



# Welcome!

## **Teterboro Airport**

14 CFR Part 150 Noise Compatibility Planning Study

Public Information Workshop #1

October 15, 2015



# Part 150 Overview

- Federal Aviation Administration (FAA) developed the Part 150 Program in response to the federal Aviation Safety and Noise Abatement Act of 1979 (“ASNA”)
- Codified under Title 14 of the Code of Federal Regulations (CFR) Part 150
  - Formal *citation* is “14 CFR Part 150,” informal is “Part 150”
  - Formal *title* is “Airport Noise Compatibility Planning”
- *Voluntary* FAA-defined process for airport noise studies
  - 250+ airports have participated
- *Why do airports participate?* Primary reasons include:
  - Provides access to FAA funding of some approved measures
  - Well-established, understood, accepted, and comprehensive process



# Part 150 Overview

- In response to ASNA, Part 150 prescribes standards and systems for:
  - Measuring noise
  - Estimating cumulative noise exposure using computer modeling
  - Describing noise exposure
  - coordinating with local land use agencies
  - documenting the analytical process
  - Submitting the documentation to FAA
  - FAA and public review processes
  - FAA approval or disapproval process



# Part 150 Overview: Major Elements

- Two primary components
  - Noise Exposure Map (NEM)
  - Noise Compatibility Program (NCP)
- Consultation required with
  - All local, state, and federal entities with control over land use within DNL 65+ dB
  - FAA regional officials, regular aeronautical users of the airport
  - All parties interested in review of and comment on draft items
- PANYNJ will significantly exceed all “consultation” requirements
  - Improved stakeholder relations is typically one of the most valuable study results
- Opportunity must be offered for a final public hearing on the NCP
- Detailed FAA guidance at [www.faa.gov/airports/environmental/airport\\_noise/](http://www.faa.gov/airports/environmental/airport_noise/)



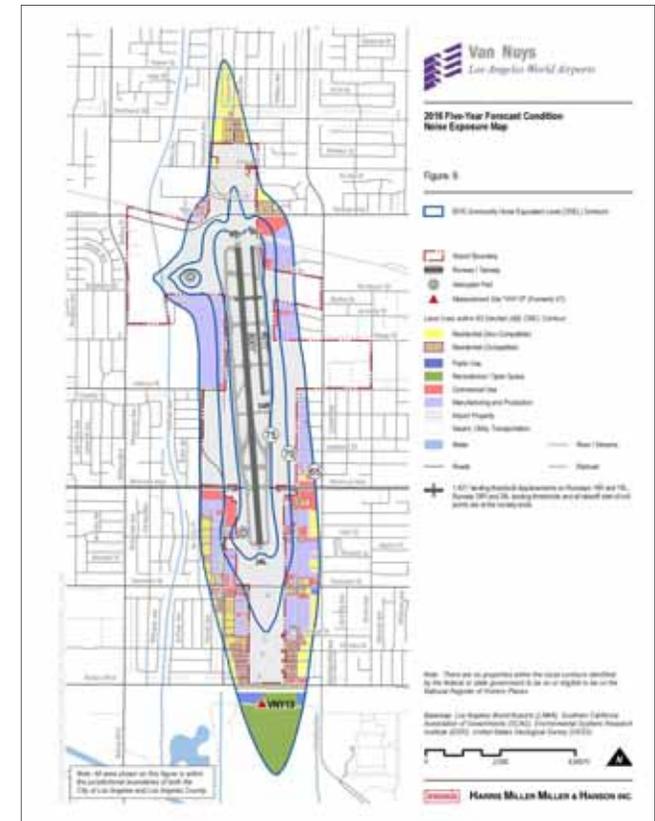
# Part 150 Overview: Noise Exposure Map

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



# Part 150 Overview: Noise Exposure Map Example

- Van Nuys Airport (California)
  - Similar to TEB, one of three airports operated by Los Angeles World Airports (LAWA)
- NEM Major graphical components include:
  - DNL 65, 70 and 75 dB contours
  - Information detailed within the 65 dB DNL contour:
    - Generalized land use categories
    - Historic properties, schools, places of worship, health care facilities, other “discrete” sensitive uses
    - Clear identification of all noncompatible land uses
    - Jurisdiction(s) responsible for land use controls
  - Flight tracks (typically on supplemental figures)



# Part 150 Overview: Noise Compatibility Program

- NCP must address three major categories of proposed actions
  - Noise abatement measures
  - Compatible land use measures
  - Program implementation
- FAA *accepts* NCP for review
- FAA reviews and *approves* or *disapproves* proposals as compliant with Part 150 standards on an element-by-element basis



# Part 150 Overview: Noise Compatibility Program

- Noise abatement measures can:
  - Shrink noise contours or move them away from noncompatible uses
  - Make changes to aircraft operations, airport layout, flight track and runway use, etc.
  - Note: Study will build on TEB's well-established noise abatement program
- Compatible land use measures can:
  - Address existing noncompatible uses
  - Prevent introduction of new noncompatible uses
- Program implementation includes:
  - Required actions, responsible parties, costs
  - NEM and NCP review and update processes



# Roles and Responsibilities: Noise Compatibility

## Defined by “FAA Noise Abatement Policy Statement” (November 1976)

- Federal Government – controls noise by regulating source emissions, managing air traffic, and providing funding and technical assistance for noise remediation projects
- State and Local Government – can affect land use near airports by zoning, planning, development, and regulation
- Aircraft operators – can affect noise generation by flight scheduling, improving fleet equipment and changing cockpit procedures
- Air travelers and shippers - bear the costs of reducing noise levels since they, by demand, generate the noise
- Current and potential residents – seek to act in an informed manner to understand the impacts of noise
- Airport operators - plan and implement noise compatibility measures



# Roles and Responsibilities: Part 150 Overall

- **The Port Authority**
  - Directs study - it is the Port Authority's project
  - Submits NEM and NCP documentation to FAA
- **FAA**
  - Provides input to, reviews and assists with analysis of noise abatement flight procedures
  - "Accepts" documentation and "approves" NCP measures
  - Responsible for implementation of noise abatement flight procedures
  - Assists in funding eligible measures in all three categories
- **Local governments**
  - Provide input to recommended land use measures
  - Implement and enforce land use measures to maintain and improve noise compatibility
- **All stakeholders, including aviation interests, residents, and other interested parties**
  - Monitor study process, provide input, assist with implementation



# Roles and Responsibilities: Teterboro TAC

- The Technical Advisory Committee (TAC) is advisory to the Port Authority solely for purposes of the TEB Part 150 Study, including
  - Review of study inputs, assumptions, analyses, documentation, etc.
  - Input, advice, and guidance related to NEM and NCP development
- TAC members are expected to provide two-way communication between the TAC and their organizations / constituents
- The Port Authority shall respect and consider TAC input, but must retain overall responsibility for the Part 150 Study and NCP recommendations
- The TAC and Port Authority recognize FAA is responsible for accepting NEM and NCP submissions and for approving NCP proposals

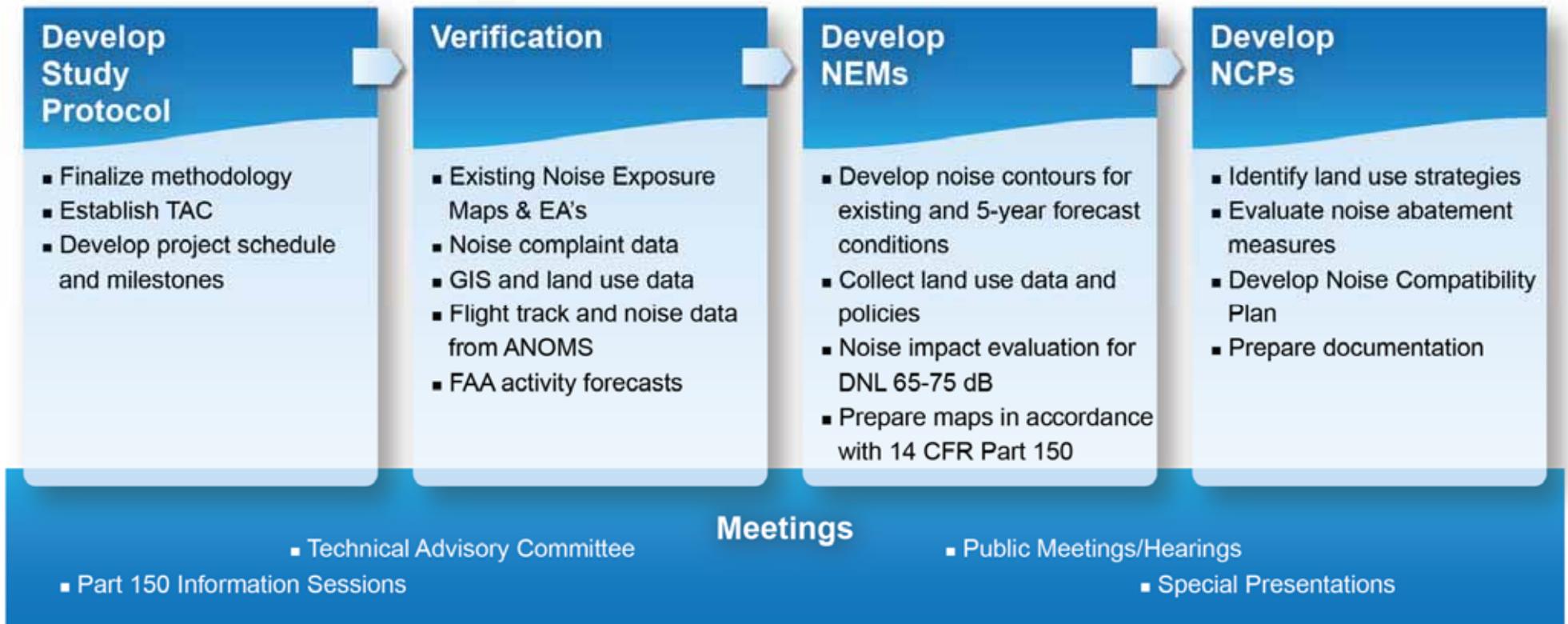


# Roles and Responsibilities: TEB TAC Makeup

- TAC composed of stakeholders representing all significant interests
  - Key agencies; e.g., Port Authority, FAA, AvPORTS
  - Local land use jurisdictions; e.g., Bergen County
  - Airport tenants and users; e.g., fixed base operators (FBOs), NetJets, etc.
  - Aviation trade associations; e.g., National Business Aviation Association (NBAA), Aircraft Owners and Pilots Association (AOPA),
  - Established advisory bodies; e.g., Teterboro Airport Noise Abatement Advisory Committee (TANAAC), Teterboro Users Group (TUG)
  - Newark/Liberty International (EWR) Noise/Community Roundtable
- Members serve on a voluntary basis without compensation



# Part 150 Study Process

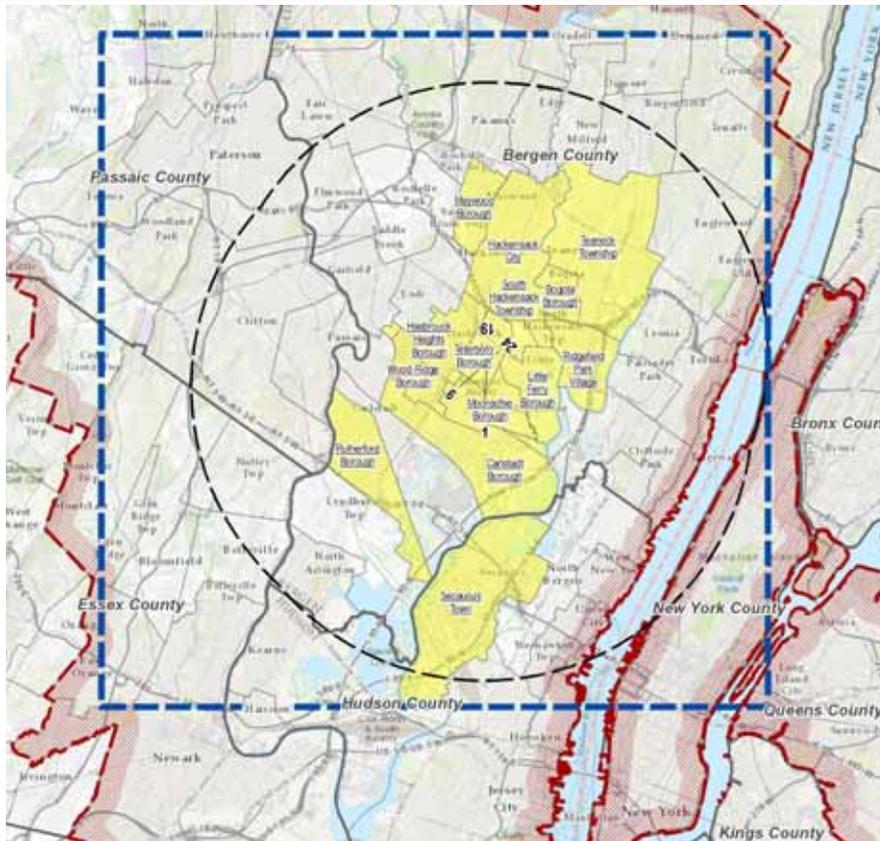


# Part 150 Study Process: Anticipated Schedule

TEB Part 150 Milestone	Anticipated Date
Project initiation	February 2015
Project kickoff meeting with FAA	March 2015
Public Information Workshop – Introduce Project	October 2015
Public Information Workshop – Present Noise Exposure Map	Fall 2016
Submit Noise Exposure Map to FAA for acceptance	Late 2016
Develop preliminary noise compatibility program measures	Spring 2017
Evaluate noise compatibility program measures	Summer/Fall 2017
Finalize recommended Noise Compatibility Program	Winter 2017/2018
Public Hearing – Present Noise Compatibility Program	Spring 2018
Submit Noise Compatibility Program to FAA for approval of measures	Fall 2018



# Part 150 Study Process: TEB Study Area



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GEBCO, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, MapboxIndia, © OpenStreetMap contributors, and the GIS User Community, New Jersey Geographic Information Network (NJGIN)

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 exposures, 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.



Teterboro Airport  
14 CFR Part 150 Study  
Study Area



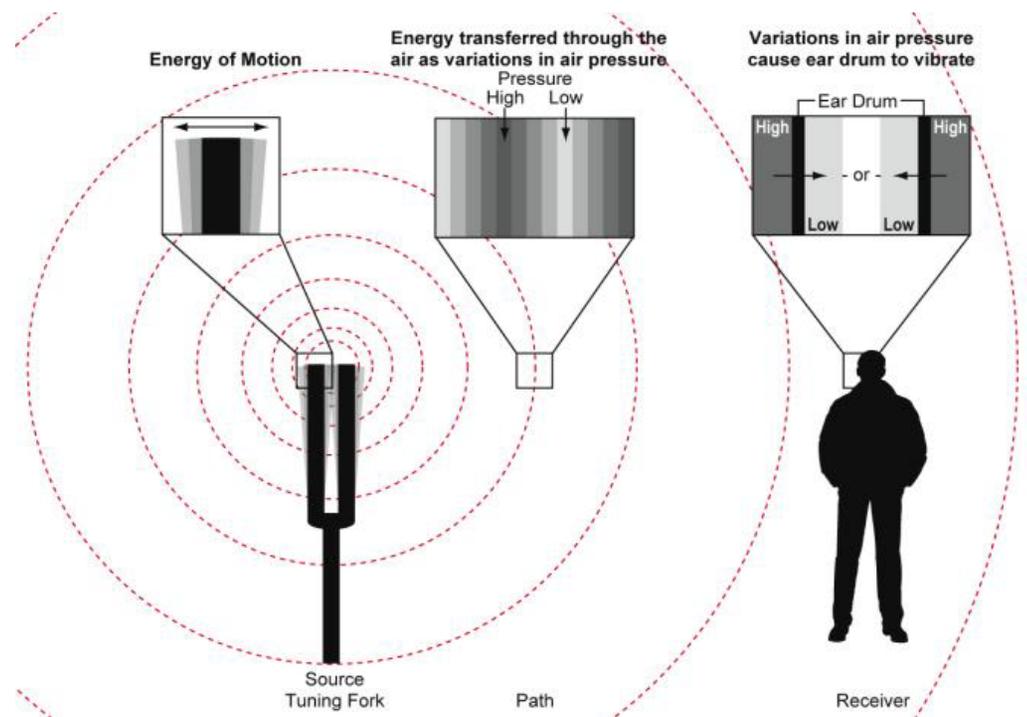
# Noise Terminology

- Sound vs. noise
- The decibel scale (dB)
- The A-weighted decibel (dBA)
- Single event noise metrics - Lmax and SEL
- Cumulative exposure metric - DNL



# Noise Terminology: What is “Noise”?

- Sound is pressure variation our ears can detect
  - An objective quantity
- Noise is “unwanted sound”
  - A subjective quantity
- We relate sound and noise by considering effects
  - Annoyance
  - Speech interference
  - Sleep disruption



# Noise Terminology: The Decibel Scale

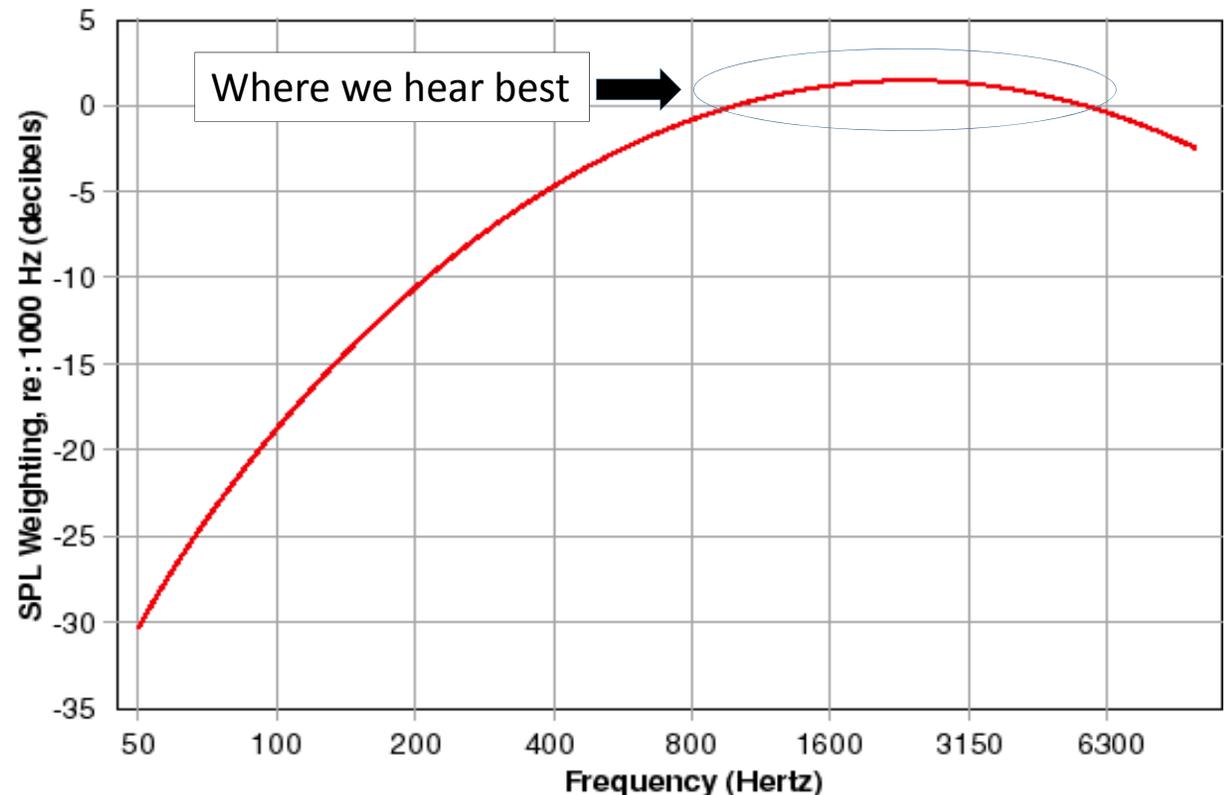
- We use a *logarithmic scale – decibels, or dB* to express sound levels and noise levels
- *Why?*
  - We hear sound pressures over a HUGE range
  - Decibels compress this range to match the way we interpret sound pressures
    - 0 to 140 dB
    - Equates to 0.000000003 to 0.003 lbs. per sq. inch
  - *We “hear” in decibels*

“Energy”	dB	Common sounds
100,000,000,000,000	140	Near a jet engine at start of takeoff
10,000,000,000,000	130	Threshold of pain
1,000,000,000,000	120	On stage at a loud rock concert
100,000,000,000	110	
10,000,000,000	100	Jack hammer at 6 feet
1,000,000,000	90	
100,000,000	80	Vacuum cleaner at user’s ear
10,000,000	70	Vacuum cleaner at 10 feet
1,000,000	60	Normal speech
100,000	50	
10,000	40	Quiet residential area
1,000	30	
100	20	Whisper
10	10	
1	0	Threshold of hearing
0.1	-10	



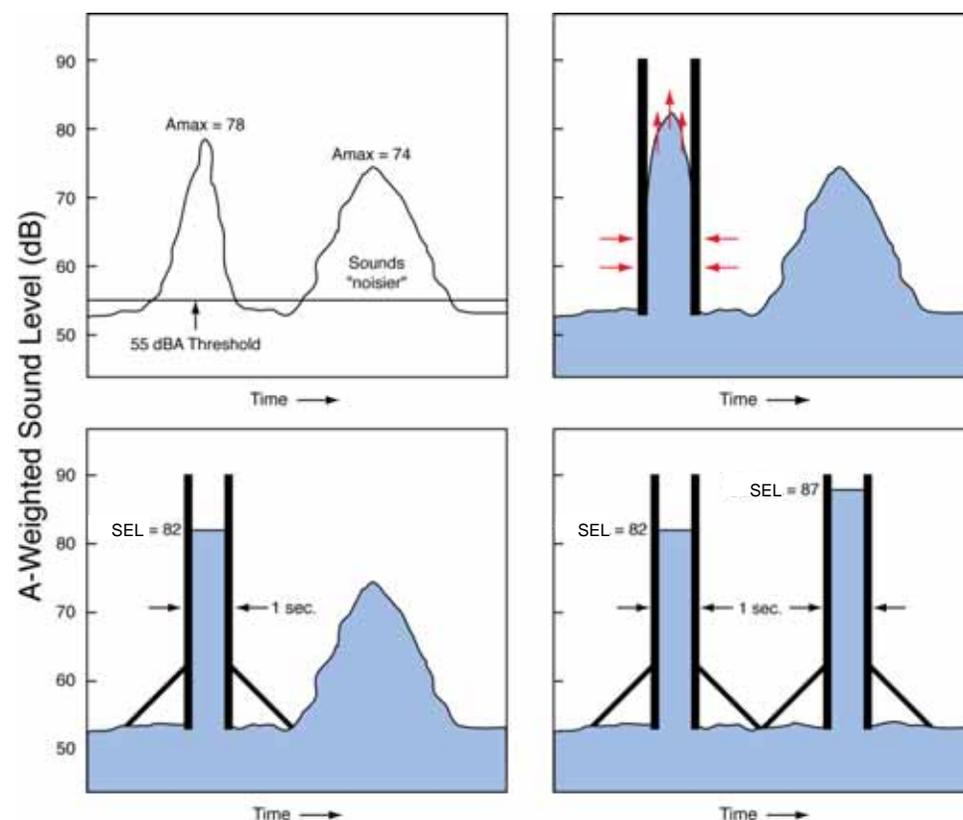
# Noise Terminology: A-Weighted Sound Level

- Our ear is not equally sensitive to all frequencies
- A-weighted decibels (dBA) measure sound the way we “hear” it
- Part 150 specifies dBA metrics to describe
  - Single events
  - Cumulative exposure
- Consistent with worldwide practice



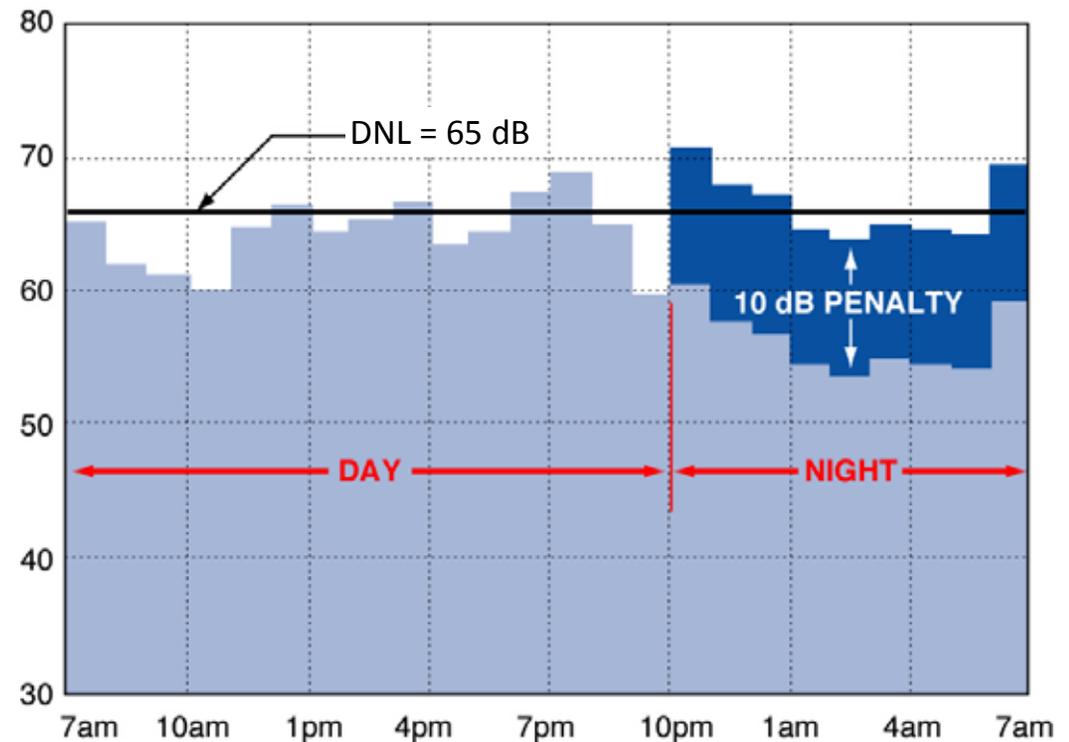
# Noise Terminology: Sound Exposure Level, SEL

- Duration matters: A longer event may seem “noisier,” even if it has a lower or equal maximum level
- SEL measures the total “noisiness” of an event by taking duration into account

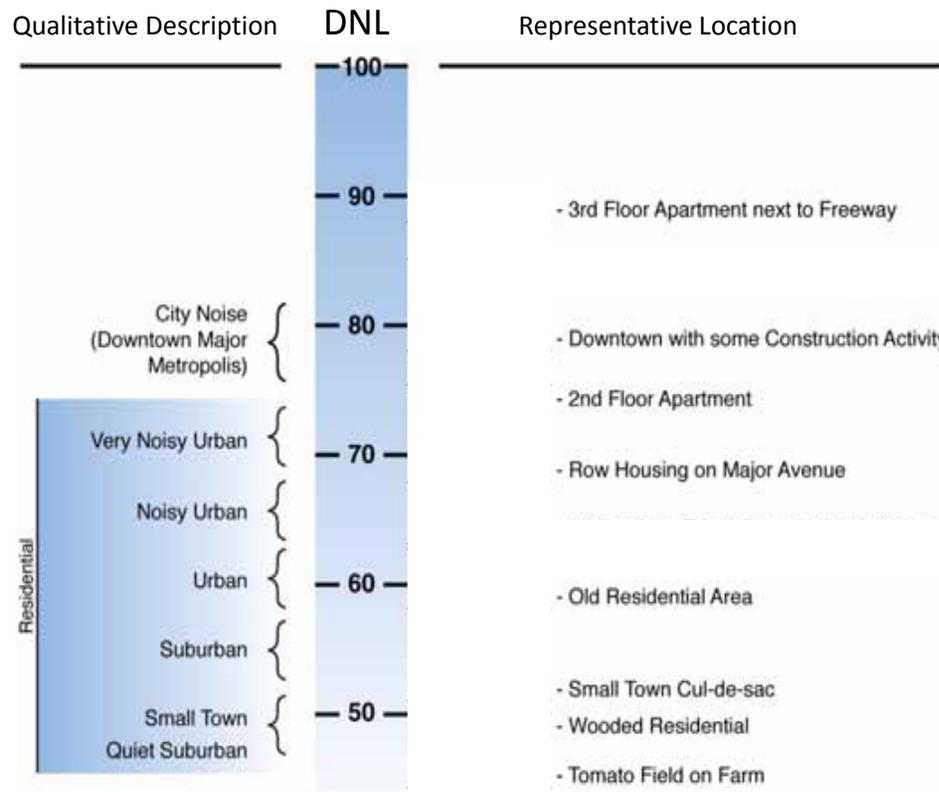


# Noise Terminology: Day-Night Average Level (DNL)

- Average 24-hour exposure over the course of a year
- Noise from 10 pm to 7 am is factored up by 10 dB
  - “Penalty” is equal to counting each night aircraft 10 times
- Sometimes abbreviated Ldn
- DNL is the only measure that Part 150 requires us to consider



# Noise Terminology: Typical Community DNL



Source: United States Environmental Protection Agency, Information on Levels Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p. 14.



