in 1988. Continental Airlines' Global Gateway project in 2001 added 600,000 square feet of space and turned the facility into a three-level terminal with two levels for departures. The C-3 concourse added 19 gates, bringing the terminal's total to 57, as well as a huge retail and concessions space and U.S. Customs facilities. The state-of-the-art International Arrivals Facility, also completed by Continental, added another 1,500-passengers-per-hour arrival capacity to Newark Liberty. A Welcome Center was also added. In 2010, Continental merged with United Airlines.

Runways

The airport has two parallel runways (4R-22L and 4L-22R) and a third runway (11-29), primarily used for commuter aircraft traffic, but all aircraft types use it during cross wind operations. Runway 11-29 is 6,726 feet long by 150 feet wide, Runway 4R-22L is 10,000 feet long by 150 feet wide, and Runway 4L-22R is 11,000 feet long by 150 feet wide. Both Runway 4R-22L and 4L-22R have displaced thresholds⁹ to reduce community noise impacts and to accommodate FAA design standards. Additionally, the runways include visual aids that include high-intensity edge lights, LED centerline and touchdown zone lighting, and high-speed exit taxiway centerline lighting. More than 12 miles of 75-foot-wide taxiways link the three runways with the central terminal and cargo areas. A 42 million USD rehabilitation

⁹ Displaced ends of runways do not coincide with the end of the pavement. Many runways have displaced arrival thresholds, which indicate the location where the available runway pavement for arrivals begins. These are typically added to runways for obstruction or noise abatement reasons. Displaced thresholds result in aircraft being at higher altitude when arriving than they would normally be if touching down at the beginning of the pavement.

of Runway 4R-22L was completed in 2012, and a 97 million USD rehabilitation of Runway 4L-22R, including the construction of multi-entrance and cross taxiways was completed in 2014. Runway 4R-22L changed its approach lighting system to an ALSF-2, and additional high-speed exits P2 and P3 were completed in 2013. Runway 22L also was upgraded to a Cat III approach system allowing for landings in poor weather conditions.

Administration Building

In 2002, reconstruction of the landmark Newark Liberty International Airport Administration Building (Building One) was completed. The 100,000-squarefoot building incorporates a new emergency response facility within the airport's original 1935 central terminal building, which is a National Historic Landmark. The facility houses most of the Port Authority's airport staff.

Air Traffic Control Tower

A 325-foot air traffic control tower was commissioned in 2003, the fourth in the airport's history. The rooftop of the Port Authority Administration Building features what is believed to be the first air traffic control tower ever built. The first air route traffic control center was also established on the airport in 1935.

Airport Users

EWR has a diverse group of airport tenants that includes commercial air carriers, cargo, fixed base operators, charter and aircraft leasing, including the United States Postal Service (USPS), public service operations, and customs to support a wide range of commercial and general aviation (and occasional military) users.

Commercial Carriers: Domestic/International

– The airport is served by dozens of commercial airlines operating non-stop service to over 75 domestic cities around the country. EWR also provides passengers with service internationally to Canadian, Mexican, Central American, Caribbean, Transatlantic and Transpacific destinations. EWR provides a commercial airline and cargo carrier with hub facilities.

Cargo – The airport is the overnight express package center for the NY/NJ region, offering a full range of short-, medium-, and long-haul services to domestic and international destinations. EWR handled more than 826,000 tons of cargo in 2017.

Fixed-Based Operators – EWR is served by one fixed-based operator (FBO), Signature Flight Support, that provides a range of services for private, general aviation aircraft. FBOs are airport service centers responsible for aircraft services, such as passenger handling, aircraft fueling, parking, maintenance, charters, rentals, flight training, and de-icing.

Airport Activity Trends

Figure 2-3 depicts recent and FAA projected Terminal Area Forecast (TAF) operations at EWR, which assumes unconstrained growth and differs from the modeling forecast.¹⁰ As the figure indicates, aircraft operations increased through the 1990s, peaking at approximately 467,000 operations in 1997 and declining to approximately 403,000 operations in 2014. Aircraft operations are expected to increase at a relatively steady rate through 2040. Section 4.2, subsection "Forecast" on page 4-11 and Appendix

¹⁰ The modeling forecast, see Appendix D, Part D.3 on page D-41, differs from the FAA TAF though the FAA requires that the five-year modeling forecast be within 10 % of the FAA TAF.

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D, Part D.3, beginning on page D-39 to page D-49 provide full detail on the FAA-approved aviation forecasts for this Part 150 Study, including their development and results.

2.2. Part 150 Study Area

Figure 2-4 on page 2-6 depicts the Study Area¹¹ that the Port Authority developed for the EWR Part 150 Study in consultation with the FAA to meet both Part 150 regulatory minimum requirements and project-specific needs. The Study Area identifies the outer limit of the overall scope of data collection, analyses, outreach, or other investigations. Pursuant to Part 150, detailed, parcel-level land use data collection and analysis was conducted within the developed 65 DNL contours. Figure 2-4 also presents geographic information considered in the development of the Study Area:

- A 30,000-foot perimeter around all runways' ends and centerlines.¹² This line almost looks like a circle around the airport. It is required under the Part 150 guidelines to consider and present flight tracks out to 30,000 feet from the end of each runway.
- An estimated area based on previously prepared noise contours for EWR, to

¹¹ FAA Op cit. Part 150 requires formal Noise Exposure Map submissions to depict tracks out to at least 30,000 feet at a scale of at least 1" to 2,000'. FAA guidelines permit airports to present the flight tracks covering this scope and scale on separate, unbound figures at this scale accompanying the Noise Exposure Map document.

¹² FAA Op cit. [Sec. A150.103\(b\)\(1\)](#) states:

(b) Except as provided in paragraph (c) of this section, the following information must be obtained for input to the calculation of noise exposure contours:

(1) A map of the airport and its environs at an adequately detailed scale (not less than 1 inch to 2,000 feet) indicating runway length, alignments, landing thresholds, takeoff start-of-roll points, airport boundary, and flight tracks out to at least 30,000 feet from the end of each runway.

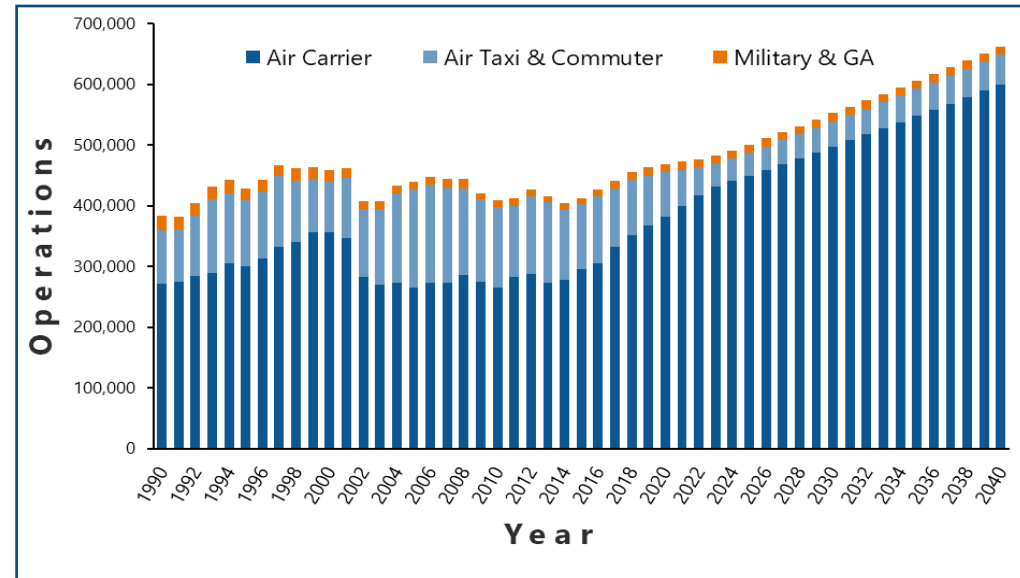


Figure 2-3: Historic and Forecast EWR Aircraft Operations

Sources: HMMH 2018 and Draft 2017 FAA Terminal Area Forecast published January 2018

accommodate DNL noise exposure contours from 75 to 55 DNL.¹³

- Figure 2-4 also depicts the municipal boundaries of all of the communities included in the Study Area.

Ongoing Stakeholder Outreach

The Port Authority takes its role as a community leader very seriously. This includes everything from investing in the infrastructure that keeps the region moving to investing in the people and places that make it all work. The Port Authority works closely with communities and elected officials throughout the region on a variety of community-based initiatives, and with

aviation interest groups on industry-based initiatives. The Port Authority is a strong proponent of noise mitigation programs for local schools, a leader in the use of alternative-fueled vehicles and a major funder of the Council for Airport Opportunity and Air Service Development Office.

Each year the Port Authority hosts a variety of educational and community events, which range from career days to help students explore aviation career opportunities. Many airport staff meet regularly with local community boards, participate in community forums and serve in community organizations during their spare time.

¹³ These contours are not shown, because they were prepared for internal deliberative purposes only and were never formally adopted.

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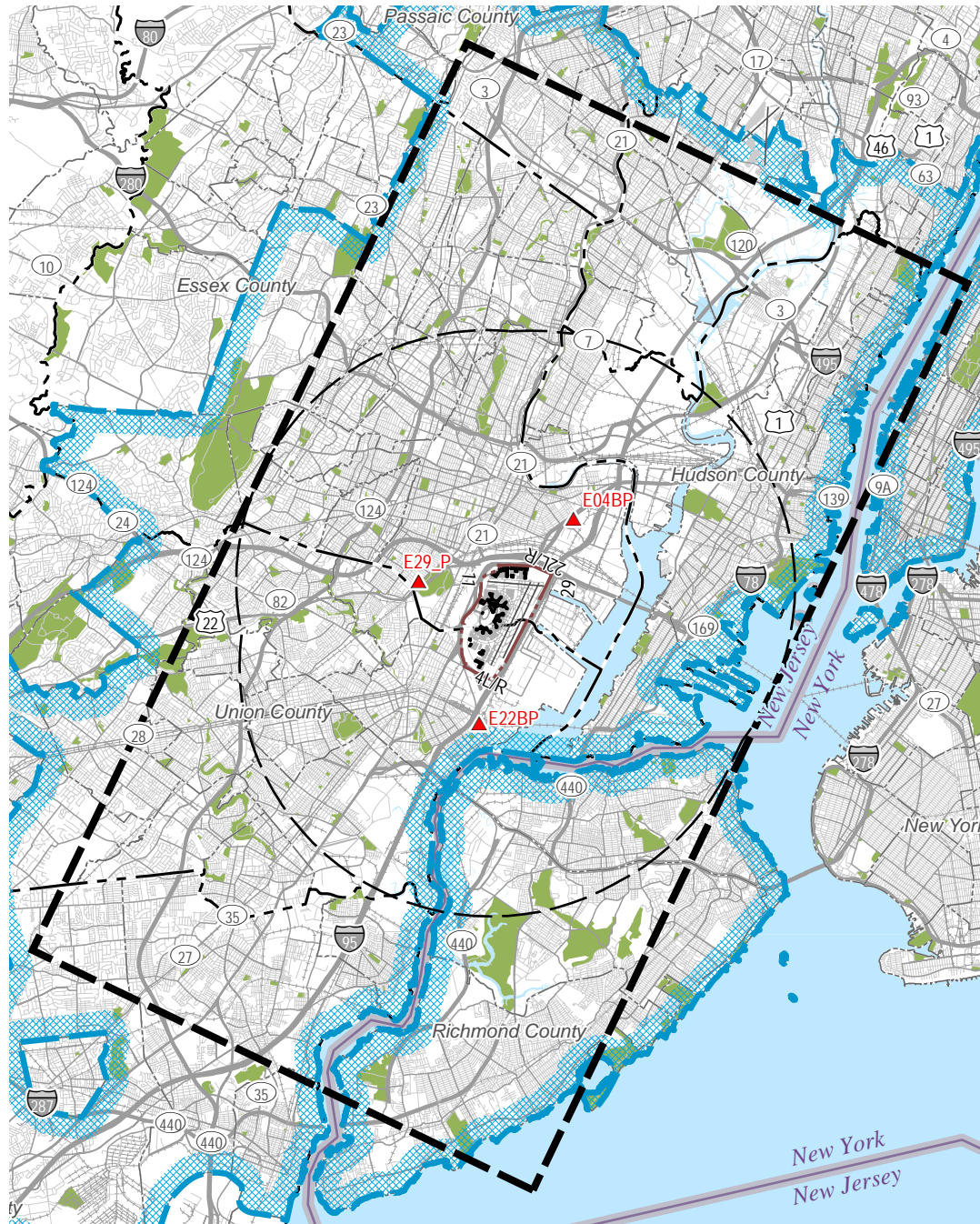
Newark Liberty International Airport

Airport Noise Compatibility

Part 150 Study

2019 and 2024 Noise Exposure Maps

Figure: 2-4
Study Area



- Extent of Municipal Boundaries within EWR Study Area
- EWR Airport Boundary (Approximate)
- EWR Study Area
- Runway Buffer - 30,000 feet
- Runway
- Noise Monitor Locations
- State Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Railroad

Note: The purpose of this figure is limited to depicting the area within which land use and flight operations data will be collected, and does not relate in any way to definition of noise exposure, land use compatibility, or eligibility for noise mitigation. Consistent with FAA guidelines in 14 CFR Part 150, land use compatibility will be assessed only within the existing and five-year forecast conditions 65 decibel (dB) Day-Night Average Sound Level (DNL) contours, when prepared and accepted by the FAA.



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2.3. Noise Complaints

The Port Authority provides two primary means of filing an aircraft noise complaint:

- 1) By completing and submitting a form on the Port Authority's website
- 2) By leaving a voicemail on the airport noise complaint hotline.

Noise complaints are recorded and processed with the help of the Port Authority's PlaneNoise® complaint management system. Each noise complaint received is compiled in a database, verified for accuracy, analyzed, and mapped for reporting. Noise complaint reports are provided to the FAA on a recurring basis to notify them of areas of noise concerns. There were a total of 2,477 complaints filed by 270 distinct households related to EWR aircraft operations in 2017. For more detailed information regarding noise complaints as well as a figure displaying complaints and their locations, please see Appendix B - Noise Complaints, beginning on page B-1.

2.4. Noise Abatement Measures

The Port Authority and the FAA have developed, over the years, several aircraft noise mitigation and abatement measures for EWR. These have included:

- Nighttime operational adjustments
- Airport noise abatement standard instrument departures (SID's)
- Diverse headings off runways
- Preferential runways
- Runway use rotations
- Ground run-up restrictions
- Displaced landing thresholds
- School soundproofing projects

- Community dialogue

The intention of the Part 150 Study is to examine existing noise abatement and noise mitigation efforts as part of the process and, more importantly, determine measures that will reduce or eliminate non-compatible land uses with aircraft noise at 65 DNL or higher.

The Port Authority has pursued aircraft noise abatement measures for several decades. In 1959, the Port Authority established a noise limit of 112 Perceived Noise Decibels (PNdB) for aircraft departures. PNdB expresses the perceived loudness of an individual aircraft noise event. To enforce the departure noise limit, the Port Authority installed the world's first airport noise monitoring system. This monitoring system consisted of 11 permanent noise monitors in total, located near LGA, JFK, and EWR. A notification of noise level exceedance is sent for each aircraft that exceeded the noise departure limit, based on noise levels measured by the monitoring system. The original system required manual correlation of noise levels with individual aircraft operations; a system upgrade in 1992 added flight tracking and automated this process.

Note on Special Conditions that Apply to Mandatory Noise Abatement Measures

In 1985, the Port Authority prohibited the use of Stage 1 aircraft at JFK, LGA, and EWR. "Stage 1" aircraft are aircraft that do not meet the noise standards in 14 CFR Part 36 (Noise Standards: Aircraft Type and Airworthiness Certification), Section B36.5(b). In 1989, the Port Authority also prohibited the scheduling of additional nighttime flights of Stage 2 aircraft at JFK,

LGA, and EWR. "Stage 2" aircraft met the noise standards in 14 CFR Part 36, Section B36.5(b), but were only slightly less noisy than Stage 1 aircraft. Passage of the Airport Noise and Capacity Act of 1990 (ANCA) subsequently prohibited operation of Stage 1 and Stage 2 aircraft with a maximum weight above 75,000 pounds within the United States after December 31, 1999. This prohibition provided noise benefits nationwide. ANCA also prevented the Port Authority from establishing additional operational restrictions on Stage 2 (or Stage 3) aircraft in flight except through compliance with 14 CFR Part 161, Notice and Approval of Airport Noise and Access Restrictions. In addition, the FAA Modernization and Reform Act of 2012 (FMRA) prohibits operation of Stage 1 and Stage 2 aircraft with a maximum weight of 75,000 pounds or lower within the 48 contiguous United States after December 31, 2015.

Aircraft Noise and Operations Management System (ANOMS)

The Port Authority operates an Airport Noise and Operations Management System (ANOMS) that collects noise monitoring data in the vicinity of EWR using permanent and portable noise monitors. ANOMS can also link noise events and complaints to specific aircraft operations. In addition to providing reliable airport operations and noise monitoring data, ANOMS allows investigation and validation of noise complaints, and provides historical data on runway use, flight tracks, and weather.

ANOMS has a public access component known as WebTrak, which allows the public to watch aircraft movements within the New

Chapter 2 — Background

York and New Jersey Metropolitan area via a website.¹⁴ For each aircraft, WebTrak provides specific information regarding aircraft type, altitude, origin and destination airports, and flight identification. Noise level readings at the noise monitors near each airport are also shown on WebTrak in A-weighted instantaneous sound pressure level readings.

School Soundproofing Projects

The Port Authority has long taken an active role in the communities it serves. In 1983, the Port Authority first made a commitment to ensure that students in schools close to its airports always have a quiet learning environment. That commitment continues today with the soundproofing work the Port Authority has done over the years in 77 schools around its airports, totaling over 400 million USD in improvements. Of these 77 schools, 26 schools are in the area surrounding EWR and soundproofing was completed at the last of these in 2013. Schools within the EWR land use data collection area that were soundproofed are displayed on Figure 3-1 and Figure 3-2 as those schools with a circle encompassing the school symbol.¹⁵ Over 95 million USD has been invested in soundproofing these schools, which serve over 15 thousand students in the area surrounding EWR.

