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TETERBORO AIRPORT: RNAV (GPS) RWY 19 Offset Draft Environmental Assessment

DECEMBER 2019

Prepared For:
Federal Aviation Administration



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CHAPTER 1

Project Background and Purpose and Need for the Proposed Action

1.1 Introduction

The Federal Aviation Administration (FAA) has prepared this Draft Environmental Assessment (EA) to identify the potential environmental effects associated with an FAA Proposed Action to implement a new proposed offset Area Navigation (RNAV) Global Positioning System (GPS) arrival procedure to Runway 19 at Teterboro Airport (the Airport), hereinafter known as the RNAV (GPS) RWY 19 Offset. A procedure is a standardized set of navigation instructions that provide a route for a pilot to follow. This new proposed procedure was developed from a concept initially identified by the Port Authority of New York and New Jersey (the Port Authority and the Teterboro Airport Noise Abatement and Advisory Committee (TANAAC) and follows a path that generally parallels New Jersey State Route 17.

In 2007, the Teterboro Airport Noise Abatement and Advisory Committee TANAAC sent a letter to the FAA Administrator requesting that an alternative procedure be developed for Runway 19 arrivals that would move aircraft away from the Hackensack University Medical Center and the surrounding area. Over the next eight years, the FAA, the Port Authority, and TANAAC worked together to develop a procedure that would achieve this goal, and the new procedure was finalized in 2015. In April of 2016, the FAA began a six-month testing period for the Quiet Visual RWY 19 procedure.

The six-month test of the Quiet Visual RWY 19 procedure showed that the procedure was technically feasible and it was flown successfully throughout the test period. However, since the details of the procedure's official FAA documentation significantly increased pilot workload, most pilots generally did not want to fly the procedure and it had a low level of usage during the test period. As a result, it was determined that the Quiet Visual RWY 19 procedure would not be made permanent. From this initial procedure design, the RNAV (GPS) RWY 19 Offset Proposed Action was drafted by the Port Authority, TANAAC, and FAA.

Federal actions, such as implementation of new arrival procedures, with the potential to cause environmental impacts must comply with the National Environmental Policy Act of 1969 (NEPA) and other applicable laws. Requirements for considering environmental impacts of FAA actions are found in FAA Order 1050.1F, Environmental Impacts: Policies

and Procedures, as well as in the Council on Environmental Quality (CEQ) regulations for implementing NEPA at Title 40 of the Code of Federal Regulations Part 1500-1508 (40 CFR 1500-1508).

This Draft EA has been prepared in accordance with FAA Order 1050.1F, which requires an EA when the Proposed Action does not require an Environmental Impact Statement (EIS) and does not fall within the scope of a categorical exclusion (CATEX) (FAA Order 1050.1F, §3-1.2 (a.)(1)). The action to implement the RNAV (GPS) RWY 19 Offset arrival to Runway 19 does not fall within the scope of a CATEX because extraordinary circumstances requiring an EA are likely to exist. This particular action has the potential to be highly controversial on environmental grounds (FAA Order 1050.1F, §5-2 (b.)(10)) because of the Airport's location in a dense, highly-populated community with a history of noise concerns related to the design and use of flight procedures. As a result, the FAA determined that completing an EA would be an appropriate approach to addressing NEPA relative to the Proposed Action.

In addition, because preliminary noise analysis results for the Proposed Action indicated that environmental impacts would not likely be significant and an EA analysis should be commensurate with the level of impact, this EA is being prepared using the format and processes defined in FAA Order 1050.1F, Sections 6-2.1 and 6-2.2.

The format of this EA is as follows: Chapter 1 provides information on the project background and describes the purpose and need for the Proposed Action. Chapter 2 presents the alternatives for the Proposed Action. Chapter 3 and Chapter 4 provide full disclosure of the affected environment and environmental consequences, respectively, that are associated with implementation of the Proposed Action. Chapter 5 provides a list of preparers of the EA as well as a list of the agencies and persons consulted. Appendix A provides copies of relevant communication and public presentations concerning the development of the Proposed Action. The listing of park and historic properties in the General Study Area (GSA) is provided in Appendices B and C, respectively. Appendix D provides a technical summary of the noise modeling. The list of notified elected officials is located in Appendix E. Finally, the Distribution Package for the RNAV (GPS) Offset RWY 19 is located in Appendix F and the List of Referenced Websites as part of the Proposed Action is located in Appendix G. The Table of Ground Based Projects under consideration for Cumulative Impacts is located in Appendix H. All of the sections and appendices of this EA have been prepared by RoVolus under contract to the FAA.

1.2 Purpose and Need for the Proposed Action

The FAA's continuing mission is to provide the safest, most efficient aerospace system in the world. The purpose of the Proposed Action is to address the concerns of the community related to air traffic control (ATC) procedures at the Airport by developing arrival procedures that take advantage of modern technology.

The Port Authority, as the operator of Teterboro Airport, has a longstanding partnership with the surrounding community to proactively address noise issues. Over ten years ago the Port Authority and TANAAC identified an opportunity to reduce noise impacts by having aircraft arriving on Runway 19 fly an offset approach roughly above State Highway 17. This concept was embraced by the two U.S. Senators from New Jersey and the congressional representative from the district that includes the Airport in a January 8, 2007 letter. Since the concept was first identified, the Port Authority, TANAAC and FAA have worked to develop a detailed arrival procedure for an offset approach and then refined that procedure to optimize pilot utilization. The culmination of that work was reflected in a final recommendation identified in a January 3, 2018 letter from TANAAC. FAA supports opportunities to work with airport operators and address community concerns when they align with FAA's mission of operating a safe and efficient airspace system.

Currently, aircraft arriving on Runway 19 at the Airport overfly the Hackensack University Medical Center and the densely populated communities of Hackensack, Teaneck, and River Edge. The FAA is seeking to respond to the request from the Port Authority by making available an alternative arrival procedure that overflies a less densely populated corridor, while maintaining efficient operation of airspace around the Airport.

CHAPTER 2

Alternatives

The clear identification and thorough discussion of project alternatives is imperative so that the potential impacts of each alternative can subsequently be distinctly defined and easily distinguished. FAA Order 1050.1F only requires a brief discussion of alternatives to show that the alternative is reasonable, feasible, and achieves the project's purposes.¹ FAA Order 1050.1F, Chapter 6, Section 6-2.1(d) states the following:

“Alternatives are to be considered to the degree commensurate with the nature of the proposed action and agency experience with the environmental issues involved. Generally, the greater the degree of impacts, the wider the range of alternatives that should be considered. ... There is no requirement for a specific number of alternatives or a specific range of alternatives to be included in an EA. An EA may limit the range of alternatives to the proposed action and no action when there are no unresolved conflicts concerning alternative uses of available resources.”

2.1 Identification of Potential Alternatives

A potential alternative is one that would accomplish the Purpose and Need for the Proposed Action while being a reasonable and feasible action. In order to merit further consideration, it is necessary that an alternative reduce overflights of Hackensack University Medical Center, is based on coded waypoints, and would be readily adopted by pilots. Alternatives that involve other modes of transportation, use of other airports, or changes in airport use may have the potential to decrease air travel or shift traffic to other airports, but these alternatives do not meet the Purpose and Need for the Proposed Action. Likewise, improvements in aircraft or ATC technology may provide overall benefits to the operating environment, but the timeframe for adoption of such technologies would be beyond what is reasonably foreseeable.

In this case the FAA has determined that the No Action and Proposed Action Alternatives represent a reasonable range of alternatives to be evaluated in this EA. The Proposed Action Alternative is based on a request from the Port Authority and TANAAC and has been carefully refined with numerous iterations, including the development and test of the Quiet Visual RWY 19 procedure, to minimize adverse environmental impacts while meeting the Purpose and Need. Presentations documenting the evolution of the procedure

¹ Order 1050.1F, 7-1,1,e, Page 7-3. https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf

are provided in Appendix A. Per FAA Order 1050.1F, these two alternatives represent the range of alternatives commensurate with the nature of the Proposed Action.

2.1.1 FAA Proposed Action

The Proposed Action (RNAV (GPS) RWY 19 Offset) is the implementation of an RNAV procedure that closely mimics the Quiet Visual RWY 19 procedure. Aircraft arriving at the Airport would continue following existing routes, but during periods of light activity, RNAV-capable aircraft arriving on Runway 19 will be directed to follow the proposed procedure beginning at waypoint EMPTY on the New York/New Jersey border. Flight paths upstream from this new routing will be unaffected.

In the new procedure, FAA will create new waypoints EMPTY, WHOLN, MOOGZ, and DUUNE which are generally aligned along the New Jersey Route 17 corridor. The anticipated minimum transition altitudes above field elevation (AFE) at the waypoints in the procedure are 3,000 feet at EMPTY, 2,300 feet at WHOLN, 1,700 feet at MOOGZ, and 1,500 feet at DUUNE (roughly above the intersection of New Jersey Route 4 and New Jersey Route 17). From DUUNE aircraft will intercept the Runway 19 Instrument Landing System (ILS) for a short final into Runway 19. Turboprop aircraft and jet aircraft that are not RNAV-capable would continue to arrive via existing Runway 19 arrival procedures.

The proposed procedure is designated as RNAV (GPS) RWY 19 Offset, and as an RNAV procedure requires that an aircraft flying the procedure remain within one nautical mile (NM) of the procedure centerline 95% of the total flight time. The Proposed Action Alternative is shown in **Figures 2-1** and **2-2**. These figures and the remaining figures were prepared using ArcGIS®, a suite of programs developed by Esri to accurately and easily display geospatial data.

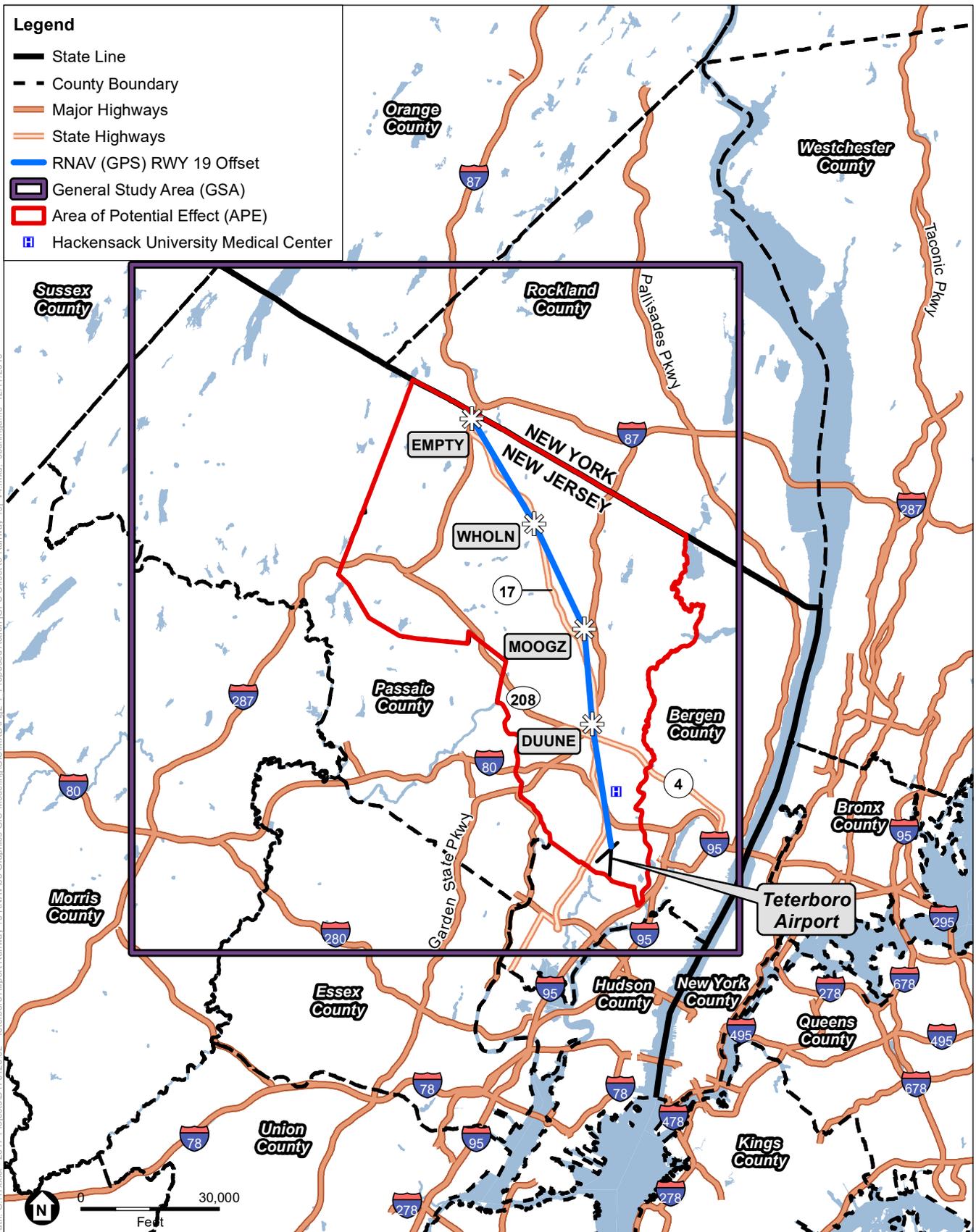
2.2 Alternatives Carried Forward for Detailed Evaluation

This section provides descriptions of the alternatives for analysis in the EA, which includes the No Action and Proposed Action Alternatives.

2.2.1 Maintain Existing Arrival Routes into Runway 19 (No Action Alternative)

The No Action Alternative would maintain the Runway 19 arrivals that are currently flown. The current options for approaches into Runway 19 include the ILS or Localizer (LOC) RWY 19, the RNAV Required Navigation Performance (RNP) Z RWY 19, and the RNAV (GPS) Y RWY 19.

Aircraft that arrive to Runway 19 transition to the RNAV (GPS) Y RWY 19 approach over waypoint SKUBY at 6,000 feet AFE and then head to waypoint NIPIE, and then finally turn



SOURCE: Esri; Prepared by ESA, 2019

Figure 2-1
Proposed Action (RNAV (GPS) RWY 19 Offset)
Teterboro Airport



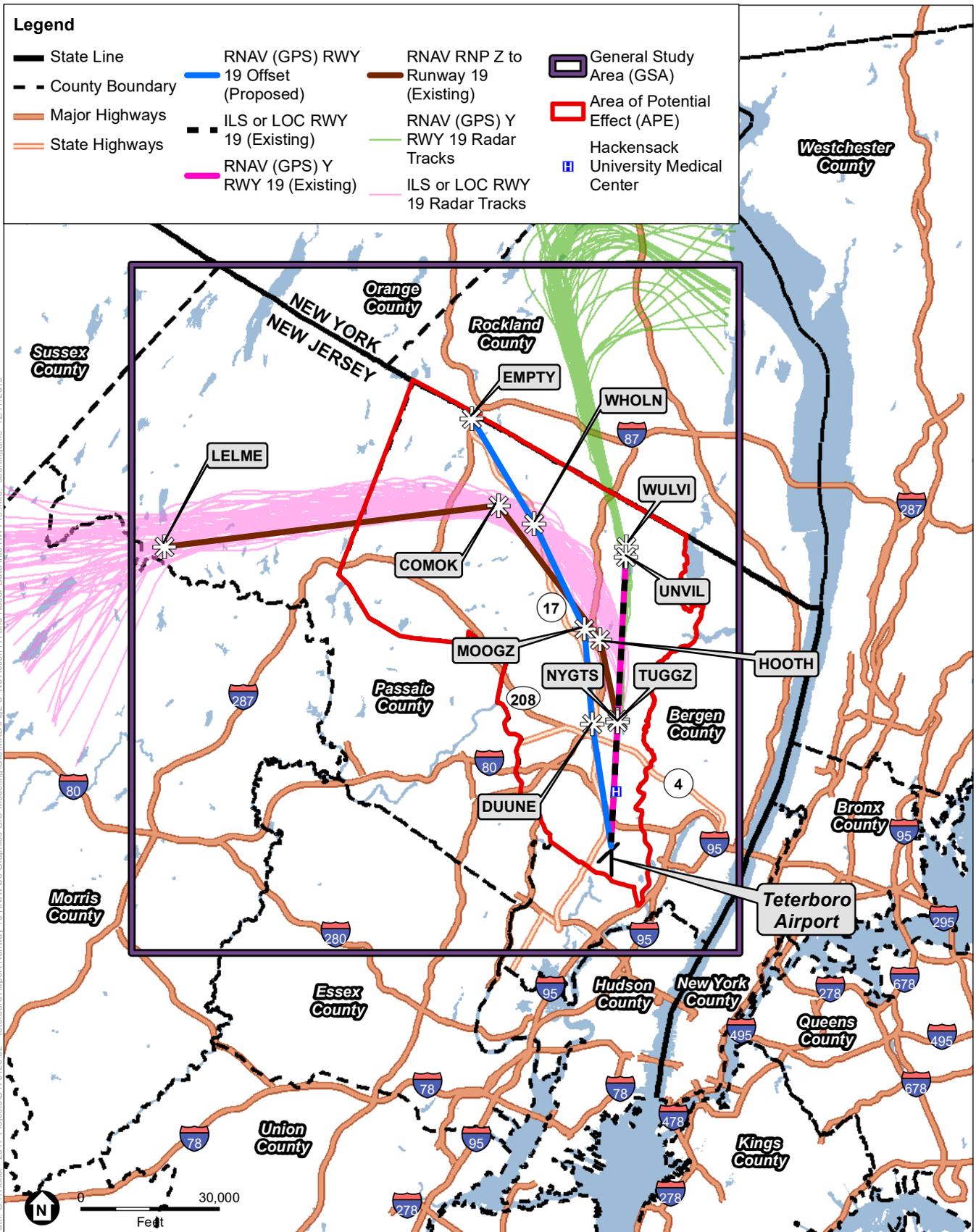
to a heading of 195 degrees when the aircraft intercepts the Runway 19 ILS. On their approach into the Airport, aircraft on the RNAV (GPS) Y RWY 19 also approach the Airport on an inbound approach course of 195 degrees. The ILS or LOC RWY 19 transitions toward Runway 19 over waypoint UNVIL at a minimum altitude of 2,000 feet and then over waypoint TUGGZ at a minimum altitude of 1,500 feet before final approach. The RNAV(GPS) Y RWY 19 routes aircraft via waypoints WULVI and NYGTS at the same respective minimum altitudes of 2,000 feet and 1,500 feet. Aircraft approaching Runway 19 on the ILS OR LOC RWY 19 can maintain a steeper approach angle as UNVIL is slightly closer to the Airport than the corresponding point (WULVI) on the RNAV (GPS) Y RWY 19. The waypoints, with a minimum altitude of 1,500 feet for both straight-in approach procedures, are in an identical position for both procedures. The final approach tracks of both procedures pass over the Hackensack University Medical Center and result in aircraft being roughly 750 feet above ground when they fly over the nine-story medical center. These straight-in procedures and a sample of flight tracks are shown in **Figure 2-3**.

The RNAV (RNP) Z RWY 19 procedure routes aircraft approaching the Airport from the COATE waypoint, STILLWATER VOR/DME, and the SHOTT waypoint, and accounts for just three percent of all arrivals into Runway 19. The aircraft merge onto a common route at the waypoint LELME and head east on a heading of 095 degrees towards the intermediate fix COMOK, which has a minimum altitude of 3,000 feet. The procedure passes waypoint HOOTH (minimum altitude of 2,000 feet) and joins with the other two RWY 19 approaches at ALSIW, which is identical to TUGGZ and NYGTS and has an identical minimum altitude of 1,500 feet. This path brings these aircraft over the Hackensack University Medical Center while on final approach similar to the two straight-in procedures. The RNAV (RNP) procedure and a sample of flight tracks is shown in **Figure 2-4**.

Under the No Action Alternative, all aircraft arriving to Runway 19 on an IAP would continue to overfly the Hackensack University Medical Center. Although it does not meet the purpose and need, the No Action Alternative is carried forward for further environmental analysis in accordance with CEQ regulations implementing NEPA.