# Noise Terminology: Noise Metric Summary

- The decibel is a complex logarithmic quantity based on sound pressure
- A-weighted decibels correlate well with how we hear
- Noise levels can be expressed many ways, including but not limited to:
  - Instantaneous maximum (Lmax)
  - Single event dose (SEL)
  - Long-duration exposure (DNL)
- Best metric to use depends on purpose
- FAA requires use of DNL in a Part 150 study to evaluate compatibility
- Part 150 guidelines consider all land uses compatible below 65 dB DNL



# Noise Modeling

- We must use FAA-approved model
  - FAA's Integrated Noise Model, Version 7.0d (INM 7.0d) was the most current when the study was initiated
- Required inputs
  - Airport layout
  - Annual average meteorological data
  - Terrain
  - Aircraft operations for 2016 and 2021 - *FAA approves*
  - "User-defined modelling inputs" for TEB-specific flight procedures - *FAA approves*
  - Runway utilization rates by aircraft categories
  - Flight track geometry and use by aircraft categories
  - Maintenance runup locations and operations



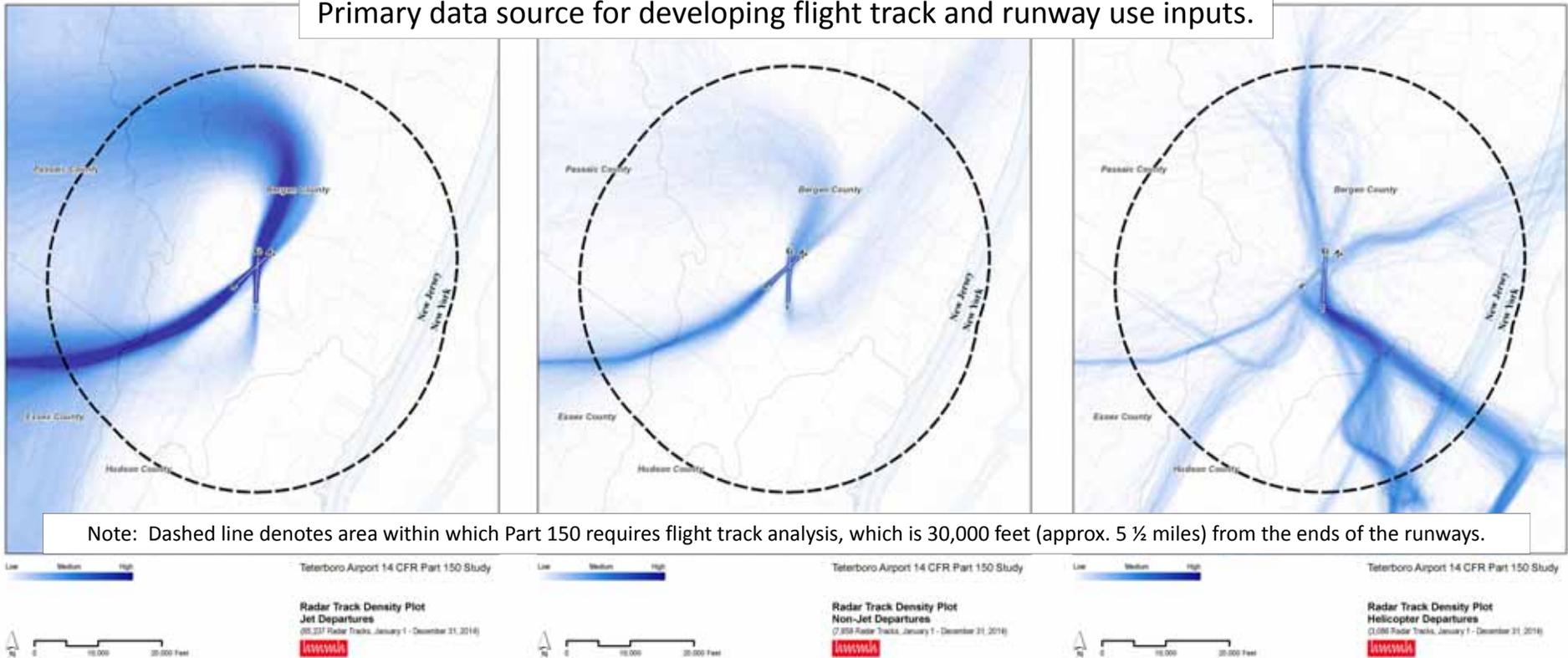
# Noise Modeling: Major Data Sources

- Best available source(s) will be used for each specific category
  - *Airport layout* - PANYNJ drawing files, FAA airport diagram, TEB Airport Layout Plan (ALP)
  - *Meteorological* - NOAA National Climatic Data Center
  - *Terrain* - U.S. Geological Survey
  - *Baseline operations* - ANOMS monitoring system
  - *Forecast operations* - FAA's Terminal Area Forecast (TAF) and PANYNJ forecasts
  - *Flight tracks, profiles, and runway use* - 2014 data from ANOMS (Airport Noise & Operations Monitoring System) and FAA National Offload Program
- Data will be compared to formal and informal procedures
  - FAA Standard Instrument Departure (SID) and approach procedures (APs), etc.
  - Industry noise abatement procedures
- Modelling assumptions will be documented in detail and shared with:
  - All interested stakeholders at workshops and on website



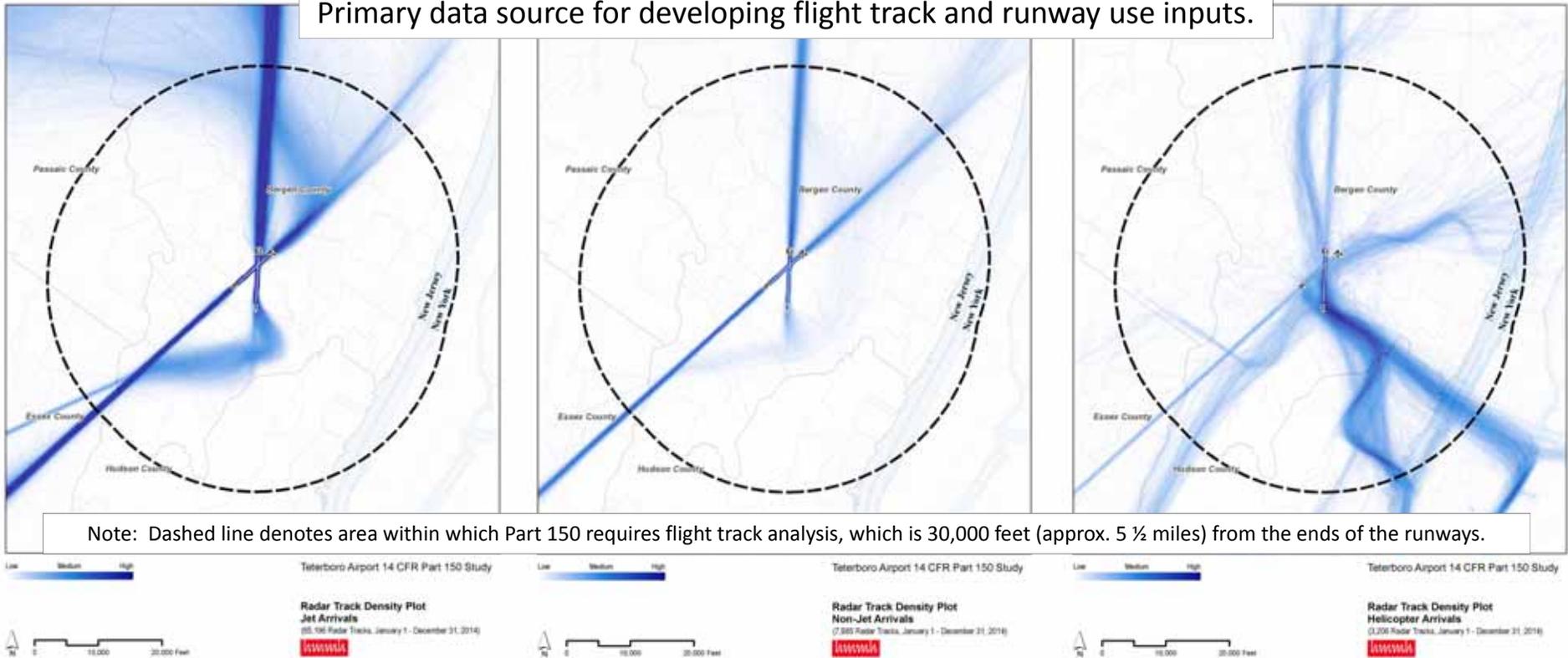
# Noise Modeling: Flight Tracks (Departure Density Plots)

Primary data source for developing flight track and runway use inputs.



# Noise Modeling: Flight Tracks (Arrival Density Plots)

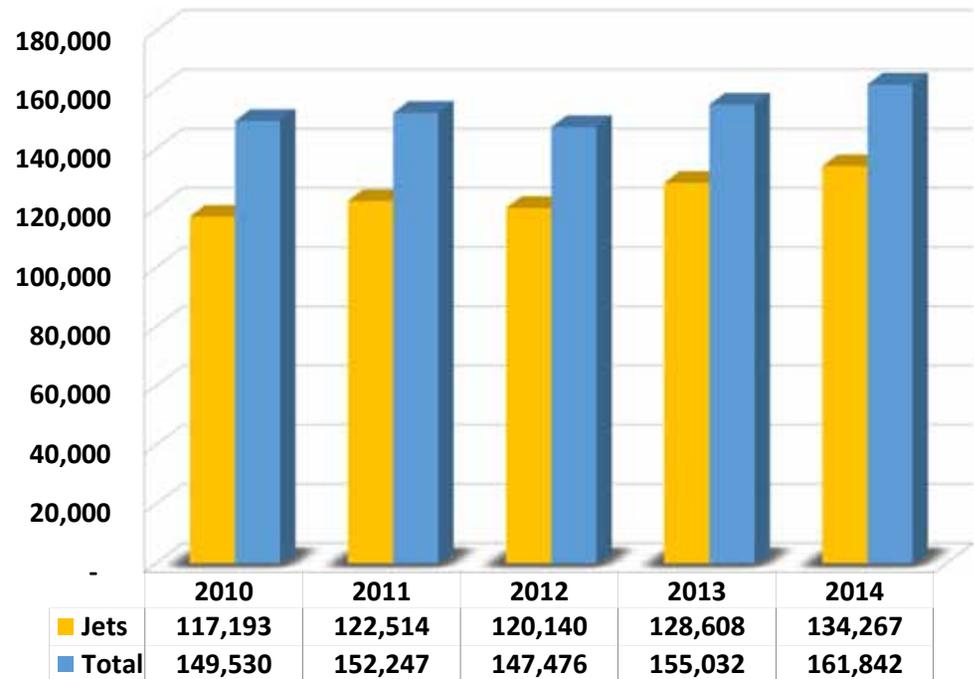
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# Teterboro Airport Overview

- A brief history
  - PA purchased in 1949 and operated for 20 years
  - 30-year lease with Pan Am in 1969
- PANYNJ resumed airport operation in 2000
  - Operations and maintenance contract with AFCO AvPORTS, LLC
- Since 2000, \$155 million spent on major projects

Teterboro Aircraft Movements



# Teterboro Airport Overview

- Existing airport facilities
  - 826 Acres
  - 5 fixed base operators
  - 6 terminals
  - 27 hangars
  - 3 fuel farms
  - 2 customs facilities
  - Engineered materials arresting systems (EMAS) on Runways 6, 19, and 24



# Port Authority Project Contacts and Websites

- Timothy Middleton, Program Manager - EWR and TEB Part 150 Studies
- Adeel Yousuf, Manager – Noise Office
- Address emails to NJPart150@panynj.gov
- TEB Part 150 Website provides most relevant information
  - Will be updated regularly for public outreach purposes
  - TAC will receive direct notices
  - [http://panynjpart150.com/TEB\\_homepage.asp](http://panynjpart150.com/TEB_homepage.asp)
- Port Authority noise information website provides broader information
  - [www.panynj.gov/airports/aircraft-noise-information](http://www.panynj.gov/airports/aircraft-noise-information)



# Comments

- Please submit comments in the manner that is most convenient for you
  - Fill out a comment sheet and leave it today
  - Take the sheet with you and mail or email it to the PANYNJ
  - Write a letter and mail or email it
  - Submit via the study website
- We will consider all comments, address them as appropriate, include them in the study documentation, and provide copies to the FAA
- ***Thank you for your participation!***





# Welcome!

## **Teterboro Airport**

14 CFR Part 150 Noise Compatibility Planning Study

Public Information Workshop #2

September 22, 2016



# Roles and Responsibilities: Part 150 Overall

- **The Port Authority**
  - Directs study - it is the Port Authority's project
  - Submits NEM and NCP documentation to FAA
- **FAA**
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# School Soundproofing Program

- 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 in 77 schools around its airports. This includes five schools that are impacted by Teterboro and soundproofing was completed in 2012.
- A total of over \$38 million USD has been invested in soundproofing these schools which serve over 2,000 students in the area surrounding TEB.

The scope of the soundproofing program includes the following:

- 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 goals approved annually by the FAA

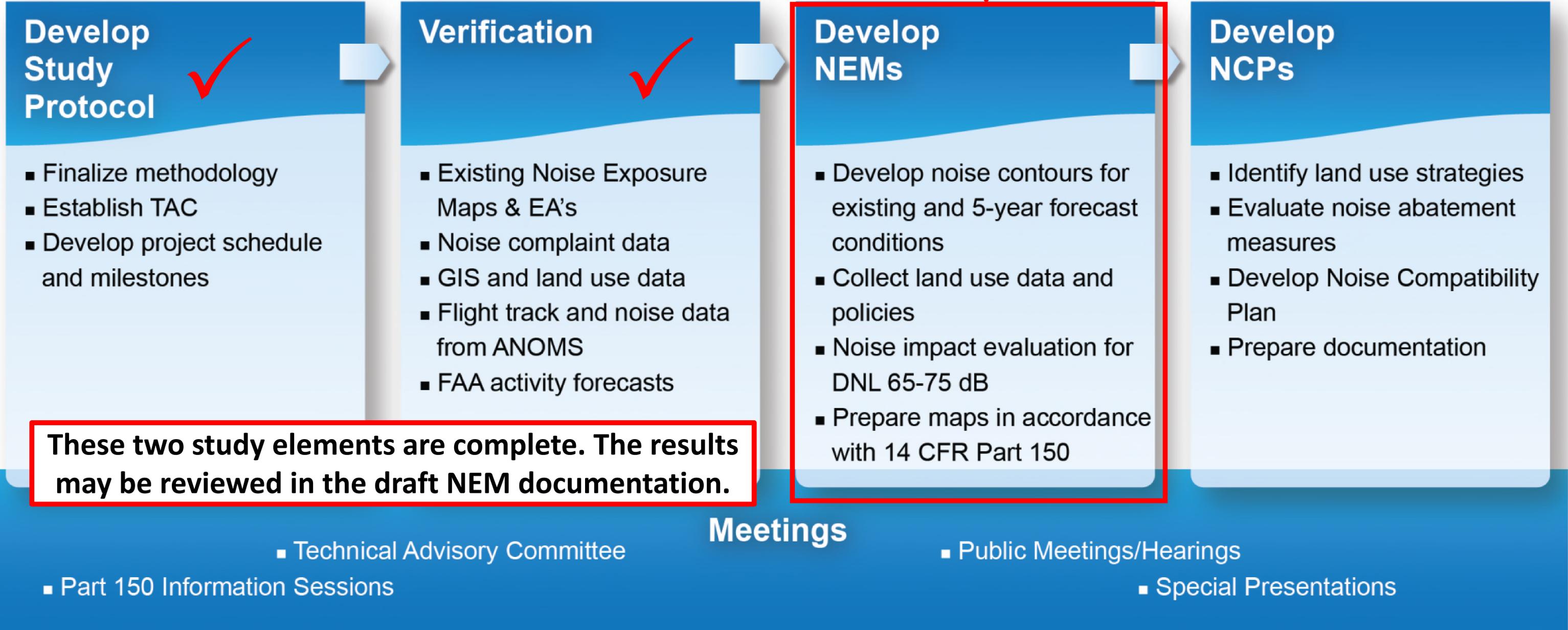
The project is contingent upon federal funding.





# Part 150 Study Process

The presentation of the draft NEM documentation is the primary purpose of this workshop.



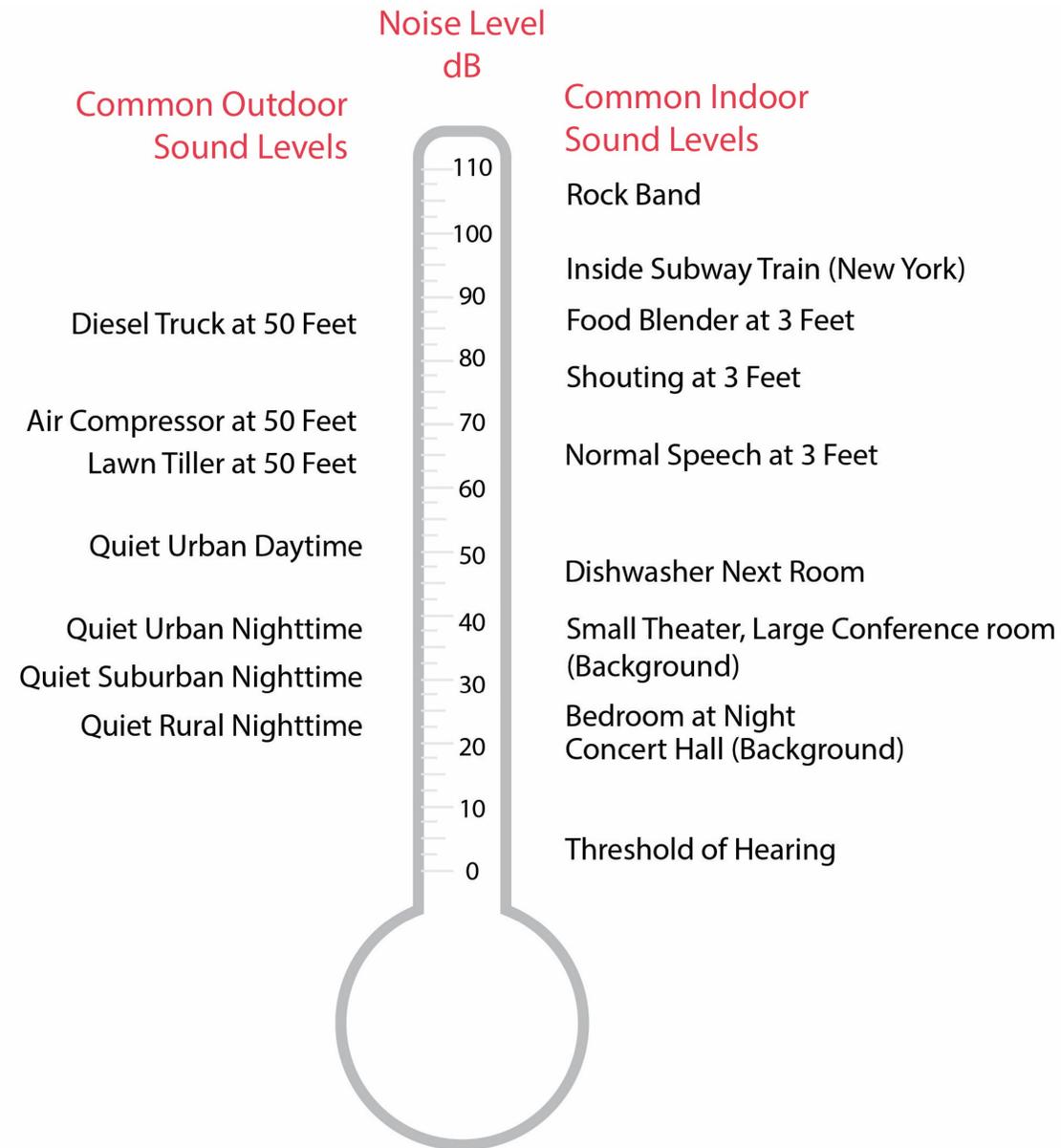
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Develop preliminary Noise Compatibility Program measures	Spring 2017
Evaluate Noise Compatibility Program measures	Spring/Summer 2017
Finalize recommended Noise Compatibility Program	Fall 2017
Public Hearing– Present Noise Compatibility Program	Fall 2017
Submit Noise Compatibility Program to FAA for approval of measures	January 2018



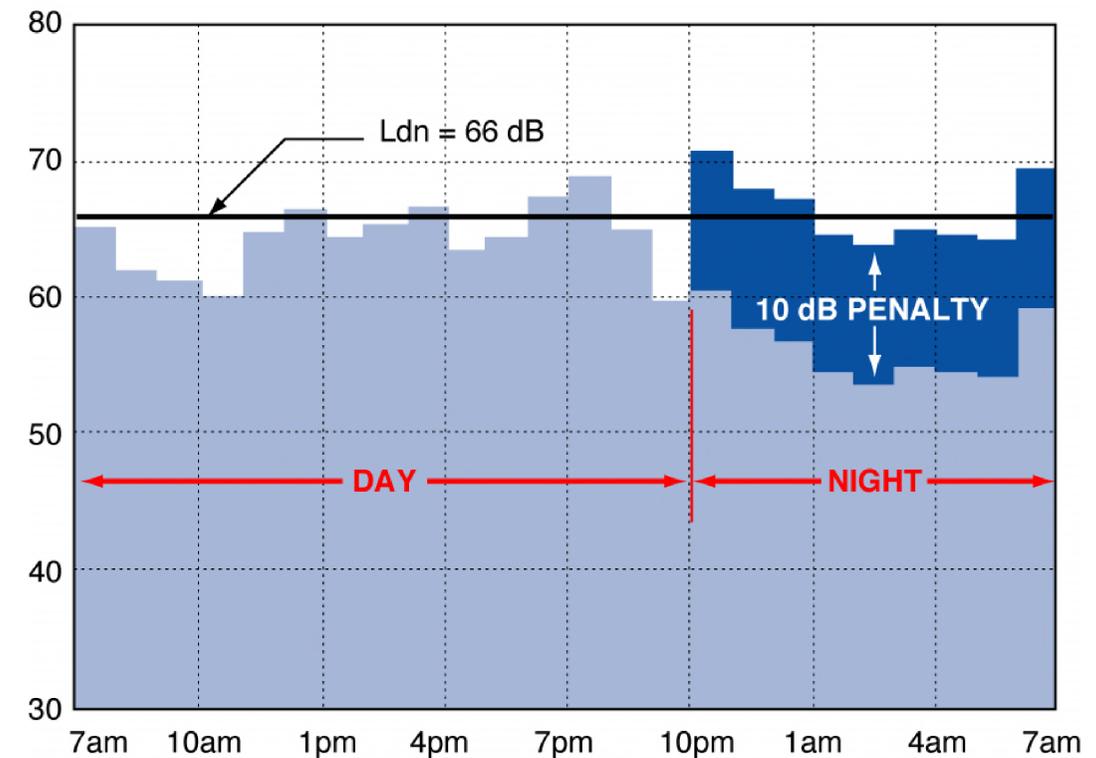
# Noise Terminology

## Common Sound Levels



## Day-Night Average Sound Level (DNL)

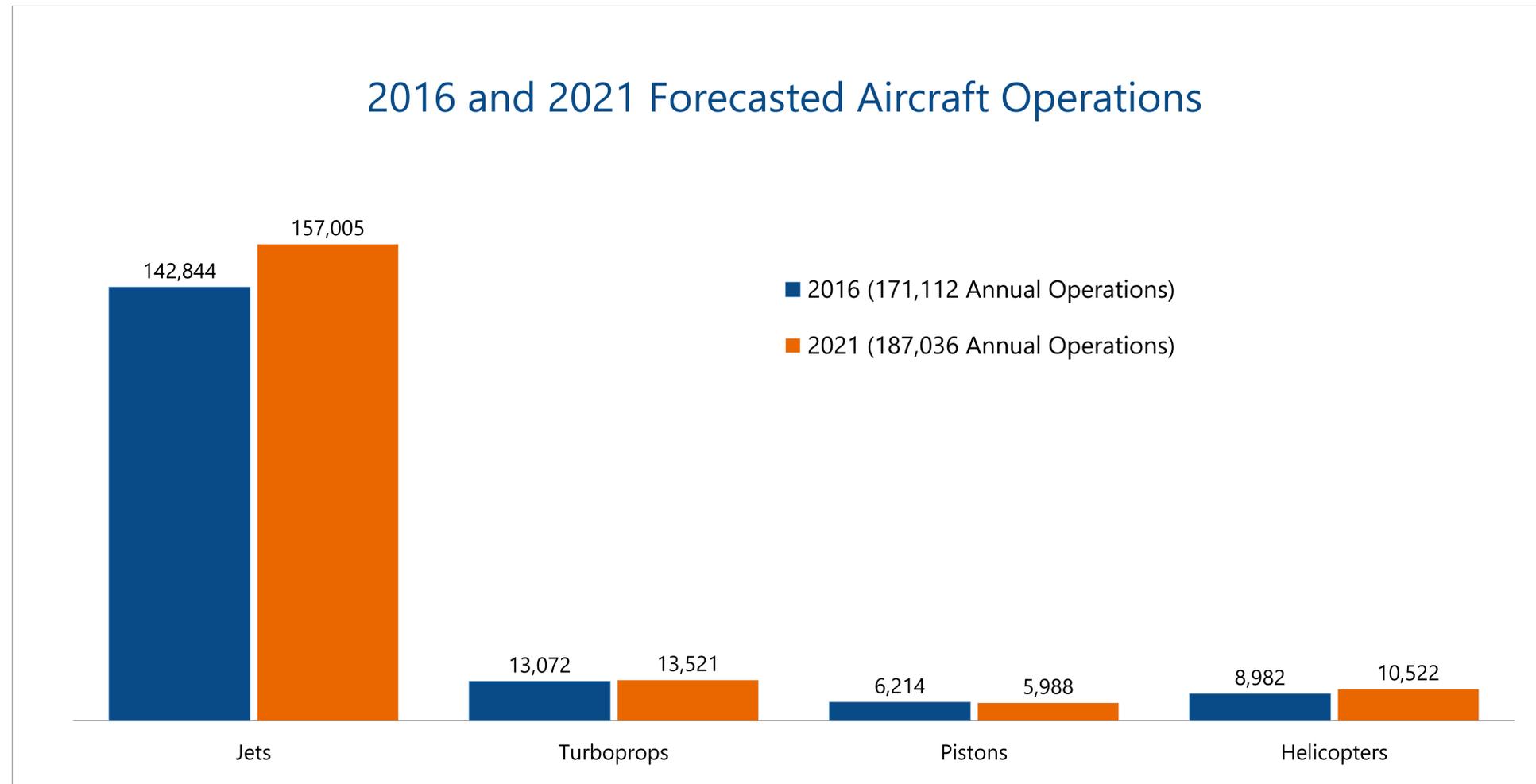
- DNL is the only metric Part 150 requires us to consider
- Computed in the FAA's Integrated Noise Model (INM)
- DNL is an average 24-hour exposure over the course of a year
- Noise from 10 pm to 7 am is factored up by 10 dB
  - "Penalty" is equal to counting each night operation 10 times