The soundproofing program includes:

- Acoustic windows, insulation, ventilation and air conditioning
- Specifications that meet federal procurement guidelines

- Sponsorship and administration of federal requirements by the Port Authority
- Reimbursement of schools by the Port Authority for consultants and contractors
- Opportunities for local contractors
- Support of DBE (Disadvantaged Business Enterprise) goals approved annually by FAA

The soundproofing project is contingent upon federal funding. Specifically, the FAA provided 80 percent of the funding for eligible improvements and the Port Authority provided the remaining 20 percent. For EWR specifically, the Port Authority has provided sound insulation to five schools through the school soundproofing project, which have been determined to be inside the 65 DNL contour in this Part 150 Study. As a result, these schools are considered compatible land uses as noise inside the classrooms has been significantly reduced by the modifications provided. The schools are as follows:

- George Washington Academy School No.1
- Benjamin Franklin School No. 13
- John Marshall School No. 20
- Hawkins Street School
- iPrep Academy School No. 8

¹⁴ <https://www.panynj.gov/airports/webtrak.html>

¹⁵ Figure 3-2 is located in the back pocket of this document in the printed version and as Attachment A to the electronic version

3. Land Use

Title 14 CFR Part 150 requires the review of land uses located in the airport environs to understand the relationship between those land uses and the noise exposure associated with arriving and departing aircraft. This includes delineation of land uses within the DNL 65 and higher contours on the NEMs and identification of noise sensitive uses that may be non-compatible with that level of noise exposure. Identification of a noise sensitive use within the DNL 65 contour does not necessarily mean that the use is either considered non-compatible or that it is eligible for mitigation. Rather, identification merely indicates that the use is generally considered non-compatible, but requires further investigation. Factors that influence compatibility and/or eligibility may include but not be limited to previous sound reduction treatments, current interior noise levels, structure condition, ambient and self-generated noise levels, whether a given use is considered temporary or permanent, and the time-frame within which a given structure was constructed.¹⁶

These factors will be more thoroughly evaluated during the NCP and subsequent

implementation phase.¹⁷

This chapter outlines the land use data collection process, land use compatibility and noise sensitive uses, and the land use regulatory environment.

3.1. Land Use Data Collection

The objective of airport noise compatibility planning is to promote the compatible growth and development of airports with their surrounding communities. Part 150 requires the review of existing land uses surrounding an airport to understand impacts associated with aircraft activity at the airport. A key element of the NEM process is the development of detailed land use and zoning maps, including a thorough review of residential and other non-compatible land uses in areas exposed to high levels of airport noise.

The FAA has published land use compatibility guidelines, as set forth in 14 CFR Part 150, Appendix A, Table 1, which is reproduced in Table 3-1 of this document. As the table indicates, the FAA considers all land uses to be compatible with aircraft-related DNL levels below 65, including residential, hotels, retirement homes, intermediate care facilities, hospitals, nursing homes, schools, preschools, and

libraries. These categories will be referenced throughout the Part 150 process.

Land use compatibility and noise impacts were evaluated based on the land use information surrounding EWR. This chapter provides an overview of municipal jurisdictions with authority to regulate land use in the vicinity of EWR. It also provides a description of recommended land uses that are deemed generally compatible under Title 14 CFR Part 150, Appendix A, the section of Part 150 that provides detail on land use regulations, and an overview of existing land uses and zoning classifications in the vicinity of the airport.

Study Area

The Port Authority established a Study Area for the EWR Part 150 Study to meet the minimum regulatory requirements of Part 150, as well as specific project needs (Figure 2-4 on page 2-6).

Land Use Data Collection Area

A land use data collection area for EWR was identified to allow for a detailed review and collection of land use data. The land use data collection area included municipalities with the potential to be located within EWR's 2019 Existing 65 DNL or higher noise contours and/or EWR's 2024 Future 65 DNL or higher noise contours.

¹⁶ On March 27, 1998, FAA issued a policy on Title 14 CFR Part 150 airport noise compatibility programs that limits approval of remedial mitigation measures (e.g., soundproofing, property acquisitions, and relocation, etc.) to land uses that were in place as of October 1, 1998 unless an airport can demonstrate that DNL contours were not published prior to that date. New non-compatible uses resulting from airport expansion may be eligible for consideration.

¹⁷ Determination of eligibility would be made when the EWR Noise Compatibility Program has been approved, program protocols have been established and the implementation phase has been initiated.

Chapter 3 — Land Use

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

Source: Part 150, Appendix A, Table 1

Land Use	Yearly Day-Night Average Sound Level, DNL, in Decibels (Key and notes on following page)					
	<65	65-70	70-75	75-80	80-85	>85
Residential Use						
Residential other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home park	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade--general	Y	Y	25	35	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Chapter 3 — Land Use

Key to Table 3-1

SLUCM: Standard Land Use Coding Manual.

Y(Yes): Land use and related structures compatible without restrictions.

N(No): Land use and related structures are not compatible and should be prohibited.

NLR: Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

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

Notes for Table 3-1

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

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

Chapter 3 — Land Use

3.2. Land Use

Local Municipality Coordination

Pursuant to New Jersey's Zoning Act of 1928,¹⁸ local governments have the authority to establish zoning regulations and prepare and adopt master plans. The New Jersey Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.), enacted in 1976, defines the powers and responsibilities of municipalities, and specifically provides that municipalities have primary authority over land use decisions within their jurisdiction. The following municipalities within the EWR land use data collection area were consulted to document existing land uses, identify future planned land uses, and discuss applicable land use controls and/or policies:

- City of Elizabeth (Union County)
- City of Linden (Union County)
- City of Newark (Essex County)
- Town of Harrison (Hudson County)
- Town of Kearny (Hudson County)
- Township of Lyndhurst (Bergen County)
- Borough of North Arlington (Bergen County)

The counties of Essex, Union, Bergen, and Hudson were also consulted to obtain county-level land use data. Additionally, a portion of the land use data collection area for EWR is located in the New Jersey Meadowlands District, maintained by the New Jersey Sports and Exposition Authority (NJSEA), which provides additional land use planning and zoning for portions of the Borough of North Arlington, the Town of Kearny, and the Township of Lyndhurst. The NJSEA was also consulted as a part of this study.

¹⁸ Modeled after the Standard State Zoning Enabling Act (SZEA)

Land Uses within the Land Use Data Collection Area

The EWR airfield is located in the cities of Newark (Essex County) and Elizabeth (Union County). EWR is bordered by the City of Newark to the north, the cities of Newark and Elizabeth to the east, the City of Elizabeth to the south, and the cities of Newark and Elizabeth to the west. In

addition, the Airport is located 14 miles southwest of downtown Manhattan, New York.

Land within the land use data collection area is heavily developed. Land use to the east of the Airport is predominantly manufacturing and production; and land use to the north and south is predominantly manufacturing and production with some

Standard State Zoning Enabling Act

In the U.S., the basic foundation for planning and zoning tools intended to influence how land is used, was laid by two standard state enabling acts published by the U.S. Department of Commerce in the 1920s. Enabling legislation is a mechanism by which a state delegates its inherent police power authority to local governments (counties and municipalities), including the power to plan and zone.



The Standard State Zoning Enabling Act (SZEA), was developed by an advisory committee on zoning appointed by Secretary of Commerce (and later President) Herbert Hoover in 1921. After several revisions, the Government Printing Office published the first printed edition in May 1924 and a revised edition in 1926.

The SZEA had nine sections. It included a grant of power, a provision that the legislative body could divide the local government's territory into districts, a statement of purpose for the zoning regulations, and procedures for establishing and amending the zoning regulations. A legislative body was required to establish a zoning commission to advise on the initial development of zoning regulations.

Chapter 3 — Land Use

residential and transient lodging uses. Land use to the west is mostly residential and transient lodging, with some manufacturing and production. All of the residential areas have parks or open space and public uses (e.g., churches, schools, hospitals, libraries, etc.) intermixed. For any mixed-use land use, the more sensitive land use was identified and used for analysis. Figure 3-1 on page 3-6 shows existing land use categories for the EWR land use data collection area.

It should be noted that the Mixed Residential and Commercial land use category is a land use designation that is common in a dense urban environment. This classification may involve a residential use located over a commercial use (e.g., an apartment over a store or eating establishment). The commercial land uses of this type may be considered compatible within the DNL 65 contour while the residential land uses would typically be considered non-compatible. However, if the noise generated by the commercial use equals or exceeds that of aircraft, the residential use would not be considered to be non-compatible. The mixed-use land uses in the DNL 65 contour have been classified as Residential to show that potentially non-compatible land uses exist. Appendix C discusses existing land uses in more detail.

Noise Sensitive Sites

Noise sensitive sites are those land uses considered non-compatible within the 65 DNL contour due to adverse effects of high levels of aircraft noise such as residences, schools, hospitals, religious facilities, and libraries.¹⁹ Noise sensitive sites within the EWR land use data collection area were identified by review of a variety of sources including information from Essex County, Union County, Hudson County and Richmond County. Specific resources reviewed include municipality master plans, consultation meetings with municipalities, available online mapping sources, as well as an extensive survey of ground land use of the area surrounding EWR by the consulting team. See Appendix C, Part 3.1, Section 3 on page C-7 for a detailed discussion of that survey.

Part 150 requires properties eligible for inclusion in the National Register of Historic Places (NRHP) to be identified and mapped along with these land uses. The following noise sensitive sites have been identified for the EWR Land use data collection area:

- Churches and places of worship
- Schools (e.g., K-12, colleges/universities, preschools, and daycare facilities)
- Libraries
- Hospitals
- Historic properties

Historic properties identified for this study are those that are included in the National

Register of Historic Places for Essex County, Union County, Hudson County, and Richmond County.

The locations of noise sensitive sites within the land use data collection area are shown in Figure 3-1 on page 3-6.²⁰ A more detailed discussion of methods used to identify noise-sensitive sites and historic resources is provided in Appendix C, as mentioned above. As indicated in the introduction to this chapter, inclusion of these properties within the DNL 65 contour does not necessarily mean that a land use is either considered non-compatible or that it is eligible for mitigation. Inclusion merely indicates that the land use is generally considered non-compatible with noise levels greater than or equal to 65 DNL, but requires further investigation during the NCP and subsequent implementation phase.

Land Use Control Regulations

Zoning and subdivision regulations are in effect for the entire Study Area. Existing land use data and zoning information (at the parcel level) were readily available for municipalities within Bergen County, Essex County, Hudson County, Union County and New York County portions of the Study Area. In the areas adjacent to the airport, zoning designations are primarily industrial with some park/open space and commercial. A discussion of zoning designations by municipality is provided in Appendix C, Part C.1, beginning on page C-1.

¹⁹ These noise sensitive categories are defined in 14 C.F.R. Part 150, Appendix A, Table 1 and are shown in Table 3-1 on page 3-2

²⁰ The official land use base map is located in Attachment A of this document in electronic form and in the back pocket of this document in print as Figure 3-2. This figure is to 1"=2000' scale.

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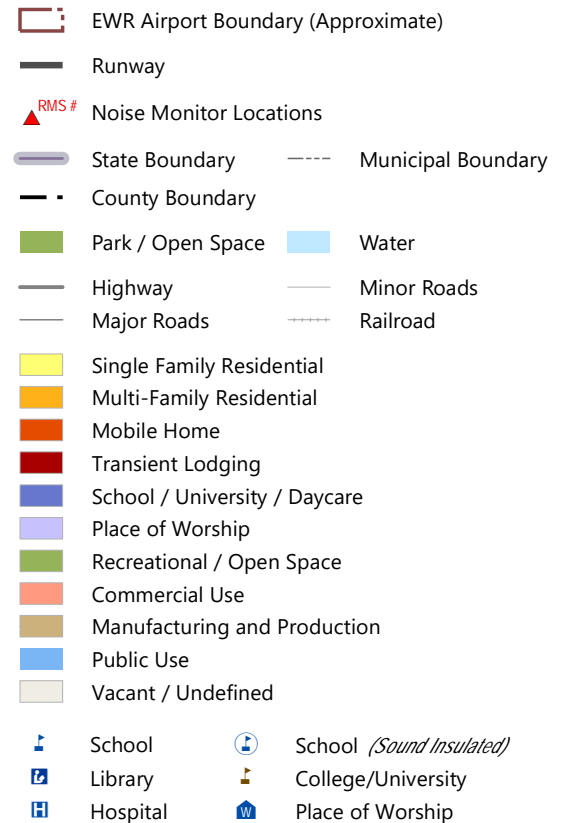
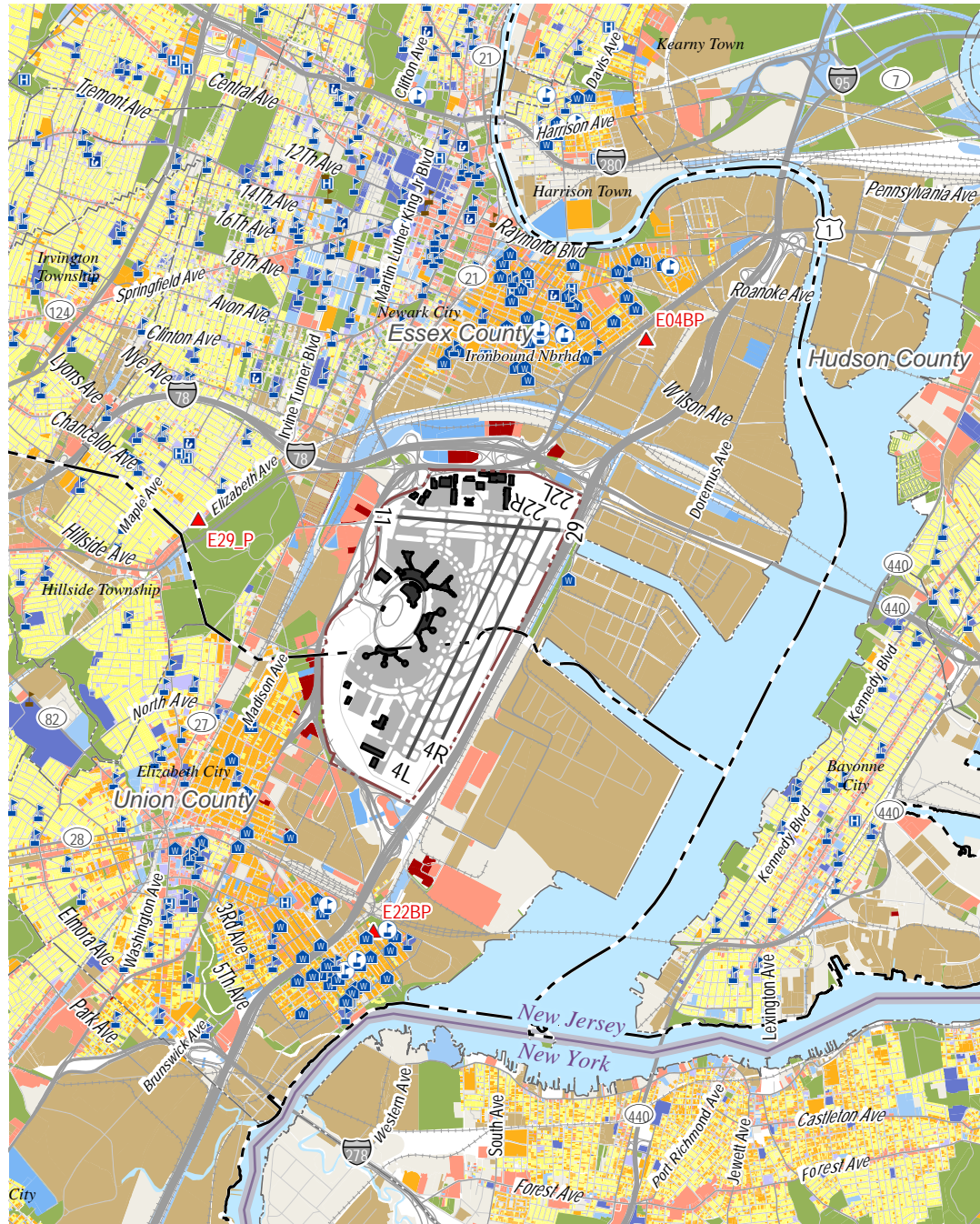
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Figure: 3-1
General Land Use



4. Development of Noise Exposure Maps

Development of Noise Exposure Maps requires detailed noise predictions and comprehensive land use data. This chapter discusses the noise modeling methodology used to develop noise contours that, when overlaid on underlying land uses presented in Chapter 3, form the basis of the Noise Exposure Map.

4.1. Overview of the Integrated Noise Model (INM)

Consistent with Part 150 requirements, the noise contours for this study were prepared using the most recent release of the FAA's Integrated Noise Model (INM) that was available at the outset of the study, "Version 7.0d." The INM was developed by the FAA for modeling noise from aircraft operations occurring in the immediate vicinity of an airport.²¹ When this study began, the INM was the FAA-approved tool for determining the cumulative effect of aircraft noise exposure around airports.²²

Statutory requirements for INM use are defined in 14 CFR Part 150, Airport Noise Compatibility Planning.

²¹ The methods and calculations that the INM uses when predicting aircraft noise exposure conform to internationally accepted scientific standards, specifically those published by Society of Automotive Engineers (SAE) in its Aerospace Information Report (AIR) Number 1845 Procedure for Calculation of Airplane Noise in the Vicinity of Airports which can be found here: <http://standards.sae.org/air1845/>

²² The Port Authority received written approval from FAA to use the INM Version 7.0d, based on the fact that significant work toward development of noise model inputs had already been completed prior to the release of the Aviation Environmental Design tool (AEDT). The FAA approval letter can be found in Appendix D., Part D.1, on page D-5.

The airport-specific information required by the INM includes both physical and operational data. The physical data includes airfield geometry (i.e., runway locations and utilization), the altitude of the airfield, average-annual weather, and terrain data. Operational data includes the number and types of aircraft operating at the airport and the three-dimensional flight trajectories of aircraft arriving to and departing from the airport. Information on each of these modeling variables is provided in Section 4.2.