2.2.2 FAA Proposed Action

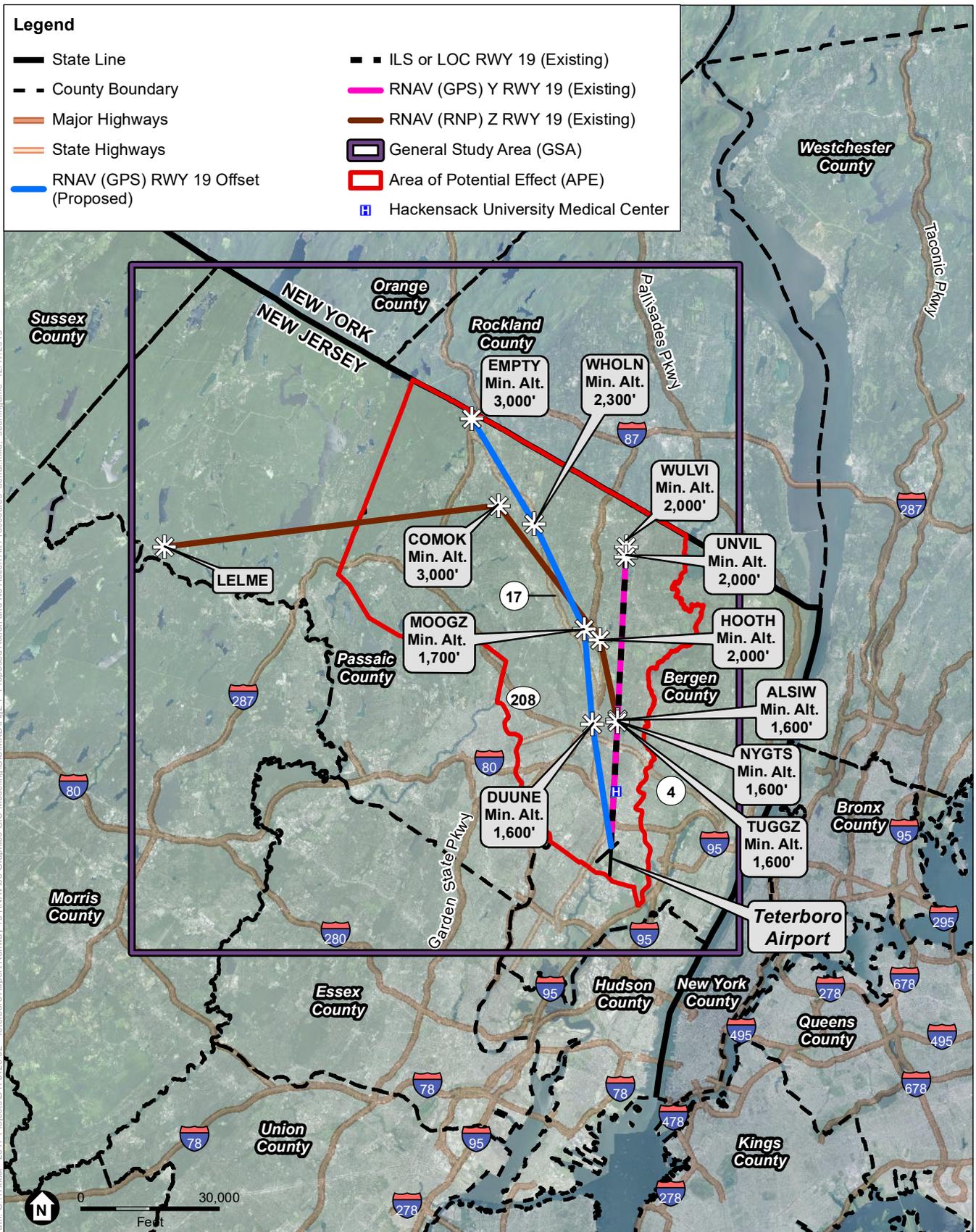
As described in **Section 2.1.1**, the FAA, at the request of the Port Authority and TANAAC, developed the RNAV (GPS) RWY 19 Offset arrival procedure that mimics the previously developed Quiet Visual RWY 19 procedure in order to reduce overflights of the Hackensack University Medical Center. **Figure 2-5** depicts the No Action Alternative and the sample flight tracks displayed in Figures 2-3 and 2-4 adjacent to the Proposed Project. These sample flight tracks and the Proposed Project illustrates how the RNAV (GPS) RWY 19 Offset will reduce overflights of the Hackensack University Medical Center. **Figures 2-6** and **2-7** depict both the Proposed Action and No Action Procedures along with the minimum altitudes at the associated waypoints. This proposed alternative, which was refined and technically evaluated to meet RNAV performance criteria and preliminarily evaluated for noise impacts, is carried forward for further environmental analysis.



SOURCE: Esri; Prepared by ESA, 2019



Figure 2-5
 No Action Alternative Procedures, Proposed
 Action, and Radar Data Into Runway 19
 Teterboro Airport



SOURCE: Esri; Prepared by ESA, 2019

Figure 2-7
 Proposed Action and No Action Alternative Procedures
 Into Runway 19 on Aerial Image
 Teterboro Airport



CHAPTER 3

Affected Environment

3.1 Introduction

This chapter describes the existing environmental conditions in those areas with potential to be affected by the Proposed Action. **Section 3.2** describes the General Study Area (GSA) delineated for purposes of identifying potential environmental impacts. **Section 3.3** lists those environmental resource categories unlikely to be affected by the Proposed Action. Lastly, **Section 3.4** describes the baseline conditions of the natural and human environment with potential to be impacted by the Proposed Action.

3.2 General Study Area

The following sub-sections describe the setting and location where the Proposed Action would be implemented, and existing land use in the GSA (including the Airport environs, which are defined as the lands directly adjacent to the airport property).

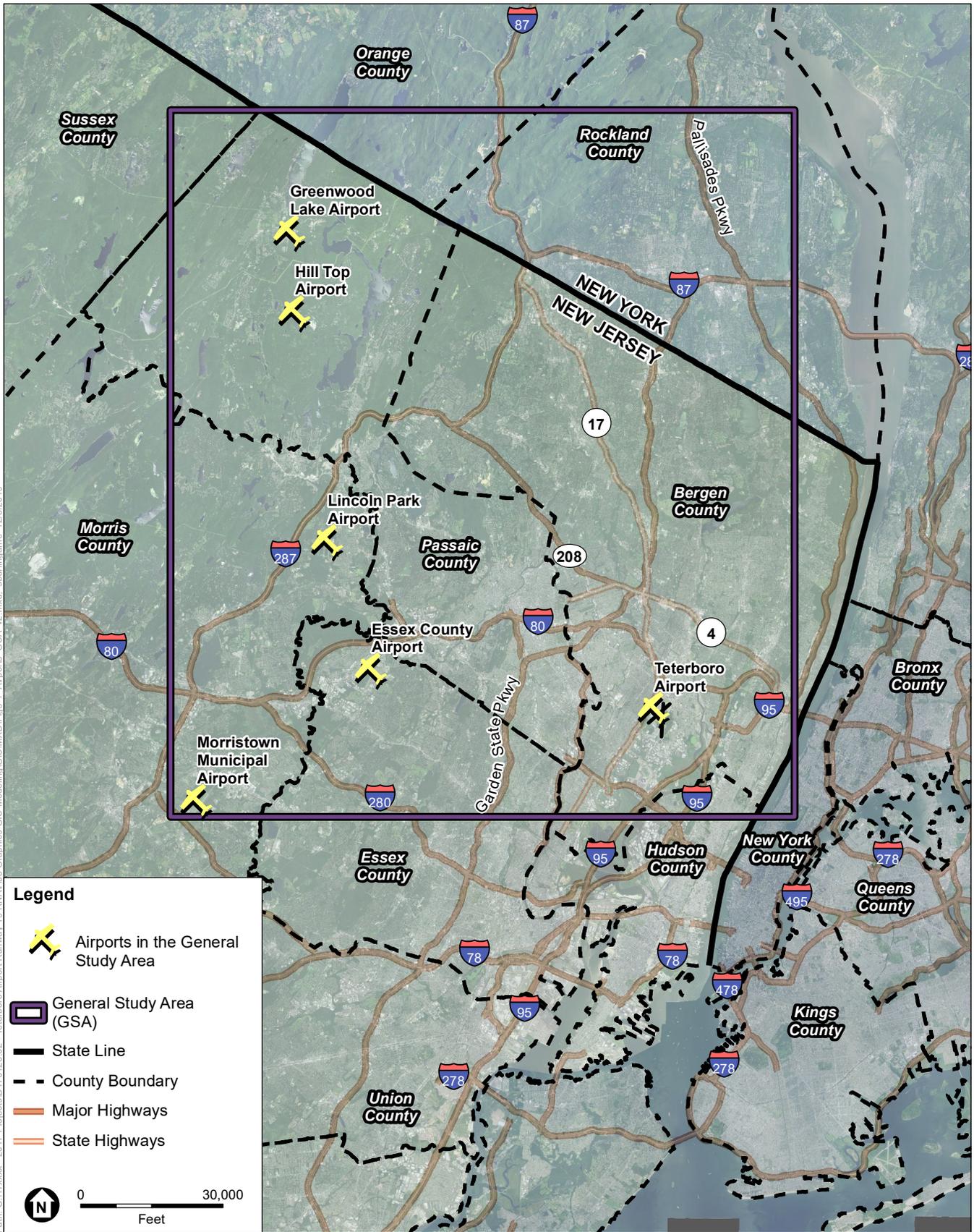
3.2.1 Setting and Location

The GSA, as depicted on **Figure 3-1**, encompasses an area of approximately 705 square miles in the states of New Jersey and New York. This includes all or parts of Bergen, Essex, Hudson, Morris, Passaic, and Sussex counties in New Jersey and parts of Orange, Rockland, and New York counties in New York. The GSA was constructed to encompass the geographic area where an aircraft flight path could be affected as a result of the Proposed Action. The Airport is located in the southeastern corner of the GSA. There are five other airports in the GSA, all located in the state of New Jersey and are shown in Figure 3-1:

- Essex County Airport (CDW)
- Greenwood Lake Airport (4N1)
- Hill Top Airport (JY43)
- Lincoln Park Airport (N07)
- Morristown Municipal Airport (MMU)

3.2.2 Teterboro Airport

As shown on Figure 3-1, the Airport is a general aviation reliever airport located approximately 12 miles west of New York City in Bergen County, New Jersey. General aviation reliever airports provide additional capacity to areas containing one or more congested commercial service airports. The Airport is owned and operated by the Port



SOURCE: Esri; Prepared by ESA, 2019

Figure 3-1
Airports in the General Study Area
Teterboro Airport

Authority. There were 174,747 aircraft operations at the Airport in 2018.² The Airport has two runways, Runway 01/19 and Runway 06/24. Runway 01/19 is 7,000 feet long and oriented in a north-south direction. Runway 06/24 is 6,013 feet long and is oriented in a northeast/southwest direction. The Airport property covers 827 acres and occupies most of the borough of Teterboro while also extending into the neighboring boroughs of Moonachie and Hasbrouck Heights.

3.2.3 Existing Land Use

Figure 3-2 depicts generalized land use in the GSA. Land use in the southeastern portion of the GSA, immediately adjacent to the Airport, is characterized by dense urban development typical of New York City and surrounding communities. Moving to the northwest, dense urban development gives way to areas of agriculture and open space interspersed with lower intensity urban development and eventually mountainous forest.

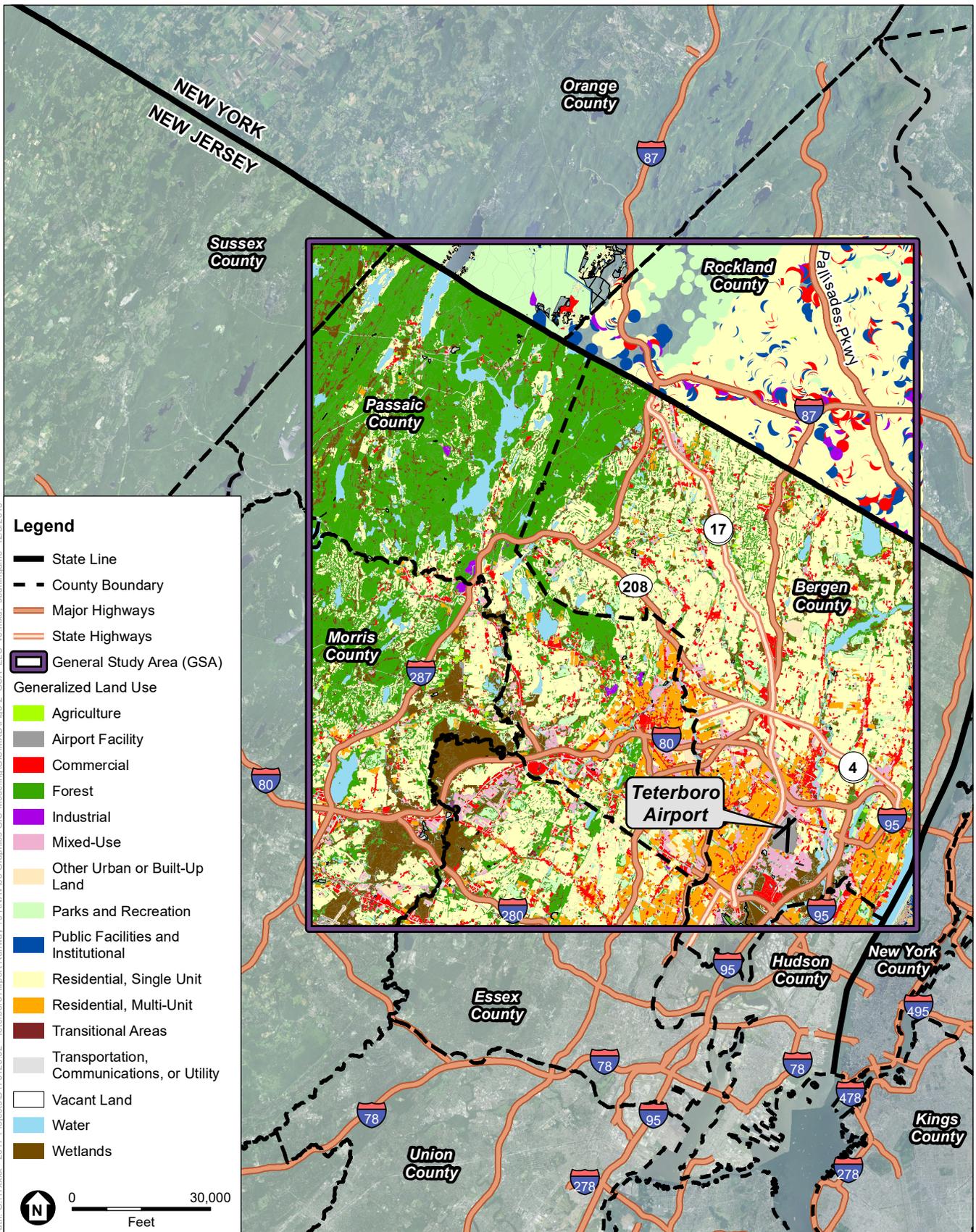
Figure 3-3 depicts existing land uses in the Airport Environs. The areas immediately surrounding the Airport are highly urbanized with high to medium-intensity development. Light industrial uses lie directly south of the Airport, and mobile home parks lie directly southeast of the Runway 01 threshold. The New Jersey Meadowlands, an area of wetlands around the Hackensack River, lies south of the Airport, as does the Meadowlands Sports Complex. To the north, the Airport property borders an area of mixed commercial and light industrial uses. Residential uses are found beyond this area, north of the Interstate 80 highway, as well as directly east and west of the Airport.

3.3 Environmental Resources Unlikely to be Affected by the Proposed Action

Neither the Proposed Action nor the No Action Alternative are anticipated to affect certain environmental resource categories identified in the Desk Reference for FAA Order 1050.1F. Accordingly, no further discussion of these environmental resource categories is warranted. These environmental resource categories include:

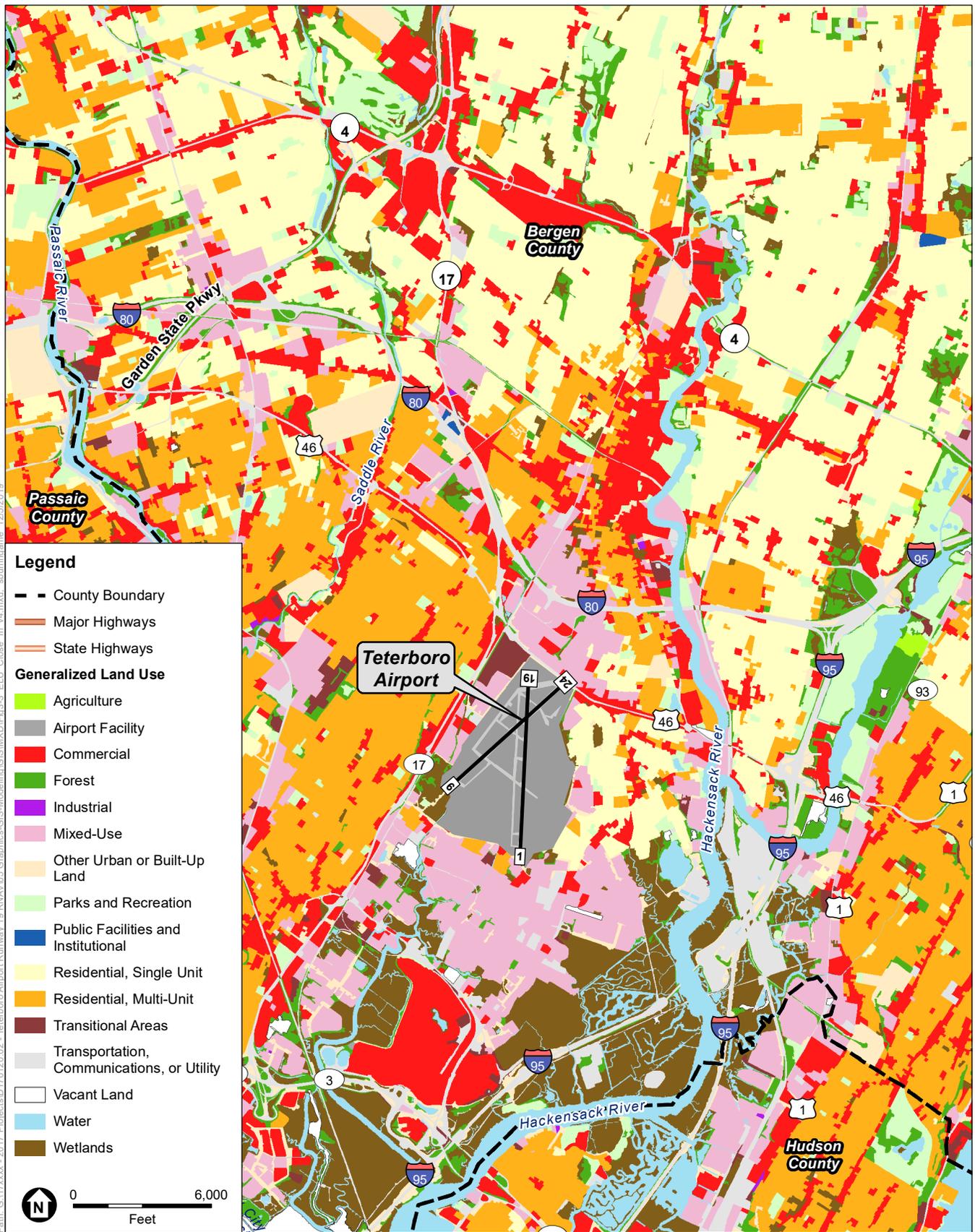
- Biological Resources – Fish, Plants, and Terrestrial Species Only
 - The Proposed Action does not result in ground based disturbance and is therefore not expected to have impacts on any terrestrial organisms considered as part of the Biological Resources impact category.

² FAA OPSNET Airport Operations Standard Report, Teterboro Airport, Calendar Year 2018, <https://aspm.faa.gov/opsnet/sys/opsnet-server-x.asp>, queried July 16, 2019.



SOURCE: Esri; State of New Jersey GIS, 2012; Orange County GIS Division of Information Services, 2016; Rockland County Assessor, 2018; NYC MapPLUTO_18v2; Prepared by ESA 2019.

Figure 3-2
Generalized Existing Land Use in the General Study Area
Teterboro Airport



SOURCE: Esri; State of New Jersey GIS, 2012; Orange County GIS Division of Information Services, 2016; Rockland County Assessor, 2018; NYC MapPLUTO_18v2; Prepared by ESA, 2019.

Figure 3-3
Generalized Existing Land Use in the Airport Environs
Teterboro Airport

- Coastal Resources
 - The Proposed Project is an airspace action with no physical ground based improvements is thus not expected to have an impact on any coastal area or coastal ecosystem.
- Farmlands
 - The Proposed Action is an airspace action with no physical ground based improvements and will not cause any conversion of farmlands into non-agricultural uses.
- Hazardous Materials, Solid Waste, and Pollution Prevention
 - The Proposed Action does not include construction or physical improvements and is not expected to have any impact on solid waste, hazardous waste, contaminated sites as defined by FAA Order 1050.1F, and solid waste management.
- Historical, Architectural, Archeological, and Cultural Resources – Archeological Resources Only
 - The Proposed Action is an airspace action with no physical ground based improvements and is not expected to have any impact on any archeological sites.
- Natural Resources and Energy Supply
 - The Proposed Action will not cause demand to exceed the availability of available or future supplies of natural resources.
- Socioeconomics, Environmental Justice, and Children’s Environmental Health – Socioeconomics and Children’s Environmental Health Only
 - The Proposed Action is not expected to cause any changes to a community tax base, or any disruption or relocation of any community business or houses. The Proposed Action is not expected to disproportionately cause a health or safety risk to children. Thus, these parts of this impact category were not considered.
- Light Emissions and Visual Effects
 - The Proposed Action is an airspace action only, which are associated with low levels of light intensity, and thus is not expected to cause any changes to visual effects in the GSA.

- Water Resources (including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)
 - The Proposed Action is an airspace action with no physical ground-based improvements and thus is not expected to cause any changes to water resources in the GSA.