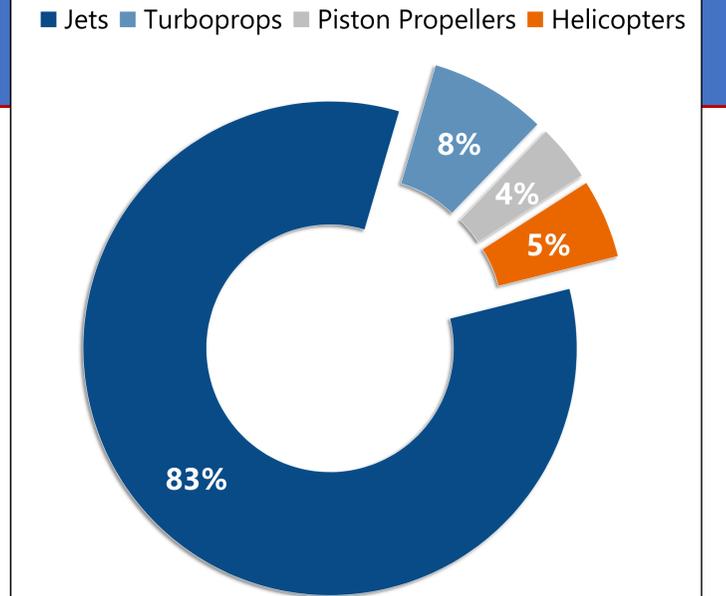
# Operations / Forecast

- The Port Authority and the Study Team developed the detailed forecast
- FAA approved forecast as consistent with its “Terminal Area Forecast”

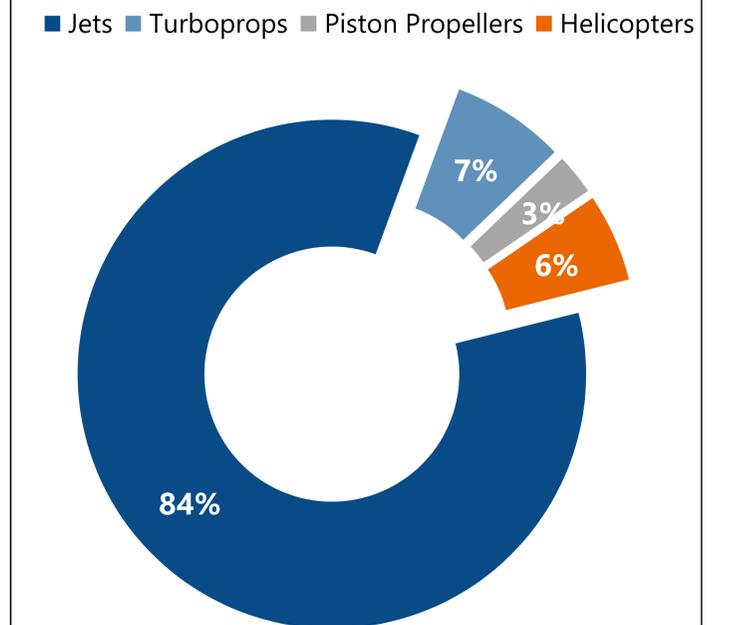
2016 and 2021 Forecasted Aircraft Operations



2016 Fleet Mix

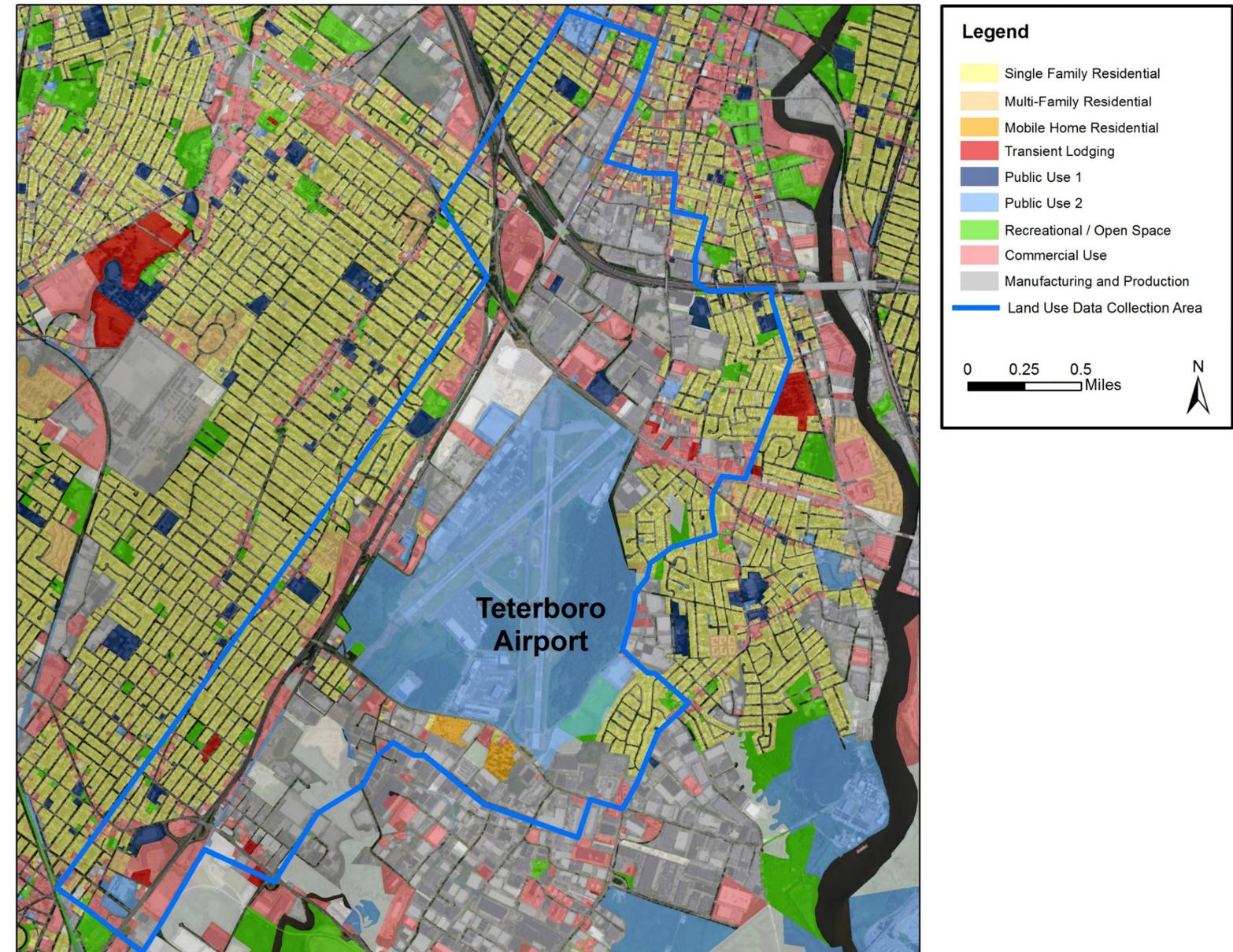


2021 Fleet Mix



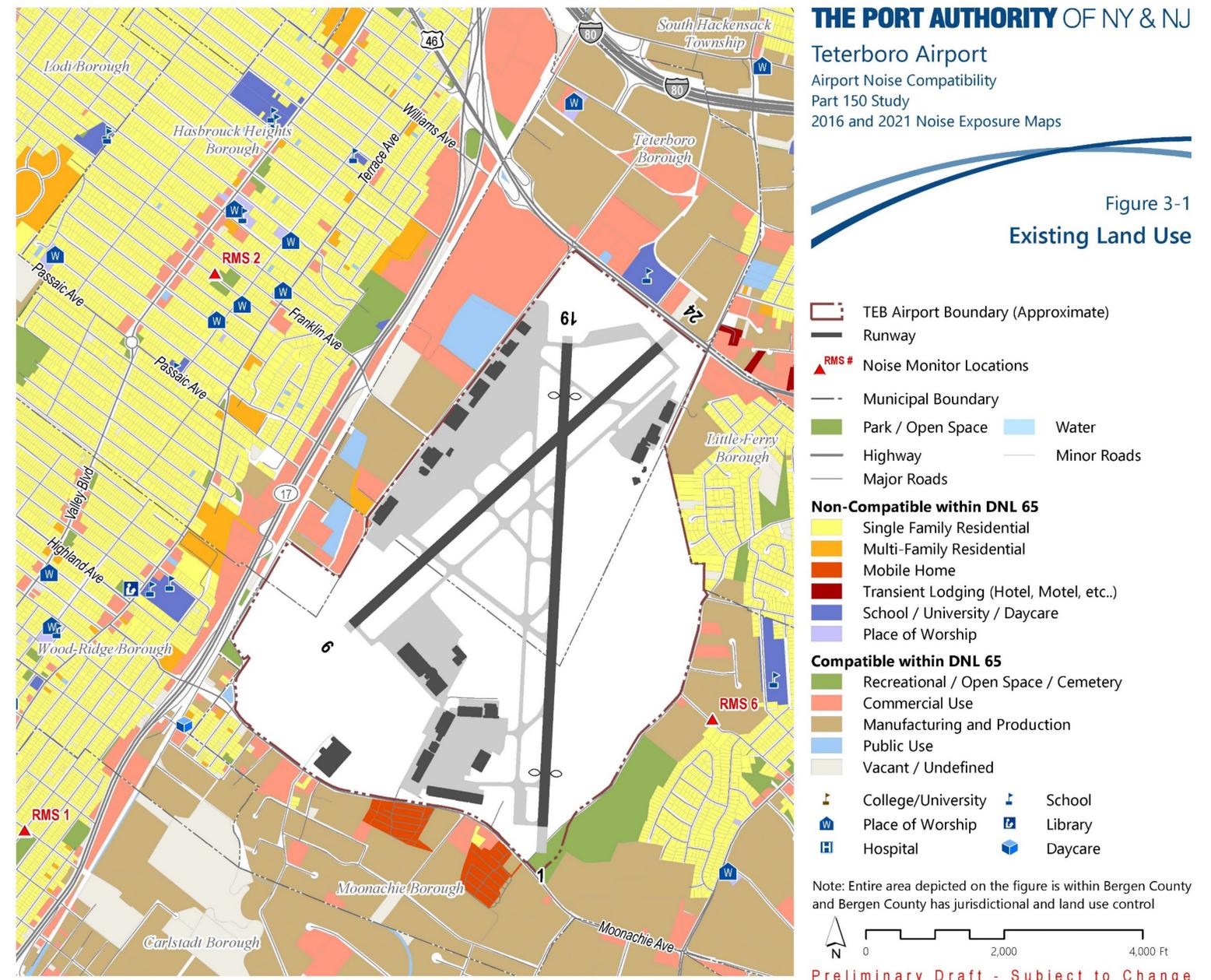
# Land Use – Process and Jurisdiction

- Primary data collection steps include:
  - Assemble and review land use, zoning, and population data
  - Identify local land use policies that address airport operations
  - Create existing land use maps
  - Conduct land use reconnaissance surveys
  - Assess and address any deficiencies of land use data
- Primary jurisdiction consultation steps:
  - Conduct initial outreach for data collection purposes
  - Interview land use planners and municipal officials
  - Identify and discuss existing land use policies and strategies



# Land Use Map

- Generalized land uses over full area covered in NEM figures
- Part 150 only requires analysis of land use within 65 DNL
- Noise abatement alternatives may extend contours within this larger area



Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



# Land Use – Part 150 Land Use Compatibility Guidelines

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
<b>Residential Use</b>						
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
<b>Public Use</b>						
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
<b>Commercial Use</b>						
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	Y(2)	Y(3)	Y(4)	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
<b>Manufacturing and Production</b>						
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
<b>Recreational</b>						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

## Key

SLCUM: 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.

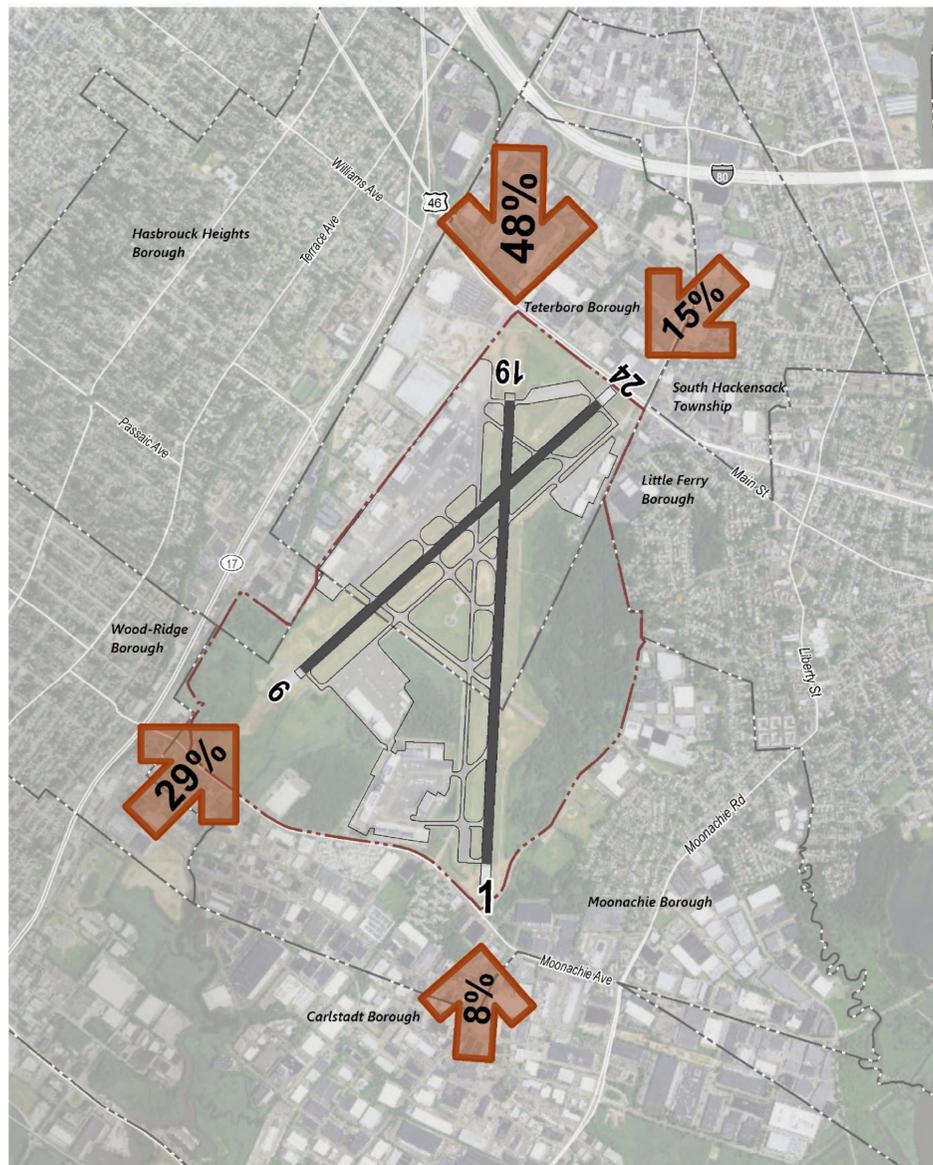
## Notes

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.



# Noise Model Inputs – Runway Utilization



**THE PORT AUTHORITY OF NY & NJ**  
**Teterboro Airport**  
 Airport Noise Compatibility  
 Part 150 Study  
 2016 and 2021 Noise Exposure Maps

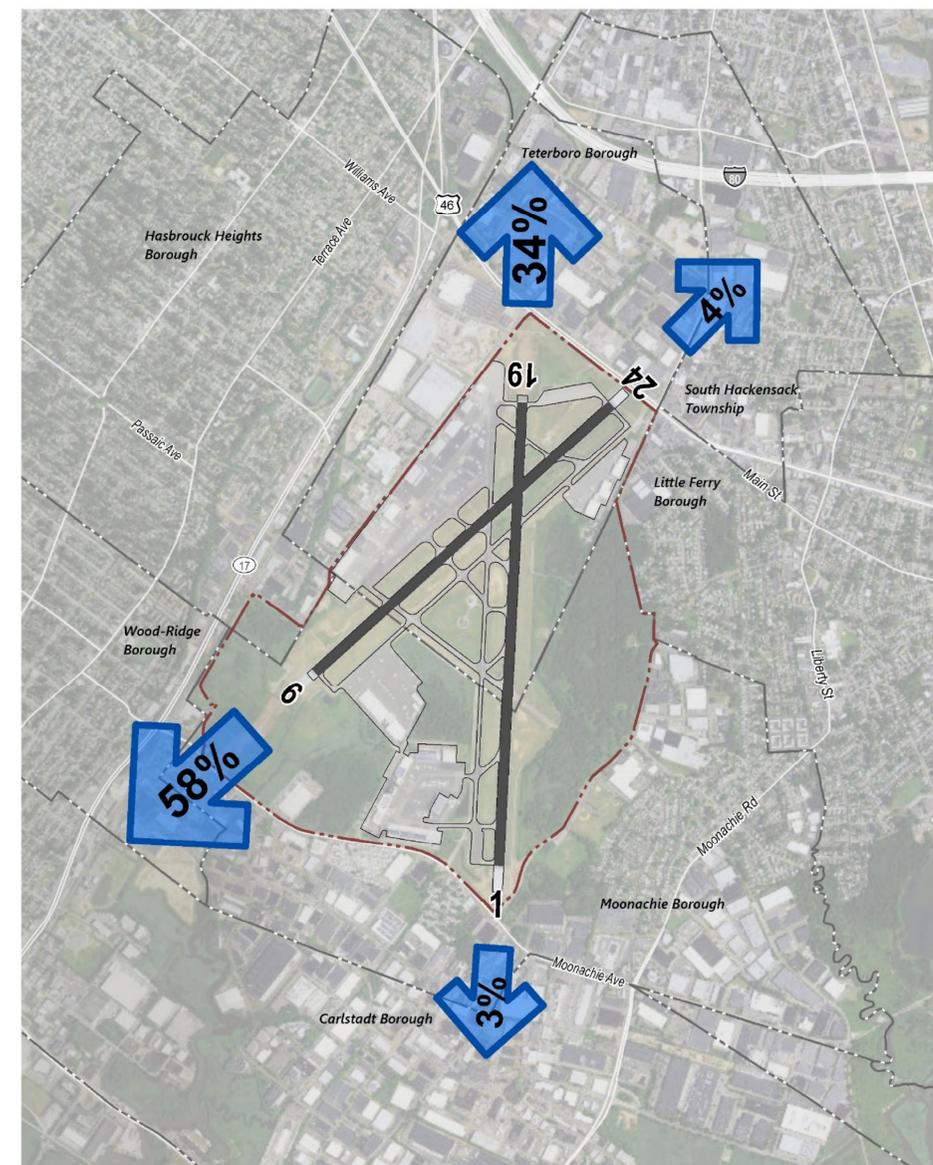
## Noise Modeling Runway Utilization Arrivals

- TEB Airport Boundary (Approximate)
- Runway
- Municipal Boundary



Preliminary Draft - Subject to Change

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; New Jersey Geographic Information Network (NJGIN)



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 Airport Noise Compatibility  
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## Noise Modeling Runway Utilization Departures

- TEB Airport Boundary (Approximate)
- Runway
- Municipal Boundary



Preliminary Draft - Subject to Change

**Note:**  
 Departure percentages do not add to 100% due to rounding.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; New Jersey Geographic Information Network (NJGIN)



# Noise Model Inputs – Flight Track Creation Process

## Step 1:

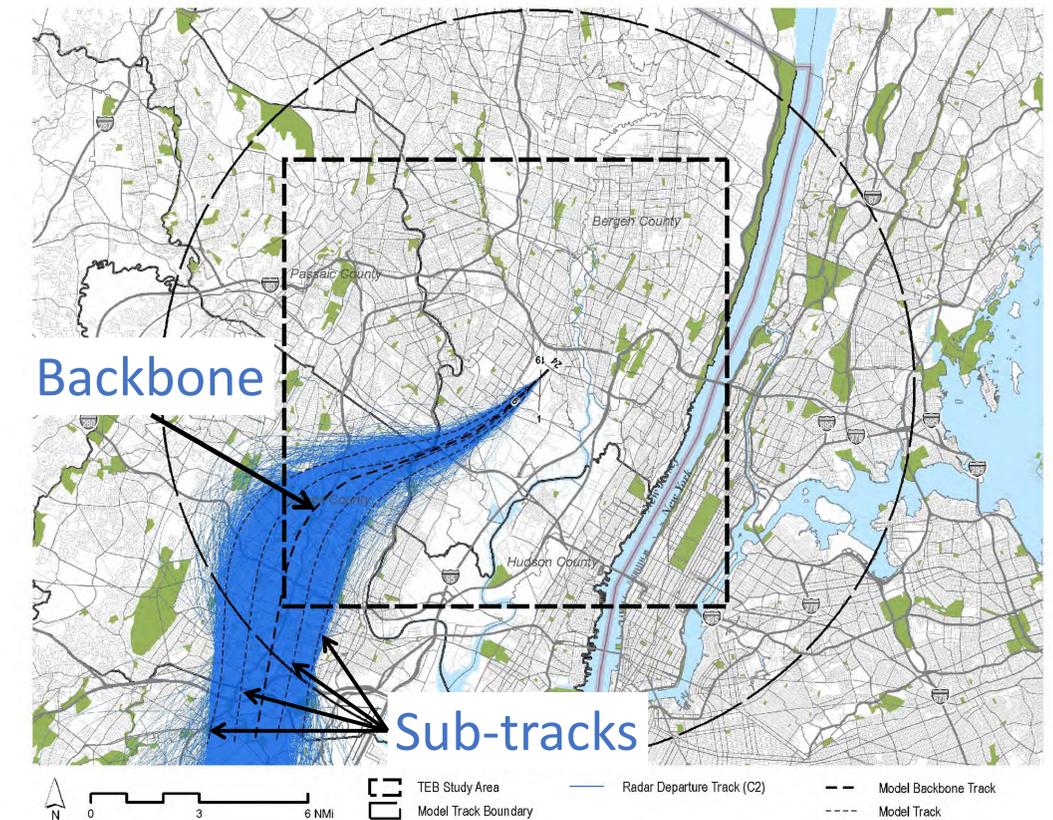
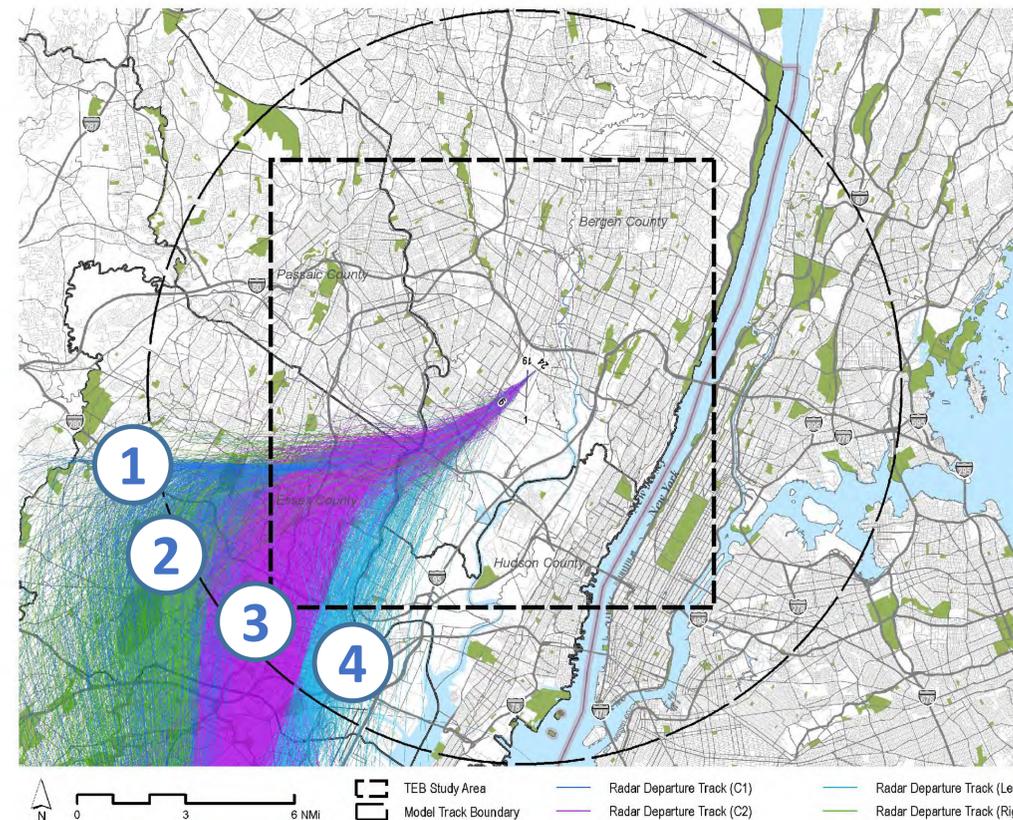
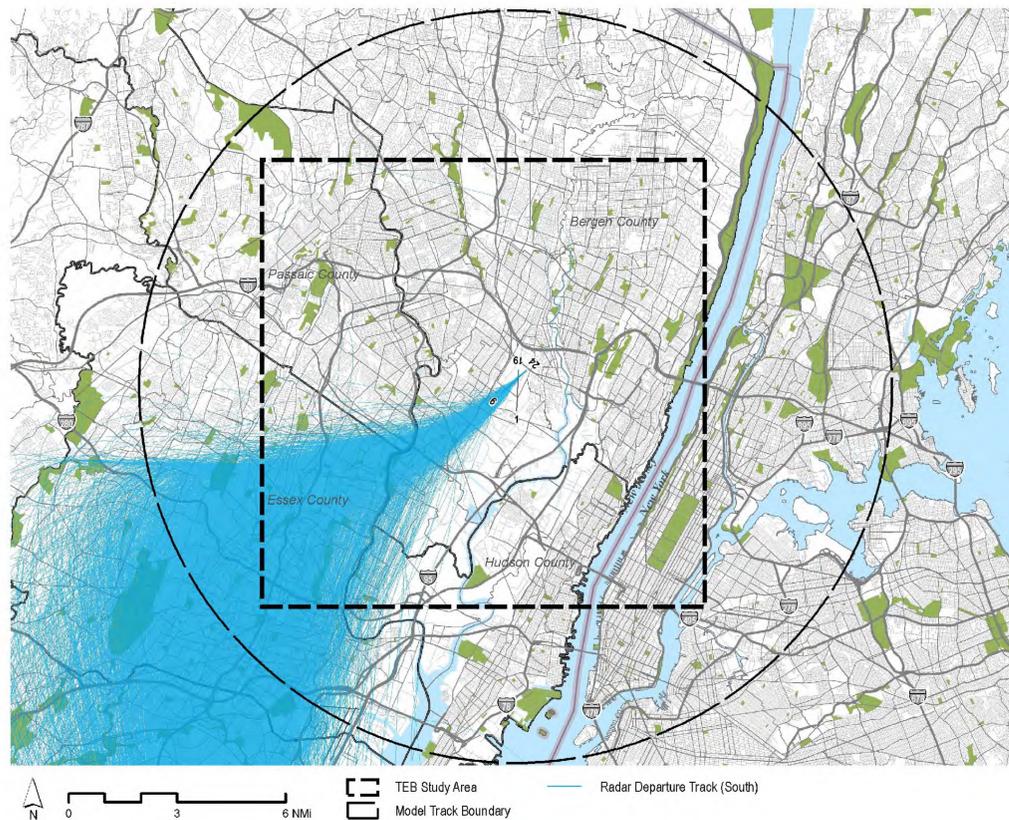
- Select a group of tracks
- Example: Jet departures on Runway 24 to the south