To create noise contours, the INM first computes noise levels at finite points, using the physical and operational parameters described previously for each aircraft operation modeled. The noise levels for all of the operations are then summed to calculate the noise level for the desired metric, such as DNL.

In addition to computing noise levels at the individual computer-defined points, the INM renders contours by connecting grid points having equal values, at user-specified intervals and levels. The modeling software also creates noise level and other reports such as operations summaries or other input data, depending on the parameters chosen by the user.

4.2. Noise Modeling Inputs

The noise modeling inputs for the existing conditions 2019 NEM and forecast conditions 2024 NEM include:

- Physical description of the airport layout
- Meteorological and terrain data
- Runway Use
- Runway and Helipad Utilization Rates
- Ground noise and maintenance run-ups
- Flight track geometry and utilization rates
- Aircraft noise and performance characteristics
- Forecast of aircraft flights

Study Area

Figure 2-4 on page 2-6 shows the Study Area for the EWR Part 150 Study. The Study Area identifies the absolute outer limit of the overall scope of data collection, analyses, outreach, or other investigations. Pursuant to Part 150 requirements, detailed land use data (parcel-level data) is analyzed within the 65 DNL contours once determined.

With this, population counts and analysis are limited to the 65 and higher DNL contour.²³ Figure 2-4 on page 2-6 presents geographic information considered in the development of the EWR Study Area. The Study Area includes:

- A 30,000-foot perimeter around the runways. The figure depicts this line,

²³ Additionally, the Port Authority has chosen to show population counts for the 55 and 60 DNL contour intervals for informational purposes only. These can be found in Appendix E, page E-5.

Chapter 4 — Development of Noise Exposure Maps

which looks like a distorted circle around the airport. This buffer was specified to accommodate the Part 150 requirement that Noise Exposure Maps consider and present flight tracks out to at least 30,000 feet from the end of each runway.

- Estimated area, based on previously prepared noise contours for EWR that would include those prior contours' extent (75 to 55 DNL).²⁴

The Study Area that results is a rectangle that uses the FAA's 30,000-foot flight track perimeter as its starting point, and extends in the direction of the primary parallel Runways 4L-22R and 4R-22L to contain the expected 55 DNL contour.²⁵

Runway Layout

Information regarding the existing (2019) airfield layout at EWR was obtained from the Port Authority. Efforts were also made to determine whether there are planned airfield development projects scheduled to occur at the airport within the next five years that would affect runway threshold locations or elevations. Current (2019) runway lengths, azimuths, and threshold locations were incorporated into the existing conditions (2019 NEM), and the Port Authority confirmed that there are no planned changes to the runway layout that would affect modeling inputs within the five-year forecast (2024) time-frame.

Therefore, no change to the 2019 runway details was required for the future

²⁴ These contours are not shown, because they were prepared for internal deliberative purposes only and were never formally adopted.

²⁵ Part 150 guidelines do not extend beyond the 65 DNL contour

Table 4-1: EWR Runway Data

Sources: Runway lengths from (1) EWR Airport Diagram (Figure 2-2 on page 2-3), other data from (2) Port Authority airport layout plan and (3) FAA 5010 "Airport Master Records and Reports" accessed February 6, 2018 at: <http://www.gcr1.com/5010WEB/airport.cfm?Site=EWR&AptSecNum=3&SpecRWYid=1871238>

Runway End	Location (Latitude and Longitude)	Elevation (Feet above mean sea level)	Length (feet)	Threshold Crossing Height (Feet)	Displaced Landing Threshold (Feet)
4L	40-40-31.3716N 074-10-46.0209W	10.1	11,000	77	2540
22R	40-42-09.2091N 074-09-43.8255W	8.9		70	1440
4R	40-40-39.2984N 074-10-27.2835W	11.1	10,000	71	1190
22L	40-42-08.2438N 074-09-30.7308W	9.4		60	1793
11	40-42-10.0955N 074-10-50.5467W	17.4	6,726	53	None
29	40-42-04.3181N 074-09-23.5515W	9.7		60	224
H*	40-42-15.1960N 074-10-0.1560W	18.3	N/A	N/A	N/A

*H denotes the location of the helipad

conditions (2024 NEM).²⁶ Table 4-1 displays the data used to define the existing conditions and future conditions for the runways in INM.

Meteorological and Terrain Data

In addition to airport-specific physical and operational data, the INM also requires data on two kinds of local conditions influencing aircraft operations and sound propagation: annual average day meteorological conditions and terrain.

Meteorological Data

The INM uses annual-average day

²⁶ See Appendix D, beginning on page D-1, which summarizes the modeling assumptions and methodology for existing (2019) and future (2024) conditions at EWR.

meteorological data to adjust aircraft performance and sound propagation. Data for the first three of the four required categories shown below were obtained from the National Climatic Data Center for calendar year 2017:

- Temperature: 56.5°F
- Pressure: 30.02 inches mercury (Hg)
- Relative humidity: 62.6%
- Headwind speed: 8 knots²⁷

²⁷ The standard headwind in the INM is 8 knots and was not modified

Chapter 4 — Development of Noise Exposure Maps

Terrain Data

The INM uses terrain data to adjust the aircraft-to-ground path length, to take into account locations where terrain variation relative to the airfield makes the ground closer to or farther from the aircraft relative to flat-earth conditions. Terrain data were obtained from the United States Geological Survey National Elevation Dataset for a 33-foot grid spacing covering the Study Area.

Runway Use

Aircraft arriving to a runway have a different noise signature compared to those departing from a runway. It is for this reason that runway use is an important factor in determining the noise exposure around an airport. Runway utilization data from 2016 and 2017 EWR operations database was used in the model.²⁸

Runway and Helipad Utilization Rates

Runway Utilization Rates

Figure 4-1 summarizes runway utilization rates that were developed from the ANOMS system. Figure 4-1 accounts for runway use data from October 1, 2016 through September 30, 2017. The rates are presented for all aircraft at each runway, i.e., Runways 4R, 4L, 22R, 22L, 29, and 11. Each aircraft group (i.e., domestic, international, cargo, and other aircraft including general aviation and military) has utilization rates

that are similar to the overall averages shown in Figure 4-1 with the exception that general aviation propeller-driven aircraft have somewhat higher utilization for the shorter Runway 11-29.

For further detail regarding aircraft group, aircraft operation (arrival/departure) and day and night split to runway utilization percentages used in the INM model, see Table 11 in Appendix D, Part D.2, on page D-17.

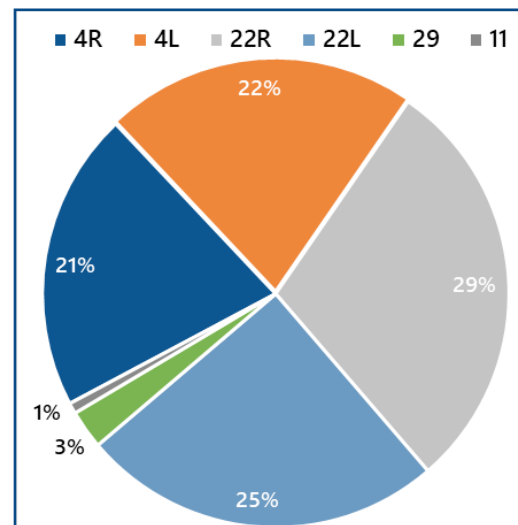


Figure 4-1: 2019 and 2024 Runway Utilization Rates

Source: HMMH 2018

Helipad Utilization Rates

There is only one helipad in use at EWR, which therefore has a utilization rate of 100%. The helipad is located to the north of Runway 11-29 and is designated with a capital H on Figure 2-2 on page 2-3.

Aircraft Landing and Departure Points Analysis

Aircraft landing and departure points assigned on the runways are critical to accurately model the noise associated with aircraft operations. The INM calculates the noise from aircraft operations using the landing threshold (the location on the runway aircraft touch down upon arrival), and the start-of-takeoff-roll (SOTR). The Airport Diagram (Figure 2-2) shows the landing thresholds, including displaced thresholds if present, and the ends of the runways. Aside from the ends of the runway, aircraft may also depart from locations more easily accessible by taxiways; this allows for a more efficient departure flow by not requiring aircraft to cross active runways. The points where aircraft depart from a taxiway entrance are called 'Taxiway Intersections.'

²⁸ EWR ANOMS Database, 2016 and 2017

Chapter 4 — Development of Noise Exposure Maps

Table 4-2: Percentage Use of Runway Entry Points Modeled

Source: HMMH and Aerobahn, 2017.

Runway	Taxiway Intersection	Percentages by Engine Type and INM Weight Category Designation						Percentage Use by Taxiway Intersection
		Jet			Non-Jet			
		Small	Large	Heavy	Small	Large	Heavy¹	
22L	Z²	100.0%	42.2%	68.8%	14.3%	26.5%	-	44.9%
	W	0.0%	57.8%	31.2%	85.7%	73.5%	-	55.1%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
22R	Z²	93.7%	4.5%	16.7%	20.3%	4.3%	-	6.4%
	W	1.7%	9.5%	6.0%	4.2%	10.2%	-	9.0%
	Y	4.6%	86.0%	77.3%	75.5%	85.5%	-	84.5%
Total³		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Note¹: There are no INM aircraft that are “Heavy” and “Non-Jet” in the default INM database. Note²: Taxiway Z denotes the end of the physical runway for Runways 22L and 22R Note³: Totals may not exactly add up due to rounding in this table.								

Not all aircraft depart from the end of the runway pavement; in particular, Runways 22L and 22R use intersection takeoffs regularly.

The NEM noise modeling inputs are based on a variety of data sources. An analysis of Aerobahn data²⁹ was used to develop the taxiway intersection departures. Table 4-2 shows the breakdown of aircraft percentages by engine type (e.g., jet and non-jet) and INM weight category designation (i.e., small, large and heavy³⁰)

²⁹ Aerobahn is a set of products based on the Aerobahn platform that provide real-time situational awareness and the status information for flights operating on the surface of an airport and facilitate cooperative decision-making. <http://saab.com/security/air-traffic-management/air-traffic-management/Aerobahn/>. Port Authority provided a data set of runway entry points of aircraft departing EWR from October 2016 to September 2017.

³⁰ The INM defines the weight category by determining the maximum gross takeoff weight. Small (S) is 12,500 pounds or less, Large (L) is heavier than 12,500 but less than 300,000

modeled at each Taxiway Intersection.³¹

Figure 4-2 on page 4-5 provides an annotated airport diagram showing the modeled departure locations for Runways 22L and 22R including the taxiway intersections (i.e., Taxiway W and Y) and the physical ends of the runways (i.e., Taxiway Z).

Ground Noise

In addition to aircraft in flight, the INM also includes the capability to model aircraft engine run-ups. Run-ups typically occur on the airfield following the completion of maintenance on aircraft

pounds, and Heavy (H) – 300,000 pounds and heavier

³¹ Helicopter operations occur at EWR’s helipad, designated in Figure 2-2 on page 2-3 with an H, and are therefore not included in this analysis of Taxiway Intersection Utilization.

engines. The following data are required to model aircraft engine run-ups in the INM:

- Aircraft type (e.g. Boeing 737, De Havilland “Dash 8”, etc.)
- Location where the run-up occurred (latitude/longitude)
- Aircraft heading during run-up
- Time when the run-up occurred (start time and end time)
- Engine thrust setting (pounds or percent)
- Duration of the event
- Number of engines running

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Figure: 4-2

Ground Run-Up Locations and Taxiway Intersection Departure Locations



EWR Airport Boundary (Approximate)



Runup Location

Aircraft Orientation

Amelia - 20°

Lindy - 0°

Building 340 - 0°

HGR 52 - 90°

HGR 54 - 0°

HGR 55 - 90°

HGR 56 - 90°

Wilbur - Varies

29 Run Block - Varies

HGR 14 - Varies

PA Pad - Varies

EE Pad - Varies

Ballpark - Varies

TWY W - Varies



Taxiway Intersection Departure Locations



Full Length Departure Locations (Runway End)



0 2,000 4,000 Ft

Chapter 4 — Development of Noise Exposure Maps

Run-up Operations

The EWR staff maintains logs of run-up activity. The data from January 1, 2016 to December 20, 2017 were used to develop run-up modeling assumptions. To model duration, run-ups were grouped into time bands; e.g. less than or equal to 10 minutes, greater than 10 to 15 minutes, greater than 15 to 20 minutes, and so on. Figure 4-3 shows run-up count by duration.

Given the relatively limited amount of run-up activity and modest growth in aircraft activity forecast through 2024, there was not sufficient basis for projecting a significant increase in run-ups over the five-year forecast period.

Maintenance run-ups were modeled at the fourteen designated run-up locations marked in Figure 4-2, (e.g. on Taxiways W, EE Pad, PA Pad, etc.). For eleven of these locations, there were ten or fewer run-up operations during the data sample period, out of a total of 599, and altogether these eleven locations accounted for 6% of run-up operations. Location TWY W accounted for 73% of run-up operations, PA Pad for 15%, and EE Pad for 7%. Based on established run-up procedures, the run-ups were modeled at the following headings:

- Run-ups were modeled at the headings observed for those operations.
- Run-ups where the headings were not reported were modeled under the assumption that run-up orientation – like runway use – is selected to be the one that is most closely aligned with the prevailing wind direction evenly distributed using an EWR wind rose.

If the number of engines was not reported,

the run-up was modeled with only one engine at power. If the power setting was not reported, the run-up was modeled at “high” power, which was done using 92% of maximum static thrust as specified by the INM type. Of the 23 aircraft types modeled for maintenance run-ups, 22% were Boeing 757-200 aircraft, 19% were Boeing 737-700 aircraft, 12% were Boeing 737-800 aircraft, and 10% were Embraer 145 aircraft. The remaining 37% were distributed among other 19 aircraft types, each under 10%.

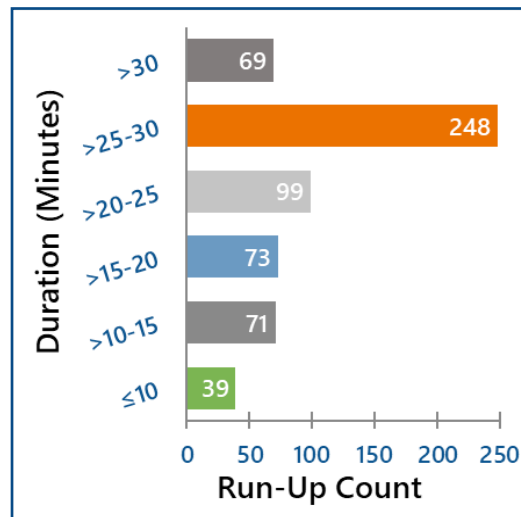


Figure 4-3: Run-up Count by Duration

Source: Port Authority and HMMH, 2018

Flight Track Development

Table 4-3 summarizes the modeled flight tracks by engine type (i.e., jet, non-jet, and helicopter) and operation (arrival/departure). The large number of modeled aircraft flight tracks (1,444) is due to the complex fleet mix, airspace and the destination/origin of the flights at EWR.

Table 4-3: Number of Modeled Flight Tracks by Engine Type

Source: HMMH, 2018

Engine Type	Arrival Tracks	Departure Tracks	Total Tracks
Jet	511	525	1,036
Non-jet	150	163	313
Helicopter	45	50	95
Total	706	738	1,444

These modeled flight tracks were developed using a standard method which entailed analyzing 12 months of radar data from ANOMS and splitting the flight tracks into similar and manageable groups.³² This was accomplished by separating flight tracks using the following order of grouping characteristics:

- Operation (i.e., arrival or departure)
- Runway used (e.g., Runway 22R)
- Aircraft group (e.g., domestic, international, cargo, etc.)
- Engine type (e.g., jet or non-jet)
- Direction of flight (e.g., northeast)
- Flight track geometry

From here, model tracks were developed for each geometrically similar group.

For example, radar data from Runway 22R domestic jet departures with a southbound destination were split into three geometrically similar groups and three ‘backbone’ tracks were developed (see Figure 4-4 through Figure 4-6 on page 4-7).

³² HMMH reviewed the 2017 ANOMS radar data set against the previously developed model tracks and determined that only one additional track was needed to represent the Runway 29 GPSX RNAV procedure.

Chapter 4 — Development of Noise Exposure Maps



Figure 4-4: Runway 22R Southbound Domestic Jet Departures
Source: HMMH, 2016



Figure 4-5: Runway 22R Southbound Domestic Jet Departures with Similar Geometry
Source: HMMH, 2016



Figure 4-6: Example of Back-bone and Subtracks: Runway 22R Southbound Domestic Jet Departures
Source: HMMH, 2016

Each of these backbone tracks was then assigned two 'dispersion' sub tracks on either side of the backbone, for a total of five tracks (one backbone and four dispersion) for each geometrically similar group. Table 4-4 shows modeled flight tracks by runway and track type; e.g. backbone and sub-tracks. All modeled flight tracks are provided at a 1" equals 2000' scale as Figures 4-13 through 4-20.³³ With this, flight tracks are broken down by aircraft type for better visibility in Attachment A to Appendix D beginning on page D-125.

Figure 4-4, Figure 4-5, and Figure 4-6 represent the process of creating backbone and dispersion tracks from a subset of radar data. Figure 4-7 and Figure 4-8 on the following pages represent a sample of departure and arrival operations for commercial domestic jets at EWR.

Flight Track Utilization

Utilization rates for each of these modeled tracks can be found in Appendix D, Part D.2, Tables 14-103 beginning on page D-20. These tables show the level of detail used in the model development, with

some tracks having as little as 0.1 percent of jet operations per runway assignment. The relative ratio of flight track usage was preserved according to those ratios in the 12-month radar dataset from ANOMS.

Table 4-4: Number of Modeled Flight Tracks by Runway
Source: HMMH, 2018

Runway	Arrival Tracks		Departure Tracks	
	Back-bone	Sub-tracks	Back-bone	Sub-tracks
11	11	44	9	36
4L	14	56	35	140
4R	40	160	22	88
22L	38	152	21	84
22R	15	60	46	184
29	14	57	7	16
H	9	36	10	40
Total	141	565	150	588

³³ These can be found in the back pocket of this document in the print version and as Attachment B to the electronic version.