3.4 Potentially Affected Environmental Resource Categories

This section describes current conditions in the GSA for those environmental resource categories or sub-categories that the Proposed Action has the potential to affect. These environmental resource categories or sub-categories include:

- Air Quality (Section 3.4.1)
- Climate (Section 3.4.2)
- Biological Resources – Wildlife Only (Section 3.4.3)
- Department of Transportation Act, Section 4(f) Properties (Section 3.4.4)
- Historical, Architectural, Archeological, and Cultural Resources – Historic, Architectural, and Cultural Resources Only (Section 3.4.5)
- Noise and Noise-Compatible Land Use (Section 3.4.6)
- Environmental Justice (Section 3.4.7)

The following sub-sections discuss each of these environmental resource categories in detail.

3.4.1 Air Quality

This sub-section describes the existing air quality conditions within the GSA, as related to national air quality standards. The United States Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for ambient (i.e., outdoor) concentrations of the following criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), ground-level ozone (O₃), sulfur dioxide (SO₂), lead (Pb), particulate matter with a diameter of 10 microns or less (PM₁₀), and particulate matter with a diameter of 2.5 microns or less (PM_{2.5}). States must identify geographic areas that do not meet the NAAQS for each criteria pollutant. These areas are then identified as non-attainment areas for the applicable criteria pollutant(s). States must develop a State Implementation Plan (SIP) for non-attainment areas that includes a variety of emission control measures that the state deems necessary to produce attainment of the applicable standard(s) in the future. If a SIP already exists, it must be revised if an area becomes non-attainment for a criteria pollutant.

An area previously designated non-attainment pursuant to the Clean Air Act (CAA) Amendments of 1990 and subsequently re-designated as attainment, is termed a

maintenance area. A maintenance area must have a 20-year maintenance plan to ensure attainment of the air quality standards is maintained.

The mixing height is defined by EPA based on atmospheric turbulence and directly reflects the ability of pollutants emitted above the ground to impact people on the ground. In the case of Teterboro, the mixing height is assumed to have an annual average height of 3,000 feet above ground and criteria pollutants emitted above this height are not considered in the air quality analysis (see Chapter 4).

Within the GSA, criteria pollutant levels associated with current flight operations at the Airport are shown in **Table 3.4-1** below.

TABLE 3.4-1
FUEL BURN AND CRITERIA POLLUTANT EMISSIONS BELOW MIXING HEIGHT
(SHORT TONS PER YEAR)

Fuel burn	11,769
CO	134.7
VOC	22.5
NO _x	140.0
SO _x	13.8
PM _{2.5}	1.71
PM ₁₀	1.71
Source: Prepared by RoVolus, 2019	

3.4.1.1 Ozone

Ozone at ground level is a harmful air pollutant because of its effects on people and the environment, and it is the main ingredient in "smog." Ozone is not emitted directly into the air but is instead created by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOCs). This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight.

The entire GSA is part of the New York-Northern New Jersey-Long Island airshed, which is designated as a moderate nonattainment area for ozone under the 2015 and 2008 8-hour NAAQS. The area was also designated as moderate nonattainment under the 1997 8-hour NAAQS and severe-nonattainment under the 1979 1-hour standard before those standards were revoked.

3.4.1.2 Particulate Matter (PM₁₀)

Particulate matter is the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be observed using an electron microscope. Particles less than 10 micrometers in diameter pose problems because they can get deep into lungs, and some may even get into the bloodstream.

New York County is the only area in the GSA that is designated nonattainment under the 1987 PM₁₀ standard.

3.4.1.3 Fine Particulate Matter (PM_{2.5})

Fine particulate matter, or PM_{2.5}, consists of fine inhalable particles with diameters that are generally 2.5 microns and smaller. Exposure to such particles can affect human cardiovascular and respiratory systems. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:

- premature death in people with heart or lung disease
- nonfatal heart attacks
- irregular heartbeat
- aggravated asthma
- decreased lung function
- increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

People with heart or lung diseases, children, and older adults are the most likely to be affected by particle pollution exposure.

The entire GSA is part of the New York-Northern New Jersey-Long Island airshed, which is designated as an attainment area for the 2012 NAAQS for PM_{2.5}. However, the area had previously been designated a nonattainment area for the 2006 and 1997 PM_{2.5} NAAQS. On September 4, 2013, air quality monitoring enabled EPA to re-designate the airshed as a maintenance area for the 2006 and 1997 PM_{2.5} NAAQS. The 1997 PM_{2.5} NAAQS has since been revoked.

3.4.1.4 Carbon Monoxide

CO is a colorless, odorless, and poisonous gas produced by incomplete combustion of hydrocarbon fuels. The majority of CO emissions are from transportation sources, with the largest share from highway motor vehicles. CO molecules survive in the atmosphere for a period of approximately one month, eventually reacting with oxygen to form carbon dioxide (CO₂). CO levels found in ambient air may reduce the oxygen-carrying capacity of the blood. Health threats are most serious for those with angina or peripheral vascular disease. Exposure to elevated CO levels can cause impairment of visual perception, manual dexterity and learning ability as well as decreased performance of complex tasks.

The entire GSA is part of the New York-Northern New Jersey-Long Island airshed, which had previously been a moderate nonattainment area for the 1971 standard for CO. On October 22, 2002, air quality monitoring enabled EPA to re-designate the airshed as a maintenance area for the 1971 CO NAAQS.

3.4.2 Climate

Greenhouse gases (GHGs) are naturally occurring and man-made gases that trap heat in the earth's atmosphere. These gases include CO₂, methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). According to the EPA, the Government Accountability Office (GAO) in 2009 reported that domestic aviation contributed approximately three percent of total national CO₂ emissions. For airspace actions, the primary source of greenhouse gases is CO₂ emissions from aircraft fuel combustion. CO₂ emissions for current flight operations (i.e. No Action Alternative) were calculated using the Aviation Environmental Design Tool (AEDT) for the lengths of the modeled tracks. **Table 3.4-2** gives the current flight operations CO₂ emissions along with the annual and statewide emissions totals for reference.

**TABLE 3.4-2
 GREENHOUSE GAS EMISSIONS**

Scale of GHG Emissions	Annual Metric Tons of CO ₂ equivalent
Annual Nationwide GHG Emissions	5,270,700,000
Annual New Jersey GHG Equivalent Emissions	100,900,000
Current Flight Operations	60,155
Sources: U.S. Environmental Protection Agency Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017, State of New Jersey Department of Environmental Protection Statewide Greenhouse Gas Emissions Inventory, 2015, Prepared by RoVolus, 2019	

3.4.3 Endangered Species

Section 7 of the Endangered Species Act of 1973 (ESA), as amended, (16 U.S.C. § 1531 *et seq.*) provides protection to any wildlife, including endangered plants or animals. In compliance with Section 7(c) of the ESA, federal agencies are required to ensure that federal projects, such as the Proposed Action, would not jeopardize the continued existence of threatened or endangered species, or result in the destruction or adverse modification of critical habitat for such species. An endangered species is defined as being in danger of extinction throughout all or a significant portion of its range. A threatened

species is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Because the Proposed Action is for an aircraft arrival procedure and will not affect terrestrial species, this section describes the affected environment as it relates to threatened and endangered bird and bat species. Bird migration is also considered, as avian species in the GSA may be impacted by changes to aircraft routing.

3.4.3.1 Threatened and Endangered Species

The United States Fish and Wildlife Service (USFWS) operates the Information for Planning and Consultation (IPaC) service, which provides for the identification of federally-listed threatened and endangered species, candidate species, and designated critical habitat within geographically defined areas. **Table 3.4-3** identifies federally-listed threatened and endangered bird and bat species and the counties in the GSA in which they are known or believed to occur. Two federally-listed bat species, the Indiana Bat and the Northern Long-eared Bat, and one bird species, the Eastern Black Rail, are found within the GSA. There are no candidate species or designated critical habitats found in the GSA.

**TABLE 3.4-3
 FEDERALLY-LISTED THREATENED, ENDANGERED, CANDIDATE, AND PROPOSED SPECIES**

Group	Species	Scientific Name	Status	Counties where Species is Known or Believed to Occur
Mammals	Indiana Bat	<i>Myotis sodalis</i>	Endangered	New Jersey – Bergen, Essex, Morris, Passaic, and Sussex; New York – Orange and Rockland
Mammals	Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	New Jersey – Bergen, Essex, Hudson, Morris, Passaic, and Sussex; New York – Orange, New York, and Rockland
Birds	Eastern Black Rail	<i>Laterallus jamaicensis ssp jamaicensis</i>	Threatened (Proposed)	N/A (No critical habitat has been designated)
Source: U.S. Department of Interior Fish and Wildlife Service Information, Planning, and Conservation System (IPaC), July 2019.				

Table 3.4-4 identifies state-listed species in New Jersey and New York.

**TABLE 3.4-4
 STATE-LISTED THREATENED, ENDANGERED, CANDIDATE, AND PROPOSED SPECIES**

Group	Species	Scientific Name	Status	State Where Species is Listed
Mammals	Indiana Bat	<i>Myotis sodalis</i>	Endangered	New Jersey, New York
Mammals	Northern Long-eared Bat	<i>Myotis septentrionalis</i>	Threatened	New Jersey, New York
Birds	Bittern, American ^a	<i>Botaurus lentiginosus</i>	Endangered	New Jersey
Birds	Bittern, least	<i>Ixobrychus exilis</i>	Threatened	New York
Birds	Bobolink ^a	<i>Dolichonyx oryzivorus</i>	Threatened	New Jersey
Birds	Curlew, Eskimo	<i>Numenius borealis</i>	Endangered	New York
Birds	Eagle, bald ^a	<i>Haliaeetus leucocephalus</i>	Endangered	New Jersey
Birds	Eagle, bald ^b	<i>Haliaeetus leucocephalus</i>	Threatened	New York
Birds	Eagle, golden	<i>Aquila chrysaetos</i>	Endangered	New York
Birds	Eastern Black Rail	<i>Botaurus lentiginosus</i>	Threatened (Proposed)	New Jersey
Birds	Egret, cattle ^a	<i>Bubulcus ibis</i>	Threatened	New Jersey
Birds	Falcon, peregrine ^a	<i>Falco peregrinus</i>	Endangered	New Jersey, New York
Birds	Goshawk, northern ^a	<i>Accipiter gentilis</i>	Endangered	New Jersey
Birds	Grebe, pied-billed	<i>Podilymbus podiceps</i>	Threatened	New York
Birds	Grebe, pied-billed ^a	<i>Podilymbus podiceps</i>	Endangered	New Jersey
Birds	Grouse, spruce	<i>Falci pennis canadensis</i>	Endangered	New York
Birds	Harrier, northern	<i>Circus cyaneus</i>	Threatened	New York
Birds	Harrier, northern ^a	<i>Circus cyaneus</i>	Endangered	New Jersey
Birds	Hawk, red-shouldered ^a	<i>Buteo lineatus</i>	Endangered	New Jersey
Birds	Kestrel, American	<i>Falco sparverius</i>	Threatened	New Jersey
Birds	Knot, red ^b	<i>Calidris canutus</i>	Endangered	New Jersey
Birds	Lark, horned ^a	<i>Eremophila alpestris</i>	Threatened	New Jersey
Birds	Night-heron, black-crowned ¹	<i>Nycticorax</i>	Threatened	New Jersey
Birds	Night-heron, yellow-crowned	<i>Nyctanassa violacea</i>	Threatened	New Jersey
Birds	Osprey ¹	<i>Pandion haliaetus</i>	Threatened	New Jersey
Birds	Owl, barred	<i>Strix varia</i>	Threatened	New Jersey
Birds	Owl, long-eared	<i>Asio otus</i>	Threatened	New Jersey
Birds	Owl, short-eared ^a	<i>Asio flammeus</i>	Endangered	New Jersey, New York

Group	Species	Scientific Name	Status	State Where Species is Listed
Birds	Plover, piping ^c	<i>Charadrius melodus</i>	Endangered	New Jersey, New York
Birds	Rail, black ^a	<i>Laterallus jamaicensis</i>	Endangered	New Jersey, New York
Birds	Rail, black ^b	<i>Laterallus jamaicensis</i>	Threatened	New Jersey
Birds	Rail, king	<i>Rallus elegans</i>	Threatened	New York
Birds	Red knot, rufa	<i>Calidris canutus rufa</i>	Threatened	New Jersey, New York
Birds	Sandpiper, upland	<i>Bartramia longicauda</i>	Endangered	New Jersey
Birds	Sandpiper, upland	<i>Bartramia longicauda</i>	Threatened	New York
Birds	Shrike, loggerhead ^b	<i>Lanius ludovicianus</i>	Endangered	New Jersey, New York
Birds	Skimmer, black	<i>Rynchops niger</i>	Endangered	New Jersey
Birds	Sparrow, grasshopper ^a	<i>Ammodramus savannarum</i>	Threatened	New Jersey
Birds	Sparrow, Henslow's	<i>Ammodramus henslowii</i>	Threatened	New York
Birds	Sparrow, Henslow's	<i>Ammodramus henslowii</i>	Endangered	New Jersey
Birds	Sparrow, Savannah ^a	<i>Passerculus sandwichensis</i>	Threatened	New Jersey
Birds	Sparrow, vesper ^a	<i>Poocetes gramineus</i>	Endangered	New Jersey
Birds	Tern, black	<i>Chlidonias niger</i>	Endangered	New York
Birds	Tern, common	<i>Sterna hirundo</i>	Threatened	New York
Birds	Tern, least	<i>Sternula albifrons</i>	Endangered	New Jersey
Birds	Tern, least	<i>Sternula albifrons</i>	Threatened	New York
Birds	Tern, roseate ^c	<i>Sterna dougallii</i>	Endangered	New Jersey, New York
Birds	Warbler, golden-winged ^a	<i>Vermivora chrysoptera</i>	Endangered	New Jersey
Birds	Wren, sedge	<i>Botaurus lentiginos</i>	Endangered	New Jersey
Birds	Wren, sedge	<i>Botaurus lentiginos</i>	Threatened	New York
Notes: ^a Breeding Population Only (New Jersey) ^b Non-breeding Population Only (New Jersey) ^c Federal- and State-Listed Species Source: New Jersey Department of Environmental Protection, Division of Fish & Wildlife, "New Jersey's Endangered and Threatened Wildlife", < https://www.nj.gov/dep/fgw/tandespp.htm >, July 2019; New York Department of Environmental Conservation, "List of Endangered, Threatened and Special Concern Fish & Wildlife Species of New York State", https://www.dec.ny.gov/animals/7494.html , July 2019.				

3.4.3.2 Migratory Birds

The Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. §§ 703-712) prohibits the taking of any migratory bird and any part, nest, or egg of any such bird, without a permit issued by the USFWS. A “take” under the MBTA is defined as the action or attempt to “pursue, hunt, shoot, capture, collect, or kill.” Federally-listed migratory bird species are managed by the same agency staff responsible for compliance with Section 7 of the ESA. Non-listed migratory bird species are managed by the Migratory Bird Program of the USFWS.

Migratory birds occur in and migrate through the GSA. The USFWS and other agencies responsible for migratory bird management largely do so based on the routes birds follow from breeding grounds in the north to wintering grounds in the south. The actual routes birds follow vary by species. For management purposes, these migratory routes have been grouped into four separate “flyways” over North America. These include the Atlantic, the Central, the Mississippi, and the Pacific flyways, which are loosely delineated in these geographic regions. These flyways represent broad areas through which birds migrate and typically conform with major topographical features oriented in a north-south alignment. The GSA falls within the Atlantic Flyway where bird migration routes are most heavily concentrated along river valleys and mountain ranges.

3.4.3.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. § 686) provides additional protection for these two bird species. The BGEPA prohibits parties from knowingly, or with wanton disregard for the consequences of the Act, taking any bald or golden eagles or their body parts, nests, chicks, or eggs, which includes collection, molestation, disturbance, or killing. The BGEPA makes it unlawful to “disturb” eagles. “Disturb” means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle or causes either a decrease in its productivity or nest abandonment due to interference with breeding, feeding, or sheltering. A permitting process provides limited exceptions to the BGEPA’s prohibitions and the USFWS has promulgated regulations concerning the permit procedures (see 50 C.F.R. § 22).

As shown in **Table 3.4-4**, Bald Eagles (*Haliaeetus leucocephalus*) are listed as endangered in New Jersey and threatened in New York. Golden Eagles (*Aquila chrysaetos*) are listed as endangered in New York.

3.4.4 Department of Transportation Act, Section 4(f) Properties

Section 4(f) of the Department of Transportation (DOT) Act of 1966 (codified at 49 U.S.C. Section 303(c)), commonly referred to as Section 4(f), restates in FAA’s 1050.1F that:

“...[the] Secretary of Transportation may approve a transportation program or project requiring the use of any publicly owned land off a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance or land from a historic site of national, State, or local significance, only if there is no

feasible and prudent alternative to the using that land and the program or project includes all possible planning to minimize harm resulting from the use.”³

The word “use” includes both direct and indirect or “constructive” impacts to Section 4(f) properties. A direct use is the physical taking of a Section 4(f) property. An indirect impact or “constructive” use does not require a physical taking of a Section 4(f) property. A constructive use would occur when a project would produce an effect, such as excessive noise, that would result in substantial impairment to a property to the degree that the activities, features, or attributes of the property that contribute to its significance or enjoyment are substantially diminished. The determination of use must consider the entire property and not simply the portion of the property being used for a Proposed Action. Privately-owned parks, recreation areas, and wildlife refuges are not subject to Section 4(f).

The FAA has established guidelines for aircraft noise and land use compatibility under 14 CFR Part 150 (Part 150). However, the applicability of Part 150 is limited when assessing noise impacts to areas where quiet and serenity are expected attributes. Accordingly, special consideration is given to parks and natural areas where a quiet setting is a generally recognized purpose and attribute. In these areas the FAA “must consult all appropriate Federal, State, and local officials having jurisdiction over the affected Section 4(f) resources when determining whether project-related noise impacts would substantially impair the resource.”

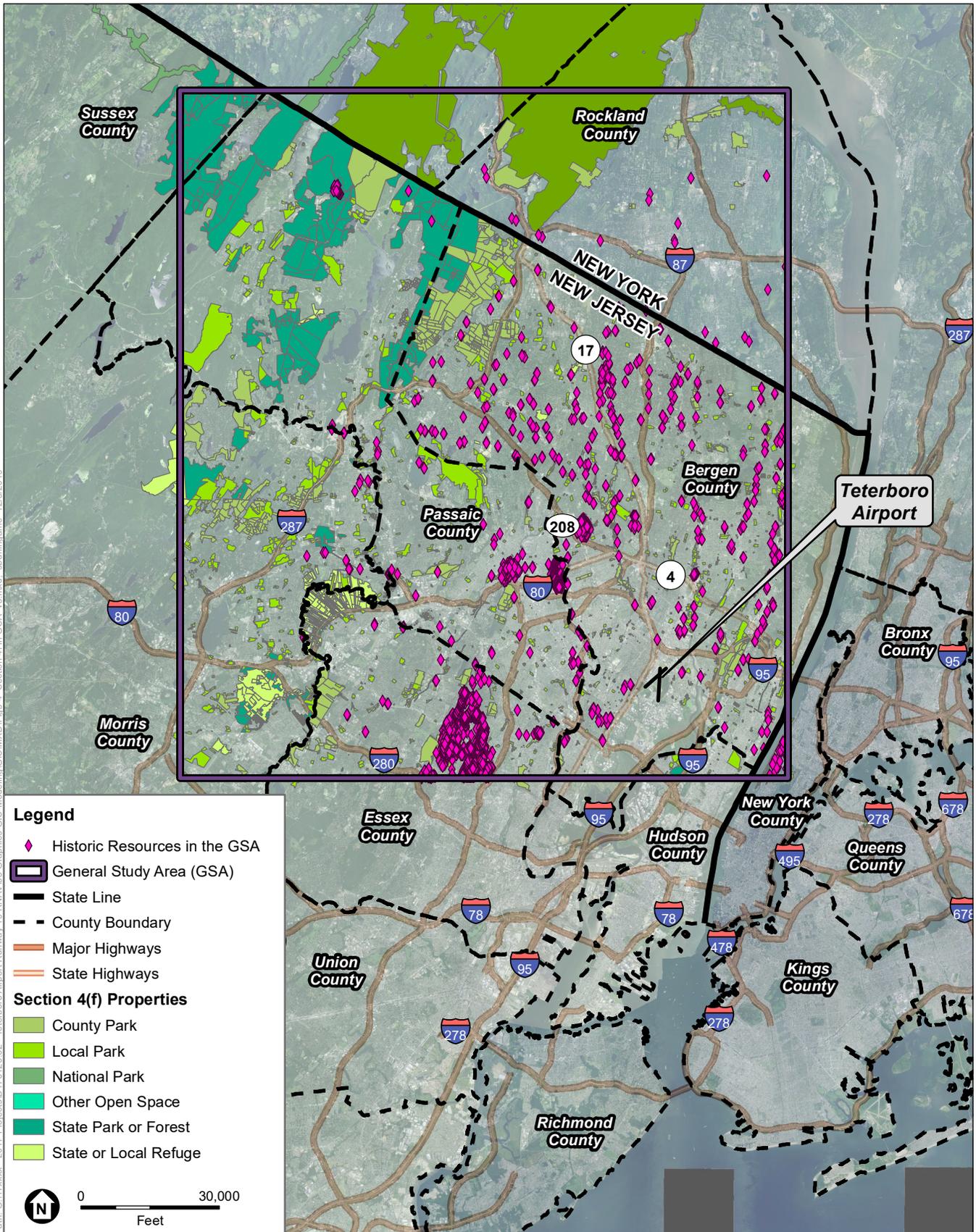
For purposes of this document, natural areas include national parks, wildlife refuges, forests, wildlife management areas and other places that are considered recreationally and environmentally significant. As shown on **Figure 3-4**, the GSA encompasses city, county, state and federally maintained parks as well as other natural areas (e.g., National Memorials or Scenic Trails).