## Step 2:

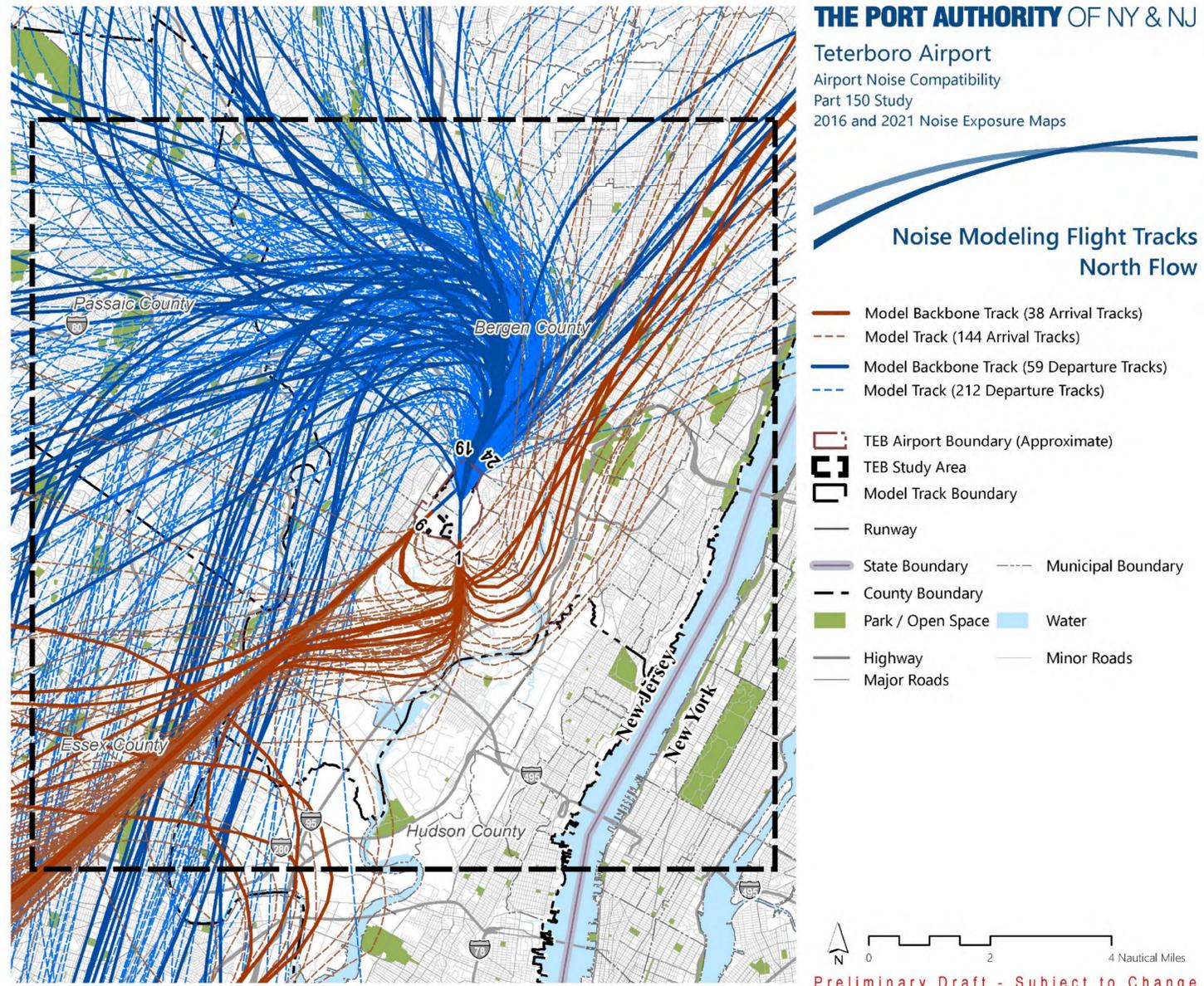
- Separate into bundles
- Example: Four bundles

## Step 3:

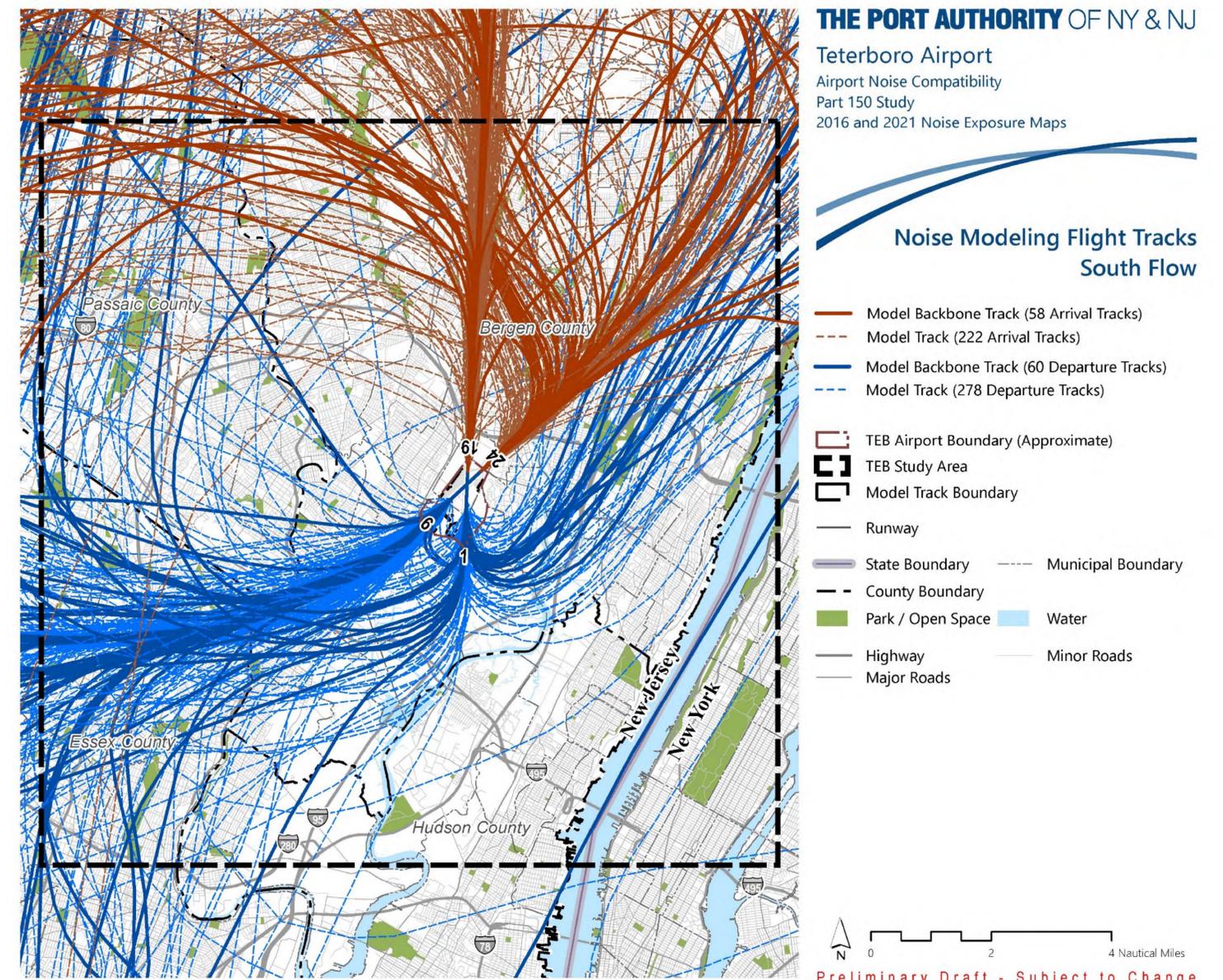
- Create model tracks for each bundle
- Example: Bundle #3



# Noise Model Inputs – Modeled Fixed-Wing Flight Tracks



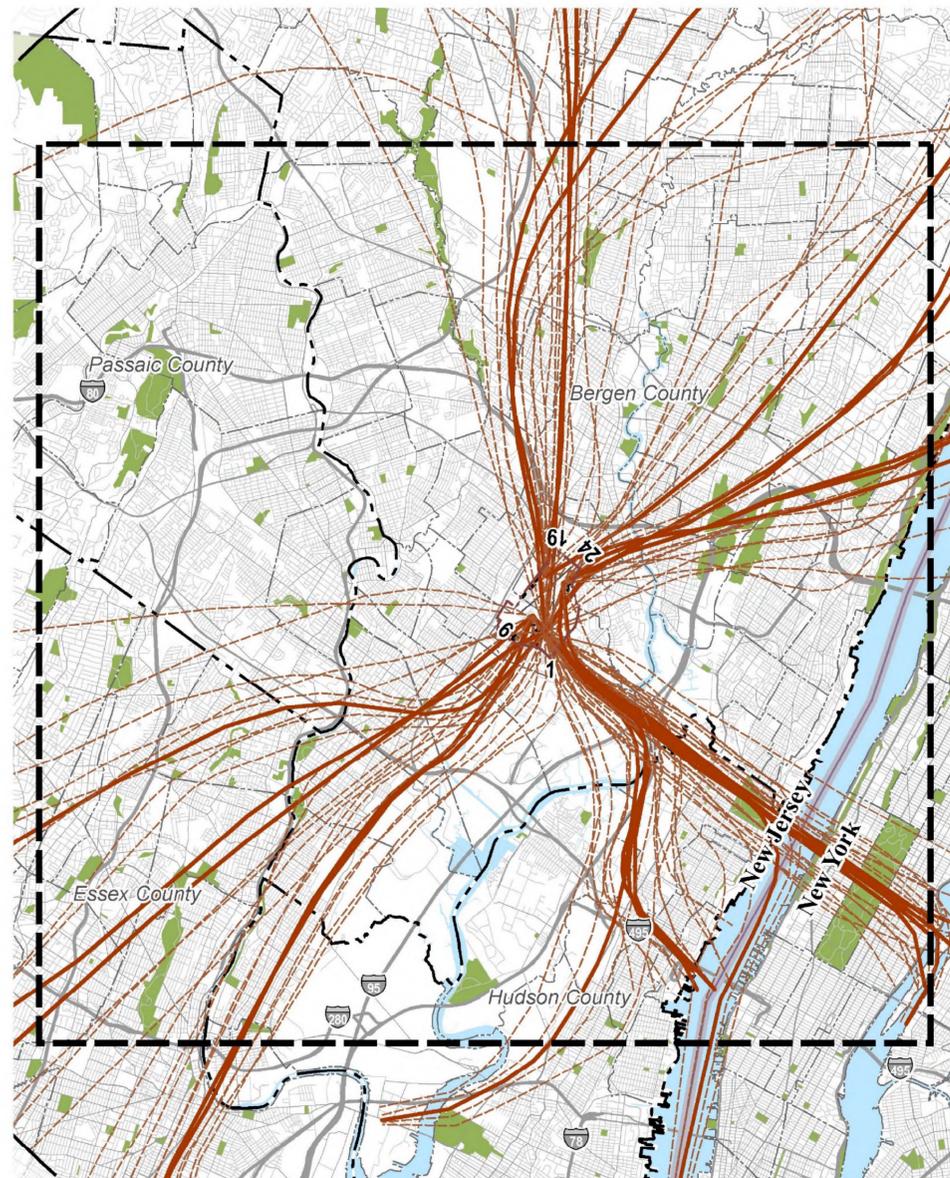
Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



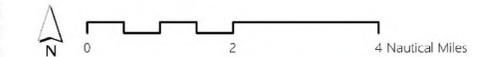
# Noise Model Inputs – Helicopter Flight Tracks



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 Airport Noise Compatibility  
 Part 150 Study  
 2016 and 2021 Noise Exposure Maps

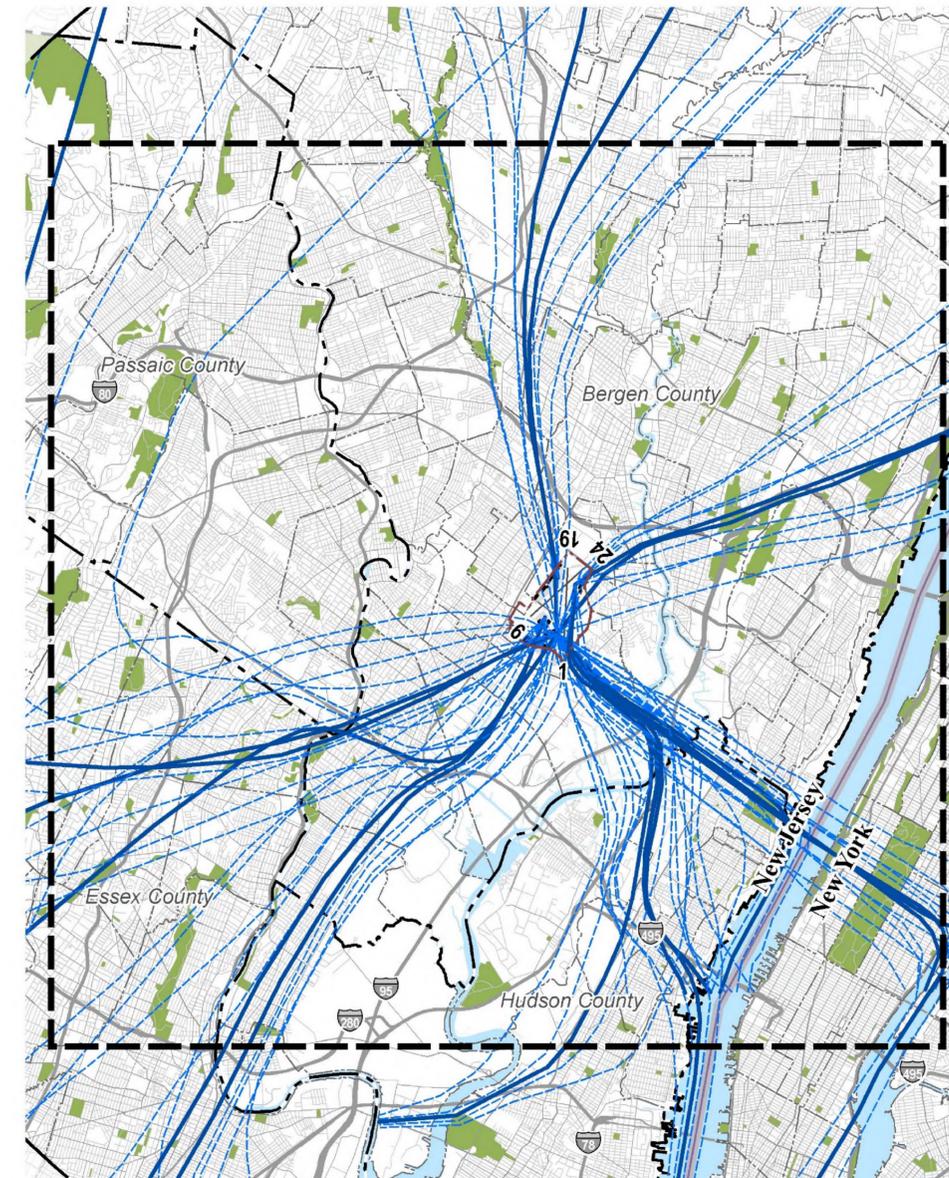
## Noise Modeling Flight Tracks Helicopter Arrivals

- Model Backbone Track (25 Arrival Tracks)
- Model Track (88 Arrival Tracks)
- TEB Airport Boundary (Approximate)
- TEB Study Area
- Model Track Boundary
- Runway
- State Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Major Roads
- Municipal Boundary
- Minor Roads



Preliminary Draft - Subject to Change

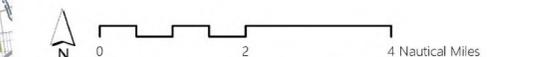
Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



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## Noise Modeling Flight Tracks Helicopter Departures

- Model Backbone Track (17 Departure Tracks)
- Model Track (64 Departure Tracks)
- TEB Airport Boundary (Approximate)
- TEB Study Area
- Model Track Boundary
- Runway
- State Boundary
- County Boundary
- Park / Open Space
- Water
- Highway
- Major Roads
- Municipal Boundary
- Minor Roads



Preliminary Draft - Subject to Change

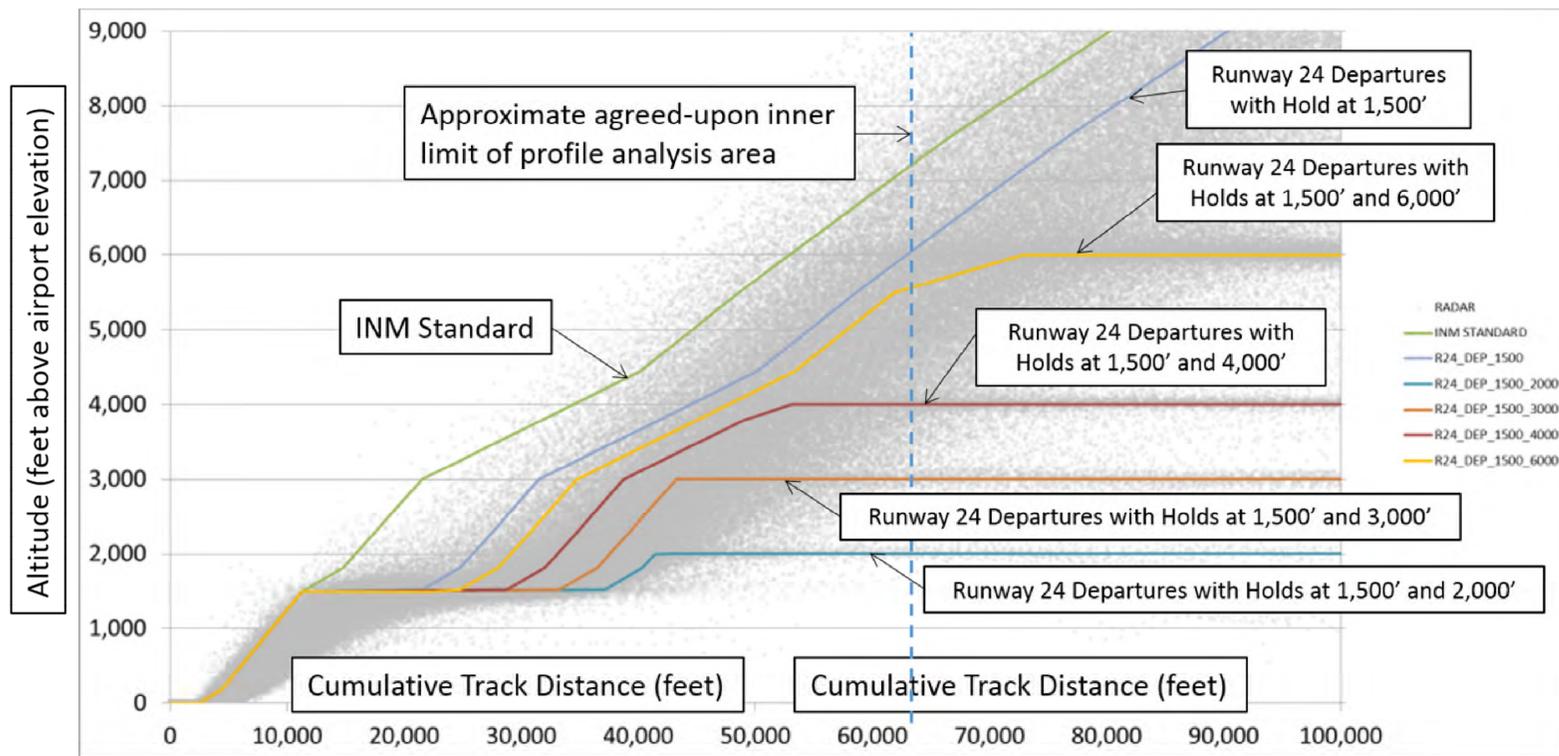
Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



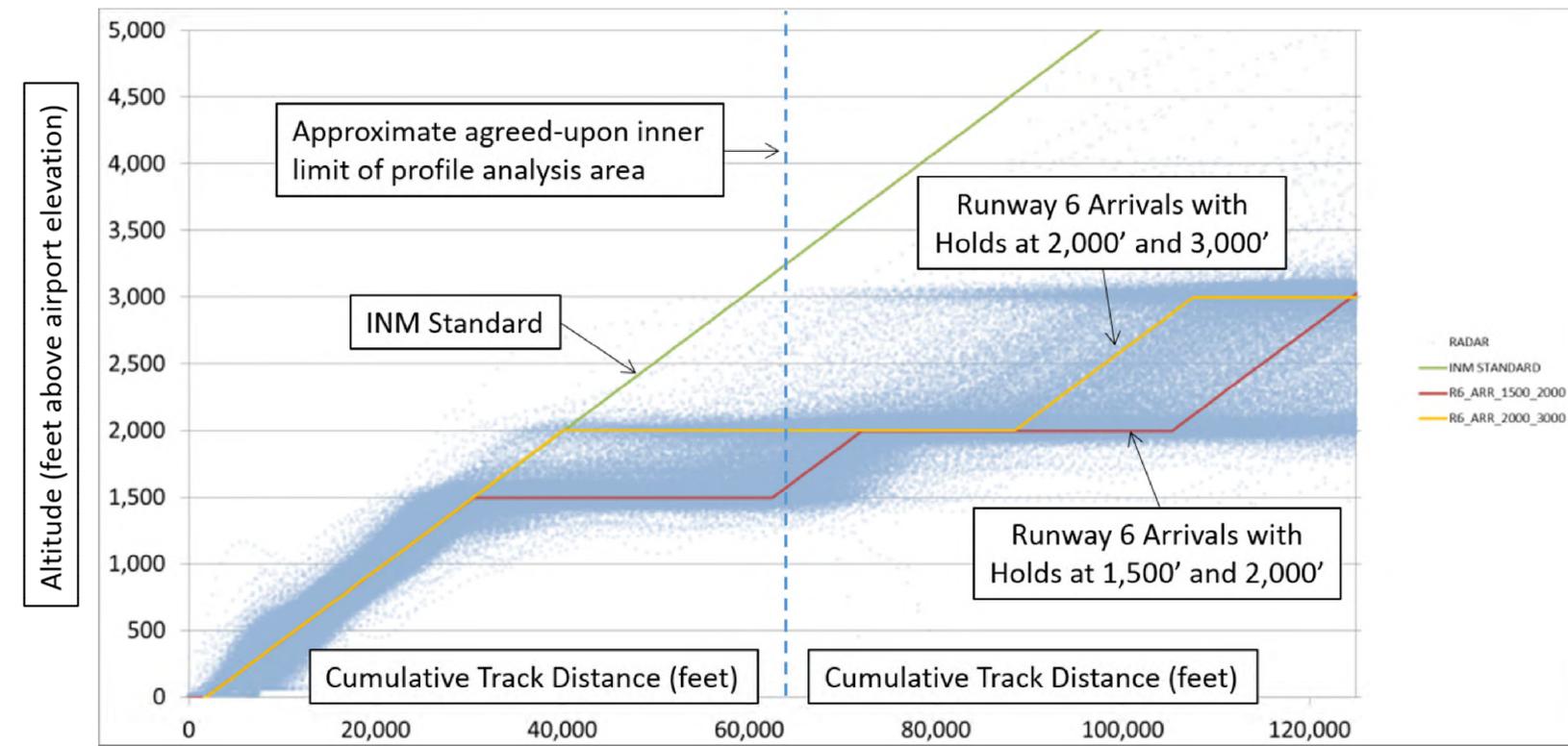
# Noise Model Inputs – User-Defined Flight Profiles

- Purpose is to reflect airspace-related altitude holds
- Lear 35 departure and arrival examples presented below
- FAA has reviewed and approved

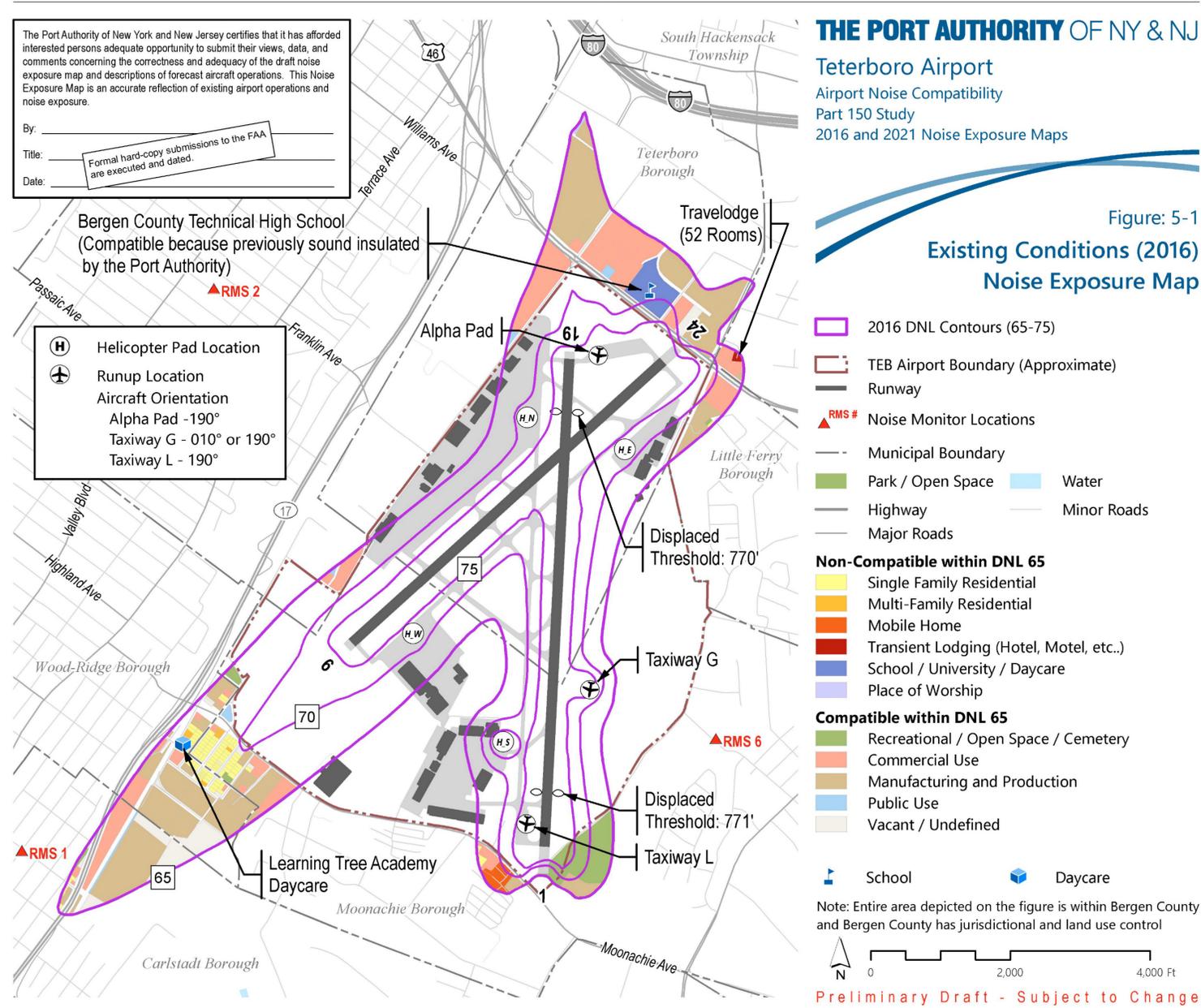
Departures



Arrivals



# Noise Exposure Map – 2016 NEM



## Residential Units within 2016 65 DNL Contour Interval

Year	Metric	Dwelling Units within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2016	Single Family	95	0	0	95
	Multi-Family	19	0	0	19
	Mobile Home	44	8	0	52
	<b>Total</b>	<b>158</b>	<b>8</b>	<b>0</b>	<b>166</b>