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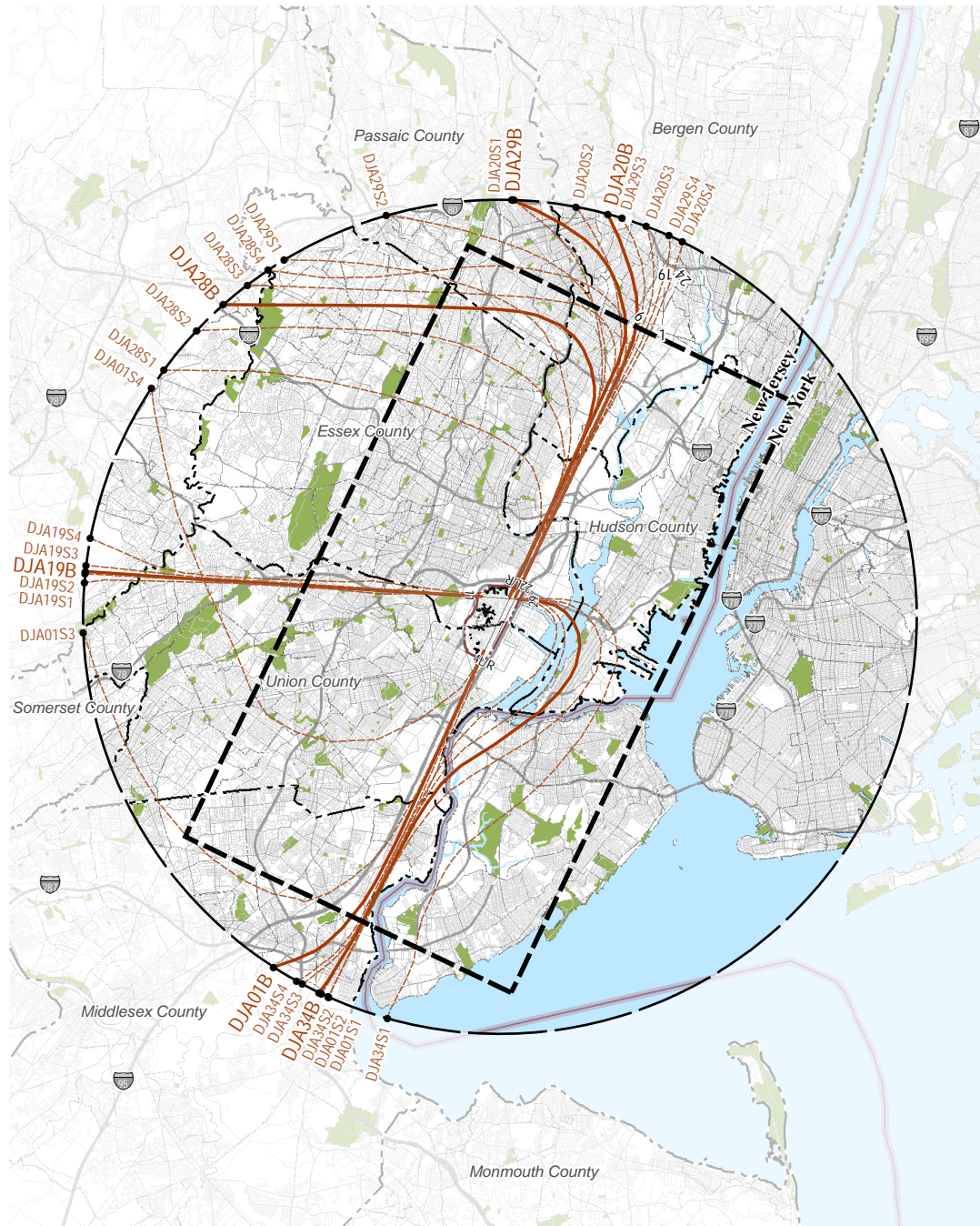
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Figure: 4-7

Sample of Jet Arrival Noise Modeling Flight Tracks



Model Backbone Track (Arrival)

Model Track (Arrival)

DJA20B

Unique Model Track ID

Operation Type (A: Arrival, D:Departure)

Engine Type (H: Helicopter, J: Jet, NJ: Non-Jet)

Group (D: Domestic, I: International, C: Cargo, G: General Aviation)

EWR Airport Boundary (Approximate)

EWR Study Area

Model Track Boundary

Runway

State Boundary

Municipal Boundary

County Boundary

Park / Open Space

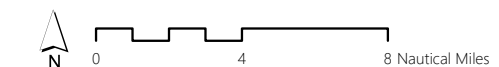
Water

Highway

Minor Roads

Major Roads

Note: Appendix D presents the complete set of modeling tracks for all combinations of aircraft and operation types.



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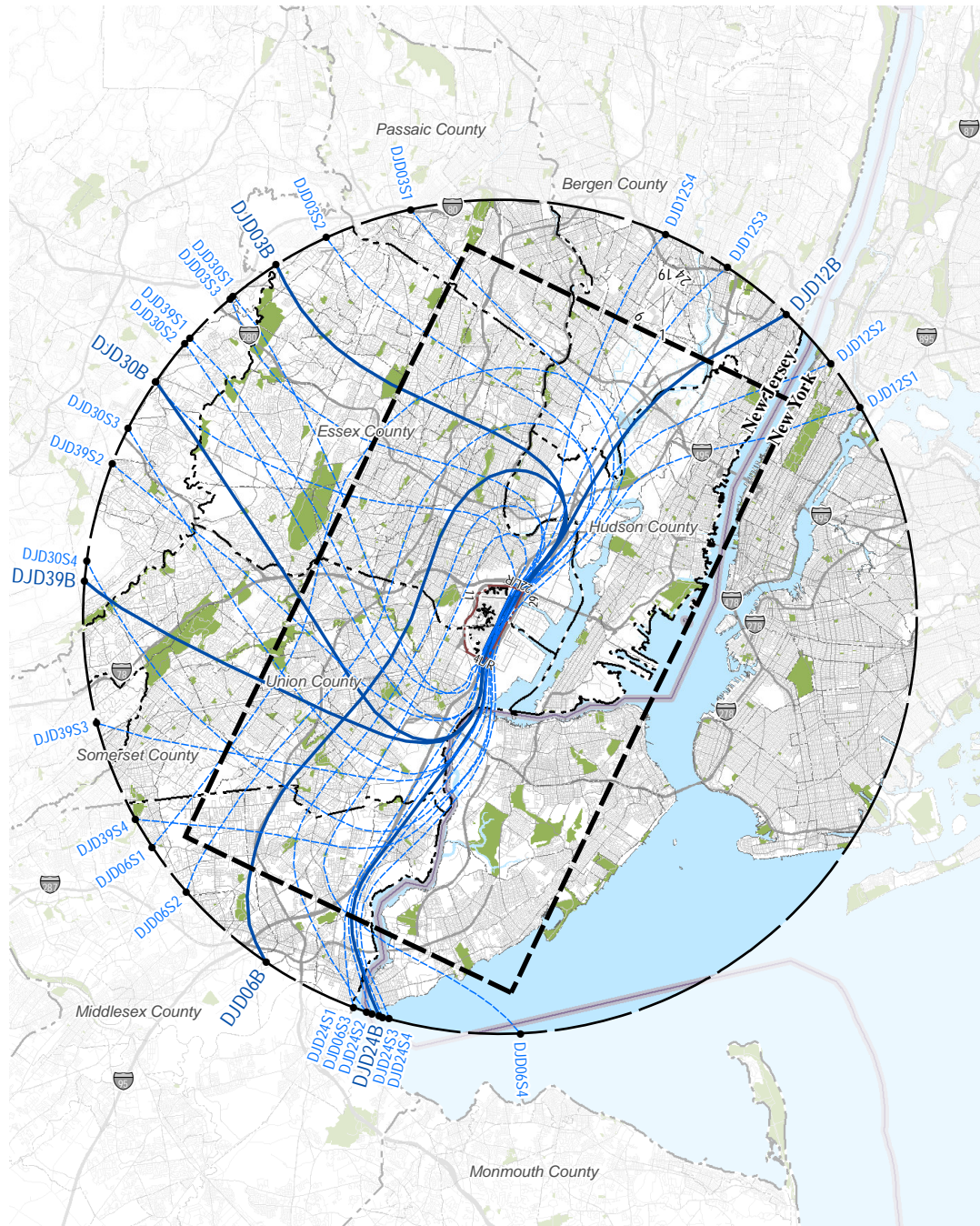
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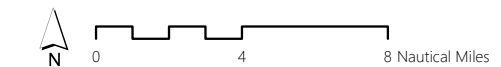
Figure: 4-8

Sample of Jet Departure Noise Modeling Flight Tracks



- Model Backbone Track (Departure)
- Model Track (Departure)
- DJD01B
 - Unique Model Track ID
 - Operation Type (A: Arrival, D:Departure)
 - Engine Type (H: Helicopter, J: Jet, NJ: Non-Jet)
 - Group (D: Domestic, I: International, C: Cargo, G: General Aviation)
- EWR Airport Boundary (Approximate)
- EWR Study Area
- Model Track Boundary
- Runway
- State Boundary
- County Boundary
- Park / Open Space
- Highway
- Major Roads
- Municipal Boundary
- Water
- Minor Roads

Note: Appendix D presents the complete set of modeling tracks for all combinations of aircraft and operation types.



Chapter 4 — Development of Noise Exposure Maps

Aircraft Noise and Performance Characteristics

FAA approval is required for the use of non-standard aircraft noise and performance modeling in two categories:

- Aircraft Substitutions (See Appendix D, Part D.4, beginning on page D-51) which includes the following:
 - INM aircraft types for modeling types that are not available in the INM as standard aircraft types and for which the FAA has not identified pre-approved substitutes
 - User-defined aircraft for which no standard INM aircraft would be an appropriate substitute.
- Non-Standard Profile Substitutions (See Appendix D, Part D.5, beginning on page D-77) which includes the following:
 - User-defined flight profiles, to address non-standard air traffic control procedures affecting departure or approach profiles.
 - User-defined flight profiles to address non-standard departure weight

FAA approvals for these items are found in Appendix D. Specifically, the aircraft substitution approval can be found in Part D.4 on page D-74 and the non-standard flight profiles approval can be found in Part D.5 on page D-123.

User-Defined Profiles

Based on a review of flight track data from ANOMS, it was determined that some aircraft arriving to and departing from EWR commonly fly procedures that are not represented by the standard profiles provided in the INM, and that “user-defined

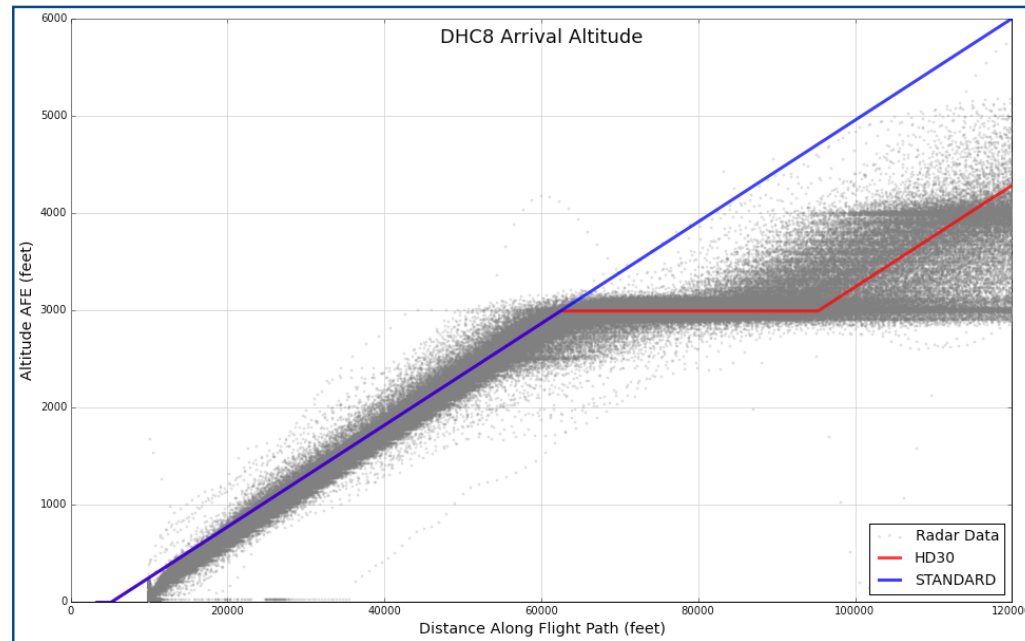


Figure 4-9: DHC8 Arrival Profiles

Source: HMMH 2016

profiles” would be the most appropriate means of modeling actual flight operations. The reason for this is that the FAA holds aircraft at particular altitudes to safely manage the NY/NJ airspace rather than allow aircraft to ascend and descend normally at EWR; this is commonly referred to as a hold down. In order to use these types of profiles in the INM, the FAA must review and approve the user-defined procedures. The Port Authority also gave air carriers at EWR opportunity to review and concur with the non-standard profiles that were developed.

Due to the diverse nature of operations at EWR, user-defined profiles were created for 12 INM aircraft types representing

approximately 75% of operations (which include at least one representative type from each modeling group), as shown in Appendix D, Part D.2 in Table 3 on page D-12. The user-defined profiles developed for this study represent arrivals and departures with extended level segments in the flight profile. Figure 4-9 displays DHC8 (De Havilland “Dash 8” twin turboprop aircraft) radar arrivals to Runway 22L along with the INM standard, as an example. The gray dots represent existing flight track data, the blue line represents the INM standard arrival profile and the red line represents the user-defined profile which better represents the FAA hold-down of the aircraft approach to EWR.

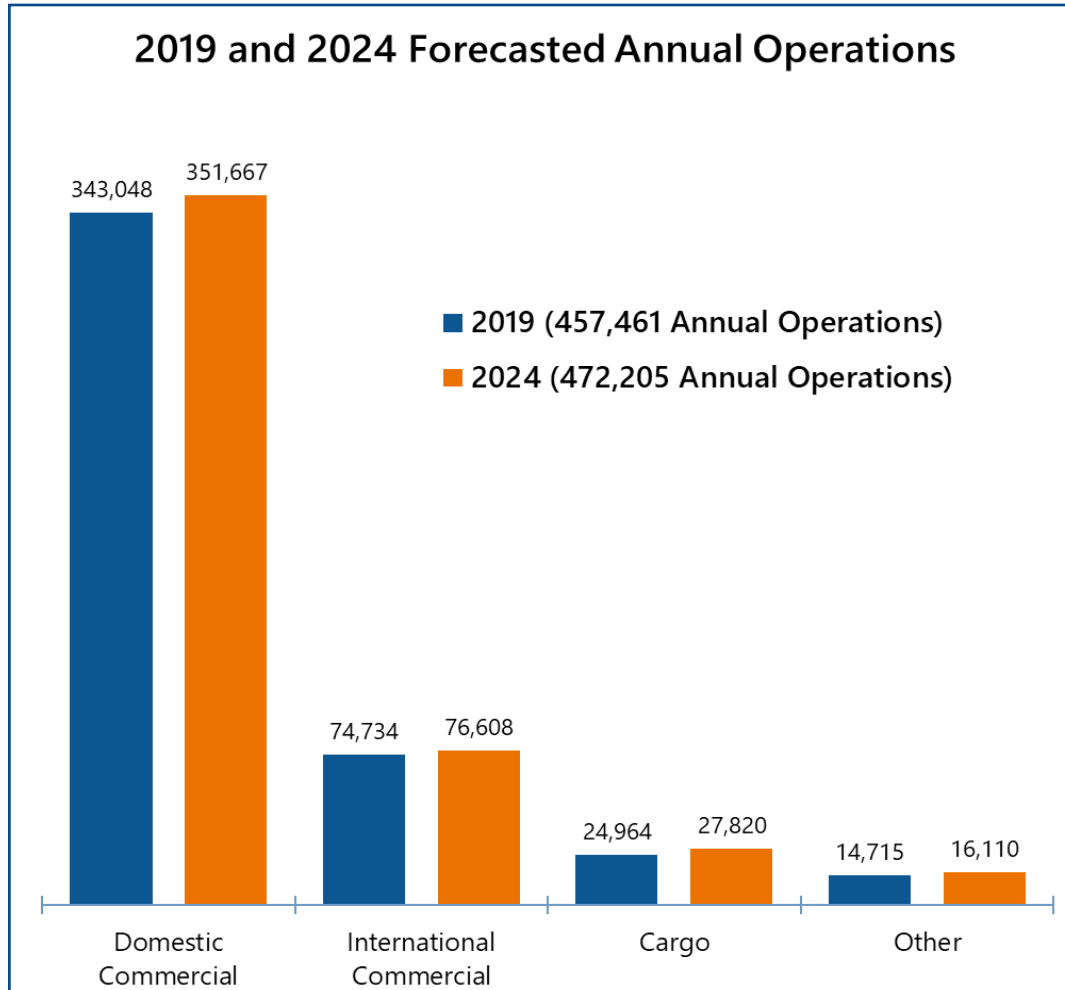


Figure 4-10: Forecast Operations for 2019 and 2024 by Aircraft Group

Note: Other category includes General Aviation and Military Operations

Source: Port Authority and HMMH, 2018

Forecast

Forecast Process

The Port Authority, the Study Team, and FAA collaborated in the development of a "Study Protocol for Newark/Liberty International (EWR) and Teterboro (TEB) Airports 14 CFR Part 150 Studies" (November 2015). Section 5 of that document sets forth the "Aviation Activity Forecast Protocol" (See Appendix G, Part G.1 on page G-3). The Port Authority and the Study team followed that protocol in preparing the EWR Part 150 forecasts. The Port Authority prepared the forecasts for 2019 and 2024, including details on annual arrival and departure operations by aircraft type for day (7 a.m. - 10 p.m.) and night (10 p.m. - 7 a.m.) time periods, and identifying stage lengths for departure operations used in calculating DNL. For more detail about the Forecast process, please see Appendix D, Part D.3, beginning on page D-39.