Many Section 4(f) properties are also subject to Section 6(f) of the Land and Water Conservation Fund Act of 1965 (LWCF) (16 U.S.C. § 460l-4 *et seq.*) Section 6(f) states that “*no public outdoor recreation areas acquired or developed with LWCF assistance can be converted to non-recreation uses without the approval of the Secretary of the Interior. The Secretary of the Interior may only approve conversions if they are in accordance with the comprehensive statewide outdoor recreation plan and if other recreation lands of reasonably equivalent usefulness and location will replace the converted areas.*”

3.4.4.1 Section 4(f) Properties in the General Study Area

Section 4(f) properties in the GSA were identified using both federal and state sources. A total of 5,213 Section 4(f) properties have been identified in the GSA. The locations of these properties are shown on Figure 3-4. Historic and cultural resources are addressed

³ FAA Order 1050.1F, B-2 Section 4(f), 49 U.S.C. 303, p. B-9,
https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf,



SOURCE: Esri; NJDEP Bureau of GIS; NYS GIS Clearinghouse; NPS; Prepared by ESA, 2019

Figure 3-4
Section 4(f) Properties in the General Study Area
Teterboro Airport

under both Section 4(f) and the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. § 470, as amended), and are discussed further in Section 3.4.5. These resources are shown on Figure 3-4 along with other Section 4(f) properties and as a sole category on **Figure 3-5**.

Please see Appendix B for a complete list of the Section 4(f) properties identified in the GSA.

3.4.5 Historical, Architectural, Archeological, and Cultural Resources – Historic, Architectural, and Cultural Resources Only

The NHPA requires federal agencies to consider the effects of their projects on properties listed, or eligible for listing, in the National Register of Historic Places (NRHP). Regulations related to this process are promulgated in 36 CFR Part 800, *Protection of Historic Properties*.

The NHPA defines historic properties as:

“...any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register, including artifacts, records, and material remains relating to the district, site, building, structure, or object and located within such properties.”⁴

It is possible that changes in aircraft flight routes associated with the Proposed Action could introduce or increase aircraft routing over historic properties and result in potential adverse noise impacts.

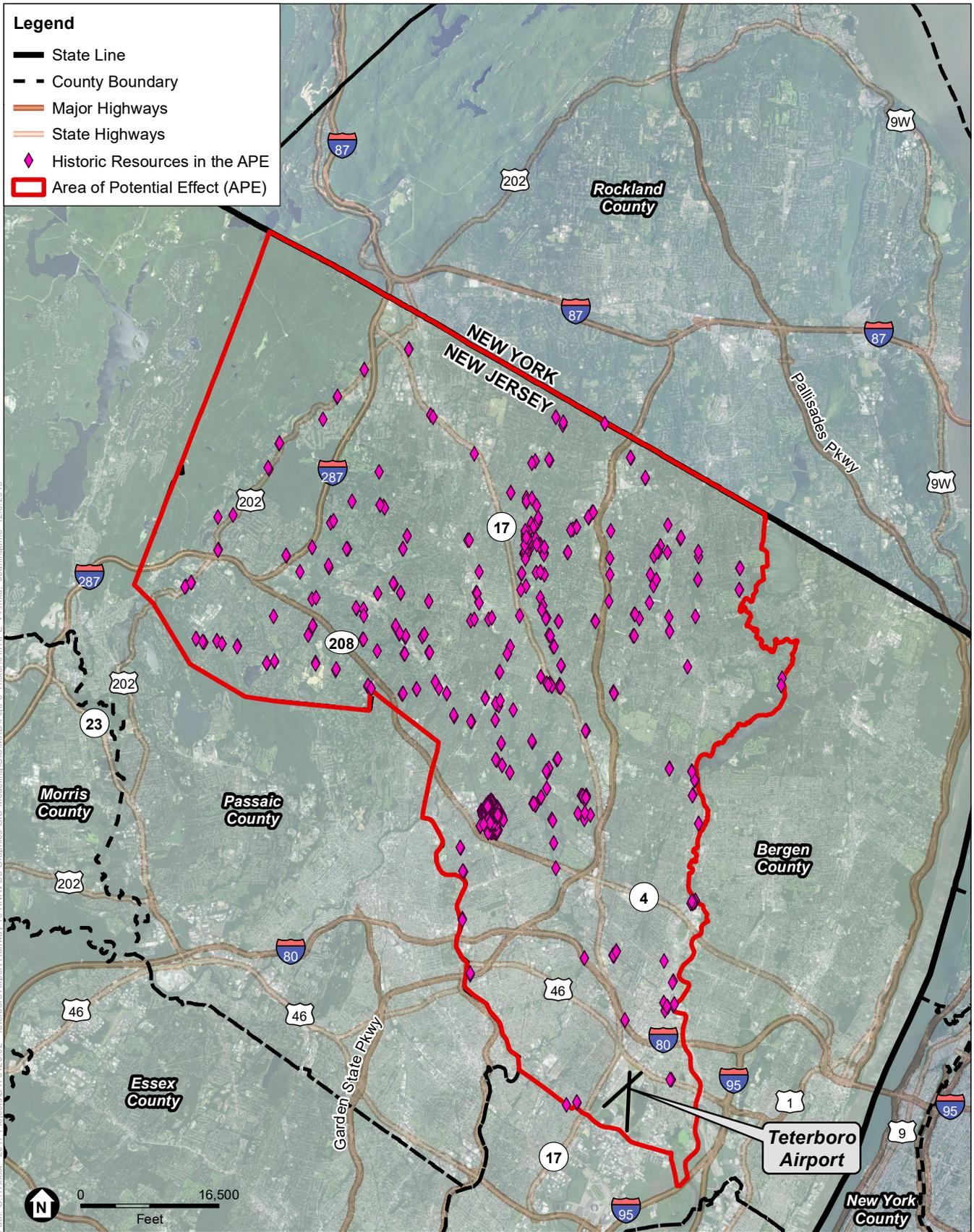
The Proposed Action is an aircraft arrival procedure that would operate above the surface of the earth. Accordingly, it does not involve the construction, disturbance, or alteration of any physical structure on, in, or emanating from the ground. As the Proposed Action does not involve ground disturbance there is no potential for impacts to archaeological resources and they are not discussed further in this EA.

3.4.5.1 Historic, Architectural, and Cultural Resources in the Area of Potential Effects

Figure 3-5 shows the location of historic and cultural resources identified in the Area of Potential Effects (APE). The APE is considered the area where the Proposed Action will “directly or indirectly cause alterations in the character or use of historic properties.”⁵ The APE boundary is defined by the New York/New Jersey border on the north side, the Bergen County/Passaic County border on the west side, Lake Tappan and the Hackensack River on the east side, and State Route 120/Hoboken Road/Paterson Avenue

⁴54 U.S.C. § 300308, <https://www.govinfo.gov/content/pkg/USCODE-2016-title54/pdf/USCODE-2016-title54-subtitleIII-divsnA-app-chap3003-sec300308.pdf>

⁵ 1050.1F Desk Reference, 8-12, https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/desk-ref.pdf



SOURCE: Esri; NJGIN Open Data; Prepared by ESA, 2019

Figure 3-5
Historic Resources in the Area of Potential Effect
Teterboro Airport

on the south side. The APE is contained entirely within the state of New Jersey. A total of 796 National Register listed properties were identified in the APE. No federally-recognized tribal properties were identified in the APE. A list of the historic and cultural resources identified in the APE and the county in which they are located is provided in Appendix C.

The New Jersey Historic Preservation Office is the designated State Historic Preservation Office (SHPO) in the State of New Jersey. A letter detailing the Historic, Architectural, and Cultural Resources analysis described in this document was sent to the New Jersey Historic Preservation Office on November 14, 2019 and this letter can be found in Appendix A.

3.4.6 Noise and Noise-Compatible Land Use

Aircraft noise is often the most noticeable environmental effect associated with the implementation of new or revised ATC procedures. This section includes a brief overview of the noise analysis methodology used for this EA as well as a discussion of the existing aircraft noise exposure levels in the GSA.

3.4.6.1 Noise Modeling Methodology

The FAA has developed specific guidance and requirements for the assessment of aircraft noise in order to comply with NEPA. This guidance, specified in FAA Order 1050.1F, requires that aircraft noise be analyzed in terms of the day-night average sound level (DNL) metric. To this end, DNL values are calculated for the average annual daily operations for the year of interest. The noise analysis evaluated all aircraft arriving and departing the Airport for the entire GSA. Noise modeling was conducted using actual aircraft operations occurring in 2018 (base year).

The noise modeling was based on fixed-wing flight operations recorded by radar in the period January 1, 2018 through December 31, 2018. Rotorcraft operations and fleet distribution for the same period were provided by the Teterboro Air Traffic Control Tower (ATCT) and were modeled on major helicopter routes as derived from traffic data recorded by radar.

Noise Metric

The DNL metric is the sound level from aircraft operations for a 24-hour period, which includes all of the time-varying aircraft sound energy within the period. Since there is a greater annoyance caused by noise events at night, a 10 decibel (dB) weighting is added for night-time noise events (those that occur between 10:00 p.m. and 6:59:59 a.m.). The weighting, in essence, equates one night-time flight to 10 daytime flights, and helps to account for the annoyance of noise during time periods when people are trying to sleep and ambient noise levels are lower. FAA guidelines, established under Part 150, provide land uses that are considered compatible or incompatible with various DNL sound levels. These guidelines are provided to facilitate land use compatibility studies under Part 150

(known as “Part 150 studies”), and indicates land uses that are considered to only be compatible with noise levels less than DNL 65.

DNL is the best measure of significant noise impact on the quality of the human environment and is based on a substantial body of scientific data on the reaction of people to noise, and has been systematically related to Federal compatible land use guidelines. Federal interagency committees such as the Federal Interagency Committee on Urban Noise (FICUN) and the Federal Interagency Committee on Noise (FICON) which include the EPA, FAA, Department of Defense, Department of Housing and Urban Development (HUD), and Veterans Administration, found DNL to be the best noise metric for land use planning.

Noise Model

AEDT is the FAA’s approved model for assessing noise and emissions at civilian airports. AEDT has been used for environmental review of air traffic noise and emissions impacts since 2012 and is also used for 14 CFR Part 150 studies, NEPA EA’s, and NEPA EIS’s. For these types of analysis, AEDT is used to estimate the long-term average changes in environmental impacts.

Detailed information on aircraft operations at the Airport was input into AEDT, including specific fleet mix information (aircraft type, arrival and departure times, trip distance), runway use, flight track location/usage, and weather conditions (e.g., temperature and humidity). Noise exposure from aircraft operations was calculated at 23,131 Census blocks (422 Census tracts) throughout the GSA. The locations consist of population centroids (i.e., the center of a 2010 Census block). Census blocks are the smallest geographic unit for which the U.S. Census Bureau tabulates data. Census blocks are generally bounded by streets, legal boundaries and other features. For this analysis, the Census block counts represent the maximum potential population within the Census block that could be exposed to the modeled DNL values, including family and non-family households, but excluding those residing in group quarters (often representing transient or temporary residential arrangements). The actual number of people impacted can be less than the total population represented by a single Census block because noise levels will vary throughout the census block.

3.4.6.2 Operational Inputs

Operational inputs (aircraft flows and operations) were developed by utilizing the radar traffic data covering the period January 1, 2018 to December 31, 2018. The data were processed to develop representative backbone routes with lateral dispersion and aircraft operations flying on those routes. Operational inputs to the noise model include the number of operations on an average annual day, the type and frequency of aircraft operations, runway locations and use, flight track locations and use, and the time of day of operations (daytime or nighttime). Appendix D, *Noise Modeling Technical Report* provides additional details regarding noise model input data.

Operational data, including the number of arrivals and departures and the aircraft fleet mix, were derived from two sources. The fixed-wing aircraft fleet mix, route usage, and operation counts were derived from the radar traffic data covering the period January 1, 2018 to December 31, 2018; the helicopter fleet mix, route usage, and operation counts were derived from a fleet mix report provided by Teterboro ATCT. The total number of aircraft operations derived from the 2018 radar traffic data was 171,532 of which 7,825 (4.6%) were rotorcraft operations. The operations derived from radar data were uniformly scaled to be equivalent to the total reported operation count of 174,747 operations from OPSNet, the official source of FAA air traffic operations and delay data. This resulted in an average annual day count of approximately 479 operations. The 2018 noise analysis is the foundation upon which the noise modeling for the Proposed Action is developed.

3.4.6.3 Existing Aircraft Noise Exposure at Population Centroids

Figures 3-6 and **3-7** show the existing (2018) noise exposure levels at population centroids between DNL 45 and 75. As would be expected, the areas closer to the Airport are exposed to the highest DNL values. Noise exposure levels are not calculated for Census blocks that did not include any resident population.

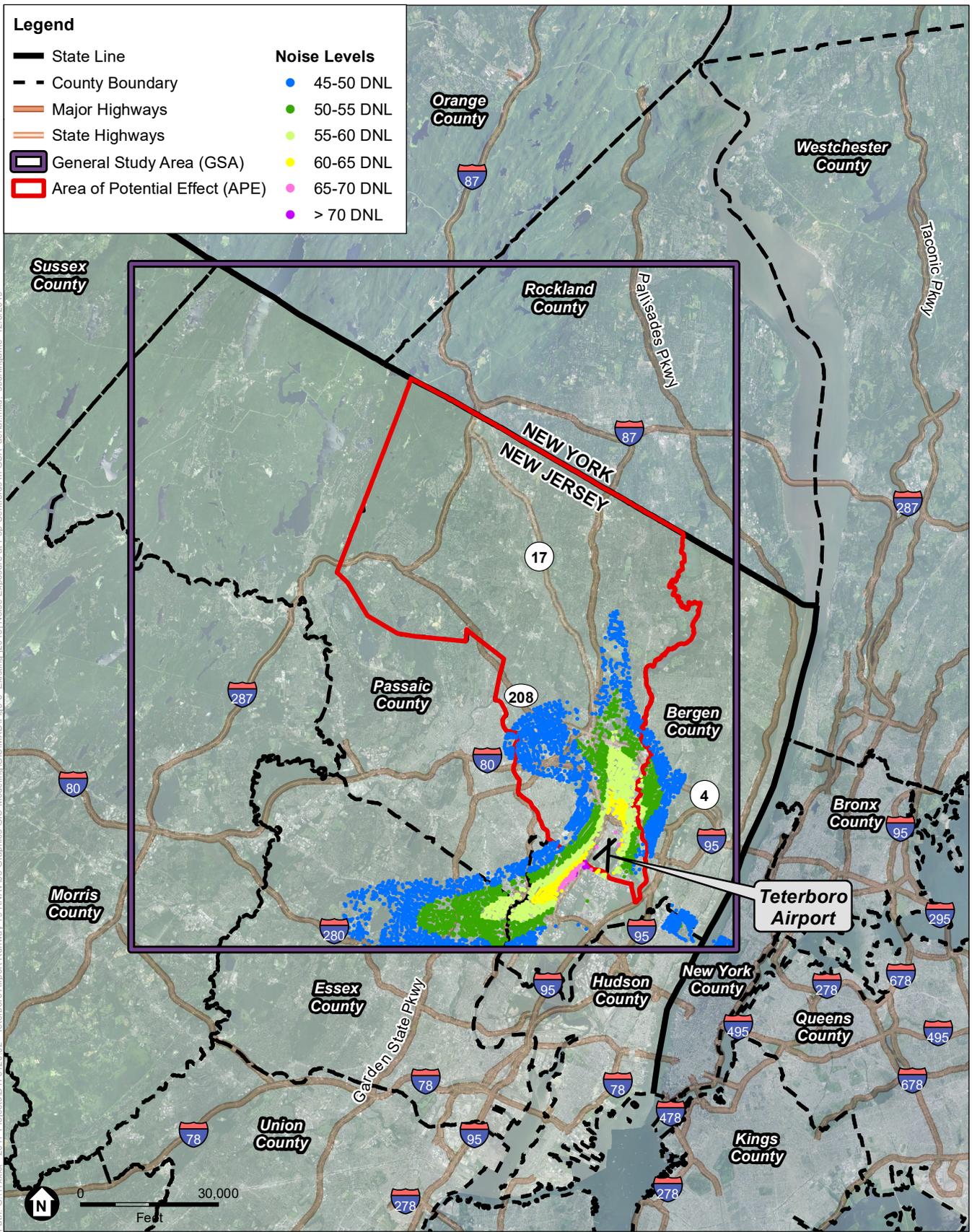
As shown in **Table 3.4-5**, approximately 76% of people residing within the GSA are exposed to aircraft noise levels associated with the Airport of less than DNL 45. Noise levels between DNL 45 and 60 include nearly 22% of the GSA population. 24,557 people experience aircraft noise levels between DNL 60 and 65 , and 5,146 people experience aircraft noise levels of DNL 65 or higher.

**TABLE 3.4-5
 GSA POPULATION EXPOSED TO AIRCRAFT NOISE ASSOCIATED WITH TETERBORO AIRPORT – EXISTING
 (2018) CONDITION**

DNL Range (dB)	Population	Percentage of Total
Less than 45	1,646,381	76.35%
45 to less than 50	286,234	13.27%
50 to less than 55	123,780	5.74%
55 to less than 60	70,399	3.26%
60 to less than 65	24,557	1.14%
65 to less than 70	4,732	0.22%
70 to less than 75	414	0.02%
Greater than or equal to 75	0	0.00%
Total	2,156,497	100%

Note: Totals may not equal 100% due to rounding

Source: U.S. Census 2010 (population centroid data) , July 2019. Prepared by RoVolus, 2019



SOURCE: Esri; U.S. Census 2010; RoVolus, 2019; AEDT 2d; Prepared by ESA, 2019
 NOTE: Noise Exposure is shown for populated centroids only.

Figure 3-6
 Existing (2018) Noise Exposure at Population Centroids in the General Study Area
 Teterboro Airport

3.4.7 Socioeconomics, Environmental Justice, and Children’s Environmental Health – Environmental Justice Only

This section is limited to a discussion of Environmental Justice (EJ) as it pertains to potential aircraft noise impacts from Teterboro Airport in the GSA. The EPA defines EJ as the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”⁶ An EJ analysis considers the potential of the Proposed Action alternatives to cause disproportionate and adverse effects on low-income or minority populations. In the event that adverse effects are determined, applicable mitigation ensures that no minority or low-income populations bear a disproportionate burden of those effects.

3.4.7.1 Definition of Impact Category

Executive Order 12898, “Federal Actions to Address EJ in Minority and Low-Income Populations,” the accompanying Presidential Memorandum, and DOT Order 5610.2(a), “*Department of Transportation Actions to Address EJ in Minority Populations and Low-Income Populations*,” provide guidance for the Federal government, including the FAA, with regard to EJ compliance. The FAA must provide (1) meaningful public involvement by minority and low-income populations and (2) analysis, including demographic analysis, which identifies and addresses potential impacts on those populations that may be disproportionately high and adverse. The Presidential Memorandum encourages the consideration of EJ impacts in EAs, especially to determine whether a disproportionately high and adverse impact may occur. As a result, the FAA defined Census block groups of EJ concern as those in which either the concentration of minority population and/or the concentration of low-income population are higher than their respective averages of the GSA. Although such an analysis is not required in an EA, it may be helpful in determining whether there is a potentially significant impact.