Source: 2010 US Census Block Data, RS&H, HMMH, 2016

## Population within 2016 65 DNL Contour Interval

Year	Metric	Population within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2016	Single Family	230	0	0	230
	Multi-Family	46	0	0	46
	Mobile Home	106	19	0	125
	<b>Total</b>	<b>382</b>	<b>19</b>	<b>0</b>	<b>401</b>

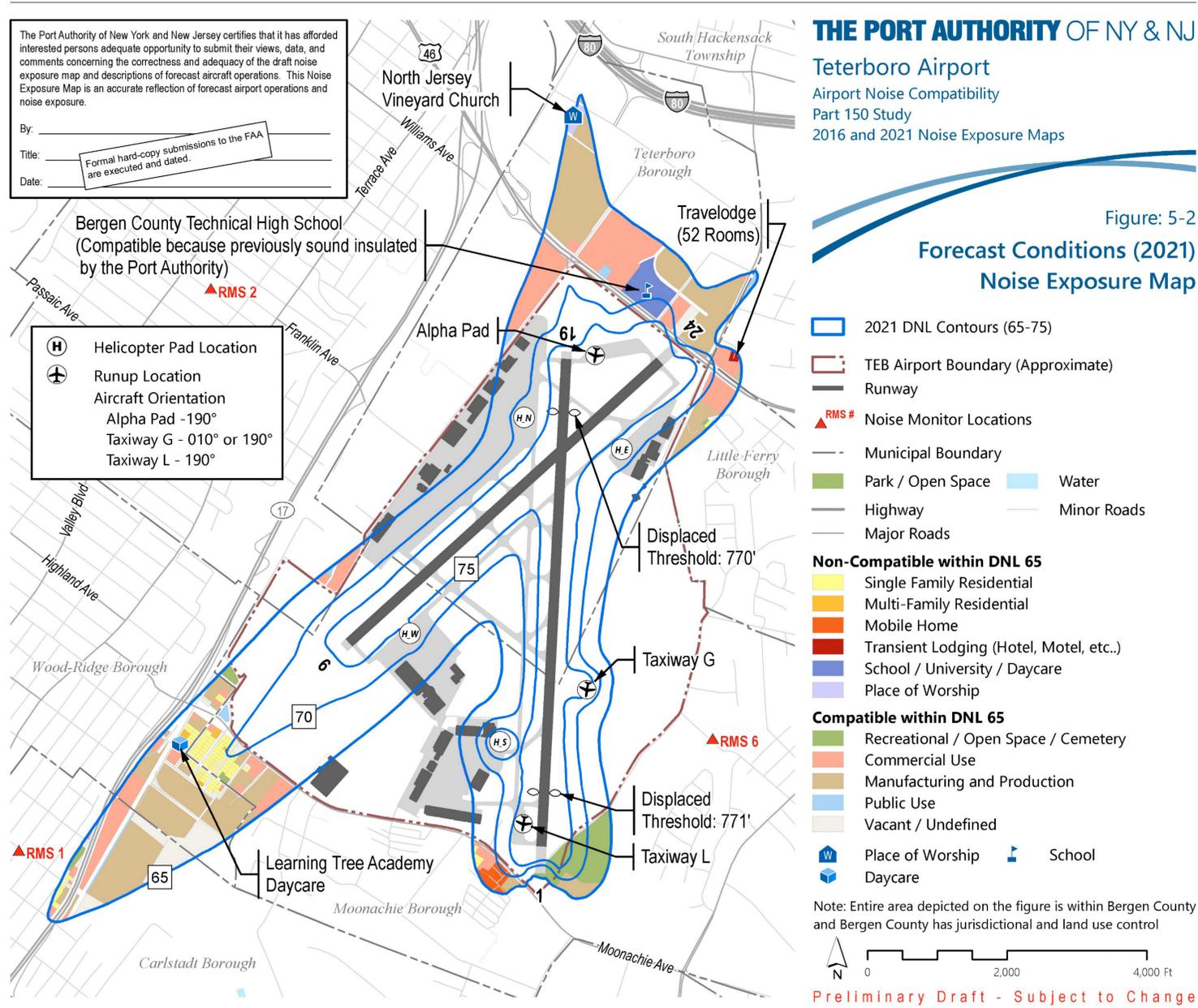
Source: 2010 US Census Block Data, RS&H, HMMH, 2016

## Noise Sensitive Sites within 2016 65 DNL Contour

Year	Noise Sensitive Site	Type	Address	Town
2016	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
	Bergen County Technical School (Previously Sound Insulated)	School	504 US-46	Teterboro



# Noise Exposure Map – 2021 NEM



## Residential Units within 2021 65 DNL Contour Interval

Year	Metric	Dwelling Units within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2021	Single Family	95	5	0	100
	Multi-Family	19	2	0	21
	Mobile Home	48	10	0	58
	<b>Total</b>	<b>162</b>	<b>17</b>	<b>0</b>	<b>179</b>

Source: 2010 US Census Block Data, RS&H, HMMH, 2016

## Population within 2021 65 DNL Contour Interval

Year	Metric	Population within DNL Contour Interval			
		65-70	70-75	>75	Total >65
2021	Single Family	230	12	0	242
	Multi-Family	46	5	0	51
	Mobile Home	116	24	0	140
	<b>Total</b>	<b>392</b>	<b>41</b>	<b>0</b>	<b>433</b>

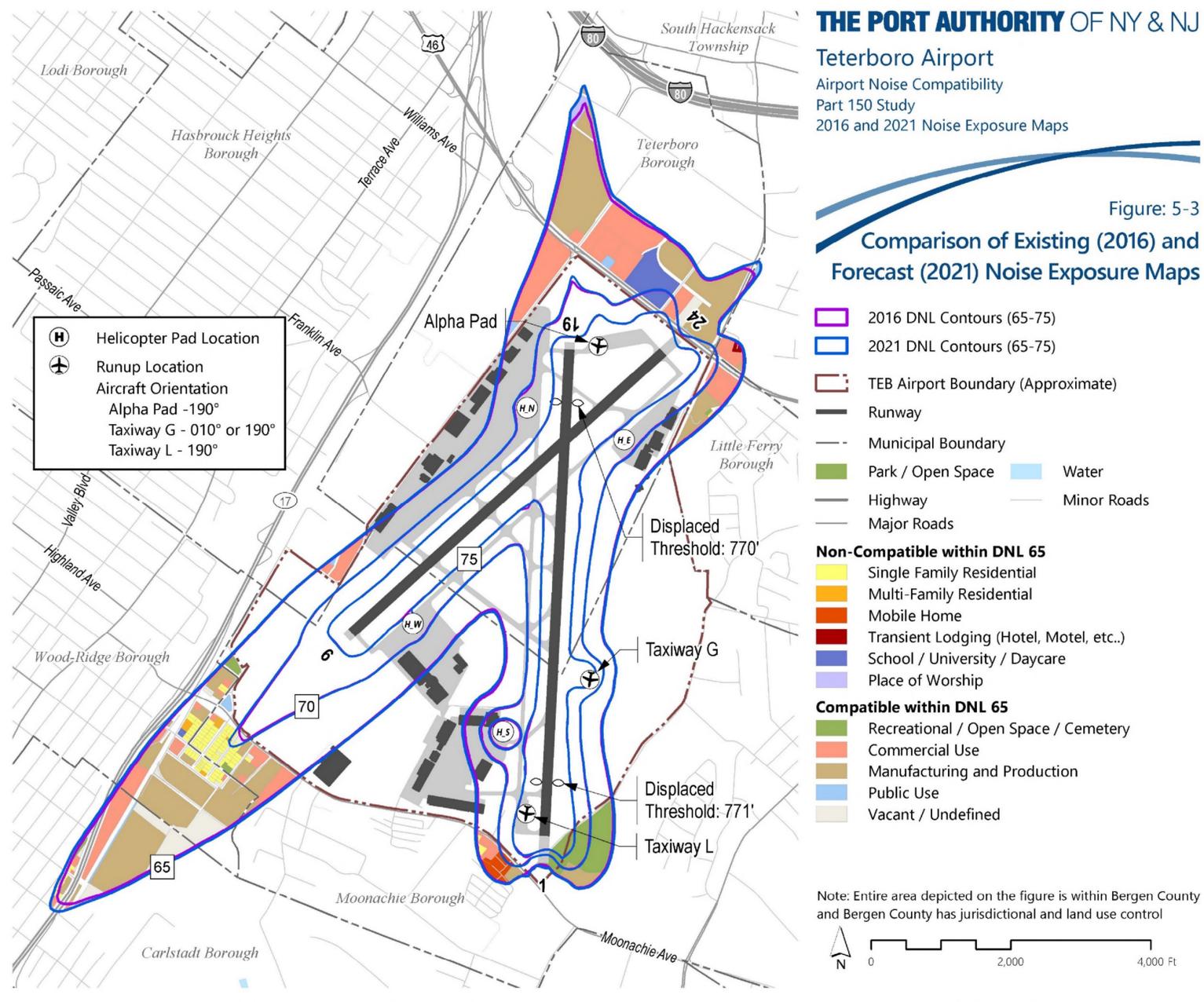
Source: 2010 US Census Block Data, RS&H, HMMH, 2016

## Noise Sensitive Sites within 2021 65 DNL Contour

Year	Noise Sensitive Site	Type	Address	Town
2021	Learning Tree Academy	Daycare	150 Park Place East	Wood-Ridge
	Bergen County Technical School (Previously Sound Insulated)	School	504 US-46	Teterboro
	North Jersey Vineyard Church	Church	370 North St.	Teterboro



# Noise Exposure Map – 2016 and 2021 NEMs



## Compatible and Non-Compatible Land Area within the 2016 and 2021 65 DNL Contours

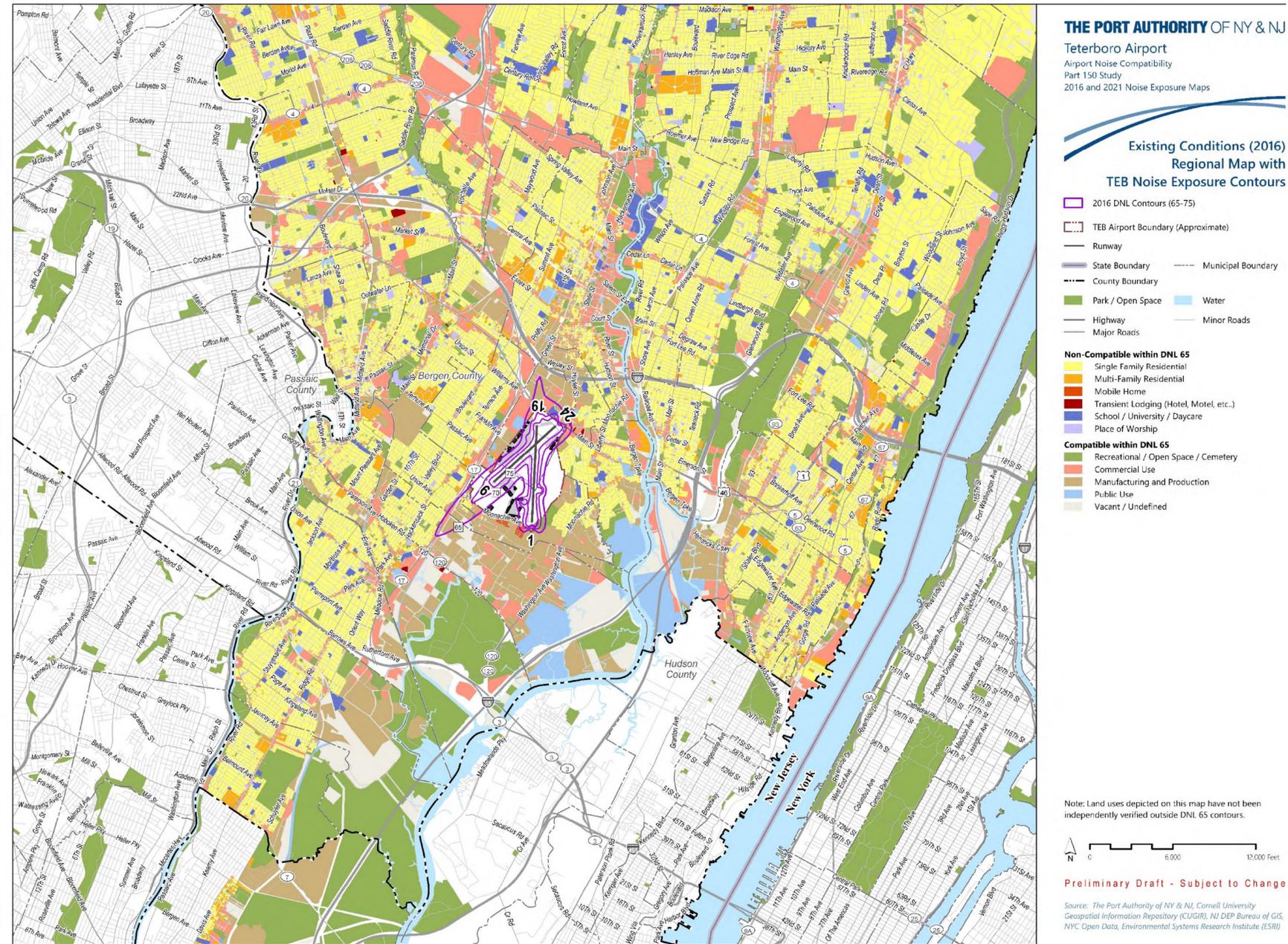
Year	Land Use within the 65 DNL	Area Outside Airport Boundary (Square Miles)
2016	Compatible	0.344
	Non-Compatible	0.035
	Total	0.379
2021	Compatible	0.365
	Non-Compatible	0.038
	Total	0.403

Source: HMMH, 2016

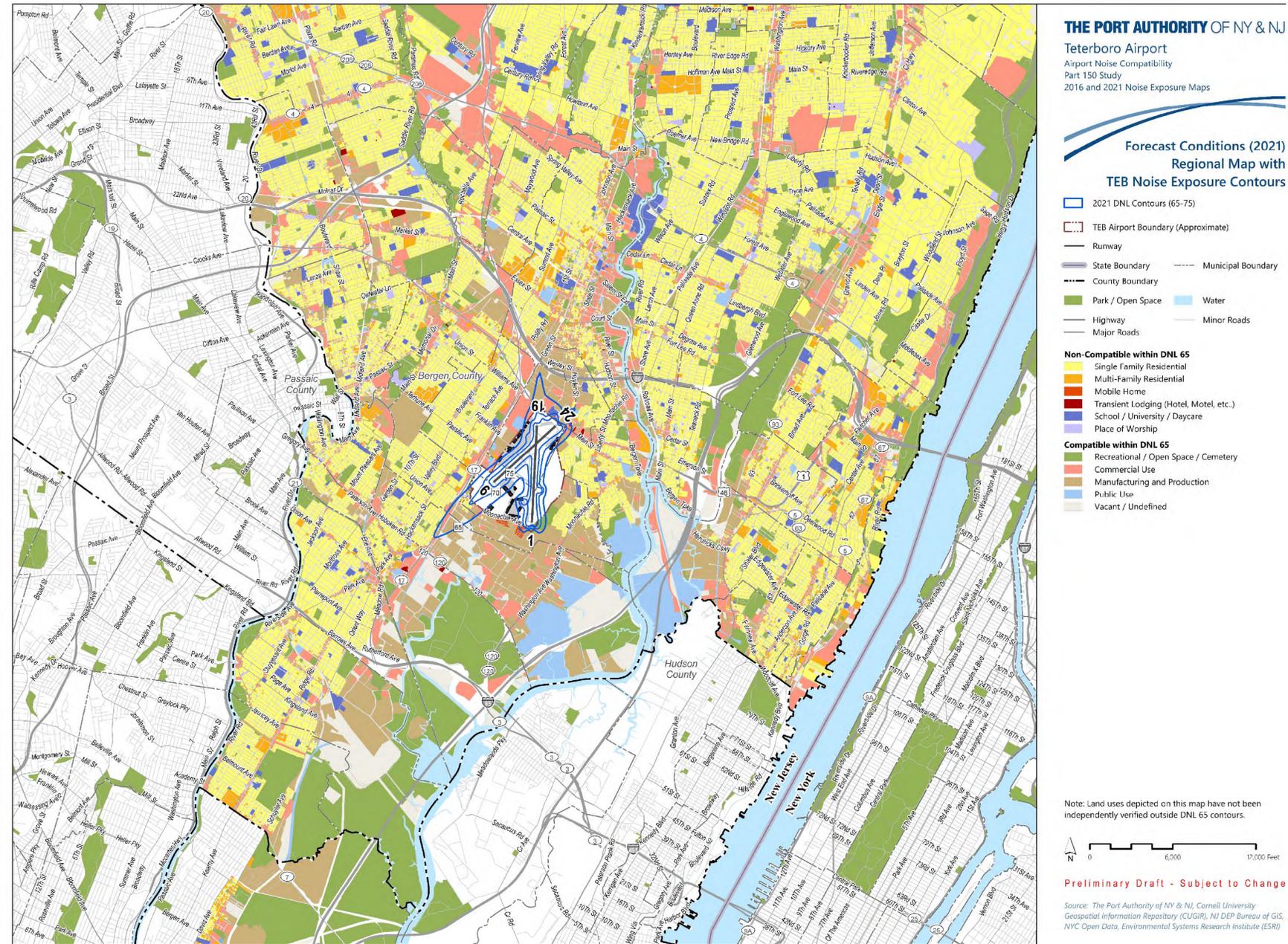
Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



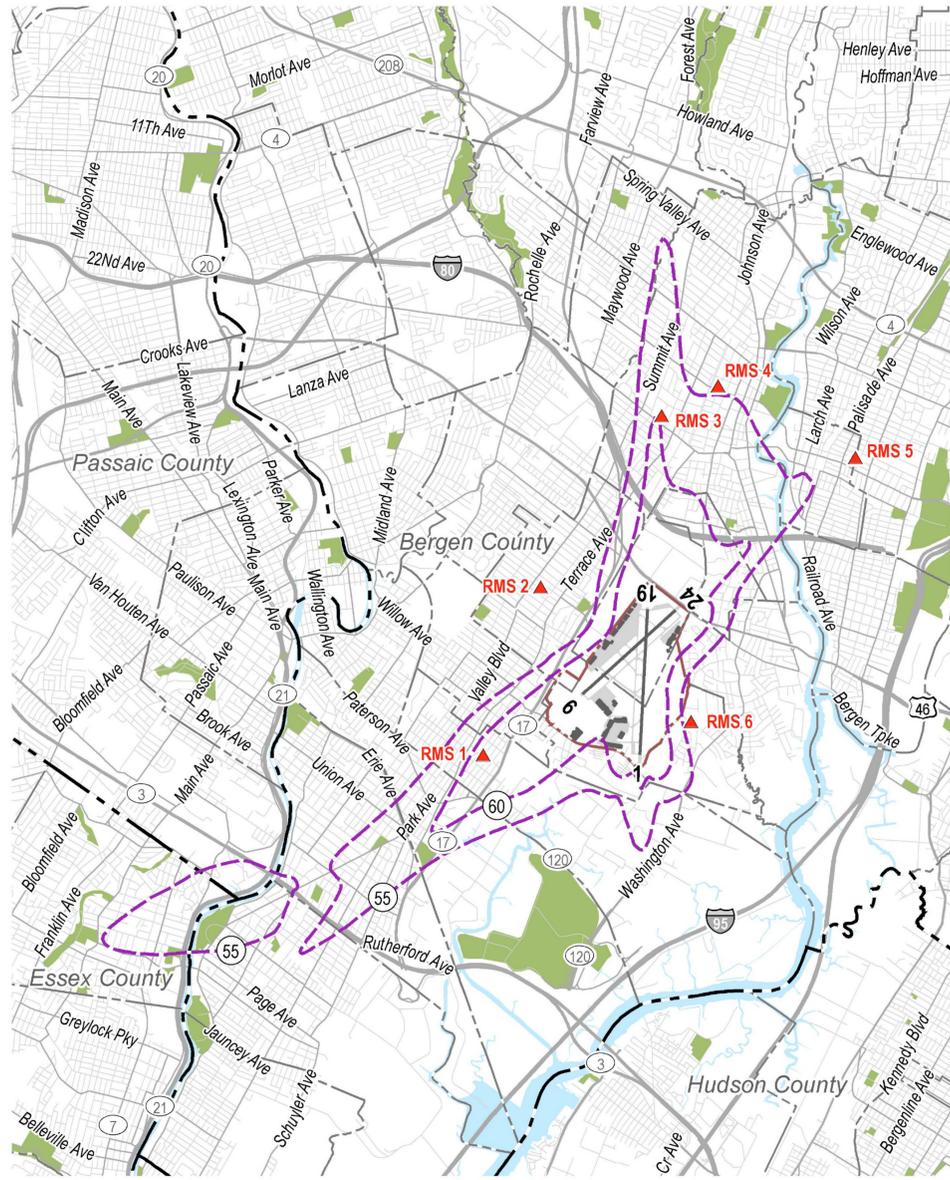
# 2016 DNL Contours with Regional Land Use



# 2021 DNL Contours with Regional Land Use



# DNL 55 and 60 Contours



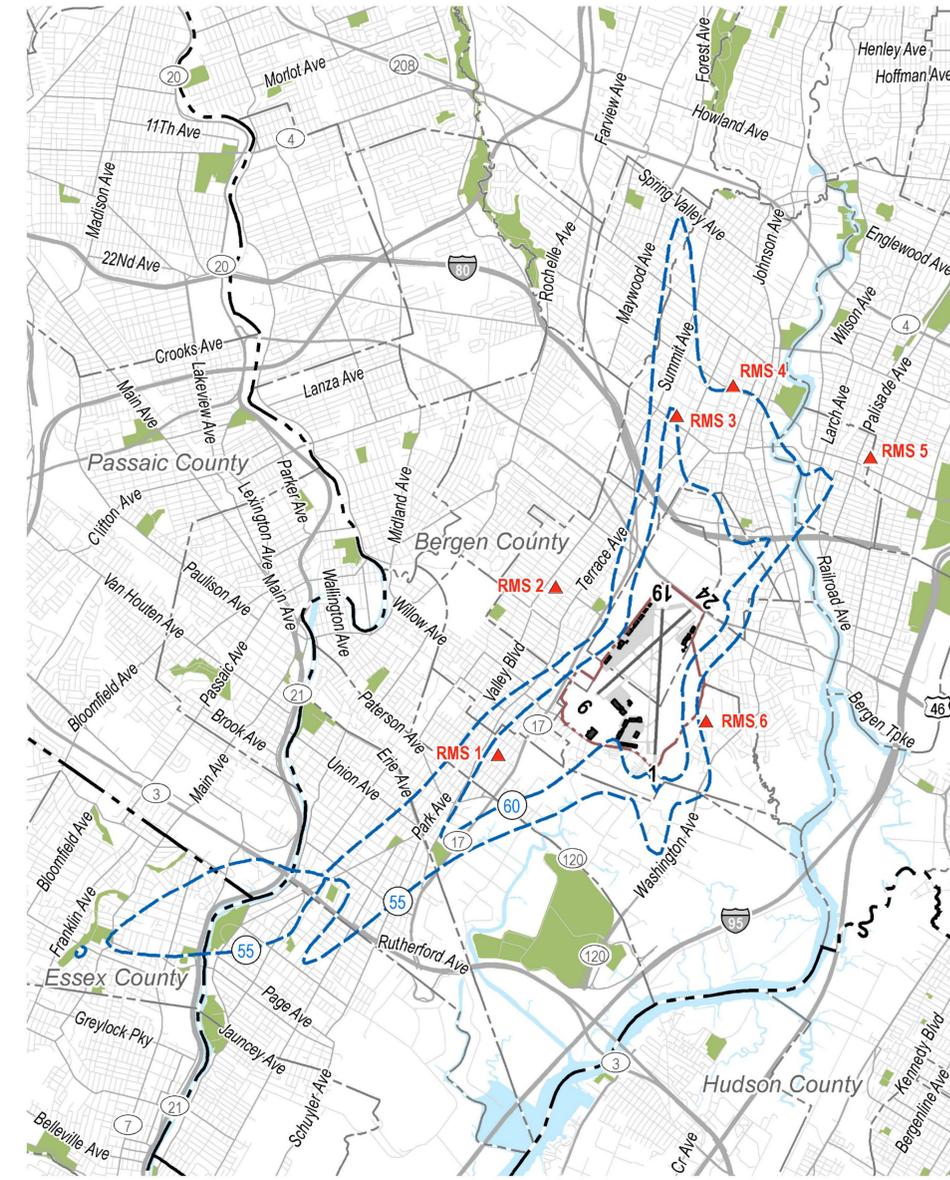
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**Teterboro Airport**  
 Airport Noise Compatibility  
 Part 150 Study  
 2016 and 2021 Noise Exposure Maps

Figure: E-1  
 2016 DNL 55 and 60 Contours

- 2016 DNL Contours (55-60)
- TEB Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- Municipal Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

0 8,000 16,000 Ft  
 Preliminary Draft - Subject to Change

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



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 Part 150 Study  
 2016 and 2021 Noise Exposure Maps

Figure: E-2  
 2021 DNL 55 and 60 Contours

- 2021 DNL Contours (55-60)
- TEB Airport Boundary (Approximate)
- Runway
- RMS # Noise Monitor Locations
- Municipal Boundary
- Park / Open Space
- Water
- Highway
- Minor Roads
- Major Roads

0 8,000 16,000 Ft  
 Preliminary Draft - Subject to Change

Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



# Noise Compatibility Program (NCP) Overview

## Step 1: Identify Incompatible Land Uses

Existing conditions Noise Exposure Map  
Forecast conditions Noise Exposure Map

## Step 2: Consider Noise Abatement Strategies

Reduce exposure over incompatible uses  
Limit growth in exposure over incompatible uses

## Step 3: Consider Land Use Strategies

Mitigate residual incompatible uses  
Prevent introduction of new incompatible uses

## Step 4: Consider Programmatic Strategies

Implement and promote measures  
Monitor and report on effectiveness  
Update NEMs and revise NCP as appropriate

## Analysis and Selection Process Applied in Steps 2 - 4

- Evaluate effectiveness of each measure in addressing objectives
- Evaluate feasibility (operational, safety, economic, etc.)
- Select preferred “package” of measures
- Identify implementation schedule, responsibilities, budget, funding sources, etc.
- If not recommended, document reasons



# Stay Connected

For more information or to submit comments and feedback, the PANYNJ has several ways you can participate and stay informed:

- The project website is updated regularly with project documents, meeting announcements, and other general information about the study. Register here to join the mailing list and receive project updates.  
[http://panynjpart150.com/TEB\\_homepage.asp](http://panynjpart150.com/TEB_homepage.asp)
- To make comments, give feedback, or ask questions, please email us at [NJPart150@panynj.gov](mailto:NJPart150@panynj.gov) or call us at (212) 435-3777.
- To file an aircraft noise complaint, please call the noise complaint hotline at 1-800-225-1071.
- The Port Authority noise information website provides broader information.  
[www.panynj.gov/airports/aircraft-noise-information.html](http://www.panynj.gov/airports/aircraft-noise-information.html)