Aircraft Operations

Consistent with FAA guidance, the Port Authority submitted a memorandum to the FAA on January 26, 2018 requesting approval of forecasts of EWR operations for 2019 and 2024. The Port Authority received approval from FAA on May 1, 2018, as shown in Appendix D, Part D.3, on page D-49. Figure 4-10 depicts the 2019 and 2024 forecasted aircraft operations. For aircraft noise exposure calculations using the DNL metric, aircraft operations associated with the annual-average day (AAD) are used in the INM.

Chapter 4 — Development of Noise Exposure Maps

The number of annual operations by each INM aircraft type is divided by 365 to arrive at the AAD by INM aircraft type. This representation of airport activity does not reflect any particular day, but gives an accurate picture of the character of operations throughout the year. Use of the AAD is required by the FAA in 14 CFR Part 150 studies.

Consistency with FAA's Terminal Area Forecast

FAA requires that airport sponsors' locally generated forecasts be consistent with the FAA's Terminal Area Forecast (TAF) for the airport. Specific FAA guidance for approval of forecasts states: "For all classes of airports, forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if they meet the following criterion: forecasts differ by less than 10 percent in the 5-year forecast period, and by less than 15 percent in the 10-year forecast period."³⁴

The FAA's 2017 TAF (issued January 2018) was used as the baseline operational forecast.³⁵

³⁴ FAA. Review and Approval of Aviation Forecasts. June 2008. https://www.faa.gov/airports/planning_capacity/media/approval_local_forecasts_2008.pdf

³⁵ See Section 5.1 of the "Study Protocol for Newark/Liberty International (EWR) and Teterboro (TEB) Airports 14 CFR Part 150 Studies" [HMMH, November 2015]. The methodology utilized in this forecast is consistent with the one defined in the initial Study Protocol; it differs only in terms of the year of FAA TAF report used from 2014 to 2017.

This requirement in the Study Protocol follows guidance provided in the September 2, 2015 letter from Mr. Andrew Brooks, FAA Environmental Program Manager, Airports Division, AEA-610, to Mr. Edward C. Knoesel, Manager Aviation Environmental Programs, The Port Authority of New York and New Jersey. "Re: Request to Utilize FAA Terminal Area Forecasts as Basis for Activity Levels for 14 CFR Part 150 Noise Studies at John F. Kennedy International, LaGuardia, Newark Liberty International, and Teterboro Airports."

Table 4-5: Comparison of the Newark Liberty International Airport Port Authority Forecast to the FAA TAF

Source: FAA 2017 TAF, Port Authority and Landrum & Brown, 2018

Year	FAA TAF Forecast (2017)	Port Authority Part 150 Forecast	Difference (%) (Forecast-TAF)
2019	456,463	457,461	0.2%
2024	485,067	472,205	-2.7%

Table 4-5 presents a comparison of Port Authority prepared forecasts of total aircraft operations for years 2019 and 2024 to the FAA forecasts for those years as presented in the 2017 TAF.³⁶ It shows that for 2019, the Part 150 forecast differs from the 2017 TAF forecast by less than one percent, and for 2024, the Part 150 forecast differs from the 2017 TAF forecast by less than three percent.

The Port Authority developed an independent enplanement forecast separate from the TAF for EWR that was determined through a detailed review of historic aircraft trends, route structure, and load factors as well as published fleet schedules, airline service and aircraft manufacturer service announcements and forecasts, and Official Airline Guide (OAG) data.

Forecast enplanements drive operations,

which are the focus of the Part 150 process. The Port Authority's analysis took into consideration a projected airline route network specific for operation to/from the New York/New Jersey market, existing and new generation aircraft that may be allocated to those routes over time, and potential changes in load factors for the international, domestic, cargo, and other (general aviation and military) fleets. The resultant Port Authority forecast is in line with FAA TAF projections.

EWR Slot Rule Change

On October 30, 2016 the FAA adjusted slot restrictions at EWR, thereby designating EWR as a Level 2 schedule facilitated airport. The Part 150 forecasts reflect the recent FAA slot rule change and are consistent with the FAA's 2017 Terminal Area Forecast (TAF) for EWR.³⁷

³⁶ The comparison only addresses operations, because the Part 150 regulation only requires forecasts of aircraft operations; there is no requirement for consideration of either enplanements or based aircraft.

³⁷ For more information regarding EWR's designation as a Level II schedule facilitated airport and the validity of the Part 150 forecast, as discussed on page D-42 of Appendix D, Part D.3.

Chapter 4 — Development of Noise Exposure Maps

Stage Length

The INM uses departure “stage length” (the distance between the departure and arrival airport) to estimate aircraft departure weight, since fuel load is the largest factor affecting variation in aircraft weight, and longer flights require more fuel.

Most air carrier aircraft types in the INM include a number of stage lengths. For purposes of developing INM inputs, aircraft departure stage lengths are subdivided into nine general lengths of flight segments. These are provided in Table 4-6 along with percent distribution for departures across stage-lengths.

Activity Levels and Fleet Mix

Appendix D, Part D.3, pages D-39 to D-48, presents the aviation forecast “Newark Liberty International Airport Aircraft Fleet Mix and Annual Operations Forecast FY 2017-2024” dated January 25, 2018 that documents the preparation of activity and fleet mix forecasts for 2019 and 2024. The report addresses and summarizes the forecasts by aircraft group (i.e. domestic, international, cargo, and other) and aircraft type (e.g. Boeing 757, Embraer 145, etc.).

Figure 4-11 and Figure 4-12 depict the activity level percentages by aircraft group that were modeled for 2019 and 2024, respectively.

Table 4-6: INM Stage Length Categories

Sources: INM User's Guide, April 2007, page 153, Landrum & Brown Aviation Forecast, adapted by HMMH, 2018

Stage Length	Distance (nmi)	Departures assigned to each Stage-Length (%)	
		2019	2024
1	0-500	35%	30%
2	501-1,000	32%	30%
3	1,001-1,500	10%	12%
4	1,501-2,500	13%	16%
5	2,501-3,500	7%	8%
6	3,501-4,500	1%	1%
7	4,501-5,500	0%	1%
8	5,501-6,500	1%	1%
9	> 6,500	1%	1%

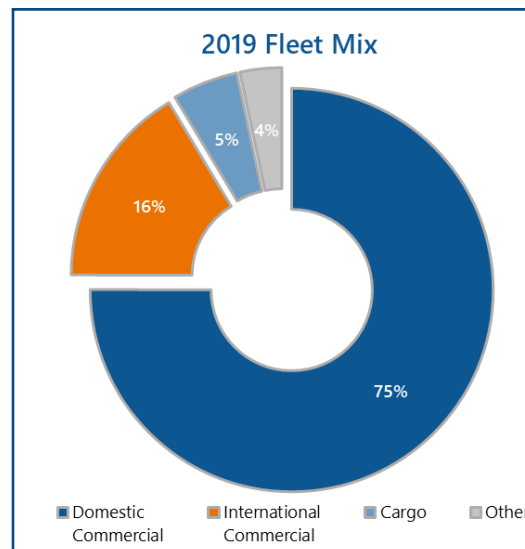


Figure 4-11: 2019 Fleet Mix

Source: L&B Aviation Forecast, adapted by HMMH, 2018

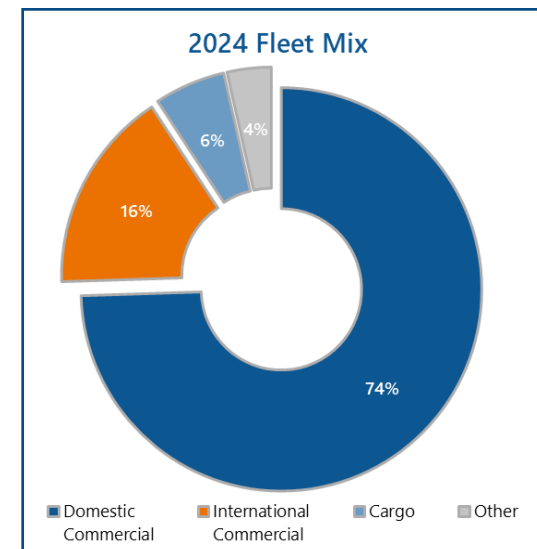


Figure 4-12: 2024 Fleet Mix

Source: L&B Aviation Forecast, adapted by HMMH, 2018

Chapter 4 — Development of Noise Exposure Maps

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5. 2019 and 2024 Noise Exposure Maps

The fundamental noise elements of a Noise Exposure Map are DNL contours for existing and forecast conditions (2019 and 2024), presented over base maps depicting the airport layout, local land-use control jurisdictions, major land-use categories, discrete noise-sensitive "receptors," and other information required by Part 150.

Section 5.1 presents the Noise Exposure Map Figures. Section 5.2 presents the associated land-use compatibility statistics. Section 5.3 on page 5-10 compares the modeled DNL for 2019 to the DNL measured in 2017 at the three monitoring locations.³⁸ Section 5.4 on page 5-10 gives a comparison of measured aircraft noise to ambient noise in the community

5.1. Noise Exposure Map Figures

Figure 5-9 and Figure 5-10 are the official Noise Exposure Maps that the Port Authority is submitting under Part 150 for appropriate FAA review and determination of compliance, pursuant to §150.21.³⁹

The scale on these figures is 1" to 2,000' which is the minimum scale as required by §A150.103(b)(1).⁴⁰ The two figures contain all graphical elements that Part 150 requires be depicted on Noise Exposure Maps, with the exception of flight tracks, which Part 150

permits airports to submit in supplemental graphics.^{41,42}

As noted in item IV.D of Part 150 Noise Exposure Maps Checklist (the checklist), Part 150 requires that Noise Exposure Maps depict the 65, 70, and 75 DNL noise contours.

Figure 5-1 and Figure 5-2 present zoomed-in Noise Exposure Map figures for existing (2019) and five-year forecast conditions (2024), respectively, for easier visibility of the contours. Figure 5-3 presents a comparison of the 2019 and 2024 contours, in the same format as Figure 5-1 and Figure 5-2.

The year of submission for these NEMs is 2019. Therefore, consistent with Part 150 requirements, the existing conditions noise contours are for 2019 and the five-year forecast-case contours are for 2024.

5.2. Land Use Compatibility within 2019 and 2024 Noise Exposure Maps

The FAA considers all land uses compatible outside of 65 DNL. The 65 DNL contour lies mainly in Union and Essex counties, with a small area in Hudson county (all in New Jersey, except a small portion that extends

into New York in the Arthur Kill waterway and an area of Staten Island).

As shown in Figure 5-1 and Figure 5-2, the 65 DNL contours for both 2019 and 2024 extend beyond airport property in four areas:

- To the south and southwest, the contour extends beyond Interstate 278, reaching slightly past the Elizabeth municipal boundary into Bayway. This area is primarily industrial and commercial, but includes a residential area in Elizabeth bounded by Interstate 95, Trumbull Street, 3rd Avenue, and the state boundary.
- To the southeast, the contour extends into New York in the Arthur Kill waterway and Staten Island. This area is entirely compatible land use consisting of manufacturing and production and vacant/undefined.
- To the northeast, the contour extends into Hudson County, to the interchange of Interstate 95 and Harrison Avenue. As with the southern part of the contour, the exposed area is mainly industrial but partly residential, bounded by US Route 9 to the southeast and Lister Avenue to the north in the Iron Bound area of Newark.
- To the east of the airport, the area within the 65 DNL contour is almost entirely compatible use, aside from one place of worship, with land uses consisting of manufacturing and production and commercial use.

³⁸ Measured values are based on 2017 data from ANOMS

³⁹ Figure 5-9 and Figure 5-10 are located in the rear pocket of the document in print and as Attachment C to the electronic version.

⁴⁰ In print, see the back pocket of this document for Noise Exposure Map and flight track figures to this scale.

⁴¹ As noted in item IV.E of the Noise Exposure Map checklist, presented in Table 1 of this document.

⁴² These can be found at the end of Chapter 4, Figures 4-13 through 4-20 which can be found as Attachment B to this document in the electronic version or in the back pocket of the print version.

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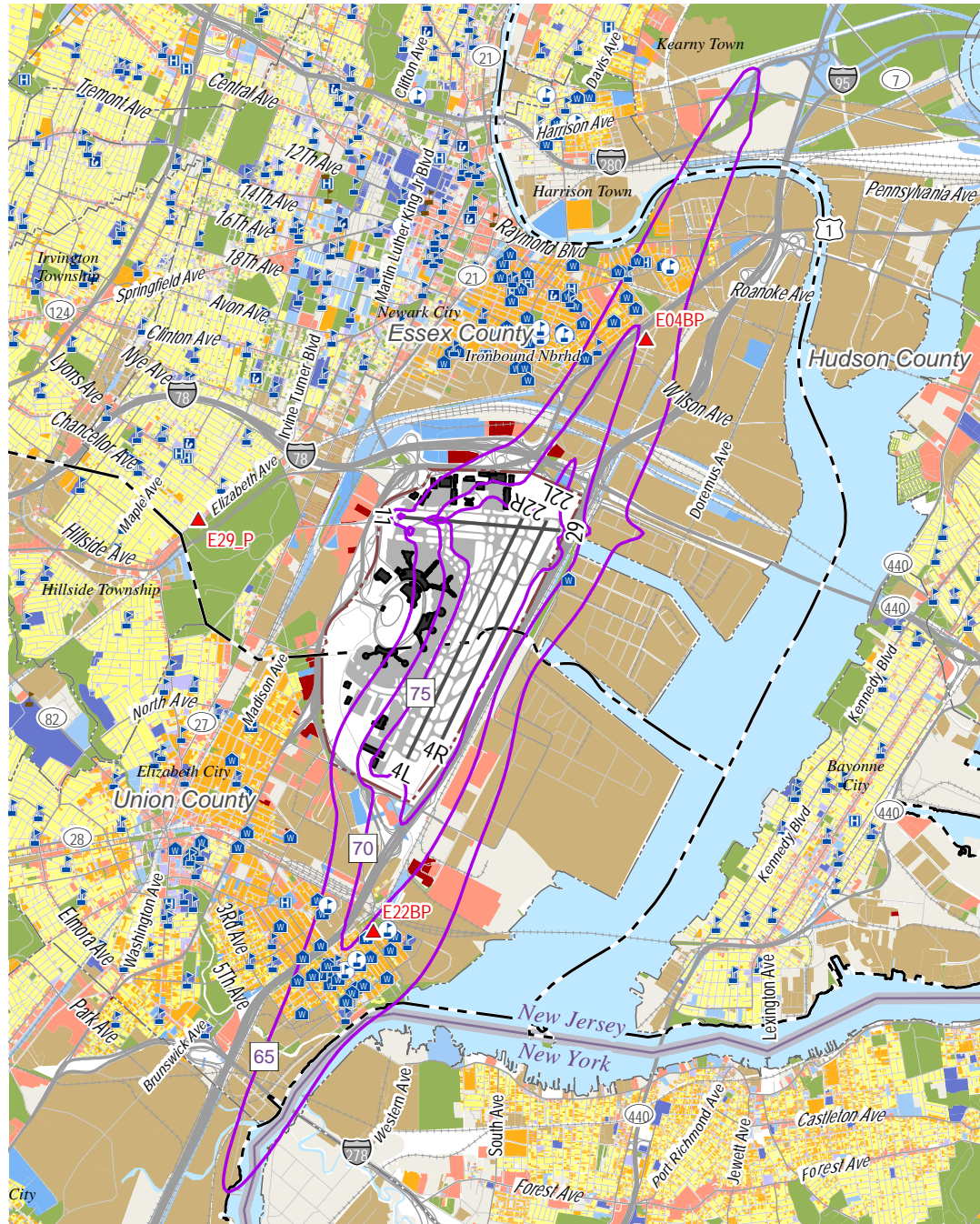
Airport Noise Compatibility

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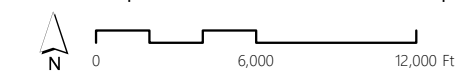
2019 and 2024 Noise Exposure Maps

Figure: 5-1

Existing Conditions (2019) Noise Exposure Map



- 2019 DNL Contours (65-75)
- EWR Airport Boundary (Approximate)
- Runway
- ▲ RMS # Noise Monitor Locations
- State Boundary Municipal Boundary
- County Boundary
- Park / Open Space Water
- Highway Minor Roads
- Major Roads Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- ▲ School ▲ School (Sound Insulated)
- ▲ Library ▲ College/University
- ▲ Hospital ▲ Place of Worship