3.4.7.2 Existing Conditions

The socioeconomic and racial characteristics of the population within the GSA are based on data from the 2010 U.S. Census and 2014 American Community Survey (ACS 5-year dataset) - the most recent available - to identify minority populations and low-income populations in the GSA. DOT Order 5610.2(a) defines “low-income” as “a person whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines.” The order defines “minority” as one of the following categories:

- Black – a person having origins in any of the black racial groups of Africa
- Hispanic or Latino – a person of Mexican, Puerto Rican, Cuban, Central

⁶ Technical Guidance for Assessing Environmental Justice in Regulatory Analysis, United States Environmental Protection Agency, page 1, https://www.epa.gov/sites/production/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf

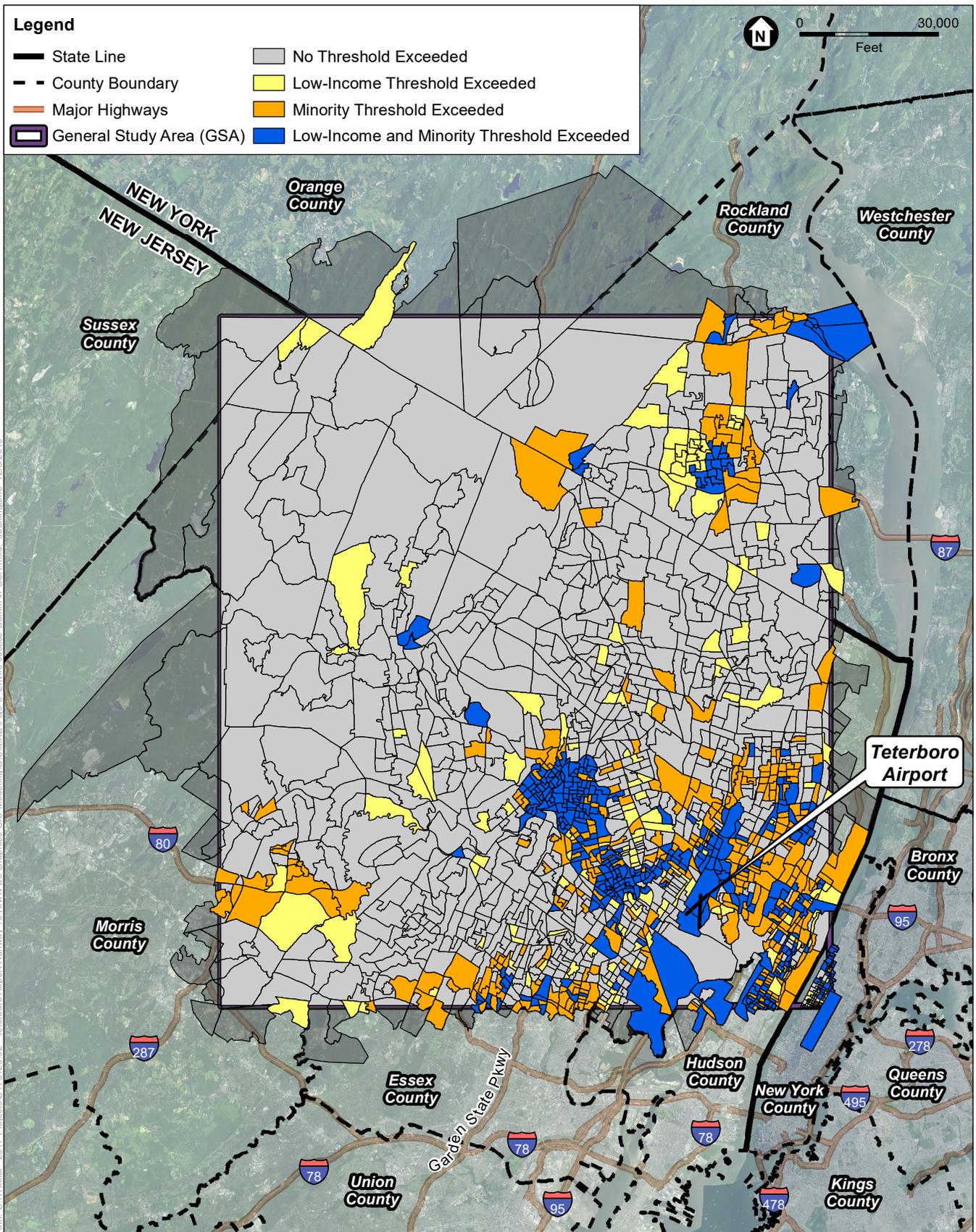
- or South American, or other Spanish culture or origin, regardless of race
- Asian American – a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent
 - American Indian and Alaskan Native – a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition
 - Native Hawaiian and Other Pacific Islander – persons having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands

The EJ module of AEDT was utilized to perform analysis of the GSA at the U.S. Census block group level, defining and identifying Census block groups for minority and low-income population as follows:

- A *minority population Census block group* is a group having a minority population percentage greater than the average minority population percentage in the GSA. Based on the 2010 data, the average percentage of minority population residing in the GSA was 44.4 percent. Therefore, every Census block group with a percentage of minority population greater than 44.4 percent was identified as a Census block group of EJ concern.
- A *low-income population Census block group* is a group having a low-income population percentage greater than the average low-income population percentage in the GSA. Based on the 2010 Poverty Guidelines identified by the HHS, the poverty threshold for a household of three persons was set at \$18,310 for the 48 contiguous states, and therefore is applicable to the GSA. For the purposes of identifying low-income population census tracts, the HHS threshold of \$18,310 was used. Based on 2010 data, the average percentage of low-income population residing in the GSA was 11.0 percent. Therefore, every Census block group with a percentage of low-income population greater than 11.0 percent is identified as a Census block group of EJ concern.

Table 3.4-6 presents the analysis results of minority and low-income population for the purposes of this EJ analysis.

Figure 3-8 depicts the areas of EJ concern located within the GSA, derived from Census block groups. In examining Figure 3-8, it is important to note that population distribution is not necessarily uniform across a Census block group. For that reason, the actual number of minority or low-income persons impacted can be more or less than the total population represented by a single Census block group because impacts may vary throughout the Census block group. In addition, because EJ includes the entirety of Census block groups intersecting the GSA, the total population reported as part of EJ will not equal the total block-derived population located inside the GSA.



SOURCE: Esri; RoVolus, 2019; AEDT 2d; U.S. Census 2010; Prepared by ESA, 2019

Figure 3-8
 Environmental Justice Census Block Groups
 Intersecting the General Study Area
 Teterboro Airport

**TABLE 3.4-6
 STATISTICS ON LOW-INCOME AND MINORITY POPULATIONS WITHIN THE GSA**

Demographic	Population	Percentage of Total
Total Population	2,430,937	100.0%
Minority Population ^a		
Total Minority Population ^b	1,079,998	44.4%
Hispanic or Latino	575,479	23.7%
Black or African American	267,268	11.0%
American Indian and Alaska Native	16,560	0.7%
Asian	275,995	11.4%
Native Hawaiian and Pacific Islander	3,464	0.1%
Other or Two or More Races	203,794	8.4%
Demographic	Population	Percentage of Total
Low-Income Population		
Total Population	2,430,937	100.0%
Population Below Poverty Threshold	267,718	11.0%
Census Block Groups	Number of Census Blocks	Percentage of Total
Total Census Block Groups Intersecting GSA	1,855	100.0%
Census Block Groups with Minority Populations ^c	780	42.0%
Census Block Groups with Low-Income Population ^d	575	31.0%
EJ Census Block Groups ^e	939	50.6%
Notes: ^a Names as they appear in the U.S. 2010 Census data ^b Includes all persons who qualify in one or more of the minority categories ^c For EJ purposes a minority Census block group is defined as on that has a percentage of minority population greater than 44.4 percent (the minority population percentage of the GSA) ^d For EJ purposes a low-income Census block group is defined as on that has a percentage of low-income population greater than 11.0 percent (the low-income population percentage of the GSA) ^e An EJ Census block group is defined as a Census block group in which either the percentage of minority population or the percentage of low-income population is higher than their respective percentages of the GSA. Source: Population Data Source: U.S. Census 2010 (population centroid data) accessed July 2019, Prepared by RoVolus, 2019.		

3.4.8 Cumulative Impacts

Cumulative impacts refers to the impacts resulting from the effects of implementation of the Proposed Action with other actions in the GSA that when combined have the potential to affect the environment. The White House Council on Environmental Quality (CEQ)

regulations define a cumulative impact as “an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.”⁷ The CEQ regulations also state that cumulative impacts can result from individually minor, but collectively significant actions that take place over a period of time.

The Proposed Action is only expected to change the arrival path for a subset of air traffic at the Airport and have no effect on any activities once the aircraft has touched down, nor any effect on other aircraft landing or departing from the Airport. This Proposed Action Alternative and the changes related to this Proposed Action Alternative will be considered against past, present, and reasonably foreseeable future actions with direct or indirect effects on the human environment.

“For cumulative effects analysis to help the decisionmaker and inform interested parties, it must be limited through scoping to effects that can be evaluated meaningfully. The boundaries for evaluating cumulative effects should be expanded to the point at which the resource is no longer affected significantly or the effects are no longer of interest to affected parties,”⁸

The study area for cumulative effects has been selected to generally align with the flight path of the Proposed Action Alternative.

Reasonably foreseeable future actions refer to projects captured in planning documents for which there is relative certainty that the project will proceed (e.g. funding has been allocated) and there is enough specificity to provide meaningful information to a decision-maker and the public. While there is not a specific time frame defined for reasonably foreseeable, actions that occur many years in the future are typically speculative and their details are ill-defined for inclusion in analyzing their cumulative impacts.

Special emphasis was placed on aviation-related projects at airports in the GSA since they have the highest probability of creating similar types of impacts which could potentially be significant when considered cumulatively. Projects at the six airports located in the GSA and identified in Section 3.2.1 are explicitly considered as part of the cumulative impacts analysis and shown below in **Table 3.4-7**. Additionally, the regional plans of the sixteen municipalities as well as Bergen County, roadway funding plans of the New Jersey Department of Transportation, the zoning amendments for sixteen municipalities, and media announcements of projects were reviewed to identify projects which could contribute to cumulative impacts. The projects listed in **Table 3.4-8** are those non-aviation projects that are have occurred or would occur in the reasonably

⁷ 40 CFR 1508.7- Cumulative Impact, <https://www.govinfo.gov/content/pkg/CFR-2001-title40-vol28/pdf/CFR-2001-title40-vol28-sec1508-7.pdf>

⁸ Considering Cumulative Effects Under the National Environmental Policy Act, Council on Environmental Quality, p. 8, <https://ceq.doe.gov/docs/ceq-publications/ccenepa/sec1.pdf>

foreseeable future and could potentially impact environmental resources that are also affected by the Proposed Action Alternative.

**TABLE 3.4-7
 ANTICIPATED PROJECTS AT AIRPORTS WITHIN THE GSA**

Airport Name	Identification	Ongoing/Anticipated Projects
Lincoln Park Airport	N07	No Anticipated Changes
Hill Top Airport	JY43	No Anticipated Changes
Greenwood Lake Airport	4N1	No Anticipated Changes
Essex County Airport	CDW	Temporary Flight Restrictions (TFR's) can temporarily change flight patterns due to Air Force One traffic
Morristown Municipal Airport	MMU	TFR's can temporarily change flight patterns due to Air Force One traffic
Morristown Municipal Airport	MMU	Capital Improvement: Runway 5-23 Rehabilitation Project
Morristown Municipal Airport	MMU	Capital Improvement: Center Line Painting of Runway 5-23
Teterboro Airport	TEB	14 CFR Part 150 Study (Ongoing)
Teterboro Airport	TEB	Amendment to TEB RWY 19 ILS or LOC (not yet approved)
Teterboro Airport	TEB	Amendment to TEB RWY 19 RNAV (GPS) (not yet approved)
Teterboro Airport	TEB	TEB RWY 24 RNAV (GPS) (not yet approved)
Teterboro Airport	TEB	TFR's can temporarily change flight patterns due to Air Force One traffic
Source: Prepared by ESA, 2019		

**TABLE 3.4-8
 NON-AVIATION ANTICIPATED PROJECTS WITHIN THE GSA**

Project Name	Date of Plan	Address	Municipality	Brief Description
Bergen County Parks Draft Master Plan	Oct-19	NA	Bergen County	Draft Overview of the Parks, and Nature Preserves of Bergen County and the Goals & Objectives of the County moving forward
Bergen County Bus Rapid Transit Study	Jul-17	NA	Bergen County	Summary of Regional Transportation Plans for Bergen County

Project Name	Date of Plan	Address	Municipality	Brief Description
Central Bergen Bicycle & Pedestrian Plans	May-15	NA	Bergen County	Summary of Planned Sidewalk and Bike Path Plans for Bergen County
Continental Plaza Redevelopment Plan	Sep-17	40, 411 and 433 Hackensack Avenue	Hackensack	The properties are comprised of three commercial buildings and two parking structures at the rear.
430 Main street	Feb-19	430 Main Street	Hackensack	Residential building with a total of 40 units. Retail space includes 1,276
22 Sussex Street	Jun-18	22 Sussex Street	Hackensack	Residential building with a total 88 units
435 Main Street	Nov-17	435 Main Street	Hackensack	Residential building with a total of 235 units
389 Main Street	Jul-17	389 Main Street	Hackensack	Residential building with a total of 82 units. Retail space includes 3,500 sq feet
2009 Master Plan Reexamination Report	Jul-09	NA	Hackensack	Review and Examination of the Goals made in the Hackensack 2001 Master Plan
Borough of Ho-Ho-Kus Master Plan	Nov-13	NA	Ho-Ho-Kus	Summary of the land use, housing and transportation plans for Ho-Ho-Kus
Lodi Township Master Plan	May-16	NA	Lodi	Summary of the land use, housing and transportation plans for Lodi Township
Comprehensive Master Plan of the Township of Mahwah	Aug-12	NA	Mahwah	Summary of the land use, housing and transportation plans for Mahwah
Housing Element & Fair Share Plan- Township of Mahwah	May-19	NA	Mahwah	Summary of the actions taken by the Township of Mahwah in order to meet the state's affordable housing requirements
Borough of Paramus 2006 Master Plan	Aug-16	NA	Paramus	Summary of the land use, housing and transportation plans for Ho-Ho-Kus

Project Name	Date of Plan	Address	Municipality	Brief Description
2019 Land Use Plan, Borough of Ramsey	Oct-19	NA	Ramsey	Details of Future Land Use in Ramsey, NJ
2019 Community Facilities Plan	Oct-19	NA	Ramsey	Summary and Future Plans for the various Public Facilities in Ramsey, NJ including Schools, Municipal Buildings, and Parks
Housing Element & Fair Share Plan- Borough of Ramsey	Apr-18	NA	Ramsey	Summary of the actions taken by the Borough of Ramsey in order to meet the state's affordable housing requirements
Reexamination of the Master Plan and Development Regulations	Feb-16	NA	Ridgewood	Review of the 2006 Master Plan for major problems and recommended changes
Housing Element and Fair Share Plan 2018	Dec-18	NA	Saddle River	Summary of the actions taken by Saddle River in order to meet the state's affordable housing requirements
Saddle River Master Plan Update 2010	Sep-10	NA	Saddle River	Master Plan Update for the Borough of Saddle River
Re-examination of Master Plan 2012	Sep-12	NA	Saddle River	Review of the 2019 Master Plan Update for the Borough of Saddle River
2016 Periodic Reexamination of Master Plan	Nov-16	NA	Teterboro	Review and Examination of the Goals made in the 2006 Teterboro Master Plan
Housing Element and Fair Share Plan	Jun-17	NA	Teterboro	Summary of the actions taken by the Teterboro in order to meet the state's affordable housing requirements
Washington Township Master Plan	Aug-05	NA	Washington Township	Summary of the land use, housing and transportation plans for Washington Township
Source: A link to each of above planning documents can be found in Appendix H, December 2019. Prepared by ESA, 2019				

CHAPTER 4

Environmental Consequences

This chapter describes the potential environmental consequences associated with the No Action and the Proposed Action Alternatives in accordance with FAA Order 1050.1F.

The potential impacts associated with the Proposed Action Alternative are determined by comparing the Proposed Action Alternative with the No Action Alternative.

4.1 Air Quality

This section presents a summary of the analysis of air quality impacts within the Study Area under the No Action and Proposed Action Alternatives.

4.1.1 Overview of Impacts

Implementation of the Proposed Action would result in a small increase in the amount of fuel burned and emissions emitted below the mixing height when compared to the No Action Alternative. Increased emissions of criteria pollutants, however, would not reach the *de minimis* thresholds, that EPA defines as delaying timely attainment of the NAAQS, in any of the counties that comprise the GSA. As a result, implementation of the Proposed Action would not have a significant impact on air quality.

4.1.2 Methodology

Emissions standards are set for criteria pollutants by the EPA as directed in Section 108 of the CAA. Areas or regions where these emissions standards are not met for one or more criteria pollutants are considered to be in *nonattainment*. Areas that were formerly in nonattainment status but have seen improvements in emissions levels that allow them to meet current standards are considered to be in *maintenance* status. The nonattainment and maintenance status of each county in the GSA is described in Section 3.4.1. Section 176(c) of the CAA specifies that Federal actions taking place in locations that in nonattainment or maintenance for one or more NAAQS must conform to the conditions of the applicable SIP, which is known as General Conformity. 40 CFR 93.153 (b)(1)(2) specifies that for Federal actions where a conformity determination is required, emissions associated with the action are unlikely to cause or contribute to a violation of the NAAQS, nor delay timely attainment of the NAAQS. This is defined by EPA as the *de minimis* value and these are shown in **Table 4.1-1** for nonattainment areas (NAA), and **Table 4.1-2** for maintenance areas below.

**TABLE 4.1-1
 CRITERIA POLLUTANT DE MINIMIS LIMITS – NONATTAINMENT AREAS**

Criteria Pollutant	Tons per year
Ozone (VOC's or NO _x):	
Serious NAA's	50
Severe NAA's	25
Extreme NAA's	10
Other ozone NAA's outside an ozone transport region:	100
Other ozone NAA's inside an ozone transport region:	
VOC	50
NO _x	100
Carbon Monoxide:	100
SO ₂ or NO ₂ :	100
PM ₁₀ :	
Moderate NAA's	100
Serious NAA's	70
PM _{2.5} (direct emissions, SO ₂ , NO _x , VOC, and Ammonia):	
Moderate NAA's	100
Serious NAA's	70
Pb: All NAA's	25
Source: 40 CFR Subpart B,93.153(b)(1), Prepared by RoVolus, 2019	

**TABLE 4.1-2
 CRITERIA POLLUTANT DE MINIMIS LIMITS – MAINTENANCE AREAS**

Criteria Pollutants – Maintenance Areas	Tons per year
Ozone (NO _x), SO ₂ or NO ₂ :	
All maintenance areas	100
Ozone (VOC's)	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
Carbon monoxide: All maintenance areas	100
PM ₁₀ : All maintenance areas	100
PM _{2.5} (direct emissions, SO ₂ , NO _x , VOC, and Ammonia)	100
Pb: All maintenance areas	25
Source: 40 CFR Subpart B 93.153(b)(1), Prepared by RoVolus, 2019	

An ozone transport region (OTR), as defined under Section 184 of the CAA, consists of states that are required to submit SIPs and install certain controls for pollutants that form ozone, even if they currently meet ozone standards. The state of New Jersey and the state of New York are both part of an OTR spanning thirteen Northeast states, and thus have lower allowable *de minimis* thresholds for VOCs than areas outside of an OTR.

4.1.3 Potential Impacts

Implementation of the Proposed Action would result in a 2.7% increase in fuel burn below the mixing height when compared with the No Action Alternative. Thus, an AEDT emissions model was run to determine if the increase of emissions exceeded the *de minimis* thresholds.

Table 4.1-3 below shows a comparison of fuel burn and criteria pollution emissions below the mixing height between the No Action and Proposed Action Alternatives.

**TABLE 4.1-3
 COMPARISON OF FUEL BURN AND CRITERIA POLLUTANT EMISSIONS BELOW MIXING HEIGHT (SHORT
 TONS PER YEAR)**

	No Action	Proposed Action	Net Change	Percentage Change
Fuel burn	11,769	12,089	320	2.7%
CO	134.7	138.5	3.8	2.8%
VOC	22.5	23.5	1.0	4.6%
NO _x	140.0	142.8	2.8	1.9%
SO _x	13.8	14.2	0.4	2.7%
PM _{2.5}	1.71	1.75	0.04	2.4%
PM ₁₀	1.71	1.75	0.04	2.4%
Source: Prepared by RoVolus, 2019				

As the AEDT emissions results show, implementing the Proposed Action will not cause exceedances of the *de minimis* thresholds applicable to the GSA for any pollutant. Based on the above analysis, no further air quality analysis is necessary and a conformity determination is not required.

4.2 Climate

4.2.1 Overview of Impacts

While fuel burn would slightly increase under the Proposed Action Alternative when compared with the No Action Alternative, there is no significance threshold for aviation GHG emissions set by FAA Order 1050.1F. As a result, this Proposed Action is not anticipated to cause significant effects on climate. The corresponding increase in CO₂ emissions is minor in the context of total regional and nationwide GHG emissions. As a result, increases in GHGs tied to increased fuel burn resulting from the Proposed Action Alternative cannot be determined to be significant contributors to climate effects associated with the propagation of GHGs in the atmosphere.

4.2.2 Methodology

In accordance with FAA guidance, AEDT was run to calculate fuel burn and CO₂ emissions in all phases of flight for both the Proposed Action Alternative and the No Action Alternative. As all emissions associated with both alternatives result from the direct aircraft emissions, CO₂ equivalent (CO₂e) emissions are assumed to be equivalent to direct CO₂ emissions.

4.2.3 Potential Impacts

The lateral changes in the Proposed Action cause only a small increase in the total miles flown by aircraft and therefore the total amount of additional fuel required for each arrival

operation under the Proposed Action Alternative is minimal. Based on analysis of AEDT results, total fuel burn associated with arriving phases of flight below 10,000 feet AGL is approximately 0.4% higher on an annual basis in the Proposed Action Alternative than in the No Action Alternative. This represents an increase of approximately 23 metric tons of fuel (approximately 74 metric tons of CO₂e) on an annualized basis.