# Public Information Workshop

## Noise Compatibility Planning Study

Title 14 of the Code of Federal Regulations Part 150

Teterboro Airport

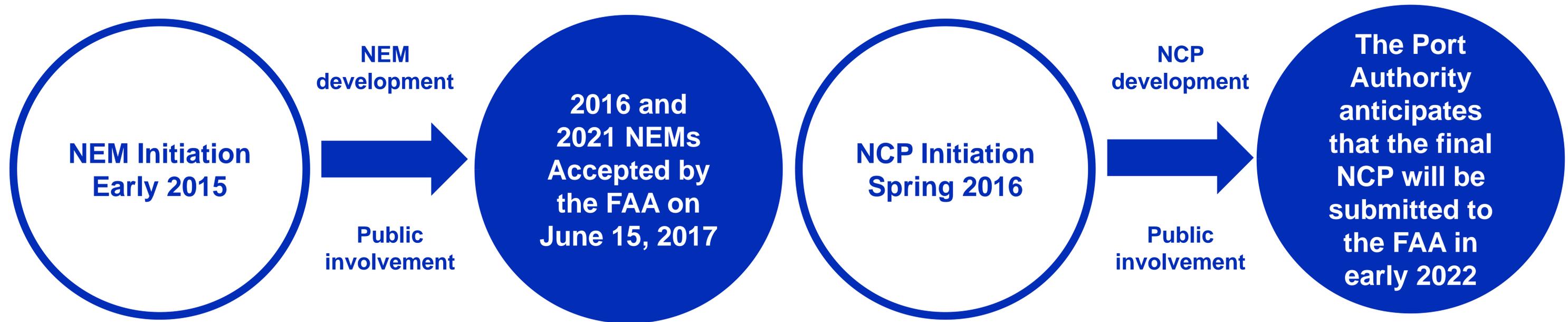
September 30, 2021

# Airport Noise Compatibility Planning

## Part 150 Overview

- Federal Aviation Administration (FAA) developed the voluntary Part 150 Program in response to the federal Aviation Safety and Noise Abatement Act of 1979 (“ASNA”)
  - Codified under Title 14 of the Code of Federal Regulations (CFR) Part 150
  - Provides airports access to FAA funding for noise compatibility measures
  - Includes a comprehensive public engagement process

# Teterboro Airport Part 150 Study Timeline

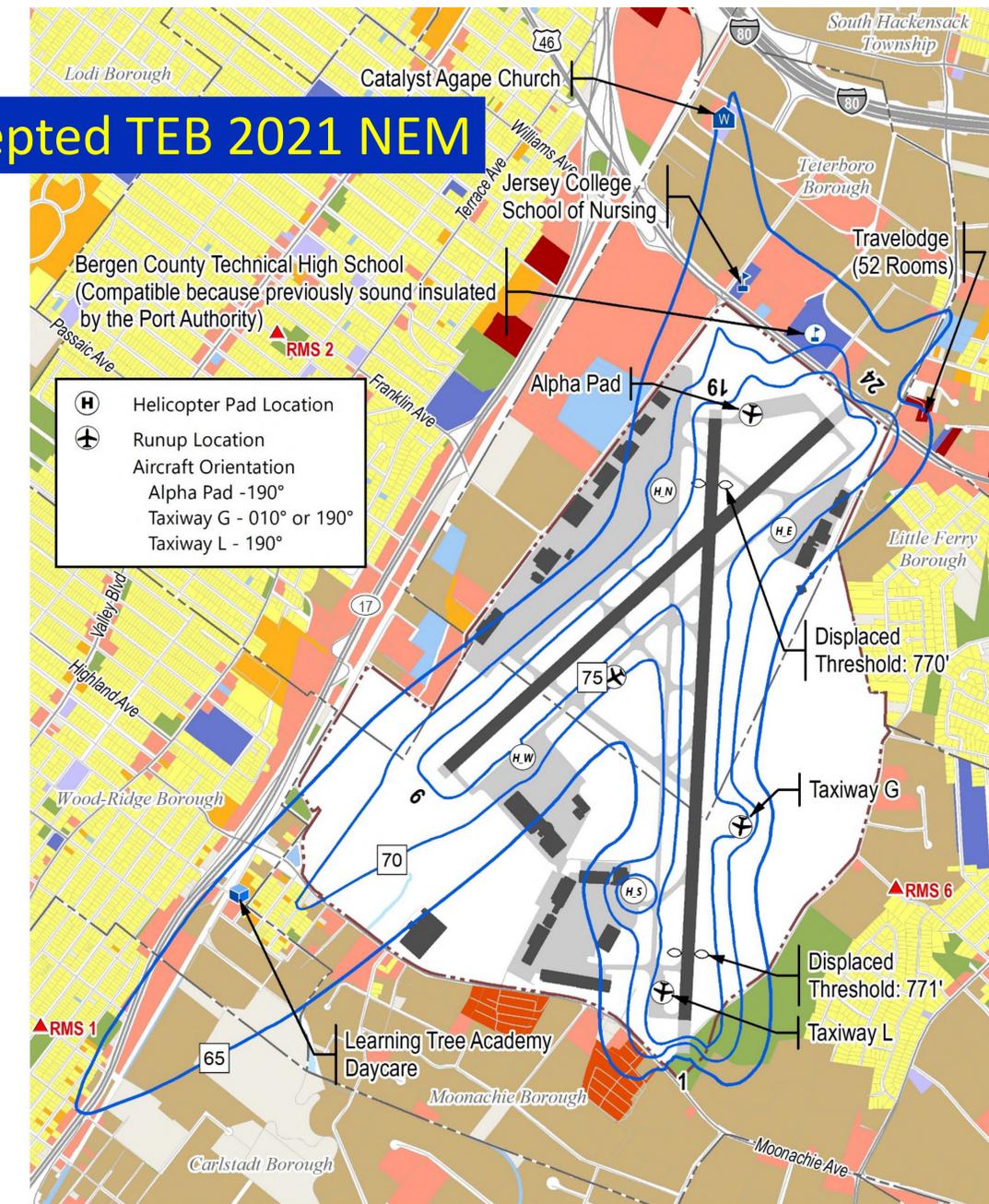


Upon receipt of the FAA's Record of Approval (ROA) for this NCP, the Port Authority may begin implementation of FAA-approved program measures and apply for federal financial assistance to support implementation of eligible FAA-approved NCP measures at TEB.

# Airport Noise Compatibility Planning Part 150

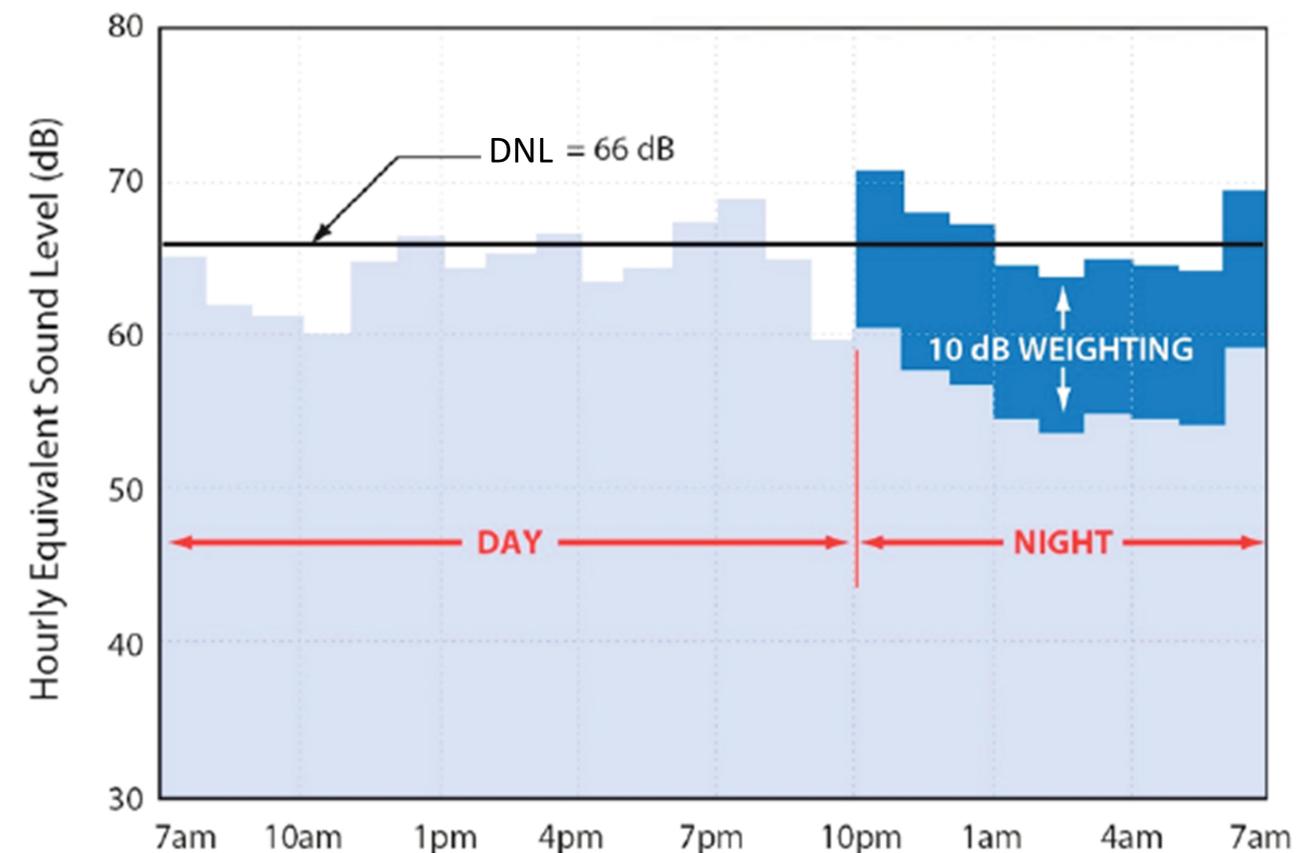
- Two primary components
  1. Noise Exposure Map (NEM)
    - Aircraft noise exposure
    - Land use compatibility
  2. Noise Compatibility Program (NCP)
    - Measures to improve land use compatibility including:
      - Noise abatement measures
      - Land use (noise mitigation) measures
      - Program management measures

FAA-Accepted TEB 2021 NEM

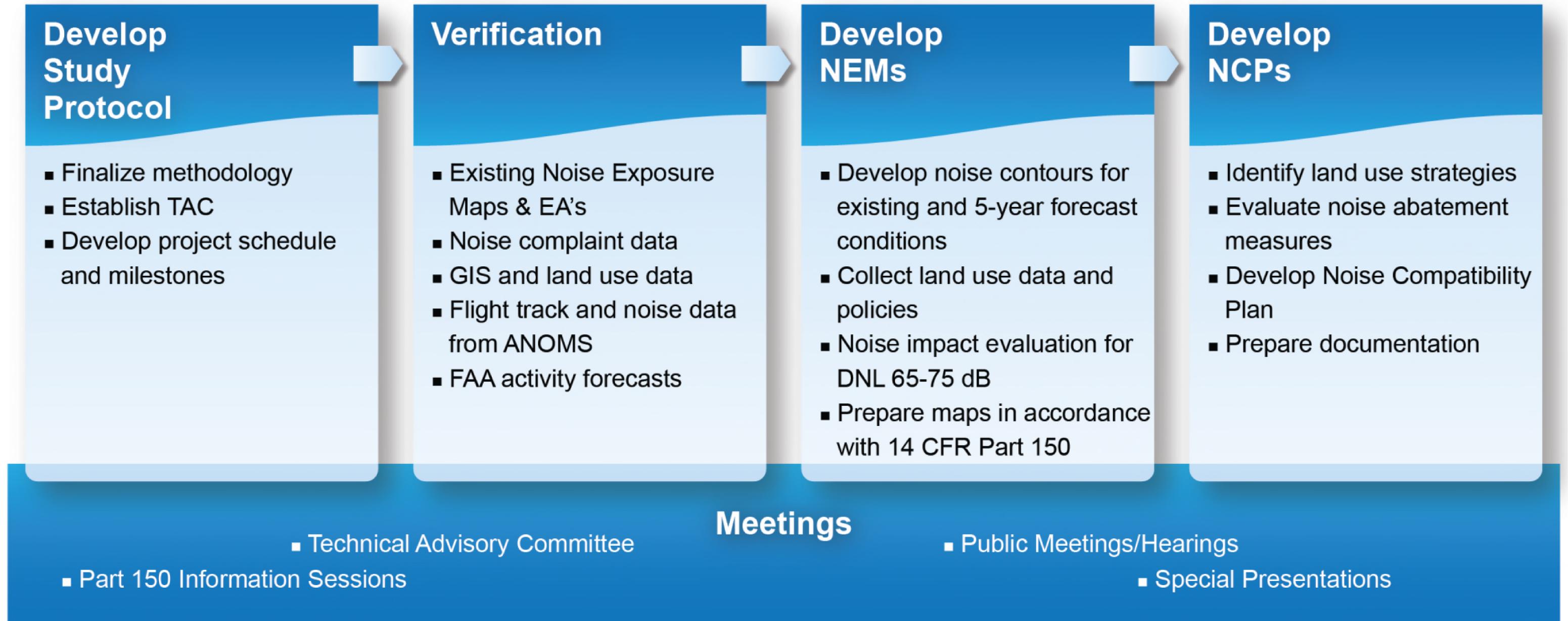


# Day-Night Average Sound Level (DNL)

- The Day-Night Average Sound Level (DNL) represents the noise energy present during a 24-hour period
- Weighting is applied to noise events occurring at night (10:00 P.M. to 7:00 A.M), with an additional 10 dB added to the actual nighttime sound level to reflect the greater sensitivity to noise at night
- DNL is drawn on maps in terms of lines connecting points of the same decibel.
- The FAA has set 65 DNL as the threshold of compatible noise exposure for noise sensitive land uses



# Airport Noise Compatibility Planning Process



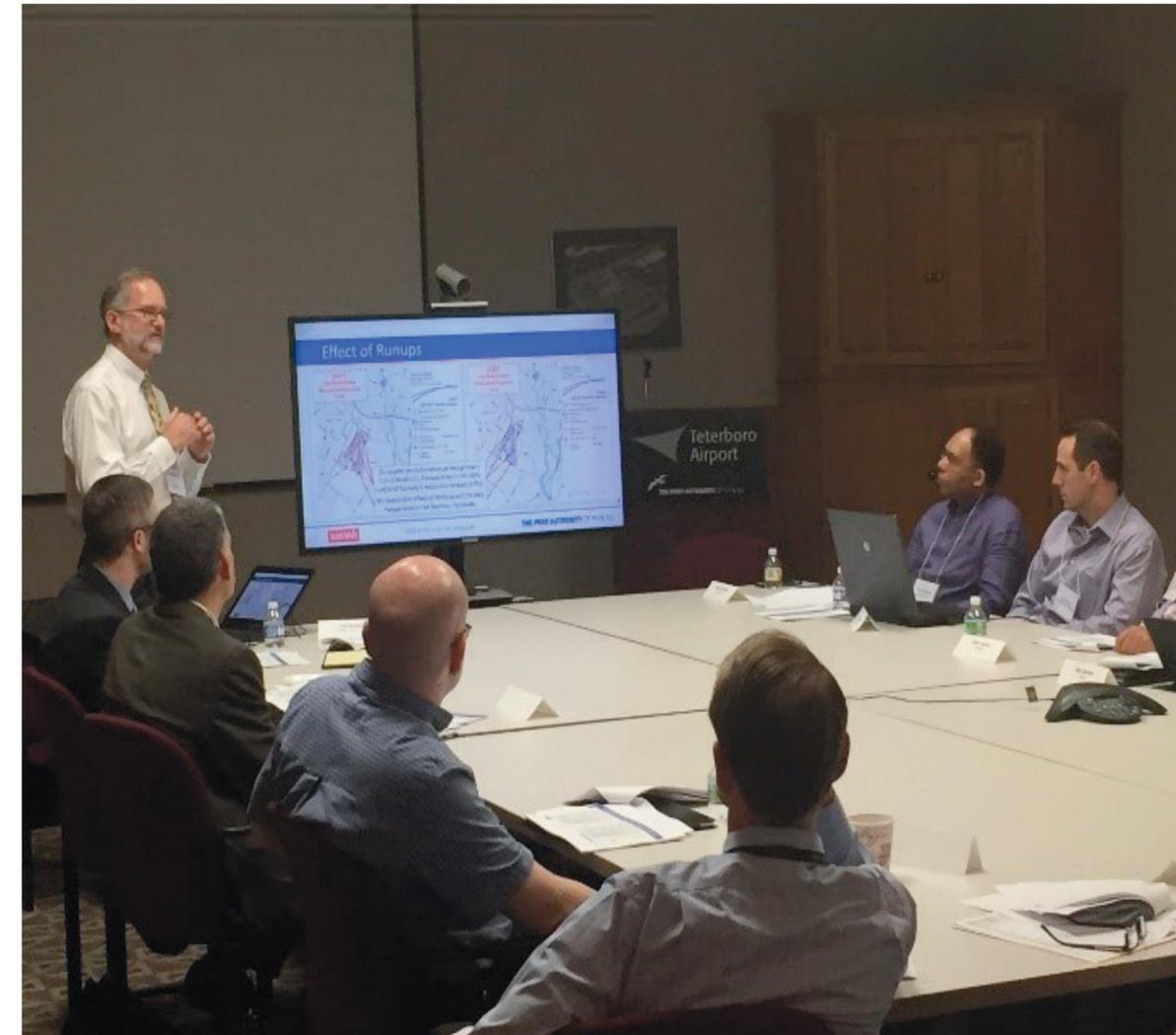
# Airport Noise Compatibility Planning

## Roles and Responsibilities

- **The Port Authority of New York and New Jersey**
  - Directs Study as the project sponsor
  - Submits NEM and NCP documentation to FAA
- **FAA**
  - Provides input to, reviews and assists with analysis of noise abatement flight procedures
  - “Accepts” NEM and NCP documentation and “approves” NCP measures
  - Responsible for implementation of noise abatement flight procedures at the sponsor’s request
  - Assists in funding eligible measures in all three categories
- **Local governments**
  - Provide input to recommended land use measures
  - Implement and enforce land use measures to maintain and improve noise compatibility
- **All stakeholders, including aviation interests, residents, and other interested parties**
  - Monitor study process, provide input, assist with implementation

# Airport Noise Compatibility Planning Technical Advisory Committee (TAC)

- The TAC has an advisory role to the Port Authority
- Members include:
  - Key agencies; e.g., Port Authority, FAA, AvPORTS
  - Local land use jurisdictions; e.g., Bergen County
  - Airport tenants and users; e.g., fixed base operators (FBOs), NetJets, etc.
  - Aviation trade associations; e.g., National Business Aviation Association (NBAA), Aircraft Owners and Pilots Association (AOPA),
  - Established advisory bodies; e.g., Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC), Teterboro Users Group (TUG)
  - Newark Liberty International Airport (EWR) Noise/Community Roundtable



# Noise Compatibility Program Development Process

## Step 1: Identify Noncompatible Land Uses

Existing conditions Noise Exposure Map  
Forecast conditions Noise Exposure Map



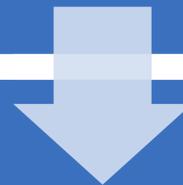
## Step 2: Consider Noise Abatement Strategies

Reduce exposure over noncompatible uses  
Limit growth in exposure over noncompatible uses



## Step 3: Consider Land Use Strategies

Mitigate residual noncompatible uses  
Prevent introduction of new noncompatible uses



## Step 4: Consider Programmatic Strategies

Implement and promote measures  
Monitor and report on effectiveness  
Update NEMs and revise NCP as appropriate

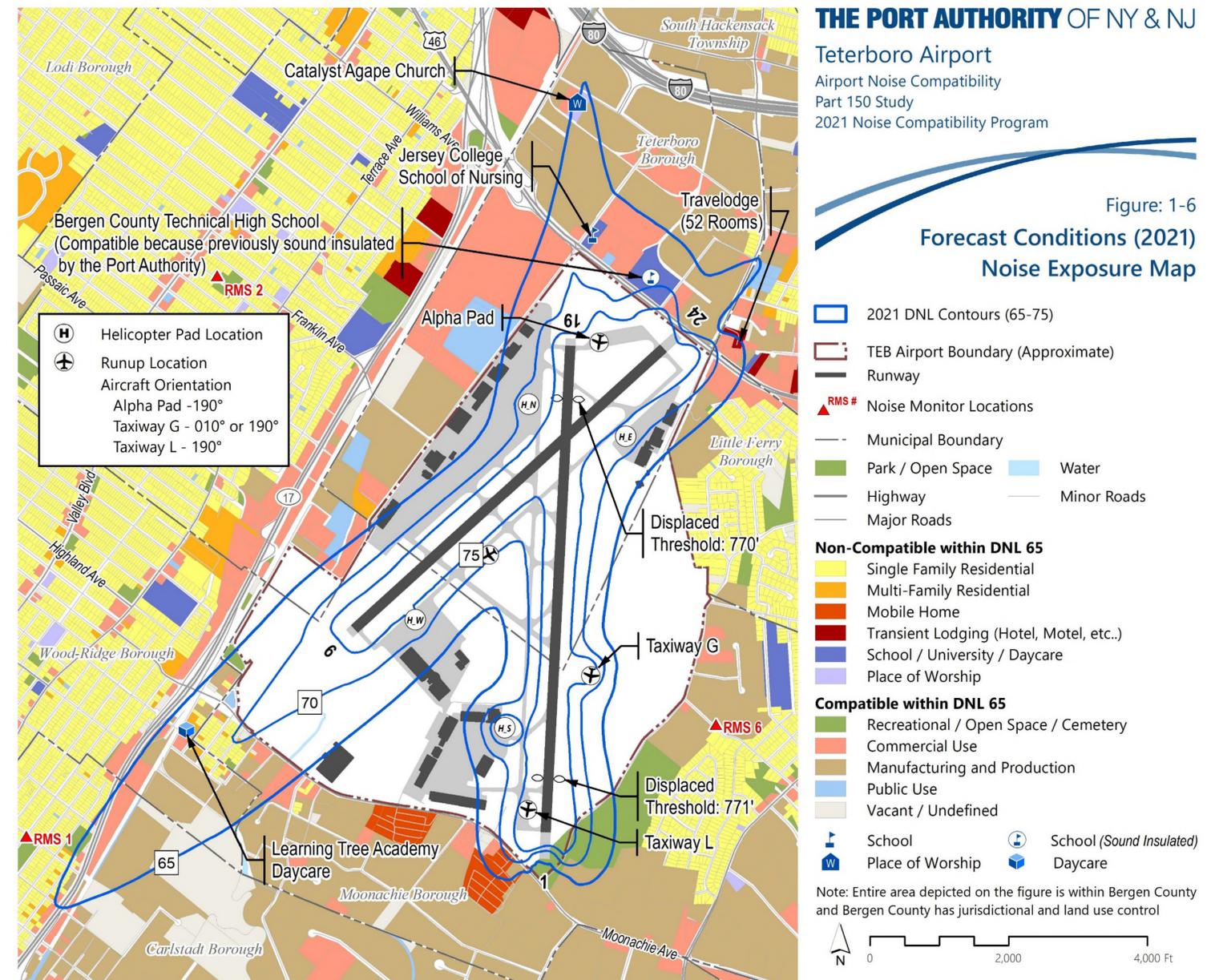
## Analysis and Selection Process Applied in Steps 2 - 4

- Evaluate effectiveness of each measure in addressing objectives
- Evaluate feasibility (operational, safety, economic, etc.)
- Select preferred “package” of measures
- Identify implementation schedule, responsibilities, budget, funding sources, etc.
- If not recommended, document reasons

# Noise Compatibility Program Development Process – Step 1

- Noncompatible land uses per 2021 Noise Exposure Map
  - 196 residential units
  - 475 people
  - 2 schools
  - 1 place of worship
  - 1 daycare

Note: One (1) school has been soundproofed as part of the School Soundproofing Program and is compatible



Source: The Port Authority of NY & NJ, Cornell University Geospatial Information Repository (CUGIR), NJ DEP Bureau of GIS, NYC Open Data, Environmental Systems Research Institute (ESRI)