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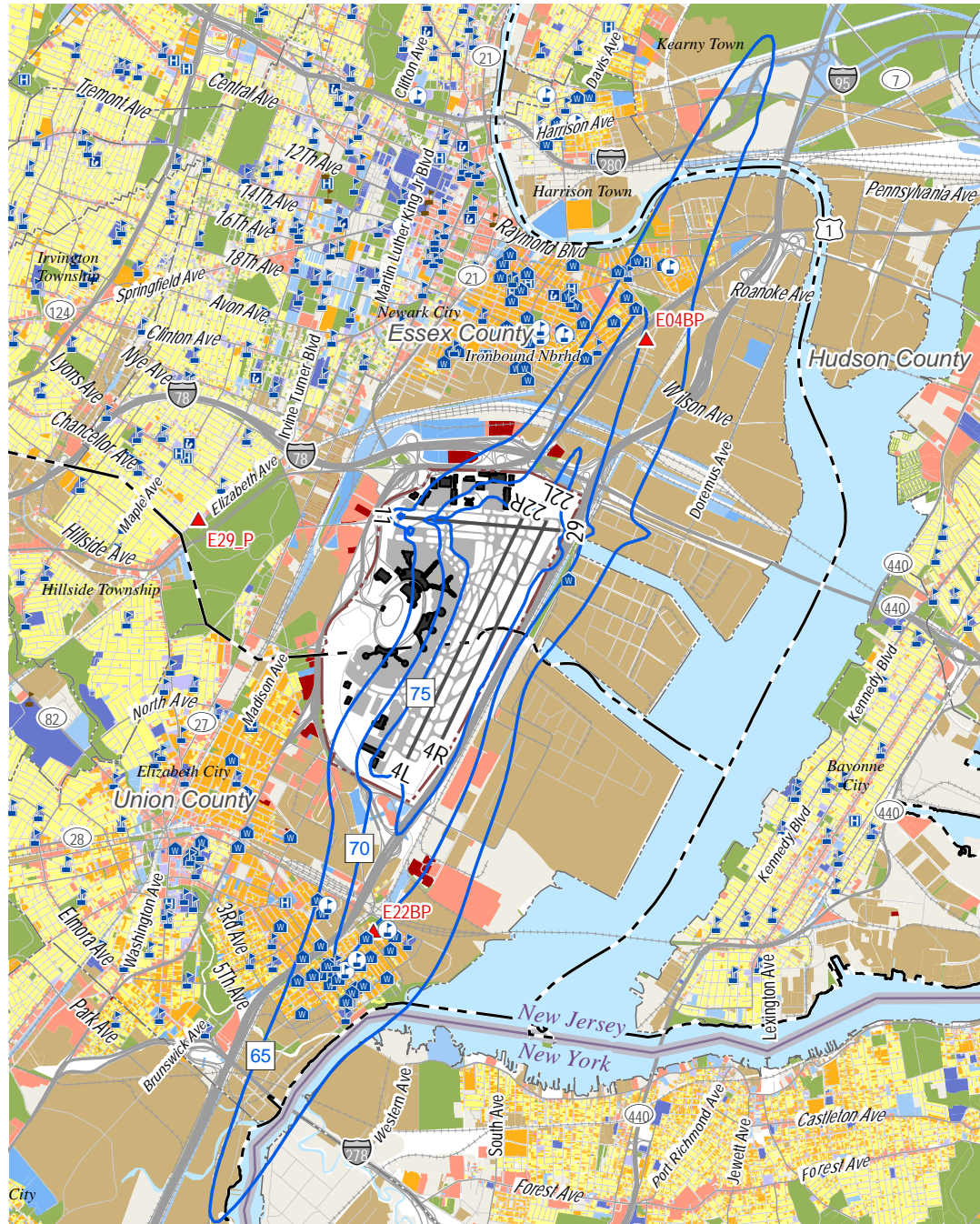
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2019 and 2024 Noise Exposure Maps

Figure: 5-2

Forecast Conditions (2024) Noise Exposure Map



- 2024 DNL Contours (65-75)
- EWR Airport Boundary (Approximate)
- Runway
- ▲ RMS # Noise Monitor Locations
- State Boundary
- Municipal Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads
- Railroad
- Single Family Residential
- Multi-Family Residential
- Mobile Home
- Transient Lodging
- School / University / Daycare
- Place of Worship
- Recreational / Open Space
- Commercial Use
- Manufacturing and Production
- Public Use
- Vacant / Undefined
- 🏫 School
- 📖 Library
- 🏥 Hospital
- 🎓 School (Sound Insulated)
- 🎓 College/University
- 🏠 Place of Worship



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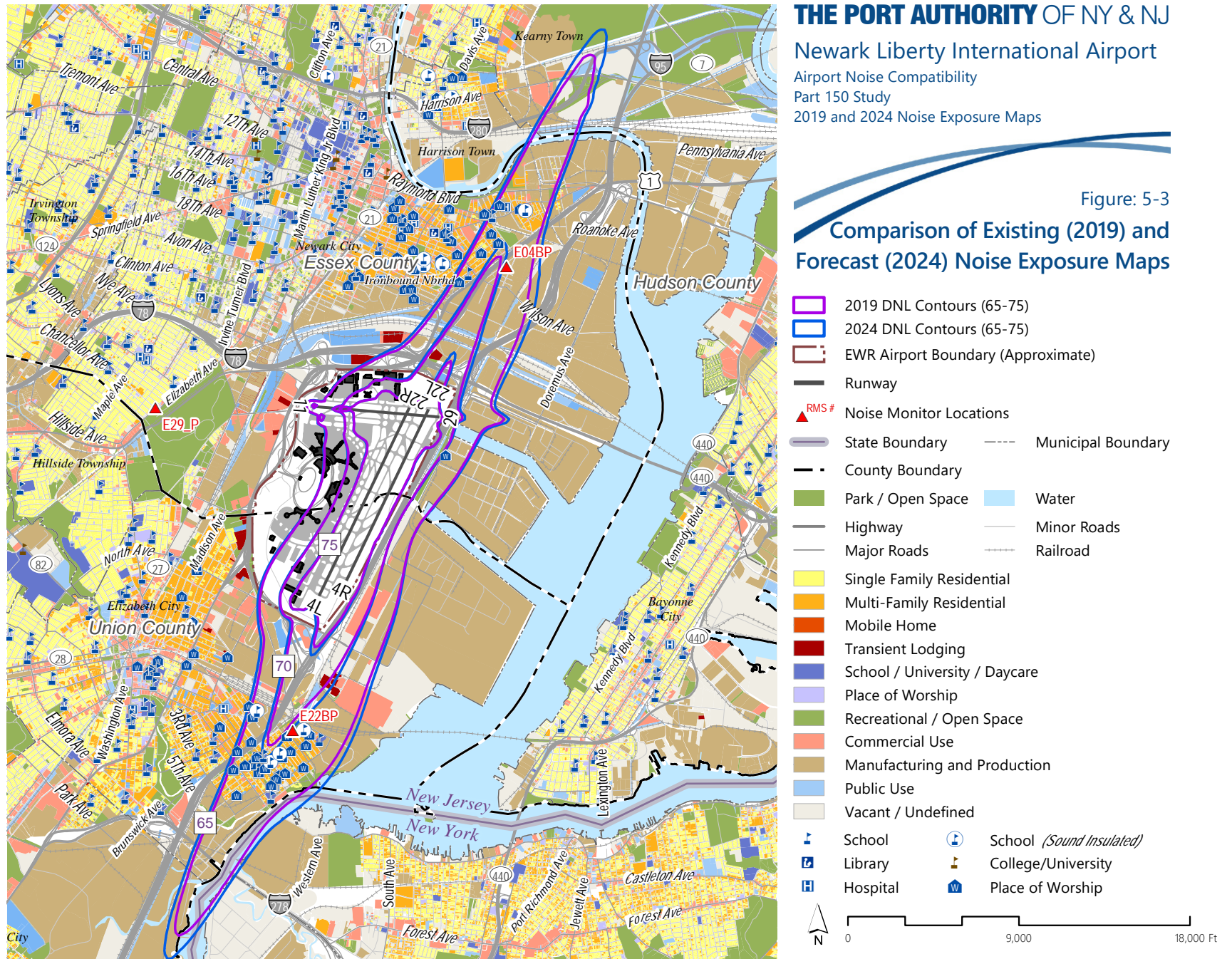
Airport Noise Compatibility

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2019 and 2024 Noise Exposure Maps

Figure: 5-3

Comparison of Existing (2019) and Forecast (2024) Noise Exposure Maps



Chapter 5 — 2019 and 2024 Noise Exposure Maps

The contours and land use data clearly illustrate that within the 65 DNL Noise Exposure Map contours for either 2019 or 2024.⁴³

- There are residents and non-compatible land uses.
- There are noise-sensitive public buildings or other discrete “sensitive receptors” (e.g., schools, health care facilities, places of worship, or properties on or eligible for inclusion on the National Register for Historic Preservation). For example:
 - There are 30 places of worship, 10 schools, one library, one medical facility, and seven transient lodging structures within the 2019 65 DNL contour⁴⁴
 - In addition to those facilities contained within the 2019 65 DNL contour, the 2024 65 DNL contour also contains two additional places of worship and one additional transient lodging structure as a result of slightly larger contours based on the forecast of aircraft operations.⁴⁵

In summary, within the Noise Exposure Map contours for 2019 there are 9,331 non-compatible residential units and 49 noise sensitive sites, and for 2024 there are 10,066 non-compatible residential units and 52 noise sensitive sites. There is an overall small percentage change in number of units and people exposed from 2019 to 2024.

⁴³ FAA Op cit.

[Part 150 §A150.101\(e\)](#) requires that the Noise exposure Maps depict these categories of non-compatible or noise sensitive land uses within the 65, 70, and 75 DNL contours.

⁴⁴ The names and addresses for these are provided in Table 5-3.

⁴⁵ Ibid.

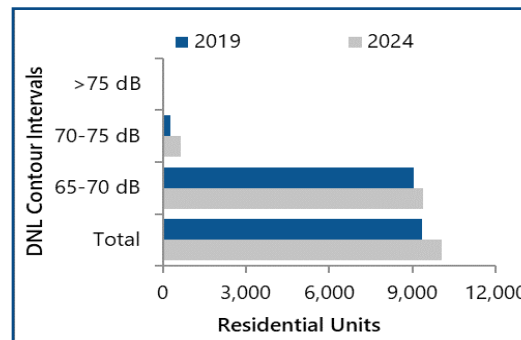


Figure 5-4: Comparison of Current (2019) and Forecasted (2024) Residential Units within the 65 DNL Contour Interval

Source: HMMH and RS&H, 2018

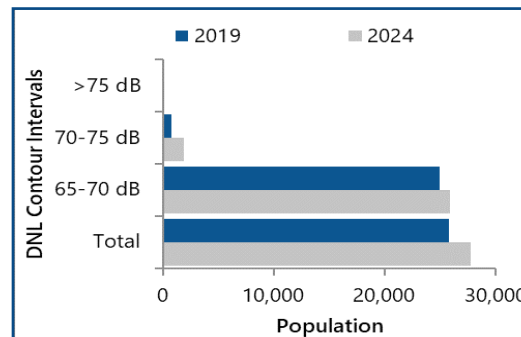


Figure 5-5: Comparison of Current (2019) and Forecasted (2024) Population within the 65 DNL Contour Interval

Source: 2010 US Census Block Data and HMMH, 2018

Figure 5-4 displays the increase from 2019 to 2024 in residential units within the areas contained by the 65 DNL contour, in particular within the 65-70, 70-75 and greater than 75 DNL contours. Figure 5-5 shows the increase in affected population

within the same DNL contour bands from 2019 to 2024. This information is broken down in detail in Table 5-1 and Table 5-2.

Table 5-1 presents the estimated population within the 65 DNL contour for 2019 and 2024, also broken down by contour interval. Table 5-2 presents the number of estimated residential units within the 65 DNL contour for 2019 and 2024, broken down by contour interval.

Table 5-3 on page 5-6 presents the noise sensitive sites within the 65 DNL contours for each year. For 2019, there are 49 noise sensitive receptors, including one library, one medical center, ten schools, 30 places of worship and seven transient lodging structures. In 2024, these noise sensitive sites remain within the 65 DNL contour, and one additional transient lodging structure and two places of worship will fall within the 65 DNL contour interval, for a total of 52 noise sensitive receptors in the 2024 65 DNL contour.

There are five schools within the 65 DNL contour that would normally be considered non-compatible land uses. However, as noted in Chapter 2, Section 2.4, under the subsection “School Soundproofing Projects” on page 2-8, these were sound insulated as a part of the Port Authority School Soundproofing Program that began in 1983. These are shown in Figure 5-6 on page 5-8 as those schools with a circle encompassing the symbol and are designated in Table 5-3 with an asterisk (*).

Chapter 5 — 2019 and 2024 Noise Exposure Maps

Table 5-1: Population within 2019 and 2024 65 DNL Contour⁴⁶

Source: 2010 US Census Block Data and HMMH, 2018

Year	Estimated Population			
	65-70 dB DNL	70-75 dB DNL	>75 dB DNL	Total
2019	25,017	804	0	25,821
2024	25,912	1,883	0	27,795

Table 5-2: Residential Units within 2019 and 2024 65 DNL Contours

Source: 2010 US Census Block Data, HMMH and RS&H, 2018

Year	Estimated Residential Units			
	65-70 dB DNL	70-75 dB DNL	>75 dB DNL	Total
2019	9,040	291	0	9,331
2024	9,399	667	0	10,066

Table 5-3: Noise Sensitive Sites within 2019 and 2024 65 DNL Contour

Source: HMMH and RS&H, 2018

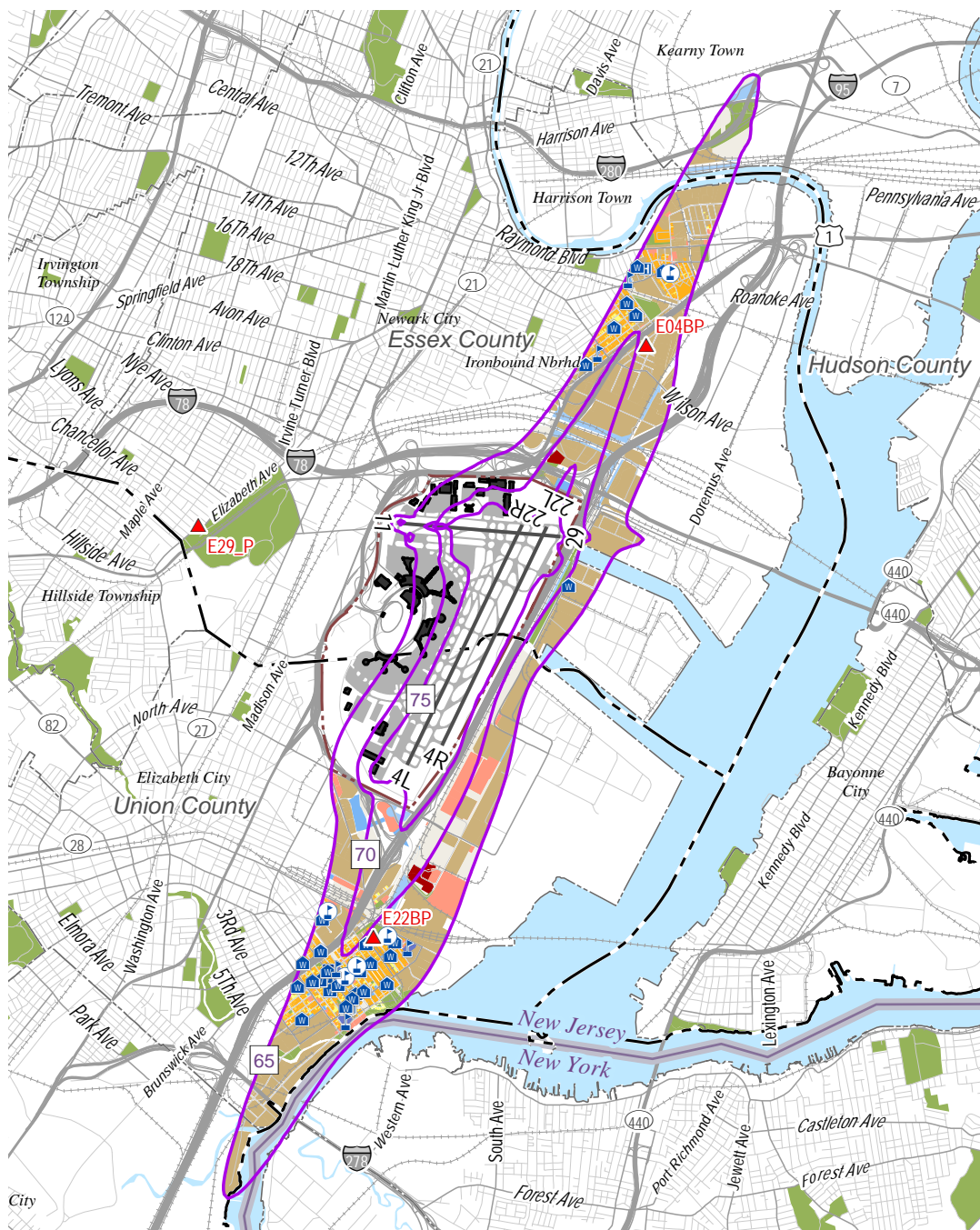
Year	Noise Sensitive Site	Type	Contour Interval	Address	City
Within 2019 and 2024	SpringHill Suites Newark Liberty International Airport	Transient Lodging	65-70 dB	652 US Highway 1 and 9 South	Newark
	Embassy Suites	Transient Lodging	2019: 65-70 dB 2024: 70-75 dB	95 International Blvd	Elizabeth
	Country Inn & Suites By Carlson Newark Airport,NJ	Transient Lodging	2019: 65-70 dB 2024: 70-75 dB	100 International Blvd	Elizabeth
	Courtyard Newark Elizabeth	Transient Lodging	70-75 dB	34905 Newark Blvd	Newark
	Residence Inn Newark Elizabeth	Transient Lodging	70-75 dB	83 International Blvd	Elizabeth
	Extended Stay America – Elizabeth	Transient Lodging	70-75 dB	45 International Blvd	Elizabeth
	Howard Johnson	Transient Lodging	70-75 dB	20 Frontage Rd	Newark
	George Washington Academy School No. 1*	Elementary School	65-70 dB	250 Broadway	Elizabeth
	Benjamin Franklin School No. 13*	Elementary School	65-70 dB	248 Ripley Place	Elizabeth
	John Marshal School No. 20*	Elementary School	65-70 dB	521 Magnolia Avenue	Elizabeth
	Dr. Martin Luther King Jr. Ecc #52	Nursery/Preschool	65-70 dB	130 Trumbull Street	Elizabeth
	Hawkins Street School*	Elementary School	65-70 dB	8 Hawkins Street	Newark
	iPrep Academy School No 8*	Elementary School	65-70 dB	221-227 Court Street	Elizabeth
	Jerome Dunn Academy No 9	Grades K-8	65-70 dB	201 Livingston Street	Elizabeth
	Juan Pablo Duarte - Jose Julian Marti #28	Elementary School	65-70 dB	25 First Street	Elizabeth
	Innovative Education Programs	Pre-School	65-70 dB	697 Market Street	Newark
	Rainbow Land Learning Center II	Pre-School	65-70 dB	115 Gotthardt St.	Newark
	City of Elizabeth Library	Library	65-70 dB	102 Third Street	Elizabeth
	Trinity Reformed Church	Place of Worship	65-70 dB	483 Ferry St.	Newark
	St Aloysius Church	Place of Worship	65-70 dB	66 Flemming Ave	Newark
	Maranatha Fellowship Church	Place of Worship	65-70 dB	97 St Francis St.	Newark
	Universal Church	Place of Worship	65-70 dB	51 St Francis St.	Newark
	St Benedict Church	Place of Worship	65-70 dB	65 Barbara St.	Newark
	St Peter & Paul Roman Catholic	Place of Worship	65-70 dB	211 Ripley Pl.	Elizabeth

⁴⁶ 2010 US Census Block Data. In order to estimate the number of people residing within the noise contours, existing parcel boundary land use maps were overlaid on 2010 US Census TIGER file maps that depict Census blocks – the smallest Census enumeration unit. “Populated Area” data polygons were then created by combining Census blocks with the residential land use concentrating population and housing unit values into the residential portion of the census block where people actually live. For example, in some areas the population is concentrated along the road rather than over several square miles of open or undeveloped land. Using Geographic Information Systems (GIS) tools, the noise contours were intersected with the “Residential/Census” data for each DNL noise contour interval. The resultant wholly or partially encompassed Residential/Census areas were then identified and the proportion of total area within the contour level was calculated to determine the estimated residential population and housing unit counts.