4.3 Biological Resources – Wildlife Only

The significance threshold pertaining to Biological Resources is if “the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in the destruction or adverse modification of federally designated critical habitat.”⁹ Since this is an airspace action, there is not expected to be any destruction of critical habitat but an impact on a federally listed species is possible through wildlife strikes. Wildlife strikes are a common occurrence at airports around the country with over 194,000 wildlife strikes on civil aircraft occurring between 1990 and 2017. Bird strikes tend to occur most often from July to October and 61% of strikes occur during the landing phases of flight. Almost all bird strikes (92%) occur at or below 3,500 feet AGL making the area near an airport the most critical area.¹⁰

The FAA National Wildlife Strike Database keeps a record of all reported wildlife strikes in the United States since 1990. The database contains records of over 227,000 different wildlife strikes across civilian and military airports. Since 1990, there have been 1,736 wildlife strikes at the Airport with 141 of these wildlife strikes occurring in 2018.

Based on the full list of threatened and endangered species from the Affected Environment section, the list of wildlife strikes was filtered by these species, by operation type, and by runway end to estimate the number of wildlife strikes with the species in question on Runway 19 arrivals. Of the 1,736 historical strikes at the Airport, no strikes were reported of any of the federally listed species. There were only six strikes of all state listed species in Table 3-4.3 on approaches into Runway 19 with three strikes of threatened species and three strikes of endangered species. Even if the strikes of all state species is expanded to include arrivals on all runways, there were only ten total strikes with seven strikes of threatened species and three strikes of endangered species. Since there are no historical strikes of the federally listed species, the significance threshold will not be triggered by the Proposed Action Alternative and such a low number of overall strikes even when including all state listed species, the impact on threatened and endangered species in the area is expected to be minimal.

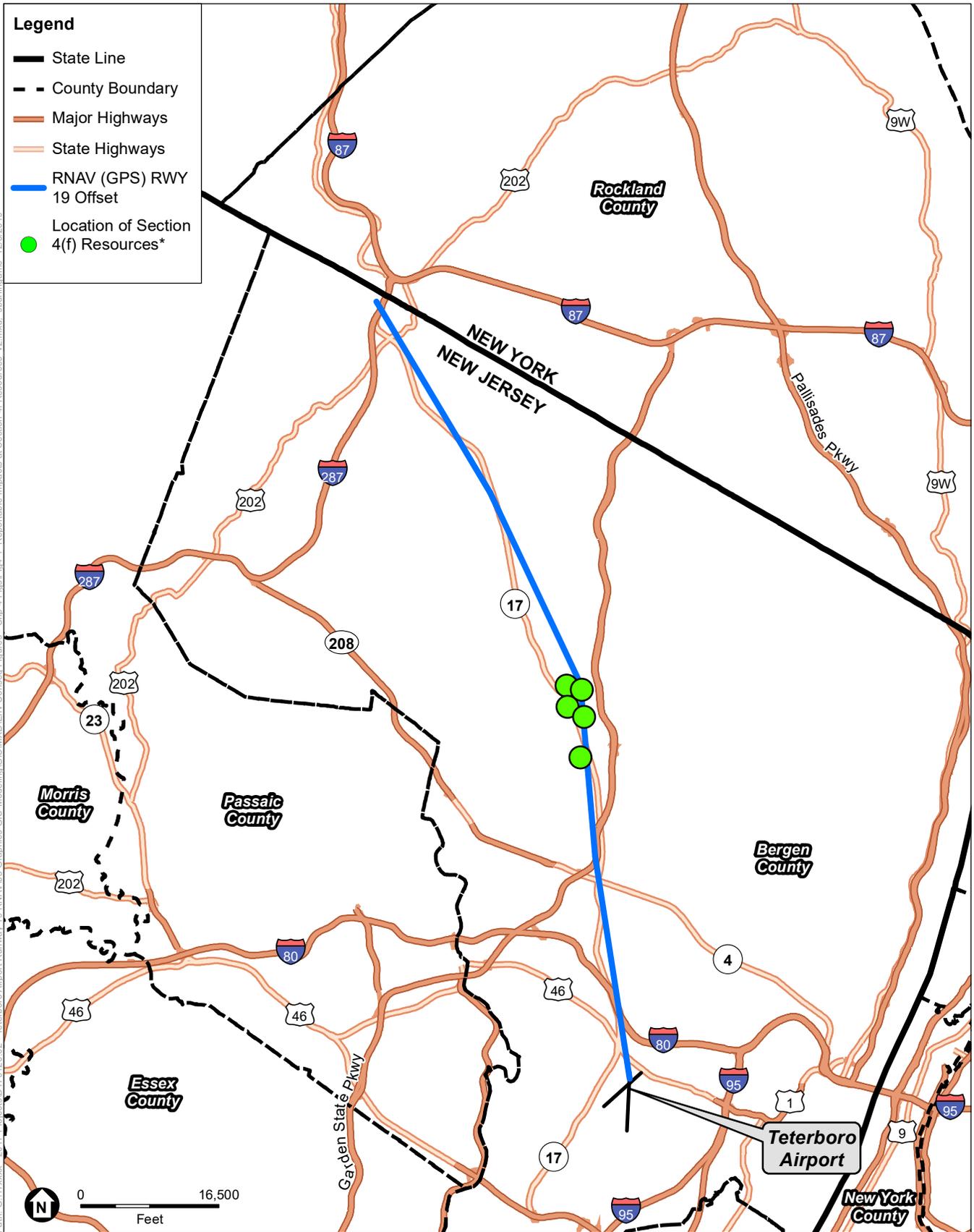
⁹ 1050.1F Desk Reference, Section 2.3.3, page 2-20,
https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/desk-ref.pdf

¹⁰ FAA Wildlife Strike Frequently Asked Questions and Answers,
https://www.faa.gov/airports/airport_safety/wildlife/faq/

4.4 Department of Transportation Act, Section 4(f)

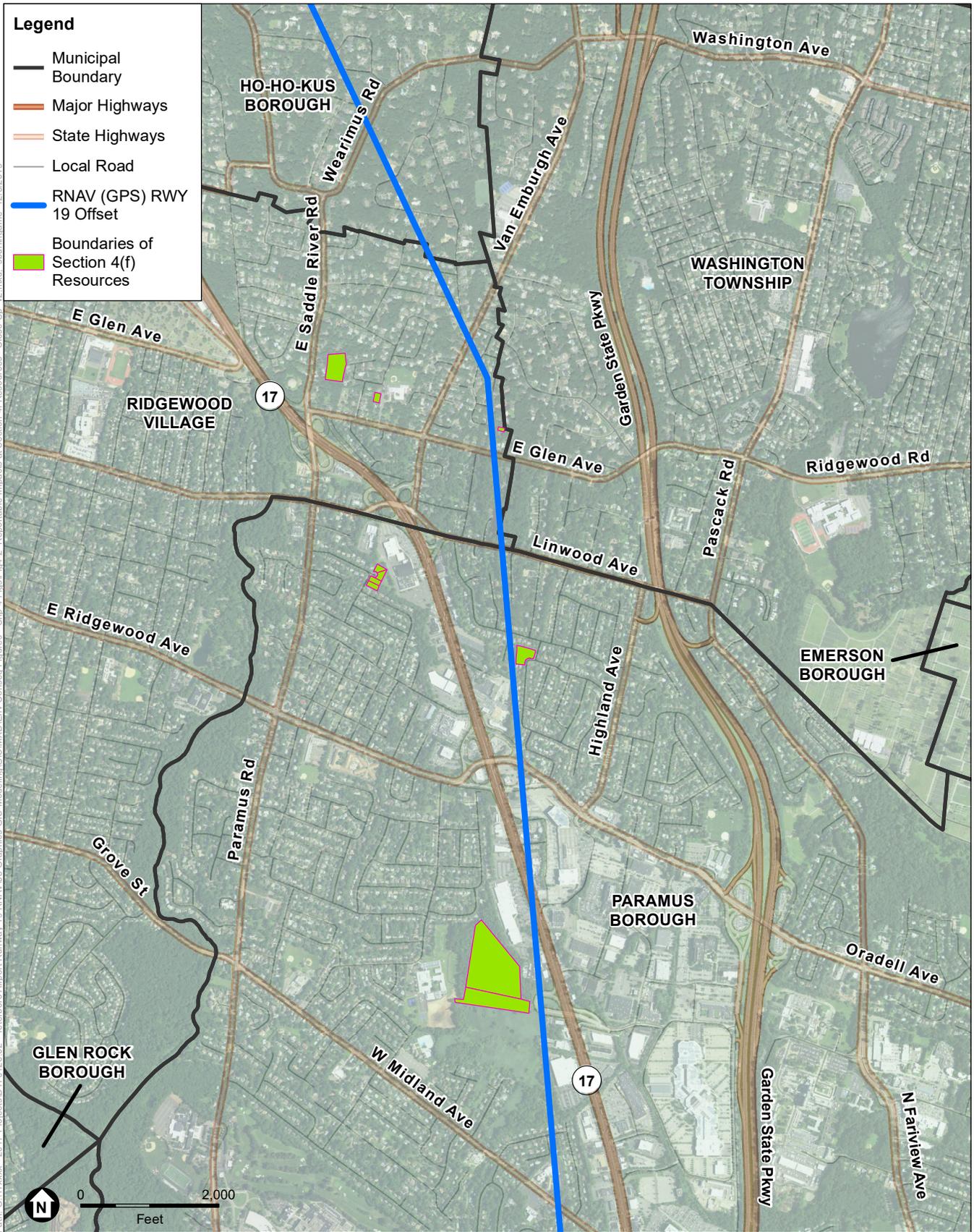
The Section 4(f) properties identified as being part of the GSA were evaluated to identify potential noise increases that may represent an adverse impact or constructive use of the property. These properties were also evaluated with the same noise increase data for any noise sensitive areas within the Section 4(f) properties that have a quiet setting as an attribute. For each of the 5,213 4(f) properties, a centroid at the center of each property was generated and the noise impact was calculated at each point for the No Action Alternative and for the Proposed Action Alternative. This noise impact was judged versus the noise exposure levels spelled out in FAA Order 1050.1F, where a change of 1.5 dB in the DNL 65 dB noise exposure level is considered significant, and a change of 3.0 dB in the DNL 60-65 dB noise exposure level or a change of 5.0 dB in the DNL 45-60 dB noise exposure level is considered as reportable.

For all of these 4(f) centroids, there were no significant noise impacts (increases of 1.5 dB within the DNL 65 noise exposure level) found within the GSA. This includes national, state, and local parks as well as state forests, state historic sites, and state & local refuges. There were also no increases above the 45 DNL noise exposure level in section 4(f) properties within the GSA located in a quiet setting, where the setting is an attribute of the site's significance, such as a national park or national wildlife refuge within the GSA. There were ten properties that had any increase that met the FAA Order 1050.1F noise exposure level for a reportable increase. It should be noted that Madison Park is listed in the New Jersey park records as four distinct properties and are listed below as such. The ten properties with a 1050.1F reportable increase are shown in **Table 4.4-1**, and are displayed graphically in **Figures 4-1 and 4-2**.



SOURCE: Esri; NJDEP Bureau of GIS; NPS; Prepared by ESA, 2019
 *Location points may represent multiple 4(f) resources.

Figure 4-1
 Reportable Impacts at Section 4(f) Resources
 Teterboro Airport



SOURCE: Esri; NJDEP Bureau of GIS; NPS; Prepared by ESA, 2019



Figure 4-2
Reportable Impacts at Section 4(f) Resources - Close-Up
Teterboro Airport

TABLE 4.4-1 SECTION 4(F) PROPERTIES WITH REPORTABLE NOISE INCREASES OF 5 DB IN DNL 45 TO DNL 60

Park Type	Park Name or Description	Owner	County	State	Latitude	Longitude
Local Park	Conservation Area next to West Brook Middle School	Paramus	Bergen	NJ	40.96193	-74.07943
Local Park	Conservation Area next to West Brook Middle School	Paramus	Bergen	NJ	40.96054	-74.07935
Local Park	DiMaggio Park	Paramus	Bergen	NJ	40.97429	-74.07769
Local Park	Madison Park	Paramus	Bergen	NJ	40.97773	-74.08525
Local Park	Madison Park	Paramus	Bergen	NJ	40.97748	-74.08517
Local Park	Madison Park	Paramus	Bergen	NJ	40.97707	-74.08561
Local Park	Madison Park	Paramus	Bergen	NJ	40.97726	-74.08548
Local Park	North Road Park	Ridgewood	Bergen	NJ	40.98576	-74.08748
Local Park	NA	Ridgewood	Bergen	NJ	40.98326	-74.07883
Recreational Facility	Glen Tennis Courts	Ridgewood	Bergen	NJ	40.98454	-74.08533

Source: Esri; NJ DEP Bureau of GIS; NPS; Prepared by ESA, 2019

4.5 Historical, Architectural, Archeological, and Cultural Resources- Historic, Architectural, and Cultural Resources Only

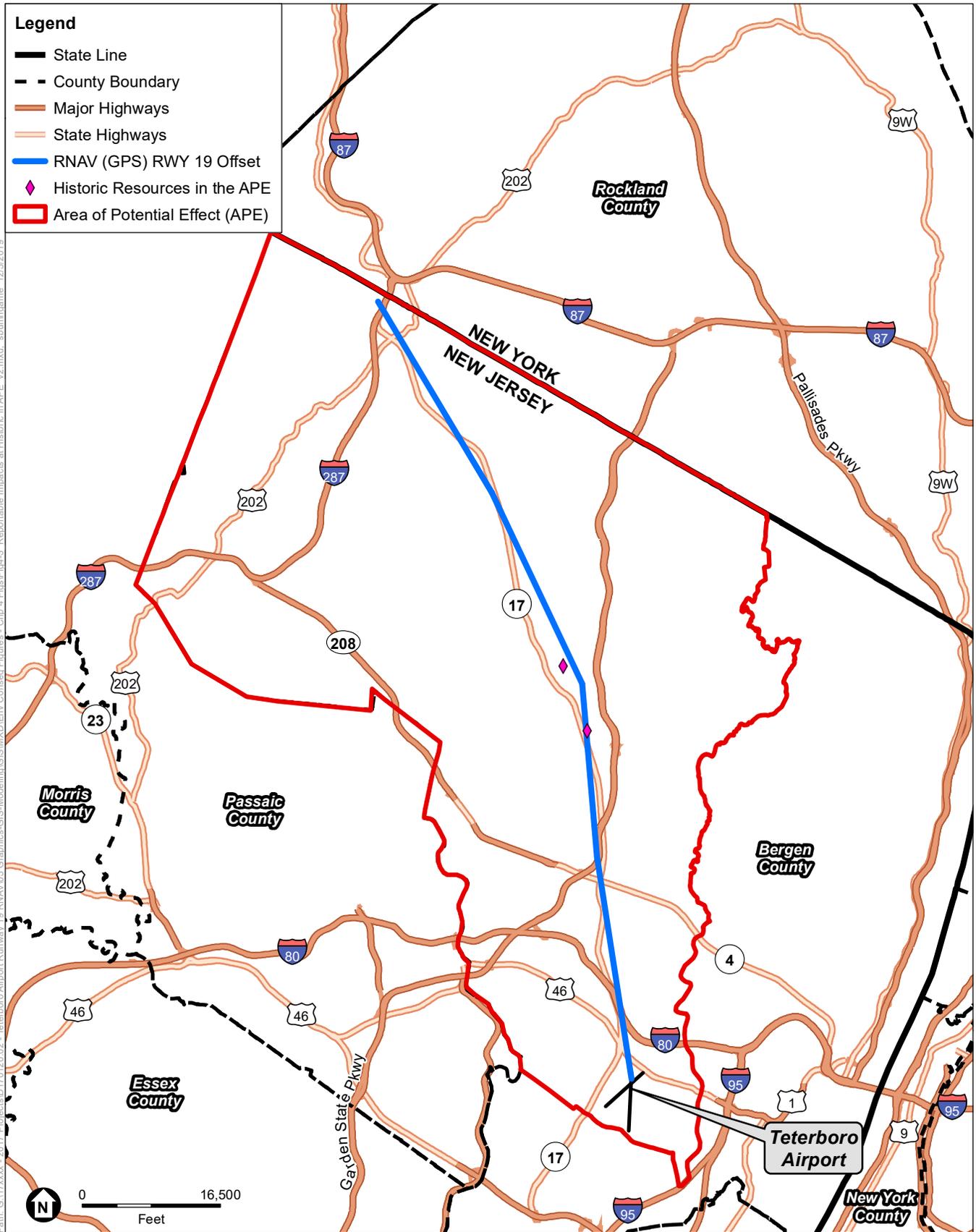
It is possible that changes in aircraft flight routes associated with the Proposed Action Alternative could introduce or increase aircraft routing over historic, architectural, archeological, and cultural resources and result in potential adverse noise impacts but only if the noise results in a significant noise impact under NEPA. FAA Order 1050.1F provides the significance threshold for noise:

“The action would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe.”¹¹

Since this is an air traffic airspace and procedure action, a number of change-of-exposure tables and maps must also be prepared by the additional noise exposure levels of DNL 60 dB to <65 dB with an increase or decrease of 3.0 dB and of DNL 45 dB to <60 dB with an increase or decrease of 5.0 dB. Since these noise exposure levels were already being assessed, the historic properties will be assessed by the same standards. The NRHP and the State of New Jersey historic property data shared by the New Jersey Department of Environmental Protection GIS Land Open Data were consulted in order to gather a comprehensive directory of all potential historic and cultural resources within the APE. A total of 796 listed properties were identified in the APE. Figure 3-5 shows the location of historic and cultural resources identified in the APE. A list of the historic and cultural resources identified in the APE and the county in which they are located is provided in Appendix C. The noise impact of each of these properties was then assessed using AEDT. The change in noise exposure was calculated at each of the 796 historic properties

Within the 796 historic properties identified, no properties experienced an increase of 1.5 dB with a noise exposure level of DNL 65 and therefore no significant impact was found. By the additional airspace reportable noise exposure levels, two properties were identified as crossing the noise exposure level of a 5 dB or greater increase within the DNL 45 to 60 band. The two properties are identified below in **Table 4.5-1**. Both homes have been deemed historic properties by the state because of their architectural properties, which does not require a quiet purpose setting or attribute. As part of the requirements with dealing with impacts on historic properties, a discussion of this finding was mailed to the New Jersey Deputy State Historic Preservation Officer on November 14th, 2019. A copy of this correspondence can be found in Appendix A of this document. **Figures 4-3 and 4-4** show the location of these reportable impact properties with respect to the Proposed Action.

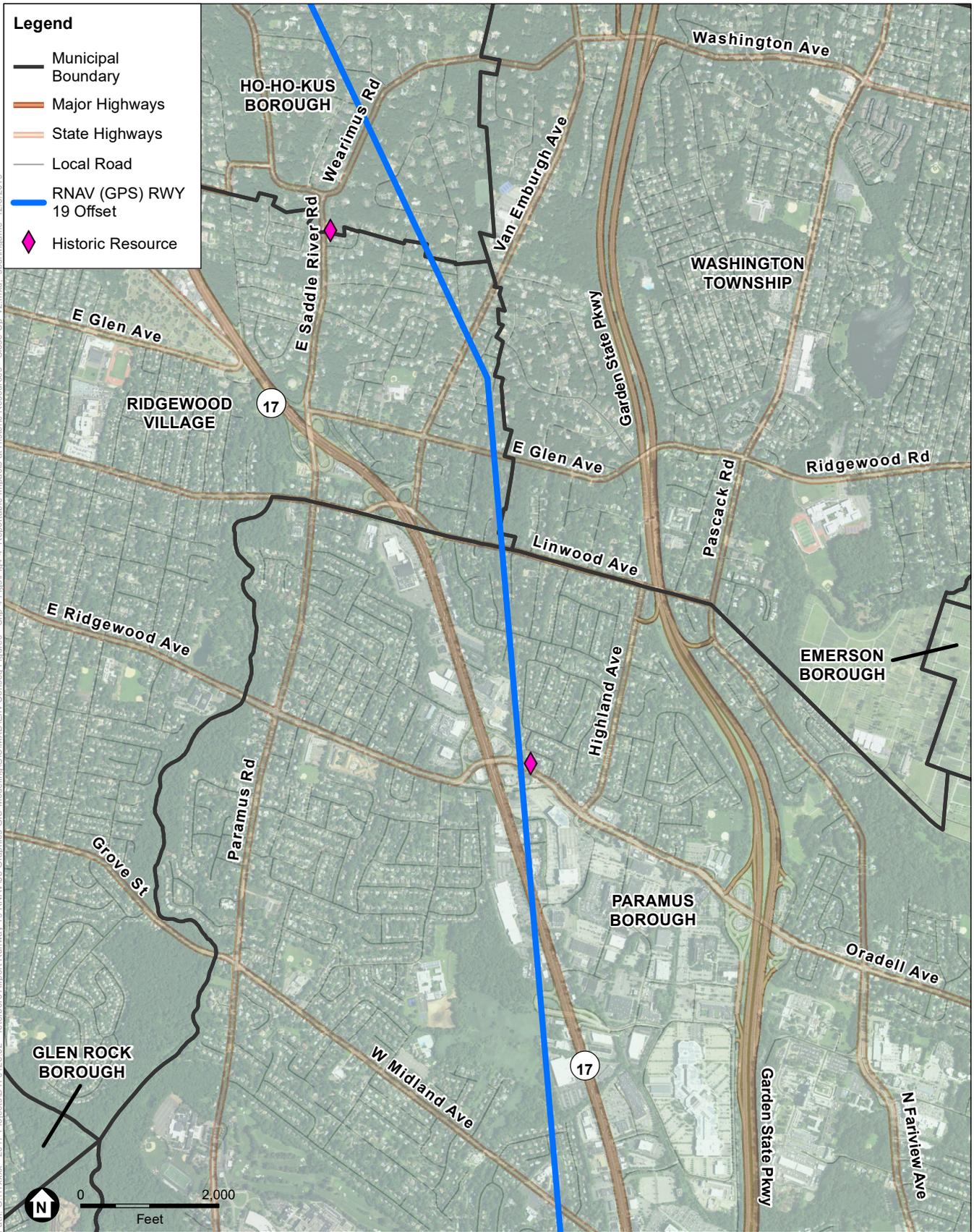
¹¹ 1050.1F Desk Reference, Section 11.3.1, page 11-13.4-0,
https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/desk-ref.pdf



SOURCE: Esri; NJGIN Open Data; Prepared by ESA, 2019



Figure 4-3
Reportable Impacts at Historic Resources in the Area of Potential Effect
Teterboro Airport



SOURCE: Esri; NJGIN Open Data; Prepared by ESA, 2019

Figure 4-4
Reportable Impacts at Historic Resources - Close-Up
Teterboro Airport

**TABLE 4.5-1
 HISTORIC PROPERTIES WITH REPORTABLE NOISE INCREASES OF 5 DB IN DNL 45 TO DNL 60**

Historic Property	Address	Town	County	State	Latitude	Longitude
Ackerman-Demarest House	605 East Saddle River Road	Ho-Ho-Kus	Bergen	NJ	40.991447	-74.087831
Albert J. Zabriskie House	7 East Ridgewood Avenue	Paramus	Bergen	NJ	40.969979	-74.077379

Source: Esri; NJGIN Open Data; Prepared by ESA, 2019

Based on the information contained within the analysis above, the FAA has determined there are no adverse effects on the historic properties within the APE for the proposed undertaking.