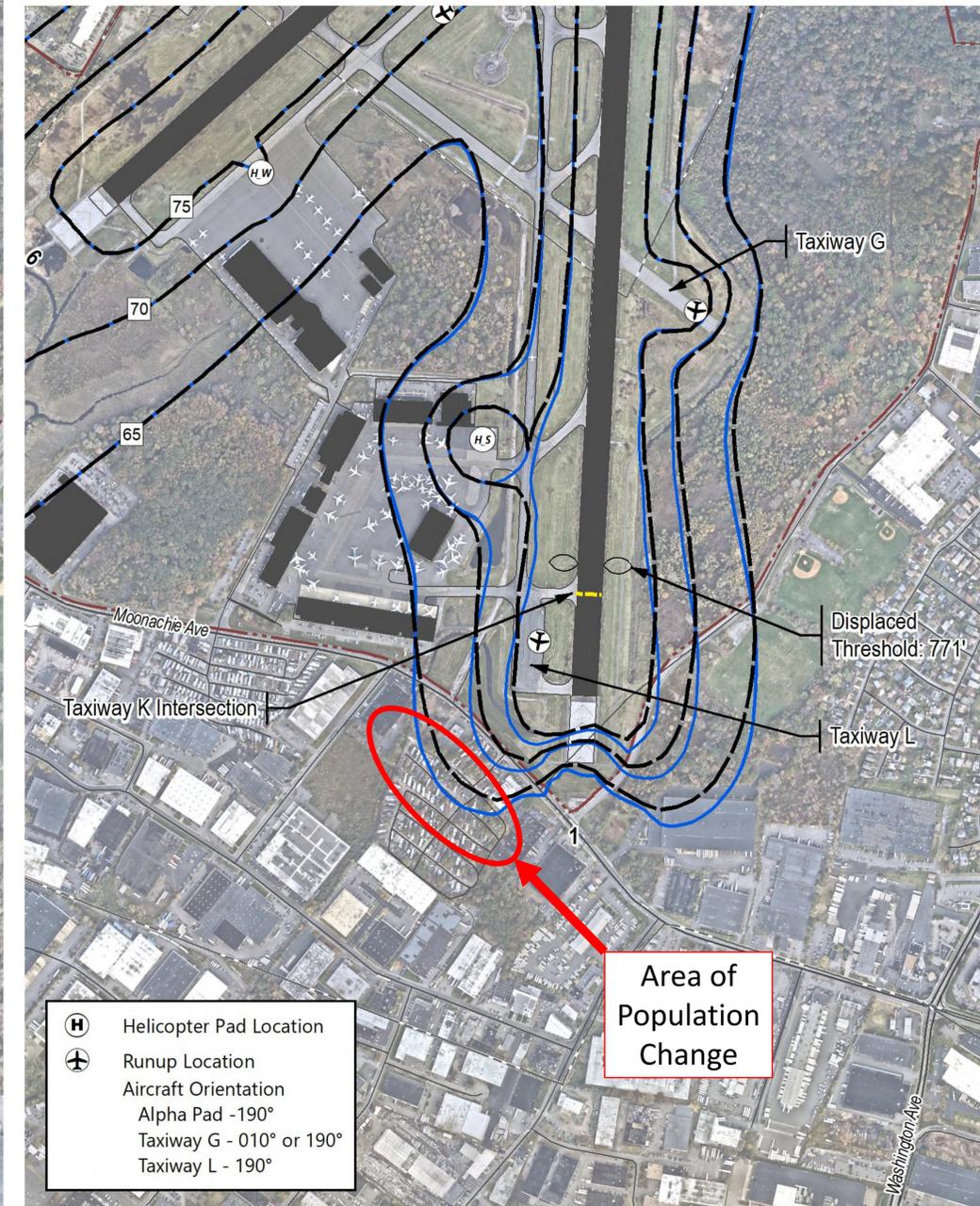
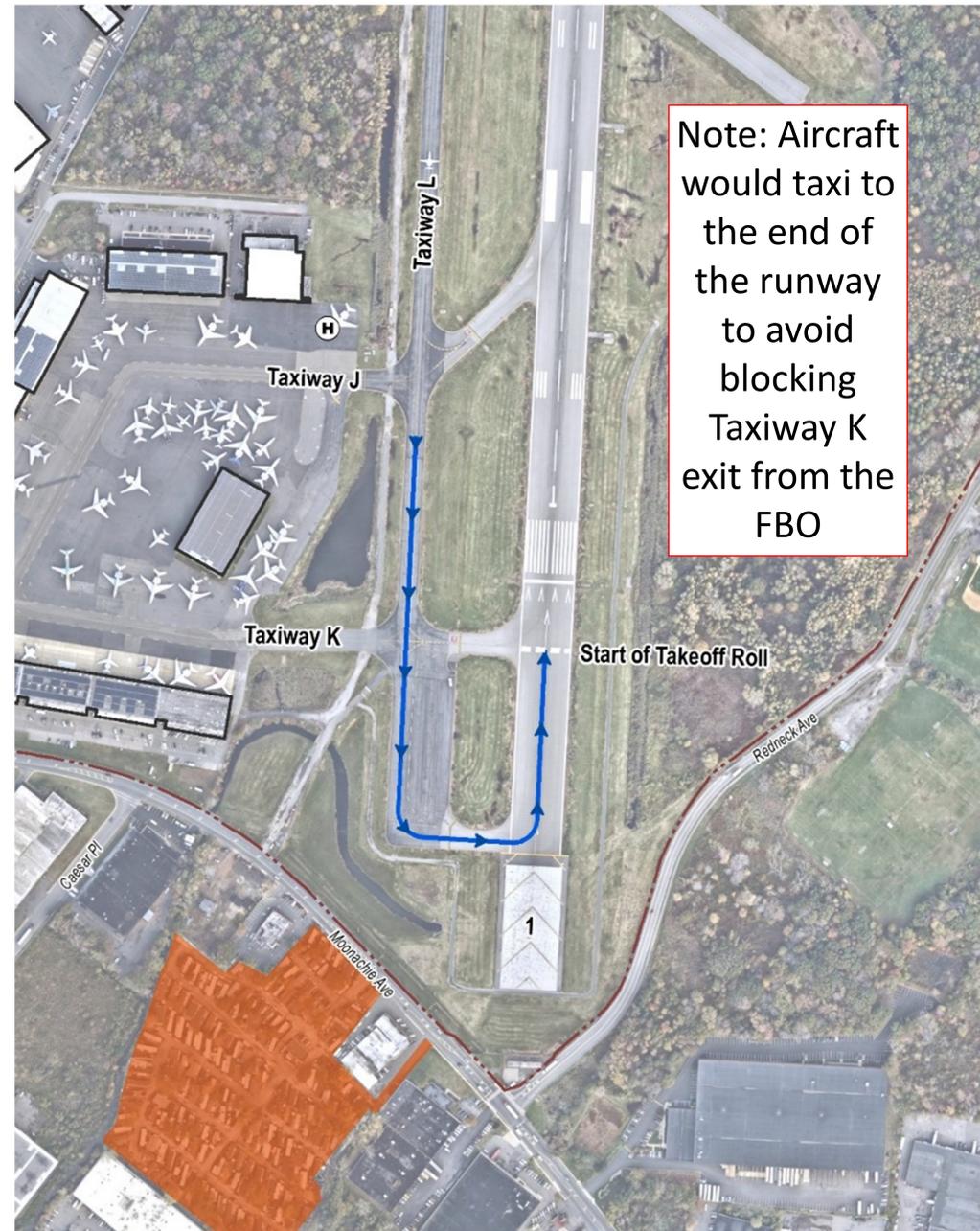
# Noise Compatibility Program Development Process – Step 2

- Consider noise abatement strategies
  - Reduce noise at the source or in the path of the noise to the receiver
    - Cockpit procedures, flight paths, runway use, noise barriers, etc.
- Port Authority considered 19 noise abatement strategies
- Port Authority is recommending 16 measures for implementation
  - 9 Existing measures
  - 7 New measures



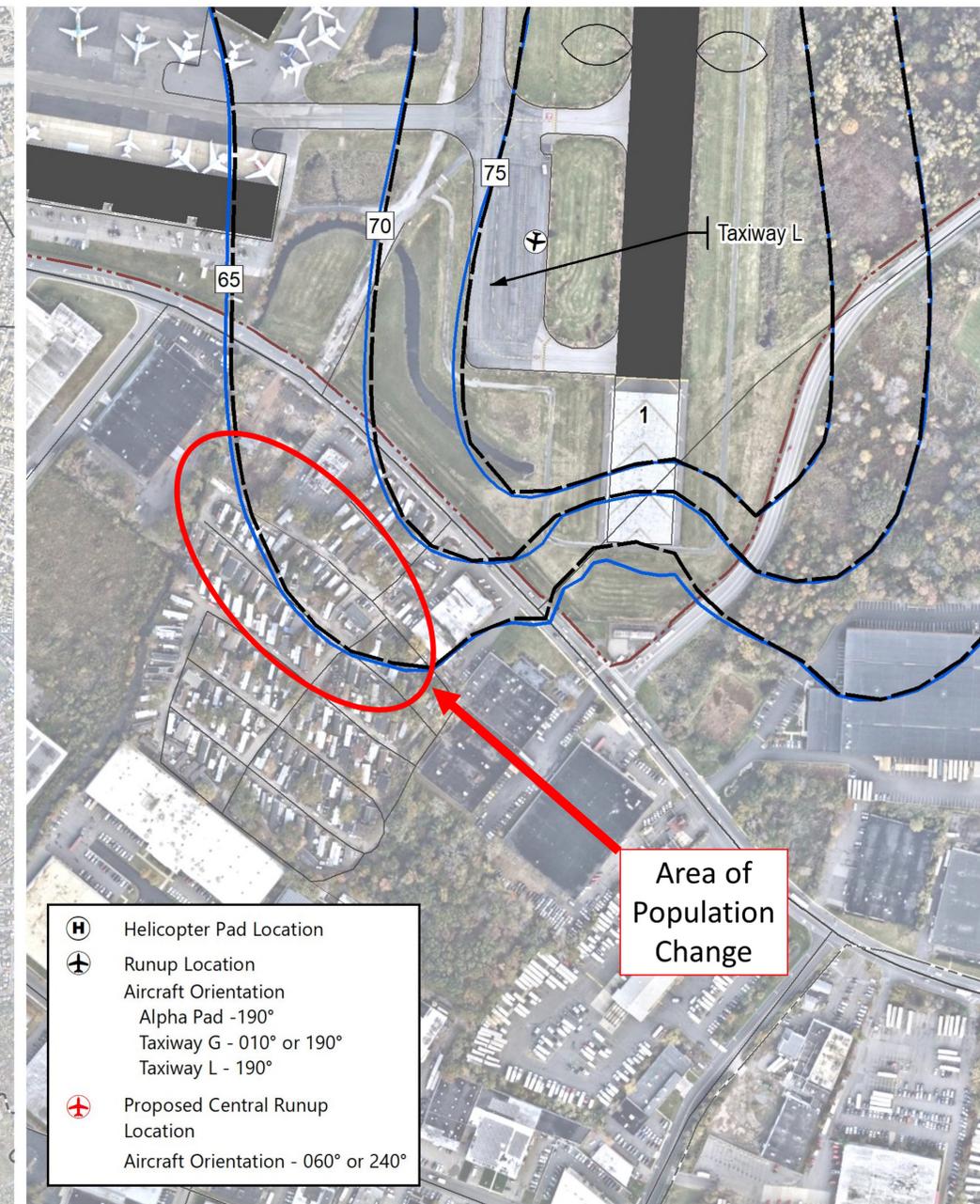
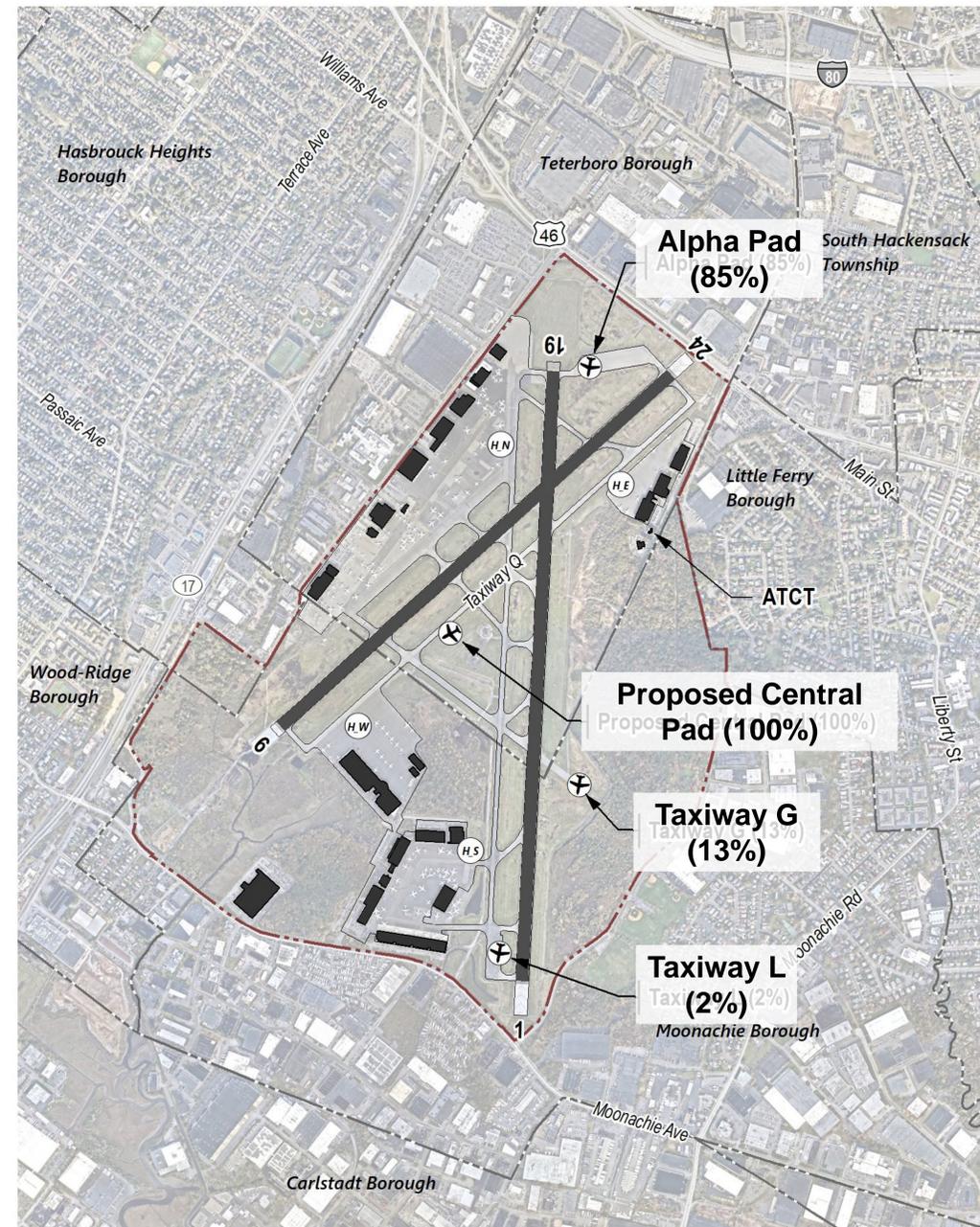
# NA-2: Encourage Intersection Departures from Taxiway K on Runway 1 at Night

- Aircraft would enter from the end of the runway, then proceed to Taxiway K before starting takeoff roll
- Potential reduction of 56 people in 23 dwelling units exposed to 65 DNL or higher with 80% use at night



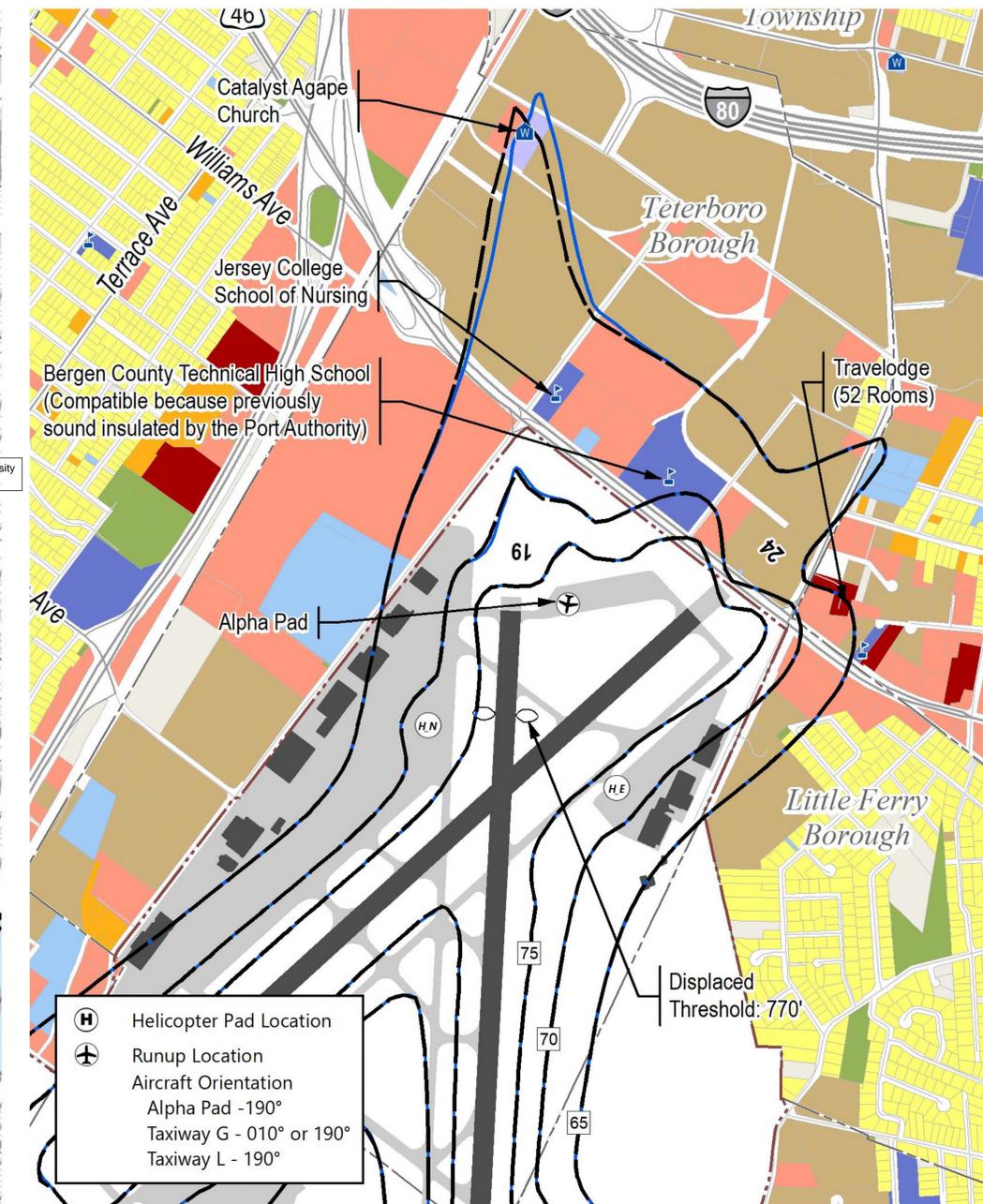
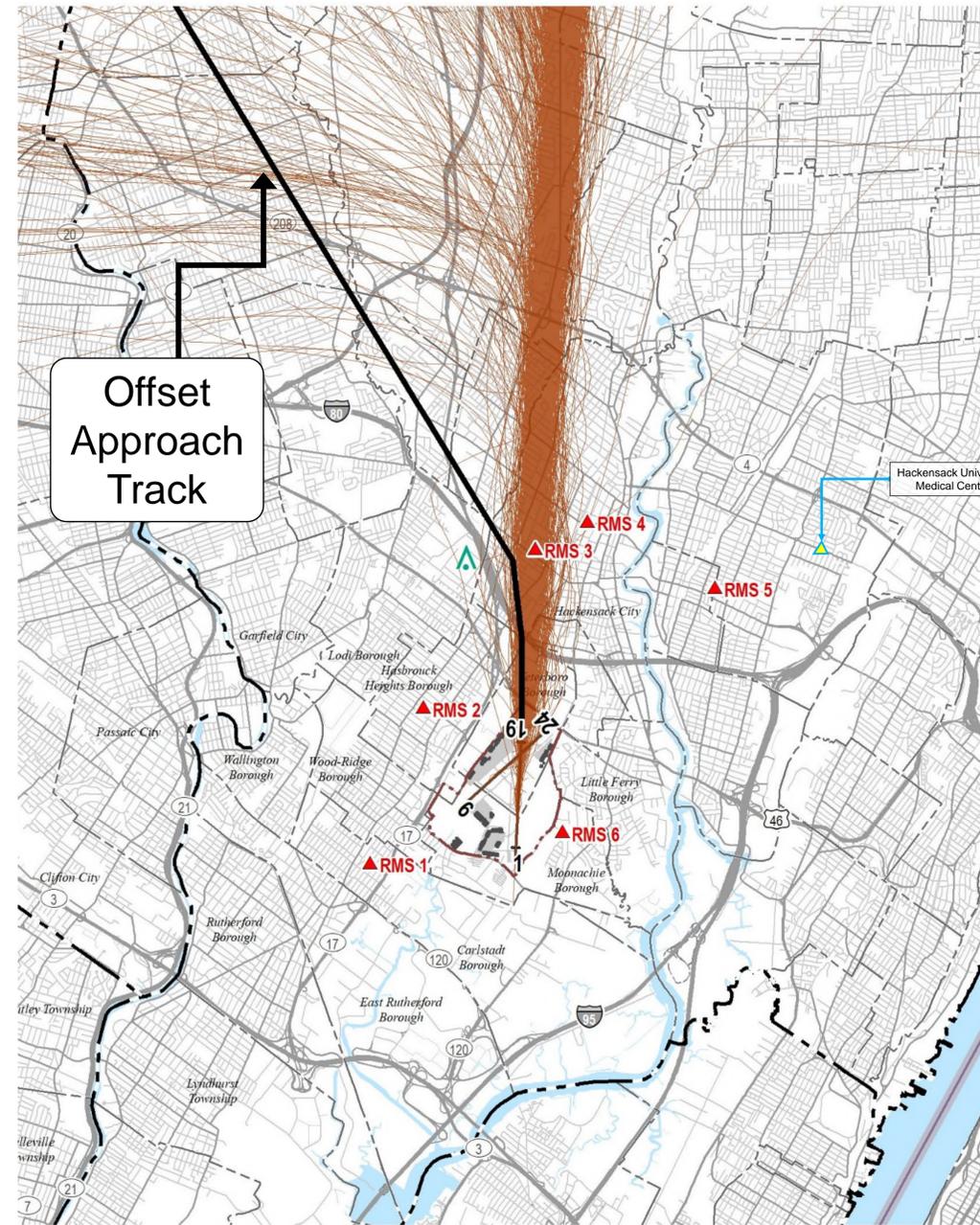
# NA-3: Design and Implement a Centralized Aircraft Run-up Pad

- Relocation of all aircraft maintenance run-ups to a new centralized run-up pad adjacent to Taxiway Q
- Potential reduction of up to 13 people in 5 dwelling units exposed to 65 DNL or higher



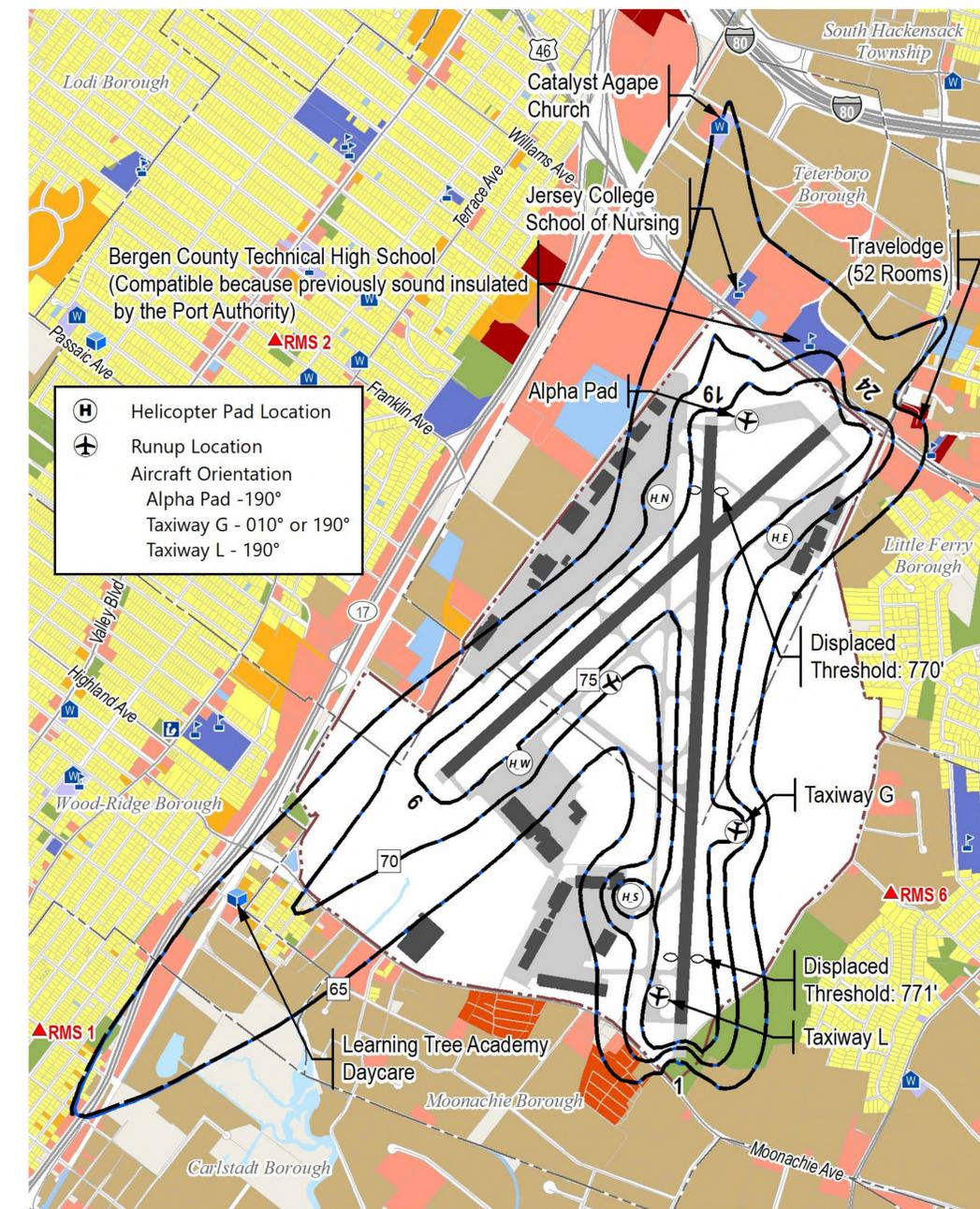
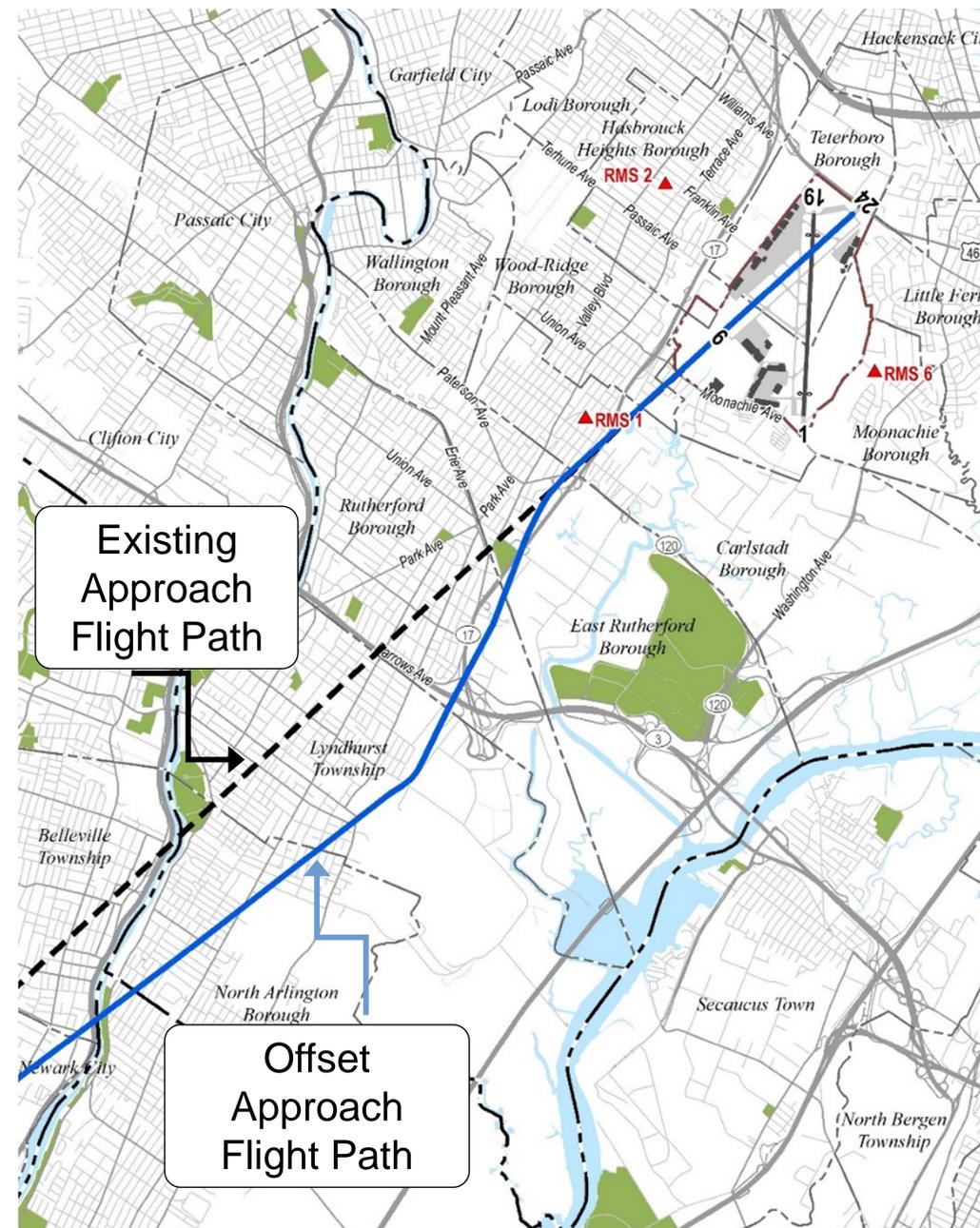
# NA-4: Implement an Offset Approach Procedure to Runway 19

- The procedure could reduce the number of overflights of Hackensack University Medical Center
- No reduction of people or dwelling units exposed to 65 DNL or higher with 50% use
- A version of this Measure has been implemented by the FAA



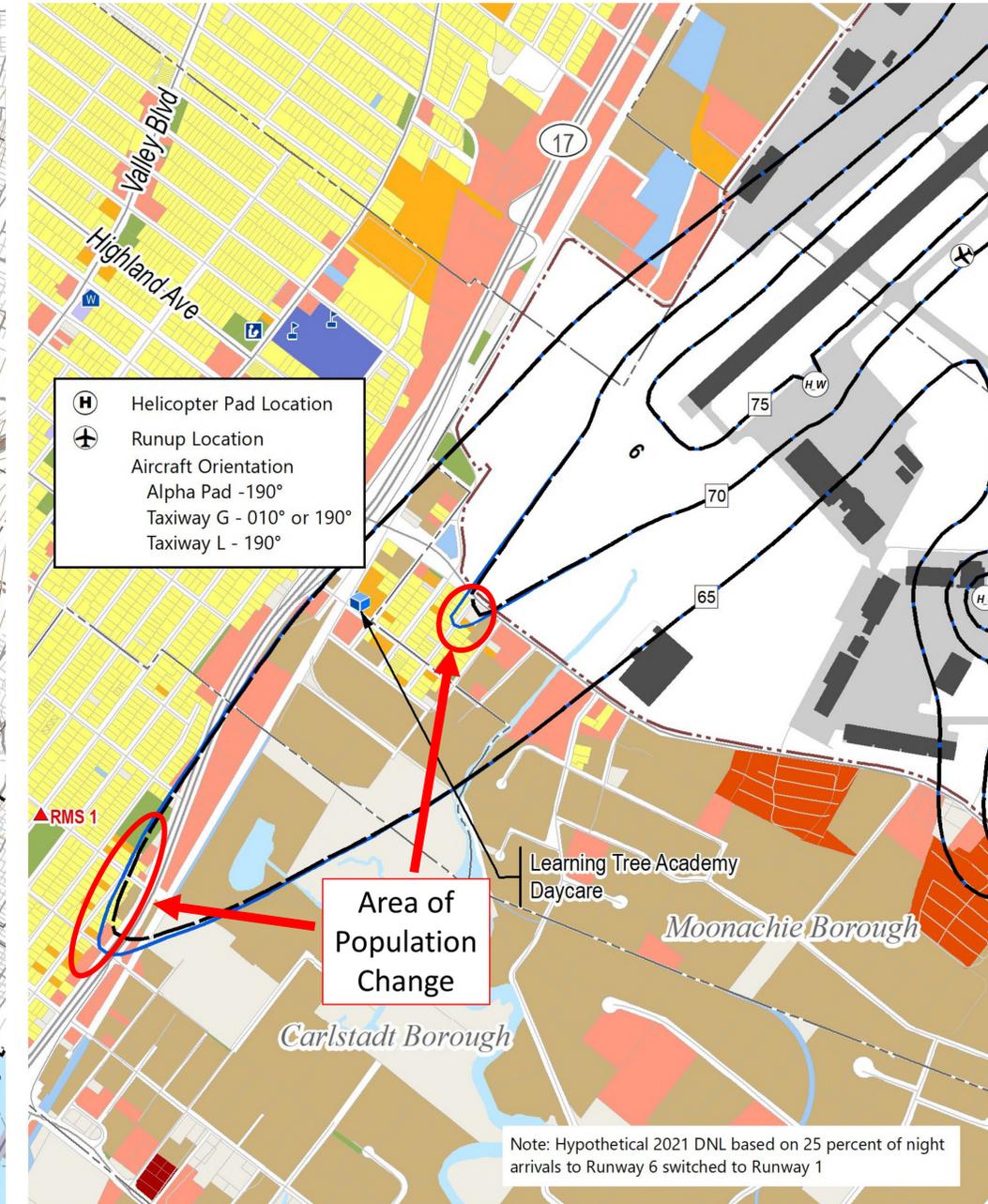
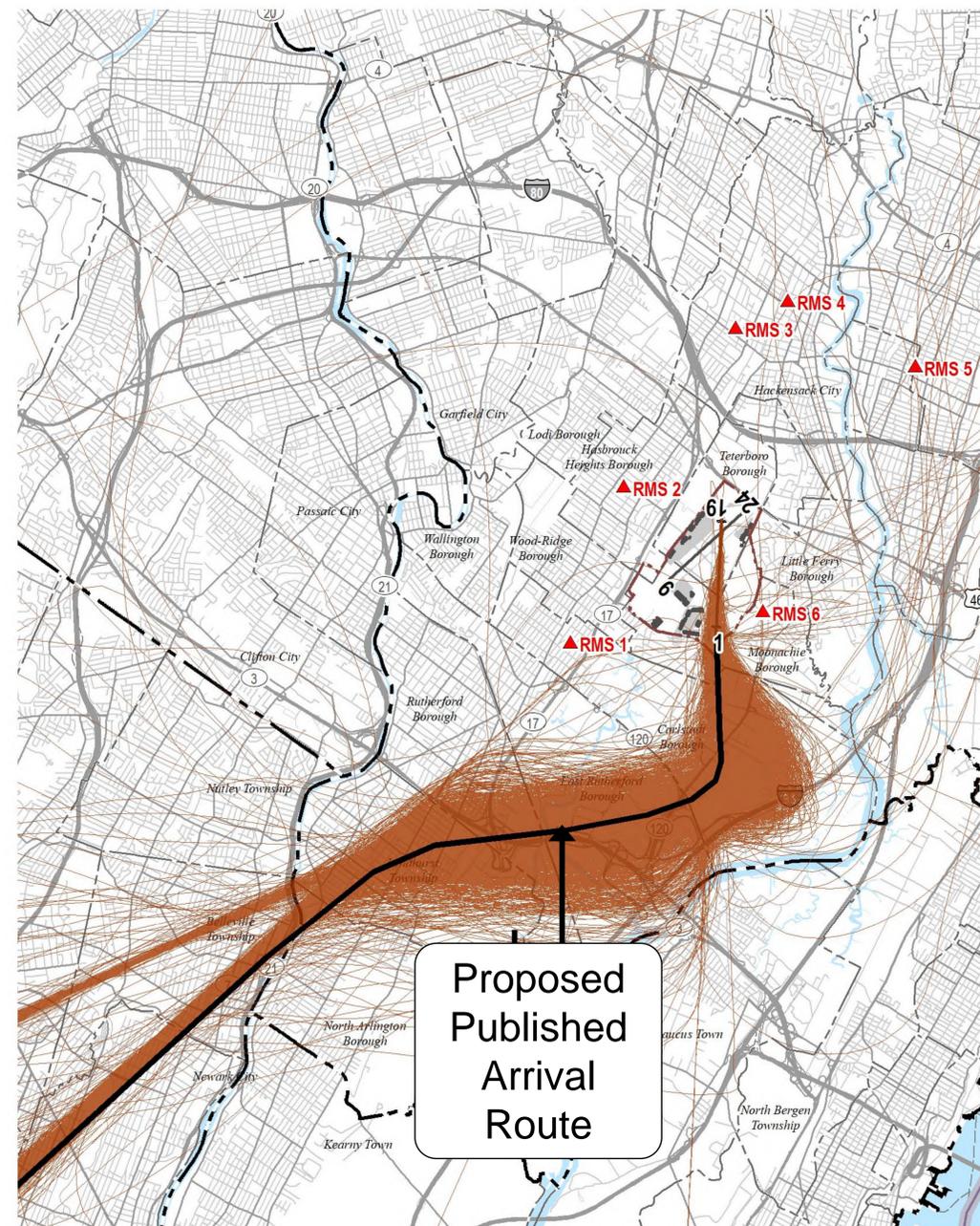
# NA-5: Implement an Offset Approach Procedure to Runway 6

- The procedure could reduce the number of overflights of Lyndhurst and Rutherford
- No reduction of people or dwelling units exposed to 65 DNL or higher with 100% use



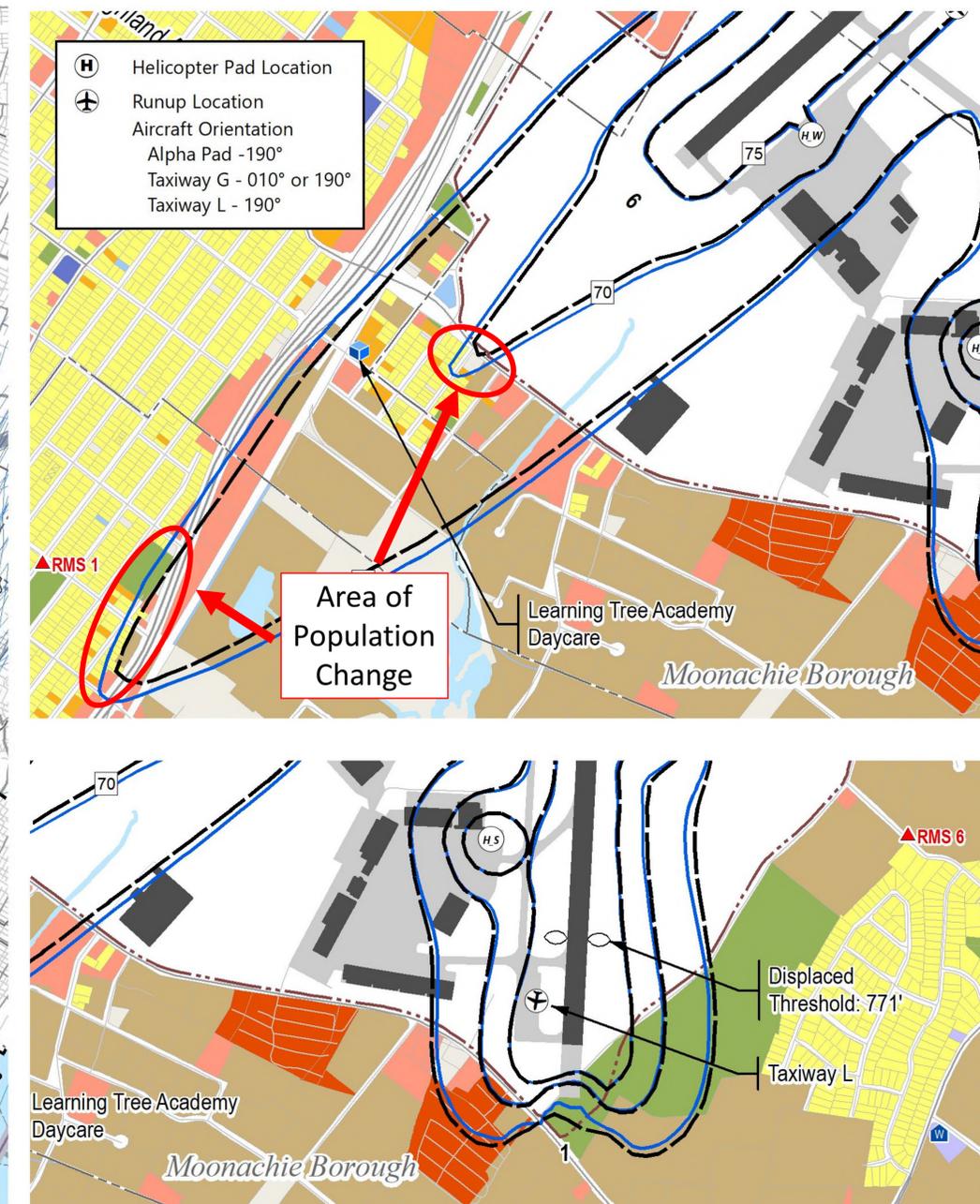
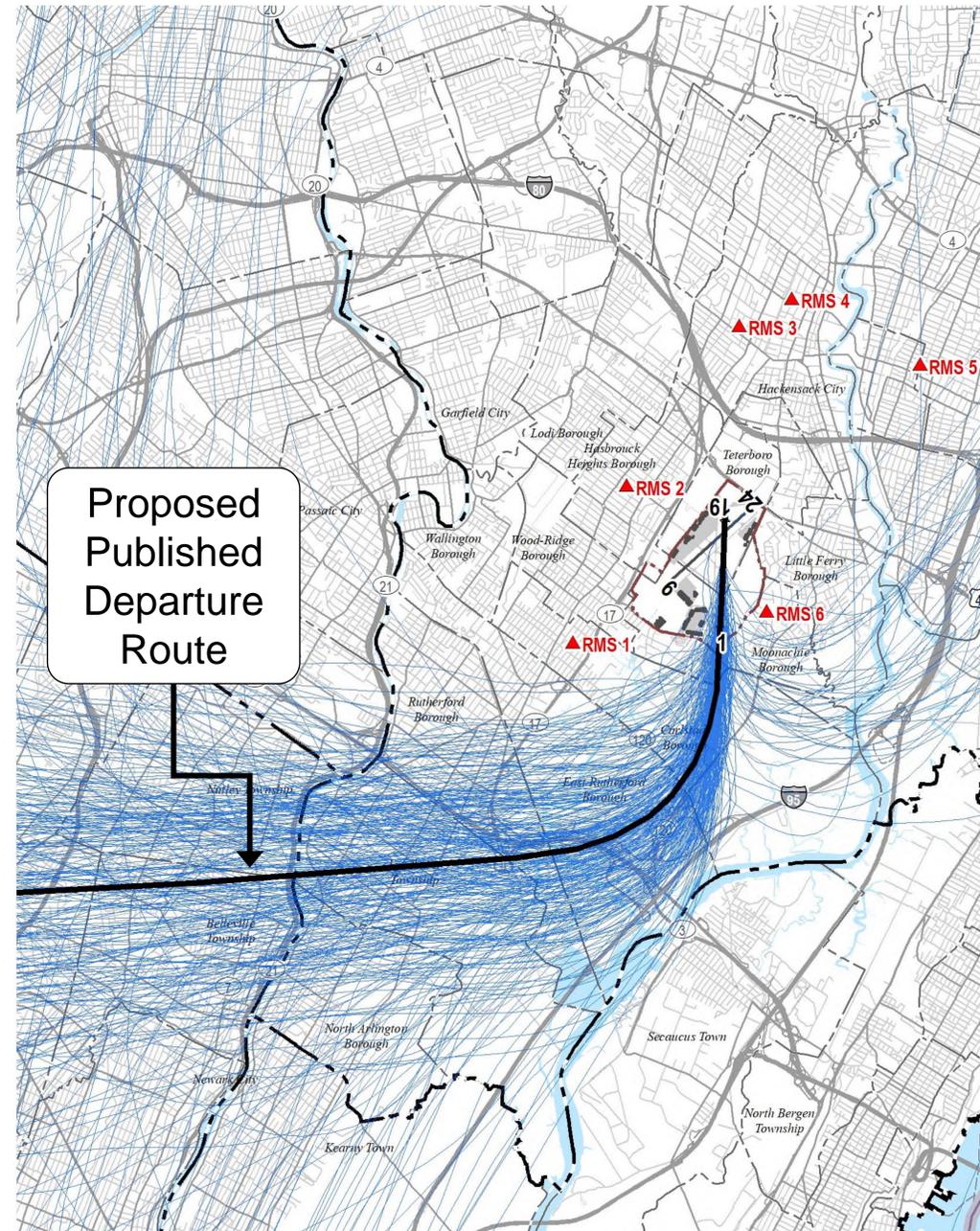
# NA-6: Implement a Published Approach Procedure to Runway 1

- Aircraft currently use the Runway 6 approach and turn east to line up with Runway 1 (shift 25% of arrivals at night)
- Potential reduction of up to 17 people in 7 dwelling units exposed to 65 DNL or higher



# NA-7: Implement a Published Departure Procedure from Runway 19

- Depart Runway 19 turning to 280 degrees (remain at or below 1,300 ft) then climb when clear of EWR arrivals
- Reduction of up to 5 people in 2 dwelling units exposed to 65 DNL or higher 1



# Noise Abatement Measures Recommended – Existing

- NA-8: Existing Mandatory Permission to Operate Jet Aircraft
- NA-9: Existing Mandatory Noise Limits
- NA-10: Existing Mandatory Aircraft Maintenance Run-Up Restrictions
- NA-11: Existing Voluntary Restraint from Operations between 11:00 p.m. and 6:00 a.m.
- NA-12: Existing Voluntary Preferential Runway Use at Night
- NA-13: Existing Voluntary Encouragement of the Use of National Business Aviation Association (NBAA) Noise Abatement Departure Procedures (NADP)
- NA-14: Existing Voluntary Restraint from the Use of Reverse Thrust
- NA-15: Existing Voluntary IFR and VFR Approach and Landing Procedures to Runway 1 at Night
- NA-16: Existing Voluntary Helicopter Routes

# Noise Abatement Strategies Considered Not Recommended

- Construct a new North-South Runway
  - Reason to not recommend
    - Would disrupt airfield operations
    - Would potentially expose new areas of noncompatible land uses to 65 DNL
    - Potential environmental effect on nearby wetlands
    - Cost
- Increase Night Departures from Runway 6
  - Reason to not recommend
    - Would expose new areas of noncompatible land uses to 65 DNL north of Runway 24

- Noise Barriers

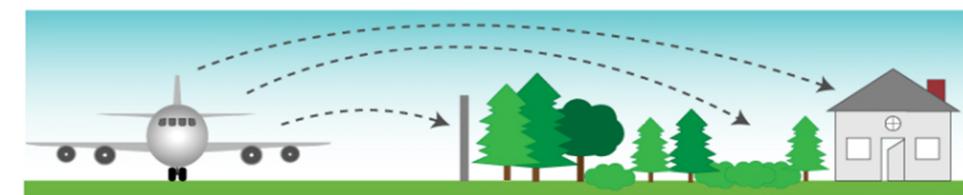
- Reason to not recommend
  - Obstruction restrictions
  - To be effective, noise barriers must be close to the noise source or the structure



Noise Barrier



Noise Berm



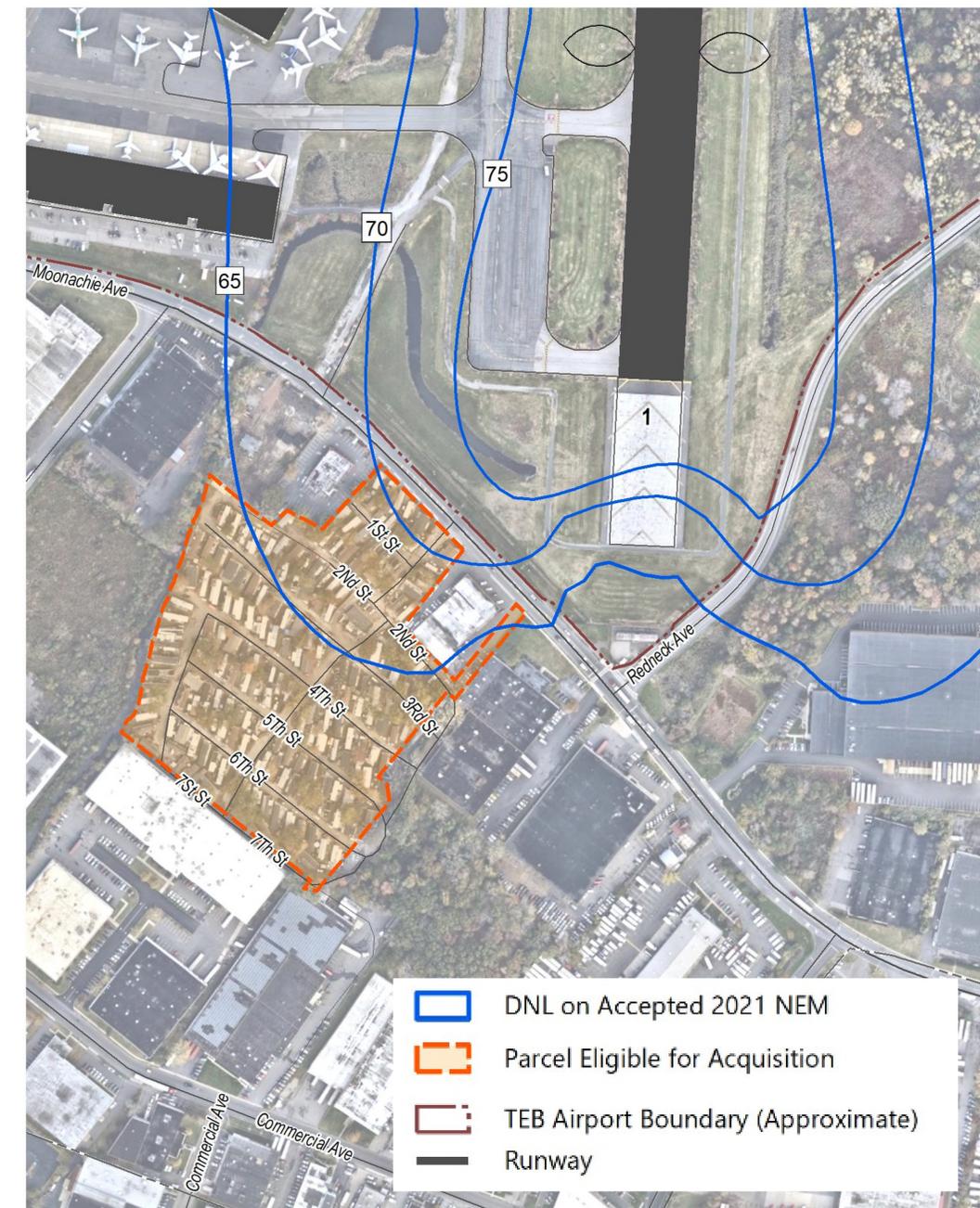
Ineffective Noise Barrier

# Noise Compatibility Program Development Process – Step 3

- Consider land use strategies
  - Mitigate residual noncompatible uses
  - Prevent introduction of new noncompatible uses
- Port Authority considered nine (9) land use strategies
- Port Authority is recommending four (4) measures for implementation:
  - Three (3) corrective mitigation measures
  - One (1) preventive mitigation measures

# LU-1: Acquire Noncompatible Residential Parcels

- The Port Authority has identified one parcel for potential acquisition (a mobile home park with approximately 200 units) south of Runway 1
  - While this parcel is eligible for acquisition, the Port Authority has not determined whether it would acquire this parcel at this time



# LU-2 and LU-3: Sound Insulate Eligible Structures (2 measures)

- Provide sound insulation treatment to:
  - Eligible dwelling units
  - Eligible non-residential noise-sensitive structures
- Sound insulation treatments include:
  - Windows
  - Doors
  - Caulking
  - Weather stripping
  - Positive ventilation

Depending on availability of program funding and construction schedules, LU-2 & LU-3 may take many years to complete

An aviation easement (or right of overflight in the airspace above a particular property) will be required

# Eligibility for Sound Insulation Treatments

- Parcel within the 65 DNL contour
- Structure constructed prior to June 15, 2017
- Adherence to local building codes



## Residential Structures

- Average noise level in habitable rooms at or above 45 DNL

## Non-Residential Noise-Sensitive Structures

- Average noise level in habitable rooms at or above 45 dB based on the hours of use

Note: If the average interior noise level is less than 45 dB, the structure may be eligible to receive positive ventilation

# Eligibility for Sound Insulation Treatments

- Parcel within the 65 DNL contour
- Structure constructed prior to June 15, 2017
- Adherence to local building codes



## Residential Structures

- Average noise level in habitable rooms at or above 45 DNL

## Non-Residential Noise-Sensitive Structures

- Average noise level in habitable rooms at or above 45 dB based on the hours of use

Note: If the average interior noise level is less than 45 dB, the structure may be eligible to receive positive ventilation

# LU-4: Assistance with Establishing Airport Noise Overlay Zones

- Airport overlay zones are intended to prevent noncompatible land uses from being developed near the Airport
  - Neither Port Authority nor FAA have control over land uses
- Port Authority could support the local jurisdictions' desire to establish an airport noise overlay zone
- Local land use jurisdictions that expressed interest include:
  - New Jersey Sports and Exposition Authority
  - Bergen County
  - City of Hackensack
  - Borough of East Rutherford
  - Borough of Hasbrouck Heights
  - Borough of Little Ferry
  - Township of South Hackensack
  - Borough of Teterboro

The Port Authority will respond promptly to any requests by jurisdictions for assistance in evaluating potential preventive land use measures

# Land Use Strategies Considered Not Recommended

- Acquire aviation easements
- Implement cooperative land use agreements
- Raise minimum building standards
- Implement rezoning of land uses
- Include airport aircraft noise real estate disclosures

# Noise Compatibility Program Development Process – Step 4

- Consider program management strategies
  - Implement and promote measures
  - Monitor and report on effectiveness
  - Update NEMs and revise NCP as appropriate
- Port Authority considered 14 program management strategies
- Port Authority is recommending 13 measures for implementation



# Program Management Measures Recommended – Existing

- PM-1: Maintain Noise Office
- PM-2: Maintain Noise and Operations Management System (NOMS)
- PM-3: Maintain public flight tracking portal
- PM-4: Maintain noise complaint management system
- PM-5: Maintain Noise Office website
- PM-6: Continue community outreach activities

# Program Management Measures Recommended - New

- PM-7: Establish a community planners forum
- PM-8: Establish a Fly Quiet Program
- PM-9: Make aircraft noise contours available in geographic information system (GIS)
- PM-10: Update the Noise Exposure Map
- PM-11: Update the Noise Compatibility Program
- PM-12: Update Airfield Noise Abatement Program Signage
- PM-13: Coordinate with the FAA on development and implementation of NextGen procedures

Sign 1 & 2



Sign 3



Sign 4



# Program Management Strategy Considered Not Recommended

- Incentivize a Quieter Aircraft Fleet
  - Reasons to not recommend
    - Changes in Federal regulations over time have resulted in a quieter fleet at Teterboro Airport
    - Due to the diverse nature of the Teterboro Airport fleet additional measures would not be administratively feasible

# Airport Noise Compatibility Planning Consultation, Engagement and Outreach

- Port Authority:
  - Consulted with
    - All local, state, and federal entities with land use control within DNL 65+ dB
    - FAA regional officials
    - Regular aeronautical users of the airport
    - All interested parties in review of and comment on draft items
  - Engaged with the Technical Advisory Committee at 14 meetings
  - Reached out to the public with three workshops and hearing on the recommended Noise Compatibility Program



# Measure Initiation Plan

## Measures to be Initiated within One Year of FAA Record of Approval\*

- TEB Noise Abatement Measure 1: Implement a Runway 24 Departure Turn to 230 degrees at Night
- TEB Noise Abatement Measure 2: Encourage Intersection Departures from Taxiway K on Runway 1 at Night
- TEB Noise Abatement Measure 5: Implement an Offset Approach Procedure to Runway 6
- TEB Noise Abatement Measure 6: Implement a Published Approach Procedure to Runway 1 and Increase Usage at Night
- TEB Noise Abatement Measure 7: Implement a Published Departure Procedure from Runway 19
- TEB Land Use Measure 4: Port Authority Assistance with Establishing an Airport Overlay Zone
- TEB Program Management Measure 7: Establish a Community Planners Forum
- TEB Program Management Measure 8: Establish a Fly Quiet Program

## Measures to be Initiated within Two Years of FAA Record of Approval\*

- TEB Noise Abatement Measure 3: Design and Implement a Centralized Aircraft Run-up Pad
- TEB Program Management Measure 12: Update Airfield Noise Abatement Program Signage

## Measures without Identified Timeline/Schedule Dependent Upon External Factors/Pandemic Recovery

- TEB Land Use Measure 1: Acquire Noncompatible Residential Parcels
- TEB Land Use Measure 2: Sound Insulate Eligible Dwelling Units
- TEB Land Use Measure 3: Sound Insulate Eligible Non-Residential Noise-Sensitive Structures
- TEB Program Management Measure 10: Update the Noise Exposure Map
- TEB Program Management Measure 11: Update the Noise Compatibility Program

\* Date is tentative and subject to change



# Next Steps

- Comments collected through October 15, 2021
- Final Noise Compatibility Program Report
  - Will include public comments and responses
  - Submission to FAA – Early 2022\*
- FAA will have 180 days to review
- FAA will issue Record of Approval
- Port Authority will release the Final Noise Compatibility Program Report

*\* Date is tentative and subject to change*