Chapter 5 — 2019 and 2024 Noise Exposure Maps

Year	Noise Sensitive Site	Type	Contour Interval	Address	City
Within 2019 and 2024 (Continued)	Iglesia De Dios Pentecostal	Place of Worship	65-70 dB	269 Second St.	Elizabeth
	St Adalbert's Church	Place of Worship	65-70 dB	250 E Jersey St.	Elizabeth
	Church of the Nazarene Iglesia	Place of Worship	65-70 dB	214 Fulton St.	Elizabeth
	Greater Faith Temple	Place of Worship	65-70 dB	128 Broadway.	Elizabeth
	St Peter & Paul Byzantine	Place of Worship	65-70 dB	316 1st Ave.	Elizabeth
	Immaculate Heart of Mary and Saint Patrick's Church	Place of Worship	65-70 dB	215 Court St.	Elizabeth
	SDA Del Puerto Church	Place of Worship	65-70 dB	213 Bond Street	Elizabeth
	Iglesia de Dios Pentecostal Cristo Te llama, Inc	Place of Worship	65-70 dB	114 South Park Street	Elizabeth
	Liberty Baptist Church	Place of Worship	65-70 dB	221 East Jersey St.	Elizabeth
	Iglesia Nueva Vida	Place of Worship	65-70 dB	515 Court Street	Elizabeth
	Mount Cavalry United Church of God	Place of Worship	65-70 dB	51 3rd Street	Elizabeth
	Bethel Holy Church	Place of Worship	65-70 dB	1st Street & Community Lane	Elizabeth
	Glorious Hope Baptist Church	Place of Worship	65-70 dB	242 3rd Street	Elizabeth
	Jesus Atelie Baptist Church,	Place of Worship	65-70 dB	88 1st Street	Elizabeth
	Iglesia de Restauracion ELIM	Place of Worship	65-70 dB	118 Livingston Street #1	Elizabeth
	Shelter Temple Apostolic Church,	Place of Worship	65-70 dB	80 1st Street	Elizabeth
	St Adalbert's Church (Hall)	Place of Worship	65-70 dB	70 South Second Street	Elizabeth
	Haitian Smyrna Church of God	Place of Worship	65-70 dB	30 3rd Street	Elizabeth
	Stella Maris Chapel	Place of Worship	65-70 dB	100 3rd St.	Elizabeth
	Elizabeth Church of God	Place of Worship	65-70 dB	170 Corbin St.	Newark
	Hermanos Unidos En Cristo	Place of Worship	65-70 dB	401 Livingston St.	Elizabeth
	Mundial Igreja Mundial do Poder de Deus	Place of Worship	65-70 dB	109 Fulton St.	Elizabeth
	Casa de Oracion - Monte Sinai	Place of Worship	65-70 dB	418 New York Ave	Newark
	Mount Carmel Guild	Medical	65-70 dB	50 4th St.	Elizabeth
				56 Freeman St.	Newark
Within 2024 Only	Fairfield Inn & Suites by Marriott Newark	Transient Lodging	65-70 dB	618 US Highway 1 & 9 South	Newark
	Jehovah's Witnesses Kingdom Hall,	Place of Worship	65-70 dB	67 Mott St.	Newark
	Greater St John's MER Church	Place of Worship	65-70 dB	183 6th St.	Elizabeth

Note 1: Schools designated with a * have been soundproofed as part of the School Soundproofing Program discussed in Section 2.4, Subsection "School Soundproofing Projects" on page 2-8.



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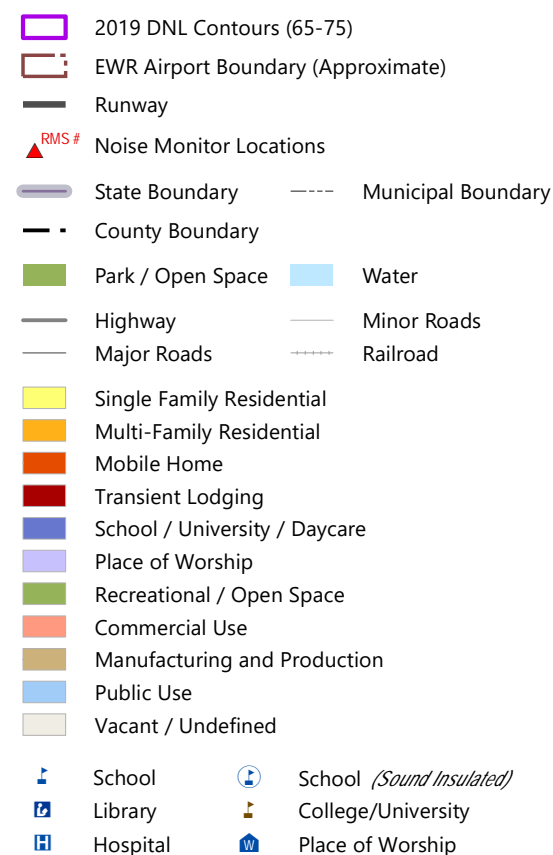
Airport Noise Compatibility

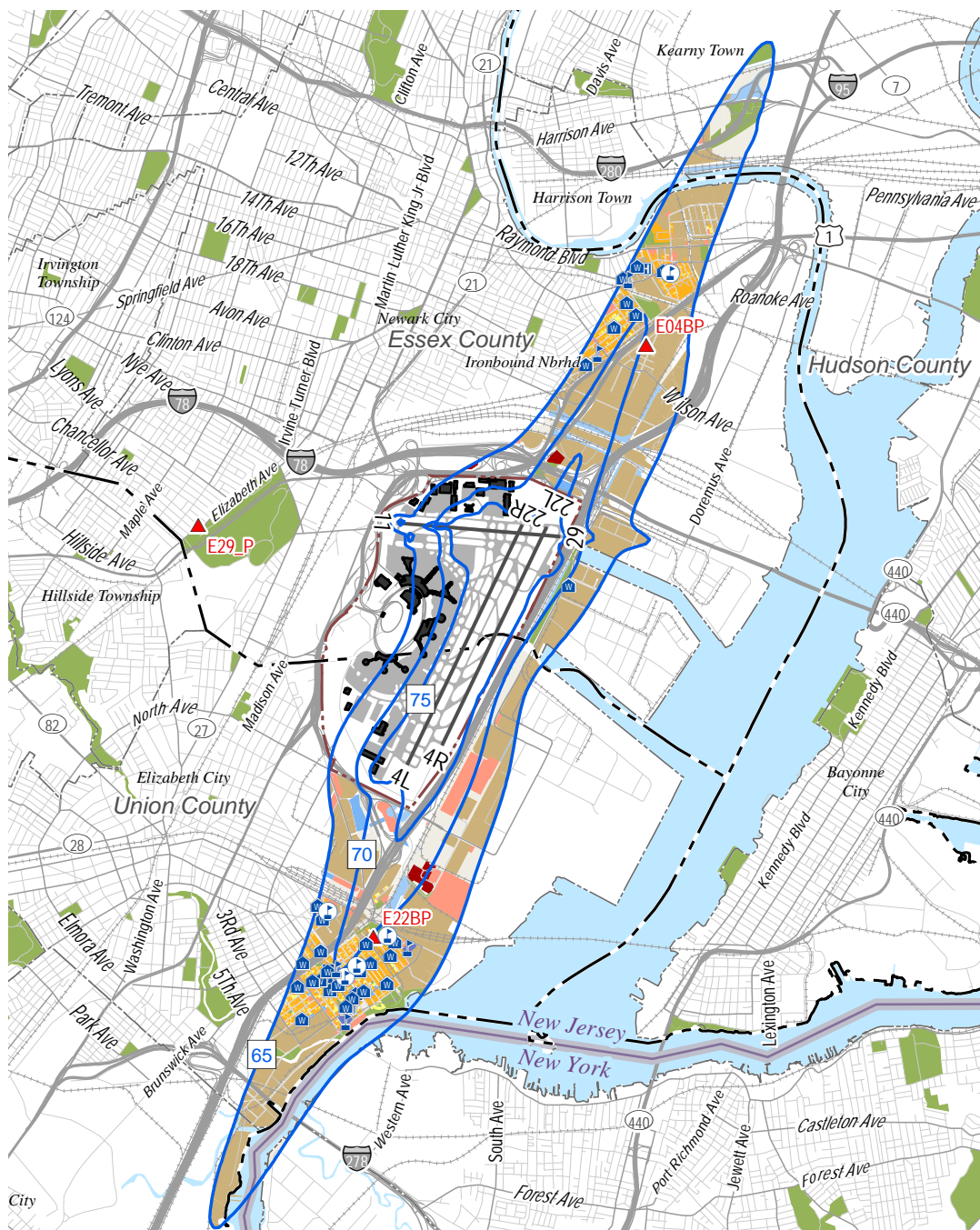
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2019 and 2024 Noise Exposure Maps

Figure: 5-6

Land Use Compatibility Analysis (2019 NEM)





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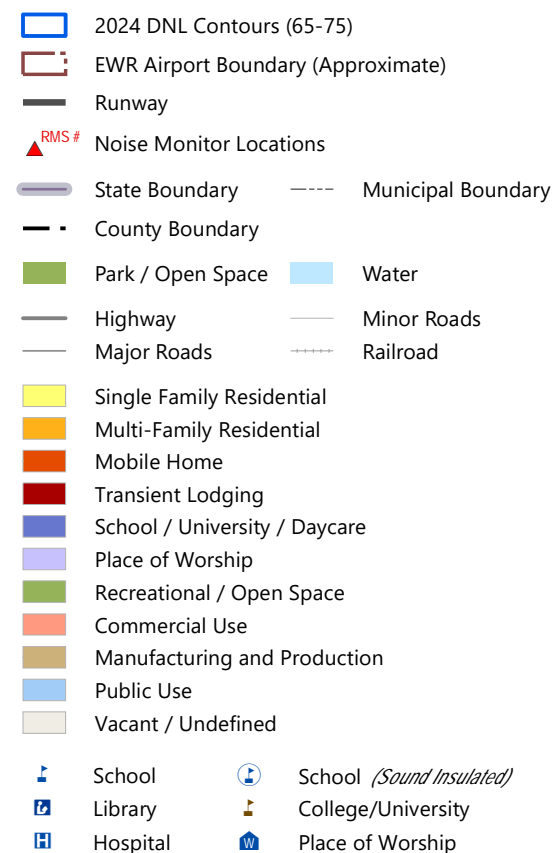
Newark Liberty International Airport

Airport Noise Compatibility

Part 150 Study

2019 and 2024 Noise Exposure Maps

Figure: 5-7
Land Use Compatibility Analysis
(2024 NEM)



Chapter 5 — 2019 and 2024 Noise Exposure Maps

Table 5-4 presents the area of compatible and non-compatible land uses within the 65 DNL contours for each year, exclusive of the airport property. Consistent with the small increase in the 2024 DNL contour, both the area of non-compatible and compatible land uses increase between 2019 and 2024.

Figure 5-6 on page 5-8 and Figure 5-7 on page 5-9 coincide with the information shown in Tables 5-1, 5-2 to 5-3 to demonstrate land use compatibility analysis within the 65 DNL contour.

5.3. Comparison of Measured and Modeled Noise Exposure

As discussed in Section 2.4 on page 2-7, EWR has a noise and operations monitoring system with three permanently installed noise monitors, whose locations are shown in the Noise Exposure Map figures presented in this chapter.

The Port Authority's noise monitoring system includes algorithms that endeavor to match measured noise to specific aircraft operations. The system then adds the noise contributions from all such events to develop an annual aircraft DNL.

Table 5-5 compares the DNL measured at the three monitoring locations in 2017 (the Permanent Monitoring Sites year from which the NEM inputs are based) to the modeled DNL for the 2019 NEM.

While humans can readily discriminate between aircraft and non-aircraft noise, it is a very challenging task for an automated noise measurement system.

Table 5-4: Compatible and Non-Compatible Land Area within 2019 and 2024 65 DNL Contours (Outside of the Airport Boundary)

Source: HMMH, 2018

Year	Land Use within the 65 dB DNL	Area Outside the Airport Boundary (Sq. Miles)
2019	Compatible	5.08
	Non-Compatible	0.52
	Total	5.60
2024	Compatible	5.78
	Non-Compatible	0.55
	Total	6.33

At EWR noise monitoring locations, aircraft noise levels tend to be close to, or even below, those of community noise sources; e.g., street traffic, children playing, dogs barking, landscaping equipment, weather sources such as wind and rain, etc.

As a result, the monitoring system will sometimes have difficulty isolating aircraft noise from community noise during identified aircraft noise events, or the events may even be masked by non-aircraft events.

Table 5-5: Comparison of 2017 measured and 2019 modeled annual DNL at noise monitor locations

Sources: HMMH, 2018 and The Port Authority ANOMS, 2016 and 2017

Site	Measured aircraft DNL 2017	Modeled DNL 2019	Difference
E04_BP	72	69	3
E22_BP	72	69	3
E29_P	49	53	-4

Thus, when comparing measured DNL to modeled DNL, it must be kept in mind that the model utilizes only aircraft operations. Other factors that may contribute to the differences between the measured and modeled levels include:

- The modeling was for forecast 2019 operations, whereas the measurements are for 2017.
- The measurements and noise model involve some inherent technical accuracy tolerances.⁴⁷

Per Part 150 regulations, noise monitoring data were not used to calibrate the model or resulting aircraft noise exposure contours presented within this document.

5.4. Comparison of Measured Aircraft Noise to Ambient Noise in the Community

A potential consideration in evaluating land use compatibility relative to aircraft noise is the non-aircraft or "ambient" contribution to total noise levels. 14 CFR Part 150 §A150.101(e)(5) states: "No land use has to be identified as incompatible if the self-generated noise from a given use and/or the ambient noise from other non-aircraft and non-airport uses is equal to or greater than the noise from aircraft and airport sources." This section

⁴⁷ The measurements were conducted using noise monitors that meet American National Standards Institute (ANSI) S1.4-1983 standards for Type 1 "precision" sound level meters (SLMs), which must meet a ± 1.5 dB end-to-end accuracy tolerance requirement. These monitors exceed the Part 150 requirement for the use of Type 2 "survey" SLMs, for which

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of Part 150 provides the Port Authority with discretion to take ambient noise into account when determining which land uses are incompatible with aircraft noise from EWR aircraft operations. Ambient noise levels generally increase as intensity of development increases ranging from rural to suburban to urban to very noisy urban noise levels. See Figure 5-8. Reviewing these classifications relative to EWR along with the noise measurements obtained from the Port Authority's ANOMS as provided below for calendar year 2017, it can be determined that areas in or near proximity to EWR generally fall within the urban to noisy/very noisy urban classification. Therefore, ambient noise levels of particular neighborhoods may require further investigation to determine implications relative to the development of the NCP and the subsequent implementation phase.

Table 5-6 compares the aircraft, non-aircraft, and total DNL measured at the three EWR noise monitors in 2017, two of which are within the 2019 and 2024 65 DNL contours.

Table 5-6: 2017 Measured Aircraft, Non-Aircraft, and Total DNL
Sources: HMMH, 2018 and The Port Authority ANOMS, 2016 and 2017

Site	2017 Aircraft DNL	2017 Non-Aircraft DNL	2017 Total Measured DNL
E04_BP	72	72	74
E22_BP	72	71	74
E29_P	49	69	69

the end-to-end accuracy tolerance is ± 2.3 dB. However, even the higher accuracy monitors used in the measurements may contribute as much as 1.5 dB to the differences between measured and modeled results. As a result, measurement tolerances alone can contribute to three decibels of difference.

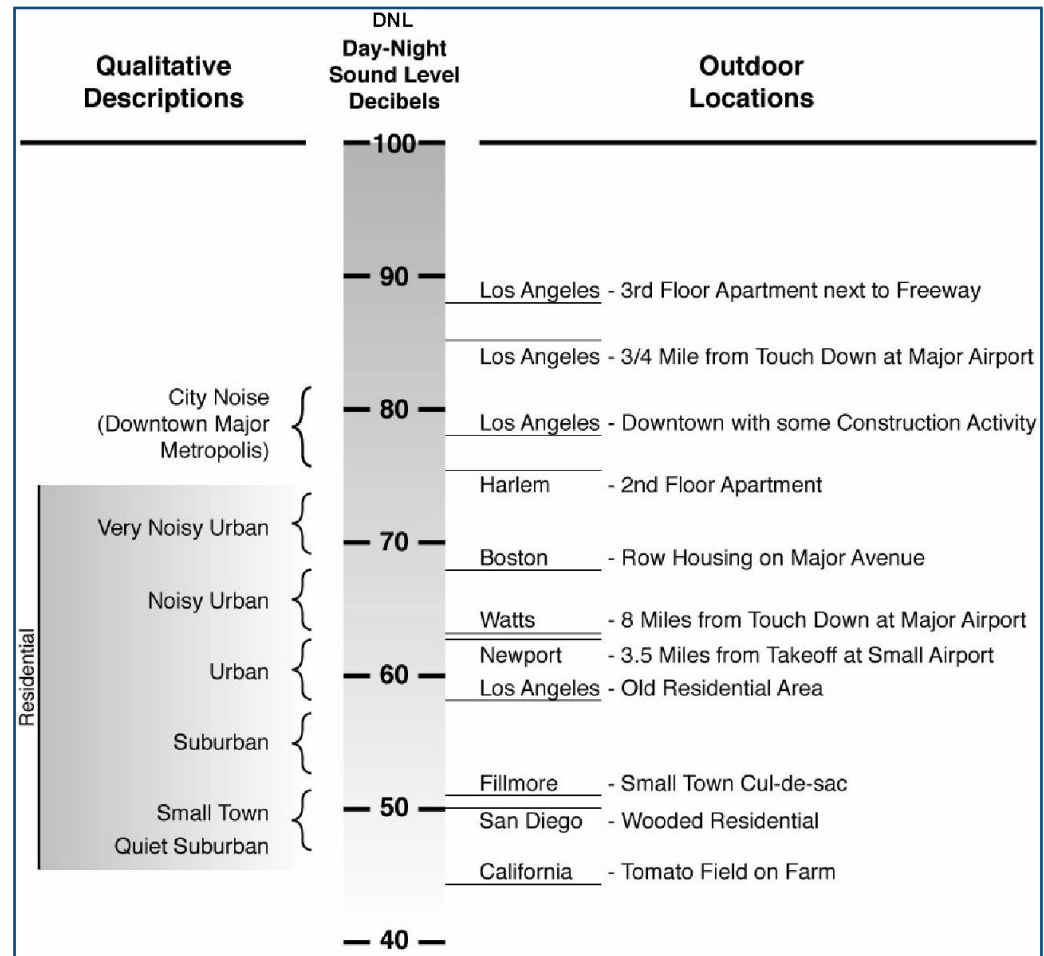


Figure 5-8: Examples of Outdoor DNL Levels Measured at Various Locations

Source: EPA, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with and Adequate Margin of Safety. <https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockkey=2000L3LN.txt>

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6. Stakeholder Engagement

A critical element of the Part 150 Process is stakeholder engagement. This chapter describes outreach efforts conducted as part of the development of this NEM.

6.1. Stakeholder Engagement and Public Participation

The Part 150 Study process includes several efforts to engage the public. The most prominent of these is the Technical Advisory Committee (TAC), which is scheduled to meet up to 18 times over the course of the Part 150 Study. As of December 2018, the TAC has met 13 times. In addition, the Port Authority hosted three public workshops; the first held as an introduction to the study in fall of 2015, and the second workshop was held in two locations in October 2016 to receive public input on the 2016 Draft NEM. The Port Authority hosted the third workshop in two locations in September of 2018 to receive public input on the 2019 Draft NEM. Finally, a public hearing will occur following the end of the NCP phase.

Technical Advisory Committee (TAC)

The Part 150 Study process benefits from the creation and participation of a TAC. The TAC serves several important functions, such as:

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

advice to the Study Team.

In order for the TAC to be effective and representative of all key positions involved in aircraft noise issues, the Port Authority composed a diverse group of key stakeholders including, but not limited to, community representatives, aircraft operators/airlines, affected jurisdictions, and land use planners. While representation needed to be broad, the TAC needed to remain a reasonable size so that deliberations would be efficient. The Port Authority identified and invited members to serve on the TAC for the EWR Part 150 Study.

Formation of the TAC

An initial invitation was distributed for the TAC to a key set of stakeholders, designated under Note 2 in Table 6-1 on the next page. These were identified as agencies requiring consultation based on the regulations governing the Part 150 process at 14 CFR 150.21 (b) and 14 CFR 150.105(a).⁴⁸

Membership

TAC meetings are open to the public, and a standing agenda item exists to offer the opportunity for public comments and discussion at every TAC meeting. Table 6-1 provides member organizations represented in the TAC. It is important to note that the TAC is advisory only. That is, the TAC is able to offer opinions, advice and guidance on the Study, but the Port Authority has the sole discretion to accept or reject the TAC

⁴⁸ 14 CFR 150.105 (a) states: "The airport proprietor shall identify each public agency and planning agency whose jurisdiction or responsibility is either wholly or partially within the Ldn 65 dB boundary."

14 CFR Part 150 Guidance on Public Participation for the NEM



FAA's acceptance of the NEM will be contingent on an FAA finding that Section 150.21(b) consultation requirements have been met.

§ 150.21 (b) [for Noise Exposure Maps]:

"Each map, and related documentation submitted under this section must be developed and prepared...in consultation with states, and public agencies and planning agencies whose area, or any portion of whose area, of jurisdiction is within the Ldn 65 dB contour depicted on the map, FAA regional officials, and other Federal officials having local responsibility for land uses depicted on the map. This consultation must include regular aeronautical users of the airport. The airport operator shall certify that it has afforded interested persons adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft noise exposure map and descriptions of forecast aircraft operations. Each map and revised map must be accompanied by documentation describing the consultation accomplished under this paragraph and the opportunities afforded the public to review and comment during the development of the map. One copy of all written comments received during consultation shall also be filed with the Regional Airports Division."

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Table 6-1: Member Organizations of the Technical Advisory Committee (TAC)

Source: HMMH, 2018

Stakeholders Identified in 14 CFR 150.21 (b) and A150.105(a)			
States, public agencies or planning agencies	FAA regional officials	Regular Aeronautical Users of the Airport	Interested Persons
<ul style="list-style-type: none"> - Port Authority Noise Office² - Port Authority EWR Airport Staff² - City of Elizabeth² - Essex County² - Staten Island - Greater Elizabeth Chamber of Commerce - Hudson County - City of Newark - City of Linden - Town of Harrison - Union County - Union County Air Traffic Noise Advisory Board 	<ul style="list-style-type: none"> - FAA Officials: <ul style="list-style-type: none"> ▪ Airport Traffic Control Tower (ATCT)² ▪ Airports Division² ▪ Air Traffic Organization² ▪ Flight Standards District Office (FSDO)² ▪ TRACON² 	<ul style="list-style-type: none"> - United² - FedEx² - Southwest Airlines² - Fixed Base Operators <ul style="list-style-type: none"> ▪ Signature Flight Support² 	<ul style="list-style-type: none"> - EWR Noise Community Roundtable² - Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC)² - AvPORTS/TEB Staff - NJ Citizens Against Aircraft Noise (NJCAAN) - National Business Aviation Association (NBAA) - NJ State Noise Control Council (NJNCC) - Newark Regional Business Partnership (NRBP) Aviation Development Council (ADC)

Note¹: States, Public Agencies or planning agencies whose area of jurisdiction is within the 65 dB DNL contour

Note²: All organizations were identified as agencies requiring consultation based on the regulations governing the Part 150 process at 14 CFR 150.21 (b) and received an initial invite to the TAC

recommendations in accordance with 14 CFR Part 150. As the sponsor of the Part 150 Study and as the operator of EWR, the Port Authority is a member of the TAC.

The FAA, as the primary funding agency for the Studies and as the approval authority, is a key advisor of the TAC. A complete list of the members of the EWR TAC can be found in Appendix F, Part F.1 on page F-3.

Summary of TAC Meetings

The Study Team handles all aspects of meeting logistics. The Study Team also identifies specific meeting goals and objectives in advance of each meeting and recommends meeting formats. The Study Team prepares presentations and meeting materials for each TAC meeting, and serves as the facilitator. Topics discussed at the first thirteen TAC meetings are found in Table 6-2.

Table 6-2: TAC Meeting Topics

Source: HMMH, 2018

Meeting	Date	Topics Covered
#1	9/24/2015	Overview of the Part 150 process and roles and responsibilities
#2	11/13/2015	Public workshop overview, noise terminology, noise modeling overview
#3	1/27/2016	Noise modeling inputs: runway usage, flight tracks, forecast approach
#4	3/31/2016	Noise modeling inputs: forecast, aircraft substitutions, user-defined profiles, flight track development
#5	5/25/2016	Noise modeling status, land use, land use compatibility, and introduce NCP development process
#6	7/27/2016	NEMs, supplemental contours, NCP process
#7	9/21/2016	Review of the NEM document, NCP process and preliminary discussion of NCP analyses
#8	11/16/2016	Review of public workshop #2 and discussion of NCP measures and potential analyses
#9	1/26/2017	Present first-round of abatement alternative analysis
#10	3/30/2017	Notify need to revise NEM contours and present second-round abatement alternative analysis
#11	5/22/2017	Present revised NEM contours, first-round compatible land use alternatives
#12	11/8/2017	Discussion of NCP documentation, including document outline, and presentation of the third round of abatement alternative analyses.
#13	7/19/2018	2019 NEM and proposed NCP measures

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6.2. Public Involvement

Members of the public who have an interest in the Study have a role to play and a responsibility to the Study's outcome. Members of the public are encouraged to stay informed of the Study's progress by visiting the [Study's website](#), attending TAC meetings, participating in public workshops, and submitting comments on the Study.

The Study Team worked with the Port Authority to create and distribute press releases about the public meetings, inform media and elected officials about the public meetings, and develop supporting media materials for each meeting. The Study Team also worked with the Port Authority to identify meeting locations, handle all logistics for securing space (and assure that they are Americans with Disabilities Act (ADA) accessible and accessible via public transportation to the extent possible). The Study Team members as well as Port Authority staff served as facilitators at various stations at the public workshops. The Study Team members also served as facilitators at any question and answer sessions and prepared a brief meeting summary for each public meeting.

The first public workshop occurred on October 14, 2015 at Marriott Newark Airport in Newark, NJ. The second public workshop to present the 2016 Draft NEM was held at Hilton Gateway at Penn Station in Newark, NJ on October 25, 2016 and at the Donald R. Conklin Conference Center at Kean University in Union, NJ on October 27, 2016. The third public workshop to present the 2019 Draft NEM was held on September 25, 2018 at Union County College in Elizabeth, NJ and on September 26, 2018 at

Weequahic Park Sports Authority in Newark, NJ.

All workshop materials, including copies of presentations, are provided in Appendix G, Part G.3 beginning on page G-45.

Public Review and Comment on 2019 Draft NEM

The Port Authority made the 2019 Draft NEM available for public review and comment from September 13 through October 15, 2018. The 2019 Draft NEM was the primary topic of the third public workshop, held in two locations on Tuesday, September 25 and Wednesday, September 26, 2018 at Union County College and the Weequahic Park Sports Authority, respectively. The 2019 Draft NEM was available for public review at the following locations:

- On the Port Authority [website](#)
- At three physical locations. The addresses, dates available, and business hours of each establishment are denoted in Table 6-3.

The workshop, 2019 Draft NEM availability,

and comment period were advertised through:

- The project [website](#)
- Legal advertisements in numerous print publications, including The Star-Ledger, The Record, The Jersey Journal, and the Bayonne Community News. See Appendix G, Part G.3.1, beginning on page G-47.
- Emailed notices to elected officials. See Appendix G, Part G.3.1, page G-72
- TAC Meeting #13

Public Review Periods

The Port Authority remained consistent in making Draft NEM documentation available to the public for review. The 2019 Draft NEM followed the same protocol of public review and accompanying workshop in the area surrounding EWR as was done for the 2016 Draft NEM.

As discussed previously in this report, while preparing the 2016 Draft NEM, inconsistencies with modeling inputs were found including runway utilization, Runway 22L and 22R aircraft departure locations and land use designations.

Table 6-3: Locations and Availability of the 2019 NEM Document for Public Review and Comment

Source: HMMH, 2018

#	Site (Address)	Dates Available	Days Open	Times
1	Manager's Office: Port Authority Administrative Offices EWR Building One 1 Conrad Road (EWR) Newark, NJ	September 13 — October 15, 2018	Monday — Friday	9:30 a.m.—4:00 p.m.
2	Elizabeth Public Library ¹ 11 South Broad Street Elizabeth, NJ		Friday, Saturday, & Monday	9:00 a.m.—5:30 p.m.
3	Newark Public Library ² 5 Washington Street Newark, NJ		Tuesday—Thursday	9:00 a.m.—8:30 p.m.
			Closed Sunday	
			Monday—Thursday	9:00 a.m.—9:00 p.m.
			Friday	10:00 a.m.—7:00 p.m.
			Saturday	9:00 a.m.—5:00 p.m.
		Closed Sunday		

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With corrections applied, the change indicated additional non-compatible land uses within the 65 DNL contour for 2016 and 2021.

Therefore, the Port Authority updated the NEMs to reflect these changes. In this process, the Port Authority released the 2016 Revised Draft NEM for a 30-day public review period that occurred from June 25 to July 25, 2017 and reopened the opportunity for public comment on the 2016 Revised Draft NEM. Following the 2016 Revised Draft NEM, the actual operational counts for 2016 differed from those modeled. As a result, the Port Authority chose to develop the 2019 NEM, using 2019 and 2024 as the forecast years to account for changes to the airport's operations.

Public Comment

As discussed in Section 1.1 on page 1-1,

see Appendix H, beginning on page H-1, for stakeholder input and public comments received on the 2016 Draft NEM, 2016 Revised Draft NEM, and 2019 Draft NEM.

The Port Authority received 40 comments since the beginning of the study through the closing of the 2019 Draft NEM 30-day comment period on October 15, 2018, including:

- Seven comment forms submitted at or following the October 25, 2016 workshop
- Five comment forms submitted at or following the October 27, 2016 workshop
- Two comment forms submitted at or following the September 25, 2018 and September 27, 2018 workshops
- 14 letters submitted either at one of the

public workshops, via standard mail, or electronic letter submissions

- 12 emails submitted via the Port Authority's Part 150 website

Table 6-4 lists, and provides summary descriptions of, the ten most frequent categories of comments received prior to the closing of the 30-day public comment period on October 15, 2018. In descending order from most to least frequent, these ten categories account for over 90 percent of comments received; the remaining comments fall into dispersed categories. Appendix H, Part H.1, beginning on page H-3 presents a table that list all the comments received and provides response for each comment. Part H.2, beginning on page H-96, includes scanned copies of the comments.

Table 6-4: Top Ten Most Frequent Public Comments Received

Source: PANYNJ and HMMH, 2018

Comment Category	Description
Noise Compatibility Program (NCP) Measures	Suggested noise abatement, administrative, or other NCP measures
Data Collection	The collection and use of data to produce Noise Exposure Maps
Noise Exposure Maps (NEMs)	The locations of noise contours on the Noise Exposure Maps, and the methodology used to produce noise contours
Part 150 Guidelines / Regulations	Requests of information, analysis or action beyond the guidelines of Title 14 C.F.R. Part 150
Frequency and Volume of Aircraft Operations	Number of aircraft operations occurring during certain periods
School Sound Insulation	Requests for information regarding the Port Authority's School Sound Insulation program
Public Participation/Outreach	Methods of public participation in the EWR 14 CFR Part 150 Study, including the locations and times of Public Information Workshops
Quality of Life	The effects of EWR aircraft operations on quality of life, including health effects and activity interference
Noise Complaints	Complaints about noise exposure
Noise Monitoring	The Port Authority's noise monitor network and use of noise monitor data in the EWR 14 CFR Part 150 Study

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The following items were entered into the table for each comment:

- First and last name (and title, if applicable)
- Affiliation/organization, if applicable
- Address (city only)
- The medium in which the comment originated – Comment Form, electronic mail, letter
- Comment identification number (including sub-identification number for comments addressing multiple topics)
- Comment topic (general categories addressed in each comment)
- Verbatim transcription each comment, broken down into separate topics, where multiple topic categories were addressed
- Response to each comment topic raised

All comments were entered verbatim, as accurately as feasible for handwritten

comments. Typographical or grammatical errors were not corrected.

As review of the table in Appendix H.1 indicates, the comments largely identified noise issues of concern and/or suggested noise compatibility measures to consider in the Noise Compatibility Program phase of the study. None of the comments raised issues that required revision of the 2019 Draft NEM.

Newsletters

The Study Team prepares periodic newsletters, distributed in electronic format, to TAC members, community representatives, elected officials, and other interested stakeholders. These newsletters are summarized in Table 6-5 and posted on the project website. Copies of the newsletters are provided in Appendix G, Part G.2, beginning on page G-37.

A workshop to receive public input on the 2019 Draft NEM took place in two locations in September of 2018. One occurred Tuesday, September 25, 2018 at Union County College in the Kellogg Building, Room K-517 and the other on Wednesday, September 26, 2018 at Weequahic Park Sports Authority in the Community Room. Both took place between 6:00 p.m. to 9:00 p.m.

Website

The Port Authority and the Study Team worked to develop and maintain a Part 150 Study [website](#). The Study Team also monitors social media channels for news and commentary on the Part 150 Study, and makes recommendations for responses or engagement, on a case-by-case basis. The Study Team coordinated with the Port Authority to design and manage the Part 150 public website to post all Study-related information and resources on the website.

Table 6-5: Newsletters Released to Date during the EWR Part 150 Process

Source: Port Authority and HMMH, 2018

Newsletter	Release Date	Description
#1	Fall 2015	Explanation of 14 CFR Part 150 and Part 150 study process at EWR. Introduces Noise Exposure Map and Noise Compatibility Program including Study Team and Study Schedule.
#2	March 2016	In-depth description of Study Team and Technical Advisory Committee. Includes brief overview of land use data collection.
#3	Summer 2016	Description of 2016 Draft NEM and results of land use data collection. Expanded information on Noise Compatibility Program and provides dates of October 2016 Part 150 Public Workshops.
#4	Winter 2017	Study update outlining Noise Abatement Strategies, Land Use Strategies, and Programmatic Strategies of EWR's NCP. Includes recap of October 25 and October 27, 2016 Public Workshops.
#5	Summer 2017	Informed public of availability of 2016 Revised Draft NEM for review. Gives further detail on Noise Abatement, Land Use, and Programmatic Strategies of EWR's NCP.
#6	Winter 2018	Explains need and plans for development of a 2019 NEM for forecast years 2019 and 2024. Informs public of tentative public review period for the new document.

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