4.6 Noise and Noise-Compatible Land Use

This section describes the operational input, the noise analysis methodology used in determining noise-related environmental impacts, and describes the environmental consequences by comparing forecast aircraft noise exposure levels in the GSA for the No Action and Proposed Action Alternatives.

4.6.1 Noise Modeling Methodology

The noise modeling methodology described in Section 3.4.6.1, Affected Environment, is also used for the Proposed Action noise modeling. This noise modeling methodology is consistent with noise modeling of aircraft operations as required by the FAA, inclusive of requirements for consideration in airspace actions, such as changes to air traffic routes. As per the guidance specified in FAA Order 1050.1F noise impacts are analyzed in terms of the DNL metric in reference to specific impact thresholds as described further in this section.

4.6.2 Operational Input

Since the Proposed Action involves a single procedure change for one runway, large parts of the input data that were developed to assess the Affected Environment remained the same and were effectively reused. This noise model input, representing 2018 conditions, was modified to encompass the RNAV (GPS) RWY 19 Offset procedure comprising the Proposed Action Alternative. However, the traffic levels and aircraft fleet mix in the Proposed Action Alternative remain exactly the same as that of the No Action Alternative as described in the Affected Environment section. In both cases, a full year's worth of aircraft operations and flight tracks were derived from 2018 radar data covering all operations at the Airport. An average daily traffic representation was developed using the 2018 dataset providing an average fleet mix and flight schedule encompassing aircraft types, origin/destination information, and arrival and departure time periods. Aircraft type information is used for estimating performance and noise characteristics for each flight

while the origin/destination data are used to assign trip distance and aircraft weight on departure. Modeled flight tracks (i.e., the path and direction the aircraft fly) were based on the averaged flight paths as also derived from the 2018 radar dataset. The scaled 2018 dataset represents about 479 average annual daily operations of which about 241 were arrivals and 238 were departures. Runway use was also derived from the 2018 dataset. From this dataset, Runway 19 arrivals represented 42.7% of all Airport arrivals (103.9 on an average annual day). The Proposed Action Alternative for the RNAV (GPS) RWY 19 Offset procedure was designed in the FAA's standard procedure design tool, the Terminal Area Route Generation and Traffic Simulation tool (TARGETS). TARGETS is an FAA developed software tool for airspace procedure development that offers a unique combination of capabilities for RNAV procedure design, flyability assessment, and ATC service provision, and operator evaluation and familiarization of these procedures through simulation.⁶ Output from TARGETS was used to provide a three-dimensional flight track for development of the Proposed Action Alternative for noise modeling in AEDT. This proposed alternative proposes to assign 34.15% of eligible average daily Runway 19 arrivals to the RNAV (GPS) RWY 19 Offset procedure based on estimates provided by the New York TRACON and concurred with by the Teterboro ATCT. The Proposed Action would only affect existing arrivals to Runway 19 – no other change to input data was made. Appendix D provides additional detail pertaining to the No Action modeling in this EA.

4.6.3 Noise Impact Criteria

Changes in noise exposure for each population centroid in the Study Area are evaluated based on FAA requirements to determine the degree of change in noise exposure. Aircraft noise is required, per FAA Order 1050.1F, to be evaluated in terms of the DNL metric. FAA Order 1050.1F further defines that a significant impact would occur if a proposed action would result in an increase of 1.5 dB or more in any noise sensitive area at or above the DNL 65 exposure level when compared to the No Action Alternative for the same timeframe.¹²

For the purpose of this noise analysis, increases of 1.5 dB above the DNL 65 noise exposure level are considered significant. Per FAA Order 1050.1F, increases of 3.0 dB between the DNL 60 and 65 noise exposure level are to receive consideration when evaluating the environmental impacts of a proposed project, and will be identified regardless of whether a significant impact is identified. Increases of 5.0 dB or greater at noise exposure levels between DNL 45 and 60 are to be disclosed. The increase in noise at these levels is enough to be noticeable to some people, but the cumulative noise level is not high enough to constitute a "significant impact." The FAA noise level criteria are used to compare DNL changes at the population locations in the GSA, which is evaluated under the following categories: (1) those receiving an increase in noise exposure relative to the No Action Alternative; (2) those receiving a decrease relative to the No Action Alternative; and (3) those having no change relative to the No Action Alternative. The

⁶<https://www.mitre.org/research/technology-transfer/technology-licensing/terminal-area-route-generation-and-traffic>

⁷ FAA Order 1050.1F, Appendix B, B-1.5,

https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf

reasons for defining the increase, categories and the sources for each are presented in **Table 4.6-1**. Additionally, in accordance with FAA Order 1050.1F, special consideration will be given to the evaluation of the significance of noise impacts on noise sensitive areas within national parks, national wildlife refuges and historic sites, as described in **Sections 4.3** and **4.4**, respectively. For example, the DNL 65 dB noise exposure level does not adequately address the effects of noise on visitors to areas within a national park where other noise is low and a quiet setting is the recognized intention of the area.

TABLE 4.6-1
CRITERIA FOR DETERMINING IMPACT OF CHANGES IN AIRCRAFT NOISE

DNL Noise Exposure with Proposed Action	Minimum Increase in DNL with Proposed Action	Level of Impact
DNL 65 or higher	1.5 dB	Exceeds Threshold of Significance
DNL 60 to 65	3.0 dB	Reportable Noise Increase (Considered When Evaluating Air Traffic Actions)
DNL 45 to 60	5.0 dB	Reportable Noise Increase (Information Disclosed When Evaluating Air Traffic Actions)
Source: FAA Order 1050.1F, Appendix B,B-1.4, p.B-4, Prepared by RoVolus, 2019		

4.6.4 Aircraft Noise Impact Analysis

Based upon the noise methodology described in **Section 4.6.1** and the noise impact criteria described in **Section 4.6.2**, a noise analysis was conducted to evaluate noise exposure levels using the applicable levels of impact for the Proposed Action Alternative as compared to the No Action Alternative.

4.6.5 No Action Alternative

Noise exposure was calculated for the 23,131 population centroids in the GSA with a population greater than zero for the No Action Alternative. **Table 4-6.2** presents the overall population exposed to various noise levels associated with the Airport in 2018. Noise exposure greater than 45 DNL at Census block centroids are depicted in **Figures 3-6** and **3-7**.

TABLE 4-6.2
NO ACTION ALTERNATIVE POPULATION EXPOSED TO AIRCRAFT NOISE ASSOCIATED WITH TETERBORO AIRPORT

DNL Range (dB)	Estimated Population	Percentage of Total
Less than 45	1,646,381	76.35%
45 to less than 50	286,234	13.27%
50 to less than 55	123,780	5.74%
55 to less than 60	70,399	3.26%
60 to less than 65	24,557	1.14%
65 to less than 70	4,732	0.22%
Greater than or equal to 70	414	0.02%
Total	2,156,497	100.0%
Note: Totals may not equal 100% due to rounding.		
Source: U.S. Census 2010 (population centroid data), July 2019.		

4.6.6 Proposed Action Alternative

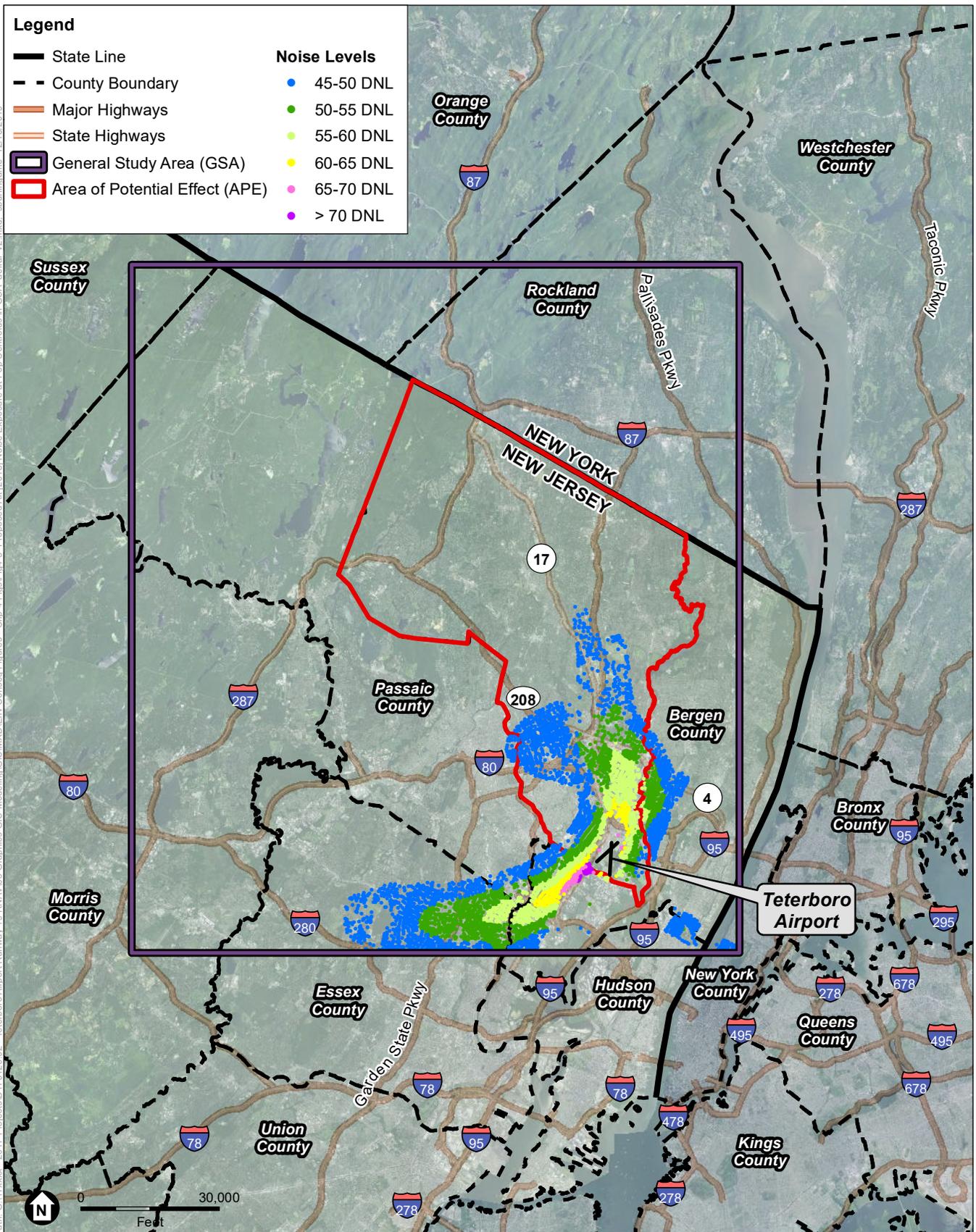
This section presents the noise results for the Proposed Action Alternative. There is no change to the number of aircraft operations or types of operations, nor does overall runway use change. The noise analysis therefore reflects changes in noise exposure only due to the implementation of the RNAV (GPS) RWY 19 Offset approach to Runway 19 (the Proposed Action Alternative), as compared to the No Action Alternative. A comparison of the 2018 No Action and 2018 Proposed Action Alternatives noise exposure for populated centroids indicates there are no significant impacts (increases of 1.5 dB in areas that would be exposed to DNL values of 65 or higher). Even though no significant impacts were identified, the Proposed Action was evaluated for an increase of 3.0 dB in population centroids between DNL 60 and 65 and an increase of 5.0 dB for population centroids between DNL 45 and 60. **Figure 4-5** and **Figure 4-6** depict noise exposure greater than 45 DNL at population centroids due to the implementation of the Proposed Action Alternative.

Table 4.6-3 depicts the population exposed to various levels of noise associated with the Airport under the Proposed Action Alternative. 13% of the GSA population would be exposed to levels between 45 and 55 DNL, and less than 5% would be exposed to noise levels above 55 DNL. The areas of highest noise exposure are located in the areas directly on and adjacent to the Airport.

Table 4-6.4 presents the changes in the population exposed to various levels of noise exposure for the Proposed Action Alternative compared to the No Action Alternative. Although not a criterion for significance based on the use of 2010 Census data, implementation of the Proposed Action Alternative would not result in changes to the number of persons exposed to noise levels of 65 DNL or higher.

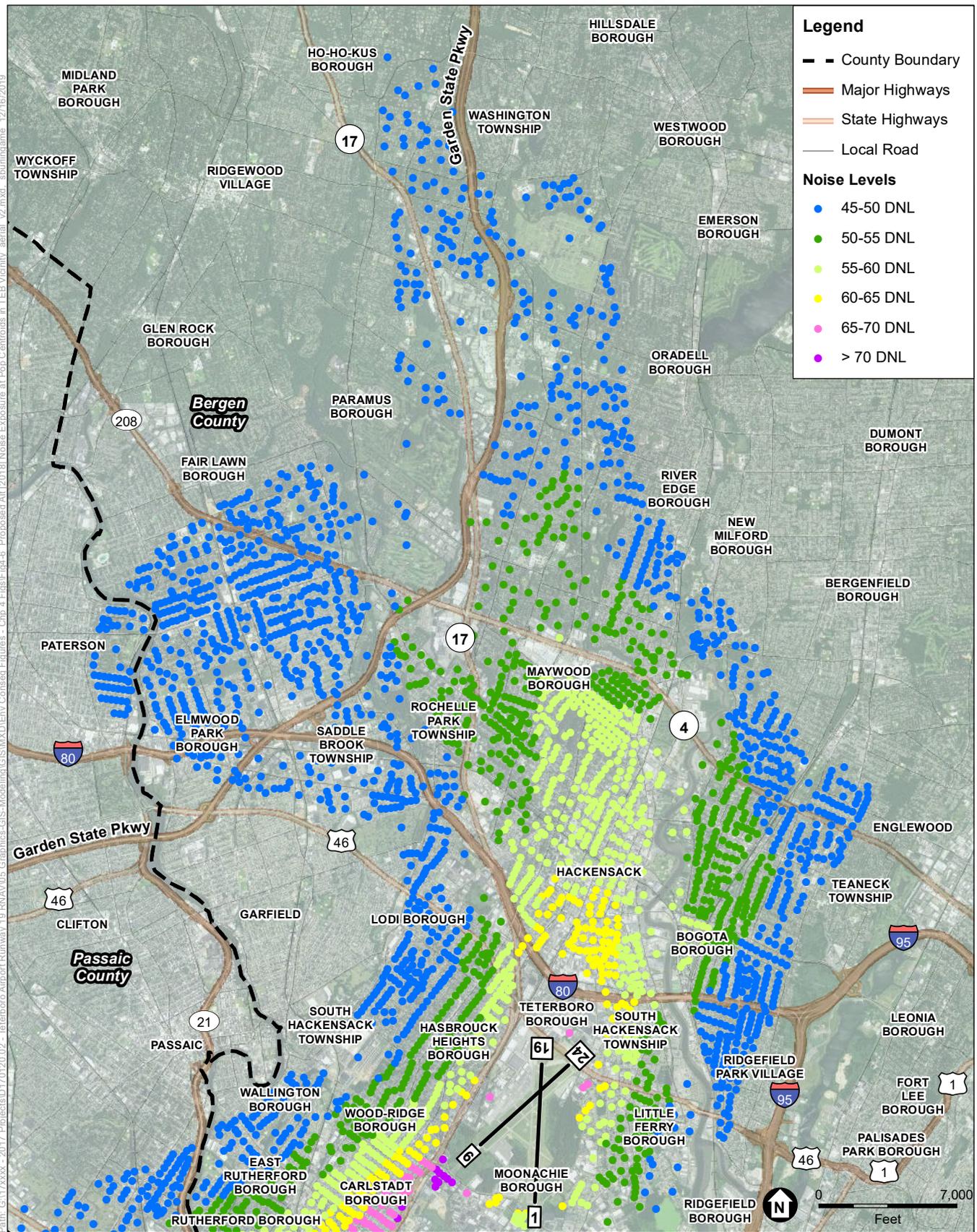
**TABLE 4-6.3
 PROPOSED ACTION ALTERNATIVE POPULATION EXPOSED TO AIRCRAFT NOISE**

DNL Range (dB)	Estimated Exposed Population within GSA	Percentage of Total
Less than 45	1,641,869	76.14%
45 to less than 50	290,784	13.48%
50 to less than 55	122,859	5.70%
55 to less than 60	73,441	3.41%
60 to less than 65	22,398	1.04%
65 to less than 70	4,732	0.22%
Greater than or equal to 70	414	0.02%
Total	2,156,497	100.0%
Note: Totals may not equal 100% due to rounding Source: Population Data Source: U.S. Census 2010 (population centroid data) accessed July 2019		



SOURCE: Esri; NJDEP Bureau of GIS; U.S. Census 2010; RoVolus, 2019; AEDT 2d; Prepared by ESA, 2019
 NOTE: Noise Exposure is shown for populated centroids only.

Figure 4-5
 Proposed Action Alternative Noise Exposure at Population Centroids in the General Study Area Teterboro Airport



SOURCE: Esri; NJDEP Bureau of GIS; U.S. Census 2010; RoVolus, 2019; AEDT 2d; Prepared by ESA, 2019
 NOTE: Noise Exposure is shown for populated centroids only.



Figure 4-6
 Proposed Action Alternative Noise Exposure at Population Centroids in the Airport Environs Teterboro Airport

TABLE 4-6.4
ESTIMATED CHANGE IN POPULATION BY DNL NOISE EXPOSURE LEVELS BETWEEN NO ACTION AND
PROPOSED ACTION ALTERNATIVE

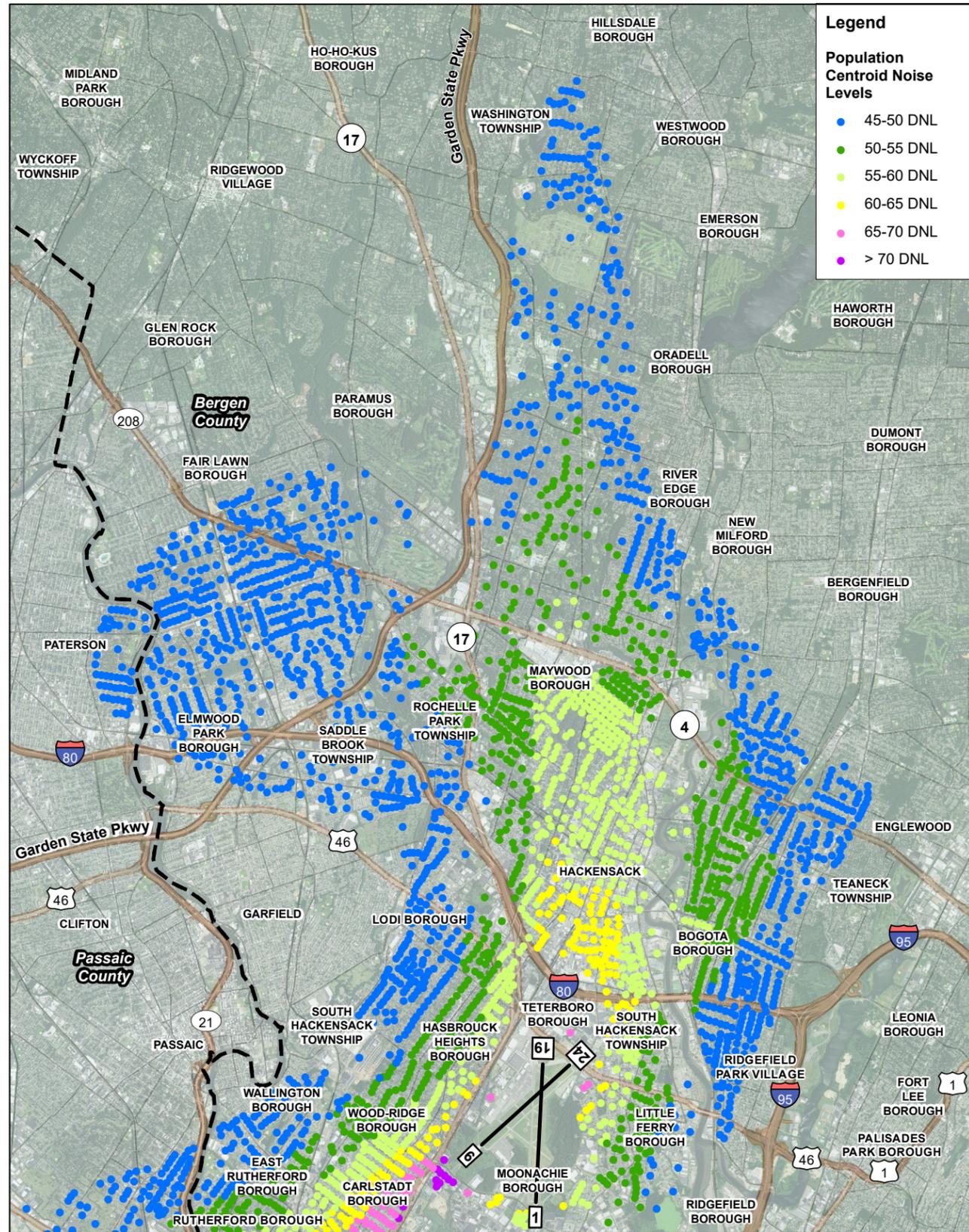
DNL Range (dB)	Estimated Change in Population
Less than 45	Decrease of 4,512
45 to less than 50	Increase of 4,550
50 to less than 55	Decrease of 921
55 to less than 60	Increase of 3,042
60 to less than 65	Decrease of 2,159
65 to less than 70	No change
Greater than or equal to 70	No change
Source: Population Data Source: U.S. Census 2010 (population centroid data) accessed July 2019, Prepared by RoVolus, 2019	

Table 4-6.5 summarizes key results of the noise analysis for 2018 conditions. The results indicate that the Proposed Action Alternative does not include 1.5 dB or higher increases in areas exposed to DNL 65 or higher nor does it include 3.0 dB or higher increases in areas exposed to DNL between 60 and 65 dB. Within these two DNL areas, there are no decreases of 1.5 dB in the DNL 65 dB or higher and 3.0 dB in the DNL 60-65 dB. **Figure 4-7** shows the noise exposure greater than 45 DNL at the population centroids for both the No Action and Proposed Action to allow for the details of each noise exposure to be seen side-by-side. In areas exposed to DNL between 45 dB and 60 dB in the Proposed Action Alternative, 44 population centroids, representing 3,024 persons have a reportable noise increase of 5.0 dB or more over the corresponding population centroids in the No Action Alternative. Within the DNL 45-60 dB, there are no population centroids where a decrease of 5.0 dB or more is seen. The 44 population centroids with an increase of 5.0 dB or greater are displayed in reference to the Airport in **Figure 4-8** and are shown close-up to show the exact areas of reportable impact within each neighborhood in **Figures 4-9** and **4-10**. The grouping of reportable population centroids are centered around the confluence of Ho-Ho-Kus, Paramus, Ridgewood, and Washington Township along State Route 17 with the majority of centroids in Paramus and Ridgewood. Of the increases at these 44 reportable centroids, the average increase in noise is 5.47 dB with a maximum recorded increase of 5.91 dB, and the absolute value of the highest modeled noise value from these 44 population centroids is 46.70 dB.

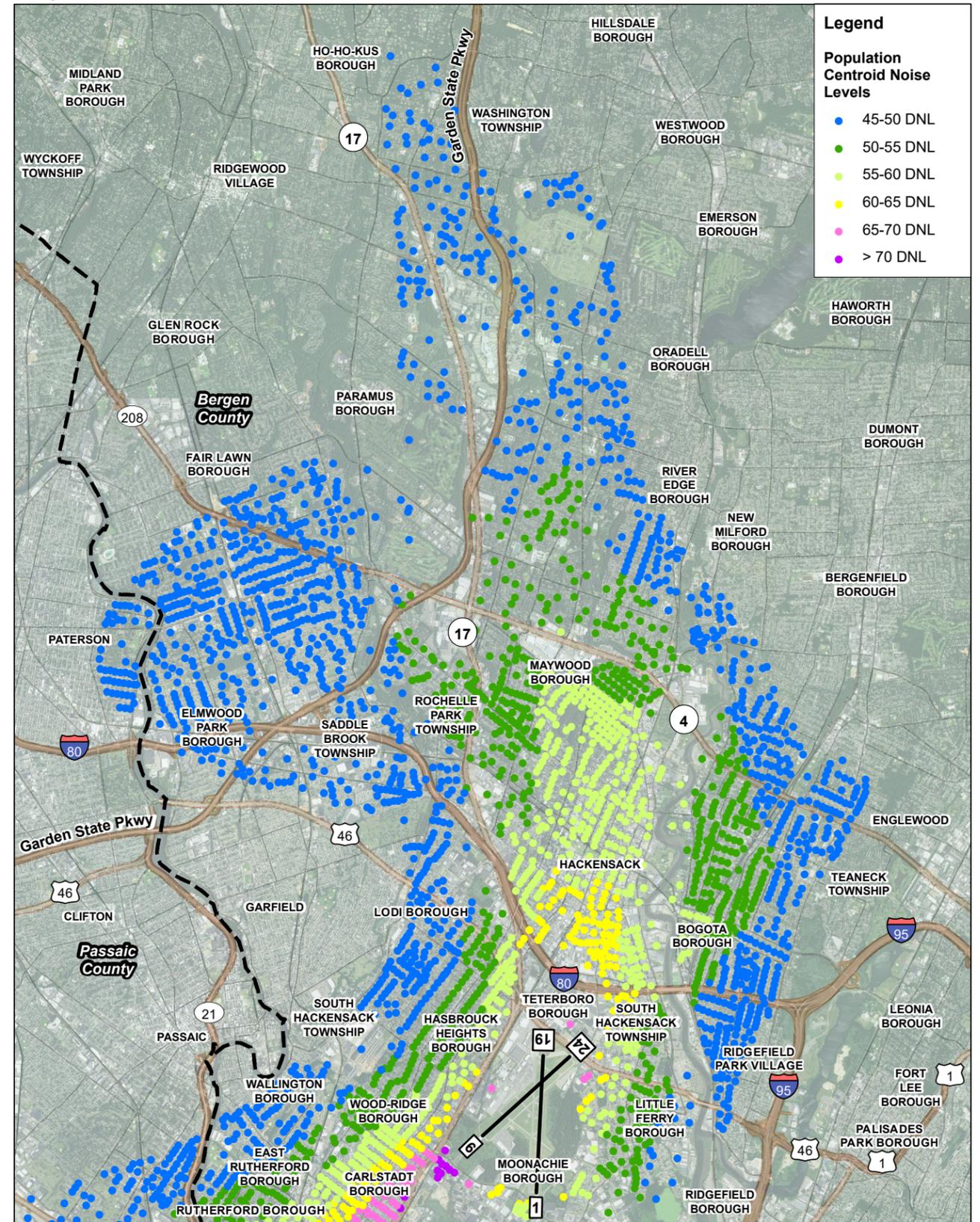
TABLE 4-6.5
CHANGE IN NOISE EXPOSURE BETWEEN NO ACTION AND PROPOSED ACTION ALTERNATIVE

DNL Noise Exposure Levels	Levels of Significant (65 DNL) or Reportable Impacts (60-65 DNL and 45-60 DNL)	Population Exposed to Increases in Levels of Significant or Reportable Impacts	Population Exposed to Decreases in Levels of Significant or Reportable Impacts
65 DNL or higher	1.5 dB	0	0
60 to 65 DNL	3.0 dB	0	0
45 to 60 DNL	5.0 dB	3,024	0
Source: Population Data Source: U.S. Census 2010 (population centroid data) accessed July 2019, Prepared by RoVolus, 2019			

No Action Alternative

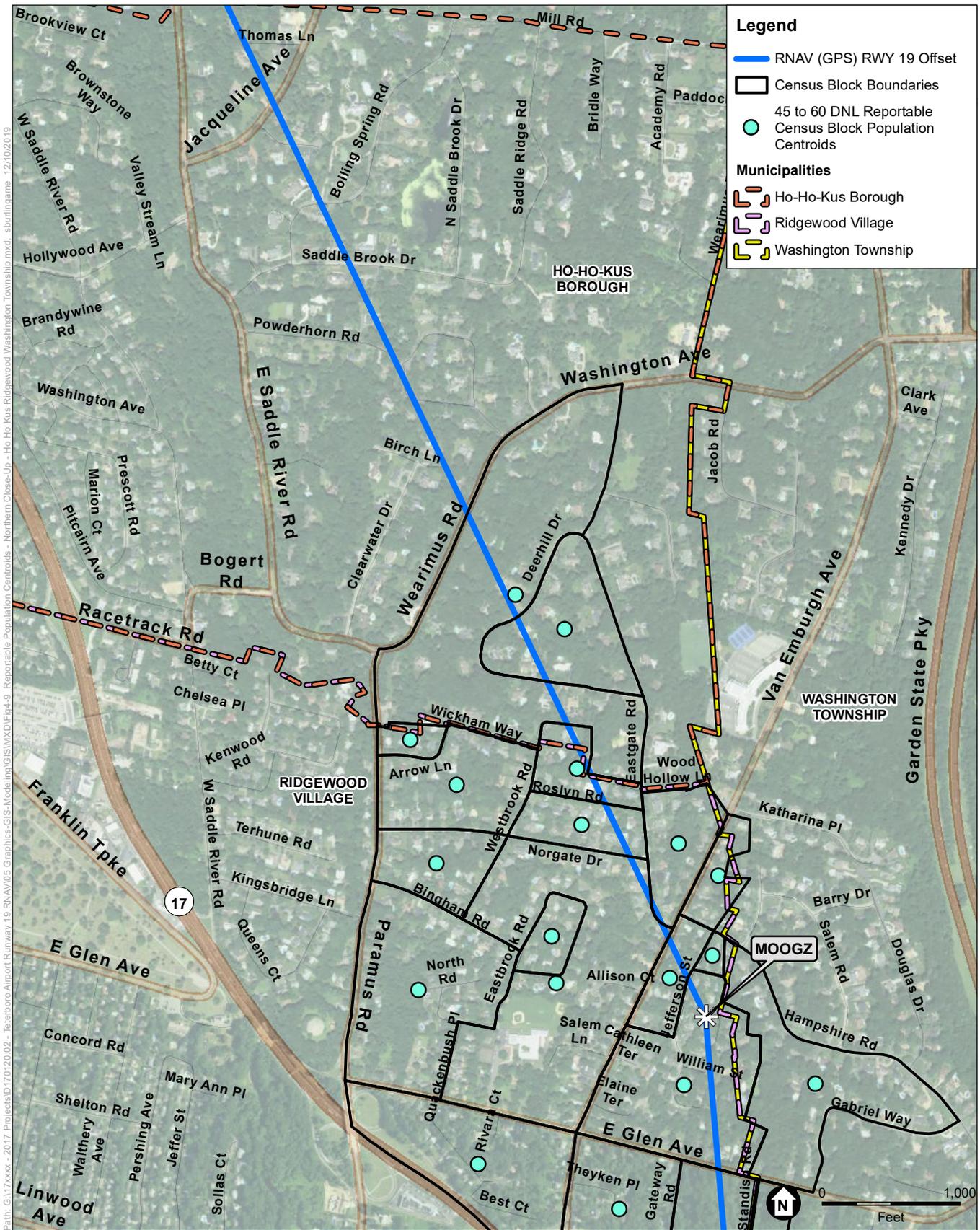


Proposed Action Alternative



SOURCE: Esri; NJDEP Bureau of GIS; U.S. Census 2010; RoVolus, 2019; AEDT 2d; Prepared by ESA, 2019

Figure 4-7
Existing Noise Exposure and Proposed Alternative Noise Exposure at Population Centroids in the Airport Environs
Teterboro Airport



SOURCE: Esri; NJDEP Bureau of GIS; U.S. Census 2010; RoVolus, 2019; AEDT 2d; Prepared by ESA, 2019

Figure 4-9
Reportable Population Centroids in the
Ho-Ho-Kus, Ridgewood, and Washington Township Area
Teterboro Airport

4.7 Socioeconomics, Environmental Justice, and Children’s Environmental Health – Environmental Justice Only

This section is limited to a discussion of EJ as it pertains to the environmental consequences of aircraft noise impacts in the GSA. As outlined in **Section 3.4.7**, an EJ analysis considers the potential of the Proposed Action Alternative to cause disproportionate and adverse effects on low-income or minority populations. In the event that adverse effects are determined, applicable mitigation ensures that no minority or low-income populations bear a disproportionate burden of those effects.

The Proposed Action Alternative will not involve any construction of physical facilities or change in noise exposure levels in excess of the applicable thresholds of significance. There would be no acquisition of real estate, no relocation of residents or community businesses, no disruption to local traffic patterns, no loss in community tax base, and no changes to the fabric of the community. Under the Proposed Action Alternative, there are no census block groups of low-income concern that would exceed any applicable thresholds of significance for noise impact. Accordingly, there would be no socioeconomic impacts.

Under the Proposed Action Alternative, 17 population centroids in a single minority population census block group will experience reportable noise increases in the DNL 45 to 60 range. However, the overall percentage of affected minority population at 43.7% is less than the 44.4% overall percentage of average minority population residing in the GSA.

As such, no persons of low income or minority populations would be affected at a disproportionately higher level than would other population segments. Accordingly, under the Proposed Action Alternative there would be no significant EJ impacts.

4.8 Cumulative Impacts

The anticipated projects at the airports in the GSA were identified in the Affected Environment Cumulative Impacts section.

Cumulative effects analysis should ‘count what counts’, not produce superficial analysis of a long laundry list of issues that have little relevance to the effects of the proposed action or the eventual decisions.

Do other activities (whether governmental or private) in the region have environmental effects similar to those of the proposed action?¹³

¹³ Considering Cumulative Effects Under the National Environmental Policy Act, Council on Environmental Quality, p. 12 and p. 13, <https://ceq.doe.gov/docs/ceq-publications/ccnepa/sec1.pdf>

The evaluation of this array of past, present, and reasonably foreseeable projects, was based on 40 CFR 1508.25 (a) (3), which instructs that the analysis consider:

Similar actions, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.

In following this guidance, and based on the lack of environmental consequences from the Proposed Action Alternative other than reportable noise impacts, this analysis focuses on projects from the list of projects compiled within Section 3.4.8 and listed fully in **Appendix H** that could cumulatively affect noise and/or the impact on noise sensitive resources (i.e. compatible land use, Section 4(f), and Section 106).

Aviation projects are most likely to affect the noise environment. In the research of potential projects at airports within the GSA, most of these projects consisted of Temporary Flight Restrictions (TFRs) related to Air Force One activity and since changes due to a TFR are temporary and unquantified, they cannot be considered as part of a cumulative impacts analysis. Morristown Airport's (MMU) list of ongoing airfield improvements projects does include a rehabilitation project of Runway 5-23, which does include some nighttime runway shutdowns. However, the arrival and departure procedures at MMU are not proximate to the areas experiencing noise increases from the Proposed Action Alternative, so any changes to those operations will not add cumulatively to any potential impacts from the Proposed Action Alternative.

The Airport is currently preparing a 14 CFR Part 150 Study. This is a voluntary Study that seeks to identify operational controls or physical improvements that could decrease the exposure of the public to aircraft noise. As part of this Study, the Airport has already prepared a set of Noise Exposure Maps (NEMs) that show the existing and forecasted noise conditions for 2016 and 2021 respectively. The Port Authority has submitted to the FAA for review a Noise Compatibility Program (NCP) that will examine potential measures to minimize the noise impact of the Airport on the surrounding environment. A range of noise mitigation strategies can be implemented at the Airport including possible operational measures.¹⁴ Noise mitigation strategies from a NCP should be considered as part of the cumulative impacts but at the time of this document, a NCP has not been formally proposed or released publicly for consideration as part of this analysis.

The FAA is also considering the amendment of two existing procedures at the Airport, the ILS or LOC RWY 19 and RNAV (GPS) Y RWY 19. In addition to these amendments, they are considering the addition of a new procedure at the Airport, the RNAV (GPS) RWY 24. For the proposed amendments, each existing procedure is located to the east of the Proposed Action and does not currently intersect with the Proposed Action except at the runway. The proposed amendments for the ILS or LOC RWY 19 and the RNAV (GPS) Y RWY 19 are identical to each other. The change to each procedure consists of adding a

¹⁴Teterboro Airport FAQs, http://www.panynjpart150.com/TEB_questions.asp

transition leg that extends to the northwest along the New Jersey and New York border. It should be noted that the initial and final fix waypoints of the RNAV (GPS) Y RWY 19 are being slightly amended but pursuant to early planning efforts, the amended waypoints will not affect the path of aircraft flying the procedure. The transition leg is made up of three waypoints: STRAD, SKUBY, and NIPIE before joining the existing procedures at UNVIL. The proposed transition does not intersect with the Proposed Action Alternative but does pass within 1,200 feet at waypoint EMPTY at the beginning of the procedure 15.95 miles from the Airport. Given that there is no direct overlap between the Proposed Action Alternative and the proposed amendments and are only close together over 15 miles from the Airport, there are no anticipated cumulative impacts from the proposed amendments.

The RNAV (GPS) RWY 24 proposed procedure is a new procedure that if approved by the FAA would follow the same transition waypoints listed above (STRAD, SKUBY, NIPIE) before shifting much further east towards the Hudson River and coming around for a final approach into Runway 24 at the Airport. The Runway 24 procedure is not expected to have cumulative impacts along STRAD, SKUBY, and NIPIE for the same reason as the proposed amendments above, and after passing by NIPIE, the proposed flight path of the RNAV (GPS) RWY 24 does not approach the Proposed Action Alternative until approaching the runway ends on the Airport property. As the new Runway 24 procedure approaches the Airport, the proposed tracks overlay the existing arrival tracks exactly on the final approach so these tracks will not have any greater impact than the existing impact. Early planning efforts indicate that some of the traffic for the Runway 24 proposed procedure currently arrives at the Airport on the Runway 19 ILS or LOC before circling to land on Runway 24. The Runway 24 proposed procedure will then shift this traffic farther away from the Proposed Action Alternative which should actually reduce the impact in the area directly under the path of the Proposed Action. For these reasons, there are no anticipated cumulative impacts from the new RNAV (GPS) RWY 24 proposed procedure into the Airport.

To assess the possibility of cumulative impacts from roadway projects, the New Jersey Department of Transportation's *Electronic Statewide Transportation Improvement Program* database was consulted and in the 2018-2027 Transportation Improvement Program there are no projects slated for Highway 17 in the environs of the areas experiencing noise increases from the Proposed Action. Thus, there are no anticipated cumulative impacts from foreseeable major roadway and highway projects.

Given the areas of reportable noise in Ho-Ho-Kus, Paramus, Ridgewood, and Washington Township, the master plans and planning documents from these four municipalities were consulted to look for any projects or plans that would need to be examined for potential cumulative impacts. The Washington Township Master Plan and the Paramus Master Plan were investigated as they listed multiple potential sites to be acquired for recreation, which if acquired could have become equivalent to a Section 4(f) property in the areas of reportable noise. However, all of these potential sites were found to be outside the areas of reportable noise. The Master Plans all mentioned various historical sites and all sites were crosschecked with the existing directory of historic

properties; in each case, the property was either already listed on the directory of historic sites or was found to be outside the areas of reportable noise.

The Bergen County Bus Rapid Transit (BRT) Study, The Central Bergen Bicycle & Pedestrian Plans and the Bergen County Parks Draft Master Plan were all reviewed for any possible project that would need to be examined for potential cumulative impacts. The proposed BRT route does pass nearby the Proposed Action and uses State Route 17 for about two miles through Paramus but the stretch of State Route 17 is one-mile south of the areas of reportable noise.

Another aspect of this evaluation of cumulative impacts is considering whether there could be a significant environmental impact when the Proposed Action Alternative is considered with other past, present, and reasonably foreseeable projects. The Proposed Action Alternative does not create any reportable decreases in noise exposure, however, it does result in fewer residents living inside the DNL 60 and no change in residents in the DNL 65 or 70. This indicates that the Proposed Action does not adversely affect noise impacts on incompatible land uses. For the populations exposed to noise levels below DNL 60, this is considerably below the DNL 65, which is the significant noise threshold for noise and noise compatible land use according to FAA Order 1050.1F.¹⁵ No projects were identified that could conceivably contribute to the noise levels below DNL 60 plus cumulative impacts and create a significant noise impact .

As a result, it can be concluded that the Proposed Action Alternative will not create a cumulative impact that will reach the significant threshold when environmental consequences are considered cumulatively with the consequences of past, present, and reasonably foreseeable projects.

¹⁵ Order 1050.1F, Exhibit 4-1, Page 4-8.
https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf